



GPS in the Pacific Island Network

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Outline

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 - Why?
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3. GPS and Vital Signs
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 - Ricoh GPS Camera
4. Vegetation Mapping Inventory
 - Project Description
 - Data Collection
 - Status



What is Inventory & Monitoring?

- **Inventories:** Surveys and documentation of what natural resources are in national parks
- **Monitoring:** Tracking these resources over time to detect changes (positive or negative)



11 Pacific Island National Parks:

Hawaii:

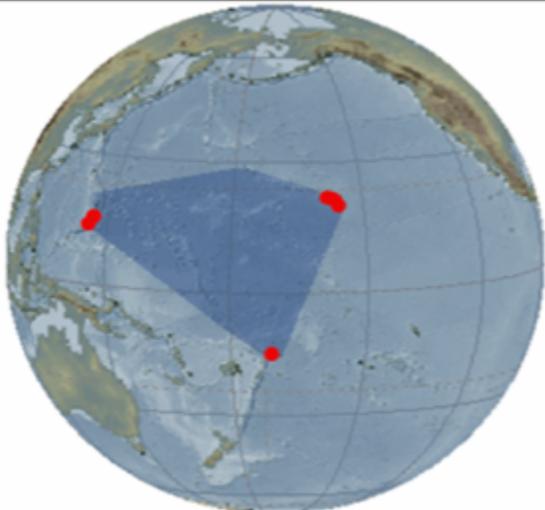
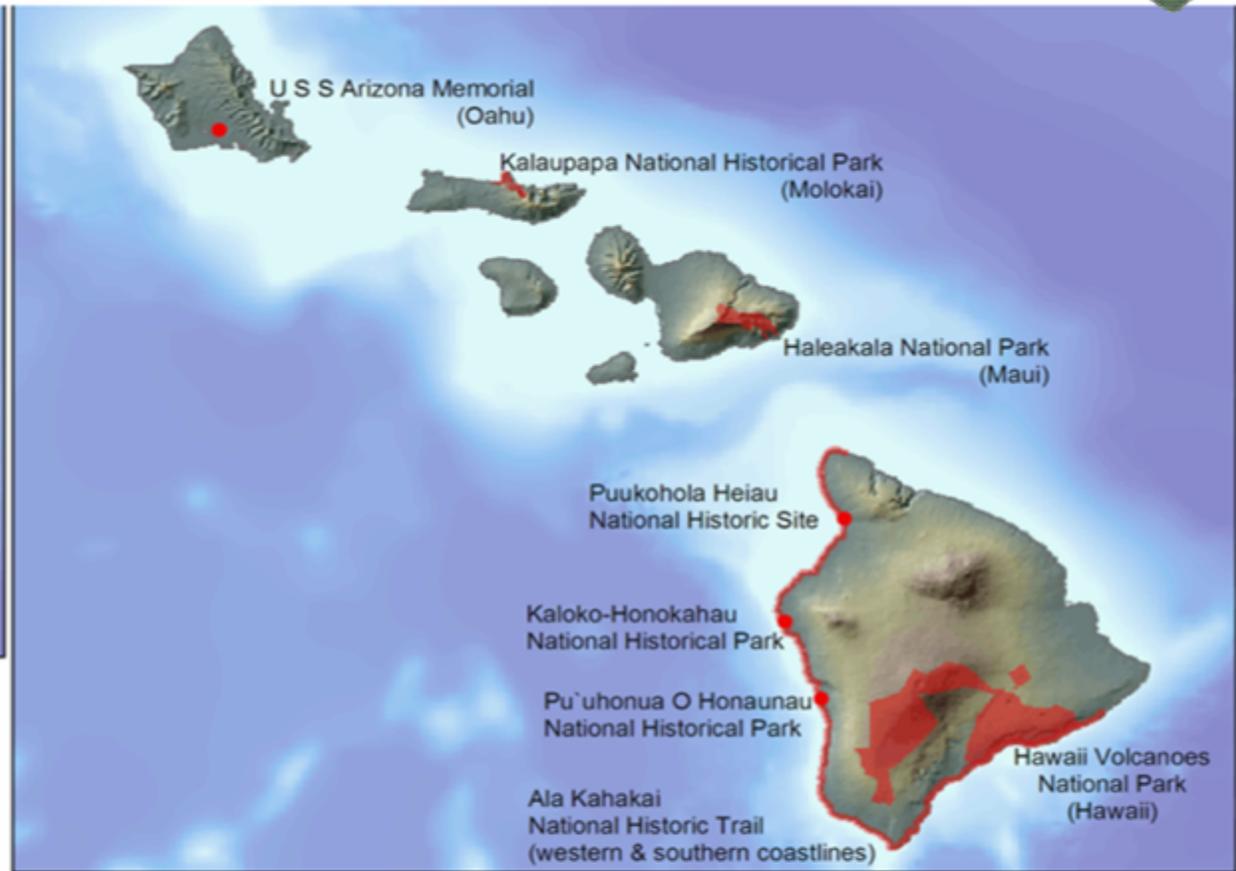
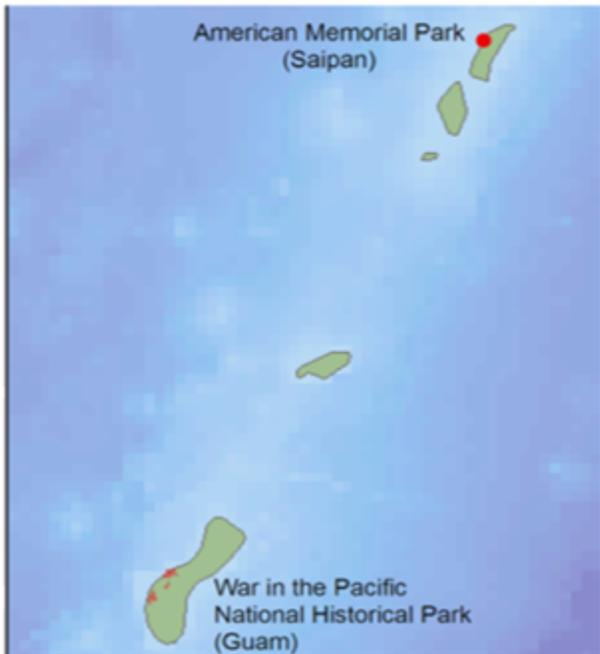
- Hawaii Volcanoes National Park (HAVO), Hawaii
- Haleakala National Park (HALE), Maui
- Kalaupapa National Historical Park (KALA), Molokai
- Puukohola Heiau National Historic Site (PUHE), Hawaii
- Kaloko-Honokohau National Historical Park (KAHO), Hawaii
- Puuhonua O Honaunau National Historical Park (PUHO), Hawaii
- Ala Kahakai National Historic Trail (ALKA), Hawaii
- USS Arizona Memorial (USAR), Oahu

West and South Pacific:

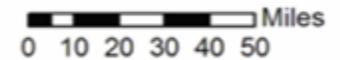
- War in the Pacific National Historical Park (WAPA), Guam
- American Memorial Park (AMME), Commonwealth of the Northern Mariana Islands
- National Park of American Samoa (NPSA), Territory of American Samoa

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All Park Maps at same scale



August 2003



I&M National Monitoring Goals

1. Determine **status and trends** in selected indicators (Vital Signs) of park ecosystems.
2. Provide **early warning** of abnormal conditions of selected resources to help develop effective management measures.
3. Provide data on: (a) dynamic park ecosystems, & (b) reference points for comparisons with other altered environments.
4. Meet certain **Legal and Congressional mandates**.
5. Measure progress towards performance goals.
6. Provide data to better understand, protect, and manage important resources that share cultural and natural value.

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It is not possible to monitor all natural resources, therefore a short list of important resources was selected.

We call this list – the Vital Signs.

What are Vital Signs?

Indicators of the health of the ecosystem selected by a wide range of experts.

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List of Vital Signs for Long Term Monitoring Protocols

- **Benthic Marine Community**
- **Climate**
- **Early Detection of Invasive Plants**
- **Fish Harvest**
- **Focal Terrestrial Plant Communities**
- **Freshwater Animal Communities, Anchialine Pools**
- **Freshwater Animal Communities, Streams**
- **Frugivorous Bats**
- **Groundwater Dynamics**
- **Insectivorous Bats**
- **Landbirds**
- **Landscape Dynamics**
- **Marine Fish**
- **Seabirds**
- **Status and Trends of Established Invasive Species**
- **Water Quality**



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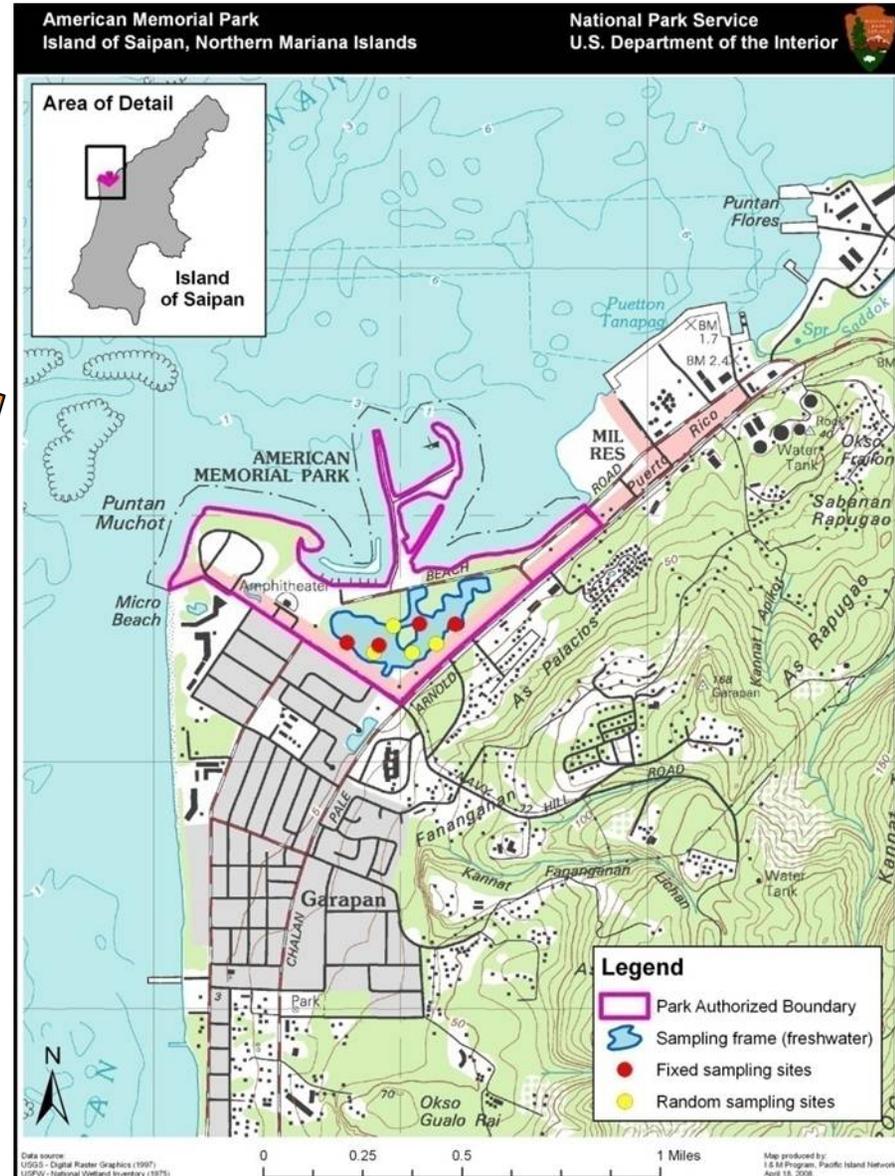
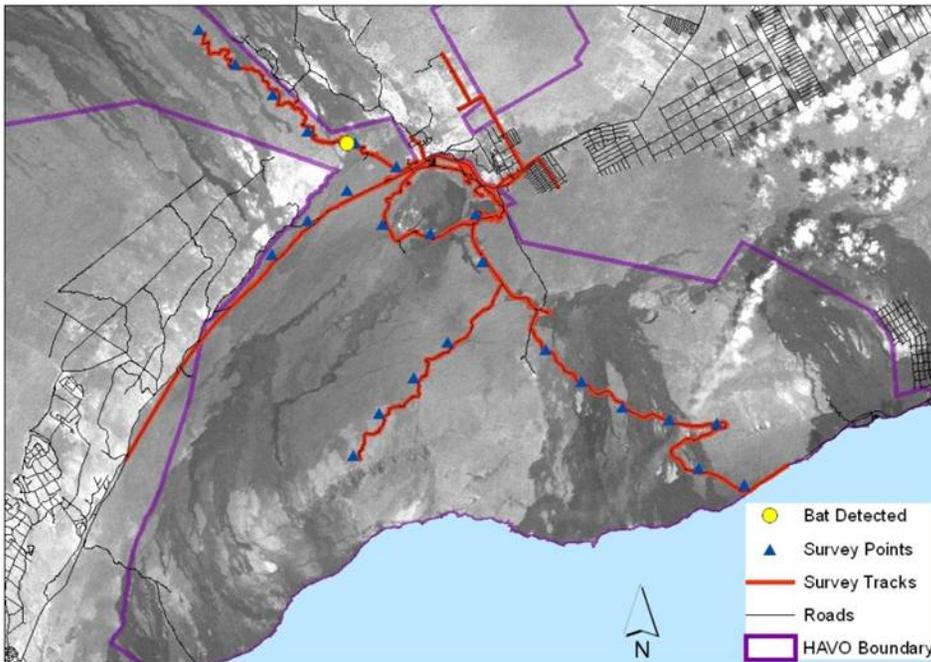
GPS and Vital Signs...

- Generate random points
- Navigate to points
- Document important locations

Insectivorous Bats



Water Quality





Data Collection

Pre-Field

- Prepare GPS unit for data collection
- Create Data Dictionary
- Transfer Data Dictionary to GPS Receiver
- Configure GPS Receiver

Field

- Navigate to locations (if necessary)
- Collect GPS data: points, lines, polygons
- Take site photographs

Post-Field

- Transfer GPS data and images to computer
- Post processing of data (differential correction)
- Export ESRI shapefiles and projection files
- Review shapefiles in ArcGIS
- Create metadata



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Ricoh GPS Camera:

- Digital camera
- GPS
- Compass
- Rugged build: water and shock resistant
- Bluetooth capability
- Image imprinting
- **GPS-Photo Link software**
 - ArcGIS shapefiles
 - Google Earth .kmz files
 - Add comments, titles or logos
 - Watermark images to show lat/long and compass direction



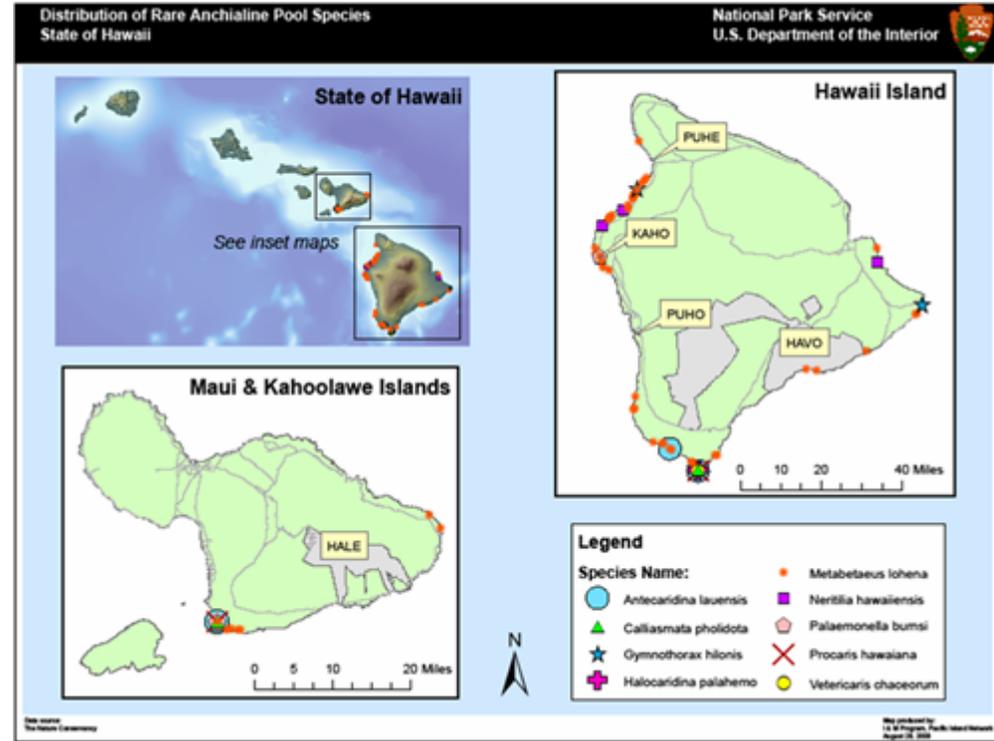
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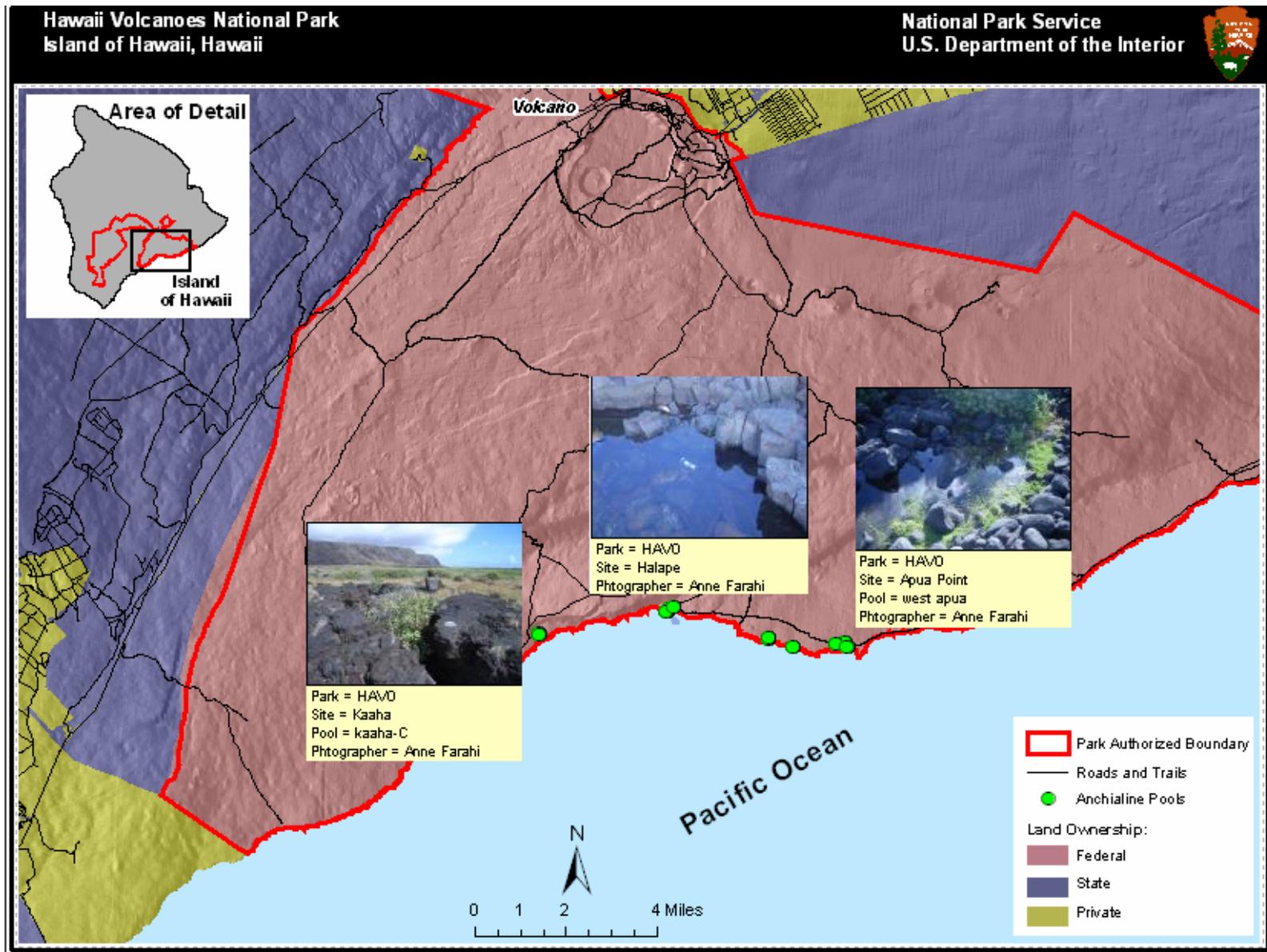
Anchialine Pools

- GPS Pool Locations
 - Navigate to existing pools
 - Any new pools?
- Photograph each pool
 - Ricoh camera will automatically create a GPS point for each photo
- Take directional photographs at each pool
 - Ricoh camera has a built in compass
- Label each picture
 - Ricoh camera will imprint watermarks to document park location, pool name, date and time, compass bearing, or any other important information



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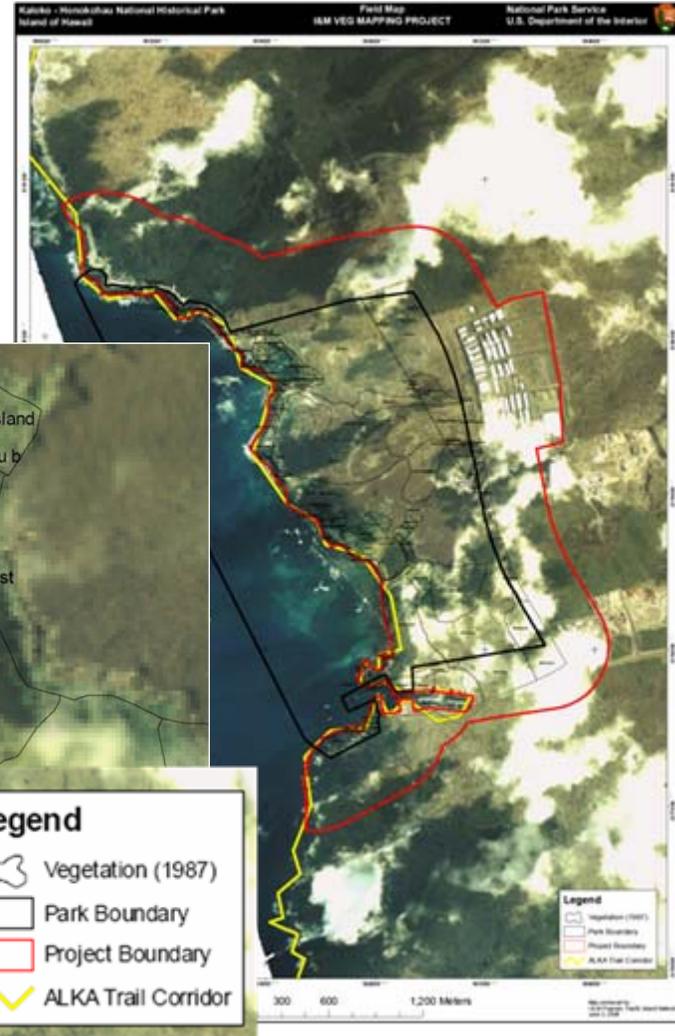
Vegetation Mapping Inventory

Old Maps...

- PACN relies on vegetation maps created by several different agencies
- Some of the maps are outdated and cover only limited sections of the parks
- Lower resolution than required by the latest USGS-NPS vegetation mapping program standards

New Maps...

- Comply with the USGS-NPS vegetation mapping program classification and accuracy standards
- Based upon satellite imagery
- Minimum unit of 1 acre or less and a 1:24,000 map base



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Project Area Summary

<u>Parks</u>	<u>Park Size</u>	<u>Environs Size</u>	<u>Total Project Area</u>
ALKA	808 acres	1,372 acres	2,180 acres
AMME	246 acres	360 acres	606 acres
HALE	33,806 acres	8,719 acres	42,525 acres
HAVO	367,949 acres	30,027 acres	397,976 acres
KAHO	1,273 acres	183 acres	1,456 acres
KALA	10,446 acres	861 acres	11,307 acres
NPSA	11,083 acres	234 acres	11,317 acres
PUHE	85 acres	436 acres	521 acres
PUHO	437 acres	1,272 acres	1,709 acres
WAPA	1,983 acres	2,315 acres	4,298 acres
Totals	428,116 acres	45,779 acres	473,895 acres

*Potential cooperation could increase size

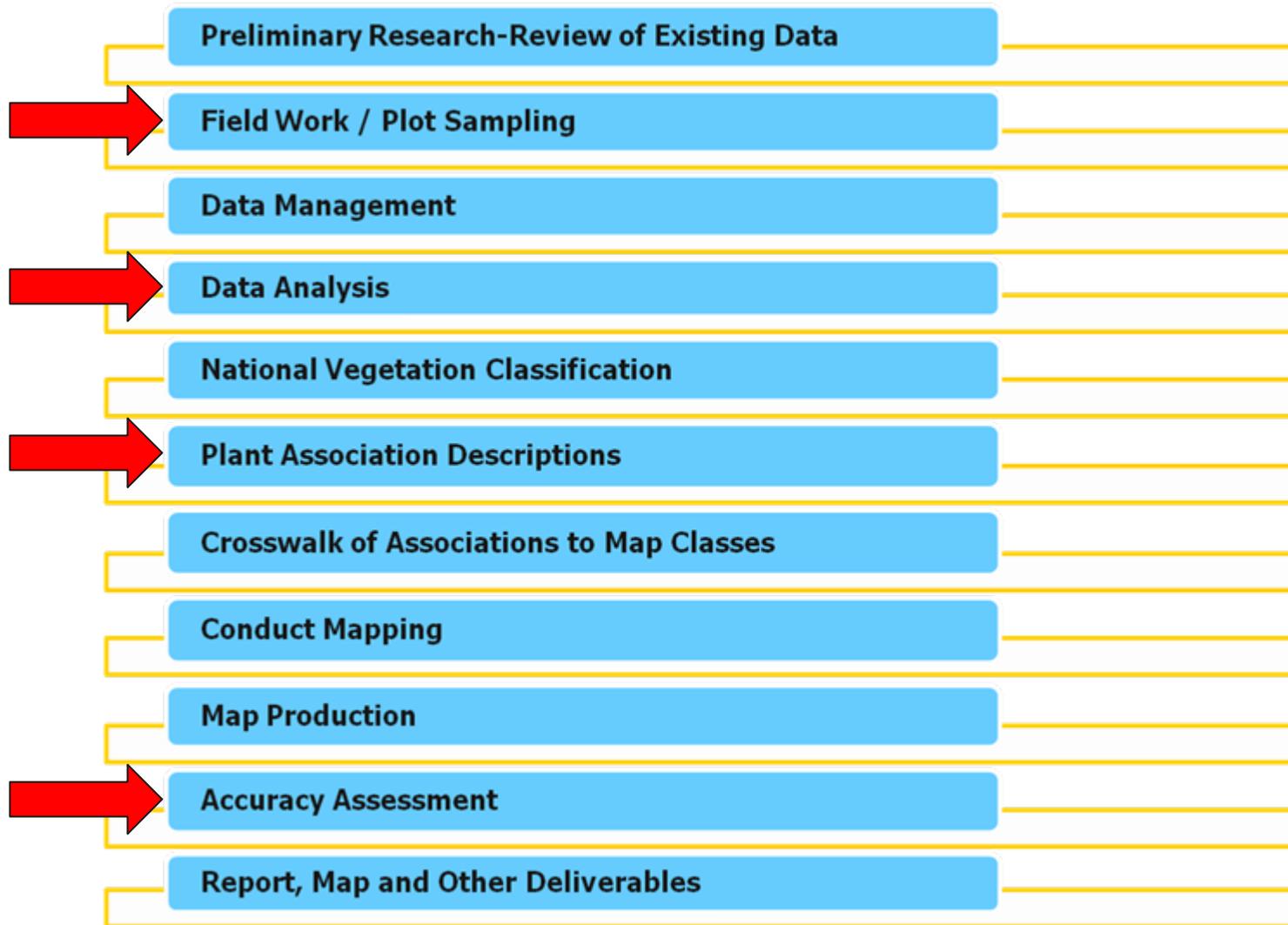
*Note acreages based on GIS layer boundaries

*Note Project Areas does not include open ocean areas

Applies to all PACN Parks with a Natural Resource Component: HAVO, HALE, ALKA, PUHO, KAHO, PUHE, KALA, AMME, WAPA, and NPSA (The USS Arizona Memorial is not included)



Vegetation Mapping Tasks:



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Field Work Components:

- **Plot and Observation Point Data Collection**
- **Map Verification Work**
- **Accuracy Assessment Data Collection**





Vegetation Mapping Inventory – Current Status for the PACN

Completed:

- Field work and classification at the three west Hawaii Parks, Puukohola Heiau National Historic Site, Kaloko-Honokohau National Historical Park, and Puuhonoua o Honaunau National Historical Park
- Field crews have been trained and vegetation plot collection is complete at War in the Pacific National Historical Park (Guam) and American Memorial Park (Saipan)

In Progress:

- A revised version of the vegetation mapping workplan is complete
- Mapping at the three west Hawaii Parks

Upcoming:

- Vegetation plot field work will be underway at Hawaii Volcanoes National Park during the summer of 2009
- Map accuracy assessments will be done at the west Hawaii parks in the summer of 2009

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Mahalo!

Learn more at NPS Inventory & Monitoring Websites:

<http://science.nature.nps.gov/im/monitor>

<http://science.nature.nps.gov/im/units/pacn>