

Forest Legacy

Amended Assessment of Needs State of Hawai'i



Photograph by Steve Bergfeld

December 2018

Assessment of Needs—Amendment Preface

For more than 20 years, the State of Hawai‘i, through the Department of Land and Natural Resources Division of Forestry and Wildlife (DLNR), has participated in the federal Forest Legacy Program (FLP). The FLP is an important tool in a state where forests cover nearly half of our total land area and provide our isolated island chain its most precious resource: fresh water. Hawai‘i’s tropical forests have suffered dearly from clearing, grazing, invasion of alien species that threaten the quality of our watersheds, and conversion to development, including for agricultural and residential use. In spite of these threats, Hawai‘i forests continue to provide habitat for a large number of rare and endangered plant and animal species, cultural resources, and forest products that help diversify Hawai‘i’s economy.

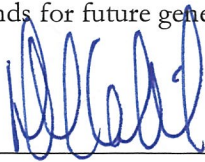
The purpose of the FLP is to protect environmentally and culturally important forestlands from conversion. The initial 1994 Assessment of Needs (AON), which documented forested areas, natural resources, and land use trends, identified two small Forest Legacy Areas (FLAs) that “tested” the program’s effectiveness in Hawai‘i. The 2004 amendment expanded the extent of eligible FLAs to include the private lands in the Conservation District and watershed partnerships, with a heavy focus on protecting watersheds and declining native flora and fauna. The state also assumed responsibility for the administration of the program as part of the 2004 update under the state grant option. Under the state administration of the program and with a broader focus on implementation of projects promoting watershed protection and biodiversity conservation, significant progress has been made in protecting our critical mauka forested watersheds. The next step in the evolution of the FLP is to further target the program to identify and support conservation on additional lands not previously covered that can be added to our network of protected watersheds and native habitats or can be developed to contribute to our forest-based economy.

In the past 13 years, there have been many changes to our environment and economy, as well as social, political, and policy changes, both good and bad, that have a direct effect on our forests and how we use them. Private property forest owners, the conservation community, DLNR, and the Hawai‘i Forest Stewardship Advisory Committee believe it is time to once again revise the state AON to target the program to priority lands that meet the emerging needs and opportunities of the times, increase participation, generate stronger proposals, and increase our effectiveness at protecting our precious forest resources.

The central purpose of this amended AON is to articulate a change in the eligibility criteria used to identify FLAs in Hawai‘i, expand the extent of eligible lands to areas not previously covered that are most at threat of conversion, and increase support for traditional forest uses while maintaining core program objectives to support watershed and biodiversity conservation.

We are proud of the partnership work we have accomplished over the past 23 years with the U.S. Forest Service to protect forestlands and watersheds with the FLP. We hope that you share our view that this amended AON

will help reinforce and guide our purpose: to conserve and ensure the sustainable management of Hawai'i's forestlands for future generations.



David G. Smith, Administrator
State of Hawai'i Department of Land and Natural Resources
Division of Forestry and Wildlife

12/6/18

Date

Table of Contents

| | |
|---|----|
| Assessment of Needs—Amendment Preface | i |
| Chapter 1: Introduction | 1 |
| 1.1 Authority and Purpose of the Forest Legacy Program | 1 |
| 1.2 Hawai‘i Forest Legacy Program Background..... | 1 |
| 1.3 Goals of the Forest Legacy Program in Hawai‘i | 3 |
| Literature Cited..... | 4 |
| Chapter 2: Overview of Hawai‘i’s Forests | 5 |
| 2.1 A Historical Perspective | 5 |
| 2.2 Natural History: Geology, Climate, and Soils | 6 |
| 2.3 Forest Cover and Composition..... | 6 |
| 2.4 Forest Plantations..... | 7 |
| 2.5 Forest Ownership and Control..... | 8 |
| 2.6 Recent Trends | 9 |
| Literature Cited..... | 11 |
| Chapter 3: Importance of Hawai‘i’s Forests..... | 12 |
| 3.1 Watershed Protection | 12 |
| 3.2 Economic Benefits from Forest Products | 13 |
| 3.3 Non-timber Forest Products and Cultural Resources | 14 |
| 3.4 Wildlife, Plants, and Unique Forest Communities..... | 15 |
| 3.5 Rare, Threatened, and Endangered Species Habitat..... | 16 |
| 3.5.1 Plants | 17 |
| 3.5.2 Wildlife..... | 17 |
| 3.5.3 Terrestrial Invertebrates | 18 |
| 3.6 Geological, Aesthetic, and Scenic Resources | 18 |
| 3.7 Mineral and Geothermal Resource Potential..... | 19 |
| 3.8 Public Access..... | 20 |
| 3.8.1 Recreation..... | 20 |
| 3.8.2 Public Hunting..... | 21 |
| Literature Cited..... | 22 |
| Chapter 4: Threats to Hawai‘i’s Forests | 24 |
| 4.1 Land Protection | 24 |
| 4.2 Land and Landowner Circumstances..... | 28 |
| 4.3 Adjacent Land Use and Development Pressure..... | 28 |
| Literature Cited..... | 29 |
| Chapter 5: Strategies to Protect Hawai‘i’s Forests..... | 30 |
| 5.1 Land Acquisition Strategies to Meet Forest Legacy Program Goals in Hawai‘i | 30 |
| 5.2 Existing Land Management Programs to Work in Parallel with and Complement the FLP to Protect Hawai‘i’s Forests..... | 32 |
| 5.3 Other Strategy to Complement Protected Lands..... | 32 |
| Literature Cited..... | 33 |
| Chapter 6: Forest Legacy Areas Eligibility Criteria and Program Priorities | 34 |
| 6.1 Background to Forest Legacy Eligibility..... | 34 |
| 6.2 Goals and Objectives | 34 |
| 6.3 Forest Legacy Eligibility Criteria..... | 35 |
| 6.3.1 Conservation District Criteria | 36 |

| | |
|--|----|
| 6.3.2 Agriculture District Criteria | 38 |
| 6.4 Priority Landscapes for Forest Legacy Areas | 38 |
| Literature Cited..... | 46 |
| Chapter 7: Program Implementation..... | 47 |
| 7.1 Overview of Program Execution..... | 47 |
| 7.2 Project Selection Process | 48 |
| Chapter 8: Stakeholder Participation | 51 |
| 8.1 Stakeholder Engagement for the 2017 AON Amendment..... | 51 |
| 8.2 1994 AON Public Participation | 57 |
| 8.3 2004 AON Amendment Public Participation..... | 58 |

Tables

| | |
|---|----|
| Table 4.1. Property Tax Rates by County for Land Uses Affecting Forested Lands..... | 27 |
| Table 6.1. Guidance on Compatible and Incompatible Activities in Forest Legacy Areas..... | 45 |
| Table 8.1. Summary of Stakeholder Responses Received for Amending the 2004 Assessment of Needs Document | 52 |

Figures

| | |
|---|----|
| Figure 2.1. Major Forest Cover Types in Hawai'i..... | 7 |
| Figure 2.2. Hawai'i Private Forestland Ownership and Control..... | 9 |
| Figure 2.3. Types of Legacy Land Acquisition Projects Initiated by DLNR | 10 |

Maps

| | |
|--|----|
| Map 6.1. Eligible Forest Legacy Areas..... | 37 |
| Map 6.2. Native Forests in Agriculturally Zoned Land are the Top Priority in Forest Legacy Areas..... | 39 |
| Map 6.3. Expanding Forests: Historical and Current Koa and 'Ōhi'a Forest in Eligible Forest Legacy Areas | 41 |
| Map 6.4. Disappearing Forest Types in Eligible Forest Legacy Areas to Be Prioritized in Forest Legacy Program..... | 43 |

Chapter 1: Introduction

1.1 Authority and Purpose of the Forest Legacy Program

The Cooperative Forestry Assistance Act (CFAA) of 1978, as amended (16 United States Code 2101 et seq.), provides authority for the U.S. Secretary of Agriculture to provide financial, technical, educational, and related assistance to states, communities, and private forest landowners (U.S. Forest Service 2017). The 1990 Farm Bill amended the CFAA and directed the Secretary to establish the Forest Legacy Program (FLP) to protect environmentally important forest areas threatened by conversion to nonforest uses. This authority continues indefinitely. Through the 1996 Farm Bill, the Secretary is authorized, at the request of a participating state, to make a grant to the state to carry out the FLP in that state, including the acquisition of lands and interests in lands (U.S. Forest Service 2017).

The purpose of the FLP is to protect environmentally important forest areas threatened by conversion to nonforest uses. This includes protecting important scenic, cultural, fish, wildlife, and recreational resources; riparian areas; and other ecological values. Traditional forest uses, including timber management, as well as hunting, fishing, hiking, and similar recreational uses, are considered consistent with purposes of the FLP. Donation of lands and the purchase of interests in lands through the use of conservation easements and fee-simple purchase are used to acquire forested land meeting FLP purposes from willing sellers or donors (U.S. Forest Service 2017).

1.2 Hawai'i Forest Legacy Program Background

Hawai'i's forests protect our most precious resource in the islands: fresh water. Hawai'i's forests also yield an array of products and services, such as clean water; timber and other wood products; carbon sequestration; nontimber plant materials of cultural importance; and recreational opportunities, such as hiking and hunting. These forests, while providing aesthetic and scenic values and economic opportunities, also provide habitat for native plant and animal species. The Hawaiian Islands are located more than 2,000 miles from the closest continental land mass. Seventy million years of isolation, and habitats ranging from alpine deserts to tropical rain forests and coastal dunes, have produced more than 10,000 species of plants and animals found nowhere else on earth. Approximately 88% of the species that inhabit Hawai'i's forests and coastal ecosystems are endemic. Hawai'i is the only state in the United States with tropical dry and rain forests.

Nearly two-thirds of Hawai'i's original forest cover has been converted to agricultural and urban uses. There is increasing pressure to develop what little remains of the state's natural areas and resources. It is estimated that up to 50% of Hawai'i's native species are extinct or in danger of extinction and nearly 40% of Hawaiian plants are listed as threatened or endangered. The survival of many of Hawai'i's remaining native species and ecosystems depends on the conservation and active management of its remaining forestlands. Reducing forest

cover, in addition to threatening the state's biodiversity, negatively affects tourism and other economic opportunities that benefit from forests.

The FLP is an important tool for private forest management, especially in Hawai'i because forests cover approximately 43% of Hawai'i's total land area and 66% of that land is privately managed (Oswalt et al. 2014). Private landowners must be provided with appropriate information, incentives, and sometimes financial means if they are to actively manage and conserve their forest resources. The FLP provides Hawai'i with an alternative, proactive forest conservation strategy to protect forests in perpetuity.

The FLP Assessment of Needs (AON) uses the program's federal guidelines to guide implementation of the FLP at the state level by identifying key areas of existing forestlands, significant natural resources, and land use trends and threats. The first AON in 1994 introduced the FLP to Hawai'i. In that 1994 document, DOFAW relied heavily on the 1992 State Land Use District Boundary Review process and identified many thousands of acres of forestland throughout the state as "Environmentally Important" and "Threatened" that would benefit from the FLP. These lands served as the pool from which the two (South Kona and Kohala) Forest Legacy Areas (FLAs) were selected to test the program and its effectiveness in Hawai'i. These FLAs of South Kona and Kohala provide critical watershed functions and were most immediately threatened by conversion to nonforest uses relative to the other areas in the state. These two small FLAs in the County of Hawai'i introduced the program to Hawai'i's landowners and the public at large and were an immediate priority for protection in the state.

Threats to forest areas in Hawai'i grew and landowners outside the limited FLAs demonstrated strong interest in participating in the FLP. So the State of Hawai'i Forest Stewardship Advisory Committee (FSAC) in 2004 sought to build on the FLP's success and expand the program throughout the state—encompassing much of the land considered "eligible" in 1994 but not established as official FLAs.

In the 2004 AON amendment, new criteria were applied statewide to define FLAs for each island. These criteria were (1) Prime Forest Lands in Hawai'i, (2) Lands within the Conservation State Land Use Area, (3) Critical Habitat Lands, and (4) Public and Private Watershed Partnerships. These criteria were chosen to find the intersection between productive forests, endangered species, and existing landowners participating in land management. New Geographic Information System (GIS) technology and multiple criteria allowed for additional important forestlands throughout the islands to gain eligibility for the FLP, making this program stronger, fairer, more competitive, and even more successful for the next decade. This 2004 process was considered a "significant amendment" under the FLP guidelines because in addition to increasing the number of FLAs, DOFAW applied for the state grant option that helped the state and private landowners have maximum flexibility to protect important forestlands in Hawai'i.

The 2004 AON amendment was more inclusive and the eligibility criteria more consistent throughout the state of Hawai'i. However, in a recent review of the program, DOFAW determined that the FLP AON was due for another update and further refinement based on the recent conditions, needs, and threats to Hawai'i's forests.

DOFAW also wanted the AON update to align with the FLP, Hawai'i Forest Action Plan (FAP), and/or the State Wildlife Action Plan; incorporate new information on the importance of and threat to Hawai'i's forest, as well as the strategic alignment with other conservation opportunities; facilitate and assist with the prioritization of the forest landscape under the program; and develop guidelines on allowed/compatible management actions and activities for FLP projects. DOFAW also wanted the update to engage relevant stakeholder groups in the process.

1.3 Goals of the Forest Legacy Program in Hawai'i

The overarching goals for the FLP that were established in the prior AON documents and that guide the program largely remain the same. These goals for the program to be used in Hawai'i and included in this amendment are:

1. Protect Hawai'i's unique and fragile environmental resources
2. Increase the protection of rare and/or endangered species
3. Promote the preservation of aesthetic beauty in Hawai'i
4. Preserve watershed health and protect the sustainable yield of fresh water
5. Protect working forests as economic assets for the state and counties of Hawai'i
6. Protect traditional and cultural forest practices and resources
7. Protect recreational forest practices

The Hawai'i FLP AON also needs to address key national threats in a strategic manner and align with the current national program's importance attributes to provide:

1. Economic benefits from timber and forest product productivity
2. Economic benefits from nontimber products
3. Threatened and endangered species habitat
4. Fish, wildlife, plants, and unique forest communities
5. Water supply, aquatic habitat, and watershed protection
6. Public access
7. Scenic beauty
8. Historic, cultural, and tribal resource protection

Literature Cited

Oswalt, S. N., W. B. Smith, P. D. Miles, and S. A. Pugh. 2014. Forest Resources of the United States, 2012: A Technical Document Supporting the Forest Service Update of the 2010 RPA Assessment. October. General Technical Report WO-91. U.S. Forest Service, Washington, D.C.

[USDA] U.S. Forest Service. 2017. Forest Legacy Program Implementation Guidelines. Final Amended. May 2017. <https://www.fs.fed.us/sites/default/files/fs_media/fs_document/15541-forest-service-legacy-program-508.pdf>. Accessed December 4, 2018.

Chapter 2: Overview of Hawai‘i’s Forests

2.1 A Historical Perspective

The Polynesians found a unique and diverse native forest when they arrived at the Hawaiian Islands more than 1,000 years ago. These early settlers cleared most of the lowland forests for agriculture and dwellings, but they left the upland forests relatively undisturbed. The European settlers, who arrived in 1778, introduced a number of practices and species that dramatically altered or destroyed much of Hawai‘i’s upland native forestlands. With King Kamehameha the First’s consent, Captain Vancouver released cattle, sheep, horses, goats, and European pigs into Hawai‘i’s forests. This introduction of large ungulates set the stage for contemporary forestry in the state.

Many of Hawai‘i’s major watersheds were badly degraded 100 years after the introduction of ungulates, and reclaiming them was an economic imperative. Forest watershed stabilization and enhancement were essential to creating a sugar production industry and thus a rural economy. The supply of water for agricultural and urban development has long been recognized as the most important forest product. The most widespread and initially successful effort to secure adequate and reliable water supplies on a long-term basis was the placement of large forest watershed areas into state Forest Reserves. Both territorial and private lands were enlisted, and a tax-free status provided private landowners with sufficient incentive to conserve their forests, in exchange for some government control.

In recent years, economics has driven the scattered clearing of native watershed forests for house lots, pasture, timber, and croplands. The few remaining stands of lowland forest are small, scattered, and often highly degraded. Most are in the Agriculture District. Grazing and browsing by feral ungulates have degraded remnant native forests at higher elevations. The upper-elevation koa (*Acacia koa*) forests on Hawai‘i Island have been reduced by clearing to create pasture, a land use that receives an agricultural tax designation and is taxed at among the lowest rates. Demand for koa, a highly valued native hardwood, has nearly depleted the supply of high-quality old growth on private lands. Koa’s scarcity is reflected in its stumpage price, which has increased tenfold during the last decade.

A number of recent administrative actions, programs, and regulations have attempted to reverse the conversion of Hawai‘i’s remaining forests. In 1961, a greenbelt law established two new land use categories—Urban and Agriculture Districts—and included the existing Forest Reserves, along with other lands, in Conservation Districts. The act reflected a growing awareness that the limited natural resources of Hawai‘i must be conserved. Today, DOFAW manages roughly 800,000 of Hawai‘i’s remaining forestlands, estimated to be between 1.5 and 1.75 million acres (USGS 2011, Oswalt et al. 2014, DBEDT 2016).

Existing measures to conserve Hawai‘i’s remaining forests are discussed in further detail in Chapter 5.

2.2 Natural History: Geology, Climate, and Soils

An appreciation for Hawai'i's diverse and unique forest resources requires some understanding of the natural processes that produced them. The Hawaiian Islands are a chain of exposed basaltic domes formed by lava outpourings along a 1,600-mile-long fissure in the floor of the Pacific Ocean. Approximately one-sixth of Hawai'i's land area is covered with relatively new volcanic earth—lava and cinders. Where volcanic flows have occurred recently, such as on the southern section of the Island of Hawai'i, the terrain is undissected and quite barren, revealing large areas of exposed lava. Where lava flows have not occurred for some time, the terrain has been eroded by rivers and streams and eventually transiting into forest ecosystems.

Hawai'i's topography creates a multitude of diverse microclimates. The principle source of this extreme variability and the highest annual rainfall totals on earth is the moist trade wind air that ascends and traverses topographic barriers on most days of the year. On lower mountains, the mean distribution of these orographic rains follows elevation contours. Rainfall totals are greatest over windward slopes and crests and least over leeward lowlands. Widespread heavy rains are also brought by winter storms, but these rains are not as affected by topography as are the rains brought by moist trade winds.

Extreme drought occurs when winter storms or trade winds fail. The probability of serious drought somewhere on the Hawai'i Island during any given 10-year period exceeds 90%. As in most of the tropics, the weathering processes that transform Hawai'i's lava flows into soil are primarily chemical as opposed to mechanical and thus driven by moisture and heat. They are formed from parent materials that vary greatly in geological age in a wide range of local microclimates, from wet-tropical to subalpine to desert.

2.3 Forest Cover and Composition

Hawai'i's natural forests are largely products of its soils and climates; thus, each of its major islands supports a wide variety of forest types, ranging from low-elevation tropical rain forests to arid scrub forests to temperate subalpine woodlands to cloud forests. For the purposes of the FLP and this AON, forestlands are lands with natural or planted forest trees (Oswalt et al. 2014). The term *forest* excludes fruit/nut orchards and groves (Oswalt et al. 2014).

Various sources provide slightly different estimates of forest cover in Hawai'i, depending on source and date of raw data and how categorized (USGS 2011, Oswalt et al. 2014, DBEDT 2016), but all sources estimate that forests cover roughly 1.5 to 1.75 million acres of Hawai'i's 4.1 million acres of land, or between 37% and 43% of the state's total land area (USGS 2011, Oswalt et al. 2014). Of total forestlands, 61% is categorized as native forest and woodland with 39% categorized as forest with predominantly nonnative trees (USGS 2011). 'Ōhi'a (*Metrosideros polymorpha*) or 'ōhi'a-mixed forests make up 39% of all forestland, with koa and koa-mixed forests making up 15%. The major types or categories of Hawai'i forestlands are illustrated in Figure 2.1.

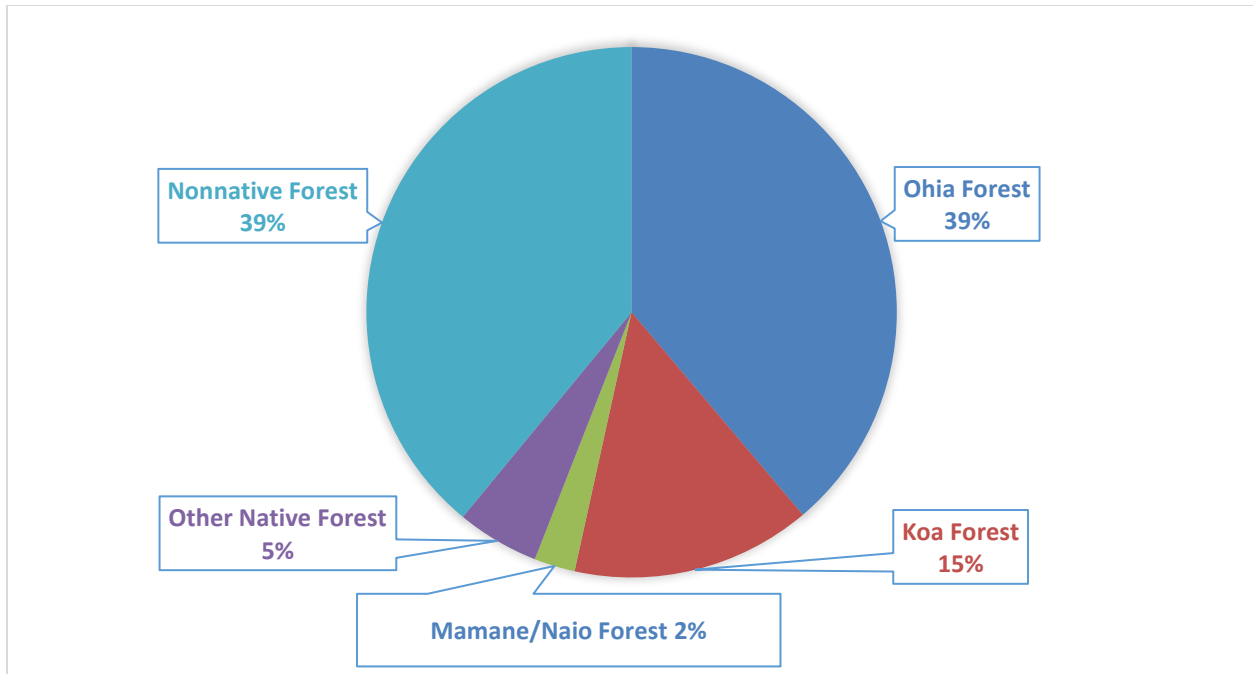


Figure 2.1. Major Forest Cover Types in Hawai'i

About 700,000 acres, or roughly 40% of the total forestland, are considered to be timberland, capable of annually producing timber and wood products on a sustainable basis, with Hawai'i's forest annually producing 120 cubic feet per acre or more (Oswalt et al. 2014). Most of this timberland is on Hawai'i Island. A small portion, roughly 76,500 acres, is used for plantation forestry¹, consisting largely of exotic eucalyptus (*Eucalyptus* spp.); again, most occurs on Hawai'i Island (DLNR 2016a).

2.4 Forest Plantations

In Hawai'i, availability of land is one of the main factors that limit commercial forest plantations to small-scale specialty and high-demand exotic and native tree species (DLNR 2016a, Inman-Narahari 2015). Most existing forest plantations in Hawai'i were established for soil and water conservation purposes in the mid-1990s to late 1990s and early 2000s on former sugarcane land with mostly nonnative hardwood species (Inman-Narahari 2015). The net volume of growing stock² in these forests was estimated to be 280 million cubic feet in 2012

¹ **Planted forests**—Areas where at least 40% is planted trees of either native or exotic species. Planted forests may be divided into two groups:

Plantations—Forest stands consisting almost exclusively of planted trees, of native or exotic species, and managed to generally maintain this composition at maturity. Management practices may include extensive site preparation before planting and suppression of competing vegetation.

Augmented forest—Forest stands consisting of at least 40% planted trees, of native or exotic species, but not intensively managed to ensure dominance of these trees in the stand at maturity. Management practices, however, may include suppression of competing vegetation at the time of planting. Frequently found in the west, where trees are planted to ensure that regeneration stocking levels are adequate to fully occupy the stand in the future.

² **Stocking**—The degree of occupancy of land by trees, measured by basal area or number of trees by size and spacing, or both, compared to a stocking standard; that is, the basal area or number of trees, or both, required to fully use the growth potential of the land.

(Oswalt et al. 2014). DOFAW records indicate that there are about 385 major landowners with 76,500 acres of potential commercial tree plantations.

DOFAW manages Timber Management Areas (TMAs) on Hawai‘i, Kaua‘i, Maui, and Moloka‘i. However, the two actively operating state TMAs—Waiākea and Kōke‘e TMAs—and active private plantations occur only the Hawai‘i Island and Kaua‘i. During 2012 and 2013, approximately 480 acres were harvested on Hawai‘i Island. By the end of December 2013, about 106,000 tons of logs were harvested on Hawai‘i Island and exported to China for veneer production. After the recent completion of a biomass energy plant, plantations on Kaua‘i are now being harvested for the production of energy at this plant (also see Section 2.6, “Recent Trends”).

Native tree plantations are still at an experimental stage in Hawai‘i. In spite of being a high-quality wood with high demand in local and foreign markets, native koa plantations have not gone through a full rotation, and most harvests are from large old trees (DLNR 2016a, Inman-Narahari 2015). Although few in comparison to exotic wood plantations, native tree plantations have been established to restore areas of native forest. Some private landowners are planting koa for purposes of restoration and eventual income generation, many with assistance from government cost-share programs, such as the Forest Stewardship Program. The state has developed a Koa Action Plan that includes short- and long-term goals to promote koa plantations through improved silviculture research to support commercial use, as well as conservation planning (DLNR 2016a). In addition to koa, the planting of other native tree species, such as ‘ilahi or Hawaiian sandalwood (*Santalum* spp.), milo (*Thespesia populnea*), kamani (*Calophyllum inophyllum*), and kou (*Cordia subcordata*), is being promoted by DOFAW for carbon sequestration projects involving exchange of carbon credits in established carbon markets (see Section 2.6, “Recent Trends”).

2.5 Forest Ownership and Control

Although small in total area, Hawai‘i has the eighth largest state-owned forest and natural area reserve system in the United States. Fifty-eight percent of the state’s forests, or 979,744 acres, are in the state Conservation District and thus to some degree are “protected” (DBEDT 2016). Of the 1.75 million total acres of forestland in Hawai‘i, 66% is estimated to be owned by private landowners (Oswalt et al. 2014).

The Conservation District is one of four land use zones established in Hawai‘i in 1961. Conservation lands are under the regulatory control of the DLNR and are divided into five subzones: Protected, Limited, Resource, General, and Special. Resources in the Protected subzone are the most environmentally sensitive, those in the General subzone are the least environmentally sensitive. The Protected and Limited subzones are the most restrictive, while the Resource and General subzones provide for sustained use of natural resources with proper management and as approved by permit. The Special subzone defines a unique land use on a specific site. Approximately 826,000 acres of Hawai‘i’s forests are privately owned and outside the Conservation District (Figure 2.2) (Oswalt et al. 2014, DBEDT 2016).

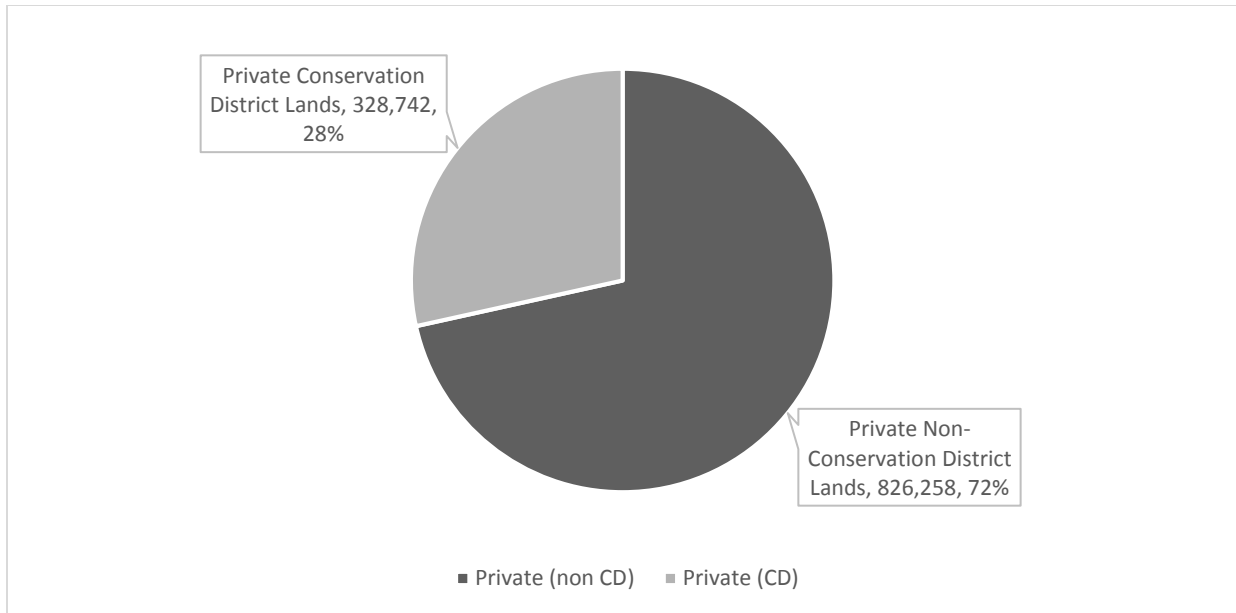


Figure 2.2. Hawai'i Private Forestland Ownership and Control

2.6 Recent Trends



Pu'unēhē sugar mill on Maui before the last harvest in 2016. With the demise of sugar plantation on Maui, 36,000 acres of former sugarcane land is now available for conversion to diversified agriculture. Photo credit: Forest and Kim Starr

Although Hawai'i's forests are largely degraded, recent economic trends are causing many to recognize their potential value. A number of market-driven factors have spawned a wide-spread interest in forest plantation establishment. Most noted among these factors are the potential increased availability of land for forestry related to sugar plantation closures and the high and ever-rising price of quality hardwood timber, such as native koa. In 2016, after the harvest of the last sugarcane plantation on Maui, 36,000 acres of land became available for other potential uses. Among other possible uses, these recently available lands on Maui could potentially be used for tree plantations for commercial or restoration purposes. Nonnative shrubland and grassland cover 25% of the state, most of it currently being used for rangeland and much of which could also be converted back to forest lands (USGS 2011, DBEDT 2016).

Given the state's aggressive goal of having 100% of all the state's power come from renewable energy sources by 2045, there is an increased interest in developing wood biomass for electric generation and/or biofuel production in Hawai'i (DLNR 2016a). Development of biomass power plants has further facilitated several

private landowners on Kauaʻi and Hawaiʻi Island to invest in tree plantations for biofuel production. As more biomass electrical generating facilities and biofuel facilities are developed, additional opportunities will arise for private landowners to grow trees as feed stock.

The forestry industry has been involved in the global carbon market through the sale of carbon credits to emitters. Eligible forest credits are derived by avoiding forest conversion, reforestation, and stand improvement projects. Hawaiʻi does not have a locally mandated greenhouse gas emission trading scheme, but over the past few years, the state has been exploring opportunities to participate in out-of-state carbon markets with the intent to minimize forest conversion and promote forestry while also generating revenue for maintenance of its underfunded forestlands. In early 2017, DOFAW issued a request for proposals to solicit a qualified bidder for a carbon forestry project in the Puʻu Mali restoration area on Hawaiʻi Island, with a successful bidder expected to restore the area with only native species and provide the state a percentage of the sale of carbon credits. If successful, such a model could facilitate the conversion of unproductive nonforestlands to forestlands. Some private landowners on Kauaʻi and Hawaiʻi Island are already running forestry operations in exchange for carbon offset credits.

Additionally, private landowners’ interests in private land stewardship, watershed conservation, biodiversity conservation, and agricultural land conservation ideals are also factors increasing participation in federal, state, and county legacy land acquisition programs. Of 48 completed or pending projects initiated over the past 11 years under the DLNR’s Legacy Land Conservation Program (state funded acquisition program), eight were for conservation easements to private landowners, and 40 were fee-simple acquisition by community or non-governmental organizations, state natural resource agencies, the state agricultural development entity, or county government (DLNR 2016b). Many of these projects included multiple purposes and benefits (Figure 2.3). Of the 48 total projects, 15 included watershed or forestland conservation; 23 included biodiversity or habitat conservation; 30 included cultural, historic, or scenic land protection; 17 included recreational uses; and 14 included some agricultural land conservation and use. Private landowner interest to participate in these private, state, and county legacy land conservation programs is strong, and between four and six projects have been initiated in the state program alone on an annual basis over the past few years (DLNR 2016b).

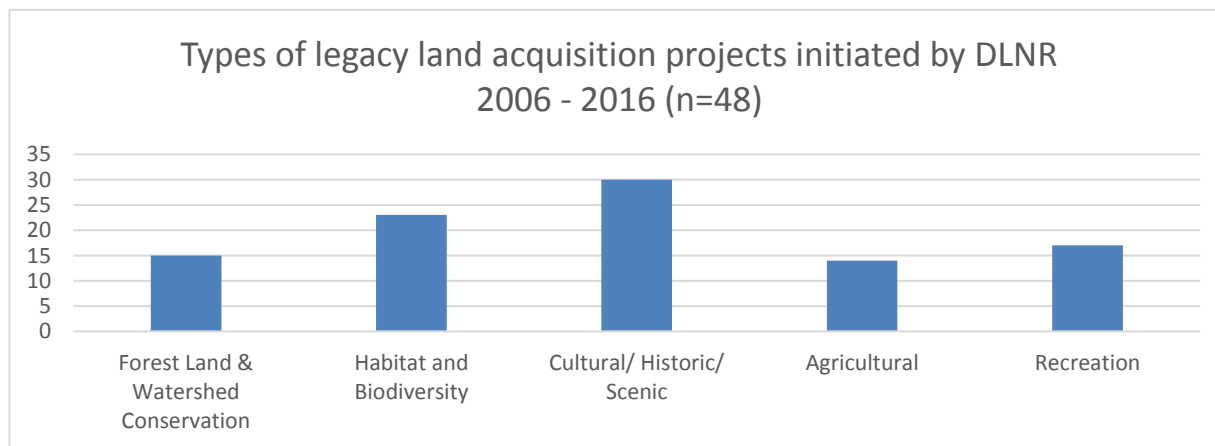


Figure 2.3. Types of Legacy Land Acquisition Projects Initiated by DLNR

Literature Cited

- [DBEDT] Hawai'i Department of Business, Economic Development & Tourism. 2016. 2015 State of Hawai'i Data Book: A Statistical Abstract. <<http://dbedt.hawaii.gov/economic/databook/db2015/>>.
- [DLNR] Hawai'i Department of Land and Natural Resources. 2016a. Hawai'i Forest Action Plan 2016. <<https://dlnr.hawaii.gov/forestry/files/2013/09/Hawaii-Forest-Action-Plan-2016.pdf>>.
- [DLNR] Hawai'i Department of Land and Natural Resources. 2016b. Report to the Twenty-Ninth Legislature, State of Hawai'i 2017 Regular Session Relating to the Land Conservation Fund and the Legacy Land Conservation Program. <<https://dlnr.hawaii.gov/wp-content/uploads/2016/12/FW17-Legacy-Land-Report-FY16.pdf>>.
- Inman-Narahari, F. 2015. Draft Koa Action Plan: Management and Research Priorities for Acacia koa Forestry in Hawai'i. Prepared for Hawai'i Department of Land and Natural Resources, Division of Forestry and Wildlife.
- Oswalt, S. N., W. B. Smith, P. D. Miles, and S. A. Pugh. 2014. Forest Resources of the United States, 2012: A Technical Document Supporting the Forest Service Update of the 2010 RPA Assessment. October. General Technical Report WO-91. U.S. Forest Service, Washington, D.C.
- [USGS] U. S. Geological Survey. 2011. Gap Analysis Program Land Cover Viewer: Land Cover Report Hawai'i. <https://gis1.usgs.gov/csas/gap/viewer/land_cover/LandcoverReport.ashx?reportTitle=Land%20Cover%20Report%20Hawaii&level=1&areaType=State&id=Hawaii>. Accessed March 14, 2017.

Chapter 3: Importance of Hawai'i's Forests

Hawai'i's forests provide a multitude of important services and benefits. Most notably, they enhance and protect watersheds that are critical to all island inhabitants. Hawai'i's forests are also major cultural resources, not only holding vast archeological sites and sacred areas, but also providing resources for hunting, gathering, and traditional practices that keep Native Hawaiian culture thriving in current society. Forests also provide an array of timber and nontimber products; unique habitat for rare and endangered species; ecosystem services, such as carbon sequestration and water and air purification; and a number of recreational opportunities. Hawai'i offers a wide range of climates and is home to the only tropical rainforests in the United States, which serve as a microcosm for tropical forest research and demonstration.

3.1 Watershed Protection

Survival in the islands depends on an abundant, clean, and sustainable supply of water. Forests intercept rainfall; produce huge quantities of organic matter, which improves soil structure and its water-holding capacity; and allows water to slowly percolate into groundwater aquifers and freshwater streams, thereby serving as the state's main freshwater recharge area. Protection of these forests as a water resource is essential to Hawai'i's livelihood because the availability of fresh water is the primary determinant in defining the carrying capacity of the islands for humans, plants, and animals. Private land owners have been interested in and participants in watershed protection efforts in Hawai'i for more than 100 years.

Forest cover affects the health of streams and nearshore marine waters. Hawai'i has about 200 miles of freshwater streams fed by forest watersheds (DLNR 2015a, DLNR 2016a). Forests trap and filter sediment and help slow the movement of water through streams, which in addition to maximizing aquifer recharge also prevent flooding during heavy rains that cause topsoil erosion and sedimentation of streams and offshore reefs. Consequently, the health of Hawai'i's nearshore ocean fisheries is directly linked to the health of its forests. These streams also provide irreplaceable habitat for both native and introduced aquatic and riparian flora and fauna.

An important but often overlooked source of fresh water is that which is intercepted directly from passing clouds by forest vegetation and soils at elevations above 2,500 feet, also referred to as cloud forests. In some areas, the annual catch of fog drip by cloud forests is believed to equal that of rainfall. Studies on fog drip have shown that passing cloud moisture otherwise lost in deforested areas can be captured for recharge by reforestation.

Hawai'i's watersheds provide hundreds of millions of dollars' worth of important goods and services to residents. A University of Hawai'i study on the economic valuation of the various watershed services—water quality, instream uses, species habitat, hunting, commercial harvest, ecotourism, and climate control—estimated

the value of services to be between \$7.4 billion and \$14 billion, for just the Ko‘olau Mountains watershed on ‘O‘ahu (Kaiser et al. 1999).

3.2 Economic Benefits from Forest Products

Hawai‘i’s approximately \$30 million per year forest products industry remains small by U.S. mainland standards (Yanagida et al. 2004). Nevertheless in 2001, Hawai‘i’s forest industry contributed 926 jobs to the state’s economy. The retail value of Hawaiian grown forest products was estimated to be \$23.9 million, 75% of which came primarily from sales of the native koa wood (DLNR 2015b). Economic benefits of Hawai‘i’s forest industry come from timber for lumber, craft woods, veneer, woodchips, wood biomass and biofuels, and a range of nontimber forest products. The various components needed for a thriving forest products industry—primarily the land, supply of trees to support commercial forest industry, and needed infrastructure—are still developing in the state. The economics of forestry in Hawai‘i has been variable, but the state is strategically guiding public timber assets into local processing facilities to optimize jobs for local communities, meet local energy needs, and contribute to carbon sequestration.

Commercial timber industry in Hawai‘i is in a nascent stage with most timber harvesting still occurring as salvage operations on lands being converted to nonforest uses from senescent forest stands (DLNR 2016a). Developing appropriate state lands and providing support for private landowners to develop their lands for forest products will encourage the commercial timber industry to expand, allowing it to achieve its goal of providing jobs to rural areas.

The net volume of growing stock on timberlands in Hawai‘i in 2012 was reported to be 281 million cubic feet, of which 4 million cubic feet was softwood and 277 million cubic feet was hardwood (Oswalt et al. 2014). Timber production in Hawai‘i largely is composed of nonnative tree species which

have different potential uses and vary in their market value because of differences in physiology and suitability for site conditions. There is high demand for these Hawai‘i-grown timber species for hardwood flooring, furniture, cabinetry, and other fixtures, including doors, windows, and moldings.

While there are several nonnative trees that are used in timber and other forest products, there is a growing interest to develop a wood product industry based on endemic tree species, such as koa and ‘iliahi. There is a particularly high demand for the native Hawaiian koa wood, the premier timber species (~75%) of the state’s



Eucalyptus (*Eucalyptus grandis*) plantation on former sugarcane land on Hāmākua coast, Hawai‘i Island. Commercial forestry operations in the state are mostly on Hawai‘i Island and Kaua‘i and largely comprise of nonnative tree species like Eucalyptus. Photo credit: Paul Conry

\$30 million forest product industry (Yanagida et al. 2004). Koa is regarded as one of the most valuable woods in the world with prices ranging from \$3 to \$15 per board foot and up to \$125 per board foot for the highest-quality pieces (Baker et al. 2009). New information on koa growth rates indicates that commercial thinning is possible within 30 years of planting. In addition, the ever-rising price of koa wood and to some extent sandalwood are drawing the attention of landowners who formerly did not consider forestry to be a lucrative industry.

Recent trends in the availability of both private and state-leased lands freed up with the closure of the last few sugarcane industries, combined with the demand for wood for electric generation or biofuel production, and the ability to generate revenue by selling eligible forest/carbon credits in the global carbon market, have further highlighted the potential economic benefits of Hawai'i's forest industry (see Section 2.6, "Recent Trends"). Together with the support of the state's several private landowner cost share and technical assistance programs, these trends are already attracting private landowners who formerly did not consider forestry to be a viable alternative land use. In the last few years, private landowners on Kaua'i and Hawai'i Island have contributed to the state's economy and growing energy demand by making forest plantations available for renewable energy production.

Hawai'i is an island state from where a heavy commodity like timber products can conveniently be transported by ship to all countries bordering the Pacific Ocean waterway, but in particular those in Pacific Asia where demand is greatest. Hawai'i's lumber consumption averages about 100 million board feet per year. About 90% of this is softwood for construction needs and 10% is quality hardwood for furniture, paneling, and cabinet work. Virtually all this lumber is currently imported from the mainland and abroad. An integrated forest industry initiative of 60,000 acres of forest plantations on Hawai'i Island alone is expected to support sustainable long-term employment of nearly 500 people, not including the indirect benefits such an industry would have on the local economy.

3.3 Non-timber Forest Products and Cultural Resources

Hawaiian cultural traditions reflect a close and long-standing relationship with the island's landscape, native species, and ecological processes. The survival of Hawai'i's native forest flora and fauna is necessary if many of the cultural traditions of its indigenous people are to continue. Many forest trees and plants provide traditional products and services.

Koa, which means "warrior" in Hawaiian, is one of the most culturally valued trees in the Hawaiian Islands. Koa was the principal tree used for canoes by Hawaiians, who also used the hardwood to make house timber, spears, paddles, and bowls. Today, koa is the premier Hawaiian timber for furniture cabinetry, interior woodwork, and woodcraft. Koa is found throughout the islands and is second only to 'ōhi'a (*Metrosideros* spp.) in abundance in natural forests. Although now found only in the highlands, it once ranged widely in lowland areas.

Koai'a (*Acacia koaia*) is a close relative of koa, found in drier, lower areas. It is used by Hawaiians for paddles, spears, and shark hooks. Many consider koai'a rare because it is now found only in small areas on the islands of Moloka'i, Maui, Lana'i, and Hawai'i.

Native wiliwili (*Erythrina sandwicensis*) has a light, corky wood historically used to construct canoe outriggers, surfboards, and fishnet floats. Its shiny red seeds have long been strung onto Hawaiian leis.

Māmane (*Sophora chrysophylla*) is a native tree of drier upland forests. It is common now only on the islands of Hawai'i and Maui. Māmane wood is hard and tough. It is traditionally used to construct houses, spades, tool handles, and sled runners.

Maile (*Alyxia olivaeformis*) is a favorite native forest understory plant. The fragrant bark of its stems and the fragrant, oval, pointed, shiny leaves are indispensable at times of celebration for decorations and leis. The plant grows as a straggling or twining shrub in native forests of the lower and middle mountain regions. The supply of maile does not meet current demand, and there is concern that continued harvesting will soon threaten its existence.

The forest floor yields many other specialty forest products that local people gather and use for leis, floral arrangements, and landscaping purposes. Examples are tree ferns, native palms, and ti (*Cordyline fruticosa*) leaves. The extraction and sale of these minor forest products is an important contributor to local economies throughout the state.

Hawai'i's forests are also known to contain a number of cultural heritage resources—historical sites that include places, structures, or objects of cultural significance. To date, only approximately 5–10% of the state has been inventoried for such historic sites, and little of this inventory has been carried out in forested areas. Since written records exist for only the last 200 years of Hawai'i's history, cultural heritage resources are essential to the reconstruction of earlier history. Much of the history of early Polynesian settlement of the islands may lie in yet to be identified or yet to be discovered archaeological sites, many of which are likely to be found in forests. Protection of cultural and historic sites is an important legacy for many landowners and has much public support, particularly from the Hawaiian community. Of 48 projects initiated under the state's Legacy Land Conservation Program, 30 involved protection of cultural, historic, or scenic resources as a major component and benefit (DLNR 2016b). Inclusion of cultural and historic resources in FLP goals fulfills many of Hawai'i's private landowners' desires for stewardship activities for their lands and meets community's interest to see these resources protected.

3.4 Wildlife, Plants, and Unique Forest Communities

Located over 2,000 miles from the nearest continent, Hawai'i is the most remote island chain in the world. Despite its relatively small area (about 4.1 million acres), the elevation ranges from sea level to 13,796 feet, resulting in a wide temperature range. Average annual rainfall ranges from less than 15 inches to over 480 inches

per year, Hawai'i displays most of the earth's variation in climatic conditions. The Hawaiian Archipelago possesses all the major known ecological zones, from wet forests to extremely dry coastal grasslands.

Based on the wide-ranging elevation zones and moisture categories, the state's terrestrial habitats are classified roughly into nine community types: alpine, subalpine, montane wet, montane mesic, montane dry, lowland wet, lowland mesic, lowland dry, and coastal. These nine habitat types, based on the dominant plants and structural characteristics of the vegetation, are refined further to recognize 33 native forest communities, 36 native shrubland communities, eight native grassland communities, and four native herbland communities (Wagner et al.1999). Subterranean systems form a tenth habitat type defined by geology rather than elevation zones and moisture. Each of these habitats and the associated plants and wildlife are discussed in the State Wildlife Action Plan (DLNR 2015a).

Because of the extreme isolation and distance, relatively few life forms successfully colonized the Hawaiian Archipelago over its 70 million year history. Those species that did, however, found a diversity of climatic and geological features that provided an enormous range of habitat types. With extremely limited gene flow from their distant, original populations, colonizing species apidly adapted to their novel environments. For many such colonists, unique adaptations occurred simultaneously among populations that were isolated from one another on an island and between islands. As a result, the archipelago displays some of the world's most striking examples of evolution, with the creation of countless new lineages of plants and animals through natural selection and adaptive radiation.

Hawai'i's unique forests and other terrestrial communities are home to more than 14,000 terrestrial and 100 freshwater taxa. Rates of endemism (i.e., percent of species found nowhere else on earth) are typically 99–100% for terrestrial insects, spiders, and land snails; 90% for plants; more than 80% for breeding birds; and 15–20% for aquatic fauna. Rapid evolution produced many species with unusual characteristics or life-histories, including two dozen flightless birds (now extinct), mintless mints, flightless flies, stinkless stink bugs, blind big-eyed spiders, carnivorous caterpillars, diadromous fish that scale 1,000-foot waterfalls, and nectarivorous birds with bills superbly adapted to the corollas of particular flowering plant species.

The first-order streams—that is, the smallest initial streams—start at the highest-altitude forests and are often in the steepest gradient areas. Perennial and some intermittent streams are habitat to all of Hawai'i's freshwater fauna, including five native stream fishes or 'o'opu, invertebrates including mollusks and shrimps, algae, and mosses. Intermittent streams, particularly at lower elevations, are seasonal and flow only during high-rainfall events. Some native fishes, however, are highly evolved at climbing waterfalls and moving to higher-order perennial streams (DLNR 2015a).

3.5 Rare, Threatened, and Endangered Species Habitat

Hawai'i is regarded as the endangered species capital because among the known extinctions, Hawai'i alone represents 75% of the recorded extinctions of plants and animals in the United States. With less than 0.2% of

the land area of the United States, Hawai'i also accounts for the highest (28%) number of federally listed threatened and endangered species in the country; this include 434 taxa of plants and animals and an additional 50 taxa that are candidates for being listed as threatened or endangered (DLNR 2015a). Forests, which cover only about 43% of the land surface in the state, are key to the survival and recovery of Hawai'i's rare, threatened, and endangered taxa.

3.5.1 Plants

Hawai'i is home to 44% of the nation's threatened and endangered plant species. Three hundred and sixty-six plant taxa are listed as threatened or endangered by federal and state governments, and over 200 plant species have 50 or fewer individuals remaining in the wild (DLNR 2016a). Richness of endangered plant species is highest in mesic and dry forests. Critical habitat for plants has been designated on every Main Hawaiian Island for many of the plants listed as threatened or endangered.

3.5.2 Wildlife



Palila (*Loxioides bailleui*), a Hawaiian honeycreeper, is on the federal and state endangered species lists. It is dependent on the mamane forest on western slopes of Mauna Kea on Hawai'i Island. Photo courtesy: DOFAW

The major wildlife group dependent on Hawai'i's forests is its unique forest bird population. The avifauna in Hawai'i are of national and global importance, because Hawai'i is home to the highest number of endemic forest birds in the United States. Also, 40% of North America's endangered bird species are from Hawai'i. Of the 40 species of forest birds found in Hawai'i, 21 are endemic and endangered. Forest birds pollinate native trees, consume insect pests, and attract a growing number of bird watchers. The 'alala or Hawaiian crow (*Corvus hawaiiensis*), Kaua'i akialoa (*Hemignathus ellisianus stejengeri*), and Kaua'i nukupuu (*Hemignathus lucidus hanapepe*) are the most endangered. The endangered palila (*Loxioides bailleui*) is particularly dependent on the native mamane tree and therefore is subject to the availability of the limited mamane forest.

Because of the introduction of mosquitoes and the prevalence of avian malaria, most remaining forest birds survive in montane mesic and wet native forests dominated by 'ohi'a and koa or in subalpine forests dominated by māmane and codominated by māmane and naio where cooler temperatures limit mosquitoes. These include forests on Hawai'i and Maui because these islands have the highest elevations available, as well as remnant forest patches at high elevations on Moloka'i, Lāna'i, O'ahu, and Kaua'i.

The major threat to native forest birds is forest habitat loss and degradation. The protection and perpetuation of forest bird habitat to a limited extent is assured because large areas of relatively undisturbed native forest are

in the Forest Reserves. However, survival of some species depends on the ability and willingness of private landowners to conserve and manage essential, contiguous areas of habitat and prevent alterations to the forest.

3.5.3 Terrestrial Invertebrates

Similar to native forest birds, Hawai'i's native terrestrial invertebrates are characterized by high levels of endemism; over 90% of terrestrial invertebrates are found nowhere else on earth (DLNR 2015a). Unique invertebrates include a carnivorous caterpillar, a happy-face spider (*Theridion grallator*) and no-eyed big-eyed spider (*Adelocosa anops*), and yellow-faced bees (*Hylaeus* spp.). Many more native invertebrates are believed to be rare.



O'ahu tree snails in the genus *Achatinella* are on the federal and state endangered species lists. They are restricted to the remnant native forests on the highest ridges of the Ko'olau and Wai'anae Ranges on O'ahu. Photo credit: W. P. Mull

Hawai'i's forests are vital to the protection and conservation of native plants and animals. Because so much of Hawai'i's forest, which provides habitat for native species, is in private ownership, private landowner conservation efforts are vital to the conservation of these resources. Habitat and biodiversity conservation is an important legacy for many landowners and has much public support. Inclusion of biodiversity conservation in FLP goals fulfills many of Hawai'i's private landowners' desires for stewardship of their lands and helps fulfill DLNR's responsibility to protect and sustain these resources.

3.6 Geological, Aesthetic, and Scenic Resources

Hawai'i's tropical forests commonly include an overstory of koa and 'ōhi'a and an understory of tree fern, milo, māmane and a variety of multicolored orchids and exotic gingers. The inherent beauty of such a typical tropical forest, often bordering on sheer cliffs, waterfalls, and public roadways, is an obvious and prominent forest value. In addition to rain forests, Hawai'i hosts a multitude of natural communities and great biodiversity that provide unique aesthetic benefits for both residents and tourists. This diversity is a function of the variety of land forms shaped by dynamic geological processes like volcanic activity and weathering.

Hawai'i's most noted geologic features are the massive volcanos that dominate the islands of Hawai'i and Maui. The island of Hawai'i consists of five volcanos: Mauna Kea (13,796 feet), Mauna Loa (13,860 feet), Hualālai (8,251 feet), Kohala (5,505 feet), and Kīlauea (4,040 feet). Lush forests cover the windward slopes of these older volcanos where rainfall is ample and soils are more developed and productive. These younger volcanoes create open and scenic "lavascapes" with scattered vegetation among the blocky chunks of 'a'ā and ropy-appearance pāhoehoe lava flows.

Maui is composed of two volcanic domes. East Maui, or Haleakala Volcano (10,025 feet), is known for its gigantic summit depression of unusual shape. West Maui (5,788 feet) is known for its sheer cliffs (pali) and needle-shaped mountain formations. These cliffs also dominate the geology of both O‘ahu and Kaua‘i, the oldest of the major islands.

Lava tubes and anchialine pools are geologic features unique to active or recently active volcanic islands. Lava tubes are essentially caves formed when surface lava cools to form a hard crust over the top of hot, still flowing lava. These features are found in many mauka (upland) forest areas. Anchialine pools are freshwater pools found scattered throughout exposed lava flows in low-lying coastal habitats, primarily along the Kona coast. Hawai‘i’s natural geological and scenic resource also include Waimea Canyon in Kaua‘i, the rugged Napali coast (Kaua‘i), Diamond Head (O‘ahu), and Pu‘u Pehe (Lāna‘i). Hawai‘i and its citizens are blessed with great scenic beauty, and much of it exists on private lands. Conservation of these geological, aesthetic, and scenic resources is an important legacy for many landowners and has much public support.

3.7 Mineral and Geothermal Resource Potential

Like all volcanic islands, those of Hawai‘i are relatively poor in minerals, and there is no real developable potential in forest or other areas. Some minerals, however, including a few semiprecious gems, have been found. These most largely result from cooling magma, reactions between different components of magma, and reactions between magma and limestone. Minerals thus formed include olivine, augite, quartz, agates, and jaspers, and small deposits can be found scattered throughout the island chain. Most Hawaiian specimens are smaller, more poorly colored, and of considerable less value than samples of these minerals from mainland sources.

One of the unique aspects of Hawai‘i’s landownership laws is that subsurface mineral rights are owned by the state (Hawai‘i Revised Statutes [HRS] Section 182-2[a]i). Under HRS Section 182-1, Definitions, minerals include oil, gas, coal, phosphate, sodium, sulphur, iron, titanium, gold, silver, bauxite, bauxitic clay, diaspore, boehmite, laterite, gibbsite, alumina, all ores of aluminum, and, without limitation thereon, all other mineral substances and ore deposits whether solid, gaseous, or liquid, including all geothermal resources; sand, rock, gravel, and other materials suitable for use and used in general construction are not included.

While this means that subsurface mineral resources are not owned and saleable by the private landowner, the state does own them and may exercise its right to mine or lease those lands to exploit those resources. This presents a potential conflict with federal legal requirements for the purchase of fee or conservation easement rights in private property. The federal agency must ensure that any outstanding rights to the property will not adversely affect the conservation values the federal agency is seeking to protect. This includes considering the likelihood that the state, acting through its Board of Land and Natural Resources, will exploit its subsurface mineral rights.

The state will evaluate whether its mineral rights are likely to be utilized or not pursuant to the requirements of HRS Section 182-4. In making its determination, the state will consider the relative value of the mineral rights at issue as compared to the benefit to the state and the public of protecting the land and its related conservation values through a conservation easement or fee acquisition.

3.8 Public Access

3.8.1 Recreation



Residents and visitors can experience and enjoy Hawai'i's rainforests and the unique fauna and flora they support. Photo credit: Paul Conry.

Hawai'i's favorable climate offers year-round opportunities for outdoor (terrestrial and marine), nature-based recreation. Residents and visitors can access and enjoy Hawai'i's seven national parks/historic sites, six national wildlife refuges, 55 state parks, 55 state Forest Reserves, 31 state harbors and boating facilities, and hundreds of county parks and recreation areas (DLNR 2016a). Tourism plays a key role in Hawai'i's economy; it is the state's largest revenue-generating industry. In 2013, more than 6 million people visited Hawai'i, generating \$14.5 billion in visitor spending (DBEDT 2016). According to the Visitor Satisfaction Survey, nature-based sightseeing and outdoor recreation were two of the main visitor attractions (DLNR 2016a). Because 66% of forestlands in the state are privately held and managed (Oswalt et al. 2014), recreation and ecotourism activities on private lands can play a major part in this industry and provide income for private landowners. Furthermore, these private forests are important because they augment the state-owned parks and facilities, which are often remote and can be accessed only via four-wheel-drive vehicles.

Nature-based recreation in Hawai'i includes hiking; wilderness camping; mountain biking; horseback riding; wildlife viewing; birdwatching; hunting; and several ocean recreation sports, such as snorkeling, diving, windsurfing, paddle boarding and kayaking. Private forestlands involved in commercial recreational activities also have economic benefits and provide for revenue diversification among other forest production or management activities. In 2011, an estimated 22% of the population participated in some type of wildlife-associated recreation with estimated expenditures of \$993 million by both Hawai'i residents and visitors for all types of wildlife-related recreation (USFWS 2011). Therefore, scenic resources, such as lush green forests, vibrant coral reefs and crystal clear water, are vital to the continued health and growth of Hawai'i's tourism. Much of the forest that provides recreation for resident and visitor alike is in private ownership. Private

landowner support for and provision of access to their lands for recreational purposes is vital, and the provision of access to private lands has much public support. Inclusion of recreation in FLP goals supports many of Hawai'i's private landowners' efforts to diversify their income and provide public recreation on their lands. Likewise, including recreation as a goal in the FLP enables state and county agencies, or nongovernmental organizations, the ability to acquire at-risk private recreational lands and provide greater opportunities to the public.

Healthy forest watersheds that trap nutrients and pollutants from reaching the ocean are essential to the quality of Hawai'i's shoreline—its most popular visitor attraction. In addition to the economic benefits, the recreational value of Hawai'i's forests instill an appreciation for Hawai'i's natural and cultural resources in residents and visitors, which in turn fosters respect and stewardship of these resources.

3.8.2 Public Hunting

Once done primarily for subsistence food, forest game hunting is a popular recreational activities in the state. Hunted game consists of nonnative species introduced into the state and released for hunting, including feral pig (*Sus scrofa scrofa*), axis deer (*Axis axis*), Columbian black-tailed deer (*Odocoileus hemionus columbianus*), feral goat (*Capra hircus hircus*), mouflon sheep (*Ovis musimon*), feral sheep (*Ovis aries*), hybrid sheep, and wild cattle (*Bos taurus*, if established by DLNR) (Hawai'i Administrative Rule [HAR] Section 13-123-11). Hunted game birds include 16 species of introduced game birds, including pheasants, quails, doves, francolin, and wild turkey (*Meleagris gallopavo*) (HAR Section 13-122-6). One of the unique aspects of Hawai'i's hunting laws is that private landowners can manage and regulate the hunting of game mammals on their property throughout the year, giving them the ability to offer fee hunts or run private hunting reserves on their lands as a source of additional income (HAR Section 13-123-8). Private landowners can also offer bird fee hunting but within the limits of DLNR game bird hunting rules (HAR Section 13-122).

A challenge for DLNR is balancing the duty to provide a viable hunting program without causing detrimental impacts on the environment and sensitive species and ecosystems. Hunting is an important cultural and subsistence tradition and a long-held and cherished tradition for many, and many hunters are fervent in their defense and maintenance of forests for hunting. Others feel that introduced ungulates should be eliminated entirely from Hawai'i's forests because of their highly destructive behavior. The state is attempting to use public hunting as one of the tools in controlling feral animal populations in forests. This policy of different game management objectives for different areas is regularly challenged by hunting groups who oppose boundary restrictions and by conservationists who want to see more vigorous control of game mammals. Private landowners do have an opportunity to help support recreational hunting, by providing access to their lands for public recreational hunting and allowing public access across their lands to other hunting areas, either through conservation easement or fee sale of property for these purposes, on lands where this use is appropriate. Private landowner participation in recreational hunting will help expand this program for residents and visitors, and help take pressure off public lands to provide these services.

Literature Cited

- Baker, P. J., P. G. Scowcroft, and J. J. Ewel. 2009. *Koa (Acacia koa) Ecology and Silviculture*. U.S. Forest Service, Pacific Southwest Research Station, Albany, California.
- [DBEDT] Hawai'i Department of Business, Economic Development & Tourism. 2016. 2015 State of Hawai'i Data Book: A Statistical Abstract. <<http://dbedt.hawaii.gov/economic/databook/db2015/>>.
- [DLNR] Hawai'i Department of Land and Natural Resources. 2015a. Hawai'i State Wildlife Action Plan. <<https://dlnr.hawaii.gov/wildlife/files/2016/12/HI-SWAP-2015.pdf>>.
- [DLNR] Hawai'i Department of Land and Natural Resources, Division of Forestry and Wildlife. 2015b. Forest Management Plan for the Waiākea Timber Management Areas. <http://dlnr.hawaii.gov/forestry/files/2016/04/WTMA-Management-Plan_Final.pdf>.
- [DLNR] Hawai'i Department of Land and Natural Resources. 2016a. Hawai'i Forest Action Plan 2016. <<https://dlnr.hawaii.gov/forestry/files/2013/09/Hawaii-Forest-Action-Plan-2016.pdf>>.
- [DLNR] Hawai'i Department of Land and Natural Resources. 2016b. Report to the Twenty-Ninth Legislature, State of Hawai'i 2017 Regular Session Relating to the Land Conservation Fund and the Legacy Land Conservation Program. <<https://dlnr.hawaii.gov/wp-content/uploads/2016/12/FW17-Legacy-Land-Report-FY16.pdf>>.
- Kaiser, B., N. Krause, D. Mecham, J. Wooley, and J. Roumasset. 1999. Environmental Valuation and the Hawaiian Economy: Introduction and Executive Summary. Draft. <<http://www.uhero.hawaii.edu/assets/HawaiiEnviroEvaluation.pdf>>. Accessed July 28, 2016.
- Oswalt, S. N., W. B. Smith, P. D. Miles, and S. A. Pugh. 2014. Forest Resources of the United States, 2012: A Technical Document Supporting the Forest Service Update of the 2010 RPA Assessment. October. General Technical Report WO-91. U.S. Forest Service, Washington, D.C.
- [USFWS] U.S. Fish and Wildlife Service. 2011. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: Hawai'i. <<https://www.census.gov/prod/2013pubs/fhw11-hi.pdf>>. Accessed October 20, 2016.
- Wagner, W. L., D. R. Herbst, and S. H. Sohmer. 1999. Manual of the Flowering Plants of Hawai'i. Two volumes. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, Hawai'i.

Yanagida, J. F., J. B. Friday, P. Illukpitiya, R. J. Mamiit, and Q. Edwards. 2004. Economic Value of Hawai'i's Forest Industry in 2001. Cooperative Extension Service, College of Tropical Agriculture and Human Resources, University of Hawai'i at Mānoa. <<http://www.ctahr.hawaii.edu/oc/freepubs/pdf/EI-7.pdf>>. Accessed January 15, 2017.

Chapter 4: Threats to Hawai‘i’s Forests

Numerous environmental, social, cultural, and economical factors are implicated in the overall threat to Hawai‘i’s forests. The FAP (DLNR 2016) comprehensively addresses the environmental or natural resource threats to Hawai‘i’s forests. These include:

- Displacement and loss of native biodiversity by invasion of forests by alien plant and animal species and conversion of multistoried, healthy native forest to monotypic stands of invasive trees (see FAP Issue 6).
- Death and dieback of dominant forest tree species such as koa and ‘ōhi‘a by invasive insect pests and pathogens that can wipe out thousands of acres of forests in a short time (see FAP Issue 2).
- Conversion of forestlands to grasslands by invasion of highly flammable and fire-adapted grasses, which has increased the frequency and intensity of forest fires (see FAP Issue 3).
- Reduction in the capacity of forests to retain water because of replacement by invasive alien tree species, which structurally have poorer water processing capacity compared to native trees and increase erosion, landslides, and subsequent loss of forestland (see FAP Issue 1).
- Recreational overuse by residents and visitors, which negatively affects the health of the forest and depletes forest resources (see FAP Issue 7).
- Unsustainable harvesting or logging of trees from forests, which depletes overall forestland (see FAP Issue 8).
- Global climate change impacts, such as sea level rise, changes in moisture and temperature regimes, and increase in frequency of storms and floods, threaten depletion of both low-lying and high-elevation forest cover (see FAP Issue 5).

Land tenure, politics, demographics, patterns of consumption and land use, economics, government procedures, and statutes have all changed relative to watershed forest protection since the Forest Reserve System was established in Hawai‘i. These changes have occurred faster than have the institutions in place to manage them. The net effect has been the failure of institutions and programs to ensure that future generations will be able to enjoy the services and benefits that Hawai‘i’s forests provide. This chapter focuses on some of the socioeconomic, cultural, and legal factors relative to land use in the state that threaten the conversion of forestland to nonforest use.

4.1 Land Protection

Pursuant to the state land use law (HRS Chapter 205), all lands in the state are classified into the following four districts (acreage totals in parenthesis from DBEDT 2016):

- Urban – citylike uses, regulated by county zoning ordinances (200,439 acres).
- Rural – small farms and low-density residential use (11,602 acres).
- Agriculture – land for crops, pastures, or forestry; federally owned land; recreational and open space that lack qualities to be in another district (1,926,502 acres).
- Conservation – forest reserves, watersheds, and other natural resources (1,973,846 acres).

The state Conservation District was first established in 1964 and administered by DLNR for the protection of watersheds and water supplies; preservation of scenic areas; provision of parklands, wilderness, and beach reserves; conservation of endemic plants, fish, and wildlife; prevention of floods and soil erosion; production of forest products; and performance of other related activities. The Conservation District has five subzones: Protective, Limited, Resource, General, and Special. The first four subzones are arranged in a hierarchy of environmental sensitivity, ranging from the most environmentally sensitive (Protective) to least sensitive (General). The Special subzone defines a unique land use on a specific site (DLNR 2017). A total of 979,744 acres of forestland are in the Conservation District, of which 328,742 (34%) is private forestland (DBEDT 2016).

The placement of lands into the Conservation District has, for the most part, proven to be an effective forest conservation tool. Although not perfect, as you look at the hills and mountains of Hawai‘i that are essential to support our watershed and that provide fresh water and other ecosystem values to us all, they are largely protected from development.

Considerable development is possible in the Limited, Resource, and General subzones of the Conservation District, with approval by DLNR of a development plan, and for those cases with larger-scale impacts, a permit issued by the Board of Land and Natural Resources, which requires considerable administrative effort. For instance, the following land uses are all allowed in the Limited, Resource, and General subzones: (1) agriculture—defined as planting, cultivating, and harvesting of horticultural crops, floricultural crops, or forest products, or animal husbandry; (2) landscaping—defined as clearing, grubbing, grading, and tree removal; and (3) construction of a single-family residence. In addition, commercial forestry and mining and extraction are allowed in the Resource and General subzones. Many land uses, such as those identified above, and which lawfully occurred prior to the establishment of the Conservation District in 1964, may continue without permit, under a “nonconforming use” exception, even in the Protective subzone.

Conservation District rules and regulations do provide a means to protect important natural and cultural resources of the state and regulate land uses; however, they are not a guarantee that forested lands will not be converted to other authorized uses or prevent the development of residential dwellings on Conservation District parcels. Other examples of land uses that could involve conversion of significant acreage of forested lands include mining and mineral extraction; geothermal wells; clearing and planting of renewable energy crops, such as nonnative commercial forests, grasses, or oil palm; conversion of forestlands to pasture for grazing;

and development of reservoirs, ditches, and other utilities and infrastructure. These uses are important, useful, and appropriate in many situations, but they may not be the best use of Conservation District lands in all situations.

The use of the FLP to acquire conservation easements or the fee purchase of the highest-quality watershed and native forest habitat in the Conservation District, by state or county agencies, or nongovernmental organizations, to extinguish development rights remains important and needed. This also adds to the further preservation and expansion of the watershed partnerships and is one of the priorities for the state.

Another factor that may be contributing to the conversion of forestlands is the property tax structure for conservation lands under the county tax systems (Table 4.1). In Hawai'i and Maui Counties, property tax rates are higher for conservation lands than for agricultural lands. In Honolulu and Kauai Counties, conservation and agricultural lands are taxed at the same rate, with the exception that on O'ahu, vacant agricultural land, which could support forest if left to revegetate, is taxed at a higher rate than active agricultural land. This tax differential does provide an economic incentive to convert forested conservation land, or vacant agricultural lands on O'ahu, into grazing and agricultural uses. In Hawai'i and Maui Counties, the property tax structure provides an economic incentive to



Mixed forestland and pastureland in upcountry Maui. Conversion of forestland to pasture or residential use is a threat here because tax rates for forestland zoned conservation is higher than for land zoned agriculture. Photo credit: Paul Conry

convert forested conservation lands to pasture or other agricultural uses, or causes landowners to resist the placement of their lands into the Conservation District. The exception is that Hawai'i County (Chapter 10, Article 8, Section 19-59 of the Hawai'i County Code) taxes landowners at the lower agricultural rate if they dedicate native forest for preservation for a period of 20 years.

Additionally, once in the Conservation District, lands become more difficult to manage because of regulation under the Conservation District rules. The societal value of protecting watersheds is not being reflected in the property tax structure. The costs and value of managing watersheds are not considered in the sale or use of the water resource. The tax system at its best values agricultural development equal to conservation management, and at its worst provides an economic incentive to convert forested conservation land to agricultural uses. The tax system does not provide enough incentives to landowners to continue the use of their forestlands as forests.

Table 4.1. Property Tax Rates by County for Land Uses Affecting Forested Lands

| Property Use Classification | Tax Rate per \$1,000 Net Taxable Land | | | |
|--------------------------------|---------------------------------------|--------|----------|--------|
| | Hawai'i | Maui | Honolulu | Kaua'i |
| Commercial | \$10.05 | \$6.60 | \$12.40 | \$8.10 |
| Industrial | \$10.05 | \$6.69 | \$12.40 | \$8.10 |
| Agricultural | | \$5.66 | \$5.70 | \$6.75 |
| Agricultural and Native Forest | \$9.25 | | | |
| Vacant Agricultural | | | \$8.50 | |
| Conservation | \$10.85 | \$5.80 | | \$6.75 |
| Preservation | | | \$5.70 | |

Source: City and County of Honolulu Department of Budget and Fiscal Services, Real Property Assessment Division 2016.

Lack of enforcing laws that protect legitimate land use practices over the years has become a major threat for forest conversion. There are thousands of acres of private forestland, including quality native forest that are zoned as agricultural land, at threat of conversion. Hawai'i Revised Statutes Chapter 205, and in particular, Chapter 205-4.5, relating to permissible uses within the agriculture districts, allows farm dwellings on agricultural land only when they are related to farm. In other words, if one does not farm, then there is no need for a farm dwelling. In spite of this, many private landowners continue to clear forested agricultural lands to build residence buildings under the pretext of doing some agriculture. This situation of “gentlemen estates” occupying thousands of acres of agricultural lands statewide without any agricultural activity is considered to be a result of nonenforcement of HRS Chapter 205-4.5.

With the demise of large-scale plantation agriculture, such as pineapple and sugar, large tracts of agricultural lands are now vacant. These lands too are subject to subdivision and conversion to gentlemen estates. In one recent example on O'ahu, 427 acres of former pineapple lands in Wahiawa are being divided into 35 farmland condominiums ranging in size from 10- to 18-acre lots with water, road access, and potential for buyers to build homes on this farmland (Gomes 2017). The project is presented as a model and good opportunity for small independent farmers to own productive farmland on O'ahu, and increase local food supply, and the financial investment to convert fallow fields to productive farmland, all good things. However, there is also concern over the potential for investors to just buy parcels and use them for homes. Other agricultural subdivisions end up with only 10–15% of their lots in actual commercial farming (Gomes 2017). Much of the challenge is to keep these acres from converting agricultural lands and forestlands to urban development and sprawl. Administratively, enforcement of state land use zoning laws is done by the county. One proposed solution to the situation regarding gentlemen estates is to consolidate land use zoning and enforcement within the state departments and not the county.

4.2 Land and Landowner Circumstances

Like elsewhere, the social and economic circumstances of the landowners in Hawai‘i determine the fate of their forestlands. Small landowners can find themselves land-rich but cash poor, and pressure to sell the forestland to commercial developers can be tempting, especially when the owners are financially struggling or getting old. There are limited mechanisms (e.g., tax benefits) for such financially struggling landowners to be compensated for selling a conservation easement.

Forestland passed down from one generation to the next can also be in threat of being sold to developers if the next generation has moved away from the land, have their own homes, and find the tax bills and the land maintenance expenses burdensome. Conservation restrictions, utility companies, and eminent domain also provoke strong resentment and discourage forestland ownership (Langer 2008). Large landowners are inclined to appraise the forestland, fragment it, and sell it over time.

If small landowners do strive to hold on to and manage their forested lands, they face the challenge of the high cost of management. The problem of invasive species is ubiquitous and immense and is a major forestland management challenge to forestland owners in Hawai‘i. Although the Hawai‘i Department of Agriculture and the county-based Invasive Species Committees provide assistance to private landowners during the early detection and eradication of new pests and weeds in Hawai‘i, these private landowners are not receiving sufficient help from government to help them control widespread invasive weeds, particularly on large-acreage parcels. Assistance from watershed partnerships to landowners is also limited by the resources available to them. Thus, lack of resources to manage the forests leaves frustrated landowners more inclined to convert land to nonforest uses, particularly when lands are zoned as agriculture or rural.

4.3 Adjacent Land Use and Development Pressure



Urban sprawl into agricultural land that was once lowland forest on Maui. Growing populations and the need to create value from private property pressure landowners to develop their lands for higher economic return than forest cover. Photo credit: Forest and Kim Starr

Subdivision of conservation or agricultural lots, building of private residences on conservation or agricultural lots, encroaching homes within view, huge housing developments and malls, expansion of highways and utilities are all seen as increased urban sprawl and a threat to private ownership of forestlands. These adjacent land uses increase the value to develop forestlands to beyond their value for forest. Landowners who have to pay higher taxes based on the developed value of their forestlands are pushed to sell forestlands to developers. Even owners of active agricultural lands and ranchlands are being pushed to sell because of pressure from surrounding urban

development. As populations grow, and demand increases for residential housing and a “country lifestyle” close to urban areas, it becomes socially and politically more acceptable to allow conversion of forestlands and agricultural lands to urban and residential uses to meet public demand. As adjacent lands are urbanized, it introduces more difficulties on the part of the forest landowner to co-exist with the urban neighbors on his border. Greater access up to, into, and through undeveloped forestlands creates trespass and vandalism problems on undeveloped forestlands from the public wanting to hunt, recreate, and explore new lands.

As the adjacent property is developed, it becomes easier and cheaper to connect into the adjacent public road and utility service and develop property. Urban sprawl creates its own demand to develop the next adjacent property. Growing populations and need to create value from private property encourage landowners to follow suit and develop their lands for higher economic return than that provided by forest cover.

Literature Cited

- City and County of Honolulu Department of Budget and Fiscal Services, Real Property Assessment Division. 2016. What Can We Help You With? <<https://www.realpropertyhonolulu.com>>. Accessed March 4, 2016.
- [DBEDT] Hawai‘i Department of Business, Economic Development & Tourism. 2016. 2015 State of Hawai‘i Data Book: A Statistical Abstract. <<http://dbedt.hawaii.gov/economic/databook/db2015/>>.
- [DLNR] Hawai‘i Department of Land and Natural Resources. 2016. Hawai‘i Forest Action Plan 2016. <<https://dlnr.hawaii.gov/forestry/files/2013/09/Hawaii-Forest-Action-Plan-2016.pdf>>. Accessed April 20, 2017.
- [DLNR] Hawai‘i Department of Land and Natural Resources. 2017. Conservation District. <<http://dlnr.hawaii.gov/occl/conservation-district/>>. Accessed April 20, 2017.
- Gomes, A. 2017. Aloun Farms offering agricultural ‘condos.’ Honolulu Star Advertiser. April 4. <<http://www.staradvertiser.com/2017/04/04/hawaii-news/aloun-farms-offering-agricultural-condos/>>. Accessed April 20, 2017.
- Langer, J. 2008. Family Forest Owners: Insights into Land-Related Stewardship, Values, and Intentions, Report on Focus Group Findings Prepared for the Sustaining Family Forests Initiative. <http://sffi.yale.edu/sites/default/files/files/Resources/Family%20Forest%20Owners%20Focus_Group_Report-2.pdf>. Accessed April 5, 2017.

Chapter 5: Strategies to Protect Hawai'i's Forests

The national policy goal behind the development of the FLP in 1990 was to protect the long-term integrity and traditional uses of forestlands in the nation. Congress, in establishing the program, recognized that the majority of the nation's productive forestlands are in private ownership; that private landowners face increased pressure to convert their forestlands to other uses; that private lands provide a wide variety of products and services from working forests, including timber and other forest commodities, fish and wildlife habitat, watershed function, water, aesthetic qualities, historical and cultural resources, and recreational opportunities; and that good stewardship of privately held forestlands requires a long-term commitment that can be fostered through a partnership of federal, state, local government and individual efforts (U.S. Forest Service, 2017). These circumstances and the need for the policy goal to protect the long-term integrity of the nation's forest remain true today, both nationally and here in the state of Hawai'i.

Forest policy in Hawai'i, as implemented historically and now by DOFAW, recognizes the importance of support for and stewardship of private forestlands. This commitment to the conservation of natural resources on private lands is evident both in the historic placement of large areas of private forestlands in Forest Reserves and the current programs to provide resources to private landowners for forest conservation and management activities. DOFAW appreciates the indispensable role that private lands and landowner actions provide in meeting the state's natural resource management goals. DOFAW also believes that cooperative assistance and economic incentive programs are often more effective in advancing forest stewardship goals than restrictive zoning and stringent regulatory control.

As established in the implementing authorities of the FLP, the major tool to protect forestlands under the program is the ability to acquire fee interests or conservation easements on lands threatened by degradation or conversion to nonforest uses. These land acquisition authorities, when used strategically to protect and acquire lands adjacent to existing protected forests, also help to create contiguous, larger, and therefore more resilient forests. When applied in concert with technical and funding assistance to enable better management of important forestlands, these land acquisition authorities are even more effective in ensuring the long-term integrity of Hawai'i's forests.

5.1 Land Acquisition Strategies to Meet Forest Legacy Program Goals in Hawai'i

Chapter 4 identified the current threats contributing to conversion of forestlands to nonforest uses. The following strategies will encourage and enable private landowners to reduce and mitigate those threats:

1. *Protect forestlands that are identified as important or essential in existing statewide, county, or local conservation initiatives, strategic plans, or management plans.*

Examples of these lands include those identified or included in the DLNR Legacy Watershed Protection Initiative; DLNR's 30 by 30 initiative; state and federal recovery plans for threatened and endangered species; watershed partnership plans; state and county legacy land acquisition programs; regional forestland conservation initiatives, such as the South Kona Watershed initiative; and the dryland-forest conservation initiative. These various initiatives support all or many of the primary purposes of the Hawai'i FLP.

2. *Aggregate small individual landowner parcels into larger management units to enable small landowners to effectively participate and compete in the program.*

Examples of this strategy would include identifying a group of small forest landowners whose forestland acreage could be aggregated in one acquisition initiative and proposal to provide increased FLP benefits and competitive position of the aggregated parcels. The way the FLP competitive award process is set up, larger landowners typically would have an advantage in competing for grants because the sheer size of their acreage can produce more conservation benefits and resolve greater threats than an individual small landowner's property. Aggregating the property of many small landowners to apply as a cooperative unit enables them to compete on a level playing field with larger landowners who have the competitive advantage of size. This approach of aggregating the property of small landowners in a single proposal also reduces the administrative burden of processing multiple small landowner proposals. This aggregating approach opens the program to many more, smaller landowners.

3. *Partner with other federal, state, and county land conservation acquisition programs to combine similar-purpose sources of funding in order to acquire interests in more lands and higher-cost and larger-sized parcels.*

Coordinating with and combining funding sources from similar acquisition programs enables program managers to greatly increase the size of acquisitions, the number of participants, and the benefits accrued from all the programs. Examples of state and county land acquisition programs and funds include the state Legacy Land Conservation Program; City and County of Honolulu Clean Water and Natural Lands Fund; County of Kaua'i Public Access, Open Space, and Natural Resources Preservation Fund; County of Hawai'i Public Access, Open Space, and Natural Resources Preservation Fund; and the County of Maui Open Space, Natural Resources, Cultural Resources, and Scenic Views Preservation Fund. Other federal land acquisitions programs include grants from the Federal Land and Water Conservation Fund, Recovery Land Acquisition Program, Habitat Conservation Plan Land Acquisition Program, National Coastal Wetlands Acquisition grants, and the Department of Defense Army Compatible Use Buffer Program. Many other federal, state, and private conservation grant programs exist that may assist with acquisition and protection of private forestlands.

4. *Combine land stewardship program assistance with conservation easements to provide additional support and financial incentive for private landowners to protect and manage forestlands.*

Combining stewardship assistance with the conservation easement acquisition program not only provides landowners the financial incentive to protect forestlands in perpetuity but also provides them the financial means to restore and manage those lands to maximize their conservation benefits. One

of the realities of managing natural resources in Hawai‘i is that without active management, native forest ecosystems will degrade and lose ecosystem values because of the degrading impacts of invasive species. Protective designations alone will not ensure the continued integrity of native forest ecosystems, and active management is necessary to maintain ecosystems. Stewardship programs provide private landowners assistance to enhance fish and wildlife habitat, watershed function, water quality, and other ecosystem services and to provide forest products, as well as educational and recreational opportunities to the public. A brief description of some of the available stewardship programs is provided in Section 5.2.

5.2 Existing Land Management Programs to Work in Parallel with and Complement the FLP to Protect Hawai‘i’s Forests

Several federal, state, and county land management incentive programs are already in place to assist private landowners with maintaining or enhancing the use of their forestlands. Appendix C, “Forestry-Related Assistance Programs,” of the Forest Action Plan (DLNR 2016) lists the various programs available in the state. For example, the Watershed Partnership Program works collaboratively with public and private landowners to protect over 2 million acres of vital forested watersheds in Hawai‘i. Watershed partnerships are making a critical difference in protecting watersheds by facilitating sharing of watershed management expertise, building public support for watershed protection, and developing sustained funding sources. Watershed partnership projects benefit on-the-ground activities protecting land for watershed conservation and implementing existing management plans negotiated under the partnerships. The landowner must enter into an MOU or memorandum of agreement adopting the scope of the existing management plan.



The Watershed Partnerships Program works collaboratively with public and private landowners to protect over 2 million acres of vital forests that recharge water for the islands. Photo courtesy: Hawai‘i Association of Watershed Partnership.

5.3 Other Strategy to Complement Protected Lands

DLNR’s policies, planning, and outreach for its watershed, forestry, and biodiversity conservation initiatives recognize that Hawai‘i needs to increase landowner-driven and proactive, rather than punitive, regulatory approaches in solving its natural resource problems. Experience with landowner incentives and cooperative management programs over the past 20 years has demonstrated that many private landowners are willing to participate in forest conservation programs if they are voluntary and compensation is forthcoming for property/land use rights foregone. Identifying administrative, policy, and regulatory changes that would enable

this approach of voluntary participation and provide compensation to landowners would encourage greater conservation partnerships.

Literature Cited

[DLNR] Hawai'i Department of Land and Natural Resources. 2016. Hawai'i Forest Action Plan 2016. <<https://dlnr.hawaii.gov/forestry/files/2013/09/Hawaii-Forest-Action-Plan-2016.pdf>>. Accessed April 20, 2017.

[USDA] U.S. Forest Service. 2017. Forest Legacy Program Implementation Guidelines. Final Amended. May 2017. <https://www.fs.fed.us/sites/default/files/fs_media/fs_document/15541-forest-service-legacy-program-508.pdf>. Accessed December 4, 2018.

Chapter 6: Forest Legacy Areas Eligibility Criteria and Program Priorities

6.1 Background to Forest Legacy Eligibility

An FLA is a geographic area with important forest and environmental values that satisfies identified “eligibility criteria” and that has been delineated, described, and mapped in the state’s FAP. Acquisition of lands and interests in lands for the FLP can occur only within an approved FLA. The criteria to determine the FLA are based on the FLP’s purpose to protect environmentally important forest areas that are threatened by conversion to nonforest use. Eligibility criteria (to determine the FLA) are defined as a set of factors developed by the state lead agency, in consultation with the state FSAC, to evaluate geographic areas to determine whether they contain environmental values significant enough to be considered an “important forest area” and whether they face “threats” of conversion substantial enough to be included in an FLA.

The minimum federal criteria for land to be designated eligible for inclusion under the FLP are as follows:

- It is within, or partially within the FLA.
- It has a minimum of 75% forestland.
- It can be managed consistent with the purpose for which it was acquired by FLP.
- The landowner is willing to sell or donate the interest in perpetuity.
- If the interest is a conservation easement that will be acquired with the use of federal FLP funds, the landowner is willing to allow title to be held by a government entity.

This chapter outlines the goals and objectives of the FLP in Hawai‘i and describes the criteria established by the state to determine the eligible FLA and the priorities considered by DOFAW when evaluating landowner applications for FLP.

6.2 Goals and Objectives

Based on the importance (Chapter 2) of Hawai‘i’s forests and the forces that threaten (Chapter 3) the conversion of private forestlands to nonforest, DOFAW, in consultation with the FSAC, has maintained the 2004 AON goals established for the FLP in Hawai‘i:

1. Protect Hawai‘i’s unique and fragile environmental resources.
2. Encourage the protection of rare and/or endangered species.
3. Promote the preservation of aesthetic beauty in Hawai‘i.

4. Preserve watershed health, and protect the sustainable yield of fresh water.
5. Protect working forests as economic assets for the state and counties of Hawai'i.
6. Protect traditional and cultural forest practices and resources.
7. Protect recreational forest practices.

The objective of the FLP is to identify and protect individual characteristics on the land that encompass the broad goals above, while also fulfilling certain policy goals and fostering an application process that encourages successful projects. The Hawai'i FSAC has created a detailed prioritization process for individual tract applications that conform to the program goals and give practical advice to DOFAW staff to help meet these goals with respect to individual projects.

6.3 Forest Legacy Eligibility Criteria

The 2004 AON identified the following four basic eligibility criteria for FLAs: (1) prime forestlands, (2) Conservation District, (3) critical habitat, and (4) public-private watershed partnership. Based on the several committee meeting discussions over the last couple of years, the assessment of current threats to forests (Chapter 4), the strategies needed to prevent conversion of forests to nonforest uses (Chapter 5), and the feedback received from stakeholders (Chapter 8) regarding threats of and recent trends in forest conversion, the FSAC and DLNR determined there was a need to revise and reorganize the eligibility criteria for FLAs. The prime forestlands criterion was removed because it is based on forest productivity, which is not necessarily a priority in Hawai'i. Instead, this criterion was replaced by native vegetation, and any nonnative forested lands in the Conservation and Agriculture Districts (zoning), plus a 0.5-mile buffer into any area of alien grassland or agriculture land around these forested land cover types. This extends protection to recovering forests on fallow agriculture lands (see Section 6.3.2, "Agriculture District Criteria," below). The FSAC also identified the issues of protecting threatened and endangered species habitat and public-private watershed partnerships of major importance when prioritizing individual tract applications rather than using these as basic criteria to determine the eligible FLA (see Section 6.4, "Priority Landscapes for Forest Legacy Areas").

The FSAC has revised the 2004 AON Hawai'i FLA to include the environmentally important and threatened areas in the state by using three broad yet comprehensive, spatially determined, easy-to-apply criteria: (1) land ownership type (government versus private), (2) the state's land use management districts (conservation, agriculture, urban, and rural), and (3) U.S. Geological Survey (USGS)-designated land cover types in the Carbon Assessment of Hawai'i (Jacobi et al. 2017). Originally adopted by the Hawai'i Legislature in 1961, the land use law (HRS Chapter 205) establishes an overall framework of land use management whereby all lands in the state of Hawai'i are classified into one of four districts: Urban, Rural, Agriculture, or Conservation. The use of this criterion is further explained in Sections 6.3.1 and 6.3.2, below.

Eligible lands for the FLP were derived using the three criteria identified above in a stepwise spatial analysis. The USGS GIS database from the Carbon Assessment of Hawai'i was used to identify the spatial layers of their

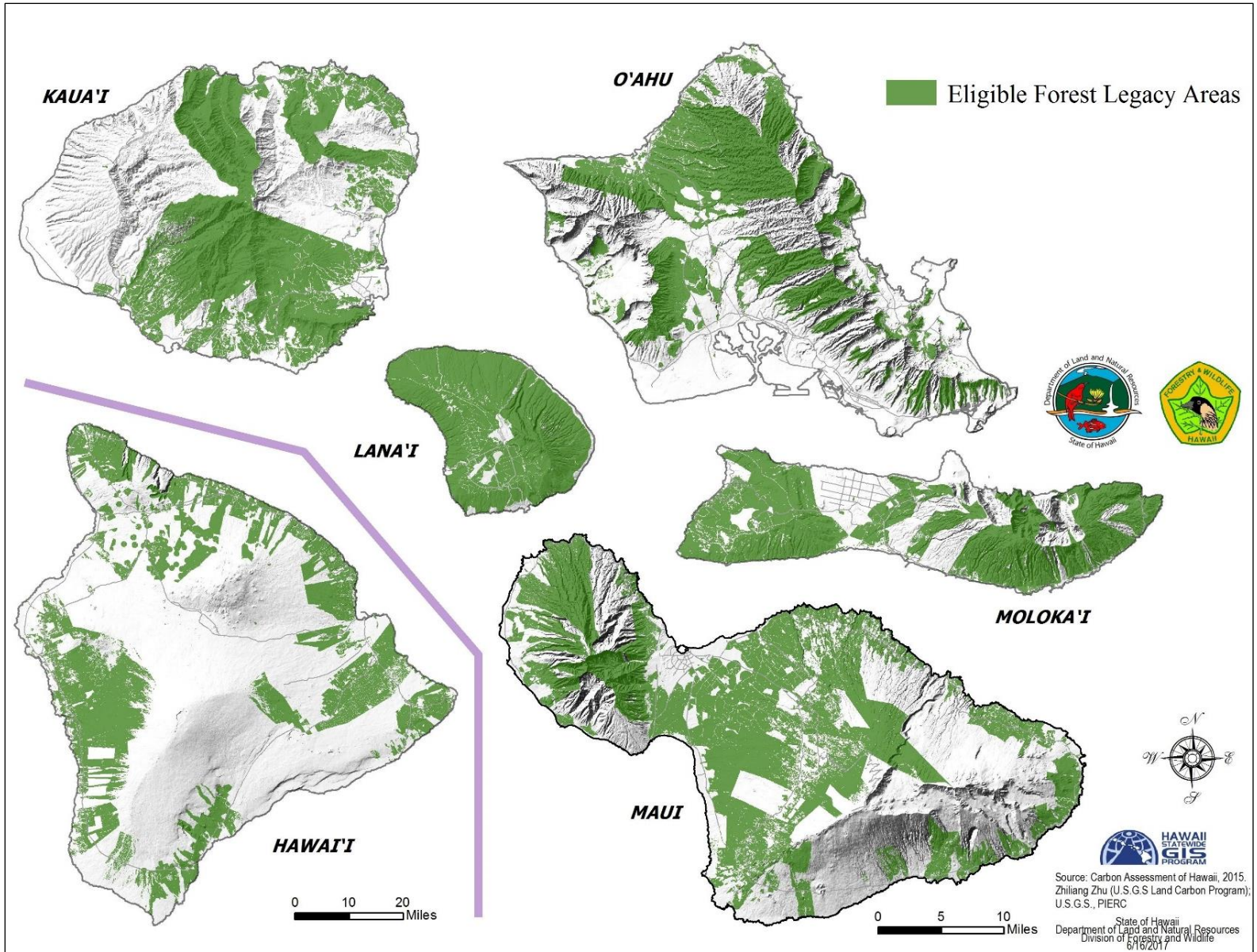
designated land cover types: native vegetation, mixed forest, alien forest, timber plantation, alien grassland, and agriculture. USGS-designated land cover types were then overlaid with the state's land use management layers to extract the six designated land types in Conservation and Agriculture District zones. Removing government-owned lands from this layer provided the six land types in private lands zoned Conservation and Agriculture in Hawai'i. Only the grassland and the agriculture USGS land types that were within 0.5-mile buffer of native vegetation, mixed forest, alien forest, and timber plantation were spatially retained to finally produce the eligible FLA as shown in in Map 6.1.

In other words, the eligible FLA includes:

1. Lands with native vegetation, mixed forests, alien forests, and timber plantations on private lands within Conservation and Agriculture Districts
2. Lands with grassland or agriculture within 0.5 mile of native vegetation, mixed forests, alien forests, and timber plantations on private lands within Conservation and Agriculture Districts

6.3.1 Conservation District Criteria

About 48% of Hawai'i's total land area lies in the Conservation District. Conservation lands are composed primarily of lands in existing forest and water reserve zones and include areas necessary for protecting watersheds and water sources; scenic and historic areas; parks; wilderness; open space; recreational areas; and habitats of endemic plants, fish, and wildlife. The Conservation District criteria include only land parcels designated Conservation District in Hawai'i by the Land Use Commission as of October 1, 2004. While Conservation District lands have more protection from conversion and/or development than any other land designation in the state, they are still subject to any number of threats and challenges (see Chapter 4). These lands are the most valuable in the state because they are critical watershed areas, house the highest number of threatened and endangered species (more than any given region in the United States), stabilize vulnerable steep slopes from landslides and flooding, and provide coral reef protection. Therefore, the state believes it is necessary to provide financial assistance to any landowner who wishes to get involved in the FLP and dedicate these lands to conservation and additionally provide an extra layer of protection to prevent these lands from being used in any way other than conservation in perpetuity.



Map 6.1. Eligible Forest Legacy Areas

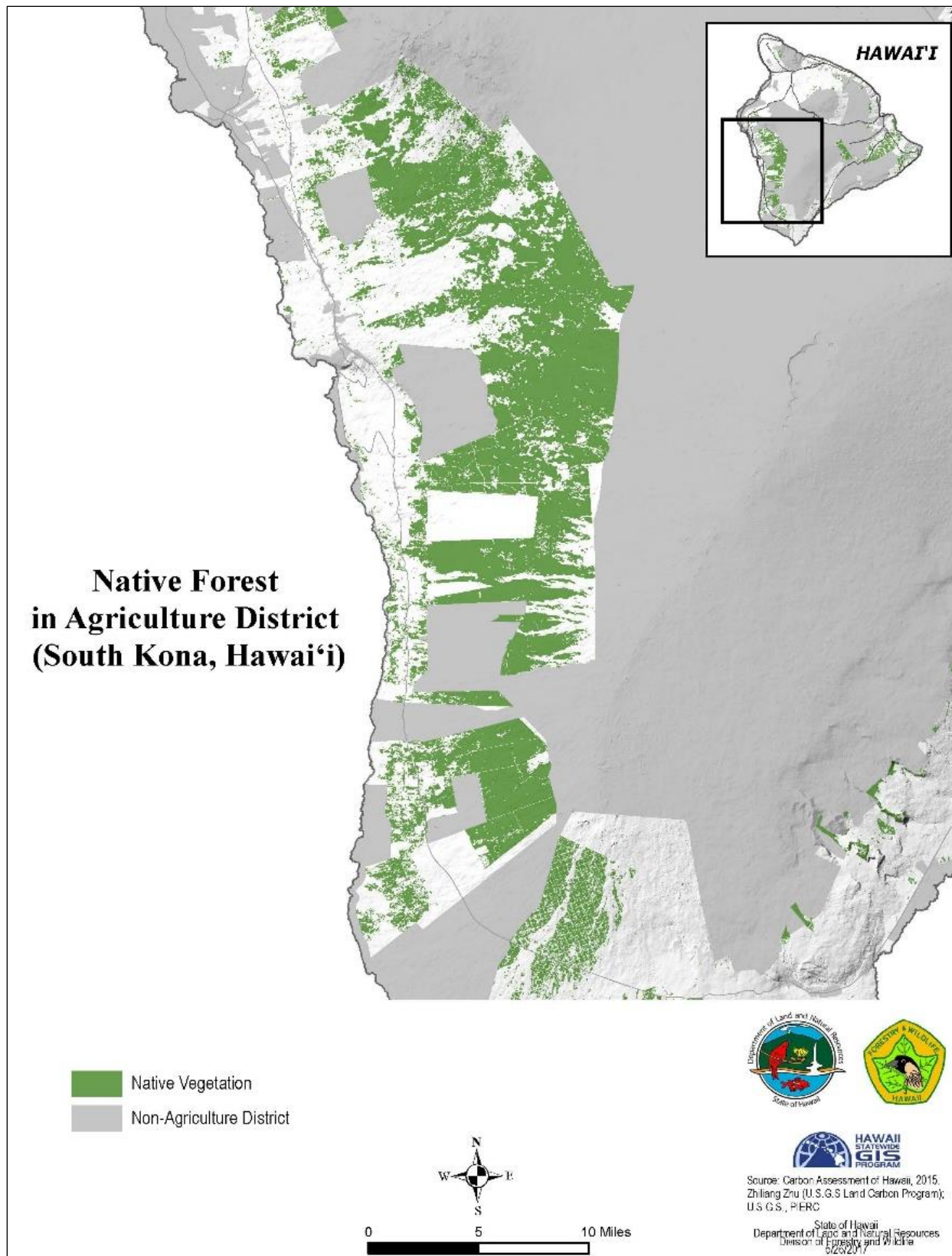
6.3.2 Agriculture District Criteria

Agriculture comprises about 47% of the total land area in Hawai‘i. In spite of some notable conversion of agricultural land to urban use, this overall percentage of land in Agriculture District is similar to that in 1961 when the Land Use Commission was established (Hawai‘i Business Magazine 2005). However, the number of acres of land actively engaged in agriculture has drastically declined in Hawai‘i over the last 35 years, with a 57% decrease in cropland and a 31% decrease in pastureland since 1980 (Melrose et al. 2015). With the shutting down of large pineapple and sugarcane plantations, some of the land has been used by diversified agriculture, including seed production, commercial forestry, and macadamia nut production, but the vast majority of agricultural land still lies fallow because of lack of irrigation and infrastructure (Melrose et al. 2015, Gomes 2016). These fallow agricultural lands, particularly those close to urban areas, are under constant pressure from development. Lands in the Agriculture District that are being used for commercial forestry or have now reverted back to mostly alien forest cover because active agriculture has been abandoned, are prioritized under the FLP to provide landowners a sustainable and viable option of maintaining forest cover on these relatively productive lands. Some lands, for example, in South Kona, are zoned agriculture but have native forest cover and are given a higher priority under the FLP because they are more threatened by conversion than native forest in the Conservation District.

To ensure that high-quality farmland is protected and preserved for long-term agricultural use and to help farming be an economically viable activity, Hawai‘i state laws (Act 183, Session Laws of Hawai‘i 2005; Act 233, Session Laws of Hawai‘i 2008) require the counties to identify and designate Important Agricultural Lands (IALs). It is important to note that the criteria for IALs include land with soil qualities and growing conditions that support agricultural production of fiber; fuel; or energy-producing crops, such as biomass. It should be noted here that eligibility for FLP does include some lands designated as IALs. Because the designation of IALs has not been completed statewide, Maps 6.1 and 6.2 depict those private agriculturally zoned lands that meet the FLA vegetative cover type criteria, including IALs.

6.4 Priority Landscapes for Forest Legacy Areas

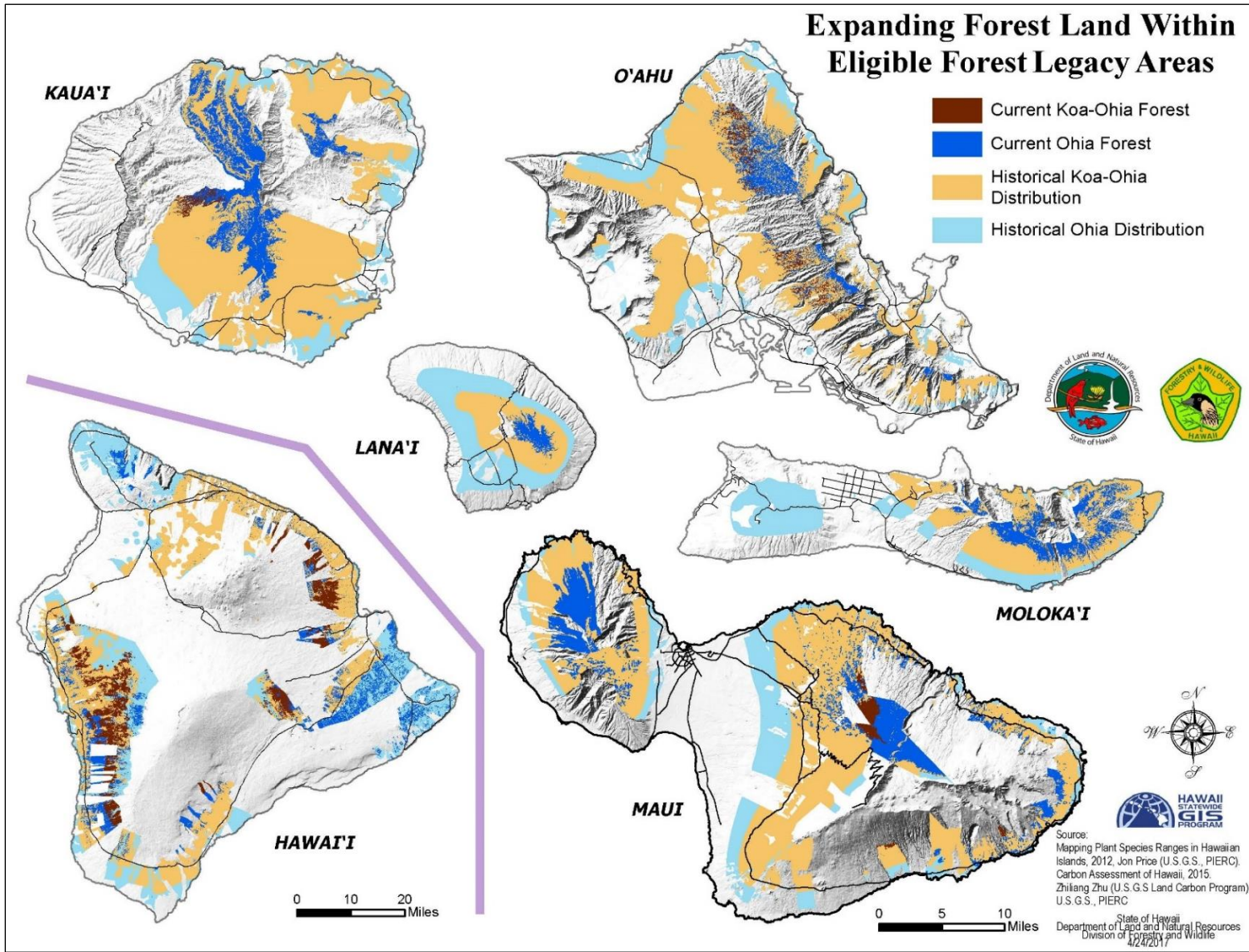
All lands that meet the basic eligibility criteria discussed above will be considered for inclusion in the FLP. In addition to the important conservation strategies discussed in Chapter 5, there are additional attributes of eligible lands that can be prioritized to best meet forest conservation needs. Within the lands proposed for inclusion in the program, there could possibly be a complex range of scenarios or landscapes based on, for example, the type of environmental importance of the land, the conversion threat to the land, forest type, or the socioeconomic situation of the landowner that the state might potentially have to consider when evaluating applications to the FLP. To help landowners better understand the nuances of the FLP selection process and to further guide the state in comparing and assessing land tract applications to the FLP, the AON update has sought to explain what the FSAC considers as some key priority landscapes for consideration to the FLP.



Map 6.2. Native Forests in Agriculturally Zoned Land are the Top Priority in Forest Legacy Areas

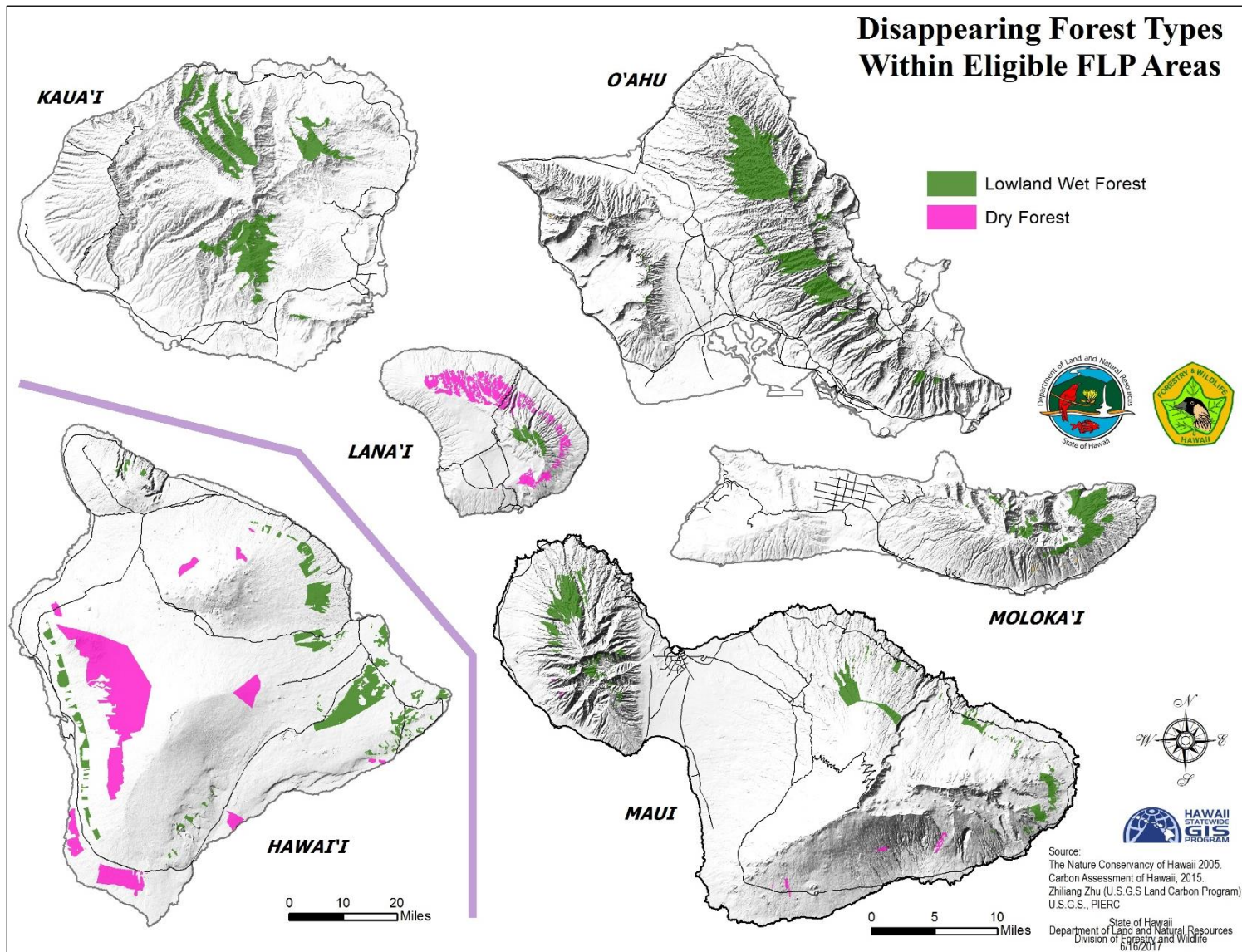
Listed below in order of priority are the landscapes or scenarios that DOFAW will consider when evaluating landowner applications to the FLP:

1. *Make native forests on agriculturally zoned lands threatened from conversion to other land use the top priority*—The state considers existing native forests on lands in the Agriculture District as the top priority. As discussed above, with the drastic decline in agriculture, lands in the Agriculture District are under significant threat from conversion to other land uses, such as development, agriculture, or “gentlemen estates.” Because native forests support native biodiversity, provide watershed protection, and have scenic, recreational, or cultural significance, they rank top in the spectrum of “environmentally important” forests in the FLP. For example, large tracts of private land in South Kona, Hawai‘i Island, that are zoned agricultural would fall into this category (Map 6.2).
2. *Restore native forests to produce native timber species, provide other ecosystem services, and/or connect existing forestlands*—As discussed in the FAP (DLNR 2016) and highlighted in Chapter 3, plantation of native trees either for timber or for sale of carbon credits is a win-win situation for the landowner and the state’s conservation goals. This is because in addition to providing financial incentives to landowners by selling carbon credits or meeting the market demand for high value Hawaiian species timber, it also restores land to native forests that support native and endemic biota. Commercial forestry, in fact, is the second largest type of diversified agriculture being invested in on old agricultural lands once used for pineapple or sugarcane farming; it is second only to seed production, and more acres of land are used for commercial forestry than are under macadamia nut production (Melrose et al. 2015, Gomes 2016). When the land connecting smaller patches of forestland is restored, it not only increases the area of forestland but also is expected to enhance the resiliency of forests to natural disturbances. Map 6.3 shows the current and historic distribution of native ‘ōhi‘a and koa forests in the state that will be used during the FLP application process to prioritize restoration of lands with historical ‘ōhi‘a and koa distribution to native forest and thereby expand forestlands in the FLA. Restoring native forests also provides a suite of other ecosystem services, such as improved watershed protection, nature-based recreation, opportunities for native Hawaiian cultural practitioners, and general benefits of improved air and water to Hawai‘i’s residents. Restoring land to native forests also encourages landowners to value, manage, and retain native forests.



Map 6.3. Expanding Forests: Historical and Current Koa and 'Ōhi'a Forest in Eligible Forest Legacy Areas

3. *Permanently protect private lands in watershed partnerships*—Watershed partnerships are voluntary alliances of public and private landowners in Hawai'i committed to the common value of protecting large areas of forested watersheds for water recharge and other values across different types of land ownerships. Because participation in watershed partnerships is voluntary and because the societal values associated with the watershed lands is so great, it is important that members have the option of selling to society, (government) those development rights that may degrade the critical watershed values. Water has long been recognized as the most important product of Hawai'i's forestlands. Forested watersheds reduce the rain's erosive effects, prevent soil from washing into the ocean, increase infiltration rates into the soil, draw moisture from the clouds, and deliver a consistent and dependable source of surface and artesian water. Therefore, protecting private lands that lie within watershed partnerships is a high priority to the state. There about 2.2 million acres of land currently enrolled in one of the 11 existing watershed partnerships. Members of watershed partnerships agree to work together and are able to use tax dollars and leverage federal, state, county, and private funds for the common goals of watershed management across four basic management arenas: (1) feral animal control; (2) nonnative weed control; (3) management of necessary infrastructure, such as roads and trails; and (4) public education and volunteer programs. The state, therefore, will give priority to private land parcels that lie within a private-public watershed partnership in Hawai'i.
4. *Target disappearing forest types for protection*—Lowland and dryland forests in Hawai'i are rapidly decreasing in size because they have historically been cleared by early colonizers for farming, ranching, and settlement, as well as ungulate and invasive species pressure. The threat of rural and urban development to lowland and dryland forests continues; for example, it is estimated that less than 10% of Hawai'i's tropical dry forests (located at elevations up to 1,500 meters) remain in Hawai'i, and most of those forests exist in fragments on the Hawai'i Island (Bruegmann 1996, Litton et al. 2006). Because of the proximity to rural and urban development, other low-elevation to midelevation dry, mesic, and wet forest types are also in danger of conversion to nonforest uses. Map 6.4 shows the disappearing lowland and dry forests that will be used when evaluating and prioritizing applications for FLP funds. In spite of being in a somewhat degraded state, these forest types continue to provide watershed protection, particularly on the dry leeward sides of the islands, and support native biodiversity. Therefore, the FLP gives priority to the highly threatened and fragmented lowland and dryland forests.



Map 6.4. Disappearing Forest Types in Eligible Forest Legacy Areas to Be Prioritized in Forest Legacy Program

5. *Open opportunities for forest recreation*—With its year-round favorable climate and environment, Hawai'i offers sustained recreation opportunities for both residents and tourists. Nature-based sightseeing and outdoor recreation are the two main reasons Hawai'i attracts visitors supporting the state's largest tourism industry (DLNR 2016). Forest recreational opportunities could include hiking, mountain biking, wildlife viewing, zip lining, or hunting. Therefore, enhancing forest-based recreational opportunities, which is contingent on having a healthy forest cover, is a high priority for the state. For example, the fee-simple purchase of lands in Helemano was important to the state to increase accessible recreational opportunities on O'ahu. Furthermore, for private landowners who cannot afford the delayed returns on investments through commercial forestry operations, such as timber or sale of carbon credits, offering recreational opportunities on their forestlands provides a more immediate financial incentive. However, the FSAC recognizes that not all recreational activities align with FLP's goals and that activities considered to be compatible or incompatible depend on a variety of factors, including the land use proposed by the owner and an assessment of that particular FLA relative to its environmental importance and level of threat. Table 6.1 provides a guideline for determining compatible and incompatible uses relative to the proposed land use category.



Signage used to distinguish compatible (hiking) and incompatible (biking, horseback riding, and dirt bike riding) uses on a popular hiking trail in upcountry Maui forest. Photo credit: Paul Conry.

With the approval of this AON, the FLAs and the “areas of emphasis” identified in the 2004 AON will be replaced by the FLA determined through the eligibility criteria discussed in this chapter. Table 8.1 in Chapter 8 lists some of private forestlands that stakeholders were asked to identify for the preparation of this AON update as priorities for future FLP projects in the state. These suggested areas helped DOFAW develop the priority landscapes discussed in this chapter, and the state will apply the priority landscapes discussed above in a relative manner when assessing and ranking project applications to the FLP. See Chapter 7 for details.

Table 6.1. Guidance on Compatible and Incompatible Activities in Forest Legacy Areas

| Use Category | Uses Allowed (Compatible) | Negotiable Uses (Depending on Purpose of Project) | Uses Not Allowed (Incompatible) |
|--------------------------|--|--|---|
| Agriculture | Compatible forestry activities | Raising livestock (silvopastoral system) Agroforestry Collection of plants | Incompatible agricultural activities Introduction of invasive species |
| Recreation | Foot trails Bird watching Hiking Horseback riding Hunting | Ecotourism Mountain biking Camping Off-road vehicles (if highly managed) Guided ATV tours Events (e.g., weddings) Ziplining Cabin development (size dependent) | Recreational vehicle park Motorcross park Introduction of game animals |
| Forest Management | Invasive species removal Planting of native species Wildlife habitat improvement | Timber harvesting Planting of nonnative species | Clear cut (unless part of on-going forestry operations such as planting or encouraging regeneration) Planting of invasive species (as determined by Hawaii Weed Risk Assessment) |
| Development/Improvements | Maintenance of existing structures | Signs Roads Utilities Recreational or educational structures Construction of improvements or structures Archaeological site preservation Temporary waste disposal Fencing | Subdivision (unless for conservation purposes) Alteration of water courses Permanent waste disposal Mining (unless it is limited and localized and not irremediably destructive) |
| Access | Private access Access by native Hawaiians DOFAW access for monitoring | Public access | Complete restriction of access |

Literature Cited

Bruegmann, M. M., 1996. Hawai'i's dry forests. *Endangered Species Bulletin* 21:26–27.

[DLNR] Hawai'i Department of Land and Natural Resources. 2016. Hawai'i Forest Action Plan 2016. <<https://dlnr.hawaii.gov/forestry/files/2013/09/Hawaii-Forest-Action-Plan-2016.pdf>>.

Gomes, A. 2016. Agriculture in decline. *Honolulu Star Advertiser*. February 22, 2016.

Hawai'i Business Magazine. 2005. Hawai'i's 7 Agricultural Myths. <<http://www.hawaiiibusiness.com/hawaiis-7-agriculture-myths/>>. Accessed May 25, 2017.

Jacobi, J.D., Price, J.P., Fortini, L.B., Gon III, S.M., and Berkowitz, Paul. 2017. Hawaii Land Cover and Habitat Status: U.S. Geological Survey data release, <https://doi.org/10.5066/F7DB80B9>.

Litton, C. M., D. R. Sandquist, and S. Cordell. 2006. Effects of non-native grass invasion on aboveground carbon pools and tree population structure in a tropical dry forest of Hawai'i. *Forest Ecology and Management* 231:105–113. <[doi:10.1016/j.foreco.2006.05.008](https://doi.org/10.1016/j.foreco.2006.05.008)>.

Melrose, J., R. Perroy, and S. Cares. 2015. Statewide Agricultural Land Use Baseline 2015. University of Hawai'i at Hilo, Spatial Data Analysis & Visualization Research Lab. Prepared for Hawai'i Department of Agriculture.

Chapter 7: Program Implementation

7.1 Overview of Program Execution

The governor of the state of Hawai'i has designated DOFAW as the lead agency to carry out the implementation of the FLP, including its expansion to other areas if this amended AON is approved. DOFAW currently has a staff of roughly 162 professionals. In addition, because the State of Hawai'i opted for the State Option in 2004, there is now a dedicated staff member to address Forest Legacy projects in Hawai'i.

DOFAW has cooperated with other divisions and related agencies and organizations to successfully implement the FLP over the past decade. These include the Division of Land Management, which administers management of all state lands, leases, and easements amounting to over 1 million acres. Once enrolled in the program, individual tracts are monitored and managed by DOFAW Cooperative Forestry Program staff, who also have extensive experience with management and monitoring of tracts enrolled in the state's Forest Stewardship Program.

The FSAC, representing many sectors of the interested public, strongly supports the expansion of the Hawai'i FLP as proposed in this document. The committee approved the amended AON at its September 2017 meeting. Committee members include (or have included) landowners, professional foresters, a resource biologist, a forestry researcher, a plant materials specialist, a planner, and a wildlife specialist. Represented organizations, institutions, and agencies are DOFAW, USFS, The Nature Conservancy of Hawai'i, Trust for Public Land-Hawai'i, Office of Hawaiian Affairs, soil and water conservation districts, the USDA Natural Resources Conservation Service, U.S. Fish and Wildlife Service, and University of Hawai'i. The FSAC serves DOFAW in an advisory capacity as DOFAW implements and develops the FLP and Forest Stewardship Program. As these programs continue to expand, DOFAW will expand the committee as necessary—and form permitted interaction groups—to coordinate the FLP.

DOFAW anticipates no difficulties in continuing to provide the 25% minimum cost share required for individual fee-simple and easement acquisition from a variety of programs. The successful projects under the program have shown that this match is possible. The state Legacy Land Conservation Program, established in 2005, provides funding for acquisition of lands having value for watershed protection, habitat protection, recreation and public hunting, natural areas, agriculture, and other resources. The state legislature has created permanent dedicated funding sources for these programs. Where exercised on FLP-eligible lands, these programs would count toward the cost-share portion. The donation of easements or portions of easement values from private landowners interested in participating in the program qualify as program/project match funding. Finally, local open space and natural resource and forestry protection funding measures were passed in 2002 in Maui County and Kaua'i County and in 2006 in Hawai'i County and the City and County of Honolulu.

7.2 Project Selection Process

A land tract application goes through federal, state, and regional evaluation and selection process to qualify for FLP funds. The evaluations entail a transparent, competitive, and defensible ranking process that is well communicated to program participants and partners and that ensures fair, equitable, and thorough review of all projects at the regional and national levels. At the federal level, USFS conducts an evaluation process to produce a prioritized project list for consideration in the president’s budget for the upcoming fiscal year. The entire process generally takes over a year before funding determination is made, after which the acquisition process may take equally long.

Project selection steps are as follows:

1. ***Step 1. U.S. Forest Service Releases a Project Request Letter***

USFS reviews and updates the process and scoring guidance as needed to ensure transparency and alignment with the national FLP priorities. Any significant changes are made in consultation with the states. The Washington office issues a letter to the USFS regional offices with due dates, scoring guidance for the national project review, and evaluation process. The regional offices send requests for project submissions to the state agencies.

2. ***Step 2. State Solicits Applications to the FLP***

The State of Hawai‘i accepts applications year-round with a cutoff date of August 10 for applications being submitted for the following year’s funding. Landowners can access the applications from the state’s (DOFAW) website. Landowners can choose to work with land trusts and other organizations to help them submit an application. Among other details, the application requires landowners to address the three national core criteria relative to their land:

- a. *Importance*—the various social, environmental, and economic benefits gained from the protection and management of their land (see Chapter 3 for a discussion on various importance attributes).
- b. *Threatened*—the possible, likely, or imminent threats from conversion to nonforest use that would lead to loss of forest values or public benefits (see Chapter 4 and the FAP for discussion on various types of threats).
- c. *Strategic*—how their project would fit within a larger conservation plan, strategy, or initiative and enhance previous conservation investments (see Chapter 5 for discussion on strategic attributes).

3. ***Step 3. State Evaluates Applications and Recommends Projects to the Region***

- a. *State compiles information from landowner applications*—DOFAW staff review and extract information about the “important,” “threatened,” and “strategic” attributes described in

the landowner applications, along with other information, such as tract cost and cost share.

- b. *State evaluates priority landscapes*—The state FSAC reviews and evaluates project proposals. In general, applications that demonstrate multiple attributes of national importance, threat, and strategy criteria will be regarded as stronger applications than those that address only one of these criteria or fewer attributes within each criterion. In addition to meeting the core national criteria, the FSAC will evaluate applications to determine whether and how many of the state priority landscapes are addressed in the FLP applications. As discussed in Chapter 6, the FSAC recognizes five priority landscapes for the state’s FLP, which are specifically based on the importance of Hawai‘i’s forests; the threats of conversion to nonforest use from existing and developing environmental, economic, social, and political reasons; and strategies that could be developed to promote the integrity of Hawai‘i’s forestlands. The FSAC will evaluate applications to Hawai‘i’s FLP in light of the priority landscapes and provide recommendations to DOFAW.
- c. *DOFAW evaluates and ranks applications*—Based on the recommendation by the FSAC, DOFAW will make a final evaluation and may choose to rank applications. High ranked applications are those that meet the state FLP’s program goals and objectives to the highest degree as determined by the FSAC; have the highest number of national FLP selection criteria attributes (of importance, threat, and strategy); and also meet the states’ priority landscapes. Applications approved and/or ranked by DOFAW are then forwarded to the USFS Regions 5 office for funding consideration
- d. *Applications are entered into the Forest Legacy Information System, producing a five- to eight-page brief on each project.*

4. ***Step 4. U.S. Forest Service Conducts Regional Review***

The USFS regional office will review submitted projects to assess project eligibility and viability and to ensure that the state has met the core program requirements. The USFS Region 5 office will work with the state to address any project or program deficiencies in advance of the final submission. USFS Region 5 may also conduct optional prereviews to provide input and advice to help states improve project proposals in advance of the final deadline.

5. ***Step 5. Agency Representatives Conduct National Review and Selected Projects Are Funded***

The Washington office established a National Review Panel, members of which include representatives from federal, state, and regional agencies that deliver the FLP. This panel evaluates the applications across states using the national core criteria of “importance,” “threat,” and “strategy.” The Washington office then submits a list of projects to the Office of Management and Budget for funding consideration in the president’s budget. After the annual appropriations legislation is passed by the Congress and after apportionment by the Office of Management and Budget, the Washington office releases the final list of funded projects through the program budget direction to the regional

office. The regional office then works with the state lead agency to issue a grant award. Because Hawai'i, in 2004 opted for the state grant option, DOFAW instead of the regional office works directly with the landowner and other partners to implement the project.

Chapter 8: Stakeholder Participation

This AON was first developed in 1994 to guide implementation of the program by identifying key areas of forestland, significant natural resources, and land use trends and threats. As required by the FLP, the state strives to keep FLP's (AON) document up-to-date, reflecting the current importance of Hawai'i's forest, the emerging threats to forest conversion, and the strategies to maintain and enhance the integrity of important forests. The AON was first revised in 2004 to further refine and expand the program. The 2004 update defined the statewide program eligibility criteria and included new GIS technology used to identify eligible FLAs. The stakeholder and public scoping process for the development of the AON in 1994 and later its first update in 2004 involved a comprehensive community engagement process, which is summarized below in Sections 8.2 and 8.3. Section 8.1 describes the stakeholder engagement involved in the 2017 update of the AON.

8.1 Stakeholder Engagement for the 2017 AON Amendment

During the 2015 and 2016 FSAC meetings, members discussed numerous aspects of the conditions of Hawai'i's forestlands, the changing land use in the state, and the imminent and developing threats to Hawai'i's forests, which collectively precipitated the decision to revise the AON document. In September 2016, DOFAW solicited proposal for a contractor to update and revise the document. H. T. Harvey & Associates was selected to assist DOFAW in revising the AON document.

On March 1, 2017, DOFAW emailed a letter to FLP stakeholders, soliciting input that would help update the 2004 AON. The stakeholders included private landowners; state agencies; and FLP partner organizations, such as Hawai'i Island land trusts, Hawai'i Cattlemen's Council, and the Ka 'Ahahui 'O Ka Nahelehele—a nonprofit for Hawai'i dryland forests. The letter solicited input on the following four key issues to guide the revision of the AON:

1. Issues that threaten a private landowner's ability and willingness to continue to maintain forest cover on their land.
2. Forestland conversion trends landowners have observed in their region or island.
3. Recreational activities that would be regarded as compatible or incompatible with protected working forests.
4. Areas to be prioritized as forest legacy areas in this AON.

Table 8.1 below summarizes the responses from stakeholders regarding these four issues.

Table 8.1. Summary of Stakeholder Responses Received for Amending the 2004 Assessment of Needs Document

| Threats to Forest Conversion | |
|------------------------------|---|
| Invasive Species | <p>On O'ahu's windward side, many forest areas are becoming increasingly degraded due to invasive species, such as albizia, that pose serious economic costs and other risks. The large falling limbs from albizia may render forested areas too dangerous for recreational activities, thereby reducing or eliminating a working forest's economic value. Moreover, forest areas are becoming more costly to maintain due to high-risk invasive species, thereby creating incentives for forest conversion.</p> <p>Alien weeds, such as Miconia, christmasberry, fountain grass, strawberry guava, and many others.</p> <p>Rapid 'Ō hi'a Death for which there is no practical control method.</p> <p>Wild goats in S. Kona (through to N. Kona) are a very serious threat to what is left of native cover.</p> <p>The fire ants simply make one not want to be in the forest. The pigs are actively destroying many native species and promoting weeds. The black twig borer, which destroys many native outplants and is believed to kill mature lama, mamaki, 'akia, kolea, kopiko, and other forest trees.</p> <p>Challenges of maintaining native forest cover—Maintaining native forest cover requires repetitive and intensive weed control efforts, and oftentimes installation and maintenance of ungulate-proof fencing and other infrastructure. These activities can be cost prohibitive and require technical expertise, hard-to-find skilled labor, and a long-term commitment of resources, with no financial return.</p> <p>Challenges of maintaining nonnative forest cover—Livestock managers generally do not want to spend money maintaining low/no-value nonnative forests on their lands. For example, on Haleakala Ranch, invasive tree species (<i>Morella faya</i>, <i>Pinus</i> species, <i>Eucalyptus</i> species) readily spread from nonnative forest stands onto active and productive pasturelands, which need to stay open for grazing livestock. Haleakala Ranch spends significant resources managing these invasive tree infestations. Kualoa Ranch, on O'ahu's east side, for example, actively manages <i>Falcataria moluccana</i>, <i>Ardisia elliptica</i> (ink berry), <i>Schefflera actinophylla</i> (octopus tree), <i>Trema orientalis</i> (gunpowder), <i>Citharexylum fruticosum</i> (fiddlewood). Other highly invasive species that are managed by livestock producers statewide include <i>Clidemia hirta</i>, <i>Senecio madagascariensis</i> (fireweed), and <i>Psidium cattleianum</i> and <i>Psidium guajava</i> (strawberry and yellow guava).</p> <p>Landowners are not receiving sufficient help from government to enable them to successfully control invasive species, especially on large-acreage parcels. The Department of Agriculture's (DOA's) noxious weed list, which ironically ignores the most heinous weed offenders, sends a wrong message by omission. This makes it harder to get funding to help eradicate weeds like albizia, miconia, clidemia, etc. Weeds that have exceeded the DOA's geographical distribution limits are removed from the list. The rationale is that the infestation is too far gone to bother with. This is an erroneous conclusion based on specious logic; Malama O Puna proved it by its red mangrove eradication work. Any infestation can be addressed given enough funding, labor, and other types of support. Also, government is not informing owners of funding sources that could help cover invasive species eradication costs WITHOUT entering into special agreements, such as stewardships.</p> |
| Hunting | <p>If the forest is unfenced and wild or domestic species of ungulates have "free range," the understory as well as tree canopy recruitment will likely be very adversely affected. Public hunting pressure in large (hundreds or more acres), unfenced parcels has never been found to be an effective form of control so should not be relied on for that purpose.</p> |

**Landowner
Financial
Challenges**

Investment in forestland is a long-term investment and takes the landowner a long time to realize his/her/family's investment. Landowner has to be able to make money while bearing the cost of holding or maintaining large acreages of land for longer periods of time.

One issue threatening private landowners' ability and willingness to maintain forests on their lands is the need for possibly using their lands for financial needs in the future. Many landowners may be willing to conserve their lands, but they are land rich and cash poor, so they perceive their lands as a tool for helping their families financially in the future. Many landowners would be willing to protect their lands if they were able to receive funding from selling a conservation easement.

Other issues that we see threatening private landowners' ability and willingness to maintain forests include trespassing by hikers and hunters, resulting in gates being left open or fencing damaged. This then leads to feral animals in the forest enclosure, which causes tremendous damage, and animals once inside are very difficult to eradicate. This recently occurred at the Palamanui forest parcel, and almost half of the new plantings in this enclosure were damaged before considerable effort finally removed all of the feral goats. Unfortunately, this is an all-too-common occurrence for many of the fenced-in forest units across the state. As the leeward sides of islands get drier and hotter, watering seedlings until they get established is also more of an issue.

**Development
Pressure**

Pressure to develop forestlands for profit, housing, resorts, or to convert to agriculture, as has occurred with macadamia nuts in South Kona or papayas in lower Puna.

High prices for land sales combined with high profitability of forestland conversion and low funding for land acquisition for conservation purposes.

**Burdensome
Regulations and
Taxes**

The Endangered Species Act and Critical Habitat—A major threat to private landowners' ability and willingness to continue to maintain forest cover on their property is the danger of attracting endangered species to their property and/or having their property designated Critical Habitat. Critical Habitat designations can increase the level and complexity of environmental compliance for even routine operations and especially for activities that require federal or state permits or funding.

If the land is zoned conservation, then the landowner is unable to utilize the forest resources present. Without the ability to harvest some of the trees, the forest becomes decadent and is more susceptible to disease and fire. There is a significant need to change the way conservation-zoned land is managed. The ability to harvest trees at a low level that will maintain the forest in a healthy condition is critical to preserving the forests on all the islands.

One issue is the tax burden, which does not give nearly enough incentive to forestland owners. This is a county issue.

The Hawai'i County Code regarding grubbing and grading is found in Chapter 10, Erosion and Sedimentation Control. The paperwork for this is a turnoff. Puna has lost many acres of native forest due to landowners who grub and grade without a permit and factor the cost of the fine (Section 10-8 I) of \$500 into the cost. There is no disincentive, and once that piece of forest is gone, it is gone forever. We believe that a stronger disincentive is needed, such as levying a moratorium of a certain number of years per acre cleared during which no development of any sort can be conducted (i.e., no permits issued) and increasing the fines. In other words, make it completely not worthwhile for forest to be cleared willy-nilly.

Climate Change

A large and increasing issue threatening private (and public) landowners' ability and willingness to maintain forest is the threat of wildfire. Wildfire occurrence in Hawai'i has been increasing, and the percent mean annual area burned from 2005 to 2011 of Hawai'i's total land area was higher than for the 12 states in the fire-prone

western United States. Wildfires will likely increase even more in Hawai'i with the projected temperature increases and precipitation declines associated with climate change. Increases in human population and abandonment of former agricultural lands that are giving way to nonnative grasslands and shrublands are also driving wildfire occurrence higher.

Increase in intensity and frequency of storms—for example, hurricane Izelle and subsequent wind storms—caused forestland owners to lose forest canopy.

Forestland Conversion Trends

Agriculture

We see some conversion of "forest" land to agriculture—either small-scale clearing for cultivated crops or the establishment of cacao orchards and similar agro-forestry activities. For the most part, forests that are being converted for these uses are composed entirely of nonnative, often invasive, species.

There is very little lowland native wet forest anywhere in the state, and most of what is left is in lower Puna, where most of it has been cleared for papaya cultivation or housing. In recent decades, macadamia nut fields have been expanded in S. Kona into native mesic forest with several rare species and good canopy cover of trees, such as lama and alahe'e. It is possible more forest could be cleared for cultivation in both districts.

Macadamia nut farming and pasture.

Biofuels

Tropical hardwoods that were grown for timber/rough form lumber now are being sold and burned for biofuel.

Timber

With forest harvesting technology changing—for example, carbide blades on saw mill equipment—there is potential of growing and harvesting other tropical hardwoods in Hawai'i besides Koa. There could be more of a promotion of growing a variety of trees.

Development

On the Big Island of Hawai'i, forests are being converted into some agricultural crops, such as coffee or macadamia nuts, but primarily they are being converted into residential developments or commercial uses.

A lot of forest in Puna Makai has been lost to homesteading, but recently there's been some even less nature-friendly development: dozing of entire lots and building of large houses with huge lawns, and conversion of forest to sheep pasture. The former is obviously ridiculous, but the latter also seems ridiculous to me given that the supply of pigs is a nearly limitless source of meat and that sheep can all by themselves convert a forest to a barren landscape.

The forestland conversion trends that I see in Puna are mainly for residential development. This is because much forestland is miszoned as Agriculture, which allows clearing and farm dwellings.

Forestland conversion on Hawai'i Island, other than that caused by the increase in wildfire occurrence, appears to be slowing down considerably as the economic and zoning constraints encourage development in areas where there is infrastructure and urban classification. There is not much expansion of agriculture, including livestock into forest, because so much open agriculture and pastureland are already available, and management makes more intensive use of the land.

Compatible and Incompatible Recreational Activities

Compatible

Recreational uses, such as hunting and hiking and well-managed horse trails, seem to be very compatible with forest management goals, and opportunities to derive income off these activities should be viewed favorably.

Hunting on foot or four-wheelers or on horseback.

Zip lines could be acceptable; might educate visitors about the value of trees and an active working forest. Forests are not just for preservation; they are an economic

asset.

Horseback riding carries the risk that invasive species are being carried on hooves or hide and in droppings with the unintended spread of weed seeds threatening the understory plants, as well as the timber trees. Maybe a hoof cleaning station and/or requiring the horses to wear poop bags like city patrol horses would be needed.

Hiking: great idea because low impact, but need to prevent the spread of invasive species. Hikers need to be educated about spread of invasive species. Also would need shoe cleaning stations to be made available.

Garner support for forests by getting the general, everyday community person into the forest by conducting educational events to bolster appreciation for trees and the forest.

Conceivably, hiking, horseback riding, all-terrain-vehicle tours, or even zip lines could be compatible if properly managed.

Hiking and horseback riding could be compatible activities, provided access is responsibly coordinated and managed.

Hunting, hiking, and horseback riding are all compatible uses of forested areas. Also, commercial groups that take hikes into various areas are also a use that is compatible as long as there is limited road development.

Hunting would be beneficial as it would reduce the damage that the pigs are doing. Hiking or horseback riding on established trails would be compatible.

Recreational activities in forests, such as hiking, when accompanied by education on how to protect the forests (e.g., minimizing Rapid 'Ōhi'a Death spread, keeping gates closed, preventing forest fires), can help with forest access, appreciation, and volunteerism as outlined in the Assessment of Needs document. Cultural uses encourage sustaining the forest for gathering, and eco-tourism can help with educating the public regarding the value of forests and how to protect them. Hunting that is done legally and with education on protecting forests also has the benefit of potential funding from the Pitman-Robertson Wildlife Sport Fish and Restoration Program. However, the location where recreational activities are allowed should be closely scrutinized.

Hawai'i has a one-legged economy—visitor industry. Hawai'i's economy needs to diversify because besides the blue oceans, the reason why people come to visit Hawai'i is the natural beauty of its forests; forest-based recreational activities like hiking are important.

Incompatible

The use of all-terrain vehicles tends to be more invasive and can negatively impact forests and generally should not be encouraged.

The use of four-wheel-drive trucks in all forested areas leads to erosion and running over native understory plants and damaging roots of bigger timber trees (but if trails were established, this would be less of a concern).

Off-road vehicles have wide rubber tires and pose the risk of erosion and damaging roots of trees. But established trails could minimize this impact.

Maintaining sustainable harvest of wild ungulates for hunting in young planted forests is likely not sustainable for the trees. Some kind of barriers would be necessary.

Off-road-vehicle (ORV) use is not compatible with forestry recreation. The ORVs often cause significant erosion and noise and impact the area by making new roads in areas that have limited access except by four-wheel drive. The vehicles bring in disease and invasive plants that can devastate the forest. This is a popular recreational pursuit, but it would have to be limited to areas that are already overrun with invasive species and should not be allowed in most forested areas.

The use of motorized vehicles for recreation.

Recreational uses compatible with maintaining forest cover:

This depends on the forest in question, but also whether or not (or to what extent) these uses are actually regulated. For example, feral pigs cause a lot of damage, but in some cases the pig hunters cause even more. The Division of Conservation and Resources Enforcement does not have a large enough staff to monitor and control the abuses. Until that lack is addressed, NO uses are compatible.

Cutting of native understory species, as well as 'ōhi'a trees, for unauthorized trail building and widening for mountain biking ramps and jumps. Some of the smaller forest units on Hawai'i Island have witnessed degradation of the forest parcel by unauthorized trail building and widening.

All the recreational activities listed, and more, may be compatible in certain areas, depending on relationships with neighboring landowners and land uses, historic preservation requirements, and preserving access and functionality for native tenants and cultural practitioners.

Priority Areas for Future Forest Legacy Projects

Kaua'i

Wailua Loop area, end of Kuamo'o Road, where the new bridge is being built. This area would be easier to access for the general public than Olokele valley (no current public access exists).

Unsure of why Olokele valley would be a priority (in the 2004 Assessment of Needs document) because it is owned by the Robinson family. If the landowners intend to join Forest Legacy Program, then inclusion of Mokuone valley, the area directly south of the Alakai Wilderness Preserve, should also be considered.

Maui

Waiopae/Kahikinui, cliffs east of Hookipa, Kahakuloa/Makamakaole West Maui, Catholic Church parcel in Wailua from Hana Highway—mauka to Forest Reserve (but possible alien plant dominated; needs study).

Hawai'i

Lower Puna, assuming there are still some private parcels there with native cover; very little left. Also Ka'u makai and mauka (ask J. Replogle at The Nature Conservancy).

The Hawaiian Islands Land Trust has already prioritized North and South Kohala and Ka'u as priority areas for conservation. Other areas of importance that are underprotected are dryland forest habitat type and cloud and rain forest habitat types.

Puna's coastal native forest needs protection. Due to uncontrolled coastal development, there are few areas around the islands that have any native forest on the shoreline, and Puna's hala forests (hala'ohi'a, lama, alahe'e, and 'akia) are worth protecting. Coastline should never be built upon but should be reserved for nature and respectful human visits, especially considering that storm events are likely increasing in severity and frequency. Little fire ants are a huge problem over most of Puna Makai; a comprehensive strategy needs to be implemented. Malama O Puna (MOP) is in the process of proposing that a section of coastal forest and shoreline north of Cape Kumukahi and south of Hawaiian Beaches, called Wai'ele, be acquired under County of Hawai'i's Public Access, Open Space and Natural Resources Preservation Commission program. Puna's native lowland wet forests that are already set aside as Forest Reserves, particularly Keauohana and the Halepua'a section of the Nanawale Forest Reserve, need help. MOP has restoration efforts ongoing in these reserves, but expansion of those efforts is needed.

Wao Kele O Puna (25,000+ acres), Halepua'a/Nanawale Forest Reserve, and Keau'ohana Forest Reserve.

Future focus areas for forests on Hawai'i Island include Assessment of Needs high-priority areas that are being devastated by Rapid 'Ō hi'a Death, as well as the

need for urban forests as mentioned above.

Private lands that will open up and provide access for management for landlocked Forest Reserves. For example, Hāmākua, where private lands currently block off access to the upland Forest Reserves. The purchase of Makaanahaloa to add to the Hilo Forest Reserve is also a good example. Similarly, perhaps Kau should be a priority area, too. There are very few accesses to the Forest Reserve, and Division of Forestry and Wildlife has to rely on temporary agreements with private landowners.

Moloka'i

Not sure why Kaunakakai gulch would be a priority—There hasn't been much activity in buying land or easements there, and it seems like the quality of the gulch is marginal. Recommend replacing this priority area with Mapulehu, which is an important area because it has the Wailau Trail and is immediately east of the proposed Pakui fenced area, and complementary/adjacent to the Kaluaaha easement. Buying or getting a conservation easement on this would help extend the "lei" of protection further east across East Moloka'i's summit. It also has most of the resources that made Kaluaaha an important area, too. It also connects to the conserved areas in Kainalu, so basically it is a big gap in the connection of the "lei."

Statewide

Lowland forests and native plant communities are in dire need of protection, whether wet or dry climate, and should be a priority for protection statewide.

The FLP should consider any area a priority where there is a landowner willing to develop a meaningful forestry operation (restoration or commercial) on their lands.

Other potential forest focus areas that should be investigated for mitigating climate change include areas with major water runoff resulting from the less frequent but more intense rainfalls that will impact the islands. Soil erosion and sediment runoff will become even more of an issue for Hawai'i's reefs with climate change.

Areas along the interface of forestlands and urban/agricultural lands. Areas that, if lost, would contribute to exceedances of fragmentation thresholds for preserving ecosystem integrity, wildlife habitat corridors, etc. Mangrove forests in coastal areas may deserve specific analysis/consideration of the tradeoffs between their value for coastal resilience, flood management, pollutant sinks, wildlife habitat, and sources of timber/wood products v. the cost and value of conversion to other uses, including restoration of native ecosystems and cultural landscapes.

Note: The comments presented in this table were provided by stakeholders in response to a letter from the Division of Forestry and Wildlife requesting input to help guide update of the 2004 Assessment of Needs document.

Input received from stakeholders was used in developing this 2017 AON. The final 2017 AON was reviewed and approved by the FSAC in September 2017.

8.2 1994 AON Public Participation

In 1994, the State Land Use District Boundary Review process provided a number of opportunities for public input and comment concerning the establishment of the FLP and preparation of the first AON document. Meetings, round-table discussions, and workshops allowed for sharing of information on watersheds; natural resources; regulations; and management strategies covering upland forest areas, forest values, and a gamut of protection tools, including district reclassification, cost sharing, tax incentives, and conservation easements. Over 500 people attended the workshop series, representing state and local government, forest and agricultural industries, environmental groups, land trusts, universities and schools, landowners and landowner associations,

land use planners, native Hawaiian groups, homeowners, and citizen planning groups. The majority of the stakeholders were positive and expressed their support for the FLP.

After the initial public scoping in 1994, DOFAW also circulated five press releases, three newsletter articles, and an informational brochures in order to inform the public about the FLP and solicit comments. Press releases were printed in several local newspapers, and articles appeared in the Hawai'i Forest Industry Association newsletter, *Woods*; in the DOFAW newsletter, *Hawai'i's Forests and Wildlife*; and in the DLNR newsletter *Resource*.

Three different drafts of the 1994 AON were circulated to various state agency staff, state FSAC members, and also made available to the general public through mailings, news releases, and public information meetings. DOFAW sent out approximately 300 personal letters directly to possible landowner participants, government officials and state agency staff. All comments and recommendations received were considered and incorporated, where appropriate, in the final 1994 AON.

Public comment received during the original 1994 public sensing process centered repeatedly on the protection of landowner private property rights and concerns about the constraints of perpetual easements, property tax liabilities that may occur with putting land into the conservation program, and restrictions on their current traditional uses of forestlands if granting the federal government interest in the property. The 1994, 2004, and current AON have included language to identify and address these concerns where appropriate.

8.3 2004 AON Amendment Public Participation

In order to ensure that proposed amendments to the AON in 2004 were made available to the public for comment, DOFAW took the following steps to allow and invite participation and feedback from concerned groups, individuals, and the public at large:

1. **FSAC Meetings Held Statewide**—The plan for amending the state's AON was first introduced at the July 12, 2002, FSAC meeting in Hilo, Hawai'i, by DOFAW FLP manager Karl Dalla Rosa. The FSAC supported the plan as reflected in the minutes of that meeting, and the amendment process became a recurring item on the FSAC agenda during the development of the 2004 amendment. Nine FSAC meetings open to the public were held on various islands, including O'ahu, Kaua'i, Hawai'i, and Moloka'i.
2. **Targeted Letter Seeking Comment to Concerned Groups**—In September 2004, DOFAW produced a rough draft of the amended AON. A letter requesting public comment was sent out to the original list of over 100 interested individuals and organizations contacted for the original AON public comment section in 1994. Letters were also sent to groups in DOFAW's Forest Stewardship Coordinator database gathered since the original publication of the AON. These letters announced two public meetings regarding the proposed amendments to the AON, and alerted interested parties that the proposed maps delineating amended FLAs were available for public viewing and comment on the DOFAW website.

3. **Maps Posted Publicly on Internet**—Maps of the proposed amended FLAs were posted to the DOFAW website on September 17, 2004, and remained available to the public through the full comment period, until November 1, 2004. The public was alerted to this posting through letters to target groups and public notice in local newspapers.
4. **Specific Public Meetings Held**—Two public meetings were held, on Hawai‘i Island and O‘ahu, the two islands where the majority of public interest and comment in the FLP had been generated during the original creation of the AON. On September 23, 2004, the FSAC held a meeting open to the public in Hilo, Hawai‘i, where the draft amendments to the AON were publicly discussed and tentatively adopted. On October 6, 2004, the FSAC held another open meeting for the public in Honolulu, where further public comments were accepted.
5. **Public Newspaper Notice**—Public notice of the proposed amendments to the AON was posted in the then-official state of Hawai‘i newspaper of record (*Honolulu Star-Bulletin*). The notice directed the public to the website showing revised maps for FLAs and also notified the public of the October 6, 2004, public meeting regarding AON amendments held at the DLNR building in Honolulu.
6. **Government Representatives**—The offices of Hawai‘i’s two senators and two congressional representatives were briefed on the amendment process and invited to review the amended AON. The entire Hawai‘i delegation has completed a review of the document and expressed unanimous support for the amended AON and stands ready to write individual letters of support for the adoption of this proposed AON.

Input and comments from agencies, stakeholders, and the public were incorporated into the 2004 amended AON.