

MESSAGE

TO ALL THE MEMBERS OF THE ORGANIZING GROUP and ALL PARTICIPANTS:

Warm greetings to you all!

De La Salle University - Dasmariñas expresses gratitude for being made a partner in this year's Philippine Biodiversity Symposium. As such, we find great joy in welcoming you to our campus—an opportunity that we will always treasure as we believe that this affirms not just what we can offer but also our commitment to journey along the same direction of ensuring a healthy environment towards sustaining a vibrant biodiversity.

We are humbled by your decision to hold your event on campus but at the same time we are also challenged to continue walking towards the same direction and we are glad to share with you the fruits of our oneness in advancing the importance of taking care of our environment.

May your gathering bear fruits of commitments and concrete actions of collaboration for a noble purpose.

One with you in this undertaking, we say congratulations and we offer our prayer of accompaniment for the success of your activity.



Br. Gus L. Boquer FSC, EdD
President
De La Salle University-Dasmariñas

We are humbled by the opportunity to co-host this year's Biodiversity Conference. We are delighted to co-host this year's conference with the National Museum of the Philippines and the De La Salle University-Dasmariñas. This co-hosting scheme was intentional and by design.

During the 19th WCSP Biodiversity Conference in Bicol in April 2010, we have re-launched FFI Philippines. We have said then that the new FFI Philippines Conservation Support Programme will not focus on direct implementation of projects or building a large organisational structure. Rather, our vision was to complement existing conservation initiatives, building conservation capacity within local and national organizations and providing support system which will improve how existing organizations deliver conservation by providing technical support, demonstrating innovation and sharing examples of best practice. In doing this, we will be working towards preserving the integrity of ecosystems on which communities directly depend.

This co-hosting therefore demonstrates this vision and ethos of building and brokering partnership for conservation. We recognise the important role of the National Museum of the Philippines (Natural History) as a generator of scientific knowledge that should underpin conservation action whilst the academia, in this case the De La Salle University-Dasmariñas, as an incubator of conservation professionals and one that will be central in building conservation capacities to deliver conservation outcomes. Both institutions, together with the WCSP, will be crucial partners of the Department of Environment and Natural Resources-Protected Areas and Wildlife Bureau as scientific authorities – a partnership that has the potentials of increasing the capacities of DENR-PAWB to deliver conservation!

As the funding climate shifts towards the climate change discourse, we hope that we do not lose sight of the basics of our conservation remit. The biodiversity bandwagon is slowly and steadily losing its public and funding charm and we have yet to achieve what we all set out to do as evinced by the growing number of species being pushed into the Red List; many protected areas still remain to be paper parks; natural habitats are being urbanized or converted to agriculture or mined! More than ever, the call to scientists and conservation professionals to stay the course and vigorously engage the government, economic development sector (private and public) to put biodiversity and community livelihoods at the core of its planning regime. A herculean task that can be done through partnerships!

FFI will be keen to facilitate and broker these conservation partnerships. We shall continue to support the initiative of WCSP in building partnerships to protect threatened species and ecosystems, choosing solutions that are sustainable, based on sound science and take account of human needs.

Congratulations to WCSP for keeping the conservation torch alight for more than two decades!



Neil Aldrin D. Mallari
Programme Director

Fauna & Flora International-Philippines

The Protected Areas and Wildlife Bureau (PAWB) congratulates the Wildlife Conservation Society of the Philippines (WCSP) for holding their 21st Annual Philippine Biodiversity Symposium. Generally speaking, the WCSP has been an essential partner of the Bureau in achieving our objectives to conserve and sustainably manage our country's remaining biological biodiversity. In particular, WCSP has provided the Bureau with sound science that forms a significant part of the bases for our policy directions and implementation.

The theme of the symposium, "Forests Sustaining Life", emphasizes issues concerning forests, their biodiversity, and services they provide to man. Moreover, it looks into factors including climate, soil, organism, and even people that affect the present status of Philippine forests.

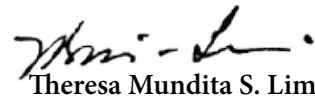
The diverse flora and fauna in the Philippine forest directly give benefits to about 25 million Filipinos in the upland communities by providing food, medicine, wood, fiber, and fuel. It also delivers cultural and provisional services, since it serves as a source of livelihood, a symbol for cultural identity, and a foundation for religious beliefs for communities. Furthermore, the Philippine forest delivers regulatory services by providing clean water and coastal protection, stabilizing climate, and sequestering carbon dioxide.

Among all the land-based ecosystems, forests are considered the most biologically diverse containing various wildlife species. Biodiversity sustains the vitality of forest ecosystems thus making them resilient and effective in delivering ecosystem services. It is therefore important to protect and conserve forest biodiversity to ensure forests' proper delivery of ecosystem services to the environment and to the people.

It is about time that we look at forests as more than just a source of timber. Activities like this annual WCSP Symposium will allow us to deepen our awareness and knowledge on the forest as an ecosystem that provides the various benefits I have mentioned.

This activity is an appropriate avenue for gathering researchers in the country in order to take stock of the current knowledge available on forests in the Philippines that will help us move forward in our efforts to implement the National Greening Program and at the same time ensure the protection of the few remaining old growth forests that we have.

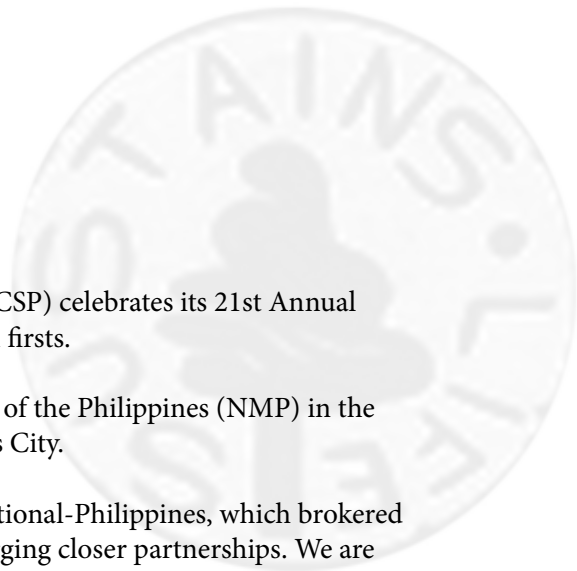
Mabuhay!



Theresa Mundita S. Lim

Director

Protected Areas and Wildlife Bureau-DENR



The Wildlife Conservation Society of the Philippines (WCSP) celebrates its 21st Annual Philippine Biodiversity Symposium this year with several firsts.

We have two venues in two cities - the National Museum of the Philippines (NMP) in the City of Manila, and De La Salle University in Dasmariñas City.

We have three co-hosts, including Fauna & Flora International-Philippines, which brokered the tripartite co-hosting arrangement with the goal of forging closer partnerships. We are grateful to Fauna & Flora International for continuing strong support of WCSP symposia including presentations and discussions on important conservation policy issues and developments.

This is the greenest WCSP symposium so far, with three days of the symposium at De La Salle University - Dasmariñas (DLSU-D), which is green not only because of the school color but from all the plants that have been tended in the large campus. Fittingly, we have five oral presentations on Philippine plants, which is probably the most we have had to date. We are thrilled that our DLSU-D counterparts assure us of strong DLSU-D student and faculty participation in the symposium.

This is the first WCSP symposium in any Philippine museum. The National Museum of the Philippines is the pre-eminent repository for specimens of Philippine biodiversity, which it curates and exhibits to foster research and promote appreciation of our national patrimony. We are very grateful that they offered not only the venue for the symposium but are also access to their exhibits, which have been recently improved and expanded.

A joint WCSP-NMP team has prepared and designed an exhibit on pioneering contributors to the study of Philippine wildlife, with assistance from institutions and individuals from around the world. The WCSP is donating the exhibit to the NMP so that it can be permanently accessible to the public. We look forward to further collaboration in the future.

Remaining unchanged over the years, and I am proud to be one of the original members in attendance in 1992, is that the Wildlife Conservation Society of the Philippines' symposia bring together people who care about Philippine biodiversity from throughout the Philippines and throughout the world. We salute all the participants in this year's symposium and hope to continue to see you in the years to come.

Nina R. Ingle
Nina R. Ingle
President

Wildlife Conservation Society of the Philippines

MESSAGE

**21st Annual Philippine Biodiversity Symposium of the
Wildlife Conservation Society of the Philippines (WCSP)
at the National Museum of the Philippines (Manila)
and De La Salle University - Dasmariñas (Dasmariñas City, Cavite)
co-hosted by Fauna & Flora International**

**17-20 April 2012
Theme: Forests Sustaining Life**

17 April 2012, Tuesday

The National Museum of the Philippines is hosting the first day of the symposium with tours of the public exhibits and research collection of the Museum. We request that you dress appropriately in smart casual to formal wear.

<p>1:00–2:00 pm <i>Lobby of the Museum of the Filipino People</i></p>	<p>Symposium Registration Note: The Entrance to the Museum of the Filipino People is along Finance Road</p>
<p>1:00–3:00 pm</p>	<p>Viewing of the Public Exhibits of the Museum of the Filipino People, including the Sanlaksang Buhay Biodiversity Exhibit (4th floor)</p>
<p>3:00–3:30 pm <i>Tambunting Hall</i></p>	<p>Snacks and Exhibit Viewing</p>
<p>3:30–5:30 pm <i>Tambunting Hall</i></p>	<p>Opening Ceremonies: Invocation National Anthem Welcome to the Philippine Biodiversity Symposium <i>Dr. Nina R. Ingle, President, Wildlife Conservation Society of the Philippines</i> Welcome to the National Museum of the Philippines <i>Mr. Jeremy R. Barns, Director, National Museum of the Philippines</i> The Natural History Collection of the National Museum of the Philippines <i>Dr. Arvin C. Diesmos, Scientist, National Museum of the Philippines</i> Pioneering Contributors to Philippine Wildlife Studies: Exhibit Opening Turnover of Exhibit to the National Museum of the Philippines Closing Remarks</p>
<p>5:30-6:30 pm <i>Central Patio, Museum of the Filipino People</i></p>	<p>Dinner cocktails</p>
<p>6:30-7:00 pm <i>Parking lot, Finance Road</i></p>	<p>Departure for Dasmariñas City, Cavite (buses to be provided) Travel time estimated at 1½ hours</p>

PROGRAM

18 April 2012, Wednesday

De La Salle University-Dasmariñas is hosting the symposium from April 18th-20th. Accommodations are available on campus and in Dasmariñas City

<p>8:00-8:45 am <i>Lobby, Alumni Hall</i></p>	<p>Registration (Raffle tickets to be distributed to those who are in the Alumni Hall by 8:45)</p>
<p>8:45-9:00 am <i>Alumni Auditorium (3rd floor, Alumni Hall)</i></p>	<p>AVP Presentations of Symposium Hosts</p>
<p>9:00-10:00 am <i>Alumni Auditorium</i></p>	<p>Opening Program: Doxology <i>DLSU-D Performing Arts Group</i> National Anthem <i>DLSU-D Choral</i> Welcome to De La Salle University-Dasmariñas <i>Br. Gus L. Boquer, FSC President, De La Salle University-Dasmariñas</i> Welcome to Dasmariñas City <i>Mayor Jennifer A. Barzaga</i> Acknowledgement of Guests <i>Dr. Nina R. Ingle, President, Wildlife Conservation Society of the Philippines</i> Inspirational Message <i>Dr. Neil Aldrin Mallari, Country Director, Fauna & Flora International - Philippines</i> Inspirational Message <i>Director Theresa Mundita Lim, Protected Areas and Wildlife Bureau, Department of Environment and Natural Resources</i></p>
<p>10:00-10:30 am <i>Multipurpose Hall (2nd floor, Alumni Hall)</i></p>	<p>Snacks Poster ingress / set-up</p>
<p>10:30-11:00 am <i>Alumni Auditorium</i></p>	<p>Invited Talk: Forests Sustaining Life <i>Dr. Tony Whitten, Asia-Pacific Director, Fauna & Flora International</i></p>
<p>11:00-11:30 am</p>	<p>Open Forum</p>
<p>11:30-11:50 am <i>Front steps of Alumni Hall</i></p>	<p>Group Photographs</p>
<p>12:00-12:30 am <i>Conference Room B, Alumni Hall</i></p>	<p>Press Conference (invited guests and media)</p>
<p>12:00-1:30 pm <i>Square Garden</i></p>	<p>Lunch</p>

1:30-3:00 pm <i>Alumni Auditorium</i>	Saving Philippine Cave Bats (video presentation) Launching of the DENR-Bat Conservation International Memorandum of Agreement for Philippine Bat Conservation <i>Director Theresa Mundita Lim (PAWB) and Dr. Dave Waldien (Bat Conservation International)</i>
3:00-3:20 pm <i>Multipurpose Hall</i>	Snacks Poster ingress / set-up
3:20-4:00 pm <i>Alumni Auditorium</i>	Keynote Address: Deep Forestry: Shapers of the Philippine Forests <i>Prof. Greg Bankoff, University of Hull</i>
4:00-4:30 pm <i>Alumni Auditorium</i>	Open Forum
4:30-6:00 pm <i>Multipurpose Hall</i>	Grand Opening of Symposium Posters and Exhibits
6:00 -8:00 pm <i>Square Garden and Lake Park</i>	Fellowship Dinner
19 April 2012, Thursday	
8:00-8:15 am <i>Alumni Auditorium</i>	Raffle (prizes raffled for those signed up and in the hall by 8 am) Introduction to WCSP Silent Auction for WCSP Student Travel Support
8:15-9:15 am <i>Alumni Auditorium</i>	Contributed Papers: Conservation Tools Leonardo Co's Digital Flora of the Philippines <i>Pieter B. Pelsler, Julie F. Barcelona and Daniel L. Nickrent</i> Novel Tools for Biodiversity Research and Education Outreach in the Philippines <i>Cameron Siler, Angel Alcala, Arvin Diesmos and Rafe Brown</i> Participatory Video Filming: A successful tool to involve community participation in crocodile conservation <i>Marites Gatan-Balbas, Willem van de Ven, Samuel Telan, Dominic Rodriguez, Jessie Guererro, Jan van der Ploeg, Myrna C. Cureg, Nicolien Pul and Merlijn Van Weerd</i>
9:15-10:15 am <i>Alumni Auditorium</i>	High School Student Presentations Abundance and Distribution of <i>Bufo marinus</i> and <i>Limnonectes macrocephalus</i> in a Freshwater Mountain Stream in Taytay, Rizal <i>Anna Ysabella M. Fernandez, Fatima B. Fernandez-Cuervo, Anna Karina Julia A. Gaurano; Samantha Sara R. Santos and Henry G. Calilung (Adviser)</i> Modeling the Dissolved Oxygen in Taal Lake Using STELLA <i>Cristina Acosta and Chuckie Calsado (Adviser)</i> Confirming the Presence of <i>Sundathelphusa antipoloensis</i> in a Small Mountain Stream in Luzon, Philippines <i>Juan Carlo T. Felizardo, Jasmin W. Valera, John Raphael V. Vinuya and Henry G. Calilung (Adviser)</i>

10:15-10:40 am <i>Multipurpose Hall</i>	Snacks and Poster and Exhibit Viewing
10:40-12:00 nn <i>Alumni Auditorium</i>	<p><i>Undergraduate Student Presentations</i></p> <p>Ants (Hymenoptera: Formicidae) of Mt. Apo National Park: A Survey of Nocturnal and Diurnal Ants in the Mossy Montane Forest <i>Jhonny Wyne B. Edaña and Janette P. Supremo</i></p> <p>Notes on the geospatial distribution of bats in Nasipit, Agusan del Norte, Mindanao, Philippines with implications for conservation using Geographic Information System <i>Neil Jun S. Lobite and Sheryl L. Paz</i></p> <p>Marine Gastropods in Kopyat Island, Compostela Valley <i>Joe Frhym D Merrillana, Marianne C. Lozare, Siegfred Kenne J. Macapas, June Rey C. Mamalintaw, April Dee V. Montiales, Maria Lourdes E. Noveno, Romnick C. Talde, Clyde Darvy T. Tizon and Sahara B. Unos</i></p> <p>Spiders of Mayon Volcano Natural Park, Albay <i>Zarieh Dawn L. Novela and Jonathan Jaime G. Guerrero</i></p>
1:15-4:15 pm <i>Aguado Viewing Room, Aklatang Emilio Aguinaldo</i>	<p>Afternoon workshops to be held concurrently at different venues</p> <p>Collection and Analyses of Full-Spectrum Ultrasound from Microchiropteran Bats: Working Towards a Freely Accessible Library of Echolocation Calls for the Philippines <i>Alice Hughes, Daniel Bennett, Apolinario Cariño and James O'Neill</i></p>
<i>Cabeza Viewing Room, Aklatang Emilio Aguinaldo</i>	Mitigation Pathways for Amphibians with Chytridiomycosis in the Philippines <i>Vance Vredenburg, Rafe Brown, Arvin Diesmos and Mae Lowe Diesmos</i>
<i>College of Science (COS) Room 101</i>	Implementing the Philippine National REDD Plus Strategy: Opportunities and Challenges <i>Edmund Leo B. Rico and Olivia Melendrez</i>
<i>College of Science (COS) Room 102</i>	The Use of Geo-Referenced Biodiversity Data and Species Distribution Modeling in Climate Change Impact Studies <i>Merlijn van Weerd, Lawrence Ramos, Alfe Torres, Denyse Snelder, Maarten 't Zelfde, Florencia Pulhin and Rodel Lasco</i>
<i>Computer Room, Aklatang Emilio Aguinaldo</i>	Hands-on Workshop on Species Distribution Modeling Using Free and Open Source Geospatial Tools <i>Cynthia Layusa, Emmanuel Sambale and Christian Supsup</i>
4:15-4:30 pm <i>Front of Alumni Hall</i>	Snacks and Poster and Exhibit Viewing
4:30-6:00 pm <i>Multipurpose Hall</i>	WCSP Annual General Meeting including Presentation of Bids for 2012 Philippine Biodiversity Symposium, and Election of Board Members
7:00 -8:30 pm	<p>Meetings and Workshops <i>[to lead additional meetings, sign up for meeting slots and rooms by April 18]</i></p>
<i>PCH 103</i>	Workshop: WCSP Contributions to DENR Threatened Species List <i>WCSP Threatened Species Committee</i>
<i>PCH 104</i>	Workshop: Assessing Impacts of Disturbances to Philippine Cave Bat Populations <i>Rai Gomez, David Waldien and Nina Ingle</i>

20 April 2012, Friday

8:00-8:05 am Raffle (prizes raffled for those signed up and in Alumni Hall by 8 am)
Alumni Hall

Concurrent Scientific Paper Presentations at the Alumni Hall

Alumni Auditorium (3rd Floor)

Multipurpose Hall (2nd Floor)

8:05-8:25 am Spatial Analysis as an Important Tool in Decision Making for Conservation and Development: The Mindoro case study
Jose Don T. Alban

Habitat and its Influence on the Territorial Displays of Southeast Asian Gliding Lizards (*Draco* spp.)
Terry J. Ord

8:25-8:45 am Implications of Hunting and Forest Loss to the Conservation and Habitat of the Calayan Rail *Gallirallus calayanensis*
Cynthia Adeline A. Layusa, Jose Don T. De Alban, Carla C. Monoy, Tolentino B. Moya and Carl H. Oliveros

Current Diversity Status of Butterflies in Selected Forests of Mindanao, Philippines
Alma B. Mohagan and Antonio E. Tambuli

8:45-9:05 am Modeling the Distribution of Bird Species in the Northern Sierra Madre in Relation to Habitat and Climatic Variables
Merlijn van Weerd

The Evolution of Colour Signals in Gliding Lizards (genus *Draco*)
Danielle Klomp, Devi Stuart-Fox and Terry J. Ord

9:05-9:25 am Habitat Association of Lizards in the Remaining Forests and Natural Grasslands of Cavite, Luzon Island
Ronaldo D. Lagat

Habitat Selection and Conservation Status of the Endemic Ninox Hawk-Owl on Cebu, Philippines
Philip Godfrey C. Jakosalem, Nigel J. Collar and Jennifer A. Gill

9:25-10:05 am An Assessment of Stakeholder Capacities on the Utilization of Geospatial Technologies for Biodiversity Conservation through the New Conservation Areas Priority Project (NewCAPP)
Jose Don T. Alban, Christian E. Supsup and Ray Neil M. Lorca

Growth of Hatchling and Juvenile *Crocodylus mindorensis* with Different Soft Release Strategies
Willem van de Ven, Merlijn van Weerd, Sammy Telan, Dominic Rodriguez, Jessie Guerrero, Marites Balbas, Hans de Iongh and Geert De Snoo

10:05-10:40 am Snacks and Poster and Exhibit Viewing
Front of Alumni Hall

PROGRAM

	<i>Alumni Auditorium (3rd Floor)</i>	<i>Multipurpose Hall (2nd Floor)</i>
10:40-11:00 am	Caves in the Philippines: What should we know and why should we care? <i>Daniel Edison Husana, Tomoki Kase and Masumi Yamamuro</i>	Negative Density Dependence and Dispersal Limitation in Dominant Philippine Tree Species <i>Sandra L. Yap</i>
11:00-11:20 am	An Assessment of Cave Bats on Siquijor Island <i>Jodi L. Sedlock, Rai Gomez and Paul Senner</i>	Distribution and Conservation Initiatives of Threatened and Endemic Vascular Plants <i>Victor B. Amoroso, Florfe M. Acma, Hannah P. Lumista, Lesley C. Lubos, Corazon G. Alava and Fulgent P. Coritico</i>
11:20-11:40 am	Photographic Estimation of Roosting Density of Geoffroy's Rousette Fruit Bat (<i>Rousettus amplexicaudatus</i>) <i>Ela-Sita Carpenter, David L. Waldien, Richard E. Sherwin and Rai Gomez</i>	Assessment of Phenotypic Diversity and Elucidation of Taxonomic Identity of Bakauan Mangroves (<i>Rhizophora</i> spp.) in Pagapas Bay, Calatagan, Batangas, Philippines <i>Leah E. Endonela, Vicitasion C. Huelgas, Maribel L. Dionisio-Sese, Nestor C. Altoveros and Teresita H. Borromeo</i>
11:40-12:00 nn	From Co-Existence to Exclusion: Mechanisms behind the generalist replacement of specialists in the face of disturbance <i>Tammy L. Mildenstein</i>	Plant Diversity Over Ultramafic Forest of Baler, Aurora Province, Central Luzon <i>Danilo N. Tandang and Edwin R. Tadiosa</i>
12:00-1:30 pm	Lunch	
	<i>Alumni Auditorium (3rd Floor)</i>	<i>Multipurpose Hall (2nd Floor)</i>
1:30-1:50 pm	Detecting El Nino Southern Oscillation (ENSO)-Linked Sardine-Anchovy Regime Shift in Philippine Waters: Implications to Conserving Marine Mammals <i>Dan S. Torres</i>	Biomonitoring of Benthic Macroinvertebrates in Selected Streams in Mt. Kanla-on Natural Park, Northern Negros, Philippines <i>Christine Jewel C. Uy, Dino Angelo E. Ramos, Perry S. Ong and Francis S. Magbanua</i>
1:50-2:20 pm	Chytridiomycosis in Amphibians of the Philippines <i>Vance Vredenburg, Arvin Diesmos, Mae Lowe Diesmos, Tina Cheng, Celeste Dodge, Cameron Siler and Rafe Brown</i>	Homing Pigeons as Biomonitors of Atmospheric Pollution <i>Richard S. Halbrook</i>

PROGRAM

2:20-3:30 pm <i>Multipurpose Hall</i>	WCSP Committee Meeting Reports Synthesis of WCSP Plans (2012-2013)
3:30-4:00 pm	Snack break
5:00-6:00 pm <i>Assembly outside Alumni Hall</i>	Tour of the De La Salle University - Dasmariñas campus
6:00-9:00 pm <i>Cafe Museo</i>	Farewell Dinner Music: <i>DLSU-D Rondalla</i> Announcements of Winning Bids for WCSP Silent Auction Announcement of Host for 2013 WCSP Symposium Closing Program
21 April 2012, Saturday	
4:00 am	Assembly for Field Trip to Mts. Palay-Palay-Mataas na Gulod National Park (MPPMNG) in Maragondon, Cavite, ParadiZoo in Mendez, Cavite and Picnic Grove in Tagaytay City
4:00 pm	Estimated arrival time at DLSU-D

High School Poster Presentations

Abundance of Rotifera at the Tungtong River in Taytay, Rizal
Eunice M. Aaron, Kimberly Megan P. Castro, Anthony John T. Del Ayre, Joshua D. Pacunayan and Henry G. Calilung (Adviser)

Co-relating Avian and Tree Diversity in Taytay, Rizal: A Development Guide for Residential Areas
Dafrose Camille M. Bajaro, Rouanna Ysabelle C. Guce, Luis Hombrebueno, Ciel Lee and Henry G. Calilung (Adviser)

A Survey on the Avian Community of Philippine Science High School-Diliman Campus
Alyssa Yapyuco, Alison Estabaya and Lea Lite

Undergraduate Poster Presentations

Ectoparasite Diversity and Host-Parasite Associations of Bats (Mammalia: Chiroptera) in Mount Makiling Laguna
James D.V. Alvarez, Leticia E. Afuang, Ireneo L. Lit, Jr. and Phillip A. Alviola

Diversity Assessment of Butterflies across Vegetation Types of Mount Kitanglad, Bukidnon
Lovely B. Billones and Alma Mohagan

Preliminary Study on the Termiticidal Property of *Allamanda cathartica* L. (Yellow Bell) Leaf Extracts
Frank Britz V. Cadavis, Jomar S. Cabiyaan, Harlene A. Apostol, Facundo Rey M. Ladiiao and Ma. Victoria D. Naboya

The Distribution and Soil Seed Bank Analysis of *Eichhornia crassipes* in Laguna de Bay, Philippines
Victoria Elena B. Chan and Regielene S. Gonzales

Food Detection of Ants: A Social Behavior
Siegfred Keene M. Macapas, June Rey C. Mamalintaw, Joefrhym D. Merillana, Marianne Vej C. Lozare and Liza Joy Y. Lazan

Diversity and Assessment of Odonata across Vegetation Types of Mt. Kitanglad, Bukidnon
Emelene C. Paciente and Alma B. Mohagan

Relative Abundance and Distribution of *Tetrastigma piscicarpum* (Miq) Planch. in Mt. Banahaw de Dolores and its Parasitic Relationship with *Rafflesia philippensis*
Romelyn C. Pasion, Leah Marris A. Villaran and Leonisa O. Bernardo

A Preliminary Survey of the Parasitic Hymenoptera Morphospecies in Puerto Princesa City, Palawan
Rosalyn S. Ramos, Antonette B. Bartolome, Analyn V. Omapas, Cory P. Jagmis, Dexter P. Gabuco, Joker E. Ramilo and David M. General (Adviser)

Assessment of Odonata Species at Mayon Volcano Natural Park
Jane Ellen Marie Salon and Jonathan Jaime G. Guerrero

Regular Poster Presentations

Population Assessment of Butterfly Host Plants in Selected Sites Near Mt. Banahaw de Lucban, Lucban, Quezon
Mary Ann R. Agudilla

Pagbilao Mangrove Forest is Potential Food Source of Bees and Other Insects
Amalia E. Almazol

Avian Species of Malagos Watershed, Baguio District, Davao City
Geonyzl L. Alviola, Bernadette I. Del Rosario, Julie B. Otadoy and Jayson C. Ibañez

Updating the Ecological Profile of Naujan Lake National Park
Phillip Alviola

Inventory of Butterflies in the Three Habitat Types of Mt. Musuan, Bukidnon
Sheriffa Andas, Ma. Celene Bandies, Donna Singson, Ronaldo Baldo, Diana Rose Maghuyop and Alma B. Mohagan

Quantifying Resilience of High Altitude Tropical Forest
Jonathan A. Anticamara, Bonifacio O. Pasion, Regielene S. Gonzales, Mariano Roy M. Duya and Perry S. Ong

Genetic Diversity in Two Native Freshwater Goby Species (Gobiidae, perciformes) in the Philippines and Its Implication for Conservation
Goli Ardestani, Diana Rose Rogelio and Rita Laude

Rapid Assessment of Mosses in Hikong Bente Falls, Lake Sebu, South Cotabato
Aisa Ruth Baroy, Ralfh Carbo, Ronalyn Estorpe, Mergie Fajardo, Jyza Marie Gaurana, Ralph Laude, Carl Dominic Retirado, Carmae Ruyeras, Angelica Sorilla, Kevin Taganahan and Elsa May Delima-Baron

Bulacan Herpetological Biodiversity and Manila's Water Supply
Rafe Brown, Arvin Diesmos, Mae Diesmos and David McLeod

Biodiversity Assessment of Mt. Banahaw De Dolores
C. N. Gascon, R. C. Garcia, F. N. Beltran, W. C. Faller and M. A. R. Agudilla

Reintroducing Head-Started and Captive-Bred Philippine Crocodiles: Monitoring population changes and survival
Jessie Guererro, Dominic Rodriguez, Marites Gatan-Balbas, Willem van de Ven, Samuel Telan, Jan van der Ploeg and Merlijn van Weerd

Sexual Competition and Gene Duplication in Stalk-Eyed Flies (Family Diopsidae)
Philip M. Johns, Richard H. Baker and Gerald S. Wilkinson

Mangrove Assessment along Butuan Bay: A perspective on its historical significance, denudation and rehabilitation
Jess H. Jumawan

An Ethnobotanical Study: Focusing on the medicinal plants of Pala'wan communities in Barangay Inogbong, Bataraza, Palawan
Lea M. Magarce and Romualdo M. Del Rosario

Diversity of Bats in the Vegetation Patches of Musuan, Bukidnon
Alma B. Mohagan, Dave P. Buenavista, Dave P. Mohagan and Heidi C. Porquis

Status of Butterflies in Dinagat Islands
Alma B. Mohagan, Dave P. Mohaga and Rochelyn Libor

A Review of Pteropodid Research and Publications in the Last 11 Years
CE Nuevo, Tammy Mildeinstein and Nick Martin Rosenberger

An "Unseen" Invasion of the Microscopic Kind – The Neotropical *Arctodiaptomus dorsalis* (Copepoda, Calanoida, Diaptomidae) in Philippine Lakes
Rey Donne S. Papa, Huiming Li, Dino T. Tordesillas, Boping Han and Henri J. Dumont

Abundance and Diversity of Resident Bird Species in Areas with On-Going Building Construction at the University of the Philippines - Diliman Campus
Erwin Don Racasa, Ana Paula Luna, Jasmin Meren and Regielene Gonzales

Compiling a Georeferenced Database of Threatened Forest Tree Species in the Philippines
Lawrence T. Ramos, Alfie M. Torres, Florencia B. Pulhin and Rodel D. Lasco


Macrofungal Diversity of Bazal-Baubo Watersheds, Aurora Province, Central Luzon
Edwin R. Tadosa, Efen S. Agbayani and Nestor T. Agustin

Addressing Human – Crocodile Conflict in the Province of Isabela
Sammy P. Telan, Femke Koopmans, Willem van de Ven, Merlijn van Weerd, Dominic G. Rodriguez, Jessie P. Guerrero, Marites G. Balbas and Jan van der Ploeg

Characterization of a Remnant Coastal Forest on a Small Coralline Sand Island in the Philippines
Daniel S. Torres and Lea Ivy O. Manzanero

Partnerships in Protecting the Olive Ridley Turtle (*Lepidochelys olivacea*): A Philippine Case Study
Daniel S. Torres

A Sampling Scheme Design for Validating Results of Preliminary Stratification for Above-Ground Forest Carbon Stock Estimation in Victoria-Anepahan Mountain Range, Palawan
Rizza Karen A. Veridiano, Anjilyn Kristine V. Monzon, Jose Don T. De Alban, Edmund Leo B. Rico, Christian E. Supsup and Ronald Allan N. Altamirano



21st Annual Philippine Biodiversity Symposium of the
Wildlife Conservation Society of the Philippines (WCSP)
at the Philippine National Museum (Manila)
and De La Salle University - Dasmariñas (Dasmariñas City, Cavite)
co-hosted by Fauna & Flora International

17-20 April 2012

Theme:

FORESTS SUSTAINING LIFE



Deep Forestry: Shapers of the Philippine Forests

*Greg Bankoff, Professor of Modern History,
University of Hull,
g.bankoff@hull.ac.uk*

Forest history is so concerned with the activities and impacts of humans on a locality that it usually neglects the role of other agents. There are other shapers of the forest too that both precede human activity and continue alongside it. When deciding who the shapers of the Philippine forests are, this history has to start much earlier than human occupation and include a wider cast of protagonists. This is what I call “deep forestry”. Climate and soil, for one, determine where and what types of species grow or predominate. Fire, of course, is mainly anthropogenic but is also autogenic even in tropical forest especially so far as it relates to climate variance. And then there are the living agents starting not with the human presence but rather with those far older “shepherds and undertakers” of the forest, the anay or white ants that prune away the weak and debilitated trees and consume the dead and dying ones. They, too, have a close relationship with human behaviour in ways that decide which species are felled and for what purposes. Finally there is humanity with all its changing needs and wants as well as its increasing desire for “lebensraum” largely at the expense of the forest. This paper examines how these processes have worked and how they have shaped the forests of the Philippines over the centuries.

Co's Digital Flora of the Philippines

Pieter B. Pelsler¹, Julie F. Barcelona^{1,2} and Daniel L. Nickrent³

¹*School of Biological Sciences, University of Canterbury, New Zealand*, ²*Philippine Native Plants Conservation Society, Inc.*, ³*Department of Plant Biology, Southern Illinois University, USA*
Email: pieter.pelsler@canterbury.ac.nz, barceljf@hotmail.com, nickrent@plant.siu.edu

The rapid decline of Philippines' native ecosystems calls for urgent conservation actions and these require solid baseline information about plant diversity. Ideally, these data would follow from comprehensive specimen-based taxonomic research and would consist of species descriptions, literature references, identification keys and distribution information. However, considering the enormous plant diversity in the Philippines (c. 1935 genera and over 9,000 species of vascular plants), such a 'traditional' approach would be extremely time consuming and would depend on substantial contributions of many taxonomic specialists. Considering the urgent need for baseline data, waiting for such efforts to be initiated and completed is not an option. We therefore recently launched *Co's Digital Flora of the Philippines* (www.philippineplants.org), a website that provides an illustrated checklist for all known species of vascular plants in the Philippines. This website builds on the late Mr. Leonardo L. Co's unpublished checklist of Philippine plants and his large collection of plant photographs (>10,000). The aim of the *Flora* is to be a widely and freely accessible source of taxonomic information that can be easily updated and expanded as new traditional taxonomic treatments are published and additional plant photographs become available. In this presentation, we will show some of the features of this website and discuss ways for scientists, teachers, students and other stakeholders to contribute.

Novel Tools for Biodiversity Research and Education Outreach in the Philippines

Cameron Siler¹, Angel Alcala², Arvin Diesmos³ and Rafe Brown¹

¹*Biodiversity Institute, University of Kansas, USA*, ²*SUAKCREM Marine Lab, Silliman University, Dumaguete City*, ³*Zoology Division, National Museum of the Philippines*
Email: camsiler@ku.edu, rafe@ku.edu, suakcrem@yahoo.com, arvin.diesmos@gmail.com

With the incorporation of molecular data into studies investigating widespread species in the Philippines, it has become apparent that we are greatly underestimating species diversity. The repeated observation of deeply divergent lineages within widespread species of amphibians and reptiles has led to a renewed effort in trying to estimate and describe species boundaries, in an attempt to arrive at well-supported estimates of species diversity. With new methods now available to identify and diagnose cryptic species, the field of biodiversity research has become more exciting than ever. However, with these new techniques, and rapidly increasing vertebrate diversity in the Philippines, how can the biodiversity information be made available to the public?

Biodiversity Research and Education Outreach - Philippines (PhilBREO) is an international education outreach program to bring biodiversity information and educational tools to the public using a multi-language and multi-disciplinary approach. This project will develop and implement the PhilBREO website to integrate studies of biodiversity, biogeography, education, and conservation. In addition to biodiversity information focused on species of amphibians and reptiles, the site will provide conservation-based education outreach tools. The collaborative project will allow for a better public understanding of the distribution of vertebrate diversity in the Philippines.

The project has a number of international collaborators, and we welcome anyone interested in getting involved in the effort. The results of this project will be implemented into the PhilBREO website, as well as the databases of our collaborating organizations: Encyclopedia of Life, AmphibiaWeb, The Reptile Database, HerpWatch Philippines.

Participatory Video Filming:

A successful tool to involve community participation in crocodile conservation

Marites Gatan-Balbas¹, Willem van de Ven¹, Samuel Telan¹, Dominic Rodriguez¹,
 Jessie Guererro¹, Jan van der Ploeg^{1,3}, Myrna C. Cureg^{1,2}, Nicolien Pul³ and Merlijn Van Weerd^{1,3}
¹Mabuwaya Foundation, Inc., ²Isabela State University, Cabagan, Isabela, ³Leiden University, Netherlands
 Email: mikaela_tess@yahoo.com; mabuwaya@yahoo.com

The Philippine crocodile *Crocodylus mindorensis* is an endemic critically endangered freshwater species with an estimated wild population size of less than 250 mature individuals. Isabela Province on Luzon Island has one of the last viable wild populations.

The Mabuwaya foundation uses passive and active methods of Communication, Education and Public Awareness (CEPA) to mobilize public support for the conservation of the Philippine crocodile. One of the aims is to actively involve rural communities in crocodile conservation. However, when community dialogues are conducted, the majority of the people are too shy to talk about their concerns about the crocodiles and therefore very few people participate in the discussion.

The Mabuwaya Foundation started the use of Participatory Video (PV) filming. PV is a method in which people are taught how to use a video camera themselves. They were asked to make a video about their ideas and concerns about crocodile conservation and wetland management, without foundation staff involved in this activity. Now they could freely express their thoughts on issues related to crocodile conservation. Short video clips were made of these films and shown to all village members during a community meeting. At this occasion, issues and problems with crocodile conservation were openly being talked about and solutions were drawn. Using PV, people are more empowered and more involved in crocodile conservation. In this presentation we would like to show some of the PV clips and discuss the use of this innovative method in community-based conservation.

Modeling the Dissolved Oxygen in Taal Lake Using STELLA

Cristina Acosta and Chuckie Fer Calsado (Adviser)

Philippine Science High School – Main Campus, Agham Road, Diliman, Quezon City

Email: cr.acosta215@gmail.com

In the past decade, fish kills have been a major problem in Taal Lake, one of the country's main producers of freshwater fish. In the May 2011 fish kill alone, 375 tons of bangus were lost—amounting to PHP53 million in damage. Scientists claimed that the fish kill had been a result of dissolved oxygen depletion. In line with this claim, a dissolved oxygen model of Taal Lake was constructed in STELLA, a system dynamics modeling software. The model took into account dissolved oxygen consumption and replenishment as a result of reaeration, photosynthesis, biochemical oxygen demand, sedimentary oxygen demand, and fish respiration. When validated against Lake Taal data, the model's simulated dissolved oxygen differed by 0.59 mg/l from the actual data (9.07% absolute error percentage). This was considered adequate. The model simulated four scenarios: the virgin lake, the ideal fish farm, the overstocked lake, and the overstocked lake with climate change. The virgin lake assumed an untouched, oligotrophic lake. The ideal fish farm modeled the guidelines set forth for fish farms, the lake assumed mesotrophic. The overstocked lake assumed a higher than required fish density and a consequently eutrophic lake. The overstocked lake with climate change assumed the same conditions as the overstocked lake with a 2 degrees Celsius increase in temperature. The model could be used to make projections about long term dissolved oxygen and to propose policies in managing the lake, thereby aiding the thousands employed in and the millions of Filipino people benefiting from Taal Lake's aquaculture.

Confirming the Presence of *Sundathelphusa antipoloensis* in a Small Mountain Stream in Luzon

Juan Carlo T. Felizardo, Jasmin W. Valera, John Raphael V. Vinuya
and Henry G. Calilung (Adviser)

Holistic Education and Development Center, Taytay, Rizal

Email: hgc_hedcen@yahoo.com

Our investigation involves *Sundathelphusa antipoloensis*, a crustacean under the Gecarcinucidae family purportedly found only in Rizal, Philippines. We are trying to establish its presence in the Tungtong River watershed, a 3km² area supporting the spring-fed source pools of a 15km river which empties into the Manggahan Floodway. This species was last studied in 1904 by Rathbun. In our monthly fieldwork, we collect samples at night when the crabs are most active. The crabs are caught by hand when we see them in shallow non-moving portions of the river. The carapace diameter should be at least 4 centimeters wide (as measured in the holotype by Rathbun in 1904). To date, we have yet to encounter a 4cm specimen though some are quite close- measuring 3.7 cm or greater. We also monitor water quality parameters (pH, dissolved oxygen levels, conductivity and light levels) so we could tell which conditions are suitable *S. antipoloensis*. We seek to determine ecological requirements, population trends, and long-term threats. This study is important since the species is classified as Data Deficient by IUCN.

**Abundance and Distribution of *Bufo marinus* (L.) and
Limnonectes macrocephalus (Inger) in a Freshwater Mountain Stream in Taytay, Rizal**

Anna Ysabella M. Fernandez, Fatima B. Fernandez-Cuervo,
Anna Karina Julia A. Gaurano, Samantha Sara R. Santos and Henry G. Calilung (Adviser)
Holistic Education and Development Center, Taytay, Rizal
Email: hgc_hedcen@yahoo.com

The Tungtong River is a 15 km freshwater mountain stream that flows from a spring-fed pool near the Beverly Hills Subdivision, Taytay, Rizal to the Manggahan Floodway. Our group discovered the presence of *Limnonectes macrocephalus* (Luzon Fanged Frog) there. This species was classified by the International Union for the Conservation of Nature (IUCN) in 2004 to be a near-threatened Luzon endemic. Also found there is the *Bufo marinus* (Cane Toad), an invasive species. Other frog species surveyed were: *Polypedates leucomystax* (Common Tree Frog), *Rana erythraea* (Green Paddy Frog), *Occidozyga laevis* (Puddle Frog) and *Kaloula pulchra* (Asian Painted Frog). Native frog species are dying out globally because of competition with exotics, habitat destruction, over harvesting and diseases, to name a few. We studied the possible effects of the *B. marinus* population to the abundance and distribution of *L. macrocephalus*. Population estimates were carried out via Mark-Recapture method. Gender determination and morphological measurements were also made. Tissue samples collected via toe clipping were submitted to the Institute of Biology in UP Diliman for the DNA Bar Coding Project. Our group estimates the density ratio of *B. Marinus*: *L. macrocephalus* at 246:11. These results prove that the toads dominate the fanged frogs. This could eventually lead to the local extinction of *L. macrocephalus*. Strategies for the protection of this species are proposed -- namely, culling of toad populations, river clean-up and water quality monitoring, and restoration and protection of the riparian ecosystem.



**Ants (Hymenoptera: Formicidae) of Mt. Apo National Park:
A Survey of Nocturnal and Diurnal Ants in the Mossy Montane Forest**

Jhonny Wyne B. Edaña and Janette P. Supremo
*Department of Biological Sciences, College of Arts and Sciences,
University of Southern Mindanao, Kabacan, Cotabato
Email: jhonnywyne@gmail.com*

Ants are one of the most ecologically dominant species that we constantly encounter and exhibit a distinct daily foraging behavior from nocturnal to diurnal foragers. This ant survey in Mt. Apo National Park, Philippines done in November 2011, aimed to identify nocturnal and diurnal ant species with hopes that contributes to the current efforts in surveying Philippine ant species. Methods used were pitfall trapping for ground foraging ants and active sampling for the arboreal species. There were 45 species under 27 genera and 7 subfamilies recorded. Of them, two (2) species *Pachycondyla claudata* and *Camponotus* sp. were found to be nocturnal foragers while thirty-two (32) species were daily foragers and ten (10) species had no daily foraging pattern where *Odontomachus monticola*, a new Philippine recorded species belonged. Physico-chemical parameters showed an average air temperature of 20°C and a relative humidity of 87% during day and an 18°C air temperature and a relative humidity of 85% during night. Temperature and humidity plays a vital role and are major contributing factors that affects the foraging behavior of these nocturnal and diurnal species, thus, an extended sampling time is necessary to establish reasons for the foraging schedules of these ants.

**Notes on the geospatial distribution of bats in Nasipit, Agusan del Norte, Mindanao,
Philippines with implications for conservation using Geographic Information System**

Neil Jun S. Lobite and Sheryl L. Paz
*Department of Biology, College of Arts and Sciences,
Caraga State University, Ampayon Butuan City
Email: neiljun_lobite@yahoo.com, sheter29@yahoo.com*

Nasipit Agusan del Norte represents a potentially important site for several bat species since it is still largely forested. However, there has been scarcity of bat community studies in the area. This five-month study (June-November) employed mist netting to examine the structure of bat community, particularly richness, abundance, alpha diversity, trophic categories, conservation status and geospatial distribution across various habitat types of Nasipit (forested, urban, agricultural area, grassland and mangrove forest). Eleven bat species were found in the area and had a diversity of $H^2=1.52$ of which seven were Megachiropterans and four were Microchiropterans representing 15% of the total Philippine bat fauna. Bat community structure was represented by 50% frugivores, 36% insectivores and 9% nectarivores with the dominance of *Cynopterus brachyotis*, *Ptenochirus jagori* and *Macroglossus minimus* comprising 84% of Nasipit bat community. The low relative abundance of the vulnerable *Megaerops wetmorei* (1.40 bats/meter-hour) and the presence of three endemic species *Haplonycteris fischeri*, *Ptenochirus jagori* and *Ptenochirus minor* implied conservation value of the area. The results suggest that Nasipit needs conservation attention to minimize habitat destruction for bats especially for the endemics and threatened species including forest loss and anthropogenic disturbances e.g. illegal logging, land-use changes and hunting. A long term study on bat and habitat relationships will yield more information and insights about the dynamic structure of bat community and proper bat conservation strategies.

Marine Gastropods in Kopia Island, Compostela Valley

Joe Frhym D. Merillana, Marianne C. Lozare, Siegfred Kenne J. Macapas,
June Rey C. Mamalintaw, April Dee V. Montiales, Maria Lourdes E. Noveno,
Romnick C. Talde, Clyde Darvy T. Tizon and Sahara B. Unos
*Department of Biological Sciences, College of Arts and Sciences,
University of Southern Mindanao, Kabacan, Cotabato*
Email: joe Frhym@hotmail.com

The study was conducted to identify marine gastropods at Kopia Island, Mabini, Compostela Valley. Physico-chemical characteristics of water such as temperature, pH and salinity were determined. A 10m by 10m quadrat was used to establish three randomly selected sampling sites based on ecosystem types: seagrass, coral reef, and mangrove. The gastropods collected were identified by Shiela Tagaro, a gastropod expert from Cebu. The gastropods identified were *Angaria delphinus*, *Bulla vernicosa*, *Canarium erythrinum*, *Canarium* sp1, *Chicoreus brunneus*, *Conumurex luhuanus*, *Conus ferrugineus*, *Conus mustelinus*, *Conus lividus*, *Conus planorbis*, *Conus* sp1, *Conus* sp2, *Conus* sp3, *Cymatium comptum*, *Cymatium vespaceum*, *Cypraea asellus*, *Cypraea erosa*, *Drupa ricina*, *Erosaria erosa*, *Euprotomus aurisdiana*, *Gibberulus gibbosus*, *Lophiotoma acuta*, *Mamilla melanostoma*, *Mitra contracta*, *Nassarius horrida*, *Nassarius pullus*, *Natica stellata*, *Nerita albicilla*, *Oliva olive*, *Polices flemingianus*, *Polia fumosa*, *Rhinoclavis aspera*, *Strombus urceus*, *Strombus* sp1, *Strombus* sp2, *Tectus fenestratus*, *Vexillum granosum*, *Vexillum plicarum*, and *Vexillum* sp1. There were a total of 39 species collected. Among the genera, *Conus* were found on all stations, thus, *Conus* showed a wide range of habitat. The temperature ranges from 30°C to 35°C. The pH ranges from 7 to 8.1. And salinity ranges from 37 ppt to 47 ppt. As a recommendation, further study on gastropods' distribution should be done. This should include areas not covered by this study. Furthermore, studies involving both gastropods' diversity and usage of belt transect method should be done for more reliable profile of the marine gastropods in the area.

Spiders of Mayon Volcano Natural Park, Albay, Philippines

Zarieh Dawn L. Novela and Jonathan Jaime G. Guerrero
Biology Department, College of Science, Bicol University, Legazpi City
Email: zariehdawnnovela@yahoo.com, jonathanjaime.guerrero@yahoo.com

Mayon Volcano Natural Park (MVNP) is a protected area under the National Integrated Protected Areas System (NIPAS) of 1992. In support to this conservation measure, this study assessed the diversity of spiders (Order Araneae) within MVNP. Specifically, the research aimed to identify spider species; determine the frequency, relative frequency, relative density, Shannon diversity index, evenness index and Simpson's index of dominance; and correlate their occurrence with precipitation, relative humidity and elevation through Pearson's correlation.

The study was conducted within eight selected sampling sites, recommended by the Department of Environment and Natural Resources V. Aerial and ground methods through handpicking, beating, and sweeping were employed in the collection of specimen. A gratuitous permit was obtained prior to collection. Identification of species was based on existing taxonomic keys and published records.

A total of 645 spiders were collected, representing 11 families, 33 genera, and 78 species. The widely distributed families were Araneidae and Tetragnathidae. The species *Leucauge decorata* was the most abundant with 89 sightings, or 14% of the total number of specimens caught and has the highest frequency of 5.13. It has the highest density (13.80) and importance value (9.46) among others. Spider fauna showed very high diversity of 3.41, evenness index of 0.78 and dominance index of 0.05. Correlation values suggest that microclimate conditions and elevation significantly affect community structure of spider fauna in Mayon volcano.

Collection and Analyses of Full-Spectrum Ultrasound from Microchiropteran Bats: Working Towards a Freely Accessible Library of Echolocation Calls for the Philippines

MODERATORS:

1. Alice Hughes, Prince of Songkla University, Thailand (ah3881@hotmail.co.uk)
2. Daniel Bennett, Mampam Conservation, U.K. (mampam@gmail.com)
3. Apolinario Cariño, Batcount Philippines (apolbcarino@yahoo.com)
4. James O'Neill, Corvus Consulting, U.K.

DESCRIPTION:

The establishment of echolocation libraries for microchiropteran bats in the Philippines has been hampered by the high cost of equipment capable of recording full spectrum ultrasound. The recent development of ultrasonic microphones compatible with universal serial bus ports means that full spectrum, real time recording of bat echolocation calls is now affordable, and thus a realistic proposition in the Philippines.

This workshop will cover the use of time expansion and real time full spectrum methods of recording bat calls, and their subsequent analysis for use in the establishment of echolocation libraries and for monitoring of bat populations. The benefits of using these methods, together with heterodyne ultrasound detection methods, as a tool to enhance the capture of bats for surveying purposes, and for ecological studies of particular species, will also be discussed.

PROPOSED OUTLINE:

1. Basic biology and physics of echolocation;
2. Review of the methods available for recording ultrasound (heterodyne, frequency division/zero crossing, time expansion and real time full spectrum, and their pros and cons;
3. Recording sound from free flying and captive bats, use of gain and filters;
4. Review of software packages suitable for analysis of ultrasound, with emphasis on free software;
5. Analysis of calls;
6. Verifying calls and contributing to online echolocation libraries



Assessing Impacts of Disturbances to Philippine Cave Bat Populations

MODERATORS:

1. Rai Gomez (sebi_rai@yahoo.com)
2. Nina Ingle, Wildlife Conservation Society of the Philippines (ninaingle@fastmail.fm)
3. David Waldien, Bat Conservation International (dwaldien@batcon.org)

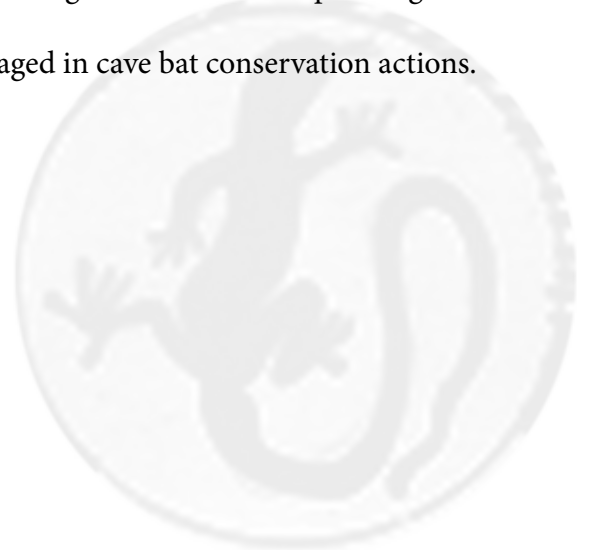
DESCRIPTION:

Caves are roosts for about 40 species of Philippine bats, which provide important ecological services including pest control, pollination, and seed dispersal. Philippine cave bats are under heavy threat but little is known about their distribution and status nationwide. Some caves that are bat roosts are effectively managed, but many caves have lost most of the cave bats as they lack effective on-the-ground protection.

To determine nationwide status of Philippine cave bats, including the major threats to cave bats and their cave habitats, a Cave Bat Workshop was conducted in January 2011 by different organizations involved with caves and cave bats: Department of Environment and Natural Resources, Bat Conservation International, Environmental Science for Social Change, Philippine Speleological Society and bat biologists. DENR personnel, bat biologists and cavers were asked to submit reports to the Cave Bat website (<http://phcavebats.crowdmap.com/>) of caves that they have surveyed or visited. Results from report submission showed that major disturbances to cave bats include mismanaged cave tourism, unsustainable guano collection and bat hunting. There is a need to assess the impacts of these primary threats to cave bat populations to contribute to better cave management. With caves distributed all over the country, there is a need for systematic methods for assessing impacts of disturbance to caves to help accurately determine impacts of disturbances to cave bats in the Philippines for input into conservation education and management.

PROPOSED AIMS AND OUTLINE:

1. Discuss priorities for cave bat assessment;
2. Present and discuss methods of assessing cave bat populations in the Philippines; and
3. Discuss/determine methods in describing and assessing the nature and impact of guano harvesting, tourism and bat collection;
4. Identify local and regional teams that may be engaged in cave bat conservation actions.



Implementing the Philippine National REDD Plus Strategy: Opportunities and Challenges

MODERATORS:

1. Edmund Leo B. Rico, EU Asean REDD+ Project National Coordinator/ Fauna & Flora International Philippines (edmund.rico@fauna-flora.org)
2. Olivia Melendrez, CodeREDD Secretariat / Non-Timber Forest Products - Task Force

DESCRIPTION:

REDD plus (REDD+) is a climate change mitigation and adaptation mechanism developed by the United Nation Framework Convention on Climate Change aimed to compensate tropical rainforest countries initiating activities on avoided deforestation and degradation. In 2010, after two years of national consultations, the Philippine National Redd plus strategy (PNRPS) was developed and adopted as a key result area in the National Framework Strategy on Climate Change (EO 881). The PNRPS intends to facilitate REDD+ development in the Philippines.

The REDD+ Roundtable discussion (RTD) aims to have an interactive discussion on the opportunities and challenges in developing REDD+ in the Philippines; on policy reform agenda, social safeguards and biodiversity conservation, through sharing of experiences in the development of REDD+ activities at the national and local level. It also aims to elicit insights across different sectors and expertise.

PROPOSED AIMS AND OUTLINE:

Twenty minute presentations on four major topics:

- a. Policy reform agenda based on the four national policy case studies on: forest policy, carbon rights, free prior and informed consent and the key drivers of deforestation and degradation - Marlea Muñoz (WISE Inc.),
- b. Advance REDD+ Project in Southern Palawan – Datu Abdulwin Sangkula (NTFP-TF),
- c. Southern Leyte REDD+ Project – Don Ignacio (GIZ-BMU), and
- d. The Sierra Madre Community Carbon Pools Project- Mr. Edmund Leo Rico (FFI).

Succeeding the four presentations will be the fishbowl discussion. The RTD shall be facilitated by the CodeREDD Secretariat and the EU Asean REDD+ National Coordinator.



Hands on Workshop on Species Distribution Modeling Using Free and Open Source Geospatial Tools

MODERATORS:

1. Cynthia Adeline A. Layusa, Isla Biodiversity Conservation, Inc.
(cynthia.layusa@gmail.com)
2. Emmanuel Sambale, Environmental Science for Social Change
(emmanuel.sambale@gmail.com)
3. Christian E. Supsup, Fauna & Flora International (Christian.Supsup@fauna-flora.org)

DESCRIPTION:

Maps play an important role in the research, planning and advocacy efforts of today's conservationists. New geospatial technologies are now available for spatial modeling of species and its distribution. Species distribution modeling is an important tool in the conservation, planning, management of specific species and their habitat.

This workshop is a technical demonstration and hands-on tutorial in the use of free and open source applications for modelling species distributions and environmental niche. At the end of the workshop, participants will be able to:

1. understand basic principles and concepts of species distribution modeling,
2. implement and run a basic habitat model workflow and,
3. prepare maps and charts from the output model.

PROPOSED REQUIREMENTS AND OUTLINE:

1. Software, data and electronic materials will be provided for free to workshop participants
2. Participants are required to bring their own laptops to be able to install and execute the provided exercises
3. Maximum number of participants - 15
4. Introduction and brief lecture (30 minutes)
5. Exercises (2.5 hour)



The Use of Geo-Referenced Biodiversity Data and Species Distribution Modeling in Climate Change Impact Studies

MODERATORS:

1. Merlijn van Weerd, Mabuwaya Foundation, Institute of Environmental Sciences, Leiden University (merlijnvanweerd@yahoo.com)
2. Lawrence Ramos, World Agroforestry Centre (ICRAF)
3. Alfie Torres, World Agroforestry Centre (ICRAF)
4. Denyse Snelder, Institute of Environmental Sciences, Leiden University
5. Maarten 't Zelfde, Institute of Environmental Sciences, Leiden University
6. Florencia Pulhin, World Agroforestry Centre (ICRAF)
7. Rodel Lasco, World Agroforestry Centre (ICRAF)

DESCRIPTION:

Climate Change (CC) models predict changes in average temperatures and rainfall in the future. CC is expected to have an influence on vegetation and natural habitats and thus on associated biodiversity. This impact is difficult to predict but computerized species distribution models could help in providing educated forecasts of changes in the distribution of species as a result of changes in habitat under impact of climate change.

Species distribution models are spatially explicit, *i.e.* they link the occurrence data of a species to habitat and other spatial variables such as elevation, forest type, soil type, canopy cover *etc.* Some of these spatial variables are correlated to climate variables such as rainfall and temperature. Current climate data, habitat data and species occurrence data can be used to construct a climate-habitat species distribution model. Changing climate variables in the model according to CC scenarios predicts changes in habitat variables and the associated distribution of model species.

A prerequisite of the use of biodiversity data in habitat-association models, and so in climate-habitat models, is the availability of geo-referenced data. Biodiversity researchers should try to acquire GPS positions for each species observation in addition to a set of spatially explicit habitat variables in order to link habitat associations of species to CC models. There is also a need for more climate data in the Philippines, especially at higher elevations and along the Eastern seaboard.

This workshop will explore the possibilities of the use of species distribution models in CC related biodiversity studies. Our goal is further to discuss the setup of a national database of geo-referenced biodiversity data, preferably online and with unrestricted access. The availability of climate data, and the need for more data, will be another topic.

Mitigation Pathways for Amphibians with Chytridiomycosis in the Philippines

MODERATORS:

1. Vance Vredenburg, Department of Biology, San Francisco State University (vancev@sfsu.edu)
2. Rafe Brown, Biodiversity Institute, University of Kansas (rafe@ku.edu)
3. Arvin C. Diesmos, National Museum of the Philippines (arvin.diesmos@gmail.com)
4. Mae Lowe L. Diesmos, University of Santo Tomas (maediesmos@yahoo.com)

DESCRIPTION:

The fungal disease chytridiomycosis has caused dramatic amphibian population declines and extinctions in Australia, Central and North America, and Europe. This disease is associated with the collapse of approximately 200 recently extinct species and a growing list of other declining and extinct species. This workshop will summarize the best studied cases of this disease with examples from California, Central America and Europe. In each of these studies, the pathogen that causes the disease, *Batrachochytrium dendrobatidis* (Bd), rapidly emerged in naive or previously uninfected host populations and caused mass mortality and population collapse within 1-6 months. Recent Bd survey work in the Philippines suggests that there are several areas where Bd either may presently be emerging or may emerge in the future. This workshop seeks to inform conservation managers and research scientists on the type of information needed to determine whether the presence of Bd in wild amphibians may become a chytridiomycosis epidemic or whether it may represent a more stable disease state that does not drive the host to extinction. The workshop will develop guidelines for techniques that may slow or mitigate the effects of Bd on host amphibians.



Distribution and Conservation Initiatives of Threatened and Endemic Vascular Plants

Victor B. Amoroso¹, Florfe M. Acma¹, Hannah P. Lumista¹, Lesley C. Lubos²,
Corazon G. Alava³ and Fulgent P. Coritico¹

¹Central Mindanao University, Musuan, Bukidnon, ²Liceo de Cagayan University,
Cagayan de Oro City, ³Bukidnon State University, Malaybalay, Bukidnon

Email: amorosovic@yahoo.com

A study was conducted on the distribution and conservation of threatened and endemic vascular plants, and recording of species new to science or new record in the Philippines. Collected specimens were identified using taxonomic keys from floras and monographs while the initial assessment of status was based on the Threatened Plants of the Philippines (Fernando *et al.*, 2008), Framework for Philippine Plant Conservation Strategy and Action Plan (DENR, 2006) and International Union for Conservation of Nature (2007). The distribution of threatened species was taken from the labels of herbarium specimens deposited in Philippine herbaria, published literature, and from our botanical fieldwork. New species and new records in the Philippines were compiled from published articles (2005-2011) by the senior author and other taxonomists. Field investigations and information of threatened plants from herbaria revealed 510 taxa of threatened vascular plants. This is an increase of 50 species from earlier published report of Fernando *et al.* (2008). Of these threatened taxa, 386 (76%) are Philippine endemics. The families Orchidaceae, Dipterocarpaceae and Arecaceae had the most number of threatened taxa. The Island of Luzon exhibited the most number (68%) of the threatened plants. Likewise, most of these threatened vascular plants are situated in mountain ecosystems. From 2005 to 2011, a total of 179 species were reported new to science and 24 species were new records in the Philippines. Some conservation Initiatives are given to protect the remaining threatened and endemic species of plants. From the study, a handbook, checklist and database of threatened plants were produced, and policy measures are recommended.

Photographic Estimation of Roosting Density of Geoffroy's Rousette Fruit Bat (*Rousettus amplexicaudatus*)

Ela-Sita Carpenter¹, David L. Waldien², Richard E. Sherwin³ and Rai Gomez⁴

¹Christopher Newport University, USA, ²Bat Conservation International, USA,

³Christopher Newport University, USA, ⁴Davao City

Email: elasita@gmail.com, dwaldien@batcon.org, rsherwin@cnu.edu, sebi_rai@yahoo.com

Conservation and management of bats requires reliable and repeatable data on the size and trends in bat colonies. Counts and densities calculated via photography have proven more accurate and repeatable than visual counts and ocular estimates. Unfortunately, the potential of photography to investigate the size of a bat colony and roost density has rarely been explored. In the summer of 2006, a colony of Geoffroy's rousette fruit bat, *Rousettus amplexicaudatus*, was photo-documented in the Monfort Bat Cave, in the Island Garden City of Samal, Davao del Norte, Mindanao, Philippines. We selected 42 images to develop roost density estimates. Mean roosting densities varied based on position within the cave due to high variability in the internal cave structure and high variance in associated clustering concentrations of bats (walls = 366 bats/m²; ceiling = 437 bats/m²).

However, while average densities of bats on walls might appear much lower than those on cave ceilings, they were not significantly different from each other ($P = 0.13$). Baseline estimates of clustering concentrations and the associated error values combined with data on the amount of area covered by roosting bats or roost stains allow surveyors to estimate the size of colonies at other roosts rather than having to rely solely on ocular estimates of numbers of bats present. These data will ultimately facilitate a better understanding of the current and maximum historical sizes of colonies for Geoffroy's rousette fruit bats and help standardize photographic techniques to enhance ongoing monitoring activities.

**Spatial Analysis of Biophysical and Socio-Economic Variables
in Support of Decision-Making on Conservation and Development Issues:
A case study of Mindoro Island, Philippines**

Jose Don T. De Alban^{1,2}

¹*Mindoro Biodiversity Conservation Foundation,*

²*Fauna & Flora International – Philippines (current affiliation)*

Email: JoseDon.DeAlban@fauna-flora.org

The study aims to assess the revitalized mining program in the Philippines and its implications to the conservation initiatives in Mindoro Island. The study provided information on resources to be considered and prioritized in Mindoro that would cater to the sustainable development of the island. Mindoro's current physical and socio-economic situation is examined including the review of relevant national policies and legislations, several global and country-level ecosystems analysis. Map overlays of mining claims in relation to (a) land cover showing forest types (b) hydrological systems (c) topographic information (d) soil types and land capabilities (e) population density and (f) land classification were prepared. The study analyzed mining claims in relation to tenurial arrangements such as ancestral domains, protected areas, and community-based forest management areas and conservation priorities. In conclusion, the spatial analyses have shown the flaws of the existing mining policy with respect to addressing the country's and that of Mindoro's characteristics as a high conservation value area with correspondingly high levels of degradation, poverty, vulnerabilities, and risks. Revision of the current policies that places environmental sustainability and public participation is necessary. Presence of resource use conflicts stems from the lack of a comprehensive land use framework. An integrated ecosystems approach to land use planning in Mindoro should be adopted with broad stakeholder involvement at national and local levels. The best development options for Mindoro can only be identified upon the implementation of a comprehensive land use planning framework that truly appreciates the country's unique biological heritage.

**Assessment of New Conservation Areas Priority Project (NewCAPP) Stakeholders' Capacities
on the Utilization of Geospatial Technologies for Biodiversity Conservation**

Jose Don T. De Alban, Christian E. Supsup and Ray Neil M. Lorca

Fauna & Flora International – Philippines

Email: JoseDon.DeAlban@fauna-flora.org, Christian.Supsup@fauna-flora.org, rayneillorca@gmail.com

Geospatial technologies (e.g., GIS, remote sensing, GNSS) have played an increasingly important role in biodiversity research, conservation, and planning over the last decade. In this study, we assessed the existing capacities of stakeholders implementing PAWB-DENR's New Conservation Areas of the Philippines Project (NewCAPP) regarding the use of geospatial tools and information for biodiversity conservation by conducting interviews among 10 DENR regional offices and 8 NGO/PO partners. We reviewed existing tools, including computer platforms, software, and equipment; and available spatial data across 10 Key Biodiversity Areas (KBA) under the NewCAPP. Results show that many DENR offices and some NGO/PO project partners have only basic knowledge and limited utilization of geospatial technologies. GIS is used only for map production, plotting survey points, and delineating protected areas boundaries. Map data are not standardized, lack metadata, and oftentimes not readily accessible. A common map database or infrastructure to facilitate sharing between DENR field services is also absent. Free and open-source tools and spatial data, which are shared over the Internet, are not maximized. Our assessment supports the need for DENR and NGO/PO project partners to undergo comprehensive training to improve their existing capacities on the modern use of geospatial technologies and to maximize the application of these tools in support of conservation activities. We proposed to PAWB-DENR to utilize available online resources and explore the broader application of geospatial technology in biodiversity monitoring and conservation management (e.g., predicting species distribution). Options on map data sharing mechanisms among NewCAPP partners were also recommended.

Assessment of Phenotypic Diversity and Elucidation of Taxonomic Identity of Bakauan Mangroves (*Rhizophora* spp.) in Pagapas Bay, Calatagan, Batangas

Leah E. Endonela¹, Vicitasion C. Huelgas², Maribel L. Dionisio-Sese³,
Nestor C. Altoveros⁴ and Teresita H. Borrromeo⁴

¹MS Plant Genetic Resources Conservation and Management, ²Institute of Plant Breeding, Crop Science Cluster, College of Agriculture, ³Institute of Biological Science, College of Arts and Sciences and ⁴Crop Science Cluster, College of Agriculture of the University of the Philippines Los Baños, College, Laguna
Email: e_endonela@yahoo.com, vi17823@yahoo.com, mldese@yahoo.com, thborromeo@yahoo.com

Field explorations on the remaining primary mangrove stands in Pagapas Bay, Calatagan, Batangas, Philippines led to the auspicious sighting of the rare “bakauan hybrid pula” (*Rhizophora* x *lamarckii*) thriving along with “bakauan lalake” (*R. apiculata*), “bakauan babae” (*R. mucronata*) and “bakauan bato” (*R. stylosa*) population. These species were identified based on published plant photos and literature, where, unfortunately, much of the descriptions were limited and often confusing. The study aimed to assess the phenotypic diversity and elucidate the taxonomic identity of these bakauan species. A total of 20 bakauan trees (dbh = 30–40 cm) were characterized based on 67 morpho-anatomical traits. Descriptor states for each character covered the extent of morpho-anatomical variations present. Diversity analysis using standardized Shannon-Weaver diversity index (H') showed an average of 0.77 indicating high intraspecific phenotypic diversity from each *Rhizophora* species studied. Cluster analysis (UPGMA SANH) showed that *R. mucronata*, *R. stylosa* and *R. x lamarckii* clustered together, while *R. apiculata* formed a separate distinct group. Analysis of scores for 20 qualitative traits using simple matching coefficient revealed that *R. mucronata* and *R. stylosa* showed 100 percent similarity at coefficient 0.76 and for 20 quantitative traits using Euclidean Distance coefficient, *R. mucronata* and *R. x lamarckii* showed 100 percent similarity at coefficient 7.12, and *R. x lamarckii* resembled intermediate features between *R. mucronata* and *R. stylosa*. This exemplified that *R. mucronata*, *R. stylosa* and *R. x lamarckii* are closely related and that *R. mucronata* and *R. stylosa* are the possible parents of sterile *R. x lamarckii*.

Homing Pigeons as Biomonitors of Atmospheric Pollution

Richard S. Halbrook, Ph.D.

Cooperative Wildlife Research Lab, Southern Illinois University, Emeritus

TG&G Wildlife Consulting, USA

Email: rhalbroo@siu.edu

Atmospheric pollution is a global concern effecting animal and human health. Air monitoring can provide information regarding concentrations of hazardous chemicals in the air; however, biomonitoring provides additional data not available from air monitoring alone. The additional data will be of value to governmental and regulatory agencies responsible for making environmental decisions. Know age, location, and health history information facilitates the use of homing pigeons to evaluate air pollution among various urban areas and regions. Homing pigeons collected from Beijing, China and Manila, Philippines had similar gross and microscopic lesions, including gray/black discolorations and anthracosis/pneumoconiosis of the lungs, and several cases of enlarged and irregular testes (tumors) compared to pigeons collected from Chengdu, China, and Midland, Texas and Los Angeles, California, USA. Concentrations of polycyclic aromatic hydrocarbons (PAHs) in lung and liver tissues from Beijing pigeons were greater than concentrations in Chengdu pigeons, and mercury (Hg) concentrations in lung and liver tissues were greater in pigeons from Beijing compared to those collected from Chengdu and from the USA. Analyses of PAHs and Hg in tissues of pigeons from Manila, and PAHs in pigeons from the USA are ongoing. Our preliminary results suggest that homing pigeons are valuable biomonitors of atmospheric pollution and additional studies evaluating sex and ages differences, and within and among city comparisons are planned. Available data suggest that atmospheric pollution in Beijing and Manila is adversely affecting the health of pigeons in those urban areas and may possibly be sentinels for human health effects.

Caves in the Philippines: What should we know and why should we care?

Daniel Edison Husana¹, Tomoki Kase² and Masumi Yamamuro³

¹Global COE (Center of Excellence) for Environmental Studies, Graduate School of Environment and Information Sciences, Yokohama National University, Japan, ²Department of Geology and Paleontology, National Museum of Nature and Science, Tokyo Japan, ³Department of Natural Environmental Studies, Graduate School of Frontier Sciences, The University of Tokyo, Japan
Email: dehusana@gmail.com, kase@kahaku.go.jp, yamamuro@k.u-tokyo.ac.jp

Caves in the Philippines are understudied despite the high susceptibility of its environment to human disturbance. This is of particular importance as caves contain unique and poorly understood fauna. The complete darkness of the cave ecosystem makes photosynthesis impossible, resulting in a scarcity of food. Nonetheless, certain animals that are adapted to long period of starvation live in this habitat. What they eat remains a puzzle and raises the question of how they survive in the extreme subterranean environment. Here, we aimed to know and understand the history of migration of cave animals, their source of nutrients, the trophic dynamics and hierarchy in the subterranean ecosystem. We used crabs as the model organism and utilized $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ stable isotopes and molecular analyses techniques. Results revealed the trophic hierarchy in the cave aquatic habitat where troglobitic (cave-obligate) animals occupied the top level of the trophic structure while non-cave-obligate animals occupied the bottom. Bat guano appears to be an important source of nutrition for many of the cave animals. Multiple colonizations of caves were shown in the phylogenetic relationship of crabs based on the 403 base pairs of 16S rRNA. The underground ecosystem is not a closed system; it relies on the allochthonous inputs. The presence of many unique and endemic cave inhabitants, and the surface-subsurface interaction and connectivity implied a major concern for ecological conservation, suggesting the need for protection of both cave and surface environment.

Habitat Selection and Conservation Status of the Endemic Ninox Hawk-Owl on Cebu

Philip Godfrey C. Jakosalem^{1,2}, Nigel J. Collar³ and Jennifer A. Gill¹

¹School of Biological Sciences, University of East Anglia, UK,

²Philippines Biodiversity Conservation Foundation, Inc., ³BirdLife International, UK

The largely deforested island of Cebu, Philippines, hosts a forest-dwelling hawk-owl identified in the literature as *Ninox philippensis spilonota* but which is in fact a Cebu island endemic species or subspecies, soon to be named. In order to assess the current distribution and habitat requirements of these owls, the five largest of 11 remaining forest patches on Cebu were surveyed between March and June 2011, involving 64 post-sunset 500-m long walked transects with playback and habitat assessments. Within the same period, radio-telemetry studies were conducted on 10 owls but only for 3–5 days per owl as they removed the tail-mounted transmitters. A total of 52 owls were located across all five forests (at 16 sites two owls responded together to playback) but only the largest forest, Alcoy, contained enough transects for analyses of habitat characteristics in relation to owl distribution. Alcoy is situated on steep-sided hills and some planting of exotic species occurs within the forest. Owls were detected in forest interior, forest edge and forest-plantation mix in Alcoy, and on ridges and in gullies despite lower tree densities and greater proximity to forest clearings in the gullies. However, some parts of Alcoy are subject to strong winds, and the probability of owl occupancy of transects decreased significantly with increasing wind speed. Home range sizes for the 10 radio-tagged owls were estimated to be ~10 ha, although given the short tracking periods this may be an underestimate. Suitable forest studied covers roughly 1,670 ha, with six unstudied forests totaling 250 ha, so assuming a pair every 10 ha the global population of the Cebu Hawk-owl may be 192 pairs, or fewer if home ranges are larger than estimated. Continuing habitat degradation triggers IUCN Red List category Endangered. Tree cavities suitable for nests may be limited in availability and experiments with nest-box deployment are an obvious next step, provided this does not increase predator pressure on other rare species.

The Evolution of Colour Signals in Gliding Lizards (genus *Draco*)

Danielle Klomp^{1,2}, Devi Stuart-Fox¹ and Terry J. Ord²

¹Department of Zoology, University of Melbourne, Australia

²Evolution & Ecology Research Centre, University of New South Wales, Australia

E-mail: d.klomp@student.unimelb.edu.au

The sensory drive hypothesis proposes that speciation could result from selection on social communication when animals diversify into new habitats. Gliding lizards, *Draco* spp., are an ideal group to test this hypothesis as territorial males use elaborate colour signals in communication and different species are found in different habitats. We expect the properties of the environment to influence the detection of colour signals because some colours are more conspicuous in some environments than others. This leads to a key prediction from the sensory drive hypothesis: that species are more conspicuous to conspecifics in their own environments than in alternate neighbouring environments. To test this prediction, we collected colour data for adult males of six *Draco* species in different habitats, plus colour and light data for those habitats, and assessed how a signal would appear to a conspecific using a model of animal colour vision. The colour signals of males were consistently more conspicuous in their own environment than when viewed in different neighbouring environments. This supports the view that the environment has been important in the evolution of colour signals in gliding lizards. This in turn suggests that habitat-dependent divergence in social communication could have played some role in speciation in this diverse genus of lizards.

Habitat Association of Lizards in Some Remaining Forests and Natural Grasslands of Cavite, Luzon Island

Ronaldo D. Lagat

Biological Sciences Department, College of Science,
De La Salle University-Dasmariñas, City of Dasmariñas, Cavite
Email: rdlagat@dlsud.edu.ph

This study investigates the association of habitat covariables on lizard distribution, species richness and forest tree composition in some forest patches and grasslands of Cavite. Six areas were found to maintain forest patches characterized as natural, riparian, mixed, and agroforest. Point Center Quarter Method (PCQM) characterized 72 transects, totaling to a length of 7.2 km documented 2,853 trees identified to 174 species, 127 genera belonging to 48 families. Kruskal-Wallis H test confirmed significant variations among the four forest types where 57 tree species were observed unique to one forest type. Three critically threatened tree species were identified in Mts. Palaypalay-Mataas na Gulod Protected Landscape (MPMNGPL) (*Shorea guiso*, *Shorea contorta* and *Shorea negrosensis*). Canonical Correspondence Analysis (CCA) on 25 habitat covariables and lizard distribution revealed two main axes. CCA axis 1 is associated with overstorey and understorey gradients and CCA axis 2 represents forest and non-forest gradients. Of the 23 lizard species observed, eight species were associated with overstorey gradient, four with understorey, four with grasslands, and seven species were outliers. Good quality forests were distributed mainly in MPMNGPL, Evercrest and Kabangaan while the forests in Buhay, Indang and Pintong-Gubat were the most disturbed. Lizard species distribution is significantly associated with habitat preferences and availability. Lizard species richness in Cavite is a consequence of diverse habitat types observed in the area. Unfortunately these communities are beset with anthropogenic disturbances contributing to accelerated deforestation and habitat loss. Conservation of these remaining forests should be strengthened particularly in Buhay, Indang and Pintong-Gubat.

Implications of Hunting and Forest Loss to the Conservation and Habitat of the Calayan Rail *Gallirallus calayanensis*

Cynthia Adeline A. Layusa^{1,2}, Jose Don De Alban³, Carla C. Monoy¹,
Tolentino B. Moya² and Carl H. Oliveros^{1,4}

¹Isla Biodiversity Conservation, Inc., ²Institute of Environmental Science and Meteorology, University of the Philippines, Diliman, Quezon City, ³Fauna & Flora International – Philippines,

⁴Department of Ecology and Evolutionary Biology, University of Kansas, USA

Email: cynthia@isla.org.ph, JoseDon.DeAlban@fauna-flora.org, carla.monoy@gmail.com, totimoya.168@gmail.com, carl@isla.org.ph

Knowledge on habitat and hunting pressure is important in evaluating the conservation status of a species. We assessed the forest loss and hunting pressure to the Calayan Rail, a species endemic to the forests of the small island of Calayan, northern Philippines presently classified as Vulnerable under the IUCN. Through interviews with local hunters and processing of satellite imagery in remote sensing and GIS, we studied the effects of hunting and forest loss to the distribution and habitat of the Calayan Rail. Results show that the Calayan Rail is 1 of 10 species most commonly hunted in Calayan Island. The hunters identified hunting grounds consistent with the known distribution of the Calayan Rail. Hunting is mostly for subsistence, although few incidences of hunting for pet trade have been recorded. Forest loss from human encroachment and slash-and-burn farming has been occurring in the island. In 2006, only 9,016.95 of the 11,253.24 hectares (80%) of forests in 1979 remain with at least 8-27% of the Calayan Rail habitat gone within the 27-year interval. Forest loss is also affecting several micro-watersheds, which is vital to the livelihood and domestic needs of the community in the island. The data from this study supports uplisting the status of the Calayan Rail to Endangered. The results also provide information that can aid in conservation planning for the species and its habitat, including the establishment of a community-managed wildlife sanctuary.

From Co-Existence to Exclusion: Mechanisms behind the generalist replacement of specialists in the face of disturbance

Tammy L. Mildenstein

Bat Count Philippines and Wildlife Biology Program, University of Montana, USA

Email: tammy.mildenstein@gmail.com

Ecological specialists are disappearing globally relative to generalists across a wide range of taxa. Anthropogenic disturbance is hypothesized to be the main cause. This so-called specialization-disturbance (SD) hypothesis is supported empirically by positive correlations between ecological specialization and extinction risk. The sensitivity of narrow specialists to disturbance is especially a concern in the Philippines, where there are many endemics (likely specialists) and human disturbance is widespread. I studied the population-level responses of two coexisting fruit bats in the Philippines to their main threats: habitat loss and roost site disturbance. My results suggest the specialist (*Acerodon jubatus*) is much more sensitive to disturbance than the generalist (*Pteropus vampyrus*). Although population abundance correlates closely with native forest cover for both species ($R^2 > 0.92$), the specialist is uniquely dependent on forest, requiring >5.6 times more forest and >6.2 times more sensitive to disturbance around the roost. Because these species compete for important forest resources (*i.e.* Figs), their differential sensitivities to disturbance is likely giving the generalist a competitive advantage and leading to the exclusion of the specialist, even in protected areas. Species composition of colonies at the three, most protected roosts all show significant shifts toward the generalist. To maintain persisting populations of the endangered specialist, *Acerodon jubatus*, we cannot rely on protected areas alone. Managers need to actively address colony compositions that are heavily skewed toward the generalist, *Pteropus vampyrus*, and strictly protect roost sites and surrounding forest from disturbance.

Current Diversity Status of Butterflies in Selected Forests of Mindanao, Philippines

Alma B. Mohagan¹ and Antonio E. Tambuli²

¹Central Mindanao University Museum, Bukidnon

²Department of Biology, University of San Carlos, Cebu

Email: almohagan@gmail.com, papilio7553@yahoo.com

Research output of CHED Funded Project

This study aims to provide information on the current status and species diversity of butterflies in four selected forests in Mindanao, e.g. Mt. Apo, Mt. Timpoong in Camiguin, Mt. Kitanglad and Mt. Musuan in Bukidnon. Data generated will be used for monitoring regarding distribution and conservation efforts on butterfly fauna in Mindanao as climate change progresses. Belt transect, light and malaise traps, time constraint and transect walk samplings were employed in the study from February 2010 to April 2011. A total of 247 species were captured and identified. Using Shannon-Weiner index on diversity, it shows fair level in all the sampling sites. Highest species richness was observed in Mt. Kitanglad with $H' = 1.959$ (148 species), followed by Mt. Apo $H' = 1.755$ (104 species), Mt. Timpoong $H' = 1.579$ (79 species) lowest in Mt. Musuan $H' = 1.54$ (117 species). A total of 105 endemic species were recorded during the entire duration of the survey. Three (3) of the endemic species were considered site endemic, two (2) were Eastern Mindanao endemic, three (3) were very rare endemic, and fifty one (51) rare endemic. The non-endemic species includes two very rare, 62 rare, 1 rediscovered, and 149 discordant species. Mt. Apo in Cotabato area had the highest species endemism of 42%. It was observed that endemism was higher in places with higher elevations. Using Bray-Curtis analysis, it shows that all study sites are unique habitats for butterflies suggesting the importance of conserving forest as home for endemic species of butterflies and other wildlife in Mindanao.

Habitat and its Influence on the Territorial Displays of Southeast Asian Gliding Lizards (*Draco* spp.)

Terry J. Ord

Evolution & Ecology Research Centre, University of New South Wales, Australia

E-mail: t.ord@unsw.edu.au, URL: www.eerc.com.au/ord/

Adaptations that facilitate the reception of long-range signals tend to reflect the environment in which animals communicate. This is because the properties of the environment determine the likelihood that social signals are detected by conspecifics. With this in mind, we should expect signal divergence to occur among species that communicate in different habitats. I have been testing this prediction in visually communicating *Draco* lizards, a diverse group of gliding lizards throughout Southeast Asia. These lizards rely on elaborate visual displays to advertise and defend territories. In this talk I will present preliminary findings on how the light environment, which should determine the types of movements that can be detected by territorial neighbors, has influenced the way adult males perform territorial advertisement displays. Videos of free-living adult males performing territorial displays are being used to measure the frequency, duration and speed of displays for two species living in contrasting light environments: *Draco sumatranus* in sunny habitats and *D. melanopogon* in shady habitats. Through this talk, I hope to illustrate how the gliding lizards have the potential to be an important model system for testing ideas in animal communication and evolution theory, while also providing important information on the natural history of this little known group of lizards. Such information will help identify how evolution generates biodiversity and how the adaptability of animal communication systems might aid in buffering populations against environmental change.

An Assessment of Cave Bats on Siquijor Island

Jodi L. Sedlock¹, Rai K. S. Gomez² and Paul Senner¹

¹Biology Department, Lawrence University, USA, ²Marfori Heights, Davao City
Email: sedlockj@lawrence.edu

Approximately one third of the 76 currently recognized bat species in the Philippines are particularly vulnerable because of their need for caves. Cave bats are heavily disturbed by swiftlet nest gathering, treasure hunting, guano collecting, mineral mining and hunting. As such, there is a need to better document the distribution and population status of cave bats. Between 18 June and 5 July 2010, we conducted an assessment of 20 large caves on Siquijor Island. Trapping and mist netting in forest resulted in the capture of 19 species, including 13 cave-dwelling bats. We used visual and acoustic methods to survey bats in caves. An acoustic activity index was developed to estimate the relative abundance of species in each cave. Thirteen caves had insect-bat populations; however, only four caves had relatively large (> 100 individuals) colonies. Only 5 of the 20 large caves had fruit bats (*Rousettus* sp. or *Eonycteris* spp.) present and of these, only two had large populations. Despite the low numbers of bats present, we observed large (*i.e.*, > 50 m²) areas of staining in 10 caves indicating formerly large populations. Interviews with locals revealed that bats were collected for food throughout the island. The apparent decline of cave-dwelling bats in Siquijor and other areas may mean not only a decline in biodiversity, but in the ecosystem services they provide as pollinators, seed dispersers and consumers of crop pests.

Plant Diversity over Ultramafic Forest of Baler, Aurora Province, Central Luzon, Philippines

Danilo N. Tandang and Edwin R. Tadosa

Botany Division, Philippine National Herbarium, National Museum of the Philippines

The municipality of Baler is located in Aurora Province, Luzon Island. It is situated along the eastern coastline of the Sierra Madre Mountain Range. It is unique for having one of the few remaining primary forests in the country where an interesting forest over ultramafic rocks can be seen.

A preliminary study on the diversity of plants was conducted at Baler where initial surveys of 72 indigenous and endemic plant species were recorded. Among the significant findings include two native plant species named after the town of Baler: the *Calamus balerensis* and *Syzygium balerense* that are under the families Arecaceae and Myrtaceae, respectively. Moreover, two endemic genera, the *Greeniopsis* and *Villaria* of the family Rubiaceae, were new records to the province.

This study attempted to document the floristic wealth of Baler, including photographing native plants naturally growing in the area. Further field surveys of the forest of Baler are anticipated to uncover a rich and diverse flora in the area. Although generally well protected, the forest is currently experiencing some degree of anthropogenic disturbances from residential and rest house establishment, carabao logging, and slash-and-burn farming. Research efforts on plant diversity monitoring are needed to evaluate impacts of these human disturbances on the ecology of the forest.

Detecting El Niño Southern Oscillation (ENSO)-Linked Sardine-Anchovy Regime Shift in Philippine Waters: Implications to Conserving Marine Mammals

Daniel S. Torres

Unaffiliated researcher, 107 K-10th Kamias, Quezon City

Email: dantuors@gmail.com

A quasi-decadal alternation of sardine and anchovy dominance was recently detected in Leyte Province by the author using Bureau of Agricultural Statistics on-line data. This serves as initial evidence that a Pacific-wide phenomenon synchronous with El Niño Southern Oscillation events, called the sardine/anchovy “regime shift”, is also present in Philippine waters. Among the 27 species of naturally-occurring marine mammals known from in the Philippines, 21 are toothed whales. Being top predators in pelagic food chains, toothed whales are exposed to a hazard similar to large-scale seabird die-offs associated with perturbations in Peruvian anchovy populations. Reductions in societally-important sardine populations predispose negative interactions between fisheries and cetaceans specializing in such small pelagics. Ecosystem-based approaches to marine mammal conservation can simultaneously factor in trophic and economic considerations, an important feature especially in a period of climate change.

Spatio-Temporal Variability of Macroinvertebrates in Selected Streams in Mt. Kanla-on Natural Park, Northern Negros

Christine Jewel C. Uy¹, Dino Angelo E. Ramos², Perry S. Ong² and Francis S. Magbanua²

¹*Diliman Science Research Foundation,*

²*Institute of Biology, College of Science, University of the Philippines Diliman, Quezon City*

E-mail addresses: christinejuy@yahoo.com, diakom86@yahoo.com,

ongperry@yahoo.com, fsmagbanua@gmail.com

Benthic macroinvertebrates were sampled during two dry periods (2010 and 2011) in three streams located within or adjacent to the buffer zone of the Mt. Kanla-on National Park to assess spatial and temporal variations in macroinvertebrate community composition. In each stream, physico-chemical parameters were likewise measured during both sampling periods. A total of 56 taxa belonging to 40 families and 11 orders were recorded. Of the 40 families, nine comprised 81.4% of the total: Baetidae (39.1%), Leptophlebiidae (4.6%), Prosopistomatidae (4.5%), Caenidae (4.0%), Heptageniidae (3.0%) [Order Ephemeroptera], Hydropsychidae (7.1%) [Trichoptera], Dytiscidae (4.1%) [Coleoptera], Simuliidae (9.7%) and Chironomidae (5.3%) [Diptera]. Several response variables (invertebrate density, taxon richness, Simpson's diversity index, Ephemeroptera-Plecoptera-Trichoptera (EPT) taxon richness and EPT density) were calculated and compared. However, none of these variables showed significant spatio-temporal differences (Two-way ANOVA; $P > 0.05$) despite marked differences in conductivity and total dissolved solids (TDS) among streams (both cases $P \leq 0.001$) and between years (conductivity, $P = 0.165$; TDS, $P < 0.001$). In contrast, beta diversity [range from 0 (minimum diversity) to 1 (maximum diversity)] revealed highest overall values across streams for 2010 (0.93) and 2011 (0.98), indicating no overlap on species composition. Whilst differences in beta diversity among streams may be caused mainly by dispersal limitation or by variation in the physical environment, we suspect that dissimilarities in beta diversity in our study resulted from differences in water chemistry (conductivity and TDS). Macroinvertebrates diversity is important in conservation studies since its distribution can be used for water quality assessment for management actions.

Growth of Hatchling and Juvenile *Crocodylus mindorensis* with Different Soft Release Strategies

W. van de Ven^{1,2}, Merlijn van Weerd^{1,2}, Sammy Telan¹, Dominic Rodriguez¹⁰,
Jessie Guerrero¹, Marites Balbas¹, Hans de Iongh² & Gert De Snoo²

¹*Mabuwaya Foundation Inc.*, ²*Institute of Environmental Sciences (CML), Leiden University, Netherlands*
Email: mabuwaya@yahoo.com

A head-start program for the critically endangered Philippine crocodile *Crocodylus mindorensis* has been in place since 2005 in San Mariano, northern Luzon, Philippines. Hatchlings are collected from the wild and reared in captivity for one to two years. After this they are released back into the wild. This method significantly increases hatchling survival rates compared to hatchlings in the wild.

Hatchling crocodiles are brought to a rearing station as soon as possible after hatching and are individually tagged using scute-clipping. The crocodiles are measured monthly to monitor health and growth rates. In total 170 individuals were collected for the head-start program, of which 162 survived the first week. Seventy nine of these were released back into the wild as of December 2011.

Different rearing strategies were investigated to increase the effectiveness of the program. These were: hand-raising, soft release in semi-wild conditions with additional feeding, soft release in semi-wild conditions without additional feeding, soft release in the wild with additional feeding and hard release. As a control group there were individuals of the same age that were not released.

Individuals that were soft released with additional food grew significantly better than individuals that were soft released without food or which were hard released or not released. These results indicate that soft releasing is an important tool to optimise growth rates, and therefore probably also survival rates, of head-started Philippine crocodiles.

Modeling the Distribution of Bird Species in the Northern Sierra Madre in Relation to Habitat and Climatic Variables

Merlijn van Weerd

¹*Mabuwaya Foundation Inc.*,

²*Institute of Environmental Sciences (CML), Leiden University, Netherlands*

Email: merlijnvanweerd@yahoo.com

Global Climate Change (CC) is expected to impact the distribution of species worldwide by influencing current natural habitat characteristics. The potential future impact of CC on Philippine biodiversity is not known except in general and theoretical terms. In a pilot study, I used the MaxEnt model to predict the distribution of selected bird species in relation to habitat and climate features in the Northern Sierra Madre in Northeast Luzon. Bird distribution data were gathered since 1999 in the Northern Sierra Madre Natural Park using point counts in all elevation levels and habitats of the park. Forest cover, forest type and land use maps were constructed using supervised classifications of recent satellite images and ground truthing data in ArcGis. Other layers used in the model were elevation and hydrological features. BioClim variables such as rainfall in the wettest and driest month and highest and lowest temperature from the WorldClim database were used in the model. Present modelled distributions of bird species were compared with future modelled distributions under different CC scenarios. For most rare bird species, presence data was not sufficient to create reliable distribution models. This is a caveat that will impact similar studies elsewhere in the country. It is especially rare, restricted, highly specialised endemic species that are expected to be impacted most by CC but geo-referenced observation data of these species are typically limited. If conservation measures are to be taken to limit the impact of CC on Philippine endemic species we need to know better what this impact will likely be. Model studies such as presented here will play an important role in this, both in actually predicting changes in species distributions and in indicating where data gaps are.

Chytridiomycosis in Amphibians of the Philippines

Vance Vredenburg¹, Arvin Diesmos², Mae Diesmos³, Tina Cheng¹,
Celeste Dodge¹, Cameron Siler⁴ and Rafe Brown⁴

¹Department of Biology, San Francisco State University, USA, ²Zoology Division, National Museum of the Philippines, ³University of Santo Tomas, ⁴Biodiversity Institute, University of Kansas, USA
Email: vancev@sfsu.edu, arvin.diesmos@gmail.com, rafe@ku.edu

The fungal disease chytridiomycosis has caused dramatic amphibian population declines and extinctions in Australia, Central and North America, and Europe yet there are few instances of infection in Asia. The pathogen that causes this disease, *Batrachochytrium dendrobatidis* (Bd), has rapidly emerged in some areas causing population and species collapse, but the mechanism behind the rapid global emergence of the disease is poorly understood, in part due to an incomplete picture of the global distribution of Bd. At present, there is a considerable amount of geographic bias in survey effort for Bd, with Asia being the most neglected continent. New studies are filling this gap but more detailed surveys are still needed. We undertook a widespread, opportunistic survey of nearly 3,000 amphibians for Bd throughout the Philippines. We used a quantitative real-time PCR assay to test for the presence and abundance of Bd on amphibians. We find Bd widespread but in low prevalence (<10%), at many sites we did not detect Bd despite large sample sizes. Infection intensity, an important measure of disease, was low in all cases except at one site. This site could be the first site in Asia where a Bd-related decline in amphibians has been recorded.

Negative Density Dependence and Dispersal Limitation in Dominant Philippine Tree Species

Sandra L. Yap

University of the Philippines, Diliman, Quezon City

University of Michigan, USA

Email: sandralimyap@yahoo.com

Spatial point pattern analysis is used to measure aggregation in 30 dominant tree species from the tropical Palanan Forest Dynamics Plot, Philippines. Aggregation is calculated at multiple spatial scales from 5m² to 185m² for each species at each of three life stages: saplings, juveniles, and adults. All species exhibit clustering with one exception (adult *Dacryodes rostrata*). Clustering commonly peaks at the scale of 45m² (42 of the 90 individual measures), occurring equally among the three life stages, and is the predominant scale of greatest clustering in the 15 most abundant species. Clustering at a smaller spatial scale (25m²) is more frequently exhibited in the 15 less-abundant species of the 30 dominants, particularly within the adult life stage. A second peak of clustering at the largest scale tested (185m²) in nine species indicates multi-scale effects of spatial processes driving species distributions. Two independent correlation tests show greater clustering of saplings than juveniles around adult trees in three species that is attributed to negative density-dependent effects. Moreover, ten species exhibit greater clustering of juveniles around adults, which indicates that saplings experienced negative density dependent effects while successful recruitment of juveniles is promoted with proximity to adult trees. Based on results, seed dispersal, negative density dependence, and species-habitat associations contribute to the spatial pattern in dominant tropical trees. An understanding of these patterns is highly relevant to conservation plans as they can guide, in particular, reforestation initiatives approximating natural tree distributions in intact forests.

Abundance of Rotifera at the Tungtong River in Taytay, Rizal

Eunice M. Aaron, Kimberly Megan P. Castro, Anthony John T. Del Ayre,
Joshua D. Pacunayan and Henry G. Calilung (Adviser)
Holistic Education and Development Center, Taytay, Rizal
Email: hgc_hedcen@yahoo.com

Rotifers are small species that can only be seen under the microscope. These species are good indicators of water quality. They are found mostly in areas where flow of water is minimal. In the river we are studying for instance, rotifers can be found mostly in basins. The stability of rotifer populations depends on algal diversity which in turn is directly co-related to water quality. This makes rotifers a good indicator of water pollution. Our objective is to determine if rotifer diversity may be used as an index of pollution for the Tungtong River. We collect samples from three basins with different substrates. These substrates include rocks and plants. We also use artificial substrate traps which are floating plastic disks held in place by stone weights and left suspended in the basins just below the water surface. We retrieve these after one week, scrape off the accumulated periphyton, put them into containers and view them under the microscope. To complete our study, we monitor water quality parameters (pH, dissolved oxygen, temperature, conductivity, salinity, and total dissolved solids) for 24 hours every month.

Co-relating Avian and Tree Diversity in Taytay, Rizal: A Development Guide for Residential Areas

Dafrose Camille M. Bajaro, Rouanna Ysabelle C. Guce, Luis Hombrebueno,
Ciel Lee and Henry G. Calilung (Adviser)
Holistic Education and Development Center, Taytay, Rizal
Email: hgc_hedcen@yahoo.com

The Beverly Hills Subdivision is a 2km² residential area situated at the boundary of Antipolo and Taytay, Rizal. Originally a cattle ranch, the area was first converted into a mango plantation before becoming a subdivision. The spring-fed source of the Tungtong River, a 15km stream which empties into the Manggahan floodway, is situated close to the community. This perennial source of freshwater coupled with relatively large tracts of woodland supports a rich avian biodiversity. Related studies have shown that tree and bird diversity are co-related. Birds and trees are mutually supportive—trees provide birds with fruits and nesting sites while birds pollinate and help in seed dispersal. Our study aims to investigate if such a relation exists in Beverly Hills. If so, then we can use the results of our study to formulate development guidelines for the homeowners' association so as to insure that a healthy avian biodiversity co-exists with extensive construction and development projects. 5-meter wide belt transects through randomly selected forested lots will be used to characterize tree communities. We will also be collecting tree specimens to establish a Herbarium and Tree Museum which can help in the environmental education and awareness of Beverly Hills residents as well as of neighbouring communities. The Multi-Variate Statistical Package (MVSP) software will be used to determine tree and bird diversity co-relations via Canonical Correspondence Analysis (CCA) and Primary Components Analysis (PCA).

A Survey on the Avian Community of Philippine Science High School – Diliman Campus

Alyssa Yapyuco, Alison Estabaya and Lea Lite

Philippine Science High School – Main Campus, Agham Road, Diliman, Quezon City

Email: alyssa_yapyuco@yahoo.com

There is an estimated 600 species of birds in the Philippines. Of these, around 120 species can be found in the Metro Manila area. The onset of urbanization in the country has caused these numbers to dwindle by destroying habitats and removing food sources.

A pilot survey of the avian community of Philippine Science High School-Diliman was conducted in order to establish baseline information that could be used to determine the impact of the proposed development of the surrounding area as part of the Quezon City Central Business District. The campus was divided into plots that possessed similar topography. Birds were observed by conducting walking line transects every week for five months through the study site. The species of birds identified, as well as the number of individuals per species were noted per plot so that population inconsistencies within the entire campus could be accounted for.

Twenty-four bird species were found on campus within the study period. Similar studies within the UP-Diliman campus observed a total of thirty-six species, fifteen of which were also found in our surveys. The highest species count was found in the plots containing much greenery and open water source (e.g. ponds, creeks), while the lowest was found in areas which were in close proximity to buildings and human activity. The most abundant species found were the Eurasian Tree Sparrow, Yellow-Vented Bulbul, and the Pied Fantail; all of which are common and well-known for thriving in urban landscapes. The least observed species were the Dollarbird, Scaly-Breasted Munia, and Yellow Bittern; these birds were all observed only once in our surveys despite being described as 'common'. They also appeared in only one plot, which was the one that contained undisturbed greenery and ponds, and was also off-limits to students, making it a quiet area.

Ectoparasite Diversity and Host-Parasite Associations of Bats (Mammalia: Chiroptera) in Mount Makiling Laguna, Philippines

James D.V. Alvarez¹, Leticia E. Afuang^{2,3}, Ireneo L. Lit, Jr.^{2,3} and Phillip A. Alviola³

¹Wildlife Biology Department, University of the Philippines - Los Baños,

²Institute of Biological Sciences, University of the Philippines - Los Baños,

³University of the Philippines – Los Baños Museum of Natural History, College, Laguna

Email: jamesalvarez21@gmail.com

A total of 140 bat individuals representing 14 species were captured in Mt. Makiling, Laguna Philippines. Each bat was sampled for ectoparasitic arthropods, and a total of 210 individuals representing 25 species and belonging to seven families (Nycteribiidae, Streblidae, Spinturnicidae, Laelapidae, Ixodidae, Trombiculidae, Glycyphagidae) and 1 superfamily (Listrophoroidea) were collected. At least 49% (68) of the sampled bats were infested with ectoparasites. Bats with the highest diversity of ectoparasite species were *Rhinolophus arcuatus* (16 species), *Ptenochirus jagori* (9 species), *Cynopterus brachyotis* (8 species) and *Rousettus amplexicaudatus* (6 species). No ectoparasite was obtained from *Hipposideros obscurus*, *Coelops hirsuta*, *Desmalopex leucopterus*, and *Haplonycteris fischeri* and this is probably due to very low sample size (1-2 individuals). The spinturnicid mites *Meristaspis lateralis* and *Paraperiglischrus hipposideros* were newly recorded in *P. jagori* and *R. amplexicaudatus*, and *Rh. arcuatus*, respectively. Ectoparasite species with the broadest host spectrum were *Brachytarsina werneri* with 4 bat species, and *Raymondia pseudopagodarum* and *M. lateralis* with 3 bat species each. The families Streblidae, Ixodidae, Trombiculidae, Glycyphagidae, and superfamily (Listrophoroidea) were found exclusively on insectivorous bats. In general, Megachiropterans had higher average parasite load (3.46 ectoparasites per bat) than Microchiropterans (2.52 ectoparasites per bat). The bat fly *R. pseudopagodarum* and mite *Ancyrostropus zeleborii* have the highest prevalence rate of 14.29% and 12.86%, respectively. Patterns of ectoparasite associations were examined with respect to host's sex, weight, age, reproductive condition of females, and elevational distribution.

Diversity Assessment of Butterflies across Vegetation Types of Mount Kitanglad, Bukidnon

Lovely B. Billones and Alma Mohagan
Central Mindanao University, Musuan, Bukidnon
Email: almohagan@gmail.com

Diversity and assessment study of butterflies across vegetation types of Mount Kitanglad, Bukidnon was conducted to provide information on the species composition, richness patterns and status across vegetation types of Mount Kitanglad using transect line and opportunistic sampling. A total of 5 families, 49 genera and 71 species of butterflies were observed/found. Species richness was highest in the agroecosystem with 68 species followed by dipterocarp forest with 65 species, montane forest with 39 species and mossy forest with 11 species. Shannon index of diversity was highest in Dipterocarp forest with $H=1.708$, followed by agroecosystem with $H=1.694$, montane with $H=1.566$ and mossy with $H=0.903$ as the lowest. The most abundant species in the agroecosystem and dipterocarp forest was *Ypthima sempera chaboras*, in the montane forest was *Appias indra treadawayi* and in the mossy forest, *Arisbe euryphylus gordion*. A total of 12.7% common/ Phil. endemic, 42.3% common, 2.8% uncommon/Phil. endemic, 14% uncommon, 9.9% rare/Phil. endemic, 7% rare, 1% Mindanao endemic and 9.9% undetermined species. Species richness showed greater mean individual in Agroecosystem in Mount Kitanglad with 4.324. The study showed that butterflies have greater preference in Agroecosystem and Dipterocarp, the home of diverse and endemic species of butterflies that is important for conservation.

Preliminary Study on the Termiticidal Property of *Allamanda cathartica* L. (Yellow Bell) Leaf Extracts

Frank Britz V. Cadavis, Jomar S. Cabiyaan, Harlene A. Apostol,
Facundo Rey M. Ladio and Ma. Victoria D. Naboya
Leyte Normal University, Paterno St., Tacloban City
Email: fritzywine_amethyst@yahoo.com

Termites eat cellulose-based materials such as wood, paper, etc. and become pests when they attack anthropogenic structures. It is imperative, therefore, to look for economical, natural and environment friendly yet effective termiticide without the environmental and human hazards of synthetic termiticides. *Allamanda cathartica* Linn. has allamandin, a toxic iridoid, and other poisonous compounds such as cardiac and cyanogenic glycosides and alkaloids, that make it a possible termite control. *A. cathartica* leaf decoction, crude leaf extract, and 40 percent and 80 percent leaf extract solution were sprayed on ten individuals of soldiers and workers of *Nasutitermes luzonicus* and *Macrotermes gilvus* termite species. Enough treatments were sprayed to moisten the termites but not flood the Petri plates. After ten minutes from application, the number of dead termites were counted and recorded. The 80 percent leaf extract solution was the most effective treatment that showed 90 percent killing rate across all test organisms followed by the 40 percent leaf extract solution and leaf decoction. The least effective is the crude leaf extract that killed only 40 percent of the termites tested. It is the 80 percent leaf extract solution, therefore, that showed most effective in killing the soldiers and workers of the two termite species. This experiment may be tested on the king and queen of *M. gilvus* and *N. luzonicus*, as well as other species of both drywood and ground termites to test whether the treatment will have similar effects to those found in this study.

**The Distribution and Soil Seed Bank Analysis of *Eichhornia crassipes*
in Laguna de Bay, Philippines**

Victoria Elena B. Chan and Regielene S. Gonzales

Institute of Biology, College of Science, University of the Philippines, Diliman, Quezon City

Email: rianny@gmail.com

The presence of *Eichhornia crassipes* in Laguna de Bay has brought about both benefits and disadvantages to the stakeholders and residents of the lake. Because of this, an effective method to control the rapid growth of the plant without total eradication is needed. The study aimed to evaluate the distribution of the plant in the lake and examine the possibility of reinfestation despite removal efforts. A soil seed bank analysis was performed to assess the likelihood of recurrence through the sexual reproduction of the plant. No seeds were recovered after sampling 8 sites around the lake, suggesting that reinfestation through seeds is unlikely. The analysis of multispectral imagery, specifically AVNIR images, was performed and gave a scientific and technical explanation of the seasonal distribution of the plant in the lake. Places with human activity, such as fish pens and residential areas, were found to be abundant with *E. crassipes*, suggesting that eutrophication is a main cause of its proliferation. To safely inhibit the growth of the plant, levels of eutrophication in the lake must be reduced. This method not only reduces the growth of the plant, but also creates an environment where aquatic organisms, such as economically-important fish, can thrive.

Food Detection of Ants: A Social Behavior

Siegfred Keene M. Macapas, June Rey C. Mamalintaw, **Joefrhym D. Merillana**,

Marianne Vej C. Lozare and Liza Joy Y. Lazan

Department of Biological Sciences, College of Arts and Sciences,

University of Southern Mindanao, Kabacan, Cotabato

Email: joefrhym@hotmail.com

This study entitled “Food Detection of Ants: A Social Behavior” was conducted last February 13, 2010 at the Center for Ecological Development and Recreation (CEDAR), Barangays Impalutao, Impasug-ong, Bukidnon. The study aimed to assess the food detection of ants as their social behavior. Through opportunistic method, the researchers had found one ant colony, and it was used to answer the objective of this study. Once and for all, the data gathering of this study occurs only twice and in just one day. Thus, it is not appropriate to make conclusions from this study. However, the researchers have found out that:

- the pathway (curvaceous) of ants towards a food source during daytime differs from the pathway (linear-like) of ants at dusk;
- as the distance of the food from the ant colony increases, the pathway of the ants toward such food becomes linear;
- more ants can congregate granulated food (bread and sugar) than non-granulated food (salted fish and candy);
- ants actively detect food during daytime than nighttime though, at first, ants hardly detect food during the first phase of food detection in daytime;
- as the distance increases, time for food detection decreases;
- and lastly, there are breakage of pathway when fire and holes are used.

From the findings cited above, the researchers highly recommend that more extensive and intensive studies regarding ants’ food detection should be done for more reliable outcomes. Correlation of abiotic factors to the ants’ food detection, application of such studies in the house should also be done.

Diversity and Assessment of Odonata across Vegetation Types of Mt. Kitanglad, Bukidnon

Emelene C. Paciente and Alma B. Mohagan
 Central Mindanao University, Musuan, Bukidnon
 Email: emelenep@yahoo.com, almohagan@gmail.com

Diversity and assessment study of Odonata across vegetation types of Mount Kitanglad, Bukidnon was conducted to provide information on the species composition, richness pattern and status across vegetation types of Mt. Kitanglad using transect line and opportunistic sampling. Study revealed 7 families, 13 genera and 17 species of Odonata. Species richness was highest in Dipterocarp with 16 species followed by Agroecosystem with 9 species and Montane with 2 species as the lowest. The most abundant species found in every vegetation types were *H. mindana mindana* and *P. flavescens*. Shannon index of diversity shows highest in Dipterocarp with $H= 1.123$ followed by Agroecosystem with $H= 0.779$ and Montane with $H= 0.301$ as the lowest. Fourty seven percent (47 %) or (8) were locally common species, thirty five percent (35%) or (6) were locally rare species and eight percent (8%) or (3) locally very rare species. A total of 59% endemic species: 9 were observed in dipterocarp and 1 in agroecosystem. Mount Kitanglad supports the 17 species of Odonata. Species richness of Odonata in Mount Kitanglad, Bukidnon is low and their preference habitat is Dipterocarp forest. The study suggests that Odonata has preference in dipterocarp forest for conservation. Species composition, diversity and status were influence by the type of habitat which suggests further the importance of the forest in sustaining life.

Relative Abundance and Distribution of *Tetrastigma piscarpum* (Miq) Planch. in Mt. Banahaw de Dolores and its Parasitic Relationship with *Rafflesia philippensis*

Romelyn C. Pasion, Leah Marris A. Villaran and Leonisa O. Bernardo
 Southern Luzon State University, Lucban, Quezon
 Email: romelyn24pasion@yahoo.com, leahhvillarann@yahoo.com, leonyob@yahoo.com

Tetrastigma piscarpum plays a crucial role for the existence of its rare and endemic parasite *Rafflesia philippensis*. However, there exist no sufficient information about the distribution and ecological characteristics of *T. piscarpum* which is very essential to form effective conservation strategies for both plants. Thus, the study was conducted to determine the distribution and relative abundance of *T. piscarpum* found at 550 meters above sea level (masl), 650 masl and 750 masl of Mt. Banahaw de Dolores and its correlation with *R. philippensis* distribution. It also aimed to determine the physical characteristics of the environment in which the plant grows along with its correlation to *T. piscarpum* distribution. Quadrats measuring 40x40 m and divided into four subquadrats were established along the trail in the said elevations. *T. piscarpum* individuals were counted and diameter at breast height of each was measured. Attached *Rafflesia philippensis* in every *T. piscarpum* were also counted and documented. Also, physico-chemical parameters, such as, air temperature, soil temperature, pH, soil fertility and texture was determined for every quadrat. A total of four (4) *T. piscarpum* with Morisita's index value of 0.003456 were found. These were computed with low abundance relative to the total number of plants in the area. A total of 36 *R. philippensis* were found in the sampling sites. Correlation value computed between the number of *R. philippensis* with the distribution and stem diameter of *T. piscarpum* were found to be 0.988 and 0.911, respectively. The amount of Nitrogen and Phosphorus in soil was computed to have a correlation value of 0.981981 and 0.999569, respectively with the distribution of *T. piscarpum*. Therefore, *Tetrastigma piscarpum* is randomly distributed with low abundance at 550-750 masl along the trail in Mount Banahaw de Dolores as affected by the soil nutrient, specifically Nitrogen and Phosphorus, in which it grows. Also, its distribution and stem size is significantly related to the number of *R. philippensis* attached to it.

**A Preliminary Survey of the Parasitic Hymenoptera Morphospecies
in Puerto Princesa City, Palawan**

Rosalyn S. Ramos, Antonette B. Bartolome, Analyn V. Omapas,
Cory P. Jagmis, Dexter P. Gabuco, Joker E. Ramilo and David M. General (Adviser)
Palawan State University Main Campus, Puerto Princesa City
Email: rosalyneramos@yahoo.com

The parasitic Hymenoptera were surveyed in six sites of Puerto Princesa City, Palawan, namely: corn field, vegetable plots, fruit trees, ornamental garden, weeds and second growth forest. Yellow bowl traps were used to sample the insects daily for seven days. A total of 1929 insects was collected, 263 (13.63%) of which are target insects. The parasitic Hymenoptera of the different sites were compared and recorded with the designated morphospecies number or without taxonomic identification.

Assessment of Odonata Species at Mayon Volcano Natural Park

Jane Ellen Marie Salon and **Jonathan Jaime G. Guerrero**
Biology Department, College of Science, Bicol University, Legazpi City
Email: janellenmarie_salon@yahoo.com; jonathanjaime.guerrero@yahoo.com

Mayon Volcano Natural Park (MVNP) is a protected area under the National Integrated Protected Areas System (NIPAS) of 1992. Being such, biodiversity studies are necessary to achieve maximum conservation efforts. The present study on Odonata species of MVNP is one contribution to this.

The research focused on the taxonomic account of Odonata species within the MVNP, its corresponding community structure and diversity indices, and its correlation to elevation and microclimatic factors such as temperature, relative humidity and precipitation. Prior to the study, a gratuitous permit was obtained from the Protected Areas and Management Bureau V (PAMB-V). Visual Encounter Survey was used throughout the duration of the study.

There were a total of 278 individuals under eight Odonata species (*Agriocnemis femina*, *Brechmorhoga mendax*, *Cordulia shurtleffi*, *Neurothemis fluctuans*, *Neurothemis ramburii*, *Orthetrum Sabina*, *Pantala flavescens* and *Libellulidae* sp.) two suborders, three families and seven genera. Libellulidae is the most widely distributed family. Correlation values indicated that elevation has an inverse relationship to the species diversity, dominance and evenness whilst, humidity and temperature have a direct relationship to species dominance and evenness yet, have an inverse relationship to species diversity, number of species and individuals. The study recommends validation and a longer monitoring of Odonata species within Mayon Volcano Natural Park.

**Population Assessment of Butterfly Host Plants in Selected Sites
Near Mt. Banahaw de Lucban, Lucban, Quezon**

Mary Ann R. Agudilla

Southern Luzon State University, Lucban, Quezon

Email: maryannagudilla@yahoo.com

This study investigates the population of butterfly host plants thriving in Mt. Banahaw de Lucban Botanical Garden and the College of Agriculture campus in Lucban, Quezon, primarily as a prerequisite for the conservation of endemic butterfly fauna and its host plants through butterfly farming. Quadrat method of sampling was utilized in the study. Ten quadrats of 20m x 20m were established in the Botanical Garden and ten 10m x 50m quadrats in the campus of College Agriculture. Results revealed 36 species of host plants belonging to 21 families thriving in the Botanical Garden while 39 species belonging to 21 families comprised the host plant population on campus. Majority of the host plants in the study sites were not randomly distributed and had low density and frequency values ranging from 0.00003 to 0.0008/m² mostly represented by 1-3 individuals. Percent abundance ranged from 0.0789 to 0.2368. Most host plant species were associated with two or more species of butterflies for nectar feeding and/or as hosts of butterfly larva while some butterflies depended on one species of plant as its larval host. The results reflect the rarity of host plants in the study sites suggesting the inability to support the food requirements for a butterfly breeding project, perhaps even the wild population of butterflies. It is recommended that a nursery for host plants be established in both sites, an enhancement planting of endemic host plants be implemented and a similar study be conducted in other areas of Mt. Banahaw.

Pagbilao Mangrove Forest is Potential Food Source of Bees and Other Insects

Amalia E. Almazol

*Assistant Professor, Forestry and Environmental Science Department
College of Agriculture, Southern Luzon State University, Lucban, Quezon*

Email: aalmazol@yahoo.com

Mangrove forests provide numerous environmental and socio-economic benefits. They maintain the integrity of shorelines by preventing soil erosion. Some mangrove species are sources of timber, fuelwood, tannin, resins, traditional medicine and honey. It is unfortunate, however, that mangrove forest is a prime target for infrastructure development. Human threats include overexploitation of forest resources, land conversion or habitat alteration, water pollution, and introduction of marine pests. The study was conducted to determine the melliferous plants in mangrove forest and its vicinity and the floral visitors of selected mangrove species. Results of the study revealed that a total of forty nine (49) plants were foraged by introduced bees (*Apis cerana*, *Apis mellifera*, and *Trigona biroi*), thirteen (13) of which were classified as mangrove species. *Apis dorsata* and *Xylocopa* spp. were native bees found as pollinator species of mangrove plants. Other floral visitors from various orders of insects include Coleoptera, Diptera, Hymenoptera, Lepidoptera, Orthoptera and Trichoptera.

Avian Species of Malagos Watershed, Baguio District, Davao City

Geonyzl L. Alviola, Bernadette I. Del Rosario, Julie B. Otadoy and Jayson C. Ibañez
*Davao Doctors College, Davao City, San Pedro College, Davao City,
 Philippine Eagle Foundation*
Email: phileagl@pltdsl.net, URL: <http://www.davaodoctors.edu.ph/>

Mindanao is considered one of the richest islands in the Philippines, due to high avifaunal biodiversity. Birds play a vital role in determining the condition of certain areas. The study is a morphological assessment of birds in Malagos watershed, Baguio District, Davao City. It sought to identify and classify the bird species; determine the distribution and compare the taxonomic listing of birds with previous avian surveys in the area. Using point count and mist netting effort, 54 species were identified belonging to 27 families. Three new families were added to the list of previous studies namely: Raliidae, Dicruridae and Psittacidae. Seven families were no longer observed like the Apodidae, Oriolidae, Picidae, Scopacidae, Turnidae, Coraciidae and Hirundinidae. It included twelve Philippine endemic species, seven Visayas-Mindanao endemic species, 32 resident species, two migrant species and one both migrant-resident species. Rufous-lored kingfisher, Silvery Kingfisher, Philippine dwarf kingfisher and Little slaty flycatcher were considered as vulnerable based on Red Data Book. The area was also considered disturbed because most of the observed birds were commonly found in open or cultivated areas. A comparative study of three avian survey showed a steady increase in the population from 1994 to 2002 but a decline in the number in 2004 study. The negative trend was associated with habitat destruction and anthropogenic activities.

Updating the Ecological Profile of Naujan Lake National Park

Phillip Alviola
Mindoro Biodiversity Conservation Foundation Inc.
Email: flip_alviola@yahoo.com

The Lake Naujan National Park in Oriental Mindoro is an important conservation area, being one of the few declared Ramsar Sites in the Philippines. It is ecologically and economically relevant site having both the terrestrial and freshwater ecosystems. It is therefore necessary that a sound management plan based on scientific information shall be pursued in the area. Relative to this, the Mindoro Biodiversity Conservation Foundation, Inc., in partnership with the UPLB Museum of Natural History initiated a study in Naujan Lake National Park (NLNP). The major objective of the study is to generate up-to-date inventory of environmental and socio-economic conditions within NLNP. Data were gathered using standard methods for the different components of the study (habitat, terrestrial vertebrates, arthropods, aquatic vertebrates and macro invertebrates, water quality and microbial diversity, and socio-economic profile and governance). Seven major research sites (for all the components) were identified and plotted. There are also 14 tributaries visited, searched and plotted for the aquatic vertebrates and macroinvertebrates. A total of 330 households/ respondents of 11 barangays were surveyed for the socio-economic and governance structure. The flora and habitat types within the old boundaries of NLNP were identified. Terrestrial vertebrates, aquatic vertebrates (fish), terrestrial arthropods, microbial diversity and water quality were also identified. Different types of maps were generated through GIS mapping. The result of this study will be used to compare results of the inventory to the 1997 resource profiling prepared by SEARCA and to determine changes and modifications on the state of Naujan Lake's environmental, socio-cultural and economic and governance situation; and to provide data-backed recommendations needed to update the current management plan of NLNP.

Inventory of Butterflies in the Three Habitat Types of Mt. Musuan, Bukidnon

Sheriffa Andas, Ma. Celene Bandies, Donna Singson, Ronaldo Baldo,
Diana Rose Maghuyop and Alma B. Mohagan
Biology Department, Central Mindanao University
Email: ronaldbaldo63@yahoo.com

Inventory of butterfly species found in Mt. Musuan, Bukidnon was conducted in three stations of Mt. Musuan using line transect sampling. Data revealed 116 species of butterflies belonged to six families. Seventy two species were observed in the forested habitat, 28 species in the mixed vegetation 16 species in the grassland. A total of 27 endemic species were listed, two of which were very rare, 10 rare, 97 common and 2 new records. Result of this manifests the importance of the forest in Mt. Musuan. Butterfly assemblage in Mt. Musuan was aggregate in the forest. This study recommends strict protection of the area from cutting of trees and pasturing of animals to encourage butterflies and other arthropods to dwell therein. It further recommends that planting of nectar host plants and food plants in the cleared areas in the foot of Mt. Musuan.

Quantifying Resilience of High Altitude Tropical Forest

Jonathan A. Anticamara¹, Bonifacio O. Pasion², Regielene S. Gonzales¹,
Mariano Roy M. Duya² and Perry S. Ong¹

¹*Institute of Biology, University of the Philippines, Diliman, Quezon City,*

²*Diliman Science Research Foundation*

Resiliency (or the ability of a deforested area to recover to a state similar to its original condition or the condition of a nearby undisturbed old-growth forest) of high altitude tropical forests showed variability depending on (1) the resilience measures or indices used, and (2) the community aspect evaluated. For instance, the species richness of understory vegetation, in the old growth forest studied did not differ significantly from the 11 year-old reforested area – therefore, highly resilient in this aspect. However, the tree assemblage and sizes (*i.e.*, Diameter at Breast Height DBH in cm), in the old growth forest had significantly higher tree diversity as well as larger trees than the reforested area. In addition, the dominant species in terms of understory vegetation cover, tree abundance, and sizes, differed significantly between the old growth forest and the 11 year-old reforested area – therefore, not highly resilient in these aspects. In general, the composition and structure of vegetation communities (understory and trees) in the old growth forest and the 11 year-old reforested area were about 13-29% similar. This means that, without management interventions (e.g., assisted recovery), it would probably take much longer time (than 11 years) for the reforested area to get to same condition as the nearby old growth forest. More importantly, results showed which aspects of the reforested area could be adjusted to potentially hasten its recovery towards the old growth forest status.

**Genetic Diversity in Two Native Freshwater Goby Species (Gobiidae, perciformes)
in the Philippines and Its Implication for Conservation**

Goli Ardestani, Diana Rose Rogelio and Rita Laude
*Institute of Biological Sciences, College of Arts and Sciences,
University of the Philippines, Los Baños, Laguna*

Email: a.goli@irri.org, dianarose.rogelio@yahoo.com, rplauade@yahoo.com

The genetic diversity within and among the natural populations of two native and threatened Philippine freshwater fishes: *Glossogobius celebius* (Valenciennes) and *G. giuris* (Hamilton) was examined using isozyme analysis. Samples (n=242 fish) were collected from different provinces of Southern Luzon, which is considered a key biodiversity area in the Philippines. A total of 19 presumptive loci among eight enzymes (ACPH, ALPH, EST, LDH, MDH, ME, GOT, α -GPD) and two protein systems (Albumin and Transferrin) were detected. Inter and intrapopulation estimates of genetic diversity for each species based on the average number of alleles, observed and expected heterozygosity, percentage of polymorphic loci, gene flow and F statistics were determined. Results revealed a higher degree of genetic variation among *G. giuris* populations, while a higher genetic diversity was observed within each population of *G. celebius*. This study confirms the need for immediate conservation interventions for *G. giuris* as its low intra-population variability could be a result of successive bottleneck events, which over years will lead to loss of genotypes. On the other hand, the higher degree of intra-population heterozygosity and polymorphism among *G. celebius* indicating its higher adaptation to various environmental conditions confirms its potential for captive breeding. Higher variation within each population is necessary to reduce inbreeding and allow the population to adapt to environmental challenges. Understanding the genetic diversity and variation of native fish species is important to inform conservation decision making.

Rapid Assessment of Mosses in Hikong Bente Falls, Lake Sebu, South Cotabato

**Aisa Ruth Baroy, Ralfh Carbo, Ronalyn Estorpe, Mergie Fajardo,
Jyza Marie Gaurana, Ralph Laude, Carl Dominic Retirado, Carmae Ruyeras,
Angelica Sorilla, Kevin Taganahan and Elsa May Delima-Baron**
San Pedro College, Davao City
Email: delimaelsa@yahoo.com

The study assessed the species composition of mosses in the surrounding forest patch of Hikong Bente Falls, one of the famous Seven Falls of Lake Sebu, South Cotabato. Mosses found inside two plots each measuring 20x20 m were collected and identified. Samples were taken from various spots including those attached to logs and rocks close to the ground and those attach to tree trunks. Thirty two individuals of mosses representing 12 species under nine families were identified. *Fissidens zippelianus* was the most dominant species followed by *Calymperes tahitense*. No Philippine endemic species was encountered. Also none of the species recorded is listed under the threatened categories of IUCN. But given the significance of mosses in determination of air as well as water quality in the area, more surveys covering other forest patches surrounding the Seven Falls must be considered for future research. This is especially timely since developments will be made in other falls to attract more tourists.

Bulacan Herpetological Biodiversity and Manila's Water Supply

Rafe Brown¹, Arvin Diesmos², Mae Diesmos³ and David McLeod¹

¹*Biodiversity Institute, University of Kansas, USA,*

²*Zoology Division, National Museum of the Philippines,*

³*University of Santo Tomas, Manila*

Email: rafe@ku.edu, arvin.diesmos@gmail.com

We report amphibian and reptile distribution records based on recent biodiversity surveys conducted at the Angat Watershed Reservation (AWR), Bulacan Province, Luzon Island. As virtually nothing is known of the herpetological biodiversity of Bulacan Province, all species recorded as part of our study constitute major geographical records and significant range extensions. Our data result in a total of 63 new records of amphibian (19 frogs) and reptile (22 lizards, 2 turtles, and 20 snakes) species for the protected area (and immediate vicinity) that serves as the principal watershed for Manila and surrounding cities. Together with the few previous literature records, our new records bring the total number of amphibian and reptile taxa for Bulacan Province to 68 species. This impressive level of herpetological biodiversity within such a small area, so close to Metro Manila, emphasizes the relatively healthy and intact nature of vertebrate communities inhabiting the remaining forested areas of the Bulacan Province. In this paper we discuss the significance of biodiversity estimates in the context of ecosystem services provided to human populations living near forested surface water catchment watersheds.

Biodiversity Assessment of Mt. Banahaw De Dolores

Gascon, C.N., Garcia, R.C., Beltran, F.N., Faller, W.C., and Agudilla, Ma.R.

Professor, Department of Forestry and Environmental Science,

College of Agriculture, Southern Luzon State University

Email: forcuala_garcia@yahoo.com

A study was conducted to assess the diversity of biological communities in Mt. Banahaw de Dolores, Sitio Kinabuhayan, Sta Lucia, Dolores, Quezon from 700masl to the peak. The area was characterized by identifying the forest trees and wildlife, their species richness and diversity, and dominance. This is the first biodiversity assessment conducted in the site after a 5-year moratorium on visitation. The forest tree and wildlife inventory including insect collection were conducted. Result revealed a total of 455 trees representing 92 species and 37 families. For wildlife, a total of 30 species of birds representing 16 families, 5 species of bats, 3 species of amphibians and 2 reptiles were recorded. There were a total of 285 insects identified representing more than 104 families and 17 orders. High values for Shannon-Weiner index (H), and Evenness index (e) and low values of dominance (C) index indicated even distribution of individuals among the species and high species variation and diversity.

Reintroducing Head-Started and Captive-Bred Philippine Crocodiles: Monitoring population changes and survival

Jessie Guererro¹, Dominic Rodriguez¹, Marites Gatan-Balbas¹, Willem van de Ven¹,
Samuel Telan¹, Jan van der Ploeg^{1,2} and Merlijn van Weerd^{1,2}

¹Mabuwaya Foundation, Inc., ²Leiden University, Netherlands

Email: mabuwaya@yahoo.com, guerreroryan@ymail.com, rodriguez.dominic@ymail.com

The Philippine crocodile *Crocodylus mindorensis* is an endemic critically endangered freshwater crocodile species with an estimated wild population size of less than 250 non-hatchling individuals. The Mabuwaya Foundation has been protecting this species in the wild in Isabela Province. One of the conservation tools used is the reintroduction of crocodiles back into the wild. We used two strategies. First, a nest protection and head-start program was initiated to increase the survival rate of wild-born hatchlings. Second, captive-bred Philippine crocodiles were released back into the wild. Quarterly monitoring surveys and annual recapturing surveys were conducted to measure survival rates.

One year after reintroduction, 26% of 48 captive-bred crocodiles survived. Several individuals ate plastic, or approached people and were killed. After two years, only 12% survived with certainty.

Head-started crocodiles were released in several batches starting in 2007. Out of 34 head-started crocodiles released at least 37% survived after one year in the wild, and at least 18% survived after two years. The head-started crocodiles adapted better to wild conditions than the captive-bred crocodiles. No human-crocodile conflicts were reported.

The results suggest that head-starting is a more appropriate tool compared to releasing captive bred crocodiles back into the wild to reinforce wild populations of *Crocodylus mindorensis*.

Sexual Competition and Gene Duplication in Stalk-Eyed Flies (Family Diopsidae)

Philip M. Johns¹, Richard H. Baker² and Gerald S. Wilkinson³

¹Bard College, USA, ²American Museum of Natural History, USA,

³University of Maryland, USA

Email: johns@bard.edu

Stalk-eyed flies (Family Diopsidae) are remarkable because their eyes sit at the ends of long eyestalks. In some sexually dimorphic species, eyestalks can be longer than males' bodies, while in sexually monomorphic species eyestalks tend to be short. Eyestalks function as sexual ornaments: males use them to assess rivals in contests over females, and females choose mates in part based on eyestalk length. Sexual dimorphism has been gained and lost over the evolutionary history of Diopsidae. In many species females are promiscuous and males compete to fertilize eggs both before and after copulation. Recent discovery of widespread gene duplication and rapid evolution of proteins associated with sperm development may, therefore, be related to postcopulatory sperm competition. There are 20-fold more duplicate paralogues that show testes-specific expression than show head-specific expression in some species. Phylogenetic analysis of genes related to sperm production show elevated rates of evolution in duplicate copies of genes. A recent taxonomic revision of one group of Asian flies based on morphological features advocates the resurrection of three previous genera: Teleopsis, Cyrtodiopsis, and Megalobops. We propose to collect diopsids in the Philippines and elsewhere in SE Asia to resolve this phylogeny and further explore the evolution of sexual dimorphism, gene duplication, and testes-specific gene expression in these extraordinary insects.

**Mangrove Assessment along Butuan Bay:
A perspective on its historical significance, denudation and rehabilitation**

Jess H. Jumawan

Biology Department, Caraga State University, Butuan City

E-mail: jehoju78@yahoo.com

The assessment of mangrove forests along Butuan Bay was conducted in four coastal barangays in the Municipality of Buenavista and Butuan City. The study attempted to assess the mangroves in terms of species composition, vegetation analysis, regeneration of seedlings and saplings, historical accounts on the uses of mangroves, baseline information on mangrove denudation and rehabilitation practices. A total of 16 sampling plots with an area of 100 m² per plot were non-randomly established in the study area. Within the main plots, 3 smaller 1m x 1m regeneration plots were equally distributed for the counting of saplings and seedlings. Primary and secondary data were gathered from the field and various local government units (LGUs) on mangrove historical significance, denudation, and rehabilitation. An inventory of mangrove species revealed 28 species of mangroves belonging to 11 different families. Vegetation analysis showed that *Avicennia rumphiana* has the highest Importance Value (IV) followed by *Rhizophora mucronata* and *Avicennia marina*. The species *Avicennia rumphiana*, *Rhizophora mucronata*, and *Rhizophora stylosa* have the highest regeneration of seedlings and saplings. Remaining mangrove forests were located using GPS coordinates and presented in a GIS map to show mangroves distribution. The data also revealed that mangroves in Butuan Bay are deeply rooted in the history and culture of Butuanons. Mangrove populations in the area went into a massive decline from severe conversion of mangrove forests into aquaculture and other land uses. The data generated from the study were also presented to the different local government agencies to provide baseline information and strengthen mangrove conservation actions.

**An Ethnobotanical Study: Focusing on the medicinal plants of Pala'wan communities
in Barangay Inogbong, Bataraza, Palawan**

Lea M. Magarce¹ and Romualdo M. Del Rosario²

¹*Palawan State University, Puerto Princesa City, Palawan,*

²*The Graduate School, University of Santo Tomas*

Email: lea_camange2007@yahoo.com

This study of medicinal plants was conducted from March 2011 to September 2011 to investigate and document the uses of therapeutic plants by Pala'wan tribe in Barangay Inogbong, Bataraza, Palawan. Information was obtained and gathered from 193 tribal people from different Sitios namely: Saray, Bayabas, Paratungon, Papan and Lupak, using semi-structured questionnaire of which 4 were local male healers. The informants were selected randomly and no prior arrangement was made for the interview. Ethnobotanical data were collected using semi-structured interview, field observation and group discussion. Data were calculated and analyzed using uses totaled, informant consensus factor (ICF), index of fidelity level (FL), relative frequency and percentage. Sixty-five medicinal plants distributed into forty-three families used as cure for forty-two ailments were documented. The distributions of medicinal plant habit were herb 37% followed by tree 34%, shrub 20% and vine 9%. For nearly all frequently utilized plant part in the treatment for human diseases were leaves 43%, root 13% and bark 8%. The administration route for the majority of remedies are oral 54%, external 43%, nasal 2% and ear 1%. The leading mentioned remedies were used to treat gastrointestinal and dermal diseases. The communities in the study area used diverse plant species to sustain their main healthcare system. These new reported result may be of great help to evade the thrashing of customary knowledge of natives on the use of curative plants in this municipality.

Diversity of Bats in the Vegetation Patches of Musuan, Bukidnon

Alma B. Mohagan¹, Dave P. Buenavista¹, Dave P. Mohagan² and Heidi C. Porquis¹

¹Biology Department, Central Mindanao University, Musuan, Bukidnon

²Mt. Musuan Zoological and Botanical Garden, Bukidnon

An output of CMU funded research in partnership with DENR

Email: almamohagan@yahoo.com, and buenavistadave@yahoo.com

We assessed bat diversity in the habitats of Musuan, Bukidnon from April 2007 to December 2008 using mist nets in five vegetation patches: Mt. Musuan Lowland Forest, Faculty Hill forest strip, Watershed area (dipterocarp), Durian plantation (agroforest) and the CMU cemetery forest patch to provide information on bat species composition and richness.

Seventeen species of bats were captured, including 15 Megachiroptera and 2 Microchiroptera. Fifty percent of the samples, mostly found in Mt. Musuan were Philippine endemic. Diversity index was at fair level in 4 vegetation patches: The Mt. Musuan lowland forest and the durian plantation had the same values of $H^2=2.126$ with 15 species each and means of 4 and 11 individuals, respectively. We found 6 species at the Faculty Hill ($H^2=1.577$) with a mean of 1.8 individuals and 6 species with a mean of 1.2 individuals at the Cemetery ($H^2=1.56$). Diversity was low at the Watershed area ($H^2=0.716$) with only 3 species and XX individuals. The presence of small mammal traps and dislodged rocks in this area indicate hunting. In addition, the Bray-Curtis similarity index is low for the species composition of bats in these patches. X species were found at all five locations, while X species were found only at one site. Our surveys provide an initial assessment of the biodiversity value of these small habitats surrounded by an urban matrix.

Status of Butterflies in Dinagat Islands

Alma B. Mohagan¹, Dave P. Mohagan¹ and Rochelyn Libor

¹Mt. Musuan Zoological and Botanical Garden, Bukidnon,

²San Jose Tourism Office, Dinagat, Surigao del Norte,

Research output partly funded by Senkenberg Museum, Germany in partnership with Central Mindanao University and LGU of Loreto, Dinagat Islands, Surigao del Norte.

Email: almamohagan@gmail.com

This study aimed to provide information on the status of butterflies in the three habitat types of Dinagat islands, Mindanao. Belt transects, light and malaise traps and time constraint samplings were employed in the study in three mountains namely: Mt. Paragua, Mt. Redondo and Mt. Kimbinliw. Data revealed 101 species of butterflies documented. Of these, 72 or 71% were endemic. Ten were rare Philippine endemic, 18 common Philippine endemic, 1 very rare Philippine endemic, 3 rare Mindanao endemic, 6 common endemic and 2 rare Dinagat Island endemic. Three of the species are new record to the Philippines, 4 new records to Mindanao, 58 new records to Dinagat Islands and 28 recorded species in Dinagat islands in the previous study. The 101 species with 71% endemism and the presence of newly recorded species are noteworthy for conservation. More than 50% of the species found in each habitat types are disconcordant, most of the endemic species were found in the forests habitats. This simply suggests that forests are important in sustaining the lives of the endemic butterflies in the area.

A Review of Pteropodid Research and Publications in the Last 11 Years

CE Nuevo¹, Tammy Mildenstein² and Nick Martin Rosenberger²

¹Bat Count Philippines, ²University of Montana, Missoula, USA

Email: cenuevo@gmail.com; tammymildenstein@gmail.com; rosenberger.nick@gmail.com

Managers depend on knowledge about wildlife species to guide the development of conservation strategies. However, published research is often lacking for many species, or in many cases when research results are available, these do not provide the type of information needed to develop conservation management plans. In revising the IUCN Old World Fruit Bat Conservation Action Plan, we have reviewed recently published literature (since 2000) for fruit bat species in Southeast Asia (N=78) to identify experts and develop a bibliography of research pertinent to the species' conservation. Despite Old World fruit bats being a known conservation priority for over three decades, many species (70%) have fewer than 6 studies published about them in the last 11 years, and most (97%) have fewer than 5 publications relevant to conservation. The most common type of study published are "surveys" (47% of 89 total papers), which provides very little information for local conservation management. Papers that focus on species attributes that satisfy IUCN Red List criteria, such as population sizes and distribution, account for only 4% of the total papers. The species for which information relevant to conservation has been published tend to be more common species, such as *Cynopterus brachyotis*, which are not of immediate conservation concern. In order to strengthen the protection of threatened taxa, we encourage the drivers of conservation such as funding agencies, managers, and academics, to use their positions to promote biological research that is most needed for conservation, such as population-level research on threatened species.

An "Unseen" Invasion of the Microscopic Kind – The Neotropical *Arctodiaptomus dorsalis* (Copepoda, Calanoida, Diaptomidae) in Philippine Lakes

Rey Donne S. Papa¹, Huiming Li³, Dino T. Tordesillas^{1,2}, Boping Han³ and Henri J. Dumont^{3,4}

¹Graduate School and Research Center for the Natural and Applied Sciences, University of Santo Tomas, Manila, ²Department of Biology, St. Paul University, Quezon City, ³Institute of Hydrobiology, Jinan University, Guangzhou, China ⁴Department of Biology, Ghent University, Belgium

Email: rspapa@mnl.ust.edu.ph, reypaps@yahoo.com

This study was originally intended to update the systematics and zoogeography of calanoid copepods in Philippine lakes. However, our results show that an invasion by the Neotropical *Arctodiaptomus dorsalis* has taken place in 19 out of 27 lakes in the archipelago studied. Only four of the previously recorded native and endemic calanoids have been encountered, which may indicate that most have been displaced by *A. dorsalis*. This was further enhanced by a general deterioration of water quality associated with aquaculture. Undescribed species may have already been displaced prior to their discovery due to the paucity of studies on Philippine zooplankton. *A. dorsalis* was first reported in the Philippines from Laguna de Bay in 1991, where it was said to have been introduced via ship ballast water, but co-introduction with tilapia is more probable. Intensive aquaculture practices during the past 20 years have aided its dispersal to other areas and have provided environmental conditions that favor its survival. The rapid spread of *A. dorsalis* together with a loss of calanoid diversity in the Philippines poses a threat to mainland Asia in the future, as similar limnological characteristics, problems and challenges persist among these neighboring countries.

Abundance and Diversity of Resident Bird Species in Areas with On-Going Building Construction at the University of the Philippines - Diliman Campus

Erwin Don Racasa¹, Ana Paula Luna¹, Jasmin Meren² and Regielene Gonzales²

¹*Institute of Environmental Science and Meteorology,*

²*Institute of Biology, College of Science, University of the Philippines Diliman, Quezon City*

Email: erwin_racasa@yahoo.com.ph

The UP Diliman campus is home to a diverse avian community. Between 2005 and 2006, 42 species of resident perching birds were recorded in the College of Science alone. However, major landscape changes have occurred since 2008 due to the wide scale construction of the National Science Complex and various new engineering buildings. In light with the changes, bird species that most likely thrived, as well as bird population, abundance and diversity, were determined. In this study, bird species sighted around three building construction areas – the National Science Complex (Site 1), NISMED–Energy Engineering Department–EEE block (Site 2), and the IE-ME and Acacia dormitory blocks (Site 3) – were identified during the month of October 2011. Abundance and diversity of the birds were also determined as well as species that most likely thrived even with the construction activities. A total of 11 species and 202 individuals were observed. Shannon, Simpson, and Evenness indices were higher in site 2 due to its combination of urbanized and forested landscape. Dominance index is higher in study site 3 due to the large number of *Passer montanus*. *P. montanus* is the most dominant bird species in all sites which can be attributed to its large brain size and commensal behavior. Clearly, urban exploiter birds, aside from *P. montanus*, such as the long-tailed shrike, yellow-vented bulbul, and brown shrike may have benefited from the changes due to increase in complexity of the landscape.

Compiling a Georeferenced Database of Threatened Forest Tree Species in the Philippines

Lawrence T. Ramos, Alfie M. Torres, Florencia B. Pulhin and Rodel D. Lasco

World Agroforestry Centre - Philippines, Los Baños, Laguna

Email: a.m.torres@irri.org; f.pulhin@irri.org; r.lasco@cgiar.org

In this paper, we discuss a method used to georeference occurrences of threatened forest tree species in the Philippines from multiple sources, namely: the Global Biodiversity Information Facility, legacy literature of biodiversity, peer-reviewed journals, technical reports and biodiversity surveys. Locality descriptions are initially narrowed down in a geographic information system using administrative maps and further confined using 2 criteria: elevation and surface cover information from remotely-sensed images. The result is a georeferenced database of 2,068 occurrence records of 47 threatened forest species on a national scale. Each record has a unique point feature per species and enough metadata directing the database user to the source of occurrence data. The database can be used as a tool in determining priority species for specimen or germplasm collection, for taxonomic identification and historical mapping. It as an integral component in spatially modeling the distribution of tree species in the past and in a possible future scenario.

Macrofungal Diversity of Bazal-Baobo Watersheds, Aurora Province, Central Luzon

Edwin R. Tadiosa¹, Efren S. Agbayani² and Nestor T. Agustin³

¹Botany Division, National Museum of the Philippines, ²Department of Forestry and Environmental Science, Aurora State College of Technology - Baler, Aurora, ³Department of Environment and Natural Resources, Baler, Aurora

A preliminary study of the diversity of macrofungi was conducted at the watershed of Aurora Province. Four transect lines were established from 500m to 1000m asl with 20m x 50m quadrat sampling each transect line (TL) and an interval of 50m between quadrats. The fungal species within the quadrats along the TLs were identified and recorded. Opportunistic sampling method was also used during the survey and fungal collection. Field sampling of fungi resulted to the identification of 38 families, 68 genera, and 107 species with a total of 684 individuals. Of which 91 are basidiomycetes, 15 are ascomycetes, and one is myxomycetes.

Among the significant findings include *Aseroe rubra* Labill., *Lycoperdon echinatum* Pers., *Cymatoderma africanum* Boidin, and *Cookeina tricholoma* (Mont.) Kuntze, as the new record fungal species in Aurora, and one possible new species of the genus *Hexagonia*. Further field surveys of the watersheds is anticipated to uncover a rich and diverse fungal flora. Although generally well protected, the watershed is currently experiencing some degree of anthropogenic disturbance such as slash-and-burn farming. Fungal diversity research efforts need to be encouraged to determine the existence of the different species which is beneficial to man and the environment.

Addressing Human – Crocodile Conflict in the Province of Isabela

Sammy P. Telan¹, Femke Koopmans², Willem van de Ven¹, Merlijn van Weerd^{1,2},
Dominic G. Rodriguez¹, Jessie P. Guerrero¹, Marites G. Balbas¹ and Jan van der Ploeg^{1,2}

¹Mabuwaya Foundation, Inc. ²Leiden University, Netherlands

Email: sammytelan@hotmail.com, mabuwaya@yahoo.com

After the rediscovery of a remnant population of the critically endangered Philippine crocodile *Crocodylus mindorensis* in the municipality of San Mariano in 1999, this species has been protected in the wild using a community-based approach. As a result, the Philippine crocodile population is recovering. However, human-crocodile conflicts are also increasing. A growing human population living in crocodile habitat leads to competition for water resources and habitat loss, and more regular interaction between humans and crocodiles. Domesticated animals such as chickens, pigs and dogs are predated by crocodiles. These issues can hamper the conservation of the Philippine crocodile, if not resolved.

The Mabuwaya Foundation is trying to address these issues in Dinang Creek, a locally declared crocodile sanctuary, where human-crocodile conflicts are often recorded. The foundation aims to restore the buffer zone using enrichment planting with native trees, fruit trees and bamboo clumps. This buffer zone will serve as a habitat of natural prey species for Philippine crocodiles, provide nesting habitat and prevent people and livestock of visiting the creek. It will also make it more difficult for crocodiles to approach houses and prey on livestock. Fruits can be harvested by local residents. Livestock will further be protected from crocodiles through livestock pens and bamboo fences near houses. In addition, pump wells will be constructed to provide an alternative and safe source of water for people currently using the creek.

If this pilot project is successful, it will be implemented in other areas where crocodiles and people live together.

Characterization of a Remnant Coastal Forest on a Small Coralline Sand Island in the Philippines

Daniel S. Torres and Lea Ivy O. Manzanero
Unaffiliated researcher, 107 K-10th Kamias, Quezon City
Email: dantuors@gmail.com

The 29-hectare, coralline sand island, Arrecife (N 9°50.565', E 118°44.703) had been farmed from the 1940s to 1997, leading to one of its common local names: "Isla Mais." One ecosystem change, as expected from farming, is the loss of the original coastal forest vegetation in most of the island except a 1.85 ha zone at the southwest fringe. Based on our photographs flowers, fruits and seeds on the island, off-site specialists were able to identify some plants up to the most detailed taxa possible. In addition, a plant specialist visiting the island provided in situ identification. Through the specialists' identification, 13 coastal forest species, including three Philippine endemics *Mimusops elengi*, *Tarenna cumingiana* and *Terminalia foetidissima*, are now known from the island. Through photographing key plant structures, non-plant specialists have the potential to contribute information on the vegetation of small, sandy islands.

Partnerships in Protecting the Olive Ridley Turtle (*Lepidochelys olivacea*): A Philippine Case Study

Daniel S. Torres
Unaffiliated researcher, 107 K-10th Kamias, Quezon City
Email: dantuors@gmail.com

The olive ridley turtle (*Lepidochelys olivacea* Eschscholtz 1829) was described from specimen collected by Eschscholtz from Manila Bay around 1827. Although the olive ridley has been known to be in the Philippines for almost two centuries, conservation efforts directly addressing the species have been in place for only about 20 years. In the Philippines, the role of formal partnerships began after the "Memorandum of understanding on the conservation of marine turtles and their habitats in the Indian Ocean and Southeast Asia (IOSEA)" was signed in Manila last June 21, 2001. Formal instruments of partnership were designed and patterned on the IOSEA. The first instrument was entered into in Bataan last November 23, 2001. Similar instruments in varying stages of completion are in Palawan, Ilocos Norte, Bataan, Davao, Zambales, Batangas, Cagayan de Oro and Cavite. The main components of the partnerships include stakeholder training on marine biology, participatory nesting beach appraisal, partner-shared management (including hatchery construction) and joint action planning. In 2008, olive ridley conservation was included into the "Manila Bay Integrated Environmental Monitoring Program." As a result of the partnerships more than 50,000 olive ridley eggs have been conserved.

A Sampling Scheme Design for Validating Results of Preliminary Stratification for Above-Ground Forest Carbon Stock Estimation in Victoria-Anepahan Mountain Range, Palawan

**Rizza Karen A. Veridiano, Anjilyn Kristine V. Monzon, Jose Don T. De Alban,
Edmund Leo B. Rico, Christian E. Supsup and Ronald Allan N. Altamirano**
Fauna & Flora International – Philippines

*Email: rizzakaren.veridiano@gmail.com, anj.monzon@gmail.com,
JoseDon.DeAlban@fauna-flora.org, Edmund.Rico@fauna-flora.org,
Christian.Supsup@fauna-flora.org, Ronald.Altamirano@fauna-flora.org*

Credible estimation of forest carbon stocks is among the initial requirements in assessing the potentials for Reducing Emissions from Deforestation and Forest Degradation-Plus (REDD+) initiatives.

Delineation and stratification of forests by its potential above-ground biomass can improve carbon estimation accuracy. We produced a preliminary stratification through remote sensing and GIS analysis of forest areas of Victoria-Anepahan mountain range, southern Palawan. An initial forest/non-forest map classification was derived from the 2009 ALOS/PALSAR 50-meter Orthorectified Mosaic Product (http://www.eorc.jaxa.jp/ALOS/en/kc_mosaic/kc_map_50.htm). The resulting forest layer and maps of three environmental parameters, which affect forest growth and structure, particularly: elevation gradients, rainfall, and soil types, were combined through an overlay approach using a GIS platform to produce the initial forest stratification map. The stratification resulted into 18 unique forest strata that could possibly hold different carbon stocks. We designed a forest inventory sampling scheme to validate the results of this preliminary forest stratification map. Three 50 x 50-meter forest inventory plots in each strata shall be used to estimate the carbon stock within each strata in view of validating the stratification results. The sampling scheme design based on the preliminary forest stratification results is presented to the WCSP for feedback and comments, prior to the conduct of forest inventory campaign planned in May 2012 at the REDD+ pilot site.

National Museum of the Philippines

Institutional support:

Jeremy R. Barns, *Director*
 Ana Maria Theresa P. Labrador
 Elenita D.V. Alba
 Virgilio Palpal-latoc
 Edwin Tadosa
 Wilfrido Vendivil

Fauna & Flora International

Aldrin Mallari, Kathleenross Marayag,
 Ronald Altamirano (*Coordination and Planning*)
 Jose Don de Alban, Christian Supsup (*Maps*)

Wildlife Conservation Society of the Philippines

Arvin Diesmos, Cynthia Layusa, Aldrin Mallari,
 Nina Ingle (*Symposium Liaison-PNM*)

Aldrin Mallari, Nina Ingle, Cynthia Layusa
 (*Symposium Liaison-DLSU-D*)

Marisol dG. Pedregosa, Nina Ingle,
 Cynthia Layusa, Aldrin Mallari (*Finance*)

Em Lastica, Cynthia Layusa,
 Marisol dG. Pedregosa (*Registration*)

Arvin Diesmos, Cynthia Layusa (*Abstract Review*)

Nina Ingle, Cynthia Layusa,
 Arvin Diesmos (*Program*)

Cynthia Layusa, Nina Ingle,
 Em Lastica (*Communication*)

Michelle Encomienda, Cynthia Layusa,
 Nina Ingle (*Commemorative Program*)

Em Lastica (*Invitations*)

Cynthia Layusa, Arvin Diesmos (*WCSP-PNM Exhibits on Pioneering Wildlife Contributors*)

Lisa Paguntalan
 (*Symposium Exhibits and Posters, DLSU-D*)

Leticia Afuang (*Moderation*)

Marisol dG. Pedregosa (*Silent Auction*)

Rafe Brown (*Awards*)

Cynthia Layusa, Marisol dG. Pedregosa,
 Carl Oliveros (*Signage*)

Chuckie Fer Calsado (*Symposium Theme Artwork*)

De La Salle University-Dasmariñas

DLSUD Focal persons:

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 Sandra Yap

WCSP-PNM Exhibits on Pioneering Wildlife Contributors

Research, Layout & Logistics:

Cynthia Adeline A. Layusa
Arvin C. Diesmos
Maria Josefa S. Veluz
Vhon Oliver S. Garcia
Faith M. Guinto
Donela D. G. Tan
Rolly C. Urriza
Aissa S. P. Domingo

Writers and Contributors:

Kraig Adler
Cecilia I. Banag
Rafe M. Brown
Ronald A. Cortes
Tom Dacey
Arvin C. Diesmos
Lawrence R. Heaney
Hector C. Miranda
Cynthia Adeline A. Layusa
Carl H. Oliveros
Rey Donne S. Papa
Bonifacio Pasion
Pieter Pelser
Julie Barcelona
Marisol dG. Pedregosa
Edwin Tadosa
Danilo Tandang
Rolly C. Urriza
Maria Josefa S. Veluz

Special thanks to:

Kraig Adler (Society for the Study of Amphibians and Reptiles), Lawrence Heaney and Andria Niedzielski (Field Museum), United States National Museum, Erika Robis (National Museum of the Philippines), Museum Education Division, Zoology Division, Botany Division, and the Office of the Director (National Museum of the Philippines), Industrial Technology Development Institute of the Department of Science and Technology

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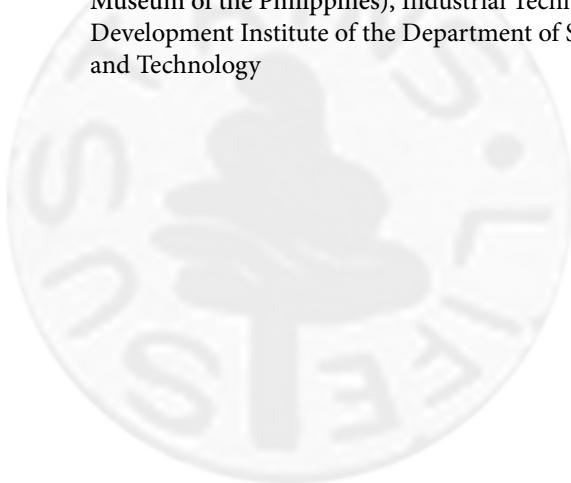
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The Wildlife Conservation Society of the Philippines (WCSP) is a professional organization of wildlife researchers, managers, scientists, and conservationists. The Society was formed to advance wildlife research and conservation in the Philippines through promoting collaborative research, providing technical assistance and training and increasing public awareness. Since 1992, wildlife biologists and conservationists from throughout the country have been meeting at different venues around the Philippines every April and the proceedings from most of these annual meetings have been published. The WCSP was officially registered in 1993.

1992	Dumaguete, Negros Oriental	2002	Cebu
1993	Los Banos, Laguna	2003	Murcia, Negros Occidental
1994	Initao, Misamis Oriental	2004	Antipolo, Rizal
1995	Quezon City, Metro Manila	2005	Tuguegarao, Cagayan Valley
1996	Dumaguete, Negros Oriental	2006	Puerto Princesa, Palawan
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De La Salle University D A S M A R I N A S



LEGEND:

- 00 SAINT LA SALLE STATUE
- 01A MAGDALO GATE
- 01B MAGPURI GATE
- 01C MAGDIWANG GATE
- 01D MAGTAGAMPY GATE
- 02 PARKING AREA
- 03 CHINI FOOD LAB BLDG.
- 04 MARIANO ALVAREZ HALL
- 05 PROPOSED CHINI BLDG.
- 06 TANGHAWAN JULIAN HELPE
- 07 JULIAN HELPE HALL
- 08 PABLO CAMPOS HALL
- 09 PROPOSED AYUNTAHMENTO BLDG.
- 10 COS OFFICES BLDG.
- 11 COS CLASSROOM BLDG.
- 12 CAMPUZ GOURMET
- 13 HOTEL RAFAEL
- 14 BOTANICAL GARDEN
- 15 ELEVATED WATER TANK
- 16 SRC CANTEN AND BOOKSTORE
- 17 ANLITANG EMILIO AGUIÑALDO
- 18 ELECTRICAL SUBSTATION
- 19 MUSEUM COMPLEX
- 20 ANTONIO & VICTORIA COJUANCO MEMORIAL CHAPEL
- 21 LAKE PARK
- 22 MUSEO DE LA SALLE
- 23 POLCA BUILDING
- 24 UNIVERSITY SQUARE
- 25 CONDOMINIUM
- 26 DOMINICAN MALE
- 27 DOMINICAN FEMALE
- 28 4-STORY DORMITORY HALL
- 29 HELPE CALDERON HALL
- 30 LADISLAO DIVA HALL
- 31 VITO BELARMINO HALL
- 32 CANDIDO TIBONA HALL
- 33 GREGORIA MONTOYA HALL
- 34 KASPAGAN HALL
- 35 CEAT BLDG.
- 36 STAFF-NOOK RESTAURANT
- 37 WAREHOUSE BLDG.
- 38 SANTIAGO ALVAREZ HALL
- 39 CIAA-GSR BLDG.
- 40 MOTOR POOL
- 41 MARIANO TRIAS HALL
- 42 INTERATED FARM
- 43 UNNMANC LA SALLE
- 44 UNIVERSITY SWIMMING POOL
- 45 GUARD POST
- 46 TRACK AND FIELD OVAL
- 47 GRANSTAND
- 48 STUDY SHEDS
- 49 STAFF & FACULTY PARKING AREA
- 50 LA PORTERIA DE SAN BENITO
- 51 ANLITANG EMILIO AGUIÑALDO (NEW)
- 52 SEVERINO DE LAS ALAS HALL
- 53 GREEN HOUSE
- 54 RESIDENCIA LA SALLE