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Technical Assistance Service Contract:
SECA (France) in association with EDG (UK),
GTZ (Germany) and CPRD-DLO (Netherlands)

Printed by: WordShop Specialists Network, Inc.

No. of Copies: 5,000

Disclaimer: Views or opinions expressed herein do not necessarily represent any official view of the European Union, the Association of Southeast Asian Nations (ASEAN) Secretariat, or the Department of Environment and Natural Resources. The authors are responsible for any data or information presented in their articles.

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Readers' Corner



Dear Co-Directors,

We thankfully acknowledge the books, which you have presented to the Siam Society Library.

Through generous donations such as yours, we can meet the Siam Society's objective of research and information gathering on the art, culture and natural science of Thailand and its neighbouring countries, and making this knowledge accessible to its members and the research community.

Sharon O'Toole

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Dear Co-Directors,

ASEAN Biodiversity! a magazine to reckon with. Thank you for sending me the January-March 2002 issue. The foresters here led by my forester-husband have read through it and we all find it very informative and a timely reference for people who are concerned with environmental and biodiversity conservation.

I am involved with community projects here, one of which will be referred to you for assistance and guidance and support.

Kudos for this publication, ASEAN Biodiversity and to the contributors of all topics published. Appreciation is hereby expressed from me, my husband Forester Andres G. Blando and his fellow foresters/environmentalists. Please continue the publication and share some copies with us and other schools and community libraries here.

More power to the staff of ASEAN Biodiversity and all people and organisations/institutions behind the success and continued publishing of said magazine.

God bless our environment.

Florentina S. Vigilia-Blando

Volunteer Worker/Educator
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Dear Co-Directors,

Greetings! We would like to acknowledge the receipt of one copy of "Participatory 3-Dimensional Modelling" with CD-Rom. The book is a welcome addition to the Learning Resources Center's

growing collection.

Your generosity is greatly appreciated.
In Saint Benilde

Ms. Celedonia Cayaban

Director
Bro. Fidelis Leddy Learning
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DLSU-College of Saint Benilde
2544 Taft Ave., Manila
Philippines 1004



Dear Co-Directors

We hereby acknowledge receipt of the following publications:

- ASEAN Biodiversity (Jan-Mar. 2002)
- Participatory 3-Dimensional Modelling (P3DM)- Guiding Principles and Applications

The above publications are of great help and valuable sources of information for our researchers and staff.

Please continue to provide us with your regular publications especially on forestry, forest products utilisation and related fields.

Thank you.

Florence P. Soriano

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Dear Co-Directors,

Greetings! Let me extend my heartfelt gratitude for including me in your mailing list. Thank you also for the very useful and informative "Guidebook of Biodiversity Principles for Developers and Planners", which was sent to me.

I would likewise wish to ask for a copy of the book "Marine Protected Areas in Southeast Asia", which I believe would be a valuable reference material and a useful guide for the conservation of our marine resources. Although I am a student on forest resources, I am interested to know more about other nature conservation issues as well.

Please send me also regularly a copy of your quarterly magazine "ASEAN Biodiversity". Thank you very much and more power to you all.

Glen C. Rojo

Brgy. Igtambo
5025 San Miguel
Iloilo, Philippines

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Dear Co-Directors,

Being a development professional, I am interested to get a copy of your publication "Participatory 3-Dimensional Modelling: Guiding Principles and Applications". Kindly let me know the price of the document so that I can send the payment in advance. In case it is not for sale, please send a copy to my address below.

An early reply in this regard would be very much appreciated.

S.K. Pradhan

Senior Consultant
Centre for Symbiosis for Technology,
Environment and Management
5/172 Viram Khand
Gomtinager, Luckinow – 226010, India

We do appreciate your interest in our publications. With regard to the above-mentioned publication, we would like to inform you that we have appointed the Natural History Book Service) as distributor of ARCBC publications outside ASEAN countries. For details, please visit their website: www.nhbs.com. Again, thank you very much.

Dear Co-Directors,

I would like to take this opportunity to thank all of you in ARCBC for the good educational and conservation works you are doing. On the same note, I would like to thank you for the two issues of ASEAN Biodiversity that I have received, the latest being on Conservation Dividends. These have been very useful to me in my research and teaching. I have also noted with a lot of interest that you often organise conferences, forums and seminars. I have been wondering how I could participate in some of these events. Please advise on how I can become an active participant.

Allow me also to kindly request for these two publications, namely: Guidebook of Biodiversity Principles for Developers and Planners, and Participatory 3-Dimensional Modelling: Guiding Principles and Applications, with the CD.

The above-mentioned publications would immensely help me with my PhD studies on the application of "A Participatory 3-Dimensional Modelling of the Is-

land Biogeography of Nairobi National Park in Kenya.

Last but not least, I would like to know how I can contribute an article in your publication "ASEAN Biodiversity."

Thomas T.B. Yatich

Kenyatta University
Department of Environmental
Planning and Management
P.O. Box 43844, Nairobi, Kenya

Dear Co-Directors,

I have been shown a most interesting report on "Marine Protected Areas in Southeast Asia" that we would very much like to have.

I am the Director of a privately-managed marine protected area in Tanzania, East Africa and I believe we could learn a lot from experiences in Asia.

Could you please send us the publication to the address below. Many thanks in advance.

Sibylle Riedmiller

P.O. Box 130, Tanga, Tanzania

First and second quarter in a nutshell

June 26 – A group of 50 red-shanked douc langurs (*Pygathrix nigripes*) was discovered in the Phong Dien Nature Reserve in Vietnam during a survey of primates carried out by the Centre for Natural Resources and Environmental Studies of Vietnam National University in Hanoi, together with the Thua Thien-Hue Forest Protection Department. This is the biggest group of douc langurs ever found in their natural habitat. The red-shanked douc langur, which lives mainly in the highlands of the tropical forests of Vietnam, Laos and Cambodia, is a rare and endangered species that needs to be protected from large-scale hunting and logging. This pretty primate usually lives in groups of between five and 10 individuals.



A male Gurney's pitta
Photo by P.D. Round, courtesy of BirdLife International

June 6 – BirdLife International announced the **rediscovery of Gurney's pitta** (*Pitta gurneyi*) in southern Myanmar 89 years after the last of its species was seen. Gurney's pitta is a brilliantly coloured secretive bird of the forest floor and is known in peninsular Thailand and adjacent southern Tenasserim, Myanmar. The discovery was made by a team of conservationists from BirdLife International, the Bird Enthusiasts and Nature Conservation Association, and the Myanmar Department of Forests during a month-long survey of lowland forests in southern Myanmar. Gurney's pitta is close to extinction and is classified on the IUCN-World Conservation Union Red List as critically endangered. BirdLife says that the last confirmed record of Gurney's pitta from Myanmar was in 1914. These birds occur in secondary, regenerating, lowland semi-evergreen

forest, with understoreys containing Salacca palms, in which they nest. Territories are centred on gully systems where moist conditions prevail in all seasons, usually with access to water, and often close to the forest edge. The surviving Gurney's Pittas in Myanmar are threatened by the rapid clearance of their forest habitat to make way for logging, both official and illegal, and conversion to croplands, fruit orchards, coffee, rubber and oil palm plantations.

June 5 – The United Nations led global celebrations of World Environment Day with the theme: **Water—Two Billion People are Dying for It!** Already about one-third of the world's population lives in countries suffering from moderate-to-high water stress, according to the most recent Global Environment Outlook (GEO-3) report. Water stress is defined as areas where water consumption is more than 10% of renewable freshwater resources. Many of the remedies available for conserving and managing freshwater resources are politically and socially difficult; many rivers, lakes, and underground aquifers cross national boundaries and can be shared by several countries. But water experts agree that adopting long-term goals is imperative. The crisis is largely that of water governance, essentially caused by the ways in which global populations mismanage water. Some two million tons of waste per day are disposed of within receiving waters, including industrial wastes and chemicals, human waste and agricultural wastes. Agriculture accounts for over 80% of world water consumption, and yet around 60% of the water used for irrigation is wasted, lost to leaky canals, evaporation, and mismanagement. Fertilizer and pesticide residues from agricultural activities also contribute to contamination of fresh water resources. Pragmatic management approaches are necessary to address the water crisis, such as increasing public and gov-

ernment awareness, properly funding the agencies that manage groundwater, supporting community management, and encouraging the use of incentives and disincentives particularly in poorer countries and rural areas.

May 19 – Environmentalists will ask the Administrative Court to **halt the construction of a 15-kilometre dam being built across the Kwan Phayao reservoir in Thailand**, which they say poses a threat to the Ramsar protected wetlands area. Initially proposed as a flood-prevention measure, environmentalists believe that the dam would instead lead to more flooding in the local area, severely affecting villagers living along the banks of the reservoir. Some authorities have decreed that an Environmental Impact Assessment (EIA) was unnecessary since the project was too small. Wildlife Fund Thailand (WFT), however, countered that "the reservoir is protected under the Ramsar Convention on Wetlands, and according to a cabinet resolution issued on 01 August 2000, any development is not permissible without an EIA." WFT was making inquiries in its capacity as a member of the Subcommittee on Wetland Management and the National Water Commission.

May 16 – In a bid to **halt illegal logging in Indonesia**, the Rainforest Action Network (RAN) called on U.S. companies to "halt all purchases of Indonesian wood and pulp until the rights of indigenous people ... are recognized and the Indonesian government agrees to stamp out illegal logging." Forestry authorities say illegal logging in Indonesia has reached 50.7 million cubic metres per year with a predicted annual loss of \$3.42 billion. Indonesia's forests cover more than 120 million hectares (296 million acres) but the annual degradation in the past four years has reached two million hectares. Most of the woodlands are located in far-flung areas of the world's largest archi-

pelago, where monitoring is weak and corruption is rampant.

May 16 – The IUCN-World Conservation Union released a study stating that **a rare freshwater dolphin found only in China's huge Yangtze River could die out within the next 10 years** unless fishing methods change. The study added that the Yangtze dolphin, the baiji, could quickly be followed into extinction by the Vaquita porpoise of Mexico's Gulf of California, New Zealand's Hector's dolphin, and several populations of whales. Larger whales like the blues, humpbacks and sperm, whose meat is prized by some nations, have long been the focus of protection efforts and many are still under threat. But the IUCN said it was the lesser-known and smaller cetaceans, often found only in developing countries, which were in special danger. To save it, the report said, the dolphin should be protected from snag-line and electric fishing, while off northern Mexico efforts had to be made to ensure that the vaquita is not caught in nets intended to sweep up fish. Source: Reuters News Service

May 15 – Environmentalists fear that the **critically endangered Mekong giant catfish (*Pangasianodon gigas*) may disappear completely from Thailand**. There have been no reports of capture of the giant catfish since 2001. Called Pla Buek in Thai, the giant catfish can weigh as much as 650 pounds and measure up to 10 feet in length. It is the largest scaleless freshwater fish in the world. Threats to the giant catfish include commercial fishing, its reputation as a food said to impart wisdom, and dynamite blasting of their spawning ground. One of the projects launched to protect the giant catfish and other endangered fish species in the area is the Mekong Fish Conservation Project. The project is supported by the National Geographic Society's Conservation Trust, the Cambodian Department of Fisheries, and



The Mekong giant catfish is the largest scaleless freshwater fish in the world.

Photograph by Zeb Hogan, University of California, Davis

the conservation group, Save Cambodia's Wildlife. The project initially began in Chiang Khong, Thailand, in 2000 but was moved to Cambodia in 2001 due to the collapse of Thailand's giant catfish fishery. Although the catfish populations are also low, Cambodia is now the last place in the world where the giant catfish is captured on a regular basis. As part of the project, researchers buy live giant catfish from fishers in Cambodia. They weigh and measure the fish, gather DNA samples for genetic studies, tag endangered fish, and release them back into the wild. A handful of endangered fish, including the giant catfish, are also kept alive to provide insight into fish migration patterns, habitat use, and mortality rates. Environmentalists are hopeful that such efforts will lead toward more sustainable management of Cambodia's fisheries," said Hogan.

May 7 – A three-year project has been launched to promote the sustainable management of forests in Vietnam. Led by the Swiss and the Vietnamese governments in partnership with World Wide Fund for Nature-Indochina, the project aims to protect Vietnamese forests from over exploitation to ensure that future generations will still be able to take advantage of their country's natural resources. The Swiss State Secretariat for Economic Affairs (SECO) has allocated \$US500,000 to support the project, which focuses both on

conserving tropical forests and the wise use and trade in forest products. The main objective of the project, which will be coordinated by WWF Indochina, is to promote sustainable forest management. This will be achieved, in part, by developing and implementing forest certification in Gia Lai Province, a first for Vietnam and Switzerland. Certification will be based on the internationally acknowledged criteria of the Forest Stewardship Council (FSC).

May 5 – Three major wetland areas in Pakistan are now protected by the Ramsar Convention on Wetlands of International Importance. Totalling over one million hectares, the sites are all wildlife sanctuaries and all in Sindh Province. These are the Deh Akro-II Desert Wetland Complex, the Indus Delta — 5th largest delta system in the world and home to the 7th largest mangrove forest system — and the Rann of Kutch, part of the great Thar desert. Pakistan now has 19 Ramsar sites covering 1,343,627 hectares.

April 28 – Rare pictures of the threatened Eld's deer (*Cervus eldii*, sub-species *siamensis*) were obtained recently by a team of conservationists from World Wide Fund for Nature (WWF) Cambodia, Birdlife/World Conservation Society-Cambodia, and Cambodia's Department of Forestry and Wildlife. This species is one of the priorities of WWF's Central Indochina Dry Forest Ecoregional Conservation Programme, due to the global significance of the population within the ecoregion and the highly significant threats to its continued existence. Most conservation biologists believe the *siamensis* sub-species is glo-



Eld's deer (*Cervus eldii*, sub-species *siamensis*).

© WWF Indochina

bally endangered, and perhaps critically endangered and close to extinction. The rapid population decline of this species in the last 50 to 60 years in Cambodia and Laos is attributed primarily to hunting, as extensive suitable habitat remains where the species is no longer present. Many parts of the animal are used in traditional medicines, and the species is on the CITES Appendix I list, which bans international trade in listed species.

April 18 – Chinese scientists have found 11 wild giant pandas in northern China, showing the endangered species is still holding on despite threats to its habitat. Six pandas were found in the Foping nature reserve in the north-western province of Shaanxi, with the males fighting among themselves to mate with the female. Five more were found nearby. The discovery was highly unusual since the panda is an elusive creature and scientists have often had to depend on paw tracks and excrement to tally the panda population. There are an estimated 1,500 pandas in the wild, with over half living in foggy, mountainous nature reserves in southwestern China. Logging has been the biggest threat to the endangered black-and-white panda, destroying its natural habit of forests with undergrowth of bamboo, its staple food. Poaching, though rare, is also a threat. Illegal hunters are subject to prison terms of more than 10 years. Traps set for other animals such as deer and bears have accidentally killed pandas. China has set up two breeding centres that aim to reintroduce captive pandas into the wild. But all the 200 pandas sent to the wild have either fallen sick or been injured in the wild, forcing them back into captivity.

April 17 – The IUCN-World Conservation Union and the International Ranger Federation (IRF) have joined forces in a "protect the protectors" initiative to bring attention to the risks faced by rangers in protected areas. The collaboration, launched at the recent 4th World Ranger Congress held in Victoria, Australia,

seeks to draw international attention to the increasing dangers rangers face and to enhance their safety. The meeting adopted a resolution to be taken to the upcoming 5th IUCN World Parks Congress, which is expected to promote measures to secure the better protection of rangers and also for the protected areas they care for. Rangers and others working in the field level often find themselves in the frontline of a conservation battle to protect our precious wildlife, plants and heritage. IUCN and the IRF are committed to profiling this important issue at the 5th IUCN World Parks Congress. The Congress will encourage measures and action to allow rangers to work safely in managing our parks and protected areas for present and future generations.

Source: IUCN-The World Conservation Union



The leopard cat

Photo by Narong Suwannarong

April 7 – Researchers in Thailand have succeeded in monitoring the movements of seven carnivorous mammal species in the Phu Khieo forest, particularly the marbled cat, clouded leopard, Asiatic golden cat, leopard cat, binturong (largest member of the family that includes civets and mongooses), dhole (Asian wild dog) and yellow-throated marten. Their work is shedding light on the mysterious lives of these predators. Over the past four years, researchers have been studying mammalian carnivores in the sanctuary. They observe the behaviour of the animals - both directly and by examining the tracks and signs they leave behind - and trap the animals to fit them with radio collars. These collars enable the researchers to monitor the animals' activities as well as to determine their foraging ranges. So far 17 carnivorous mammal species have been trapped in their study areas. However, due to lack of money

and manpower, only seven have been tagged with radio collars. The study is still in the data-gathering phase; once completed, the study will reveal precious information about the carnivorous mammals of the Phu Khieo forest and will be used to improve wildlife conservation in the sanctuary.

March 24 – A report called **Winged Messengers: The Decline of Birds** from the Worldwatch Institute states that pressures from the global human population has put about 12% of the world's 9,800 bird species at risk of extinction. Declining bird populations mark the unravelling of delicate natural balances since they are valuable environmental indicators.



The endangered Hawaiian moorhen is threatened by loss of wetland habitat.

Photo by John and Karen Hollingsworth courtesy of the U.S. Fish and Wildlife Service

Population growth or decline of bird species can offer early warnings of impending environmental problems, in particular dangerous levels of pesticides and insecticides. Island bird species have been at particular risk of extinction at the hands of humans – 93% of bird extinctions recorded since 1500 have occurred on islands. The report provides details on the impacts of major threats, including habitat loss, predators, poaching, conflict and climate change, on bird populations.

March 18 – The most comprehensive database of the world's river basins, the **Watersheds of the World CD**, was released at the 3rd World Water Forum in Osaka, Japan. The CD presents maps on twenty global issues as well as key maps, data and indicators of 154 of the world's basins. It also provides an analysis of



The white headed duck is an endangered bird that lives in the Persian Gulf. Its population suffered from the Persian Gulf War of 1991.

Photo courtesy of Wildfowl & Wetlands Trust

the state of the world's river basins, including the environmental goods and services they provide. The Watersheds of the World CD offers the best information available on the river basins of the world and serves as a vital reference for the general public.

March 14 – **Key Sites for Conservation in Vietnam**, a new report from BirdLife International, asserts that wildlife is disappearing quickly in 56 out of Vietnam's 63 protected areas. These areas have become accessible to hunters as new road networks open up areas that have been isolated for centuries. After poaching, the next most serious threat



The golden-winged laughing thrush is one of three new species discovered during the fieldwork for BirdLife's publication.

Drawing courtesy of BirdLife International

to Vietnam's wildlife is agricultural intensification, which affects 43 conservation sites. The BirdLife study is a two-year effort funded by DANIDA and identifies the most important places for biodiversity conservation in Vietnam. The publication describes a network of Important Bird Areas, the protection of which would go a long way towards the conservation of biodiversity and the wider environment

in Vietnam. In all, 63 areas qualify as Important Bird Areas and total 1.69 million hectares. Of these, 28 Important Bird Areas are within protected areas. The global Important Bird Area programme co-ordinated by BirdLife International aims to identify and protect a network of critical sites for the world's birds using standardised, internationally agreed criteria. In Vietnam, the IBA programme is coordinated by BirdLife International in Indochina, in collaboration with the Institute of Ecology and Biological Resources of the National Centre for Natural Science and Technology.

March 12 – Wildlife experts are relieved that **50,000 Olive Ridley turtles crawled up an eastern Indian beach this week to lay eggs**, after the endangered animals missed nesting last year. Turtle experts believe that widespread illegal fishing along the 480-kilometre coast of Orissa state, where three protected turtle nesting grounds lie, is responsible for the deaths of 100,000 Olive Ridelies in the past 10 years. An Olive Ridley lays 120 to 150 eggs, from which hatchlings emerge after about 45 to 50 days. The eggs are often damaged by erosion or eaten by other animals such as wild boars, dogs, and jackals. Turtle experts plan to count the nests, turtles, and hatchlings and help forest officials protect them. For the past 20 years, trawler fishing has been illegal within 10 kilometres of the Orissa coast during the turtle nesting season. Conservationists assert that trawlers continue to violate the law.

February 28 – IUCN-The World Conservation Union released **Turning the Tide: The Eradication of Invasive Species**. The new publication contains 52 papers and 21 abstracts from the International Conference on Eradication of Island Invasives that focused on the theme

"Eradication of invasive species from islands; methods used and the results achieved". The book includes a wide assortment of projects dealing with the ecological impacts of invasive alien species, and represents significant contributions from the IUCN/SSC Invasive Species Specialist Group (ISSG). Abstracts of all papers featured in the publication are available on the IUCN/SSC Invasive Species Specialist Group website at <http://www.issg.org/>.

February 14 – **Sweden said it would give 764 million kronor (US\$90 million) to the Global Environment Facility (GEF)**, raising an earlier pledge by 100 million kronor (US\$12 million), because the organisation needs more money to promote environmental projects in developing countries. In 2002, some 32 countries pledged a total of US\$2.92 billion to support the work of the fund over the next four years. The environmental fund, based within the headquarters of the World Bank in Washington, has allocated US\$4.2 billion over the past decade to support 1,000 environmental projects in 160 developing countries.

February 9 – The **black-faced spoonbill**, a kind of migratory bird on the brink of extinction worldwide, has **reappeared in Hainan Province in southern China** after an absence of more than two decades. The black-faced spoonbill, a large-sized migratory bird native to Asia, including China, Russia, the Democratic Republic of Korea, the Republic of Korea, Japan and Vietnam, has been designated as one of the most valuable species in eastern Asia for both research and protection. At present, there are only 800 of the birds worldwide, according to the IUCN-World Conservation Union. Taiwan Province has the world's largest number at 622. Hainan was once a

major winter habitat for the black-faced spoonbill, but the bird began disappearing from the region in the early 1980s.

Source: Forest Conservation Portal

February 6 – Two new studies in the journal “Nature” agree that **invasive species gain a competitive advantage in their new homes** because they leave behind their native parasites and diseases. This escape from illness gives non-native pests - now second only to habitat destruction in threatening biodiversity - a headstart in displacing native



This European green crab has a knob-like parasitic barnacle attached to its underside.

Photo by Todd Huspeni, courtesy of UCSB

species. Globalisation of commerce, particularly by ships and air traffic, transports hitchhiking plants and animals around the world, and in many cases these become pests in their new locations. Two teams of researchers - one targeting animals and the other focusing on plants - have drawn the same conclusion regarding the reason for the success of these invaders: freedom from disease. One team conducted parasite studies of 26 invasive animal species, from snails to rats, comparing them in natural habitats and invaded habitats. In general, the introduced populations had only half as many parasites as native populations of the same species. Among the animals the researchers studied was the European green crab, which had a devastating effect on U.S. fisheries. In Europe, the green crab’s native home, parasitic barnacles castrated the crabs. Where the barnacles were common, the crabs were small and rare.

But in areas where barnacles were uncommon, crabs grew large and abundant. The same pattern holds true for invasive plants. At least 473 alien plant species from Europe have invaded and established colonies in the United States as noxious weeds. The most successful carried few parasites with them, and were resistant to North American diseases.

January 31 – **Indian researchers from the Centre for Cellular and Molecular Biology in Hyderabad have asked Iran to loan them a pair of cheetahs in the hope of cloning the species.**

The cheetah has been extinct from India for more than 50 years. The cheetah is similar to the leopard and is the fastest animal on land - capable of reaching 100 kilometres per hour (60 mph) in short spurts. It disappeared from India following large-scale hunting during British rule that ended in 1947 but is still found in parts of Iran. The Centre plans to set up a large laboratory to revive endangered species such as the cheetah as part of a project worth \$2.3 million. An Indian leopard would be able to serve as a surrogate mother for a cloned cheetah. Researchers hope that the project could pave the way for the conservation of other endangered species such as Indian tigers and lions.



Researchers hope to reintroduce cheetahs to India

Photo courtesy of Murihiku Expeditions

January 27 – The **Auckland Islands Marine Reserve** is closer to becoming a reality now that the application of New Zealand’s Department of Conservation for this protected status has been approved. The Aucklands, which are sub-Antarctic



Sea lion pup on the Auckland Islands tagged by the NZ Department of Conservation

Photo courtesy of Murihiku Expeditions

islands south of New Zealand, offer a haven for marine mammals and sea birds. When established, the 484,000-hectare site will become New Zealand’s second largest marine reserve, safeguarding the main breeding ground for the threatened Hooker’s sea lion, southern right whale, and yellow-eyed penguin. Other species found in the area include black, grey-faced and Cook’s petrels, Buller’s shearwaters, blue penguins, Australasian gannets, Arctic skua, Bryde’s whales, common and bottlenose dolphins and orcas. The Auckland Islands have the richest flora of all the sub-Antarctic islands - 233 taxa have been recorded, of which 196 are native.

January 21 – A state of the environment report by the United Nations Environment Programme (UNEP) reveals that South Asia is suffering from excessive land degradation, desertification, and habitat fragmentation, depleting the forest products that are sources of food, medicine and income for indigenous people. The publication is aimed at policy makers and was released during the Special Session of the Governing Council of the South Asia Cooperative Environment Programme. The **South Asia State of the Environment Report** identifies five key environmental issues: livelihood security, environmental disasters, industrialization, urbanisation and biodiversity loss. It urged institutions and policy makers to do more to integrate environmental and socio-economic factors into decision-making and to

ensure trade liberalization does not compromise the environment and erode natural resources. Information for the report came from the newly published national State of the Environment Reports for Bangladesh, Bhutan, India, Maldives, Nepal, Sri Lanka and Iran, funded by the Norwegian Agency for Development Cooperation. Another report called the “**Children of the Monsoon**” offers the youth a perspective on the state of the environment and was written by members of youth organisations, which make up the South Asia Youth Environment Network (SAYEN), established by UNEP in Kathmandu in June 2002.



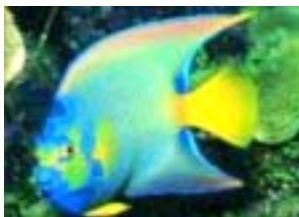
Royal Bengal tiger in Nepal

Photo courtesy of Safari Narayani

January 20 – Reduced presence of armed forces in Nepal’s national parks has led to the **death of two Royal Bengal tigers**. An adult male tiger roaming in the Royal Bardiya National Park was found poisoned to death, according to officials at the Ministry of Forests and Soil Conservation. Another tiger, this time a female, was shot dead last week in Royal Chitwan National Park, a UNESCO World Heritage Site. Endangered wild animals are often at risk due to conflict between wild animals and people living around national parks and wildlife reserves. The conflict has many times resulted in the poisoning of wild animals, which frequently come out of the national parks and destroy agricultural products and attack people. The population of Royal Bengal tigers in Nepal’s protected areas is estimated at around 100, but the total population of the species has yet to be counted. This wildcat species is included in the

government's list of protected animals. Killing tigers or trading in tiger body parts can draw up to 10 years of imprisonment under Nepalese laws.

January 14 – A report by the Pew Oceans Commission stresses that integrated networks of marine reserves offer the best formula for protecting and preserving marine resources. Marine reserves are areas in which no extractive use of any living creature, fossil, or mineral resource, or any habitat destruction, is allowed. The report, **"Marine Reserves: A Tool for Ecosystem Management and Conservation,"** finds that marine reserves also contribute to the recovery of larger marine ecosystems. This report is the final one in a series by the Pew Oceans Commission, a non-profit organisation that is conducting a comprehensive review of U.S. ocean policy. The Pew Oceans Commission reports have found the world's oceans are threatened by a daunting list of problems - overfishing, habitat alteration, recreational threats, pollutants, agricultural runoff, aquaculture, introduced species, climate change and coastal development. The current report recommends that a network of reserves should be implemented immediately in all major marine habitats in U.S. coastal waters. In addition to the report on marine reserves, three reports on the state of the U.S. commercial fishing industry were released by the Pew Oceans Commission. These reports address the issues surrounding the industry's declining economic status, which is



Queen angelfish like this one lives in Caribbean waters.
Photo courtesy of Reef Environmental Education Fund



There are more than 6,000 species of plants and animals in the waters of the Florida Keys.
Photo courtesy of Florida Keys National Marine Sanctuary

largely the result of excess competition, declining productivity, and poor management. For more on the Pew Oceans Commission please see: <http://www.pewoceans.org/>

January 13 – IUCN urged the Governments that share the Mekong River to fully consider the threats to biodiversity imposed by the blasting of shoals and rapids undertaken as part of the **Upper Mekong Navigation Improvement Project.** The Project proposes the blasting of 21 rapids, shoals and reefs in the river as part of a scheme to allow 500-tonne ships to navigate the river. Economically important fish species as well as fish species on the verge of extinction, such as the giant catfish, depend on these rapids and shoals. The blasting of their habitat may put these fish in danger and increase the risk of their extinction. The Mekong is home to an estimated 1,200 species and is only surpassed in richness by the Amazon and Congo rivers. The giant catfish (*Pangasianodon gigas*) is already listed as endangered on the IUCN Red List of Threatened Species and the proposed blasting of its only known spawning site will detrimentally affect it. Another species of large catfish (*Pangasius sanitwongsei*) is reported to undertake similar spawning migrations in the same area, and is currently assessed by the Red List as Data Deficient. Without thorough assessment of freshwater species, biodiversity can be

lost even before it is known. IUCN is concerned that continuing the Project without undertaking a comprehensive Environmental Impact Assessment conflicts with the obligations of Governments under international agreements. IUCN does not contradict the importance of river transport, but it urges the parties to the Agreement on Commercial Navigation on Lancang -Mekong River to carry out a comprehensive EIA before any further blasting work is carried out. Taking out the proposed rock outcrops could reduce water flows in the river during the dry season and significantly affect downstream fisheries and biodiversity.



Black-faced spoonbills
Photo courtesy of the Taiwan Government

January 14 – An outbreak of **avian botulism has killed 71 endangered black-faced spoonbills** in the Tseng-wen Estuary in Taiwan over the past month, according to the Wild Bird Federation Taiwan, the BirdLife International Partner organisation in Taiwan. The deaths account for more than 7% of the world population of 969 individual birds. Avian experts attribute the disease to unusually high winter temperatures at Tseng-wen Estuary, the most important wintering site in the world for the species. The estuary holds more than 70% of the global population of black-faced spoonbills. Black-faced spoonbills breed on islets off the west coast of the Korean Peninsula and China. There are major wintering wetland sites in Taiwan, Hong Kong, Vietnam, China, Japan, Macao and South Korea. An action plan involving these major range states has resulted in co-ordinated actions, including satellite tracking and field surveys, which have added to

knowledge of migratory movements and identified important breeding and passage sites. Japanese and Korean scientists have also been invited to investigate the epidemic in hopes of preventing the disease.

January 9 – IUCN-The World Conservation Union launched **Ecoagriculture: Strategies to Feed the World and Save Wild Biodiversity**, which is authored by Jeffrey A. McNeely, Chief Scientist at IUCN and Sara J. Scherr, Senior Policy Analyst at Forest Trends and Senior Advisor to the Future Harvest Foundation. The publication examines the global impact of agriculture on wild biodiversity; describes the challenge of reconciling biodiversity conservation and agricultural goals; outlines and discusses the Ecoagriculture approach; and presents diverse case studies that illustrate key strategies.



Threatened by the fishing and mining industries, dolphins in the Irrawaddy River are now at risk of becoming an endangered species.

January 6 – Dolphins in the Irrawaddy River in Myanmar have declined in number and may become an endangered species. The New York-based Wildlife Conservation Society (WCS) found just 37 dolphins in a 550-km stretch of the river between Bhamo in northern Kachin state and Mingun near Mandalay, compared to 59 animals in a 1998 survey. 'The population of the dolphins is isolated to a limited area. The survey indicated they were at risk of becoming an endangered species in Myanmar. Major threats to the dolphins are nets, the use of electrical charges to catch fish, and mercury run-off from gold mines. ■

Editorial

Transboundary Conservation

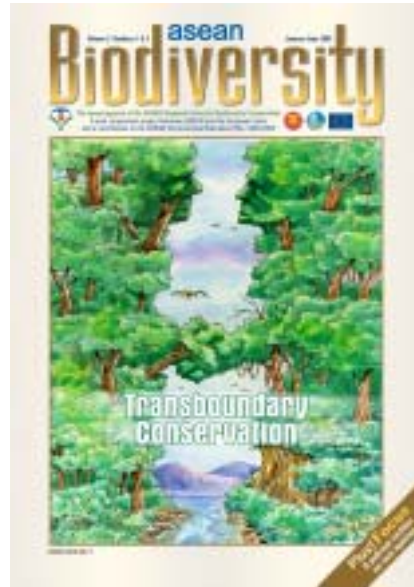
Why should particular attention be given to transboundary protected areas (TPAs) - that is, to adjoining protected areas that involve a degree of cooperation across one or more boundaries between or within countries?

“Our mountain ranges do not end abruptly because some 19th century politician drew a line on a map. The winds, the oceans, the rain and atmospheric currents do not recognise political barriers. The earth’s environment is the common property of all humanity and creation and what takes place in one country affects not only its neighbors, but many others well beyond its borders” (Dr. Z. Pallo Jordan, then-African Minister of Environmental Affairs and Tourism; opening address for the 1997 Cape Town meeting on Transboundary Protected Areas).

Plants and animals do not recognise national boundaries nor do many of the forces that threaten them. Clearly, strategies to conserve biodiversity in the 21st century must emphasise transboundary cooperation in relation to shared ecosystems and other conservation concerns.

Aside from the benefits for biodiversity conservation, transboundary PAs can also play an important role in fostering better cooperation and understanding between countries. Indeed they may also help catalyse the peaceful resolution of disputes. In many parts of the world, TPAs have been important in building bridges between nations and peoples.

The International Union for the Conservation of Nature and Natural Resources (IUCN) has taken the initiative in sustaining efforts to promote the role of TPAs for biodiversity



Cover illustration by Rene Aranda

“
**The earth’s environment
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 ”

conservation, peace and cooperation. Also, it is most encouraging to see the recent surge of support that such linkages are getting from local communities, government, conservation and tourism organizations, bilateral and multi-lateral aid agencies, the private sector and non-government organisations (NGOs) in many countries throughout the world.

It is believed that transboundary cooperative action is a highly strategic means of achieving regional integration and securing landscape-level conservation at a scale not possible previously.

Since 1997, IUCN has promoted a Park for Peace Initiative as a tool to enhance regional cooperation for biodiversity, conflict prevention and reconciliation, and sustainable regional development. This work has been undertaken in a partnership between the IUCN, the WCPA and the Peace Park Foundation.

The TBPA established by two or more countries or other jurisdictions creates opportunities in enhancing their management and transboundary cooperation. It also helps to encourage friendships and reduces tension among border regions.

As adopted by the IUCN, TBPA is an area of land and/or sea that straddles one or more boundaries between states, sub-national units such as provinces and regions, autonomous areas and/or areas beyond the limits of national sovereignty or jurisdiction, whose constituent parts are especially dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources and managed cooperatively through legal or other effective means. TBPAs are special types of protected areas; and Parks for Peace is a special type of TBPA.

Transboundary protected areas can also offer a lot to tourists. Although their carrying capacity may be threatened, TBPAs might help to promote an understanding and awareness of trans-national nature protection (Brunner, Robert, 2003). ■

European perspective and experience in transboundary cooperation

■ By Robert Brunner

Europe is different
Why transboundary
co-operation is necessary
Nature's limits versus
political borders

Borders in a geographical or political sense can be very clear, like state borders, fixed by treaties. Borders of natural areas are often unclear, fluid and depending on the background of the observer. Only in rare cases do political borders correspond to natural borders. Rivers for example are a contradiction in itself. Rivers link territories, river basins are natural areas for settlements, but rivers very often are also borders.

From isolated areas
towards networks

In the past, protected areas were designated according to their value, their biodiversity, or their availability. It just happened in the more recent decades that environmentalists put more weight on protected area networks like clusters and bio-corridors.

Upstream and downstream.
Mountains and lowland.
Different points of view

Protection also depends on the point of view. The disaster on the Romanian Thiza River in 2000 showed clearly the impacts on protected areas downstream of mines. Impacts on the valuable Danube delta could have destroyed one of the most important but vulnerable habitats in Europe.

A border theory

In Europe, many borders are found in remote areas, where a low population density and less development pressure have together created optimal preconditions for the



Saxonian Switzerland National Park and the Labske Piskovce Protected Landscape Area.

preservation of ecological diversity.

But borders do have two sides. Environments and habitats have the same value, the same beauty, the same richness on both sides. Protection on just one side of the border can never lead to sufficient nature protection. From the planning and the designation of protected areas to their administration and management, transborder co-operation is a necessary and important task.

Size of countries and density of borders

Europe – many states in a small area

Europe is a small continent – or let us say it is just a part of Eurasia. On nearly 10,000,000 km² from the Atlantic to the Ural, from the polar circle to the Mediterranean, more than 40 national territories can be counted.

What do borders mean to people,
economic development, political
tensions and to nature

Border areas very often have a common history, the same culture

and sometimes a similar language. Due to a separation during the Cold War, a distinct social and economic decline appeared across Europe.

At the same time, nature was protected in the shadow of a strict border. More than 6,700 km² in the heart of Europe benefited from a kind of protection by the strict borderline.

Remote areas and their
natural value

By concentrating economic progress in the central areas, the areas along the Iron Curtain were cut off from economic development. Less pressure, emigration and resignation characterised these border regions.

But it was an advantage for nature. Modest use of natural resources helped to preserve areas of high natural value.

Overcoming borders

Immediately after the fall of the Iron Curtain in 1989, many initiatives appeared to help preserve

PHOTO BY EUROPARC

areas of high natural value. Ecological bricks for Europe, Green Belt of Fennoscandia and others have been developed.

But there are still borders and restrictions to overcome such as on the Balkans or in the former Soviet Union.

Size of protected areas

Small but beautiful

There are many protected areas in Europe. Apart from the large unspoiled nature in Scandinavia, Europe is a continent where natural areas have to exist beside a high pressure in land use and competing interests. Very often, protection is a kind of compromise between these interests.

Wilderness under pressure

Land use, economic development, tourism, traffic, and housing are the more recent factors that threaten the wilderness. Some decades or centuries ago, it was the protection of settlements and securing daily life, which became a threat to our environment. Prevention from natural disasters and protection against wild animals were the main arguments to turn wilderness into a cultural landscape.

Wilderness and/or sustainability – a theoretical approach

We have lost the feeling for original wilderness in Europe. Wilderness is more the chaos, the unknown, unpredictable, and uncontrolled nature, with all its dangers for people and their living space. At the same time, it is a nostalgic, idealistic image of the environment.

How much room can we give back to wilderness? How much wilderness do we want to protect? And how much wilderness can we af-

ford? Can we find a compromise between land use and wilderness? There are many questions but we cannot provide a general answer. We have to find it for the specific area, under specific conditions, and for ourselves.

Many of these conditions can be fulfilled only if we think "transboundary".

Natural and cultural landscapes – land use or restrictions

What's left of unspoiled nature

For many centuries, men have learned to control nature. Up to high mountain pastures and down to drained lowlands, people have cultivated the land for their use. The image of Europe is more the cultivated landscape than wilderness. Can environmentalists be satisfied with what is left? In Europe, wilderness and large untouched areas can only be found in Scandinavia or partly in the Alps and in Eastern Europe.

Nature reserves are mostly left-over areas where land use has

stopped due to extreme conditions like alpine farming. Recently a system of biosphere reserves with strict protected core zones and extensively used farmland is becoming more popular and possibly an interesting approach for Europe.

Coexistence of land use and restricted areas

Nobody wants to turn cultivated land into strict reserves in a large scale. But there are several areas in Europe, which have a rich biodiversity, a high natural value, and habitats of threatened species. These areas are interesting for environmental protection.

Competing / conflicting interests in protected areas

Nearly all national parks in Austria and many in Europe were established to avoid other types of land uses. Valleys are wonderful sites for hydro-power plants and at the same time worth protecting for their habitats. High mountains can be ski resorts or at the same time the last refuges for large birds. The value of trees can be measured as the price for wood or the price tourists are willing to pay for untouched nature.

Cultural and national borders vs. natural borders

National borders are not necessarily ecological borders

Nature has neither limits nor borders. Ecological units are not necessarily state boundaries. High mountain ranges often act as climate borders or divide different habitats. River basins are much more ecological units.

Rivers - state borders but ecological units

Large rivers very often form state borders. These are easy to defend in times of



View on the Thaya River, at the same time the border between Austria and Czech Republic and the two National Parks.

Photo courtesy of NP Thayaatal

conflicts, and sometimes hard to cross. But they are at the same time ecological units. They have the same water, the same fishes, and the same floods; create the same living conditions, and influence the local climate equally. And they build corridors for habitats, migrating routes, and unique ecosystems.

National minorities, common culture, but no common future?

Large rivers divide people, even when the culture, the language, the traditions are the same on either side. Remote areas, which are very often the home of minorities, and border areas, are at the same time the most valuable landscapes.

and to bring it forward. EUROPARC, IUCN and others published material or supported initiatives.

Flying high – what managers expect

The expectations were high. A questionnaire helped to evaluate the European experience in 1997.

Hard landing – the daily reality

But reality was somehow different. At the same time, double barbed wire fences divided ecosystems in the Balkans and in Poland. Strict reserves had no other partners on the other side of the river other than gravel digging companies in Croatia; the forest was logged in Karelia on the borders to national

to cross borders whenever they want, we managers have failed in our job. Keeping reserves fenced to keep wild animals in a compound has nothing to do with protected areas but a lot with zoos. There are several reasons for opening borders to wildlife like migration routes, genetic pools, etc.

A chance and a challenge for border people

Borders are both, a threat and a chance. A threat because of restrictions, control, and limits. A chance because of exchange, crossroads, and trade. Border people are used both to limitations and contacts. Transborder protected areas are more than just reserves. They provide the responsibility for the environment across borders, and combine common interests and different sights on the same object.

Political soap-box oratory

We know a lot about the importance of open borders, for nature, for wildlife, and for people. Protected areas and their management need to be harmonised on either side of a border. But theories and political ideas very often differ from the daily reality. People fighting for their basic needs have no chance to think about sustainability, peace parks or restrictions on land use. Politics has to build the foundations for equal conditions for life in and around protected areas.

Threats to transborder co-operation

The burden of history

Some 80 years ago, Europe had a few large multinational empires - multicultural and multiracial. After World War 1, empires were split into dozens of small states. Even if there was a common history, relations were not always the best. WW2 did a lot more to fix boundaries and their burdens.

Political tensions and social and economic decline

In Europe, one can still find a west-



Photo by Z. Niewiadomski

Polish-Ukrainian border, Bieszczady NP, Mt. Tarnica (1,346) to the left, Mt. Halicz (1,333) to the right.

Transborder co-operation means – what? Questions and (no) answers!

Transborder co-operation – statistics and reality

Transborder co-operation in Europe at the end of the 90's

– a quick glance

Transborder co-operation became very popular in the last decade. Even if the first transborder protected area was established in 1932, it took some decades to raise more interest. The fall of the Iron Curtain and a growing European Union helped a lot in this particular field. Some conferences and meetings were held to discuss this topic

parks in Finland. And there are more examples to show.

Who co-operates with whom?

Managers, park rangers, scientists – a transborder self gratification

The typical co-operation is personal contacts and exchange of staff. That sounds great – but only for people. Joint seminars and publications do help to strengthen contacts. But they do not help nature. Joint managers is not the goal but joint management. And this has still to be developed.

Wildlife – a need for exchange

As long as birds are the only ones

east decline in economic wealth and social benefits. Or you can call it the rich and the poor, where one side can afford to protect nature whereas the other side has to exploit natural resources to balance the state budget.

Private interests, governance and local heroes

But even in the wealthy countries in Western Europe, private interests can be a threat to the environment. Landlords want to make profit, companies exploit natural resources and governments are often rather weak in the field of nature protection. In border areas, different interests develop and are much more evident.

Language problems?

An easy excuse

One of the most common arguments against co-operation across borders is the language. I am convinced that similar differences as the ones between Austria and the Czech Republic can be found on most continents. But especially in border areas, one can always find people who speak both languages. And what keeps us from learning the other language? The daily work does not need translators but joint plans on how to do it.

Protected areas in wartimes

During the Ruanda/Urundi conflict, refugees partly cut the Virunga NP in Congo. During the Kosovo conflict, the Shar mountains and others were mined. Between Ecuador and Peru, a territory has been claimed by both sides. Protecting areas in war times cannot be done through written agreements only. Mutual understanding, long-term co-operation and the involvement of local people might help to prevent such conflicts.

Can international conventions help to improve transborder co-operation?

A big NO! But

Many international agreements exist at the global or the regional

level: Ramsar, Bonn and Bern Conventions, Convention on Biological Diversity, World Charter for Nature, Washington Convention. Such conventions can help of course, but the local understanding of either side of the border comes first.

From Kyoto to local agreements, the scale of treaties

This is one reason why right at the beginning the National Park Thayatal negotiated an agreement on transborder co-operation. International protocols are something we have to obey in all types of protected areas. But the difference lies in the local scale, the special situation in certain spots, which cannot be regulated by international conventions.



Director Brunner (left) and the Czech National Park Director (standing) discussing the joint management of the Park.

Frameworks and guidelines

Several institutions have worked out guidelines or proposals for such cases. But so far they all failed to produce accepted principles. Neither IUCN, the Council of Europe nor EUROPARC could agree on principles for transborder co-operation. So far, some good examples are the Mercantour (F), the Trilateral Biosphere Reserve (P/SK/UKR) or the Thayatal.

Who could be a helpful umbrella?

IUCN could be an umbrella (if they want to), and the international criteria for protected areas could

easily be extended as criteria for transborder co-operation in all categories of protected areas.

A future for transborder co-operation – an outlook **Theories of transborder co-operation**

From simple contacts to an understanding of co-operation

Some protected areas were declared transboundary protected areas by politicians. The first one in Europe was Pienniny in Poland / Slovakia in 1932, but with no particular results in the beginning. They showed only in the 50s when co-operation was effectively carried out by both administrations to improve the quality of protection.

Protected area staff or local

people know best how co-operation can work. Personal contacts are important and a trustful basis for co-operation. Management should provide support to this co-operation, and formulate agreements.

A unique protected area – extraterritorial unit

Usually protected areas do not start at the same time on either side of a border. They have to grow together. Borders do not make sense within an ecological unit. Claire Shine (1997) called this an ecological utopia, but it is worth going for it.



Photo courtesy of NP Thayatal

The historical bridge in Hardegg connects the two Parks.

Bottom-up or top-down

It makes sense to listen to locally experienced people. Experts from outside, who take a quick look at an area and then tell the people what to do are not needed. Common history, old traditions, the knowledge of the nature across the borders bear a lot of information and experience for protected area managers. But they have to find time to listen. Together with the local population, protected area managers can find a serious basis for the future development of protected areas.

Basic needs for nature, people and managers

Free nature: nature as it was

Protected areas are homes for nature in the first place. Nature has no limits. We cannot always preserve nature in its original condition, but we have to make room for free development - with all considerations for people.

No limits for nature's development

If nature has no limits, we cannot bind it to state borders.

Land use versus protection: How to find a compromise?

Restrictions mostly result in a compromise. How much land is needed to secure protection and biodiversity? Do we need reserves for protected species or reserves for the exploitation of natural resources? Is a compromise possible for areas that are left for the protection of nature?

In many countries, there are problems when trying to design a protected area in the national level. So, is it not much more difficult to create a transborder protected area system? The compromise across borders is hard to negotiate, but it is necessary to secure last refuges for endangered species and landscapes.

Tourists, adventure, Disneyland

Transborder protected areas can offer a lot to tourists. The chance to experience a nature conservation area in another country can be an adventure for tourists, but can also be a threat on its carrying capacity. However, it might help to promote an understanding and awareness of transnational nature protection.

An attempt at European recommendations

Some examples and how they work
Europe has some excellent ex-

amples of transborder co-operation. The National Park Mercantour (F) and the Regional Park Alpi Marittimi (I) have been co-operating since decades; in the Pyrenees, the French National Park and the Spanish Ordesa National Park found good ways to work together, and along the former Iron Curtain some existing protected areas improved their co-operation after its fall in 1989.

Others try to find an efficient co-existence, but some still suffer from threats due to political tensions and strict borders, especially in the Eastern European countries.

Along the Polish-Belarusian border or in the Carpathians, fences and border installations hinder both the exchange of staff and the border-crossing for wildlife.

'Musts' and 'shoulds'

Musts: Joint management comes first. The National Park Thayatal and Podyjí agreed on principles for joint management, regular updating and evaluation of transborder co-operation. Short-term working plans, based on joint research processes, are negotiated bilaterally to find solutions to the daily problems.

Shoulds: But there is more to consider. Joint presentation, joint corporate design and corporate identity, common cross border infrastructure or joint marketing all help to promote protected areas and raise their public image.

Defining minimum standards

The approach to nature conservation regarding national legislation, the status of the protected area or the special aims can be different in neighbouring parks. But as all measurements have an effect on the other side of the border, a minimum standard for each task and each topic has to be defined.

In the National Parks along the Thayatal, fishery is an excellent example. Since 2000, regulations concerning time, size and kind of fish, and fishing equipment and methods have been the same on both sides of the border. Information leaflets are printed in both languages (and also in English). National park guards cover the ground on bilateral patrols.

How to adapt them to Southeast Asia

Lessons to be learned

Anything goes. It was hard to imagine transborder protected areas along the Iron Curtain two decades ago, with joint management, staff exchange, and research.

Transborder co-operation is needed. We cannot protect the full range of habitats with strict borders. Nature is unlimited. The thinking of park managers has to be the same – unlimited.

Nature protection has to consider the people, their traditions, their

habits, and their manners. But in border areas, it must also consider the improvement of mutual understanding.

Joint management is an important step forward. It is the basis for common development and therefore the quality of the protection status.

Bring your staff together. Joint research programmes and international projects will help to improve the understanding for the other side.

Towards a smaller world

Border restrictions will be lifted sooner or later. The world is becoming smaller. The protection of areas can help to enforce this process. Act locally! The global thinking will follow and it is needed to protect areas in a shrinking world. ■

Robert Brunner is the Managing Director of National Park Thayatal.

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TRANSBOUNDARY BIODIVERSITY CONSERVATION AREAS IN SOUTHEAST ASIA:

Lessons learnt from Betung Kerihun National Park, Kalimantan, Indonesia

■ By Herry D. Susilo

Introduction

Betung Kerihun National Park (BKNP) is located in the Kapuas Hulu District (Kabupaten Kapuas Hulu). The name Betung Kerihun is a combination of two mountains - Mt. Betung located in the western part of the park and Mt. Kerihun, in the eastern part.

The park is the largest conservation area in West Kalimantan province, covering a total area of 800,000 hectares (roughly 25% of the Kapuas Hulu District surface) of tropical rainforest at varying altitudes of 150 to 2,000 meters above sea level. From the west to the east, BKNP is rectangle and lies between $112^{\circ}15' - 114^{\circ}10'$ longitude and $0^{\circ}40' - 1^{\circ}35'$ N latitude. It shares its border with Sarawak to the north; East Kalimantan province to the east; Banua Martinus and Putussibau to the South, and Nanga Badau to the West.

The Park has a highly diverse flora, represented among others by the different species of the Dipterocarpaceae family. Of the 267 species known for this family from Borneo, at least 121 species occur in the park. In total, at least 695 woody plant species, comprising 156 genera and 63 families, are known to occur in the Park; and 50 of these species are endemic to Borneo.

The diverse forest ecosystems of BKNP provide significant natural habitats for the rich fauna species, in which some 652 have already been identified. These include 54 mammal species (including eight primate, 17 bat, and 17 rodent species); 112 species of herpetofauna (consisting

of 59 amphibian, 25 reptilia, 24 squamata, and four testudinata species); 300 bird species, and 186 freshwater species.

The primates include the orangutan (*Pongo pygmaeus*), found mainly in the west part of the park, which is contiguous with the Lanjak Entimau Wildlife Sanctuary (LEWS) in Malaysia. The transboundary aspect of the two Reserves, which is particularly important for the conservation of the orangutan and other migratory species, also contributes to security and

on the agreement, the Government of Indonesia submitted in November 1993, a proposal entitled "The Development of Bentuang Karimun Nature Reserve as National Park" to the International Tropical Timber Organization (ITTO), which was eventually approved.

During its 6th meeting on 08–11 December 1993, the Cooperation Committee on Forestry between the Governments of Indonesia and Malaysia agreed to pursue the "Joint Cooperation in Developing



The Kapuas River in West Kalimantan, Indonesia.

confidence between the two nations, and enhances the tourism potential in the region.

Towards the Transboundary Biodiversity Conservation Area

In the 5th meeting of "The Cooperation Committee on Forestry" between the Governments of Indonesia and Malaysia, held from 01–04 December 1992, both Governments agreed on the establishment of a "trans-frontier reserve." Following up

Transfrontier Reserve" particularly Bentuang Karimun Nature Reserve (BKNR) in Kalimantan Barat, Indonesia, and LEWS in Sarawak, Malaysia.

Then on 12 August 1994, the Government of Indonesia and the ITTO signed an agreement to implement Project No. 26/93 Rev. 1(F): "Development of Bentuang Karimun as a National Park" Phase 1. The objective of this project is: "to develop a model of natural forest

Dave Lumenta

management through the national park system that not only will serve conservation of species and ecosystems but will also accommodate other purposes such as socio-economic development with the involvement of the local and regional communities. Such a model could be extended to regional cooperation between the neighbouring countries of Indonesia and Malaysia”.

Specifically, the trans-boundary cooperation aimed to:

- Establish cooperation in conservation activities between Indonesia and Malaysia through the development of a transboundary joint management reserve, and
- Develop joint project proposal for further cooperation of the Governments of Indonesia and Malaysia (Sarawak).

At the same time, ITTO also agreed to finance Project No. 106/90 Rev. 1 (F): “Development of the Lanjak Entimau Wildlife Sanctuary (LEWS) as a Totally Protected Area (Phase 1). The general objective of this Project is: “to develop the LEWS as a Totally Protected Area **for nature conservation** and as a site for biological research”. This will be contiguous with a larger wildlife sanctuary in Indonesia and will be carried out **in cooperation** with the Government of Indonesia.

Both projects reflect the transboundary aspects of biodiversity conservation as well as joint protected area management with the Government of Sarawak/Malaysia and Indonesia and in the context of project (Phase I) implementation. Cooperation was basically on two levels:

- Joint preparation, organising and implementation of the ITTO Borneo Biodiversity Expedition (IBBE); and
- Mutual visits and workshops.

On 07 October 1994, a “Launching Ceremony of Lanjak Entimau-Bentuang Karimun Biodiversity Conservation Area” was held in Kuching, Malaysia.

Candidate Trans-border Natural World Heritage Site

Following the Berastagi World Heritage Forest Policy Dialogue of 1998, the Directorate General of Forest Protection and Nature Conservation, Ministry of Forestry-Indonesia and UNESCO (World Heritage Center and Jakarta Office) in partnership with the ASEAN Secretariat and IUCN’s WCPA Southeast Asian Regional Forum organised the Technical Workshop on the Preparation of Cluster and Transborder Natural World Heritage Nominations in the ASEAN Region, on 19 -21 April 2001 at Lido Lake, Bogor, Indonesia. This Technical Workshop recommended that Betung Kerihun National Park (West Kalimantan, Indonesia), Lanjak Entimau Wildlife Sanctuary and Batang Ai National Park (Sarawak, Malaysia) be given high priority as a pilot case for trans-border Natural World Heritage nomination of the central Borneo Montane Forests.

Other possible trans-border Natural World Heritage Sites include the:

- Peninsular Malaysian Lowland forests (Thailand and Malaysia): Halabala and Belum
- Northern Borneo Moist Forests (Malaysia and Brunei): Labi Forests Reserve and Gunung Mulu National Park.

As a follow up to the technical workshop, a joint meeting for the preparation of Transborder Natural World Heritage Nomination of Central Borneo Montane Forests was held in Kuching, Sarawak – Malaysia in March 2002. Indonesia and Malaysia have both agreed to set up a single proposal for nominating Betung Kerihun National Park, Lanjak Entimau Wildlife Sanctuary and Batang Ai National Park as Transborder Natural World Heritage Site. Both parties understand that the objective of the agreement could be achieved if both Governments support this nomination.

Back to back with the joint meeting, the Second Task Force meeting of Trans-boundary Conservation was

held on 23 March 2002. The meeting discussed the progress achieved since the first meeting and the joint actions that would be carried out. The meeting emphasised that research studies-related activities would still dominate the management activities of both conservation areas. The major activities include: (for BKNP) collaborative research programme on medicinal plants between World Wildlife Fund (WWF) and the Indonesian Institute of Science and Tanjung Pura University; joint study on orangutan with Kyoto University, Japan; the International Conference in Ecotourism Development in Betung Kerihun National Park; and (for LEWS) the establishment of three gene banks in LEWS that include non-timber species; exploration of the uses of plants for traditional medicine, and ornamental plants.

Lessons Learnt

Implementation of the projects

In the context of project implementation, the cooperation was basically on: (1) joint preparation, organisation and implementation of the ITTO Borneo Biodiversity Expedition (IBBE), and (2) mutual visits and workshops.

The implementation of the two ITTO-funded projects provided some significant initiatives and inputs to the implementation of the Trans-boundary Biodiversity Conservation Areas (TBCA).

The IBBE 97 effectively conducted and collected a lot of valuable data on forest types, botany, medicinal plants, primates, fish, birds, reptiles, amphibians and socio-economic aspects on forest communities. The expedition further enhanced the findings on the commonalities of the two conservation areas that must be managed as one TBCA. A joint expedition (research/study) is very important not only to know the biodiversity (species richness of flora and fauna; types of ecosystem) of the neighbouring protected areas to be conserved but also to know and

understand the socio-economic conditions of the local communities concerned. The data and information collected by the joint expeditions or research will be used for designing the cooperation activities for both conservation and sustainable development purposes.

However, the results of IBBE 97 have not been used optimally in preparing the Management Plan of BKNP, especially for the joint activities for the TBCA that have to be carried out by the park management unit.

Political Situation and Changes

TBCA cooperation started under the centralised regime of the previous government and has experienced substantial political changes. Although the declaration and administration of protected areas including National Parks is still a central government matter, the new government policy of decentralization and empowerment of local command has brought along drastic changes for the project, regarding both opportunities and constraints experienced during its implementation.

It has also suffered from leadership changes in the Ministry of Forestry. During its implementation, it has experienced changes of Ministers and of Directors General of Forest Protection and Nature Conservation.

Security concerns and boundary issues in West Kalimantan have delayed field implementation, particularly the implementation of the joint Biodiversity Survey (IBBE, 1997).

While both the Governments of Indonesia and Malaysia appear to have a clear picture of the scope of cooperation in biodiversity conservation and also in eco-tourism development and non-timber forest products (NTFP) trade, the issues on trans-boundary cooperation in the suppression of illegal logging, particularly along the northern boundary of the BKNP with Sarawak (outside LEWS) were not addressed in project activities. Illegal logging is a very sensitive issue for both govern-

ments, and it seems, at certain levels, to be bringing a negative impact on TBCA cooperation.

Different Management Categories and Sizes of the Conservation Areas

The Zoning System in Betung Kerihun National Park allows activities inside the park especially eco-tourism (inside Use Zone/Intensive Use Zone). In LEWS, the zoning approach for total protection and conservation allows very limited activities only in buffer and wilderness zone. The cooperation faces difficulties in designing certain joint activities, especially in efforts for empowering the local communities through the sustainable utilization of the park area (e.g. eco-tourism). At a certain level, the different sizes of the protected areas have also caused difficulty, especially in protecting the areas, for example, along the northern boundary of the BKNP with Sarawak that is outside LEWS.

Authority and Security Aspects of the Border

During the first meeting of the "Task Force for the Collaborative Management of the Trans-boundary Biodiversity Conservation Area (TBCA) of Lanjak Entimau Wildlife Sanctuary (LEWS) and Betung Kerihun National Park (BKNP)" on 07 August 2001 in Jakarta, it was agreed that three immediate cooperation activities will be implemented, i.e joint patrol, staff exchange and exchange of visits of the local communities.

The Task Force, however, in its second meeting realized that the implementation of the joint patrol would face problems in regard to the legal/authority and security aspect of the border.

Continuity of Funding for TBCA

The initiatives for TBCA cooperation such as the one between Betung Kerihun National Park, Indonesia and Lanjak Entimau Wildlife Sanctuary, Sarawak-Malaysia, have been driven

mainly by the ITTO through its financial support for the two initial projects, especially the ITTO Borneo Biodiversity Expedition (IBBE) 1997.

Presently, the trans-boundary activities are largely dependent on external funding. Although the Project's Phase I has been followed by the second phase, which is also supported by the ITTO, there is no concrete plan yet on how to sustain these efforts when external funding ends.

The efforts to nominate Betung Kerihun National Park and Lanjak Entimau Wildlife Sanctuary for inscription as a Trans-border Natural World Heritage Site could become an alternative in finding fund resources and in drawing attention of international communities to this TBCA, a relatively undisturbed montane forests/ecosystems in the heartland of Borneo.

In the regional level (ASEAN), the ASEAN Regional Centre for Biodiversity Conservation or ARCBC can play an important role in this case.

Conclusion

The importance of trans-boundary biodiversity conservation has become increasingly recognised in South-east Asian countries. Several initiatives have been started in several countries, but still need a lot of efforts towards closer cooperation at site level, and synchronisation of management and action plans for the TBCA.

Guidelines to be developed should consider the following:

- Initial joint activities, especially joint expedition/research
- Political support and commitment
- Legal/political aspect: particularly related to the policies and authority on border.
- Management categories and size of the protected areas (TBCA).
- Continuity of funding: alternatives of fund resources. ■

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Transboundary Conservation Cooperation Through UNESCO World Heritage and Biosphere Reserves

An Update in East and Southeast Asia*

■ By Han Qunli and Kazuhiro Nitta

Introduction

Recent years have seen an increasing interest in transboundary protected areas, for a variety of environmental, economic and political reasons, including the need for more effective management of shared ecosystems (MAB, 2000). Within the World Network of Biosphere Reserves, there are some examples of formally recognised transboundary reserves in Europe¹. In the East Asian Biosphere Reserve Network (EABRN), transboundary cooperation has been identified as one of the three priority subjects for cooperation. In Southeast Asia (SEA), a number of initiatives have laid down a basis for regional cooperation², although currently there is still lack of operational cases for transboundary conservation. The United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Association of Southeast Asian Nations (ASEAN) have started promoting the establishment of transboundary conservation areas in SEA in a number of occasions such as during the 10th ASEAN Working Group on Nature Conservation and Biodiversity (AWGNCB) meeting in



Bogor and the ASEAN Regional Centre for Biodiversity Conservation (ARCBC) workshop in Hanoi, Vietnam in 2000. A number of proposals on bilateral and regional scales are being pursued with the participation of international non-government organizations (NGOs) and IGOs in the ASEAN region. The establishment of transboundary reserves, peace parks, friendship parks and other new types of multi-functional areas for conservation and development and for the reduction of chances of conflict will become a priority in the implementation of the Convention on Biological Diversity (CBD).

For UNESCO, transboundary

conservation cooperation has offered a new dimension for the development, both for the World Network of Biosphere Reserves and Natural World Heritage Sites. This paper tries to outline the needs, interests, possible modalities for

transboundary cooperation and the related constraints and updates on some recent initiatives.

The relevance for transboundary cooperation

The need for conservation cooperation crossing national borders has existed for a long time but interest in it has only been visible in recent years³. This growing interest for transboundary conservation cooperation comes partially due to the fast advancement of the countries in biodiversity conservation, especially in *in-situ* conservation. The establishment of the CBD and its relatively prompt ratification by many countries as well as conservation enforce-

* The main text of this paper is based on a few recent workshop papers on the same issue and some project documents. It represents only the opinions of the authors.

¹ The sites include Krkonoše/Katrkonoze (Czech Republic-Poland), Vosges du Nord-Platzwald (France-Germany); Tatra (Poland-Slovakia) and Danube Delta (Romania-Ukraine). There is also a trilateral Biosphere Reserve – the East Carpathians, located at the intersection of Poland, Slovakia and Ukraine, at the watershed of the Baltic and Black Sea Basins.

² Examples include the UNDP-WWF Forum for Transboundary Conservation in Thailand, Cambodia, Laos and Vietnam; Protected Areas Systems Review of Indo-Malayan Realm of ABC and WCMC; World Heritage Forest Meeting in December 1998, and the 2nd IUCN-WCPA Southeast Asia Regional Forum 1999

³ Some important works since 1994 include: a) CNPPA Workshop in Australia Alps in November 1996. The output was published by IUCN as "Transboundary Protected Area Cooperation", edited by L. Hamilton *et al.*; b) Pan-European Conference on Biodiversity Conservation in Transboundary Protected Areas in Europe", June 1996 at the Czech and German Bohemian-Saxonian Switzerland Park. The report was edited by Jan Cerovsky, Ecopoint Foundation; c) An international workshop was held in July 1995 in the Transfrontier Protected Landscape Area "Bili Karpaty" – White Carpathians (Czech Republic and Slovak Republic). The result was edited by Amy Arends, *et al.* and published by Ecopoint; d) Regional Workshop on Transborder Protected Areas organised by the Polish Academy of Sciences and the US Academy of Sciences in Tatra Mountain Poland, May 1994. The result was summarized in a joint publication of the two Academy of Sciences.

ment actions by many countries have led to a rapid increase of protected areas, with varying ecosystem types and geographical distribution. China, for example, has doubled its number of protected areas over the last 10 years. Mongolia has enlarged its conservation areas, with the aim of putting some 30% of its vast territory for natural conservation. Many new protected areas are located at or close to national borders (Figure 1).

The need for transboundary conservation has also been raised due to the advance of *conservation concepts and practices. The Ecosystems Approach advocated by scientific and conservation communities, for example, stresses that managing the conservation areas must come with appropriate spatial and temporal scales. This is in contrast to the fact that many ecological systems cut across the country frontiers and are managed according to different, and sometimes conflicting policies. Transboundary cooperation is therefore called if management is to be approached and undertaken at an appropriate scale for ensuring the ecological integrity of the area and maintaining an adequately diverse and sufficiently large gene pool (MAB, 2000).

In SEA, there are many sites that have been identified as having the need and possibility for transboundary conservation (Figure 2). Some of these sites may become transboundary biosphere reserves. On the border between the Lao Peoples Democratic Republic (Lao PDR) and Cambodia, the Siphandone and associated wetlands are home to a highly endangered endemic freshwater dolphin. Between Lao PDR and Vietnam, the Sai Phou

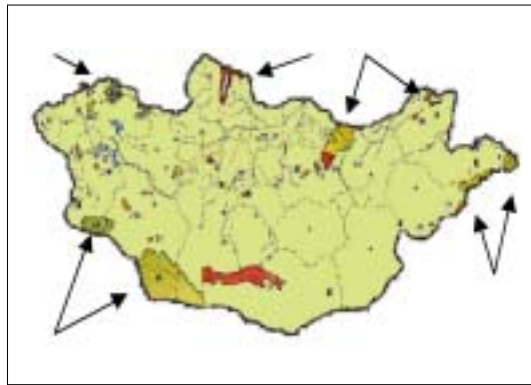


Fig 1. Many Mongolia protected areas are located at national borders. The success of the conservation largely depends on cooperation with its neighboring China and Russia Federation

Luang mountain range contains a cluster of protected areas on either side of the border, containing wide tracts of virtually undisturbed tropical montane rainforest, as well as multiple karst cave systems with as of yet unexplored biodiversity. In Thailand, on the border with Myanmar, the Thung Yai Nature Reserve is Thailand's most extensive remaining natural forest complex, and home to several threatened large mammals such as tigers and elephants. On the island of Borneo, the two Malaysian states of Sarawak and Sabah both share protected area borders with neighbouring Indonesian Kalimantan states covering lush Central Borneo montane forest – home to several species of primates as well as one of the world's most biologically diversified forest ecosystems. In addition to this Bornean rainforest, two more sites have been highly considered for in-

clusion in the World Heritage list in the coming years: Peninsular Malaysian lowland forest in Malaysia and Thailand, and Northern Borneo moist forest in Malaysia and Brunei (UNESCO and PHKA, 2002). Table 1 lists some of the current and potential transboundary reserves identified through several workshops related to World Heritage (WH) and ASEAN Heritage Parks (AHP).

There is also a transboundary cooperation issue linked with large river systems and watersheds. The Mekong River Basin provides one interesting and challenging case. While the Mekong River region has been the focus of much discussion – as well as the establishment of an intergovernmental body to ensure managerial coordination - only very modest results have emerged in the field of protected area cooperation and management. The ramifications of uncoordinated development in the Mekong reach far and wide – from disputes over the downstream effect of upstream dams, to the arguments on issues of spawning grounds and fishing rights. Encouragingly, the situation is starting to improve, thanks to the work of international NGOs. UNESCO is also approaching the subject through its MAB and Biosphere Reserve Network and institutional cooperation with ASEAN.

In East Asia, two adjacent Biosphere Reserves - Mount Changbai and Mount Paekdu - share the same volcano mountain and its mountain forest ecosystem, including a crater lake. Mongolia's East Steppe Restrict Protected Area for the Mongolian Gazelle (*Procapra gutturosa*) needs conservation support from China and Russia to achieve its objective to protect the migratory species. Anxi National Nature Reserve of China and Great Gobi "A" Biosphere Reserve of Mongolia are seen as natural partners for wild camel pro-



Fig 2. Current and potential-boundary reserves in Southeast Asia.

Table 1. Tentative list of current and potential transboundary reserves

No.	Name	Country	Sites Involved	Status	Source
1-1	Central Borneo Montane Forests (A)	Indonesia, Malaysia	Betung Kerihun NP, Lanjak Entimau WS, Batang Ai NP	TBCA* High biodiversity-value tropical forest ASEAN Heritage Park candidate site** WH nomination pilot site	ITTO WH Forests ¹ ASEAN Heritage Parks ² Trans-border WH Nominations ³
1-2	Central Borneo Montane Forests (B)	Indonesia, Malaysia, Brunei	Sebuku Sembakung NP, Kayan Mentarang NP, Bulungan Research Forest, Pulong Tau	High biodiversity-value tropical forest World Heritage potential site	World Heritage Forests Trans-border World Heritage Nominee
2	Peninsular Malaysian Lowland Forests	Thailand, Malaysia	Halabata NP, Belum NP (including Krau), Khao Sok/Khong Lan	High biodiversity-value tropical forest	World Heritage Forests Trans-border WH Nominations
3-1	Northern Borneo Palawan Moist Forests	Malaysia, Brunei, Indonesia, Philippines	Gn. Kinabaru, Gn. Mulu, Labi, St. Paul Subterranean Park, Palawan; Sarawak-Kalimantan area	High biodiversity-value tropical forest	World Heritage Forests
3-2	Northern Borneo Moist Forests	Malaysia, Brunei	Gunung Mulu NP, Labi FR	World Heritage potential site	Trans-border World Heritage nominee
4	Kaya-Karen Tenasserim Moist Forests	Thailand, Myanmar, Malaysia	Huai Kha Khaeng/Thung Yai (WH) Naresuan (WH), Andaman Coast, Myinmo Melatkat	World Heritage Site ² High biodiversity-value tropical forest World Heritage potential site	World Heritage Convention World Heritage Forests Trans-border World Heritage nominee
5	North Indochina Sub-tropical Moist Forests	Vietnam, Laos, Thailand, Myanmar, China		High biodiversity-value tropical forest	World Heritage Forests
6-1	North Annam Mountains	Vietnam, Laos		ASEAN Heritage Park candidate site	ASEAN Heritage Parks
6-2	Annamite Range Moist Forests	Vietnam, Laos, Thailand	Phong Nha, Vu Quang, Pu Mat, Kebang (Hin Namnu)	World Heritage potential site	Trans-border World Heritage nominee
7	Tri-state Park	Cambodia, Vietnam, Laos		ASEAN Heritage Park candidate	ASEAN Heritage Parks
8-1	Malaysia, Philippines			ASEAN Heritage Park candidate	ASEAN Heritage Parks
8-2	North Borneo/Balabac Strait/Turtle Islands	Malaysia, Philippines		World Heritage priority site	World Heritage Marine Biodiversity ⁴
9	Phuquoc/Namdu	Cambodia, Vietnam		World Heritage priority site	World Heritage Marine Biodiversity

*TBCA: Transboundary Biodiversity Conservation Area by ITTO

**mentioned as Lanjak Entimau/Bentuang in the source

Sources: 1. World Heritage Forests – the World Heritage Convention as a mechanism for conserving tropical forest biodiversity, December 1998, Berastagi, Indonesia

2. Workshop on the Guidelines and Criteria for the Selection and establishment of ASEAN Heritage Parks, September 2000, Hanoi, Vietnam

3. Technical Workshop on the Preparation of Cluster and Trans-border Natural World Heritage Nominations in the ASEAN Region, Lido lakes, Bogor, Indonesia

4. World Heritage Marine Biodiversity – filling critical gaps and promoting multi-site approaches to new nominations of tropical coastal, marine and small island ecosystems, February/March 2002, Hanoi, Vietnam.

tection. The establishment of Uvs Nuur Depression Biosphere Reserve brings together Mongolia and Russia (Tuva Republic) for the same conservation objectives. A trilateral case concerns the “CMR (China/Mongolia/Russia) – Daurian International Protected Area” (Dalaihu Nature Reserve of China, Mongol Daguur Strictly Protected Area of Mongolia and Dauruskiy Zapovednik of Russia). This is a cluster of wetlands that is home for many migratory waterfowls including some endangered crane spe-

cies. Tumen River basin is another case that involves three countries (China, DPR Korea and Russia). In Southeast Asia, there are also many such divided ecosystems.

At the UNESCO EABRN workshop in 1997, cross boundary conservation cooperation was considered for areas having the following common characteristics (see **Figure 3 on page 22**):

- The sites belonging to neighbouring countries are part of same ecosystems and home, same protected species

and habitats. Sometimes the reserves are geographically adjacent or close to each other and the protected species migrating from one site to another.

- Often the people living in and around these protected areas share the same culture and have similar traditions as well as ways of using the resources.
- Zonation of the adjacent conservation sites is not set up with the same concept and is often inconsistent; sometimes

there are no corresponding conservation systems across the borders.

- Differences in management policies and practices.
- Differences in terms of demands of resource uses and level of human pressure.
- Communication between such sites is often found poor, if it exists at all.
- Often the managers and researchers have little idea about what is going on over the borders, a vital information for conservation.
- Scientific researches are organized independently, and often have duplications.
- Protected areas connected through large hydrological regimes crossing national borders face similar problems.

This state of affairs can clearly cause ineffectiveness or even failure in conservation efforts. Lack of exchange of scientific data and monitoring, for instance may result in wrong calculation of the protected wildlife populations, a crucial piece of information for conservation. Countries sharing a border lake or wetlands may have different management concepts, with one site prohibiting economic production activities in the area, and the other site introducing economic fish species in the reserved water body or setting up factories that discharge pollutants into the system. If not properly handled, such situations will

have the potential to become a source of unpleasant feeling between the neighbouring countries and even a source of dispute between the countries. In certain cases, poaching and legal logging across borders have generated major problems, not to mention natural- or human-caused fires. Tourism activities are increasing also in many protected areas, bringing both challenges and opportunities that require improved cooperation.

UNESCO (EABRN-5 meeting in 1997 at Ulaabaatar) listed some advantages of transboundary conservation, categorised in terms of conservation, scientific research and education, monitoring, management and development (see Box):

Transboundary conservation cooperation as contribution to peace and stability

Certain areas in Asia have been under dispute over sovereignty such as the small islands and reefs in the South China Sea. In a contest with very high diplomatic and security stakes, the countries concerned have confronted each other on several occasions, and relations have, for this reason, often been tense over a period of several years. These are areas where the borders themselves are a problem. In such areas, it is not precise to talk about 'transboundary' cooperation, although the integrity of the ecosystems concerned remains the same and management issues are comparable. Whatever the final solution

as to sovereignty or ownership might be – determined through bilateral or multilateral negotiations between the states concerned – if biodiversity and its conservation are neglected in these areas owing to such disputes, the long-term interests that concern all parties will be seriously affected.

History has shown that it is unlikely that the disputes of sovereignty over territories, waters or the combination of the two, could be resolved in a short period of time. This is because, apart from historical, political and judiciary issues, the complexity due to the high profile of social-cultural aspects as well as emotion involved the people. It is in this context that the development of transboundary biodiversity conservation cooperation becomes relevant and may serve as a temporary solution for the problem. It may help in protecting the natural resources and ecosystems of common interest, stabilising the situation on the ground, reducing tension, and offering a new channel of communication for the countries to explore good will. It may provide a new angle of thinking and assessment over the values of the areas concerned.

Conserving the disputed areas and their biological diversity for future human generations could prove to be a wise and honorable option. It may turn out in the end as the sole and commonly acceptable way in order to accommodate the different positions and to achieve peaceful

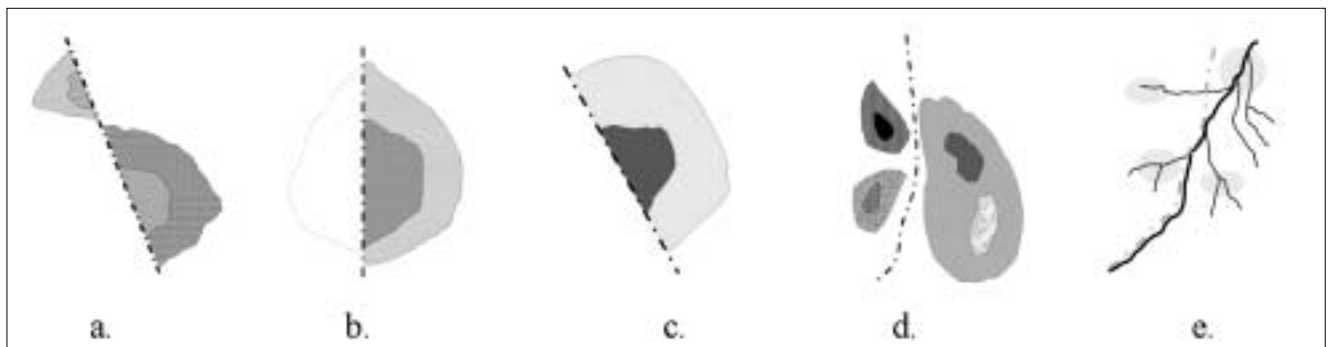


Fig 3. Five sketched situations related to cross border conservation. a. There are PAs at borders but they are not consistent in covering the ecosystem, b. Different zonation concepts and policies, c. Only one side has PA, d. Clusters over the borders but no management contact in between, e. Protected areas over border river systems, problems related to upstream-down stream issues.

Advantages for transboundary cooperation highlighted by EABRN countries

For Conservation

- Better knowledge and coherent data on protected species, especially migratory species.
- Conservation is based on the ecosystem approach and takes biodiversity as a whole.
- Sites may function as crossing backing-up *in situ* gene bases.
- Useful in re-introduction of species extinct on one side of the border.
- Identify gaps in setting up the establishment of protected areas
- Identify differences in conservation policy and management strategies.

Scientific research and education

- Reduce the chance of research duplication.
- Scientific exchange in terms of researches and scientific data as well as building up common scientific databases.
- Better chance for organising integrated scientific surveys and research projects.
- Better chance for receiving support from government and outside sources for this type of joint research.
- Possibility of providing better support for international research and training.

Monitoring

- Better data on migratory animals under protection categories.
- More effective in controlling illegal hunting and poaching crossing borders.
- Water and air pollution control and documentation.
- Nature fire monitoring and observatories cooperation.
- Exchange monitoring methodologies.

Management

- A better knowledge on the partners' management systems particularly "who is responsible for what" on the side of the partners.
- Possibility to exchange and compare maps owned by reserve authorities to develop clearer and consistent maps for conservation management.
- Better knowledge on the technical capacity and facilities for mapping, monitoring and communication, which might be shared when needed.
- Identify and understand the difference on each other's management strategies.
- Be better prepared to respond to emergencies such as pollution problems, disease and forest fires, etc.
- Possibility to develop joint management agreements and even management plans.

Development

- Better understanding of the difference of development policy adopted by the partners across borders.
- Opportunity to exchange and demonstrate examples of sustainable utilization of nature resources.
- Possibility in certain areas to design schemes for common economic activities such as ecotourism and cultural events.

Source: EABRN-5 Report, 1997

coexistence. For such an initiative to be successful, while the countries may and will retain their claims over the areas, they should not exercise major natural resource development in the area concerned, especially by not carrying out industry exploitation, unless it is mutually or multilaterally agreed upon.

Two areas in the East Asia region currently move toward this direction. One is the DMZ (demilitarized zone) dividing the Korean peninsula. The area has been proposed by Korean scientists (EABRN 95, 97, 99) as well as by scientists from around the world as a special zone for conservation and the study of ecosystem rehabilitation. Perhaps more importantly is that the area may become a heritage that has recorded the process from conflict to peace and reunifi-

cation. A DMZ Transboundary Biosphere Reserve has been seriously considered as a possibility for the area, which if established as such, would be a great legacy for future generations of Korean people and the people around the world.

Another area is a group of four islands, Kunashir, Iturup, Shikotan and Hanbomai, which concerns both Japan and Russian Federation. During the UNESCO/MAB-IUCN scientific workshop in January 2001, the participants composed of conservation specialists and scientists, agreed that it is necessary to develop a much closer scientific and conservation cooperation, given the value of biodiversity of the islands and the problems encountered such as poaching. They also agreed that the conservation of these islands and

its surrounding waters is for the best interest of Russian and Japanese people; a joint declaration for cooperation has thus been made, the first time in history regarding these islands.

International and regional instruments related to the issue

Although not specifically articulated, the Convention on Biological Diversity has also put a basis for transboundary conservation⁴. This is reflected in the provisions regarding *in situ* conservation and technical and scientific cooperation. Within the UNESCO framework, there are two international instruments that can promote and implement transboundary conservation cooperation: Seville Strategy for Biosphere Reserve and World Heritage Convention. In the regional framework, UNESCO and ASEAN have been working together to promote transboundary cooperation.

Seville Strategy for Biosphere Reserve

The Seville Strategy for Biosphere Reserve, developed in 1995, has special provisions for guiding transboundary conservation, using the biosphere reserve as a mechanism. These are:

- Objective 1.2: Integrate biosphere reserves into conservation planning. Recommendation at the international level: Encourage the establishment

⁴ Convention on Biological Diversity's provisions for transboundary conservation can be seen from these items: Item C of Article 14 on Impact Assessment and Minimising Adverse Impacts says: "Promote, on the basis of reciprocity, notification, exchange of information and consultation on activities under their jurisdiction or control, which are likely to significantly affect adversely the biological diversity of other states or areas beyond the limits of national jurisdiction, by encouraging the conclusion of bilateral, regional or multilateral arrangements, as appropriate. Item 5 of Article 18 on technical and scientific cooperation says: the Contracting Parties shall, subject to mutual agreement, promote the establishment of joint research programmes and joint ventures for the development of technologies relevant to the objectives of this Convention.

of transboundary biosphere reserves as a means of dealing with the conservation of organism, ecosystem, and genetic resources that cross national boundaries.

- Objective IV.2: Strengthening the World Network of Biosphere Reserves. Recommendation 6 at the international level: Promote and facilitate twinning between biosphere reserve sites and foster transboundary reserves.

In line with the Seville Strategy together with the development in the regions, UNESCO-MAB has set up an ad hoc task force on transboundary biosphere reserves (TBR). The work of the task force resulted in a set of recommendations during the MAB Seville+5 Conference in Pamplona, Spain. These recommendations were adopted by the 16th session of the MAB International Coordinating Council held in November 2000 in Paris.

The Pamplona recommendations for the Establishment and Functioning of Transboundary Biosphere Reserves provides a general provision and definitions about the: 1) Procedure for the Establishment of a TBR; 2) Functioning of the TBR; 3) Institutional mechanisms and 4) Responding to the Goals of the Seville Strategy. It is the mechanism for UNESCO-MAB to act in the promotion of transboundary cooperation. The process leading towards the official designation of a TBR can include many forms of cooperation and coordination among the existing and proposed areas on either side of a border.

World Heritage Convention

In parallel, UNESCO is looking into the transboundary conservation issue through the World Heritage Convention. Currently there are eight trans-border natural and mixed World Heritage sites inscribed, and involves 14 countries⁵. The significance of the World Heritage con-

cept is universal application for the protection and conservation of a cultural and natural heritage with outstanding universal value. The Convention stated that countries recognise that the sites located on their national territory and inscribed in the World Heritage List constitute a world heritage "for whose protection it is duty of the international community as a whole to cooperate" without prejudice to national sovereignty or ownership. By inscribing a site as World Heritage, the States Parties are expected to benefit in the protection and conservation of the cultural and natural properties in the form of: 1) building up public awareness, 2) receiving financial, technical and emergency assistance, 3) receiving international cooperation, and 4) promoting local people participation.

UNESCO, in cooperation with the United Nations Foundation (UNF) and the United Nations Fund for International Partnerships (UNFIP), launched a project, *the World Heritage Biodiversity Sites – filling critical gaps and promoting multi-sites approaches to new nominations*, in 2000. The main objective of multi-sites approaches is to increase the total area of internationally protected areas with minimum increase in the number of listed sites, in order to ensure the credibility of the World Heritage listing process and the maximisation and efficiency of the conservation effort. A trans-border approach, in particular, is expected to promote further international cooperation to protect ecosystems or management areas from an ecological point of view. One of the goals of this project⁶ is to assist in cooperation efforts among the ASEAN countries to develop pilot cases for cluster and trans-border World Heritage nominations for the conservation of the tropical forest biodiversity. As it is now, the World Heritage Biodiversity sites in this region are poorly represented in spite of the region's global

biodiversity significance and high potential of areas as World Heritage sites.

At the first regional technical workshop in Lido Lakes, Bogor in March 2001, the Central Borneo montane forests, located between Indonesia and Malaysia, was selected as a pilot project site for trans-border nomination, taking into account the preparedness of the countries and the sites concerned and operational conditions of the project. The target for submitting the nomination document to the World Heritage Centre by both governments was February 2003.

The project has two distinctive objectives as follows:

- To nominate the Central Borneo Montane Forests (Betung Kerihun National Park, Lanjak Entimau Wildlife Sanctuary and Batang Ai National Park) as a trans-border World Heritage site to contribute to conserving the tropical forest biodiversity in Southeast Asia.
- To learn modalities and procedures for preparing trans-border World Heritage nominations and to share experiences and knowledge obtained from among the rel-

⁵ These include: Belarus-Poland (1979, 92); Belovezhskaya Puscha Bialowieza Forest (N iii); Costa Rica-Panama (1983, 90); Talamanca Range-La Amistad reserves La Amistad National Park (N i, ii, iii, iv); Cote D'Ivoire-Guinea (1981); Mt. Nimba Strict Nature reserve (N ii, iv); Hungary-Slovakia (1995, 2000); Caves of the Aggtelek Karst and Slovak Karst (N I); USA-Canada (1979, 92, 94); Kluane/Wrangell-St. Elias/Glacier Bay/Tatshenshini-Alsek (N ii, iii, iv); USA-Canada (1995); Waterton Glacier International Peace Park (N ii, iii); Zambia-Zimbabwe (1989); Mosi-oa-Tunya/Victoria Falls (N ii, iii); France-Spain (1997, 99); Pyrenees-Mont Perdu (N I, iii/C, iv, v).

⁶ The other two main goals are: a) to establish the necessary conditions for improving global representation of World Heritage biodiversity sites in coastal, marine and small island ecosystems; and b) to study the global significance of biodiversity specific to tropical karst sites in Southeast and East Asia and improve application of the Convention for conserving tropical karst biodiversity.

evant authorities in the ASEAN region.

The project teams for both countries have carried out necessary documentary and field surveys and socialization activities for local communities on the project site in cooperation with the park management and NGOs. The compilation of the information and data for the nomination document is still in process. It is recognized that main constraints for implementing the project are not technical matters but rather those derived from historical, cultural, political and bureaucratic issues between the two countries. The recent diplomatic relations between the countries, which becomes relatively tense due to issues concerning illegal logging, labour and immigrants and haze pollution, are likely to have induced some delay in proceeding the trans-border nomination in central Borneo.

UNESCO-ASEAN cooperation

UNESCO and ASEAN have been working together to promote and establish transboundary conservation areas in Southeast Asia through the 19th AWGNCB meeting in Bogor and the ARCBC workshop in Hanoi, Vietnam in 2000. Recommendations from the workshop "Towards Harmonising the Management and Action Plans for Trans-boundary Reserves in ASEAN" in Phnom Penh, Cambodia in November 2002 are useful in reviewing the current and possible sites for transboundary cooperation and in preparing specific harmonised action plans for a few identified sites. It is also expected that UNESCO, ASEAN and other relevant organizations will take a more active role in contributing to creating links with the current protected area systems in the region, such as ASEAN Heritage Parks, World Heritage and Biosphere Reserves.

Conclusion

Transboundary conservation is a relatively new subject but is expected to become a very active field in biodiversity conservation in the com-

ing years. The needs and interests in pursuing this subject in the Southeast Asian region are by no means less than other regions, although currently there are a few operational cases. The direct beneficiaries through such cooperation are the countries that committed to the implementation of the Convention on Biological Diversity. Such cooperation would help improve each of the countries' natural resources management and effectiveness in protecting the habitats and species at cross border ecosystems, as well as bring long-term benefits to the countries. Through such cooperation, the communication, exchange and understanding between the people can be enhanced, as these are crucial ingredients toward friendship, trust and the spirit of peace. If we were successful in the cases mentioned in the papers (presented during the "Workshop Towards Harmonising the Management and Action Plans for the Conservation of Trans-boundary Reserves in ASEAN"), the Southeast Asian region would create a new paradigm toward the reduction of conflicts and building peaceful atmosphere through cooperation of science and biodiversity conservation.

In general, there is an obvious difference in terms of preparedness among the countries toward transboundary conservation. Apart from political will, the lack of technical capacity in countries is part of the reason; funding is also a constraint. Although there are already some international mechanisms and guidelines, countries still need to respond to the issues on a case-by-case basis, an approach which often takes its point of departure in bilateral diplomatic concerns rather than in a potentially more productive and wider, scientifically-based framework. Roles of national and international NGOs toward such issues have not yet been explored. For disputed areas, where borders themselves are a matter of disagreement, the framework of cooperation is largely un-chartered.

To move ahead on this issue, international communities and the countries must amass the needed institutional, intellectual and financial resources. The existing frameworks and instruments, such as Biosphere Reserves and World Heritage that offer room to accommodate transboundary conservation cooperation, should be used and explored. In this undertaking, science has a major role in initiating the cooperation. Effort should also be made to bring NGOs into the initiatives. For the countries involved in a new initiative, they must pay attention to identify and work the right partners and to the approaches used, given the sensitivity and political-legal complexity of the issue. ■

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PHILIPPINES

Project Title: Ecological assessment, restoration and protection of the Northwest Panay Low-elevation Forest Ecosystem: Developing community-based agroforestry systems for natural resources management and biodiversity conservation

Study Leader: Dr. Samuel N. Koffa, Bioresource Conservation Trust for the Philippines, Inc.

Introduction

As forests in the Philippines and other countries in the Southeast Asian Region recede and/or degrade and human needs for forest products and services mount, there is also a heightening interest in the private and public sectors to protect the remaining forests in an honest attempt to conserve biodiversity and to sustain the variety of ecological processes, which forests normally maintain and support, in addition to the rich assortment of products they provide. Interactive participation in conservation efforts by direct forest-dependent folks (locals) within the proximity of protected forests and other nature reserves has been recognised in the Philippines and across the globe as a key ingredient for success in this endeavor.

Arguments for participation of locals in protected area management range from humanistic (ethical, human rights concerns) to those predicated upon pragmatism, resource use efficiency and conflict resolution. A critical element in the quest towards participation, as practical experience and recent research results on the subject indicate, is to integrate the needs of locals into conservation objectives. One of the most common, appropriate and potent means to effect participation is to adopt the framework of the integrated conservation and development (cash income and livelihood generation for and by locals) approach.

Developing and employing the principles and practices of agroforestry through a range of social assessment tools (quantitative surveys, key informants, semi-structured interviews, focused group discussions), the above project had meticulously planned and successfully executed research and development activities that would help abate the degree of human impact on the remaining fragments of the Northwest Panay Low-Elevation Forest (NPLF). It would also help address the survival and socio-economic needs of direct forest-dependent families of farmers, fisherfolks and hunters or immediate project clients. This document is an update on the project's accomplishments.

Propagation of more seedlings of a variety of client-preferred plant species in 17 community-based nurseries.

The 17 nurseries were established for and with 15 people's organisations in 15 village communities and one nursery each on the campuses of the Central High School in Pandan and a Vocational High School in Libertad. Pandan and Libertad are municipalities in the Province of Antique where significant fragments of the NPLF are located. In addition to the 27,719 seedlings (of 21 plant species) propagated during the first year of the project, some 24,246 more had been raised in the second year.

Development of 10 agroforestry systems and component technologies (in direct fulfillment of the requirements for livelihoods and indirectly for forest conservation purposes).

Establishment and development of agroforestry systems

Four (4) multi-strata agroforestry systems had been established, developed and are being managed on coconut-dominated lands in four village communities. These systems are "multi-strata" because of the various canopy layers created by the different species introduced in the huge spaces among coconut trees in a given coconut plantation (to diversify productivity and maximise the use of the land). The systems include coconut trees (in the first stratum), followed by timber and fruit trees (second stratum) and crops such as ginger, pineapple, forage grasses and beans on the last stratum (ground level).

Agroforestry technologies

Honeybee husbandry. Three honeybee colonies had been established and are being managed directly by a selected group of clients who had, during the training in honeybee husbandry, demonstrated outstanding ability to understand the subject matter and to train others.

Honeybees are very active and effective pollinators for many crop types; their integration into agroforestry can improve crop yield. Properly managed honeybee pollination can result in larger, well-formed fruits, berries, vegetables, nuts and seeds. Hence honeybee husbandry can improve agroforestry, forestry and agronomic crop production and productivity.

Tree-planting and management. More than 35 small-scale (0.25-2 ha) plantations of timber and fruit trees had been established by members of the 15 grassroots organisations whose members are the project's immediate clients/beneficiaries. These trees had been planted in degraded areas within watersheds, which the communities feel are very important for

sustaining their water supply; others in vacant backyards, and the rest on lands designated for the DENR's Integrated Social Forestry Programme. These plantations belong to those who planted them for various reasons (cash, construction material, food, forest conservation, watershed stabilization). Students in Pandan Central School will soon be planting over one thousand trees on their campus this month, mainly for shade and boundary delineation.

Installation of biogas digesters. Clients who own livestock, especially pigs, raise them close to their houses, about two to five meters away. The odor of animal waste and from the animals themselves is clearly a health menace in itself because it attracts houseflies and other carriers (undetected, unidentified) of diseases, which take their toll on the lives of rural households. This health hazard is being lessened as animal wastes (in some cases, crop residues) are deposited into biogas digesters. Eight units had been installed in rural households in the five municipalities: Buruanga, Libertad, Malay, Nabas, Pandan. At the time of this update, four biogas digesters are in full operation. Thus, the clients have cut down their dependence on forests for fuel and have not been buying LPG, saving their money to buy other or future needs.

This good news about the biogas is spreading like fire, and requests for more units have been received by the office in the past few months. Moreover, the digested wastes in these biogas digesters are excellent sources of organic fertilizer, which are used to improve soil fertility and for the production of chemical free-vegetables and other crops. The fertilizers produced are also used to increase soil fertility for tree-growing purposes, as much of the areas slated for tree planting are highly degraded.

Seedling dispersal

There are several thousands of seedlings of over 20 plant species that are still in some nurseries. These have yet to be collected later by clients inasmuch as they are still small for outplanting. Some beneficiaries had collected and planted most of the healthy and plantable seedlings.

Completion of community mapping exercises to groundtruth 3-D maps and delineate forest boundaries

Community mapping exercises as well as the delineation of the protected forest have been completed. There is already a map of the area.

Characterisation of mycorrhizal species (which are associated with various plant spe-

cies in the protected forest)

The first draft of this work had been submitted by the team (in Los Banos) that carried out this study; it had been reviewed and is being finalised. The final copy is expected within the second week of (July 2003).

Publications of results

Faunistic and floristic inventories, mycorrhizal characterization, analysis of market and marketing constraints and opportunities, primers on the propagation methods and techniques of six tree species, stakeholder analysis and a detailed quantitative survey on trees that beneficiaries themselves have grown on farms through their own initiatives (for livelihood and other purposes) have been done. Almost all publications had been completed or are in the final stages of completion. Those under completion concern with the faunistic inventory, primers on propagation methods and the detailed quantitative survey. These papers shall be completed and submitted as scheduled.

Training courses, workshops and a field day

All training courses and workshops had been completed. There is a planned field day in which the project's overall accomplishments shall be shared with the public.

Preparation and submission of the Final Report

Collection of data on all activities is being finalised and is expected to be completed on or before 25 July 2003. As agreed, the Final Report shall be submitted on 31 August 2003.

Project Title: Resource assessment, economic valuation and identification of rehabilitation strategies and alternative livelihood options in areas within and surrounding the Batangas Bay, Ragay Gulf and Tayabas Bay, Philippines
Study Leader: Ms. Merlyn Rivera, Ecosystems Research and Development Bureau, College, Laguna, Philippines

This 30-month project was implemented in July 2001 to: conduct a resource inventory and assessment within the surrounding areas of Batangas Bay, Ragay Gulf and Tayabas Bay; describe ecosystems health vis-à-vis prevailing geophysical conditions of the area; identify marine and terrestrial resources of economic and ecological importance in the surrounding communities of the said sites; identify threats to biological resources and areas where rehabilitation strategies may be applied;

assess the economic importance of marine and terrestrial resources in terms of their market and non-market values; identify income-generating/livelihood activities which would lessen the pressure on biodiversity; and lastly, draw up management plans for the conservation of biological diversity in these areas.

The project covers three (3) sites – the Ragay Gulf, Tayabas Bay and Batangas Bay. The project adopted the landscape/watershed approach in studying resources, wherein all levels (upland, lowland and coast/marine) are represented. The study was conducted by a team of scientists with different disciplines.

Among the three sites, the Ragay Gulf's location is the farthest and the first studied site. It is approximately 300 km south of Manila. The Ragay River Watershed was the specific site studied. Identified as the largest watershed in the municipality, Ragay is under the political jurisdiction of Ragay, Camarines Sur with an area of 18,464 ha. The Watershed is composed of 28 barangays. Its main tributary is the Ragay River, which empties into the Ragay Bay and to the Ragay Gulf. It falls under Climatic Type IV under the Corona Classification, which is characterised by evenly distributed rainfall throughout the year. The average rainfall is 12,913 mm.

In the case of Tayabas, the Binahaan River Watershed Forest Reserve is the specific site of study, located at Pagbilao, Quezon. It is about three to four kilometres from the Pagbilao-Atimonan National Road and about 156 km south of Manila. It has a land area of about 1,489.26 ha of forested areas and is drained by the main channel of the Binahaan River or Locohin River from the downstream to the coastal mouth of Pagbilao Bay. The area is categorised under Climatic Type II, which is characterised by a wet season from July to December, and relatively dry from January to June, with an average rainfall of about 5,039 mm.

To date, project management has been able to analyze data gathered on the inventory and assessment of resources from the two sites – Ragay Gulf and Tayabas Bay and rehabilitation measures have been identified as well; initial work has begun in Batangas Bay. The following are the discussions on the preliminary inventory on the resources, particularly flora and fauna, found in the first two sites.

Flora. In assessing plant resources, the project used the Quadrat Sampling Technique. Ragay has a total of 180 species inventoried belonging to 87 families under various forms, namely: tree, shrubs, vines and grass in Quadrats I & IV. The most dominant is the *Vitex parviflora* (molave), *Polyscias nodosa* (malapapaya), *Cordia dichotoma* (anonang), *Cocus nucifera* (cocoanut), and *Samanea saman* (rain tree). In Quadrats II and III, the most dominant species is the *C. nucifera*.

Binahaan, on the other hand, has a total of 199 species belonging to 163 genera and 65 families. The family Moraceae is the most diverse among plant species in the watershed area. Other families with the most number of representative species are Euphorbiaceae and Fabaceae (11), Arecaceae and Poaceae (10), Meliaceae (9) and Rubiaceae (8). Rhizophoraceae is the most prevalent mangrove species.

Fauna. The faunal species observed and found to be existing in the Ragay area include bulbuls, warblers, flycatchers, sunbirds, kingfisher, tree sparrows, wildpigs, monkeys, wild cats, rats, rodents, monitor lizards, and water monitor lizards. There are also mangrove heron, bhramingy kite, white-collared king fisher, Malaysian fantail, crow sunbirds, titmouse, serpent eagle, yellow-vented bulbul and wood swallow.

In Binahaan, a mangrove area was found to have 28 species of birds belonging to 18 families. Fifty (50) per cent of these is endemic to the area and the country, 25% is rather common and another 25% is classified as either migratory and/or introduced. There are also monitor lizards and species of bats found thereat, namely: *Rosettus amplexicaudatus*, *Pteropus vampyrus*, *Eonycteris spelaea* and *Macroglossus lagochilus*.

The uplands of Binahaan Watershed is mostly agroforestry/agricultural in nature. There are a total of 24 bird species under the 19 families sighted and identified. These species include *Passer montanus*, *Pycnonotus goiavier*, *Collocalia esculenta*, *Hypsipetes philippinus* and *Lonchura leucogaster*. Binahaan's forested areas have been found to have other bird species like the *Zosterops nigrorum* and *Pycnonotus goiavier*. There were other bird species caught by mist nets.

Large mammals that are still in existence are the Philippine deer, wildpigs and civet cats.

Eight (8) orders of arthropod species were also observed at the upper and lower streams: shrimps (Decapoda), mites (Acari), pill bugs (Isopoda), caddisflies (Trichoptera), mayflies (Ephemeroptera), bugs (Hemiptera), dragonflies (Odonata) and stoneflies (Plecoptera). The assessment revealed that the upstream portion had more insects than in the downstream area.

The following were also inventoried and assessed: microfungi, coastal and marine resources, hydrology (water and sediment charges, water quality, plankton population), soil and socio-economic component (socio demographic, economic and community profiles). The project has also started identifying alternative livelihood options in the two sites.

The terminal report is expected to be submitted in December 2003, which would incorporate the analyses on the various data gathered from the three project sites. ■

SINGAPORE

Project Title: Population and conservation biology of a threatened Malesian ornamental genus, *Johannesteijmannia* H.E. Moore (Palmae)

Study Leader: Associate Professor Hugh Tan Tiang Wah, The National University of Singapore, Singapore

This 21-month project, which started in March 2002, aims to conduct studies on population genetics, evolution, systematics and phylogeny of *Johannesteijmannia*, purposely to provide information necessary to effectively manage conservation as well as sustainable exploitation of the species.

Johannesteijmannia is a genus of four species of forest understorey palms ranging from southern Thailand, Peninsular Malaysia, Sumatra and western Borneo. The four species are *J. altifrons* (Reichb.f.et Zoll) H.E. Moore, *J. lanceolata* J. Dransfield, *J. magnifica* J. Dransfield and *J. perakensis* J. Dransfield.

J. altifrons, which is the most widely distributed congener, occurs in southern Thailand, Peninsular Malaysia, western Sarawak, western Kalimantan and Sumatra. The other three are endemic to Peninsular Malaysia, and are relatively rarer and more threatened. *J. perakensis* is restricted to the Kledang Saiong and Gunung Bubu Forest Reserves in Perak. *J. magnifica* occurs in patches in Ulu Semenyih, Selangor and in a few hills in northeastern Negeri Sembilan, whereas *J. lanceolata* is known in Selangor, Pahang (Dransfield 1972) and Negeri Sembilan.

The four species are under threat due to the loss of habitat because of logging, deforestation, over-

collection of leaves (by the indigenous communities for making house and roof thatches) and seeds (for export). The condition has become worse because all four species are sensitive to forest disturbance and are severely threatened by forest clearance.

Although *J. altifrons* is more widespread and common than the others, it should also be considered under threat. Field observations in Belum Forest, Perak over a 10-year period reported that the native population of *J. altifrons* has decreased to approximately a quarter of the original population (Lim and Whitmore 2000). On the other hand, the conservation of *J. perakensis* is particularly important since the species is restricted to Perak. Consequently, conservation of the four species should be carried out before it is too late.

The evolutionary history and distribution of the four *Johannesteijmannia* species exhibit an interesting pattern because one species is widespread and the other three species are endemic to Peninsular Malaysia. Of the three species, *J. perakensis* is endemic to Perak. It is also the only species with a trunk, although the reason for this phenomenon is not known. It would be interesting to confirm whether all the *Johannesteijmannia* species are monophyletic.

One of the more efficient strategies to conserve the plants properly is to understand the genetic variations within and among populations. In order to better understand the population genetic structure, it is important to study the reproductive biology, especially the mating system of the plants. Mating systems determine the pattern of genetic transmission and affect the organisation of genetic variation in a population. Hence, the knowledge of mating systems and inter- and intra- population genetic variability has important practical application in the management and conservation of these endangered plant species.



J. altifrons



J. perakensis

At present, field collections have been made for 73% (19 out of 26) of all the study sites of four *Johannesteijsmannia* species in Thailand and Malaysia. Collections have been subjected to the following analyses: morphometric, molecular, and phylogeny.

Morphometric Analysis. Some preliminary phenograms using morphological characters for each species using the samples have been collected. Most of the populations examined were morphologically indistinguishable. However, differences were observed in the inflorescence morphology for *J. lanceolata* at two study sites. For the plants at the Angsi Forest Reserve (Negeri Sembilan, Malaysia) their inflorescences show more rachillae when compared with those of the Sungai Lalang Forest Reserve (Selangor, Malaysia). Populations in Pahang (Malaysia) will have to be examined before any conclusions could be drawn.

Molecular Analysis. Amplified Fragment Length Polymorphism (AFLP) fingerprinting was carried out for *J. altifrons* from eight populations. Eight primer combinations were screened but only six have been selected for the analysis as they produced more polymorphic bands. A total of 418 bands were scored, of which 316 were polymorphic. Analysis using the software AFLP-SURV 1.0 was carried out to estimate the genetic differences within and among populations. Preliminary results show that the genetic variation among populations can be detected although they are morphologically indistinguishable. Also, cluster analysis was done using the computer programme Multi-Variate Statistical Package (MVSP) version 3.10b. The cluster analysis showed that most of the individuals from the same population are clustered together.

Phylogeny. Interests are in studying the relationships of *Johannesteijsmannia* with its sister group *Licuala* and selected taxa from the same subfamily Coryphoideae. DNA sequencing will be carried out using the three targeted nuclear genes or regions, viz., genes encoding for phosphoribulokinase (*PRK*), the second largest subunit of RNA polymerase II (*RPB2*) and 5S ribosomal DNA. DNA sequencing has been successfully optimised and developed for *PRK* and *RPB2*. Both the genes, *PRK* and *RPB2*, have been amplified. PCR amplification for *PRK* yielded a band of approximately 700 base pairs (bp) and that for *RPB2* yielded a band of approximately 900 bp. Both regions have been cloned into a vector and then sequenced. Next activities to be done will be on trying out the protocol for amplifying and sequencing 5S ribosomal DNA. ■

VIETNAM

Project Title: The study and conservation of bryophyte diversity of Vu Quang Protected Area in Ha Tinh Province

Project Leader: Tran Ninh, National University of Hanoi, Vietnam

Although bryophytes play a significant role in the forest ecosystem and perform a vital ecological role as a whole, the knowledge of Vietnamese on bryophytes is still uneven and fragmentary. Easily accessible mountains such as Tamdao Mountains, Hoang Lien Son mountainous range, have been visited by various expeditions and collectors whereas in large areas of Vietnam including Vu Quang Protected Area no collections have been made yet.

Vu Quang Protected Area is an area of spectacular natural beauty for tourism. It is largely a mountainous area sharing its border along the western side with Laos. It has global importance from the recent discovery of *Psudoryx nghetinhensis* and *Megamuntiacus vuquangensis*, respectively the sixth and seventh large mammals discovered during the past 100 years.

During the first year of the project, about 1500 packets of mosses and liverworts were collected in three expeditions. Preliminary determination of some 200 packets belonging to liverworts and mosses include: four species new to science, namely *Cololejeunea vuquangensis* Pocs; *Colura brevistyla* Herz. var. *vietnamica* Pocs; *Frullania tranninhiana* Pocs and *F. vuquangensis* Pocs; and eight species new to Vietnam, namely: *Cololejeunea madothecoides* (Steph.) Ben; *Dumortia hirsute* ssp. *Nepalensis* (Tay.) Schust.; *Frullania junghunhiana* Gott.; *Heteroscysphus zollingeri* (Gott) Schiffn; *Lejeunea anisophylla* Mont.; *Lejeunea exilis* (Reinw.) Grolle; *Lejeunea obscura* Mitt.; *Plagiochila aff. Javanica* (Swartz) Dum.; and *Plagiochila intergrilobula* Schiffn. More packets need to be identified and classified in the second year of the project.



Bryophyte

Project Title: Biodiversity assessment in the Ha Long Bay Heritage Area and proposition of management plans

Project Leader: Nguyen Van Tien and Tu Lan Huong, Hai Phong Institute of Oceanology

Recognised as a World Natural Heritage by UNESCO in 1993, Ha Long Bay is rich in economically valuable resources such as coral reefs, mangroves and seagrasses.

The project aims to conduct an inventory of the species richness, aquatic resources, ecological conditions and their changes of the Bay; assess its marine biodiversity; conduct rapid appraisal of environmental conditions, utilization status, development activities and threats to marine biodiversity; and propose management plans, which include mapping of marine biodiversity zones and involving the community in the management work.

Results of samples obtained from the three field surveys show that the species diversity of organisms in the Ha Long Bay is high. Some 2,099 species of marine organisms were recorded, and included 278 arephytoplankton, 53 foraminifera, 129 seaweed, 5 seagrass, 16 mangrove, 141 zooplankton, 146 corals, 554 zoobenthos, 147 fish, 107 coral fish, 435 plants on islands, 76 seabirds, and 22 mammals on islands. The total number of species obtained from the present surveys was approximately three times (2,099 species) higher than the past records (753 species).

More than 150 species of economic importance were found in Ha Long Bay. These are divided into five groups, namely: species for export; food group; raw material for fine arts; medicine; rare and precious species.

The 32 species for export include seaweeds, gastropods, bivalves, squids, crabs, fishes. The most significant species are: snappers, Epinephelus, mackarels, tunas, Gracilaria, Haliotis, blood ark, pearl shell and oysters, loligo, sepia and sea crabs. There are 36 other species used as food, and these include "Sa Sung" (*Sipunculidae*), "tu hai" (*Lutaria rhinchaena*), "Ngo den" (*Dosinia laminata*), "trung truc" (*Sinovacula constricta*), *Ostrea*, scallop, fish and seaweeds.

Ha Long is a city that is highly urbanised, with an urban population of over 95% that threatens the ecosystem. The Bay area surrounding the City with water surface area of 2,000 hectares and the 50-km coastal areas offer a good site for seafood aquaculture, thus, tidal coastal areas in Cua Luc, Yen Cu, Dai Yen and around Tuan Chau Island have been used extensively for intensive farming and industrial

fishing. The mangrove forests from Cai Dam, Lan Be Gieng Day to Van Yen, Le Loi, Thong Nhat are being devastated. Threats to the coral reefs are overexploitation of branching coral for fine arts in tourism centres and hotels, digging on reefs to find mollusk and capture fishes.

The sustainable use and development management of Ha Long Bay is much needed. The project included recommendations on fishing seasons, gears, exploitative production, governance, and aquaculture. The project finds it worthy to protect specific areas such as Tuan Chau Island, Cong Do, Vung Ha, Ba Cat, Hang Trai, Dau Be, Cai Dam, Dau Moi, Dau Go.

Project Title: Introduction of rare and endangered medicinal plants into the forest gardens of ethnic minorities

Project Leader: Luu Dam Cu, Institute of Ecology and Biological Resources (IEBR), Hanoi, Vietnam

About 3400 species of medicinal plants are known to occur in Vietnam. More than 80% of them are distributed and grow wildly in the mountainous provinces. Harvesting of wild medicinal plants is one of the important sources of economic income for ethnic groups living in the mountainous areas. A large number of the medicinal plants are also used for traditional pharmacies in the whole nation.

The demand for the medicinal plants caused many species to become rare and endangered of extinction. These species include: *Coptis sinensis*, *C. quinquiserta*, *Panax bipinnatifidus*, *Berberis wallichiana*, *Nervilia fordii*, *Valeriana jatamansii*, *V. hardwickii*, *Thalictrum foliolosum*, etc. The research study was thus proposed in order to determine how the introduction and development of medicinal plants in forest gardens of ethnic minority groups would change the present state or condition of the said species in the area.

The project specifically aims to study the *ex-situ* conservation of rare and endangered medicinal plants and develop them to become economic products and regular crops in the forest-gardens. It is hoped that through this project, conservation of these plant species and alleviation of poverty in mountainous areas could be addressed and improved.

The selected study site for the project is the Ban Khoang, Sapah communes belonging to Sapa district, Lao Cai province. In these communities, there is a primitive forest with high biological and cultural diversity. The ethnic minorities living in the area are Dao (Jiao) and Hmong (Miao) groups who regularly gather medicinal plants in the forest.

For the first year of implementation, 22 rare and endangered medicinal plant species were found/discovered in the primitive forests of Lao Cai province. For the study on introduction, 12 forest gardens were established (five in the Hmong community and seven in the Dao community). The 14 selected medicinal plant species were cultivated in the forest gardens, and all species except for one (*Anoectochylus roxburghii*) were introduced successfully.

As part of the information and education campaign of the project, two training courses were organised and conducted in Taphin and Bankhoang communities with the active participation of local people (Hmong and Dao) on the following topics: a) Techniques on agriculture and biodiversity conservation (gathering, cultivating and managing wild medicinal plants); and b) Techniques for preserving and processing medicinal plants.

These training boost the importance of indigenous knowledge system (IKS) of local communities / ethnic minorities in resource management. Their IKS could indeed support conservation of the medicinal plant species if aptly used or applied. This is the first time in the country where some endangered medicinal plants become economic crops in the forest garden of ethnic minorities.

Project Title: Protection of four endangered species in Upper Stream Gam River

Project Leader: Dr. Le Than Luu, Department of Environment and Aquatic Resources Management and Protection, Research Institute for Aquaculture No.1

The Red River system occupies 134,000 km² and is the biggest system in Northern Vietnam. The river strongly influences the lives of nearly 25 million people living in its basin. Gam River is one of the biggest rivers in the Red river system and accounts for about 20% of its sources. Nowadays, the upper Gam River remains one of the richest in terms of aquatic resources and biodiversity. Recently, the Institute of Aquaculture No.1 has carried out a Situation Appraisal on fish fauna in this region. The Institute reported that although a number of fish species were recorded, the fish resources in the area had critically decreased. Valuable fish species such as *Mastacembelus amatus*, *Bagarius yarrelli*, *Spinibarbus denticulatus*, *Balantiocheilus macracanthus*, *Semilabeo notabilis*, and *Sinilabeo lemossoni* are under great pressure due to over exploitation and degradation of their habitats. These species are caught in all sizes by different fishing methods including electric high voltage traps. At

the same time, bottom sand and stones are mined to screen gold traces. This has seriously degraded the habitats and breeding grounds of fishes. The threatened species identified are *Hemibagrus guttatus*, *Bagarius yarrelli*, *Semilabeo obscurus*, *Spinibarbus denticulatus*.

In terms of research, those that have been carried out include some studies on the distribution and breeding season of these species. However, these studies were not directed towards their protection. The Government decided on building a dam at the lower part of the river and this may seriously affect the aquatic resources particularly the fishes. This research grant project therefore aims to study the biology, ecology and habitats of the threatened species to serve as fundamental base to propose and appropriate conservation measures.

The study sites selected for the study are Nahang – Tuyenquang, Bacme-Hangieng, Baolac – Caobang and Chiemhoa – Tuyenquang. After a year of implementation, important biological characteristics such as distribution, growth rate (age, length, weight), feeding habits, gonad development and breeding grounds of the four endangered species in Upper Stream Gam River were determined and analyzed.

In Gam River, the two-fin-fishes (*Spinibarbus denticulatus* and *Semilabeo obscurus*), and two catfish species - *Bagarius yarrelli* mainly distributed at Bacme to Nahang, and *Mystus guttatus* from Nuido down stream to Tuyenquang - are the focus of this study. With the present river conditions, the growth rate of these four endangered fishes is low and *Semilabeo obscurus* has the slowest growth rate. These fish species will become extinct if overfishing continues.

Spinibarbus denticulatus is a typical omnivorous species. The fish feeds on both vegetable and organic debris, even animal meat. *Semilabeo obscurus* on the other hand, eats mostly algae on rocks' surface. On the other hand, the two catfishes *Mystus guttatus* and *Bagarius yarrelli* are carnivores and prefer to eat small fish, crustaceans and other small aquatic animals.

Spinibarbus denticulatus, *Mystus guttatus* and *Bagarius yarrelli* mature at 4 years of age and reproductive capacity is highest at the ages of 7 or 8, while *Semilabeo obscurus* develops gonad after 2 years. Breeding season of the two catfishes and *Semilabeo obscurus* is during heavy rainy season from June to September, whereas *Spinibarbus denticulatus* breeds from April to June and September to October. The exact breeding ground of the two catfishes is not yet known, although some evidences of fry appearance, gonad development, and breeding grounds were found in Noido, Nahang town and Tuyenquang (where

high fish concentration can be found). *Semilabeo obscurus* migrate to caves for breeding, four of which are in Thantuong, Thuyloa and Bacme.

Based on their growth rate, feeding, living habitat and strong resistance to diseases, the investigated fishes, except *Semilabeo obscurus*, indicate that they can be good pond-cultured species.

Baseline information on the biological characteristics of these threatened species were used to recommend conservation and development measures such as:

- a) Building species areas. Reserved zones for the natural recovery and development of the fish species should be established. In Gam River, the parts of Nahang to Bacme are desirable for building species areas. However, it is the centre of the planned reservoir of the government. Other suggested areas are Babe National Lake, Nang River and the upper stream at Baolac. Biodiversity is considered rich/high in these areas because the distribution of inhabitants is scattered and the impacts from human activities on natural resources are minimal.
- b) Improving management and regulation. Over-fishing is the main threat to these species. Local authorities need to control fishing activities and protect/conservate the aquatic resources through effective enforcement of existing laws.
- c) Community-based management. Local people should be organised and educated in managing their aquatic resources.
- d) Developing aquaculture. Aquaculture plays a very important role in mountainous areas as it creates food supply, employment and income-generating activities. The aquaculture practice in these areas lacks technical 'know-how', resulting in the outbreak of diseases and pollution in ponds. They do not know the causes of fish death and slow growth rate of fishes. Technology transfer and training are necessary for the proper establishment and management of fish-ponds.

Project Title: Investigation on the insect biodiversity of Bach Ma National Park in Thua-Thien, Hue Province

Project Leader: Dr. Le Trong Son, Faculty of Science, Hue University

One of the seven national parks in Vietnam, Bach Ma is located in Thua Thien Hue province (Phu Loc and Nam Dong Districts) on the eastern edge of the Annamite mountain chain. The mountain chain forms



Coleoptera

the natural boundary between Vietnam, Laos and Cambodia. Estimates as to the size of the park vary from 18,900 to 25,000 ha, although the official figure is 22,030 ha. The estimated altitudinal range within the park is from 50 to 1,448 meters above sea level (asl). Floristically, this conforms to the three habitat ranges of lowland (0-700 m asl), transitional (700-1,100 m asl), and lower montane (1,100 -1,500 m asl).

In recent years, some entomological studies have been done, and some authors have made a preliminary report on the general ecological investigation with reference to biotopes of insect biodiversity in Bach Ma National Park. In July and August 1993, five members of St. Catherine's College, Oxford and three Vietnamese scientists investigated the diversity of *Formicidae* and *Sphingidae* within the national park and assessed the suitability of the latter as an indicator of habitat diversity. The study of Bach Ma's moths fauna has a potential role in monitoring the effect of conservation strategies in the area.

The project's overall goal is to provide the basis for the management of insect biodiversity in Bach Ma National Park. The study focused on two major orders, namely: *Coleoptera* and *Lepidoptera*. After a year of implementation, the project found 721 species, 237 genera, 82 families and 16 orders of insects, of which 8 orders, 41 families and 280 species are new. These specimens will be analysed during the remaining months of the project. It is expected that at the end of the project, a field guidebook of insects in BMNP shall have been published.

Project Title: Study on ant biodiversity in Vietnam

Project Leader: Dr. Bui Tuan Viet, Institute of Ecology and Biological Resources

Ants are important components of ecosystems because they constitute a great part of the animal

biomass and act as ecosystem engineers. Ants are ideal bio-indicators because they are diverse and abundantly found in almost every habitat in the world. Ant biodiversity is extremely high, particularly in the tropical rainforest. Many ant species are highly sensitive to microclimate and habitat structure and respond rapidly to environmental changes. These organisms are highly responsive to human impacts, which reduces their richness.

In Vietnam, there are few foreign scientists who have interests in collecting ants. This project, which promotes taxonomy and systematics, provides a reference collection of ants and basis for inventory and monitoring of this diverse group in the country.

After a year of project implementation, the research team collected 2,500 ant specimens from six sites: Ba Vi National Park, Cuc Phuong National Park, Sa Pa, Nha Trang and Ho Chi Minh City, Huong Son Forest, Bai Tu Long National Park, and identified 170 ant species belonging to 60 genera and 8 subfamilies. The collection is still in the initial stage but it is virtually the first ant fauna collection in Vietnam.

Most of the specimens were identified up to the genera level, and others up to the species level. The ant specimens were sorted into genus using the key book of Bolton



Pheidole

(Identification Guide to the Ant Genera of the World). The identification of ants into species was done in Kagoshima University, Japan. Most of the genera of ants were checked into species by Prof. Seiki Yamane; the genus *Pheidole* by Dr. Katsyuki Eguchi; the genus *Myrmecina* by Mr. Okido Hirofumi (Kyushu University); the genus *Polyschachis* by Rudolf J. Kohout; the genus *Dorylus* by Mr. Stefanie M. Berghoff, Department of Animal Ecology and Tropical Biology, Biozentrum, Am Hubland, University of Wuerzburg. From this project, two new *Myrmica* species (*M. titanica* and *M. yamaneii*) and one species new to Vietnam were found.

The project successfully conducted the 3rd International Workshop on Ants at the Institute of Ecology and Biological Resources, Hanoi, Vietnam, and was attended by 26 foreign delegates (from Australia, Germany, Korea, Japan, Malaysia, Sri Lanka and Thailand) and 24 Vietnamese scientists. ■

INDONESIA

Project Title: Research and conservation of the hawksbill turtle (*Eretmochelys imbricata*) in Indonesia

Study Leader: Dr. Matheus H. Halim, Fauna & Flora International Indonesia Programme, Bogor, Indonesia

Introduction. The hawksbill (*Eretmochelys imbricata*) is one of six species of marine turtles occurring in Indonesia. The others are leatherback (*Dermochelys coracea*), olive ridley (*Lepidochelys olivacea*), green (*Chelonia mydas*), loggerhead (*Caretta caretta*), and flatback (*Natator depressus*). All of these species are highly migratory, often passing through territorial and international waters, from feeding to nesting grounds and back. The turtles are likely to come from an area within a radius of 2,500 kilometers around the nesting area (Limpus 1993). Stark (1992) reported that a tagged leatherback from Irian Jaya, Indonesia was discovered in Cebu, Philippines; this shows that the sites of tagging and recovery were separated by some 1,900 km.

The post nesting migration of five female green turtles monitored by satellite tracking from Redang Island, Malaysia showed movement into Indonesian territory in Belitung, Tambelan and Natuna, after being released 28 days (1,153 km), 16 days (714 km) and 13 days (669 km), respectively. Information on the migration of green and leatherback turtles mentioned above indicates that the hawksbill turtle in Indonesia has the possibility of migrating to neighbouring countries, but so far there has been no information on the migration of the hawksbill population from this region. There has yet been no intensive study that would determine the migration patterns of this marine turtle in Indonesia.

The hawksbills occur widely with low nesting densities throughout the Indonesian archipelago. For instance, in the Segamat rookeries (ca. six hectares and two hectares), only 150 nests were found per year. Salm and Halim (1982) recorded 143 nesting sites throughout Indonesia. Some 80 nesting sites were used by hawksbills for laying their eggs and most of these rookeries are located in very remote areas with very poor accessibility. Hawksbill and green turtles have the most depleted turtle species populations in Indonesia due to over harvesting for a long time, including egg harvesting and the utilization of their flesh, carapace, bones, etc. Although the Indonesian government issued Government

Regulation No. 7/1999 totally prohibiting the utilisation of all six species occurring in Indonesian waters, the implementation of the regulation is ineffective and illegal harvest is still going on in areas such as Bali, Belitung and Riau. It is also unknown whether this hawksbill population is shared with other neighbouring countries (as in the case of the green turtle) or is a local population. Therefore, detailed research is needed in order to obtain their migration pattern data by satellite tracking method and to identify the original gene of the species by Mitochondria DNA (mtDNA) analysis.

Indonesia has been trying to down-list the hawksbill turtle species since the CITES meeting in 1992, but has always failed due to data deficiency in terms of population status. Currently, the Government's development strategy prioritises exploitation of marine resources. The establishment of the Marine Resources Ministry shows the importance of these resources as a primary product in the future. Therefore, now is the critical time to establish the status of vulnerable species such as the hawksbill turtle so that sufficient data will be available in the future especially with the predicted exploitation crises.

The ASEAN region is considered a critical habitat for the dwindling sea turtle population. The mtDNA has been widely used for molecular phylogenetic studies. In particular, sequences within the mtDNA control region evolve rapidly, and have proven useful for the resolution of population structure. The mitochondria control region has also proven useful for identifying the nesting origin of migratory animals (Bowen and Avise 1996; Avise 1994). Therefore, effective management and conservation can be considered through collaboration efforts between the ASEAN member-countries. Through this project, an effective measure could be implemented in soliciting cooperation in sea turtle conservation in the region, particularly of the hawksbill population. This research project is a collaborative effort between FFI-Indonesia Programme, Research Centre for Biology-LIPI and the D.G. of Forest Protection and Nature Conservation-Ministry of Forestry RI.

Duration and objectives. The project, which covers two years (01 October 2001 to 30 September 2003) of implementation, aims to: a) identify the critical habitat of hawksbill population, a tool for determining a conservation and management policy and strategy in Indonesia; and b) assist the ASEAN member countries in developing a framework for improving technical and institutional approaches through regional cooperation for managing biodiversity conservation. The specific objectives are to: a) develop and improve the

Indonesian Marine Turtle Centre (IMTC) for gathering data and information from other institutions, government, NGOs, and local people, which would focus on the importance of strengthened biodiversity conservation and management policies and strategies, particularly for the hawksbill turtles; b) establish and maintain an appropriate database referral system that would link national and international institutions and agencies holding information relevant to biodiversity conservation, to the ARCBC, database networks, and possibly with the ASEAN web network where appropriate; c) identify the post migration pattern of hawksbill turtles by using the radio transmitters (photo telemetry) for a 5-month monitoring period; d) identify the feeding grounds of post juvenile and adult female hawksbill turtles; and e) map nesting sites of hawksbill turtles throughout Indonesia.

Project sites. The selected nesting sites for sample collection include: Belitung (Southern part of the east coast of Sumatra, Segamat (Lampung), and Seribu (Islands Marine National Park – northern part of Jakarta). These sites are located in between the China and Java seas. An additional sample site is the Komodo National Park–Western part of Sumbawa Island, representing the hawksbill population of the Indian Ocean.

Progress report. As of early 2003, the following are the highlights of the project's progress report:

Tissue sample collection for mtDNA analysis.

A total of 41 tissue samples have been stored at the genetic laboratory of LIPI in Cibinong for mtDNA analysis. Samples were collected from Seribu Islands (25 samples), Segamat Islands, Belitung (4), and Sumbawa Island (7). More samples will be collected from various parts of Indonesia like Karimun Jawa National Park (central java).

Tagging programme. The programme aims to discover the turtle's inter-breeding migration, interval of nesting, movement, total population, nesting season, and growth rate in nature, etc. Some 1,000 turtle tags have been provided to support the tagging programme, which was undertaken with the collaboration of various international and local agencies. The tag has records of the number, date of tagging, place of turtle found, size of the turtle (straight carapace length (SCL), straight carapace width (SCW), curve carapace length (CCL), curve carapace width (CCW), place of release, and recapture/re-nesting notes).

Satellite tracking. Four units of Platform Transmitter Terminals, St-14 have been purchased from the USA. The transmitters are used to monitor the movement of tagged turtles. ■

CAMBODIA

Project Title: Benefits of seaweed farming for improvement of livelihoods of coastal population and biodiversity enrichment in Cambodia

Study Leader: Mr. Hav Viseth, Department of Fisheries, Cambodia

The Kingdom of Cambodia, which has a total area of 181,035 km², is located in the Indochina peninsula of Southeast Asia. It lies between 10°-15° N latitudes and 102°-108° E longitudes, and is bounded by three countries: Vietnam in the east and the southeast, Laos in the north and Thailand in the West and the Northwest. The topography of Cambodia is generally flat and some lowland plains in the interior of the country, but surrounded by highlands and mountains along the border. In the southwestern part of the country, there are 435 km of coastlines along the Gulf of Thailand, stretching between the Vietnamese borders in the South to the Thai border in the West. Furthermore, the Kingdom of Cambodia has her own Exclusive Economic Zone (EEZ), the area extending from the shoreline to 200 nautical miles, which covers 55,600 Km² (World Resource Institute, 1994).

The fisheries sector plays a vital function in the people's food supply, particularly for poorer members of the population. It is also important to Cambodia's national economy because most national incomes come from this sector through extraction as well as exportation. The latest official data recorded by the Department of Fisheries (DoF) in terms of total commercial fisheries production in 2002 was 424,400 tons, which included small scale and family scale freshwater fisheries and aquaculture production, except crocodile culture (DoF, 2003). In this case, freshwater fish capture was the dominant category, and accounted for 85% of the total production in 2002; marine capture fisheries was 11%, while total aquaculture represented only more than 4%. Even fish production increased based on fish capture fisheries data. The trend in fish production has led many to assume that fishery resources are overexploited. Therefore, to allow fishery resources to recover, alternative jobs for local fishers are the best option to enhance fishermen's

livelihood and stop them from fishing, especially their destructive fishing practices. One option is aquaculture, which, in Cambodia, includes not just fish and shrimp culture but seaweed culture as well. Total aquaculture production has increased since 1984. Seaweed culture, which was introduced in 1999 in Cambodia, is considered to be one of the best employment opportunities for local people who live along the coastline of Cambodia.

Cottonii was first introduced to Cambodia in 1999. More than 500 kilograms of *Euचेuma alvarezii* or *Euचेuma cottonii* was brought from Malaysia by a Malaysian company called 'Star Private Enterprise Limited', which started cultivating this seaweed close to the Prek Treng bridge of Sihanoukville, and then moved to Ream. Due to some problems with the Royal Navy in the area, production was again moved to Stung Hav. After that, the office was moved and finally settled

in Koh Tunsay in Kep Municipality. In Kep, there were more challenges with illegal competitors and an uncooperative governor, so again the project was forced to move office to Prek Ampil Commune of Kampot province by the end of 2000. From 1999 to 2000, the company completely lost any profit because only 16 tons of seaweed were exported to Malaysia. In 2001, the company ex-



Euचेuma cottonii

ported about 303 tons of seaweed and got more benefits, but in 2002 the production decreased to 241 tons due to the poor quality of the seaweed. The company plans to increase the production to 345 tons of export by the middle of May 2003.

The study has focused on reviews of literatures, socio-economic surveys and direct observations in the site to evaluate the socio-economic benefits of seaweed farming and the impacts of seaweed farming on the environment.

Many fieldwork activities were carried out in the site including direct observation, and many stakeholders, especially two groups of fishers and seaweed farmers, have been randomly selected for interview. Data were analysed and interpreted and incorporated into the report. The report also included farming history and techniques, problems encountered, social and environmental impacts, and policy guidelines. Conclusions and recommendations were also mentioned.

The study was strongly anchored on both social and economic surveys. Future plans include a scientific study on the project's biological and ecological impacts. ■

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Photo from <http://parksociety-cambodia>

Kirirom NATIONAL PARK KOMPONG SPEU PROVINCE, CAMBODIA

“Mountain of joy” or “Happy Mountain”, is the English meaning of Kirirom, a name suggested to the King by a monk from Phnom Penh. Kirirom was then a mountain resort (675 m asl), known for its pine-tree covered hills, waterfalls, and small lakes, and quite popular with Phnom Penh’s rich and famous as well as a favourite retreat for King Sihanouk himself in the 1960s. The plateau then was a large recreational complex, but the villas, road and other infrastructure were all destroyed during the Khmer Rouge era. The area was declared a National Park soon after Government troops won it back in 1992. Some buildings have been rehabilitated, and the National Park has again become a popular weekend location for nearby urban dwellers and residents of Phnom Penh.

Kirirom National Park, a high altitude plateau, is more famous for its unique,

high elevation pine forest, which forms the headwaters for numerous streams feeding Kompong Speu Town. The Park is situated 120 km west of Phnom Penh, Phnom Sruoch, District, Kampong Speu province (Cambodia Travel Guide), and abuts Koh Kong Province. It covers a total area of 35,000 hectares (350 km²), all of which is estimated to be composed of natural or semi-natural vegetation.

Kirirom or Preah Suramarit Kossamak (Preah Suramarith-Kosomak) as it is officially called in Cambodian was declared a national park in 1993 under IUCN Category II. The Park is part of the “South-West Cluster Protected Areas” that include the Phnom Bokor, Preah Sihanouk (Ream) and Kep National Parks, all of which covers an area of some 201,000 hectares.

The southwest coastal ranges and marine zone is defined as one of seven biodiversity conservation regions (IUCN

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Spotted linsang (*Prionodon pardicolor*)



Pileated gibbon

1997a) on the basis of its biological resources, geology and soils, and past and present use. This region includes wet tropical forest, coastal formations and marine areas generally associated with sandstones. It has low population densities and is dominated by natural and modified landscapes used for forestry, fisheries and the maintenance of biodiversity. This is considered to be one of the three highest priority regions for biodiversity conservation in the country (IUCN 1997a).

The mean annual total rainfall exceeds 5,000 mm in the Emerald Valley near Bokor in the Elephant Range. Kirirom, which is more distant from the coast in this range, receives about 2,000 mm annually. These ranges are largely Mesozoic sandstone, with localised areas of limestone and volcanic rock. Younger basalts in these ranges have produced rich supplies of gemstones (rubies, sapphires, and zircons).

The Plant and Animal Life

The rolling hills of the park are dotted with waterfalls, lakes and colourful wild plants. It is also an important wildlife sanctuary of many endangered species

The Park protects the largest *Pinus merkusii* forest, about 13,000 hectares, in the country. Other forest types include lowland evergreen and deciduous forests, as well as some medium altitude ever-

green forest. The area is connected to Phnom Bokor National Park by the forests of Pechnil Mountain, and shares a number of endangered species with it such as the tiger, sun bear and pileated gibbon. Banteng cattle and Elk's deer have also been recorded, and, in 1994, an unknown species of rhinoceros was reported from the forests north-west of the Park. There is a small tea plantation (1,500 ha) within the park, and also a small hydro-power dam on the headwaters of Prek Kampong Leu.

Although Kirirom has few larger types of wildlife, it is still an ideal spot to glimpse some of the Kingdom's unique birdlife; birdwatchers from other countries continue to visit the Park.

Cambodian researchers aided by the World Wildlife Fund and the Wildlife Conservation Society had photographed rare species for the first time in Cambodia at Kirirom (WWF, 12 January 2002). They have sighted the elusive spotted linsang, a slender cat-like carnivore. Tigers and leopards, clouded leopards, marbled cats, sun bears, Asian elephants, Asian wild dogs, and two species of wild cattle - gaur and banteng - were among the species caught in the camera traps.

A prominent area of *Pinus merkusii* occurs on the Kirirom Plateau in the Elephant Range, where *P. merkusii* grows with *Dipterocarpus obtusifolius*,

Rhodomyrtus tomentosa, *Phyllanthus officinalis*, and a variety of Melastomataceae and Rubiaceae species.

Park Management

The Ministry of Environment is responsible for the management and protection of all national parks and also for the development of eco-tourism in these parks. However, due to financial problems, recreational infrastructure and services are not yet in place (Chamrouen, 2000). The Ministry's Department of Nature Conservation and Protection directly manages Kirirom.

In Kirirom, officials of the Ministry of Environment have allowed villagers living near the Park to manage and harvest 400 hectares of the Park's forest. Some 548 families of the Chambak commune in Kompong Speu province have been given permission to harvest the timber for construction and private household needs, said Chay Smith, director of the Conservation Department at the Environment Ministry.

Amanda Bradley, coordinator of MLUP Baitong (Green Shadow), a local environment NGO that supports park management in increasing environmental awareness and conservation through education, training and advocacy, said, "At the moment, we are dealing with a captive audience, but in the future we'd like to see the rangers attracting non-captive audiences as well, and making outreach and environmental education a standard feature at the park." Bradley also reported that Kirirom now receives over 10,000 visitors a year.

The Park has deployed about 29 rangers, operating from three Park stations strategically located around the area. Through its Park and Ranger programme, MLUP Baitong trains rangers in interpretation, running a Visitor Education Center, maintaining nature trails, organising weekly educational trips for students in local schools, and supporting community outreach by the Park staff. MLUP Baitong also acts as an advisor on new Protected Areas legislation.

In terms of general park management, Kirirom has been supported by the

Cambodia Environmental Management Programme (1997), and the Worldwide Fund for Nature (1998-1999). The Wildlife Conservation Society conducted bird and mammal surveys in 1998, and the MLUP Baitong continues to implement environmental awareness activities.

For more information, contact: Nhal Thoun, Director of Kirirom National Park, Department of Nature Conservation and Protection, Ministry of Environment

How to get there

Kirirom is the only park accessible to Phnom Penh in a day trip, or as a stop-over on the way to the coast from the city.

The Park can be reached through a serviceable access road, which is off the main road known as **Route 4 (or Highway 4 as some websites describe it.)**

A large new concrete sign on the right as one drives from Phnom Penh to Sihanoukville makes finding the turnoff very easy. The road rises steeply but is paved and in quite good condition.

Route 4 to the Sihanoukville port is reportedly the best road in the country, built in the early 1960s with American money before King Norodom Sihanouk severed relations with the United States. It would take three and a half hours to reach the port in a chartered bus. It is 112km southwest of Phnom Penh in the Elephant Mountains.

Park fees and facilities

The Park complex includes a visitor's centre built on land donated by the King and also a guest house.

Park rangers charge foreigners a 20,000 riel (\$5) entrance fee.

Best time to visit

Tourists began to visit Kirirom only in 1997. Tourists or visitors usually come during the weekends and public holidays; from May to October, visitor arrivals decrease due to the rainy season.

What to see and do

Kirirom has great potential for visitors. The primary activity of visitors has been to drive to a set of waterfalls, swim in one of the small lakes, and have a picnic around

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the lakes.

It also offers great potential for hiking to the thickly forested mountains dotted with lakes, rivers and waterfalls

Other Places of Interest

Phnom Penh

The Royal Palace and the **Silver Pagoda** (sometimes closed if the King is in residence). The Palace is a magnificent example of Khmer architecture, that was built in 1866. Here, one can see the Throne Hall and Napoleon III Pavilion.

Silver Pagoda is one of the richest shrines in the world – some 5, 000 silver tiles reportedly make up the floor.

Cambodia Angkor Tours (at No. 56 National Road 6, Siem Reap, Cambodia; Telephone: (855) 12-912 005; Fax: (855) 63-963 721; Email: procambodia@yahoo.com) recommends the following activities or places of interest close to Kirirom National Park.

There are endless possibilities for the adventurers, around the Sihanoukville area. These include island trips, scuba diving, ocean fishing, nature walks and riverboat trips to Ream and Kirirom National Parks, exploring fishing villages and secluded beaches, waterfall trips, and overnight stays at Bokor Hill Station, Kep and Kampot. Facilities are still pretty

basic. For island and ocean trips using local fishing boats, arrangements should be made at least 24 hours or more in advance. Several, if not most, of the western-managed guesthouses and hotels arrange boat trips and island picnics, waterfall trips and treks to the national parks and Bokor. Guesthouses such as Les Feuilles, Melting Pot, Mealy Chenda, Chez Mari-Yan, Marlin Bar, and Chez Claude can make reasonably priced arrangements. But only Chez Claude provides scuba trips; it has a good collection of fishing gear, and offers a wide variety of services including fishing, scuba and snorkeling excursions and equipment rental, island tours and picnicking, and sailboarding. Contact Chez Claude at Tel: 012-824870, Fax: 034-320032.

Red Snappers Tours specialises in national park tours, Bokor/Kep trips and other local adventures such as boat trips. Call tel: 012-808222

Ses-Samooth Tourism arranges organised tours to the town, the parks, waterfalls, etc. Contact Mr. Soun Sophal at the Department of Tourism in Sihanoukville. Tel: 012-808222.

Sihanoukville

Miles of lazy white sand beaches, warm surf, tropical sun and salty air. This is Sihanoukville, Cambodia's premier



Royal Palace



Sihanoukville

beach town. Only a 30-minute flight or a 3-hour drive from Phnom Penh, Sihanoukville's pristine beaches and easy access draw more visitors every year.

Most of the shoreline surrounding the town is beautifully unspoiled, a place where secluded beaches and picturesque little seafood restaurants can be found.

Sihanoukville is home to Cambodia's only deep-water commercial port; it has a more international and commercial atmosphere than most provincial cities. And as a recently rediscovered tourist destination, Sihanoukville offers a surprising 900-room hotel and some of the country's finest dining and nightlife outside of Phnom Penh.

One can also do some sightseeing in the following areas:

Cambrew Brewery. The government operated the brewery from 1967-1975 and produced Angkor and Bayon Beer. In 1991, it was refurbished and Cambrew started producing the same products. The brewery is open to the public only by advanced request. It is located 2.5km west of the port on Route 4.

Fisherman's Pagoda. This is an informal collection of spirit houses and a concrete altar set in the rocks close to at least two bat caves, south of Otres beach. It is said that monks live out there sometimes. To get there, drive to the south end of Otres beach where you will find a

small river, a police station and a fisherman's house. For a nominal fee, the fisherman sometimes ferries people to the pagoda.

Fishing Port (Kampong Pier Nep Lok): The port sits at the end of the long jetty about 2km north of the main port. Its wooden quay and surrounding village are a continual whirl of color and activity. The blue and orange boats and the movement of goods and people are perfect shots for photographers.

Independence Square. Constructed in 1985 to commemorate the independence and sovereignty of Cambodia, the Square features an open meeting hall, the Independence Monument (Vimean

Ekareach) and a small garden. Ceremonies are held there every 7th of January.

Minority Village: The village of Samrong, about 38km north of Sihanoukville on Route 4, is occupied primarily by the Sa-Och, an ethnic minority people.

Port of Sihanoukville: The port was constructed from 1955-60. It can be seen from Victory Beach and from Phe St. The port waters are 11-13 meters deep except for an 8-9 meters point in the channel near Koh Pos. The older quay can be seen from Victory Beach jutting 290m into the ocean. The new section to the north consists of a 350-m quay and 3117-m of breakwater. Ships approach from the west or between Koh Pos and the mainland.

Sihanoukville Mountain (Phnom Krong Preah Sihanouk). This 135-m high peak offers a spectacular view of the area. Take Route 4 about 2.5km northwest of the port. Make a hard right turn at Cambrew and follow the road up the hill, about 200m pass Wat Leu to the rocks.

Places of Worship

Wat Chotynieng: Commonly known as Wat Leu (Upper Wat), it overlooks the town from the top of Sihanoukville Mountain. It currently houses 54 monks and a primary school. The interior is painted with panels depicting the life of Buddha. At the rear are portraits of the founder, Prince

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Junot, and Ok Om who is the leader of the Buddhist community in this area. In front of the chapel is a statue of Ok Om, erected in 1966.

Wat Khrom: Lower Wat sits on a small hill on Santipheap St. overlooking the ocean.

St. Michael's Church: Constructed in 1960, this church serves the local Catholics in the area. This church serves about 50 Vietnamese and Khmer families in the area. Services are held in Khmer every second Sunday at: 8:00. It is located just off of Boray Kamakor St. near the intersection with Mitapheap Kampuchea-Soviet St. ■

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Profiles



Photos by George Tapan

Mt. Kitanglad Range

NATURAL PARK BUKIDNON, MINDANAO, PHILIPPINES

For anyone wanting to have a glimpse of the endangered Philippine Eagle (*Pithecophaga jefferyi*) in its natural habitat, Mt. Kitanglad Range Natural Park would be the perfect place to go. Mt. Kitanglad is one of the few remaining rainforests in the Philippines, hosting one of the most important diverse species of rare and endemic wildlife such as the Philippine Eagle, which is now known as the country's national bird. The Park's diverse and rich flora and fauna make it one of the last sanctuaries of the country's natural heritage.

The natural park boasts more than a dozen mountain peaks, densely forested slopes, a number of caves, several waterfalls and a hot spring. Five of its peaks have very high elevations: Mt. Dulang-Dulang, the highest at 2,938 m; Mt. Kitanglad, 2,899 m; Mt. Maagnaw, 2,742 m; Mt. Lumuluyaw, 2,612 m; and

- Mt. Tuminungan, 2,400 m.
- Legend relates that when the great flood submerged the native lands, only the tip of the mountain, which was the size of a *tanglad* plant (lemon grass), remained visible; thus the name Kitanglad .
- The Mt. Kitanglad Range Natural Park covers 47, 270 hectares (protected area – 31,236 ha; buffer zone – 16,034 ha) in the north central portion of the province of Bukidnon, and straddles parts of the municipalities of Baungon, Talakag, Lantapan, Impasugong, Sumilao, Libona and Manolo Fortich and the city of Malaybalay.
- The Natural Park is the major watershed that provides water for irrigation, power generation and domestic use for Bukidnon as well as the province of Misamis Oriental, and the catchment area of the Cagayan, Tagoloan and Pulangi river system. It is likewise the ancestral territory

Profiles



The Philippine brown deer

of the Talaandig, Higaonon and Bukidnon ethnolinguistic groups that share common historical and cultural ties with Mt. Kitanglad, which they consider the well-spring of their traditions.

The establishment of the Mt. Kitanglad Ranges as a full-fledged protected area on 9 November 2000 by virtue of Republic Act 8978, strengthens the protection of its ecological, biological, scientific and educational features. The peripheral buffer zone serves as an extra layer of protection for the park. The protected area covers portions of the city of Malaybalay and the municipalities of Impasugong, Sumilao, Manolo Fortich, Libona, Baungon, Talakag and Lantapan.

The Plant and Animal Life

The Natural Park has six major habitat types, ranging from lowland evergreen forest, which is the most species-rich forest formation; lower montane forest, upper montane (mossy) forest, grasslands, freshwater wetlands and caves. Every part of Mt. Kitanglad's habitat is considered precious not only for harbouring countless species but more for serving vital functions to its inhabitants.

The lower montane forest is characterised by a two-layered canopy. Trees in this habitat type are shorter in height than those found in lowland residual dipterocarp forest. In the upper montane (mossy) forest, trees are gnarled

and have a stunted growth with a more or less uniform height; trunks and branches are festooned and characterised by the presence of numerous species of mosses, lichens and ground epiphytic ferns. The brushland / grassland and cultivations are confined to the central lower portions of the park (CPPAP).

These forests and grasslands protect a sizable population of flora and fauna endemic to the Philippines, many of which are endangered like the Philippine eagle. Seventy-four avian species have been recorded, including some species that were found to be common during previous studies but are rarely observed at present. The list includes *Phapitreron amethystina*, *Macrophygia phasianella tenuirostris*, *Prioniturus discurus*, *Trichoglossus jhonstoniae*, *Harpactes ardens*, *Coracina mcgregori*, *Aceros leucocephalus*, and *Basilornis miranda*. Some species, however, appeared more abundant compared to earlier observations; these include *Lophozosterops goodfellowi*, *Hypocryptadius cinnamomeus*, *Leonardina woodi* and *Erythrura coloria*. Another species, *Serinus estherae* was recorded for the first time. Others include the Whitehead's Swiftlet, Mindanao Lorikeet, Mindanao Racquet-tail, Mindanao Scops-owl, Slaty-backed Jungle-flycatcher, Red-eared Parrot finch, Apo Myna, Philippine Brown Deer and the Mindanao Pygmy Fruit Bat (*Alionycteris paucidentata*).

On the other hand, 58 mammalian species are known to exist in Mt. Kitanglad, compared to 49 in the entire island of Negros. There were 13 species found to be endemic to the Park in contrast to only eight such species in Mt. Apo, the highest mountain in the country. The equally diverse amphibians and reptiles represent 26 species and 21 species respectively, with 50% endemicity. Birds have 159 known species and an exceptional composition of butterflies numbering about 131 species. Numerous bat species are also plentiful; in fact, the Mindanao Pygmy Fruit Bat, which is abundant and endemic to the park alone, is the first fruit bat species known in Asia.

Mt. Kitanglad supports the richest known vertebrate fauna (mammals and

birds) in the country (Heaney and Peterson 1992, Amoroso *et al.* 1996; L. Heaney, *unpublished manuscript*, as cited in Garrity, *et al.* 2002). Heaney and Peterson (1992), as cited in Garrity, *et al.* (2002), observed 13 of the 14 species of birds endemic to Mindanao, including the critically endangered Philippine Eagle. Very few mammalian and herpetological species were observed but this could be an artifact rather than a reflection of the real conditions in the area. Common species of the Families Suidae and Cervidae have become rare in the area because of the increased demand for meat by the local inhabitants.

The park also has an exceptional conservation value in terms of the high endemism of the vascular flora (Amoroso *et al.* 1996; Pipoly and Madulid, 1995, *personal communication*, as cited by Garrity, *et al.* 2002)). This includes the endangered rootless vascular plant *Tmesipteris lanceolata* Dang (Amoroso *et al.* 1996, as cited in Garrity, *et al.* 2002). The park was recently found to have the highest tree density ever reported in a tropical forest (Pipoly and Madulid, 1995, *pers. comm.*, as cited by Garrity, *et al.* 2002). This combination of a small, manageable size and a rich, singular biodiversity conforms to the type of protected ecosystem that, according to Sayer (1995), ought to receive the most determined attention in tropical biodiversity protection (Garrity, *et al.* 2002).

The Indigenous peoples

The indigenous communities consider Mt. Kitanglad as the centre of their well-being; they regard the mountain range as their ancestral domain - their history, myth and tradition revolve around it. Despite the influx of migrants and the impact of inculturation, they still manifest strong cultural traits in their activities and way of life. Their current livelihood practices determine the sustainability of the biodiversity conservation goals instituted in the Park.

They grow mostly root crops in the area, but some residents have also ventured into gathering rattan poles, weaving rattan and bamboo strips, abaca

production, and hunting. Though some 40% of the occupants engage in fishing in nearby creeks or rivers, their catch contributes very little to their daily subsistence.

In December 1998, the three main indigenous communities – the Tala-andig, Higa-onon and Bukidnon tribes – living within the areas of the Park, asserted their rights of ownership over the plant and wildlife resources of Mt. Kitanglad through a proclamation made during a programme that included a customary ritual where a boar and several heads of chicken were slaughtered. Accordingly, they hope to put the entire world on notice that they have first and prior rights over these resources as they are the ones who nurtured and conserved these resources over several generations. Thus, academic researchers or scientists who wish to have access to these resources would have to deal with the Council of Elders of the three tribes and comply with their requirements (Peria, E. *undated*).

In addition, the tribal communities, in particular the Tala-andig group, have started building cultural monuments within their ancestral domains in the Park to stop bio-piracy in the areas; preserve the cultural tradition of the people; and, organise and institutionalise indigenous leadership. The tribes themselves have become more vigilant against intrusions into their areas especially after they saw



A datu of Talaandig tribe patrols the park.

Profiles

researchers gathering herbal plants for medicine research (Vanzi, 2000).

The Tala-andig community plans to build some 200 monuments or altars that they call *bangkasu*, where offerings to their gods are made. The first monument was built in a hidden spring at the foot of Mt. Apolang; the altar of the gods who keep honey, *bangkasu hu lalawag*, marks the traditional worship area of the Tala-andig community (Vanzi, 2000).

The second monument, the altar of the gods who protect wild animals, was erected at the eastern side of Kiabansag mountain while a third built at Kaatoan, Lantapan hopes to regain and strengthen the traditional worship area, which is now known as the Cinchona Reforestation project (Vanzi, 2000).

Park Management

The Office of the Protected Area Superintendent under the Department of Environment and Natural Resources directly supervises the day-to-day operations and management of Mt. Kitanglad. The Office works closely with the Protected Area Management Board (the governing body) and in partnership with Kitanglad Integrated NGOs or KIN.

Recognised as the host NGO of the Park in April 1996, the KIN is a consortium of five local NGOs organised in May 1995 with proven capability in various fields that include cultural, environmental and church-based programs, upland and tribal community welfare activities, as well as in cooperative and entrepreneurial social development aspects. KIN's focus in MKRNP is on reviving and strengthening the cultural integrity of local communities toward their socio-economic upliftment and capability enhancement to protect Mt. Kitanglad.

The NGO consortium was formally sanctioned to assist in the implementation of the Mt. Kitanglad Range National Park Community Resource Management Project, a component of the Conservation Priority of Protected Areas Project (CPPAP) of the World Bank-Global Environment Facility (WB-GLF) and the Government of the Philippines through the Department of Environment and Natural Resources

(DENR). Its over-all operation is premised on partnership and coordination with the Protected Area Staff (PAS) and the PAMB.

The Management Project envisions to protect and enhance the biodiversity of Mt. Kitanglad through sustained community-based economic, site stabilization and environmental conservation activities. To achieve a long-term conservation effort, the Project adopts key strategies that support site rehabilitation while ensuring the survival of community beneficiaries. The project also aims to promote local involvement in the protection of the mountain range.

For almost seven years, the Kitanglad project had been provided regular assistance from the CPPAP. When the project officially ended in June 2002, the PAMB was able to source funds from the Provincial Government of Bukidnon, which approved a P3 million assistance for forest protection work. Local governments with jurisdiction over Mt. Kitanglad have also expressed willingness to allocate varying amounts for the protected area, the total of which amounts to 2.8M pesos.

Before entering the Park, visitors are advised to drop by the Protected Area Superintendent Office (Telefax: (088) 813-3453; [email:mkrnp@mlbly.philcom.com.ph](mailto:mkrnp@mlbly.philcom.com.ph)) located within the DENR Compound at Malaybalay City, Bukidnon. Or while at Cagayan de Oro City, one can get information from the DENR Regional office there.

Climate

Temperature ranges from 22.7°C in January to 24.6 °C in June. It receives the highest amount of rainfall in June. The driest period is March.

The climate at the Kitanglad Ranges falls under the Modified Corona Classification, which is characterised by a short dry season usually lasting from one to three months, and no pronounced rainy season. The area is cloud-covered all year round.

How to get there

Access to the Province of Bukidnon is through Cagayan de Oro City. Daily plane flights from Manila and Cebu are

available. From Cagayan de Oro, the park can be reached by regular public jeepneys and buses plying the 99-km Cagayan-Bukidnon route. From Cagayan, Rural Tours and Bachelor Express leave for Malaybalay every hour. At least four trails that lead to the summits of Mt. Kitanglad and Mt. Dulang-dulang are described in another section below.

Park facilities/fees and guidelines

Park visitors are limited to only 15 persons at a given time and are allowed a maximum of two (2) days and one (1) night stay.

Mountaineers who trek the area can stay at the Visitors' Center at Sitio Intavas, La Fortuna, Impasugong, Bukidnon or at the renovated PAMB building at the summit. These nature centers are equipped with cooking utensils and sleeping paraphernalia. The fees are as follows:

- a. Overnight stay = P50.00 pesos/person
- b. Guide (serves also as the caretaker) = P300.00 pesos
- c. Additional P100.00 pesos for the use of the summit center to defray expenses for the electricity; a 100-watt bulb per bed capacity has been installed.

Porters, most of whom are residents of the barangays, are available at each entry point.

Visitors are advised to bring rainproof clothing and bags, camera, binoculars, hat, insect repellent, water, food as well as camping equipment for those wishing to stay a few days.

Visitors' Entrance Permit

All visitors are required to secure a permit from the Office of the Protected Area Superintendent. The administrative fees for the issuance of visitor's permit are as follows:

	Mt. Kitanglad	Mt. Dulang-Dulang
Students	P50.00/person	P15.00/person
Foreign Nationals	US\$ 15/person or peso equivalent	US\$ 15/person or peso equivalent
Professional	P85.00/person	P50.00/person

The PAMB has also set the administrative fees and governs specific visitor's activities at the Cinchona Forest Reserve, located at Kaatuan, Lantapan, Bukidnon. Entrance fees for a 12-hour duration is

P20.00 for Filipinos and P50.00 for foreigners.

Visitors shall undergo an orientation/briefing at the Protected Area Superintendent's Office prior to any scheduled climb. They shall then make a courtesy call on the barangay captain and tribal leader of the entry barangay. Before entering the park premises, specific conditions have to be met such as securing the Prior Informed Consent (PIC) of the concerned Indigenous Peoples, performing a ritual and coordinating with the local government units.



A Talaandig tribe performs the ritual of Panahod.

What to see and do

The recreational zone of Mt. Kitanglad offers potential attractions to foreign and local mountaineering enthusiasts. Regulated and responsible ecotourism activities are allowed. Trekking at the summit, camping and bird watching are among the favorite activities in the park.

Hiking

It is safe to scale the mountains all year round. Four trails lead to the mountain summits. For Mount Kitanglad summit, the first trail is located at Intavas, La Fortuna, Impasug-ong town; the second at Barangay Lupiagan, Municipality of Sumilao, while for Mount Dulang-dulang destination, the first trail starts at Bol-ogan,

Profiles

Songco and Kaatuan, Lantapan, Bukidnon, and the second trail is at Dalwangan, Malaybalay City.

Mount Kitanglad summit

Intavas Trail

The first trail is located at Sitio Intavas, La Fortuna, Impasugong. Sitio Intavas can be reached by any type of vehicle. It takes about an hour ride from Malaybalay City or a two-hour ride from Cagayan de Oro City to reach the sitio. The jump-off point is at Crossing Sta. Ana of Impasugong Municipality (located along Sayre Highway). Passenger jeepneys ply the Crossing Santa Ana – Intavas route daily.

There is a Visitor's Center at Sitio Intavas, which is manned by the Barangay Council of La Fortuna through its Barangay Chairman. The Sitio is about five km away from the foot of Mt. Kitanglad. From the foot, it is three km away to the summit of Mt. Kitanglad with a three- to five- hour regular walk.

Lupiagan Trail

Lupiagan trail is located at Barangay Lupiagan, Sumilao, Bukidnon. Sumilao is five kilometers away from the Kisolon Bus Terminal (located along Sayre Highway). From Sumilao, an eight-km road leads to Lupiagan, but is passable only by a four-wheel type vehicle. However, at present,

only a motorcycle locally called *habalhabal* is available to bring passengers from Sumilao up to the foot of Mt. Kitanglad.

Mount Dulang-dulang summit

Bol-ogan Trail

Bol-ogan trail is located at Sitio Bol-ogan, Songco, Lantapan. Public utility jeepneys ply the Malaybalay-Kibanggay route, passing the National Highway, the converging road network to the City of Iligan. From Malaybalay City, it takes an hour and a half to reach Crossing Bol-ogan.

Barangay Songco is approximately eight kilometres away from Crossing Aglayan (*Sayre Highway*). The road is well graveled and cemented at Lantapan proper.

Bol-ogan trail leads climbers to Mt. Dulang-dulang and a cross-country towards Mt. Kitanglad using the Intavas and or Lupiagan trails as the exit route (Information Hand Book, Mt. Kitanglad Range Natural Park)

Dalwangan Route

The trail although already established is quite difficult to traverse as it is not often used. For normal hikers, it will take half a day to reach the peak. There are no facilities in the area, thus one has to bring his/her camping gear.

Camping at Cinchona Forest Reserve.

Cinchona Forest Reserve at Kaatuan, Lantapan, Bukidnon is a favourite for campers. The reserve was established on 22 September 1936 per Presidential Proclamation No. 83 and covers an area of 1,914 hectares. It was declared as Kaatuan Forest Reserve for the experiment and propagation of quinine, forest protection and timber production. The forest is a habitat of the rare Green Maya and *Ratus ratus rabori*, the only rat of its kind in the world. The Reserve formed part of the Mt. Kitanglad protected area on 24 October 1996. The Mt. Kitanglad PAMB manages the site.

Birdwatching. The nesting site of the famous Philippine eagle is located at Sitio Mangasa, Dalwangan, Malaybalay City.



Campers at Mt. Kitanglad Range Natural Park



Philippine Eagle

The **Ecolodge at Sitio Lalawan**, also at Dalwangan, offers bird watching and camping activities. A tourist guide for birdwatchers is available.

Lusok Falls at Kalanganan, Baungon. A series of three falls with a height of 30-50 metres can be reached in two hours along a jungle trail with a distance of approximately four to five kilometres. The local government unit proposed the area for ecotourism activities.

Nabitag Falls at Sitio Lantud, Brgy Sagarán, Talakag, Buk. The falls measure 200 metres. It takes a 45-minute walk to the falls from Brgy Lantud through the forest. From Brgy Sagarán to Sitio Lantud, it takes a one-hour walk.

Sitio Tulugan, Songco, Lantapan. The place is home to the Talaandig tribe. The School of Living Tradition still exists. Here, one can find the various products from the art of weaving, handicraft production, rituals, dance and music. People entering sacred areas are required to participate in a cleansing ritual called "Pangawan".

Hot spring at Sitio Alas-as, Licoan, Sumilao, Bukidnon. It is located along

the Culaman River at Sitio Alas-as, Brgy. Licoan. The water is very hot that it can boil an egg (chicken) in less than 5 minutes. Although there is no trail going to the site, it can be reached from Brgy Licoan of the said municipality through a two-hour walk in the forest.

Other attractions around the Park (as recommended in the [clickmindanao website](#)):

- The *Del Monte Pineapple Plantation*, with an area of 90 km², is the largest pineapple plantation in the world where work in the field goes on 24/7. Vast tracts of land show different stages of crop production: while some are readied for planting, others have ripe fruits for harvesting. There is a Clubhouse and a Golf course within the plantation.
- *Mangima Canyon* in Monolo Fortich town on the road from Cagayan de Oro to Malaybalay has a zigzag road winding up and down the wide and deep canyon with naturally scenic surroundings.
- Just before reaching the next town of Impasugong on the national highway, a road branches southwest to Sumilao with several natural attractions: *hanging ladders* ascent a cliff wall of Mt. Palaspas



to the *multi-chambered Paiyak Cave*, an ancient native burial site; and *Alalum falls* with a cool spring at its base;

- Maagnao Spring Resort at Sitio Maagnao, Patag, Lantapan, Bukidnon;
- At Barangay Bangcud are *Matin-ao Spring*, a popular picnic spot, and *Nasuli Spring*, with a depth ideal for diving.
- South of Malaybalay is Valencia, where one can visit the *Napalit Lake* and the *Central Mindanao University*, a World Bank-subsidized agricultural school. The school is in the shadow of Musuan Peak. Napalit Lake, which is about 36 ha wide is at the foot of Kalatungan mountains. It stands out because of its 24 floating islets of varied sizes.
- Apo Lake in Barangay Guinoyoran, Valencia is a 25-ha lake surrounded by mountains. It is ideal for boating and fishing.
- The *Kaamulan* is a native term meaning “gathering for a purpose”. It is a week-long cultural festival during which the seven tribes of Bukidnon gather amidst a setting of pine trees, aptly called Pines View Park in Malaybalay City. It features dances, songs, oral traditions, mimetic, native force and wine in various reenacted rituals. Held every first week of March, the festival aims to foster unity among the tribes and understanding between them and the lowlanders. Ethnic groups trek down from their mountain villages in colorful costumes and spectacular headdresses to join in the singing and dancing, compete in indigenous sports, and perform traditional rituals. Among its highlights are a parade of the tribes followed by the *Pamalás*, a cleansing and purification ceremony, and *Alusod*,

the offering of native wine and food to visitors.

Where to stay

Other than the places mentioned above, the best hotels and resorts are usually located in Cagayan de Oro City and Malaybalay City. Rates are very reasonable with excellent services. ■

We wish to thank Mr. Felix Mirasol, Protected Area Superintendent of Mt. Kitanglad Range Protected Area and his staff, and also Ms. Lina Segunial of the Biodiversity, Management Division of the Protected Areas and Wildlife Bureau for reviewing the article and providing additional information.

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WORLD WETLANDS DAY 2003

No Wetlands – No Water!

Each year the world celebrates World Wetlands Day (WWD) on February 2 to commemorate the 1977 signing of the Convention on Wetlands in the Iranian city of Ramsar. The Ramsar Convention is an intergovernmental treaty, which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are presently 136 Contracting Parties to the Convention, with 1,267 wetland sites totaling 107.5 million hectares. The Convention defines wetlands as “areas of marsh, peatland or water, whether natural or artificial, permanent or temporary, with water that is static, flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six meters.”

Wetlands include reefs flats and seagrass beds in coastal areas, mudflats, mangroves, estuaries, rivers, freshwater marshes, swamp forests, saline marshes and lakes. It is home to a rich variety of flora and fauna, and is a vital feeding and breeding habitat for migratory birds.

Wetlands are sources of fresh water and food, help regulate floodwater as well as the intrusion of saline water, prevent soil erosion, retain sediments and nutrients in soil, sources of energy (hydro-electric, firewood and peat), provide water transport, and serve as habitats of plants and animals.

World Wetlands Day celebrations began in 1997 and has since become an opportunity for government agencies, non-governmental organizations, and groups of citizens at all levels of the community to undertake actions aimed at raising public awareness of the Ramsar Convention and wetland values and benefits. For instance, the Society for the Conservation of Philippine Wetlands, in cooperation with the Philippines' Protected Areas and Wildlife Bureau, educated visitors at the Ninoy Aquino Parks and Wildlife Nature Center on the importance of wetlands and the significance of World Wetlands Day. In Thailand, the Office of Environmental Policy and Planning conducted a World Wetlands Day Conference, which featured an exhibition of wetland products by lo-

cal communities and exhibition boards on Ramsar sites and wetland values. Other activities often undertaken to mark the event include lectures and seminars, nature walks, art contests, community clean-up projects, radio and television interviews by conservation personalities, as well as the launch of new wetland policies and new Ramsar sites.

This year's WWD theme is “No wetlands - No water”, which underscores the importance of wetlands in conjunction with the observance of 2003 as the United Nation's International Year of Freshwater (IYF). The choice of the theme is meant to strengthen efforts by the United Nations to bring attention to the importance of protecting the world's freshwater sources. Over the years there has been growing concern over the availability of safe drinking water to accommodate the needs of the world's growing population. On the surface, statistics indicate that there seems to be enough water for everybody, since we only use around 20% of the water in the world's rivers. However, the situation, as well as the quality of available water varies across the globe. It is known though that:

- 1.1 billion people do not have access to safe drinking water.
- 2.3 billion people currently live around rivers where there are frequent water shortages, and
- 1.7 billion of these people live in areas where water is scarce.

Obviously, water is not distributed well enough to satisfy everybody's needs. In addition, at least 1.1 billion people do not have access to safe drinking water and 3 million die each year, many of them children, from illnesses caused by contaminated water.

Wetlands play an important role in water cycle by capturing and holding rainfall and snowmelt, retaining sediments, and purifying water. And yet, human-related activities have led to the destruction of 50% of the world's remaining wet-



The Airhitamlaut river at the heart of Berbak Park in Sumatra, Indonesia.

lands. Modification of wetlands with dams and canals have significantly fragmented and altered water flow in 60% of the world's largest rivers - often compromising the many valuable ecosystem functions upon which we depend.

Wetlands have also been converted to agriculture to increase food production while depleting global freshwater supplies. Agricultural practices, particularly the use of pesticides in farming, have also contributed to the contamination of remaining wetlands. Excessive logging of forests has also led to soil erosion, causing widespread sedimentation of rivers and lakes. Pollution from industrial sources has also caused the death of a significant number of freshwater bodies and groundwater sources all over the world. The net result is a serious reduction in both freshwater quantity and quality.

This situation will not improve with a projected 1.7 billion additional people on the planet in the next 20 years, most of whom will live in developing countries. These circumstances pose a triple challenge to environmentalists all over the world. How can we ensure food, water and ecosystem security for the global population? Solutions lie in integrated water resource management strategies at the source level with full stakeholders' participation.

Approaches must incorporate improved technologies for more efficient use of water in agriculture, industry and domestic use, as well as recognise the value of water infrastructure and ecosystem protection, as well as provide the appropriate safety nets for the poor. The Ramsar Convention believes that the source of freshwater, our wetland ecosystems, should be the starting point of all integrated water management strategies. Maintaining the health of wetlands to secure our sources of freshwater and much of our food is one of the fundamental keys to a sustainable planet. ■

Surfing the Web... of Life

Protected areas that meet across international borders provide important opportunities for collaboration between managers and scientists in neighbouring countries. Various terms are used to describe these areas - transboundary protected areas, transfrontier protected areas, and peace parks are the most common.

These areas provide possibilities for promoting biodiversity conservation and sustainable use across politically divided ecosystems, while at the same time encouraging international collaboration in management, and in the sharing of experience and of information. The **World Conservation Monitoring Centre** (http://www.wcmc.org.uk/protected_areas/transboundary/index.html) provides information on the status and distribution of transboundary protected areas, key meetings on peace parks, as well as links to other sites.

The **Peace Parks Foundation** (<http://www.peaceparks.org/>) aims to facilitate the establishment of Transfrontier Conservation Areas (TFCAs) in Africa while supporting sustainable economic development, the conservation of biodiversity, and regional peace and stability. The idea for the project first began in 1990, when the possibility of establishing a permanent link between some of the protected areas in southern Mozambique and their adjacent counterparts in South Africa, Swaziland and Zimbabwe was first explored. Results from the project supported by the World Wide Fund for Nature (WWF)-South Africa, World Bank and Global Environment Facility suggested a conceptual shift away from the idea of strictly protected national parks towards greater emphasis on multiple resource use by local communities. The concept of transfrontier conservation area (TFCA), or peace parks, was defined as relatively large areas that straddle frontiers between two or more countries and cover large-scale natural systems encompassing one or more protected areas. Very often both human and animal populations traditionally migrated across or straddled the political boundaries concerned. In essence, TFCAs therefore extend far beyond designated protected areas, and can incorporate such innovative approaches as biosphere reserves and a wide range of community-based natural resource management programmes.

The **North American Commission for Environmental Cooperation (CEC)** (<http://www.cec.org/home/index.cfm?varlan=english>) is an international organisation created by Canada, Mexico and the United States under the North American

Agreement on Environmental Cooperation (NAAEC). The CEC was established to address regional environmental concerns, help prevent potential trade and environmental conflicts, and to promote the effective enforcement of environmental law. The Agreement complements the environmental provisions of the North American Free Trade Agreement (NAFTA). The CEC supports projects in four major areas: Trade and the Environment; Conservation of Biodiversity; Pollutants and Health; and Law and Policy. Initiatives funded and logistically supported by the CEC seek to develop the rationale for changes in public policy and investment strategies across North America through protection of shared ecosystem.

The CEC website also has a **Transboundary Agreements Infobase** (http://www.cec.org/pubs_info_resources/law_treat_agree/transbound_agree/index.cfm?varlan=english), which gives Internet users free and unrestricted access to agreements and treaties on transboundary environmental cooperation in North America. The Infobase is part of the CEC's efforts to provide information that promotes North American cooperation on environmental issues that affect the entire region. Users can search the database by subject, agreement name, or by parties to the agreements. A complete list of agreements—there are approximately 200 individual agreements currently in the database—is also available for users to browse through. In addition, the database provides hyperlinks to the full text of the agreements, as well as to other Internet sites that provide additional information related to the agreements.

The **Transboundary Freshwater Dispute Database** (<http://www.transboundarywaters.orst.edu/>), a project of the Oregon State University Department of Geosciences in collaboration with the Northwest Alliance for Computational Science and Engineering, was developed to aid in the assessment of the process of water conflict prevention and resolution. It provides links to case studies of transboundary dispute resolution; an International Freshwater Treaties Database with more than 400 international, freshwater-related agreements, covering the years 1820 to 2001; an International River Basins Register that lists and maps the world's international river basins, delineated by continent; and an International Water Event Database documenting historical international water relations from 1948 to 1999, among others. ■

The Third World Water Forum

From 16-23 March 2003, some 24,000 participants from 182 countries attended 351 separate sessions on 38 interlocking themes dealing with water during the Third World Water Forum. The major event, part of ongoing efforts to commemorate 2003 as the International Year of Freshwater, was held in three Japanese cities - Kyoto, Shiga and Osaka.

Key issues discussed by the participants included balancing increasing human requirements for adequate water supplies and improved health and sanitation with food production, transportation, energy and environmental needs. Other countries stressed the need for more effective governance, improved capacity and adequate financing. More than 100 new commitments on water were made, 20 of which focused on climate, and 13 on gender issues. Global agreements include the:

- Establishment of the International Flood Network (IFNet) – this will launch the “Global Flood Warning System” project, which will have the capacity to create the precipitation maps all over the world

every 3 hours. The project aims to improve flood warnings around the world and thus benefit up to 4.8 billion people.

- Development of an international consortium of concerned organisations to produce a programme that will precisely identify and highlight the benefits brought by sound water management and provide governments with appropriate tools to enhance priority setting, planning, development, management, and budgeting for the water sector.



- Memorandum of Understanding between UN-HABITAT and the Asian Development Bank (ADB) to create a programme to build the capacity of Asian cities to secure and manage pro-poor investments and to help the region meet the Millennium Development Goals (MDG) of halving, by 2015, the proportion of people without safe drinking water and basic sanitation.
- Commitment by UNESCO and the World Water Council to promote, develop and

- support the establishment and operation of an independent, easily accessible facility that can help solve problems related to trans-boundary waters by providing experienced technical advisers, tools, training sessions and mediators.
- Formation of an “International Water and Climate Alliance” that will build bridges between the climate and water sector, and develop activities to better cope with climate impacts.
- UNDP development of a Community Water Initiative, aimed at building on the power of the local community to solve water and sanitation challenges. Its aim is to provide innovative communities with small grants to expand and improve their solutions to the water and sanitation crisis.

Some of the regional commitments include:

- Funding from Australia amounting to over AUD\$80 million for water conservation activities, primarily in countries in the Asia-Pacific region.
- Preparation of a navigation strategy and programme by the end of 2003 by the Mekong River Commission (MRC) with the governments of Cambodia, Laos PDR, Thailand and Vietnam and other partners. The long-term goals of the strategy are to develop sustainable, effective and safe navigation on the Mekong, and to increase the international trade opportunities for the mutual benefit of the member countries of the MRC.

Other key issues focused on governance, capacity-building, financing and local community participation. Details on the Third World Water Forum is available on www.worldwaterforum.org. ■



Pollution from industrial and other sources is causing the death of rivers and lakes.

2ND INTERNATIONAL TROPICAL MARINE ECOSYSTEM MANAGEMENT SYMPOSIUM (ITMEMS 2)

RP Hosts International Marine Symposium

■ By DENR Public Affairs Office

March 24, 2003

Some 248 participants, composed mostly of marine experts from 37 countries and 19 institutions and funding agencies have mapped out a comprehensive plan to save coral reefs and the many life forms during the 2nd International Tropical Marine Ecosystem Management Symposium (ITMEMS 2) held from March 24 to 27, 2002 at the Westin Philippine Plaza, Manila, Philippines.

With the Philippines as host country, Environment Secretary Elisea G. Gozun welcomed the delegates to the symposium, which was organized by the Department of Environment and Natural Resources (DENR) and the International Coral Reef Initiative (ICRI) Secretariat, per the approval of the ICRI Coordinating and Planning Committee. Former Philippines President Fidel V. Ramos delivered keynote messages to the international attendees.

ICRI is an environmental partnership organized in 1994 by the governments of the United States, Australia, France, Jamaica, Japan, Philippines, Sweden, and United Kingdom with World Bank and the United Nations Environment Programme (UNEP) to stop and reverse the global degradation of coral reefs and related ecosystems, i.e. mangroves, seagrass and estuarine areas.

In 1995, ICRI adopted a "Call to Action" that urged governments to act on a concerted action to conserve coral reefs, and a "Framework for Action" which sets the objectives for governments, funding institutions, non-governmental organizations (NGOs), private sector and stake-

holders for the sustainable development of coral reef resources.

Since then, it has enjoined the US Agency for International Development (USAID), World Wildlife Fund (WWF), International Union for Conservation of Nature (IUCN), Swedish International Development Agency (SIDA), Regional Seas organisations and international conventions such as the Convention on Biological Diversity (CBD) and Ramsar Convention on Wetlands.

Together, ICRI partners aim to mobilize governments and a wide range of stakeholders in an effort to improve management practices, increase capacity and political support, as well as share information on the health of the corals and related ecosystems.

The ICRI Secretariat functions as the operational arm of ICRI under the guidance of a Coordinating and Planning Committee. The Secretariat is currently co-hosted by the governments of Sweden and the Philippines, through the DENR.

Major activities organized by the ICRI Secretariat included three Regional Workshops for East Asia (Cebu, Philippines: April 2-4, 2001); Regional Workshop for the Indian Ocean (Maputo, Mozambique: November 26-29, 2001); and Regional Workshop for the Tropical Americas (Cancun, Mexico: June 2-4, 2003); and several CPC Meetings. These activities successfully updated regional priorities for implementation on the conservation of coral reefs and related ecosystems.

As host of the ICRI Secretariat and as part of the ICRI Action Plan for 2001-2002, the DENR organized

ITMEMS 2 as a culminating activity of its term as co-chair of the ICRI Secretariat.

ITMEMS 2 was organized in collaboration with the UNEP, USAID, International Coral Reef Action Network (ICRAN) and SIDA.

It was participated in by coral reef managers and key players in the management and conservation of coral reefs and associated ecosystems from countries with coral and coastal resources, and various regional bodies (e.g. UNEP RCUs, IUCN, Coral Reef Degradation in the Indian Ocean (CORDIO), South Asia Co-operative Environment Program (SACEP), Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA).

International funding institutions (e.g. USAID, World Bank, SIDA), government and NGOs (e.g. Great Barrier Reef Marine Park Authority—GBRMPA, National Oceanic and Atmospheric Organization (NOAA) Conservation International (CI), The Nature Conservancy (TNC), WWF), international conventions (e.g. CBD) and academic institutions (e.g. James Cook University), shared experiences and lessons learned through a multi-disciplinary consideration of management-related case studies.

The ITMEMS 2 process offered opportunities to discuss gaps in the current management of tropical coastal ecosystems and identify priority actions and recommendations that should be addressed in the implementation of the ICRI Framework for Action and in response to the Plan of Implementation of the 2002 World Summit on Sustainable Development (WSSD) held in Johannesburg, South Africa. ■



**DENR Secretary
Elisea G. Gozun**

WORLD WATER DAY

Water for the Future

The idea for World Water Day was first discussed during the 1992 United Nations Conference on Environment and Development in Rio de Janeiro - the Earth Summit, after which the United Nations General Assembly dedicated the 22nd of March to activities related to the conservation and development of water resources. This year's theme, "Water for the Future", calls on everyone to observe sustainable approaches to water use for the benefit of future generations. This year's celebration aims to inspire worldwide political and community action and encourage greater global understanding of the need for more responsible water use and conservation.

World Water Day 2003 provided one of the highlights of the Third World Water Forum held from 16-23 March 2003 in the cities of Kyoto, Shiga and Osaka, all in Japan, and was

a key event of the UN International Year of Freshwater. In a speech commemorating the event, UN Secretary General Kofi Annan stressed how much we have taken freshwater resources for granted. Though freshwater is essential for healthy ecosystems, for sustainable development and for human survival itself, all too often pollution, over consumption and poor water management all over the world have led to the decreasing quantity and quality of available water.

The demands of agriculture have taxed freshwater resources and overall demand for water already far outpaces population growth. If current trends continue, two out of every three people on earth will suffer moderate to severe water shortages in little more than two decades. Freshwater problems unfortunately cause the most suffering among the world's poorest communities, who lack access to safe

drinking water, adequate sanitation, and fall victim to water-related diseases. The Secretary General urged everyone to work together to secure the world's water for the future.

To mark the event, the United Nations Environment Programme (UNEP), the UN's lead agency in this year's celebrations, provided a World Water Day website (<http://www.waterday2003.org/>) to help governments, key partners such as education ministries and schools, civil society organisations, communities and individuals worldwide achieve their goals in freshwater conservation.

The site provides links to the world's best online water information and practical water conservation advice, suggestions for local and regional activities, and high-resolution posters, logos and photos to help groups and individuals to promote and participate in the day. The site also includes information on Water Programmes conducted by the UNEP and other agencies in the UN System, news concerning water conservation across the globe, as well as links to relevant publications. ■

2003 is International Year of Freshwater

The United Nations General Assembly last year passed Resolution No. 55/196 proclaiming 2003 as the International Year of Freshwater. The resolution encourages governments, the United Nations system and all other stakeholders to take advantage of the Year to increase awareness of the importance of sustainable freshwater use, management and protection.

Over the years, the deteriorating quality of the world's water has wreaked havoc on people's health. According to a study by the International Water Management Institute (IWMI), each year more than five million people die of water-related diseases. About 2.3 billion suffer from diseases linked to dirty water. Some 1.2 billion people lack access to safe water and more than 2 billion lack adequate sanitation. By 2025, about 2.7 billion people – nearly one-third of the expected world's population – will live in regions facing severe water scarcity, with Asia and sub-Saharan Africa to be most severely affected. The world's



six billion people already access 54% of all available freshwater. The demand for water rises as global population increases, making access to freshwater one of the most important issues humanity faces today.

Throughout 2003, a number of events, including the Third World Water Forum as well as the celebration of World Water Day, will be conducted to stress the importance of conserving the world's freshwater resources. The website of the International Year of Freshwater is hosted by UNESCO at <http://www.wateryear2003.org>, and provides

information on various aspects of freshwater concerns, activities in various countries designed to protect fresh and groundwater sources, ways to get involved in conservation efforts, as well as links to important publications focusing on freshwater issues. Hopefully ongoing efforts to increase awareness on the matter will lead to increased protection, better management and sustainable use of our remaining freshwater resources. ■

Thailand and Indonesia Collaborate on Karst and Limestone Ecosystems Research

■ By Aida B. Lapis

Southeast Asia abounds with karsts and limestones that are potential reservoirs for biodiversity, offering a wide range of ecological information that are unknown and taken for granted. Most sites are formations of wonders and aesthetics, spiritual haven, habitat of specialised organisms and recently, ecotourism destinations.

Cognizant of the multifarious functions of karst and limestones, which are considered as poorly studied ecosystems in terms of their biological resources and much more their conservation, the ARCBC Research Grant Programme, which was launched in the year 2000, included the study of these ecosystems as priority for research. As such, no less than two countries - Thailand and Indonesia - submitted re-

search concepts on the impact of human activities and disturbances to the caves' integrity. Specifically, Thailand researchers intend to document caves for their database and to investigate possible research sites to study the effects of human activities on cave fauna. On the other hand, Indonesian scientists wish to conduct a taxonomic account of various organisms and treat them by systematic classification and identification.

Indonesia and Thailand each conducted their research works but have agreed to closely collaborate in the implementation of their projects. During one scientific meeting, project staff from the two countries agreed on an exchange and sharing of related information. They further agreed to initiate cross visits and staff training to learn the meth-

odology and practical sampling techniques to attain the two projects' set objectives.

Collaborative activities started with the Thailand project staff joining the Indonesian group in the field collection trip whereby the selection of specimen, collection, proper handling and on-site preparation of collected specimens were demonstrated. The methodologies to preserve specimens were experienced in the laboratory and in the museum. This exposure is critical to the project particularly in voucher specimen collection, preparation and management. In any taxonomic and systematic study, the processes of specimen curation make any systematic work worthy and reliable. Good specimens as evidence of the research work enhance the validity and reliability of data.



Bau limestone area



The author at the mouth of Fairy Cave



Dered-Krian Limestone Range

With the varied faunal organisms in the caves and the fact that specialised experts are needed to recognise species, it is critical for the research staff to be exposed to particular faunal groups, and to orient themselves and enhance their skills on taxonomic work. Thus, a series of training courses had to be conducted. A Thai staff was sent to Indonesia for a hands-on short training under the supervision of Dr. Yayuk Suhardjono in the laboratory using museum collections and in the field during the collection trips.

Furthermore, both the Thai and Indonesian researchers participated in a workshop held in Phuket, Thailand from 25 – 28 May 2003. The workshop, which was initiated and organised by the Thai Project leader, Dr Chawewan Huthacharern, was designed to present the progress of the projects and to share the methodologies each project adapted to meet their objectives. Three Indonesian and eight Thai researchers, one Cave management expert, an entomologist, and ecologist attended the workshop. The venue provided the research staff the opportunity to discuss research results and to stimulate interaction to further improve the presentation of the project

outputs. More importantly, the research methodologies were discussed and enabled the researchers to learn which methods and techniques can be adopted for a particular need.

The workshop included cave visitation that enriched the participants' knowledge on the variability in cave types, rock formations, types of fauna and actual assessment of extent of human disturbance. One cave visited was the Phangnga Cave, which is presently used as religious site; the entrance serves as a Buddhist Temple. It represents a classic example of a cave where human activities impact on the biodiversity found thereat.

During the cave visit, Thai research staff showed the actual human activities that were the bases for setting the criteria in determining the impacts of human disturbances. Disturbances to the cave included the use of cave-wide crevices in the wall as prayer site with offerings, graffiti marks left behind by hikers, empty bottles left behind and other wastes, the compacted cave flooring destroying rock formations, and the cut and chopped felotherms. Using assigned numerical values corresponding to enumerated human activities, the impacts to caves were assessed.

The research approaches applied through research collaboration enhanced the researchers' experiences and learnings. The Thai researchers got a grasp of the systematic way of enumerating encountered data and managing specimens as well as the collection methodologies. On the other hand, the Indonesians were shown the natural and ecological experiments that are useful in managing caves for ecotourism, the sampling techniques to be used and the statistical methods to be employed for specific organisms. The criteria developed by the Thai researchers for the human impacts to cave can be validated and verified in Indonesia.

The overall exercise, i.e., training and workshop, is being encouraged by ARCBC. Working out the investigations together on common research interests can make research results comparable between countries, and the data and information, readily accessed and disseminated. When there is collaboration, researchers are linked to each other, thereby fostering closer relationship, which is essential for future research implementation of similar researchable areas in the region. ■

Aida B. Lapis is Chief of the Research and Development Branch of ARCBC.

NBRUs Participate in Biodiversity Information Sharing and Data Management Training Course

■ By Imelda C. Pangga

With the aim of setting up country-specific data bases and establishing data sharing protocol, the ASEAN Regional Centre for Biodiversity Conservation (ARCBC) conducted a Biodiversity Information Sharing and Data Management Training Course in Bangkok, Thailand. The database training was held for 12 days (02-15 March 2003) at the National Electronics and Computer Technology Center (NECTEC).

During the training, the 19 participants representing each of the National Biodiversity Reference Units in nine ASEAN member-countries learned how to create and maintain SQL databases, publish the database over the web, extract the country databases from ARCBC database, and demonstrate the uses and application of ARCBC developed softwares.

A culminating activity of the training was the extraction of the country data for each participating ASEAN countries from the ARCBC data collection. The extracted data were placed in CDs and given to each country representative or participant. The participants were tasked to set up this database in their respective country and continuously update it based on information available in their country.

The training course is a big step in assisting ASEAN institutions in setting up country-specific databases and data sharing protocol. All softwares taught were free of charge, from the installation up to the maintenance. This is to help the NBRUs in maintaining the databases at the least cost possible.

The course was implemented through team teaching, with Mr. Lewie Dekker, EU Database Expert, Imelda Pangga, Head of the Data-

base Branch, Mr. Edmund "Jojo" Revilla, SQL Programmer and Mr. Renato Marapao, Web Administrator alternating to explain the course and assisting the participants in their practical or hands-on exercises. ARCBC Co-Directors Gregorio I. Texon and John R. MacKinnon both emphasized to the participants the importance of the training course as well as biodiversity information sharing among ASEAN member countries.

The following attended the course:

BRUNEI DARUSSALAM

Mr. Arifin Kalat Abdullah

Brunei National Herbarium

Mr. Mudh Firdaus Lai Abdullah

MIS Forestry Department

CAMBODIA

Mr. Chhith Sophal

*Relationship and Public Office,
Ministry of Environment*

INDONESIA

Mr. Sutoto Dwijayanto

Ministry of Forestry

Mr. Lukman Budiman

Research Center for Biology

LAO PDR

Mr. Ithiphonh Chanthamalinh

Department of Forestry

Ms. Syphavanh Inthapatha

Department of Forestry

MALAYSIA

Mr. Shafee Sajat

*Malaysian Science and Technology
Information Center,
Ministry of Science, Technology
and Environment*





Ms. Sam Yen Yen
Forest Research Institute of
Malaysia (FRIM)

PHILIPPINES

Ms. Sarah Jane Tagtag
Planning Division
Protected Areas and Wildlife
Bureau (PAWB)
Department of Environment and

Natural Resources (DENR)
Mr. Antonio Bautista
Management Information
Services (MIS)
Department of Environment and
Natural Resources (DENR)

SINGAPORE

Ms. Cheryl Chia
National Parks Board

Mr. Chua Keng Soon
Department of Biological Sciences
National University of Singapore

THAILAND

Ms. Woranad Tangthachtong
Ms. Chompunut Songkhaw
Ms. Phimphann Ngoented
Office of Natural Resources and
Environmental Policy and Planning
Ministry of Natural Resources and
Environment

VIETNAM

Mr. Le Hoang Anh
Vietnam Environment Protection
Agency
Ministry of Natural Resources and
Environment
Mr. Nguyen Duc Hung
Department of Environment
Ministry of Natural Resources
and Environment ■

Imelda C. Pangga is the Chief
of the Database Branch at the ASEAN
Regional Centre for Biodiversity
Conservation.

Buying publications from ARCBC

ARCBC is pleased to announce that the Natural History Book Service (www.nhbs.com) has been appointed distributor of ARCBC publications outside ASEAN Countries.

Below is the list of available titles.

- Marine Protected Areas in Southeast Asia
- Guidebook of Biodiversity Principles for Developers and Planners
- Participatory 3-Dimensional Modelling: Guiding Principles and Applications
- Competence Standards for Protected Area Jobs in Southeast Asia



TRAINING RESOURCES DATABASE ENTRIES

Capsule reviews

■ By the Training and Extension Branch, ARCBC

A GUIDE FOR TRAINING IN WETLAND CONSERVATION AND WISE USE IN ASIA

Brian Gilligan

ASEAN Wetland Bureau, 1993

This publication serves as a guide for training in wetland conservation and wise use in Asia. Background information has been drawn from different sources in developing this paper. Aspects from formal teaching courses combined with the experience of the Asian Wetland Bureau are drawn together for identifying participants needs, course structure and delivery methods. This publication is valuable to individuals pursuing training in the field of wetland conservation and management.



For more information, contact:
ASEAN Wetland Bureau
Institute of Advanced Studies
University of Malaya
Lembah Pantai
59100 Kuala Lumpur
Malaysia
Tel: +603 756 6624
Fax: +603 757 1225

BIODIVERSITY MONITORING SYSTEM RESOURCE BOOK FOR TRAINERS

Nordic Agency for Development and Ecology (NORDECO) & Department of Environment and Natural Resources (DENR), 2000
ISBN 87 986168 6 2

This resource book is a guide to protected areas staff and others who are to train protected area workers in monitoring biodiversity. It links knowledge on biodiversity and resource use to the day-to-day work of implementing the Biodiversity Monitoring System in the field. The book also informs trainers on how to prepare themselves for the training before going to the site. It is organised into 8 training modules with corre-



sponding sections. Each section describes module objectives, methodology, materials needed, additional readings and activities, and is accompanied by illustrated handouts which serve as a starting-point for discussions. A list of reference materials is provided in each module section.

For more information, contact:
Project Management Office
of WB-TAB
Protected Areas and
Wildlife Bureau
Department of Environment
and Natural Resources
Ninoy Aquino Parks and
Wildlife Nature Center
North Ave., Diliman,
Quezon City, Philippines

GUIDELINES FOR AID AGENCIES ON GLOBAL AND REGIONAL ASPECTS OF THE DEVELOPMENT AND PROTECTION OF THE MARINE AND COASTAL ENVIRONMENT

OECD Development Assistance Committee (DAC) 1995
ISBN: 2-8317-0544-4

This document is 8th in the 9-volume series- DAC Guidelines on Aid and Environment. It provides an overview of major issues relating to the state of the marine and coastal environment, and sets out various approaches for its protection, including institutional, managerial, economic and scientific approaches. In addition, the guidelines offer advice for aid agencies for priority activities for technical and financial assistance for a better integration of marine concerns in environment protection and development activities.

For more information, contact:
Publications Co-ordinator
Development Co-operation
Directorate
Organization for Economic
Co-operation and Development
2, rue Andre Pascal
Paris 75016 France



SURVEY MANUAL FOR TROPICAL MARINE RESOURCES

S. English, C. Wilkinson, V. Baker
Australian Institute of Marine
Science, 1997

ISBN: 0-642-25953-4

This widely used manual has been developed to survey and monitor coastal resources. Application of the methods described herein produce reliable information on the current status of tropical coastal ecosystems. Covers topics on coral reefs, mangrove ecosystems, soft-bottom and seagrass communities, and coastal fisheries.

For more information, contact:
Australian Institute
of Marine Science
P.M.B. No. 3
Townsville Mail Centre
Qld, 4810 Australia



ECOLOGICAL CENSUS TECHNIQUES: A HANDBOOK

William J. Sutherland, 1996

ISBN: 0 521 47815 4

A concise and comprehensive book that provides an overview of the most important methods on field studies in population and behavioural ecology and at all levels of conservation biology to beginners and practising professionals. Practical texts with examples outline the main techniques used by field ecologists to enumerate plants and animals. Taxonomic groups are treated separately, with detailed descriptions of appropriate census methods; their advantages, disadvantages and biases. Also included are techniques for measuring a wide range of environmental variables.

For more information, contact:
Cambridge University Press
The Edinburgh Building
Cambridge CB2 2RU, UK



EXPEDITION FIELD TECHNIQUES: BIRDS SURVEY

Collin Bibby, Martin Jones,
Stuart Marsden

Expedition Advisory Centre, 1998

ISBN: 0-907649-79-3

Techniques needed to obtain and analyse good quantitative bird data from the field; and the potential problems and pitfalls of such work are highlighted to help design effective surveys.

GUIDELINES FOR DEVELOPING AND IMPLEMENTING NATIONAL WETLAND POLICIES

Compiled by: Clayton Rubec
Ramsar Convention Bureau,
ISBN 87 986168 6 2

These guidelines may prove most useful to countries making or considering a commitment to new formulations of national policy or strategies on wetlands. Sections treat in sequence the suggested steps and issues that may arise. This includes defining the purpose of such an initiative, organising a suitable process, deciding how to present the content of the policy document, and developing strategies for implementation and monitoring. Seven case studies from different countries complement these guidelines.



For more information, contact:
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Fax: +41 22 999 0169
E-mail: ramsar@ramsar.org

MANAGING PROTECTED AREAS IN THE TROPICS

John MacKinnon, Kathy MacKinnon, Graham Child, Jim Thorsell, 1986
ISBN: 81-85019-56-8

A comprehensive reference highly recommended for protected area managers. Includes the basic concepts, policies and legal aspects, planning, and implementing management for protected areas.

HANDBOOK FOR MANGROVE AREA MANAGEMENT

Lawrence S. Hamilton (ed.), Samuel C. Snedaker (ed.)
Environment and Policy Institute East-West Center; International Union for the Conservation of Nature and Natural Resources; United Nations Educational, Scientific and Cultural Organization
ISBN: 0 86638 055 8

This handbook summarizes information on the range of products, benefits and services provided by the world's mangrove resources. Guidelines are provided throughout the handbook for sustainable, multiple-use management of mangrove ecosystems. The approach in this handbook is to discuss problems in mangrove area management in 4 sections that deal

with topics such as policy and planning, management at the resource level, restoration and establishment, and economic considerations in mangrove management.

For more information, contact:
Commission on Ecology
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GUIDELINES FOR MOUNTAIN PROTECTED AREAS

Duncan Poore (ed.)
International Union for the Conservation of Nature and Natural Resources (IUCN), 1992
ISBN: 283 1701112

This booklet of general guidelines is intended for planners and managers of mountain protected areas. These guidelines are offered as a sharing of experience by 40 scientists and managers in over 30 countries. Topics in this booklet include: general criteria for the selection of mountain protected areas, preservation of biodiversity and physiographic features, transfrontier mountain protected areas, socio-economic aspects of mountain protected areas and topics on management of mountain protected areas.



GREATER THAN THE SUM OF THEIR PARTS: DESIGNING CONSERVATION AND DEVELOPMENT PROGRAMS TO MAXIMIZE RESULTS AND LEARNING: A PRACTICAL GUIDE FOR PROGRAM MANAGERS AND DONORS

Nick Salafsky, Richard Margoluis, WWF 1999

This guide is designed for field-based conservation and development practitioners as well as other key clients in the conservation and development community including donors and their grantees. It is about applying the principles of adaptive management at a program level- i.e. a collection of

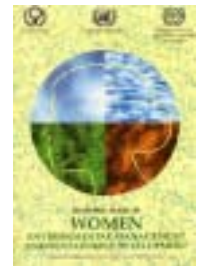


projects. It intends to spark people's examination of their own programs and how they can maximize their results and learning in order to enhance our collective knowledge. The guide is structured in 5 steps involved in developing and implementing a learning program.

TRAINING MANUAL: WOMEN ENVIRONMENTAL MANAGEMENT AND SUSTAINABLE DEVELOPMENT

Borjana Bulajic, Martha DueñasLoza, Adelina Guastavi

This manual is designed to assist policy makers and development officials in enabling a more participative role of women in sustainable development and environmental management; comprehensive and multidisciplinary linkages between women, sustainable development and environmental aspects. It also deals with overall existing problems and presents possible solutions for usage and application in training workshops; educational and training institutions worldwide.



For more information, contact:
UN INSTRAW, United Nations

ENVIRONMENTAL IMPACT ASSESSMENT: A TRAINING GUIDE

Norman Lee
2nd Edition
Department of Planning and Landscape 1989

This second edition of the EIA Training Guide is aimed to assist those involved in organising and teaching courses on environmental impact assessment. The guide is mainly directed to the needs of trainers who have a limited experience in EIA work. The guide provides guidance on: the nature and scope of EIA; the preparation of EIA training programmes and courses; undertaking key tasks in the EIA process; the content and method of courses and EIA literature and other sources of information.



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ASEAN Regional Centre for Biodiversity Conservation

National Biodiversity Reference Units' Network



ARCBC is a joint cooperation project between ASEAN and the European Union

