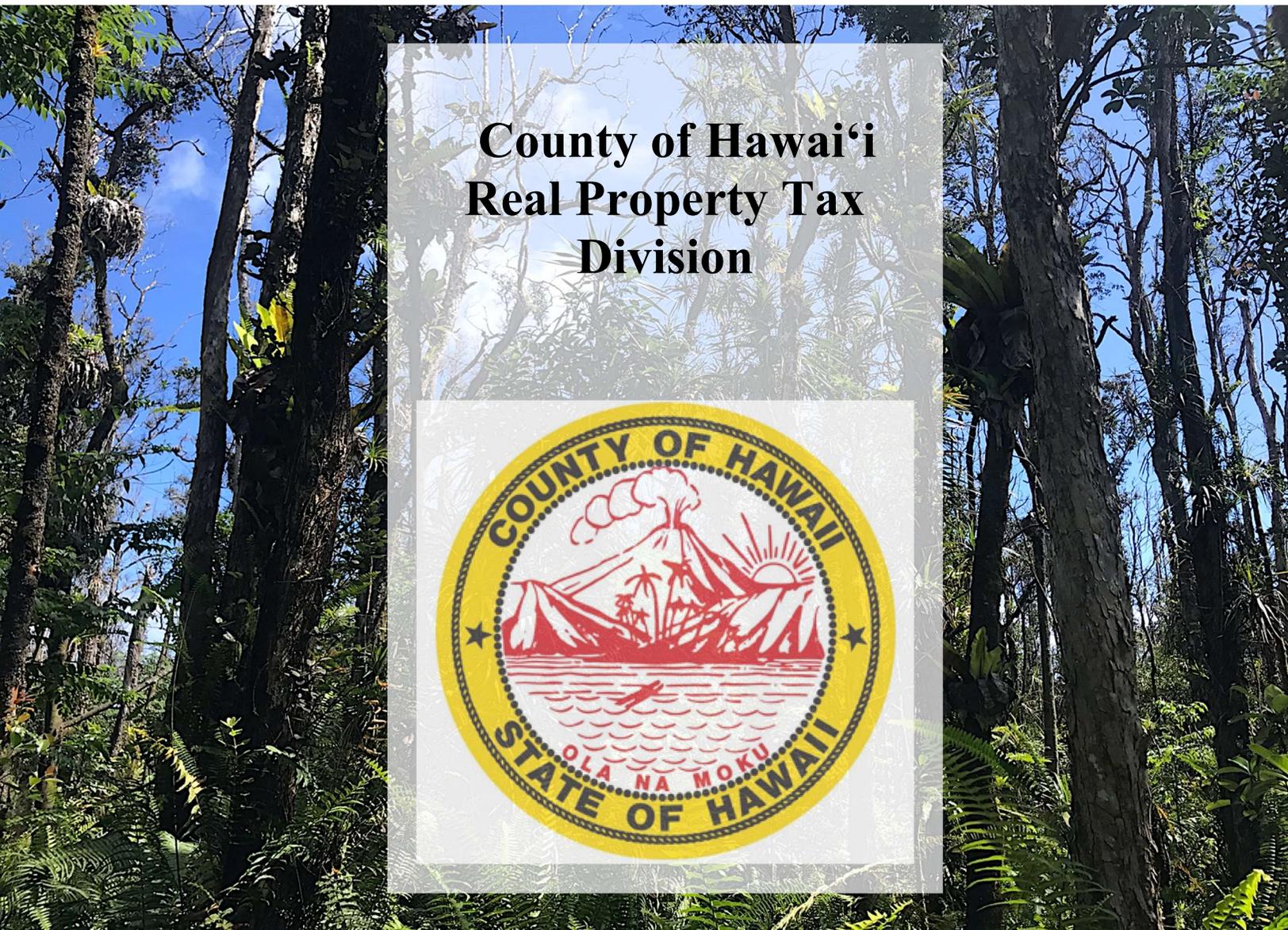
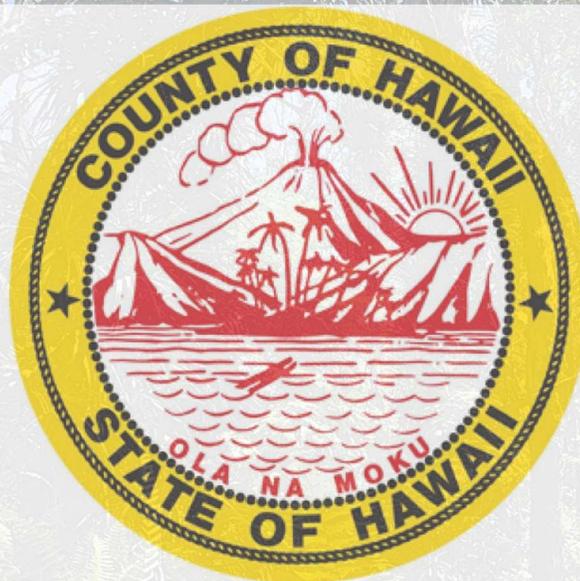




**Species List for Native, Non-Native/Non-Invasive Plants
and their Associated Habitats**



**County of Hawai'i
Real Property Tax
Division**





The Species List for Native, Non-Native/Non-Invasive Plants and their Associated Habitats represents a document that was researched and written for the County of Hawai‘i Real Property Tax Division

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Plant Species List and Associated Ecological Habitat

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‘A‘ohe hana nui ke alu ‘ia. *No task is too big when done together by all.* ‘Ōlelo No‘eau 142

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The Objective of the Hawai‘i County Real Property Tax Division Species List for Native, Non-Native/Non-Invasive Plants and their Associated Habitats Document

The purpose of the *Species List for Native, Non-Native/Non-Invasive Plants and their Associated Habitats* document is to provide private landowners of Hawai‘i County with information they can use to guide their native forest, functional forest, or successional forest land-use dedication projects. As there are multiple habitat types and ecological communities on the island of Hawai‘i, the selection of plant species that correspond with their preferred habitat type is one way to increase the success of habitat rehabilitation endeavors. This list is meant to serve as a reference by the property owners of Hawai‘i County and can be used to select native and non-native/non-invasive species that are suited for the environments within the project site. It can also be used to help landowners whose forests have been negatively impacted by Rapid ‘Ōhi‘a Death (ROD) and want to increase the diversity of native plant species after losing trees affected by this destructive fungal disease. The list provides recommendations for planting but following this list is not required as there are additional plant species that could be used to meet the requirements for the native forest, functional forest, and successional forest land-use dedications.

The *Species List for Native, Non-Native/Non-Invasive Plants and their Associated Habitats* document consists of a list of species which includes their common name, scientific name, growth form, and their taxonomic classification as a native, non-native, or non-invasive species. This is followed by a colored map illustrating the areas in which these plants are commonly found which represent the locations for their optimal growth and survival. This document does not contain information pertaining to planting and maintaining native species, but, there is a list of additional resources below the literature cited section that can be used to obtain this supplemental information.

Background

The climate on the island of Hawai‘i is highly variable with annual rates of precipitation being anywhere from 250 mm to over 10,000 mm (Price et al. 2007) and has elevation gradients ranging from 0 - 300 m at the coast to alpine areas over 3,000 m resulting in an extensive range of native ecosystems (Wagner et al. 1999). These habitats consist of elevated levels of endemic flora which have become adapted to the ecological environments in which they are commonly found (Friday et al. 2015). A diverse array of complex vegetation communities has arisen as a result of the assorted topography and climate on Hawai‘i Island with there being an extensive range of native ecosystems (Little & Skolmen 1989). As a result of the highly variable biotic and abiotic conditions that exist throughout Hawai‘i County, native forest rehabilitation projects must be developed to complement the climate, soil, topography, and organisms found within each specific area to maximize the success of native forest rehabilitation efforts.

One way this can be accomplished is by pairing native and non-native/non-invasive plant species with locations that are consistent with the environmental conditions required to promote sustained plant growth and viability in both short-term and long-term time scales. Native species that are outplanted outside of their traditional geographic range are likely to experience increased

mortality rates while those that are compatible with the dryland, mesic, or wet forest environments in which they are commonly found are likely to persist as these areas provide native plant species with the optimal conditions required to support their continued existence. Scientific studies have shown that the success of reforestation efforts at a particular site is largely dependent on the choice of plant species which is why this plant species list was developed (Whitesell & Walters 1976). By providing the private landowners of Hawai‘i County with a list of plants that can be used in native forest, functional forest, and successional forest rehabilitation, this is one way to help landowners qualify for reduced property tax rates while promoting the continued engagement in native forest restoration.

How the Species List for Native, Non-Native/Non-Invasive Plants and their Associated Habitats Document was Created

This plant species list was created by referencing *Growing Hawai‘i’s Native Plants* (Lilleeng-Rosenberger 2005), *Manual of the Flowering Plants of Hawai‘i* (Wagner et al. 1999), The Big Island Invasive Species Committee (BIISC) Plant Pono Website, and *Plants for Tropical Landscapes: A Gardeners Guide* (Rauch & Weissich 2000) to select plant species that are the most appropriate for the ecological zones found on the island of Hawai‘i. Plants in this list were selected by growth forms, those that are easily obtained from nurseries, plants that did not contribute to the decline of other native flora and fauna (e.g., bromeliads and other water-holding species harboring mosquitoes facilitating the spread of avian malaria), and those that are relatively common in existing native forest, functional forest, or successional forest environments. Another consideration that was made in the development of this plant species list was selecting plants (e.g., trees, shrubs, groundcovers, etc.) that would increase forest cover, help to reduce the spread of invasive species, while also being relatively easy to remove if a property owner wanted to move towards or between different native forest dedications. As a result, epiphytic species like ‘Ēkaha nui (*Asplenium nidus*) were not included, however, this species and those that have similar growth forms can be useful for filling additional niches, preventing non-native invasive species from colonizing open niche space while also increasing biodiversity in native forest, functional forest, and successional forest habitats.

For plants that can be characterized as being non-native/non-invasive, including Polynesian introductions, selected species are those that have received a low weed risk assessment score from the Hawai‘i-Pacific Weed Risk Assessment (HPWRA). The HPWRA is a plant screening tool that botanists use to evaluate plants and whether or not they are likely to be or become invasive in Hawai‘i and other tropical Pacific islands that have similar climate regimes (Daehler et al. 2004). Each plant is screened using peer-reviewed, scientific papers to answer a set of 49 predetermined questions and placed in one of three categories which are species of low risk, evaluate, or high risk. This screening process is a critical component of preventing the colonization and expansion of harmful and destructive introduced plant species that may pose significant threats to our highly prized native forest ecosystems. To date, the Hawai‘i-Pacific Weed Risk Assessment has evaluated more than 2,100 plants with 853 being classified as a low-risk species, and 607 having an HPWRA score of 0 or less. New species are continually being assessed, so the pool of low-risk species will continue to grow in the future. This information is readily available to the general public and included in the list of additional resources along with a

Microsoft Excel spreadsheet of additional low-risk species which is not included in the non-native/non-invasive plant species list. Aside from Polynesian introductions, species that are classified as evaluate were not included in this document as the County of Hawai‘i Real Property Tax Division does not want to condone nor promote the use of species that require additional information to be evaluated and may become invasive in the future. Furthermore, the inclusion of Polynesian introductions with scores categorized as having a high risk of invasibility should only be considered on a case-by-case basis and be evaluated and approved by a forestry professional before being incorporated into a forestry management plan. To help Hawai‘i Island become more self-sufficient, edible plant species were also included in this list to increase food security, work towards attaining the Hawai‘i 2050 sustainability goals, while reducing our dependence on imported fruit and vegetable products. In addition, the species selected were also intended to help both seasoned plant enthusiasts and native forest restoration beginners easily increase native species cover to meet the requirements listed in Chapter 19, Article 8, Section 19-59 of the Hawai‘i County Code 1983 (2016 Edition, as amended).

Plants are grouped into four different communities based on elevational ranges with coastal being 0 – 100 ft. in elevation, lowland being 100 – 3,000 ft., montane being 3,000 – 6,500 ft., and subalpine being 6,500 – 10,000 ft. in elevation. Once the native, non-native/non-invasive species were placed in the appropriate elevational gradient, they were placed within one of three moisture regimes with dry being classified as areas that receive less than 50 in. of rainfall annually, mesic with 50 – 100 in. annual rainfall, and wet having greater than 100 in. of annual rainfall. The alpine region was not included in this plant species list as this zone, which is considered to be anything over 10,000 ft., is a region where the native forest, functional forest, and successional forest land-use dedication is not applicable as these zones are primarily on state or federal lands.

The *Bishop Museum Hawaiian Ethnobotany Database* was used to determine the appropriate diacritical marks for the Hawaiian names of each plant species (i.e., kahakō and ‘okina), and the *Smithsonian National Museum of Natural History Flora of the Hawaiian Islands* was accessed to find the most current scientific name. Once the species list was compiled, it was evaluated by ecological professionals and vegetation specialists including individuals from the Big Island Invasive Species Committee, Hawai‘i Invasive Species Council, Institute of Pacific Island Forestry, the Pacific Cooperative Studies Unit at UH Mānoa, and the University of Hawai‘i at Hilo to ensure that the information presented is accurate.

Description of Forest Types

Under the revisions in Chapter 19, Article 8, Section 19-59, of the Hawai‘i County Code 1983 (2016 Edition, as amended) native forests pertain to lands that have sixty percent or greater native species forest cover. To meet the requirement to be eligible for the preferential per-acre value in its restricted preservation use, native forests must contain a minimum of twenty-five percent native forest cover in the canopy layer with the remaining being met by native species in either the tree layer, the understory layer, or a combination of the two. In accordance with the Hawai‘i County Code, native species are defined as species that are either endemic or indigenous to the Hawaiian Islands, with native species being classified as species that have evolved or have

become established in the Hawaiian Islands without the assistance of human beings. Due to the severe degradation of native ecosystems across the landscape of Hawai‘i County, in many instances, it is difficult for contemporary native forest habitats to ever return to their historic structure. However, property owners undertaking this land-use dedication should work towards reforesting their property in a way that the designated area eventually resembles a traditional native forest under modern circumstances. This can be accomplished by increasing native species diversity in all layers of the native forest including the canopy, mid-canopy, and understory helping selected native species become the dominant vegetation type throughout this portion of the landscape. Ideally, over time, native forests would become fully functional as its own entity, requiring minimal maintenance as all niches within this habitat are filled by native species, preventing the colonization and establishment of exotic plant species in both short-term and long-term time frames.

Functional forests are defined as lands that have sixty percent or greater native species forest cover combined with non-native/non-invasive species forest cover. To meet the requirement to be eligible for the preferential per-acre value in its restricted preservation use, functional forest dedications must be composed of non-native/non-invasive species in either the tree layer or the understory layer or a combination of the two; provided that a minimum twenty-five percent of the forest cover shall contain tree cover and a minimum of half of the forest cover shall contain native species. In accordance with the Hawai‘i County Code, non-native/non-invasive species are defined as those species that are not native to the Hawaiian Islands, having arrived with human help, which does not invade or overtake native species habitat. As many forest systems may fall between the lines of a native forest and a forest habitat primarily comprised of invasive species, functional forests are one way to retain these forest’s functional characteristics while preserving and encouraging native species to persist despite the pervasive challenges associated with competing for shared resources. Due to the fact that some native forests may not be responsive to traditional management techniques, the functional forest dedication gives property owners whose land may have passed an ecological threshold an opportunity to improve the value of these hybrid ecosystems.

In addition, the term successional forests pertains to lands where new lava substrates are currently unsuitable for cultivation in that soil depths and/or organic material are less than 10 cm. In this instance, successional forests are areas where lava flows are in the earliest stages of becoming forested lands that would not currently qualify for native forest or functional forest dedications. Successional forest dedications and management plans should be developed to actively maintain or promote either native forest or functional forest development in the future.

* This species list is intended to serve as a guide and does not need to be followed to fulfill the requirements for native forest, functional forest, or successional forest land-use dedications. As there is a diverse array of ecological communities, vegetation types, and climatic conditions found throughout the island of Hawai‘i, it is difficult to account for every plant species and habitat type and include it in the native non-native/non-invasive plant species list. While this plant species list is intended to provide baseline information to help people decide which plants to incorporate into forestry management plans making it easier for the general public to engage in reforestation activities, the recommended plants below are not representative of all the

possible species that can be used to meet the stipulations outlined in Chapter 19, Article 8, Section 19-59 of the Hawai‘i County Code 1983 (2016 Edition, as amended). If additional information is required, please use the resources found in the additional resources section and consult a forestry professional to help you stay on track for effectively preserving our native forests and qualifying for reduced property tax rates.

How to use the Species List for Native, Non-Native/Non-Invasive Plants and their Associated Habitats Document

The Hawai‘i County Real Property Tax Division *Species List for Native, Non-Native/Non-Invasive Plants and their Associated Habitats* document is intended to provide private landowners who are actively participating in native forest, functional forest, or successional forest rehabilitation with a list of species they can use in their reforestation endeavors. This list can be useful for developing a native forest management plan and/or during the continued maintenance of one of the three native forest land-use dedications listed in the updated native forest land-use dedication by:

1. Defining the objective(s) of the native forest management plan in both short-term and long-term time frames to achieve project goals and to be eligible for reduced property tax rates. This document is intended to help landowners select native and non-native/non-invasive plant species that are adapted to their specific location.
2. Using the maps and resources provided in the literature cited section to determine the ecoregion in which your native forest project is taking place.
3. Determining what types of species (native and/or non-native/non-invasive) and growth forms (grasses, shrubs, trees, etc.) that are the most appropriate for your reforestation goals.
4. Using this information to develop strategies to maximize the success of outplanting and reforestation efforts to help achieve short-term and long-term objectives.
5. Selecting the most appropriate plant(s) based on the steps above and the information presented below.

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Plant Species List and Associated Ecological Habitat

Native Plant Species List

Table 1 Coastal Vegetation Plant Species List

Hawaiian/ Common Name	Scientific Name	Growth Form	Moisture Regime	Status	Forest Dedication Type
‘A‘ali‘i	<i>Dodonaea viscosa</i>	Shrub	D/M/W	Native	NF/FF/SF
‘Ae‘ae	<i>Bacopa monnieri</i>	Ground cover	W	Native	NF/FF
‘Ahu‘awa	<i>Cyperus javanicus</i>	Grass/Sedge	W	Native	NF/FF
‘Ākia	<i>Wikstroemia</i> spp.	Shrub	D/M	Native	NF/FF
‘Ākulikuli	<i>Sesuvium portulacastrum</i>	Ground cover	D/W	Native	NF/FF
Hala	<i>Pandanus tectorius</i>	Tree	D/W	Native	NF/FF
‘Iliahi alo‘e	<i>Santalum ellipticum</i>	Shrub/Tree	D	Native	NF/FF
‘Ilie‘e	<i>Plumbago zeylanica</i>	Shrub	D/W	Native	NF/FF
‘Ilima	<i>Sida fallax</i>	Shrub	D	Native	NF/FF
Koki‘o ke‘oke‘o	<i>Hibiscus arnottianus</i> subsp. <i>arnottianus</i>	Shrub/Tree	M/W	Native	NF/FF
Kolomona	<i>Senna gaudichaudii</i>	Shrub	D/M	Native	NF/FF/SF
Kou	<i>Cordia subcordata</i>	Tree	D/M/W	Native	NF/FF
Lama	<i>Diospyros sandwicensis</i>	Tree	D/M/W	Native	NF/FF
Loulu	<i>Pritchardia</i> spp.	Tree	D/W	Native	NF/FF
Maiapilo	<i>Capparis sandwichiana</i>	Shrub	D	Native	NF/FF/SF
Ma‘o	<i>Gossypium tomentosum</i>	Shrub	D/M	Native	NF/FF/SF
Milo	<i>Thespesia populnea</i>	Tree	D/M/W	Native	NF/FF

Plant Species List and Associated Ecological Habitat

Nanea	<i>Vigna marina</i>	Vine	D	Native	NF/FF
Nānū	<i>Gardenia brighamii</i>	Shrub	D/M	Native	NF/FF
Naupaka kahakai	<i>Scaevola taccada</i>	Shrub	D/W	Native	NF/FF/SF
‘Ohai	<i>Sesbania tomentosa</i>	Shrub	D	Native	NF/FF
‘Ohe makai	<i>Polyscias sandwicensis</i>	Tree	D	Native	NF/FF
‘Ōhi‘a lehua	<i>Metrosideros polymorpha</i>	Tree	D/M/W	Native	NF/FF/SF
Pōhinahina	<i>Vitex rotundifolia</i>	Vine/Shrub	D/W	Native	NF/FF/SF
Pōhuehue	<i>Ipomoea pes-caprae</i>	Vine	D	Native	NF/FF/SF
Pua kala	<i>Argemone</i> spp.	Herb	D/M	Native	NF/FF/SF
‘Uhaloa	<i>Waltheria indica</i>	Shrub	D/M	Native	NF/FF/SF
‘Ūlei	<i>Osteomeles anthyllidifolia</i>	Shrub	D/M	Native	NF/FF/SF
Wiliwili	<i>Erythrina sandwicensis</i>	Tree	D/M	Native	NF/FF/SF

Table Key: D = Dry / M = Mesic / W = Wet / NF = Native Forest / FF = Functional Forest
SF = Successional Forest

Plant Species List and Associated Ecological Habitat

Table 2 Lowland Vegetation Plant Species List

Hawaiian/ Common Name	Scientific Name	Growth Form	Moisture Regime	Status	Forest Dedication Type
‘A‘ali‘i	<i>Dodonaea viscosa</i>	Shrub	D/M/W	Native	NF/FF/SF
‘Ākia	<i>Wikstroemia</i> spp.	Shrub	D/M/W	Native	NF/FF
Alahe‘e	<i>Psydrax odorata</i>	Shrub	D/M	Native	NF/FF
‘Ama‘u	<i>Sadleria</i> spp.	Tree Fern	W	Native	NF/FF/SF
‘Āweoweo	<i>Chenopodium oahuense</i>	Shrub	D	Native	NF/FF
Hāpu‘u	<i>Cibotium</i> spp.	Tree Fern	M/W	Native	NF/FF
Hō‘awa	<i>Pittosporum</i> spp.	Tree	M/W	Native	NF/FF
‘Ie‘ie	<i>Freycinetia arborea</i>	Vine	M/W	Native	NF/FF
‘Iliahi alo‘e	<i>Santalum ellipticum</i>	Shrub/Tree	D	Native	NF/FF
‘Ilie‘e	<i>Plumbago zeylanica</i>	Shrub	D	Native	NF/FF
‘Ilima	<i>Sida fallax</i>	Shrub	D/M	Native	NF/FF
Kāwa‘u	<i>Ilex anomala</i>	Tree	M/W	Native	NF/FF
Koki‘o ke‘oke‘o	<i>Hibiscus arnottianus</i> subsp. <i>arnottianus</i>	Shrub/Tree	M/W	Native	NF/FF
Kōlea	<i>Myrsine lessertiana</i>	Tree	M/W	Native	NF/FF/SF
Kolomona	<i>Senna gaudichaudii</i>	Shrub	D/M	Native	NF/FF/SF
Kōpiko	<i>Psychotria hawaiiensis</i>	Tree	M/W	Native	NF/FF
Kou	<i>Cordia subcordata</i>	Tree	D/M	Polynesian introduction	FF
Kūpaoa	<i>Dubautia scabra</i>	Ground cover	M/W	Native	NF/FF/SF

Plant Species List and Associated Ecological Habitat

Lama	<i>Diospyros sandwicensis</i>	Tree	D/M/W	Native	NF/FF
Loulu	<i>Pritchardia</i> spp.	Palm	D/M/W	Native	NF/FF
Maiapilo	<i>Capparis sandwichiana</i>	Shrub	D	Native	NF/FF/SF
Maile	<i>Alyxia stellata</i>	Vine/Shrub	M/W	Native	NF/FF
Māmaki	<i>Pipturus albidus</i>	Shrub	M/W	Native	NF/FF
Manono	<i>Kadua affinis</i>	Shrub/Tree	M/W	Native	NF/FF
Manono	<i>Kadua centranthoides</i>	Vine/Shrub	M/W	Native	NF/FF/SF
Ma‘o	<i>Gossypium tomentosum</i>	Shrub	D/M	Native	NF/FF/SF
Ma‘o hau hele	<i>Hibiscus brackenridgei</i>	Shrub	D/M	Native	NF/FF
Milo	<i>Thespesia populnea</i>	Tree	D/M/W	Native	FF
Naio	<i>Myoporum sandwicense</i>	Tree	D/M	Native	NF/FF
Nānū	<i>Gardenia brighamii</i>	Shrub	D/M/W	Native	NF/FF
Neneleau	<i>Rhus sandwicensis</i>	Tree	M/W	Native	NF/FF
‘Ohai	<i>Sesbania tomentosa</i>	Shrub	D	Native	NF/FF
‘Ōhelo	<i>Vaccinium reticulatum</i>	Shrub	M/W	Native	NF/FF/SF
‘Ohe makai	<i>Polyscias sandwicensis</i>	Tree	D	Native	NF/FF
‘Ōhi‘a lehua	<i>Metrosideros polymorpha</i>	Tree	D/M/W	Native	NF/FF/SF
‘Ōlapa	<i>Cheirodendron trigynum</i>	Tree	M/W	Native	NF/FF/SF
Olopua	<i>Nestegis sandwicensis</i>	Tree	D/M	Native	NF/FF
Pāpala kēpau	<i>Pisonia brunoniana</i>	Tree	M/W	Native	NF/FF
Pilo	<i>Coprosma</i> spp.	Shrub	M/W	Native	NF/FF/SF
Pōhinahina	<i>Vitex rotundifolia</i>	Vine/Shrub	D/W	Native	NF/FF/SF
Pōhuehue	<i>Ipomoea pes-caprae</i>	Vine	D	Native	NF/FF/SF

Plant Species List and Associated Ecological Habitat

Pua kala	<i>Argemone</i> spp.	Herb	D	Native	NF/FF
Pūkiawe	<i>Leptecophylla tameiameia</i>	Shrub	D/M/W	Native	NF/FF
‘Uhaloa	<i>Waltheria indica</i>	Shrub	D/M	Native	NF/FF/SF
‘Uki	<i>Machaerina angustifolia</i>	Grass/Sedge	M/W	Native	NF/FF/SF
‘Uki‘uki	<i>Dianella sandwicensis</i>	Herb	M/W	Native	NF/FF
‘Ūlei	<i>Osteomeles anthyllidifolia</i>	Shrub	D/M	Native	NF/FF
Wiliwili	<i>Erythrina sandwicensis</i>	Tree	D/M	Native	NF/FF/SF

Table Key: D = Dry / M = Mesic / W = Wet / NF = Native Forest / FF = Functional Forest
SF = Successional Forest

Plant Species List and Associated Ecological Habitat

Table 3 Montane Vegetation Plant Species List

Hawaiian/ Common Name	Scientific Name	Growth Form	Moisture Regime	Status	Forest Dedication Type
‘A‘ali‘i	<i>Dodonaea viscosa</i>	Shrub	D/M	Native	NF/FF/SF
‘Ākala	<i>Rubus hawaiiensis</i>	Shrub	M/W	Native	NF/FF
Alani	<i>Melicope</i> spp.	Tree	W	Native	NF/FF
‘Ama‘u	<i>Sadleria</i> spp.	Tree Fern	M/W	Native	NF/FF/SF
‘Āweoweo	<i>Chenopodium oahuense</i>	Shrub	D	Native	NF/FF
Hāpu‘u	<i>Cibotium</i> spp.	Tree Fern	W	Native	NF/FF
Hō‘awa	<i>Pittosporum</i> spp.	Tree	M	Native	NF/FF
‘Iliahi	<i>Santalum paniculatum</i>	Tree	D	Native	NF/FF
‘Ilima	<i>Sida fallax</i>	Shrub	D/M	Native	NF/FF
Kanawao	<i>Hydrangea arguta</i>	Shrub	W	Native	NF/FF
Kāwa‘u	<i>Ilex anomala</i>	Tree	M/W	Native	NF/FF
Koa	<i>Acacia koa</i>	Tree	M	Native	NF/FF
Koai‘a	<i>Acacia koaia</i>	Tree	M	Native	NF/FF
Koki‘o ke‘oke‘o	<i>Hibiscus arnottianus</i> subsp. <i>arnottianus</i>	Shrub/Tree	M/W	Native	NF/FF
Kōlea	<i>Myrsine lessertiana</i>	Tree	M/W	Native	NF/FF/SF
Kolomona	<i>Senna gaudichaudii</i>	Shrub	D	Native	NF/FF/SF
Kōpiko	<i>Psychotria hawaiiensis</i>	Tree	M	Native	NF/FF
Kūkaenēnē	<i>Coprosma ernodeoides</i>	Ground cover	D/W	Native	NF/FF/SF
Kūpaoa	<i>Dubautia scabra</i>	Ground cover	M/W	Native	NF/FF/SF

Plant Species List and Associated Ecological Habitat

Maile	<i>Alyxia stellata</i>	Vine/Shrub	M	Native	NF/FF
Māmaki	<i>Pipturus albidus</i>	Shrub	M/W	Native	NF/FF
Māmane	<i>Sophora chrysophylla</i>	Tree	D/M	Native	NF/FF
Manono	<i>Kadua affinis</i>	Shrub/Tree	M/W	Native	NF/FF
Manono	<i>Kadua centranthoides</i>	Vine/Shrub	M/W	Native	NF/FF/SF
Naio	<i>Myoporum sandwicense</i>	Shrub/Tree	D/M/W	Native	NF/FF
‘Ōhelo	<i>Vaccinium reticulatum</i>	Shrub	D/M/W	Native	NF/FF/SF
‘Ōhelo kau lā‘au	<i>Vaccinium calycinum</i>	Shrub	M/W	Native	NF/FF/SF
‘Ohe mauka	<i>Polyscias</i> spp.	Tree	D/M	Native	NF/FF
‘Ōhi‘a lehua	<i>Metrosideros polymorpha</i>	Tree	D/M/W	Native	NF/FF/SF
‘Ōlapa	<i>Cheirodendron trigynum</i>	Tree	M/W	Native	NF/FF/SF
Olopua	<i>Nestegis sandwicensis</i>	Tree	D/M	Native	NF/FF
Pa‘iniu	<i>Astelia menziesiana</i>	Herb	W	Native	NF/FF
Palapalai	<i>Microlepia strigosa</i>	Fern	M	Native	NF/FF
Pāpala kēpau	<i>Pisonia brunoniana</i>	Tree	M	Native	NF/FF
Pāwale	<i>Rumex</i> spp.	Shrub	W	Native	NF/FF/SF
Pilo	<i>Coprosma</i> spp.	Shrub	D/M/W	Native	NF/FF
Pua kala	<i>Argemone</i> spp.	Herb	D	Native	NF/FF
Pūkiawe	<i>Leptecophylla tameiameia</i>	Shrub/Tree	M/W	Native	NF/FF
‘Uki	<i>Machaerina angustifolia</i>	Grass/Sedge	M/W	Native	NF/FF/SF
‘Uki‘uki	<i>Dianella sandwicensis</i>	Herb	D	Native	NF/FF
‘Ūlei	<i>Osteomeles anthyllidifolia</i>	Shrub	D/M	Native	NF/FF

Table Key: D = Dry / M = Mesic / W = Wet / NF = Native Forest / FF = Functional Forest
SF = Successional Forest

Plant Species List and Associated Ecological Habitat

Table 4 Subalpine Vegetation Plant Species List

Hawaiian/ Common Name	Scientific Name	Growth Form	Moisture Regime	Status	Forest Dedication Type
‘A‘ali‘i	<i>Dodonaea viscosa</i>	Shrub	D	Native	NF/FF/SF
‘Ākala	<i>Rubus hawaiiensis</i>	Shrub	M	Native	NF/FF
‘Āweoweo	<i>Chenopodium oahuense</i>	Shrub	D	Native	NF/FF
‘Iliahi	<i>Santalum paniculatum</i>	Tree	D/M	Native	NF/FF
Kūkaenēnē	<i>Coprosma ernodeoides</i>	Ground cover	D/M	Native	NF/FF/SF
Laukahi	<i>Dryopteris wallichiana</i>	Fern	M	Native	NF/FF
Māmane	<i>Sophora chrysophylla</i>	Tree	D/M	Native	NF/FF
Naio	<i>Myoporum sandwicense</i>	Tree	D	Native	NF/FF
‘Ōhelo	<i>Vaccinium reticulatum</i>	Shrub	D/M/W	Native	NF/FF
‘Ōhi‘a lehua	<i>Metrosideros polymorpha</i>	Tree	D/M	Native	NF/FF
Pūkiawae	<i>Leptecophylla tameiameia</i>	Shrub	M/W	Native	NF/FF
‘Ūlei	<i>Osteomeles anthyllidifolia</i>	Shrub	D	Native	NF/FF

Table Key: D = Dry / M = Mesic / W = Wet / NF = Native Forest / FF = Functional Forest
SF = Successional Forest

Photographs and Descriptions of Native Plants



'A'ali'i (*Dodonaea viscosa*) – An easy to grow native Hawaiian evergreen species that comes in many forms and has a variety of uses in the landscape as a tree, hedge, windbreak, or even serve as a screening plant. It can be cultivated from sea-level to areas of higher elevation with its height being determined by elevation, sunlight, and the amount of water it receives and can grow to be 24 feet in height. 'A'ali'i grows at a moderate rate, is highly wind, drought, and salt-tolerant, and thrives in well-drained soils.

Photo Credit: Forest & Kim Starr



'Ae'ae (*Bacopa monnieri*) – 'Ae'ae is native to Hawai'i as well as many other tropical regions. By rooting at each node, this sprawling groundcover can colonize mud, sand flats, marshes, and around brackish streams. Eventually, it can form a dense mat several inches thick and does well in moist sand or soil, and prefers to be in areas with full sun.

Photo Credit: Forest & Kim Starr



'Ahu'awa (*Cyperus javanicus*) - 'Ahu'awa is a flood-tolerant species in the sedge family, Cyperaceae, that grows anywhere from sea-level to 3,000 feet in elevation. This sedge is salt-tolerant and is known to do well in a variety of growing conditions as it can be planted along streams to help mitigate erosion while also being known to flourish in dry environments as well. It prefers highly saturated soils, requires a stable water source, and does best in areas where it receives full to partial sun.

Photo Credit: Forest & Kim Starr



‘Ākala (*Rubus hawaiensis*) – ‘Ākala is an endemic Raspberry related to Blackberry and is a shrub that can reach up to 15 feet in height. It produces large edible berries that resemble Blackberries and has small sharp hairs that resemble thorns but are not nearly as sharp. It can be described as being somewhat deciduous as it loses its leaves during the winter season. ‘Ākala grows best in areas of higher elevation (3,000 – 9,000 ft.) in spots where it receives full or partial sunlight and requires regular water as it does best in well-saturated soils.

Photo Credit: Forest & Kim Starr



‘Ākia (*Wikstroemia* spp.) - ‘Ākia is endemic to the Hawaiian Islands, and creates a dense, shrub-like ground cover growing up to 3 feet in height and having an equal width. This small shrub is wind, drought, and salt-tolerant and prefers to be cultivated in areas that receive direct sunlight. It responds positively to pruning and can be useful in the landscape where there are banks or as a ground cover. There are several species of ‘Ākia on Hawai‘i Island and depending on its growth form, it can be used to effectively shade out pesky weeds while filling in empty spaces throughout the landscape. Photo Credit: Forest & Kim Starr



‘Ākulikuli (*Sesuvium portulacastrum*) – ‘Ākulikuli is an indigenous coastal plant species that can be described as being a low-lying ground cover having succulent green leaves, red stems, and light purple flowers. It is commonly grown on rocky or sandy beaches, or around marches and estuaries and forms dense mats in these areas. ‘Ākulikuli is highly wind, drought, and salt-tolerant and grows best in areas with full sun.

Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Alahe'e (*Psychotria odorata*) – This native species, which is in the coffee family, showcases dark glossy foliage and blooms periodically throughout the year. With nutrient-rich well-drained soils and a regular feeding and watering schedule, Alahe'e can grow to be 30 feet in height forming an attractive evergreen shrub or small tree. It does best in elevations from sea-level to upwards of 3,000 feet and should be planted in areas where it receives full to partial sunlight. Alahe'e is also drought and wind tolerant while being quite salt-tolerant as well.

Photo Credit: Forest & Kim Starr



Alani (*Melicope* spp.) – Alani is a long-lived endemic shrub or tree species that can grow to be anywhere from 6 to 15 feet in height depending on its location. It is commonly found in mesic to wet forests from about 1,200 to 4,000 feet in elevation and prefers to be grown in areas where there is lots of moisture and is exposed to partial sun. This species requires cool, moist, and well-drained soils to thrive. It does not tolerate full sun so it should be planted in an area that is partially shaded where it is not exposed to strong winds.

Photo Credit: Sebastian Wells



'Ama'u (*Sadleria* spp.) – This endemic tree fern is defined by its bright red new growth and its singular, compact leaf form. 'Ama'u is commonly found in areas of higher elevation mesic and wet forests and pioneer shrublands. While it can tolerate full sun it does best when it has some protection from the direct mid-day sunlight. It is wind tolerant, requires wet and somewhat moist growing conditions, as well as cinder based soils that are well-drained.

Photo Credit: J.B Friday



‘Āweoweo (*Chenopodium oahuense*) – ‘Āweoweo is a shrub or small tree that can be cultivated in areas from coastal dryland forests up to subalpine shrublands and can be anywhere from 2 to 8 feet in height. This versatile plant can be used as an accent, ground cover, or hedge, and once it is fully established it does not require regular water unless there are prolonged periods of drought. It can be grown in full sun or partial shade and is drought, wind, salt, and heat tolerant.

Photo Credit: Forest & Kim Starr



Hala (*Pandanus tectorius*) – This evergreen tree species is primarily grown in coastal habitats and can form monotypic forest stands where it can grow to be 30 feet in height. When fully mature it provides ample amounts of shade and can be used as a windbreak. Hala does best in well-drained, sandy soils and can tolerate salt spray, heavy winds, and direct sunlight.

Photo Credit: Forest & Kim Starr



Hāpu‘u (*Cibotium* spp.) – This tree fern, which is endemic to the Hawaiian Islands, is one of the most commonly found fern species in mesic and wet forest understories. Hāpu‘u is a slow-growing tree fern that can grow to be 15 feet in height being easily identified by its large arching fronds. It can be grown in areas where it receives full sun or partial shade but must have lots of moisture and well-drained soils where it is planted. It does best in areas where it is protected from the hot sun and drying winds in lowland locations and also provides a canopy for shade-loving plants in the understory. Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Hō'awa (*Pittosporum* spp.) – There are several native species of Hō'awa on Hawai'i Island all of which can reach 30 feet in height, forming a dense canopy of leaves upon reaching full maturity. It has multiple uses in the landscape as it can serve as a screen or accent while also being used to fill in large portions of open areas. Hō'awa thrives in areas where it receives full sun and if it is planted in well-drained soil mixtures.

Photo Credit: Forest & Kim Starr



'Ie'ie (*Freycinetia arborea*) – 'Ie'ie is an epiphytic woody climber that can be found clinging to trees or sprawling across the forest floor like a ground cover. It is most commonly found growing in lowland mesic to wet forest habitats from about 1,000 to 5,000 feet in elevation. This vine-like species does best in areas where it receives ample amounts of moisture and shade, and when it is planted in nutrient-rich, well-drained soils. As a climbing plant species, it is recommended to plant 'Ie'ie next to strong forest trees like Koa or 'Ōhi'a.

Photo Credit: Forest & Kim Starr



'Iliahi (*Santalum paniculatum*) – 'Iliahi, also known as Sandalwood, can be categorized as being small shrubs or trees that grow to be 16 to 33 feet when fully mature and has a slow-to-moderate growth rate. As a result of its hemiparasitic nature, 'Iliahi requires one or more host plants making intercropping essential for long-term viability. Sandalwood does best in moist, well-drained soils where it receives full or partial sunlight. It tolerates moderate levels of drought and wind disturbances and is susceptible to waterlogging and root rot if planted in substrates that do not have good drainage. Photo Credit: Sebastian Wells

Plant Species List and Associated Ecological Habitat



'Iliahi alo'e (*Santalum ellipticum*) – 'Iliahi alo'e is a coastal Sandalwood species that grows as a low lying shrub or small tree that can reach heights of 30 feet while having a spread of 10 feet or more. It is commonly found growing in a variety of habitats from sea-level up to 3,000 feet in elevation but does best in lowland dry to mesic forest environments. Coastal Sandalwood is also hemiparasitic so it does best when intercropped with host plants and prefers to be cultivated in areas where it receives full sun. It has been shown to be wind, drought, heat, and salt-tolerant as well. Photo Credit: Forest & Kim Starr



'Ilima (*Sida fallax*) – This plant, which can be described as a sprawling ground cover or shrub, has multiple uses within the landscape as it can serve as an accent, provide erosion control, as a ground cover, for hedges or screening, as well as a specimen plant. 'Ilima is commonly found in coastal areas, dryland forests, as well as mesic forests from sea-level up to 6,500 feet in elevation. It likes to grow in areas where the conditions are dry and it is exposed to full sun. It is also drought, heat, wind, and salt-tolerant and likes to be cultivated in light soils that have good drainage. Photo Credit: Forest & Kim Starr



'Ilie'e (*Plumbago zeylanica*) – This herbaceous, woody shrub has many functions in the landscape as it can serve as an accent, ground cover, or hedge, and is an ideal plant species to help mitigate soil erosion. 'Ilie'e can grow in both full sun and partial shade and is highly drought, wind, and heat tolerant. Although it can survive in dry conditions, it does best when it receives regular water and is planted in well-drained soils.

Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Kanawao (*Hydrangea arguta*) – Kanawao is Hawai‘i’s endemic Hydrangea and is most commonly found in montane wet forests throughout the Hawaiian Islands from 1,000 to 7,000 feet in elevation. This species has adapted to low light conditions as it grows in the understory of many native forests and does best when it is planted in a location where it receives partial sunlight in moist, well-drained soils.

Photo Credit: Sebastian Wells



Kāwa‘u (*Ilex anomala*) – This long-lived tree species can grow to be 40 feet in height when fully mature and is commonly found in mesic to wet forests between 2,000 and 4,600 feet in elevation. It requires well-drained soils for optimal growth and can be cultivated in areas where it receives full sun or partial shade in areas of lower elevation, however, it does best in situations where it receives low light exposure. Kāwa‘u is wind tolerant and prefers environments that are relatively moist.

Photo Credit: Forest & Kim Starr



Koa (*Acacia koa*) – Koa is the largest endemic tree species in the Hawaiian Islands, which grows rapidly and can reach heights upwards of 100 feet when fully mature, creating an open and wide-spreading canopy up to 40 feet or more. It is recommended that Koa be planted in areas upwards of 2,000 feet in elevation in spaces where it receives full sunlight. This tree species is not tolerant of salty, infertile, waterlogged soils, or areas where it is exposed to shade or high winds. It is also important to note that its surface roots can be easily damaged by human, animal, or vehicular traffic. Photo Credit: J.B. Friday



Koai'a (*Acacia koaia*) – Koai'a, which is a close relative to Koa, has a smaller stature when compared to Koa as it only grows to be around 30 feet in height when fully mature having a canopy spread of roughly 20 feet. It does best in areas where it receives full sun and is shown to be drought and wind tolerant. Koai'a thrives in dry and moist watering conditions having minimal watering requirements. Like Koa, its surface roots can be easily damaged by human, animal, or vehicular traffic and should be planted in an area where it is not exposed to these disturbances. Photo Credit: Forest & Kim Starr



Koki'o ke'oke'o (*Hibiscus arnottianus* subsp. *arnottianus*) – This Hibiscus species can grow up to 30 feet in height producing large fragrant flowers throughout most of the year. Koki'o ke'oke'o likes to be grown in areas where it receives full to partial sunlight out of persistent strong winds and responds positively to nutrient-rich, moist soils that are well-drained. It has a variety of uses in the landscape as it can serve as an accent, a hedge, and a screening plant, and grows at a moderately fast rate.

Photo Credit: Forest & Kim Starr



Kōlea (*Myrsine lessertiana*) – This endemic mid-canopy tree species is a beautiful specimen to include in any landscape and is easily identifiable by its striking liko (new growth) which ranges in color from light pink to magenta. Kōlea is commonly found in mesic to wet forests from 700 to 7,200 feet in elevation and can grow to be 30 to 50 feet tall when fully mature. It is not salt or drought-tolerant and does well in areas where it receives full or partial sunlight in wet, well-drained soils. Care must be taken when transplanting this species as its roots cannot tolerate agitation or disturbances. Photo Credit: Sebastian Wells

Plant Species List and Associated Ecological Habitat



Kolomona (*Senna gaudichaudii*) – This low lying shrub or small tree can grow to be anywhere from 2 to 10 feet tall depending on the conditions and can be used as an accent, hedge, or as a screening plant. It is most commonly found growing in coastal to lowland mesic forests, anywhere from sea-level up to 4,000 feet in elevation. Although it can tolerate partial shade, Kolomona does best when it is grown in areas where it receives full sunlight. It responds positively to light, well-drained soils and is shown to be drought and heat tolerant.

Photo Credit: Forest & Kim Starr



Kōpiko (*Psychotria hawaiiensis*) – When fully mature, this endemic tree species can reach heights upwards of 40 feet and have a canopy cover of roughly 30 feet. It can be cultivated in a variety of habitat types from sea-level up to 5,000 feet in elevation in dry, mesic, and wet forest environments. Kōpiko requires moist, well-drained soils and prefers to be planted in areas where it receives partial sunlight.

Photo Credit: Forest & Kim Starr



Kou (*Cordia subcordata*) – Kou is an evergreen tree species that is medium in size growing to be 30 to 50 feet in height with a spread of over 25 feet when fully developed. It is a great shade tree and can be used for screening purposes as well. It does best in full sun, is salt-tolerant, and requires substantial amounts of water until it is fully established. It is important to note that this tree species has a shallow root system that can be damaged by continuous surface disturbances so it is best to plant it in areas where it is not susceptible to heavy foot or vehicular traffic.

Photo Credit: Forest & Kim Starr



Kūkaenēnē (*Coprosma ernodeoides*) – This sprawling groundcover is commonly found growing in open areas like lava and cinder fields from about 4,000 to 8,500 feet in elevation. As an early successional plant species, Kūkaenēnē can tolerate dry conditions and can grow in areas where there is very little soil or organic material. It does best in areas where it receives full or partial sun but can also grow in the shade as an understory plant. Kūkaenēnē is tolerant of drought, wind, as well as soils that are wet for prolonged periods of time.

Photo Credit: Forest & Kim Starr



Kūpaoa (*Dubautia scabra*) – Kūpaoa is characterized by being an early successional sprawling ground cover or soft shrub. It is primarily found in barren lava flows or pioneer lava shrubland communities where there is very little soil, in elevations between 250 to 8,000 feet. This species, which is in the sunflower family, occupies sites that receive roughly 24 to 250 inches of rainfall annually and can withstand some of the most inhospitable environmental conditions as it is exposed to very dry, hot, and wind-exposed circumstances.

Photo Credit: Forest & Kim Starr



Lama (*Diospyros sandwicensis*) – Depending on its location and habitat type, Lama can be a dominant component of dry, mesic, and lowland wet forests ranging in elevation from 15 to 4,000 feet. This is a slow-growing tree species that is relatively easy to maintain once it becomes fully established. It does best in areas where it receives full to partial sun but can tolerate moderate amounts of shade as well. It is drought and wind tolerant, and it is suggested to plant Lama with other native shrubs and ground covers that prefer to be cultivated in dry conditions.

Photo Credit: Forest & Kim Starr



Laukahi (*Dryopteris wallichiana*) – Also known as ‘I‘o nui, this indigenous evergreen fern can grow up to 4 feet in height with its fronds extending outwards from its central crown. This fern is commonly found growing in montane mesic and wet forests as well as subalpine mesic shrublands. It does best in moist, well-drained soils that are periodically wet in areas where it is out of the full sun and in partial shade. Laukahi requires very little maintenance once it is established and is known to be somewhat drought tolerant.

Photo Credit: Sebastian Wells



Loulu (*Pritchardia* spp.) – There are over two dozen endemic *Pritchardia* species in Hawai‘i which can be characterized as slow-growing, hardy fan palms that can grow to 20 feet in height when fully mature. Loulu can be grown in dry, mesic, and wet forest environments up to 1,500 feet in elevation and prefers to be planted in areas where it gets full sun in well-drained, moderately wet soils. It is drought, salt, and wind tolerant, and unlike other fan palms, it is relatively low maintenance as it does not produce large amounts of leaf or seedpod litter.

Photo Credit: Forest & Kim Starr



Maiapilo (*Capparis sandwichiana*) – This woody shrub has multiple uses in the landscape as it can serve as an accent or hedge, while also being a good ground cover in dry coastal areas and/or open lava substrates. It does best in elevations between sea-level and 500 feet and is highly drought, salt, wind, and heat tolerant. Maiapilo prefers to be grown in areas where it receives full sun and in soils that are well-drained. It requires frequent watering until it becomes fully established and it is recommended that watering schedules be reduced during periods of prolonged heavy rain.

Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Maile (*Alyxia stellata*) – Maile is an endemic vine that commonly occurs in shady, moist environments from 500 to 3,000 feet in elevation. It does well as an understory plant species as it can climb and grow on other native shrubs or tree species. It prefers to be cultivated in areas where it receives full or partial sunlight, and for best results plant it in nutrient-rich, well-drained soils. It is somewhat drought tolerant but if planted in areas with full sun it may require more frequent watering. Another important note is that it is not salt-tolerant.

Photo Credit: Forest & Kim Starr



Māmaki (*Pipturus albidus*) – Māmaki grows in a variety of habitats from sea-level to 3,000 feet in elevation in areas where it is exposed to full sun, partial sun, or is heavily shaded. It responds positively to added organic material such as mulch, or grass clippings and requires substantial amounts of water. This fast-growing species is a valuable understory plant as its leaves can block sunlight preventing unwanted understory plants from germinating. It is also useful for attracting butterflies and for native habitat rehabilitation projects.

Photo Credit: J.B. Friday



Māmāne (*Sophora chrysophylla*) – Māmāne is a nitrogen-fixing tree that is commonly found in dry to mesic forests in areas from 1,500 to 10,000 feet in elevation. It grows best in areas where it receives full sun in well-drained soils. This tree species is drought, wind, and fire-tolerant when it is fully mature but does not tolerate clay soils or coastal environments where it is exposed to salt spray. To increase the chance of survival, Māmāne seedlings should be protected from intense direct sunlight, strong winds, and heavy rain events until they are roughly a foot in size.

Photo Credit: J.B. Friday

Plant Species List and Associated Ecological Habitat



Manono (*Kadua affinis*) – This endemic species is highly variable in its form as it can be described as a liana, shrub, and tree. When fully mature, it can be anywhere from 6 to 30 feet in height and have a spread of more than 10 feet. Manono is commonly found in mesic to wet forests from 850 to 7,000 feet in elevation and is relatively easy to grow. It should be cultivated in an area where it receives partial sun or under other plants for added protection and likes moist well-drained soils.

Photo Credit: Sebastian Wells



Manono (*Kadua centranthoides*) – *K. centranthoides* is a sprawling shrub with stems growing to be 6 feet long depending on the environment in which it is being grown. It is commonly found from about 1,200 to 6,300 feet in elevation in pioneer lava substrates, wet forests, and occasionally in mesic forests as well. This plant requires very little maintenance once it becomes established and prefers to be grown in areas where it receives full or partial sun, in moist to wet well-drained soils.

Photo Credit: Sebastian Wells



Ma'o (*Gossypium tomentosum*) – Also known as Hawaiian cotton, this low-lying ground cover or shrub reaches 2 to 6 feet in height and produces attractive bright yellow flowers. It does best in lowland coastal areas up to dryland forests in elevations from sea-level up to 1,000 feet. Ma'o does best when it is planted in areas where it receives full sunlight in light, well-drained soils. It is drought, wind, heat, and salt-tolerant and requires very little water once they become fully established.

Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Ma'ō hau hele (*Hibiscus brackenridgei*) – This endemic Hibiscus is a great specimen to include in a variety of landscapes and with all Hibiscuses, it can be easily groomed to your desired height or shape. Ma'ō hau hele does best in areas where it receives full sun and is capable of growing in both wet and dry environments. It is a fast-growing, low maintenance plant that is both heat and drought tolerant, but, it can be overwatered resulting in anaerobic soil conditions that may negatively impact plant viability. It is also important to note that due to its shallow root system, it is susceptible to high wind events that may cause it to uproot and fall over. Photo Credit: Sebastian Wells



Milo (*Thespesia populnea*) – Milo is a dense evergreen tree species that can grow to 40 feet in height with a spread of 30 to 40 feet when fully mature and is commonly found in coastal areas up to about 1,000 feet in elevation. It can be used as a screen or windbreak, as well as being a great specimen for providing shade. This tree species grows best in full sun and is adaptable to a variety of soil conditions including clay, sand, cinder, and coral-based soils. It does not respond positively to heavy pruning and is salt, drought, wind, and heat tolerant.

Photo Credit: Forest & Kim Starr



Naio (*Myoporum sandwicense*) – Found in a variety of habitats and comprising multiple growth forms, Naio can be found in coastal environments, lava fields, as well as mesic to wet forests from sea-level up to 8,000 feet in elevation. Naio is a hardy shrub or tree species that can be grown in both moist and dry conditions but requires full sun and soil with good drainage to succeed. It is drought, heat, wind, and salt-tolerant and should only be watered during times of prolonged drought conditions once it is fully established.

Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Nanea (*Vigna marina*) – Nanea is a slender, climbing perennial herb that is commonly found in coastal habitats sprawling on the ground or growing up trees and shrubs. As a member of the Fabaceae family, this nitrogen-fixing plant will provide other plants with readily available nitrogen and can be used in open, sunny areas as a ground cover and to mitigate erosion. It does best in well-drained soils where it receives full sun and is drought, wind, heat, and salt-tolerant.

Photo Credit: Forest & Kim Starr



Nānū (*Gardenia brighamii*) – This endemic Gardenia species has many uses in the landscape as it can serve as an accent, hedge, a shade tree, and as a screening plant which can grow to be 30 feet high with a canopy spread of 10 to 15 feet when fully mature. Nānū does best in dry to mesic forests from 1,000 to 2,000 feet and when it is cultivated in areas where it receives full sunlight. Like other Gardenia species, Nānū is easy to grow as it requires little maintenance once it is established and can be grown in a variety of soil types. This endemic Gardenia species is drought and wind tolerant. Photo Credit: Forest & Kim Starr



Naupaka kahakai (*Scaevola taccada*) – Naupaka kahakai is easy to grow and is an indigenous coastal shrub that can grow up to 10 feet in height when fully mature. This plant species has a variety of uses in the landscape as it can serve as a hedge, a screening plant, provide shade, as well as helping to prevent erosion. It thrives in full sun environments but tolerates shady areas as well and is salt, wind, heat, and drought tolerant. It requires well-drained soils such as sand, cinder, or coral and as a species that has been shown to help prevent erosion, it binds sand in coastal habitats.

Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Neneleau (*Rhus sandwicensis*) – This endemic tree species is found in a variety of locations throughout Hawai‘i Island between 500 to 7,000 feet in elevation. It grows to be 15 to 25 feet when fully mature and is relatively easy to cultivate. Neneleau responds positively when it is grown in well-drained soils, it can tolerate both wet and dry conditions, and does best in areas where it is exposed to full or partial sun. Neneleau can reproduce by seed dispersal and suckers so it is recommended to consider those growth traits before outplanting this species.

Photo Credit: Forest & Kim Starr



‘Ohai (*Sesbania tomentosa*) - ‘Ohai is an endemic plant species that can grow to be a small hedge, tree, or be a sprawling shrub that can encompass a 15 to 45-foot area in its prostrate form. It is most commonly found growing in low elevation dry habitats from sea-level up to 3,000 feet. This species does best in dry areas where it receives full sun and is planted in well-drained soils. As a dry coastal plant species, ‘Ohai is drought, wind, salt, and heat tolerant. It is important to note that excessive watering will lead to this cultivar becoming a host to a variety of pests and fungal diseases. Photo Credit: Forest & Kim Starr



‘Ohe makai (*Polyscias sandwicensis*) – This is a long-lived endemic tree species that can grow to be 15 to 50 feet tall when fully mature with the canopy spreading over 60 feet. ‘Ohe makai is relatively easy to grow and maintain when it is cultivated in drier habitats that have loose free-draining cinder based soils. It grows best in areas where it is exposed to full sun and is drought, wind, and heat tolerant. As a drought-tolerant plant, ‘Ohe makai can survive in extremely dry, drought-like conditions and will likely perish if there is consistently too much moisture in the soil from excessive watering.

Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



‘Ohe mauka (*Polyscias oahuensis* & *P. hawaiiensis*)
‘Ohe mauka is an easy to grow, hardy tree species that is found in mesic to wet forest environments from about 500 to 3,000 feet in elevation. Both species are better suited for areas of higher elevation and do well in well-drained cinder and nutrient-rich organic soils. They have the ability to grow in areas where it is exposed to both full and partial sunlight and is somewhat drought tolerant as it requires periodic watering or rainfall to keep the soil moist.

Photo Credit: Forest & Kim Starr



‘Ōhelo (*Vaccinium reticulatum*) - ‘Ōhelo likes to grow in open areas as erect or sprawling shrubs in mesic to wet forests ranging from 1,600 to 6,000 feet in elevation. This is a long-lived, slow-growing shrub that can reach up to 15 feet in height when fully mature. It prefers well-drained cinder based soils and likes to be cultivated in areas where it is exposed to full or partial sunlight. As a species that is in the same genus as Blueberries and Cranberries, ‘Ōhelo has a shallow root system that can be negatively impacted by dry/drought-like conditions and requires moist to wet soils to survive. Photo Credit: Forest & Kim Starr



‘Ōhelo kau lā‘au (*Vaccinium calycinum*) – ‘Ōhelo kau lā‘au is the largest and tallest of all three native *Vaccinium* species, with this species growing over 15 feet tall and being at least 6 feet wide when fully mature. Besides the difference in growth form, *V. calycinum*’s growth requirements are similar to the ones listed above which can be used as a guide for its cultivation.

Photo Credit: Forest & Kim Starr



'Ōhi'a lehua (*Metrosideros polymorpha*) - 'Ōhi'a lehua is one of the most common and highly variable tree species found throughout the island of Hawai'i. It can be found growing from sea-level up to 7,200 feet in elevation and is highly variable in its growth form as it can be seen in nature as a shrub, or small to large tree. This endemic species is relatively easy to grow as it tolerates a broad range of soil conditions, temperature regimes, and elevation gradients. It has good wind and drought tolerance but can only tolerate moderate levels of salt spray.

Photo Credit: Forest & Kim Starr



'Ōlapa (*Cheirodendron trigynum*) – This endemic species is commonly seen in mesic or wet forests as a shrub or tree. It grows to be 50 feet in height when fully mature and is characterized by having shiny leaves that appear in groups of three fluttering in the wind. 'Ōlapa prefers to be grown in cooler conditions and does best in areas where it is exposed to full sun to partial shade. This species requires moist, well-drained soils and is not salt-tolerant. In addition, weeds can absorb the much-needed water required by this tree species, and burying the lower portion of the trunk can cause it to die. Photo Credit: Forest & Kim Starr



Olopua (*Nestegis sandwicensis*) – Olopua is an endemic tree species that can grow up to 50 feet in height and have a spread of 30 feet or more when fully mature. Like many other endemic species, Olopua is a slow-growing tree that requires very little maintenance once established. It does best in areas where it receives full sun and has been shown to be able to tolerate both dry and moist soil conditions. This tree species is drought and wind tolerant and likes to be planted in well-drained soils that consist of cinder and nutrient-rich organic material.

Photo Credit: Forest & Kim Starr



Paʻiniu (*Astelia menziesiana*) – Paʻiniu is a perennial herb defined by its silvery rosettes and is commonly found growing on trees (epiphytically) or in the understory of montane wet forests. They are commonly found in elevations from 2,000 to 5,000 feet and require cool and moist conditions where it receives ample amounts of water. It does best in areas where it receives partial or full shade which makes it a great choice for filling in areas that are heavily shaded. Its growth rate is slow-to-moderate and it cannot tolerate salt or habitual wind exposure.

Photo Credit: Sebastian Wells



Palapalai (*Microlepia strigosa*) – Growing to be 2 to 3 feet in height and having a 3 to 5-foot spread, Palapalai forms an excellent ground cover that is easy to grow and easy to maintain. It does well as an understory plant species under large trees or shrubs where its clump size can increase relatively quickly. This indigenous fern does best in areas that are partially shaded, wind-protected, and in moist soils that are not clay-like or become easily waterlogged. It does poorly in areas where it is exposed to direct sunlight and elevated temperatures.

Photo Credit: Forest & Kim Starr



Pāpala kēpau (*Pisonia brunoniana*) – Pāpala kēpau is a large shrub or small tree species that can grow to be 50 feet tall under ideal growing conditions. It produces very sticky fruits that were once used by ancient Hawaiians to trap native birds and collect their vibrant colored feathers. It is most commonly found growing in dry to mesic forest environments anywhere from 1,200 to 3,000 feet in elevation and do best when they are cultivated in areas where they receive full to partial sunlight. It is recommended to plant them in moist, nutrient-rich, well-drained soils.

Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Pāwale (*Rumex* spp.) – This endemic, low sprawling shrub is commonly found colonizing new a‘a and pahoehoe lava substrates in Kona, Puna, and southern Kā‘u as an early successional plant species in areas from 2,000 to 12,000 feet in elevation. As a species that can tolerate barren lava substrates, Pāwale does best in areas where it receives full sun and requires very little maintenance once it becomes established. It does best in loose, well-drained soils and can tolerate hot, dry, and windy conditions, but it is suggested to water it periodically during times of prolonged drought. Photo Credit: Sebastian Wells



Pilo (*Coprosma* spp.) – There are 13 endemic species in the genus *Coprosma*. Pilo has many forms and can vary depending on its habitat as it can be a low sprawling shrub or a spindly tree with multiple branches. It is commonly found in areas from 1,200 to 8,000 feet in elevation growing in mesic, wet, and even subalpine forests under a variety of light conditions. It does best in nutrient-rich, well-drained soils.

Photo Credit: Sebastian Wells



Pōhinahina (*Vitex rotundifolia*) – Pōhinahina is a low lying medium-sized vine or shrub-like species that can encompass large areas under the right circumstances. It is an excellent plant to incorporate into landscapes of lower elevations as it is extremely salt, heat, wind, and drought tolerant. This species likes to be grown in areas where it receives full sun with plants becoming more sparse and leggy when grown in heavily shaded areas that receive excessive amounts of water. It does best in light, well-drained soils that consist of clay, sand, cinder, or coral.

Photo Credit: Forest & Kim Starr



Pōhuehue (*Ipomoea pes-caprae*) – Pōhuehue is a herbaceous vine that spreads rapidly, rooting at each node, forming a mat like groundcover that can be useful for mitigating erosion. It is most commonly found on sandy beaches, marshes, and occasionally in areas of lower elevation and is drought, wind, salt, and heat tolerant. Plant in soils that are loose and well-drained. In addition, Pōhuehue must be grown in areas where it receives full sun as it is shade intolerant. Shady environments combined with excessive watering can promote harmful fungal growth.

Photo Credit: Forest & Kim Starr



Pua kala (*Argemone* spp.) – Pua kala is an endemic non-woody herbaceous plant species that is relatively easy to grow and is a beautiful addition to any landscape. It grows in elevations from sea-level up to 6,200 feet and is one of the few endemic plant species that can tolerate extremely dry drought-like conditions while also being able to withstand hot and windy conditions and hardpan soils. For best growing and flowering potential, grow in areas where it receives full sun. Frequent overwatering can lead to these plants becoming top heavy causing them to fall over instead of standing tall.

Photo Credit: J.B. Friday



Pūkiawe (*Leptecophylla tameiameia*) – This indigenous shrub species inhabits a variety of different areas in the wild from low elevation mesic forests to montane wet forests and up to the cool and dry subalpine shrublands. Although it is most commonly seen as a shrub, in some circumstances it can grow to be upwards of 12 feet high with a spread of about 6 to 8 feet resembling something similar to a tree. It can be cultivated in areas where it receives full or partial sunlight in light, well-drained soils. It is wind, heat, and slightly salt-tolerant as well.

Photo Credit: Sebastian Wells

Plant Species List and Associated Ecological Habitat



‘Uhaloa (*Waltheria indica*) – ‘Uhaloa is an indigenous sprawling shrub that is commonly found growing from sea-level up to 4,000 feet in elevation. This plant species requires very little maintenance once it becomes established and is a great plant for native forest restoration as it can colonize newly cleared areas in coastal or dryland forest habitats. It does best when it is grown in areas where it receives full sun in well-drained soils and is drought, wind, heat, and salt-tolerant.

Photo Credit: Bryan Harry NPS



‘Uki (*Machaerina angustifolia*) – ‘Uki is a non-woody, clumping sedge that has rhizomes or stolons as its root system. This species is found in a variety of habitats ranging from deserts to montane wet forests as well as pioneer lava shrublands growing in elevations from about 1,300 to 7,000 feet. It likes to be grown in open areas where it receives full or partial sunlight and is known to be wind tolerant. ‘Uki likes wet, and well-drained soils that are comprised of cinders mixed with light organic materials.

Photo Credit: Forest & Kim Starr



‘Uki‘uki (*Dianella sandwicensis*) - ‘Uki‘uki is a relatively common perennial herb that is easy to grow and is best outplanted as an understory plant with trees, shrubs, and other ground covers. As it becomes more developed, it can have a 3 to 5-foot spread which makes it a good plant for filling in open areas in the landscape. It can be cultivated in spaces where it receives full or partial sunlight, in addition to areas that are heavily shaded. It is drought, wind, salt, and heat tolerant and likes to be grown in soils that have good drainage.

Photo Credit: Forest & Kim Starr



'Ūlei (*Osteomeles anthyllidifolia*) – This indigenous evergreen species thrives in both moist and dry areas as a tree growing up to 14 feet in height at higher elevations, and as a low sprawling ground cover at sea-level. 'Ūlei is a hardy plant that requires very little maintenance once established and has a variety of uses in the landscape as it can serve as a ground cover, hedge, and/or screening plant, while also helping to mitigate erosion. It does best in areas where it receives full to partial sunlight in well-draining soil. 'Ūlei is also drought, wind, and heat-tolerant while being somewhat salt-tolerant as well.

Photo Credit: Forest & Kim Starr



Wiliwili (*Erythrina sandwicensis*) – Wiliwili is a large dryland forest tree species that can grow to be 18 to 45 feet tall depending on the location and conditions in which it is grown. This tree species grows at a moderately fast rate and does well in dry, lowland elevations between sea-level and 2,500 feet. It is recommended to plant this endemic tree species in a dry location where it receives full sunlight in well-drained soils.

Photo Credit: Forest & Kim Starr

Non-Native/Non-Invasive Plant Species List

Table 1 Coastal Non-Native/Non-Invasive Vegetation Plant Species List

Hawaiian/Common Name	Scientific Name	Growth Form	Moisture Regime	Status	Forest Dedication Type
Aloe	<i>Aloe</i> spp.	Herb	D/M	Non-native / non-invasive	NF/FF/SF
Blue Plumbago	<i>Plumbago auriculata</i>	Shrub	M/W	Non-native / non-invasive	NF/FF
Calamansi	<i>Citrus x Citrofortunella mitis</i>	Tree	M/W	Non-native / non-invasive	NF/FF
Cape Plumbago	<i>Plumbago auriculata</i>	Shrub	M/W	Non-native / non-invasive	NF/FF
Common Plumeria	<i>Plumeria rubra</i>	Tree	D/M	Non-native / non-invasive	NF/FF/SF
Desert Rose	<i>Adenium obesum</i>	Shrub	D/M	Non-native / non-invasive	NF/FF/SF
Dracaena	<i>Dracaena</i> spp.	Shrub/Tree	D/M/W	Non-native / non-invasive	NF/FF
Dwarf Poinciana	<i>Caesalpinia pulcherrima</i>	Tree	D/M	Non-native / non-invasive	NF/FF/SF
Firecracker Plant	<i>Russelia equisetiformis</i>	Shrub	D/M/W	Non-native / non-invasive	NF/FF
Gardenia	<i>Gardenia</i> spp.	Shrub	D/M/W* (*depending on species)	Non-native / non-invasive	NF/FF
Hau	<i>Hibiscus tiliaceus</i>	Tree	M/W	Polynesian introduction	NF/FF
Kamani	<i>Calophyllum inophyllum</i>	Tree	D/M/W	Polynesian introduction	NF/FF
Kī	<i>Cordyline fruticosa</i>	Shrub	M/W	Polynesian introduction	NF/FF
Kō	<i>Saccharum officinarum</i>	Perennial Grass	M/W	Polynesian introduction	NF/FF
Kukui	<i>Aleurites moluccana</i>	Tree	D/M/W	Polynesian introduction	NF/FF
Lemon	<i>Citrus limon</i>	Tree	M/W	Non-native / non-invasive	NF/FF
Lily of the Nile	<i>Agapanthus africanus</i>	Ground cover	M/W	Non-native / non-invasive	NF/FF

Plant Species List and Associated Ecological Habitat

Lime	<i>Citrus spp.</i>	Tree	M/W	Non-native / non-invasive	NF/FF
Mai'a	<i>Musa acuminata</i>	Large Herb	M/W	Polynesian introduction	NF/FF
Mango	<i>Mangifera indica</i>	Tree	D/M/W	Non-native / non-invasive	NF/FF/SF
Niu	<i>Cocos nucifera</i>	Palm	D/M/W	Polynesian introduction	NF/FF
Noni	<i>Morinda citrifolia</i>	Shrub/Tree	D/M/W	Polynesian introduction	NF/FF
Orange	<i>Citrus spp.</i>	Tree	M/W	Non-native / non-invasive	NF/FF
Pineapple	<i>Ananas comosus</i>	Perennial Herb	D/M	Non-native / non-invasive	NF/FF
Pua male	<i>Stephanotis floribunda</i>	Vine	D/M	Non-native / non-invasive	NF/FF
Rainbow Shower Tree	<i>Cassia x nealiae</i>	Tree	M/W	Non-native / non-invasive	NF/FF
Red Spurge	<i>Euphorbia cotinifolia</i>	Tree	D/M/W	Non-native / non-invasive	NF/FF
Singapore Plumeria	<i>Plumeria obtusa</i>	Tree	D/M	Non-native / non-invasive	NF/FF
Spider Lily	<i>Crinum asiaticum</i>	Shrub	M/W	Non-native / non-invasive	NF/FF
'Ulu	<i>Artocarpus altilis</i>	Tree	M/W	Polynesian introduction	NF/FF

Table Key: D = Dry / M = Mesic / W = Wet / NF = Native Forest / FF = Functional Forest
SF = Successional Forest

Plant Species List and Associated Ecological Habitat

Table 2 Lowland Non-Native/Non-Invasive Vegetation Plant Species List

Hawaiian/Common Name	Scientific Name	Growth Form	Moisture Regime	Status	Forest Dedication Type
‘Alaea	<i>Bixa orellana</i>	Shrub	D/M/W	Non-native / non-invasive	FF
Aloe	<i>Aloe</i> spp.	Herb	D/M	Non-native / non-invasive	FF/SF
‘Ape	<i>Alocasia macrorrhizos</i>	Herb	M/W	Polynesian introduction	FF
‘Awa	<i>Piper methysticum</i>	Shrub	M/W	Polynesian introduction	FF
‘Awapuhi	<i>Zingiber zerumbet</i>	Herb	M/W	Polynesian introduction	FF
Azalea	<i>Rhododendron indicum</i>	Shrub	M/W	Non-native / non-invasive	FF
Blue Daze	<i>Evolvulus glomeratus</i>	Ground Cover	M/W	Non-native / non-invasive	FF
Calabash Tree	<i>Crescentia cujete</i>	Tree	M/W	Non-native / non-invasive	FF
Calamansi	<i>Citrus x Citrofortunella mitis</i>	Tree	M/W	Non-native / non-invasive	FF
Cape Honeysuckle	<i>Tecoma capensis</i>	Shrub	D/M	Non-native / non-invasive	FF
Cape Plumbago	<i>Plumbago auriculata</i>	Shrub	M/W	Non-native / non-invasive	FF
Cardboard Palm	<i>Zamia furfuracea</i>	Palm	D/M	Non-native / non-invasive	FF
Chenille Plant	<i>Acalypha hispida</i>	Shrub	M/W	Non-native / non-invasive	FF
Common Hibiscus	<i>Hibiscus rosa-sinensis</i>	Shrub	D/M/W	Non-native / non-invasive	FF
Common Plumeria	<i>Plumeria rubra</i>	Tree	D/M	Non-native / non-invasive	FF/SF
Copper Leaf	<i>Acalypha wilkesiana</i>	Shrub	D/M	Non-native / non-invasive	FF
Coral Hibiscus	<i>Hibiscus schizopetalus</i>	Shrub	D/M/W	Non-native / non-invasive	FF
Croton	<i>Codiaeum variegatum</i>	Shrub	D/M/W	Non-native / non-invasive	FF

Plant Species List and Associated Ecological Habitat

Day Lily	<i>Hemerocallis fulva</i> var. <i>aurantiaca</i>	Ground Cover	M	Non-native / non-invasive	FF
Desert Rose	<i>Adenium obesum</i>	Shrub	D/M	Non-native / non-invasive	FF/SF
Doña Luz Mussaenda	<i>Mussaenda</i> x 'Doña Luz'	Shrub	M/W	Non-native / non-invasive	FF
Dracaena	<i>Dracaena</i> spp.	Shrub/Tree	D/M/W	Non-native / non-invasive	FF
Dwarf Poinciana	<i>Caesalpinia pulcherrima</i>	Tree	D/M	Non-native / non-invasive	FF/SF
False Eranthemum	<i>Pseuderanthemum carruthersii</i>	Shrub	D/M/W	Non-native / non-invasive	FF
Firecracker Plant	<i>Russelia equisetiformis</i>	Shrub	D/M/W	Non-native / non-invasive	FF
Gardenia	<i>Gardenia</i> spp.	Shrub	D/M/W* (*depending on species)	Non-native / non-invasive	FF
Hau	<i>Hibiscus tiliaceus</i>	Tree	M/W	Polynesian introduction	FF
Ipu	<i>Lagenaria siceraria</i>	Vine	D/M	Polynesian introduction	FF
Ixora	<i>Ixora chinensis</i>	Shrub	M/W	Non-native / non-invasive	FF
Jaboticaba	<i>Myrciaria cauliflora</i>	Tree	M/W	Non-native / non-invasive	FF
Kalo	<i>Colocasia esculenta</i>	Herb	M/W	Polynesian introduction	FF
Kamani	<i>Calophyllum inophyllum</i>	Tree	M/W	Polynesian introduction	FF
Kī	<i>Cordyline fruticosa</i>	Shrub	M	Polynesian introduction	FF
Kō	<i>Saccharum officinarum</i>	Perennial Grass	M/W	Polynesian introduction	FF
Kukui	<i>Aleurites moluccana</i>	Tree	D/M/W	Polynesian introduction	FF
Lemon	<i>Citrus limon</i>	Tree	M/W	Non-native / non-invasive	FF
Lily of the Nile	<i>Agapanthus africanus</i>	Ground cover	M/W	Non-native / non-invasive	FF
Lime	<i>Citrus</i> spp.	Tree	M/W	Non-native / non-invasive	FF
Lychee	<i>Litchi chinensis</i>	Tree	M/W	Non-native / non-invasive	FF
Mai'a	<i>Musa acuminata</i>	Large Herb	M/W	Polynesian introduction	FF

Plant Species List and Associated Ecological Habitat

Mango	<i>Mangifera indica</i>	Tree	D/M/W	Non-native / non-invasive	FF/SF
Niu	<i>Cocos nucifera</i>	Palm	M/W	Polynesian introduction	FF
Noni	<i>Morinda citrifolia</i>	Shrub/Tree	D/M/W	Polynesian introduction	NF/FF
‘Ohe kahiko	<i>Schizostachyum glaucifolium</i>	Large Grass	M	Polynesian introduction	FF
‘Ōhi‘a ‘ai	<i>Syzygium malaccense</i>	Tree	M/W	Polynesian introduction	FF
‘Ōlena	<i>Curcuma longa</i>	Herb	M/W	Polynesian introduction	FF
Orange	<i>Citrus</i> spp.	Tree	M/W	Non-native / non-invasive	FF
Pia	<i>Tacca leontopetaloides</i>	Perennial Herb	M/W	Polynesian introduction	FF
Pineapple	<i>Ananas comosus</i>	Perennial Herb	D/M	Non-native / non-invasive	FF
Pua kenikeni	<i>Fagraea berteriana</i>	Tree	M/W	Non-native / non-invasive	FF
Pua male	<i>Stephanotis floribunda</i>	Vine	D/M	Non-native / non-invasive	FF
Rainbow Shower Tree	<i>Cassia x nealiae</i>	Tree	M/W	Non-native / non-invasive	FF
Red Spurge	<i>Euphorbia cotinifolia</i>	Tree	D/M/W	Non-native / non-invasive	FF
Singapore Plumeria	<i>Plumeria obtusa</i>	Tree	D/M	Non-native / non-invasive	FF
Soursop	<i>Annona muricata</i>	Tree	M/W	Non-native / non-invasive	FF
Spathiphyllum	<i>Spathiphyllum</i> spp.	Perennial Herb	M/W	Non-native / non-invasive	FF
Spider Lily	<i>Crinum asiaticum</i>	Shrub	M/W	Non-native / non-invasive	FF
Starfruit	<i>Averrhoa carambola</i>	Tree	M/W	Non-native / non-invasive	FF
Turk’s Cap	<i>Malvaviscus penduliflorus</i>	Shrub	D/M/W	Non-native / non-invasive	FF
‘Uala	<i>Ipomoea batatas</i>	Vine	M/W	Polynesian introduction	FF
Uhi	<i>Dioscorea alata</i>	Perennial Herb	D/M	Polynesian introduction	FF
‘Ulu	<i>Artocarpus altilis</i>	Tree	M/W	Polynesian introduction	FF
Wauke	<i>Broussonetia papyrifera</i>	Tree	M/W	Polynesian introduction	FF

Plant Species List and Associated Ecological Habitat

Yesterday, Today, and Tomorrow	<i>Brunfelsia australis</i>	Shrub	M/W	Non-native / non-invasive	FF
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Table Key: D = Dry / M = Mesic / W = Wet / NF = Native Forest / FF = Functional Forest
SF = Successional Forest

Plant Species List and Associated Ecological Habitat

Table 3 Montane Non-Native/Non-Invasive Vegetation Plant Species List

Hawaiian/Common Name	Scientific Name	Growth Form	Moisture Regime	Status	Forest Dedication Type
‘Awapuhi	<i>Zingiber zerumbet</i>	Herb	M/W	Polynesian introduction	NF/FF
Azalea	<i>Rhododendron indicum</i>	Shrub	M/W	Non-native / non-invasive	NF/FF
Blue Daze	<i>Evolvulus glomeratus</i>	Ground Cover	M	Non-native / non-invasive	NF/FF
Calabash Tree	<i>Crescentia cujete</i>	Tree	M	Non-native / non-invasive	NF/FF
Calamansi	<i>Citrus x Citrofortunella mitis</i>	Tree	M/W	Non-native / non-invasive	NF/FF
Cape Honeysuckle	<i>Tecoma capensis</i>	Shrub	M/W	Non-native / non-invasive	NF/FF
Chenille Plant	<i>Acalypha hispida</i>	Shrub	M/W	Non-native / non-invasive	NF/FF
Common Hibiscus	<i>Hibiscus rosa-sinensis</i>	Shrub	D/M	Non-native / non-invasive	NF/FF
Common Plumeria	<i>Plumeria rubra</i>	Tree	D/M	Non-native / non-invasive	NF/FF/SF
Copper Leaf	<i>Acalypha wilkesiana</i>	Shrub	M/W	Non-native / non-invasive	NF/FF
Coral Hibiscus	<i>Hibiscus schizopetalus</i>	Shrub	D/M/W	Non-native / non-invasive	NF/FF
Croton	<i>Codiaeum variegatum</i>	Shrub	M/W	Non-native / non-invasive	NF/FF
Day Lily	<i>Hemerocallis fulva</i> var. <i>aurantiaca</i>	Ground Cover	D/M	Non-native / non-invasive	NF/FF
Doña Luz Mussaenda	<i>Mussaenda</i> x ‘Doña Luz’	Shrub	M/W	Non-native / non-invasive	NF/FF
Dracaena	<i>Dracaena</i> spp.	Shrub / Tree	D/M/W	Non-native / non-invasive	NF/FF
Gardenia	<i>Gardenia</i> spp.	Shrub	D/M/W* (*depending on species)	Non-native / non-invasive	NF/FF
Ixora	<i>Ixora chinensis</i>	Shrub	D/M	Non-native / non-invasive	NF/FF
Jaboticaba	<i>Myrciaria cauliflora</i>	Tree	M/W	Non-native / non-invasive	NF/FF

Plant Species List and Associated Ecological Habitat

Kī	<i>Cordyline fruticosa</i>	Shrub	D/M/W	Polynesian introduction	NF/FF
Lemon	<i>Citrus limon</i>	Tree	M/W	Non-native / non-invasive	NF/FF
Lime	<i>Citrus</i> spp.	Tree	M/W	Non-native / non-invasive	NF/FF
‘Ōlena	<i>Curcuma longa</i>	Herb	M/W	Polynesian introduction	NF/FF
Orange	<i>Citrus</i> spp.	Tree	M/W	Non-native / non-invasive	NF/FF
Spathiphyllum	<i>Spathiphyllum</i> spp.	Perennial Herb	M/W	Non-native / non-invasive	NF/FF
Turk’s Cap	<i>Malvaviscus penduliflorus</i>	Shrub	D/M/W	Non-native / non-invasive	NF/FF
‘Uala	<i>Ipomoea batatas</i>	Vine	M/W	Polynesian introduction	NF/FF
Yesterday, Today, and Tomorrow	<i>Brunfelsia australis</i>	Shrub	D/M/W	Non-native / non-invasive	NF/FF

Table Key: D = Dry / M = Mesic / W = Wet / NF = Native Forest / FF = Functional Forest
SF = Successional Forest

Photographs and Descriptions of Non-Native/Non-Invasive Plant Species



‘Alaea (*Bixa Orellana*) – Also known locally as Achiote, Annatto, or Lipstick plant, ‘Alaea is a relatively fast-growing shrub that can grow up to be 30 feet in height when fully mature. It is most commonly found growing in lowland elevations up to 3,000 feet and does best in areas where it receives full to partial sunlight. ‘Alaea does best in moist, nutrient-rich, well-drained soils and requires regular water until it becomes fully established. It has a low tolerance to strong winds and salt spray and is moderately drought tolerant.

HPWRA score: 1 (Low Risk).

Photo Credit: Forest & Kim Starr



Aloe (*Aloe* spp.) – The species within the *Aloe* genus can be low lying groundcovers or can grow relatively tall developing a hedgelike appearance. It can be grown from sea-level up to 3,000 feet in elevation and does best in areas where it receives full sun but can also be grown in partial shade. Aloe needs light, well-drained soils for it to survive and requires very little maintenance once it becomes fully established. Most of the species within this genus are drought, wind, and salt-tolerant.

HPWRA score: (Low Risk).

Photo Credit: Forest & Kim Starr



‘Ape (*Alocasia macrorrhizos*) – Also known as Giant Taro or Elephant’s Ear, this Polynesian introduction grows rapidly up to heights of 12 feet producing large leaves that resemble those of Taro. ‘Ape can be grown in areas where it is exposed to full sun or partial shade, and also do well in the understory of closed-canopy forest environments. It grows best when it is cultivated in rich, organic, moist soils that are well-drained. This plant species is not salt or wind tolerant and should be planted in an area where it is not subject to frequent wind flow or disturbances. No HPWRA score available.

Photo Credit: Forest & Kim Starr



'Awa (*Piper methysticum*) – 'Awa grows as a well-rounded branching shrub ranging in size from 4 to 12 feet tall depending on the habitat in which it is grown. It is commonly found in shaded to open mesic valleys and is most commonly propagated from freshly harvested cuttings. When planting in the landscape, it is best to wait until the wet and rainy months of winter and should be grown in areas where it is exposed to full to partial sun in well-drained soils. 'Awa is not wind tolerant so it should be planted in an area where it is not exposed to strong winds. HPWRA score: -4 (Low Risk).
Photo Credit: Forest & Kim Starr



'Awapuhi (*Zingiber zerumbet*) – 'Awapuhi, also known as Shampoo ginger, is a clump-forming perennial herb that is commonly found in the understory of mesic forests. Going dormant during the winter months and losing all of its foliage, it regenerates and grows back in the spring. This species of ginger rarely grows taller than 3 feet and can colonize large areas of the landscape so it is best to cultivate it in open areas. It is a shade-loving understory plant that does best in moist soils and can be propagated by splitting and replanting its rhizomes. HPWRA score: -1 (Low Risk).
Photo Credit: Forest & Kim Starr



Azalea (*Rhododendron indicum*) – This evergreen shrub from Japan can reach heights of up to 6 feet while having an 8-foot span when fully mature. The flowers come in a variety of different colors and can be cultivated in multiple habitat types from lowland mixed forests up to areas of higher elevation. For Azaleas to do best, they need to be grown in areas where they are not exposed to direct sunlight in slightly acidic, well-drained soils. Mulch placed around the base of the tree will help retain moisture while also providing it with added nutrients. HPWRA Score: 4 (Low Risk).
Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Blue Daze (*Evolvulus glomeratus*) – Blue Daze is a sprawling groundcover that forms a dense mat reaching 18 inches in height when fully developed. It produces showy blue flowers throughout most of the year and grows in a variety of lowland elevations up to 3,000 feet. This groundcover does best in areas that receive full to partial sunlight and can be useful for covering embankments where other species may be difficult to grow. It requires regular watering until it becomes fully established, is moderately drought tolerant, and cannot handle salt spray. HPWRA score: 0 (Low Risk).

Photo Credit: Forest & Kim Starr



Calabash Tree (*Crescentia cujete*) – Known as La‘amia in Hawaiian, this round canopied evergreen tree species can grow to heights of 40 feet when fully mature. Calabash trees do best in lowland elevations where it is hot and dry requiring full sun and moist, well-drained soils for optimum plant viability. It is moderately drought, wind, and salt-tolerant and its unique branching structure makes this specimen useful for creating a shady understory.

HPWRA score: -8 (Low Risk).

Photo Credit: Forest & Kim Starr



Calamansi (*Citrus x Citrofortunella mitis*) – Calamansi is a popular citrus tree that is found in a variety of landscapes throughout Hawai‘i. This evergreen tree species is relatively small when compared to other common citrus species but its nutrient-rich fruits are highly desirable for their use in marinades, cocktails, and more. Please use the references in the additional resources section for information on how to successfully cultivate Calamansi trees here in Hawai‘i County.

HPWRA score: 0 (Low Risk).

Photo Credit: Krzysztof Ziarnek, Kenraiz

Plant Species List and Associated Ecological Habitat



Cape Honeysuckle (*Tecoma capensis*) – Known as I'iwi haole in Hawaiian, this evergreen shrub can be useful as a hedge, screening plant, or to cover embankments growing up to 10 feet in height when fully mature. This plant species does best when it is grown in areas where it receives full sunlight and is planted in nutrient-rich, well-drained soils. It is relatively easy to grow and is shown to be wind, salt, and heat-tolerant while being slightly drought tolerant as well.

HPWRA score: 6 (Low Risk).

Photo Credit: Forest & Kim Starr



Cape Plumbago (*Plumbago auriculata*) – Cape Plumbago is a dense evergreen shrub species that can reach heights upwards of 6 feet bearing pronounced blue and white flowers throughout the majority of the year. It has multiple uses in the landscape as it can serve as a hedge, as a bank cover, or to brighten up your garden with its beautiful colored flowers. It likes to be grown in areas where it receives full sun in nutrient-rich, well-drained soils and is moderately salt, wind, heat, and drought tolerant.

HPWRA score: 6 (Low Risk).

Photo Credit: Forest & Kim Starr



Cardboard Palm (*Zamia furfuracea*) – This is a low-lying palm species that has fronds that extend up to 3 to 4 feet in height with an equal spread. It does best in lowland elevations up to 3,000 feet and prefers to be grown in full sun but can tolerate partial shade or full shade as well. Cardboard Palms grow well in light, well-drained soils and are salt, wind, heat, and partially drought tolerant as it requires regular watering until it becomes fully established.

HPWRA score: -2 (Low Risk).

Photo Credit: Forest & Kim Starr



Chenille Plant (*Acalypha hispida*) – Growing up to 8 feet in height when fully mature, this shrub species does best when it is cultivated in lowland elevations up to 3,000 feet. Also referred to as Red Hot Poker, this evergreen plant species likes to be grown in moist, nutrient-rich soils in areas where it receives partial sun to light shade. It requires frequent watering until it becomes fully established and responds positively when it is out planted in locations where it is out of direct wind and salt spray as it cannot withstand these conditions. HPWRA score: 2 (Low Risk). Photo Credit: Forest & Kim Starr



Common Hibiscus (*Hibiscus rosa-sinensis*) – There are a variety of cultivars of Common Hibiscus in a variety of flower shapes, sizes, and colors. This evergreen species can reach heights of 15 feet when fully mature and has many uses in the landscape as it can serve as an accent, screen, or a hedge. It can be grown in areas where it receives full or partial sun and cultivated in a variety of soil types as long as it is well-drained. Common Hibiscuses are heat tolerant while being slightly salt and drought tolerant as well. HPWRA score: -2 (Low Risk). Photo Credit: Forest & Kim Starr



Common Plumeria (*Plumeria rubra*) – Plumeria's have become an integral component of many tropical landscapes in Hawai'i as their beautiful scented flowers are used to make lei and for table decorations. In some circumstances, they can grow up to 35 feet in height and do best in areas below 3,000 feet in elevation. They require very little maintenance once they are fully established and do best in loose, well-drained soils in areas where they receive full sun. They are salt and drought tolerant and can tolerate moderate levels of wind as well. HPWRA score: -5 (Low Risk). Photo Credit: Forest & Kim Starr



Copper Leaf (*Acalypha wilkesiana*) – This herbaceous shrub has dense foliage and is an ideal hedge or screening plant species that grows rapidly up to 15 feet in height when fully mature. Also known as Beefsteak plant, this hardy shrub is easy to grow, does best in lowland elevations up to 3,000 feet, and prefers to be grown in areas where it is exposed to full sun but tolerates partial shade as well. It is moderately drought and salt-tolerant and will grow in a variety of soil types with no special drainage required for its success. HPWRA score: -2 (Low Risk).
Photo Credit: Forest & Kim Starr



Coral Hibiscus (*Hibiscus schizopetalus*) – Known as Aloalo ko‘ako‘a in Hawaiian, this tall evergreen shrub grows to 15 feet in height when fully mature bearing its unique and attractive flowers throughout most of the year. It does best when it is grown in lowland areas up to 3,000 feet in elevation in places where it is exposed to full or partial sunlight. Coral Hibiscuses do well in most well-drained soils requiring a regular watering schedule until they become fully mature. This hibiscus species is not salt-tolerant but has been shown to tolerate slight heat and droughts. HPWRA score: -4 (Low Risk).
Photo Credit: Forest & Kim Starr



Croton (*Codiaeum variegatum*) – This evergreen shrub can easily reach heights of 20 feet under the right conditions if not pruned regularly. It is a common and highly desirable plant to incorporate into any landscape as its foliage comes in many shapes, sizes, and colors. Crotons do best in lowland elevations between sea-level and 3,000 feet and like to be grown in moist well-drained soils in full or partial sun. It requires regular watering and is moderately drought and salt-tolerant while also being able to tolerate strong winds. HPWRA score: -4 (Low Risk).
Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Day Lily (*Hemerocallis fulva* var. *aurantiaca*) – This is a moderately fast-growing herbaceous plant species that produces radiant flower blossoms in the spring, summer, and fall. It does best in lowland elevations up to 3,000 feet and likes to be cultivated in areas where it receives full sun. Day Lilies respond positively to moist, nutrient-rich, well-drained soils and can be used in flower beds, along borders, as accents, and to cover hills or embankments. It is moderately salt-tolerant and requires regular water until it becomes fully established. HPWRA score: -3 (Low Risk).
Photo Credit: Forest & Kim Starr



Desert Rose (*Adenium obesum*) – Desert Rose is a popular slow-growing shrub that does best when it is grown in lowland elevations from sea-level up to 3,000 feet and can reach heights up to 12 feet when fully mature. For Desert Rose to be successful, it must be grown in light, well-drained soils where it receives moderate amounts of water. It likes to be cultivated in areas where it receives full sun and can withstand heat, drought, and elevated levels of salt spray.
HPWRA score: -8 (Low Risk).
Photo Credit: Oregon State University, Department of Horticulture



Doña Luz Mussaenda (*Mussaenda* x '*Doña Luz*') – This shrub species from the Philippines can grow up to 12 feet and flowers heavily from spring through fall making it an attractive plant in the landscapes where it is grown. It does best in lowland elevations to those greater than 3,000 feet and should be planted in an area where it receives full to partial sunlight. It responds positively to moist, nutrient-rich soils that are well-drained, and is protected from strong winds. This plant species is not salt-tolerant and requires regular watering. HPWRA score: -5 (Low Risk).
Photo Credit: Forest & Kim Starr



Dracaena (*Dracaena* spp.) – There are five different species of *Dracaena* listed in the HPWRA index which are: *D. draco*, *D. fragrans*, *D. marginata*, *D. marginata* (tricolor), and *D. reflexa*, all of which have a low-risk designation. Most species are commonly found in landscapes and nurseries throughout Hawai‘i and develop a round canopy when fully mature. It likes to be grown in areas where it receives full sun, it can tolerate a variety of soil types, and is highly drought and wind tolerant.

HPWRA score: Scores vary by species (Low Risk).
Photo Credit: Forest & Kim Starr



Dwarf Poinciana (*Caesalpinia pulcherrima*) – Also known as ‘Ohai ali‘i in Hawaiian, this small evergreen tree species reaches 15 feet in height when fully mature while producing its vibrant colored flowers throughout most of the year. It does best in lowland elevations up to 3,000 feet where it is planted in loose, nutrient-rich, well-drained soils in full sun environments. It is drought, heat, and salt-tolerant and is endorsed by CGAPS and BIISC as a pono plant species.

HPWRA score: 5 (Low Risk).
Photo Credit: Forest & Kim Starr



False Eranthemum (*Pseuderanthemum carruthersii*) – This evergreen shrub can grow to heights of 10 feet when fully mature producing small white flowers throughout most of the year. It can be grown in lowland elevations to those greater than 3,000 feet and prefers to be cultivated in areas where they receive partial to full shade. They respond positively to moist, nutrient-rich, well-drained soils and are moderately drought and salt-tolerant as well. Its shape makes this species an ideal specimen for creating hedges or for screening purposes as well. HPWRA score: 1 (Low Risk).
Photo Credit: Forest & Kim Starr



Firecracker Plant (*Russelia equisetiformis*) – Known as Lōkālā in Hawaiian, this fast-growing evergreen species produces bright red flowers year-round and can reach heights of 3 to 6 feet when fully mature. It does best in lowland areas from sea-level up to 3,000 feet thriving when it is planted in locations where it receives full sun in light, nutrient-rich, well-drained soils. Lōkālā is moderately drought tolerant while being salt and wind tolerant as well.

HPWRA score: -2 (Low Risk).
Photo Credit: Forest & Kim Starr



Gardenia (*Gardenia* spp.) – There are six different species of Gardenia listed in the HPWRA index: *G. jasminoides*, *G. latifolia*, *G. taitensis*, *G. thunbergia*, *G. tubifera*, and *G. volkensii* all of which have low-risk designations. Generally speaking, most species require a regular watering regime and do best when planted in well-drained, nutrient-rich soils. Consult your local nursery provider on what species would work best at the location you plan on outplanting your Gardenias.

HPWRA score: Scores vary by species (Low Risk).
Photo Credit: Forest & Kim Starr



Hau (*Hibiscus tiliaceus*) – Hau is a fast-growing evergreen species in the Hibiscus family and can grow to be 30 feet in height when fully mature. It is commonly found and grown on beaches, along waterways, and lowland coastal areas. Its branches can form dense intertwined thickets and require regular pruning to make them grow in a straight or upright shape. *H. tiliaceus* is salt, wind, and heat tolerant and can withstand moderate drought conditions as well.

No HPWRA score available.
Photo Credit: Forest & Kim Starr



Ipu (*Lagenaria siceraria*) – Ipu is a wide-spreading climbing vine that was traditionally planted at the end of the rainy season during the hua moon phase, 3 to 4 days before the full moon. This gourd requires additional support to facilitate its growth which can be provided by rock walls, trees, or even a trellis. This Polynesian introduction does best on the leeward side of the island below elevations of 1,500 feet requiring moderate levels of watering or rainfall and well-drained soils. Planting Ipu in an area that is protected from the wind will ensure prolonged plant health and viability. HPWRA: 0 (Low Risk). Photo Credit: Forest & Kim Starr



Ixora (*Ixora chinensis*) – Ixoras are a popular plant species that are found in landscapes throughout Hawai‘i as they are highly desirable for their beautiful flowers which attract bees and other pollinator species. This evergreen shrub does best in lowland elevations up to 3,000 feet and likes to be planted in areas where it receives full to partial sunlight. They thrive when they are planted in well-drained soils and receive regular watering and additional nutrients. It cannot withstand salt spray and is useful for creating hedges, screening plants, or as an accent. HPWRA score: 0 (Low Risk). Photo Credit: Forest & Kim Starr



Jaboticaba (*Myrciaria cauliflora*) – Jaboticaba is a slow-growing tree species native to Brazil that can reach heights of 25 feet when fully mature with a rounded canopy that can have a spread of 50 feet. It grows best in lowland areas to those greater than 4,000 feet in elevation and likes to be planted in deep, nutrient-rich, well-drained soils. Regular watering is an integral component of its success and because of its shallow root system, it is recommended to surround the base of the tree with mulch to help retain water during drought-like conditions. HPWRA score: -2 (Low Risk). Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Jackfruit (*Artocarpus heterophyllus*) – This large tree species is native to India and produces the world’s largest edible fruit which grows directly off of its trunk and branches. Jackfruit does best in moist, nutrient-rich, well-drained soils in lowland elevations from above sea-level up to 3,000 feet. They like to be grown in areas where they receive full to partial sunlight and require regular water to maintain plant viability and health in short-term and long-term time frames. It is moderately salt-tolerant and cannot withstand prolonged drought-like conditions. HPWRA score: 1 (Low Risk). Photo Credit: Forest & Kim Starr



Jatropha (*Jatropha integerrima*) – This bushy evergreen tree species forms a rounded canopy growing up to 20 feet in height when fully mature. It does best in lowland elevations up to 3,000 feet and when it is planted in areas where it is exposed to full or partial sunlight. Jatrophas prefer nutrient-rich, well-drained soils and are moderately salt and drought tolerant. As this tree species flowers year-round, it provides good fodder for pollinators and as a word of caution, all parts of this tree are poisonous to humans and animals. HPWRA score: 0 (Low Risk). Photo Credit: Forest & Kim Starr



Kalo (*Colocasia esculenta*) – Considered to be one of the most important plants in the Hawaiian culture, there are numerous varieties of Kalo (Taro) found throughout the Hawaiian Archipelago and are found growing in both wet and dry environments. It is most commonly propagated from cuttings or huli and is outplanted in dryland environments where it is provided with mulch or other organic materials and in lush valleys in flowing freshwater. Kalo varies in size which is determined by the location it is grown, sun exposure, and soil quality. No HPWRA score available. Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Kamani (*Calophyllum inophyllum*) – Known as Alexandrian Laurel in English, this is a slow-growing evergreen tree species that can grow to be 60 feet in height when fully mature developing a large canopy making it a great specimen for creating shade. As a result of its dense foliage, Kamani is an effective tree to use as a windbreak or screening plant. It does best in areas where it receives full sun to partial shade, tolerating a variety of soils, and is wind, salt, and drought tolerant.

HPWRA score: 6 (Evaluate).

Photo Credit: Forest & Kim Starr



Kī (*Cordyline fruticosa*) – Green ti has a slender stem with large green leaves having relatively few branches. It has become naturalized since its introduction and can be commonly found growing in mesic forests, valleys, and throughout many commercial and residential landscapes. In some circumstances, ti can grow to be 15 feet in height when fully mature and does best when it is cultivated in moist, nutrient-rich soils. Kī is moderately tolerant of salt spray and strong winds and does best in areas that receive light to partial shade. HPWRA score: 4 (Evaluate).

Photo Credit: Forest & Kim Starr



Kō (*Saccharum officinarum*) – Like Kalo, there are multiple varieties of Kō which can be characterized as being large grasses that have hard stalks and long, pronounced blades. When fully mature, Kō, or Sugarcane, can grow to be 15 feet tall and is a nice accent to include in native gardens. It does best when it is grown in full sun in areas where it receives regular watering and is somewhat wind, salt, and drought tolerant.

HPWRA score: -2 (Low Risk).

Photo Credit: Forest & Kim Starr



Kukui (*Aleurites moluccana*) – Kukui is a fast-growing evergreen tree species with large, fully mature trees reaching roughly 60 feet in height. Commonly known as Candlenut, this Polynesian introduction is a natural component of mesic forests where it can be seen growing from sea-level up to 2,000 feet in elevation. It grows best in areas where it is exposed to full sun in moist, nutrient-rich soils that have good drainage. Although Kukui has a high-risk score, it has been here for hundreds of years and planting more is not likely to cause additional harm. HPWRA score: 12 (High Risk). Photo Credit: Forest & Kim Starr



Lemon (*Citrus limon*) – Lemon trees are widely cultivated in Hawai‘i and are adapted to a variety of locations and habitat types. While there may be other varieties of Lemon grown in Hawai‘i, this is the only species of Lemon listed in the Hawai‘i Pacific Weed Risk Assessment. Please use the references in the additional resources section for information on how to successfully cultivate Lemon trees here in Hawai‘i County.

HPWRA score: -3 (Low Risk).
Photo Credit: Forest & Kim Starr



Lily of the Nile (*Agapanthus africanus*) – This slow-growing perennial herb can reach 4 feet in height and is easy to grow in full sun or areas where it receives partial shade. It can be grown in lowland areas to places greater than 3,000 feet in elevation and requires very little maintenance once it becomes established. This plant species can be cultivated in a variety of soil types and is partially heat, salt, and drought tolerant. The vibrant flower stocks can be used in arrangements or to make lei and attracts pollinators like birds, bees, and butterflies as well. HPWRA score: 2.5 (Low Risk). Photo Credit: Forest & Kim Starr



Lime (*Citrus* spp.) – Lime trees are widely cultivated in Hawai‘i and are adapted to a variety of locations and habitat types. There are two species of Lime listed in the Hawai‘i Pacific Weed Risk Assessment that have a low-risk designation which are: *C. aurantiifolia*, and *C. latifolia*. To select which variety of Lime would work best for your location/habitat type, please refer to the Hawai‘i rainfall atlas to determine the elevation and annual precipitation rate at your property and consult with local nursery owners.

HPWRA score: Scores vary by species (Low Risk).
Photo Credit: Forest & Kim Starr



Lychee (*Litchi chinensis*) – This evergreen tree species grows up to 40 feet developing a widespread canopy when fully mature. As a result, this is a great shade tree that produces one of the most highly treasured fruits in Hawai‘i today. Plant in lowland areas below 3,000 feet in elevation in nutrient-rich, well-drained soils. Young Lychee trees do best when they are cultivated in areas where they receive protection from direct sunlight and strong winds until they are fully established. They require ample amounts of water and can tolerate full sun when fully grown. HPWRA score: -6 (Low Risk). Photo Credit: Forest & Kim Starr



Mai‘a (*Musa acuminata*) – Bananas are commonly found growing in lowland to mesic forest habitats and continues to be a staple food crop here in Hawai‘i. This large perennial herb can grow up to 15 feet tall, producing leaves that can be up to 9 feet long and 2 feet wide. While Bananas can be grown in a wide range of habitats, they do best in areas where they receive regular rainfall in well-drained soils that retain moisture. If possible, keiki should be planted in areas that are not exposed to strong winds as they are susceptible to wind damage. HPWRA score: -11 (Low Risk).
Photo Credit: Forest & Kim Starr



Mango (*Mangifera indica*) – Mangos are another common tree species that are cultivated in areas throughout Hawai‘i as it is prized for its fruit that is enjoyed in a multitude of ways. They can grow to be anywhere from 20 to 100 feet tall and do best in lowland elevations below 3,000 feet in areas where they are exposed to full sun. It requires well-drained soils and regular water and is shown to be moderately salt-tolerant. When selecting a variety for your landscape, it is critical to only choose species that coincide with the precipitation rates found at your location. HPWRA score: 1 (Low Risk). Photo Credit: Forest & Kim Starr



Niu (*Cocos nucifera*) – Coconut palms grow at a moderate rate with it reaching heights of 100 feet when fully mature. This Polynesian introduction does best in areas of lower elevation (below 1,000 feet) but can be cultivated in areas up to 3,000 feet as well. It can grow in loose sandy soils along the coast making it a species that can be useful for mitigating erosion while also being capable of growing in soils further inland as well. Niu likes to be cultivated in areas where it receives full sun and is sun, heat, and wind tolerant. HPWRA score: -4 (Low Risk). Photo Credit: Forest & Kim Starr



Noni (*Morinda citrifolia*) – Noni represents a hardy small tree species that can grow up to 15 feet in height when fully mature while having a relatively large canopy area under certain circumstances. Due to its growth form, it can serve as a hedge, windbreak, or as a screening plant. It is wind, salt, and drought tolerant and prefers to be grown in areas where it receives full sun to partial shade. As a friendly reminder, fully ripened fruits have a very strong, pungent odor so it is best to grow this plant downwind from established dwellings. HPWRA score: 10 (High Risk). Photo Credit: Forest & Kim Starr



‘Ōhi‘a ‘ai (*Syzygium malaccense*) – ‘Ōhi‘a ‘ai or Mountain Apple, is fast-growing medium tree species that is most commonly found in wet, lowland elevations. Reaching heights of 45 feet when fully mature, ‘Ōhi‘a ‘ai requires very little maintenance and can be easily grown under the right conditions. It does best in areas where it receives full to partial sunlight, and regular water. It is not salt-tolerant, but it can tolerate a variety of soil types not requiring any special drainage.

HPWRA score: 0 (Low Risk).

Photo Credit: Forest & Kim Starr



‘Ohe kahiko (*Schizostachyum glaucifolium*) – ‘Ohe kahiko is a slow-growing clumping bamboo that develops canes that are roughly 2 inches in diameter and can reach 50 feet in height forming an open canopy. This Polynesian introduction can be grown in lowland mesic areas from 0 to 500 feet in elevation and requires regular water and well-drained nutrient-rich soils. It does best in full to partial sun, is not salt-tolerant, and is a useful specimen for mitigating erosion or runoff.

HPWRA score: 0 (Low Risk).

Photo Credit: Bishop Museum Hawaiian Ethnobotany Database



‘Ōlena (*Curcuma longa*) – Also known as Turmeric, this perennial herb can be grown in lowland elevations up to 3,000 feet in elevation. It does best in areas where it is exposed to full sun or partial shade in nutrient-rich organic soils that are moist and well-drained. ‘Ōlena is moderately salt-tolerant and requires regular watering for prolonged health and longevity. Like many other species in the ginger family, ‘Ōlena is deciduous, losing its leaves 2 to 3 months out of the year returning to its original state once this cycle is complete.

HPWRA score: -8 (Low Risk).

Photo Credit: Forest & Kim Starr



Orange (*Citrus* spp.) – Orange trees are widely cultivated in Hawai‘i and are adapted to a variety of locations and habitat types. There are two species of Oranges listed in the Hawai‘i Pacific Weed Risk Assessment that have a low-risk designation which are: *C. reticulata* and *C. sinensis*. To select which variety of Orange would work best for your location/habitat type, please refer to the Hawai‘i rainfall atlas to determine the elevation and annual precipitation rate at your property and consult with local nursery owners to decide which variety would do best in your landscape. HPWRA score: -5 and -2 (Low Risk). Photo Credit: Forest & Kim Starr



Pia (*Tacca leontopetaloides*) – Pia, which is also referred to as Polynesian Arrowroot, is a fast-growing species that does best in warm, windward areas below 800 feet in elevation. It prefers to be cultivated in wet conditions in light, well-drained soils that are continually moist. It can tolerate partial shade and full sun environments and like ‘Ōlena, it will die back during the winter season and will regrow again upon completion of this part of its natural cycle.

HPWRA score: 0 (Low Risk).
Photo Credit: Forest & Kim Starr



Pineapple (*Ananas comosus*) – This herbaceous, low-lying shrub is a member of the Bromeliad family and is commonly found throughout gardens in Hawai‘i. Pineapples do best in lowland elevations up to 3,000 feet and require very little maintenance once they become fully established. They thrive when they are planted in areas where they receive full sun and require well-drained soils as waterlogged soils will cause root rot resulting in mortality. It is salt and drought tolerant as it only requires water during prolonged dry periods and when it is first out planted. HPWRA score: 3 (Low Risk). Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Pua kenikeni (*Fagraea berteriana*) – Pua kenikeni is an evergreen tree species that can grow up to 40 feet in height when fully mature forming a large and dense canopy. This medium tree species can be grown from areas of lower elevation up to 3,000 feet in areas where it receives full to partial sunlight. It requires a regular watering schedule to ensure continued survival and does best in nutrient-rich, well-drained soils.

HPWRA score: -1 (Low Risk).

Photo Credit: Forest & Kim Starr



Pua male (*Stephanotis floribunda*) – Also known by its scientific name *Stephanotis*, this is a moderately fast-growing evergreen vine that can stretch over 30 feet from the central area where it is planted. Its vibrant and fragrant white flowers make a nice addition to any landscape and are frequently used in lei, arrangements, and bouquets. Pua male does best when it is supported by a fence or trellis and likes to be cultivated in areas where it receives full sun. It likes light, well-drained soils and is moderately heat, drought, and salt-tolerant.

HPWRA score: -4 (Low Risk).

Photo Credit: Forest & Kim Starr



Rainbow Shower Tree (*Cassia x nealiae*) – Rainbow Shower Trees are found in landscapes throughout Hawai'i and are defined by their beautiful flowers. It grows at a moderately fast rate reaching 40 feet in height when fully mature and does best in lowland elevations up to 3,000 feet. It prefers to be cultivated in areas where it receives full to partial sun and is planted in well-drained soils. This tree species has good drought tolerance but is not salt or wind tolerant as its shallow root system makes them vulnerable to falling over during periods of strong winds. HPWRA score: -8 (Low Risk). Photo Credit: Forest & Kim Starr



Red Spurge (*Euphorbia cotinifolia*) – This evergreen tree species has inconspicuous flowers and bright showy leaves making it a nice accent or addition to landscapes where it can be cultivated. Under the right circumstances, this tree species can grow to be 20 feet in height when fully mature and does best in lowland elevation areas up to 3,000 feet. It does best when it is planted in areas where it receives direct sunlight in well-drained, nutrient-rich soils and is shown to be drought-tolerant but incapable of handling strong winds or salt spray. HPWRA score: -2 (Low Risk). Photo Credit: Forest & Kim Starr



Singapore Plumeria (*Plumeria obtusa*) – Singapore Plumeria are similar to *P. rubra* with the biggest difference being the leaf shape, being semi-deciduous, and displaying flowers throughout most of the year. *P. obtusa* also does best in areas below 3,000 feet in elevation and can grow up to 35 feet in height when fully mature. This plumeria species thrives in hot, semidry conditions and prefers to be grown in areas where it receives full sun. It is also drought, and salt-tolerant and it is suggested to be planted in moist, well-drained soils for best results. HPWRA score: -6 (Low Risk). Photo Credit: Forest & Kim Starr



Soursop (*Annona muricata*) – Soursop is a small evergreen tree species that produces fruit multiple times throughout the year which does not require hand pollination like other species in the same genus. It does best in lowland elevations above the shoreline up to 3,000 feet in nutrient-rich soils that are well-drained. Plant this species in an area where it is exposed to full sunlight and receives regular water. Soursop is not salt or drought tolerant. The fruits have an extensive list of health benefits and it is important to note that the seeds are the only portion of the tree that are inedible. HPWRA score: -3 (Low Risk). Photo Credit: Forest & Kim Starr

Plant Species List and Associated Ecological Habitat



Spathiphyllum (*Spathiphyllum* spp.) – This is an herbaceous clumping plant species that has glossy green leaves and produces vibrant white to greenish white flowers. It does best in lowland elevations up to 3,000 feet and when it is cultivated in nutrient-rich, loamy soils that have good drainage. Spathiphyllum thrive in low light conditions, requires regular water and protection from the wind, and is not salt-tolerant. There are two species listed in the HPWRA index: *S. Cannifolium* and *S. wallisii*, both of which have a low-risk score. HPWRA score: Scores vary by species (Low Risk). Photo Credit: Forest & Kim Starr



Spider Lily (*Crinum asiaticum*) – This small to medium evergreen shrub forms broad clumps up to 5 feet in height serving as an ornamental accent or border in the landscape. Spider Lilies grow best in lowland elevations up to 3,000 feet thriving in areas where it receives full sun. It prefers moist, well-drained soils and is tolerant of salt, drought-like conditions, and areas where it is covered by partial shade. Fragrant flower clusters are produced year-round and can be incorporated into leis or flower arrangements. HPWRA score: -4 (Low Risk). Photo Credit: Forest & Kim Starr



Starfruit (*Averrhoa carambola*) – This is a slow-growing evergreen tree species that can grow up to 20 feet in height and is easy to cultivate in a variety of landscapes throughout Hawai‘i County. Starfruit does best in elevations lower than 1,500 feet in nutrient-rich, well-drained loamy soils and does poorly in oxygen-deficient waterlogged soils. Plant Starfruit trees in areas where they will receive full sun and away from locations where it is exposed to salt spray as it has a low salt-tolerance.

HPWRA score: -1 (Low Risk).
Photo credit: Forest & Kim Starr



Turk's cap (*Malvaviscus penduliflorus*) – Also known as Pahūpahū, this evergreen shrub is a relative of Hibiscus which can be identified by its similar leaf, flower, and growth form. It can grow up to 15 feet in height when fully mature and grows best in lower elevations from sea-level to 3,000 feet. It does best in areas where it receives full sun in moist, well-drained soils. It is shown to be slightly salt-tolerant and requires regular watering until it becomes fully established.

HPWRA score: -9 (Low Risk).

Photo Credit: Forest & Kim Starr



‘Uala (*Ipomoea batatas*) – ‘Uala, also known as Hawaiian Sweet Potato, is a sprawling vine that acts as a ground cover with heart-shaped leaves that range in color from green to deep purples depending on the variety. It does best in lowland elevations between 0 to 3,000 feet in areas where it receives full to partial sunlight. It is shown to be drought, somewhat salt-tolerant, and has the ability to effectively reduce soil erosion. One additional requirement for the best results is well-drained, nutrient-rich soils.

HPWRA score: 2 (Low Risk).

Photo Credit: Forest & Kim Starr



Uhi (*Dioscorea alata*) – Uhi is another edible Polynesian introduction that can be incorporated into functional forest habitats. It can be grown from 15 to 2,000 feet in elevation and is a fast-growing, climbing vine that likes to be supported by the trunks of trees or trellises. This yam species requires fertile, nutrient-rich soils and grows best in areas where it receives full sunlight. Uhi is not drought tolerant as it requires ample amounts of water during the growing season and is therefore suggested to plant it in areas that receive elevated levels of rainfall. No HPWRA score available. Photo Credit: Forest & Kim Starr



'Ulu (*Artocarpus altilis*) – Also known as Breadfruit, 'Ulu is a large evergreen tree species that can grow up to 60 feet in height when fully mature. It is primarily cultivated in areas of lower elevation from 0 to 500 feet and is a highly desirable species that is known for its ornamental foliage and large edible fruits. 'Ulu does best in areas where it is exposed to full to partial sunlight and is not wind, salt, or drought-tolerant as it will defoliate if it experiences interruptions in watering schedules or periods of prolonged drought conditions. HPWRA score: -12 (Low Risk).
Photo Credit: Forest & Kim Starr



Wauke (*Broussonetia papyrifera*) – Also known as Paper Mulberry, Wauke is a fast-growing small tree species that can reach heights of 15 feet when fully mature. It does best in areas where it receives full sun to partial shade, requiring substantial amounts of water to ensure proper growth and prolonged plant viability. It is slightly salt-tolerant and requires loose well-drained soils. As a result of its growth form, Waukes abundant root suckers prevent other species from growing in close proximity to its base.
HPWRA score: 3 (Low Risk).
Photo Credit: Forest & Kim Starr



Yesterday, Today, and Tomorrow (*Brunfelsia australis*) – This shrub species develops a dense crown or hedge-like shape when fully mature and gets its name from the flower's colors fading from a vibrant lavender to white as they age. It does well in most elevations as it can be grown from lowland areas to places upwards of 3,000 feet and does best when it is exposed to partial shade. This plant can be cultivated in a variety of soil types, requires regular water until it becomes fully established, and is not tolerant of salt spray.
HPWRA score: -3 (Low Risk).
Photo Credit: Forest & Kim Starr

Habitat Range Maps

Moisture Regime Map

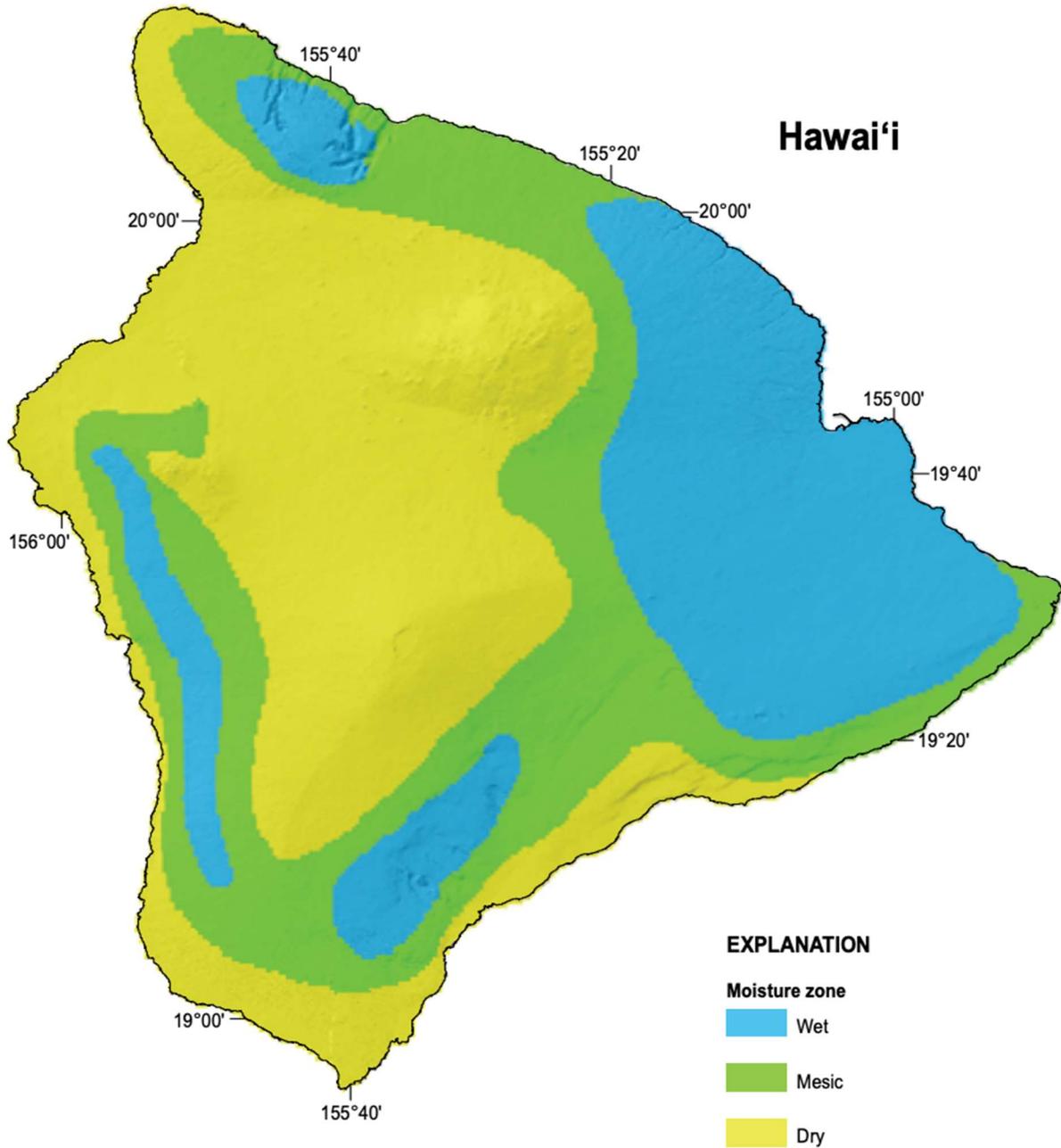


Figure 1. Produced by the U.S. Geological Survey, Pacific Island Ecosystems Research Center 2017. This map illustrates dry, mesic, and wet moisture regimes on the Big Island of Hawai'i. Link to the full publication can be found in the additional resources section.

Elevation Range Map

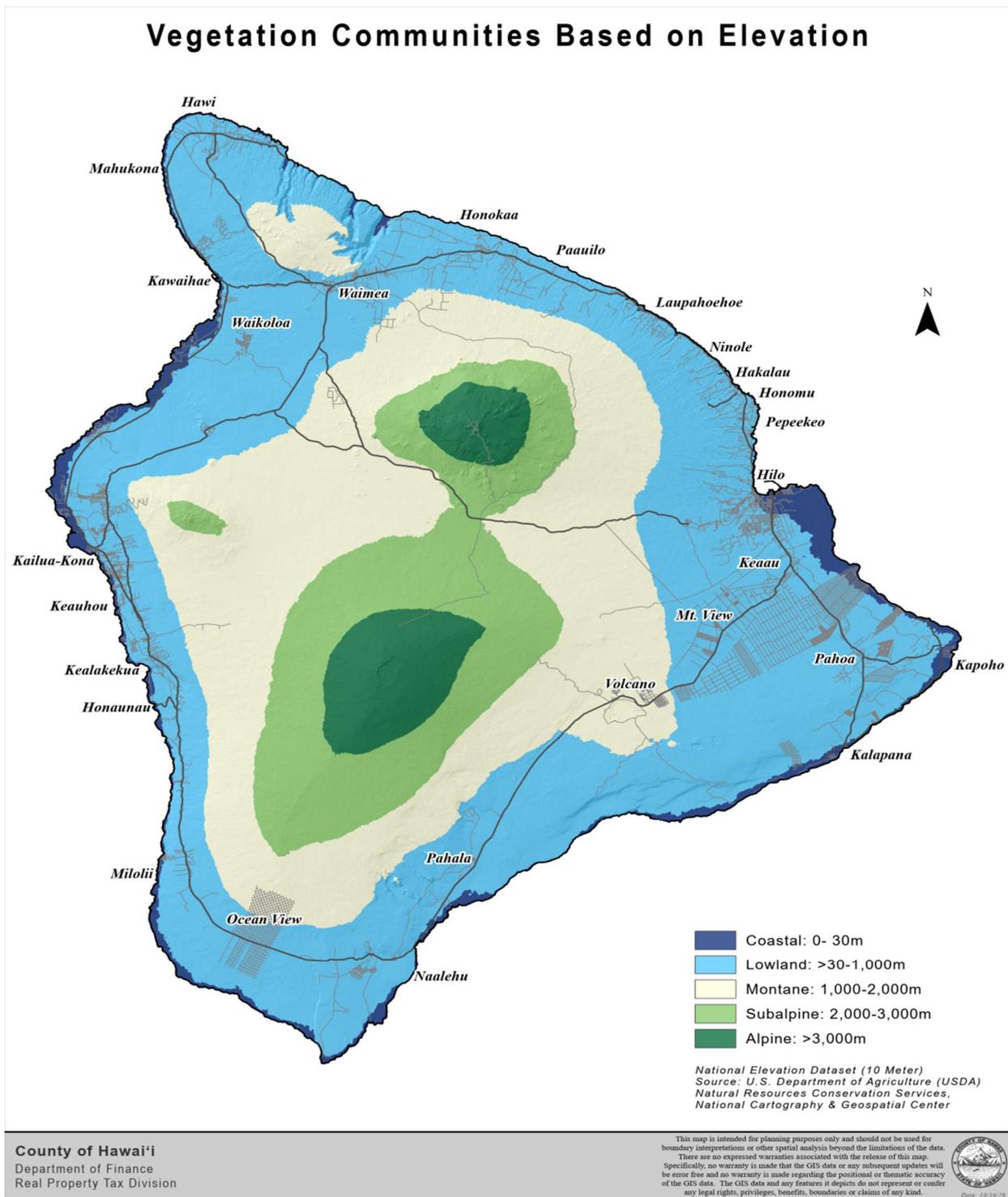


Figure 2. Created by Cheryl Chan of the County of Hawai'i Real Property Tax Division, this map illustrates the different elevational zones and the plant community types associated with the corresponding elevations on the Big Island of Hawai'i.

Appendix

Glossary of Terms

Abiotic. Non-living components of an ecosystem such as wind, sunlight, soil, temperature, water, and the atmosphere.

Alpine. Areas of 10,000-foot elevation or greater.

Biodiversity. Biological diversity in an environment as indicated by the numbers of different species of plants, animals, and other living organisms.

Biotic. Living components of an ecosystem including plants, animals, insects, fungus, etc.

Canopy Layer. The canopy layer is the uppermost layer of forest habitat and is comprised of a continuous layer of large or dominant tree species. This forest layer is constantly exposed to sunlight and can be variable in size and structure as not all species will have the same height.

Coastal. Areas from sea-level (0) to 100 feet in elevation.

Dry. Classified as a moisture regime that receives less than 50 inches of precipitation annually. This area can be described by plants that are adapted to drought-like conditions as they have the ability to grow in soils where there is very little moisture available for their consumption.

Ecological Threshold. The point at which there is an abrupt change in an ecosystem's quality and/or property, or a phenomenon when small changes in the environment produce significant responses in the ecosystem.

Endemic. Naturally occurring only in a particular location or specified area such as a single island or across the Hawaiian Archipelago and nowhere else on the planet.

Epiphytic. A plant that is commonly found living or growing on another plant but has no negative impact on its host as it does not derive its nourishment from it.

Functional Forest. To be consistent with the terminology used in Chapter 19, Article 8, Section 19-59 of the Hawai'i County Code, functional forests pertains to lands that have sixty percent or greater species forest cover combined with non-native/non-invasive species forest cover.

Indigenous. An organism that is naturally occurring or living in a given area but is naturally occurring in other locations as well.

Lowland. Areas from 100 to 3,000 feet in elevation.

Mesic. This moisture regime can be described by receiving 50 to 100 inches of rainfall annually

and having moist, adequate soil moisture retention for most of the year. Water available to plants is removed somewhat slowly in relation to supply. Available soil moisture is a reflection of the frequency and magnitude of climatic inputs such as rainfall, fog, evapotranspiration, river flow, and groundwater or surface water retention.

Montane. Occurring primarily on leeward slopes of Hawai‘i Island between 3,000 to 6,500 feet in elevation.

Native Forest. To be consistent with the terminology used in Chapter 19, Article 8, Section 19-59 of the Hawai‘i County Code, native forests are defined as lands that have sixty percent or greater native species cover either in the tree layer, the understory, or a combination of the two.

Native. Plant species that became established or evolved in the Hawaiian Islands without the aid of human beings.

Niche. Describes the ecological role a species or population of the same species plays in the ecosystem where it is found, including the ways it meets its food and shelter requirements, how it survives, and how it reproduces.

Non-native/Non-invasive. Plant species that are not native to the Hawaiian Islands, having arrived with human help, which do not invade or overtake native species habitat and have a Hawai‘i-Pacific Weed Risk Assessment score of six or less.

Polynesian Introduction. Plant species that were introduced to the Hawaiian Islands by Polynesian voyagers.

Subalpine. Areas between 6,500 to 10,000 feet in elevation.

Successional Forest. To be consistent with the terminology used in Chapter 19, Article 8, Section 19-59 of the Hawai‘i County Code, successional forests are lands that have new lava substrates currently unsuitable for cultivation such that soil depths and/or organic matter are less than 10 cm.

Tree Layer. This layer sits directly below the canopy layer and is part of the forest environment where small to medium tree species grow forming dense networks of branches that shade the lower portions of the forest floor.

Understory Layer. Located below the tree layer, this forest layer which sits between the canopy and the forest floor is comprised of cohorts of naturally regenerating new tree species and a combination of small to large shrubs, groundcovers, ferns, and other species that can tolerate these heavily shaded forest habitats.

Wet. An area that receives 100 inches or more of rainfall annually. This area can be described by soils that are periodically or often inundated with water and the water table being at or above the soil surface.

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Additional Resources

Baseline and Projected Future Carbon Storage and Carbon Fluxes in Ecosystems of Hawai‘i – Published by the United States Geological Survey, Pacific Island Ecosystems Research Center, and edited by Paul C. Selmants, Christian P. Giardina, James D. Jacobi, and Zhiliang Zhu. This publication has detailed information about the distribution and types of different vegetation communities on Hawai‘i Island and across the State of Hawai‘i.

Available from: <https://pubs.usgs.gov/pp/1834/a/pp1834.pdf>

Citrus for Hawai‘i’s Yards and Gardens – Publication by the College of Tropical Agriculture and Human Resources, University of Hawai‘i at Mānoa. This resource provides readers with useful information on growing citrus trees in Hawai‘i.

Available from: https://www.ctahr.hawaii.edu/oc/freepubs/pdf/F_N-14.pdf

Common Forest Trees of Hawaii (Native and Introduced) – This publication by Little, E.L. and Skolmen, R.G. of the U.S. Forest Service includes a detailed list and description of forest tree species that can be commonly found throughout different habitat types on Hawai‘i Island.

Available from: <https://www.fs.fed.us/psw/publications/documents/misc/ah679.pdf>

Department of Forestry and Wildlife (DOFAW) Rare Plant Program – Online resource from the State of Hawai‘i, Division of Forestry and Wildlife Native Ecosystems & Protection Management website. This is a useful resource about the ethics and other considerations that should be made when it comes to the protection of native forests and rare plants that live within them.

Available from: <https://dlnr.hawaii.gov/ecosystems/rare-plants/>

Hawai‘i-Pacific Weed Risk Assessment (HPWRA) – Online resource with information pertaining to the evaluation process of exotic plant species and their level of invasiveness in Hawai‘i and other Pacific Islands.

Available from: <https://sites.google.com/site/weedriskassessment/home>

Hawaiian Native Plant Propagation Database – College of Tropical Agriculture and Human Resources (CTAHR) the University of Hawai‘i at Mānoa. Information is available for native and endemic plant species propagation and selection in public and private landscapes.

Available from: <https://www.ctahr.hawaii.edu/hawnprop/>

Laukahi Hawai‘i Plant Conservation Network – This is a useful guide that provides information about topics including collecting seeds from native plants, strategies for plant conservation,

species of conservation importance, and many other useful and interesting native plant-related topics.

Available from: <https://laukahi.org/>

Lemons in Hawai‘i – Written by Ken Love and Robert E. Paul and published by the College of Tropical Agriculture and Human Resources, University of Hawai‘i at Mānoa. This online resource provides readers with insights on how to successfully cultivate Lemons in Hawai‘i.

Available from: https://www.ctahr.hawaii.edu/oc/freepubs/pdf/F_N-25.pdf

Mapping Plant Species Ranges in the Hawaiian Islands – Developing a Methodology for Associated GIS Layers – Written by J.P. Price et al. 2012, this publication expands on the three (3) moisture regimes used in this document by providing readers with a list of seven (7) moisture regimes with corresponding maps which is an additional resource that can help determine what moisture regime you are in and what types of plants can be grown at your location. It also has a link (Appendix, species table pdf.) which has links to a total of 1,158 maps and the corresponding range of habitats where these endemic and indigenous plant species are commonly found.

Available from: <https://pubs.usgs.gov/of/2012/1192/>

Native Plants Hawai‘i – Online resource for native plant propagation, outplanting, and maintenance techniques.

Available from: <http://nativeplants.hawaii.edu/>

Native Plants for Landscaping, Conservation, and Reforestation – Written by Heidi L. Bornhorst and Fred D. Rauch and published by the College of Tropical Agriculture and Human Resources, University of Hawai‘i at Mānoa. This publication can be used as a reference to guide native forest restoration projects and is a useful resource for the development of forestry management plans.

Available from: <https://www.ctahr.hawaii.edu/oc/freepubs/pdf/of-30.pdf>

Plant Pono – Plant Pono is a partnership between the Hawai‘i Invasive Species Council, Coordinating Group on Alien Pest Species (CGAPS), the Hawai‘i Biological Information Network, with advice and participation from the Landscape Industry Council of Hawai‘i and its member associations. This online resource was developed to help the general public make pono planting decisions. Their mission is to endorse and promote green businesses that make the plant pono pledge while also providing information about cultivating plants.

Available from: <https://plantpono.org/>

Plant Species List and Associated Ecological Habitat

Rainfall Atlas of Hawai‘i – Resource for determining the location, elevation, annual rates of precipitation, and annual temperature variations of the project site.

Available from: <http://rainfall.geography.hawaii.edu/>

United States Fish and Wildlife Service (USFWS) Pacific Islands Fish and Wildlife Office – This resource is designed to promote the conservation of the shared natural resources of Hawai‘i and the Pacific Islands and includes a comprehensive list of endangered ferns and fern allies, a list of endangered flowering plants, in addition to a list of threatened plant species.

Available from: <https://www.fws.gov/Pacificislands/promo.cfm?id=177175799>

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