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# XVII Iberian Symposium on Marine Biology Studies (SIEBM)

11<sup>th</sup> - 14<sup>th</sup> September 2012. Donostia-San Sebastián (Spain)

## Programme



### Day 1 - 11 september

**11:00 - 15:00 REGISTRATION  
POSTER INSTALLATION**

**15:00 - 15:30 OPENING WORDS**

**15:30 - 16:15 OPENING TALK**  
"Iberian marine research: from the past to the future challenges" F. Xavier Niell (Universidad de Málaga)

**16:15 - 16:30 COFFEE- BREAK**

#### SESSION - PELAGIC ECOLOGY

**16:30 - 16:50** Phytoplankton distribution across the Atlantic Ocean and the neutral theory of biodiversity

**16:50 - 17:10** Zooxanthellae importance in the development of the pelagic phase of the blooming jellyfish *Cotylorhiza tuberculata* (Scyphozoa: Rhizostomeae)

**17:10 - 17:30** Reproduction and respiration of a climate change indicator copepod *Centropages chierchiai*: effect of temperature and variable food supply

**17:30 - 17:50** Patch dynamics and early life stages mortality of anchovy (*Engraulis encrasicolus* L.) in the south-eastern Bay of Biscay.

**17:50 - 18:10** Comparative analysis of the larval growth patterns of five fish species in the Bay of Biscay

**18:10 - 18:30** Cannibalism and IntraGuild predation on anchovy (*Engraulis encrasicolus* L., 1758) eggs in the Bay of Biscay

**18:30 - 18:50** Environmentally sensitive recruitment embedded in a Bayesian model for the European anchovy

**18:50 - 19:10** La edad y el crecimiento del atún rojo Atlántico (*Thunnus thynnus thynnus*)

**19:10 - 19:30** Stock structure of some deep sea fishes (*Helicolenus dactylopterus* and *Pontinus kuhlii*) in Azores Archipelago using otolith elemental fingerprints

**20:30 WELCOME RECEPTION IN THE AQUARIUM OF SAN SEBASTIAN.  
LIGHT SNACK WILL BE SERVED**

### Day 2 - 12 september

**08:45 - 09:30 PLENARY TALK**  
"Portuguese Polar Science: Recent advances and perspectives in Marine Biology"  
José Carlos Caetano Xavier (IMAR, Coimbra)

#### ROOM A - SESSION BENTHIC ECOLOGY

**09:30 - 09:50** Diversity and similarity of marine fungi associated to driftwood from four geographic regions of the western coast of Portugal

**09:50 - 10:10** Efectos de la salinidad sobre el crecimiento, la fluorescencia de clorofila y el drift de la microalga bentónica *Cylindrotheca closterium*

#### ROOM B - SESSION RESTORATION, CONSERVATION & PLANNING

A reassessment of Fucacean communities next to a cancelled waste in the Northwest of Spain. Effects of the improvement of the environmental protection technology

<b>10:10 - 10:30</b>	Spatial variation of solar radiation (PAR and UVR) and temperature in subtidal beds of <i>Gelidium corneum</i> (Eastern Cantabrian Sea) and its relationship to biochemical variables	Evolución de las praderas de <i>Posidonia oceanica</i> en la Comunidad Valenciana entre 2001y 2011
<b>10:30 - 11:00 COFFEE- BREAK</b>		
<b>ROOM A - SESSION BENTHIC ECOLOGY</b>		<b>ROOM B - SESSION RESTORATION, CONSERVATION &amp; PLANNING</b>
<b>11:00 - 11:20</b>		Impact of divers on benthic communities: a tool to establish the carrying capacity at Medes Islands
<b>11:20 - 11:40</b>	Performance of the seagrass <i>Cymodocea nodosa</i> and associated biota under an experimental fertilization scenario: does clonal integration modulate responses?	Efecto de la protección en las poblaciones de dos especies de lapas de interés marisquero en la Reserva Marina de La Palma, Islas Canarias
<b>11:40 - 12:00</b>	Dinámica del crecimiento del coral escleractinio <i>Oculina patagonica</i> en dos ambientes diferentes en la costa de Alicante	El apoyo a la gestión de especies marinas protegidas a través de entidades diferentes. el coral naranja y la asociación hombre y territorio
<b>12:00 - 12:20</b>	Estudio de la reproducción del coral Mediterráneo <i>Cladocora Caespitosa</i> (Anthozoa, Scleractinia)	Evolution of the spiny lobster <i>Palinurus elephas</i> in a temperate protected area over two decades
<b>12:20 - 12:40</b>	Mother care in gorgonians: the <i>Paramuricea clavata</i> and <i>Eunicella singularis</i> case study	Caracterización y diagnosis del estado de conservación de las comunidades profundas dominadas por especies longevas y estructurales en la Reserva Marina de las Islas Columbretes y su entorno
<b>12:40 - 13:00</b>	The sea fan ( <i>Paramuricea clavata</i> ) ‘forests’ near the Blanes Canyon (Spain, Northwestern Mediterranean)	Patrones de movimiento espacial y temporal de dentón ( <i>Dentex dentex</i> ) en la Reserva Marina de las Illes Medes (Med. NW)
<b>13:00 - 13:20</b>	Removing environmental noise: true symbionts vs. transient microbes in Mediterranean sponges	Ten years of monitoring Tagus estuary at Porto do Buxo and Portinho da Costa (Almada’s Municipality, Portugal): evidence of positive impacts on the ecosystem as a result of sanitation infrastructural improvements
<b>13:20 - 14:45 LUNCH</b>		
<b>ROOM A - SESSION BENTHIC ECOLOGY</b>		<b>ROOM B - SESSION GENETICS AND TAXONOMY</b>
<b>14:45 - 15:05</b>	Population dynamics of short lived species can validate the trophic impact of long-lived species: the hydrozoan case study	How many genotypes in a sole individual? Extent of chimerism in natural sponge populations
<b>15:05 - 15:25</b>	Natural products from Antarctic colonial ascidians of the genera <i>Aplidium</i> and <i>Synoicum</i> : variability and defensive role	Identificación de megalopas de cangrejos (Decapoda: Brachyura) de la Península Ibérica mediante código de barras de ADN
<b>15:25 - 15:45</b>	Growth, age and size at sexual maturity of the sword razor clam <i>Ensis arcuatus</i> (Jeffreys, 1865) from the Ría de Pontevedra (NW Spain)	Diversidad y origen de las especies del género <i>Ophiothrix</i> (Ophiuroidea, Echinodermata) en Europa
<b>15:45 - 16:05</b>	Latitudinal gradients in <i>Scrobicularia plana</i> reproduction patterns, population dynamics, growth, and secondary production	Relaciones filogenéticas del género <i>Thunnus</i> basadas en el genoma mitocondrial
<b>16:05 - 16:25</b>	Espanjas carnívoras del Cañón de Avilés (Mar Cantábrico)	The mating genes: what determines dominance?
<b>16:25 - 16:55 COFFEE- BREAK</b>		

ROOM A - SESSION BENTHIC ECOLOGY		ROOM B - MANAGEMENT OF LIVING RESOURCES
<b>16:55 - 17:15</b>	Sources of secondary metabolite variation in sponges: temporal, ecological, and ontogenetic trends of avarol production in <i>Dysidea avara</i>	The gooseneck barnacle ( <i>Pollicipes pollicipes</i> ) in the Basque Country (Northern Spain): facing the future of its management
<b>17:15 - 17:35</b>	A faithful marriage: temporal and spatial stability of host-specific bacterial symbionts in 3 sympatric <i>Ircinia</i> spp. (Porifera)	La pesquería de erizo ( <i>Loxechinus albus</i> ) en Chile
<b>17:35 - 17:55</b>	Inferring the ancestral reproductive condition in sponges (Porifera)	Sea urchin ( <i>Paracentrotus lividus</i> ) biomass assessment in the Basque Country (Northern, Spain): the key for an exploitation management design
<b>17:55 - 18:15</b>	On the biology of <i>Schistomysis</i> species (Crustacea, Mysida, Mysidae) in the southern European waters	La necesaria reforma de la Política Pesquera Comunitaria (The necessary reform of the EU Fisheries Policy)
<b>18:15 - 18:35</b>	Sex-ratio fluctuations acting as resilience mechanisms of amphipod populations	Cómo diagnosticar la depredación del ser humano sobre un recurso pesquero con CPUE y PRCF. El caso de la dinámica poblacional del stock de Sierra, <i>Thyrssites atun</i> (Euphrasen, 1791), en Chile
<b>18:35 - 18:55</b>	Estimas de edad y crecimiento de la lapa amenazada <i>Patella ferruginea</i> (Mollusca, Patellidae) en las islas Chafarinas (Mediterráneo occidental)	Offshore wind farms as FADs: a new methodological approach
<b>20:00</b>	<b>BOAT TRIP IN SAN SEBASTIAN BAY (1 HOUR TRIP)</b>	

**Day 3 - 13 september**

- 08:45 - 09:30** PLENARY TALK  
 “Exploring the marine prokaryotes by genomics approaches at global scale: TARA Oceans and Malaspina expeditions”  
 Silvia González Acinas (ICM-CSIC, Barcelona)

ROOM A - SESSION BENTHIC ECOLOGY		ROOM B - MANAGEMENT OF LIVING RESOURCES
<b>09:30 - 09:50</b>	Dinámica espacio-temporal de la malacofauna asociada a fondos blandos de la bahía de La Goulette (norte de Túnez)	Short term effect of a selectivity change in a trawling fishery (in the western Mediterranean)
<b>09:50 - 10:10</b>	Variaciones día-noche y estacionales en la estructura de la comunidad de crustáceos decápodos asociada a una pradera superficial de <i>Cymodocea nodosa</i> en el norte de Túnez (mar Mediterráneo)	Population dynamics and exploitation of four by-catch nekto-benthic species in the bottom trawl fishery of the Balearic Islands (western Mediterranean)
<b>10:10 - 10:30</b>	¿Natural o naturalizado? La filogeografía del erizo negro <i>Arbacia lixula</i> refleja su reciente colonización del Mediterráneo	Capturas accidentales de elasmobranquios en la pesca artesanal con trasmallo de las islas Canarias
<b>10:30 - 11:00</b>	<b>COFFEE- BREAK</b>	

ROOM A - SESSION BENTHIC ECOLOGY		ROOM B - ECOLOGICAL ASSESSMENT
<b>11:00 - 11:20</b>	Body size determines the patterns of spatial variability on exposed sandy beach assemblages	The impact of Alqueva dam on the ecological networks of Guadiana estuary salt marsh areas
<b>11:20 - 11:40</b>	Surf zone suprabenthos of two Galician beaches (NW Spain): A temporal study	Differences on population structure, dynamics and production of <i>E. marinus</i> populations from 3 different estuaries presenting a gradient of environmental pressure: Minho (low-impacted), Mondego (medium-impacted) and Ave (highly-impacted)
<b>11:40 - 12:00</b>	A biological trait approach to assess the functional composition of subtidal benthic communities in an estuarine ecosystem	Exploring patterns of variation of amphipod assemblages at multiple spatial scales: natural variability versus coastal aquaculture effect
<b>12:00 - 12:20</b>	Cartografia de los Hábitats Litorales de Cataluña	Transitional and freshwater bioassessments: one site - two perspectives
<b>12:20 - 12:40</b>	Patterns of landscape and assemblage structure along a latitudinal gradient in ocean climate	Assessing the health status under European directives in the Basque Country: from estuaries to offshore waters
<b>12:40 - 13:00</b>	Patrones de diversidad en comunidades de sustrato blando de cuevas submarinas; los crustáceos como grupo de estudio	Morirás en Chafarinas: el drama de la gorgonia gigante <i>Ellisella paraplexauroides</i>
<b>13:00 - 13:20</b>	Resultados preliminares de las comunidades bentónicas de fondos blandos de una montaña submarina: el Banco de Galicia (NE Océano Atlántico)	Variability in the Stress-On-Stress (SOS) response in native mussels ( <i>M. galloprovincialis</i> ) from Biscay Bay
<b>13:20 - 14:45 LUNCH</b>		
<b>14:45 - 15:05</b>	Characterization of soft-bottom benthic macroinvertebrates assemblages inhabiting the continental shelf and slope off the Basque coast (North Spain)	
<b>15:05 - 15:25</b>	Diversity and spatial patterns of the Portuguese continental shelf soft-bottom benthic macrofauna communities	Impactos del desarrollo del litoral asociado al turismo en los arrecifes de coral de Bonaire
<b>15:25 - 15:45</b>	Heterogeneidad bentónica en volcanes de fango del margen Español (Golfo de Cádiz)	The use of easy measurable variables in the sediment to assess impact in marine sediments affected by organic wastes (1978-2010)
<b>15:45 - 16:05</b>	Epibenthic communities of sedimentary grounds of the Avilés Canyon's system and the near continental shelf	The background metal levels determination in bivalves – quality assessment of the European Water Framework
<b>16:05 - 16:25</b>	Deep suprabenthic assemblages from submarine canyons of the Cantabrian Sea (NE Atlantic Ocean): Avilés vs Capbreton	Analysis of morphological characteristics of rhodoliths as indicator of habitat complexity and fishing effects
<b>16:25 - 16:55 COFFEE- BREAK</b>		
<b>16:55 - 17:15</b>	Using EUNIS habitat classification in the Avilés Canyon's system and the near continental shelf (Cantabrian Sea)	Development of a Bayesian Networks based method for assessing the status of hard bottom substrata biota
<b>17:15 - 17:35</b>	The benthic-pelagic coupling enhances the body condition of deep-sea demersal species.	<i>Pinna Nobilis</i> as a proxy to good environmental status: stable isotope signatures under a gradient of eutrophication and protection
<b>17:35 - 17:55</b>	The role of macrophyte structure in mediating predation: a refuge or a source of predators?	Development of innovative tools for understanding marine biodiversity and assessing good environmental status: the EU project DEVOTES

ROOM A - SESSION BENTHIC ECOLOGY		ROOM B - MODELLING AND HABITAT SUITABILITY
17:55 - 18:15	Feeding and sheltering preference of Echinogammarus marinus: Fucus sp. versus Ulva sp.	Modelling spatial and temporal variability of intertidal Zostera marina on the Ems estuary, Dutch Wadden Sea
18:15 - 18:35	Macroinvertebrates communities associated with the decomposition process of Phragmites australis and Fucus vesiculosus in transitional systems	Modelling sensitive elasmobranchs habitat
18:35 - 18:55	Variations on the energy flow along estuarine food webs caused by seasonal fluctuations of opportunistic green macroalgae	Marine pelagic ecosystems in the vicinity of Gibraltar Strait: a physical-biogeochemical coupled model approach
18:55 - 19:15	Efecto sobre la diversidad bentónica de dos ingenieros de ecosistemas con efectos contrapuesto	Modelling the ecological niche of 'El Banco de La Concepción' (Canary Islands) urchins. Which is the best model?
20:30	<b>SOCIAL DINNER</b> <b>Bus to PETRITIGUI CIDERHOUSE (Astigarraga)</b> <b>There will be a basque rural sport exhibition before dinner</b>	

#### Day 4 - 14 september

- 08:45 - 09:30** CLOSURE TALK  
 "Management in marine habitats needs much better experimental ecology" Professor A.J. Underwood, FAA (Centre for Research on Ecological Impacts of Coastal Cities, School of Biological Sciences, University of Sydney, Australia)

SESSION - GLOBAL CHANGE	
09:30 - 09:50	Spatial distribution and temporal trends (1989-2008) of soft-bottom marine benthic alien species in the Nervión estuary (Basque Country, N of Spain)
09:50 - 10:10	Phylogeography of the allochthonous calcareous sponge Paraleucilla magna: a cue for several introduction events along the Atlanto-Mediterranean European coasts?
10:10 - 10:30	Catálogo de las especies exóticas marinas pertenecientes al macrozoobentos marino en el ámbito ibero Balear
10:30 - 11:00	<b>COFFEE- BREAK</b>
11:00 - 11:20	Spread of the invasive seaweed Lophocladia lallemandii on the bivalve Pinna nobilis in a Marine Protected Area
11:20 - 11:40	Photosynthetic acclimation of different species and lineages of the invasive genus Asparagopsis to different temperatures
11:40 - 12:00	Exploring the response of phytoplankton biomass (chlorophyll-a) to climate forcing in the Basque coast (southeastern Bay of Biscay)
12:00 - 12:20	Los fondos y arrecifes de Cladocora caespitosa en las Islas Columbretes, un patrimonio natural del Mediterráneo amenazado por el cambio global
12:20 - 12:40	Distribution patterns and shifts in abundance of rocky shore gastropods along a latitudinal gradient: A response to climate change
12:40 - 13:00	Seasonal variation of biological responses to gradual temperature raising in digestive gland of mussels
13:00	<b>CLOSING WORDS AND PRESENTATION OF NEXT VENUE</b>

# **XVII Iberian Symposium on Marine Biology Studies (SIEBM)**

**11<sup>th</sup> - 14<sup>th</sup> September 2012. Donostia-San Sebastián (Spain)**

## **Introduction**

AZTI-Tecnalia organizes the XVII edition of SIEBM – Iberian Symposium on Marine Biology Studies, in Donostia – San Sebastián, from 11<sup>th</sup> to 14<sup>th</sup> September 2012. This edition is very special, since this conference started in San Sebastian in 1979. Since then, 16 editions have been organized and, after 33 years it returns to this city. The conference has been organized within the Summer School of the Basque Country University, which takes place every year in San Sebastián.

The objectives of the Symposia are to show the recent advances in marine biology research, within the Iberian Peninsula (Portugal, Spain and the Macaronesian islands) and also South American countries. The research topics covered by the Symposium, divided in scientific sessions, include aquaculture and parasitism; benthic ecology; ecological assessment, environmental impacts and pollution monitoring; genetics and taxonomy; global change; management of living resources; modelling and habitat suitability; pelagic ecology; restoration, conservation and planning; and, finally, a miscellaneous section. In total, 310 abstracts have been received, from which 109 were oral contributions and 201 posters. All of them are collated in this special issue of the *Revista de Investigación Marina*, published by the Marine Research Division (AZTI-Tecnalia).

In this edition, the organizers want to join the tradition (the fact that the conference was organized for the first time in this city) and the future of the marine research. In this way, a special session on marine environment assessment has been organized, related to the European Water Framework Directive and the Marine Strategy Framework Directive. In addition, we pay attention to current hot topics and four key-note speakers have been invited:

- F. Xavier Niell (University of Málaga): “Iberian marine research: from the past to the future challenges”.
- José Carlos Caetano Xavier (IMAR): “Portuguese Polar Science: Recent advances and perspectives in Marine Biology”.
- Silvia González Acinas (ICM-CSIC): “Exploring the marine prokaryotes by genomics approaches at global scale: TARA Oceans and Malaspina expeditions”.
- A.J. Underwood (University of Sydney): “Management in marine habitats needs much better experimental ecology”.

Our intention with this symposium is to promote a meeting point for innovative ideas and stimulate new projects, sharing the scientific experiences, with a high scientific level. This is a good occasion for novel and senior marine biology researchers to meet, exchanging knowledge among the Ibero-American and European investigators, consolidating the marine research in this area.

All of you are more than welcome to Donostia-San Sebastián. We hope that this can be another fruitful symposium.

Angel Borja, Chair of the Symposium  
AZTI-Tecnalia

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 AGRICULTURA Y PESCA





# In between the carboniferous and the XXI Century in the south pyrennean marine ecology

F.X Niell

What were the FAO recommendations to obtain wet weight in algae in the 1st IGBP (1968)? What is equilibrium, eutrophy or oligotrophy? How many sardines are necessary to be processed in fishery studies to obtain good representative values of their biometrical characteristics? Does Redfield's relationship exist? Is your sampling area greater than mine?. In the pre-computer research times, in benthic ecology, these and other exciting questions were frequently asked: this was forty years ago, before this Iberian symposium of marine biology studies (in that time on marine benthic studies). Now, I am less able to ask questions of general interest, not because less questions exist, but because of the lack of general interest.

It seems that recently Ecology has lost the objectives that guided the research forty years ago. The pressure to satisfy bibliometric indices of productivity "to publish or to perish", in order to apply for stable and best paid positions, leads the scientific production to look for the easier and best funded tricky specialities.

Scientific production became redundant and lineal. Ecology is nowadays ageography, and a discipline producing indices of various types in order to assess and support policy decisions. There is a reduction of the continuous nature of the ecosystems to the five categories established by the authorities: High, Good, Moderate, Poor and Bad. What a brilliant set of brains strongly storming to invent this!!

The reinvention and the fuzzy autodidacted rediscovery of ancient well stated concepts have invaded the current environmental disciplines, among which Ecology is progressively included, discretizing the studies to "a before and afterwards", forgetting that changes are essentially oscillatory and continuous. Hence, many changes are little understood because they are progressive and not catastrophic, as climatic change, greenhouse effect, and recently ocean acidification are focused with frivolity as the comparison between two state situations: ".....in the preindustrial times and in a future scenario of extreme conditions....." More hurried poor brain storming results...

New words as biodiversity, sustainability, ecosystem services are vague neologisms that generated an umbrella under which simplified contents are again and again published.

The data treatment lost the fine statistics and the meta-analysis accepted low correlation to state norms on the ecosystem

performances always that a correlation is significant, data without standard deviations are accepted in prestigious journals. And more and more mathematics is misused in many published papers.

An experiment testing the influence of temperature in some aspect is nowadays masked with the climate change epithet. Richness is called biodiversity, and all these and other troubles are unashamedly produced without respect for the priority of the classical contents which are not in internet. Ecology has had its mirror in the physics, and in physics the ancient paradigms are conserved and compared with the current ones but never trough to the litter basked...

Oceanography is wasting money away in the Planet, it is also a geography, the theoretical basis of oceanography is full of physiological weaknesses, a recent hot question in oceanography as: Is The Ocean Heterotrophic or Autotrophic? lacks absolutely of sense; in agreement of my expertise sometimes is heterotrophic and several times it is not.

Molecular biology allows that many techniques could be used transversally in ecology, sometimes this conceptual approach has not given benefits as expected, generating confusion in taxonomy and nomenclature. As an example, it could be ask to decision makers of the sequencing routine: Who establish the limits to a homology? When to forms are different? Is epigenetics taken into account in shape and structure control or only AND rides the identity or difference between ecomorphotypes? The current development of the epigenetics could provide an answer to the question: Was right Lamarck, and he was not able to explain his observations? Or, must remain his statements mineralizing in the dead theories pool?

The progressive contributions in the framework of the thermodynamics and the system stability, the system theory that supported the modern ecology since the sixties (recently rediscovered by molecular biologists), their connections with the information theory, the advanced spectral and factorial data analysis and the conceptual modelling, open windows scarcely used by the young scientists because these "things" are unknown by them (?), and by the old ecologists too. Hence, in this talk these topics will be presented and discussed as a door to future progress in ecology.

Coastal environments are very heterogeneous and the use of chemical marks could support a fruitful exploration of the origin of several materials, the time of renewal and the time of residence could be estimated and a more robust modelling in more agreement with the fine study of the processes of matter and energy dynamics, would contribute to the main objective of the ecology: To predict the behaviour of the ecosystems in coming years.

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## Portuguese Polar Science: Recent advances and perspectives

José Xavier

The Polar Regions play a key role in the Earth system. Major scientific issues such as sea level rising, ozone hole and climate change have been investigated in the Polar Regions by scientists from more than 60 countries worldwide in the last 200 years. Portugal has been carried out Polar science more actively, in the last decade, particularly in the Antarctic. As a new country carrying out Polar research, Portugal was considered a successful example during the International Polar Year. This presentation aims to show how Portugal defined a strategy for Polar science, established a successful scientific research program, PROPOLAR, and an educational program, LATITUDE60!, and joined major organizations (e.g. the Scientific Committee for Antarctic Research (SCAR)), signed the Antarctic Treaty, published major research products and their scientists been awarded some of the most important Polar research awards (e.g. the Martha T. Muse Prize). As an example of the Portuguese Polar marine science carried by Portugal, I will show the Antarctic research carried out at the Institute of Marine Research of the University of Coimbra, in collaboration with colleagues from more than 10 countries (including Spain), addressing science questions from the effects of climate change in the Southern Ocean, foraging and feeding behaviour of penguins and albatrosses, and the start of the development of mathematical models to predict changes in the Southern Ocean. Finally, various examples of research projects between Portuguese and Spanish teams will be described.

Institute of Marine Research. Department of Life Sciences. University of Coimbra.

## Exploring the marine prokaryotes by genomics approaches at global scale: TARA Oceans and Malaspina expeditions

Silvia G. Acinas

Prokaryotes (bacteria and archaea) are a relevant component of the ocean's food networks; they are responsible for 30% of the primary biomass production and 95% of the respiration of the ocean accounting with 10<sup>29</sup> cells in the global ocean. Bacterial diversity patterns and functioning at global scale is still poorly known but this knowledge is essential to understand carbon flow in the ocean. Also, understanding shifts in marine microbial communities patterns in response to environmental changes should be crucial for future planktonic ecosystem modeling predictions. Most of the marine bacterial studies have been carry out as a snapshot in photic layers but the deep ocean is the largest habitat in the biosphere and it is one of the environments less explored on Earth in terms of microbial diversity and functioning. Deep oceans contains 70% of the ocean's microbial cells, and almost 60% of the ocean's heterotrophic activity is due to the deep ocean's microbial life. First, I would introduce **two unique global microbial expeditions: TARA Oceans** (<http://oceans.taraexpeditions.org/>) **a 2.5 years worldwide collection of plankton sampled "End to End"** analyzing the microbial diversity spectrum from metazoans to viruses but mostly **focused in the photic layers and MALASPINA** (<http://www.expedicionmalaspina.es/Malaspina/Main.do#content:Home>) in which one of the main goal is the description of microbial diversity of the dark ocean. Secondly, I would briefly explain some of our current research topics in the context of both expeditions and related to: (i) establish alternative approaches based on new sequencing technologies to explore microbial diversity at a global scale, (ii) to analyze microbial diversity patterns observed in marine communities (iii) to develop new bacterial species concept in the ocean based on uncultured ecological relevant bacterial genomes by single cells genome sequencing.

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## Management in marine habitats needs much better experimental ecology

**Anthony J. Underwood**

Never in previous history have there been so many environmental issues needing prompt and effective action. These include pollution, destruction of habitat, over-harvesting of resources, climatic change, introduced species, etc., etc. At the same time, there are more ecologists in jobs now than at any time in previous history. It would seem that we are compellingly equipped to solve some of the problems before they get worse. Unfortunately, much of governmental responses to environmental problems around the world are based on very poor ecological analysis – often involving very primitive and inadequate sampling and description (“base-lines”, “indicators”: and other buzz-words of little logical relevance).

What is needed is what marine ecologists have really learned how to do –that is to do sensible and managed ecological experiments to understand what are the problems and their consequences and how best to fix things, or, if nothing else is possible, how to restore what is damaged. It turns out that the same principles of good logic, sensible design and competent analyses of relevant data as are used in well-designed experiments are used in exactly the same way in more practical projects of management.

I shall attempt to demonstrate the value of experimental approaches to managerial problems using work done in and around Sydney (Australia) to assist with governmental responses to pollution (from boating marinas), restoration of degraded habitat (from the wetlands sites used for the Olympic Games in Sydney), conservation of an endangered species, establishment of a wild-catch fishery.