



BOOK OF ABSTRACT

- I. SESSION DESCRIPTION
- II. SESSION PROGRAM
- III. ABSTRACTS

I. SESSION DESCRIPTION

ID: B1

Title of session:

Ecosystem Services Approach related to the manage of the coastal marine zone

Hosts:

	Title	Name	Organisation	E-mail
Host:	Prof.	Pedro Roberto Jacobi	University of São Paulo	prjacobi@gmail.com
Host:	Mr.	Americo Alexander Sanchez Fernandez Baca	Red ECOMAR & IMARPE (Marine Research Institute of Perú)	amsanchez@imarpe.gob.pe
Co-host:		Alexander Turra , Marina Ribeiro Correa, Caroline Cichoski		capopck@hotmail.com; marina.ribeiro.correa@usp.br; turra@usp.br
Co-host:				
Others involved:				

Abstract:

The coastal zone is considered one of the most vital socio-ecological system in the world. It is composed by an ecosystem mosaic and provides a wide range of Ecosystem Services. The maintenance of its quality and processes is essential to the sustainability of human activities. Nonetheless, threats to coastal areas are derived from activities in both marine and terrestrial territories



Mangrove forests, coastal wetlands, estuaries, coral reefs, sea grass beds, macroalgae assemblages and upwelling areas in Latin America and Caribbean support economic activities in the region like fisheries, aquaculture and marine eco-tourism, are supported by coastal marine ecosystem

The coastal ecosystem has to be seen as a unit to be managed: the Ecosystem Services approach may be a key concept to achieve this view at different scales of policy implementation and sustainable management of coastal areas. Yet, several issues remain to be solved to integrate this approach into Coastal Management.

The session will abord the studies, projects and programs made in Latin America and Caribbean, about ecosystem services in coastal marine zones for manage. The discussion will be focused on these mechanisms and how they are being implement in processes of governance and management like MSP, conservation management and others. »

Goals and objectives of the session:

Debate the adoption of the Ecosystem Services Approach into Coastal Management, its achievements and challenges. Moreover, the session will debate diverse ways developed to achieve this integration

The use of the CMES studies and initiatives for reducing the social conflicts, also how known are this studies and initiatives by the people who lives in coastal marie zones.

The use of PES for ecosystem monitoring, motivate conservation actions, and management policies like MSP or coastal marine management

Planned output / Deliverables:

Survey of case studies, bibliographic reviews and analysis of methodologies of practices that allow advances for the integration of the Ecosystem Services Approach into Coastal Management and decision making./ Elaboration of a joint document addressing how the Ecosystem Services Approach is being implemented into the Coastal Management and guidelines to the future

Related to ESP Working Group/National Network:

[Biome Working Groups– BWC 1 – Marine systems](#)

II. SESSION PROGRAM

Date of session: Tuesday, 23 October 2018



Time of session: 13:30– 17:00

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
13:30–13:45	Americo	Sanchez	Red ECOMAR & IMARPE (Marine Research Institute of Perú)	Session Introduction
13:45–14:00	Carla	Ellif	Universidade Federal da Bahia	Assessment of shoreline protection by coral reefs and habitat risk in a Brazilian archipelago using InVEST and SMC–Brasil
14:00–14:15	Isadora	Okuma Barbosa Ferraz Bragantini	University of São Paulo	Carbon dioxide from soil to atmosphere: how mangroves losses contribute to climate change?
14:15–14:30	Yara	Schaeffer–Novelli	University of São Paulo	Aerial Rivers and Monsoon System in South America
14:30–14:45	Andrés	Vagas	Universidad del Norte	Biodiversity and the portfolio effect: some implications for the poverty–biodiversity nexus
14:45–15:00	Julio Cesar	Mazenet–González	Participante no asociado	Los Servicios de los Ecosistemas del Área Urbana del Distrito de Santa Marta, Colombia.
15:30–15:45	Darlin	Botto–Barrios	Red ECOMAR	Valoración socioeconómica de la pesca y otros servicios ecosistémicos asociados en relación con el bienestar de dos comunidades pesqueras en el Caribe y Pacífico colombiano
15:45–16:00	Nadia	Selene Zamboni	Federal University of Rio Grande do Norte	Economic value and spatial–temporal dynamic of carbon stored in the Brazilian northeast mangroves
16:00–16:15	Julián	Prato Valderrama	Universidad Nacional de Colombia	Coastal protection from attenuation of wave height by coral reefs barrier at Serranilla Island, Seaflower marine biosphere reserve: ecosystem approach and importance for management at Caribbean islands



16:15–16:30	Marina	Ribeiro Corrêa	University of São Paulo	Does beach management considers Ecosystem Services and their vulnerability to Climate Changes?
16:30–16:45	Caroline	Cichoski	University of São Paulo	Marine ecosystem services and their threats according to stakeholder views in the Marine Protected Area – North Coast of São Paulo.

III. ABSTRACTS

The abstracts appear in alphabetic order based on the last name of the first author. The first author is the presenting author unless indicated otherwise.

1. Type of submission: **Abstract**

B. Biome Working Group sessions: B1 Ecosystem Services Approach related to the manage of the coastal marine zone

Valoración socioeconómica de la pesca y otros servicios ecosistémicos asociados en relación con el bienestar de dos comunidades pesqueras en el Caribe y Pacífico colombiano

First authors(s): Darlin Botto-Barrios, Lina Saavedra-Díaz

Other author(s): Sandra Vilardy

Affiliation, Country: Red ECOMAR Red ECOMAR, Universidad del Magdalena, Colombia

Contact: darlinbottobarrios@gmail.com

La pesca es uno de los principales servicios ecosistémicos suministrados en las zonas costeras, es la principal fuente de proteínas para las poblaciones que de ella dependen. Taganga (Caribe colombiano) y Tumaco (Costa Pacífica), son dos poblaciones con una identidad cultural asociada a la pesca y gran parte de sus ingresos económicos dependen de ella. Mantener la actividad pesquera y los procesos socioecológicos de los que depende, se convierte en una prioridad para estas comunidades. El presente estudio identifica los servicios asociados a la pesca y su impacto en el bienestar de estas comunidades, mediante una valoración socioeconómica. Se realizaron 14 grupos focales, con la participación de 115 pescadores y otros líderes del sector para identificar los servicios asociados a la pesca, valorarlos y analizar la relación de estos con su bienestar; para la valoración económica de los servicios se utilizó la disponibilidad a pagar mediante el uso de encuestas. Los resultados evidencian la



importancia que tiene para los pescadores de ambas comunidades la pesca como servicio de abastecimiento, adicionalmente se identificaron 8 servicios asociados (Taganga: 8; Tumaco: 7). Se observó que la pesca contribuye en ambas comunidades a diferentes dimensiones del bienestar de los pescadores: calidad de vida (Taganga: 22.5%; Tumaco: 16.8%), actividad laboral (Taganga: 21.8%; Tumaco: 36.1%) y seguridad alimentaria (Taganga: 18.8%; Tumaco: 14.5%). Sobre la valoración económica, los pescadores están dispuestos a invertir en promedio 1,9 horas diarias de trabajo voluntario para preservar la pesca (disponibilidad a pagar US\$ 3/día). En ambas comunidades, los servicios de abastecimiento y culturales asociados con la pesca, registran mayor valor de importancia. Se evidencia interés de los actores locales en preservar el servicio de la pesca y los servicios asociados, a través de la disponibilidad de invertir horas de trabajo voluntario para este fin.

Keywords: servicios ecosistémicos, bienestar humano, pesca artesanal, conocimiento ecológico local

2. Type of submission: **Abstract**

B. Biome Working Group sessions: B1 Ecosystem Services Approach related to the manage of the coastal marine zone

Carbon dioxide from soil to atmosphere: how mangroves losses contribute to climate change?

First author(s): Isadora Okuma Barbosa Ferraz Bragantini

Other author(s): Ângelo F. Bernardino, Hermano M. Queiroz, Luiz Eduardo de Oliveira Gomes, Tiago O. Ferreira

Affiliation, Country: ESALQ Departamento de Ciência do Solo, Escola Superior de Agricultura Luiz de Queiroz, ESALQ/USP, Brazil.

Contact: isadora.bragantini@usp.br

Mangroves are ecosystems known for their “Blue Carbon” fundamental functions as carbon sinks and reduction of greenhouse gases. Nevertheless, mangrove forests are lost to impacts by anthropic or natural causes. This study is part of a Long Duration Ecological Program that aims evaluate the mangrove forest located in the Piraquê-Açu and Piraquê-Mirim rivers in Aracruz, Espírito Santo, which lost 24% of the forest after a hailstorm in 2016. CO₂ fluxes were measured in 2018 in four sites: 2 forested (FS) and 2 impacted (IS). The gaseous samples were collected in triplicate on low tides during the dry and wet season using chambers and



measured every 15 minutes (e.g. 0, 15 and 30 minutes) during 3 hours on four placements. The CO₂ concentrations were determined by gas chromatography and calculated using the universal gas equation, considering the changes in gases concentration over the time in the closed chamber associated with the chamber volumes and area, soil temperature and atmospheric pressure. The mean CO₂ fluxes did not present significant difference among sites (FS: 62.9±39.2 mg m⁻² h⁻¹; IS: 68.0± 40.8 mg m⁻² h⁻¹; p= 0.8174). However, in the impacted forest there are no longer inputs by plant biomass and soil, only CO₂ emission, decreasing the carbon soil storage. Thus, more studies are needed to evaluate C storage of those carbon sinks. Since GHG reduction is a primary mangrove ecosystem function, the maintenance and preservation of those ecosystem are of the utmost importance. Public policies for mangroves preservation, increase of Long Duration Ecological Program sites and better compliance of the Brazilian Forest Law (Lei de Preservação de Vegetação Nativa), would promote a higher conservation of marine ecosystems.

Keywords: Carbon dioxide emissions, Greenhouse gases, Carbon stock, Blue carbon, Coastal ecosystem

3. Type of submission: **Abstract**

B. Biome Working Group sessions: [B1 Ecosystem Services Approach related to the manage of the coastal marine zone](#)

Marine ecosystem services and their threats according to stakeholder views in the Marine Protected Area – North Coast of São Paulo

First authors(s): Caroline Cichoski, Paulo Antônio de Almeida Sinisgalli

Affiliation, Country: Universidade De São Paulo Procam USP, EACH – USP, Brazil

Contact: capopck@hotmail.com

The north coast of São Paulo is responsible for providing numerous Ecosystem Services (ESs), direct and indirect benefits to humans. Due to the potential use of ESs for management, we considered important to identify ESs and threats to their maintenance, and then discuss relationships with management council member's of Marine Protected Area. This work aims to analyze the perception of the Management Council's members of the SP North Coast on the marine ESs and their threats. It was based on the evaluation of actors' perceptions, which work in the management of the marine protected area of SP North Coast, on what marine ESs they are able to identify and how they perceive the threats to those ESs. Nineteen interviews were conducted with members of the Management Council in 2018. The main ESs were then



compiled for a semi-structured interview using a free-listing method that identifies items in a cultural domain. Data were analyzed by Visual Anthorpac 1.0 calculating Smith's Index (SI) and classification of major marine SE's and their threats. Our conclusions are that the fishing industry and tourism are the most important SEs for the interviewees, with a SI of 0,74 and 0,526, respectively. The main threats to them are those that directly interfere, in short term, in their daily activities, such as sewage and solid waste (SI 0,611 e SI 0,131). Ecosystem services and threats that have larger temporal and spatial scales, as climate regulation and climate change, are less salient, (IS 0,193 e IS 0,083) indicating the need to include in the coastal management discussion. This stage of the research indicates the need for collective construction of the ESs and climate change's understanding. Although climate change is an imminent threat to the coastal, the problem is not identified by the managers that work in the region.

Keywords: Ecosystem services, Marine Protected Area, climate change, perception.

4. Type of submission: **Abstract**

B. Biome Working Group sessions: [B1 Ecosystem Services Approach related to the manage of the coastal marine zone](#)

Does beach management considers Ecosystem Services and their vulnerability to Climate Changes?

First authors(s): Marina Ribeiro Corrêa

Other author(s): Alexander Turra

Affiliation, Country: University of São Paulo University of São Paulo, Brazil

Contact: marina.ribeiro.correa@usp.br

Global changes such as Climate Change and its effects on ecosystems have led to the development of new management strategies such as Ecosystem-Based Management (EBM): a holistic and adaptive approach to diagnose socio-ecological vulnerabilities and early respond to them. Among the challenges for its implementation, the lack of a systemic vision and the divergence of opinions among decision makers are intensified in the management of complex environments, such as sandy beaches. The management of impacts in this environment tends to prioritize few ecosystem functions and disregard ecological processes and the effects of climate change on them. Thus, to understand if and how beach management decision makers identify and prioritize the Ecosystem Services provided by the sandy beaches and its vulnerabilities to Climate Change are important steps to map the limitations and opportunities



of the implementation of EBM for beaches. This is the objective of this project, which will study the North Coast of São Paulo State. Through techniques such as survey and document review (of public policies, legal norms and scientific literature), analysis of social networks, interviews with key actors, discourse analysis and SWOT analysis, it is proposed to discuss how different views can affect the application of EBM in beaches, subsidize strategies to overcome difficulties and limitations encountered and to increase the theoretical framework related to adaptations to Climate Change.

Keywords: Decision making; Ecosystem Approach; Coastal Zone; Ecosystem-based Management; Integrated Coastal Management; Ecosystem Services

5. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B1 Ecosystem Services Approach related to the manage of the coastal marine zone

Assessment of shoreline protection by coral reefs and habitat risk in a Brazilian archipelago using InVEST and SMC-Brasil

First authors(s): Carla Elliff

Other author(s): Iracema R. Silva

Affiliation, Country: Universidade Federal da Bahia, Brazil

Contact: carlaelliff@gmail.com

The archipelago of Tinharé-Boipeba, northeastern coast of Brazil, is bordered by a fringing reef system that promotes a variety of ecosystem services. Coastal vulnerability and shoreline protection were evaluated in the area to assess the role of coral reefs in these processes. The InVEST coastal vulnerability model was used to qualitatively estimate the potential of shoreline protection against erosion and inundation. Two scenarios were created: the first was the current situation of the archipelago and the second was a scenario in which the coral reefs no longer existed. To complement the analysis, the Brazilian coastal modelling system SMC-Brasil was used to model hydrodynamics under storm surge conditions at different tide levels. Finally, the InVEST habitat risk assessment model was also applied to identify areas with the highest risk of losing their capacity to deliver ecosystem services. The coral reefs analyzed presented potential for shoreline protection along 50.5% of the islands. Moreover, 46.8% of the shoreline would present moderate to high vulnerability in case of coral reef disappearance. Even under storm surge conditions during a high tide, when the reefs are completely submerged, wave height decreased from 2.5 m to under 0.5 m in some areas. The coincidence



of areas with high risk of loss in the capacity to provide services and high vulnerability in the scenario of absence of reefs is concerning. Thus, current management strategies should be rethought seeking to make the most of ecosystem services delivered and increase coral reef resilience.

Keywords: coastal vulnerability, fringing reef, ecosystem services, hydrodynamics

6. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B1 Ecosystem Services Approach related to the manage of the coastal marine zone

Los servicios de los ecosistemas del área urbana del distrito de santa marta colombialos servicios de los ecosistemas del área urbana del distrito de santa marta colombia

First authors(s): Julio César Mazenet–González, Sandra Vilardy Quiroga

Affiliation, Country: Universidad del Magdalena Participante no asociado, Colombia

Contact: juliomazenet@gmail.com

Santa Marta es una ciudad costera de 491387 habitantes, ubicada en las estribaciones de la Sierra Nevada de Santa Marta, con gran influencia de los vientos Alisios del Norte. El clima es cálido seco o muy seco, con formaciones de bosque seco tropical y la influencia de 2 ríos principales. Por sus características naturales es objeto de desarrollo turístico, comercial y portuario. El objetivo de este trabajo fue identificar los servicios de los ecosistemas percibidos por los actores y su relación con el bienestar humano, como insumos para el ordenamiento en un esquema de manejo integrado costero. Se realizó un análisis de percepción en 5 sectores del área urbana de Santa Marta, aplicando 120 entrevistas, entre enero y abril de 2014. Se obtuvieron 403 respuestas sobre servicios de los ecosistemas de las cuales 52,6% fueron culturales, 28.3% de abastecimiento y 19,1% de Regulación. 80.3% de los servicios percibidos pertenecen a 3 categorías: disfrute del paisaje y recreación (45,5%), ciclos de regulación del clima (20,7%) y alimento (14,1%). La tendencia de cambio mostró que el 54% de los servicios disminuye, el 38% se mantiene, el 5% aumenta y el 3% desaparece o no se sabe. Se encontró que el 43,4% de los servicios son esenciales, el 34,1% muy necesarios, el 18,2% necesarios y el 4,3% importantes, pero no necesarios. Especialmente se encontró que en el sector 1 (Rodadero –aeropuerto) se identificaron el 80% de las categorías, mientras que en el sector 5 (Taganga), solo el 60%. La prevalencia de la categoría disfrute del paisaje y recreación en los sectores 1 y 5, se debe a sus características naturales. Por la importancia de los servicios de



los ecosistemas para el bienestar de los actores, es necesario incluirlos en los planes de manejo y en las políticas de desarrollo local.

Keywords: Santa Marta, Servicios de los ecosistemas, Percepción de servicios, Tendencias de cambio, Manejo Costero.

7. *Type of submission: Abstract*

B. Biome Working Group sessions: B1 Ecosystem Services Approach related to the manage of the coastal marine zone

AERIAL RIVERS AND MONSOON SYSTEM IN SOUTH AMERICA AND MONSOON SYSTEM IN SOUTH AMERICA

First authors(s): Yara Schaeffer–Novelli

Other author(s): Gilberto Cintrón–Molero

Affiliation, Country: University of São Paulo, Instituto BiomaBrasil, Brazil

Contact: novelli@usp.br

Aerial Rivers – AR in South America are associated with the South American Monsoon – SAM System that encompasses half of the continent's air shed and is a continental scale climatic feature. This "atmospheric lake" is a first order environmental service generator because of its vital role and spatiotemporal scope. The SAM is in turn the source of atmospheric rivers that interact with the land to produce complex feedbacks at multiple subordinate scales. The Amazon rainforest is considered a vital component of the SAM acting as a powerful pump that feeds moisture back into low level atmospheric air flows that become ARs; although these components of the aerial hydrologic cycle are mostly continental, a distinctive branch is the signature of the mature SAM; the South Atlantic Convergence Zone – SACZ, a monsoon trough (low) that runs along the subtropical plains and intersects the east coast within 20°–30°S triggering mesoscale–convective phenomena that influence salinity and nutrient regimes within this coastal setting that is characterized by highly productive salt marsh–mangrove ecosystems which are highly sensitive to salinity levels. We suggest that the AR phenomena are not only vital for the continental delivery of ecosystem services but that greater attention must be focused on coastal–atmospheric processes. Furthermore, we highlight that greater awareness is needed of the fact that the 'management' of related issues is different from most other environmental management issues because of its continental scope and the fact that most managerial practices involve stable or quasi stable systems whereas the management of AR's to conserve the performance of ecological services delivered involves dealing with severe



atmospheric instability. The administration of unstable processes to maintain reliable and safe delivery of ecological services involves; Preventive mitigation actions containment quick recovery and the reduction or elimination of "apparently" non-climatic threats such as widespread burning and deforestation. Management/policymaking requires sustained foresight to conceive and implement "win-win" policies focused on shared goods and coevolutionary behavior.

Keywords: Aerial rivers, South American Monsoon System, South Atlantic Convergence Zone, Brazilian east coasts' mangroves and salt marshes.

8. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B1 Ecosystem Services Approach related to the manage of the coastal marine zone

Coastal protection from attenuation of wave height by coral reefs barrier at Serranilla Island, Seaflower marine biosphere reserve: ecosystem approach and importance for management at Caribbean islands.

First authors(s): Julián Prato Valderrama, Adriana Santos Martínez

Other author(s): Adriana Santos Martínez, Andrés Fernando Osorio, Juan David Osorio-Cano, Peter Shuhmann; Herman Leon.

Affiliation, Country: Universidad Nacional de Colombia, Colombia

Contact: jprato@unal.edu.co

Coral reefs provide a large amount of ecosystem services and are recognized for their great biodiversity. For various reasons, they have suffered degradation and coverage losses about close to 80% in the case of the Caribbean Sea. These losses diminish their capacity to provide ecosystem services for the well-being as coastal protection and stability of coastal territory. The present valuation of ecosystem services research was developed with the objective of generating knowledge about the coastal protection service provided by coral reefs of Isla Cayos de Serranilla at Seaflower the Colombian Marine Biosphere Reserve recognized by UNESCO. To quantitatively evaluate in the field the capacity of wave energy attenuation of the reef barrier, wave sensors were installed in a sector adjacent to Beacon Cay, the main cay of the island that supports households. The sensors were located at a point exposed to the waves outside the barrier and one inside the reef lagoon on the wave protected area. The ability to attenuate wave energy (wave height) was up to 63%. The passage of Hurricane Irma north of I.C. Serranilla during the sampling days generated a change in the wind pattern, causing the



wave direction to be reversed, which allowed to demonstrate the role of bidirectionally attenuating the barrier. The results highlight the importance of coral reefs for the integrity of coasts in oceanic islands by generating coastal protection thanks to the attenuation of wave energy they generate. These results are evidences to improve the knowledge and recognition of coral reefs importance for human wellbeing specially at island territories, aspects that should be highly consider for and adequate coastal management and increase of investments on marine ecosystems protection.

Keywords: Coastal protection, coral reefs, I.C. Serranilla, Seaflower, ecosystem services, coastal management.

9. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B1 Ecosystem Services Approach related to the manage of the coastal marine zone

Biodiversity and the portfolio effect: some implications for the poverty–biodiversity nexus

First authors(s): Andrés Vargas

Other author(s): David Díaz, Sebastián Restrepo

Affiliation, Country: Universidad del Norte Universidad del Norte, Colombia

Contact: andresmv@uninorte.edu.co

It is an increasingly accepted idea that biological diversity stabilizes ecosystem processes and the services they provide to society. If the resources people depend on for their livelihoods have a varied response to changes in environmental conditions, then they can harvest diverse portfolios in order to stabilize their yield and income. This effect is analogous to the risk–spreading function of financial portfolios. On this light, this paper explores the relationship between poverty and changing environmental conditions in an open–access small–scale fishery context, in which fishermen manage the impacts of ecological changes through their access to the labour market and diverse fishing portfolios, oriented to maintain their livelihoods health. This paper develops a poverty–environment trap model to characterize the stabilizing role of biodiversity under normal and extreme environmental conditions. A case study of an estuarine ecosystem in a Colombian Biosphere Reserve is presented to illustrate the argument.

Keywords: Biodiversity, fishery, poverty, environmental conditions, our market



10. Type of submission: **Abstract**

B. Biome Working Group sessions: B1 Ecosystem Services Approach related to the manage of the coastal marine zone

Economic value and spatial-temporal dynamic of carbon stored in the Brazilian northeast mangroves

First author(s): Nadia Selene Zamboni

Other author(s): Venerando Amaro, Maria de Fátima Alves de Matos, Adriana Pelegrini Manhães, Adriana Rosa Carvalho

Affiliation: Federal University of Rio Grande do Norte, Brazil

Contact: nselenezamboni@gmail.com

Mangroves are an important blue carbon ecosystem, that provides carbon sequestration and storage services, contributing to global warming mitigation. The economic value of such services depends on the vegetation characteristics and on prices in the carbon credit market. In order to quantify and valuate temporal variations in the carbon sequestration and storage services of mangroves species in north-eastern Brazil, hybrid remote sensing images from the years 1999, 2007 and 2017 were processed to identify and map different Land Use and Land Cover conversions. The Blue Carbon Model of the software InVEST was used to estimate carbon storage and sequestration as well as their economic values. A decrease in mangrove cover area and carbon stocks were observed throughout 18 years. The total net carbon sequestration obtained was 370.38 tCO₂e.ha⁻¹ with an economic value of US\$2,621.3.ha⁻¹. The value of these mangroves represents potential tool to support policies of payments for ecosystem services and should be included in further conservation and restoration projects in the region.

Keywords: blue carbon, carbon sequestration, carbon stock, LULC maps, InVEST, spatial planning