



PBIN: Enabling Citizen Science

Traditional knowledge and modern science come together to enable biodiversity management at all levels of society.

Traditional Ecological Knowledge

Resource management, with an emphasis on a Hawaiian sense of place, is a relatively recent movement that has been gaining momentum. There is growing recognition that traditional ecological knowledge has value in maintaining and restoring ecosystem function. When combined with Western science, traditional practices can add substantially to the capacity for sustainable resource management of Hawaii's natural resources.



“He ali'i ka 'aina;
he kauwa ke kanaka”
The land is a chief; man is its
servant. (Pukui, 1983)

Adopting traditional values and practices for application toward resource conservation requires

a holistic approach that involves the broader social structure, reaches out through education, and taps into the knowledge held by elders within the community.

The NBII Pacific Basin Information Node (PBIN) supports the acquisition and application of traditional ecological information as it enhances the existing body of scientific knowledge and emphasizes community involvement in conservation efforts.

Traditional Hawaiian Values in Resource Conservation

For over a thousand years, the Hawaiian people maintained a sustainable existence upon the most isolated high island chain on earth. The culture developed into one of the most highly organized and productive societies in Polynesia. The social structure revolved around a deeply connected bond between nature and culture. The stars, sun, and moon told the kanaka maoli (indigenous people) when to plant and harvest. The tides and ecological cycles determined the fishing season. Hawaiians recognized the impacts human activity had on ecosystems and instituted a complex land management system, to mediate a balance between the



Photo credit: Derek Masaki, PBIN

Restoring the native vegetation at Kanaha Beach has stabilized the beach, created a model of a native Hawaiian beach ecosystem, and serves as a case study for native plant restoration projects.

demands of a sophisticated society and the health of the environment on which they were dependent. In each land division (ahupua'a) a high ranking official (konohiki) served as land steward, ensuring community compliance with the law.

Modern society has brought substantial change to the relationship between human culture and nature in Hawaii. Present-day culture has separated social relationships from local contexts. People living in the islands are no longer wholly dependent upon the land for food and survival. Most individuals have become distant from the natural cycles of the tides and seasons. The separation between human culture and nature has been

Photo credits: Derek Masaki, PBIN



From left to right: Limu survey; traditional wet taro lo'i; water sampling; restored beach naupaka, taking GPS points for plant survey.

accompanied by degradation of once thriving ecosystems. Many of the reefs surrounding the main Hawaiian islands no longer support bountiful schools of fish. Forests have been lost to development. Hawaii leads the nation in numbers of extinct plant and animal species. The introduction of community based action and traditional land management practices is one attempt to reverse the decline of Hawaii's environment.

Na Kupuna, Na Makua, Na Opio (Past, Present, Future)

The transfer of traditional values requires cohesion and continuity within a community. Information in a traditional Hawaiian system is passed on through oral history. The elders (Na Kupuna) held the traditions, conveying the collective knowledge on to the present generation (Na Makua), with the intent that the prosperity of the land would eventually be passed on to future generations, the youth (Na Opio).



Engaging the community helps to create a continuity of effort that extends through the generations and makes it possible to develop long-term management strategies.

Within modern society, teachers and professors are often the hubs of local community networks. Professional instructors are modern day kupuna, capable of reinforcing values and ethics. The role of teachers is of particular importance in that they are in large part responsible for passing on the values that will shape the next generation.

The National Biological Information Infrastructure (NBII) <www.nbii.gov> is a broad, collaborative program to provide increased access to data and information on the nation's biological resources. The NBII links diverse, high-quality biological databases, information products, and analytical tools maintained by NBII partners and other contributors in government agencies, academic institutions, non-government

organizations, and private industry. NBII partners and collaborators also work on new standards, tools, and technologies that make it easier to find, integrate, and apply biological resources information. Resource managers, scientists, educators, and the general public use the NBII to answer a wide range of questions related to the management, use, or conservation of this nation's biological resources.



Photo credit: Derek Masaki, PBIN

Since GPS units do not work underwater, a clever person designed a way to tow the unit above divers on the reef survey teams.

Citizen Science

PBIN is actively involved within the community to promote student awareness of science, with an understanding of the importance of monitoring and an appreciation of the environmental issues that currently confront Hawaii. USGS staff have assisted with the training of instructors and students at the K-12 and University level, offering courses in Geospatial Information Systems, Geography, and the use of GPS technology.

PBIN has been providing ongoing technical support for online distribution of the Ho'ike o Haleakala secondary school science curriculum. This curriculum was designed for Hawaiian students using the ahupua'a model and Hawaiian examples to illustrate ecological principles. This gives students an understanding and awareness of their local environment and issues while teaching general biology and ecology concepts.

In Hawaii, PBIN is currently involved with several place-based learning projects. Staff from PBIN recently sailed on the Hokule'a, serving as science support team members with the Malama Maunalua program. Malama Maunalua is a community-based initiative dedicated to enhancing the ecology and cultural value of the Maunalua region on Oahu, introducing students to the unique cultural and natural features of the area.

Another collaborative partnership has been with Malama Piko'i, a project run out of the University of Hawaii at Manoa that centers on improving school performance of Native Hawaiian children in the fields of science and math by emphasizing traditional Hawaiian cultural practices. On Maui, PBIN staff have provided technical support to the Maui Digital Bus, a program that brings technology to school children through environmental field projects. All of the projects and programs in which PBIN is involved attempt to instill traditional values of conservation and land care into the youth of Hawaii, Na Opio o Hawaii.

For More Information

Dr. Mark Fornwall
NBII/PBIN Node Manager
Phone: 808-984-3724
E-mail: mark_fornwall@usgs.gov

Mr. Derek Masaki
NBII/PBIN Technical Trainer
Phone: 808-984-3721
E-mail: dmasaki@usgs.gov

Find us on the Web at:
<<http://pbin.nbii.org>>.