# THE RUFFORD SMALL GRANT CONFERENCE SOUTH AMERICA



CENTRO DE INVESTIGACIONES MARINAS DE QUINTAY

QUINTAY | CHILE













Welcome words from the Organization Committee representative:

On behalf of the Organization Committee (OC) and our partners, we would like to extend you a warm welcome to Quintay for the **Rufford Small Grant Conference South America, Chile 2015**. Quintay is a small town that was known as one of the primary areas for whale hunters during the midcentury in Chile. Nowadays, the town is well recognized due to the implementation of successful marine management initiatives through the direct collaboration between Centro de Investigaciones Marinas de Quintay (CIMARQ) and local fishermen's community. Its key role recovering marine resource populations has contributed to understand how crucial is to build capacity within local communities in order to improve marine conservation and resource management at diverse levels of organization.

We are grateful for the effort of by the OC and collaborators to organize the conference as well as for the support of The Rufford Foundation and Universidad Andres Bello through CIMARQ. Most of all, we appreciate your participation and willingness to share your ideas and expertise here.

We believe you will find the conference program most stimulating and your attendance at this conference most worthwhile. This occasion program is full of interesting papers, posters, and plenary talks, and we are confident all will generate spirited discussions, new connections, and future collaboration. Finally, we hope you will develop a greater awareness of the recent progress that has been made in the field of conservation, ecology, biodiversity and resource management and the challenge we still face.

Once again, welcome to The Rufford Small Grant Conference South America, Chile 2015 and we send our best wishes for stimulating and rewarding experience.

Conference Organizer Chair Luciano Hiriart-Bertrand Costa Humboldt Chile WEDNESDAY 27

| 9:30 - 10:45  | REGISTRATION   |  |  |
|---------------|--|--|--|
| 10:45 - 11:00 | WELCOME<br>Luciano Hiriart Bertrand, Costa Humboldt, Chile<br>Ariel Orellana, Universidad Andrés Bello, Chile  |  |  |
| 11:00 - 12:00 | PLENARY TALK<br>Gonzalo Medina, Dean Facultad de Ecología y Recursos Naturales, Universidad<br>Andrés Bello, Chile   |  |  |
| 12:00 - 12:20 | <b>PRESENTATIONS</b><br><b>FLAVIA MAZZINI:</b> Domestic cattle as drivers of Andean Subtropical Rainforest<br>(Yungas) dynamics  |  |  |
| 12:20 - 12:40 | <b>MICAELA CAMINO:</b> Design of a conservation landscape for a portion of the semiarid Argentinean Chaco, based on habitat requirements of five large-mammal species                      |  |  |
| 12:40 - 13:00 | Naylien Barreda: Science-community: The conservation of snakes from Fazenda Barra do Eta and Barrio Guapiruvu, Mata Atlântica, São Paulo, Brazil   |  |  |
| 13:00 - 14:30 | LUNCH BREAK  |  |  |
| 14:30 - 14:50 | <b>Andrés Vlenzuela-Sánchez:</b> Chytridiomycosis and conservation of Darwin's frogs ( <i>Rhinoderma spp</i> )   |  |  |
| 14:50 - 15:10 | MARINA ARBETMAN: Alien parasites co-introduced with invasive bumblebees, as potential cause of the ecologogical replacement of <i>Bombus dahlbomii</i> in Patagonia, Argentina             |  |  |
| 15:10 - 15:30 | ELIZABETH CHANG: Disease transmission risks from exotic to native deer in National Parks of Northern Patagonia, Argentina  |  |  |
| 15:30 - 15:50 | <b>SANDRA FLECHAS:</b> Does the microbial community in Andean frogs affect pathogen dynamics?  |  |  |
| 15:50 - 16:10 | COFEE BREAK  |  |  |
| 16:10 - 16:30 | <b>VIVIAN ZEIDEMANN:</b> Socioecological heterogeneity shapes Brazil nut contribution to household income in an Amazonian extractive reserve: implications for long-term reserve viability |  |  |
| 16:30 - 16:50 | <b>JUAN EMIRO CARVAJAL COGOLLO :</b> Effects of the transformation of the landscape on the reptiles in the region of Colombia Caribbean  |  |  |
| 16:50 - 17:10 | MARIA JOANA SILVA: Burning for sustainability: determinants of firewood consumption in a fragmented landscape of atlantic forest of Brazil   |  |  |
| 17:10 - 17:30 | <b>René Reyes:</b> The firewood dilemma: human health in a broader context of well-<br>being in Chile  |  |  |
| 17:30 - 17:50 | <b>ALIANA PINEIRO:</b> A community-based approach to the management, restoration, and delineation of buffer zones in Napo, Ecuador   |  |  |
| 17:50 - 18:10 | JULIAN PADRÓ: Local community and protected areas: arthropods survey in arid<br>environments of the north-west Argentina, in the context of a field school                                 |  |  |

20:00 - 22:00 Poster Session & Ice Break Coctail



#### **THURSDAY 28**

| 9:00 - 10:00  | PLENARY TALK   |
|---------------|--|
|               | Gustavo Chiang: Scientific Director, Melimoyu Research Institue (MERI)   |
|               | Presentations  |
| 10:00 - 10:20 | <b>FRANCISCO FONTÚRBEL:</b> Effects of habitat transformation on the ecological dynamics of pollination and seed dispersal mutualisms  |
| 10:20 - 10:40 | <b>Joseph Sarvary:</b> Ecological study of the endangered White-winged Nightjar ( <i>Eleothreptus candicans</i> )  |
| 10:40 - 11:00 | <b>Max Hirshfeld:</b> Biotelemetry of juvenile Blacktip Sharks and the conservation of key nursery habitats in the Galapagos Archipelago   |
| 11:00 - 11:20 | <b>ROBERT LAMB:</b> Fish diversity and ecosystem function in the Galapagos marine reserve: what drives it and where is is most vulnerable to fishing and Climate Change?                     |
| 11:20 - 11:40 | COFEE BREAK  |
| 11:40 - 12:00 | <b>LUCIANO HIRIART-BERTRAND:</b> Using scientific-based approaches to promote the establishment of a Marine Protected Area for threatened Humboldt and Magellanic penguins in Southern Chile |
| 12:00 - 12:20 | <b>JAVIER OÑA:</b> Coding the art of Humpback whale songs ( <i>Megaptera novaengliae</i> ) off the coast of Ecuador.   |
| 12:20 - 12:40 | Adriana Salinas: The Bolivian river dolphin ( <i>Inia boliviensis</i> ): ambassador for conservation in the northeastern part of the Amazon basin  |
| 12:40 - 13:00 | <b>DALIA BARRAGÁN-BARRERA:</b> Isolated in the Caribbean: conservation status of Bottlenose dolphins in Bocas del Toro, Panama   |
| 13:00 - 14:30 | LUNCH BREAK  |
| 14:40 - 16:50 | <b>WORKSHOP</b><br>Evaluate the implementation of regional efforts to improve marine and land<br>conservation through community and scientific-based management                              |
| 16:50 - 17:00 | COFEE BREAK  |
| 17:00 - 18:00 | Workshop Group Presentations   |
| Friday 29     |  |
|               |  |

9:30 - 15:00 FIELD TRIP Pelagic trip to the common SeaLion (*Otaria flavencens*) colony in Punta Curaumilla, Valparaiso, Chile

#### 15:30 - 15:45 CLOSING CEREMONY

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#### **POSTER PRESENTATIONS**

DIEGO R. GONZÁLEZ ZEVALLOS, PABLO YORIO, OSCAR E. BIAGIONI Y ALEJANDRO GATTO: Magellanic Penguin diet requirements and its relationship with commercial fisheries: a case study in Golfo San Jorge, Patagonia Argentina Galapagos Archipelago.
 VICTORIA RODRÍGUEZ, ANDREA MARINO, GUSTAVO PAZOS: On sustainable grazing and the conservation of Patagonian rangelands: Self-regulation of population density by free-ranging guanacos.

MICAELA CAMINO, SARA CORTEZ, IVANA GHIONE, HUGO HERNANDO CORREA, MARIANA ALTRICHTER, SILVIA DIANA MATTEUCCI : Local participation in wildlife monitoring, Criollos and Wichis monitor medium-sized and large mammals in the Argentinean Chaco

Marisol Hidalgo Cossio : Andean forest conservation and small mammals in Bolivia

Adriana Mireya Salinas Mendoza : The Bolivian river dolphin (*Inia boliviensis*): ambassador for conservation in the northeastern part of the amazon basin

**FERNANDO DÍAZ, ANDREA CONTRERAS, JIM JOHNSON :** Diademed sandpiper plover (*Phegornis mitchellii*): conservation and research of a rare Andean shorebird in central Chile

**FRANCISCO E. FONTÚRBEL, DANIELA A. SALAZAR & CAREZZA BOTTO-MAHAN :** Tracking the monito del monte (*Dromiciops gliroides*) on native and transformed habitats: consequences for seed dispersal northeastern part of the amazon basin

VIRGINIA MORENO & <u>ANDRÉS CHARRIER</u>: Conservation of *Telmatobufo bullocki* in fragmented forests of Nahuelbuta

<u>RICARDO SARMIENTO-DEVIA</u> & CHRIS HARROD: Apparent reduction in sea turtle abundance in Antofagasta bay (Chile)

JUAN EMIRO CARVAJAL COGOLLO: Direct impacts caused by human communities on the reptiles in the Colombian Caribbean

<u>JAVIER Oña</u>, ELLEN GARLAND, JUDITH DENKINGER: Southeastern pacific Humpback Whales (*Megaptera novaeangliae*) and their breeding grounds: distribution and habitat preference of social groups off the coast north of Ecuador

**ROBERT LAMB**: Churos, barnacles, and boundary currents: using biological oceanography to set conservation priorities in coastal Ecuador

Julio Vasquéz: Plant Your Future: Financially Sustainable Agroforestry Systems and payments for ecosystem services in Loreto and Ucayali - Peru

**ELENA CASTIÑEIRA, A. CANAVERO, M. ARIM & M. L. POTCHETTINO:** The botanical medicinal knowledge in a priority area for the biocultural conservation in Rivera, Uruguay

GABRIEL ROCHA: Biology and ecology of yellow cardinal (Birds, Thraupidae) in Uruguay

<u>Carlos Valeris,</u> Lucy Perera-Romero, Elso Espinoza, Orlando Rodríguez & Williams Sarmiento: Abundance and records of Paleosuchus trigonatus (crocodylia: alligatoridae) in Erebato river basin, Venezuela.

Carlos Valeris, Lucy Perera-Romero, Ramón Jasatao, Manuel Asatali, & Hernán Castellanos: Reproductive aspects of *Paleosuchus trigonatus* (Crocodylia: Alligatoridae) in Erebato river basin, Venezuela.

The Rufford Small Grant Conference South America was held by Costa Humboldt and the Centro de Investigaciones Marina de Quintay (CIMARQ) of the Universidad Andres Bello sponsored by The Rufford Foundation. The coastal town of Quintay was the perfect place to host grantees from diverse countries in the continent.

The RGS programme, offers grants to support a variety of environmental and conservation projects, involving both endangered species and ecosystems. In South American, it has been granted 724 projects, which include important contributions to Argentina with 187 projects, Brazil with 126, Peru and Colombia with 91 and 86 respectively, Chile with 56, Uruguay 52, Ecuador 47, Bolivia 44, 26 to Venezuela, Guyana 4 and Paraguay only 2. As a result, numerous initiatives have achieved significant impacts at different levels of organization. Since the creation of a whale sanctuary in Uruguay, the creation of a Marine Protected Area in Chile to protect feeding areas of Blue Whales, to the identification and description of the bacterial diversity associated with several groups or ecosystems. On the other hand, they have sponsored important projects to protect endangered animal species, such as the north-eastern Peruvian amazon giant otter, native deer species in Argentina's Patagonia or the Pacific's Ocean black marine turtle.

It is noteworthy that the history of such meetings began the year 2012. To date, it has been held 15 encounters across the world, including Armenia, Nepal, Bolivia, Peru, Cuba, India, Kenya, Bali, Indonesia, Myanmar, Rwanda, Madagascar, Mexico, South Africa, Vietnam, and finally Chile.

The purpose of this meeting was to learn about the issues and initiatives that our region is facing, and in consequence served as a cornerstone on the development and transfer of knowledge. It also we focused building a platform to creates opportunities for discussion aimed to improving our regional communication skills and foster transnational initiatives in order to achieve integrated and increase our efforts to generate greater impact.

#### The importance of sharing experiences

The Rufford Foundation promotes dialogue among their beneficiaries by organizing the RSG Conferences in different regions. This year the event was held in Chile for the first time and received participants from Argentina, Brazil, Bolivia, Chile, Colombia, Ecuador, Venezuela, Paraguay, Uruguay and Peru. RSG's beneficiaries, which are mainly scientists from academic institutions, presented their projects and talked about the importance of having the kind of support The Rufford Foundation offers, in order to face the endangerment of species and ecosystem in our continent.



The reunion began with an opening speech from Luciano Hiriart-Bertrand, founder and Executive Director of Costa Humboldt. During his speech, Mr. Hiriart-Bertrand highlighted the importance of the conference "as a way of promoting the local and regional conservation efforts which take place in our continent". In representation of the Andrés Bello University, Dr. Ariel Orellana welcomed the participants by pointing out the advantages "to be able to share, exchange and create useful bonds for scientific work". The first part of the event ended with the presentation of the Dean of the Faculty of Ecology and Renewable Sources from the same academic institution, Dr. Gonzalo Medina. During his conference the professor showed how he did get started in his research about natural and human factors that have had an impact on the decrease of Chilean native's otters population. His speech focused on the importance of having financial aid to get started on a long lasting project.

During the event, thirteen participants exposed their research work along with some of the results of their fieldwork. PhD student Micaela Camino, from the University of Buenos Aires, showed for example, her work in designing conservation plans for endemic mammal in Argentinian Chaco.

Chilean grantee, Andrés Valenzuela-Sánchez, exposed some results on his research on Darwin's frog, showing its disappearance is most likely to be the result of a fungus associated disease, rather than the action of human presence. However, the focus of presentations wasn't only focused on endangered animal species conservation plans. The problem of environmental preservation and its effect on local population were also approached. Brazilian student, María Joanna Silva, showed her work, which aims to mitigate environmental impact by educating local communities on how to consume their natural resources on a sustainable way.

#### The impact of RSG

As a great number of RSG's beneficiaries are young Scientifics starting their research careers, it is important to enhance the impulse given by The Rufford Foundation to finance projects that otherwise wouldn't be possible to conduct. It is the case of German student living in Ecuador, Maximilian Hirschfeld, from the Galápagos' Science Centre, who explained that the grant allows him to finance important expenses associated with his extremely touristic fieldwork in the Galapagos', "where the rent of a boat to go to open waters may cost up to 500 dollars". For Dalia Barragán Barrera, from Macuáticos Colombia Foundation, the key advantage of these grants is that it gives a chance to young researchers. "Usually when someone is starting in the research field is very .

difficult to get financial aid. It is difficult too, when nobody knows you as a researcher, your work about an unknown subject or your work about species that are not particularly endangered. So The Rufford Foundation is really important for us. It gives us the first support to make conservation science".

North American grantee, Aliana Piñeiro, who came representing Runa Foundation from Ecuador, highly recommended applying for this grants "because there is a huge chance to get financial aid in order to study different areas and work within scientific and social structures". Hirshfeld did have a similar opinion: "The best part of this grant is that it covers a large margin of projects, with very different study subjects like, macro biology, applied conservation, education and scientific education. This makes the grants very interesting because they confront all sorts of conservation issues, it doesn't matter whether it is about big species or small ones".

Finally, Josh Cole, Grants Director de The Rufford Foundation, who travelled especially to Chile to participate in the conference, highlighted the importance for "researchers who work on the same species or in similar areas, to have the opportunity to share valuable information between them". That was exactly the spirit of this group of Latin-American beneficiaries during those three days: nurture themselves with valuable information that will lead to preserve the flora and fauna of the continent.



Figure 1. Participants of The Rufford Small Grant Conference Southamerica 2015, Quintay, Chile



#### About the workshop

The workshop "Evaluate the implementation of regional efforts to improve marine and terrestrial conservation through community and scientific-based management" served as an instance for participants to be asked about their personal reflection on three main aspects; the possibility of build integration between the field of knowledge and scientific research. It also focused on understanding the influence and the link among

society and communities in order to strengthen the prospects for sustainable development and environmental conservation effots. Thus, the workshop discussion focused on priorities for evaluate interaction of current programs with local communities and appropiate methodologies. The format included presentations of current knowledge by Organization Comitte members, small break-out sessions to consider emerging ideas, and plenary discussion to synthesize findings.



Figure 2. Break out group discussion session

Throughout the activity, diverse themes were analysed. Basically, it was possible to collect ideas and suggestions to produce concrete Regional Biodiversity Network (RBN) recommendations, question of scientific and societal concern that should guide RBN design and implementation, integration of observations and understanding across spatial and temporal scales, and merging knowledge from various methods. Finally, this workshop aimed to promote the creation of a RBN, based on the active participation of representatives from organizations, universities and governmental agencies from diverse countries of South America.

#### Break-out groups structure and questionnaire

Break-out groups focused on responding three main questions to characterize the full scope of biodiversity conservation through community using scientific-based approaches. We provided the following question in addition with summarized responses.

# 1. What links -activities and initiatives- can be established between the scientific community, society and communities to strengthen rational natural resources uses and conservation of biodiversity in the region?

This dimension is characterized by the identification of opportunities for collaboration with the communities from strengthening the interest of the scientific community in the nature of local knowledge and the possibility of working with communities together



Figure 3. Break out group discussion session

with scientific work in the same way. Furthermore, raises the opportunity to build partnerships with local communities through collaboration and exchange of knowledge for the generation of sustainable development initiatives and conservation of ecosystems. In addition, this workshop presented an opportunity to strongly integrate scientific knowledge in different instances of outreach and education ecotourism initiatives, talks

and instances of dialogue and knowledge transfer to its incorporation in mass media or thematic festivals. RBN also focuses on creating instances of collaboration among the academia, local communities and the private entities, from identifying opportunities for local development alternative that allows the conservation of natural resources, to obtaining financial resources through initiatives such as ecotourism, education or marketing of products that are sustainable and support conservation and community development.

Break-out groups proposed a sequence of recommendations to face the lack of initiatives associate with the link between scientific community, society and local communities:

- Strengthen the exchange of knowledge by creating spaces of interaction
- between parties and stakeholders;
- Achieve integration of audio visual broadcast content (TV shows, stories, etc.) attractive, depending on the working group;
- Integration of scientific content into school curriculum;
- Develop interaction in the generation of knowledge from the community, training and validation;
- Building capacity through training efforts for ecosystem services and trai ning for people on the impact of people on biodiversity and natural resources;
- Involving the community in research and conservation projects to give continuity and connection;
- Conducting talks and field activities to promote scientific dissemination around conservation initiatives;
- Conduct training in local communities to support monitoring of species or areas of research;
- Strengthen management capacity and funding sources identification;



- Development and implementation of tools and systems that contribute to the economy of local communities through the sustainable use and care of their bio diversity;
- Integrating traditional knowledge local, with scientific knowledge (workshops);
- Use traditional mechanisms to achieve goals (through the local view);
- Provide a service / product through science / conservation that can be attractive to individuals;
- Improve communication skills with local communities;
- Identify and enforce participation of local leaders and train local people to selfmanagement, strengthen resilience through empowerment of many;
- Keep a database of conservation projects (national museums, institutions, etc.);
- Production of documentaries, outreach and education materials, which conside red the community as part of the ecosystem;
- Involvement of local communities in the process of research and/or conservation;
- Build partnership between academia, NGOs and local communities, while the NGOs must be supported and connected with industry and government;
- Link between the scientific community and local communities through society
- as a whole, through various initiatives and from a diagnosis and tracking of prior knowledge of the community;
- Dissemination of knowledge in a dynamic, accessible and entertaining;
- Developing ecotourism initiatives;
- Support the development of volunteer participation within communities;
- School curriculum should incorporate traditional elements of their environment, strengthening the educational link;
- Integrate communities in educational programs at all levels of organization, from the school to the community;
- Participation of researchers in outreach established (i.e., science week);
- Generate dialogue with local and national policy makers; and
- Strategies that give value to biodiversity and natural resources.

One of the most valuable approaches to improve RBN successful actions is to focuses on collaboration between academia and society. Mainly, characterized by starting with appropriate contacts with decision-makers in order to achieve conservation efforts. Thus, researchers must understand the communities' needs within the ecosystem. Therefore, NGOs should focus on making the link bridge between politicians, academics and rural communities . Furthermore, to achieve efficacious initiatives, scientific information must be translated into common language to insert it into the media. This makes it possible to attract the interest of society and life sciences communities from an economic, ideological and/or cultural interest. Finally, it also recommended gaining

the confidence of communities based on respect for their traditional knowledge, so as to recognize the complementarity of them with scientific knowledge. Thus a collective work under which that can define the solution of the problem from different looks possible. This allows for continuity and confidence allowed by ties that are strengthened over time.

# 2. What support can be mobilized in favour of strengthening and realization of these initiatives?

Participants recognized the lack of opportunities to generate networks oriented to transfer knowledge and to empower local communities for conservation initiatives, in

addition with the creation of multidisciplinary groups. It is recommended that working with communities require the consideration of including professionals from diverse disciplines to strengthen the capacity of communication, dissemination and linking projects to society.



Figure 4. Break out group discussion session

It was also highlighted the complex scenario to generate partnerships between academia, private world, local political leadership and NGOs. In order to create regional networking groups, it appears critical to identify strategies for financial support basically for dissemination of projects. The need to develop sources of information and sharing specific knowledge, through databases and encounters based on the dissemination and collaboration spaces that can also mobilize volunteer and organizations also should be increases.

Among the main supporters to mobilize mentioned:

- Achieving a virtual space for the transmission of linking strategy/outreach, and content with its positive and negative results;
- Spaces for encounter and collaboration between scientists in related topics, that allowing to cultivate and maintain formal and informal links with authority;
- Incentives for participation in dissemination/disclosure for scientists;
- Databases with specific dissemination material
- Support and assistance in the design of broadcast content with graphic designers, sociologists, lawyers, etc.;
- Support of scientists to share laboratories, equipment, and research platforms;

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- Building a virtual space where scientists publish their equipment at their disposal;
- Incentives for publication in local scientific journals;
- Raise the added value of product: links with foreign economies, training, technology use and access;
- Legal/bilateral agreements;
- Mapping of all stakeholders of worldwide issues;
- Find points of shared values;
- Knowing what the media who come to the community approach are;
- Involving local people and a focus group to stay in place (constantly present);
- Enhance human resources on economic;
- Achieve mutual support with other NGOs with similar national and international visions;
- Gain support of local leaders;
- Access to sources of volunteers among youth institutions (colleges, universities);
- Access solvents figures like politicians and public figures;
- Access to research funds, regional development to be directed toward conservation initiatives;
- Obtaining international political commitments;
- Establish databases with diffusion material;
- Dissemination sessions dissemination strategies and/or or links;
- Environmental activities designed for youth education and community members in monitoring conservation projects;
- Environmental education should be included as part of the course (educational curriculum);
- It is necessary to cycle based on the human dimension of scientific research, based on interviews with tools such as communities, from this understanding their vision and then to systematize that knowledge;
- It is necessary to cultivate mutual trust for working together with other scientific and social institutions, but this requires investment in time resource;
- It is necessary to influence the education system to achieve a paradigm shift in relation to the value of conservation and its relationship with science;
- From the perspective of the economy it is necessary to give value to influence the environment, in terms of establishing a "Fair Trade" appealing to the consumer's responsibility;
- Establish adaptive management to the communities and resources;
- Establish multidisciplinary conservation initiatives;
- Establishment of formal and informal networks of collaboration;

- Relying on networks to improve communication strategies;
- Take advantage of technology and mass communication media platforms;
- Develop work in interdisciplinary groups also consider traditional knowledge, allowing a holistic work; and
- The initiatives should seek to be sustainable for integrating communities and ensure the continuity of research and conservation programs.

# 3. What are difficulties and obstacles in the implementation of these initiatives?

This analysis refers mainly to issues related to the absence of communities' participation on research activities and involvements in develop conservation initiatives. At the same time, the importance of bridging links between academic communities and political decision-making, which represents an area where scientists have not explored due to lack of interest or competence mentioned. Moreover, the deficiency of human and financial resources, coupled with limited and demanding scientific work impedes investment of this resource in improving partnerships with the community mentioned time. Finally, the nonappearance of training and interest from scientists in communication, dissemination and linkage of scientific projects among stakeholders and the communities in which the research and conservation initiatives mentioned develop.

Main difficulties recognized:

- Lack of knowledge of the local reality;
- Lack of communication and knowledge of the tools and resources available;
- Lack of interest of local authorities and communities;
- Low profile of participation in the dissemination and linkage systems in science and technology;
- Unwillingness to perform scientific meeting spaces with the authorities;
- Lack of coordination and continuity of government institutions;
- Lack of training of officials, species and resources;
- Lack of training in outreach and linkage;
- Gossip against conservationist;
- Lack of history, heritage and link to the place, recent settlers;
- Assume that everyone in a community have the same priorities, belief etc.;
- Seek to implement a common goal through different techniques, actions and individualized for each site;
- Lack of economic alternatives for the local community;
- Support from governments for productive activities on those focused on conservation, given the scarcity of strategic vision on sustainability;



- Ego"of scientists;
- Lack of interest from local communities;
- Attitudes, beliefs and negative values with conservation projects;
- Lack of control;
- Lack of technical skills of communication and dissemination by researchers;
- Lack of a long-term perspective;
- Scarcity of resources to address scientific activities and more so associated with conservation;
- Threats from the industry;
- Researchers believe it is not part of their job disclose their results;
- Researchers who do their own principles, are not always able or do not have the necessary tools;
- Time researcher, local situation (cost of living);
- Lower Local resource assessment of the species;
- Framework of the project within a working group versus individual work;
- Stakeholders get support, recognizing the value of the participation of each of the stakeholders;
- The main obstacles are in the bridge contact between academic and political, in the sense of achieving government control in protected areas, so the problem is political rather than technical or quality of information;
- The main obstacles are given by ignorance and conflicts of interest, given that the objectives of preserving, understand and protect are not possible to achieve without political, so that the existence of neutral intermediary, represented by NGOs is necessary;
- Variable Shortage of time and economic resources;
- Shortage of political will and financial support;
- Shortages will of the large landholders;
- Limited funds for periods not exceeding one year or two whose continuity is not guaranteed;
- Changing community leaders;
- Failures in effective communication among researchers;
- Lack of understanding of the needs and interests of the community; and
- Excessive government bureaucracies to perform initiatives.





# PATAGONIA: CONSERVATION THROUGH COOPERATION

# G. Chiang

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Northern Patagonia covers two distinct ecoregions: the Chiloean Ecoregion, which runs until the Taitao Peninsula, and the Channels and Fjords of the South of Chile Region, extending South to Cape Horn. Chilean Patagonia is a hotspot of biodiversity with unique geological (volcanos) and physical (high orographic precipitation rate) characteristics and little influence from industrial development, making it an ideal area to study Chilean marine ecosystems. In order to understand and protect this unique environment, Fundacion MERI has developed a research program that puts emphasis in conservation of Patagonian ecosystems and international cooperation. For the past 4 years, Fundacion MERI has been involved in numerous research projects, from studies on the ecological behaviour ofone of the biggest and most charismatic animal in the world, the Blue whale (Balaenoptera musculus) to the conservation status of one of the tiniest and less known, Darwin frog (Rhinoderma darwinii), from natural ecology to human impact on aquatic food web.

Blue whales were once abundant in the Southern Hemisphere, but commercial whaling hunted them to near extinction in the previous century. This species is currently listed as endangered on the IUCN Red List of Threatened Species. As a feeding and nursing ground, the Chiloé-Corcovado region in Chile is one of the most important areas in the Southern Hemisphere for blue whales. Understanding the seasonal variation in the abundance of this and other cetaceans, along with the possible effects of shipping traffic and noise pollution is crucial for population management and conservation. On the other hand, chytrid fungus is a worldwide concern for amphibians, including our Patagonian Darwin frogs. Their population status in Chile, along with the health of the different populations has been under recent study. MERI hopes to understand the frog's ecology and health status, hopefully providing tools for proper conservation. Finally, while there are many studies examining mercury (Hg) and its trophic transfer in Northern aquatic ecosystems, much less information is available for the southern hemisphere. Melimoyu Bay is an isolated coastal environment within the influence of the Melimoyu volcano and the Marchant River whose headwaters originate from a glacier in the volcano. Mercury dynamics through the food web are currently being studied and will help to understand how humans have altered mercury natural cycling.

This are just part of the studies Fundacion MERI is involve in. We emphasise the need of collaboration on research to ensure knowledge and conservation of Patagonian unique ecosystem.

- QUINTAY CHILE | 27-29 MAY 2015 -

# FROM CONTINENTAL DISTRIBUTION AND PHILOGEOGRAPHY TO THE EFFECT OF INFECTIOUS DISEASE AND ALIEN INVASIVE NORTH AME-RICAN MINK. THE DISCOVERY OF THE CAUSES IN THE DECREASE OF THE SOUTHERN RIVER OTTER AND THE MARINE OTTER POPULATIONS IN CHILE.

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No so many times it is possible to put together such a great number of committed scientist, student and national as well international continued financial support for more than 28 year behind one goal: The discovery of the negative environmental variables that are responsible of the population decline of two cryptic semi-aquatic carnivores. Which has resulted in an important number of high guality publications, incorporation in all environmental impact assessment the need of conservation of both species, and even the born of new environmental movements. This is the story that started in 1987 in the south city of Valdivia. The southern river otter (Lontra provocax) populations now are distributed in least than the 10% of the original distribution in freshwater habitats, and least than the 1% is protected by National Parks or Reserves. Populations in marine habitat are genetically distinct from those of freshwater habitats. Mink (Neovison vison) is affected by the presence of good populations of river otter, and so the improvement of their populations can help in the control of alien North American minks. Unfortunately river otter are highly vulnerable to infectious disease like Parvovirus and Canine Distemper Virus, Leptospirosis and Toxoplasmosis. Pathogens that are present in the otter habitat. In contrast, marine otter (Lontra feline) are increasingly affected by the fragmentation of the natural discontinuity of the rocky seashore due the increase of human activity associated to sandy beaches. In fact humans compete for preys and habitat with marine otter. To save both species of otters it is need of a new approach in conservation, this is conservation in great scale or regional conservation, the build of a network of protected areas communicated by a friendly matrix. These researches have been financed by: The Rufford Small Grant, Idea Wild, Frankfurt Zoological Society, The American Society of Mammalogy, Univeridad Austral de Chile, Univeridad Andrés Bello, The Earthwatch Institute, and Project FONDECYT N°1100139.

*Key words*: Southern river otter, Marine otter, environmental negative variables, population decline, network of protected areas, friendly matrix



#### SOCIOECOLOGICAL HETEROGENEITY SHAPES BRAZIL NUT CONTRI-BUTION TO HOUSEHOLD INCOME IN AN AMAZONIAN EXTRATIVE RESERVE: IMPLICATIONS FOR LONG-TERM RESERVE VIABILITY

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Protected areas characterized by human-ecosystem interactions represent the fastest growing type of conservation units worldwide. One type, termed extractive reserve, explicitly promotes sustainable use of natural resources by reserve residents. This reserve type is concurrently expected to sustain subsistence and cash economies of reserve residents, often through use of non-timber forest products (NTFPs). Brazil nut (Bertholletia excelsa), due to its basin-wide distribution, significance in global markets, and potential for sustainable use and forest conservation, has played a key role in designation of many Amazonian reserves, such as our study site, Riozinho do Anfrísio Extractive Reserve (RDAER). Yet, do the benefits of this and other NTFPs extend to all extractive reserve residents? We employed a livelihood survey, structured interviews, and forest inventories, randomly sampling the widely dispersed households and corresponding forests across the three regions of the reserve. Our results demonstrate significant social and ecological heterogeneity within RDAER, detecting differences in Brazil nut stand access, individual tree characteristics (including the important variable of fruit production), stand and tree management, and multiple household characteristics that shape resident investment and dependence on NTFPs. As a consequence, contribution of Brazil nut to forest-based income also varied within RDAER. These findings indicate that if Brazil nut and other NTFPs are used as a tool to reconcile conservation and development in RDAER and other forest communities, then policies that aim to regulate and promote NTFP use need to take into account the socioecological heterogeneity that is inherent in these forest products and within reserve polygons.

*Key words*: Amazon, *Bertholletia excelsa*, Conservation, Non-timber Forest Products, Livelihoods.

#### - QUINTAY CHILE | 27-29 MAY 2015 -

# CHYTRIDIOMYCOSIS AND CONSERVATION OF DARWIN'S FROGS (<u>Rhinoderma spp</u>.)

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The chytridiomycosis, an emerging disease caused by the chytrid fungus Batrachochytrium dendrobatidis (Bd), has been associated with the alarming population decline and extinction of many amphibian species throughout the world. In Chile, the presence of Bd infection has been described in exotic and native anuran species, from north to south of the country. In this work, we present historical and current evidence of Bd infection in Darwin's frgs (*Rhinoderma spp*). Retrospective data showed Bd infections occurring between 1971-1978 in both R. rufum and R. darwinii. Our results suggest that the population decline observed in Rhinoderma spp is associated with chytridiomycosis. Longitudinal epidemiologic data from nine wild populations of R. darwinii showed higher prevalence (~30%) in northern populations. The effects of Bd infection over survival probability and population dynamics are discussed. Moreover, we described the first Bd strain isolated from wild anurans from Chile. Morphological aspects of this strain are presented. Finally, we show our experience in amphibian conservation education including results from talks, meetings, exhibitions, documentary filming, rescue and the publication of a book related with conservation of Chilean amphibians.

*Key words*: Amphibians, *Batrachochytrium dendrobatidis*, emerging diseases, Rhinoderma.



# THE BOLIVIAN RIVER DOLPHIN (<u>Inia boliviensis</u>): AMBASSADOR FOR CONSERVATION IN THE NORTHEASTERN PART OF THE AMAZON BA-SIN

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The Bolivian river dolphin (Inia boliviensis) is a charismatic and endemic cetacean from the up Madera basin. This species is relatively well protected in the Bolivian Amazon; however it is very vulnerable due to two reasons: (a) in contrast with Inia geoffrensis, total population size of I. boliviensis is low; (b) the construction of hydropower stations (Jirau and San Antonio) on the Madera River is a major threat for this species. The objectives of the present study are (a) to evaluate distribution patterns of the Bolivian river dolphin in the northern Amazon; (b) to evaluate the role that rapids and water falls in the Mamoré-Madeira basin play for the distribution of the species; (c) estimate the impact of hydropower construction on the distribution and abundance of the species; (d) adjust the national conservation plan of Inia boliviensis. A total of 482 Km were sampled across five different rivers: Mamoré (70 Km) and 6.3 Km in the Santa Cruz lake, Madera 55.35 Km, Abuna 90 Km, Negro 32 Km and Yata 228.2 Km and the relative abundance were 0.35, 0.02, 0.12, 0.2, 0.6 dolphin/Km respectively. Physical and chemical data were also collected. This study provided important information about the population status in one of the most important areas of distribution of the species and contributed to formulate conservation strategies for the species in the National Action Plan of Conservation for Inia boliviensis.

Key words: Inia boliviensis, cetacean, conservation, Madera basin.

- QUINTAY CHILE | 27-29 MAY 2015 -

#### ALIEN PARASITES CO-INTRODUCED WITH INVASIVE BUMBLEBEES, AS A POTENTIAL CAUSE OF THE ECOLOGICAL REPLACEMENT OF BOMBUS DAHLBOMII IN PATAGONIA, ARGENTINA

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Invasive species and emerging diseases are major threats to biodiversity. Since the introduction of European bumblebees Bombus ruderatus and B.terrestris into Chile last century, a strong decline of *B.dahlbomii* is perceived. This is the only native bumblebee species of the temperate forests of southern Argentina and Chile, where plays a key role in the pollination of native flora. We investigated the transmission of parasites from invasive to native bumblebees as a possible cause of this aparent ecological replacement. We recorded during 20 years the abundance of these three species in a forest of NW Patagonia Argentina dominated by Alstroemeria aurea, endemic herb pollinated by bumblebees. In 2011 we recorded the abundance of bumblebees in 33 sites along 1200km on the eastern slope of the Andes, covering the entire latitudinal range of B.dahlbomii in Argentina. We determined the presence of internal parasites by PCR and their molecular identity. We document a substantial reduction of the historic range of *B.dahlbomii* in Argentina simultaneously with the advance of the invasive bumblebees. We detected a highly pathogenic parasite (Apicystis bombi) in B.dahlbomii that was not detected in Patagonia prior to the arrival of B.terrestris, and which shares a common origin with European variants. This suggests that the invasion of bumblebees have induced the collapse of populations of B.dahlbomii and proposes the transmission of pathogenic parasites as one of the potential underlying mechanisms. We strongly recommend avoiding the introduction of non-native species of bumblebees.



# SOUTHEASTERN PACIFIC HUMPBACK WHALES (<u>MEGAPTERA</u> <u>NOVAEANGLIAE</u>) AND THEIR BREEDING GROUNDS: DISTRIBUTION AND HABITAT PREFERENCE OF SOCIAL GROUPS OFF THE COAST NORTH OF ECUADOR

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Understanding the spatial distribution, habitat requirements and social structure of humpback whales within developed coastal areas is essential for conservation efforts in the region of coastal Ecuador. We studied the spatial distribution and habitat preference of social groups (singers, singletons, pairs, groups with a calf and competitive groups) in relation to depth (up to 200 m) and substrate type (muddy soft and mixed). Visual and acoustic monitoring was carried out during the reproductive season of 2012. Our data were explored using spatial analysis (Nearest Neighbor Analyses) and habitat preference was assessed using the Neu's index. A total of 579 whales were registered with group sizes ranging between one and eight individuals, recording 147 humpback whale songs. Singers were randomly distributed (did not display a clustered distribution), and preferred to use waters less than 20 m depth with mixed substrate to sing. Other social groups showed a moderately clustered distribution. Pairs, singletons and groups with a calf were observed commonly between 10 and 50 m, preferred mixed substrate type and avoided depths over 50 m. Competitive groups did not show a clustered distribution, using the study area in a random fashion. Social groups did not show a strongly overlapping distribution, similar to the temporal segregation of social groups at other breeding areas. The northern Ecuadorian coast is an important breeding habitat for the Southeastern Pacific humpback whale population, and significant conservation efforts are required to ensure that the expanding anthropogenic activities in the region do not affect this population.

*Key words*: Spatial Distribution, Habitat Preference, Depth, Sea Floor Substrate, Humpback Whale.

#### USING SCIENTIFIC-BASED APPROACHES TO PROMOTE THE ESTABLISHMENT OF A MARINE PROTECTED AREA FOR THREATENED HUMBOLDT AND MAGELLANIC PENGUINS IN SOUTHERN CHILE

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Puñihuil Islets are considered as a critical area for the conservation of threatened Humboldt (Spheniscus humboldti) and Magellanic (S. magellanicus) penguins due to its ecological value, and the social and economic significance that this mixed-colony represents. It has been well documented that penguins off the islets constantly interact with coastal gillnets, causing a decrease of their populations in the area. Since 1999 when the breeding site of the mixed-species colony were protected and recognized as a Natural Monument, several initiatives were established in order to improve knowledge and conservation measures to protect both penguins' species. In consequence, a large number of conservation projects, conducted by NGOs, universities and the local community, have contributed to raise empirical information about these birds. Nonetheless, results mainly address deficiencies produced by unregulated tourism, as well the biology and ecology of penguins. Considering the ecological implications of this mixed-species colony as well as the economic value that the presence of penguins represent, is crucial to impulse the creation of a variety range of mechanism to ensure protection of their marine habitat. Continuously are reported injuries or mortalities of penguins, which are linked by two primary sources: boat strikes and entanglements in gillnet fishing gear. This project provided knowledge about the ecology, biology and conservation of threatened penguins in order to promote the establishment of a MPA oriented to how the implementation of such regulation may contribute tremendously to both local conservation and community development, as well to increase positive attitudes towards the establishment of MPAs.

Key words: Humboldt and Magellanic penguin, MPA, mixed-colony, conservation.



# ISOLATED IN THE CARIBBEAN: CONSERVATION STATUS OF BOTTLE-NOSE DOLPHINS IN BOCAS DEL TORO, PANAMA

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The resident population of bottlenose dolphins of Bocas del Toro Archipelago holds the largest dolphin-watching industry in Panama. Since 2012 we have monitored this population to determine the degree of genetic isolation of this dolphin population, and expanded sampling efforts to assess the effect of boat traffic on dolphin behavior and communication. Outreach and educational activities were also initiated in schools, and we conducted training workshops for local boatmen. To this date, we have collected 25 skin biopsies, over 1000 sound recordings, and 4000 photographs. The genetic data indicates that the Bocas dolphins are isolated from other populations in the Caribbean. The acoustic data shows that dolphins respond to dolphin-watching boats by modifying their sounds to reduce signal masking. We have photo-identified a total of 145 individuals, 80% of which are annual residents. Finally, behavioral analyses have revealed that the degree of dolphins' evasion to dolphinwatching boats is associated with the number of the boats and the conduct of the boat captains. The combination of genetic isolation, small population size and high degree of interaction with human activities threatens this bottlenose dolphin population, which should be considered by IUCN as "Critically Endangered". Outreach and educational activities with local community have allowed us to identify local leaders interested in implement conservation strategies for these dolphins.

*Key words*: *Tursiops truncatus*, Bocas del Toro, Caribbean, dolphin-watching, conservation.

#### THE BOTANICAL MEDICINAL KNOWLEDGE IN A PRIORITY AREA FOR THE BIOCULTURAL CONSERVATION IN RIVERA, URUGUAY

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The ethnobotanical knowledge is a complex system with capacity of self-organization and response to changes in the environment. In order to describe and understand its dynamics, we used a network theory approach. We propose to unravel the structure of the this network and to detect patterns in the knowledge and treatment of various diseases with medicinal plants in the region of the Biosphere Reserve "Bioma Pampa Quebradas del Norte", Rivera, Uruguay. For this purpose, we analyzed a network composed of key informants, medicinal plants, and disease categories. We tested three hypotheses about its structure: modularity, nestedness and segregation. To analyze the robustness of the system, different scenarios of species extinction and loss of knowledge holders were simulated. The obtained scale-free networks fit the model of segregation and ability to withstand perturbations. Finally we discuss the relationship between the observed patterns, environments of high biodiversity, multicultural contexts, and biocultural conservation. From the beginning, this ethnobotanical work was developed in a context of action research and the commitment of the community empowerment. For accomplish this approach, it was fundamental to examine the processes of knowledge transfer and personal experience. We developed a space for environmental interpretation in a conservation and recreational area at the "Parque Gran Bretaña", Rivera, where workshops and activities relevant to the local community are taking place on a regular basis.

*Key words*: Biosphere Reserve, Ethnobotany, Medicinal Plants, Network Structure, People and Plants.



# DISEASE TRANSMISSION RISKS FROM EXOTIC TO NATIVE DEER IN NATIONAL PARKS OF NORTHERN PATAGONIA, ARGENTINA

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The risk of disease transmission from exotic to native wildlife is of great conservation concern for endangered species such as the huemul (Hippocamelus bisulcus) a deer-like mammal of Southern Argentina and Chile, which is threatened by habitat fragmentation, poaching and competition with introduced herbivores. However, this risk has been poorly characterized in Argentina. The aim of this study was to identify diseases of introduced red deer (Cervus elaphus) in Patagonia, and evaluate the risk of their transmission to huemul. A health survey was carried out on red deer hunted within and near Los Alerces, Nahuel Huapi and Lanin National Parks. Eight huemuls that died from different causes were also included in this study. Severe lesions caused by Fasciola hepatica (15/110) and Dictyocaulus spp. (10/110), a high prevalence of Sarcocystis spp. (38/62), and exposure to rotavirus (29/29), para-influenza type 3virus (5/29), and Leptospira spp. (7/29) were found in red deer. Huemul deaths included neurological disease of yet undetermined etiology (1), poaching (2), dog predation (2), and unknown causes (3). Findings in huemul were similar to those in red deer, including parasitism by *Sarcocystis spp*. (2/5) in skeletal muscle, and verminous pneumonia by Dictyocaulus spp. (1/5). The similarity of findings in red deer and huemul suggest that transmission of disease offers between these two species. Conservation efforts should be made to reduce or avoid the presence of invasive introduced ungulates within protected areas, especially those with huemul populations.

Key words: native deer, invasive ungulate, huemul, red deer, diseases risk.

#### - QUINTAY CHILE | 27-29 MAY 2015 -

### CODING THE ART OF HUMPBACK WHALE SONGS (<u>MEGAPTERA</u> <u>NOVAENGLIAE</u>) OFF THE COAST OF ECUADOR

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Humpback whale singing patterns change over time among different breeding seasons and/or among breeding grounds during the beginning, duration and end of their migratory behavior. Among breeding areas there is evidence of a cultural transmission of singing habits within regions. This has been reported in breeding areas off Western Australia and the Eastern Central Pacific, but has not been investigated in the Southeastern Pacific Equatorial. During breeding seasons from 2012 to 2014, we obtained approximately 250 recordings of humpback whales songs in breeding areas located on the central coast, in particular focusing our efforts in the northern part of Ecuador (Esmeraldas). So far, we have identified 48 high-quality recordings to start acoustic analysis. This research proposal will compare song patterns of humpback whales between different reproductive seasons and locations along coastal Ecuador. We will use a qualitative analysis for coding songs and then will carry out a quantitative analysis through of Levenshtein distance method, as described by Dr. Ellen Garland (international collaborator). These methods will allow us to quantify the structure of humpback whale songs and to observe variation of different songs between seasons and locations. The support received by the Rufford Foundation has allowed us to maintain our acoustic monitoring of humpback whales in the country. Currently, the acoustic songs database is being managed by the CETACEA Project in order to stimulate further research in this field at both local and regional scales.

*Key words*: Song, Structure, Quantitative Analysis, Breeding Ground, Humpback Whales Ecuador.



# ECOLOGICAL STUDY OF THE ENDANGERED WHITE-WINGED NIGHTJAR (<u>ELEOTHREPTUS</u> <u>CANDICANS</u>) 2013-2015

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Through the use of radio-tracking, mark-and-recapture and vegetation studies, the ecological requirements of the Endangered White-winged Nightjar are currently being investigated. The White-winged Nightjar is only known to breed in three locations across southern Brazil and North-eastern Paraguay. There has only been one other ecological study on this species done before (Pople, 2003), and despite the limited number of confirmed populations, we suspect that this is partially due to the species' elusive nature and lack of investigator effort. This two-year study, initiated in November of 2013, has the goal of adding to the data collected by Pople at a separate reserve in Paraguay in order to determine the habitat selection and behaviour of the species. Using ArcGIS, we have created a vegetation map that will serve as an underlying matrix for our radio-tracking data. The goal is to create a management plan for future conservation efforts that includes areas of interest for new population discovery and indicator species of the appropriate habitat structure. While the study is still underway, we have established an estimated population count, determined sex ratio, created a vegetation map and begun radio-tracking individuals. The data set is incomplete but we are already seeing a strong correlation linking the presence of the White-winged Nightjar to areas of high soil moisture and low drainage. By May of this year, our first round of radio-tracking will be complete and data will be ready to be presented. Observations on other behaviours, courtship and day roosts will also be presented.

*Keywords: Eleothreptus candicans*, Conservation, Radio-tracking, Endangered, Paraguay.

#### DIADEMED SANDPIPER PLOVER (<u>PHEGORNIS</u> <u>MITCHELLII</u>): CONSERVATION AND RESEARCH OF A RARE ANDEAN SHOREBIRD IN CENTRAL CHILE

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With an estimated population size estimated at <10,000 individuals, the Diademed Sandpiper Plover (*Phegornis mitchellii*) is one of the world's rarest shorebirds. The species is endemic to high elevation Andean wetlands; several anthropogenic and climate effects threaten these habitats. Our study is the first comprehensive effort to determine aspects of the species' breeding ecology and demography. In addition, our objectives have focused on identifying threats, creating a land cover classification and implementing a citizen science program. Our study was conducted in the Yeso River Valley (-33.64° S, -69.93° W), central Chile. Among 2010-2014 we individually marked 101 birds and monitored 66 nests/families. Adults have high breeding site fidelity and moderately high apparent survival (0.77). Breeding pairs successfully produce >1 clutch, of 2 eggs, during each season. Our results suggest that livestock foraging/grazing negatively influences the occurrence of second nesting. In total, we identified 30 dominant habitats in the Yeso Valley, and found a strong association of P. mitchellii with brackish springs. Our study suggests that the local population trend is stable, and its size is likely regulated by the limited availability of brackish springs and wetlands, which are relied on for foraging. In combination with research activities we also developed an education/outreach and information sharing with several stakeholder groups, thereby forming the foundation for future conservation efforts.

*Key words: Phegornis mitchellii*, High Andean Wetlands, Demography, Reproductive Ecology, Citizen Science.



# POPULATION STATUS OF RED DEER (Cervus elaphus) AND ITS EFFECT ON GRAZING IN FORESTS OF NOTHOFAGUS SPP. IN THE LA-NÍN NATIONAL PARK, ARGENTINA.

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The invasion of red deer in Patagonia threatens the conservation of native forest known are its effects on vegetation, but not in relation to the population status of deer. This work compares, on a preliminary basis, the deer population status and its effects on understory *Nothofagus spp.* (Lenga, raulí-coihue and ñire) in two sectors of PN Lanín, Lolog and Tromen. Within the Red Deer Management Plan, implemented with Argentina Hunting Federation since 2009, population data from the pellet count in 20m2 plots, sightings, and hunting per unit effort were obtained. The effects on vegetation were evaluated using transects within 50m x 50m plots by the line and point intercept method to estimate vegetation cover, species frequency, grazing rates, and vertical complexity of understory. A density of 6 and 1.7 deer / km2 in Lolog and Tromen area were estimated, respectively, with a predominance of females in both populations. From 32 species of trees and shrubs recorded, in 72% grazing was observed, with 35% of affected individuals on average. There is a direct relationship between the relative abundance and frequency of grazing by species, and between the abundance of plants and severity of browsing. Twenty five percent of the sampled forests gathered more than 50% of browsing, the most affected Lenga in Lolog. The history of invasion, habitat use and population density could explain the effects on vegetation.

Key words: Red Deer, Management, Impact, Population, Lanín.

# DOES THE MICROBIAL COMMUNITY IN ANDEAN FROGS AFFECT PATHOGEN DYNAMICS?

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Amphibians are among the most threatened group of animals. An emerging infectious disease caused by a fungal pathogen Batrachochytrium dendrobatidis (Bd) is a major threat factor having caused the recent extinction of hundreds of species, yet some survive epidemics. To understand disease resistance, I studied two sympatric species of frogs from Colombia: Dendropsophus labialis and Rheobates palmatus. Skin microbial symbionts are known to protect some amphibian hosts from Bd infection. In this study we describe and compare variation in the skin microbiome across life stages, between species and with the environment using massively parallel sequencing (Illumina miSeg automated DNA sequencer) and correlate the abundance and diversity of symbionts with Bd infection intensity (zoospore equivalents). We collected skin swabs from 17 tadpoles, 10 juveniles and 17 adults, extracted DNA, and prepared 16S rRNA amplicons to identify and quantify bacterial diversity. We collected and analyzed 10 water samples to determine the proportion of skin bacteria shared with the environment. We used QIIME, bioinformatics analysis software, to perform microbiome analyses. We used a quantitative qPCR assay to estimate Bd infection intensity from 73 skin swab samples collected from hosts. Preliminary results show large differences in skin microbial composition within life stages of frog species between the two frog species, and between frog species and environmental samples (water), and correlations with disease infection intensity are ongoing. This study suggests that symbiotic relationships between skin bacteria and host species are well developed and may play an important role in health and disease.

*Key words*: Microbiome, Infection Intensity, Colombia, Andean Frogs, *Batrachochytrium dendrobatidis*.



# EFFECTS OF HABITAT TRANSFORMATION ON THE ECOLOGICAL DYNAMICS OF POLLINATION AND SEED DISPERSAL MUTUALISMS

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Habitat transformation implies the partial or total replacement of native for exotic species. However, its effects on plant-animal interactions remain yet little studied. We assessed the multi-scale effects of habitat transformation on pollination and seed dispersal mutualisms, using a highly specialized system composed by the keystone mistletoe Tristerix corymbosus (Loranthaceae), which is only pollinated by one hummingbird (Sephanoides sephaniodes) and dispersed by one endemic marsupial (Dromiciops gliroides). Pollination and seed dispersal interactions were assessed along a gradient of replacement of the native forest for unmanaged Eucalyptus plantations. Pollination and seed dispersal presented scale-dependent responses, being S. sephaniodes has been little affected by habitat transformation and responded at a broad spatial scale than *D. gliroides*, whose activity increased as transformed habitat becomes dominant, and was spatially concordant with *T. corymbosus* recruitment. Then, the coupled effect of pollination and seed dispersal on T. corymbosus' fitness along a habitat transformation resulted in larger quantitative component (visit rates) for pollination and seed dispersal at native habitat, but dispersers' quality (fruit removal rate), germination, and plant fitness have increased at transformed stands. Considering the structural modification involved in this habitat transformation process, we stress the relevance of having found *D. gliroides* at an exotic-tree dominated forest, as this species was thought to be restricted to old-growth forests. Sephanoides sephaniodes and D. gliroides were present, abundant, and interacting with T. corymbosus at both native and transformed forests, which may represent a remarkable opportunity for the recovery of disturbed habitats in southern South America.

*Key words*: Anthropogenic disturbance, Keystone species, Mistletoes, Plant-animal interactions.

#### TRACKING THE MONITO DEL MONTE (<u>DROMICIOPS</u> <u>GLIROIDES</u>) ON NATIVE AND TRANSFORMED HABITATS: CONSEQUENCES FOR SEED DISPERSAL

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The monito del monte (Dromiciops gliroides) is an endemic marsupial of the South American temperate rainforests, where it plays a major ecological role as seed disperser of at least 16 plant species. This relict marsupial was considered to be restricted to old-growth forests, but it was recently found at second growth and transformed stands (composed by Eucalyptus globulus plantations with native understory). Dromiciops gliroides is the sole disperser of the hemiparasitic mistletoe Tristerix corymbosus, a keystone species of these forests. However, those mistletoes were found forming denser aggregates in the transformed habitat, compared to the native forest. Aiming to determine if such aggregation pattern derives from changes in D. gliroides behaviour in response to resource offer, we tracked ten individuals at both habitats using radio-telemetry, and related the locations obtained with resource (i.e., fleshy fruits) availability. We found no differences in D. gliroides movement behaviour (home range, core area, and inter-individual overlap; individuals fitted a random walk model) between habitats, despite the structural differences between habitats and the larger resource offer and diversity found at the transformed habitat. We found that *D. gliroides* locations were spatially associated with fleshy-fruited plants, since average and nearest plant distances were significantly shorter than those calculated from a matching set of random points. At the transformed habitat, D. gliroides used Eucalyptus and native vegetation for feeding, but nesting sites were always at native vegetation. Our results suggest that D. gliroides may constitute an important regeneration agent at disturbed habitats, including abandoned productive lands.

*Key words*: Habitat disturbance, Home range, Keystone mistletoe, Spatial ecology, Restoration.



# MAGELLANIC PENGUIN DIET REQUIREMENTS AND ITS RELATIONSHIP WITH COMMERCIAL FISHERIES: A CASE STUDY IN GOLFO SAN JORGE, PATAGONIA ARGENTINA

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Aspects related to the abundance, biomass and the role of the Magellanic Penguin (Spheniscus magellanicus) as top predator, position it as an important component of coastal and marine ecosystems. Although one guarter of the Patagonian population of this species breeds along the northern coast of Golfo San Jorge, recently included in the Patagonia Austral Marine Park, the composition of its diet is still unknown. This study analyzes the diet composition of Magellanic Penguins complementing two methodologies, stomach lavage and stable isotope analysis, during the breeding season 2011-2012 in colonies located in the North Vernacci Islands (45°11'S, 66°30'W). Samples were taken in the early and late chicks stages (chicks younger and older than 30 days, respectively). Through the analysis of stomach samples, a total of 1870 prey items were recorded and at least 14 species were identified, including 8 species of fish, 3 of cephalopods and 3 of crustaceans. The Anchovy (Engraulis anchovy) was the prey with the higher relative importance index value in both stages of the reproductive cycle (88.4 and 54.1%) followed by squid (*Illex argentinus*) in the second stage (24.5%). Stable isotope analysis confirmed the results obtained using stomach lavage. The recent interest in developing an Anchovy fishery in the study area suggests the need for more information to assess the potential impact of the extractive activity on Magellanic penguin populations.

Key words: Diet, Magellanic Penguin, Commercial Fisheries, Golfo San Jorge.

# ANDEAN FOREST CONSERVATION AND SMALL MAMMALS IN BOLIVIA

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Andean forests have great species diversity and provide a variety of benefits for its inhabitants and the rest of the population. Threats by anthropic use and climate change in Bolivia affect the Yungas and Dry Interandean forests, which hold unique and little-known species in the Andes. Small mammals are an interesting group, and these forests have endemic species and probably undescribed species to science. Our project aims at the conservation of these important natural habitats and contribution to the knowledge of their small mammals. Through the fieldwork, we describe the current state of forests, dynamics, presence of small mammals, and perception of local communities. Thus, we are learning about the species and conservation needs of each habitat through educational talks. Our project is currently being developed and the partial results show an interest of local people to learn the importance of forests and share their knowledge about them. We also recorded the presence of 6 species of small mammals, two of them endemic to Bolivia and Dry Interandean Forests. In conclusion, the sites visited so far are aware and want more information on how to conserve their forests, as they are strongly associated with them. Our challenge is to investigate the different views of the sites we still need to visit, the status of their forests, and of their species.

*Key words*: Yungas Forests, Dry Interandean Forests, Endemism, Diversity, and Local Communities.



# BIOTELEMETRY OF JUVENILE BLACKTIP SHARKS (<u>CARCHARHINUS</u> <u>LIMBATUS</u>) AND THE CONSERVATION OF KEY NURSERY HABITATS IN THE GALAPAGOS ARCHIPELAGO

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Little information exists about the importance and spatial extent of shark nurseries in the Galapagos Archipelago, and thus these habitats were not taken into account in the original design of the Galapagos Marine Reserve. We studied the movement behavior of juvenile blacktip sharks in nursery areas on San Cristóbal Island, Galapagos, in order to reveal how these top predators use their environment and to determine core areas for habitat protection. Using acoustic telemetry we continuously tracked a total of 8 individual sharks over an average of 45 hours each. Six blacktip sharks showed high site fidelity to their primary nursery area, while two sharks traveled to another nursery area at a distance of 6,5km. Regular trips outside the nurseries were made by all individuals with the exception of two neonate sharks. These exploratory movements were faster and either highly directional along the coast in search of a suitable refuge or with random directionality in deeper water. In order to effectively determine areas that are crucial for a species' survival, it is important to understand how animals adapt their behavior according to the environment. Furthermore, the importance of nursery habitats was reflected by the sharks' high site fidelity and the dense concentration of movements within core areas in shallow water inside the protected bays. Our results delineate the key nursery habitats for this species and were provided to the Galapagos National Park Services, which will include these areas in the revised zoning scheme of the Galapagos Marine Reserve.

*Key words*: Blacktip sharks, movement behavior, nursery areas, habitat protection, Galapagos Marine Reserve.

#### MONITORING OF GROWTH AND HEALTH OF NATIVE TREE SPECIES IN AGROFORESTRY SYSTEMS IN THE PERUVIAN AMAZON USING MOBILE ELECTRONIC DEVICES

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Since 2012 with the support of Plant your Future (PyF), I have been working with smallholder farmers in the Peruvian Amazon to restore degraded lands. Our work promotes sustainable agriculture and reduces deforestation pressure, by establishing agroforestry systems with native species. There are currently limitations in establishing these systems due to insufficient technical information on recommendations and specifications for the reforestation of degraded land in the Peruvian Amazon with native species. That is why in this context, our project aims to develop a monitoring tool using mobile electronic devices to assess growth and health patterns of native trees as part of agroforestry practices. To evaluate and improve efficiency in the field, our monitoring tool will use smartphones to capture images which are GPS-linked, and collect data on the progress in the growth of trees, presence or absence of pests, applied control measures and other key variables. This data will be uploaded and shared in the "cloud" accessible to colleagues in Peru and the United Kingdom. With this data we will be able to evaluate variables impacting growth and determine the optimal conditions for developing agroforestry plantations with native plants. This will improve the income to farmers selling fruits and premium quality wood. This type of monitoring will allow proper quantification of carbon sequestered and future sale of carbon credits will also benefit farmers in the medium term.

Key words: PyF, smallholders, native species, GPS-linked images, agroforestry.



# ON SUSTAINABLE GRAZING AND THE CONSERVATION OF PATAGONIAN RANGELANDS: SELF-REGULATION OF POPULATION DENSITY BY FREE-RANGING GUANACOS

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The guanaco is the dominant native herbivore inhabiting the Patagonian steppe and a potential productive alternative to the traditional sheep-ranching that has produced massive habitat degradation across the region. However, local people perceive this herbivore as a threat to livestock production. Hypothetical overgrazing-risks exhort current culling initiatives planned by government agencies aimed at hindering the perceived guanaco overpopulation. Since there is a lack of empirical knowledge on the processes linking native herbivores, vegetation and livestock within this system, grazing impact by guanacos and sheep is often confounded and management plans are susceptible to be founded on wrong assumptions. To address these interactions in the context of the study of the processes that regulate guanaco density, we assessed the response of a guanaco population and the main vegetation communities within a traditional sheep ranch of Northeastern Patagonia that was turned into a wildlife reserve. We recorded the rapid increase in guanaco density coupled with augmented forage cover after livestock removal. The observed density stabilized below the environmental carrying capacity predicted by an equal share of available forage. These results, in addition to our measure of vegetation performance, are consistent with the hypothesis of a self-regulatory mechanism that prevents overgrazing, which challenges major assumptions of classic regulation models for large herbivores in predator-free populations. Besides the critical implications for the conservation and management of South-American camelids and austral rangelands, our results are an important contribution to the understanding of the processes shaping the distribution of territorial herbivores and their grazing impact across the landscape.

*Key words*: guanacos, self-regulation of population density, grazing impact, vegetation.

### DOMESTIC CATTLE AS DRIVERS OF ANDEAN SUBTROPICAL RAINFO-REST (YUNGAS) DYNAMICS

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Large mammalian herbivores play an important role as drivers of plant communities and ecosystems. Cattle have been suggested as one of the main causes of forest degradation and biodiversity impoverishment in neotropical montane forests (Yungas). Since the understanding of cattle impact on plant community is scarce and mostly based on anecdotal data, quantifying cattle use and damage is crucial in order to promote forest conservation and management. Here, we present preliminary results on cattle use and impact on abundance and composition of forestry species in Yungas montane forest. In seven sites located in Jujuy province (Argentina) we registered vegetation attributes, and animal use and relative abundance. Sites showed to be variable in cattle abundance (estimated by feces counting) and browsing pressure. Also, a trend of decreasing seedling density and height and an increasing browsing degree in sapling and seedling was observed as relative cattle abundance increased. Due to the importance in terms of biodiversity, wood provisioning and ecosystem services, Yungas management and conservation is a high priority for Argentina.

Key words: Ungulate, Herbivory, Grazing, Impact.



# LOCAL PARTICIPATION IN WILDLIFE MONITORING, CRIOLLOS AND WICHIS MONITOR MEDIUM-SIZED AND LARGE MAMMALS IN THE ARGENTINEAN CHACO

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To plan the sustainable use of a territory and its natural resources we need information about the distribution and ecological requirements of wildlife species. The Semiarid Argentinean Chaco is a biodiversity rich territory, with endemic species and evolutionary and ecological processes, but the information for planning the sustainable use of its resources is scarce. The area is inhabited by local peasants, Criollos, and indigenous Wichís, two cultures with subsistence economies and close contact with surrounding natural environments. These people inhabit in small settlements in isolated territories, and have their own cultures, therefore they are usually excluded of national territory planning and management, and production plans. These are vulnerable populations that lack nutrition or water security. The long-term conservation of this region is a challenge; deforestation and resource over-exploitation are accelerated and threaten not only biodiversity but also local inhabitants. Information about local species, their distributions and habitat requirements is insufficient. To gather information about local wildlife and enhance local capacities, we developed and evaluated a locally based monitoring system focused on medium-sized and large mammals. We worked on a portion of the Chaco Province. Local participants actively gather information about the species they find in their territories, sharing their traditional knowledge and learning research methods and tools. We analyse gathered data, and evaluate benefits and disadvantages of using this type of methodologies to gather wildlife information. We also analyse difficulties, costs, time stability and the possibility of replicating the experience.

*Key words*: Locally-based monitoring system of wildlife, Semiarid Argentinean Chaco, Wichís, Criollos, medium-sized and large mammals.

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# LOCAL COMMUNITY AND PROTECTED AREAS: ARTHROPODS SURVEY IN ARID ENVIRONMENTS OF THE NORTH-WEST ARGENTINA, IN THE CONTEXT OF A FIELD SCHOOL

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The socio-economic difficulties faced by developing countries may jeopardize the effectiveness of protected natural areas. In particular, the risk of public conflict in the implementation of environmental policies in Argentina has a historical background of colonial tradition. In order to achieve long-term policies, it is crucial to involve local communities through educational programs that generate knowledge and positive attitudes towards the natural environment. In this context, we present the experience of an Arthropods Field School in the Valle Fertil Natural Park, in conjunction with the local school. The reserve protects an area considered at risk of degradation, which in turn is a hot spot for species conservation due that its valleys create an "oasis" within the extensive xeric environment of the region. During 2014, three field surveys were conducted, along with lessons of the representative features of the most common groups in the area, including its advantages as environmental bioindicators. Practical classes of identification, assembling of traps and trapping techniques were also performed. In this work, we present the first arthropods survey in the area, along with richness and abundance biodiversity indexes (including new species records for the area). With the gathered data throughout the project, we have performed reports, posters and brochures that today are material of tourist information at the park entrance office. Furthermore, the program has been incorporated into the school curriculum for its continuity throughout 2015. In sum, this project shows a successful experience in the engagement of local communities with conservation activities in protected areas.

*Key words*: Local Communities, Arthropods, Conservation, Protected areas, xeric environments.



# THE FIREWOOD DILEMMA: HUMAN HEALTH IN A BROADER CONTEXT OF WELLBEING IN CHILE

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Addressing climate change requires addressing both, as we develop alternatives to fossil fuels to mitigate climate change, while simultaneously looking for ways to increase the resilience of the ecosystems on which we rely. Forest biomass is receiving increased attention as a source of renewable fuel for these reasons; yet at the same time, increased use of woodfuels raises health concerns about the adverse effects of pollution and as a possible contributor to deforestation and forest degradation. In these cases, policies are designed to shift people away from using forest biomass. Using a case study from Chile, where air pollution from residential firewood combustion has become a serious issue, we show that implementing such actions through substituting firewood by fossil fuels, while they might reduce pollution in the shortterm, is unlikely to improve either human well-being or the sustainability of resource use in the long-term. Instead, through applying a system analysis of the interlinked energy and resource subsystems, we show that the institutional context is important in determining the appropriate policy interventions and that a combination of actions involving the adoption of energy-saving technologies, while still maintaining woodfuel as a primary energy source, would yield higher economic, social and environmental benefits.

Key words: firewood, heating, air pollution, energy poverty, GHG emissions.

# EFFECTS OF THE TRANSFORMATION OF THE LANDSCAPE ON THE REPTILES IN THE REGION OF COLOMBIA CARIBBEAN

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The transformation of the landscape alters the biotic communities, pattern that has been evident in the seasonal tropical dry forests in Colombia, where the fertility of its soil has caused centuries of transformation for the establishment of various agricultural booms. This study evaluated the effects of these changes on the reptiles in fragments of seasonal dry forest. Using satellite imagery, we evaluated the dynamics of land use between 1984 and 2013, was characterized the structure of the vegetation through a sampling with plots, samples were taken in standardized reptiles replicated transects along the gradient Pasture-Edge-Interior in forest fragments and in productive systems, to determine the presence or absence of nesting, the coexistence of species and to assess the influence of the edge on the diversity of reptiles. We observed a reduction of the forested areas, an increase of production systems and the recovery of areas intervened toward forest coverage. It is not detected edge effect on the composition and structure of the vegetation, the historical shocks would be responsible for the patterns of species richness and structure of the existing vegetation. The diversity of reptiles was not related to the structure of the vegetation, due to the high occupancy rate (high coexistence of species) and high distribution between the types of coverage (nesting especially lizards). At the local level the influence of the edge, is found mainly on the abundance of species, with variations between the pasture, the edge and inside and between the climatic seasons.

*Key words*: Seasonal tropical dry forest, transformation of the landscape, influence of the edge, Assembly of reptiles.



# DIRECT IMPACTS CAUSED BY HUMAN COMMUNITIES ON THE REPTILES IN THE COLOMBIAN CARIBBEAN

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The reptiles have different uses by human communities, from the food up to uses for pets (turtles, lizards, crocodiles), snakes in turn generated aversion and the first reaction generated among ordinary people is to eliminate them. Recently the interest in investigating the different forms that access different cultures to learn about and use their natural environment has gained relevance, despite this the human dimension of the conservation of species and their habitats has been poorly evaluated. Surveys and workshops with children and adults were obtained results about the perceptions and use of the reptiles by indigenous peoples and peasants in the Colombian Caribbean. The turtles were the group identified as beneficial as source of food and income sometimes. The Tortoise Chelonoidis carbonarius presents a strong problem by extraction from the wild for use as a pet, believing it provides longevity that has them. Otherwise the snakes were the group considered to be detrimental, with very few exceptions; all kill them as harmful to health. The Boa constrictor snake sometimes gets treated differently since it is marketed for nurseries and for entertainment of tourists. This information is important to integrate management plans and restoration of flora and fauna in the region, taking into account the cultural component which would help to ensure success in the implementation of these programs.

*Key words*: Direct effects, human communities, Colombian Caribbean, reptiles, uses, and perceptions.

# SCIENCE-COMMUNITY: THE CONSERVATION OF SNAKES FROM FAZENDA BARRA DO ETA AND BAIRRO GUAPIRUVU, MATA ATLÂNTICA, SÃO PAULO, BRAZIL

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Snakes are animals of ecological, cultural and medical importance, which unfortunately provoke fear and rejection in several people. For this reason, it is important to develop educational projects that contribute to the conservation of snake populations. Our work seeks to record people's knowledge about snakes as well as to perform educational activities that contribute to species' conservation and the prevention of snakebites. The work began in February 2014, in two communities (Fazenda Barra do ETA and Bairro Guapiruvu) located in the Atlantic Forest domain in Sao Paulo, Brazil. Both communities were selected due to the presence of endangered snake species in the region, including Corallus cropanii Hoge, which is critically endangered according to the IUCN, and whose last recorded specimen was observed near the area. During the social work, the IAP methodology (Research-Action-Participation) was employed, as well as the method of Community Inquiry and ethnographic methods such as interviews and application of semi-structured questionnaires. These methods allowed us obtaining ethno-ecological preliminary results on snakes and snakebites in the region. Workshops and talks were given during some visits to communities and the 1st Festival of Snakes of Bairro Guapiruvu and Fazenda Barra do Eta was held, creating a space for the exchange of knowledge between the community residents and the researchers and educators who work in the Biological Museum of Butantan Institute. Considering the 17 species recorded in the area by collaborating researchers, during April 2013 and March 2014, an identification guide of snake species was developed. The guide was based on photographs and directed fundamentally at local farmers.

Key words: snakes, community, conservation, environmental education.



# DESIGN OF A CONSERVATION LANDSCAPE FOR A PORTION OF THE SEMIARID ARGENTINEAN CHACO, BASED ON HABITAT REQUIREMENTS OF FIVE LARGE-MAMMAL SPECIES

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We worked in a portion of the Semiarid Argentinean Chaco (SACH), a biodiversity rich region that is considered a conservation priority with unique species and ecological and evolutionary processes. Although its land-use planning was supposed to consider the sustainable use of natural ecosystems and resources, these are overexploited and the region is seriously endangered. Information to generate effective conservation plans and design conservation landscape is insufficient. Our objective was to identify priority conservation areas in a portion of the SACH, based on the spatial and habitat requirements of five large-mammal species: Tayassu pecari, Catagonus wagneri, Tapirus terrestris, Priodontes maximus, Myrmecophaga tridactyla. These species were chosen because they represent unique ecological or evolutionary processes or are seriously endangered. We used a systematic methodology that allows the design and application of spatially explicit conservation actions based on these species requirements. Between 2010 and 2012 we performed 320 semi-structured interviews to rural local inhabitants, in randomly selected sites, and we determined presence/absence of each species. We used this information together with environmental variables to develop habitat models (Maximum Entropy Algorithm, Maxent). We combined all spatially explicit models in a single model, represented in a map, where we identified priority conservation sites considering connectivity and complementarity (Zonation). We identified sites that should be preserved if the long-term conservation of these species and processes is expected; this conservation landscape is a first approximation to the conservation of the region.

*Key words*: Priority conservation sites, conservation landscape design, large mammals, Argentinean Chaco, habitat use.

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## FISH DIVERSITY AND ECOSYSTEM FUNCTION IN THE GALAPAGOS MARINE RESERVE: WHAT DRIVES IT AND WHERE IS IT MOST VULNERABLE TO FISHING AND CLIMATE CHANGE?

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The Galapagos Marine Reserve, located 1000km off the coast of Ecuador, is a biodiversity hotspot and global icon of natural history. Established in 1998, the reserve is currently being restructured in an attempt to encompass and protect additional services provided by different components of the marine ecosystem, but information is lacking on the ecological roles of mobile consumers such as fishes. To investigate the environmental drivers of fish diversity and the impact of fish on community dynamics through consumer pressure, patterns of fish diversity throughout the central archipelago in relation to benthic habitat characteristics and seasonal and inter-annual trends in oceanography were examined. At the regional scale, benthic topography, upwelling of cold, nutrient rich waters, and wave turbulence have been identified as key drivers of fish diversity. A manipulative experiment was performed to elucidate the changes in fish herbivory and benthic community response across a wave stress gradient. Fish biomass and bite rates are significantly higher in waveexposed locations, indicating the potential for greater ecosystem-wide impacts of fish feeding behaviour relative to sedentary macroinvertebrates, such as sea urchins, at these locations. Continuing work will test the interactive effects of wave stress, benthic topography, and oceanography on these consumer impacts. The synergistic effects of the physical environment on fish community structure and fish consumer pressure on benthic habitat-forming species requires integration into the reserve zoning system to buffer against extreme climate events such as El Niño.

*Key words*: Ecosystem function, reef fish, herbivory, Galapagos Marine Reserve, environmental stress.



# CHUROS, BARNACLES, AND BOUNDARY CURRENTS: USING BIOLOGICAL OCEANOGRAPHY TO SET CONSERVATION PRIORITIES IN COASTAL ECUADOR

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The number of marine reserves in coastal Ecuador has steadily increased in the past decade. These reserves are interspersed along the confluence zone of the cold, productive Humboldt Current and the warm, less productive Panama Current. Adequate management of these reserves requires an understanding of the ecological consequences of these oceanographic differences. To elucidate the role of temperature variation in driving patterns of diversity. I surveyed rocky intertidal communities and performed manipulative field experiments along 360 km of the coastline bridging this convergence zone. Functional groups such as barnacles and macroalgae showed differentiation comparable to regional-scale differences (Southern Ecuador ~ Humboldtian; Northern Ecuador ~ Panamanian). Intertidal shellfish collectors were common at all sites, with as many as 500 predatory snails (genus Thais) collected per individual per day. In contrast to pre-existing patterns, measurements of colonization and succession revealed high barnacle recruitment and growth in northern sites, while southern sites were colonized mostly by macroalgae, suggesting high potential for species turnover and regime change of marine habitat-forming species. This study highlighted two important concepts for local marine reserve management: 1) top-down control through predation and herbivory appears to be higher in northern Ecuador where nutrients are limiting, indicating that Thais removal in this region should be monitored due to the potential for widespread ecological impacts; and 2) fluctuations in current-driven temperature and nutrient levels and larval supply may result in markedly different community assemblages to those currently observed if they coincide with disturbance, such as that caused by habitat-destructive fishing methods.

*Key words*: oceanography, marine reserve management, intertidal fisheries, topdown control, resilience.

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# BIOLOGY AND ECOLOGY OF YELLOW CARDINAL (AVES, THRAUPIDAE) IN URUGUAY

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The Yellow Cardinal (Gubernatrix cristata) is a very territorial specie, it is found in pairs, family groups or even sporadically in small flocks of up to thirteen individuals (several pairs and some immatures). It feeds on seeds and grains that searches their favorite habitats are thorny scrub (Acacia caven, Prosopis sp.) and the open woodland (Celtis spinosa, Scutia buxifolia, Schinus longifolius) slightly wavy, where it has even been found nesting. Located in category "endangered" (IUCN), its range is in Uruguay, Argentina and Brazil, with a tendency to decrease in population. In Brazil it has virtually disappeared, recorded in recent years only in the "Parque Estadual do Espinilho" (Rio Grande do Sul) near the northern border of Uruguay. The largest populations are still in Argentina and Uruguay, estimating the existence of between 1,500 and 3,000 individuals. Specifically, in Uruguay, in collaboration with Rufford Foundation, has made a deeper study of the specie and has been registered in zones where no historical data were available and has also been detected disappearance in other areas, for the destruction of one of their habitats, especially on the west with the disappearance of significant areas of thorny scrub and also in other localities by hunting for illegal marketing of the specie.

Key words: Yellow Cardinal, Endangered, Disappearance, Illegal marketing, Uruguay.



# A COMMUNITY-BASED APPROACH TO THE MANAGEMENT, RESTORATION, AND DELINEATION OF BUFFER ZONES IN NAPO, ECUADOR.

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The Amazon boasts some of the greatest biodiversity on the planet, yet very few of its plant species are incorporated into global trade. This is caused by the lack of viable supply chains for these products. Simultaneously, economic pressure drives the conversion of native forests to monocrop agriculture. In the past five years, RUNA, a social enterprise based in the United States, has created a new value chain of the llex guayusa, thereby generating new incentives for maintaining biodiversity-rich agroforestry systems in the Ecuadorian Amazon. Ilex guayusa is a shade-tolerant perennial tree, which is harvested biannually and cultivated in agroforestry systems across the western Amazon. In 2009, RUNA began large-scale commercialization of guayusa; they currently source leaves from over 3,000 small-scale indigenous producers in the Ecuadorian Amazon and sell guayusa tea and beverages in over 7,000 locations. RUNA is certified Fair Trade and organic, ensuring that producers obtain a minimum price, as well as a social premium fund for community development. Guayusa cultivation is largely informed by ancestral knowledge, augmented by scientific research funded by RUNA. For Kichwa farmers, guayusa has strong cultural significance and that has been incorporated into agroforestry management. Using the successful commercialization of guayusa as an example, this presentation examines the potential for and difficulties of creating innovative supply chains centered around indigenous agroforestry systems. Specifically, we investigate the development of supply chains in conjunction with conservation initiatives, as a template for integrated landscape management that provide significant benefits to local communities and forest ecosystems.

Key Words: Agroforestry, landscape management, buffer zones, indigenous communities, Amazon.

# APPARENT REDUCTION IN SEA TURTLE ABUNDANCE IN ANTOFAGASTA BAY (CHILE)

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For several decades, Chelonia mydas and Lepidochelys olivacea have been associated with certain bays in the north of Chile where they were reported interacting with fishing ports and thermal discharges of power plants. Groups of up to 50 individuals were reported to reside in these bays, consuming benthos and undertaking interactions with common sea lions Otaria flavescens. Their presence in this area was related with warming and retention process in some sectors of the bays. In this area, sea surface temperatures are lowest in June-October, driven seasonal upwelling variability. As such, sea turtles are expected to be present during the warmer, first months of the year. On the other hand, it has been suggested that negative interactions between sea turtles and sealions were the force driving variation in sea turtle numbers. These hypotheses have not been formally tested. With the aim of estimating the current abundance of sea turtles in Antofagasta bay, by first time in this area we made several marine surveys with the local artisanal fishing fleet in the January-December 2014 period. Sea lions and other vertebrates were abundantly recorded in all of our tracks, but during the survey period, no effective captures or sightings were made of sea turtles. During the same period we report several landings of sea turtles around the Peninsula of Mejillones, a non-urban setting, as well as several sightings made by other scientific researchers or fishermen. In contrast to previous decades, our results indicate the almost total absence of sea turtles in Antofagasta Bay during the survey period.

Key words: Lepidochelys olivacea, Chelonia mydas, Northern Chile, abundance.



# BURNING FOR SUSTAINABILITY: DETERMINANTS OF FIREWOOD CONSUMPTION IN A FRAGMENTED LANDSCAPE OF ATLANTIC FOREST OF BRAZIL

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The Atlantic Forest of Brazil is a global hotspot for species conservation due the high number of endemic species and the degrees of threats that still suffer, currently having only less than 12% of the original forest. Still, provides environmental goods and services to human populations, including low-income people who directly use wood for cooking resources. Due to the low number of studies of the impacts of the use of firewood in this region, through surveys with 208 heads of families, we identified the socioeconomic profile of the rural consumer of domestic firewood in the northeastern portion of the country, the favorite firewood, the average used by family, the source and type of firewood used and it was possible to create a map of sustainable use of wood in this region. In addition, an experiment was conducted in 25 forest logging areas and 25 control areas to estimate the impact of logging on seedling regeneration. With the help of local organizations we conducted a pilot project with families in two rural communities to implement 80 ecological stoves. We achieved a significant reduction of the firewood use and on the health effects of people. The results of this study are important, not only for generation of scientific data about the sustainable use of firewood, but were extremely important to draw government attention to this social and environmental problem before neglected.

Key words: Rural Communities, Timber Resources, Conservation, Ecological stoves.

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# ABUNDANCE AND RECORDS OF <u>PALEOSUCHUS</u> <u>TRIGONATUS</u> (CROCODYLIA: ALLIGATORIDAE) IN EREBATO RIVER BASIN, VENEZUELA.

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Paleosuchus trigonatus is used as resource by Ye'kwana and Sanema communities that inhabit the Erebato River Basin, but are perceived for them as one of the most threatened species. It was proposed to evaluate the abundance of this species in the major tributaries of the basin and compare these data with hunt records. The counts consisted of daytime and night tours. The first, walking in the margin creeks, while the night counts is done in canoes, rowing or motor, according to the accessibility of the water body. In most evaluated localities, the species was found. High values of abundance were not observed, except for the Caño Ajuju, in Upper Ka'kada River in which 2.3 individuals per linear kilometer of the water body were recorded. The heterogeneous distribution suggest that in the most remote areas of the basin, where a greater number of individuals was observed, populations are still relatively abundant, but not in more accessible creeks and portions of the river, where indigenous communities practice subsistence hunting and fishing. Due to the cryptic characteristic of this species is recommended to include other indices, such as occupation and the detection probability, in order to obtain more robust data to infer more precisely the population status of this species of crocodilian in the Erebato River Basin.

*Key words*: *Paleosuchus trigonatus*, Abundance, Distribution, Erebato River, Venezuela.



# REPRODUCTIVE ASPECTS OF <u>PALEOSUCHUS</u> <u>TRIGONATUS</u> (CROCODYLIA: ALLIGATORIDAE) IN EREBATO RIVER BASIN, VENEZUELA.

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The ecology of *Paleosuchus trigonatus* is poorly known, even more things related to reproductive events. The objective was to characterize the reproductive events of P. trigonatus in Erebato River Basin. A nest of *P. trigonatus* from Caño Washadi, in Middle Erebato River, which is the first record of this kind for Venezuela, is described and discussed the characteristics and timing of the nests found between 2012 and 2014. The nest was found on May 2013, partially predated for *Tupinambis teguixin*. Thirteen eggs were counted, eight of which were intact. It was characterized the micro-habitat where the nest was located and eggs measured and weighed. The eggs biomass varied between 82 and 91.5 grams. The nest was built at the base of a tree, on a mound of active termites, within 1,5 meters of the water body. These characteristics are consistent with those reported for nests of this species in countries of the Amazon Basin. Data from five nests, a female with eggs inside, and reliable anecdotal records indicates that reproductive season of *P. trigonatus* covers dry and rainy seasons, aspects not registered to any other crocodilian species of Neotropical Region.

*Key words: Paleosuchus trigonatus*, Reproductive Events, Nest, Erebato River, Venezuela.

# CONSERVATION OF TELMATOBUFO BULLOCKI IN FRAGMENTED FORESTS OF NAHUELBUTA

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Telmatobufo bullocki (Anura, Calyptocephalellidae) is among the most threatened amphibian species in Chile's temperate forests. Its distribution is restricted to the Nahuelbuta Range, where it lives associated to fast-flowing streams and native forest. One of the main threats for this species is the dramatic loss and fragmentation of native forest, caused mainly by exotic forestry plantations. Several surveys were conducted within Nahuelbuta to assess current distribution and habitat use, and telemetry was used to study the species' movement patterns and behavior. In addition, GIS and a landscape genetics approach were used to assess current levels of population connectivity, and propose a network of connectivity corridors based on inferred dispersal routes. Despite T. bullocki rareness and relatively low abundance, several extant populations were found. T. bullocki made extensive use of terrestrial habitat, where it was found in burrows up to 500 m away from breeding streams. In order to protect T. bullocki populations from clear-cut operations, an estimated core riparian area of at least 220 m from breeding streams should be protected. In addition, connectivity among breeding streams should be maintained through the establishment of a native corridor network. Along with the research components, a website (www.anfibiosdenahuelbuta.com) and a small documentary were developed to increase public awareness on Nahuelbuta amphibian diversity and threats. This project represents an effort to understand T. bullocki threats and develop necessary conservation measures to secure the species' long-term persistence.

Keywords: *Telmatobufo bullocki*, Nahuelbuta Range, conservation, connectivity, forestry plantations.

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