



# Pacific Island Network Quarterly

Quarterly Newsletter of the  
Pacific Island Network  
Inventory & Monitoring Program  
Jan - Mar 2008, Issue no. 11

## Fire and ice on Hawaii's mountains



Hawaii's mountains continually alter and stress their environments. From sub-zero winter peaks to over 1000 degree Celsius lava flows, these mountains keep everyone looking up.

### Photos from top to bottom:

- ☼ Mauna Kea covered in a winter snowfall
- ☼ Kilauea continues to spew lava near the ocean
- ☼ Elevated steam and sulfur dioxide emissions at Kilauea's summit in Hawai'i Volcanoes NP
- ☼ ʻĀhinahina or silversword (*Argyroxiphium sandwicense macrocephalum*) dusted in snow at Haleakalā NP
- ☼ Background photo: snow-capped Mauna Loa

### Notes from the Field, pg. 4

Adam Miles recounts his work on the islands of American Samoa as he studies flying foxes in preparation for a long-term monitoring program.

### Featured Resources, pgs. 6-7

This issue features two exciting Vital Signs monitoring protocols: Landbirds and Water Quality.

### Critical Issue, pg. 8

A resource database called NatureBib may save your life one day... Well, maybe not, but it could make your natural resources research much faster and easier.

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# Hot Topic

## Sulfur dioxide (SO<sub>2</sub>) at the summit 10 times 2007 levels

Halema'uma'u crater is showing us a glimpse of power. Located within Kilauea caldera at UNESCO World Heritage site Hawai'i Volcanoes National Park, the crater is presently undergoing some dramatic geologic changes. Since December of 2007, SO<sub>2</sub> (and other) emissions from Kilauea summit increased from a daily minimum of 150 tonnes to more than 2000 tonnes. Due to the potential of current emission levels adversely affecting the respiratory health of park visitors and staff, the south & west expanses of Crater Rim Drive have been closed until further notice. Emergency evacuation plans for the park are also being reviewed and engaged in case of a volcano-related hazard.

Even more ominously exciting is the appearance of red hot incandescence and lava from a new gas vent in the crater wall. The incandescence (right) began mid-March.

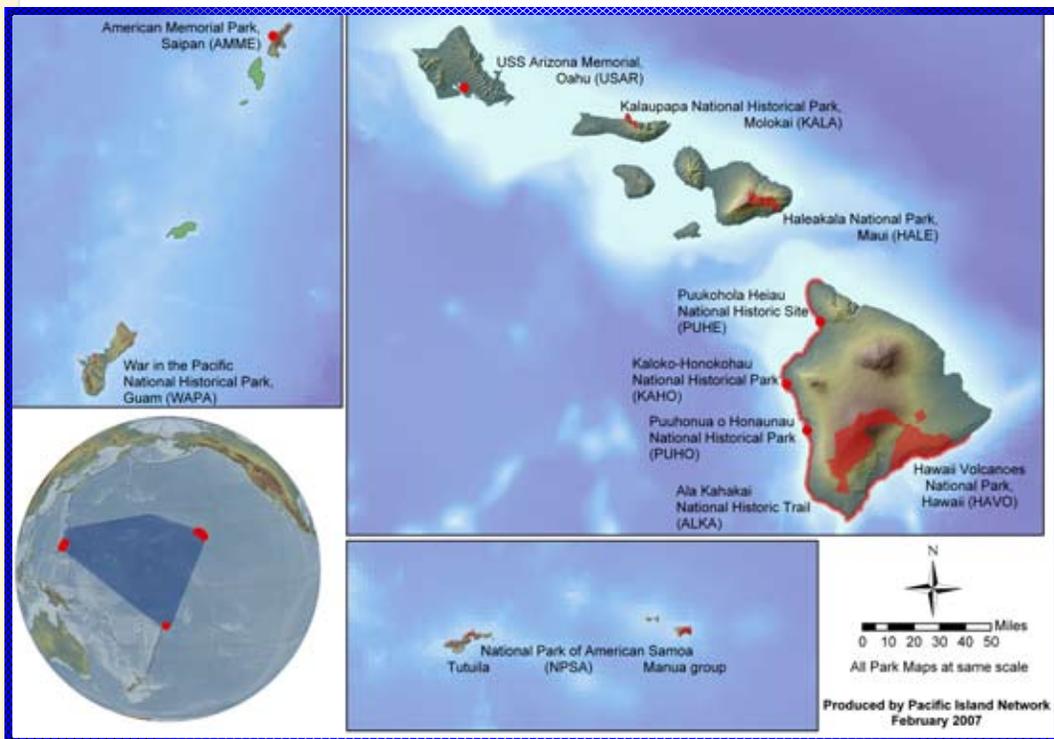
During the active and spectacular history of Kilauea, this crater has served as a fo-

© Charlene Meyers



cal point of spirituality and volcanic activity. Moreover, geologic history has shown us bubbling pools and magnificent fountains of lava from this section of Kilauea. Although the crater has been fairly quiet in recent decades, it is unclear what may be in store for us now.

For more information on the latest happenings at Halema'uma'u crater and the rest of Kilauea Volcano, please see the U.S. Geological Survey's Hawaiian Volcano Observatory website at: <http://hvo.wr.usgs.gov/kilauea/>



# Map of the 11 Pacific Island Network park units

# Inventory Update

## Rare plants found in Haleakalā

The Ka'āpahu vascular plant inventory report by Patti Welton and Bill Haus was just published in the Pacific Cooperative Studies Unit (PCSU) Technical Report Series. Ka'āpahu is a 598-ha (1,478-acre) parcel of Haleakalā National Park which was added in 1999. The southwestern portion of Ka'āpahu has a mesic moisture regime at elevations not previously represented in HALE. Mesic forest is defined as a moderate rainfall gradient between wet and dry (rainfall between 122-254 cm [48-100] in/year). The inventory focused on species not found on the park checklist as well as federally-listed and rare native species. Abundance and distribution data were collected on these target species and vegetation associations of the sites in which they were found were described. The inventory, conducted from 2002-04, and results from previous surveys document 292 vascular plant species in Ka'āpahu. Of these 157 (54%) are native, of which 110 are

endemic and 47 are indigenous to the Hawaiian Islands. Of the 135 (46%) non-native species, 12 are Polynesian introductions. Four species listed as endangered and three species listed as

candidates for endangered status by the U.S. Fish and Wildlife Service (USFWS) were found. One species listed by the USFWS as a species of concern was also recorded. In addition, 10 species which are considered rare in the park were documented. The report includes a checklist for all recorded the species in the area. Please see the published report on-line to learn more.

This and many other natural resource reports can be found at the PCSU website: <http://www.botany.hawaii.edu/faculty/duffy/techrep.htm>



The rare *Cyanea asplenifolia* discovered in Ka'āpahu during the inventory is only the second known population in East Maui.



Two populations of the endangered *Huperzia mannii* fern ally were found on two separate ridges.

## Featured Staff

### Leslie HaySmith

Leslie has worked for the Inventory and Monitoring Program, and the National Park Service for nearly four years. She was Network Coordinator for three years, then happily stepped aside to become Wildlife Ecologist for the PACN last year.



She received her B.S. from Western Washington University with a thesis on wildlife harvest by the Cofan/Siona-Secoya in Ecuador, and later attained a M.S. from the University of Florida in Wildlife Ecology. She completed her Ph.D from the University of Idaho on wildlife as ecological and social indicator species in Belize, Central America with a focus

on Mayan indigenous values and adaptive management. She has worked in Latin America, the Caribbean, Florida, the Pacific Northwest, and Hawaii.

Leslie began work in Hawaii 20 years ago by radio tracking mongoose and serving beachside mai tais at the Kona Village Resort. Now for I&M, in addition to task agreements and tedious administration, she is developing the fruit and insect bat monitoring protocols.

She resides with her husband, three kids, and livestock menagerie on their farm in Pahoia on the Big Island.

With chocolate in hand, Leslie sends an "Aloha nui, and hasta luego to all!"



# Notes From the Field - Flying foxes in NPSA



White-naped fruit bat hanging upside-down from a tree branch.

before. As I pulled on my gray I&M t-shirt and cap, I began to long for the instant coffee from the infamous Seaside gas station. From Leone, the town where missionaries built the first Christian church in American Samoa, it would take between one hour to an hour and a half of pot holes and slow mini buses, to reach the much needed instant coffee.

of the coconut crabs subsided. In the intimate moments that I shared with my surroundings, I realized a deeper connection between myself and the creatures I had been sent to study. Frequently the natural world cannot be confined to the columns and rows of our data sheets.

— A. Miles & S. Welch

**The alarm sounds. Darkness all around.** I hit snooze. Sleep. Snooze again. The bats would not wait. The White-naped fruit bats (*Pteropus tonganus*) would soon return to their collective roosts, as the Samoan fruit bats (*Pteropus samoensis*) would just be rising to start a new day.

As I splashed my face with frigid water, my heavy eyelids wondered how I would make it through a long day of field work. I heard my stomach churn and momentarily longed for a taste of the palusami (taro leaf and congealed coconut milk) I had eaten for dinner the night

When I finally arrived at the beloved fuel stop, the coffee was hot and the customer service was cold. But who could blame these groggy teenagers at five in the morning?

My dented rental car continued to rattle over uneven pavement until I reached my destination: a grassy spot on the side of the road in the seat of Amalau Valley. The sky was just fading from a dark indigo to a pale powdery pink as I doused my exposed neck and forearm skin in 100% DEET. The first flying fox appeared on the horizon.

In increments of ten minutes I counted the bats that soared from tree to tree. They were sampling the fruits of the *Palaquium stehlini* and *Syzygium inophylloides* while chasing one another flirting, and fighting in the day's first rays shining through the clouds. During the five minute breaks between counts, I sipped my dark, non-drip, brewed crystals, the caffeine stimulating my senses with every swallow.

During the seventh count I peered through my binoculars at a *Pteropus tonganus*, grooming its white nape. I watched as the mammal released a clump of guano onto the snag from which it hung.

Quiet. The call of the boobies and the rustle

*Monitoring for both fruit bat species will be conducted primarily on Tutuila and Ta'u islands. Long-term monitoring of these species in NPSA is critical to documenting population changes and identifying environmental stressors that affect population and habitat.*



Adam readies fruit bat surveying equipment such as the spotting scope (top) as a flying fox glides overhead. Binoculars, spotting scopes, and other essentials are indispensable tools for counting fruit bats in the National Park of American Samoa.



Accompanying researcher Adam Miles (right) on a fruit bats scoping study are Dr. Don Drake (UH Mānoa), and field assistant Suzannah Welch (middle).

# Outreach and Staffing Update

I&M would like to welcome Stephen Prokop, the new superintendant at Kalaupapa National Historical Park to the PACN. Superintendent Prokop joins us from Cape Cod National Seashore, Mass. He is expected to arrive on Moloka'i in April and is excited to begin working with the greater Kalaupapa community.

On a somber note, Fale Tuilagi, a biotech at NPSA, passed away. He will be missed by many.

## Outreach

Many projects are underway including the creation of five Vital Signs videos (Water quality, Seabirds, Fruit bats, Climate, and Freshwater animals). These videos should be completed and available for download on the PACN website by late spring.



Perhaps the biggest news for outreach is the creation of a science communications plan for the network. This plan will serve as a template for all aspects of PACN science communications and outreach for years to come. The plan is currently in draft and will be submitted to the Board of Directors for review in summer 2008.

## Staffing Update

**NPS:** The Program manager position was advertised in late January and early February.

I&M is looking for an experienced and visionary new network leader to continue guiding us down the path toward fulfilling our obligations and reaching our network goals. Hopefully, by the next newsletter, we will have a solid update on this position.

The PACN Data manager, Kelly Kozar, has advertised a position for a Database programmer to join her dynamic data team.

Anne Farahi joins the PACN aquatic team as a volunteer. Anne is familiar with Hawai'i national parks as she volunteered with the HAVO turtle project for nearly a year before joining us. We

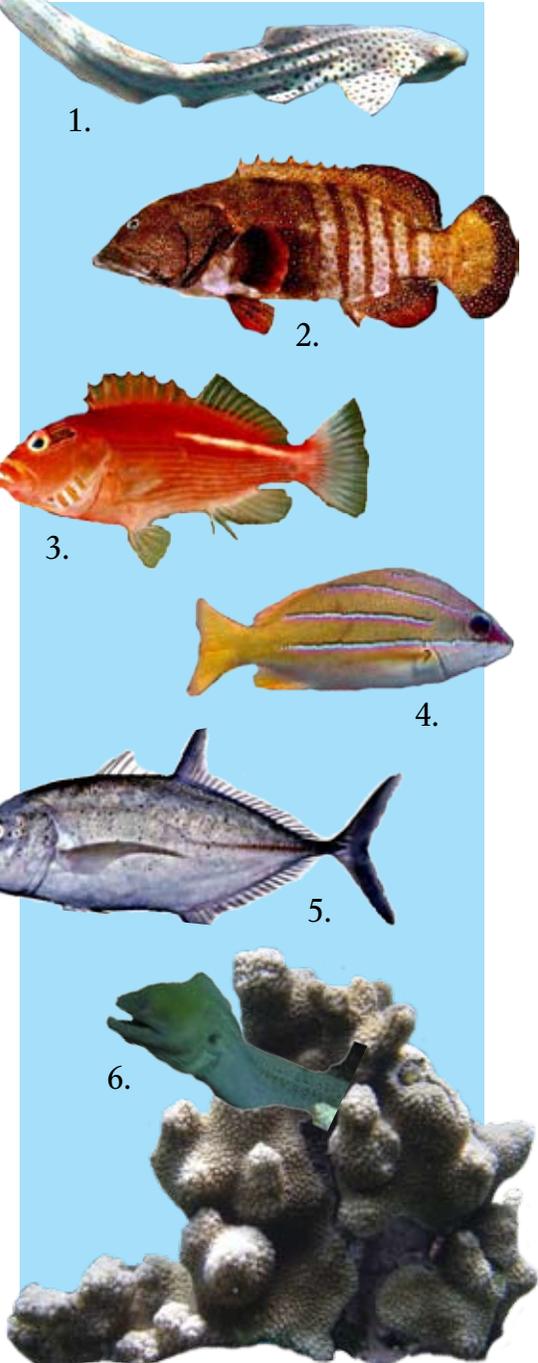
are looking forward to working with her on projects ranging from water quality sampling to outreach and field activities.

**CESU:** On the cooperator side of the I&M equation, the network is actively seeking an Ecological monitoring database application specialist based out of the HAVO office to work on data collection, management, GIS, and other aspects of data handling for Haleakalā National Park and Kalaupapa National Historical Park. This position will include opportunities to travel and experience some of the PACN's amazing natural and cultural areas. We expect the position to begin in May or June.

# Games Corner

## Fish fishing for fish

There are many predators on the coral reefs. Below are just a few. Can you identify them before they identify you? (Note: not to scale)



ANSWERS:

- 1= zebra shark (*Stegostoma fasciatum*)
  - 2= peacock grouper\* (*Cephalopholis argus*)
  - 3= Arc-eye hawkfish (*Paracirrhites arcatus*)
  - 4= bluestripe snapper\* (*Lutjanus kasmira*)
  - 5= bluefin trevally (*Caranx melampygus*)
  - 6= giant moray (*Gymnothorax javanicus*)
- \*indicates species introduced to Hawaii

## Calendar January - March,

- January 7-11 and 28-30 = I&M staff attended interpretation and environmental education workshops on Maui
- January 31-Feb. 3 = I&M staff attended budget training in Denver, CO
- February 10-16 = I&M staff attended Water Quality conference in Ft. Collins
- February 11-15 = I&M staff attended Sql server training on mainland
- February 11-15 = I&M staff travelled to NPSA for fruit bat field study
- March 4-5 = Steering Committee meeting at HAVO
- March 6-7 = Vegetation mapping meeting at HAVO
- March 11-13 = NPS agreements training in Hilo
- March 31- April 3 = I&M staff attended Data management conference in Ft. Collins, CO



## Landbirds Monitoring

### Network Parks Where Resource Is Monitored

- ✦ Haleakalā National Park (HALE)
- ✦ Hawai'i Volcanoes National Park (HAVO)
- ✦ National Park of American Samoa (NPSA)

### Importance: Ecological Driver and Indicators

Birds are the principal, and sometimes only, native terrestrial vertebrates on islands. Largely free from factors that limit bird populations on continents, the Pacific islands were originally bird havens. Two characteristics of island bird communities are: (a) population densities are often higher than on continents, and (b) island birds have lost some defenses to agents that may exploit them. Furthermore, from their position at or near the top of the terrestrial food chain, birds more strongly influence ecological processes on islands than on continents as consumers, pollinators, and seed vectors. Lastly, with enough time, bird populations marooned on islands inevitably evolve. Consequently, island bird communities are composed overwhelmingly of endemic species. Since humans started settling Pacific islands and introduced alien species, the biota of islands continues to become more continental in composition, invariably to the detriment of native birds. However, hope remains for Pacific island birds where they can escape alien threats, be assisted by management of ecosystems, or can ultimately adapt to novel pressures.

### Long-Term Monitoring

There is an extensive legacy of surveying terrestrial birds, collectively known as “landbirds,” in Hawaii and the South and West Pacific. These surveys have used distance-sampling methods – allowing for estimating actual densities and abundances, and for tracking trends and species composition patterns. Monitoring surveys of native and non-native landbirds will occur during peak vocalization periods using point-transect sampling methods. In addition, habitat measurements will be taken at bird sampling stations. The collection of habitat data and co-location (simultaneous gathering of data for multiple monitoring protocols) will tie bird status and trends into vegetation and landscape monitoring. This will provide valuable information for policy decisions by park management.

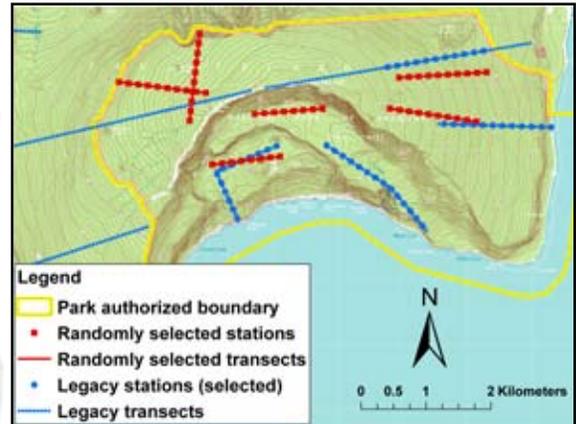
### Monitoring Objectives

- ✦ Determine long-term trends in species composition, distribution, and density of native and non-native forest landbird species.
- ✦ Monitor changes in species composition and density of native and non-native forest landbird species relative to management activities.

### Management Applications

- ✦ Document trends in landbird species composition and distribution within the parks.
- ✦ Quantify long-term trends in landbird abundance within the parks.
- ✦ Identify trends in landbird populations relative to habitat features and change.
- ✦ Assess changes in landbird composition and abundance relative to management activities.

— R. Camp



Example potential location of landbird sampling stations within NPSA (Ta'u island). Transects are traversed on foot, and distances to all birds observed at sampling stations are recorded. Legacy (fixed historical) stations (●) are sampled on each survey occasion, whereas randomly chosen stations (■) will change.



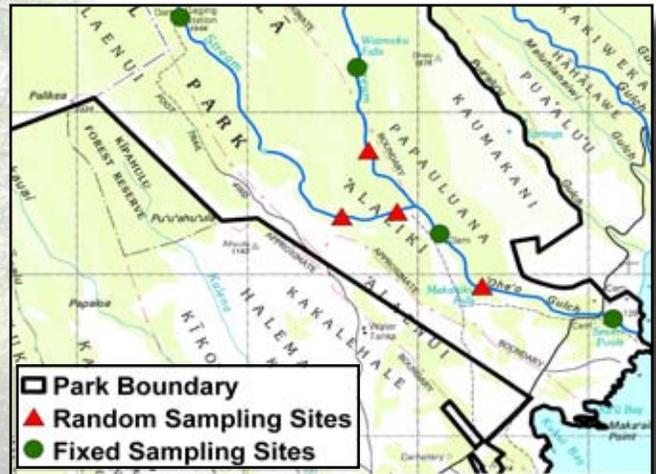
A sample of the native landbirds whose status will be monitored in the PACN. **From top:** i'iwi (*Vestiaria coccinea*), Pacific pigeon (*Ducula pacifica*), cardinal honeyeater (*Myzomela cardinalis*), Hawai'i 'amakihi (*Hemignathus virens*), collared kingfisher (*Halcyon chloris*). **Background photo:** Although not monitored by the PACN, the Hawaiian hawk (*Buteo solitarius*), is a vital component of the Hawaiian avifauna.



## Water Quality Monitoring

### Network Parks Where Resource Is Monitored

- ◆ Haleakalā National Park (HALE)
- ◆ War in the Pacific National Historical Park (WAPA)
- ◆ American Memorial Park (AMME)
- ◆ Kaloko-Honokōhau National Historical Park (KAHO)
- ◆ Kalaupapa National Historical Park (KALA)
- ◆ National Park of American Samoa (NPSA)
- ◆ Puʻuhonua o Hōnaunau National Historical Park (PUHO)
- ◆ Puʻukoholā Heiau National Historic Site (PUHE)
- ◆ Ala Kahakai National Historic Trail (ALKA)



### Importance: Clean Water Is Necessary For Life

PACN park waters supply island communities with water for drinking and domestic uses, crop irrigation, and recreation. Precipitation that collects in park watersheds feeds anchialine pools and streams and eventually runs into the ocean. Clean water is a requirement for healthy organisms and the ecosystems they create and inhabit. Some threats to water quality include: urban runoff, chemical and nutrient contamination, temperature change, and sedimentation. Contaminants make water unsafe for human and animal consumption and create unsuitable habitat for aquatic organisms. High temperatures and turbidity alter the water's ability to support life.

Example of fixed and random water quality sampling sites in the Kīpahulu area of HALE.

### Long-Term Monitoring

The Water Quality Monitoring Protocol was field tested in KAHO, PUHO, PUHE, KALA, AMME and WAPA. Bi-monthly sampling trips in HALE have been on-going since April 2007 and have proven successful. Two person crews, led by the PACN Aquatic ecologist or Aquatic biotechnician, hike up the stream or nearby trails to locate selected sampling sites where physical measurements (temperature, pH, turbidity, salinity/conductivity, dissolved oxygen, and chlorophyll) and water samples for nutrient analysis are collected. Habitat information, photographs, GPS waypoints, date, and time are recorded to help in data interpretation. Monitoring of fixed and random locations will provide the NPS with the ability to characterize the water quality of the entire watershed, and compare changes in water quality in the parks over time.

### Monitoring Objectives

- ◆ Identify trends in physical and chemical water quality parameters
- ◆ Determine compliance with federal, state, and local water quality regulations

### Management Applications

- ◆ Identify park waters in compliance with relevant water quality regulations
- ◆ Document long-term trends in water quality parameters
- ◆ Document effects of management actions on water quality
- ◆ Provide warnings for management on deteriorating water conditions

— T. Jones & D. McKay



Water throughout the PACN is monitored in its many forms (streams, nearshore marine environments, estuaries, and brackish water pools).





## NatureBib: The One Stop Source for Park Resources

*Looking for an article about coral disease in American Samoa or limestone forests on Guam, but don't know where to find it? Need to find a reference for shorebirds at Pu'uuhonua o Hōnaunau National Historical Park? Interested in seeing published and unpublished research conducted in your national park? Do you have historical documents and maps that should be shared with other resource managers, but don't know a way to share these resources? Wouldn't it be great to have a place where NPS employees and contractors could find and store all of this information and more? There is such a place. It's called NatureBib.*

NatureBib, the Natural Resources Bibliography for the National Park Service (NPS), is not meant to be a general bibliography for every resource users may desire. However, it is a storehouse of research and materials directly associated with national parks. Maps, conference proceedings, published and unpublished reports, articles, correspondence, and more can be found among its 20,000+ citations. Citations can also be linked to other helpful databases such as NPSpecies (biodiversity database for protected areas administered by the NPS).

NatureBib is an online bibliography for NPS employees and contractors. In the future, NatureBib will be made available to the public, but right now any NPS employee can request a login (contact your data manager) to access the database or add citations on the website or desktop version. However, not all citations can be accessed by all users. Sensitive materials (e.g., locations of endangered species, vulnerable cultural sites) can be restricted to a particular park or network and its employees.

The database can be easily queried in a number of ways. If you are doing a general search, you can search by keywords, by words in the title of the citation, by author(s) names, by publi-

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copy of the desired document. In this case, someone who wants access to the document can request a copy from the listed source. This is another way in which sensitive information can be controlled and properly apportioned by park personnel.

Adding citations to the database is a simple exercise. Just click on the "add citation" tab at the top of the window, choose a workform (e.g., book, book chapter, published report, etc.), and start typing in your information. If you run into questions, there is a help menu on the left side of the window that can assist you with data entry, workform type, searching options, and how to create reports. There is even a Spanish language help button.



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You can find more information, including a user's guide, at this website: <http://www.nature.nps.gov/nrbib/index.cfm>



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