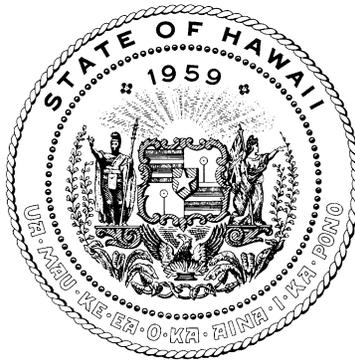


**REPORT TO THE TWENTY-EIGHTH LEGISLATURE  
REGULAR SESSION OF 2016**

**RELATING TO THE NATURAL AREA RESERVES SYSTEM,  
NATURAL AREA PARTNERSHIP PROGRAM,  
AND  
THE FINANCIAL CONDITION OF THE  
NATURAL AREA RESERVE FUND**



**PREPARED BY**

**STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
DIVISION OF FORESTRY AND WILDLIFE**

**IN RESPONSE TO SECTION 195-6.6, HAWAII REVISIED STATUTES**

**HONOLULU, HAWAII  
NOVEMBER 2015**



# Natural Area Reserve Fund FY 15 Summary of Accomplishments

The Natural Area Reserve Fund (NARF) supports the Natural Area Partnerships Program, the Natural Area Reserves, the Watershed Partnerships Program, and the Youth Conservation Corps through the tax paid on conveyances of land. These programs protect Hawaii's native ecosystems and unique plants and wildlife - Hawaii's cultural and natural heritage. Forested watersheds provide Hawaii's fresh water, and reduce erosion and flooding. Protecting these resources is critical for our island's economy, as well as for the health of its people. Summaries and maps of the accomplishments funded by FY 15 NARF funding are listed below.



**146**  
Jobs provided



**46,489**  
Trees and shrubs planted



**65,000**  
Hours of youth intern service contributed



**84,087**  
Acres of invasive plant control



**17,660**  
Volunteer hours donated



**30**  
Reserves and Preserves managed for current and future generations



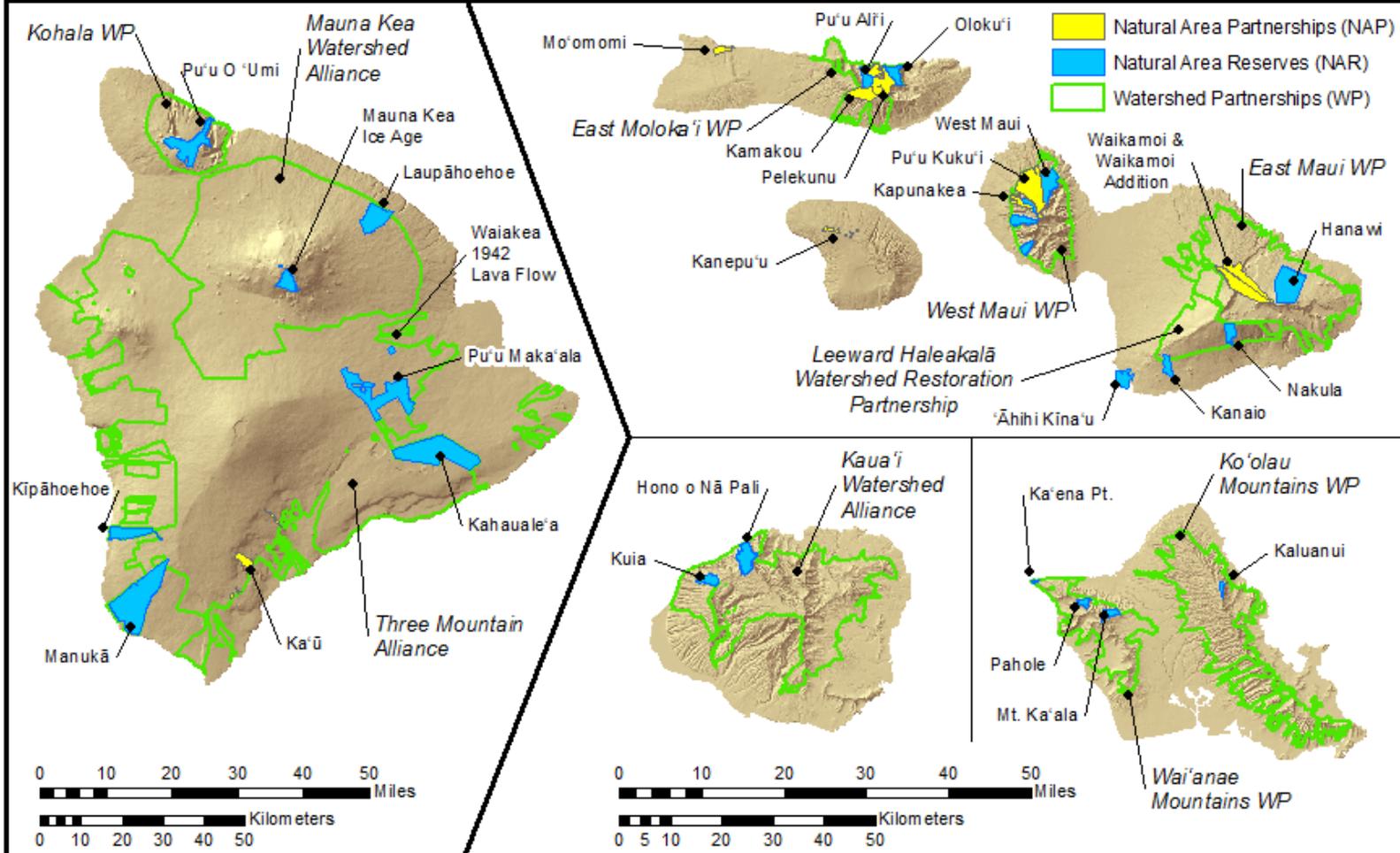
**30-50%**  
More fresh water supplied by native forests than invaded forests



**218**  
Miles of roads and trails maintained



# Natural Area Reserves, Natural Area Partnerships, and Watershed Partnerships

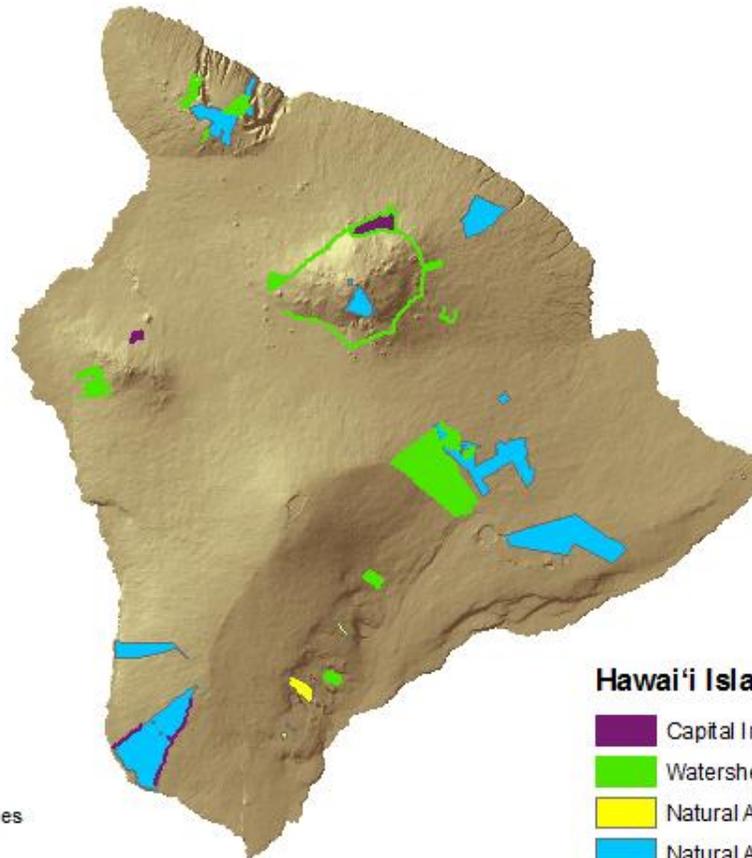




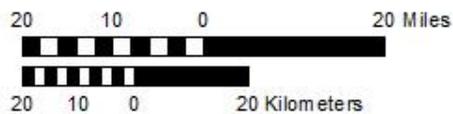
# Hawai'i Island NARF and CIP Projects FY 15



Ginger control in Kohala



Clermontia Seed Collection



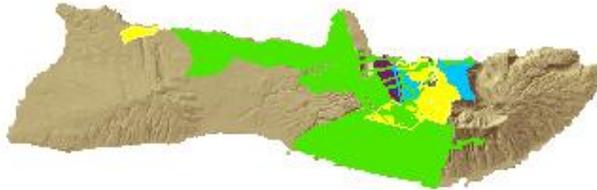
## Hawai'i Island NARF Funding

- Capital Improvement Project (CIP): \$2,850,000
- Watershed Partnership Projects (WP)\*: \$713,452
- Natural Area Partnerships (NAP): \$110,090
- Natural Area Reserves (NAR): \$1,235,839

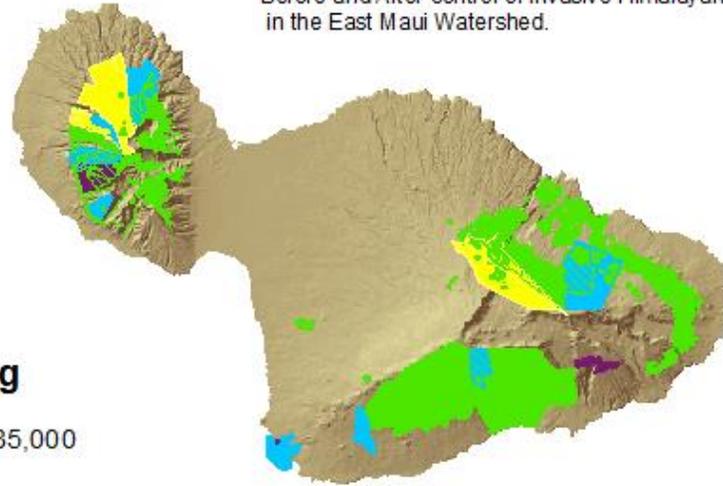
\*Watershed Partnership projects were carried out using FY14 state funds, which largely occurred during FY15.



# Maui, Moloka'i, and Lāna'i NARF and CIP Projects FY 15

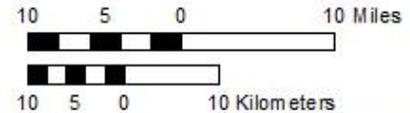


Before and After control of invasive Himalayan Ginger in the East Maui Watershed.



## Maui, Moloka'i, and Lāna'i NARF Funding

-  Capital Improvement Project (CIP) Watershed: \$1,085,000
-  Natural Area Reserves (NAR): \$1,107,184
-  Natural Area Partnerships (NAP): \$1,061,609
-  Watershed Partnership Projects (WP)\*: \$1,046,055



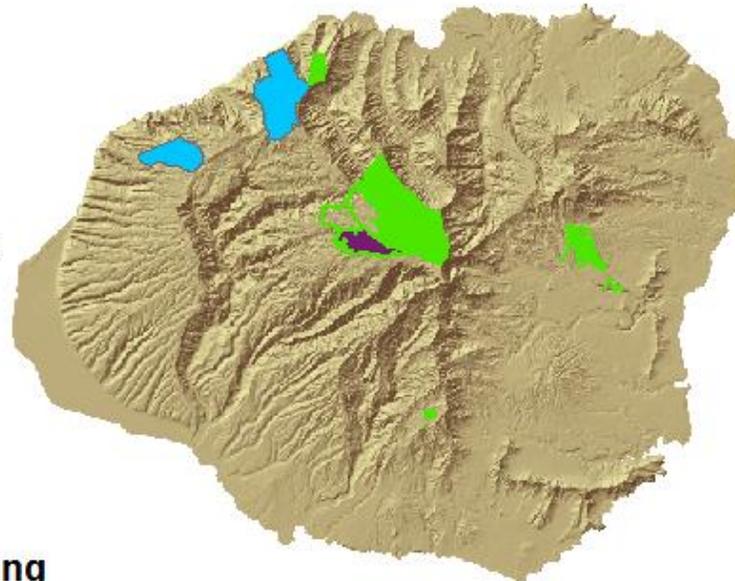
\*Watershed Partnership projects were carried out using FY14 state funds, which largely occurred during FY15.



# Kaua'i NARF and CIP Projects FY 15



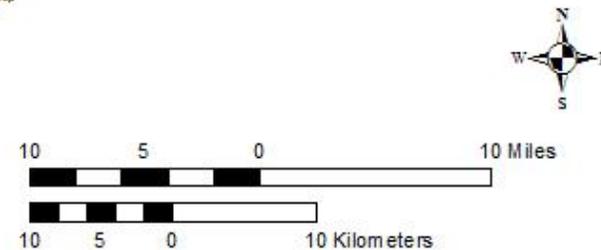
KISC controlling for Miconia using HBT.



Before and after (7 months) pig removal at Wainiha Valley.

## Kaua'i NARF Funding

-  Capital Improvement Project (CIP): \$400,000
-  Natural Area Reserves (NAR): \$515,227
-  Watershed Partnership Projects (WP)\*: \$390,000



\*Watershed Partnership projects were carried out using FY14 state funds, which largely occurred during FY15.



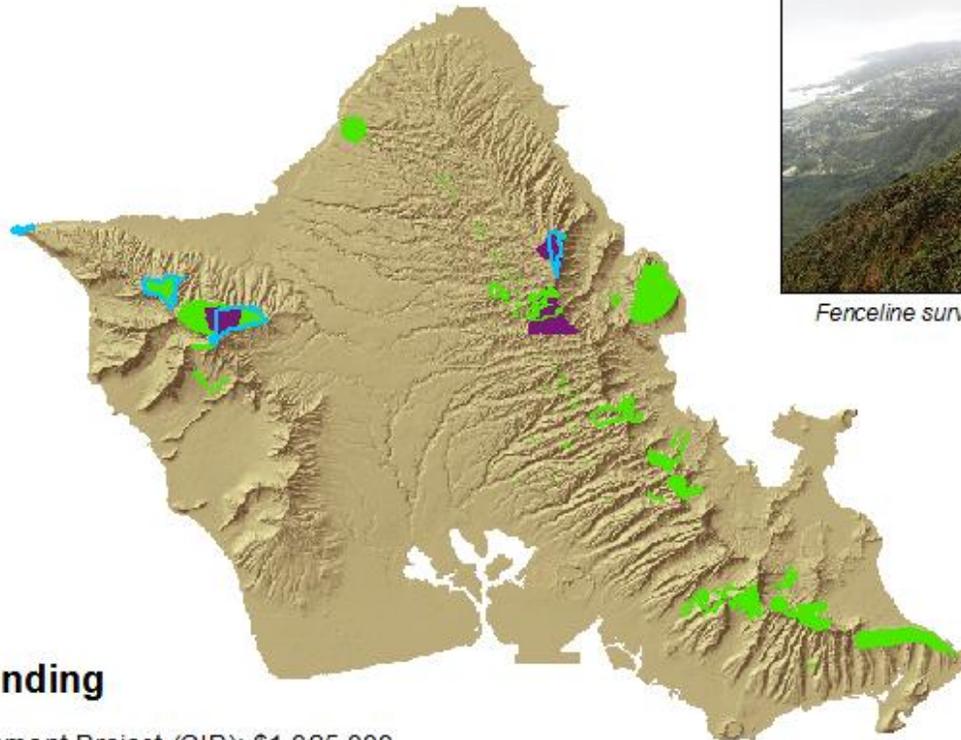
## O'ahu NARF and CIP Projects FY 15



*Miconia control, OISC*

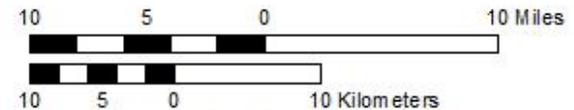


*Fenceline survey at Waiawa, KMWP*



### O'ahu NARF Funding

-  Capital Improvement Project (CIP): \$1,025,000
-  Watershed Partnership Projects (WP)\*: \$467,000
-  Natural Area Reserves (NAR): \$508,249



\*Watershed Partnership projects were carried out using FY14 state funds, which largely occurred during FY15.

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## **LIST OF ACRONYMS**

**BLNR** Board of Land and Natural Resources  
**CIP** Capital Improvement Project  
**DLNR** Department of Land and Natural Resources  
**DOE** Department of Education  
**DOFAW** Division of Forestry and Wildlife  
**FY** Fiscal Year  
**HRS** Hawai'i Revised Statutes  
**KISC** Kaua'i Invasive Species Committee  
**MISC** Maui Invasive Species Committee  
**NARF** Natural Area Reserve Fund  
**NAR** Natural Area Reserve  
**NARS** Natural Area Reserves System  
**NAPP** Natural Area Partnership Program  
**NIP** Native Invertebrate Program  
**OISC** O'ahu Invasive Species Committee  
**OANRP** O'ahu Army Natural Resources Program  
**PEP** Plant Extinction Prevention  
**PLT** Project Learning Tree  
**RC&D** Resource Conservation and Development  
**RCUH-PCSU** Research Corporation of UH -Pacific Cooperative Studies Unit  
**SEP** Snail Extinction Prevention (SEP) Program  
**T&E** Threatened and Endangered  
**TMA** Three Mountain Alliance  
**TNC** The Nature Conservancy  
**UH** University of Hawai'i  
**USFWS** United States Fish and Wildlife Service  
**USGS** United States Geological Survey  
**WMMWP** West Maui Mountains Watershed Partnership  
**YCC** Youth Conservation Corps

**REPORT TO THE TWENTY-EIGHTH LEGISLATURE  
REGULAR SESSION OF 2016**

**RELATING TO THE NATURAL AREA RESERVES SYSTEM,  
NATURAL AREA PARTNERSHIP PROGRAM,  
AND  
THE FINANCIAL CONDITION OF THE  
NATURAL AREA RESERVE FUND**

Section 195-6.6, Hawai‘i Revised Statutes (HRS), requires an annual comprehensive status report on the Natural Area Reserves System (NARS), the Natural Area Partnership Program (NAPP) and the financial condition of the Natural Area Reserve Fund (NARF). This report includes a description of activities and accomplishments, compliance with Chapter 42F HRS, an analysis of problems encountered, status of public hunting opportunities, plans and management objectives for the next fiscal year (FY), activities and goals for other programs funded through NARF, and a financial report for the NARF.

DLNR has used the NARF to gain cash and in-kind contributions from Federal, County, and private funds that approximately double the State fund investment in FY15. The State funding provides reliable core funding that enables these programs to vastly expand their accomplishments by applying for grants and securing in-kind support.

Accomplishments listed are from programs directly funded by the NARF, not transferred funds.

**1. NATURAL AREA RESERVES SYSTEM ACTIVITIES AND ACCOMPLISHMENTS**

**1.1 WATERSHED PROTECTION**

Protecting native forests is a critical tool for adapting to climate change’s drying effects, and will make Hawai‘i more resilient in extreme weather events by reducing landslides, flooding, and runoff. Because forest losses result in high costs for Hawaii’s economy, people, and unique plants and wildlife, the Department of Land and Natural Resources (DLNR) has elevated watershed protection as its top priority. The DLNR is nearly on track to meet its target to double the acreage of priority watershed forests protected by 2021. In FY 15, \$3 million in bond funding was appropriated (see Appendix A for summary of status of bond-funded projects). Since Capital Improvement Project (CIP) funding was first appropriated in FY13, over 25,000 acres have been protected by completing fencing projects, and fences are under construction to protect another 21,000 acres. Continued funding is essential to maintain existing infrastructure and continue to expand protected areas to reach the 2021 target.

**1.2 NATURAL AREA RESERVES SYSTEM MANAGEMENT**

The NARS consists of 21 reserves comprised of 124,259 acres on five islands. NARS was established to protect the best remaining native ecosystems and geological sites in the State. For detailed information on the NARS, please go to <http://dlnr.hawaii.gov/ecosystems/nars/>

In FY 15, staff continued to implement the NARS Strategic Plan. The main management activities are: fencing and control of feral ungulates (wild, hoofed animals such as cattle, sheep, deer and pigs); control of other invasive species (weeds, non-native mammalian predators); reforestation; rare plant monitoring, propagation, and outplanting; fire prevention and control; monitoring; maintenance of infrastructure; and public outreach. While NARS is focused on protecting native ecosystems, as opposed to single species, many threatened and endangered (T&E) plants and animals benefit from the protection efforts through NARS.

NARS staff continues to work with hunting organizations, the Division of Forestry and Wildlife (DOFAW) Wildlife Program, and others to accomplish control goals while minimizing conflict with the recreational hunting community.

Approximately 133 miles of existing trails, and 85 miles of roads were maintained, primarily for management and public access. Existing helipads and over 15 management shelters were maintained to facilitate management and to provide access for emergencies.

Outreach and volunteer projects increased the public's appreciation of the NARS and Hawaii's unique natural resources. Staff led volunteer trips, presentations, and guided hikes for numerous groups, including visiting dignitaries, cooperating agencies, school groups, and the University of Hawai'i (UH). NARS staff continued participation with the Hawai'i Conservation Alliance, the Pacific Island Climate Change Co-operative, and the Forest Stewardship Advisory Committee.



#### **NARS Commission**

The NARS Commission is an advisory body to the DLNR under §195-6, HRS.

- The NARS Commission met once in FY 15.
- Board of Land and Natural Resources (BLNR) or its authorized representative, with the approval of the NARS Commission, recommended the issuance of 68 Special Use Permits for research, education, large group hikes, educational and commercial filming.
- Experimental Tropical Forest permits for Laupāhoehoe NAR are issued through the United States Forest Service, as authorized.

### **1.3 RESERVE ACTIVITIES AND ACCOMPLISHMENTS BY ISLAND**

FY 15 Accomplishments for the NARS are summarized in the table and narrative below.

<b>Natural Area Reserve System (NARS) FY 14 Accomplishments Summary</b>						
	<b>Invasive plants search &amp; control</b>	<b>Protected from hooved animals</b>	<b>Planting common and T&amp;E species</b>	<b>Volunteer Contributions</b>	<b>Fence (new constructed)</b>	<b>Fence (existing maintained)</b>
<b>Reserve</b>	<b>Acres</b>	<b>Acres</b>	<b>Number</b>	<b>Hours</b>	<b>miles</b>	<b>miles</b>
Kaua'i						
Hono o Nā Pali	785	2,400		0	2.2	1.0
Kuia	696	129	2,347	888	.17	4.09
Blue Hole Forestry Fence	12	18				0.189
O'ahu						
Pahole	18.8	650	763	2569		7
Ka'ala	12	50	33	418		0.3
Kaena Point	0.8	65	274	272		0.25
Poamoho (BLNR Approved NAR)		636		192	4.6	
Maui						
'Āhihi-Kīna'u	10.0	--	136	1,548.50	1.3	.2
Hanawi		6,411		32	2.3	12
Nakula	278	674	24,650	2040	0.4	8.5
Kanaio	314	1,450	1478	480		7.6
West Maui		5,461			.1	3.5
Pu'u Ali'i		1,000				6.5
Oloku'i		1,620				0.1
Hawai'i						
Mauna Kea Ice Age		3,894				0.81
Pu'u O 'Umi	5.56	2,568	162		4.65	10.02
Laupāhoehoe	12.77	27.14	199		0.875	1.9
Kahauale'a	1.04	153.7				2.7
Kīpāhoehoe	11.54	1,330	225			9.05
Pu'u Maka'ala	402.44	9,813.4	3,650		2.8	52.27
Manukā	9760.66	1,095.30	321			12.6
Pu'u Wa'awa'a FR/Forest Bird Sanctuary	143.65	3,925	7,422	112	2.4	18.97
Koai'a Corridor Tree Sanctuary		230.4	4030	396		2.9
<b>TOTAL</b>	<b>12451.49</b>	<b>40,296.54</b>	<b>45359</b>	<b>6265.5</b>	<b>20.395</b>	<b>162.149</b>

**Kaua‘i** – Two reserves, 4,786 acres

- *Hono o Nā Pali* - 3,150 acres; mesic and wet forest with perennial streams
- *Kuia* - 1,636 acres; dry and mesic forest with perennial streams

*Hono O Nā Pali:* Staff began animal control and successfully removed feral ungulates through the installation of a trapping network. A partnership with Kokee Resource Conservation Program assisted with invasive plant removal. This ecosystem is home to at least 300 confirmed active endangered seabird nesting burrows and many endangered forest birds.

*Kuia:* Achievements include weed removal and restoration of a five acre site damaged in the 2012 Milolii Fire.

**O‘ahu** – Four reserves, 2,220 acres

- *Pahole* - 658 acres - dry and mesic forest
- *Ka‘ala* - 1,100 acres - dryland to wet shrub forest
- *Ka‘ena Point* - 12 acres - coastal dune ecosystem
- *Kaluanui* - 450 acres - mesic to wet forest and cliff
- *Poamoho (BLNR Approved NAR)* - 1,500 acres; mesic to wet forest

Building upon a maturing public outreach program the O‘ahu team amassed an impressive number of volunteer hours - the equivalent of adding two full-time field staff for the entire year.

*Poamoho:* The first watershed protection fence on state land in the northern Ko‘olau Mountains was completed to protect 636 acres of ‘ōhi‘a forest.

*Kaala:* There is encouraging early success from an innovative project to produce native plants on site from local seed sources at very low cost. The low nutrient boggy conditions on the summit require an approach tailored to the sensitive ecosystem being restored.

*Pahole:* Ran a volunteer “adopt a forest” program with intermediate and high schools that melds resource management with Department of Education (DOE) school standards. Students camp at Peacock Flats campground and assist with weed control and native plantings while learning about native ecosystems, science, and math.

*Ka‘ena Point:* Committed significant resources to maintain a predator free fenced area to protect nesting seabirds such as Laysan Albatross, Wedge tailed Shearwater, and Black Noddies.

*Kaluanui:* In FY 15 staff completed baseline bird surveys.

**Maui and Moloka‘i** - Seven reserves, 22,131 acres

- *‘Āhihi-Kīna‘u* - 2,045 acres; lava flows, anchialine ponds, nearshore marine ecosystems
- *Hanawi* - 7,500 acres; ‘ōhi‘a wet forest, alpine grassland, and perennial streams
- *Nakula* - 1,420 acres; leeward montane koa/‘ōhi‘a forest and alpine shrublands
- *Kanaio* - 1,514 acres; halapepe and lama dry forest
- *West Maui* - 6,702 acres; pili grassland, mesic/wet forest, bogs, and perennial streams
- *Pu‘u Ali‘i* - 1,330 acres; wet shrubland and forest with perennial streams

- *Oloku 'i* - 1,620 acres; mesic forest, wet shrubland and forest with perennial streams

*‘Āhihi-Kīna ‘u*: Trained and coordinated volunteers to help educate the public about resources, historic sites and rules and to assist with coastal wetland restoration including removal of invasive plants and planting rare and native plants. Four public Advisory Group meetings were held to discuss progress implementing the management plan. Staff coordinated infrastructure improvements including planning and compliance for a new temporary makai fence to remove ungulates, installation of a new security camera system, control of invasive plants, collecting native seed and planting T&E and native species. Coastal debris cleanups and anchialine pool restoration efforts were implemented. Existing parking lots, trails and office-trailer area were maintained.

*Kanaio*: An Executive Order was finalized adding 638 acres to the Reserve.



At Nakula NAR staff together with over 2,000 volunteer hours planted 25,000 native trees and shrubs, in the continuing effort at forest canopy enhancement and biodiversity enrichment.

*Oloku 'i*: A staff visit in January 2015, the first human visit in 25 years, confirmed the near absence of any weeds, which emphasizes its continued importance as the most pristine forests of the islands.

*Other areas:* Assisted East Molokaʻi Watershed Partnership in conducting aerial shooting missions that removed goats, deer, and pigs from the south slope of Molokaʻi.

**Hawaiʻi** - eight reserves (95,122 acres)

- *Mauna Kea Ice Age* - 3,894 acres; *alpine community*
- *Puʻu O ʻUmi* - 10,142 acres; *wet forest, montane bog, and perennial streams*
- *Laupāhoehoe* - 7,894 acres; *wet forest with perennial streams*
- *Kahaualeʻa* - 22,521 acres; *wet forest with volcanic activity*
- *Kīpāhoehoe* - 5,752 acres; *mesic to wet forest*
- *Waiākea 1942 Flow* - 640 acres; *developing wet forest*
- *Puʻu Makaʻala* - 18,730 acres; *wet forest*
- *Manukā* - 25,550 acres; *coastal to subalpine forest*

*Mauna Kea Ice Age:* Worked with the Office of Mauna Kea Management on protection of the unique natural and cultural features.

*Laupāhoehoe:* Participated in the management of the Hawaiʻi Experimental Tropical Forest (<http://www.hetf.us/>) with the United States Department of Agriculture Forest Service (USDA-FS) including permit review and public meetings of the Laupāhoehoe Advisory Council to develop a management plan.

*Kahaualeʻa:* Active volcanism is ongoing and the NAR remains closed to public use due to volcanic hazards. Staff monitored eruption by coordinating with the USGS Hawaiian Volcano Observatory and Hawaiʻi Civil Defense. Staff added and maintained signs and issued animal control permits to hunters to access safe areas to assist with feral animal removal.

*Puʻu Makaʻala:* Repaired 2.4 miles of vandalized fence and removal of ingress feral pigs due to fence damage at a cost of \$110,000.

*Manukā:* Initiated the Manuka CIP Boundary fence project. Boom spraying equipment continued to increase the effectiveness of invasive fountain grass control. Staff cleaned tons of trash from the coast and illegal dumping sites in partnership with the Hawaiʻi Wildlife Fund.

*Kīpāhoehoe:* An Executive Order was finalized adding 169 acres to the Reserve.

*Other Areas:* Staff assisted with sheep control on Mauna Kea for Palila restoration and compliance with a court order as well as provided staff and resources to the Hawaiʻi Island Axis Deer Working Group to ensure the successful control of this threat.

Outreach and education staff conducted volunteer trips and distributed outreach materials to hundreds of people during events such as Earth Day, Merrie Monarch Parade, Hawaiʻi County Fair and Audubon Christmas Bird Count; hosted the Kauluwehi lei contests, Hawaiʻi Nei Art native species art contest in cooperation with the Wailoa Art Center and the Three Mountain Alliance (TMA); and assisted with the annual Puʻu Waʻawaʻa “Run for the Dry Forest” event.

## 1.4 PLANS AND MANAGEMENT OBJECTIVES FOR FY 16

### Specific Plans and Objectives by Branch (FY 16):

#### Kaua‘i:

- Complete Hono O Nā Pali wing fence construction and continue feral ungulate and invasive weed control.
- Complete installation of weather port.

#### O‘ahu:

- Construct fences at Poamoho and Kaluanui and initiate ungulate removal.
- Monitor and remove predators within and adjacent to the Ka‘ena Point Predator Proof Fence, and monitor seabird population recovery.
- Continue implementing new herbicide efficacy trials, programmatic weed control and weed seed viability trials.
- Complete addition of Poamoho to the NARS.
- Continue to work with O‘ahu Army Natural Resources Program (OANRP) in the Mākua and O‘ahu training area mitigation process.
- Continue active participation in the DLNR Ka‘ena Point Stewardship Group.

#### Maui:

- Protect Hanawī NAR through fence construction, maintenance, and cyclic replacement, ungulate and weed control, and rare species monitoring, with East Maui Watershed Partnership and Maui Forest Bird Recovery Project.
- Continue weed control, rare species out planting, and reforesting Kanaio NAR and begin updating the management plan.
- Conduct boundary fence inspection and maintenance at Kahakuloa NAR and removal of animals, with the West Maui Mountains Watershed Partnership (WMMWP).
- Continue ungulate removal from inside the fenced mauka unit in Pu‘u Ali‘i NAR.
- Continue aerial shooting of feral goats, pigs and deer populations on the north shore cliffs of Moloka‘i.
- Construct ungulate fence along Waikolu rim, and strategic Oloku‘i protection ridge fences on Moloka‘i
- Continue implementation of ‘Āhihi-Kīna‘u access restrictions, finish temporary fence along road, continue kipuka restoration plantings, conduct monitoring surveys, and implement the management plan with the Advisory Group and the Nature Conservancy of Hawai‘i (TNC).

#### Hawai‘i:

- Construct the CIP-funded Manukā boundary fence.
- Continue cooperation with USGS Hawaiian Volcano Observatory to monitor the current lava flow within Kahauale‘a NAR.
- Work with the TMA and other state departments to advance management goals including invasive species control, rare plant restoration, and protection of native habitat.

- Work with the Kohala Watershed Partnership to begin the Opaeloā watershed protection project to protect 1,060 acres in the Pu‘u O Umi NAR.
- Continue participation in the Hawai‘i Experimental Tropical Forest, particularly as it overlaps with Laupāhoehoe NAR and finalize management plan with input from the Laupāhoehoe Advisory Council.
- Continue collaboration with the Office of Mauna Kea Management to address management needs.

## 1.5 RARE PLANT PROGRAM

The NARF supports the Rare Plant Program by providing matching funds for projects listed below, which are supported by Section 6 of the Federal Endangered Species Act.

**The Hawaiian Mid-Elevation Rare Plant Facilities** are propagation and storage facilities for rare native Hawaiian plant species which function as part of a statewide network with contributions from federal, state, and private land managers. They work to prevent extinction by 1) propagating and increasing plant numbers for reintroduction into natural habitat, and 2) storing species for which there is no adequately protected habitat and to safeguard against extinction for those which have very few wild individuals remaining.

- The four mid-elevation nurseries of Volcano (Hawai‘i), Pahole (O‘ahu), Olinda (Maui) and Kōke‘e (Kaua‘i) propagated 285 rare plant taxa for outplanting, with over 6,000 individuals out-planted back into natural habitats.
- Lyon Arboretum Micropropagation Laboratory received 236 separate collections representing 78 species, of which 53 (68%) are from species federally listed as T&E. The total number of plants that the lab currently has in inventory is 19,750.
- Lyon Seed Conservation Laboratory accessioned 352 collections, representing 691 individual seed lots, and 164 species. Of these individual seed lots, 537 (78%) were from T&E species. A total of 2,451,371 seeds were deposited into the seed bank.

**The Plant Extinction Prevention (PEP) Program** (<http://www.pepphi.org>) leads the largest statewide T&E plant protection effort in Hawai‘i, and is supported with federal, state, and private funding. To address the extinction crisis and focus efforts on the most critically rare Hawaiian plants, the PEP Program implements recovery actions for species that number fewer than 50 individuals remaining in their natural habitats. These are coined “PEP” species. The PEP Program focuses efforts on preventing the extinction of its 238 target species. PEP staffing is currently comprised of 13 employees.

<b>PEP Program FY 15 Highlights</b>
<ul style="list-style-type: none"> <li>• Implemented actions to protect 185 T&amp;E species and recover 138 PEP species.</li> <li>• Collected propagules from 88 PEP species including several first-ever collections.</li> <li>• Monitored populations of 105 species, placing 88 of these into ex situ cultivation at a cooperating Rare Plant Facility.</li> <li>• Surveys were conducted for 65 PEP species and resulted in the discovery of species that had not been seen for decades.</li> <li>• Managed threats for 78 PEP species to protect wild plants. Threat management entailed alien plant control; activities associated with ungulate-excluding fencing (e.g., site</li> </ul>

selection and planning, construction, and maintenance); rat trapping; application of molluscicide, removing tree fall from imperiled plants; and bagging fruits to protect them from invertebrate and rodent pests or to prevent fruit from falling to the ground.

- Reintroduced 30 PEP species totaling 760 plants into protected habitat to establish new populations.
- Partnered with Waianae Mountains Watershed Partnership and DOFAW to fence the largest known population of *Gouania vitifolia* on O‘ahu. The fence is expected to be completed in September 2015.



Two new populations of *Lysimachia venosa* were rediscovered on Kauai. There are now 9 plants known. Photo by Steve Perlman



Waianae Mountains Watershed Partnership fence crew work under tremendously challenging conditions to fence the largest remaining population of *Gouania vitifolia* on O‘ahu. In the center of the photo is a wiliwili (*Erythrina sandwicensis*) plant. Photo by WMWP staff.

## 1.6 NATIVE INVERTEBRATE PROGRAM (NIP)

The objective of the Native Invertebrate Program (NIP) is to direct resource management, monitoring, research, conservation, and policy relating to federally listed T&E and otherwise rare native invertebrate species. The NARF support for this program provides matching funds for multiple federal funding sources including: U.S. Fish and Wildlife Service (USFWS), Dept. of Defense and USDA-FS grants. In FY 15 the NIP program leveraged State funds at a ratio 7:1. Hawaiian ecosystems are dependent upon the ecological services completed by a diverse assemblage of native invertebrate species. NIP projects range from species-specific conservation to habitat-level restoration projects that broadly support invertebrate diversity. Addressing the ecological impacts of invasive pest species is also a high priority for the program.

**Statewide Native Invertebrate Database:** An ecological, specimen level database has been developed to house both historical and contemporary invertebrate data and streamline online permitting and reporting. The database is in the process of being made available to the public online as a result of collaboration with the Department of Business, Economic Development and Tourism.

**Native Invertebrate Captive Propagation Program:** In FY 15 the NIP program was awarded funding by USFWS for an Insectary Entomologist and an Insectary Technician position. These positions will support operations in the first State Insectary Facility dedicated to captive propagation and research on native invertebrate species for reintroduction into natural habitats.

**NIP Projects** conducted in collaboration with University of Hawaii (UH) at Manoa researchers in FY 15: 1) Pulelehua (Kamehameha Butterfly) Project; 2) Yellow-faced Bee Captive Propagation Project; 3) Yellow-faced Bee Nest Habitat Enhancement Project; 4) Captive Rearing of the Orange-black Damsel fly.

Like many pollinators, native yellow-faced bees in the genus *Hylaeus* are declining across the State. The NIP Program supports two projects through UH Manoa, directed at increasing yellow-faced bee populations and improving and expanding habitat. These projects are the first of their kind to target restoration and reintroduction for these important pollinator species. Photo: *Hylaeus anthracinus*, courtesy of Jason Graham, UH Manoa, PEPS Dept.



**Snail Extinction Prevention Program (SEPP)** is a partnership between DLNR-DOFAW and the USFWS established to prevent the extinction of rare Hawaiian land snail species, and preserve the ecosystems upon which these species depend. SEPP is currently supported with State and federal funds and is comprised of three fulltime staff members.

#### **Snail Extinction Prevention Program FY 15 Highlights**

- Established predator control and or monitoring for 50 populations of rare snail in the Wai‘anae and Ko‘olau mountains on O‘ahu.
- With partners at Bishop Museum, discovered a rare snail species not seen on O‘ahu in over 30 years.
- Received \$306,000 from the USFWS to establish a captive rearing facility and to support research partnerships at the UH Manoa.
- Authored the SEPP Strategic Plan outlining the first coordinated approach to preventing the extinction of rare Hawaiian snails across the islands.
- Established the first protected Hawaiian tree-snail population from the Ko‘olau region inside a predator exclusion structure.
- Conducted candidate endangered species surveys on Lanai, Maui, and Hawai‘i Island, with partners at the Bishop Museum and the USFWS.
- Surveyed the Northwestern Hawaiian Island of Nihoa for rare snails with USFWS partners.

Kahuli or Hawaiian tree snails have beautiful shells and are famous in Hawaiian lore for their presumed ability to sing. Unfortunately, Kahuli are severely impacted by invasive predators, and most species are threatened with extinction. The species featured (*Achatinella sowerbyana*) is critically imperiled and found only in the Northern Ko‘olau Mountains. Fortunately, this species will be protected by a predator exclusion structure. (Photo: David Sischo, DOFAW-SEPP)



## **2. NATURAL AREA PARTNERSHIP PROGRAM (NAPP)**

### **2.1 DESCRIPTION OF ACTIVITIES AND ACCOMPLISHMENTS**

This innovative Program, established by the Legislature in 1991 through Act 326, manages natural resources on 32,520 acres of private lands permanently dedicated to conservation. The \$1,171,699 of NARF funds that supported the NAPP were matched on a 2:1 basis with private funds. NAPP complements the existing NARS by providing long-term protection, financial support and management to protect, restore and enhance unique natural resources on private lands. Similarly to NARS, management activities include: fencing and control of feral ungulates; control of invasive weeds; monitoring; T&E species protection and public outreach.

#### **Natural Area Partnership Program (NAPP) FY 15 Accomplishments Summary**

	<b>Invasive non-native plant search and control</b>	<b>Areas protected from hooved animals</b>	<b>Plantings (trees, shrubs and T&amp;E species)</b>	<b>Volunteer Contributions</b>	<b>Fence (new constructed)</b>	<b>Fence (existing maintained)</b>
<b>Preserve</b>	<b>Acres</b>	<b>Acres</b>	<b>Number</b>	<b>Hours</b>	<b>miles</b>	<b>miles</b>
Moloka'i						
Kamakou	490	723				4
Mo'omomi	14			792		
Pelekunu				24		
Maui						
Pu'u Kukui	34.2	8,961	1,100	1,444	0.31	6.76
Waikamoi	1,775	5,230	30	291		10
Waikamoi Addition	9	2,721			3	3
Kapunakea	14.2	1,264				1.12
Lana'i						
Kanepu'u	4	111		2,924		7.2
Hawai'i						
Ka'u	45	1200		934	1.4	5.5
<b>TOTAL</b>	<b>2385.4</b>	<b>20210</b>	<b>1130</b>	<b>6409</b>	<b>4.71</b>	<b>37.58</b>

*Waikamoi* – TNC staff, partners, and docents led guided trips for 1,115 visitors.

*Kamakou* – After 1,400 hours of intensive hunts, the fenced unit harboring 700 acres of rainforest, T&E plants, a unique Hawaiian bog, and headwaters of several streams has been cleared of feral ungulates. Over 1,000 Moloka'i residents attended TNC's Earth Day events.

*Pelekunu* - TNC has continued with funding and logistical support of NARS aerial shooting of Molokai's north shore cliffs that includes Pelekunu.

*Mo'omomi* - Ua'u Kani (wedge tailed shearwaters) continued to increase as a result of predator control as shown by monitoring completed in collaboration with DOFAW and Maui Nui Seabird Recovery Project. Nearly 300 more active bird nests were found this year compared to the same time last year. Volunteers recorded over 1,300 Hawaiian green sea turtles hatches from the neighboring bay, the highest number of hatches recorded there to date. Compliance is completed for fencing that will protect over 185 acres of the best remaining coastal strand and wedge-tail nesting colony on Moloka'i from axis deer and predators. Community outreach included preserve hikes and beach cleanups.

*Pu'u Kukui* –Inter-agency collaboration through the Ridge to Reef Initiative continues to make progress in ahupua'a management to protect reefs below the preserve. Community collaboration and internships included several plantings/seed gathering and hosted over 120 interns. Hawea Point habitat protection is on -going and remains the largest Ua'u Kani bird colony on Maui. This banding season resulted in over 200 chicks and 275 adult birds recorded.

*Ka'u* - TNC executed a contract for 2.85 miles of remote fence construction protecting an additional 800 acres. When completed, this fence will connect protected intact native forest in the Ka'u Preserve to Ka'u Forest Reserve's planned fenced management area and the National Park's Kahuku unit. TNC will continue to provide support to DOFAW to secure public access to Ka'u FR along the lower FR boundary.

## **2.2 PLANS AND MANAGEMENT OBJECTIVES FOR FY16**

The NAPPs will continue existing conservation management, guided BLNR-approved management plans, available at <http://dlnr.hawaii.gov/ecosystems/napp>.

## **3. COMPLIANCE WITH CHAPTER 42F, HRS, REQUIREMENTS FOR GRANTS AND SUBSIDIES**

Under NARS, no grants or subsidies were issued pursuant to Chapter 42F, HRS. Due to legislative amendments, Chapter 42F, HRS, is no longer applicable to the types of grants issued under NAPP. All grants awarded as part of NAPP are compliant with the State Procurement Code, Chapter 103D, HRS.

## **4. STATUS OF PUBLIC HUNTING OPPORTUNITIES**

Under NARS Management Policies, strategies to reduce populations of non-native animals to the lowest possible level are to be employed. Public hunting continues to be a control option in many areas within NARS, with most NARS acreage now open to hunting every day with no bag limit. Hunting is not managed on a sustained-yield basis. Staff animal control (including fencing, trapping, staff hunting, snaring, and aerial shooting) are used as needed in specified areas where public hunting is not able to reduce population/activity to the lowest possible level.

In NAPP Preserves, the public hunting opportunities vary.

- Mo'omomi Preserve does not have public hunting due to safety concerns and limited resources for administration and enforcement. If studies indicate that deer control is needed, TNC will pursue management in the best interest of the resources.

- Kamakou Preserve is open for public hunting 365 days/year, with no bag limit. During extreme fire hazard, unsafe road conditions, aerial shooting, or herbicide spraying in accessible areas, portions or all of the Preserve may be closed.
- Pu‘u Kukui Preserve is open to public hunters by permit 365 days/year, with no bag limit.
- Waikamoi Preserve’s conservation easement allows ranch employees to hunt. Public hunters are permitted to hunt in portions of the Preserve when it does not interfere with management, guided hikes, and ranch employee hunting. The management goal is to remove all ungulates; approximately 50,000 acres of public hunting lands are available below the Preserve to meet public hunting needs.
- The new Waikamoi Addition was open to private hunting for about one year prior to TNC initiating ungulate control.
- Kapunakea Preserve’s conservation easement requires that there be no unaccompanied public hunting. The Preserve is closed to hunting with dogs due to snaring.
- In Kanepu‘u, TNC used volunteer hunts to remove deer from the fence units.
- TNC will continue to use volunteer hunters to reduce animal numbers in the Ka‘ū Preserve.

## **5. OTHER PROJECTS FUNDED BY THE NARF PURSUANT TO § 247-7, HRS: WATERSHED PARTNERSHIPS & HAWAI‘I YOUTH CONSERVATION CORPS**

### **5.1 WATERSHED PARTNERSHIPS PROGRAM**

#### **Overview**

Watershed Partnerships are voluntary alliances of public and private landowners committed to protecting over 2 million acres of the most important watershed lands in Hawaii. These forests form the living sponge that allows millions of gallons of water to soak into the aquifers, providing a source of fresh water upon which all residents, tourists, agriculture and industry depend. There are currently 10 Watershed Partnerships involving over 70 private landowners and 24 public agencies. All partnerships have management plans approved by their members which guide their actions, providing clear objectives and measurable outcomes.

In 2001, the Hawaii State Legislature authorized the use of the funds to support projects undertaken in accordance with watershed management plans negotiated with private landowners. In FY 14, \$3.5 million was allocated in state general funds. The Governor’s restriction resulted in 5% of those funds being withheld (in addition to administrative overhead charges). The Legislature also created 11 new positions to be paid from these general funds. The remainder, a total of \$3,035,562 was awarded to the Watershed Partnerships Program (WPP) through a competitive Request for Proposals (RFP). Projects awarded state funds were able to use state funds to leverage federal, county, and private monies. Due to the time required for contracting, this report summarizes activities that were carried out under the Watershed Partnerships Program using FY 14 state funds, which largely occurred during FY 15. Projects awarded FY 15 funds (approximately \$2.4 million of NARF and Forest and Wildlife Resources Funds) will be covered in next year’s report. A Request for Proposals has been completed for \$2.2 million in State general funds allocated for FY 16. Contracting is currently underway for those projects.

There are many benefits to managing Hawaii's mauka lands through Watershed Partnerships. These include:

- Threats are addressed more economically across ownership boundaries
- Limited State funds are leveraged to obtain federal, county and private monies
- Resources and expertise are pooled to reduce redundancy
- Private landowners increase their capacity and desire to protect their forests
- Protection of cultural resources
- Native species preservation
- Green workforce employment opportunities

The main threats to the health of Hawaii's watersheds are:

- Destructive Animals: Non-native feral ungulates like pigs, goats, deer, sheep, mouflon, and cattle trample and kill plants, tear up the ground with their hooves, and increase erosion.
- Destructive Weeds: Habitat-modifying invasive species replace native species, contribute to erosion, and reduce the amount of rainfall entering our aquifers.

The most important management actions include:

- Fencing priority watershed areas
- Removing non-native feral hooved animals (ungulates)
- Controlling invasive weeds
- Monitoring forest health
- Outplanting, restoration and rare species management
- Education and community outreach

For more information about the Watershed Partnerships Program please visit the following link:  
<http://dlnr.hawaii.gov/ecosystems/wpp/>

## Watershed Partnerships Program FY 15 Accomplishments Summary\*

\*Due to the time required for contracting, this report summarizes activities that were carried out using FY14 funds, which largely occurred during FY15. The table includes only actions funded by the State Watershed Partnerships Program Grants; additional work is funded by federal, county and private funds.

	Invasive plants search & control	Protected from hooved animals	Volunteer contributions	Fence (new constructed)**	Fence (existing maintained)
Watershed Partnership (WP) / Program Name	Acres	Acres	Hours	Miles	Miles
<b>Kaua'i</b>					
Kaua'i Watershed Alliance	2,149	5,725			6
National Tropical Botanical Garden	82	365			4
Koke'e Resource Conservation Program	56		2,910		
Kaua'i DOFAW NARS	4,708				
Kaua'i Invasive Species Committee	1,768		8		
<b>O'ahu</b>					
Waianae Mountains WP	10		420		
Ko'olau Mountains WP	220		535		
Oahu DOFAW NARS	10				
Oahu Invasive Species Committee	3,513		35		
<b>Maui Nui</b>					
West Maui Mountains WP	18	7,495	142	0.5	8
Leeward Haleakalā WRP	16,671	2,873			21
East Maui WP	41	8,939			8
East Moloka'i WP	1,545	3,280	201	0.06	10
Maui Invasive Species Committee	37,554		15		
<b>Hawai'i</b>					
Three Mountain Alliance	822	31,116	403	2	4
Kohala Watershed Partnership	1,545	971	210		9
Mauna Kea Watershed Alliance	84	7,067	107		51
<b>TOTAL</b>	69,251	67,831	4,986	2.56	121

## **Watershed Partnership Highlights**

### **Kaua'i**

#### *Kaua'i Watershed Alliance:*

The East Alaka'i fenced unit showing 90% ungulate free. Currently overseeing construction of the new Halehāhā fence.

### **O'ahu**

#### *Ko'olau Mountains Watershed Partnership:*

Mouflon sheep and goats removed from Kualoa and Waimanalo. Mouflon sheep are now eradicated from O'ahu. Conducted 12 volunteer trips and participated in 16 community events and presentations.

### **Maui Nui**

#### *East Maui Watershed Partnership:*

Monitoring within the fences showed almost zero animal activity. A five year weed management plan was updated and finalized. Control of priority weeds is underway focusing on control of the highest priority backcountry invasive ginger population.

#### *West Maui Mountains Watershed Partnership:*

Ungulate numbers continue to decline in management units. Water quality monitoring, outreach and education, and forest health monitoring programs were expanded.

#### *Leeward Haleakala Watershed Restoration Partnership:*

Controlled incipient populations of invasive species and collected thousands of seeds for restoration. Continued efforts to secure funds and build partner support to complete fencing across the south slope of Haleakalā that will result in over 10,000 acres of protected forest.

#### *East Moloka'i Watershed Partnership:*

Pig population in new fence unit estimated at zero and aerial ungulate control efforts in the inaccessible gulches along the south slope are helping to reduce impact to native forests.

### **Hawai'i Island**

#### *Mauna Kea Watershed Alliance:*

Refurbished, inspected and maintained conservation fence on Mauna Kea. Continued to remove ungulates and conduct weed and ungulate surveys on partnership lands.

#### *Three Mountain Alliance:*

Supervised inmate conservation work line from the Hawaii Community Correctional Center that inspected and repaired fences. Led volunteer planting trips, conducted student enrichment programs, and hosted a native species art contest.

#### *Kohala Watershed Partnership:*

Removed feral cattle and conducted aerial surveys to confirm no remaining animals. Continued protection and management of high quality watershed areas by clearing ginger and other habitat-modifying weeds.

### **Other Projects Supported by the Watershed Partnerships Program**

#### *Kauai DOFAW NARS*

Funding enabled the Kauai NARS program to continue efforts to control Australian Tree Fern, which is drastically changing the landscape of Kauai's forests.

#### *National Tropical Botanical Garden*

Ground surveys in the Limahuli Preserve resulted in the removal of thousands of ginger seedlings and aerial imagery is helping staff locate incipient weed populations.

#### *Koke'e Resource Conservation Program*

Removed a total of 322,210 invasive weeds (mostly Himalayan ginger) with the help of 249 volunteers, including populations inside the newly completed Hono o Na Pali fence.

#### *Kauai Invasive Species Committee (KISC)*

Surveyed 1,768 acres for *Miconia calvescens* and treated 344 individual plants by manual removal and treatment using herbicide ballistic technology (HBT).

#### *Oahu Invasive Species Committee (OISC)*

Controlled 9 mature and 1,528 immature *Miconia calvescens* plants. The number of mature *Miconia* continues to decline.

#### *Maui Invasive Species Committee (MISC)*

Conducted ground and aerial surveys and control of invasive weeds on over 37,554 acres.

#### *Natural Resource Data Solutions*

Provided technical support for watershed reporting and tracking yearly accomplishments statewide.

#### *DLNR EA Exemption List*

Division exemption lists were consolidated into one Departmental list, which improves consistency and uniform application of exemption determinations across Divisions. The final DLNR Exemption List received Environmental Council concurrence in June 2015.

## **5.2 INFORMATION AND EDUCATION PROGRAM**

Staff uses a variety of methods to connect with communities across demographics and islands including: websites, social media, press releases and other media support, public outreach events and coordination, educator workshops, field trips, classroom visits, and the youth programs. The DOFAW website underwent a major transition, empowering staff to share success stories and increase transparency.

The education and information section was managed by one ¾ time, permanent staff person, two part-time interns, and two full-time contracted RCUH-PCSU staff. Dedicated funding for staff would greatly assist in the development of a robust and consistent program that meets the needs of all program sections and allow the program to focus on meeting the education, communication, and information needs of the community rather than searching for funding sources. Despite funding challenges, DOFAW continues to improve outreach efforts through innovative partnerships, grants and implementing programs that have demonstrated success nationally and resonate with local needs contributing to a more environmentally conscious and sustainable island community.

### **Youth Conservation Corps (YCC) Program**

The State of Hawai‘i YCC Program enables young adults to gain entry-level experience as they work with natural resource professionals. Internships often lead to future jobs or advanced degrees in natural resource management.

The majority of the state’s YCC programs were funded by the NARF, and supported by federal and community grants awarded to the contractor, Kupu. Through a competitive Request for Proposals, DLNR secured 31 year-round AmeriCorps members through Kupu in addition to 15 weeks of project service learning for a number of teams throughout the summer program and 5 summer interns. These individuals dedicated over 65,000 hours of service.

### **Project Learning Tree (PLT) Program**

The Information and Education Coordinator serves as the state coordinator for PLT, a national program that aims to “teach students how to think not what to think about complex environmental issues”. Workshops provide Hawai‘i’s educators with locally and nationally relevant resources that connect to state standards. This allows the environment to be a part of everyday classroom learning. These resources help educators more effectively incorporate environmental education across disciplines. DOFAW uses PLT’s standards-based, field tested materials, which are consistently updated to meet national and locally developed curricula. Tri-Isle RC&D serves as the fiscal sponsor.

In FY15 the PLT program led 3 workshops and certified an estimated 42 Hawai‘i educators. The program continues to develop a volunteer network of facilitators totaling 20 individuals statewide. The program is working to integrate PLT in university education programs by training pre-service educators in environmental education and supplying them with a support network of experts in natural resource management.

### **Outreach events, school visits, interpretive site visits, and community meetings**

DOFAW Information and Education staff participated in ~20 community outreach events reaching over 5,500 community members; reached over 1,000 students through classroom presentations; supported partners by providing staff on interpretive trips reaching students; and supported the community at meetings and informational sessions.



The O‘ahu Education Specialist coordinated site visits and teacher workshops in Moanalua Valley through a partnership with the Moanalua Gardens Foundation and led 1,749 students on site visits to Moanalua Valley to learn about place, culture, and natural resource management.

Students listen to DOFAW staff instruct them on planting native species at Pahole NAR as part of DOFAW’s Adopt-A-Forest Program on O‘ahu.

## **6. ANALYSIS OF THE PROBLEMS AND ISSUES ENCOUNTERED**

Act 84, SLH 2015 repealed the conveyance tax as a funding source for the NARF, and authorized general funds for the NARF’s programs. These programs are highly reliant on steady sources of funding. Even a single year of budget cuts can undo decades of progress if fences are not maintained, invasive weeds are allowed to spread, etc. Budget cuts can even result extinction of native Hawaiian species, which rely on active and sustained management. Consistent funding in the future remains a necessity.

NARF programs partner with the RCUH-PCSU, to supplement important NARS and watershed work, provide learning opportunities to young professionals in the biological sciences, and giving the State much-needed assistance with on-the-ground conservation.

At the landscape level, control of feral animals is possible using a combination of public hunting, exclusion by fences, and staff control. Some members of the public do not understand the connection between feral ungulates and damage to native forest and watershed – raising objections to both fencing and animal control as unnecessary. Currently, approximately 5% of DOFAW’s lands are highly protected by fences, and an additional 7% comprise the Mauna Kea protected area.

## **7. CONCLUSION**

Detailed project plans and accomplishment reports for NARS, NAPP, Watershed Partnership Program, Rare Plant Program, NIP and YCC are available through links from DOFAW website <http://dlnr.hawaii.gov/ecosystems/> or from the:

DLNR/DOFAW Native Ecosystem Section Manager, Telephone: 587-0166, Fax: 587-0160  
1151 Punchbowl Street, Room 325  
Honolulu, HI 96813

**8. FINANCIAL CONDITION OF THE NATURAL AREA RESERVE FUND (NARF)**

In FY16, general funds have replaced the NARF special funds. The NARF no longer has a spending ceiling nor receives conveyance tax revenues, pursuant to Act 84, SLH 2015.

**LNR 407 – NARS and WATERSHED MANAGEMENT SUMMARY**

**General Fund Appropriation G-15-047**

NARS 'A' Personnel Expenditures FY 14	\$ 688,561.55
NARS 'B' Operating Expenditures FY 14	\$ 57,490.87
NARS Encumbrances	\$ 26,791.88

**NAR Fund S-15-342**

Revenues	\$ 19,946,623.41
NARF 'A' Personnel Expenditures	\$ 1,876,577.40
NARF Operational Expenditures	\$ 3,939,967.13
NARF Operational Encumbrances	\$ 2,772,558.89
Transfers Out	\$ 7,525,872.00

**APPENDIX A. BOND-FUNDED PROJECTS FY 15 (SUMMARY TABLE)**

<b>Watershed Initiative CIP FY15</b>				
<b>Island</b>	<b>Project</b>	<b>Project Status</b>	<b>Acres</b>	<b>FY15 Funding</b>
Kauai	Alakai Wilderness Preserve - Halehaa	Ongoing; 1 mile cleared	1300	\$400,000
Oahu	Ewa Forest Reserve	First unit completed, second being cleared	1300	\$390,000
	Kaluanui Natural Area Reserve	Ongoing, contract awarded	500	\$145,000
	Kaala Natural Area Reserve	Ongoing, contract awarded	TBD	\$490,000
Maui	Lahaina Forest Protection	Ongoing, installation initiated	5300	\$375,000
	Kipahulu Forest Reserve	Ongoing, contract awarded	TBD	\$100,000
Molokai	Puu Alii Natural Area Reserve	Ongoing, fenceline being cleared	TBD	\$250,000
Hawaii	Puu Waawaa Henahena Rest. & Fence Instl.	Ongoing, contract awarded	900	\$250,000
	Hilo and Honuaula Forest Reserves	Ongoing, fenceline being cleared	N/A	\$500,000
	Mauna Kea Forest Restoration Project	Ongoing, 15,680 trees planted	N/A	\$100,000
SUBTOTAL			8000	\$3,000,000
<b>Other Bond-Funded Projects CIP FY15</b>				
Maui	Ahihi Kinau Natural Area Reserve Kanhena Parking Improvements	Ongoing, compliance and design, construction contract not yet awarded	N/A	\$360,000
Hawaii	Manuka Natural Area Reserve Boundary Fence	Ongoing, contract awarded	24000	\$2,000,000
SUBTOTAL			24000	\$2,360,000
<b>TOTAL</b>			<b>32000</b>	<b>\$5,360,000</b>