A PROTOCOL FOR REMOVING, RELOCATING, AND REPLANTING NATIVE PLANTS

Kaheawa Pastures Wind Energy Project

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Pacific Analytics, L.L.C.

Natural Resource Consultants

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Prepared for

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II. EXECUTIVE SUMMARY

Kaheawa Wind Power, LLC is developing the island of Maui's first commercial wind energy generation facility. The Kaheawa Wind Power (KWP) project will consist of 20 GE Wind Energy 1.5 MW 60 Hertz wind turbine generators and related equipment. The Hawai'i State Board of Land and Natural Resources approved a Conservation District Use Application for the proposed facility, situated on State conservation lands on West Maui in an area near Ukumehame Gulch locally referred to as Kaheawa Pastures.

The project access road and turbine sites are located in an area of predominantly non-native dry grasslands that have been grazed for many years. Despite the grazing, there are some areas where Hawaiian native plants are abundant and comprise a large portion of the flora.

Native plants have important ecological and cultural significance, and appropriate efforts should be made during development on conservation lands to protect native species and mitigate for impacts on native natural resources.

Kaheawa Wind Power, LLC has proposed to protect native plants and enhance their habitats on the KWP site to mitigate potential disturbance by on-site construction, installation, and operation of the wind farm. To that end they have prepared this protocol for removing, relocating, and replanting Hawaiian native plants. The goal is to avoid damaging native plants, relocating those individuals that would be disturbed by on-site construction and operation, and reintroducing appropriate native plants species to the KWP project site.

This four-step protocol describes procedures and techniques for salvaging native plants from areas that would be disturbed by on-site construction and installation of the wind turbine generators. Appendix A is an annotated list of native Hawaiian plants that occur on the KWP project site, that includes the methods that should be applied to salvage the species.

III. INTRODUCTION

Kaheawa Wind Power, LLC is developing the island of Maui's first commercial wind energy generation facility. The Kaheawa Wind Power (KWP) project will consist of 20 GE Wind Energy 1.5 MW 60 Hertz wind turbine generators and related equipment. The Hawai'i State Board of Land and Natural Resources approved a Conservation District Use Application for the proposed facility, situated on State conservation lands on West Maui in an area near Ukumehame Gulch locally referred to as Kaheawa Pastures. The KWP project site is particularly suitable for wind farm development, having a Class 1 diurnal wind regime, which is driven largely by prevailing trade winds and daily temperature inversions on Maui.

The project access road and turbine sites are located in an area of predominantly non-native dry grasslands that have been grazed for many years. Despite the grazing, there are some areas where Hawaiian native plants are abundant and comprise a large portion of the flora. Four botanical surveys (Medeiros 1996, 1999, Hobdy 2004a, 2004b) that were conducted for the project during the permitting process reported no federally endangered or threatened

plant species; however, some native plants that occur in construction areas are important components of the native flora and thus worthy of protection.

In compliance with permit conditions, three new botanical surveys have been conducted to evaluate the status of Hawaiian native plants that would be disturbed during on-site construction and installation of the roads and turbines.

***ʻAʻaliʻi* is abundant on some of the Turbine areas and occurs on all the main islands throughout the state.**

The botanical surveys indicate that native plant species occur throughout the KWP project site. Some species are abundant within the KWP project site, while others are less common. In the context of adjacent ridges and other locations on Maui and throughout the state, none of the plant species have distributions limited to the project site, and are thus not considered rare, threatened, or endangered.

Native plants have important ecological and cultural significance, and appropriate efforts should be made during development on conservation lands to protect native species and mitigate for impacts on native natural resources. Concerns were expressed during the permitting process about the impact the KWP project would have on native plants and their habitats. Concerns include direct impacts such as displacement and habitat disturbance, as well as indirect impacts such as introduction of invasive, non-native species and the cumulative loss and fragmentation of native habitat.

Kaheawa Wind Power, LLC has proposed to protect native plants and enhance their habitats on the KWP site to mitigate potential disturbance by on-site construction, installation, and operation of the wind farm. To that end these partners have prepared this protocol for removing, relocating, and replanting Hawaiian native plants. The goal is to avoid damaging native plants, relocating those individuals that would be disturbed by on-site construction and operation, and reintroducing appropriate native plants species to the KWP project site.

IV. PROTOCOL OBJECTIVES

Protocol Objectives

The overall objective of this protocol is to assure that the project is in compliance with all of the conditions contained in the construction permit that pertain to the protection and reestablishment of Hawaiian native plants and their habitats. The project has already implemented several measures that address that goal.

Vehicles that arrive at the Entrance and Staging area on State Highway 30 are inspected for alien plant and insect species. Vehicles that are found to harbor these species are not allowed to proceed up the Access Road until they have been cleaned and all signs of invasive species have been removed.

The KWP environmental coordinator was directed to confirm that the native floristic components in the various project areas are consistent with the prior botanical surveys, and to consult with plant experts familiar with the Hawaiian native flora to determine the best course of action for relocating native species that will be impacted by on-site construction and installation of KWP roads and equipment.

Additional botanical surveys of the alternate access route and the turbine areas were commissioned to update and confirm the prior inventories. These surveys have been completed and the results are being considered in future decisions regarding mitigation. Construction will proceed after the KWP environmental coordinator has provided the KWP construction manager with clearance that native plant salvage and relocating activities have been completed.

Plants along a road cut on an unnamed Pu'u that are scheduled for removal and salvage before work proceeds.

Hawaiian native plants that may be disturbed or displaced by on-site construction, installation, and operation of the KWP wind turbines are to be salvaged and relocated to suitable habitats. Salvaged plants will be out-planted to areas disturbed by construction in proportions that reflect

the surrounding plant community structure. Out-planting will be done with consideration for the terms of the Habitat Conservation Plan and the fire contingency plan. For example, there is some concern that replanting areas under the turbines would become attractive to *nēnē*. Vegetation there may also be susceptible to fire, therefore these areas will not be replanted.

The final goal is not the success of individual plants, but the establishment of viable reproducing populations where crosspollination can occur and in which genetic variation is maintained. The replanted areas will reflect the composition of the existing native communities and provide habitat for native Hawaiian flora and fauna.

***'Ohi'a lehua* (Metrosideros polymorpha).**

V. NATIVE PLANT SALVAGE PROTOCOL PROCEDURES

Salvaging plants from areas that will be damaged during construction and installation of equipment is a popular option for restoration/mitigation projects. Plants that survive the salvaging process best tend to have a shallow, compact root system, can adapted to a broad range of habitat conditions and can tolerate transplanting disturbance. Appendix A contains an annotated list of plants that occur on the project site and recommendations for transplanting.

There are four basic steps to follow when removing, relocating and replanting native species.

Step 1: Identifying the species and individual plants that will be salvaged.

Step 2: Removing the selected specimens from the soil.

Step 3: Potting specimens for future use.

Step 4: Out-planting salvaged plants.

Each of the steps needs to be undertaken and completed for a native plant salvage program to succeed.

Select candidate plants for salvage by inspecting each area, clearly flagging plants suitable for salvage.

Step 1 - Identifying the species and individual plants that will be salvaged.

It would be ideal to produce a detailed map of plant cover for each area with the location of every individual native. Due to the abundance of Hawaiian native plants in some areas, this is not practical. Instead each area should be inspected before mitigation proceeds, and plants that are selected for salvage should be identified in the field and clearly marked as they are encountered.

The size and location of plants selected for salvage should be recorded on detailed site maps. Photographs should accompany the maps to document the mitigation activities.

Selecting Suitable Specimens

Plants should never be dug up from an intact native plant community that will not be developed or disturbed. Salvaging is a technique used only to save plants that otherwise would be destroyed.

Size

Young plants are more likely to survive transplanting than older, established plants. Young plants have smaller root systems that are easier to extract from the soil intact, while older plants have root systems entangled with the roots of other plants and are too large to remove from the soil without substantial damage.

Young naupaka plants will have a higher survival rate than larger plants.

Vigor

This is a subjective assessment of how healthy plants appear, and can differ depending on time of year or the physiological state the species is in at the time. Generally, plants with green, turgid leaves and robust stems are vigorous. Selected plants should be able to stand upright on their own without stakes or supports. Spindly growth and dry or discolored leaves or tissue are all examples of signs of weak plants. Select bright green plants with vigorous growth.

Injury

Plants should generally be free of injuries, wounds or insect damage. Mechanical damage includes such injuries as broken off shoot tips, cuts or digs in the stems, and severe pruning or wind damage.

Number of Plants of Each Species

Each Turbine area encompass almost 2-ac (0.8-ha) and may contain hundreds specimens of some species.

***Pūkiawe* is very abundant in some Turbine areas and occurs throughout the State of Hawai'i.**

For example, the T-11 area was estimated to have over 1,000 individual *pūkiawe* (Styphelia tameiameiae)

specimens, about 80% of which were of a suitable size and age for salvage and transplanting.

While it would be desirable to salvage each and every individual plant, the task is not practical, nor is it ecologically necessary. *Pūkiawe* is abundant throughout the entire project area and occurs on all the main Hawaiian Islands. It reproduces easily, and only a limited proportion of these plants need to be salvaged.

Orange *naupaka* is uncommon in most of the Turbine areas but it occurs throughout the Hawai'i.

Other species are less abundant, or may have more restricted distributions. Species such as Trisetum inaequale (an uncommon native grass) and orange-flowered *naupaka* (Scaevola gaudichaudii) are locally abundant on the project site but are restricted to isolated habitats. It is ecologically important to salvage as many of individuals of these species as possible, thereby preserving genetic diversity in the local population. Site-specific targets for the salvage proportions for each Hawaiian native plant species can be found in the Botanical Assessment (Pacific Analytics, 2005).

Step 2 - Removing the selected specimens from the soil.

Tools

Salvaging plants requires clean tools with sharpened cutting edges. It is recommended to have several sizes of shovels, spades and hand trowels, as well as pruning shears, and loppers. The shovels and spades will be used to dig into the soil and establish the root ball that will be removed. Pruning equipment will be used to cut larger roots or trim damaged foliage from the specimens being transplanted. Watering cans and large buckets may be useful for soaking the soil before extraction, applying B1, and soaking roots that lose their soil after extraction.

Timing

Plants can be moved any time of the year in Hawai'i, but to reduce the chance of losses, removing plants during cool days, mornings or evenings is recommended. If dry conditions exist, the soil should be thoroughly saturated one day before the move. This will allow ample time for the water to dissipate. Do not soak the plant and then try to

move it. The added weight of the water and the softness of the soil will cause the root ball to fall apart. Use B1 to reduce transplant shock at the label-recommended dosage when pre-watering.

If one knows six months or more prior to transplanting the plants that are to be moved, root pruning is a practice which may be beneficial. A spade is inserted to its full depth around the circumference of the root ball just inside the drip line of the plant. The drip line is the line one would draw on the soil directly under the outermost branch tips. No attempt should be made to lift the plant. The purpose of cutting the side roots at the drip line leaving the bottom roots of the ball intact is to force additional root growth within the ball prior to transplanting. This root prune line should be marked in some way because at time of transplanting, the cut of the root ball should never be within this line but outside of it since the new root growth will take place near the location of the cut at the root tips.

If the plant is to be relocated immediately, the transplant hole should be prepared before digging commences. Details for this procedure are covered in Step 4 below.

Transplanting

To remove salvageable plants from the soil, first remove plant debris, grasses, and small plants surrounding the selected specimen. Then delineate the drip line and root ball. When determining where to make the root cut around the plant, check the stem to determine that it is in the center of the plant. If it is, the drip line of the plant is a reasonable guide for your cut (see Figure V-1 A). If the stem is off center, then the stem should be the primary guide(see Figure V-1 B). One should center the stem but not cut inside the drip line. The depth of the root ball should be approximately one-third to one half the height of the plant.

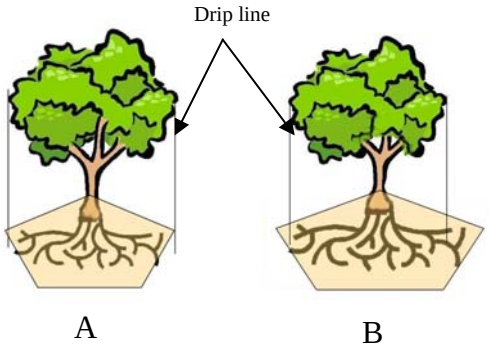

Figure V-1 – Root ball cutting guide. Shaded area is desired root ball.

Next, cut and establish the root ball. Make a circumferential cut with a sharp spade angled slightly inward. After cutting once around, cut around again

to insure that all lateral roots have been severed.

Use a shovel or spade to cut the lateral roots around the drip line of the plant before removing the plant from the soil.

If the specimen is large, first dig a trench around the plant, at about the drip line. Work carefully entirely around the plant. It may appear that the root ball is far too big to be moved by hand, but some of the soil between the roots can be gently worked free, reducing the size and weight of the transplant.

After the lateral roots are completely severed, a prying action can begin. After inserting a shovel to its full depth, pry slightly first towards, then away from the plant, in various locations around the plant in order to gently free it from the surrounding soil. When working with larger plants, two people, each with a spade, prying together, works most effectively. When prying, constantly check the integrity of the ball to insure that it is not breaking or cracking. It should be lifted as an intact unit.

Dig around and then under the plant. Cut through any major roots that must be severed with a sharp knife, loppers, shears, or pruning saw. Don't tear roots as this leaves them more vulnerable to disease. After a point, the ball should "feel" free, even though it may feel heavy. When you can rock it in the soil it is ready to move.

Extracting plants with an intact root ball will increase the chances of a successful transplanting.

It is important to take proper care of the roots of salvaged plants. Native soil should be kept intact with the root ball and transplanted with the salvage plant. The roots should be cut cleanly. Do not attempt to remove the plant from the ground until all roots are free. Failure to

do so may result in losing most of the soil around the root ball, and reducing the chances for a successful salvage.

The ball should be carefully lifted from the hole. This is done by one or two people, each grasping at the base one or two major branches, and lifting the ball up and out of the hole. Take care not to damage the tiny feeder roots. These are the part of the root that absorbs moisture and nutrients. Preserving these is important to the plant re-establishing in its new location.

When first salvaged the root ball should be kept moist. If the plants cannot be planted immediately at the restoration site, there needs to be a good holding facility which can keep the plants moist and healthy until it is the right time to replant them.

Step 3 - Potting specimens for future use.

Before any attempt to remove a specimen from the soil is made, the container or new location must first be prepared. If potting for future out-planting, select a pot that is large enough to accommodate the root ball.

Potting Medium

Prepare a potting medium by mixing equal amounts of native soil and commercial potting mix. Perlite, rocks, or cinder may be added to facilitate drainage. Mix in a small amount of time-release fertilizer. Do not use fertilizers with nitrogen content higher than 10% because it may burn the tender roots.

Cover the bottom of the pot with small to medium-sized rocks so that drain holes will not become clogged with the potting medium and roots will not be susceptible to becoming water logged. Add enough potting medium to cover the rocks but not so much that the pot cannot accommodate the root ball. When the root ball is placed in the container the root crown (top of the root ball) should be about 2-3 inches below the lip of the container.

Place several small rocks or cinders in the bottom of the container to prevent clogged drain holes.

After placing the plant into the container, fill the area around the root ball with the potting medium. Pack the soil firmly but not so hard that water cannot penetrate into the mix. Water the

plant thoroughly with B1 using the label-recommended dose.

Store plants out of direct sun, under shade cloth or in a lath house, until they have overcome the shock of transplanting. Soil moisture should be monitored and plants watered frequently.

Step 4 - Out-planting

The planting site should be adequately prepared ahead of time. Select a site where the plant will be placed that is similar to the conditions where it was salvaged from. Remove non-native plants at least 2 feet around the planting site. This will limit competition for nutrients and increase the chances of a successful transplanting.

Dig a hole that is about one and a half times larger than the circumference of the root ball but not deeper. The reason for not digging deeper is that the plant should not sink. The final level of the plant should be not be deeper than it was before salvage. Potting medium can be mixed into the soil surrounding the hole to ensure well-drained, rich soil. Add small rocks or cinders to facilitate drainage in heavy soil as needed.

Once placed in the hole, stabilize the plant prior to filling the hole to determine that the placement and depth are correct. When planting multiple plants in the same general location, one may stabilize all the plants in the holes in this manner to check the placement of the group to determine whether one or more plants need adjustment. After all minor adjustments have been made fill in around each plant using the potting medium. When filling, use soil that is loose and not lumpy in order to minimize air holes. While filling in the dirt, water liberally in order to eliminate any air pockets.

If planting on a slope, prepare the site by first digging horizontally into the slope, creating a level planting area. If the soil is loose, place rocks behind and below the area to prevent erosion.

When planting on a slope, prepare a level planting site and moisture retention ring.

After transplanting, build a ring of soil around the drip line of the plant to aid water retention and prevent erosion.

When transplanting is complete, water the plant thoroughly with B1 at the label-recommended strength.

Water the plants daily for at least two weeks after transplanting if the area does not receive sufficient rainfall. Root balls must be kept moist until established for the plants to survive. After two weeks, check the plants frequently for signs of stress, such as lack of turgor or wilting leaves. Water as needed, treating with B1 about once a week for the first month.

'Akoko **(Chamaesyce multiformis var. microphylla) that occurs in the lower Turbine Areas.**

VI. ALTERNATIVE METHODS OF PROPAGATION

Native plants can be propagated using techniques other than salvage and transplanting. For example, native grasses can be propagated by dividing the clumps. Each segment is capable of becoming a new plant. Air layering can be a successful means of propagating larger, more established plants, but requires time for a propagule to develop. Details about these two techniques can be found in most general gardening books, such as the Sunset Western Garden Book (Williamson, 1973).

Collecting seeds is another useful means of propagation, but the seeds of some species need to be treated before they will germinate. For more details about collecting and germinating seeds of Hawaiian native plants visit the Hawai'i Forest Industry Association website at: http://www.Hawai'i-forest.org/reports (Stratton et al., 1997).

Finally, propagation by cuttings is a viable technique when plants are not suitable for transplanting. This technique requires specialized facilities, equipment, and expertise and is best left in the hands of professional or commercial growers.

***Bidens micrantha* at Turbine area T11.**

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APPENDIX A

LIST OF HAWAIIAN NATIVE PLANT SPECIES REPORTED FROM THE KWP PROJECT SITE.

SCIENTIFIC NAME	COMMON NAME	STATUS	SALVAGE METHOD
FERNS			
ASPLENIACEAE (Spleenwort Family)			
Asplenium adiantum-nigrum L.	'iwa'iwa	indigenous	transplant
BLECHNACEAE (Chain Fern Family)			
Doodia kunthiana Gaud.	okupukupu	endemic	transplant
Sadleria cyatheoides Kaulf.	'ama'u	endemic	transplant
DENNSTAEDTIACEAE (Bracken Family)			
Microlepia strigosa (Thunb.) C. Presl	palapalai	endemic	transplant
Pteridium aquilinum (L.) Kuhn. var. decompositum (gaudich.) R.M. Tryon	kilau	endemic	transplant
DRYOPTERIDIACEAE (Wood Fern Family)			
Dryopteris sandwicensis (Hook. & Arnott) C. Christens	----------	endemic	transplant
Nephrolepis cordifolia (L.) Presl	----------	indigenous	transplant
GLEICHENIACEAE (False Staghorn Family)			
Dicranopteris linearis (Burm.f..) Underw.	uluhe	indigenous	no action
LINDSAEACEAE (Lindsaea Family)			
Sphenomeris chinensis (L.)Maxon	pala'a	indigenous	transplant
LYCOPODIACEAE (Club-moss Family)			
Lycopodiella cernua (L.) Pic. Serm.	wawae'iole	indigenous	transplant
PSILOTACEAE (Whisk Fern Family)			
Psilotum nudum (Hillebr.) Robinson	moa	indigenous	transplant
PTERIDACEAE (Maidenhair Fern Family)			
Doryopteris cf. decipiens (Hook.) J. Sm.		endemic	transplant
Dryopteris fusco-atra (Hillebr.) Robinson	i'i	endemic	transplant

SCIENTIFIC NAME	COMMON NAME	STATUS	SALVAGE METHOD
MONOCOTS			
CYPERACEAE (Sedge Family)			
Carex meyenii Nees	----------	indigenous	transplant
Carex wahuensis C. A. Mey.	----------	endemic	transplant
Gahnia gahniiformis (Gaud.) A. Heller	----------	indigenous	transplant
Machaerina angustifolia (Gaud.) T. Koyama	'uki	indigenous	transplant
Mariscus hillebrandii (Boeck.) T. Koyama		endemic	transplant
Mariscus cf. hypochlorus (Hillebr.) C.B. Clarke		endemic	transplant
JUNCACEAE (Rush Family)			
Luzula hawaiiensis Buchenau		endemic	transplant
POACEAE (Grass Family)			
Eragrostis variabilis (Gaud.) Steud.	kawelu	endemic	transplant
Eragrostis grandis Hillebr.			transplant
Heteropogon contortus (L.) P. Beauv. Ex Roem & Schult.	pili	indigenous	transplant
Trisetum inaequale Whitney	----------	endemic	transplant
DICOTS			
APOCYNACEAE (Dogbane Family)			
Alyxia oliviformis myrtillifolia Gaud.	maile	endemic	transplant, cut back long runners to 2'
ASTERACEAE (Sunflower Family)			
Bidens micrantha Gaud.	ko'oko'olau	endemic	transplant

SCIENTIFIC NAME	COMMON NAME	STATUS	SALVAGE METHOD
EBENACEAE (Epacris Family)			
Diospyros sandwicensis (A. DC.) Fosberg	lama	endemic	transplant small plants, propagate by seed from larger plants
EPACRIDACEAE (Epacris Family)			
Styphelia tameiameiae (Cham.& Schletend.) F.V.Muell.	pukiawe	indigenous	transplant small plants, gather seeds from larger plants
ERICACEAE (Heath Family)			
Vaccinium calycinum Sm.	ohelo	endemic	transplant
Vaccinium dentatum Sm.	ohelo	endemic	transplant
EUPHORBIACEAE (Spurge Family)			
Chamaesyce multiformis (Hook. & Arnott) Croizat & Degener	'akoko	endemic	transplant
GOODENIACEAE (Goodenia Family)			
Scaevola gaudichaudii Hook. & Arnott	orange naupaka	endemic	transplant only small plants, cuttings from larger plants
LILIACEAE (Lily Family)			
Dianella sandwicensis Hook. & Arnott	'uki'uki	indigenous	transplant
LYTHRACEAE (Loosestrife Family)			
Lythrum maritimum Kunth	pukamole	indigenous	transplant, cut back long stems
MALVACEAE (Mallow Family)			
Sida fallax Walp.	'ilima	indigenous	transplant small plants, gather seeds from larger plants

SCIENTIFIC NAME	COMMON NAME	STATUS	SALVAGE METHOD
MENISPERMACEAE (Myrsine Family)			
Cocculus orbiculatus (L.) DC	huehue	indigenous	transplant small plants, cut back long runners to 2', gather seed from larger plants
Cocculus trilobus (Thunb.) DC	huehue	indigenous	
MYRSINACEAE (Myrsine Family)			
Myrsine lanaiensis Hillebr.	kolea	endemic	Unknown
Myrsine lessertiana A.DC	kolea lau nui	endemic	Unknown
MYRTACEAE (Myrtle Family)			
Metrosideros polymorpha Gaud.	'ohi'a lehua	endemic	gather seeds and plant
OLEACEAE (Olive Family)			
Nestegis sandwicensis (A. Gray) Degener, I.Degener & L.Johnson	olopua	endemic	transplant smaller plants, propagate from seeds from larger plants
OXALIDACEAE (Wood Sorrel Family)			
Oxalis corniculatas L.	'ihi	indigenous?	transplant
PAPAVERACEAE (Poppy Family)			
Argemone glauca (Nutt. Ex Prain) Pope	puakala	endemic	propagate from seeds in flats
PLUMBAGINACEAE (Leadwort Family)			
Plumbago zeylanica L.	'ilie'e	indigenous	transplant

SCIENTIFIC NAME	COMMON NAME	STATUS	SALVAGE METHOD
PRIMULACEAE (Primrose Family)			
Lysimachia hillebrandii J.D. Hook. ex A. Gray	kolokolo kuahiwi	endemic	transplant small and moderate sized specimens
ROSACEAE (Rose Family)			
Osteomeles anthyllidifolia (Sm.) Lindl.	'ulei	indigenous	transplant small plants, cut back long runners
RUBIACEAE (Coffee Family)			
Coprosma foliosa A. Gray	pilo	endemic	transplant smaller plants, propagate from seeds from larger plants
SANTALACEAE (Sandalwood Family)			
Santalum ellipticum Gaud.	'iliahi alo'e	endemic	cuttings or from seeds
SAPINDACEAE (Soapberry Family)			
Dodonaea viscosa Jacq.	'a'ali'i	indigenous	transplant small plants, gather seeds from larger plants
SOLANACEAE (Nightshade Family)			
Solanum Lycopersicum L.	cherry tomato	indigenous	propagate by seed
STERCULIACEAE (Cacao Family)			
Waltheria indica L.	'uhaloa	indigenous	transplant small plants, gather seed from larger plants
THYMELAEACEAE ('Akia Family)			
Wilkstroemea oahuensis (A.Gray) Rock	'akia	endemic	transplant
VISCACEAE (Mistletoe Family)			
Korthalsella cylindrica (Tiegh.) Engl.	hulumoa	endemic	parasite on other plants????