

## **The evolution of the Pacific-Asia Biodiversity Transect Network (PABITRA) in the Pacific Science Association**

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**Abstract**— At the 21st Pacific Science Congress in Okinawa (June 2007), we celebrated the first ten years of PABITRA, the Pacific-Asia Biodiversity Transect Network. PABITRA is a grass roots effort of a group of conservation scientists that presents a significant departure from earlier efforts in ecology and conservation to fulfill the mission of the Pacific Science Association (PSA). This departure goes beyond the usual means of scientific communication as it actively encourages and involves resident Pacific Islanders in biodiversity assessment of their own renewable resources. It aims at empowering them to work with scientific methods through hands-on experience in cooperation with established conservation scientists. The principal objectives are mutual capacity building with work along selected ecosystem transects aiming to answer scientific questions and to fulfill practical needs. This introductory paper discusses four main points: a brief history leading to PABITRA; the PABITRA concept; the PABITRA track record; and PABITRA's long-term goals.

### **Introduction**

#### A BRIEF HISTORY LEADING TO PABITRA

In 1975, during the 13th Pacific Science Congress in Vancouver, B.C., I inherited the chairmanship of the PSA committee on Ecology, Conservation, and Environmental Protection (ECEP). Under the leadership of Dr. Lee Talbot, the ECEP had become one of the well-established interdisciplinary science committee's in the PSA. The task of the ECEP was to bring together and review Pacific conservation activities in scientific symposia at the PSA congresses and inter-congresses, which normally take place at two-year intervals. Concurrently the ECEP was expected to act as a "watch dog" on environmental issues impacting the Pacific region.

Between congresses, the ECEP became involved several times in this watch dog activity. For example, in 1979, when the US and Japanese governments contemplated storing nuclear waste on Palmyra Island, our ECEP letter-writing campaign and subsequent testimonials presented at a governmental meeting in Honolulu, helped to avert such a disastrous plan. Also, when a California logging company (Biopower Corporation) started to cut native lowland rain forest in Hawai'i for electricity generation in 1983, a vigorous counter campaign, aided with science-based input, helped to stop this ill advised effort in 1984. A

resolution developed during the 5th PSA Inter-Congress in Manila (1985) drew further attention to this disastrous mistreatment of the Hawaiian rain forest. A total reversal of public perception about the need of conserving Hawai'i's unique biological resources and ecosystems began thereafter in the late-1980's.

A new ECEP program was developed for the 14th Pacific Science Congress in Kabarovsk (1979). This program was to cover the full spectrum of the ECEP focus in four themes: Ecological inventories and mapping of biodiversity in Pacific ecosystems, research on dynamic processes in Pacific ecosystems, appropriate methods for monitoring Pacific ecosystems, and application and conservation activities

Pacific ecosystems were broadly defined as islands, coastal ecosystems, and the open ocean. The new program worked well for Kabarovsk, where much of the Russian research effort was focused on how to protect the coastal environment from oil spills in the open ocean. The program worked equally well at the following PSA congresses. For example, in Dunedin (1983) our main focus was on research of dynamic processes in Pacific forests, the second ECEP theme. The other themes were also addressed. At each of the congresses that followed on Kabarovsk, the four themes drew an adequate number of contributions and led to five milestone publications:

1983 "Canopy Dieback and Dynamic Processes in Pacific Forests" (Pac. Sci. 37 (4) with 17 contributions).

1988 Geojournal 17 (2) "Forests of the World" (with 23 contributions).

1992 Pac. Sci. 46 (2) "Vegetation Ecology of the Pacific Islands" (with 11 contributions).

1993 Springer book "Forest Decline in the Atlantic & Pacific Regions" (with 27 contributions) based on a symposium held at the 17th PSA Congress in Honolulu, edited by Huettl & Mueller-Dombois.

1998 Springer book "Vegetation of the Tropical Pacific Islands" by Mueller-Dombois & Fosberg. This book arose through the ECEP focus and the long-term involvement of the authors in the PSA.

#### THE PABITRA CONCEPT

Several scientific task forces were created in the PSA during the Honolulu Congress in 1991. The ECEP was to become the Ecosystem Division in the Scientific Task Force on Biodiversity. Charged with this new mandate, the PABITRA concept was initiated in Fiji at the 8th PSA Inter-Congress (Kitayama & Mueller-Dombois 1997). The concept evolved further during the 1998 Inter-Congress in Taipei (Mueller-Dombois et al 1999). It presents a significant departure in line with the new emphasis on task forces in the PSA. Following are the three outstanding elements of the PABITRA concept:

- PABITRA emphasizes mutual capacity building through community-based field workshops and networking with resident Pacific islanders.
- PABITRA promotes a two-way transect strategy for island ecosystem studies and biodiversity assessment.

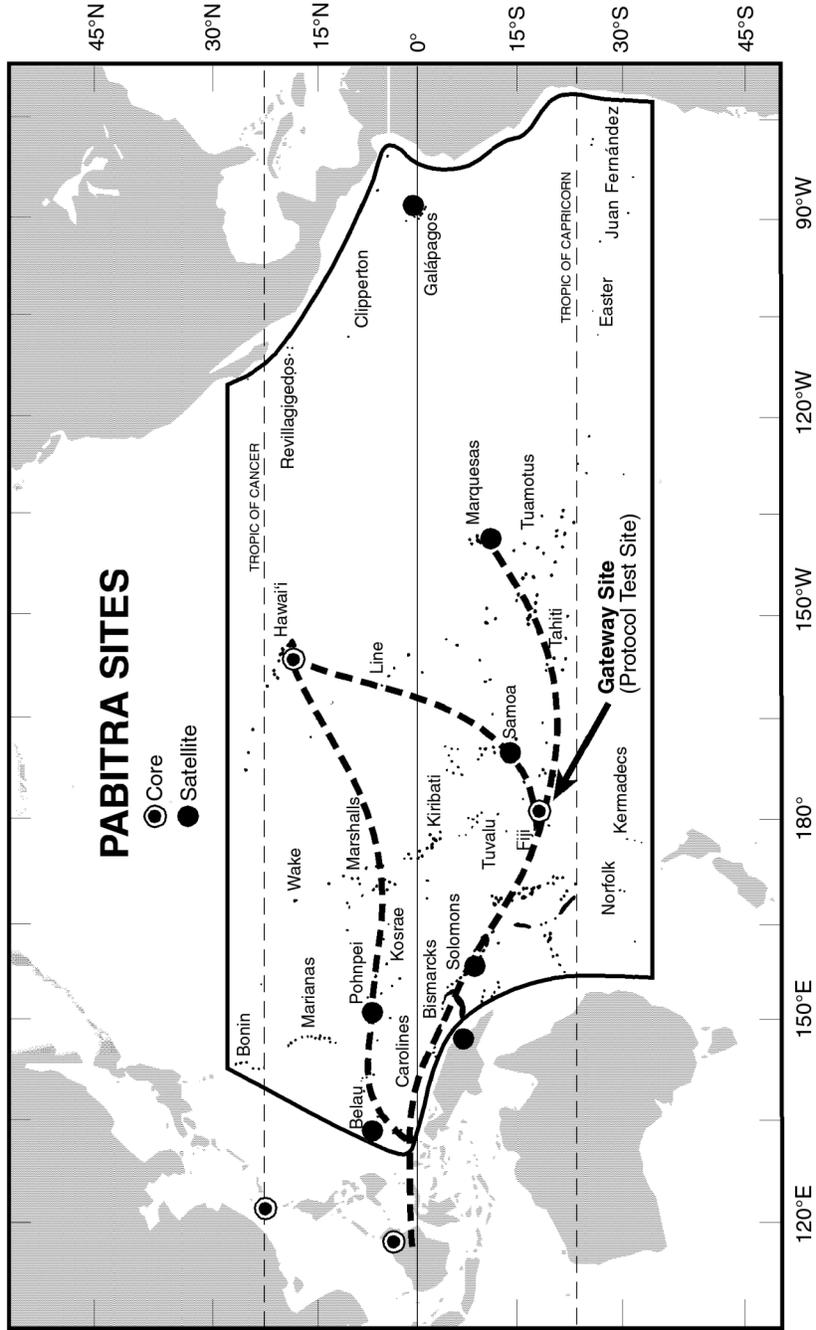


Figure 1. The PABITRA transect system across the tropical Pacific as projected during the first ten years, 1997-2007.

- PABITRA incorporates the four-part program of the former ECEP committee.

Mutual capacity building is based on four premises: Approaching indigenous island cultures with respect for their evolution under the restraints of isolation, arranging for community-based field work through a local PABITRA coordinator, building on indigenous knowledge with western scientific methods, and emphasizing exchange of knowledge in an atmosphere of mutual trust. PABITRA's two-way transect strategy includes:

- A horizontal strategy of cross-island ecosystem studies within the same biome (Figure 1). Such biomes include inland/upland forests, agro-ecosystems, coastal communities and other ecosystems which are normally present on all high islands.

- A vertical strategy of within-island studies from inland/upland forests to coastal saltwater ecosystems patterned after the Hawaiian ahupua'a human support system (Figure 2).

#### THE PABITRA TRACK RECORD

In contrast to the former ECEP program in which members participated with funding from their own research projects or institutions, the success of PABITRA depended on extramural funding through grant writing. This clearly required considerable and additional effort. An initial grant was received for set-up funding of PABITRA from the MacArthur Foundation in 1998. With this funding it was possible to invite like-minded island conservation scientists to structure the PABITRA Net in successive workshops:

(1) At the 8th PSA Inter-Congress in Taipei (1998), where site selection criteria and a list of islands for PABITRA transect sites were outlined together with contact persons. A PABITRA web site was thereafter established, which now has been active for nine years at [www.botany.hawaii.edu/pabitra](http://www.botany.hawaii.edu/pabitra).

(2) At a PABITRA symposium and workshop during the 19th PSA Congress in Sydney 1999, where a number of proposed PABITRA sites were presented. At this time, also in Sydney, the PABITRA group held a joint workshop with DIWPA (DIVERSITAS in Western Pacific and Asia), a Japanese group of conservation scientists. In 1994 this group had been charged by IUBS and UNESCO to officially represent the international Program DIVERSITAS in that region. DIWPA was pursuing research sites along two longitudinal north-south belt transects, a "green belt" (focusing on forests and lakes) and a "blue belt" (focusing on coastal saltwater ecosystems). PABITRA was invited to be DIWPA's sister network by complementing DIWPA with PABITRA's focus on the east-west belt of Pacific islands in the tropical/subtropical realm.

(3) A draft protocol manual was prepared for standard methods of DIWPA's biodiversity assessment program. PABITRA was invited to contribute a chapter on methods to be used for quantitative vegetation surveys in island ecosystems. It was thereafter published as Chapter 5 "Research Methods to initiate PABITRA: the Island Branch of DIWPA" in a 2002 Kyoto University Press book entitled



transect in Viti Levu's wet zone from Mt. Tomaniivi to near shore coastal habitats.

From 2002 through 2007 new funding for PABITRA was derived through three successive grants received from the Asia-Pacific Network for Global Change Research (APN) in Kobe, Japan. APN became our new partner in funding of the major PABITRA activities. These activities involved two on-site field meetings each in Fiji, Samoa, and Palau. Each grant allowed for an "Initial Synthesis Meeting" and a follow-up field training workshop stipulated as "Joint Analysis Meeting."

Through networking via the Internet, the meetings were thoroughly prepared by assembling existing background information with data sets wherever available. A local PABITRA coordinator contacted his or her country's government agencies and invited land managers, teachers, politicians, and university students as participants. The local coordinator also prepared the logistics according to a mutually agreed upon meeting agenda and budget.

All workshop meetings are discussed in detail in reports on the PABITRA web site. The "Joint Analysis Meetings" in form of field training workshops are also each summarized and illustrated on a two-paneled poster for Fiji, Samoa, and Palau. The posters show the locations of the PABITRA transects established on the islands of Viti Levu in Fiji, Savai in Samoa, and Babelduap in Palau. They list the names of all participants, show photos of field scenes and activities and the certificates of participation presented at the conclusion of each field workshop. The posters are accessible on the PABITRA web site.

APN grant money also helped to support two additional PABITRA symposia. The first took place at the 20th PSA Congress in Bangkok 2003. This symposium was published in *Pacific Science* Vol. 59 No. 2 in 2005 with the title "The PABITRA Project: Island Landscapes under Global Change." Of the 13 contributions, six were from Fijian PABITRA members. Recently, some leftover money from the 2006/2007 Palau project allowed for supporting two participants from the Palauan PABITRA group to attend our latest PABITRA symposium at the 21st PSA Congress in Okinawa. The papers that follow this one were presented at this Okinawa symposium and represent long term ecological research from mountain to sea.

#### PABITRA'S LONG-TERM GOALS

In conjunction with the field training activities, some PABITRA scientists prepared chapters on methods for biodiversity assessment for tropical island ecosystems and studies of their combined function in island landscapes. These chapters cover the spectrum of ecosystems in the biological resource zones of an inland/upland to coastal landscape as depicted in the Hawaiian ahupua'a life support system. They include the forest ecosystems (*wao nahele*), the agro-ecosystems (*wao kanaka*), the freshwater ecosystems (*kaha wai*) and the coastal saltwater ecosystems (*kaha kai*). The methodological approaches have been discussed repeatedly at indoor seminars and applied and tested in the field. They

were also offered for review on the PABITRA web site. So far, 13 chapters have been assembled as the *PABITRA Manual for Interactive Ecology and Management under the title Biodiversity Assessment of Tropical Island Ecosystems*. These are currently being published in book form by the Bishop Museum Press of Honolulu, Hawai'i. PABITRA's long-term goals are presented in the first two chapters of this book. They coincide with those of the PSA: (1) to promote and stimulate cooperation and communication in science, (2) to review common scientific concerns, and (3) to strengthen the bonds among Pacific peoples. The more specific goals are to empower resident Pacific island scientists as members of PABITRA to do their own grant writing and to become equal partners in the mainstream of Pacific conservation science.

PABITRA endeavors to become more inclusive in terms of proposed islands and participants, to improve its methods and diversify them as the program continues into the future under new leadership. After 32 years, a generational takeover of the international coordinator task was officially sanctioned at the 21st PSA Congress in Okinawa. This takeover refers to the successional replacement of the writer by Dr. Curtis Daehler, who likewise serves as professor in the Botany Department of the University of Hawai'i at Mānoa. A continuing PABITRA goal is to remain adaptive to new situations incurred by the global change scenarios, but also to remain strong and steadfast in the philosophy of integrative conservation science and its application to work for sustainable island resources.

### References

- Kitayama, K. & D. Mueller-Dombois. 1997. Workshop on Biodiversity Transect. PSA Information Bulletin 49 (1/2): 10-11.
- Minerbi, L. 1999. Indigenous management models and protection of the ahupua'a. *Social Science Process in Hawai'i* 39: 208-225.
- Mueller-Dombois, D., R.R. Thaman, J.O. Juvik, & K. Kitayama. 1999. The Pacific- Asia Biodiversity Transect (PABITRA), a new conservation biology initiative. In C.H. Chow, G.A. Waller, and C. Reinhardt, (eds), *Biodiversity and Allelopathy: From Organisms to Ecosystems in the Pacific*, pp 13-20. Academia Sinica, Taipei.

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