

KAUA`I INVASIVE SPECIES COMMITTEE (KISC)

Addendum to 2003 Action Plan FY2003 (Result of October 22, 2002 KISC Strategic Planning Meeting)

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Strategic Planning Meeting Summary (October 22, 2002)

A review of KISC's original Priority List from KISC's 2003 Action Plan was presented to those who attended the Strategic Planning Meeting. A summary of each species follows:

1. **Miconia**: In homesteads and Wailua River State Park (WRSP). We are about halfway through homestead private property searches. Have found around 18 (one flowering). We are just about done with second sweep search of park. We have been advised to extend the one mile buffer to two mile buffer from last known plant. Meghan suggested keeping a one mile buffer to be extensively searched and then doing recon. for the two mile buffer area. Are surveys done in GMA? Yes, whenever DoFaW has money a helicopter survey is done. It has been about a year since the last helicopter survey. Is it a useful way to survey? Will not see the plants easily from the air. The *Albezia* gets in the way and unless the *Miconia* are flowering, they are difficult to spot. In WRSP Bryon suggests that we go back to areas of known infestations rather than do full sweeps. Leland suggests putting up posters along roadways and trails. Recommend: keeping *Miconia* as number one priority.
2. **Thorny Kiawe**: KISC has mapped over 46 miles of coastal areas: the core infestation, satellite populations, and hybrids. What is the attitude of landowners? Do they want to contribute equipment etc.? Need to develop partnerships with the landowners. Have we surveyed inland where other Kiawe is growing? No, we have mostly monitored coastal area, because of the suggested habitat of 200m from shore. We sampled the outside to where it most likely would be found if it existed inland. Adam Asquith suggests we leave it high on the priority list, as funds are available to support our efforts through Fish and Wildlife. Are mechanical means of removal feasible? We haven't actively pursued this at the base. If spike would prevent germination of native plants, since much of the infestation site is now deemed part of the critical habitat, this might not prove to be a good method for removal. Guy suggested that spike would not prevent germination due to the porous nature of the ground. Another method suggested was to bulldoze paths through the Kiawe to more accurately disperse spike. Thorny Kiawe is not only found on Kaua'i, Oahu, and Niihau, but also rumored to be on Molokai with the status unknown on other islands.
3. **Fireweed (*Senecio madagascariensis*)**: Found only at Halfway Bridge. We started out by finding out 1000 plants /mo. We are now down to about 25 plants /mo. Total infestation area is about 10 to 15 acres. Window of opportunity for control is very small now. It spreads rapidly. Recommended that we go after it with intense effort. Suggestions included enlisting the help of the cattlemen industry and 4H. Lelan recommends another sign in that area. Possible government interactions with cost-share programs are available.
4. **Fountain Grass**: KISC has yet to move on this. Population is found mainly on A&B land with small satellite populations on Robinson land. When it was pointed out that this population seems to be spreading slowly, Mark White contributed that it spread slowly on the Big Island then the population exploded and is now out of hand. Guy's theory is that since it thrives in dry land it is not very happy where it is now because of the high rainfall in this area. If it moves to the west, to the drier side of the island, it will explode. If we do nothing the whole west side, including the canyon and the Na Pali, will be covered with Fountain grass. Is it grazed by goats? No. This weed is a great fire hazard.

5. **Pampas Grass**: Only one known population. So far, untreated. Can it spread in the wild? Yes, it has spread on West Maui and the Big Island and is found in both wet and dry areas. Suggested action: put through Weed Risk Assessment.
6. **Ivy gourd**: Currently treating. We have discovered people are harvesting this plant for culinary purposes. We are trying to contact property owners to get the names and phone numbers of the harvesters to educate them. We have purposely left a small population for these people so as not to risk them planting it elsewhere. We can monitor this population more easily. KISC has treated all outlying populations. Because the population is limited we do have the opportunity to eliminate it. This is a major pest on other islands. Education is primary. Perhaps showing the harvesters pictures of what it can do will discourage their use of it.
7. **False Kava**: There is one known population at Kahili Mountain School. We have treated it but must continue to monitor it. We need to do a wider transect of area to confirm containment.
8. **Cattail**: We are still mapping populations. Have treated one 1-½ acre population at Mahaulepu. Niumalu has a large population that is denser but confined to about an acre. This weed can move quickly to fill wetlands. It forms a dense **rhizomeryzome** mat. Adam Asquith said that within a year, a small population in Niumalu grew to a much larger, denser and more spread out population. We need to work on educating the public. John Plews suggested that it could be confused with native rushes. Guy suggested that it is sometimes good to get false calls to go talk story with the general public. F&W have focused funds toward eradication and there may be more.
9. **Frogs**: *Planirostris* has established populations (Hyatt and Sheraton in Poipu and possibly in Wailua Homesteads). Coqui no established populations. *Planirostris* is not too far-gone for eradication. We will be receiving help from USDA on eradication on Kaua'i. ~~\$250K~~**\$250 mil** for this year is dedicated for frog control through USDA/Wildlife Services. Two Coqui have been recently caught in Lawai and one in Puhi.
10. **Little Red Fire Ant**: We have been monitoring two sites on the North Shore. Results showed negative. KISC will monitor every six months. There have been no new sightings.
11. **Pyracantha**: Katie's group (KRCP) has eliminated all known populations in Kokee. It is in a monitoring phase now.

ADDITION OF TARGET SPECIES

ACTION LIST:

1. **Giant reed (*Arundo donax*)**: Giant reed is a large, cane-like grass native to India. It is a major weed in the southern United States where it crowds out native plants, restricts beach access, and clogs rivers and flood control drainages. It is spread by rhizome, not seeds and has been used as a landscaping plant. It has a wide range of habitat and can live in wet or dry environments. The variegated variety is used in haku leis.

Objective: On Kaua'i, eight populations have already been mapped. KISC will continue to survey and map populations and work to secure landowner permission to remove this plant from ornamental situations.

Methods: Chemical treatment of *Arundo* with Velpar, Roundup Pro and Aquamaster herbicide or mechanical removal will be employed. Control methods will continue to be modified as field trials are conducted by the KISC crew.

MONITOR/ MAP/ TRIALS:

1. **Hiptage (*Hiptage benghalensis*)**: This climbing liana smothers and kills vegetation on which it grows and forms dense thickets. The Division of Forestry and Wildlife of the Hawaii Department of Land and Natural Resources has designated Hiptage as one of Hawaii's Most Invasive Horticultural Plants. Its winged fruits (samaras) are wind dispersed. Hiptage threatens dry and moist areas from sea level to the 3500 ft. elevation. Hiptage, a member of the Malpighiaceae family, is native to India and Malaysia and was introduced to Hawaii as an ornamental plant. Its current known distribution on Kaua'i is on the edge of Huleia valley. Although the acreage is unknown, it is estimated to be at least 500 acres.

Objective: Map, begin trials for control and monitor results.

Methods: Involve land owners/leasers in identifying and mapping infestation. Possibly use aerial surveying due to the ease of spotting it from the air. Oahu Invasive Species Committee (OISC) has begun control efforts using Garlon on cut stumps. Conduct trials for control methods and possibly treat outlying populations.

2. **Kahili ginger (*Hedychium gardnerianum*)**: This species of ginger has leafy shoots 1-2 meters tall and can spread both by rhizome and bird-dispersed seeds. It is native to the Himalayas and adjacent regions and can be found in dense populations in Koke'e.

Objective: Map, formulate a strategic plan and treat to control satellite populations to help protect the integrity of the Alakai Wilderness Preserve.

Methods: In partnership with Kokee Resource Conservation Program, the Watershed Alliance and the Division of Forestry and Wildlife, conduct aerial and ground surveys to map the extent of the infestation. Using GIS mapping and GPS technology, create up-to-date records that will aid in the creation of an action plan outlining defensible infestation lines with control schedules and methods.

3. **Fiddlewood (*Citharexylum spinosum* or *caudatum*)**: This large shrub or small tree is of a genus of over 70 species from Bermuda, the West Indies, and southern United States through Mexico to South America. A number of species are commonly cultivated as ornamentals and can be found lining streets of Lahina, Maui. Seeds are easily bird-dispersed.

Objective: Identify the species. *C. spinosum* has already been put through the Hawaii Weed Risk Assessment and evaluated as a Major Pest. KISC should map the infestation on Kaua'i and present the finding for possibly adding it as an Action Item.

Methods: Using GIS and GPS ascertain the area of infestation of Fiddlewood. It is believed to only be in the Anahola area, but there are unconfirmed reports of it also being in Wailua Homestead.

4. **Mangrove (*Rhizophora mangle*)**: This alien tree has a rounded crown, a dense branching system, and aerial or stilt roots. The unusual fruits of the mangrove germinate while they are still attached to the parent plant. Eventually each germinated fruit, up to a foot in length, drops into the surrounding mud or surf. Mangrove forests form dense groves and because their aerial roots trap sediments, they are presently choking the traditional Hawaiian fishponds and destroying habitat for endangered Hawaiian stilts in wetland areas.
Objective: Map extent of infestation and look for partnerships for possible control. Investigate control methods.
Methods: Using GIS and GPS ascertain the area of infestation of Mangrove. Contact land owners/leasers and possibly DLNR and other agencies wanting to protect the Fishponds.

EDUCATION AND FURTHER STUDY:

1. **Kudzu (*Pueraria lobata*)**: Possible populations in Hanalei as well as in Kokee. It was probably introduced to Hawaii by the Chinese and was cultivated originally for the edible root tubers.
2. **Kokee Weed Project**: When the State Park cabin leases expire (approximately 100 of them) in 2004, 2005, this would be an ideal time to eradicate potential invasives on these properties. KISC will offer to assist State Parks in taking inventory and surveying weeds around the cabins. KISC can also concentrate the next few years on gaining funds for the project of invasive weed eradication around State Park cabins.
3. **Hapu'u Tree Fern shipping process**: This is a Prevention Project. We could establish some kind of monitoring of incoming logs and certifying them free of invasives. It was estimated that 1000/year come into this island. Both the private sector and nurseries bring in logs. KISC needs to find out what other islands are doing for preventative measures.
4. **Jackson chameleon (*Chamaeleo jacksonii*)**: Find out the extent of concern regarding this pest.
5. **Brown anole (*Anolis sagrei*)**: Seems to already be established here. It occurs in high density. Find out the extent of concern regarding this pest.
6. **Day geckos (*Phelsuma standingi*)**: Find out the extent of concern regarding this pest.
7. **Grey cheeked parakeet (*Brotogeris pyrrhopterus*)**: There have been reports of 4 individuals. Follow up on whether anything has been done with these reports. Involve the Farm Bureau.
8. **Ringed neck parakeet (*Psittacula krameri*) and Bulbuls (*Pycnonotus cafer* and *P. jocosus*)**: Seed companies have contracted Wildlife Services to eradicate. These birds will go after any seed or fruit producing plant.
9. **Clerodendron (*Clerodendrum quadriloculare*)**: Species has been identified from a sample brought to Tim Flynn. This species has already been evaluated by the Hawaii Weed Risk Assessment and determined to be a pest. KISC should educate nurseries as to the hazards of selling this particular species.
10. **Australian Tree Fern (*Cyathea cooperi*)**: This species is a major threat in the back of Lumahai Valley. KRCP is treating in Kokee State Park. Many nurseries are still selling this plant. Needs more study and discussion.

KAUA`I INVASIVE SPECIES COMMITTEE (KISC)

Addendum to 2003 Action Plan FY2004

(Result of November 19, 2003
KISC Strategic Planning Meeting)

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Strategic Planning Meeting Summary (November 19, 2003)

A review of KISC's Priority List of KISC's FY2003 Action Plan Addendum was presented to those who attended the Strategic Planning Meeting. A table showing the species populations and acreage was presented (Table 1) as well as a table showing person hours spent per species (Table 2). A summary of each species follows.

Only one species (cactus) was suggested as an additional target species, but was agreed by committee that HDOA would follow up on this.

Under the category of 'Monitor/Map/Trials' Hiptage was moved up to a higher priority for surveying. It was agreed that KISC should prioritize this to determine a base line for invasiveness. It was also agreed that Kahili ginger and Mangrove remain as survey items. Kudzu will be upgraded to a survey item from the 'Education and Further Study' category.

Now that Fiddlewood has been surveyed it was agreed that we pursue this species from an educational perspective. Getting homeowners and landscapers involved with this will be key to its elimination.

All other 'Education and Further Study' species will remain on the list.

1. Table 1 – Target Species (Plants only)

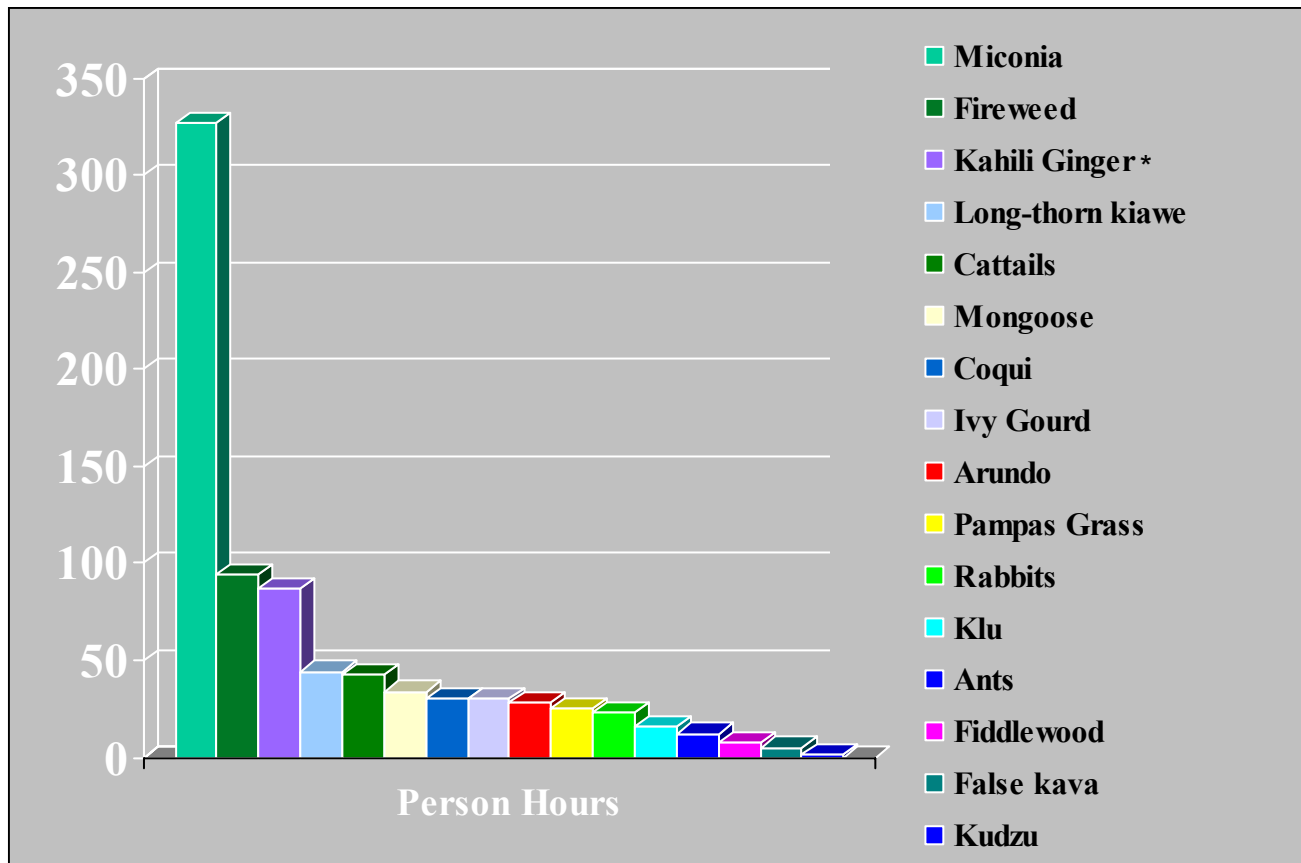
Species	Original Estimate		Treated [†]		Actual Known to Date	
	Populations	Acres	Populations	Acres	Populations	Acres
Miconia	2	755*	2	2386*	3	1170*
Long thorn Kiawe	8	500	7	31	8	500
Fireweed	1	2	1	58	2	2.1
Fountain Grass	2	30	0	0	2	30
Pampas Grass	2	0.167	2	79.3	3	?
Ivy Gourd	7	3.76	7	16.6	8	4.32
False kava	1	0.001	1	4.9	1	0.5
Cattails	5	2.5	9	194	12	7.53
Arundo	5	0.61	8	3.61	10	4.64

* Includes Buffer

† Includes re-treatments

As shown, by the table above, additional populations of almost all target plants were found.

2. Table 2 - Person-hours per species



*The addition of Kahili ginger, as a survey item, shows a temporary spike in time spent on this species. A partnership to survey the extent of Kahili ginger in the Alakai has been formed involving Kokee Resource Conservation Program, DOFAW, the Watershed Alliance and KISC. Once this survey is complete, involvement for ground work on control efforts will be limited by KISC.

Target Species Summary

1. **Miconia**: Currently, this is our number one target species. DOFAW would like KISC to take the lead on the new outliers found in the Wailua Game Management Area during an aerial survey. DOFAW will assist when able. Searches continue in Wailua River State Park with seedlings continuing to be found. We do have about a 1.5 year buffer in searches considering the rate of growth before flowering. KISC will attempt a 500m ground search buffer and a 1000m aerial search buffer from any known flowering plant. We will now prioritize what areas we will ground search depending on terrain and canopy coverage. The biggest outlying tree was about 6 inches dbh (diameter at breast height). Following seed contamination protocol and using dedicated footwear and equipment will continue to be mandatory. **Action: Keep on list as number one target.**
2. **LT Kiawe**: At Mahaulepu we are just checking for seedlings now. At Kekiola harbor and Mana Drag Strip Craig Kaneshige (HDOA) has been using different rates of Garlon or Remedy in a foliar spray. This method, however, is seeing re-growth after 3 mos. He is now trying the mist blower with herbicide/crop oil mixture. There has been no re-growth with a cut/stump method but the Mana population is too thick to get to the center to cut. PMRF Base trials seem to reveal

spike to be the most effective method and frilling with Garlon to be a close second. **Action: Keep on list and continue partnership work with HDOA. Graded as number 3 priority.**

3. **Fireweed:** Although another population of Fireweed has been discovered, its control is effectively being handled due to its moist location and rapid germination on the North Shore. Current monitoring of the site at Halfway Bridge continues to show a decrease in population density. Continued monitoring at each site will be mandatory. Concern as to the method of introduction (hydro-mulching) should be brought to a CGAPS or HISC level. **Action: Keep on list and continue partnership work with HDOA. Graded as number 4 priority (w/Cattails).**
4. **Fountain Grass:** We have only aerial surveyed; no ground-truthing or treatment has been done to date. Aerial surveys have been about two years apart. This population has spread very little. HDOA is working on obtaining access from property owners to conduct ground survey. This is a species that we could get additional funding for. KISC should pursue this as an active program. It should be a win/win situation with the landowners. **Action: Keep on list and continue partnership work with HDOA. Upgrade to Number 2 priority.**
5. **Pampas Grass:** The two known populations have been treated and are under control. KISC is still monitoring. One individual in Princeville still needs to be addressed. This species should be addressed on a state-wide level if other islands are using it as a landscaping plant. **Action: Keep on list. Downgrade priority.**
6. **Ivy Gourd:** Current technique of cut/stump working well. We haven't prioritized this species as much as other targets but we plan on targeting it more with the addition of new employees. It does not appear as though this population is being harvested any longer by restaurants. Monitoring of treated areas will be essential for spotting re-growth from seed bank. **Action: Keep on list.**
7. **False Kava:** This species' known location has been surveyed to a 500 meter perimeter. More plants were discovered in this survey and have been treated twice. Although it is not known to produce seed, the distribution of plants at this site may indicate otherwise. This species may be sold in nurseries as "Mock Kava". KISC should concentrate on the education aspect of this species. **Action: Keep on list. Downgrade priority.**
8. **Cattails:** Seeds spread by wind and possibly birds. This weed is relatively easy to kill with a solution of Aquamaster. It does seem to be widespread in its distribution. The large Waimea Valley (Makaweli side) population is one of concern as it is in the taro lo'is and appears to cover approximately four acres. There will be participation from other groups on this project; landowners, HDOA, DOFAW. After the removal effort in Waimea Valley, KISC should scale back efforts with cattail. Keep up the educational aspects (ex. KISC should do a display at the Hanalei Taro Festival). **Action: Keep on list and continue partnership work with HDOA. Graded as number 4 priority with Fireweed.**
9. **Arundo:** Although this species is hard to kill the technique of cutting and then spraying when young seems to be effective. This species seems to be moving around in fill dirt and has been used as a landscaping plant. **Group: Keep on list. Downgrade Priority.**
10. **Frogs: Coqui frog:** USDA contained the biggest population in Lawai although there is still a small and spreading population including new hatchlings. Other reports are still coming in (one at Marriot). Information still needs to be shared from

USDA on their control efforts on Kaua`i. KISC should hold the line with follow-up for USDA's efforts until USDA gets funding for next year (FY05). **Action: Keep on list and continue partnership work with HDOA.**

Greenhouse frog: USDA's efforts on the South Shore have not reduced this species very significantly. They also seem to be wide spread across the island. As these frogs are extremely hard to detect, it was agreed that KISC should focus its energy on known threats and ones that we have a chance of controlling. The ecological impact from this species of frogs is also an unknown, unlike its vocal cousin, the coqui frog. **Action: Remove from list and focus on Coqui.**

11. **Ants:** An annual survey of a known historic site revealed a resurgence of this population of *Wasmannia auropunctata* commonly known as Little Fire Ant. Further survey by HDOA has determined that this infestation has grown from the last one and crosses several properties. Treatment will ensue on known population in partnership with HDOA. Continued monitoring will be needed. **Action: Keep on list and continue partnership work with HDOA.**
12. **Firethorn:** KRCP continues work on this. Almost all plants have been eradicated except known individuals around a cabin. **Action: Remove from list.**

Monitor/ Map/ Trials

1. **Hiptage (*Hiptage benghalensis*):** This climbing liana smothers and kills vegetation on which it grows and forms dense thickets. The Division of Forestry and Wildlife of the Hawaii Department of Land and Natural Resources has designated Hiptage as one of Hawaii's Most Invasive Horticultural Plants. Its winged fruits (samaras) are wind dispersed. Hiptage threatens dry and moist areas from sea level to the 3500 ft. elevation. Hiptage, a member of the Malpighiaceae family, is native to India and Malaysia and was introduced to Hawaii as an ornamental plant. Its current known distribution on Kaua`i is on the edge of Huleia valley. Although the acreage is unknown, it is estimated to be at least 500 acres.
Objective: Map, begin trials for control and monitor results.
Methods: Involve land owners/leasers in identifying and mapping infestation. Possibly use aerial surveying due to the ease of spotting it from the air. Conduct trials for control methods and possibly treat outlying populations.
2. **Kahili ginger (*Hedychium gardnerianum*):** This species of ginger has leafy shoots 1-2 meters tall and can spread both by rhizome and bird-dispersed seeds. It is native to the Himalayas and adjacent regions and can be found in dense populations in Koke'e.
Objective: Map, formulate a strategic plan and treat to control satellite populations to help protect the integrity of the Alakai Wilderness Preserve.
Methods: In partnership with Kokee Resource Conservation Program, the Watershed Alliance and the Division of Forestry and Wildlife, conduct aerial and ground surveys to map the extent of the infestation. Using GIS mapping and GPS technology, create up-to-date records that will aid in the creation of an action plan outlining defensible infestation lines with control schedules and methods.
3. **Kudzu (*Pueraria lobata*):** Possible populations in Hanalei as well as in Kokee. It was probably introduced to Hawaii by the Chinese and was cultivated originally for the edible root tubers. It has also been introduced as livestock forage.
Objective: Map extent of infestation. Investigate control methods.
Methods: Using GIS and GPS ascertain the area of infestation of Kudzu.

- 4. Mangrove (*Rhizophora mangle*):** This alien tree has a rounded crown, a dense branching system, and aerial or stilt roots. The unusual fruits of the mangrove germinate while they are still attached to the parent plant. Eventually each germinated fruit, up to a foot in length, drops into the surrounding mud or surf. Mangrove forests form dense groves and because their aerial roots trap sediments, they are presently choking the traditional Hawaiian fishponds and destroying habitat for endangered Hawaiian stilts in wetland areas.
Objective: Map extent of infestation and look for partnerships for possible control. Investigate control methods.
Methods: Using GIS and GPS ascertain the area of infestation of Mangrove. Contact land owners/leasers and possibly DLNR and other agencies wanting to protect the Fishponds.

Education and Further Study

- 1. Kokee Weed Project:** When the State Park cabin leases expire (approximately 100 of them) in 2004, 2005, State Parks will be re-writing the leases and may include stipulations to eradicate invasive weeds. KISC will offer to assist State Parks in this process. Wayne Souza will notify KISC when this process takes place.
- 2. Hapu'u Tree Fern shipping process:** This is a Prevention Project. We could establish some kind of monitoring of incoming logs and certifying them free of invasives. It was estimated that 1000/year come into this island. Both the private sector and nurseries bring in logs. KISC needs to find out what other islands are doing for preventative measures.
- 3. Jackson chameleon (*Chamaeleo jacksonii*):** Find out the extent of concern regarding this pest.
- 4. Brown anole (*Anolis sagrei*):** Seems to already be established here. It occurs in high density. Find out the extent of concern regarding this pest.
- 5. Day geckos (*Phelsuma standingi*):** Find out the extent of concern regarding this pest.
- 6. Grey cheeked parakeet (*Brotogeris pyrrhopterus*):** There have been reports of 4 individuals. Follow up on whether anything has been done with these reports. Involve the Farm Bureau.
- 7. Ringed neck parakeet (*Psittacula krameri*) and Bulbuls (*Pycnonotus cafer* and *P. jocosus*):** Seed companies have contracted Wildlife Services to eradicate. These birds will go after any seed or fruit producing plant.
- 8. Clerodendron (*Clerodendrum quadriloculare*):** Species has been identified from a sample brought to Tim Flynn. This species has already been evaluated by the Hawaii Weed Risk Assessment and determined to be a pest. KISC should educate nurseries as to the hazards of selling this particular species.

9. **Australian Tree Fern (*Cyathea cooperi*):** This species is a major threat in the back of Lumahai Valley. KRCP is treating in Kokee State Park. Many nurseries are still selling this plant. Needs more study and discussion.

Kaua`i Invasive Species Committee Projected Budget – FY04*

Salaries & Wages		
Project Coordinator		\$36,000
Technicians - 2		\$55,500
Benefits		\$29,325
	Subtotal	\$120,825
Material and Supplies		
Herbicides/crop oil/dye/other		\$2,985
Expendable safety gear, e.g. gloves		\$400
Volunteer support supplies		\$500
Tools/applicators/base yard supplies		\$1,800
Vehicle Gas		\$5,200
Office supplies		\$2,470
Maps, survevs, ref materials		\$400
Computer supplies & services		\$1,500
	Subtotal	\$15,255
Equipment		
Vehicle		\$12,000
Computer		\$3,500
	Subtotal	\$15,500
Travel/Tuition		
Helicopter time		\$5,800
Travel		\$4,310
Training		\$1,210
	Subtotal	\$11,320
General		
Utilities & Communication		\$1,332
Rentals		\$65
Printing and Publications		\$3,700
Repairs		\$500
	Subtotal	\$5,597
Services		
Contracted Services		\$3,278
Vehicle maintenance		\$2,000
	Subtotal	\$5,278
Administrative costs of arants		\$16,225
	Subtotal	\$16,225
	TOTAL	\$190,000

*This budget has been based on funds to be contributed to KISC in FY04 by the following agencies:

Hawaii Community Foundation, Department of Land and Natural Resources, Division of Forestry and Wildlife, US Forest Service, US Fish and Wildlife Service, and County of Kaua`i.