



Pacific Island Network Quarterly

Quarterly Newsletter of the Pacific Island Network Inventory & Monitoring Program July - Sept. 2007, Issue no. 09

Board of Director's Note, pg. 2

Roger Moder enlightens us to some of the unique challenges and opportunities facing the NPS in the National Park of American Samoa.

Notes from the Field, pg. 4

Cooperator and biologist Kazuki Kageyama lays down the line by describing underwater marine ecosystem measuring techniques as part of his day to day activities in Kalaupapa NHP.

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Wetlands at American Memorial Park in the Commonwealth of the Northern Mariana Islands

Aloha - Talofa - Greetings Tirow - Hafa adai

The Pacific Island Network (PACN) Inventory and Monitoring Program (I&M) invites you to once again peruse the goings-on of this geographically isolated group of islands which play a relatively small, albeit vital, part in the composition of the nation's natural resources.



Fishing ain't what it used to be... A common concern across much of the globe is the declining state of fisheries. In the Pacific region, fish and products from the sea have been a staple in the diets of Pacific islanders since early settlement. Traditional marine harvesting practices, although often still employed, have gone by the wayside as higher yield/more efficient technologies have taken their place. Near most PACN park units, fish harvests have declined in modern times from increased demand for fish and marine products to feed larger populations,



Fish market near a Pacific Island Network national park unit

pollution and development which often destroy fish habitat, and sometimes careless resources stewardship. The PACN Vital Signs monitoring program, which includes monitoring both fish and fish harvests within National Park Service boundaries, will provide a long-term framework for tracking fish resources. This program will ensure that the NPS is armed with the data we need to make educated decisions about the future of our fisheries.



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The National Park Service has implemented natural resource inventory and monitoring on a servicewide basis to ensure all park units possess the resource information needed for effective, science-based management, decision-making, and resource protection.

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***NOTE:** Unless indicated all photos and articles are NPS.
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Board of Director's Note

Superintendent Roger Moder - National Park of American Samoa (NPSA)

Talofa,

If the Samoan people have been taking care of the natural resources for the last 3,000 years, why do we need the National Park Service?

This is a good question asked by Samoans when they talk about leasing their land to the National Park Service. NPSA leases land from seven villages, and is authorized to do so from three others. Those three villages have matai (chiefs) who think that they should lease land to the NPS, but there is dissent within the villages. Some villagers have told me that they like the NPS and are willing to allow us to enter their lands, but they don't see enough of a benefit to lease the land to us.



Teamwork between the NPS and the communities adjacent to and within NPSA is the key to eliminating devastating invasive species such as tamaligi (*Falcataria moluccana*).



Beautiful coral beds such as these serve as pillars of the nearshore marine ecosystems surrounding American Samoa.

One benefit to leasing the land to the NPS is that the villages alone don't have the resources to deal with invasive non-native species. The National Park of American Samoa has the knowledge and funding to try to eradicate targeted non-native plants, like tamaligi (*Falcataria moluccana*). We have removed it from areas of the park, sometimes even rappelling down to the trees. Now we are helping villages adjacent to the park get funding to destroy the tamaligi on village lands. When they get funding through Americorps or Seacology, we work with the matai to select a crew, outfit them, and provide training and oversight. Terrestrial Ecologist Tavita Togia's education programs inspire people to eliminate tamaligi on their own. This would not happen if there was no National Park of American Samoa. Another invasive species, pigs, were brought here by early Samoan explorers, but they do a lot of damage when they become feral. Farmers come to us for assistance, and we loan them snares. We also trap pigs to reduce the population, and it makes a difference to the farmers, forest, and reef.

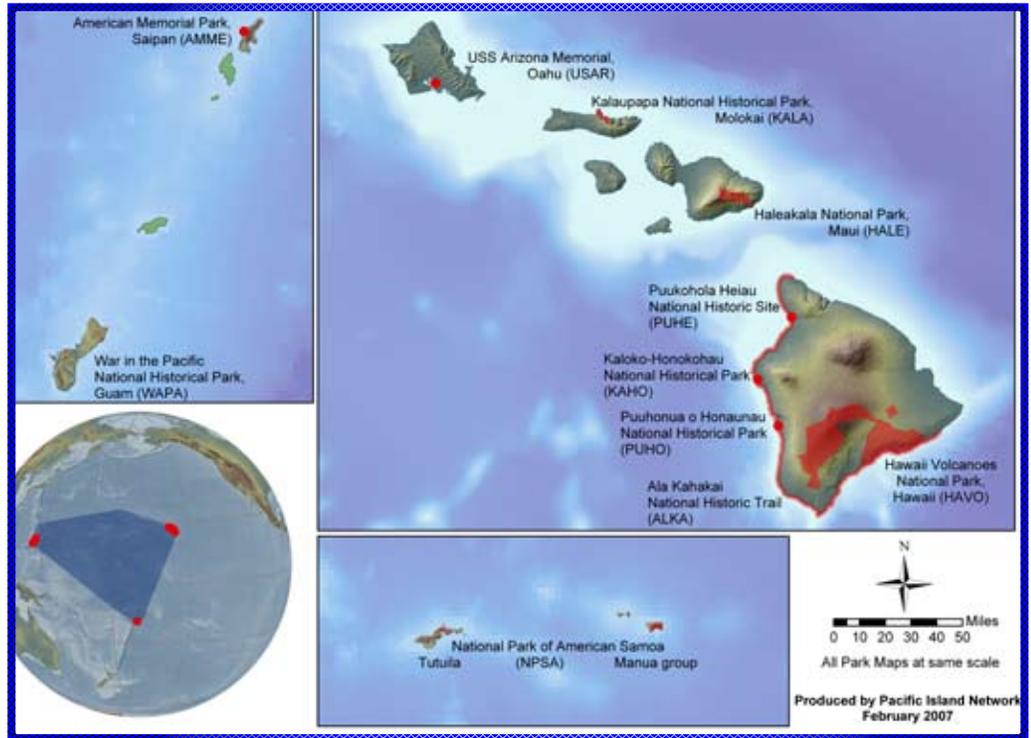
The second benefit to having the NPS involved is that we have the capability to study the coral reefs and fisheries. Villages are aware when the fish populations decline, but they are not sure what to do about it. Some villages close their waters to fishing, which will help, but they don't have the resources to figure out what is happening to the coral reef habitat. That is where we can help.

The natural resources on our small islands are in good condition – so good that they qualified to be included in the national park system. Samoans have done a good job of caring for the land. However, it is now easy for invasive species to infect our ecosystem, so we have to attack the problems on an islands-wide scale. We look forward to the day when we have the authority to expend our funds on cooperative natural resources projects on lands adjacent to the park. We are hopeful that together we can preserve our paleotropical rainforests and coral reefs.

Outreach

It can be easy for many of us to forget the big picture of why we devote time to natural resource projects in the Pacific Islands.

The PACN has engaged the Integration Application Network of the University of Maryland to help us remember. Through the use of conceptual diagram modeling, this team of science communicators have collaborated with I&M and West Hawai'i national parks to create illustrative displays of resources issues. The final products will visually demonstrate mauka to makai resources, threats, issues, and mitigation efforts. Each park's display is intended to educate both the public and park staff of the fundamental resource components and interactions functioning in their park. Scoping will be done to assess the feasibility to conduct similar projects with other PACN parks. Understanding and communicating the basic interplay of ecosystems, cultural entities, stressors, and political boundaries is a vital first step to understanding the importance of the I&M program.



Map of the 11 Pacific Island Network park units

Hot Topic - Wasp Invasion

The spread of non-native yellowjacket wasps is a phenomenon of the late 20th century that threatens native ecosystems throughout the Pacific and elsewhere.

Researchers in New Zealand, Australia, and Hawaii have demonstrated that introduced yellowjackets prey on many native insect species, thereby potentially reducing prey for insectivorous forest birds and interfering with



pollination of native plants. USGS scientists at the Pacific Island Ecosystems Research Center have completed initial tests on toxicants to control yellowjacket wasps in Hawaii. The goal of the work is to suppress seasonal population irruptions of the wasps in the summer and fall. The research was carried out in collaboration with scientists from Landcare Research in New Zealand where several promising control strategies have been developed in recent years. The western yellowjacket spread to all the major Hawaiian islands in the late 1970s and was first recorded in Hawai'i Volcanoes National Park in 1978. This rapid range expansion coincided with the increased use of refrigerated containers for shipping Christmas trees to Hawaii from Oregon and Washington. Inspections of Christmas tree shipments in the 1980s by the Hawaii

State Department of Agriculture resulted in the interception of numerous yellowjackets. Sanitation procedures developed jointly with Oregon and Washington, including the shaking of Christmas trees before shipment, have virtually eliminated yellowjackets from Christmas trees entering Hawaii. These sanitation and inspection procedures have helped keep at least three other species of yellowjackets out of Hawaii. Meanwhile, USGS scientists have been working with resource managers at Hawai'i Volcanoes and Haleakalā National Parks to jointly monitor and develop control strategies for western yellowjackets. Toxicant tests conducted with New Zealand Landcare Research scientists have been focused in Special Ecological Areas of Hawai'i Volcanoes National Park as part of long-term protection efforts for forests still rich in plants and animals native to the Hawaiian islands.

— D. Foote, USGS

Notes From the Field

Marine Monitoring at Kalaupapa

Situated on the north shore of Moloka'i, we are always at the mercy of Mother Nature and her fickleness. Weather/marine forecasts and predictions don't bear much weight here at Kalaupapa National Historical Park (KALA). The ocean can turn from a flat calm to a roiling boil in a matter of hours. Even during our summer season when the ocean conditions are supposed to be "calm", we find ourselves navigating through rough, white-cap, seas to reach our dive sites. Eric Brown (KALA Marine Ecologist), calls it "Victory at Sea!" However, once we drop into the water "hot" and submerge into the blue, the chaos above dissipates and we enter a realm of absolute beauty and tranquility.



Top: Kazuki Kageyama taking a photo on a monitoring point along a benthic transect to determine the percentage of living organisms.

Right: Kazuki laying a rugosity chain along a benthic monitoring transect line to measure the topography of the ocean floor.



As part of the National Park Service's Inventory & Monitoring program, a total of 30 sites (15 fixed and 15 random) have been monitored along roughly sixteen miles of picturesque coastline and offshore islands at KALA. Our monitoring program integrates both the Marine Fish and Benthic Marine Community protocols on each dive. For the fish protocol, fishes observed along a 25 m X 5 m transect are counted and categorized by species and size. To determine the complexity of the reef habitat, a rugosity chain is contoured along the substrate and measured. Digital photographs of the substrate are taken at 1 m intervals along the transects for the benthic protocol. The images are analyzed to generate data for percent coral cover, percent macroalgae cover, and incidence of disease/bleaching of corals. We also installed coral settlement tiles in early April, after the first full moon, to coincide with the annual

coral spawning event. The tiles were recovered at the end of the season to determine coral settlement rate.

We completed our first year of data collection from 2006. The following are some highlights of the results: The fish communities at KALA are not as taxonomically diverse as in other parks (e.g. NPSA, WAPA), but abundance and biomass levels are some of the highest found in the main Hawaiian Islands. Coral cover was uniform throughout the 30 sites; macroalgae cover was low overall, with the highest cover was in front of Kalaupapa settlement; incidence of disease/bleaching were also low with the highest incidence (12 - 15 %) at scattered points

around the park; compared to other areas in the state, coral settlement was low. Highest settlement occurred at Kahi'u Point (104 recruits, yr-1) and the lowest by Kalaupapa and Nihoa on the west end of the park (0 recruits).

We've just completed our monitoring dives for 2007 at KALA and will be heading to Kaloko-Honokōhau National Historical Park in early October to initiate the marine fish and benthic protocols. Tentative dates are scheduled for War in the Pacific National Historical Park (WAPA) in January, followed by a return visit to the National Park of American Samoa (NPSA) for their second season of monitoring.

— K. Kageyama, RCUH

Featured Staff

GAIL ACKERMAN likes birds. That professional and personal interest has led her to some interesting career choices. She has rehabilitated raptors, studied the nesting success of seabirds, waterfowl and falcons, and captive-reared psittacines and native Hawaiian birds. She received a Master's



degree in biology specializing in (what else?) ornithology. She has been a PCSU cooperator with I&M since 2005 as the Vertebrate Fauna Specialist, and is currently working on the Seabird and Frugivorous bats monitoring protocols. Although fruit bats are not certainly birds, they have wings and fly around, and that is close enough for Gail. Other hobbies include cooking, making stained glass artwork, hiking, and relaxing on Hawaii's many beaches.

HEATHER FRASER has been a PCSU cooperator with the PACN since April 2005. She started out working on Hawaiian hoary bat inventories and quickly became involved in the development of the Insectivorous bat monitoring protocol. Heather discovered her passion for bats while working as a tour guide on the Maharajah Jungle Trek in Disney's Animal Kingdom. She found herself asking for extra shifts in the "Bat House" to deliver information to guests about Malayan flying foxes and Rodrigues fruit bats. When she later pursued a Masters in biology at Eastern Illinois Univ., there was never doubt that her focus would be on the Chiropterans. Over the years, she has traveled and worked with a variety of taxa, including bats, amphibians, and reptiles

in Texas, spider monkeys in Bolivia, birds in Maui, and many others. Currently, Heather is gearing up (and growing round) for her next big endeavor, motherhood.



Program Update

Outreach In August, I&M participated with a natural resources display at the PUHE Cultural Festival.

In September, I&M teamed up with the interpretation staff of HALE to create a multidimensional and integrated display for the Maui County Fair. Both community outreach efforts were a success.

Also, the I&M program has called upon the expertise of the University of Maryland Integration and Application Network to create West Hawai'i park specific conceptual models as a tool for communicating large scale ecological issues (see page 3 for more information). Tim Carruthers and Jane Hawkey have made multiple trips to Hawaii to see this project through. And finally, the PACN brochure is now printed and ready for distribution to PACN parks.

Staffing Update

NPS: Two up-and-coming new National Park Service employees recently joined the ranks of I&M. Most recently, the PACN welcomes Lindsey Kramer who came on board as an aquatic

bio-technician and is stationed at KAHO. Also, former CESU cooperator Kelly Kozar

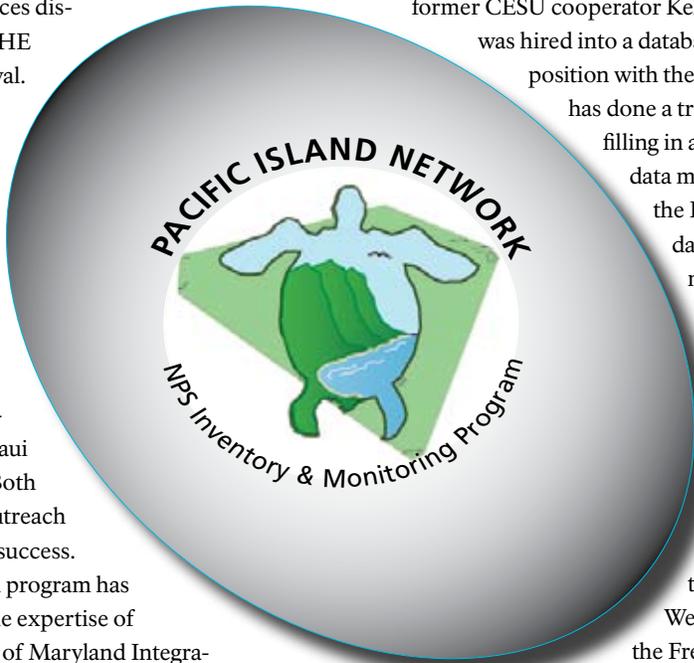
was hired into a database specialist position with the PACN. Kelly has done a tremendous job filling in as temporary data manager since the PACN NPS data management team left several months ago.

CESU:

On the cooperator side of the I&M equation, Mariska Weijerman joins the Freshwater

animals protocol develop-

ment team. She is stationed at KAHO and specializes in anchialine pools. Four individuals have recently joined the PACN for inventory work. The expert services of Lynn Raulerson from the University of Guam, and Art Whistler at the University of Hawaii, have been called upon to certify vascular plant species checklists for AMME and NPSA respectively. In addition, Kalena Blakemore and Jahkotta Burrell will be surveying cave communities with Jade Moniz-Nakamura for the next several months at KALA, HALE, and PUHO.



Games Corner

Scintillating Science of Symbology

Illustrations representing ecological processes or methods can be an effective tool to explain complex scientific ideas. Can you identify which symbol represents which monitoring Vital Sign?

VITAL SIGNS

- A. Early detection of invasive plants
- B. Landscape dynamics
- C. Focal terrestrial plant species / communities
- D. Freshwater animal communities
- E. Seabirds
- F. Climate
- G. Water quality
- H. Landbirds

ANSWERS:

1=C, 2=E, 3=F, 4=D, 5=G, 6=H, 7=A, 8=B

Calendar • July - Sept., 2007

July 25-27= Hawaii Conservation Conference on O'ahu. Several I&Mers attended. I&M contributed one presentation and two posters.

August 18-19= PUHE cultural festival. I&M participates with a display.

August 22,24= Univ. of Maryland conceptual diagram team meets with West Hawai'i parks.

August 23= I&M meets with HAVO Cultural Resources staff to discuss Vital Signs.

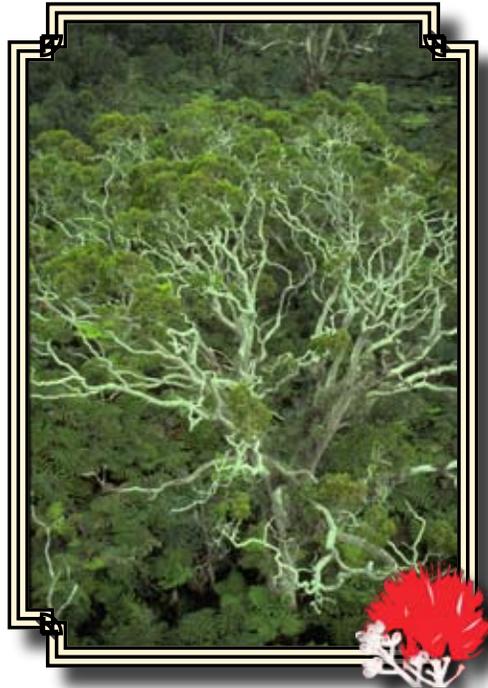
September 11= I&M meets with HAVO kupuna (elders) group to discuss Vital Signs.

September 27-29= I&M participates in interactive display with HALE at the Maui County Fair.



Terrestrial Plant Communities

Description: Of the numerous terrestrial plant communities located within Pacific Island National Parks, scientists and resource managers have identified five plant communities of fundamental importance to the National Park Service's (NPS) Pacific Island Network (PACN). Experts selected these five communities based on their relative intactness, high species diversity, prevalence across parks, uniqueness to their respective areas, and usefulness as indicators of environmental change. The five communities include: (1) the wet forest plant community found within Hawai'i Volcanoes National Park (HAVO), Haleakalā NP (HALE), Kalaupapa NHP (KALA) and the NP of American Samoa (NPSA), (2) the subalpine shrublands of HAVO and HALE, (3) the limestone forests within War in the Pacific NP (WAPA), (4) the mangrove forests/wetlands of American Memorial Park (AMME), and (5) the coastal strand plant communities of KALA and Kaloko-Honokōhau NHP (KAHO).



Often playing a leading role in the composition of the canopy, Koa trees (*Acacia koa*) are recognized as essential cultural and ecological components of the plant communities in three PACN parks.

Significance: Each of the selected plant communities is significant in its own way. For example, the mangrove (*Bruguiera gymnorhiza*) forest of AMME is a scarce community in the Northern Mariana Islands that provides critical habitat for two endangered bird species and a rare tree snail. Within WAPA in north-central Guam, the limestone forest represents a unique and highly diverse assemblage of plants that contains a multitude of native trees, shrubs and ferns, many of which are found only in the Mariana Islands. In the parks of Hawaii and American Samoa, the wet forest communities lack the diversity of the Southeast Asian or South American rainforests. However, due to their geographic isolation, these communities have extraordinarily high rates of endemism (e.g., nearly 90% of Hawaii's native flowering plants are endemic species). Additionally the wet forests of Hawaii's parks contain numerous endangered plant species as well as plants used for traditional gathering (e.g., *Alyxia oliviformis* or maile used for lei making), while the wet forests of American Samoa contain plants of ethnobotanical value and provide food

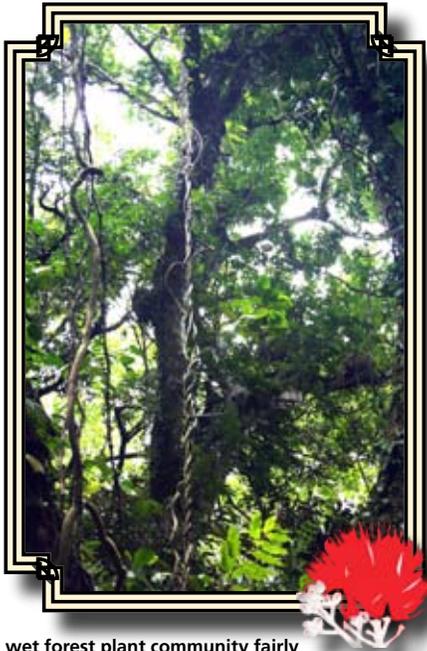
for two rare fruit bats (*Pteropus samoensis* and *P. tonganus*). Similarly, the subalpine shrublands and coastal strand communities within Hawaii's parks contain many plant species and assemblages found nowhere else in the world, including plants such as the spectacular 'Āhinahina, or Haleakalā silversword (*Argyroxiphium sandwicense* subsp. *macrocephalum*).

Sometimes you just need to look down at your feet to see interesting plant communities like this coastal strand community in Hawaii.





Plants continued — A Fundamental Resource



A wet forest plant community fairly typical of the Pacific Island Network.

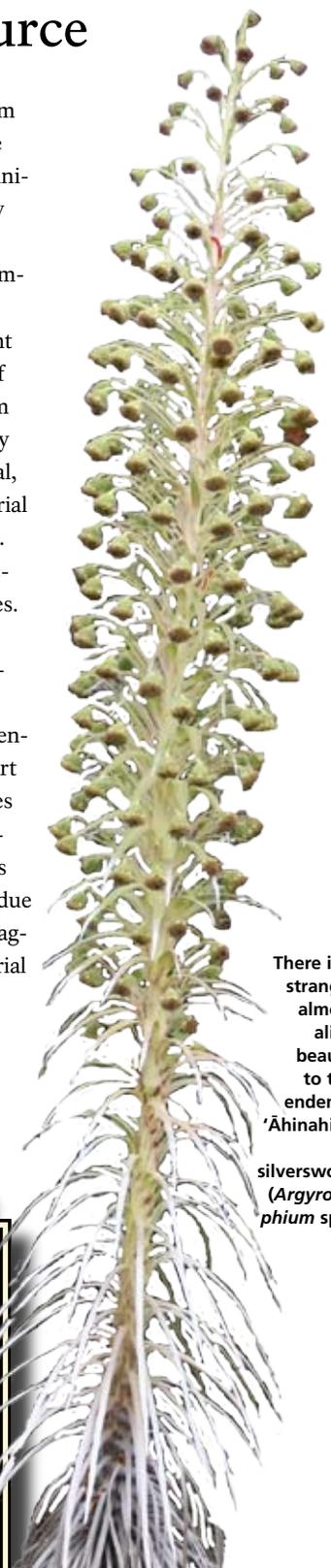
Inventories: Although plant inventories or vegetation surveys exist for some portion of each PACN park, few vegetation monitoring studies have been conducted in the identified focal terrestrial plant communities. Of these studies, many were short-term and focused on changes in the wet forest community in response to feral pig removal. The wet forests of HAVO, HALE and NPSA have been studied most extensively while the other communities and parks have received less attention.

Monitoring: Currently the PACN is developing a long-term monitoring protocol to assess the status and trends of the five previously listed terrestrial plant communities. These communities are important to monitor for a variety of reasons: (1) they are key indicators of ecosystem health, (2) they represent important habitat for other biota (e.g., forest birds), (3) plant communities reflect the dynamic relationship between native and invasive plant species, and (4) they often indicate management needs as well as reflect management effectiveness. The goal of this monitoring effort is to determine the status and long-term trends in plant species diversity, cover, density, and frequency within each of the identified communities. To achieve this goal, scientists will allocate a series of random plots in each terrestrial plant community and survey these plots once every five years. Based on the data collected, they hope to determine the direction and magnitude of any changes in these plant communities.

Conservation and Management: Ultimately the information gathered from this monitoring protocol will help NPS resource managers determine the health and needs of each identified plant community. More specifically, this monitoring effort has the potential to identify a wide range of management issues such as rapid increases in weed abundance, native species die-backs due to disease, plant recoveries after catastrophic events (e.g., fires or hurricanes) or shifts in community composition due to climate change. With the aid of long-term monitoring, managers will be better equipped to protect and enhance the terrestrial plant communities in PACN parks now and in the future.

— P. Berkowitz, RCUH & J. Jacobi, USGS

Biologist Joan Yoshioka mucking through the mangrove (*Bruguiera gymnorrhiza*) forest at American Memorial Park.



There is a strange, almost alien beauty to the endemic 'Ahinahina or silversword (*Argyroxiphium* sp.).

For more information:
http://www1.nature.nps.gov/im/units/pacn/monitoring/vs_plant_community.cfm



Making Research Relevant

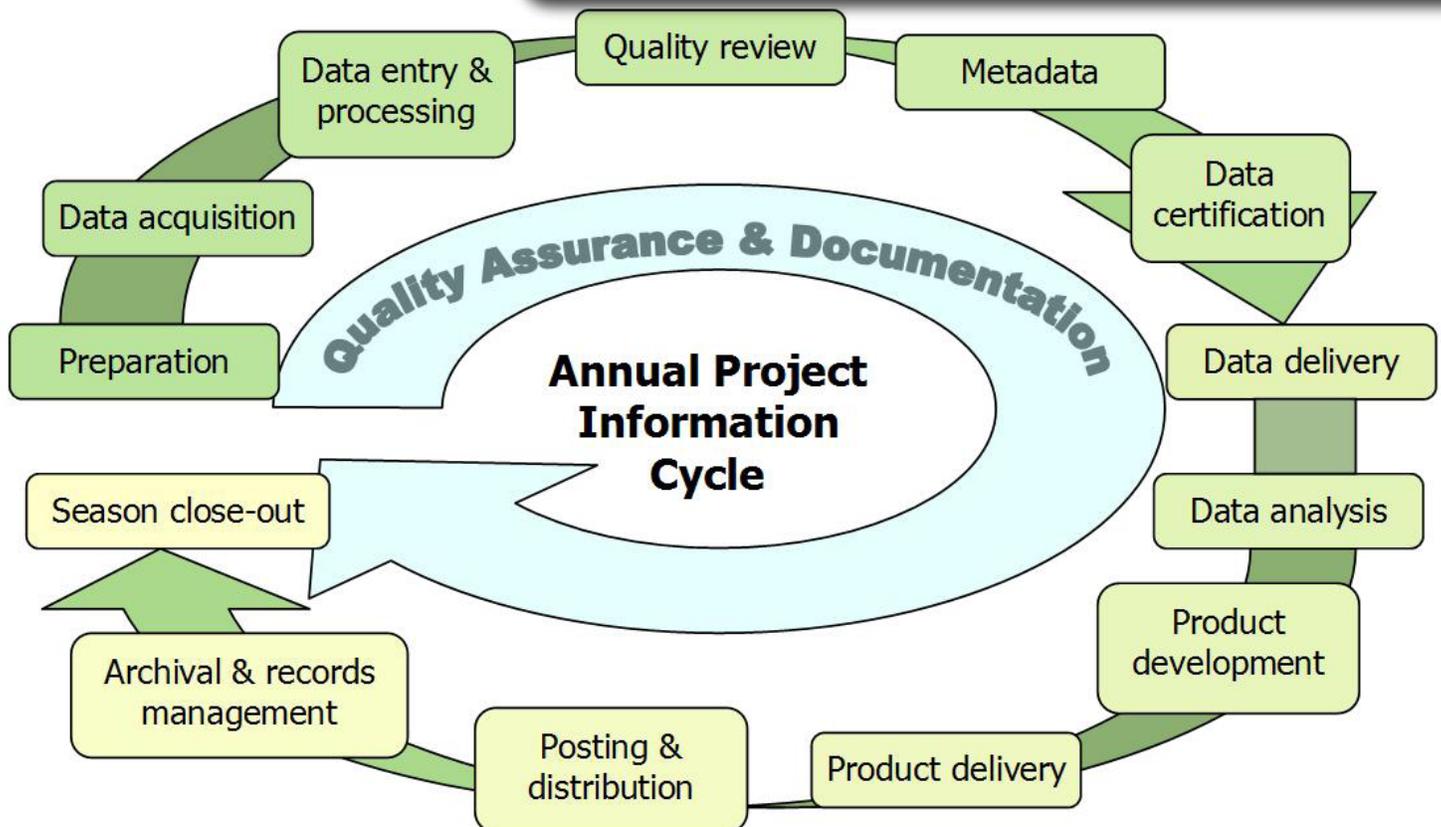
The PACN Data Management

Plan: Information is the common currency among the activities and staff involved in the stewardship of natural resources for the National Park Service. The PACN Data Management Plan is a guide for current and future project leaders and PACN staff to ensure the continuity and documentation of data management methods and procedures over time. The Data Management Plan, in turn, refers to other guidance documents and standard operating procedures which convey the specific standards and steps for achieving the network's data management goals.

Project data management may be best understood as an ongoing or cyclic process, as shown in the figure below.

The stages of this cycle are summarized as follows:

- **Preparation** – Training, logistics planning, print forms and maps
- **Data acquisition** – Field trips and data mining to acquire data
- **Data entry & processing** – Data entry and uploads into the working copy of the database, GPS data processing, etc.
- **Quality review** – Data are reviewed for quality and logical consistency
- **Metadata** – Documentation of the year's data collection and results of the quality review
- **Data certification** – Data are certified as complete for the period of record
- **Data delivery** – Certified data and metadata are delivered for archiving and uploaded to the master project database
- **Data analysis** – Data are summarized and analyzed
- **Product development** – Reports, maps, and other products are developed
- **Product delivery** – Deliver reports and other products for posting and archiving
- **Posting & distribution** – Distribute products as planned and/or post to NPS clearinghouses
- **Archival & records management** – Review analog and digital files for retention (or destruction) according to NPS Director's Order 19. Retained files are renamed and stored as needed.
- **Season close-out** – Review and document needed improvements to project procedures or infrastructure, complete administrative reports, develop work plans for the coming season



Idealized flow diagram of the cyclical stages of project data management, from pre-season preparation to season close-out. Note that quality assurance and documentation are thematic and not limited to any particular stage.

For more information, the PACN Data Management Plan can be accessed online at: <http://www1.nature.nps.gov/im/units/pacn/data.cfm>