



RSG CONFERENCE PHILIPPINES 2020

Enhancing Biodiversity Conservation in the Philippines

6th and 7th February 2020
Hive Hotel
Quezon City, Philippines



CONTENTS

Welcome Message	3
Opening Remarks	5
About The Rufford Foundation	7
About LAMAVE	8
Schedule of Activities	9
Abstracts.....	16
Survival of a mammalian carnivore, the leopard cat, in an agricultural landscape on an oceanic Philippine island	17
Anurans as important predators in riparian communities of a watershed in the Caraga Region in the Eastern Mindanao Biodiversity Corridor	18
Philippine bat research and conservation in the Anthropocene	19
Building capacity to enhance Protected Area Management effectiveness: A current needs assessment for Mt. Guiting-Guiting Natural Park, Sibuyan Island, Philippines.....	20
Adopting rainforestation for small island biodiversity conservation and watershed rehabilitation	21
The Fish are back: Promoting public awareness about marine protected areas.....	22
Nuisance behavior of Philippine Warty pig (<i>Sus philippensis</i>) in Mt. Banahaw de Tayabas, Philippines.....	23
Microplastics and chameleons – Poetic expeditions into H ₂ O.....	24
Saving Nemo: Recommendations for the ornamental marine aquarium fish trade.....	25
Establishment of community-driven dugong (<i>Dugong dugon</i>) conservation area in Calawit Island, Busuanga, Palawan	26
Freshwater ichthyofauna of wetlands in Tablas Island, Romblon, Philippines	27
Floating marine macroplastics and its implications on marine wildlife conservation in Davao Gulf, Mindanao, Philippines	28
Finding balintong: The power of local ecological knowledge	29
Conservation of Irrawaddy dolphins in the City of Bago and the Municipality of Pulpandan: A multi-sectoral approach.....	30

Research and conservation of the critically endangered Philippine Crocodile (<i>Crocodylus mindorensis</i>) in Southern Philippines	31
Motivations of hunters to engage in hunting of Flying Foxes in Divilacan and Dinapigue, Isabela and Baguio, Cagayan	32
The role of citizen science in the long term monitoring of dugongs (<i>Dugong dugon</i>) in Northern Busuanga, Palawan	33
Improving the detection of binturongs, <i>Arctictis binturong</i> , and other bird and arboreal species in Palawan Island by canopy camera-trapping	34
Decimation of marine life due to plastic crisis	35
Physicochemical, microbiological and lead level assessment of the Magapa-Suaga River	36
Sea turtles in the Northern Sierra Madre Natural Park (NSMNP): Local knowledge and threats	37
Project Palaka: Ex-situ amphibian conservation in the Philippines.....	38
Community structure of herpetofauna in the lowland forest of Mt. Hilong-hilong, Tandag City, Surigao del Sur, Philippines	39
Understanding Philippine reef biodiversity's values, decline, conservation, and future scenarios	40
Floristic biodiversity along an elevation gradient in Mount Sawtooth, Central Luzon, Philippines	41
Future citizen scientists: Marine science camps in the Verde Island Passage	42
The ongoing illegal pangolin trade in the Philippines	43
Blue carbon and ecosystem services: a case of small-scale fisheries in mangroves and seagrasses.....	44
Provisioning whale sharks for tourism: An overview on management and research efforts for the endangered species in Oslob, Cebu.....	45
Genetic and genomic approaches to biodiversity research in Philippine seas: Implications for management and conservation	46
Conference Photos	47

WELCOME MESSAGE

Biodiversity is the key to the maintenance of the world as we know it. Life in a local site struck down by a passing storm springs back quickly because enough diversity still exists...This is the assembly of life that took billions of years to evolve. It has eaten the storms—folded them into its genes—and created the world that created us. It holds the world steady.

E.O. Wilson

Biodiversity simply is life on Earth. In relation to its human impact, it supports our food security and economic growth, alleviates poverty and is an integral part in the solution to climate change to name a few. The Philippines is one of the world's megadiverse countries with our terrestrial environment boasting one of the highest rankings in endemic species. Our waters host the highest species richness for all distributions combined per unit area than anywhere else in the world, garnering it the epicenter of marine biodiversity. The importance of safeguarding the Philippines biodiversity extends beyond the ecological aspects, but culturally and evolutionary, biodiversity is at the very core of it. The Philippines biodiversity is being threatened by a range of factors—overfishing and destructive fishing practices, wildlife trade, deforestation, soil erosion, habitat loss... We are driving our wildlife resources to a point of extinction. And with every extinction we face, we undermine the stability of our planet.

Fortunately, the projects and research that will be shared in the next few days are important play pieces in combating further biodiversity loss. We are defining the status and threats of our terrestrial and marine environments and addressing the challenges on a multi-disciplinary approach from genetics and genomics to involving the use of citizen science and employing local ecological knowledge. But it is not enough to offer our suggested management

practices and protocols to the respective authorities in hopes it will uptake for implementation. We cannot control any external circumstance but that of our actions; therefore, we must always think to act in the right direction. We have a responsibility to each other and to the future generation to make the right choices. Starting with ourselves we can then influence the people around us.

I hope that this conference connects you with other who share the same visions and goals as yourself personally and professionally. I'm looking forward to learning about the different areas of research being done on the diversity of our natural resources. I hope you enjoy as well!

Mabuhay!



Ariana Agustines
President, LAMAVE

Ariana learned to dive at the age of 13, which sparked her fascination for the colourful and diverse marine critters. She pursued a biology-based degree for her undergraduate course and later worked at Mote Marine Laboratories' Ecotoxicology and then Marine Microbiology lab. Her desire to help marine conservation efforts in the Philippines led her to join LAMAVE where she is also the Project Leader for the Southern Leyte and Palawan Whale Shark Projects.

OPENING REMARKS

Since its inception, The Rufford Foundation – a British charity established specifically to support nature conservation grants – has awarded an excess of 5,000 grants. It is an incredible and honourable achievement, and one that deserves to be celebrated. In a world where biodiversity is decreasing on every ecosystem, and where the rate of species extinction is at its highest ever, it will take collaborative, bold and persistent work to protect what is left. The Rufford Foundation Small Grants Programme offers an opening to early-career conservationists working towards this common goal.

With support from The Rufford Foundation through their Small Grants Programme, LAMAVE has conducted whale shark research and conservation initiatives in Southern Leyte, Surigao del Norte, Misamis Oriental and Palawan. We started work with whale sharks opportunistically in 2011, and in 2012 we started dedicated work at two study sites in the Visayas. In 2013, we set up season-wide monitoring efforts at Panoan Island in Southern Leyte. We would soon discover that this was one of the largest aggregations in the region and the tourism operations there were sustainably managed. We worked closely with the community to ensure population monitoring of this Endangered species continued and that the tourism focused on minimising the disturbance to the animals.

Moreover, in 2015, we started a satellite tagging programme in the Sulu and Bohol Seas to understand the risk of these animals moving to areas where poaching still occurs. This led us to northern Mindanao, where we mounted monitoring programmes including local ecological knowledge to understand the whale sharks in this region.

The work eventually expanded to Palawan, Honda Bay in Puerto Princesa City, where in 2019 it hosted the largest whale shark aggregation in the region! We wouldn't have been able to conduct all this work over the years without the support from The Rufford Foundation. I would like to express my gratitude to them, and to you participating in this conference, so that we can build on this and reach our conservation goals by working together. Lastly, I would like to thank the conference Secretariat, Ms. Lorraine Aplasca, for the hard work in bringing us together. With that, mabuhay and maraming salamat po!



Gonzalo Araujo
Conference Organizer

Gonzalo Araujo is a Director for Large Marine Vertebrates Research Institute Philippines, an Associate Research Fellow at the Endangered Marine Species Research Unit at Universiti Malaysia Sabah, a Kinship Conservation Fellow, and a Ph.D. Candidate at the University of Portsmouth, UK. He has been supporting marine megafauna conservation in the Philippines since 2011.

ABOUT THE RUFFORD FOUNDATION

The Rufford Foundation is a UK-registered charity which funds nature conservation projects across the developing world through its Rufford Small Grants for Nature Conservation (RSGs). To date the Foundation has awarded grants to 5,035 projects in 152 countries (and counting).

With the success of its first Small Grants Conference in Nepal in 2012, the Rufford Foundation has been organizing small in-country conferences as a platform for communication and connection between its grant recipients.

The Rufford Small Grants Philippines Conference 2020 brings together scientists, conservationists and practitioners at the forefront of biodiversity conservation in the country. The aim of the conference is to share the experiences, successes and failures, in conserving nature in the country. By working together, we can succeed on this paramount mission we are all working towards.

For more information about The Rufford Foundation, please visit their website: <https://www.rufford.org/rsg/>.

ABOUT LAMAVE

Large Marine Vertebrates Research Institute Philippines is a Filipino non-stock non-profit NGO solely dedicated to the conservation of marine megafauna and their habitats in the Philippines.

LAMAVE focuses its efforts on charismatic megafauna species acting as umbrella species to protect the wider marine environment. We identify important habitats for whale sharks, turtles and other species. Our work is closely linked to the communities which are directly influenced or dependent amongst target species. The results are shared with governments and stakeholders in order to work together to minimize impacts, and to develop tools for conservation management, such as creating or zoning marine protected areas or advising policy.

To learn more about what we do, please visit <https://www.lamave.org/>.



SCHEDULE OF ACTIVITIES

SCHEDULE OF ACTIVITIES

Day 0: February 5, 2020 (Wednesday) – Arrival of Participants

14:00 PM	Check-in for early arrivers
19:00 PM	Group dinner and socials

Day 1: February 6, 2020 (Thursday) – Opening

8:00 AM	REGISTRATION	
9:00 AM	Welcome Remarks	Ms. Ariana Agustines President, Large Marine Vertebrates Research Institute Philippines
9:15 AM	Opening Remarks	Mr. Gonzalo Araujo Director, Large Marine Vertebrates Research Institute Philippines
9:30 AM	Start of Morning Sessions	Chairs: Ms. Christine Legaspi Project Manager, Large Marine Vertebrates Research Institute Philippines Dr. Alessandro Ponzo Director, Large Marine Vertebrates Research Institute Philippines
	Plenary 1: Genetic and genomic approaches to biodiversity research in Philippine seas: Implications for management and conservation	Ms. Rachel Ravago-Gotanco Assistant Professor, Marine Science Institute, University of the Philippines – Diliman
10:00 AM	Speaker 1: Physicochemical, microbiological and lead level assessment of the Magapa-Suage River	Nick John B. Solar Research Coordinator, Department of Education – Iloilo
10:20 AM	Speaker 2: Understanding Philippine Reef Biodiversity's Values, Decline, Conservation, and Future Scenarios	Dr. Jonathan Anticamara Professor, Institute Of Biology, University of the Philippines – Diliman

SCHEDULE OF ACTIVITIES

Day 1: February 6, 2020 (Thursday) – Continuation		
10:40 AM	Speaker 3: Recommendations for the Ornamental Marine Aquarium Fish Trade	Gregg H. Yan Director, Best Alternatives
11:00 AM	Speaker 4: Anurans as important predators in riparian communities of a watershed in the Caraga Region in the Eastern Mindanao Biodiversity Corridor	Ms. Jeszianlenn Plaza Faculty/Academic Research Staff, Father Saturnino Urios University-Biodiversity Informatics and Research Center
11:20 AM	Speaker 5: Finding Balintong: The power of local ecological knowledge	Ms. Charity Apale Project Manager, Zoological Society of London Philippines
11:40 AM	Open Forum	Plenary Speaker 1 + Speakers 1 to 5
12:00 NN	Lunch Break: Managed Buffet	
13:00 PM	Group Photo	
13:10 PM	Start of Afternoon Sessions	Chairs: Ms. Ariana Agustines Mr. Gonzalo Araujo
	Plenary 2: Provisioning whale sharks for tourism: An overview on tourism management implications and research efforts for the conservation of the endangered species	Ms. Christine Legaspi Project Leader, Large Marine Vertebrates Research Institute Philippines
13:40 PM	Speaker 6: The role of citizen science in the long term monitoring of dugongs (Dugong dugon) in Northern Busuanga, Palawan	Ms. Erina Molina Masters Student, Institute of Environmental Science and Meteorology, University of the Philippines – Diliman
14:00 PM	Speaker 7: Establishment of community-driven Dugong (Dugong dugon) conservation Area in Calawit Island, Busuanga, Palawan	Mr. Reynante V. Ramilo Programme Coordinator, Community Centred Conservation (C3) Philippines

SCHEDULE OF ACTIVITIES

Day 1: February 6, 2020 (Thursday) – Continuation		
14:20 PM	Speaker 8: Conservation of Irrawaddy dolphins in the City of Bago and the Municipality of Pulupandan: A Multi-Sectoral Approach	Mr. Manuel Eduardo L. de la Paz Research Associate, University of St. La Salle, Bacolod City
14:40 PM	Speaker 9: Sea turtles in the Northern Sierra Madre Natural Park (NSMNP): Local knowledge and threats	Mr. Julius Rae R. Allam Mabuwaya Foundation
15:00 PM	Open Forum	Plenary Speaker 2 + Speakers 6 to 9
15:20 PM	Afternoon Snack and Break	
15:30 PM	Afternoon Sessions Resume	Chairs: Ms. Jessica Labaja Director, Large Marine Vertebrates Research Institute Philippines Ms. Sally Snow Director, Large Marine Vertebrates Research Institute Philippines
	Speaker 10: Decimation of Marine Life due to Plastic Crisis	Ms. Peachie Dioquino-Valera Climate Reality Leader (PH) & Futures Learning Advisor, The Climate Reality Project & Center for Engaged Foresight
15:50 PM	Speaker 11: Floating marine macroplastics and its implications on marine wildlife conservation in Davao Gulf, Mindanao, Philippines	Mr. Neil Angelo S. Abreo Davao del Norte State College
16:10 PM	Speaker 12: Microplastics and Chameleons – Poetic Expeditions into H ₂ O	Mr. Roman Kroke Independent Artist
16:30 PM	Speaker 13: Nuisance behavior of Philippine Warty pig (<i>Sus philippensis</i>) in Mt. Banahaw de Tayabas, Philippines	Mr. Al John C. Cabanas Graduate Student, University of the Philippines - Los Banos
16:50 PM	Open Forum	Speakers 10 to 13

SCHEDULE OF ACTIVITIES

Day 1: February 6, 2020 (Thursday) – Continuation		
17:10 PM	Closing Remarks	Ms. Ariana Agustines Mr. Gonzalo Araujo
18:30 PM	Conference Dinner and Cultural Show	Kultura Dance Group
20:00 PM	END OF DAY 1	

Day 2: February 7, 2020 (Friday)		
8:00 AM	REGISTRATION	
9:00 AM	Welcome Remarks and Recap of Day 1	Mr. Gonzalo Araujo Ms. Ariana Agustines
9:10 AM	Start of Morning Sessions	Chairs: Dr. Alessandro Ponzo Ms. Jessica Labaja
	Plenary 3: The Ongoing illegal pangolin trade in the Philippines	Mr. Emerson Y. Sy TRAFFIC
9:40 AM	Speaker 14: Survival of a mammalian carnivore, the leopard cat, in an agricultural landscape on an oceanic Philippine island	Dr. Ma. Renee P. Lorica Freelance Wildlife Ecologist
10:00 AM	Speaker 15: The Fish are back: Promoting public awareness about marine protected areas	Ms. Yasmin Arquiza Communications Manager, Rare Philippines
10:20 AM	Speaker 16: Motivations of hunters to engage in hunting of Flying Foxes in Divilacan and Dinapigue, Isabela and Baggao, Cagayan	Ms. Jessa D. Macapallag
10:40 AM	Speaker 17: Philippine bat research and conservation in the Anthropocene	Mr. Krizler C. Tanalgo Xishuangbanna Tropical Botanical Garden, Chinese Academy Of Sciences

SCHEDULE OF ACTIVITIES

Day 2: February 7, 2020 (Friday) – Continuation		
11:00 AM	Speaker 18: Research and conservation of the critically endangered Philippine Crocodile (<i>Crocodylus mindorensis</i>) in Southern Philippines	Mr. Jake Wilson B. Binaday Biologist, Crocodylus Porosus Philippines, Inc.
11:20 AM	Open Forum	Plenary Speaker 3 + Speakers 14 to 18
11:40 AM	Lunch Break: Managed Buffet	
13:00 PM	Start of Afternoon Sessions	Chairs: Mr. Gonzalo Araujo Ms. Christine Legaspi
	Plenary 4: Blue Carbon and Ecosystem Services: a case of small-scale fisheries in mangroves and seagrasses	Ms. Angela Quiros Post-Doctoral Researcher, Hokkaido University, Akkeshi Marine Station BlueCARES program (SATREPS, JICA, JST)
13:30 PM	Speaker 19: Future citizen scientists: Marine science camps in the Verde Island Passage	Mr. Joseph Ascalon Executive Director, SEA Institute – Verde Island Passage
13:50 PM	Speaker 20: Building capacity to enhance Protected Area Management effectiveness: A current needs assessment for Mt. Guiting-Guiting Natural Park, Sibuyan Island, Philippines	Ms. Camila G. Meneses University Extension Associate I, University of the Philippines Los Baños Museum of Natural History
14:10 PM	Speaker 21: Adopting rainforestation for small island biodiversity conservation and watershed rehabilitation	Mr. Eufrazio Pagalan Maratas Executive Director, (RISE) Restoration Initiative for Sustainable Ecosystems, Inc.
14:30 PM	Speaker 22: Freshwater Ichthyofauna of Wetlands in Tablas Island, Romblon, Philippines	Mr. Jeric B. Gonzalez Faculty/Research Coordinator, Romblon State University-San Agustin Campus
14:50 PM	Open Forum	Plenary Speaker 4 + Speakers 19 to 22

SCHEDULE OF ACTIVITIES

Day 2: February 7, 2020 (Friday) – Continuation		
15:10 PM	Afternoon Snack and Break	
15:20 PM	Afternoon Sessions Resume	Chairs: Ms. Ariana Agustines Ms. Sally Snow
	Speaker 23: Improving the detection of binturongs, <i>Arctictis binturong</i> , and other bird and arboreal species in Palawan Island by canopy camera-trapping	Ms. Agathe Debrulle Co-president & Scientific officer, Arctictis Binturong Conservation
15:40 PM	Speaker 24: Project Palaka: Ex-situ amphibian conservation in the Philippines	Mr. Norman Greenhawk Director, Project Palaka
16:00 PM	Speaker 25: Community structure of herpetofauna in the lowland forest of Mt. Hilong-Hilong, Tandag City, Surigao del Sur, Philippines	Mr. Arturo G. Gracia Jr Instructor, Surigao Del Sur State University
16:20 PM	Speaker 26: Floristic biodiversity along an elevation gradient in Mount Sawtooth, Central Luzon, Philippines	Ms. Abigail Garrino Research Associate, Biodiversity Research Laboratory, UP Diliman
16:40 PM	Open Forum	Speakers 23 to 26
17:00 PM	Closing Remarks	Mr. Gonzalo Araujo Ms. Ariana Agustines
	END OF CONFERENCE	

Day 3: February 8, 2020 (Saturday) – Departure of Remaining Participants	
12:00 NN	Check-out for remaining participants

ABSTRACTS

Survival of a mammalian carnivore, the leopard cat, in an agricultural landscape on an oceanic Philippine island

Ma. Renee P. Lorica¹ & Lawrence R. Heaney²

¹ Conservation Biology Program, University of Minnesota, 200 Hodson Hall, 1980 Folwell Ave., St. Paul, MN 55108, USA

¹ Current address: Pagbilao, Quezon, Philippines

² Division of Mammals, Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605, USA

Concerns about vulnerability of mammalian carnivores to extinction, especially on small islands, appear to conflict with prior reports of endemic populations of leopard cat *Prionailurus bengalensis* (Kerr, 1792) surviving in agricultural landscapes on oceanic islands. We investigated the persistence of the Visayan leopard cat (*P. b. rabori*) in the sugarcane fields on Negros, an oceanic island in central Philippines. A population remained throughout the year at our study site on a sugarcane farm, and reproduction was noted. Non-native rodents form the bulk of the cat's diet, followed by reptiles, birds, amphibians, and insects. Prey species identified from the samples commonly occur in agricultural areas in the Philippines. Prey composition did not vary significantly with respect to wet and dry season, or sugarcane harvest cycle. This study provides evidence that an intensively managed agricultural landscape on this oceanic island supports a native obligate carnivore that subsists primarily on exotic rats. This study supports a prior prediction that leopard cats will show flexibility in prey selection on islands with few or no native small mammal prey species, but in this case they do so not by switching to other vertebrates and invertebrates, but rather to exotic pest species of rodents.

KEYWORDS: Exotic rats, habitat use, islands, prey selection, *Prionailurus bengalensis*

Anurans as important predators in riparian communities of a watershed in the Caraga Region in the Eastern Mindanao Biodiversity Corridor

Jeszianlenn L. Plaza^{1,2}, Ephrime B. Metillo² and Marites B. Sanguila¹

¹Biodiversity Informatics and Research Center, Father Saturnino Urios University, San Francisco Street, Butuan City 8600 Philippines

²Department of Biological Sciences, College of Science and Mathematics, Mindanao State University-Iligan Institute of Technology, Andres A. Bonifacio Avenue, Iligan City 9200 Philippines

Ecological niche theory suggests that species commonly use three major resource axes (i.e. space, food, and time) to facilitate coexistence in ecological communities. Anurans occur in sympatry in riparian communities and are hypothesized to share these important resource axes. We used stomach content and stable isotope analyses to determine food resource partitioning in sympatric anuran assemblages in riparian communities at low- and mid-elevation in Taguibo River Watershed Forest Reserve. Low niche overlap and narrow trophic niche breadth suggest dietary specialization to insect prey types in *Ansonia muelleri*, *Limnonectes magnus*, *Occidozyga laevis*, *Megophrys stejnegeri*, *Pulchrana grandocula*, *Sanguirana mearnsi*, and *Staurois natator* as revealed by temporal stomach content analysis. We specially note ant-specialization (myrmecophagy) of the Mindanao island endemic bufonid *Ansonia muelleri*. The difference in trophic position and assimilation of potential prey sources from carbon and nitrogen stable isotopes confirm feeding niche partitioning in *L. magnus*, *P. grandocula* and *O. laevis*. Ecological interactions between sympatric species gleaned from this study suggest the importance of sustaining populations in watershed ecosystems, such as Taguibo River Watershed Forest Reserve, critically important for its ecosystem services.

KEYWORDS: Ecological niche, resource niche partitioning, tropical riparian communities, watershed ecosystem, amphibians

Philippine bat research and conservation in the Anthropocene

Krizler Cejuela. Tanalgo^{1,2,3}

¹Landscape Ecology Group, Center for Integrative Conservation, Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Menglun, Mengla, Yunnan Province, P.R. China

²Center of Conservation, Core Botanical Gardens of the Chinese Academy of Sciences, Menglun, Mengla, Yunnan Province, P.R. China

³Global Bat Cave Vulnerability and Mapping Initiative

Effective science-based conservation priorities and policies are crucially important to effectively maintain biodiversity into the future. National level approaches to the development and implementation of effective conservation policy and practice are often challenged by limited capacity and resources. Developing relevant and achievable priorities at the national level is a crucial step for effective conservation. The Philippine archipelago includes over 7000 islands and is one of only two countries considered both a global biodiversity hotspot and a megadiversity country. Yet, few studies have conducted overarching synthesis for threats and conservation priorities of any species group. As bats make up a significant proportion of mammalian diversity in the Philippines and fulfil vital roles to maintain ecosystem health and services, we focus on assessing the threats and priorities to their conservation across the Philippines. Habitat loss from logging and agriculture and hunting are the main threatening process to over half of the Philippine bats. Using available information on species' threats, conservation status, and endemism, we developed priority settings for Philippines bats to enable effective future decision making. We determined endemic and threatened species are the highest priority and larger bats are under more intense threat than smaller bats. Our finding further suggests that in order to bolster bat conservation and prevent future species loss, it is important to identify emerging threats and its extent, increase conservation education, develop effective policies, and forge equitable partnerships between scientists and stakeholders towards research and outreach capacity.

KEYWORDS: Bats, conservation, endemism, forest loss, oil palm

Building capacity to enhance Protected Area Management effectiveness: A current needs assessment for Mt. Guiting-Guiting Natural Park, Sibuyan Island, Philippines

Camila G. Meneses

University of the Philippines Los Baños Museum of Natural History

Current debates in the conservation sciences argue for better integration between research and practice, often citing the importance of the dissemination and implementation of scientific knowledge for environmental management, policy, and conservation. Different studies revealed that monitoring the status and trends of species is critical to their conservation and management. However, the current state of biodiversity monitoring is insufficient to detect such for most species and habitats. One of the biggest impediments to adequate monitoring is the lack of local capacity to carry out such programs. Thus, building the capacity to do such monitoring is imperative. Hence, we discuss the critical significance and consequences of our findings for the future of conservation science and practice in biologically and geographically diverse landscapes of Sibuyan Island, with an explicit call to action for local academic institutions and protected area management board to support researchers in developing appropriate dissemination strategies. We present a range of socio-economic contexts relevant to Mt. Guiting-Guiting Natural Park conservation capacity building: protected area management, community and academic engagement. It resulted to five broad types of suggested action: (1) the establishment of capacity building resources (2) the communication of ideas of successful initiatives, (3) the implementation of new research or gap analyses, (4) the establishment of new structures within and between organizations, and (5) the development of new partnerships. A number of challenges also emerged from the discussions: the need for a greater sense of urgency in developing capacity building activities and the need to return scientific findings.

KEYWORDS: Conservation, knowledge exchange, local perceptions, research-action, research-implementation

Adopting rainforestation for small island biodiversity conservation and watershed rehabilitation

Eufracio Maratas Jr.

With less than 1% of its original forests remaining, native tree species are under enormous pressure of disappearing in the island municipality of Pilar. Thus, the project was proposed to promote community support for biodiversity conservation while helping maintain the functional integrity of the watershed. Rainforestation is a reforestation approach that promotes planting of native tree species in a closed canopy and high diversity forest farming system that integrates human food production efforts using fruit trees, and supports complementary livelihood of farmer-cooperators. The project resulted to the adoption of Rainforestation by four farmer organizations and a total of 11.3 hectares demonstration farms established.

KEYWORDS: Rainforestation, forest, restoration, biodiversity, communities

The Fish are back: Promoting public awareness about marine protected areas

Yasmin Arquiza

Communications Manager, Rare Philippines

From St. Paul's Bay marine reserve in Palawan to Sipaway Island in Negros Oriental, educating various audiences about the importance of marine protected areas is always a challenging task for conservation advocates. This presentation explores communication strategies that can be employed to make technical topics easier to explain, as well as media channels that are effective in conveying key messages and achieving desired results.

KEYWORDS: Communication, Marine Protected Areas, conservation

Nuisance behavior of Philippine Warty pig (*Sus philippensis*) in Mt. Banahaw de Tayabas, Philippines

Al John C. Cabanas¹ and Judeline C. Dimalibot¹

¹University of the Philippines Los Banos

Human-wildlife conflict is one of the greatest challenges for the conservation of biodiversity (Madden and McQuinn 2014). Crop damage by wildlife is one of the causes of human–wildlife conflict, particularly outside protected areas (Aryal et al., 2017). One of the species that cause severe damage to crop in the Philippines is the Philippine warty pig (*Sus philippensis*). To determine the presence of human-wildlife conflict between a local community and Philippine warty pigs, a community survey using a questionnaire involving 96 households was conducted in a barangay (village) at the foot of Mt. Banahaw de Tayabas. Seventy-three (73%) of respondents confirmed the existence of human-wildlife conflict in the area. Results show that root crops (66.67%) ($X^2=153.48$, $p= 0.0001$) are the most preferred of the Philippine Warty pig, these include sweet potato, *gabi* (yam) and potatoes. Majority of respondents (96.88%) ($X^2= 174.43$, $p=0.0001$) believe that there is no organized poaching of Philippine Warty pig in the mountain. Mitigation strategies such as cooperative guarding of matured crops, use of local protective methods such as fences should be promoted by the local community organization. The community should be more alert on the presence of the species and other wildlife which may destroy their crops so that they will not resort to poaching, hunting or maiming them.

KEYWORDS: Human-wildlife conflict, Philippine warty pig, crop raiding, poaching

Microplastics and chameleons – Poetic expeditions into H₂O

Roman Kroke

How may ART assume the role as a “social player” contributing to build ecological consciousness in community projects and to raise awareness for issues related to biodiversity, environmental pollution and climate change? To what extent may ART serve as a communication bridge helping to make complex scientific research accessible to a broader public? For the last three years, the interdisciplinary artist Roman Kroke, a former lawyer, has been working on these topics in partnership with schools, universities, foundations and scientific institutes. In 2019, he accompanied an international group of 30 scientists as an artistic mediator on the research vessel SONNE on their expedition across the Pacific Ocean: starting in Vancouver (Canada), passing by the Philippines until Singapore. Main research topics: plastic pollution of the oceans and climate change. During his following stay in the Philippines, he explored the universe of marine life via intensive freediving in order to further develop two of his artistic metaphors: the “turtle” and the “whale shark”. On the basis of these experiences, he has been realizing numerous exhibitions, workshops, conferences and teacher-trainings. In his presentation, he will illustrate the concepts and pedagogical approaches which may serve as an inspiration for comparable projects in the Philippines.

KEYWORDS: Art, interdisciplinarity, education

Saving Nemo: Recommendations for the ornamental marine aquarium fish trade

Gregg Yan

Director, Best Alternatives

The Best Alternatives campaign estimates that in the Philippines, as many as nine out of ten wild-caught marine ornamental fish die within one year of capture. Due to current collection, transportation and shipping practices, about 80 per cent of all marine fish die even before they are sold to hobbyists. As much as 90 per cent of all ornamental marine fish that are locally sold die within the first year. Only the hardiest – clownfish, damselfish, wrasses, gobies and blennies – or those lucky enough to be bought by elite hobbyists, survive beyond their first year in captivity.

Regulated collection using nets and not poisons, better stocking and shipping techniques plus imposing sensible size, catch and species limits can provide collectors both sustainable livelihoods and a strong incentive to protect instead of exploit our reefs.

KEYWORDS: Marine aquarium trade, ornamental fish trade, reef fish and invertebrate conservation

Establishment of community-driven dugong (*Dugong dugon*) conservation area in Calawit Island, Busuanga, Palawan

Reynante V. Ramilo*, Ginelle Jane A. Gacasan, Patricia ZR. Davis

*C3 Philippines, Busuanga, Palawan, Philippines,

The dugong (*Dugong dugon*) is listed as 'vulnerable' on the IUCN Red List (Marsh et al, 2002) and 'threatened with extinction' under CITES Appendix I. Dugongs in the Philippines are understudied; thus, the number of remaining dugongs in the Philippines is unknown, decreasing, sparse and scattered caused by habitat loss and degradation and fisheries by-catch. Palawan is one of the dugong's last strongholds and the most promising hope for its national survival. In Calawit Island, Busuanga, Palawan, there are a few semi-habituated dugongs feeding on the seagrass beds also used by the indigenous *Tagbanwa* tribe. These individuals provide a unique opportunity to better study and conserve the species, employing standardised techniques (drones, boat and land-based surveys, seagrass surveys) to determine dugong core habitats, population and distribution as well as community perceptions and beliefs. These studies conform with the Palawan Council for Sustainable Development's (PCSD) Strategic Environmental Plan for enhanced community centered conservation of critical marine species and habitats in Busuanga municipality. Using the results from research conducted by C3 since 2011, the Calawit *Tagbanwas* in May 2018 declared 8 sites in their ancestral waters as Dugong Conservation Areas (DCAs) covering a total area of 617.36 hectares and with the assistance of C3 have created monitoring and management plans for the areas. This paper will share the processes for the establishment of the DCAs in Busuanga, Palawan which can serve as a model and guide for the replication of dugong conservation programs throughout the region. Furthermore the blueprint will be scaled up and shared through a 4 year Climate Initiative (IKI) seagrass ecosystem services project implemented by CMS Dugong MoU Secretariat across 5 countries; the Philippines, Malaysia, Timor Leste, Indonesia and Thailand.

KEYWORDS: Dugong (*Dugong dugon*), community conservation, critical habitat

Freshwater ichthyofauna of wetlands in Tablas Island, Romblon, Philippines

Jeric B. Gonzalez, Bernie G. Mantes, Vincent Jay H. Gado and Rey P. Rasgo

Romblon State University-Tablas Campuses
Tablas Island, Romblon, Philippines

The Philippines is a globally important hotspot for biological diversity and center for endemism, but much of the studies are focus in terrestrial and marine biodiversity and less is known about freshwater ecosystem especially freshwater fishes. In Romblon, only few studies had been conducted formally on these organisms. Hence, this study was realized. The objective of this study was to assess the freshwater fishes of Tablas Island, Romblon using different method on September 2018 to May 2019. There were 51 species under 35 genera and belonging to 21 families of freshwater fishes in Tablas Island, Romblon dominantly belong to order Perciformes and family Gobiidae. They are common in river, stream, irrigation creek and canal and majority of them were native to the Philippines and utilized as food by the locals. Most of these species were classified in Least Concern category by the IUCN Red List. Among all species, *Gambusia affinis* was the dominant species while *Giuris margaritaceus* was the most common in all sites. A new locality record of endemic minnow species (*Barbodes hemictenus*) in Tablas Island, Romblon, Philippines was discovered. The different freshwater habitat of Tablas Island is relatively diverse. Two species were recorded as threatened species in Tablas Island and both were introduced. Meanwhile, majority of the native species were categorized as Least Concern, Unknown, Not Evaluated and Data Deficient. Since the sampling was conducted during dry season, this study strongly recommends to conduct another study during rainy season. In addition, conduct the same study to the other Islands of the province such as Romblon Island, Sibuyan Island and Banton Island.

KEYWORDS: Ichthyofauna, species composition, utilization, conservation status, San Agustin

Floating marine macroplastics and its implications on marine wildlife conservation in Davao Gulf, Mindanao, Philippines

Neil Angelo S., Abreo¹, Edison D. Macusi², Remie Aurelio Jr.³ and Michael Dann Superio⁴

¹ Davao del Norte State College, Panabo City, Philippines

² Davao Oriental State College of Science and Technology, Mati City, Philippines

³ University of the Philippines Mindanao

⁴ Davao Medical School Foundation, Inc., Davao City, Philippines

Marine litter is a global problem. The possible impacts of this problem on marine biodiversity and human welfare are daunting. Therefore, data on marine litter is essential to understand the extent of the problem. The Philippines contribute significantly to marine litter, especially plastics, making data from the country particularly important. Surprisingly, little information is available on marine litter from the Philippines. Here, we presented the first boat-based survey of floating macroplastics (> 5mm) from Davao Gulf, Philippines. Also, we explored the use of social media as a source of information for marine litter and wildlife interaction. Results showed the high density of floating marine litter, which was dominated by single-use plastic. Furthermore, we found several cases of plastic ingestion within Davao Gulf from a common social media platform. A similarity between the dominant floating macroplastics and most commonly ingested debris was observed. Evidence seem to suggest dominance of local litter inputs and ingestion occurring within Davao Gulf. The presence of marine litter in Davao Gulf adds to the predicament on marine wildlife conservation efforts in the area. We recommend further studies on marine litter and the possible improvements on the methodology employed in the study.

KEYWORDS: Plastics, pollution, marine litter, Davao Gulf, Philippines

Finding balintong: The power of local ecological knowledge

Lucy Archer¹, Darlyn Coroña², Ronald Amada², Josefa Gacilos² and Charity Apale²

¹ University of London and Institute of Zoology

² Zoological Society of London Philippines

Classified as Critically Endangered on the IUCN Red List of Threatened Species due to suspected population declines, the Palawan pangolin or 'balintong', *Manis culionensis*, has the smallest range of all eight pangolin species, known only from Palawan Province, Philippines. As a nocturnal, semi-arboreal and non-vocal species, *M. culionensis* displays low levels of detectability, making monitoring efforts difficult. The species is thought to be subject to high levels of hunting pressure and so population densities are thought to be low due to exploitation driven by the illegal wildlife trade. When species population densities are thought to be low, traditional ecological sampling methods can be costly. In these circumstances, local people can provide important information on rare species utilising the same environments and provide useful insights across wide geographical areas. This type of knowledge is known as Local Ecological Knowledge (LEK). LEK can be a cost-effective method to determine a species' presence across large areas and can build a baseline picture of a species' status and threats. This research attempts to provide a broad-scale yet range-wide assessment for the species, using LEK household interview surveys. A total of 1296 household interviews were conducted in 72 barangays across 17 municipalities and one city. Preliminary results showed that, pangolin appears absent from Linapacan Municipality, with no sightings reported on the island. Elsewhere, all other municipalities reported pangolin sightings. Also, majority of the respondents (85%) declared that the population of the Philippine Pangolin changed. Of these, 75% of which declared that the numbers decreased.

KEYWORDS: Wildlife conservation, local ecological knowledge, social science, cryptic species

Conservation of Irrawaddy dolphins in the City of Bago and the Municipality of Pulpandan: A multi-sectoral approach

Romeo G. Teruel, PhD¹, Manuel Eduardo L. de la Paz², Jessica O. Pacalioga³, Mary Ann Pandan, PhD⁴, Virgilio R. Aguilar, PhD⁵, Mercedes R. Canal, PhD⁶, Maribeth Pillo, PhD⁷

¹ Asst. Vice Chancellor for Research and Engagement, Project Leader

² Research Associate, Dolphin Team Leader

³ Faculty, Fisheries Team Leader

⁴ Faculty, Water Quality Team Leader

⁵ Director, Publication and Engagement Office, Livelihood Team Leader

⁶ Faculty, Project Impact Team Leader

⁷ Faculty, Tourism Potential Team Leader

This project was conducted to support efforts to conserve the Irrawaddy dolphins in Bago City and Municipality of Pulpandan, Philippines, through the establishment of Marine Protected Areas. Phase 1 of the project focused on the generation of baseline data for the drafting of policies and management strategies necessary in the establishment of MPA specifically data on the updated dolphin population estimates, inventory of fishes in the locality, socio-economic profile, training needs, awareness and perceptions on Irrawaddy dolphins and MPAs of different stakeholders. Phase 2 continued dolphin monitoring, fish inventory studies within and outside MPAs with additional studies on water quality, tourism potential, livelihood, and project assessment. These were done to generate data necessary for developing integrative strategies to ascertain the sustainability of the MPAs. The research project used the Multi-Sectoral Approach involving different stakeholders in the conduct of the project to include information and education campaigns and drafting and approval of MPA management plan and ordinances. The more pronounced challenges encountered include the difficulty of engaging community members in the project because of economic reasons and diminishing support of local government due to changing local priorities. Despite the challenges, it is imperative to sustain the current conservation efforts through exploring more innovative and collaborative partnerships given the following local realities: declining population of Irrawaddy dolphins; community members are living below the poverty line, and a significant number of community members are not aware of the presence of the dolphins in their locality.

KEYWORDS: Irrawaddy dolphin, multi-sectoral, marine protected areas

Research and conservation of the critically endangered Philippine Crocodile (*Crocodylus mindorensis*) in Southern Philippines

Rainier I. Manalo and Jake Wilson B. Binaday

Crocodylus Porosus Philippines, Inc., Pag-asa Farms, Kapalong, Davao del Norte

The Philippine Crocodile (*Crocodylus mindorensis*) is considered as the rarest crocodilian in the world due to its elusive nature. This species is classified as Critically Endangered with only around an estimated 92-137 individuals remaining in the wild, patchily distributed in the extreme Northeastern Luzon and Mindanao.

Crocodile research and conservation efforts of the Crocodylus Porosus Philippines, Inc. (CPPI) on *C. mindorensis* for the past decade have focused in the known stronghold population, the island of Mindanao, southern Philippines. In 2013 and 2017, sixty two juveniles has been successfully introduced in Paghungawan Marsh, Siargao Island Protected Landscapes and Seascapes, Surigao del Norte Province wherein a community-based sustainable tourism managed by a People's Organization has been established. Currently, citizen-science based radio-telemetry study is being conducted in the release site to determine the home range of the released *C. mindorensis*. Sustained population studies on abundance, distribution and behavior have led to the discovery of two new populations in the wild and new altitudinal records. Intensive public education and awareness campaigns have increase the optimistic perceptions of the communities on the two species of crocodiles in the country.

CPPI is a duly registered non-stock and non-profit non-government organization of legitimate commercial crocodile farmers that are committed to the sustainable conservation of the two species of crocodiles in the country. It will continue to implement its crocodile conservation programs to ensure the continued existence of *C. mindorensis* in the wild, focusing on the conduct of research on its natural history and putting species conservation into action.

KEYWORDS: Philippine crocodile, Crocodylus Porosus Philippines, Inc., conservation efforts, community-based sustainable tourism, citizen science

Motivations of hunters to engage in hunting of Flying Foxes in Divilacan and Dinapigue, Isabela and Baggao, Cagayan

Jessa D. Macapallag (researcher), Joni T. Acay, Leonalyn C. Tumaliuan, Myrna C. Cureg, Marites G. Balbas, Merlijn van Weerd and Jouel B. Taggweg

Mabuwaya Foundation

The Northern Sierra Madre has three species of giant fruit bats or flying foxes: the endemic solitary roosting Mottle-winged Flying Fox *Pteropus leucopterus*, the endemic and endangered Golden-crowned Flying Fox *Acerodon jubatus*, and the non-endemic near-threatened Large Flying Fox *Pteropus vampyrus*. Three main roost sites with *A. jubatus* and *P. vampyrus* are present in Baggao, Cagayan and in Divilacan and Dinapigue in Isabela. Flying Foxes are threatened by roost disturbance and by hunting, both in the roost and in foraging areas. This research aimed to determine the attitudes of hunters towards Flying Foxes and their motivations to engage in hunting. We used the theory of planned behavior as the conceptual framework for this. This framework assesses behavior of people as a result of a combination of attitudes, subjective norms and perceived behavioral control. A questionnaire was developed and administered in Divilacan, Dinapigue and Baggao. Here we present the results of these interviews with details on Flying Fox hunting practices, intensity, use and trade and an initial attempt to understand why people are hunting flying foxes as a basis for targeted conservation action.

KEYWORDS: Northern Sierra Madre, flying foxes, hunting

The role of citizen science in the long term monitoring of dugongs (*Dugong dugon*) in Northern Busuanga, Palawan

Erina Pauline Molina¹, Lemnuel V. Aragon¹, Reynante Ramilo²

¹ Institute of Environmental Science and Meteorology, University of the Philippines Diliman, Quezon City

² Community Centered Conservation (C3) Philippines, Busuanga, Palawan

The dugong (*Dugong dugon*) is classified globally as Vulnerable (VU) by the IUCN Red List. In the Philippines, there is a dearth in dugong monitoring data because monitoring wide-ranging and long-lived marine mammals like the dugong is a challenge especially to developing countries such as the Philippines because it is too costly to study using conventional marine mammal survey techniques (i.e. ship surveys, boat surveys). However, in the recent decade, citizen science has been becoming a trend and proven useful in collecting data to improve species and ecosystem knowledge as well as being an effective conservation strategy in different field areas. In this study, we demonstrate how citizen science coupled with systematic surveys can infer distribution patterns and generate an understanding of dugong ecology in Northern Busuanga, Philippines through a citizen-led simultaneous land-based dugong monitoring system. This monitoring scheme was started in 1990, re-established in 2017 and replicated in 2018 and 2019 with 8, 21, 28 and 32 monitoring stations around the island, respectively. While this study aims to estimate the relative abundance of dugongs and infer basic aspects of dugong ecology and habitat-use from sightings, it also aims to assess the efficacy of this technique for monitoring dugong populations which can be employed on a regular basis. Ultimately, this monitoring scheme aims to generate important data to be used in developing conservation objectives for dugongs in Northern Busuanga while demonstrating the importance of establishing strong social relations through citizen science, in the success of conservation efforts.

KEYWORDS: dugong conservation, citizen science, marine mammal, monitoring

Improving the detection of binturongs, *Arctictis binturong*, and other bird and arboreal species in Palawan Island by canopy camera-trapping

Agathe Debrulle

Co-president and Scientific officer of ABConservation

Camera-trapping methods are well known and often used in many types of environmental studies. However, when placed on ground level, these camera traps are poorly adapted to obtain pictures of bird and arboreal species. Thus, most biodiversity assessment studies conducted in South-East Asia either failed to highlight the presence of binturongs, *Arctictis binturong*, a strongly arboreal Mammal, or obtained very low detection rates. For this reason, the abundance of binturongs remains unclear in its entire range although it is listed as Vulnerable by the IUCN and Endangered on the local red-list edited by the Palawan Council for Sustainable Development. Our study aimed thus to test an alternative method of arboreal camera trapping to improve the detection of binturongs and of other arboreal species. Twenty camera-traps have been set up on tree-tops in the forest of the Barangay Langogan, Puerto Princesa city, Palawan. We obtained a total of 41 independent detections of binturongs for 2,973 trap-nights, representing a detection rate of 1.38, which is currently the highest detection rate for the species. We also collected photos of fourteen species of birds and five other Mammals. Among them, nine are listed as Vulnerable, Near-Threatened or Endangered by the IUCN and nineteen had not been recorded in previous biodiversity surveys of the area. This suggests arboreal camera trapping can be useful as a complementary method for biodiversity assessment and population monitoring of bird and arboreal species, including binturongs.

KEYWORDS: *Arctictis binturong*, arboreal camera-trapping, detection rate

Decimation of marine life due to plastic crisis

Peachie Dioquino-Valera

It has been reported hundreds of times before that Philippines rank 3rd in the world as Ocean Plastic Polluter. This has highlighted a lot of systemic and cultural problems in the country due to the massive plastic pollution output of such a small country.

There is now an alarming rate of cetaceans and other marine creatures killed due to plastic entanglement, ingestion, and suffocation. Not to mention that 99% of marine life (including different types of plankton) now are found to have microplastics within their system.

Philippines lacks proper waste management and this crisis is further exacerbated here due to our being a sachet economy. There is also a deficient amount of education and policy in terms of segregating waste; then couple it with our extreme usage of single-use plastic/disposables. Another challenge would be the communities who live in coastal areas. Most have reported that their areas are inaccessible to garbage collectors/trucks. This forces them to do the following to their garbage: throw them in the water; bury them; or burn them—this last act pointing to an increase of respiratory problems amongst the coastal inhabitants.

Plastic is highly connected to Climate Change due to its being a petroleum-based product. Production and disposal of this product uses up 14% of the world's oil and gas; thus, making it a very carbon intensive material. This material has a recycling life limit.

If we are to protect our Big Blue and conserve Marine Life, this is one of the issues to address.

KEYWORDS: Plastic crisis, ocean pollution, microplastics, bio-accumulation

Physicochemical, microbiological and lead level assessment of the Magapa-Suage River

Nick John B. Solar¹ and Nilo L. Masbaño²

¹ Alberto Sorongon Sr. Memorial National High School, DepEd Iloilo

² West Visayas State University

The worsening condition of Magapa-Suage River and its vulnerability to water pollution and further degradation is largely influenced by anthropogenic activities. This study aimed to determine the physicochemical, bacteriological and lead concentration of the four (4) stations specifically Station A: Brgy. Calmay, Janiuay; Station B: Brgy. Poblacion, Janiuay; Station C: Brgy. Poblacion, Mina; and, Station D: Brgy. Poblacion, Pototan of the Magapa-Suage River during dry and rainy seasons. Statistical tool employed was the mean using the SPSS version 20.0. The results revealed that the temperature was on the range of 30°C to 33°C and pH level of the river was neural and has a minimal decreased during wet season. There was a high level of Coliform and E. coli bacteria in the river which indicates that many bacteria causing diseases were present. High lead concentration was evident only during dry season. Periodic monitoring of the physicochemical, bacteriological and heavy metals concentration of Magapa-Suage River is needed. Formulated policies and ordinances in intensifying clean up drive for Magapa-Suage rehabilitation should follow the DENR standards. Schools should spearhead in disseminating information emphasizing the importance of Magapa-Suage River in cultural, social and economic aspects of people.

KEYWORDS: physicochemical, microbiological, lead level assessment

Sea turtles in the Northern Sierra Madre Natural Park (NSMNP): Local knowledge and threats

Julius Rae R. Allam¹, Joni T. Acay², Marites G. Balbas³, Merlijn van weerd³ and Jouel B. Taggug⁴

¹ Researcher

² Mabuwaya staff

³ Head of Mabuwaya

⁴ Thesis adviser

Of the seven species of sea turtles in the world, three are known to occur along the cost of Northern Sierra Madre Natural Park (NSMNP) in Isabela province. These are Green sea turtles (*Chelonia mydas*), Hawksbill turtles (*Eretmochelys imbricata*) and Loggerhead turtles (*Caretta caretta*). All these are globally threatened. This study aimed to identify local knowledge on the threats to sea turtles in NSMNP, particularly in Maconacon, Divilacan, Palanan and Dinapigue. Visual Observations, structured interviews and focused group discussions were conducted from May to August 2018. Our interviews suggest that there may be other two species present in the park, Olive Ridley (*Lepidochelys olivacea*) and Leatherback (*Dermochelys coriacea*) – the latter, reportedly seen after making its nest in Palanan. Hunting of turtles and poaching of eggs by indigenous people, legal migrants and visiting fishermen are a serious threat to sea turtles of NSMNP. Most people we interviewed know it is illegal to hunt them but law enforcement is lacking. The meat is sold for 40-80 Php per kilo, the eggs for 5 Php and the whole animal for 250- 1,500 Php. We also found three raided nest during the course of the study. Carapaces of Green sea turtles were seen displayed on the walls in houses. Beach development and quarrying were observed on some of the nesting beaches as well. Characterization of four nesting beaches was done to establish baseline information on these critically important habitats. The data gathered will be used as basis for local actions for the protection of sea turtles and their nesting beaches in NSMNP.

KEYWORDS: NSMNP, turtles, threats

Project Palaka: Ex-situ amphibian conservation in the Philippines

Norman Greenhawk

Project Palaka

Comprised of an archipelago of over 7,500 islands, the Republic of the Philippines has one of the highest rates of amphibian and reptile endemism on the planet; 80% of amphibians and 70% of reptile species in the Philippines are found nowhere else in the world. The main threats faced by Philippine herpetofauna include habitat destruction, deforestation, water pollution, overharvesting for the illegal pet trade, food, and traditional medicine. The Philippines is experiencing the conversion of wild areas to urbanized settings and large-scale agriculture.

In 2015, Project Palaka began as a Fulbright project at the University of the Philippines, Los Banos. In cooperation with the UPLB Animal Biology Division, the UPLB Museum of Natural History, and Aviron Zoo, Project Palaka housed native species of Philippine frogs from the Mount Makiling Protected Area. Specifically, the project maintained the endemic species *Platymantis mimulus*, *P. luzonensis*, *P. corrugatus*, *P. dorsalis*, *Rhacophorus pardalis*, and *Hylarana similis* in captivity.

Here, we present the outcomes of Phase I of Project Palaka, including successes, challenges, and perspectives on obstacles on ex-situ amphibian conservation that are unique to the Philippines. The current status of Project Palaka (Phase II) will be summarized, and a general roadmap for the future of amphibian conservation (both in-situ and ex-situ) in the Philippines will be presented.

KEYWORDS: Amphibians, ex-situ conservation, captive breeding

Community structure of herpetofauna in the lowland forest of Mt. Hilong-hilong, Tandag City, Surigao del Sur, Philippines

Laurence P. Albios, Romart Lloyd B. Alvero, John Carlo M. Jimenez, Jerald Kim O. Vasquez and Arturo G. Gracia Jr.¹

¹ College of Teacher Education, Surigao del Sur State University – Main Campus, Rosario, Tandag City, Surigao del Sur, Philippines

Amphibians and Reptiles are an integral part of the ecosystem since they play a vital role in its stability. However, continuous deforestation threatens the community structure of these taxa. Thus, this study was conducted to determine the species diversity of amphibians and reptiles in underexplored areas for herps research in Mindanao and assess its current status. A two-kilometer transect line, visual encounter, and pitfall trapping (320 trap-nights) were carried out to capture and document the diversity of herptiles. A total of 24 species of anurans and 22 species of reptiles were recorded. Species diversity was relatively high with a diversity index of $H' = 1.08$ and 1.297 for anurans and reptiles, respectively. Among the species, 10 anurans and 10 reptiles are reported to be endemic. Two threatened species (*Pelophryne lighti* and *Ophiophagus hannah*) and 1 Near-Threatened species (*Limnonectes magnus*) were also recorded. Another noteworthy finding was that despite the study site was situated at the lowland forest, the species *Philautus* spp., *Platymantis* spp., and *Pelophryne lighti* which were reported to inhabit high elevation were abundantly observed in the area. Major threats observed were habitat fragmentation and killing of culturally and socially perceived unlucky and dangerous species. Based on the results, Mt. Hilong-Hilong is home to various herptiles species with high species diversity. Thus, conservation measures are highly recommended to conserve and protect the wildlife in the area.

KEYWORDS: Anurans, reptiles, awasian watershed, diversity

Understanding Philippine reef biodiversity's values, decline, conservation, and future scenarios

Jonathan Anticamara, PhD

Institute of Biology, University of the Philippines-Diliman

Ecosystem Services (ES) – the direct (e.g., food and natural medicines) and indirect (e.g., cultural diversity and aesthetic values) benefits people obtain from various ecosystems – need to be assessed to aid decision makers and concerned public in creating policies that ensure continuous flow of ES to their beneficiaries (e.g., fisheries, food, income, livelihood, and traditional way of life to fishers and consumers). However, to date, ES assessments in Philippine reefs are mostly concentrated only on fisheries and tourism or on few areas in the Philippines (e.g. Pangasinan and Bohol Marine Triangle). This study fills research gaps by assessing coral reefs across 15 regions in the Philippines by estimating the following: (1) potential reef fisheries and Willingness-To-Pay (WTP) biodiversity values using underwater surveys and literature data, (2) reef fisheries value using Bureau of Fisheries and Aquatic Resources (BFAR) and literature data, (3) tourism value using Department of Tourism (DOT) and literature data, and (4) Total Economic Value (TEV). The TEV of Philippine reefs' ES amounted to 4 billion US\$/yr or 140,000 US\$/km²/yr. Furthermore, in each region of the Philippines, annual TEV ranged from 100 to 800 million US\$, with potential reef fisheries value contributing the most in the TEV, followed by reef fisheries, tourism, and WTP biodiversity values. In addition, the Visayas regions have the highest values of benefits from coral reefs. Although the Philippines is deriving millions to billions of dollars of economic benefits from coral reefs, the observed degradation and temporal decline in coastal ecosystems could lead to a decline in the potential reef fisheries value, subsequently the TEV. The Philippines need to improve accounting and managing the derived benefits from coral reefs to ensure the sustainability and continuous flow of these benefits for present and future Filipino beneficiaries.

KEYWORDS: Ecosystem services

Floristic biodiversity along an elevation gradient in Mount Sawtooth, Central Luzon, Philippines

Abigail L. Garrino¹, Bonifacio O. Pasion^{2,3}, John Michael M. Galindon^{1,4}, Mariano Roy M. Duya^{1,2}, Liza V. Duya², Perry S. Ong¹, Edwino S. Fernando^{2,5}

¹Institute of Biology, Diliman Science Research Foundation Inc., University of the Philippines Diliman, 1101 Quezon City, Philippines

²Institute of Biology, College of Science, University of the Philippines Diliman, 1101 Quezon City, Philippines

³Center for Integrative Conservation, Xishuangbanna Tropical Botanical Garden, Chinese Academy of Science, Menglun, Mengla, 666303 Yunnan, China

⁴National Museum of the Philippines, Botany and National Herbarium Division, Padre Burgos Avenue, Ermita, 1000 Manila Philippines

⁵Department of Forest Biological Science, College of Forestry and Natural Resources. University of the Philippines Los Baños, Los Baños, 4403 Laguna, Philippines

The Zambales mountain range encompasses several provinces in Central Luzon, but its biodiversity remains unexplored. This study was conducted in Mount Sawtooth, a mountain at the eastern side of the Zambales mountain range, to understand patterns of plant diversity and composition along an elevation gradient. Nine variable transects were established from 800 to 1700 m asl (100-m elevation distance), where trees, understory herbs, epiphytes and lianas were sampled. The study documented a total of 321 morphospecies under 162 genera and 87 families, of which 124 species are native to the Philippines with 36 species found only in the Philippines and nine species are Luzon island endemic. Notably, 14 species were determined to be under threat of extinction. Hierarchical Clustering on Principal Components (HCPC) analysis revealed three distinct elevation forest communities in Mount Sawtooth – lower elevation forest (800-1110 m asl), mid-elevation forest (1200-1500 m asl) and upper elevation forest (1600 and 1700 m asl), which is reflective of three of the twelve forest formations known in the Philippines: the Tropical Lowland Evergreen Rainforest, the Tropical Lower Montane Forest, and the Tropical Upper Montane Forest. The results of this study contribute information on the floral biodiversity of the Philippines and provides insights for the management and conservation of the remaining forest along the Zambales mountain range.

KEYWORDS: Forest, elevation, tropical

Future citizen scientists: Marine science camps in the Verde Island Passage

Joseph Ascalon

Executive Director, SEA Institute – Verde Island Passage

The Verde Island Passage is recognized by scientists as the “Center of the Center” of Marine Biodiversity in the world due to the number of unique species found in its various ecosystems. Increasing development and demand for resources has also led to the degradation of these ecosystems that are crucial to the livelihood and survival of coastal communities in the VIP. SEA Institute – VIP works with scientists, educators, storytellers and conservationists to raise awareness about the beauty and importance of the marine resources of the Verde Island Passage and encourage stakeholders to participate in conservation efforts.

SEA-VIP organizes Environmental, Conservation and Outdoor Camps (EcoCamps) for students and teachers to instill a love for nature and to inspire a future generation of environmental advocates and citizen scientists.

KEYWORDS: Citizen Science, marine, education

The ongoing illegal pangolin trade in the Philippines

Emerson Y. Sy and Kanitha Krishnasamy

TRAFFIC

The eight pangolins of Asia and Africa are collectively known as the most trafficked mammals in the world due to the high demand for their scales and meat. It is estimated that over 1.5 million pangolins were trafficked internationally in the last two decades. The endemic Philippine Pangolin *Manis culionensis* occurs in Palawan faunal region and has the most restricted range among the eight species. It has been assessed as critically endangered by the Palawan Council for Sustainable Development (PCSD) since 2015 and listed in the CITES Appendix I since 2016. In December 2019, the species was globally assessed as Critically Endangered by the IUCN, a reflection of the severely threatened status of the species. Despite national legislations and international regulation providing protection to the Philippine Pangolin, poaching and trafficking occur in unsustainable level. Seizure records from 2001-2017 documented 38 cases involving 667 Philippine Pangolins. In the last two years, authorities seized more than 2,000 kg of pangolin scales and we documented an unprecedented 15 retrieval cases of individual pangolins found roaming the streets of Metro Manila and nearby provinces. Market surveys and investigations conducted by TRAFFIC researchers uncovered a few restaurants in Metro Manila offering pangolin meat as a luxury food item on a pre-order basis. Wildlife authorities are urged to allocate additional resources to thoroughly investigate poaching, trafficking, and smuggling to mitigate the illegal and unsustainable exploitation of pangolins in the Philippines.

KEYWORDS: Pangolin, Philippines, trade

Blue carbon and ecosystem services: a case of small-scale fisheries in mangroves and seagrasses

T. E. Angela L. Quiros¹ and Masahiro Nakaoka¹

¹ Akkeshi Marine Station, Hokkaido University

Ecosystem services (ES) are benefits that nature provides to humans; these services change in space and time and are largely dependent on context. Here, we study whether the maximization of blue carbon stocks provided by seagrass beds and mangrove forests also benefits other types of major ecosystem services, such as provisioning of seafood, protection of coastline from disasters, and the use of mangrove/seagrass bed/coral reef for eco-tourism.

What is the value to society of seagrass and mangrove ES? What is the spatial reach and variability of each ES? To address these questions, we employed a social-ecological approach that draws from the vulnerability literature for social, ecological, and economic indicators to map ES provision in six communities from two municipalities on Busuanga Island, Palawan Province, Philippines. Second, we assess the spatial dynamics of ES provision, in relation to local beneficiaries, the local coastal community.

Using a mixed-methods approach with ecological assessments of seagrass beds, on the ground landing surveys, household interviews, and in-depth interviews with key informants, we overlay biophysical variables with social data. We are members of the Indo-Pacific Seagrass Network (IPSN) and are employing IPSN survey methods for the gleaning and invertebrate surveys and the Seagrass Watch method for seagrass surveys.

KEYWORDS: Blue carbon, ecosystem services, small-scale fisheries

Provisioning whale sharks for tourism: An overview on management and research efforts for the endangered species in Oslob, Cebu

Christine Legaspi¹, Ariana Agustines¹, Sally Snow¹, Jessica Labaja¹, Alessandro Ponzo¹, Gonzalo Araujo¹

¹Large Marine Vertebrates Research Institute Philippines, Cagulada Compound, Jagna, 6308, Bohol

The whale shark is the world's largest fish that forms predictable aggregations in tropical and warm temperate waters globally, making it a popular species for wildlife tourism. Despite the species being listed as Endangered in the IUCN Red List, tourism with this species is booming in the Philippines. Oslob, Cebu currently entertains >500,000 guests annually, making it the world's largest non-captive whale shark tourism site. The sharks in Oslob are provisioned daily, year-round, with unknown long-term consequences. The tourism began in late 2011 by the Tan-awan Oslob Sea Warden and Fishermen Association (TOSWFA), a group accredited by Oslob's local government. Since then, only minimal action has been taken for best practices despite >500M PHP gained from yearly ticket sales. This study presents results of >7 years of research efforts, including daily in-water work and visitor and community surveys in Tan-awan towards whale shark conservation and improvement of tourism management. From these results and best international practices, recommendations were made and shared to the local government unit of Oslob and TOSWFA, as well as other local and regional stakeholders. It is imperative that the welfare of the host species, the satisfaction of tourists, and the benefit to the local community are carefully considered when engaging in tourism with an Endangered and protected species.

KEYWORDS: whale shark tourism

Genetic and genomic approaches to biodiversity research in Philippine seas: Implications for management and conservation

Rachel June Ravago-Gotanco
Marine Science Institute, University of the Philippines – Diliman

Advances in DNA sequencing technologies have transformed biological study. Genetic and genomic approaches are now widely applied towards assessments of biological diversity, to characterize diversity across all levels of organization, from individuals, to populations, species, communities and ecosystems. Applications of molecular approaches to uncover biological diversity, characterize distribution patterns and their driving forces, and provide insights on functional significance of genetic diversity, are presented for several marine organisms of management and conservation concern. New developments and avenues for research are particularly relevant to support resource management and conservation initiatives for vulnerable and threatened marine organisms and ecosystems.

KEYWORDS: DNA sequencing, genetic diversity, genomic studies

CONFERENCE PHOTOS



