



Ecoregional Assessment of Biodiversity Conservation
Executive Summary
September 2006

Hawaiian High Islands

This executive summary presents an 9-page overview of the Hawaiian High Islands Ecoregional Assessment II. The complete ecoregional plan is a web-only report. Details on the biological background, technical planning methods, results, and conclusions can be found online at: www.hawaiiecoregionplan.info.

Introduction & Purpose

The Nature Conservancy (TNC) as a global organization requires its more than 80 operating units to follow a unified, science-based Conservation Approach to developing and implementing their conservation actions (Figure 1). This approach is called *Conservation by Design*, and calls for use of multi-scale planning and evaluation. At the regional scale, efforts start with understanding how every State or Country Program contributes to the Conservancy's global goal of conserving 10% of each Major Habitat Type in each geographical Realm. For the Oceania Realm (Figure 2), Hawai'i contributes to the terrestrial and freshwater Major Habitat Types of Tropical Moist Forest, Tropical Dry Forest, Tropical Grassland & Shrubland, and Tropical Coastal Rivers¹.

The process of "ecoregional planning" is used to determine exactly which and how much biodiversity each operating unit will contribute to the 10% global goal. Ecoregional planning determines a specific *portfolio* or suite of sites that collectively conserve the biodiversity of an ecoregion. In general, well-established TNC methods guide planners to identify the best remaining native ecosystems and species populations that have the greatest likelihood of persisting in the future. The ecoregional portfolio is a proactive conservation vision and guides how and where a unit should spend its limited resources.

Most Conservancy operating units encompass many ecoregions. Because of our geographic isolation, Hawai'i encompasses a single TNC terrestrial/freshwater ecoregion – the Hawaiian High Islands (4 WWF terrestrial ecoregions). The ecoregion is marked by dramatic variation in physiography and climate, globally significant percentages of plant and animal endemism, significant historic land use conversion at lower elevations, extremely urgent threats from invasive species, and relatively stable socio-economic conditions compared to other tropical biodiversity hotspots.

A first iteration ecoregional plan was drafted for the Hawaiian High Islands in 1998. The first iteration plan identified all the remaining native ecosystems in the archipelago. These large, native-dominated areas captured 50-80% of the known rare species and natural community occurrences, and presented clear priorities for Conservancy action. Following the 1998 plan, chapter strategies shifted to focus more heavily on watershed partnerships, statewide alien species prevention, detection, and containment, and increased capacity building and funding for the Hawai'i State Department of Land and Natural Resources (because of their critical land holdings in native-dominated areas).

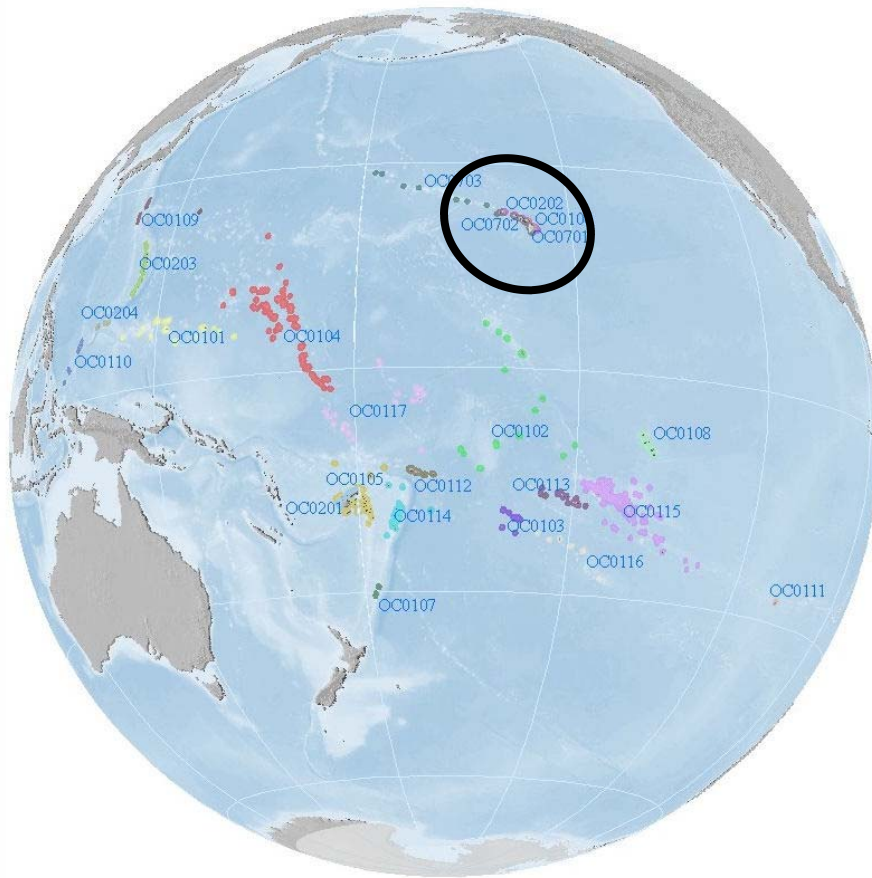
In 2003, TNC's global office developed a series of ecoregional planning standards based on nearly eight years of lessons learned across the organization. The standards outlined a minimum set of components and analyses that constituted an acceptable plan within TNC. The 1998 Hawai'i plan did not meet minimum criteria because standards emerged after it was complete. Bringing the 1998 Hawai'i ecoregion plan up to internal standards was the primary impetus of this 2nd iteration. The 2nd iteration was also an opportunity to incorporate new data and information available since 1998.



Figure 1. Nature Conservancy's Conservation Approach.

¹ This plan focuses exclusively on the terrestrial and freshwater environments. Marine components of the Hawaiian Islands are covered in a separate, but similar planning process and analysis that is currently in progress.

Introduction & Purpose



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|---|---|
| OC0101. Carolines tropical moist forests | OC0113. Society Islands tropical moist forests |
| OC0102. Central Polynesian tropical moist forests | OC0114. Tongan tropical moist forests |
| OC0103. Cook Islands tropical moist forests | OC0115. Tuamotu tropical moist forests |
| OC0104. Eastern Micronesia tropical moist forests | OC0116. Tubuai tropical moist forests |
| OC0105. Fiji tropical moist forests | OC0117. Western Polynesian tropical moist forests |
| OC0106. Hawaii tropical moist forests | OC0201. Fiji tropical dry forests |
| OC0107. Kermadec Islands subtropical moist forests | OC0202. Hawaii tropical dry forests |
| OC0108. Marquesas tropical moist forests | OC0203. Marianas tropical dry forests |
| OC0109. Ogasawara subtropical moist forests | OC0204. Yap tropical dry forests |
| OC0110. Palau tropical moist forests | OC0701. Hawaii tropical high shrublands |
| OC0111. Rapa Nui/Sala-y-Gomez subtropical broadleaf forests | OC0702. Hawaii tropical low shrublands |
| OC0112. Samoan tropical moist forests | OC0703. Northwestern Hawaii scrub |

J.Roberston 10/7/05

Figure 2. Terrestrial ecoregions of the Oceania Realm.



The Tropical Moist Broadleaf Forest in Oceania consist of 5.5 million acres, of which 1.7 million is in Hawai'i.



The Tropical Dry Broadleaf Forest in Oceania consists of 3.5 million acres, of which 1.6 million is in Hawai'i.



The Tropical Grassland, Savannas and Shrublands in Oceania consist of almost 1 million acres, all of which is in Hawai'i.



Tropical Coastal Rivers are a freshwater major habitat type in Oceania and in Hawai'i.

Developing the Portfolio

Well-tested methods and standards for ecoregional planning in the Conservancy have evolved from basic conservation planning principles and lessons from the field. There are five components that especially characterize the Conservancy's standard approach for which the Hawai'i 2nd iteration specifically aspired to include:

- *Conservation Targets* – explicit definition of the ecological systems, natural communities, species, and special features that the portfolio will conserve.
- *Viability Assessment* – a consistently applied ranking of the ability of each example of each conservation target to withstand or recover from natural or anthropogenic disturbance and persist over time.
- *Conservation Goals* – the number and spatial distribution of each conservation target needed to adequately conserve that unit of biodiversity in the ecoregion.
- *TNC Priorities* – the subset of sites in the portfolio that are The Nature Conservancy's current priorities based on biodiversity value, threats, and feasibility/opportunity.
- *Standard Database* – use of a standard database tool to capture portfolio information that allows the organization to roll up ecoregional plans across the globe.



The first step in the Hawai'i planning process was to determine the units of biodiversity or conservation targets that the portfolio would conserve. With thousands of endemic and at-risk species and natural communities in the ecoregion, this was not an easy step. However, careful, systematic analysis by the planning team revealed that the vast majority of species and natural communities could be adequately nested under 10 broadly defined ecological systems (Table 1) and that such units were excellent building blocks for the overall portfolio. The team determined that one natural community (Continuous Perennial Stream) and three special features were not adequately nested (Rare Plant Concentrations outside viable native ecological systems, Waterbird Concentrations) or had unique threats (Forest Bird Concentrations), and so were defined as explicit conservation targets (Table 1).

Table 1. Conservation targets for Hawaiian High Islands Ecoregion

1. Alpine System
2. Subalpine System
3. Montane Dry System
4. Montane Mesic System
5. Montane Wet System
6. Wet Cliff System
7. Lowland Wet System
8. Lowland Mesic System
9. Lowland Dry System
10. Dry Cliff System
11. Continuous Perennial Stream
12. Forest Bird Concentration
13. Rare Plant Concentration
14. Waterbird Concentration

Developing the Portfolio

Next, viability or “health” ranks were assigned to each example of each conservation target (Figure 3). The ranks were categorical (i.e., Very Good, Good, Fair, Poor), and were based on explicit criteria. Information for assigning viability ranks was from a combination of available data, partner assessments and surveys, and expert opinion of knowledgeable scientists. This step in the process helped eliminate all non-viable examples (ranked Poor) from further consideration.

The most difficult step of the 2nd iteration analysis was setting explicit conservation goals – that is, the number and distribution of each conservation target needed to adequately conserve that unit of biodiversity in the ecoregion. Spatial distribution or stratification was relatively straightforward since there are strong patterns of ecological variation across the archipelago. Such well-known variation resulted in four stratification units: Kaua‘i (islands of Kaua‘i and Ni‘ihau),

O‘ahu, Maui Nui (islands of Maui, Moloka‘i, Lāna‘i, and Kaho‘olawe), and Hawai‘i Island.

In contrast, it was extremely difficult to determine how many examples of each conservation target were necessary to conserve, especially for broadly defined ecological systems. This step complicates all ecoregional planning efforts and can only be determined by educated guess. Our team was liberal in setting numerical conservation goals, in part because the Hawaiian High Islands Ecoregion is highly converted, highly threatened, and globally unique.

Thus, the portfolio included:

- (1) All good- or very good-ranked examples of ecological systems and fair-ranked occurrences to ensure at least a total of two examples of each ecological system per stratification unit;

SUs	Kaua‘i		O‘ahu		Maui Nui					Hawai‘i					
Islands	NII	KAU	OAH		MOL	LAN	KAH	MAU		HAW					
ESs	NII	KAU	WAI	KOO	EMO	LAN	KH	EMA	WMA	KOH	MK	WML	K-K	KON	P-P
ALP								■			■		■	■	■
SUB								■			■		■	■	■
MD								■			■		■	■	■
MM		■				■		■	■		■		■	■	■
MW		■	■			■		■	■	■	■	■	■	■	
WC		■	■	■		■		■	■	■			■		
LW		■	■	■		■		■	■	■			■		
LM		■	■	■		■	■	■	■	■	■		■		■
LD		■				■	■	■	■				■	■	■
DC		■	■				■	■	■	■					
CPS		■		■		■		■	■	■	■				
FBC		■						■			■	■	■	■	■
RPC		■	■						■						
WBC	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Figure 3. Overall Viability and Selected Conservation Targets. Colors indicate viability rank: Dark Green = Very Good; Green = Good; Yellow = Fair; Red = Poor. Key to abbreviations: SU = Stratification Unit; ES = Ecological System, NII = Ni‘ihau, KAU = Kaua‘i, OAH = O‘ahu, MOL = Moloka‘i, LAN = Lāna‘i, KAH = Kaho‘olawe, MAU = Maui, HAW = Hawai‘i; Conservation Areas: NII = Ni‘ihau, KAU = Kaua‘i, WAI = Wai‘anae, KOO = Ko‘olau, EMO = East Moloka‘i, LAN = Lāna‘i, KAH = Kaho‘olawe, EMA = East Maui, WMA = West Maui, KOH = Kohala, MK = Mauna Kea, WML = Windward Mauna Loa, K-K = Ka‘ū - Kapāpala, KON = Kona, P-P = Pōhakuloa - Pu‘u Wa‘awa‘a; Targets: ALP = Alpine System, SUB = Subalpine System, MD = Montane Dry System, MM = Montane Mesic System, MW = Montane Wet System, WC = Wet Cliff System, LW = Lowland Wet System, LM = Lowland Mesic System, LD = Lowland Dry System, DC = Dry Cliff System; CPS = Hawaiian Continuous Perennial Stream Community, FBC = Forest Bird Concentration, RPC = Rare Plant Concentration. WBC = Waterbird Concentration. Black dots indicate occurrence selected for portfolio.

Developing the Portfolio

(2) Four of the highest ranked/quality continuous perennial streams on each high island where streams occurred;

(3) All forest bird concentrations ranked good or very good;

(4) No rare plant concentrations because all were deemed Poor viability (concentrations of rare plants outside viable ecological systems);

(5) All waterbird concentration occurrences that the U.S. Fish & Wildlife Service recovery plan determined necessary for recovery.

Applying the goals described above resulted in the selection of 50 ecological system occurrences on 5 islands, 20 continuous perennial streams on 5 islands, 5 forest bird concentrations on 3 islands, 0 rare plant concentrations, and 53 waterbird concentrations on 7 high islands (not Kaho‘olawe) (Figure 3).

Overall, the selected conservation targets were grouped into 16 conservation areas – 4 broadly defined waterbird conservation areas, and 12 upland native landscapes which also encompassed forest bird concentrations (Figure 4a, b). Three of the 8 high islands (Ni‘ihau, Lāna‘i, Kaho‘olawe) did not contain selected ecological systems. The upland native landscapes encompass approximately 1.6 M acres (650,000 ha) within the portfolio.



Although conservation of the entire portfolio is necessary in the long term, a smaller set of priorities was needed to guide the shorter-term investment of resources by The Nature Conservancy of Hawai‘i, and ranking sites for TNC action is a new standard in ecoregional planning. Thus, a small set of near-term priority sites was chosen based on biodiversity value, urgency of threat, and feasibility/opportunity. The Nature Conservancy of Hawai‘i’s near-term action priorities include:

Kaua‘i Conservation Area

East Maui Conservation Area

East Moloka‘i Conservation Area



**Ka‘ū-Kapāpala Conservation Area
(Hawai‘i Island)**

**Kona Conservation Area
(Hawai‘i Island)**

For the remaining sites within the portfolio, TNC will look to conservation partners to lead efforts and will continue to play a supportive role in assuring these areas make progress toward effective conservation over time.

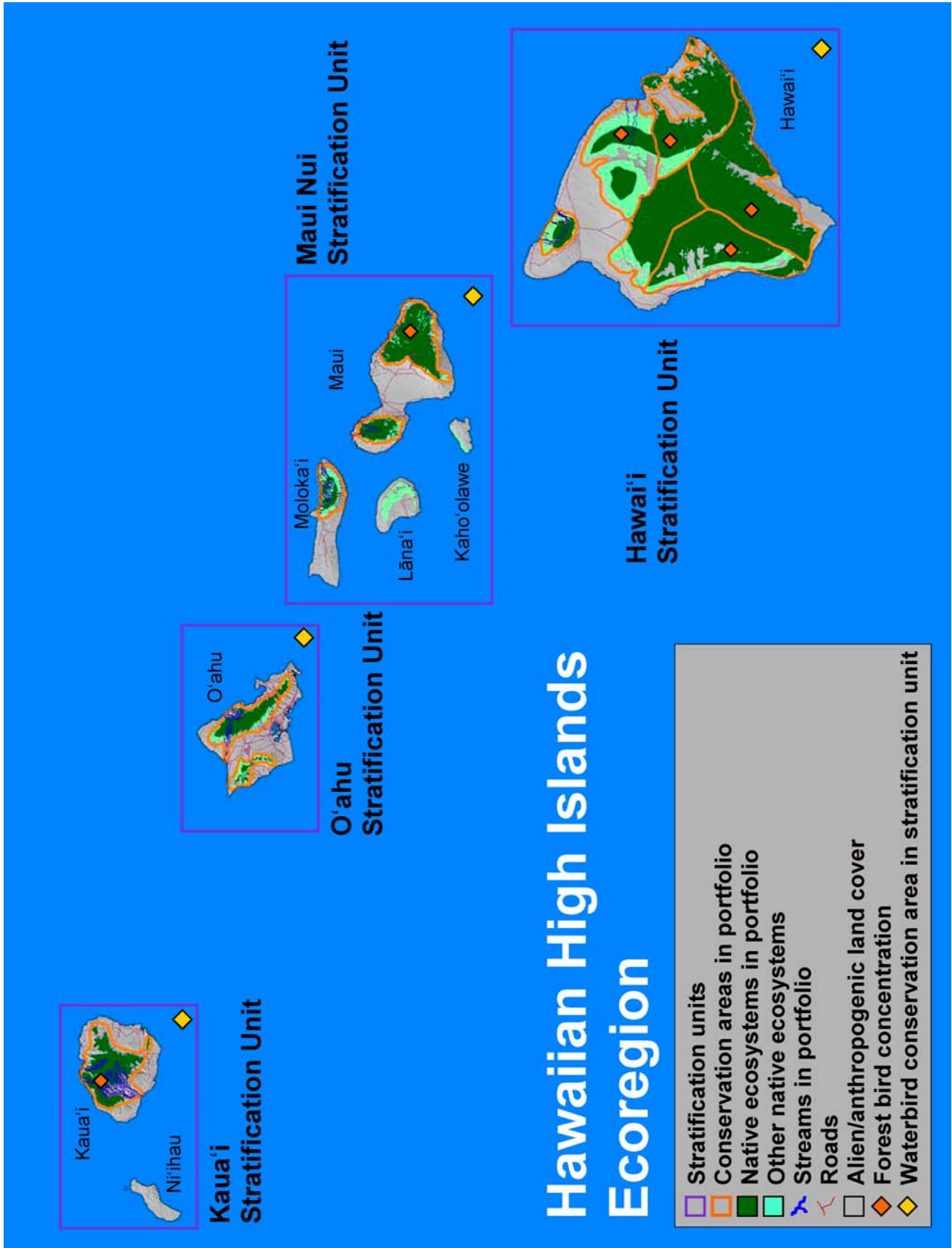


Figure 4a. Hawaiian High Islands Ecoregion, 2nd iteration portfolio.

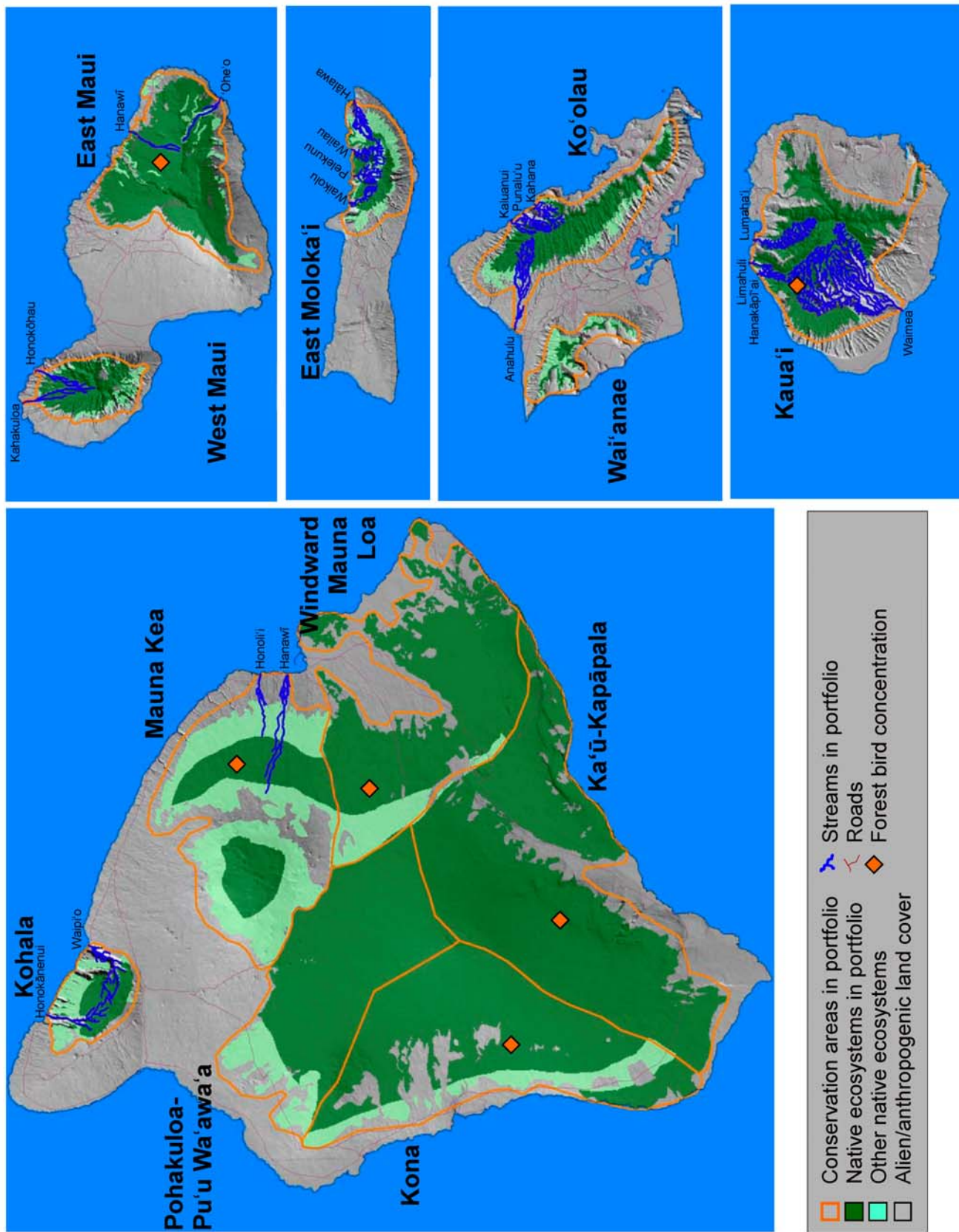


Figure 4b. Closer view of 2nd iteration portfolio.

TNC Priorities & Strategies

As part of the 2nd iteration, threats to biodiversity were ranked for each portfolio site and overall. Not surprisingly, the greatest, most pervasive threats to the Hawaiian High Islands ecoregional portfolio were feral ungulates and invasive, habitat-modifying weeds. Threats such as fire, residential development, and military training were important and highly ranked at specific locations.

In response to the pervasive, cross-cutting threat of plant and animal invasive species, statewide conservation strategies initiated in 1998 were confirmed and/or refined as part of the 2nd iteration. Such strategies are aimed at addressing the critical threats that erode the viability of conservation targets, allowing viability to stabilize and improve. Three primary strategies were confirmed:

Strategy 1. Watershed Partnerships

Establish and implement public-private land management partnerships in all portfolio sites to dramatically increase cooperative landscape-scale management actions and threat abatement.

Strategy 2. Increased State Funding and Management Capacity

Significantly increase funding/staffing support for management of priority watershed partnership and state-owned lands. Increase capacity for managing State Natural Area Reserves, Forest Reserves, and State holdings within public-private partnerships.

Strategy 3. Prevention of Alien Species

Establish a system to effectively prevent new introductions of invasive alien plant and animal species, deal with incipient introductions, and contain/control established pests. Build additional capacity in all above areas.

Conclusions

Developing a 2nd iteration Hawaiian High Islands ecoregional plan was an excellent challenge for The Nature Conservancy of Hawai'i. The process took approximately two years and required us to use the most recent available information and data to analyze and review our current conservation priorities, strategies, and direction. Overarching strategies developed in 1998 were confirmed and refined by better scientific data and consistent, explicit analyses. Ultimately, all remaining native biodiversity in Hawai'i needs to be conserved. This 2nd iteration terrestrial and freshwater portfolio will help guide the Conservancy to focus its limited resources on agreed upon priorities identified using our organization's standard methods and tools.

We greatly appreciate the input of all Hawai'i conservation partners, many of whom contributed substantially to the 1st iteration and this update.

KEY PARTNERS

National Park Service
US Fish & Wildlife Service
US Geological Service/Biological Resources Discipline
National Tropical Botanical Gardens
University of Hawai'i
Hawai'i State Department of Land & Natural Resources
Hawai'i Biodiversity & Mapping Program
Kamehameha Schools
Bishop Museum
Hawai'i Conservation Alliance
Hawai'i Association of Watershed Partnerships
Kaua'i Watershed Alliance
Ko'olau Mountains Watershed Partnership
East Maui Watershed Partnership
West Maui Mountains Watershed Partnership
Leeward Haleakalā Watershed Restoration Partnership
East Moloka'i Watershed Partnership
Lāna'i Forest & Watershed Partnership
'Ōla'a-Kilauea Partnership
Kohala Watershed Partnership

Further details, results, and explanations are available in the web-only 2nd iteration Hawaiian High Islands ecoregional plan online at:
www.hawaii.ecoregionplan.info