

# The Hawaii Strategy for Plant Conservation

*Implementing the GSPC in one of the most unique floristic regions of the world*

Chipper Wichman

National Tropical Botanical Garden



# The Hawaiian Perspective



Distances are approximate





# Hawai‘i’s Native Flora

1,220 Total Species

1,380 Total TAXA

89% Endemic  
Angiosperms

74% Endemic  
Pteridophytes

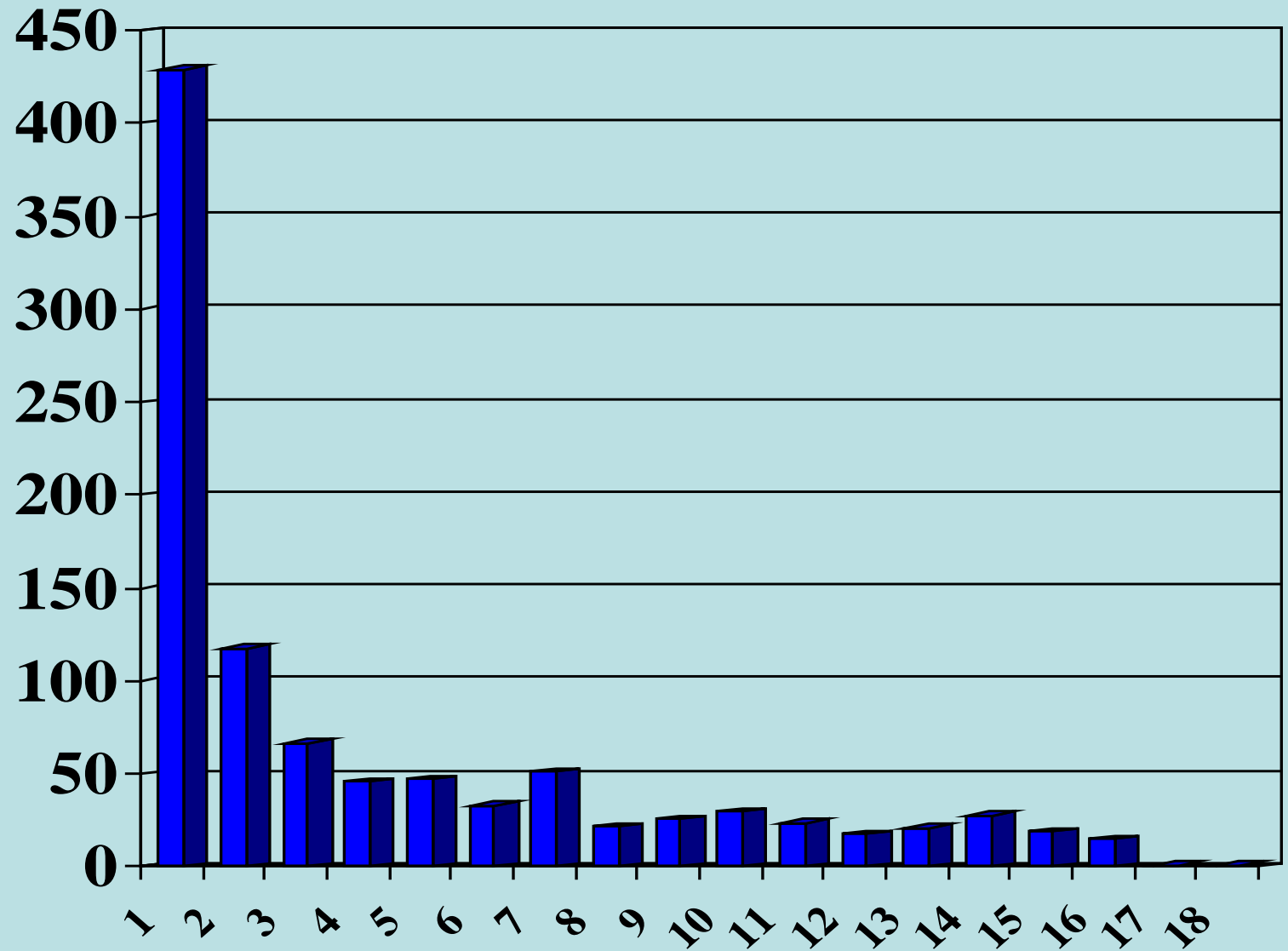
113 Extinct (8%)

**449 U.S. Endangered**

**730 Species of CI**

**87% Red List CR/EN**

Number of species



Range Size (number of volcanoes)



# Campanulaceae (Bellflower family)

- *Brighamia*
- *Cyanea*
- *Clermontia*
- *Delissea*
- *Lobelia*
- *Trematolobelia*

5 new genera

125 new species

99 single-island species (79%)



## From a single founder!



*Viola chamissoniana*  
(Violaceae)







***Cyanea crispa* (Campanulaceae)**



*Cyanea st.-johnii*  
(Campanulaceae)





*Tetramolopium filiforme*  
(Compositae)







***Metrosideros macropus***  
**(Myrtaceae)**



*Kanaloa kahoolawensis*  
(Fabaceae)



*Stenogyne kanehoana* (Lamiaceae)



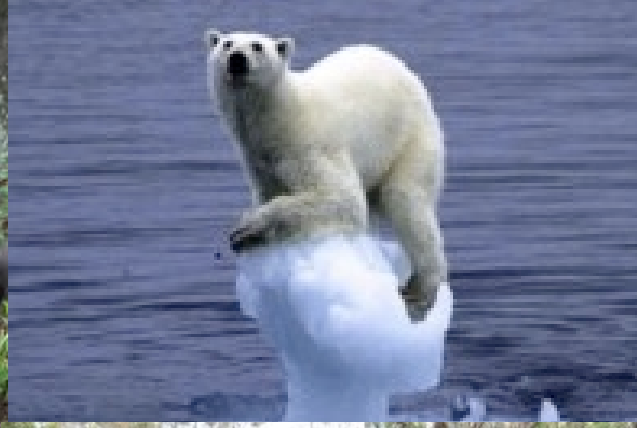


# Threats to Hawaiian Plants





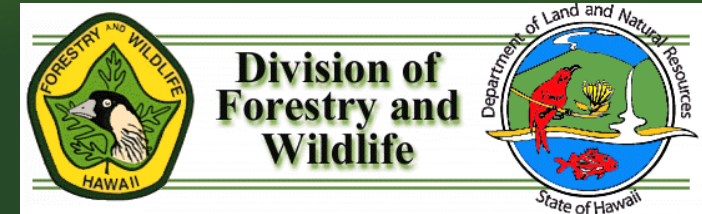
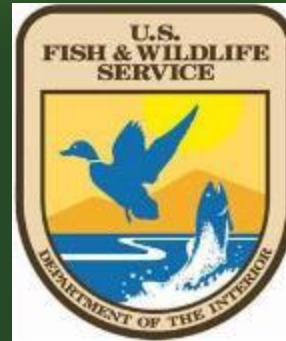
# Threats to Hawaiian Plants





# Key Actors Working on Plant Conservation in HI

- US Fish & Wildlife Service
- State Forestry & Wildlife
- Botanic Gardens & Arboreta
- US Army



Plant Extinction Prevention Program of Hawaii



Waimea Arboretum  
& BOTANICAL GARDEN







# 2011 Global Partnership for Plant Conservation Meeting

## **CONFERENCE ANNOUNCEMENT**

**A global partnership for plant conservation –  
Supporting the worldwide implementation of the Global Strategy for  
Plant Conservation**

**Organised by: the Global Partnership for Plant Conservation (GPPC)**

**in association with the Secretariat of the Convention on Biological Diversity (SCBD)  
and Botanic Gardens Conservation International (BGCI)**

**Hosted by: the Missouri Botanical Garden, St Louis, Missouri, U.S.A.**

**5<sup>th</sup> -7<sup>th</sup> July, 2011**

**Conference Web site: <http://www.mobot.org/gppc2011/>**

**Conference Email address: [gppc2011@mobot.org](mailto:gppc2011@mobot.org)**

**Hosted by Missouri Botanical Garden**

# Contributions from Hawaiian Plant Conservation Efforts Towards GSPC Targets

Mehrhoff, Loyal<sup>1</sup>, Bruce Baldwin<sup>7</sup>, Marie Brueggemann<sup>1</sup>, Vickie Caraway<sup>8</sup>, Margaret Clark<sup>2</sup>, Christopher Dunn<sup>4</sup>, Sam Gon<sup>5</sup>, John Henshaw<sup>5</sup>, James D. Jacobi<sup>3</sup>, Trae Menard<sup>5</sup>, Nellie Sugii<sup>4</sup>, Warren Wagner<sup>6</sup>, Chipper Wichman<sup>2</sup>, and Hau'oli Wichman<sup>2</sup>

<sup>1</sup> U.S. Fish and Wildlife Service, <sup>2</sup> National Tropical Botanical Gardens, <sup>3</sup> U.S. Geological Survey, <sup>4</sup> Lyon Arboretum, <sup>5</sup> The Nature Conservancy, <sup>6</sup> Smithsonian Institution, <sup>7</sup> University of California at Berkeley, <sup>8</sup> Hawaii Division of Forestry and Wildlife

## OVERVIEW

The Hawaiian flora has 1,345 native plant taxa. Approximately 90% of these plant taxa are endemic – an extremely high endemism level. The Hawaiian flora is also one of the most endangered floras in the U.S. A total of 351 Hawaiian taxa are listed under the U.S. Endangered Species Act – almost half of all listed U.S. plants. The flora is primarily threatened by invasive species such as feral ungulates, weeds, and other pests. Hawai'i's plant conservation efforts emphasize partnerships and have been ongoing for decades.

Table 1. Status of Hawaiian Plants in 2011. Number of species in each of the eight abundance categories (data from USFWS).

Abundance Categories for Hawaiian Plants	Number of Species
Extinct	115
In captivity only	19
1 in wild	12
2-20 in wild	95
21-100 in wild	123
101-1,000 in wild	205
1,000 – 5,000 in wild	83
> 5,000 in wild	637
Unknown	56
<b>Total</b>	<b>1,345</b>



## GSPC OBJECTIVES AND TARGETS

Hawai'i has made some progress towards objectives and targets set by the Global Strategy for Plant Conservation. A summary of Hawai'i's current status follows:

### OBJECTIVE I: Plant diversity is well understood, documented, and recognized.

- Target 1: Target met. Hawai'i has an online flora. (1.)
- Target 2: Target met. Hawai'i has an assessment of all plants, with periodic updates (Table 1).
- Target 3: Target not met. While research and information are well communicated, there is inadequate levels of research on species and population biology and restoration ecology.

### OBJECTIVE II: Plant diversity is urgently and effectively conserved.

- Target 4: Target not met. The GSPC target is 15%, but only 4% of the total land area of Hawai'i is both protected and effectively managed. Effective management requires ungulate-proof fencing and extensive weed control. See Figure 1 for an island example.
- Target 5: Target not met. Areas essential for the protection of Hawaiian plants have been identified (see Figure 2). Only a small fraction of these areas, not the target of 75%, have been protected and managed effectively (compare Figures 1 and 2).
- Target 6: Target not met. A portion of State and private lands are managed, but these do not reach the target of 75%. Other sectors have no information.
- Target 7: Target not met. Data are only just now being accumulated on this target, but only 62% of the 351 state and federally listed plant species have one or more populations managed *in situ*.
- Target 8: Target not met. Approximately 69% of the 351 state and federally listed plants are conserved *ex situ*. Extensive work has been undertaken, but Hawai'i is short of the 75% target.
- Target 9: Unknown if target met. Genetic collections of banana, breadfruit, and taro exist, but it is not known if the target of 70% of genetic diversity has been conserved.
- Target 10: Target not met. Hawai'i's biosecurity strategy is underfunded and key Hawai'i-specific actions are precluded by federal regulations. Hawai'i has a good, but underfunded, system for early detection/rapid response to plant introductions. Control of chronic invasive species is minimal. There is significant resistance to control of key invasive species that are considered beneficial by certain sectors of society (e.g., feral pigs, introduced deer, introduced grazing grasses, and fruit trees). Biocontrol programs for conservation purposes are underfunded. There is not a comprehensive plant conservation strategy for Hawai'i.

### OBJECTIVE III: Plant diversity is used in a sustainable and equitable manner.

- Target 11: Target not met. Some endemic palm species are at-risk from seed collectors. Commercial availability of some rare species for gardening, but not restoration, is confusing to the public.
- Target 12: Unknown if target met. Koa products are probably sustainably managed, but naturally occurring old-growth koa is disappearing. Some sandalwood harvest may be unsustainable. Some native plant products used for cultural practices are in short supply and now imported from other island groups, but Hawaiian species are not at risk of extirpation.
- Target 13: Target probably met. Indigenous knowledge, practices, and use of native plant resources is increasing. A strategy is needed to increase the availability of native and cultural plant resources for Hawaiian cultural use, while also meeting the needs of restoration efforts.

### OBJECTIVE IV: Education and awareness about plant diversity, its role in sustainable livelihoods and importance to all life on earth is promoted.

- Target 14: Target not met. Many organizations have been trying for decades to improve public understanding of the value of plant diversity. These efforts have met with limited success – much progress is needed before Hawaiian plant diversity is adequately appreciated.

### OBJECTIVE V: The capacities and public engagement necessary to implement the Strategy have been developed.

- Target 15: Target not met. The human resources needed to implement and achieve this Strategy in Hawai'i are not currently available. There is a lack of capacity in biocontrol research, restoration, population biology, invasive species control, and other fields.
- Target 16: Target not met. The institutions and partnerships needed to achieve the Strategy are in place (with the exception of biocontrol institutions), however, these are significantly

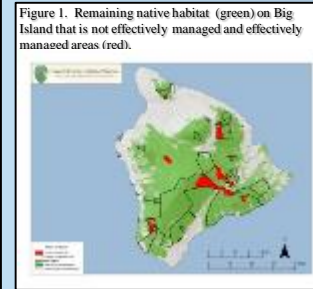


Figure 1. Remaining native habitat (green) on Big Island that is not effectively managed and effectively managed areas (red).

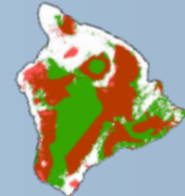


Figure 2. Habitat essential for the conservation of Hawaiian plants (red) and native habitat not essential for plant conservation. (green).

## CONCLUSIONS

Hawai'i is well positioned to contribute to national GSPC efforts. Hawai'i has a long history of plant conservation efforts and this experience can inform national efforts as well as help achieve national targets. Hawai'i can, in the near future, provide good data on a number of key conservation targets, especially as they relate to Objectives I and II. The greatest impediments to achieving GSPC targets in Hawai'i are:

1. Lack of a comprehensive plant conservation strategy that has been agreed to by major land managers and conservation organizations.
2. Lack of funding to implement the conservation strategy.
3. Lack of funding to implement the biosecurity strategy and the inability of the State of Hawaii to exceed federal biosecurity standards (which are inadequate to protect Hawai'i).

## LITERATURE CITED

1. Wagner, W. L., D. R. Herbst, and D. H. Lorence. 2005-. Flora of the Hawaiian Islands website. <http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/inde>



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# 2012 Ex Situ RFP

Inspired by the GPPC meeting and how the GSPC was being implemented globally the **National Tropical Botanical Garden** and **Lyon Arboretum** together with the **US Fish & Wildlife Service** issued an RFP to conduct a state-wide assessment of the state of ex situ plant conservation in Hawaii.





# ASSESSING THE STATUS, CAPACITY, AND NEEDS FOR EX SITU CONSERVATION OF HAWAIIAN PLANTS

## Assessing the Status, Capacity, and Needs for Ex Situ Conservation of Native Hawaiian Plants

The plants of the Hawaiian Islands comprise one of the most unique and rare floras, with over half of all species at risk of extinction.<sup>1,2,3</sup>

The first step in preventing extinction is to secure and maintain collections in a "genetic safety net" using *ex situ*, or off-site, storage methods. These methods include micropropagation, seed banking, and cultivation in nurseries and gardens, all of which are necessary and available in Hawai'i. Ex situ collections are vital for research and restoration efforts. The rapid degradation of native ecosystems, recent commencement of recovery efforts and the looming threat from new alien species and climate change all contribute to an urgent situation. Well-maintained *ex situ* collections insure against extinction if natural populations decline while habitat restoration is proceeding. Germplasm (genetic resource) collections with the highest conservation value are genetically diverse, representative of naturally occurring populations, have been managed to ensure documentation of their provenance and length of time in cultivation, and have been carefully monitored to prevent artificial selection or genetic loss.

A renewed focus is needed to secure collections from taxa of conservation concern. Methods are available to provide a genetically diverse and representative pool of propagules for future recovery efforts. More support, however, is needed to expand *ex situ* services and strengthen partnerships between conservation groups. A statewide initiative is underway to enhance ongoing programs, identify conservation goals, measure progress, and create a formal partnership to coordinate *ex situ* collections. Creating a well-maintained *ex situ* collection from each of Hawai'i's at risk plants is essential and possible. Once secured, these collections will provide conservation botanists with the plants necessary for creating healthy native plant communities.

Steve Perlman  
(National Tropical Botanical Garden)  
collects from  
*Platanthera hololeuca*.

The conservation of Hawai'i's flora is essential and challenging. Preserving our irreplaceable natural heritage is achievable with increased collaboration and resources.



A project for Lyon Arboretum and the National Tropical Botanical Garden, sponsored by Mau Loa Foundation. Prepared by Matthew Keir and Lauren Wesenberger.



- 89% of flowering plants and 71% of ferns native to Hawai'i are found nowhere else in the world
- Over 30% of the flora is endangered
- 213 species (of 1,360) have fewer than 50 plants remaining in the wild
- Nearly 10% of the flora is already extinct



### Overview



In 2012, an inventory was conducted to assess the state-wide capacity for micropropagation and seed banking in the conservation of the native Hawaiian flora. During this process, local botanists defined taxa of conservation concern (TOC), which include species found on state or federal conservation lists in addition to those currently in some form of *ex situ* storage. A comprehensive inventory of *ex situ* facilities across the state combined individual facilities' inventories, determined the optimal *ex situ* method for each species of TOC, and identified the

major limiting factors to increasing capacity to protect TOC in genetic safety nets.

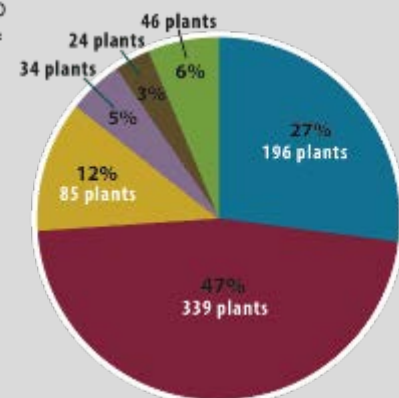
TOC are not exclusively represented by rare plants. More common Hawaiian taxa, such as *Acacia koa*, play a significant ecological role in native habitats.



### Results

After interviewing botanists, 15 conservation agencies, and 20 *ex situ* facilities, the assessment revealed the following figures:

- 724** Total taxa of conservation concern (TOC)
- 528** Total TOC represented in *ex situ* collections (micropropagation, seed banks, nurseries and gardens) across the state
- 27%** Percentage of unsecured<sup>†</sup> TOC
- 64%** Percentage of secured<sup>‡</sup> taxa (339 plants) represented by collections from ≤10% of the remaining naturally occurring individuals—such *small* representation does not constitute a "genetic safety net"



Percentage of TOC plants represented in *ex situ*

- unsecured taxa<sup>†</sup>
- 10% or less
- 11-49%
- 50-84%
- 85-100%, low replication of representation
- 85-100%, high replication of representation

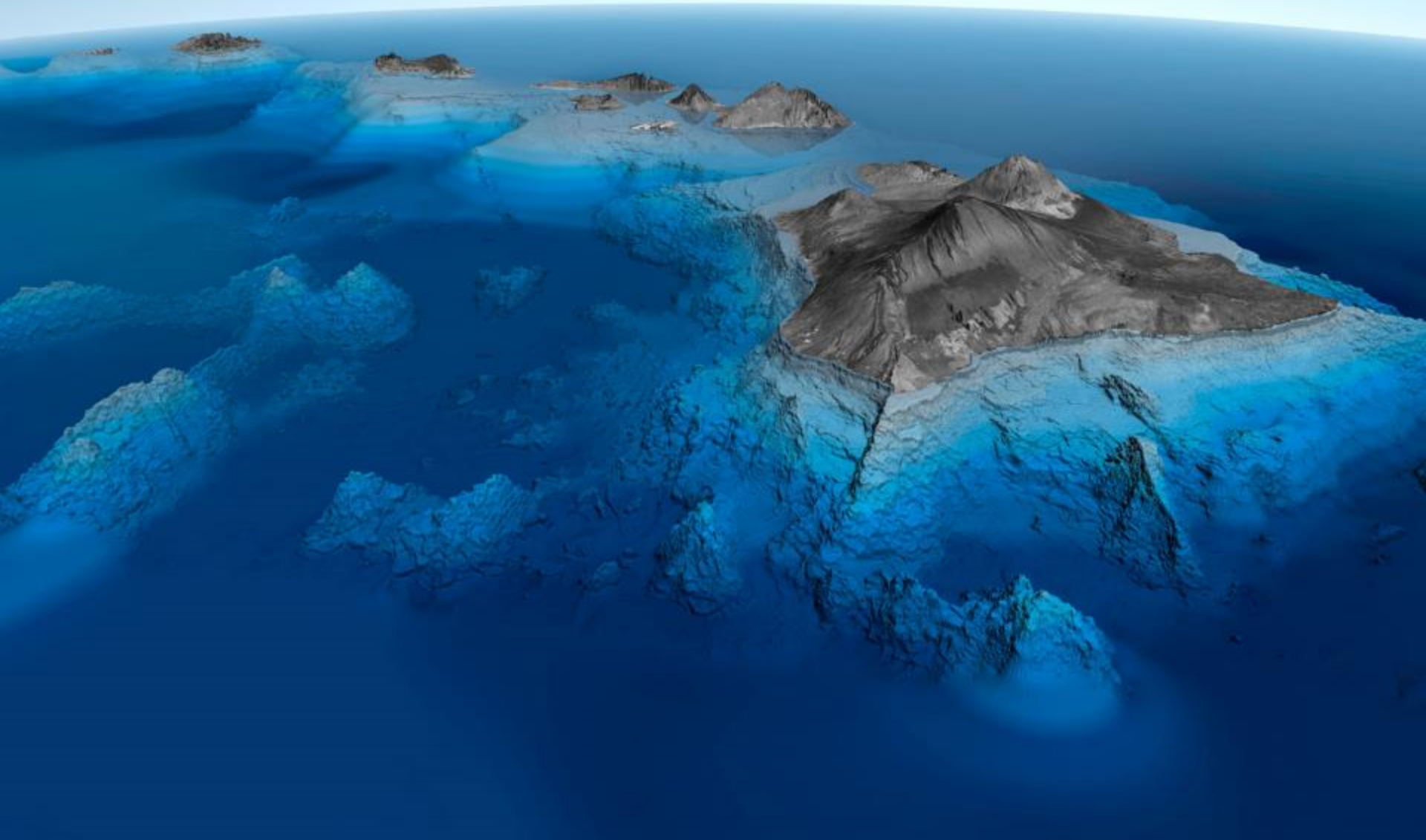
With less than 10 percent of the remaining naturally occurring individuals represented in *ex situ* storage, *Lobelia niihavensis*, along with 338 other taxa, is not supported by an adequate genetic safety net and therefore at greater risk of extinction.



<sup>†</sup>Not currently represented in any *ex situ* facility <sup>‡</sup>represented in at least one *ex situ* facility

**30 Individual Conservation Groups**

**20 *Ex Situ* Facilities**





# 2012 Ex Situ Assessment Recommendations

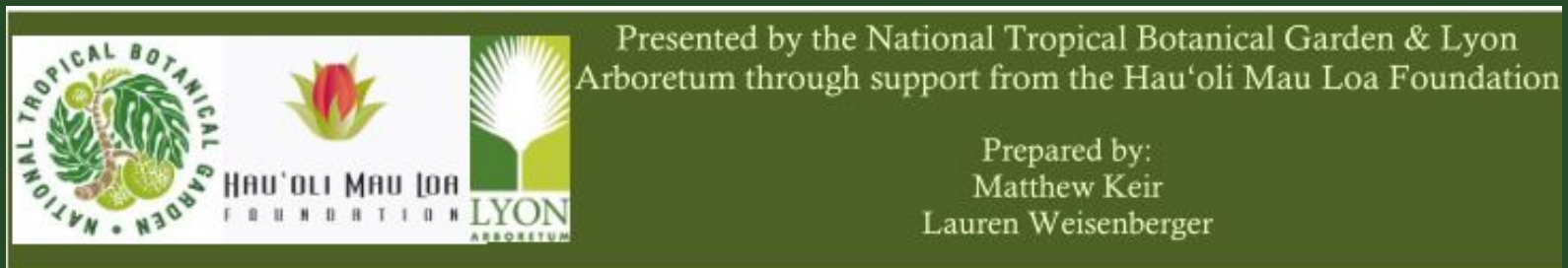
- Increase capacity for in situ management & ex situ conservation
- Improve coordination among in situ management & ex situ actors
- **Develop a statewide strategy for plant conservation based on the GSPC.**

# 2012 – 2014

## Development of the HSPC



Based on the framework of the Global Strategy for Plant Conservation



Matthew Keir and Lauren Weisenberger

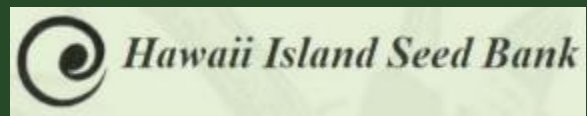
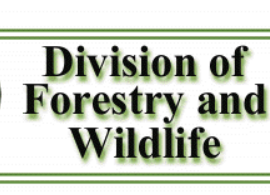
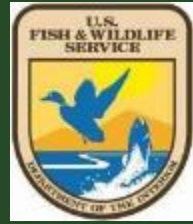


# Partners who participated in the creation of the HSPC



Smithsonian

Gardens



# HSPC created a Statewide Conservation Network



## Laukahi: The Hawai'i Plant Conservation Network

September 2014

### Hawai'i Strategy for Plant Conservation

Phase 1: increasing *in situ* collecting and *ex situ* capacity

Increasing collaboration and capacity for plant conservation in Hawai'i toward meeting the goals of the Global Strategy for Plant Conservation

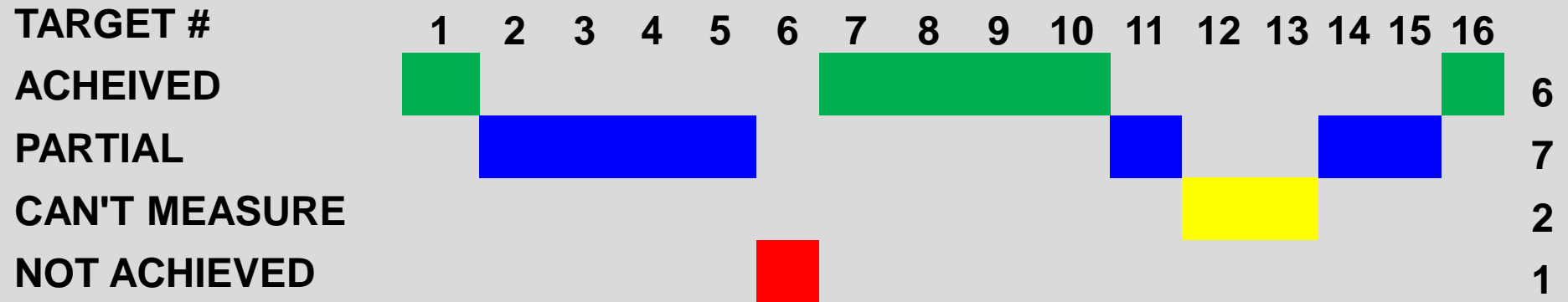


Presented by the National Tropical Botanical Garden & Lyon Arboretum through support from the Hau'oli Mau Loa Foundation

Prepared by:  
Matthew Keir  
Lauren Weisenberger



# Progress on GSPC Targets



**ACHIEVED: 6**

**PARTIALLY: 7**

**CAN'T MEASURE: 2**

**NOT ACHIEVED: 1**

# GSPC Target #1 –An online flora of all known plants.

Botany



- [Home](#)
- [Introduction](#)
- [Checklist](#)
- [Vascular Plant Updates](#)
- [Specimens](#)
- [Bibliography](#)
- [Links](#)
- [Contacts and Citation](#)
- [Image Gallery](#)
  
- [Flora of the Marquesas Islands](#)
- [Flora of Micronesia](#)

## Flora of the Hawaiian Islands

Now Available Online

**Hawaiian Vascular Plant Updates: A Supplement to the Manual of the Flowering Plants of Hawai'i and Hawaii's Ferns and Fern Allies - Version 1.3, 12 April 2012.**



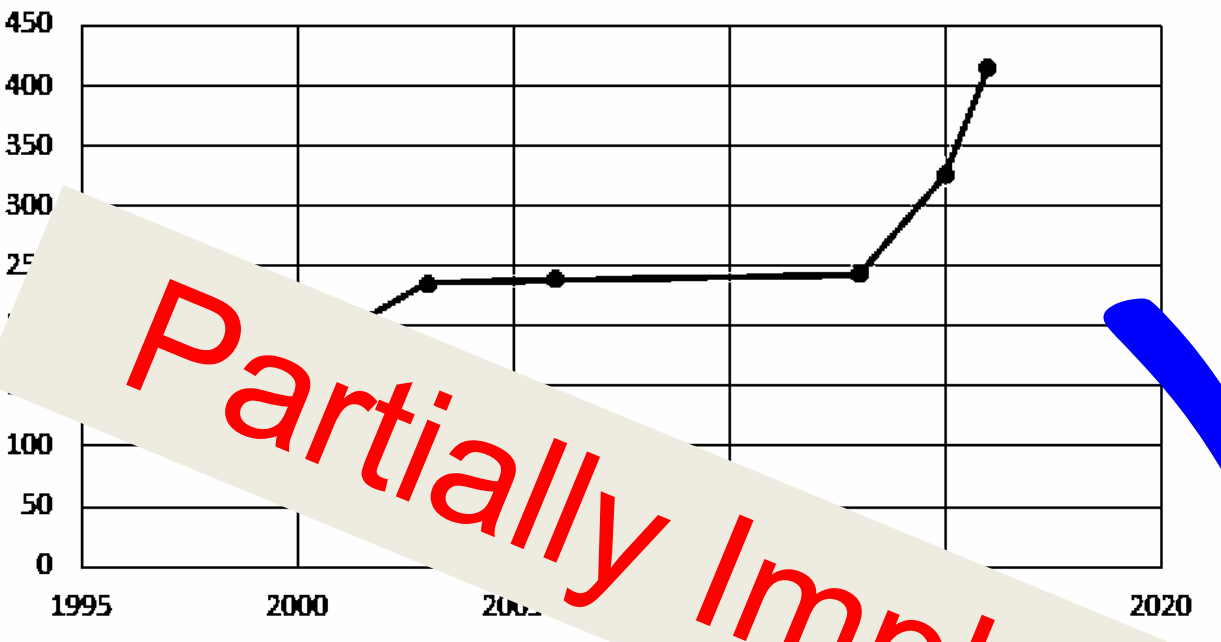
A collaboration between  
 **Smithsonian Institution**  
and **National Tropical Botanical Garden** 





# GSPC Target #2 – Assessing Conservation Status of all Plants

Total # Hawaiian Plants on Red List



## IUCN Red List

Hawaiian Plant Specialist Group

415/~1220 Species

87% Endangered

**Partially Implemented**

Future Targets:

*Hibiscus*

*Metrosideros*

*Euphorbia*

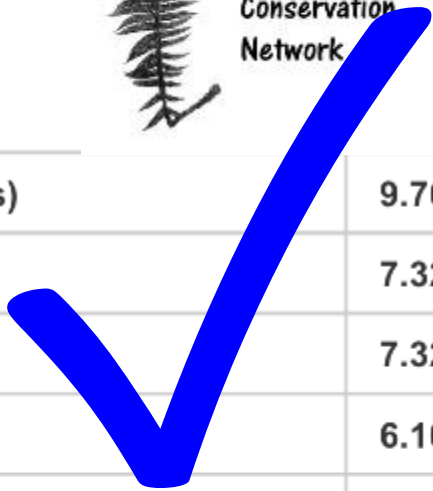
Newly Discovered Taxa



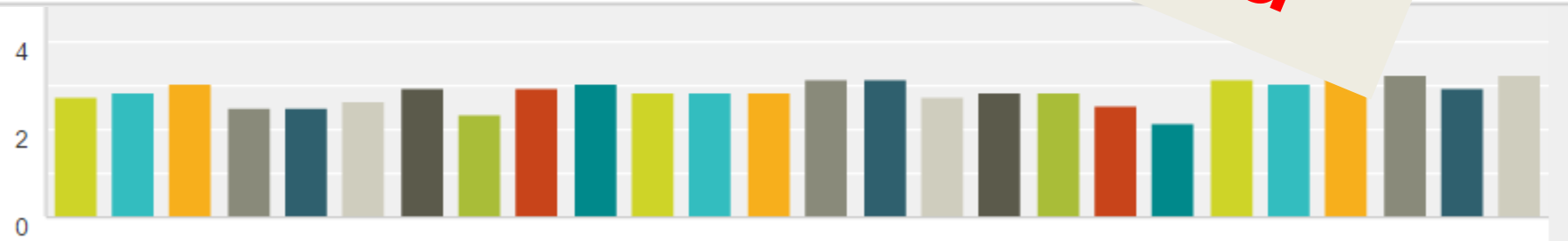
## PLANT CONSERVATION RESEARCH SURVEY



Restoration: Strategy and Design	85%	13
(identifying pollinator, disperser, mycorrhizal symbionts)	9.76%	8
Variation (molecular study)	7.32%	6
	7.32%	6
Climate Change (Identifying threat)	6.10%	5
Reproductive Biology (mating, apomixis)	6.10%	5
Taxonomy (phylogenetic relationships)	6.10%	5
Threat Control: Pathogens	6.10%	5
Climate Change: Assisted Colonization (mitigating threat)	4.88%	4
Threat Control: Alien Invasive Plants	%	4

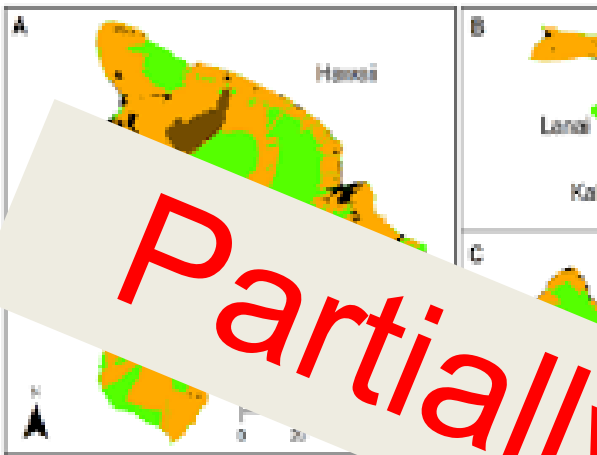


*Partially Implemented*





**GSPC Target #4 – At least 15 per cent of each ecological region or vegetation type secured through effective management and/or restoration.**



**Over 50% of all lands are in the Conservation**

**SUSTAINABLE HAWAII INITIATIVE**

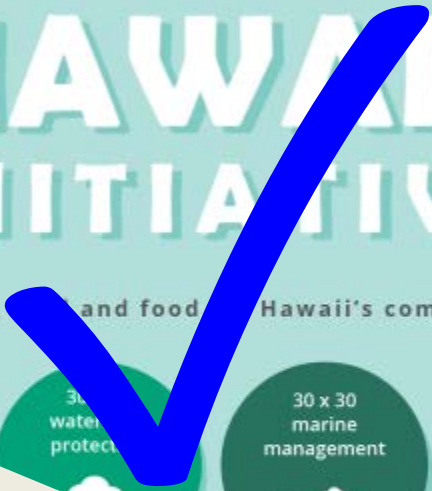
Strengthening our waters, and food Hawaii's communities

- Hawai'i Agency
- 30% water protection
- 30 x 30 marine management
- 100% renewable energy

100% increase in local agricultural production by 2020

Invest in species protection infrastructure and capacity by 2027

Complete transfer to clean, renewable energy by 2045



**Partially Implemented**



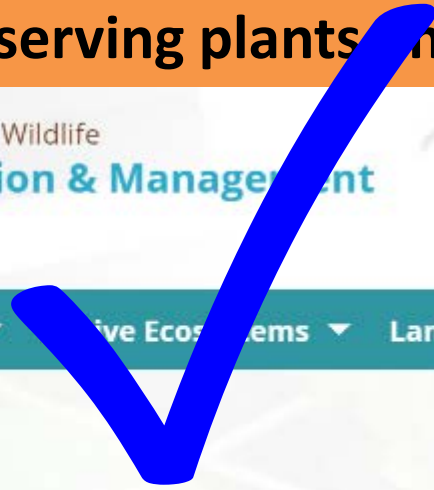
**Goal: 30% of Priority Watersheds effectively managed by 2030!!!**

**GSPC Target #5 – At least 75 per cent of the most important areas for plant diversity of each ecological region protected with effective management in place for conserving plants and their genetic diversity.**



State of Hawaii, Division of Forestry and Wildlife  
**Native Ecosystems Protection & Management**

**21 NARS on five islands, encompassing the State's most unique ecosystems.**



**Partially Implemented**



**PEPP effectively conserves the 190 rarest plant taxa across the Hawaiian archipelago.**



**GSPC Target #6 – At least 75 per cent of production lands in each sector managed sustainably, consistent with the conservation of plant diversity.**

*2015 Crop Summary by Acreage*

Crop	Hawai'i	Kaua'i	Maui	Moloka'i	Lāna'i	O'ahu	State Total
Aquaculture	165	183	-	28	-	274	651
Bananas	536	26	62	-	-	345	969
Coffee	525	3,788	545	123	-	168	10,149
Commercial Horticulture	-	1,743	33	-	-	26	22,864
Dairy	-	-	-	-	-	-	1,855
Diversified Crop	-	-	-	937	54	9,865	16,904
Flowers / Foliage / Landscape	1,756	-	-	15	10	484	2,432
Macadamia Nuts	21,359	-	-	-	-	-	21,545
Papaya	2,566	-	-	-	-	166	2,824
Pineapple	-	-	1,050	-	-	-	4,508
Seed Production	-	13,299	754	27	-	-	17,370
Sugar	-	-	38,810	-	-	-	38,810
Taro	61	443	54	2	-	-	560

Not Implemented

**Less than 10% of production lands are managed consistent with plant diversity in Hawaii.**

**GSPC Target #7 – At least 75 per cent of known threatened plant species conserved in situ.**



**Fenced and managed units have been built to protect 90% of the 500 federally-listed plants.**



**GSPC Target #8 – At least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes.**

## Plant Conservation at Botanical Gardens

- Unique capacity for *ex situ* conservation
- Ability to incorporate research and education
- Important venue for showcasing biodiversity



Honolulu Botanical Gardens



Waimea Arboretum  
& BOTANICAL GARDEN

59-864 KAMEHAMEHA HIGHWAY • HALEIWA, HAWAII 96712



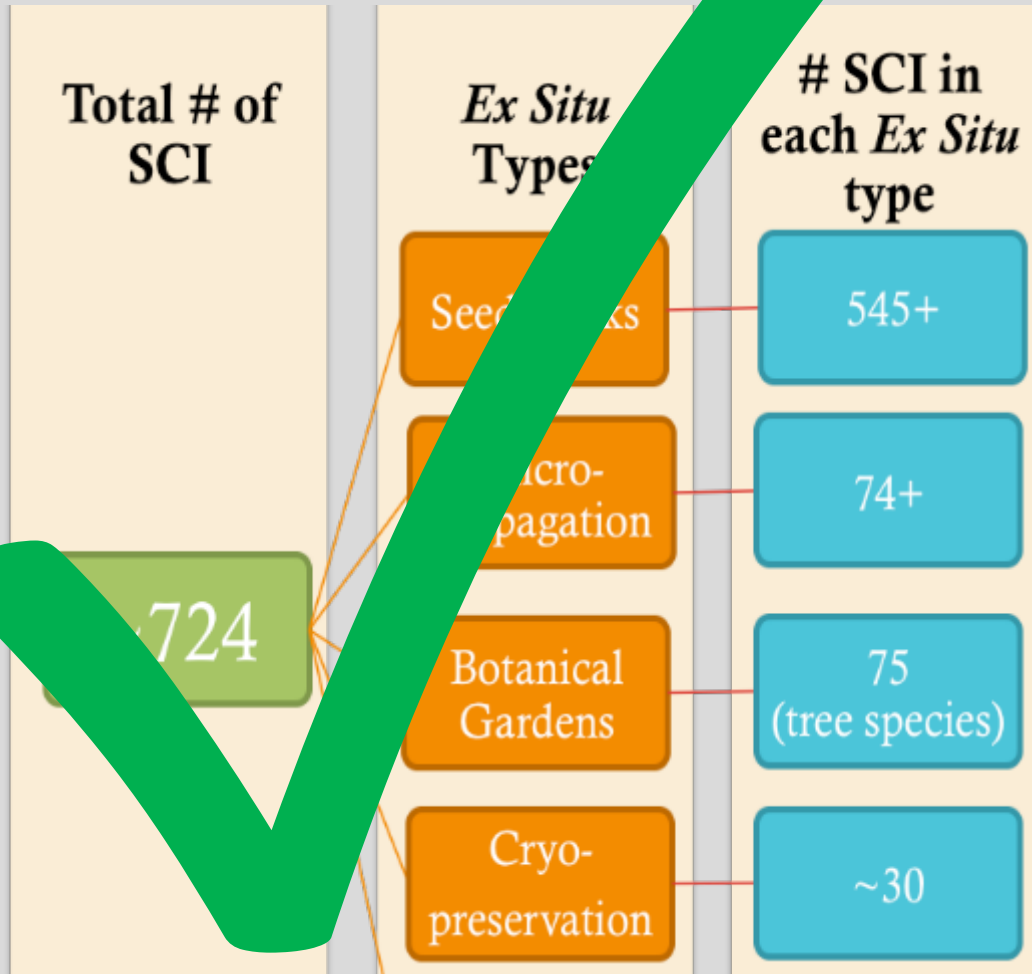
## GSPC Target #8 – Secure species in *ex situ* collections

The HSPC has driven an increase the depth of genetic diversity held in conservation collections and grow the number of seed banks in Hawaii to 8.





## Ex Situ Strategies for Species of Conservation Importance



75% in Seed Banks

10% in Tissue Culture

10% in Gardens as LC

5% require new protocols

95% of all SCI

# GSPC Target #9 – 70% wild crops & culturally significant plants conserved



Collections of plants & food secured at botanical gardens in tissue culture

**Dr. Noa Kekuewa Lincoln, Ph.D.**

**Assistant Professor**  
**Indigenous Crops and Cropping Systems**



Area of Specialty: Ethnography, Biogeochemistry, and Archaeology of Traditional Farming Methods

Department of Tropical Plants and Soil Sciences

3190 Maile Way

St. John 102

Honolulu, Hawaii 96822

Phone: (808) 956-6498

Email: [nlincoln@hawaii.edu](mailto:nlincoln@hawaii.edu)





# GSPC Target #10 – Management plans to prevent biological invasions



## Hawaii Interagency Biosecurity Plan 2017–2027 Executive Summary

### Hawaii's Interagency Biosecurity Plan

is a coordinated path forward to increase support for local agriculture, protection for our environment, and safeguards for the health and lifestyle of Hawaii's people.

**Biosecurity** is the set of measures taken to manage the risk from invasive species to the economy, environment, and health and lifestyle of the people.

#### THREAT

Red Imported Fire Ants are predicted to cost **\$211 million** per year.



The brown tree snake could cause upward of **\$2.14 billion** per year in economic damages.



Private Industry Input

Agency Review

Public Review

Final Interagency Biosecurity Plan

### Where are we now?

... is the work of multiple state, federal, and county ... Department of Agriculture (HDOA) is the only agency with ... plan recognizes that HDOA is not alone in protecting ... the impacts of invasive species. Key players in Hawaii's ... Land and Natural Resources (DLNR), Hawaii Department

... assists farmers and landowners with post

# GSPC Target #11 – No species of wild flora endangered by international trade.



...ngered A1acde+2cde, B1+2abcde, D [ver 2.3](#)

Year Published: \_\_\_\_\_  
Date Assessed: \_\_\_\_\_  
Annotations: No  
Assessor(s): Gemmill, C

**Geographic Range [top]**

**Range Description:** Restricted to the windward side of Kauai Island, Hawaii, USA. It was first discovered in 1975, but was not listed as endangered until 1997, when two more were discovered; one of which was critically endangered.

**Countries occurrence:** **Native:** United States (Hawaiian Is.)

**Additional data:**

**Range Map:** [Click here to open the map viewer and explore range.](#)

**Partially Implemented** ✓

**Illegal Harvesting of critically endangered palms for local collectors remains a problem.**



**GSPC Target #12 – All wild harvested plant-based products sourced sustainably.**



**No Way to Measure This**

**We believe HI is succeeding in this Target but we do not have a clear way to measure this on private land.**

**GSPC Target #13 – Indigenous and local knowledge innovations and practices associated with plant resources maintained or increased, as appropriate, to support customary use, sustainable livelihoods, local food security**



**No Way to Measure This**

**We believe HI is succeeding in this Target but we do not have a clear way to measure this.**



# GSPC Target #14 – Need for plant conservation is incorporated into communication, education and public awareness programmes

## Rare Plant Code of Conduct

**Mission Statement of the Hawai'i Plant Specialist Group:** *To prevent the extinction of native Hawaiian plants and provide for their recovery through a cooperatively administered off-site plant conservation system in collaboration with on-site management partners to sample, propagate, and reintroduce rare plants, and to advance the preservation of native plants and their habitats through effective communication and public education. The group is a member of the IUCN Species Survival Commission and is known locally as the Hawai'i Rare Plant Restoration Group (HRPRG).*



Hawai'i  
Plant  
Specialist  
Group



## Guidelines for the Responsible Viewing of Rare Native Plants in the Wild

**Hō'ihi aku, hō'ihi mai**  
**Give respect and you will receive respect**



IUCN  
World  
Conservation  
Congress  
Hawai'i 2016

**GSPC Target #14 – Need for plant conservation is incorporated into communication, education and public awareness programmes**





# GSPC Target #15 – Workforce development to implement the Strategy



Partially Implemented



HAWAII CONSERVATION

Powered by Hawaii Conservation Alliance



HAWAII CONSERVATION ALLIANCE

CONSERVATION CAREER COMPASS



CONSERVATION CAREER COMPASS

About

Pathways & Opportunities

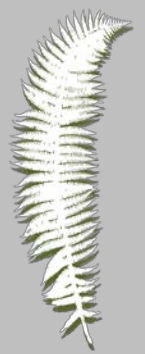
Navigator Spotlights

Career Guidance

e.g. Marine, forestry, etc.

Submit

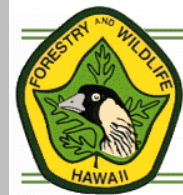
# GSPC Target #16 – Networks established to implement the Strategy



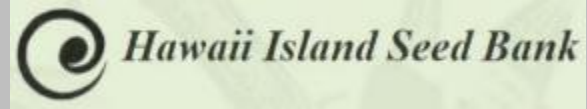
## The Hawai'i Plant Conservation Network



Honolulu Botanical Gardens



Division of Forestry and Wildlife





**GSPC Target #16—Networks established to implement the Strategy**



# Lessons Learned

- The GSPC has focused and enhanced plant conservation in Hawaii.
- Coordination with agencies and NGOs is critical – however sharing data seamlessly continues to be a challenge.
- Hard to quantify several targets and thus measure/claim success.
- Federal politics has reduced funding and support in key agencies.
- Integrating the GSPC into Federal agencies working in HI has been very difficult.



# GSPC Recommendations

- Refine targets to have clear measurable metrics.
- Recognize indigenous people's role and rights.
- Link to SDGs.
- Create easy to read dashboard to track annual progress.



*Hibiscadelphus woodii*





Hesperomannia arbuscula



Geranium arboreum





**Aloha**

**and**

**Mahalo**

