Abstracts

Oral Sessions

Theme 1: Coastal habitats and ecosystem services

Abstract ID – 1503

Introductory lecture

The 2nd International Symposium on
Integrated Coastal Zone Management
Arendal, Norway
3 – 7 July 2011

The Role of Science in the Transition to Sustainability: Coastal Zone Examples

Thomas Sawyer Hopkins

CNR-Istitute for the Coastal Marine Envrironment
Calata Porta di Massa n. 80
Porto di Napoli
80133 Naples
Italy

tom.hopkins@iamc.cnr.it

Abstract

The intent of this speech is to explore why we are moving too slowly towards Sustainability. The answer to the question, of who is responsible for Sustainable Development, is no one and everyone. This may give us a clue as to why we won't get there in time. We are starting to study complex human systems and we know that they have the capacity to reorganize to lower entropic states and that this capacity depends on the health and diversity of its components. The unfortunate reality is instead that these systems are degrading to higher entropic states. We know some scenarios of change that could make the degradation worse, but we don't seem to have any complete scenarios that would reverse this degradation trend. This is where everyone comes in and everyone needs to cooperate. The chain of interacting components that constitutes the circle of responsibility necessary for a sustainable society may start or end with appropriate science and public awareness, but in between there is a lot of inertia against change in the societal components that needs to be overcome in order to make the cycle complete. A recent EU Integrated Project has arguably demonstrated a method by which science might help jump-start this reorganization process. It would require accelerating two coupled trends that are already in place, an expansion to complex systems science, and a more interactive role between science and society. To provide specific material for this discussion, I present how the 'systems approach' was applied to policy issues in eighteen European coastal sites and what was learned about how scientific research, coupled with local societies, can better address coastal issues and guide coastal management for the transition to Sustainable Development.

Abstract ID – 1509

Theme 1: Coastal habitats and ecosystem services

Invited speaker

The 2nd International Symposium on
Integrated Coastal Zone Management
Arendal, Norway
3 – 7 July 2011

Mapping and valuating of marine habitats – a basic knowledge for coastal management and surveillance

Torjan Bodvin

Institute of Marine Research
Flødevigen Marine Research Station
Nye Flødevigveien 20
4817 His
Norway

torjan.bodvin@imr.no

Abstract

For many years, the planning and management of terrestrial areas has been supported by a detailed knowledge of the distribution of habitats and their associated species. However, the detailed mapping of biological resources in extent coastal areas, such as the Norwegian coastal zone, is unrealistic due to its enormous coastline. But, through the activities in "National program for mapping of marine habitats" a broad-scale overview of marine habitats and fish resources for about 50% of the Norwegian coast are established. The first generation of this method was developed in conjunction with a pioneer study conducted along the southern coast of the Skagerrak. The identification of the location of the habitat is based on combined knowledge gathered from local fishermen with scientific knowledge of important species and nature types. Valuations of these habitats are done by estimating the ecological value of different characteristics of the habitat and then summarize these values in an index. GIS modeling tools are used in both the mapping program and to integrate local and scientific knowledge into digital maps made available to local area management. As a tool for conservation of vulnerable species and/or habitats, establishing Marine Protected Areas (MPA) has been a very popular method the last years. To be able to choose an area with the habitats needed to achieve the necessary results, a map of the actual habitats with a valuation is a very useful tool. But, choosing the best area for a MPA, it is important to also reduce conflicts with both professional fishermen, recreational fishers and other users to a minimum. It is therefore necessary to have a very close contact with the local stakeholders throughout the process.

Abstract ID - 857

Theme 1: Coastal habitats and ecosystem services

Presentation: Oral

The 2nd International Symposium on
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A Bio-economic Model Approach: Measuring the Exploitation of the Peninsular Malaysia East Coast Pelagic Fishery

Illisriyani Ismail, Kusairi Mohd. Noh, Gazi Md. Nurul Islam and Aswani Farhana Mohd. Noh

Institute of Agricultural and Food Policy Studies
Universiti Putra Malaysia
Putra Infoport
43400 Serdang, Selangor
Malaysia

illisriyani@gmail.com

Abstract

Overexploitation of the marine fisheries especially pelagic fisheries has been observed in Malaysia. This paper estimates maximum sustainable yield and maximum economic yield for the Peninsular Malaysian east coast pelagic fisheries using surplus production bio-economic models. The data were obtained from Annual Fisheries Statistics from the period 1980-2009. The pelagic fish catches and effort data were in terms of fishing days. Standard fishing effort in terms of standard fishing days and catch per unit of standardized effort are calculated for each gear for pelagic fisheries. The cost of pelagic catches was estimated based on previous studies. Schaefer and a modification of the Fox model, explain better the population dynamics of the pelagic fishery. The results from both models illustrate that pelagic fish stocks are biologically overexploited. The results indicate that fishery has potential to produce additional economic rents by reducing excessive fishing effort. It appears that maximum sustainable yield can be achieved through sustainable resource management strategies.

Keywords: Overexploitation; marine fisheries; pelagic fish; bio-economic models; catch per unit of effort (CPUE)

Abstract ID - 902

Theme 1: Coastal habitats and ecosystem services.

Presentation: Oral

The 2nd International Symposium on
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Vulnerability of coastal environments to oil spills – Applying 'Dynamic sensitivity mapping' as a tool for integrated management

Annelise Chapman[1], Andrzej Osowiecki[2], Magdalena Blenska[2], Juliusz Gajewski[2], Katarzyna Rybka[2], Trond Haukebø[3] and Knut Sindre Vale[4]

1) Runde Environmental Centre, 6096 Runde, Norway
2) Maritime Institute in Gdańsk, Dlugi Targ 41/42, 80-830 Gdańsk, Poland
3) Møre and Romsdal County Council, 6404 Molde, Norway
4) The County Governor of Møre and Romsdal, 6404 Molde, Norway

lise@rundecentre.no

Abstract

As a consequence of increasing marine traffic in Europe and elsewhere, the risk of vessel collisions and associated oil- and other chemical spills continues to grow. Providing coastal zone managers and vessel traffic controllers with effective tools to assess collision risks and vulnerability of coastal areas in an integrated manner, represents a high priority. In a joint and comparative project, two pilot regions – on the Norwegian west coast and in the Gulf of Gdansk in Poland – were used to develop and test ‚dynamic sensitivity mapping' as such a management tool, thereby applying an innovative method to two regions with a clearly distinct operational framework (including geographical, environmental, administrative and social aspects). Spatial sensitivity assessments of the two pilot regions were associated with two main parameter categories, i.e. environmental (e.g. geology, benthic vegetation and fauna, marine mammals, protected areas) and socioeconomic ones (e.g. fisheries, aquaculture, recreational uses, cultural heritage). In a stepwise process, spatially distributed 3-grade sensitivities assigned to particular parameters were integrated into a resulting sensitivity map which, through adding a temporal dimension wherever appropriate, becomes a dynamic sensitivity map. Future applications of dynamic sensitivity maps include their use in managing other environmental challenges in the coastal zone.

Abstract ID - 911

Theme 1: Coastal habitats and ecosystem services.

Presentation: Oral

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Developing a model for tropical seagrass light requirements in a turbid port environment: guidelines for a dredge mitigation strategy

Kathryn M. Chartrand, Michael A. Rasheed and Peter J. Ralph

Department of Employment, Economic Development andInnovation
38-40 Tingira Street
Portsmith
Cairns, QLD 4870
Australia

chartrkm@yahoo.com

Abstract

In Australian coastal waters and embayments, tropical seagrasses are often subject to highly dynamic light environments as naturally turbid waters and large tidal flux create periods of extreme high and low light over relatively short time scales (i.e. hours). Large port developments in these areas have the potential to confound the complex relationships between seagrass physiology and the dynamic light field with the onset of dredging and their associated plumes. Understanding the capacity for seagrasses to respond to changes in the quantity and quality of the light environment will allow for prediction of how seagrass species and populations will tolerate changes in light attenuation as may occur during large scale dredging. We present a strategy for determining whole plant light requirements for an intertidal tropical seagrass community in a port environment. Locally relevant light requirements are established by describing the relationships among photosynthetic inputs and losses, tidal exposure, shifts in spectral quality of light, seasonality and the capacity to utilise below ground carbon reserves. The outcomes of the model may provide definitive guidelines for a mitigation strategy that is focussed on maintaining critical windows of light to support seagrass growth and longer term survival in such turbid environments.

Abstract ID - 913

Theme 1: Coastal habitats and ecosystem services.

Presentation: Oral

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Fish abundance and diversity relative to tidal inundation in a mangrove forest in northern New South Wales, Australia

Joe Lee, Jan-Olaf Meynecke and Wenqing Wang

Australian Rivers Institute
Australia

j.meynecke@griffith.edu.au

Abstract

Mangrove wetlands are key fish habitats and contribute directly to the quality of recreational fishing. This is because mangroves are amongst the most productive natural habitats in the world. Critical to achieving this however is effective tidal hydrologic connectivity, ie good tidal flushing. The current sea level rise is already changing tidal wetlands in Australia and predicted levels will change the distribution and function of mangroves. Here we provide preliminary results from a fish study in a mangroves forest in northern New South Wales, Australia. We have investigated the relationship between fish abundance and diversity and tidal inundation at varies sampling points. Fish were caught at ponds differing in timing of tidal flooding over a one year period. The time of tidal inundation, water quality and pool area was measured for each pond using costume made water switches and YSI multiparameter sonde. Over 500 fish comprising of 14 species were caught. Abundance and diversity of fish differed significantly with time and period of inundation. Resident species like Gudgeons (Hypseleotris compressa) were present in landward pools and visiting species like sand mullet (Myxus elongatus) intruded mostly into the seaward pools. Small variations in topography between the pools were responsible for the time of inundation and accessibility of habitat. With sea level rise some fish species will likely enter further into mangrove areas with consequences for species assemblages and abundance.

Abstract ID – 941

Theme 1: Coastal habitats and ecosystem services

Presentation: Oral

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The national program for mapping marine habitats – scientific approaches giving coastal zone managers a tool

Trine Bekkby[1], Frithjof Moy[2] and Heidi Olsen[3]

1) Norwegian institute for Water Research, Gaustadalléen 21, 0349 Oslo, Norway
2) Institute for Marine Research, Flødevigen Marine Research Station, 4817 His, Norway
3) Geological Survey of Norway.

trine.bekkby@niva.no

Abstract

There is a growing pressure on coastal ecosystems from increasingly diverse human activities coupled with climate change impacts. To make sensible management decisions, managers and policy makers need information (i.e. maps) on where different habitats are found. This information has been lacking in the marine environment for years, but in 2003, the National program for mapping and monitoring of marine biodiversity started integrating data on habitat and species distribution. The field mapping started in 2007, and at present, selected habitats have been mapped for about 50 % of the municipalities in Norway. The Norwegian coast is long and complex, and mapping all of the habitats in all areas is impossible. Consequently, spatial predictive modelling was introduced as a tool. Mapping different habitats require different tools, and this presentation will introduce you to some of the methods developed, the main findings of the program and lessons learned from linking science and management.

Abstract ID - 1520

Theme 1: Coastal habitats and ecosystem services

Presentation: Oral

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AKVAVIS – Decision support system for aquaculture planning

A. A. Hageberg[1], A. Ervik[2], I. Døskeland[3], Ø. Strand[2] and R. Rosland[4]

[1]Christian Michelsen Research AS, Fantoftvegen 38, 5892 Bergen, Norway
[2]Institute for Marine Research, Nordnesgate 50, 5817 Bergen, Norway.
[3]Hordaland County, Agnes Mowinckels gate 5, 5008 Bergen, Norway
[4]Dept. of Biology, University of Bergen, Postbox 7800, 5020 Bergen, Norway.

E-mail: anne@cmr.no

Abstract
The management of the coastal zone is thus becoming increasingly complex and new tools for management and decision support are needed. In Norway a management system for benthic environmental impact from aquaculture has already been developed. The system MOM (Modelling – On growing fish farms – Monitoring) integrates simulation and monitoring of environmental impacts. To meet the challenges of locating aquaculture farms in the Norwegian coastal zone the decision support system AkvaVis is presently under development. Demonstrators for locating blue mussels and Atlantic salmon are available for demonstration at www.*akvavis.no*.
It divides the relevant area into grid cells and objects containing quantitative information on localization parameters. The user can insert into the map an “intelligent farm object” that communicates dynamically with a mathematical model using the information in the grid as input for simulating the production capacity as well as with information on other objects. As examples, a MOM model version is implemented to simulate impact on the benthic community, a mussel growth model (DEB) is implemented to produce mussel growth and condition as an indicator of site suitability. Once inserted, the “intelligent object” will thus immediately report back how suitable a given site would be for mussel or fish farming by giving a score for each parameter and a calculated total score on how the requirements are met. The interactivity allows the user to immediately see the consequences of his choices.

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Theme 1: Coastal habitats and ecosystem services

Presentation: Oral

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Selection of coastal estuarine habitats by larval fish in laboratory mesocosms

Renata Gonçalves, Radhouan Ben-Hamadou and Luís Chícharo

Algarve University
Pcta António Agostinho Jr
Lote 4H 2º Frente
8005-157 Faro
Portugal

rgoncalves@ualg.pt

Abstract

Coastal wetlands are recognized by their importance as nursery areas for many fish species providing food, refuge from predators and optimal hydrodynamic conditions. The Guadiana estuarine wetlands have been impacted by the decrease of river flow and consequent reduction of salt marsh flooded areas mainly due to the intense upstream river damming. Their ecological functions need to be identified as a basis for establishing adequate measures for the long-term sustainability of the ecosystem and its associated resources. Patterns of habitat selection were examined in wild-caught *Atherina boyeri* (Risso, 1810) larvae by means of mesocosmos experiments. It was hypothesized that fish larvae at this stage would already present distinct patterns of habitat selection. Three habitats representative of vertical marsh profile at Guadiana wetland (non-vegetated bottom (sand), marsh-edge (*Sarcocornia* spp) and flooded-spartina (*Spartina maritima*)) were simulated in mesocosms units. Generally, A. boyeri demonstrated strong avoidance for both flooded-spartina and marsh-edge habitats.

Abstract ID – 951

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Presentation: Oral

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Monitoring ecological quality of coastal waters by the Nature Index (NI) - an integrated measure of biodiversity

Eivind Oug[1], Gro van der Meeren[2], Grègoire Certain[2] and Signe Nybø[1]

1) Norwegian Institute for Water Research, Jon Lilletuns vei 3, 4879 Grimstad, Norway
2) Institute of Marine Research, POBox 1879, 5817 Bergen, Norway

eivind.oug@niva.no

Abstract

On a request by the Norwegian Government, a comprehensive index aimed at monitoring state and trends across and within all aquatic and terrestrial ecosystems has been developed and implemented in Norway. The Nature Index (NI) synthesises information on biodiversity from a variety of sources into simple and easily-communicated forms. The index is composed of a series of indicators, each representing individual species or diversity measures standardized to a reference state, and combined and weighted for ecosystems or geographical regions. We present results for coastal waters. The data were assembled from plankton and benthos monitoring programmes, habitat mapping, fish stock assessments, and seabird and sea mammal monitoring. In total 65 indicators were scored. Lack of surveillance data led to proportional under-representation of algae, invertebrates and non-commercial fish. The overall status of coastal waters was good, with a slight worsening from 1990 and 2000 to 2010. In south-eastern Norway the pelagic biodiversity status improved following reduced nutrient inputs. The benthic status was deteriorated due to reductions in kelp, invertebrates and fish. In Mid-Norway the pelagic status deteriorated due to a strong decrease of sea-birds. The benthic status improved following a re-growth of kelp in previously sea-urchin grazed areas. Compared to terrestrial systems, the coastal waters showed better status than forests, mires and wetlands and open lowland with semi-natural grasslands and coastal heaths. The Nature Index is intended to become a permanent tool for use in Norwegian nature management and political planning and will be further developed and updated every 5 year, next in 2015.

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Theme 1: Coastal habitats and ecosystem services

Presentation: Oral

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The Key elements of Ecosystem-Based Management and an Assessment of their Application in 3 Fisheries in the Bay of Fundy, Canada

Rachel Long, Tony Charles and Robert Stephenson

Saint Mary's University
5669 Inglis St. Apt. 3
Halifax, Nova Scotia
B3H 1K2
Canada

rachel.long@smu.ca

Abstract

Over the last decade Ecosystem-Based Management (EBM) has gained popularity in the fisheries sector. It acknowledges the importance and interconnectivity of ecological, social and economic systems. The all encompassing nature of EBM has allowed for a variety of interpretations of its theoretical elements and defining characteristics. There is no universal application framework which inhibits its implementation. The immense number and variation of key elements associated with EBM makes it difficult to recognize when EBM is being utilized and a list of the essential ingredients is vital to being able to assess the degree to which EBM is currently being applied, and to further its implementation. My research compiles and compares the frequency of the key elements of EBM from a variety of published sources, across various disciplines. This is used to develop a list of the minimum core elements that must be applied for EBM to be fully implemented. This set of key elements is used to assess the degree and method by which EBM is currently being applied in the soft-shell clam, atlantic lobster and groundfish fisheries in the Bay of Fundy in both SW New Brunswick and Nova Scotia. Interviews will be conducted with industry representatives to determine which key elements of EBM are being implemented at the ground level, along with an analysis between these coexisting fisheries. Multiple parties will be interviewed within a single fishery to compare the perspectives of EBM and get a well rounded, in depth view of the EBM process in the area.

Abstract ID – 960

Theme 1: Coastal habitats and ecosystem services.

Presentation: Oral

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Investigating effects of various harvest regimes on fishery yield and ecosystem health indicators of two coastal ecosystems using ECOPATH modelling

Torstein Pedersen, Silje Ramsvatn, Einar Magnus Nilssen, Marianne Nilsen, Trond Ivarjord, Anita Maurstad, Ina Kolsum, Geir Helge Systad and Lyne Morissette

University of Tromsø
Department of Arctic and Marine Biology, Faculty of Biosciences, Fisheries and Economy,
N-9037 Tromsø
Norway

torstein.pedersen@uit.no

Abstract

Coastal ecosystems have been affected by fishery and other harvesting strategies for a long time, but the knowledge of how these activities affect fishery yield and ecosystem structure and –health are still limited. Traditional harvesting in northern coastal ecosystems has targeted top predators, but in more recent years, small pelagic fish such as herring and capelin, as well as crustaceans (shrimp) have been exploited. In this paper, ecosystem models (ECOPATH with ECOSIM) of two Norwegian fjords, Sørfjord and Ullsfjord, are used to investigate effects of different harvesting strategies on fishery yield, and ecosystem structure and -health. The models are based on extensive empirical data on catches, biomasses, mortality rates and feeding of various trophic groups, ranging from primary producers to top-predators. In the model period, 1993-96, large gadoids (cod, saithe and haddock) and deep-water shrimp dominated the catches. To investigate potential ecosystem effects on ecological groups and to identify system indicators of different harvest strategies, ecosystem states were simulated using ECOSIM. Fishing effort on the different target groups was varied to represent harvesting strategies, and a suite of ecosystem indicators were estimated based on the model output. The alternative harvest strategies targeted (1) large gadoids, (2) deep-water shrimp, (3) seals and whales, (4) sea birds and (5) small pelagic fishes. More hypothetical harvest regimes, targeting; (6) sea urchins, (7) macroalgae, (8) large bivalves, (9) benthic predators such as crabs and gastropods, (10) zooplankton (krill and copepods), were also tested. The modeling provides important knowledge for future management strategies.

Abstract ID – 973

Theme 1: Coastal habitats and ecosystem services

Presentation: Oral

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Linking Economic and Ecological Models for an Integrated Assessment of Water Management in the Oder Estuary Coastal Region

Jesko Hirschfeld, Nardine Stybel and Ralf Scheibe

Institute for Ecological Economy Research (IÖW), Berlin
Potsdamer Str. 105
10785 Berlin
Germany

jesko.hirschfeld@ioew.de

Abstract

In the context of the European Integrated Project SPICOSA we have modeled relevant elements of the regional economy linked to ecological models within a System Approach Framework. River basin and coastal zone management options were evaluated concerning their impacts on water quality and water transparency. Water transparency serves as a major link between ecology and economy. Therefore it has been chosen as one of the environmental targets in the Oder estuary case study. The ecological effects of different water quality management options were modeled with an ecological model system which was then linked to a regional economic model. The tourism sector model takes water transparency as one of the independent variables that influence the demand for beach visits and thereby the number of tourists at the beach. By expenditure functions visitors contribute to the regional product of the tourism sector. This in turn generates employment, income, and investment into tourism infrastructure. To evaluate the variables determining the demand for beach visits and thereby to assess variables influencing the regional product of the tourism industry, a questionnaire including a choice experiment was used in an on-site interview campaign in the German and Polish Oder estuary region. One of the results was the willingness to pay for an improvement of water transparency. Finally the results were integrated into an environmentally extended cost-benefit analysis.

Abstract ID – 976

Theme 1: Coastal habitats and ecosystem services

Presentation: Oral

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Co-existence of seagrass and algae beds enhances young-of-the-year rockfish Sebastes cheni production: toward a habitat conservation based on the phenology of fishery resources and vegetation

Jun Shoji and Yasuhiro Kamimura

Hiroshima University
5-8-1 Minato-machi, Takehara, Hiroshima
Japan

jshoji@hiroshima-u.ac.jp

Abstract

Japanese black rockfish Sebastes cheni is a dominant component of fish fauna in vegetated habitats in temperate waters of eastern Asia. Larval and juvenile rockfish immigrate to macloalgae (Sargassum spp.) beds in early March at a total length of 20 mm and then inhabit seagrass (Zostera spp.) beds through summer in the Seto Inland Sea, Japan. We tested the hypothesis that seasonal changes in vegetation of coastal habitats affect mortality and production of the larval and juvenile rockfish and propose the significance of conservation of marine coastal habitats referring phenology of different types of vegetation (eg. macloalgae and seagrass) and fish. Physical and biological surveys were conducted from February to August in macloalgae and seagrass beds in central Seto Inland Sea, Japan. Rockfish larvae and juveniles were divided into the sama hatch-date cohorts by the use of otolith daily rings, each covering a 10-day extrusion period. Increase in cohort-specific mortality coefficient with decrease in vegetation and results from mesocosm experiments showed that vegetation contributed as predation refuge for the rockfish larvae and juveniles. The mortality coefficients of fish at 20-50 mm (macloalgae-dependent period: March to May) were higher that those at 50-80 mm (seagrass-dependent period: June to August). The macloalgae grow during winter and seagrass during summer in the temperate waters of Japan. Therefore, co-existence of these two different types of vegetation, macloalgae and seagrass, within a small spatial scale can increase the accumulative survival of young-of-the-year rockfish from post-immigration period (March) through summer in the Seto Inland Sea.

Abstract ID – 985

Theme 1: Coastal habitats and ecosystem services

Presentation: Oral

The 2nd International Symposium on
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The effects of environmental degradation on social vulnerability: the case of Kiribati (South Pacific)

Esméralda Longépée

Coastal Geography Department of Geography
UMR LIENSs, 6250
Université de la Rochelle-CNRS
France

esmeralda.longepee@univ-lr.fr

Abstract

Coral island states have fragile environments offering limited resources that are highly vulnerable to climate change and anthropogenic pressures. Freshwater and wood are scarce, building materials are limited to sand, coral debris and reef conglomerate, and soils are poor and saline. Over the past millennia, the island communities of Kiribati have developed natural resources management systems that have enabled their survival. However, over the past decades, globalization has caused rapid changes, in particular in lifestyles and relationships of island communities to their natural environment. In the central district of South Tarawa, rapid urbanization has led to ecosystems degradation and the pollution of coastal waters and freshwater lenses. In addition, manufactured imported goods have largely replaced local products in household food consumption. In which way do the rapid changes in lifestyles affect the social vulnerability? This communication will address this question from the comparison between two situations: those of the modern urban atoll of Tarawa and the traditional rural atoll of Abemama. The results that will be presented are based on: (1) an in-depth analysis of statistical data providing indicators to assess the changes in lifestyles and natural resources management practices, (2) semi-structured interviews conducted in 2010 in both atolls, and (3) the analysis of aerial photographs showing the evolution of settlement and land use in the past fifty years.

Abstract ID – 987

Theme 1: Coastal habitats and ecosystem services

Presentation: Oral

The 2nd International Symposium on
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Adaptive Management Based on Vulnerability and Ecological Risk Assessment: a case of the west coast of the Bohai Sea, China

Xuegong Xu, Lifen Xu, Zongwen Ma, Xin Zhou and Yaling Lu

Peking University
Yifu Building 2
College of Urban and Environmental Sciences
Beijing 100871
China

xxg@urban.pku.edu.cn

Abstract

Coastal zone is a complex area with land-ocean interactions, human activities and ecological vulnerability. This paper takes the west coast of the Bohai Sea, one of the most intensive developing zones in China, as a case to study on adaptive and integrated coastal management. Firstly, eco-environmental vulnerability was evaluated by using indicators of landform, climate, vegetational cover and population density. Secondly, ecological risk assessment was made by means of relative risk model, which involved eco-environmental vulnerability, probabilities of 8 disaster risk sources (drought, flood, earthquake, storm-surge, blizzard, hail, frozen, sandstorm), and hazard of 10 ecosystem risk receptors. Thirdly then, based on the assessed result, put forward a series of adaptive measures to achieve harmony between the socio-economic development and the eco-environmental protection in the west coast of Bohai Sea. This research is supported by the Project 40830746 of NSFC.

Abstract ID - 861

Theme 1: Coastal habitats and ecosystem services

Presentation: Oral

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***Scomberomorus brasiliensis* gill net fishery: a case of unmanaged Brazilian small-scale fishery**

Victoria J. Isaac, Roberto V. E. Santo, Bianca S. Bentes, Keila Mourão and Flavia L. Frédou

Universidade Federal do Pará
Passagem Getulio Vargas, 300
66613 070 Belém Pará,
Brazil

biologiapesqueira@yahoo.com.br

Abstract

The gillnet small-scale fishery is one of the most important activity along the Brazilian coast. In the Amazonian coast, over 60% of the boats and 70% of the marine production correspond to this fishery. Among the exploited resources, *Scomberomorus brasiliensis* represents 5% of catches. Statistic data on effort and fishing grounds are not available. Therefore, this kind of information was collected by scientists on the landing ports of the municipality of Bragança, Para State, from 2006 to 2010. Analyses of data demonstrate the increase in boat size and number of fishermen. To ensure higher incomes and to offset operating costs, fishing grounds have become gradually more distant of landing ports. This refers to possible depletion of fish socks, in a regional scale. Maximal permitted gillnet length of 2.5 km for the entire Brazilian coast, has been ignored by fishermen and not supervised by the authorities. Actually, average size of gillnets is 5 km and is growing. *Scomberomorus brasiliensis* was already at maximum sustainable yield in 2005, and yet there were not taken appropriate management measures. A program of reduction of harvesting and measures for better use of the products would be sustainable alternatives, but insufficiently considered so far. Biological research programs, as well as targeted assistance to develop human and social capital are suggested. However, government continues to finance renewal of gear and vessels in an attempt to increase the global catch, without considering the carrying capacity of the stocks.

Abstract ID – 1507

Theme 1: Coastal habitats and ecosystem services

Presentation: Oral

The 2nd International Symposium on
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Development challenges of multi-functional coastal system in the Niger Delta, Nigeria

Yemi Akegbejo-Samsons

University of Agriculture
Dept of Aquaculture and Fisheries management
PMB 2240, Abeokuta
Nigeria

samsons56@yahoo.co.uk

Abstract

As coastal populations in Africa continue to grow, and pressures on the environment from land-based and marine human activities increase, coastal and marine living resources and their habitats are being lost or damaged in ways that are diminishing biodiversity and thus decreasing livelihood opportunities and aggravating poverty. Coasts are experiencing the adverse consequences of hazards related to climate and sea level. While physical exposure can significantly influence vulnerability for both human populations and natural systems, a lack of adaptive capacity is often the most important factor that creates a hotspot of human vulnerability. Nigeria's Niger Delta is well recognized for its rich and diverse biological resources and these natural systems form the foundation of the economy of the country, from which the majority of the population derive their livelihood. Threatened terrestrial and marine ecosystems translate to threatened livelihoods in Africa. In the Niger delta of Nigeria exploitation of these non-living resources has damaged the coastal environment and has caused civil conflict. This paper presents the different categories of the coastal resources of this system, highlights the different methods of exploitation and the consequences of these methods. The paper exposes the different challenges of this multi-functional ecosystem of this Africa's most populous country that ranks 4th in the world oil producer's list. It concludes by suggesting various ways of managing this oil rich environment.

Abstracts

Oral Sessions

Theme 2:
Adaptation/mitigation to change in coastal systems

Abstract ID – 1510

Theme 2: Adaptation/mitigation to change in coastal systems

Invited speaker

The 2nd International Symposium on
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Variable nutrient pathways through the microbial part of the pelagic food web – an insight relevant to management issues?

Tron Frede Thingstad

University of Bergen
Postboks 7800
5020 BERGEN
Norway

Frede.Thingstad@bio.uib.no

Abstract

The old textbook story was one presenting the concept of a linear nutrient-phytoplankton-zooplankton food chain as one able to capture the essence of the lower parts of the pelagic the photic zone food web. Driven by the introduction of new methodologies and their revelation of new taxonomic groups and increasing biological diversity, the emphasis has drifted from this old focus on simplicity, to a focus emphasizing the overwhelming complexity of an ecosystem involving protists, bacteria, archaea and viruses; comprising a large diversity in cell sizes, trophic strategies and gene content. Through this complex microbial food web, there are many alternative pathways from inorganic nutrients to the mesozooplankton level. Much research in this field is best characterized as basic attempts to understand the mechanisms by which ecosystem properties emerges from interactions at the cellular level, but I will argue that this type of knowledge is needed to analyze a large range of applied issues including degradation of oil pollution, duration of phytoplankton blooms, invasion of alien species and survival of pathogens.

Abstract ID - 903

Theme 2: Adaptation/mitigation to change in coastal systems

Presentation: Oral

The 2nd International Symposium on
Integrated Coastal Zone Management
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3 – 7 July 2011

Adaptation to Environmental Changes in the Coastal Zones of India

Shadananan Nair

Nansen Environmental Research Centre - India
Gopal Residency II Floor
Thottekkat Road
Kochi - 682011
Kerala
India

nair59@yahoo.com

Abstract

Impact of climate change on the coastal zone is of serious concern to India, because of its high productivity and extensive use for socio-economic development. Indian coasts with three growing megacities are becoming increasingly vulnerable to climate change. Increasing intensity and frequency and change in track of the storms are threats to coastal environment. Sea level rise has great significance to India because of the displacement of the millions of poor depending on marine resources. Seawater may contaminate coastal aquifers and inundate and salinize fertile agricultural land. India is one of the top exporters in fishery products and change in coastal water characteristics, circulation and upwelling may affect fisheries and thus the economy and life of thousands. Anthropogenic pressure worsens the impact of climate change. Finding an adaptation strategy and efficient measures for the protection and sustainable management of coasts are vital in poverty eradication and in maintaining economic development. In this paper, a comprehensive study of the impacts of environmental changes and their reflections on different sectors of the society has been made. A critical review of the existing strategies, policies, coastal zone regulation act and constitutional provisions, and an assessment of the efficiency of the administrative and legal mechanisms in the implementation of policies and regulations have been made. India needs to develop a novel coastal zone information system, an adequate environment policy and a climate change adaptation strategy to face the new challenges.

Abstract ID - 908

Theme 2: Adaptation/mitigation to change in coastal systems

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A systems approach to exploring the influence of 'Ocean Acidification' on nutrient cycling in coastal zones

Russell Richards, Marcello Sano, Tim Smith and Rodger Tomlinson

Griffith University

Australia

r.richards@griffith.edu.au

Abstract

Global concentrations of aqueous carbon dioxide (CO2) have been steadily increasing since the onset of the industrial revolution. A consequence of this has been an observed decrease in the pH of seawater as its natural buffering capacity has become overwhelmed. Research into this 'ocean acidification' effect has only emerged recently, although there is already compounding evidence that the impacts will be wide-ranging. This is because pH is a dominant variable in controlling biogeochemical processes. A potentially critical effect of decreasing pH is how it influences nutrient cycling in coastal zones, which will have flow-on effects on primary and secondary producers and has various implications including nutrient management, ecosystem health and carrying capacity. Of these, nutrient management is of particular concern because (1) the effect of decreasing pH combined with other expected changes in climatic conditions (e.g. increased storm events, increased water temperature) will alter the environmental fate of nutrients; and (2) there will be increased demands for managing 'recycled' water discharges into coastal waters arising from increasing populations. We present here a systems approach to mapping nutrient cycling within the context of ocean acidification for a sub-tropical coastal waterway located in southeast Queensland, Australia. This conceptualization will help to identify the causal pathways (including feedback loops) between a suite of important social, economic and environmental variables and highlight important leverage points for adaptation strategies for nutrient management under ocean acidification.

Abstract ID – 922

Theme 2: Adaptation/mitigation to change in coastal systems

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Quantitative assessment of nutrient removal potential of harvesting macroalgae within the Baltic Sea: The case of Trelleborg, Sweden

Emma Risén, Joseph Santhi Pechsiri, Maria E. Malmström, Nils Brandt and Fredrik Gröndahl[1]

Industrial Ecology
School of Industrial Engineering and Management
The Royal Institute of Technology (KTH)
Stockholm, Sweden

fgro@kth.se

Abstract

The interest in harvesting biomass from the Baltic Sea has grown in several coastal regions within the last few years. There are, however, few studies that estimate the available amount of macroalgae biomass and there is a lack of cost effective methods for site specific quantification of macroalgae. This paper is part of a sustainability assessment of macroalgae harvesting for biogas production as a nutrient reduction strategy for the Baltic Sea. The specific aim of this study is to present a model for quantifying macroalgae biomass and thus the nutrient reduction that could be achieved by harvesting filamentous macroalgae on a local or regional scale. Several commonly used methods for quantifying macroalgae biomass and growth are selected from literature and assessed. An estimate of the biomass of the dominant filamentous species, Polysiphonia fucoides, is made from literature data of inventories of macroalgae biomass, photic zone distribution and bottom substratum. Data regarding factors that affect the growth of the macroalgae, such as nutrients, irradiance, temperature and salinity are taken into account. A generalized model for assessing the potential of nutrient reduction by removing filamentous macroalgae on a local or regional scale is suggested. The presented model is applied to the case of Trelleborg, Sweden, thereby yielding an assessment of the nutrient removal potential on a local scale. An uncertainty analysis is performed in order to evaluate the results.

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Theme 2: Adaptation/mitigation to change in coastal systems.

Presentation: Oral

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Monitoring Humpback Whale (Megaptera novaeangliae) behaviour in a highly urbanised coastline, Gold Coast, Australia

Jan-Olaf Meynecke[1], Silje Vindenes[2] and Danielle Teixera[3]

[1] Humpbacks and High-Rises Inc. Gold Coast 4222 and Griffith University, Australian Rivers Institute, Gold Coast 4222 Queensland, Australia
[2] Griffith University, Griffith Centre for Coastal Management, Gold Coast 4222 Queensland and Sea World Whale Watch, Main Beach 4217, Australia
[3] Humpbacks and High-Rises Inc. Gold Coast 4222 Queensland, Australia

j.meynecke@griffith.edu.au

Abstract

Over 50 000 people enjoyed whale watching at the Gold Coast in 2009 alone. The stretch of coastline experiences the world's largest humpback whale (*Megaptera novaeangliae*) migration with an estimated 14 000 humpback whales in 2010. However, the increasing coastal development is exhilarating the environmental pressure on marine megafauna. This requires solutions to better manage humpback whale presence in urbanised waters and with it ensure a sustainable whale watching industry. We have developed a survey method that can be applied to operating whale watch vessels better integrating the tourism industry into research and ultimately coastal management in urbanised coastal waters. Preliminary results from the first year of observation (May-November 2010) in the Gold Coast bay showed a successful survey return of over 500 individuals that included 14 286 behavioural state observations. The data was analysed in terms of most commonly observed behaviours, movement, pot size and composition. The numbers of mothers with calves were highest in September and October and resting as well as feeding behaviour was documented indicating the importance of the bay as part of their migration. Our pilot study demonstrated that the benefits of whale watch boat based data collection can overweigh its limitations when strategically deployed and carefully analysed. Information on humpback whale movement patterns and core activities in urbanised coastal waters can be collected effectivly and ultimatly help to improve the management of humpback whales.

Abstract ID - 918

Theme 2: Adaptation/mitigation to change in coastal systems.

Presentation: Oral

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Cyanobacteria removal as means of nutrient reduction in the Baltic Sea: Quantitative assessment of potentials in Kalmarsund, Sweden

Joseph Santhi Pechsiri, Emma Risén, Maria E. Malmström, Nils Brandt and Fredrik Gröndahl

KTH
Sweden

pechsiri@kth.se

Abstract

Since the 1974 Helsinki convention, efforts by the Baltic States have been made to protect and enhance the marine environment of the Baltic Sea. In the past, a variety of nutrient reduction schemes that aim at preventing and/or reducing nutrient introduction to natural systems have been explored. Despite taken actions, the Baltic Sea is still subject to eutrophication. This paper proposes the removal of cyanobacteria as a technique for nutrient reduction in the Baltic Sea and uses the Kalmarsund, Sweden, as a case-study. A model for quantifying the cyanobacteria biomass is proposed and tested by comparing model results to monitoring data from literature. Model results are then coupled to cyanobacteria chemical composition, nitrogen fixation rate estimations, and Michaelis-Menten based nitrogen uptake models in order to yield a prediction of nutrient removal potentials. The models use site-specific, monitored surface temperature, salinity, irradiance, and nutrient data from literature. A quantitative assessment of Kalmarsund reveals the possible nutrient reduction on a local scale. The possibility to generalize the model to other parts of the Baltic Sea is discussed.

Abstract ID – 1511

Theme 2: Adaptation/mitigation to change in coastal systems

Invited speaker

The 2nd International Symposium on
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Enhancing the Ability of Coastal Regions to Respond to Climate Change

Tim Smith

University of the Sunshine Coast
Maroochydore DC Qld 4558
Australia

TSmith5@usc.edu.au

Abstract

Coastal communities face a range of human-induced coastal pressures from pollution to resource conflicts that create enduring challenges for integrated coastal zone management. Climate change has emerged as a new issue for ICZM that exacerbates many traditional challenges. If we have not been able to adequately deal with persistent ICZM challenges, what basis is there for thinking that our traditional management approaches will be effective against climate change? Similar to other complex and uncertain sustainability challenges, effective adaptation (and mitigation) to climate change requires new approaches to knowledge production, civic engagement, and decision-making, particularly in the face of high decision stakes. While reductionist science has enabled detailed understanding of specific phenomena at defined scales, holistic solutions to ICZM problems require a systems perspective that comprehensively addresses the interrelationships between system drivers (the things that affect change), relays (the things that magnify or dampen the drivers), the impacts, and various possible management interventions. Furthermore, the institutions that facilitate ICZM need to adapt to changing contexts and challenges through an ongoing process of social learning - so that ICZM can be process enabled (dynamic to changing socio-ecological contexts and goal focused) rather than process constrained (restricted by outdated institutional structures). Current ICZM challenges are mounting and the way coastal communities and decision makers tackle these challenges will be paramount to achieving sustainability and improved quality of life.

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Theme 2: Adaptation/mitigation to change in coastal systems.

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Conservation of Mangrove Ecosystem for Livelihood Sustainability and Climate Change Adaptation in the Ganges Basin

M. Shahadat Hossain

University of Chittagong
Associate Professor
Institute of Marine Sciences and Fisheries
University of Chittagong
Chittagong-4331
Bangladesh

hossainms@yahoo.com

Abstract

The Ganges-Bragmaputra-Meghna (GBM) river systems contain fluvial and tidal geomorphological deposits that created the world's largest delta in the form of coastal landscape and islands, which give an opportunity to develop a complex mangrove ecosystem. The objective of the study is to assess the spatial distribution of mangrove with accreted zone for further plantation and to explore the goods and services of mangrove ecosystem. Landsat TM satellite image was classified using ENVI software. Participatory field observation, focus group discussion and key informants interview with diverse social groups were applied. A total of 27,014 ha mangrove forest was identified with spatial location. Accreted and marshy land suitable for mangrove plantation covers an area of 60,000 ha of the islands. The interviewees mentioned that the structure of the mangrove trees enables to withstand wave impacts and help to dissipate wave action during cyclones. Mangrove ecosystem protects shoreline and accumulates sediment to build new land along the islands. Due to the stabilization of new land, mangroves move towards seaward leaving the new land to be colonized by other plants. Detached from the mainland of the country, over one million people live in these isolated islands. Most of the islanders are fishermen and their livelihoods largely depend on the capture fisheries of the GBM estuary and the Bay of Bengal. Conservation of existing mangrove with further plantation in the newly accreted stable lands can act as bio-shield to climate change extreme events with diversified goods and services to sustain the livelihoods of the islanders.

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Theme 2: Adaptation/mitigation to change in coastal systems

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Determination of sensitive and less sensitive area along Aegean coastal areas of Turkey

Gülsen Avaz[1], Filiz Küçüksezgin[2], İbrahim Tan[1], Leyla Tolun[1], Çolpan Polat-Beken[1], Aslı Dönertaş[1], Ersan Kuzyaka[1] and Süleyman Tuğrul[3]

1) TÜBİTAK- Marmara Research Center, Institute of Environment, Gebze-Kocaeli, Turkey
2) DEU, Institute of Marine Sciences and Technology, Izmir, Turkey
3) METU, Institute of Marine Sciences, Erdemli-Mersin, Turkey

gulsen.avaz@mam.gov.tr

Abstract

In the last few decades, due to the enormous increase of urbanization, industrialization and tourism activities, eutrophication risk has been gradually gaining more significance, especially for closed/semi closed bays of Turkey. Similar environmental deterioration problems have been indicated for some particular bays at the Aegean coastal waters of Turkey by means of assessment of the national coastal area monitoring program results.

In order to protect marine environment suffering from urbanization activities, the necessity of implementation of sound pollution prevention measurement programs and developing realistic investment plans have been recognized by decision-makers and implementing organizations. In this frame, “Urban Wastewater Treatment Regulation” based on “Urban Wastewater Treatment Directive (91/271/EEC UWWTD)” was come into force in the beginning of the 2006. According to UWWTD, classification of water environment as to their sensitivity to eutrophication has crucial importance in planning the urban wastewater treatment investments. In this context, the present study aims firstly to develop an evaluation methodology for the determination of sensitive/less sensitive areas based on coastal eutrophication assessment and then to apply this methodology to classify Aegean coastal zone of Turkey considering their sensitivity to eutrophication by using adequate parameters and data sets. In the methodology, morphological, geographical, hydrodynamic, biochemical and physical/optical characteristics of coastal areas and human activities were taken into account. By applying this quantitative methodology, Izmir and Aliağa bays were designated as sensitive areas along the Aegean coastal zone of Turkey.

Key words: Aegean Sea, coastal zone, eutrophication, sensitive area, methodology, UWWT Directive

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Theme 2: Adaptation/mitigation to change in coastal systems

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Renewable Coastal wave energy utilization along with coastal protection and fisheries development

Paimpillil S. Joseph and Baba.M.

Center for Earth Research and Environment Management
37/1837, Paimpillil Building
Kaloor Kadavanthara Road
Cochin 17 PIN 682017
India

psjoseph@eth.net

Abstract

Estimates of wave energy indicate annual wave energy potential for Indian coastline (5 MW to 15 MW per meter). The sea-bed topography focus wave energy near shorelines called 'hot spots". The "wave energy hot spots" on Indian coast were identified by 2/3 power relationship (Toba, 1972) and by direct wave measurements. Swell waves dominate the wave field except in monsoons (wind-waves up to 6.5m). Based on the wave statistics, a mean monthly wave power of 4 - 25 kW/m is estimated and an Oscillating Water Column type Wave absorption device of 150 MW capacity was installed at Vizhinjam. This power plant delivered 75 kW during April - November and 25 kW from December - March. During June - September, it peaks to 150 kW. The monsoon month's average power production was 120 kW. The construction cost of power plant was $2000000 and it produced 445000 units electricity per year. The unit cost stands $0.016, while the power from hydroelectric generators cost around $0.033 per unit. These renewable energy projects are not going to help India to tide over any power crises soon, but it is a good attempt to move forward on a technology that is at least as a promising power source. Since India has a lot of potential for new fishing harbours, the development of new cost effective breakwater systems is useful. Wave energy breakwater becomes profitable because the costs are being shared between the breakwater wall and the power plant.

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Theme 2: Adaptation/mitigation to change in coastal systems

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The aspects of characteristic architecture and townscapes for a sustainable development in coastal resorts at the Baltic Sea, Germany. Results of an empirical case study of tourist perception

Jan M. Landman

Rostock University, Department of Maritime Systems
Faculty of Agricultural and Environmental Sciences,
Justus-von-Liebig-Weg 6
18051 Rostock,
Germany

jan.landman@uni-rostock.de

Abstract

To achieve sustainable development in coastal areas, it is crucial to coordinate and harmonize the different groups of interests. Focussing on tourism stakeholders in coastal resorts, spatial planning, architecture and townscapes are relevant aspects that are controversially discussed with respect to the appropriate development of resorts. But how is the perception of tourists concerning the architecture and townscapes of coastal resorts? And which influence do they have on the image of coastal resorts in comparison to other significant aspects, e.g. good seawater quality, nice beaches, the price-performance ratio, etc.? This case study answers these questions exemplarily for four sea resorts at two characteristical regions at the Baltic Sea, Germany. To gather information about the perception of tourists we performed 930 face-to-face interviews based on standardised questionnaires in both survey regions, the traditional fishery resorts “Fischland/Darss” and the typical sea spa resorts on the island Ruegen. All surveys were performed in August 2010. The data shows that the image for all considered resorts is primary correlated with landscape-based aspects. Nevertheless, typical architectural styles are also associated with these resorts. The Image of Fischland/Darss for example, is first and foremost related with a rural habitus of buildings. The results reveal that the characteristical style of architecture is primarily associated with the image of the resorts. Based on the implemented surveys, and to obtain a sustainable touristic development, it is recommended to consider high quality architecture fitting into the settlement structure of the coastal resorts and thereby following an efficient use of land consumption.

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Theme 2: Adaptation/mitigation to change in coastal systems

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Better understanding coastal communities' adaptive capacity to climate change

Alexandre Magnan

IDDRI
27 rue Saint-Guillaume, 75007 Paris
France

alexandre.magnan@iddri.org

Abstract

Coastal communities are considered particularly vulnerable to climate change due to sea-level rise and changes in precipitation, temperature and extreme events patterns. Yet, beyond exposure to physical changes, vulnerability is also a function of communities' adaptive capacity. In many papers, the ability to adapt is assimilated with the level of economic development. This approach does not reflect reality adequately and might lead to inefficient choices in terms of designing adaptation strategies. It indeed induces the risk of obscuring true, specific, and potentially replicable adaptive capacities. It thus tends to favour the import of standardised projects and entails possible dismissal and even degradation of local specificities (e.g. local knowledge, social networks), while they might be powerful adaptation drivers. One main reason for this misunderstanding is a relative lack of a structured research framework on adaptive capacity to climate change. This communication aims at presenting an innovative framework based upon 4 main axes of research: (i) the influential factors of adaptive capacity, both environmental and societal; (ii) the relevant spatial and temporal scales to consider, notably spatiotemporal combinations that go past 'short term/local scale vs. long term/national and international scales'; (iii) the iterative links between adaptive capacity and vulnerability; and (iv) the interactions between adaptation and sustainability. Such a framework, based upon fieldworks conducted for several years in coastal areas of the Mediterranean and small tropical islands (Indian Ocean, Caribbean and the Pacific), allows highlighting comprehensive knowledge that should constitute a starting point for building realistic, contextualized and ambitious adaptive strategies.

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Theme 2: Adaptation/mitigation to change in coastal systems

Presentation: Oral

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American lobster (*Homarus americanus*) in Norwegian waters - Environmental impact with emphasis on shell disease and hybridization

Ann-Lisbeth Agnalt, Egil Karslbakk, Nina Sandlund, Eva Farestveit and Knut E. Jørstad

Institute of Marine Research, Bergen Norway
PO Box 1870 Nordnes
N-5817 Bergen
Norway

ann-lisbeth.agnalt@imr.no

Abstract

Lobster is of high importance to the world seafood market, and importation of live American lobster (*Homarus americanus*) to Europe has increased the last decades. Transport of live American lobster to Europe serves as vector of introductions. In fact, since 2000 89 specimens have been DNA-tested under the suspicion to be *H. americanus*. Of these, 25 have been identified to be Americans, of which 6 were berried. The American lobsters have been captured along the entire coast, with a few hot-spot areas. In autumn 2009, 3 American lobsters were captured in one of the hot-spot areas, Larvik-Sandefjord. One berried female was seriously infected with what was suspected to be shell disease, and one male slightly infected. The following year, three more American lobster were captured with similar symptoms of shell disease, two in the Sandefjord-Larvik area. In 2010 also several native *H. gammarus* have been captured in Sandefjord with lesions, although lesions different to that observed in the American lobsters. Due to concerns with corssbreading, all berried American females captured have been DNA tested. In 2009, the first evidence of a successful cossmating was found, and the first documented case of hybridization between the two species under natural conditions. The hybrids were successfully hatched at IMR. and will be kept to assess. The presence of live American lobster in Norwegian waters has raised concerns about disease transfer, ecological interactions, and crossbreeding with the local European lobster (*Homarus gammarus*), and must be must be investigated further.

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Theme 2: Adaptation/mitigation to change in coastal systems

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Coastal discourses – protection or production in the Lofoten Islands?

Trude Borch, Bjørn Hersoug and Jahn Petter Johnsen

Nofima
Brinkvegen 31, 9012 Tromsø
Norway

trude.borch@nofima.no

Abstract

Many coastal communities that traditionally have based their economy and employment on fisheries are now experiencing an economic restructuring in which tourism plays a role. This is also the case in the Lofoten Islands in the north of Norway. Like many other coastal areas the Lofoten Islands are experiencing conflicts over coastal areal and marine resources in wake of economic change. Lately this conflict has intensified as the result of the Norwegian offshore petroleum industry having discovered petroleum reserves outside Lofoten. The plans for future offshore petroleum activity outside Lofoten have been met by substantial resistance from the environmental movement. When a suggestion was launched to have Lofoten listed as an Unesco World Heritage site, the environmental movement embraced the idea, claiming this would be important not only to protect the environment, but also to protect Lofoten as a tourism destination. The fragmented nature of the tourism industry implies that the industry often speak with more than one voice on policy issues. This is also the case in the debate on the future use of Lofoten. This paper presents a discourse analysis of the ongoing debates on the future of Lofoten with a special focus on the tourism industry but also highlighting the arguments of other coastal/stakeholders. The paper presents the main arguments or points of gravitation in the discourse on the future of Lofoten, what images of Lofoten is being presented, the resources and strategies mobilized and the different alliances established.

Abstract ID - 1518

Theme 2: Adaptation/mitigation to change in coastal systems

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Sustainability and adaptive capacity of Pacific salmon under the changing climate

Masahide Kaeriyama, Hyunju Seo and Michio J. Kishi

Faculty of Fisheries Sciences
Hokkaido University
3-1-1, Minato, Hakodate,
Hokkaido, 041-8611
Japan

E-mail: salmon@fish.hokudai.ac.jp

Abstract

At the present, the global warming has positively affected for increase growth at age-1 and survival of Hokkaido chum salmon. In the future, however, this global warming will affect decrease in carrying capacity and distribution area of chum salmon in the North Pacific Ocean. For establishing the sustainability on seafood security and ocean ecosystem conservation, we have 3 issues. 1) How can we use the ocean organisms as -seafood in the future? 2) What do we need for seafood security and ocean ecosystem sustainability in present and future? 3) How do we establish the sustainable fisheries management based on the ecosystem approach? In order to answer these issues, we should know carrying capacity are limited and fluctuated in ocean ecosystem, that fisheries industry are emphasized not only the economic efficiency, but also the ecosystem approach. As the education, we need paradigm shift from the traditional fisheries science for only fisheries to the ecological fisheries science for the protection of marine ecosystems and human food resources in order to be human well-being in future generation. Adaptive management and precautionary principle are essentially important to establish the sustainable fisheries management based on the ecosystem approach.

Abstracts

Oral Sessions

Theme 3: Coastal governance

Abstract ID – 1512

Theme 3: Coastal governance
Invited speaker

The 2nd International Symposium on
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Small-scale fisheries: an evaluation of their role in the coastal zones of the world

Daniel Pauly

Fisheries Centre, University of British Columbia
Main Mall 2202
Vancouver, BC, Canada V6T 1Z4
d.pauly@fisheries.ubc.ca

Abstract

With the deployment of the first steam-powered trawlers along the English coast in the late 1880s, a mode of fishing emerged which relies on non-renewable fossil energy to exploit a renewable resource. In the short-term, industrial fisheries simply had to in 'win' in their competition with small-scale fisheries, as they could deploy concentrated capital and fishing power to generate massive catches. Indeed, from the 1950s to the late 1980s, the fishing world was consumed by the exploits of industrial fishing which, at the end of this period, spanned the globe. Almost everyone forgot small-scale fisheries, except for a few maritime anthropologists, who often emphasized quaint features of the lives of fisher folks, rather than their core activity. Fisheries scientists also tended to avoid small-scale fisheries, whose catch, even when known, contains little of the detailed per-species information required for population dynamics models. Moreover, in many countries, the bureaucracy could not be bothered with the logistical difficulties in monitoring small-scale fisheries, and thus their catch are not reported to the FAO. As a result, its databases vastly underestimate the contribution of small-scale fisheries to the global catch. But then, throughout the 1990s, came the realization that industrial fisheries have serious sustainability issues. Some industrial fisheries are managed well, notably in Norway. But in much of the world, the very size of industrial fleets translates into political power often exceeding that of coastal states, and they abuse this power. And, in addition to destroying habitats, as in the case of trawlers, they also regularly crash the stocks they depend on. They then move further offshore, into deeper waters and further south because, at least in developed countries, they are subsidized, and thus escape the economic consequence of their activities. However, these fleets cannot expand any more, and they are squeezed by increased fuel costs; hence the widespread crisis of fisheries. Thus, it is high time to recall that there is an alternative: small-scale fisheries. Because small-scale fishers by definition live close to their fishing grounds, and depend on the resource therein, they can be (re-)connected, if need be, with the idea of caring for the resources. This, combined with the obvious advantage of adjacency (short sailing time, and hence limited fuel consumption, if fuel is used), provides a major reason why small-scale fisheries have the potential of becoming the fisheries of the future, both in developed and in developing countries. This theme will be elaborated upon, following an attempt to properly quantify the global catch of small scale fisheries, based on data assembled by the Sea Around Us project.

Abstract ID - 896

Theme: Theme 3: Coastal governance

Presentation: Oral

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Are ICZM Protocols the new silver bullet for regional seas to promote sustainable coastal development?

Julien Rochette and Raphaël Billé

IDDRI / Sciences Po
27, rue Saint Guillaume
75337 Paris Cedex 07
France

julien.rochette@iddri.org

Abstract

Since the early 2000s, the role of ICZM in enhancing the sustainability of coastal zones development has been constantly highlighted by the UNEP Regional Seas Programme. From the viewpoint of implementation, two major options have emerged worldwide over the last decades: (i) a project-based approach using experimentation, often with a primarily local scope but sometimes supported by the regional level; (ii) An approach based on legal instruments, underpinned by the need to comply with international commitments, which are slowly being deployed at the regional and national levels. Regional seas have widely contributed to the development of the latter, which has emerged more recently. The latest development in this regard, internationally, is the decision made during Nairobi Convention COP 6 to embark in the process of developing an ICZM protocol, following the Mediterranean experience where such a protocol was adopted in January 2008. Nevertheless, the elaboration of such legal instruments cannot be considered a good idea per se. Indeed, it may be a useful and strategic lever to address coastal issues if a number of conditions are met. This presentation is therefore aimed to identify these key conditions for an ICZM Protocol to be relevant and useful, focusing in particular on (i) the issues to be addressed by each protocol, according to the special features of the regional ecosystem, (ii) the capacity of the regional structure to lead the elaboration and negotiating process, (iii) the conditions to avoid the pitfalls of “Paper Protocols”, adopted and ratified but insufficiently implemented.

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Theme 3: Coastal governance

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The Ecosystem-Based Management System: a formal tool for the management of the marine environment

Rafael Sardá[1], Amy Diedrich[2], Joaquin Tintoré[2] and Roland Cormier[3]

1) Centre d'Estudis Avançats de Blanes (CSIC). Carrer d'accés a la cala Sant Francesc 14, 17300-Blanes, Girona (SPAIN).
2) OceanBit. Edificio Naorte. C. Isaac Newton. 07121-ParcBit, Palma de Mallorca (SPAIN)
3) Departament of Fisheries and Oceans. Gulf Division. Moncton (Canada).

sarda@ceab.csic.es

Abstract

The new marine policy of the European Union (Marine Strategy Directive and the Integrated Maritime Policy) responds to the introduction of the concept of Sustainable Development into the management of the marine environment. The understanding and commitment of the application of such concept to Europe's Seas is critical for the future and it requires of new guidelines and tools to assist their implementation. International agreement has recognized the need to establish the management of oceans and coasts based on the Ecosystem approach and its associated principles. To reach this objective, we propose a structured system of procedures and tools, here called Ecosystem-Based Management System (EBMS), aimed at implementing the Ecosystem approach at different spatial and administrative scales. This managerial system should be implemented within effective governance structures designed to uphold the modern principles of environmental management. Prior to the emergence of the Ecosystem approach and other integrated approaches to environmental management, ecological and anthropogenic systems were managed separately, with different set of objectives and associated management framework. It is now recognized that human activity and the ecosystems in which they occur can not be separated and should be managed as a whole. The EBMS framework, here proposed, combines classical environmental management system theory, the traditional idea of minimizing the environmental impact exerted by human activities, with the principles of the Ecosystem approach. The specific design of the EBMS framework can be divided into three components (a three pillar structure: the managerial pillar, an information pillar, and a participatory pillar).

Abstract ID - 907

Theme 3: Coastal governance

Presentation: Oral

The 2nd International Symposium on
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Arendal, Norway
3 – 7 July 2011

Participatory approaches to exploring the adaptive capacity of coastal settlements and ecosystems in South East Queensland

Russell Richards, Marcello Sanon and Tim Smith

Griffith Centre for Coastal Management
Griffith Climate Change Response Program
Griffith University
Australia

r.richards@griffith.edu.au

Abstract

Effective coastal zone management requires accounting for multiple stakeholders who may have conflicting mental models regarding coastal management and the impacts of climate change. Identifying the determinants of adaptive capacity of coastal settlements and ecosystems is a relevant challenge to characterizing the overall vulnerability of the system exposed to a changing climate. However, the subjectiveness of this information can be difficult to capture. We present a case study that exemplifies stakeholder involvement in eliciting important climatic change and context-specific information about coastal zone management. This approach was applied to climate change adaptation research within a regional cross-sectoral project that seeks, among other expected outcomes, to inform decision makers about the coastal zone's adaptive capacity and adaptation options to climate change. We conducted participatory stakeholder workshops for three different coastal settlement typologies and one protected ecosystem, considered representative of the salient climate change issues for the region. The stakeholders used systems thinking to develop a conceptualization of the system and as a mechanism to identify leverage variables crucial for addressing the impact of climate change and used Bayesian models to further explore these 'key leverage variables' and to address the identification of key determinants of adaptive capacity to climate change. Observations made by stakeholders were recorded as a form of narrative capture to provide additional context to the modelling process. Overall, this process found to be effective in capturing different types of knowledge, reasoning and group dynamics from the stakeholders themselves and to identify critical issues informing future policies and plans.

Abstract ID – 983

Theme 3: Coastal governance

Presentation: Oral

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The role of public and private institutions in Integrated Coastal Zone Management – Examples from two districts in Indonesia

Arne Tesli and Håkon Kryvi

NIBR
Norw Institute for Urban and Regional Research (NIBR)
Gaustadalléen 21
0349 Oslo
Norway

arne.tesli@nibr.no

Abstract

This paper presents some experiences from work linked to developing integrated coastal zone management plans (ICZMPs) in the two districts Bintan and Batam, Indonesia. We discuss: the role of public and private institutions in ICZM work; the relationships and responsibilities of different institutions and authorities; development of parallel institutions; fragmentation of responsibilities; awareness-raising and ownership of plans; institutions that plan and implement. We examine constraints and challenges linked to ICZMP work: the results, outlook and ways forward for the ICZMP strategies in the two districts.

Abstract ID - 919

Theme 3: Coastal governance

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The architect and the System Approach Framework

Michel Lample, Denis Bailly and Johanna Beganton

UBO-AMURE
Centre IFREMER de Bretagne
B.P. 70
29280 Plouzané Cedex
France

lample@univ-brest.fr

Abstract

The SPICOSA Experience (www.spicosa.eu), conducted in the framework of an Integrated Project under the 6th RTD programme of the European Commission, allowed us to measure the benefits and shortcomings of the System Approach Framework (SAF). First, it is noteworthy to see the co-constructive potential of SAF in terms of results regardless of the technical quality of the models. On the other hand, the expected complexity of the Ecological, Social and Economic models brings us closer to the problems of "models integration" and drift of the modelling exercice against stakeholder's expectations. Some major drawbacks of the SAF as applied in SPICOSA project are inherent to how the protocol of iterative model building is performed. Indeed, in most cases the scientists have been responsible both for managing the SAF process and for writing the models in their area of expertise. This, which is not specific to SPICOSA project but applies to most attempts to run science-management participatory assessments, very much limits the capacity for "assimilation" of policy questions by the model. And it carries the risk that the representation of the system be very much biaised towards the compartment of interest to the scientist leading the work. Based on SPICOSA experimentation, this contribution explores how SAF methodology could be revisited so that it becomes policy rather than science driven, the management of a SAF application being identified as a function of a nature different from the various scientific and technical expertise required. This role, referred as the "SAF architect" is discussed as well as the implications on the methodology.

Abstract ID – 937

Theme 3: Coastal governance

Presentation: Poster

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The battle for space - the position of Norwegian aquaculture in integrated coastal zone planning

Bjørn Hersoug

NFH, UIT
Grønlandsvn 10
9013 Tromsø
Norway

bjorn.hersoug@gmail.com

Abstract

When Norwegian salmon farming started in the early 1970s coastal space was not a problem. Over the next 40 years the competition for space has become considerably harder. Not only will the aquaculture industry have to compete with fishing and sea transport, but tourism, the petroleum industry as well as energy (windmills and tidal mills)all claim important areas, as do conservation and recreational interests. In addition all space is not equally valuable. Within aquaculture technological changes have implied a search for the "super localities", with sufficient depth, strong currents and good logistics. The paper will adress the battle for space, with particular emphasis on the changes in the aquaculture industry over the last 40 years. How do the authorities solve these conflicts, and what are the perspectives of the industry for the next 10-20 years. Will lack of space limit further growth or will deseases, escapes and lice be the contributing factors for limiting the growth of the aquaculture industry?

Abstract ID – 965

Theme 3: Coastal governance

Presentation: Oral

The 2nd International Symposium on
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An overview of the implementation of SAF methodology regarding the stakeholder response, in the mussel farming area of Chalastra, Thermaikos Gulf

Zoi I. Konstantinou and Yannis N. Krestenitis

Aristotel Univeristy of Thessaloniki, Greece
Division of Hydraulics & Environmental Engineering, Department of Civil Engineering,
Aristotle University of Thessaloniki, 54124
Greece.

zkon@civil.auth.gr

Abstract

The main aspects of the implementation of System Approach Framework (SAF) methodology in the sustainable management of the mussel farming area of Chalastra, Thermaikos Gulf, Greece, and the interaction between the scientific team and the stakeholders participating to the procedure are the main topics of this work. The obtained results of the SAF implementation will be examined in parallel to the stakeholder involvement effort, trying to identify if in the end the experiment had succeeded its initial goals of bringing science closer to policy and use existing knowledge to produce management tools that would support deliberations. More particularly, the paper will focus in the manner that the key governance issues were faced in what concerns a) the developed management tool, b) the stakeholders and "policy makers" engagement and c) the structuring of the relationship between science and policy. Additionally this work will also provide information about the evolvement of the management tool following the stakeholders' demands and the use of the new results through the developed communication platform in order to reveal further scientific and management questions and to enable the dialogue concerning matters of internal social conflicts that is not always possible to be addressed through science.

Abstract ID – 1513

Theme 3: Coastal governance
Invited speaker

The 2nd International Symposium on
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Non-stautory approaches to integrated coastal management based on UK experience

Peter R. Burbridge

Professor Emeritus for Coastal Management
School of Marine Science and Technology
University of Newcastle upon Tyne
England

p.r.burbridge@newcastle.ac.uk

Abstract

This paper examines "Partnerships", coastal Fora and other local, non-statutory approaches to the development of Integrated Coastal Zone Management (ICZM). Although the principles and practice of ICZM have been evolving for some 40 years in the United States and other areas of the World, ICZM in Europe has been slow to develop. There have been some notable examples of advances towards international cooperation in developing sustainable use of terrestrial and near-shore marine resources in the Baltic and the Wadden Sea. However, most ICZM initiatives are based on smaller scale, non-statutory, voluntary partnerships and there are major concerns over their sustainability. It is only in the past 12 years that there has been a concerted effort on the part of the European Union (EU) to promote ICZM through funding demonstration projects and formulating a non-binding "Recommendation" that encourages the adoption of ICZM and the formulation of national strategies in all Member States. The EU Recommendation on ICZM provides a general framework for national actions to facilitate the development of a robust ICZM process, however it remains an advisory mechanism and is non-binding on Member States. It does offer some elements of an "Enabling" environment for ICZM development. However, unlike the US Coastal Management Act, it does not provide the same incentives that would encourage Member States to adopt ICZM, or the funding and technical support to enable a coastal Member State to develop and implement a coastal strategy, policy and supporting legislation that is consistent with principles and practices set out by the EU. In a sense we have "lost an opportunity" to emulate the US "Federal consistency requirement" whereby a Member State of the EU could require any EU policy, or other mechanism to be consistent and adhere to their approved coastal strategy and plans. We therefore rely heavily upon local voluntary ICZM initiatives to meet expectations at a European level that our coasts will be managed in a wise and sustainable manner. This is a highly questionable approach as "Partnerships" face major difficulties in sustaining their efforts in meeting local, national and European coastal management objectives. These obstacles include: the absence of national policies to promote ICZM, lack of funding to support local ICZM initiatives, absence of technical support and information, any plans and management measures developed at a local level do not have a legal base and cannot be enforced, in the absence of a national framework for ICZM there is no "home" for local initiatives at a national level, and there is no mechanism for coordinating local ICZM initiatives at a district or provincial level. Although there are some notable examples of effective local, non statutory ICZM, most local voluntary initiatives struggle to maintain their viability.

Abstract ID - 1516

Theme 3: Coastal governance

Presentation: Oral

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Governance systems for marine protected areas in Ecuador

Vincent Gravez[1], Robert Bensted-Smith[2] and Pippa Heylings[1]

1) Fundación Futuro Latinoamericano, Guipuzcoa E16-02 y Av. Coruña, Casilla 17-17-558, Quito, Ecuador

2) Fauna & Flora International, Alemania N31-118 y Mariana de Jesús, Apt 3b, Quito, Ecuador

vincent.gravez@ffla.net; Robert.Bensted-Smith@fauna-flora.org; pippa.heylings@ffla.net

Abstract

The paper analyses the emergence of a variety of governance systems for Marine Protected Areas in Ecuador. The Galapagos Marine Reserve was created in 1998 under a participatory governance system, but in mainland Ecuador marine protection was minimal until political change in 2006 opened opportunities for local conservation initiatives. The 2008 Constitution affirms the right to participation but the recently enacted Law on Participation stresses consultation and leaves the State with the dominant role in decision-making. Within this context, several new MPAs have been created, with Galera San Francisco Marine Reserve in particular pioneering the negotiation of a new role for the Management Committee, which comprises State agencies, local authorities and civil society organizations. The issue of preferential local access to marine resources is also under discussion. In parallel with MPA initiatives under the Ministry of Environment has come the creation of special reserves under fisheries legislation and the exclusion of industrial fishing from nearshore waters along the entire coast. Lastly, dating from 2000 - well before the current government – there are mangrove management agreements, which go furthest of all in granting local groups use rights and responsibilities in relation to crab and shellfish. These have yielded encouraging social and ecological results. This melting point of evolving governance models has generated valuable lessons about the potential and limitations of community participation in MPAs and the need for coordination between government institutions. The paper suggests ways forward for Ecuador and assesses relevance of these lessons to other countries in the region.

Key words: governance, participation, Marine Protected Area, fisheries

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Theme 3: Coastal governance
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The 2nd International Symposium on
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A Decision Support Tree for Management of Estuaries in Tasmania, Australia

Christine Crawford, Jeff Ross and John Gibson

Institute of Marine and Antarctic Science
University of Tasmania, Nubeena Crescent, Taroona, Tasmania, Australia

E-mail: Christine.Crawford@utas.edu.au

Abstract

Estuarine environments around Tasmania are complex and highly variable, both in their geomorphology and physical/chemical characteristics, as well as the levels of human activities that they are exposed to. This has made management of estuaries very difficult. We have developed an Estuarine Decision Support Tree (DST), based on the vulnerability of Tasmanian estuaries to human-induced change, which aims to support management of estuaries by standardising and simplifying condition assessments and their interpretation, and development proposals. We have concentrated on the vulnerability of estuaries to eutrophication due to increased concentrations of nutrients, although the DST is also applicable to other diffuse sources such as agricultural chemicals. Using the known fact that estuaries most susceptible to degradation are those that have a poor ability to dilute or flush out pollutants, we have used the key hydrological (river flow and tidal range) and physical (volume and geomorphology of the entrance) determinants of flushing time as the primary classification of estuaries into Well Flushed, Poorly Flushed and Open/Closed. The second tier in the DST identifies for the different flushing classes the critical times or events when they are most sensitive to anthropogenic impact. Well flushed estuaries generally show strong seasonal patterns and are most vulnerable during summer low flows when pollutants take longer to be flushed from the system and temperatures and hours of daylight are higher, resulting in greater biological activity. Although poorly flushed estuaries receive less freshwater flow, flooding can be extensive and at any time of year. Nutrients brought into these estuaries during the flood are retained for extended periods and can result in eutrophication, especially in summer. Conversely, a reduction in base flows, such as during drought and through water extraction, can have the opposite effect of reducing nutrient input and hence productivity of an estuary. Intermittently open and closed estuaries are clearly most vulnerable when they are closed as any nutrient or pollutant entering the estuary cannot be flushed out by tidal activity. The response to anthropogenic inputs will also vary depending on location within an estuary. In both well flushed and poorly flushed estuaries the greatest impact has been observed in the upper estuary where dilution of pollutants by oceanic waters is lowest. In open/closed estuaries human influences are generally evident across the entire lagoon. The DST is being used to develop cost effective monitoring programs for estuarine condition. A range of indicators are required and we recommend that stressors, such as nutrients or turbidity, as well as ecological response indicators, e.g. chlorophyll a, are monitored. Other contextual data that should be monitored to aid our understanding of the vulnerability of estuaries to human-induced change are suggested, including bathymetry, basic hydrodynamics and entrance state. We also recommend condition decision points or 'Thresholds of Potential Concern' (TPCs), which are our best estimate from the data available that environmental conditions are deteriorating and further assessment is required to determine whether the changes in condition are temporary or are being sustained, and what is the likely cause of impact. Previously trigger values for estuarine water quality had been set as a single value for each indicator for all South eastern Australian estuaries. TPCs have been recommended for each flushing class and differentiate between locations and times that are likely to respond differently. As there are few relatively pristine estuaries suitable as reference estuaries for each flushing class in Tasmania, we have used the median value (50^{th} percentile) to set TPCs. Expert opinion and other assessments have then been used to further evaluate the suitability of these threshold values.

In the presentation the Decision Support Tree and monitoring programs for estuarine condition assessment are discussed in detail and examples of using the DST in different estuarine systems are provided.

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Theme 3: Coastal governance

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Governance failure in a deeply investigated coastal system: clam farming in the Lagoon of Venice

Donata Melaku Canu and Cosimo Solidoro

OGS The National Institute of Oceanography and Experimental
Borgo Grotta Gigante 42 c
34010 Sgonico Trieste
Italy

dcanu@inogs.it

Abstract

Why, despite good productive results and great efforts made in order to manage the resource following an ecosystem based approach sustainable management of clams (Tapes philippinarum) in the Venice Lagoon has not been reached? Recollecting here the efforts made in the last 26 years -since the introduction of the species- from research, management and social perspective and making comparisons with the neighbour case of Sacca di Goro, we highlight obstacles against sustainable management of this social-ecological-system (SES). Basing on past local management history and experiences of other study sites, and on a survey made among local experts, we will make propositions on key elements that need to be addressed in promoting adaptability on a complex coastal SES such as the clam SES in the Lagoon of Venice. As long as an unbalanced effort will be kept among economic, environmental and social aspects, sustainability will be at risk. Additional efforts should be made in social network mediation and coordination in order to increase fishermen commitment to management rules.

Abstract ID – 989

Theme 3: Coastal governance

Presentation: Oral

The 2nd International Symposium on
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Dilemmas in Local Coastal Governance -Local management and development ambitions vs. sectoral and institutional barriers in Risør, Norway

Håkan T. Sandersen[1], Eirik Mikkelsen[2], Jon Helge Vølstad[3] and Erlend Moksness[3]

1) University of Nordland, 8049 Bodø, Norway
2) Norut AS, Postboks 6434 Forskningsparken, 9294 Tromsø, Norway
3) Institute of Marine Research, POBox 1870, 5817 Bergen, Norway

haakan.t.sandersen@hibo.no

Abstract

The inherently difficult task of governing ecosystems involve management of natural environment and human societies both characterized by complex dynamics, uncertainties, variations and scale dependencies. Local municipalities are increasingly embarking on projects and programs both related to development and protection of their coastal zone. As documented in many coastal zone settings local ambitions tend to get paralyzed by lack of resources, decision-making power or the problems are caused by sources outside the geographic or institutional scope of the municipality. This paper applies a governance perspective in the analysis of the most prominent coastal zone issues addressed by Risør municipality the last five years. The aim is to display some dilemmas and institutional conflicts related to these issues, and to show how limited the practical possibilities are to form and implement autonomous coastal zone policies aiming at protection or development of coastal zone resources.

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Theme 3: Coastal governance

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Interactive coastal management; The Astafjord project

Tone Rasmussen[1] and Børge Arvesen[2]

1) SeaEco AS, Laupstad
N-9454 Ånstad
Norway
2) Kleiva Fiskefarm AS
N-9455 Engenes
Norway

tone@sea-eco.com

Abstract

Throughout the last 30 years a gradual change from the coastal traditional small vessel fisheries towards aquaculture have taken place, especially in protected areas of the coast. The need for more areas for aquaculture, as well as environmental concern, and the general interest in the coast as a recreational zone has triggered the need for more intensive coastal zone planning. The responsibility to plan and manage the coastal zone is strict; all use should be sustainable and environmental friendly. Lack of knowledge limits the local government and the population in general from knowing what consequences their decision-making will have on the system. Faced with this challenge, a group of municipalities in northern Norway, joined forces in 2003 for the management of their marine areas. The Astafjord project identified early the need for politicians and management as well as the users of the coastal zone to speak the same language. Information obtained through scientific research had to be "translated" to enable non-scientists to take part in discussions. The primary result of this is an overall awareness in the whole community of the value, robustness and fragility of the marine areas, as well as it reduced conflicts over decisions made.

The project is unique as it is defined and run by the local management in cooperation with the users and the knowledge have been obtained through joint venture and "science shopping" from the Geological Survey of Norway, SINTEF Fisheries and Aquaculture, the Norwegian Defence Research Institute (FFI), and the Norwegian Hydrography Service.

Abstract ID - 862

Theme 3: Coastal governance

Presentation: Oral

The 2nd International Symposium on
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Applying science to temperate marine protected area network design – perspectives from stakeholders in California's Marine Life Protection Act process

Samantha Murray

Ocean Conservancy
USA

smurray@oceanconservancy.org

Abstract

In 1999, California adopted the Marine Life Protection Act (MLPA), which directs the state of California to redesign its system of marine protected areas (MPAs) to increase its coherence and effectiveness as a network. In 2004, the MLPA Initiative launched an intensive multi-year MPA planning process to implement the MLPA. The process, structured to be science-based and stakeholder-driven, has been successfully designed and implemented for the Central and North Central coastal regions, spanning 5000 square kilometers of California's ocean. It involves a Regional Stakeholder Group, a Science Advisory Team, a Blue Ribbon Task Force, an independent MLPA Initiative staff, contractors, Department of Fish and Game, and the California Fish and Game Commission. The delivery of spatial data, planning tools, science guidelines, and socioeconomic and ecological evaluations are essential in designing and refining alternative MPA networks and informing decision-makers. The MLPA represents an excellent example of a strong information-driven process that relies heavily on committed stakeholders with local expertise to design MPA networks that meet clearly identified science guidelines. Access to complex scientific information and local experiential knowledge by diverse stakeholders and decision-makers has been a hallmark of the process and one key to its success. Samantha Murray served on the North Central Coast Regional Stakeholder Group and has remained intimately involved throughout the South and North Coast regions, which are near completion. Her presentation focuses on the goals of the MLPA, the process for achieving them, the interface between stakeholders and science, and the ultimate outcome of this success story.

Abstracts

Oral Sessions

Theme 4: Linking science and management

Abstract ID – 926

Theme 4: Linking science and management

Presentation: Oral

The 2nd International Symposium on
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Perspectives of social and ecological systems

Paul Tett[1], Audun Sandberg[2], Anne Mette[3], Denis Bailly[4], Marta Estrada[5], Tom Hopkins[6], Maurizio Ribeira d'Alcalà[7] and Loraine McFadden[8]

1) Scottish Association for Marine Science, Scottish Marine Institute, Oban, Argyll, PA37 1QA, Scotland, UK
2) (Nordlands University, Bodø, Norway
3) KMNGE, Berlin, Germany
4) University of Brest, France
5) CSIC, Barcelona, Spain
6) IAMC, Naples, Italy
7) Zoological Station of Naples, Italy
8) FHRC, Middlesex University, London, UK

paul.tett@sams.ac.uk

Abstract

ICZM depends on an understanding of the coastal zone system to be managed. The SPICOSA project (2007-2011) concerned 'Science and Policy Integration for Coastal System Assessments'. During the project we had the task of preparing practical and theoretical guidance for teams engaged in implementations of Spicosa's 'System Approach Framework' at 18 study sites in European Union and adjacent coastal zones. The Framework involves stakeholder interaction and deliberation, and takes account of multilevel governance, in evaluating options for increasing coastal zone sustainability. Our theoretical challenge was to bring together the hard, thermodynamically-based, science of 'General Systems Theory' (von Bertalanffy, Odum), the post-modern approach of 'Soft Systems Methodology' (Checkland), Holling's 'Panarchy', Popper's 3-worlds cosmology, Habermas' 'Communicative Rationality', Luhman's theory of ecological communication, ideas about the value of nature (Costanza) and the 'value in nature' (Ralston), and Ostrom's diagnostic framework for social-ecological systems. We argue that a synthesis of these approaches can be achieved by conceptualizing social-ecological systems as multi-dimensional objects that appear as paradigmatically different when viewed from different perspectives and in a reduced number of dimensions.

Abstract ID - 859

Theme 4: Linking science and management

Presentation: Oral

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Fishery Dependent Information for the Establishment of Marine Protected Areas in Sierra Leone

Sheku Sei, Edward Aruna, Mohamed B.D. Seisay and Heiko Seilert

Ministry of Fisheries and Marine Resources
7th Floor, Youyi Building, Freetown
Sierra Leone

seisheku@yahoo.com

Abstract

Daily fish catches in the artisanal fisheries sector are currently low in Sierra Leon and incomes are unable to meet the basic subsistence needs of fishers and their households. The objective of this study was to collect sufficient data to evaluate fish size and to identify the relevant socio-economic indicators for the establishment of MPAs in Sierra Leone. A national consultative forum was held to elicit stakeholder views and to identify key areas for MPAs, based on length distribution of recent catches and the traditional knowledge of fishers. Socio-economic indicators were captured using questionnaires for random interviews of stakeholders at 16 coastal communities in the Yawri Bay, as this was considered critical for the establishment of pilot MPAs. Recent fisheries investments and the views of respondents were used in a Multi Criteria Decision Analysis and Analysis of Internal Rates of Returns. This study demonstrates that the major livelihood activity in most of the coastal communities around the Yawri Bay is fishing. This is followed by small scale farming, petty trading and salt processing. Fisheries investment is currently unprofitable and the incentive to accrue optimal fishery benefits is affected by illegal fishing, weak capital asset, poor road networks, lack of fish processing and storage facilities. The information obtained from the study reveals that there is strong local support for the establishment of MPAs in critical habitats within the Yawri Bay. However, there are major concerns on the duration of the MPAs and enforcement schemes.

Abstract ID - 860

Theme 4: Linking science and management

Presentation: Oral

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Building bridges between science and policy: Adaptive learning and ICZM, Australia

Melissa Nursey-Bray

University of Adelaide, Australia
Geography and Environmental Studies, North Terrace, Adelaide, South Australia
Australia

melissa.nursey-bray@adelaide.edu.au

Abstract

It is now well established that there are many threats to the ecological and social integrity of the coastal zone. Australia, with a huge coastline, is no exception. Despite multiple efforts to manage the coast, it remains a contested space. At the heart of this are conflicting discourses about its use and management, derived from differing stakeholder perceptions about the value and location of knowledge about the coast and management. By way of a discussion about the forms and constructs of how scientists, policy makers and stakeholders learn, this paper offers a reflection into the ways in which different adaptive learning strategies influence and impact on one specific dimension of coastal zone management; the transmission of science into the policy domain. We find (i) that until common agreements are made about what forms of knowledge are to be prioritised or identified within the management endeavour, (ii) how different interests learn from and adapt to change, and (ii) until communication strategies about science into policy are fine tuned in accordance with these understandings, that the effectiveness of implemneting adaptive learning stratgeis that may enahnce how science is adopted into policy will be impeded.

Abstract ID - 910

Theme 4: Linking science and management

Presentation: Oral

The 2nd International Symposium on
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Framing a 'post-normal' science-policy interface for Integrated Coastal Zone Management

Scott Bremer

University of Bergen
c/o Senter for vitskapsteori
Postboks 7805
Allegaten 34
NO-5020
Bergen
Norway

scott.bremer@svt.uib.no

Abstract

From its inception, Integrated Coastal Zone Management (ICZM) has sought to mobilise the best available knowledge in support of collective decision-making, and to this end promoted a multi-disciplinary 'science-policy interface.' As ICZM has evolved as a field, this has seen the parallel development and mutual influence of two broad traditions of interface: (i) a science-based setting characterised by an ecosystem-based perspective, inter-disciplinarity and adaptive management; and (ii) a participatory setting, inclusive of all knowledge perspectives, which are integrated through reciprocal dialogue. More recently, some ICZM authors have depicted the science-policy interface as an institution for coastal 'governance,' in recognition of the multi-faceted, pluralistic and political nature of collective decision-making, where knowledge is employed as evidence in support of competing values. A number of epistemological perspectives have been proposed as a way of framing such a participatory and deliberative governance setting; from 'Civic Science,' to 'Mode 2 science, to 'Transdisciplinarity,' to 'Post-Normal Science.' This paper explores the potential of post-normal science as an alternative approach to framing the science-policy interface within the field of ICZM. After discussing the key characteristics of post-normal science, the paper briefly explores ways in which it may lead to more successful ICZM, relative to the quality of coastal management institutions and stakeholder interactions. The paper summarises the key findings of PhD research, drawing on empirical analyses of the science-policy interface for coastal management at the international scale in Europe, and at the national and local scales in New Zealand.

Abstract ID – 925

Theme 4: Linking science and management.

Presentation: Oral

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Reflexively mapping the science-policy interface for coastal zones

Anne Blanchard and Scott Bremer

University of Bergen
Senter for Vitskapsteori (SVT)
Allegaten 34, Postboks 7805
5020 Bergen
Norway

anne.blanchard@svt.uib.no

Abstract

The scholarship and practice of Integrated Coastal Zone Management (ICZM) has long promoted institutional settings such as the 'science-policy interface', within which knowledge is mobilised in support of decision-making. As ICZM has evolved, the role of the scientific community within this interface has also evolved, with many authors now demanding coastal science which is ecosystem- and issue-based, highly integrated and adaptive to new knowledge. Owing to the complex and dynamic nature of the science-policy interface itself, it can be difficult for coastal scientists to understand its current shape, and in which direction it needs to progress. In order to help them locate their current institutional setting and chart a route to a preferable location better placed to address the challenges of a specific issue or context, the metaphor of a 'map' presents a useful reflexive heuristic. This paper interposes two different scales: (a) the degree of integration between disciplines, and (b) the objectives of knowledge mobilisation within the coastal zone; and uses this to 'map' the state of the science-policy interface relative to these two measures. As illustration, this paper presents the results of qualitative research undertaken with coastal managers in New Zealand's Regional Authorities, where participants described and situated the current state of the science-policy interface on the 'map', together with barriers and opportunities for the future structuring of the interface.

Abstract ID – 1514

Theme 4: Linking science and management

Invited speaker

The 2nd International Symposium on
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Science Policy Interactions: Between policy fragmentation, integration and new paradigms for planning and management

Andreas Kannen

Helmholtz Zentrum Geesthacht
Max-Planck Str. 1
D-21502 Geesthacht
Germany

Andreas.Kannen@hzg.de

Abstract

Human activities in marine areas are increasing in number and intensity, and patterns of sea use are changing as a result of political, economic and societal developments. In addition proposed mitigation and adaptation measures to climate change might alter sea use patterns further and consequently the distribution and intensity of human impacts on marine ecosystems. Associated to the multitude of issues and sea uses are fragmented policy frameworks, not only divided by sectors but also between environmental regimes and the balancing approach of Marine/Maritime Spatial Planning, both claiming to be integrative. But even when integrated assessments (rare as they are) may more or less adequately ascertain the impacts, the implementation of resulting management plans is hampered by the potentially conflicting, jurisdictional policy objectives of various levels and arms of government in a given geographical area. Furthermore, neither long-term climate change impacts nor future socio-economic and cultural developments can be precisely predicted and put in definite numbers which offer a definitive guide for policy development. Planning under these circumstances can be characterised with the term “planning under uncertainty” and requires a move towards continuous planning processes reacting upon changing contexts instead of mainly data driven decisions. Today’s prevailing approach of scientific management seems to be ill equipped to offer solutions under these circumstances, for example in dealing with cumulative effects resulting from multiple sector-based activities or with normative conflicts between different actors. This presentation will illustrate such problems using specific examples and argue for a move towards adaptive, transnational and participative modes of coastal and marine governance using tools such as visioning and research which analyses the particular social, cultural and normative context of decision making. It aims to link the context in which institutions act to potential contributions of research.

Abstract ID – 935

Theme 4: Linking science and management

Presentation: Oral

The 2nd International Symposium on
Integrated Coastal Zone Management
Arendal, Norway
3 – 7 July 2011

Building with nature: the challenge of integrating nature in coastal engineering design Lessons from a building with nature case study in the Netherlands

Stephanie Janssen

Deltares
Postbus 85467
3508 AL Utrecht
The Netherlands

stephanie.janssen@deltares.nl

Abstract

This paper concentrates on the knowledge integration challenge in coastal engineering infrastructure resulting from an innovative design approach: building with nature. Coastal engineering infrastructure plays an important role in the development of densely populated Delta's around the world. These projects provide safety from flooding and support economic functions such as harbour development. Since the 70's environmental awareness has raised. Rules and legislation have been developed to compensate and mitigate the negative effects of infrastructure on ecosystems. 'Building with nature' is one of the most recent approaches in coastal engineering infrastructure to handle the effects on nature. This proactive approach aims at using the potential of the coastal ecosystem and looking for ways to improve the ecological qualities. Incorporating nature in the design of coastal engineering is new and brings along challenges of integrating different knowledge disciplines resulting from different research and design backgrounds. Based on Schneider and Ingram (2007) and Van Buuren (2009), we study how different 'ways of knowing' coastal engineering infrastructure are combined in a multi-disciplinary design. By looking at facts, frames and organizing capacity, we consider different levels of the integration challenge. We look into the practice of a Dutch 'building with nature' project: a mega sand nourishment project in front of the Dutch coast, the 'sand engine'. From this case study we draw lessons on integrating different knowledge disciplines into one integral design and formulate recommendations for knowledge management practices. The case study supports our idea of assessing integration of nature and safety on multiple levels.

Abstract ID – 946

Theme 4: Linking science and management.

Presentation: Oral

The 2nd International Symposium on
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Sustainable development indicators for the coastal zone management

Rosita Mileriene and Saulius Gulbinskas

Coastal Research and Planning Institute, Klaipeda University
H. Manto 84
Klaipeda
LT 92294
Lithuania

rosita@corpi.ku.lt

Abstract

Increasing pressure on coastal areas arising from more intensive marine use stimulates conflicts among different stakeholders in coastal regions. Different demands in using land and marine coastal components need to be balanced in a multi-sectoral perspective. Therefore application of ICZM principles seems to be the optimal economical and legal instrument for minimising possibilities of conflicts. 27 sustainable development indicators, established by EU have been widely applied for ICZM in many European coastal regions. Indicator-based approach to evaluating coastal zone development allows to make comparisons between different coastal regions as well as between coastal zone and hinterland. Such approach also has to provide the reliable information on state of the coastal zone in each separate region, thus supporting the quality of coastal management decisions. The Sustainable Development indicators for ICZM (SDI-4-SEB) in the South-Eastern Baltic region project was carried out in order to assess the state of the coastal zone using EU recommended set of indicators. Analysed indicators are the signpoins, describing the current state of the coastal zone management. Also being interconnected to each other indicators have the additional value when speaking about understanding such a complex system as the coastal zone. However, project implementation revealed that sustainable development indicators may require some improvements and adaptation to regional specifics. Insufficient data, imprecise requirements or lack of national regulations suggested to revise the chosen indicator's set and to think about the development of more region specific indicators, also reserving the possibility of benchmarking EU coastal regions.

Abstract ID – 948

Theme 4: Linking science and management.

Presentation: Oral

The 2nd International Symposium on
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Adaptive water management in coastal areas: From climate and anthropogenic impact assessment to policy recommendations

Bormann Helge, Ahlhorn Frank and Klenke Thomas

University of Oldenburg
Department of Biology and Environmental Sciences
Ammerländer Heerstraße 114-118
D-26129 Oldenburg
Germany

helge.bormann@uni-oldenburg.de

Abstract

Climate proofing the coastal water management in the North Sea region requires several actions: Providing information on expected regional hydrological change, assessing the functionality of the existing water management systems, elaborating adaptation options for future scenarios and implementing the most suitable adaptation option. As part of this process, linking science and policy plays a central role. Scientific projections are required for a sound decision making, while the information provided to decision makers must be provided in a way which is suitable for non-scientists. This contribution presents results of EU-Interreg VIB 'Climate Proof Areas' project. In the German part of the North Sea Region, water management regulates a strong seasonality in water quantity. While in winter time drainage and storage avoid flooding, in summer time watering assists guaranteeing sufficient water availability with respect to quantity and quality. In a participatory process, together with representative stakeholders, we analysed the efficiency of the Wesermarsch water management system and developed a bunch of adaptation alternatives. Based on the mentioned boundary conditions, we discuss the following questions: - Which information is needed for adaptive water management related decision making in coastal regions? - Which information from hydrological scientists is suitable for decision makers in such a climate adaptation process? - How should we deal with the uncertainty in the climate projections? - How does selective use of available information influence the characteristics of suggested adaptation options? Discussing these questions we try to infer the necessary compromise between scientific completeness of information on the one hand and the requirements on straightforwardness for decision making on the other hand.

Abstract ID – 957

Theme 4: Linking science and management.

Presentation: Oral

The 2nd International Symposium on
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Hindsight is wonderful: simple lessons for increasing science and policy integration

Loraine McFadden[1], Sally Priest[1], Audun Sandberg[2], Denis Bailly[3], Johanna D'Hernoncourt[4], Jeanette Reis[5] and Anne Mette[6]

1) FHRC, Middlesex University, UK
2) Nordlands University, Bodø, Norway
3) University of Brest, France
4) Centre d'Etudes Economiques et Sociales de l'Environnement – ULB, Belgium
5) University of Cardiff, UK
6) KMNGE, Berlin, Germany

l.mcfadden@mdx.ac.uk

Abstract

This paper presents a perspective about how EU SPICOSA Project scientists might have been better equipped to further increase the integrative power of project research. It is based on a series of surveys which have explored different social aspects of the Systems Approach Framework (SAF) developed within the SPICOSA Project. The lessons are cross-cutting in that they have emerged as important across each of the surveys, encapsulating the range of issues that the SPICOSA community believed had acted to constrain or facilitate the success of integrating disciplines and science and policy within the project. We argue that some relatively simple changes in how we fund, organise and facilitate inter-disciplinary research projects could result in more profound changes for science and policy integration. The clear fact is that once critical lesson was learned by all SPICOSA participants: it is considerably easier to think of a system as a system than actually to manage it in practice as one. The context of science and policy integration is itself a social world which is continuously changing and a policy-world that is in reality an experiment. A critical view of science and policy integration is that we need to improve the facilitation of this dynamic social reality with more adaptive and flexible approaches to research.

Abstract ID – 958

Theme 4: Linking science and management.

Presentation: Oral

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Linking Science and Management through demanding research funding mechanism

Xavier Lafon and Yves Henocques

French Ministry for Sustainable Development
MEDDTL , CGDD/DRI/SR/MUTS, Tour Voltaire, 92055 La Défense CEDEX
France

xavier.lafon@developpement-durable.gouv.fr

Abstract

When linking science & management one often makes the assumption that Science stands for reality and management for actions that will impact reality. Therefore we should link one to the other so that sound and rational management prevail. According to Theme 4 sub-themes, there is, among other, room to improve management indicators, information needs for policies, and better integration of science integration into policy decisions ; we would add science questions relevance. LITEAU, a research program funded by the French Ministry for environment since 1998, assumes that binding funding to strong demands regarding relationships between researchers and managers will be necessary to address the challenges previously identified and induce efficient long-term linkage that are necessary to over-pass investment and trust issues. Forcing a change in scientific practices put a researcher 'at risk' regarding his posture, his relations to his research institution and scientific community. Through tangible examples from funded and realized research projects, we'll make explicit the benefits from investing in science-management linkage from a scientific point of view. It allows to open up a new science field, giving access to new actors, data and scientific issues (e.g. from former scientists dealing with water policies and agent based modeling). This initial investment can turn into long-term exclusive relationships recognizing an unique expertise to the researcher. It also enable to better focus a research project, for example when elaborating scenarii for modeling. LITEAU therefore helped to identify and test the importance of a funding instrument to address science-management issues.

Abstract ID – 968

Theme 4: Linking science and management

Presentation: Oral

The 2nd International Symposium on
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Measuring social behavior? – A survey of farmers' incentives to contribute to better water quality by creating wetlands

Frida Franzén

Södertörn University
Sweden

frida@enveco.se

Abstract

The importance of the social dimension of sustainability is increasingly recognized in natural resource management, including better understanding of how people and societies interact with natural systems. The other dimensions of sustainability; ecology and economy are commonly used in integrated modeling, producing guidelines for policy implementation. However, the social dimension is often left out. The risk of excluding the social systems in integrated models is that the optimized solutions produced by them, might not be well implemented in the social context in which they are govern. The research of this paper presents a way of conducting social analysis to produce relevant data for the social dimension in integrated models. In connection to the research project SPICOSA - Science and Policy Integration for Coastal System Assessment, an integrated model was built to simulate nitrogen management scenarios for Himmerfjärden, a coastal bay, south of Stockholm, Sweden. One of the main polluters of nitrogen is agriculture; therefore one of the options in the model was wetland creation to reduce nitrogen leakage. Thus, a questionnaire was sent to all farmers in the drainage basin of Himmerfjärden to study the willingness of farmers to participate in wetland creation, given various conditions. Following a choice modeling setting, different combinations of five attributes of policy instruments for wetland creation were estimated to give the probability of farmers to participate. This result was linked to ecological and economic components in the integrated model for Himmerfjärden nitrogen management, and can also be used to formulate appropriate policy instruments.

Abstract ID – 1515

Theme 4: Linking science and management

Invited speaker

The 2nd International Symposium on
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The social factor in the system approach for ICZM - challenges and options

Denis Bailly

University of Bretagne Occidentale
CEDEM
Brest
France

denis.bailly@univ-brest.fr

Abstract

Abstract ID – 971

Theme 4: Linking science and management

Presentation: Oral

The 2nd International Symposium on
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The Use Conceptual Models as Tool to Design of a System in a Transdisciplinary Setting, case study application in Terceira Island, Azores

Maria Helena Guimarães[1,2],Tomaz Dentinho[1], Tomasz Boski[2]

1) Gabinete de Gestão e Conservação da Natureza, Universidade dos Açores, 9701-851, Angra do Heroísmo, Portugal
2) Centro de Investigação Marinha e Ambiental, Faculdade de Ciência do Mar e Ambiente, 8005-139, Faro Portugal

mguimaraes@ualg.pt

Abstract

Management of natural resources is a complex issue. Nature per se is a system of multiple elements and processes that interacts with the social and economic systems. Human history shows the need for sustainable management of natural resources and one of the premises for this is knowledge integration. Nevertheless the need to integrate different types of knowledge poses a challenge. This paper proposes Conceptual Models as tools to improve deliberation processes and research. Praia da Vitoria Bay in Terceira Island in Azores Island, Portugal is used as a case study to illustrate the use of Conceptual Models towards system definition. During a workshop of three hours, 18 stakeholders worked together to produce Conceptual Models concerning wetland degradation. Participants included researchers, local and regional public institutions, tourism, managers, and non governmental institutions. Process, models and stakeholders feedback are discussed. The exercise reveals that conceptual modeling is a challenging task for non scientist and information driven by it includes not only variables and process but also scenarios. In a management perspective the benefits of the exercise were manly the promotion of discussion, sharing visions, while cooperating to finalize the task. In the scientific arena the main results show that during the 3 hours workshop data identification and integration has been achieved. The conclusion of this application is that collective Conceptual Modeling will not serve all purposes but can be an important step towards integrated management.

Abstract ID - 1517

Theme 4: Linking science and management
Presentation: Oral

The 2nd International Symposium on
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Educational and Professional training (Building capacity for SAF within an ICZM framework)

Jeremy Gault (+ Spicosa training leaders)

Coastal and Marine Research Centre
Environmental Research Institute, University College Cork
Naval Base – Haulbowline, Cobh, Co. Cork
Ireland

J.Gault@ucc.ie

Abstract

The overall objective of the SPICOSA (Science and Policy Integration for Coastal Systems Assessment) FP6 project is to develop an approach that enables an integrated assessment of any coastal system using best available scientific knowledge from all disciplines. The Project advocates informed decision-making using an Eco-system approach such that potential impacts of any policy shift on the Ecological, Social and Economic (ESE) sectors are considered in a balanced way. This is achieved using a System Approach Framework (SAF) which explores the dynamics of coastal zone systems and the overall potential consequences of different policy scenarios. Coastal zone systems are, by their nature, ecologically complex and the addition of economic and social considerations only adds to this complexity. The challenge for successful capacity building is to break down these complexities into a form that is readily palatable to coastal managers and policy makers. Under SPICOSA this was achieved using parallel approaches aimed at (1) current coastal management professionals and policy makers and (2) future coastal managers engaged in post-graduate educational programmes.

The structured training programmes were tailored towards their respective audiences and were delivered using contrasting vehicles – for the professional / policy community a workshop approach was adopted whereas the educational component was delivered using lectures augmented by fieldtrips. However, both outline the benefits of an Eco-system approach and the SAF using 'real-life' examples from the collective experiences gained during the implementation of the SAF at sites across Europe. Included were detailed descriptions of the approach and methods to critically evaluate the relevance of the SAF approach to the principles of Integrated Coastal Zone Management (ICZM).

By championing the SAF approach it is hoped that current and future coastal management professionals will use it to improve decision-making by assessing the impacts of proposed policy changes prior to their implementation. This presentation will provide an overview of the training and educational initiatives developed and promote their use to build capacity for SAF as a tool to support ICZM.

Abstract ID - 887

Theme 4: Linking science and management

Presentation: Oral

The 2nd International Symposium on
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Integrated Coastal Zone Management - Preview and Evaluation on its Application on the Mediterranean Coast of Cyprus

Nicholas Kathijotes and Athina Papatheodoulou

Cyprus University of Technology
POB 50329 Lemesos CY3603
Cyprus

nicholas.kathijotes@cut.ac.cy

Abstract

Today, at the beginning of the 21st century, the majority of the worldâ€™s population is living in urban areas, generating significant pressure on the supporting ecosystems. The need for a more integrated, long term approach is then made evident, something that moved certain initiatives on building on the concept of integrated coastal zone management. The EU policy is emphasized in general terms, together with an evaluation of the ecological degradation of the Mediterranean coasts. The city of Lemesos in Cyprus is evaluated, stating the ecological risks and the possible mitigation measures, resulting from the EU directives and policies. Types of pollution include litter and oils, municipal wastewater, nutrients and sediments, radioactive waste, some heavy metals and persistent organic pollutants. Emphasis is given on nutrients that may end up into the sea and the overall management of water resources. Focusing on the Mediterranean Sea in terms of the above mentioned hazards, suggestions, measures and good practices are given in the direction of creating model ecological cities, based on an integrated coastal zone management practice. Great improvement has been achieved in Lemesos by the construction of the central sewerage system. The concept of â€˜Urban Metabolismâ€™ is also outlined as a tool used to quantify and assess urban sustainability of coastal cities.

Poster Session

Theme 1: Coastal habitats and ecosystem services

Abstract ID - 897

Theme 1: Coastal habitats and ecosystem services

Presentation: Poster

The 2nd International Symposium on
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Goatfishes (Mullidae) as indicators of coastal habitats: life history of manybar goatfish Parupeneus multifasciatus

Pavlov Dimitri A., Natalya Emelyanova, Vo Thi Ha and Luong Thi Bich Thuan

Moscow State University
Faculty of Biology
Department of Ichthyology
119992 Moscow
Russia

dimi-pavlov@yandex.ru

Abstract

Goatfishes of the family Mullidae respond strongly to human-induced factors such as fisheries, habitat modification, pollution and coastal degradation as reflected by the changes of their distribution, population structure, morphological and physiological parameters (Uiblein, 2007). Unfortunately, ecology of many representatives of the tropical zone remains unknown. The goal of this study is the description of the life history of a widely distributed coral reef-associated species, manybar goatfish *Parupeneus multifasciatus*. The fish (n = 443) are collected in the coastal zone of southern Vietnam. The sex ratio (females : males) is 1.4 : 1 in the Marine Protected Area of Nha Trang Bay and 4.8 : 1 in Dai Lanh Bay: the difference can be explained by various fishing pressure in the bays. In general, males are larger than females (on the average, 155 and 143 мм FL, respectively) especially in the largest size classes. The oogenesis is asynchronous, and the fish spawn over the whole year showing a trend to the decrease of the GSI from June to October. The embryos (1.4-1.6 mm TL) hatch at the age of 24 h after egg activation (at 25ºC), and the larvae transit to exogenous feeding in five days. Based on the analysis of otolith microstructure, the juveniles transit to demersal life reaching 19 mm FL at the age of 24 days, and the life span of the fish is less than 16 months. Thus, manybar goatfish is a short-living species, and the populations are able for rapid recovery.

Abstract ID - 898

Theme 1: Coastal habitats and ecosystem services.

Presentation: Poster

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Goatfishes (Mullidae) as indicators of coastal habitats: assessment of ovarian composition in manybar goatfish *Parupeneus multifasciatus*

Natalya Emelyanova, Pavlov Dimitri A., Luong Thi Bich Thuan and Vo Thi Ha

Moscow State University
Faculty of Biology
Department of Ichthyology
119992 Moscow
Russia

enata@rambler.ru

Abstract

The ovarian composition is assessed in coral reef-associated species, manybar goatfish Parupeneus multifasciatus, from southern Vietnam. The fish are collected in the Marine Protected Area of Nha Trang Bay off Hon Tre Island (12º10' - 12º14' N; 109º14' - 109º21' E) and in Dai Lanh Bay (12º55' N, 109º27' E) at a distance of 74 km between the sampling sites. The ovaries at maturity stages IV, IV-V and VI-IV are sampled in January and February 2010 and subjected to histological analysis. The morphological abnormalities of oocytes are revealed mainly in substantial parts of the cells at the periods of maturation and vitellogenesis. The abnormalities are as follows: unequal distribution of lipid vacuoles in the cytoplasm, a fusion of several yolk granules with the content of lipid vacuoles, smaller size of the yolk granules, compression of the nuclear content or total disappearance of the nucleus, destruction of the zona radiata and unequal distribution of trophoplasmic inclusions in the cytoplasm. Hypertrophy of follicular cells is also observed suggesting onset of utilization of the oocyte content. Lysis of the cytoplasm and vascularization of the ovarian stroma are also registered. In two specimens from Dai Lanh Bay, sterile parts of the ovarian fragments are observed. The abnormalities in the gonads are revealed in 20% (n = 44) and 29% (n = 48) of females from the Nha Trang and Dai Lanh areas, respectively. The difference is not significant, but a high degree of anthropogenic pressure in both bays can be suggested.

Abstract ID – 961

Theme 1: Coastal habitats and ecosystem services.

Presentation: Poster

The 2nd International Symposium on
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Biodiversity and ecosystem functioning in coastal lagoons of southeastern Caspian basin-IRAN

Rahman Patimar and Asghar Abdoli

Gonbad Kavous University
Shahid Fallahy Street
Gonbad Kavous
Golestan Province
Iran

rpatimar@gmail.com

Abstract

Lagoon ecosystems are extremely dynamic and typically highly productive. These areas are ephemeral habitats whose conservation requires human intervention. We make here an attempt to relate lagoon functioning and ichthyo-biodiversity (using a series of parameters including fish species diversity and abundance in two southeastern Caspian lagoon systems). The lagoons of the basin (Gomishan wetland and Miankaleh wildlife refuge) differed significantly in fish species diversity indices and abundance, while there were no significant differences between the lagoons in many ecological parameters (water and sediment quality). In light of ecosystem function alternation, it seems that recent changes could have promoted the increase of the abundance of the non-indigenous species and reduced species diversity in both lagoons, compared to the situation of 80s-90s. These variations in fish species assemblages could be related to the observed changes of alternation of lagoonal functions. Direct effects on fish assemblages in the lagoons were more detectable than the possible secondary effects in the surrounding shallow areas, where the higher spatial heterogeneity (in both benthoses and macrophytes) can mask any relevant effects. The investigation of the links between ichthyo-diversity and functioning in lagoons of the basin is still at its infancy, but these preliminary results suggest that a better understanding of the role of fish species diversity on lagoon functioning and efficiency could open new perspectives for the conservation and management of these vulnerable ecosystems, and a combination based on presence, abundance, and biomass of newly introduced species could be a good indicator of lagoon health and function.

Abstract ID – 962

Theme 1: Coastal habitats and ecosystem services.

Presentation: Poster

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Conservation status of coastal lagoons in Iran, example of southern Caspian lagoons

Asghar Abdoli and Rahman Patimar

Shahid Beheshty University
Department of Biodiversity and Ecosystem Management, Environmental Research Institute, Shahid Beheshty University, G. C., 1983963113, Tehran
IRAN

asabdoli@yahoo.com

Abstract

Iran possesses more than 35 wetlands including many coastal lagoon sites. Recently, these lagoons were under considerable degradation as a result of natural causes and human interference. As an example, the heavy fishing pressure has led to a reduction in the average size of many fishes and the population density of fishes was also extremely low in lagoons where the species was heavily exploited. Coastal lagoons of southern Caspian Sea in Iran provide valuable resources to the local communities and offer important habitats for several animals, especially for birds and fishes. Therefore, the increasing number of impact assessment studies, management and conservation plans, as well as ecological monitoring studies, demand new and more efficient techniques, and there is a need for scientific evaluation of the traditional conservations. Obtained indices in this evaluation as a practical application were important tools to aid scientific community, and should allow an easier comprehension of the data by managers, decision-makers and the general public.

Abstract ID – 990

Theme 1: Coastal habitats and ecosystem services
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The 2nd International Symposium on
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Assesment of Luga Bay ecosystem as a tool for the future integrated management plan of the Eastern Baltic Sea coastal zone

Dubrava Kirievskaya and Varvara Ivanova

St. Petersburg State University
7-9 Universitetskaya nab.,
199000, St. Petersburg
Russia

dubrava.kirievskaya@gmail.com

Abstract

Social and economic development of the Baltic region and the Luga Bay ecosystem (southern part of Gulf of Finland) depends on prospects building of the port complex «New Harbor Streams». In this territory ecological estimation has been made. In this research we have got following results: 1. Waters have neutral and alkalescent reaction of pH (from 7,1 to 8,5). Depending on depth (in near-bottom horizons) the pH value fallen. 2. The surface waters (according to quality) are clear and very clear waters. Concentration of oil carbohydrates, heavy metals, polyaromatic hydrocarbon, chlorine organic pesticide,policlorine-bifinils are below maximum permissible concentration. 3. Character of this substances distribution on depth was different depending. Most likely it is connected with atmospheric receipt of polluting substances, emergency floods, hydrodynamics and chemical features of sea water as soon as sorbtion of substances with bottom sediment. 4. Positive correlation of oil carbohydrates, Zn, As distribution with dept was found as well as petroleum carbohydrates and As with concentration of clay fraction. 5. Bottom deposits of investigated territory were weakly polluted and clear, but in places to the north of the bay and in places of geomorphological traps the polluted sediment was found. 6. We have divided the investigated area into clusters (according to pollution classes) and have made recommendations about use of these clusters for port building. These recommendations will not cause the ecosystem degradation and at the same time will contribute to economic and social development of region.

Abstract ID - 916

Theme 1: Coastal habitats and ecosystem services.

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Integrated Coastal Zone Management (ICZM) in Bangladesh: potential challenges for the Department of Fisheries

Siddique, M.A.L, S. Zafrin, S. Myers, T. Smith and R.W. Carter

University of the Sunshine Coast
4 Panamuna Crescent
Buderim, QLD 4556
Australia

latif@dal.ca

Abstract

This paper identifies the potentials for and constraints to achieving Integrated Coastal Zone Management (ICZM) in Bangladesh, with particular emphasis on the programme of Department of Fisheries (DoF) for sustainable marine and coastal fisheries management. An ICZM donor aided project was completed in 2005 with two major outputs: a Coastal Zone Policy (CZPo, 2005) and a Coastal Development Strategy (CDS) with a Priority Investment Program (PIP, 2006). The CDS identifies interventions necessary for implementing the CZPo. It prepares for coordinated priority actions and arrangements for their implementation through selecting strategic priorities and setting targets. The PIP is the operational arm of the CDS and the linking mechanism to integrate coastal development into the national planning process. The guidelines, as the first policy document for coastal zone management in Bangladesh, address contemporary marine and coastal fisheries issues and assist the DoF in fulfilling its commitments and responsibilities. Despite shortfalls in the policy instruments (e.g. lack of clarity in institutional rearrangements, research priorities, marine pollution management and transboundary species management, and integrated enforcement), the ICZM instruments provide a platform for the DoF to be proactive in sustainable coastal and marine fisheries management. Review and adjustment of the existing fisheries management approach, reorganizing legal and institutional frameworks, and greater emphasis on community and stakeholder participation in planning, management and evaluation are required to successfully achieve the intent of the ICZM policy framework.

Abstract ID – 921

Theme 1: Coastal habitats and ecosystem services

Presentation: Poster

The 2nd International Symposium on
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Coral Reef Mapping and Valuation : as Basic Knowledge for Marine Resources Monitoring

Yoniar Hufan R., F. Anggoro Cahyo, Ratna Sari Dewi, Nurwadjedi and Niendyawati

BAKOSURTANAL
Jl. Raya Bogor KM.46
Cibinong - Bogor 16911
Indonesia

dewi.rsd@gmail.com

Abstract

The coral reef provide many benefits, which are of high value and critical importance to local and national economies in Indonesia. Economic valuation of these benefits helps to guide the sustainable use coastal resources. It is said that these values are frequently overlooked or underappreciated in coastal investment, development and policy decisions, resulting in short-sighted decisions that do not maximize the long-term economic potential of coastal areas. The method use in this research does not apply Total Economic Value (TEV), but rather focusses on fisheries. This method was chosen because of their importance to local economies and because data are available to support estimation of these values. Coral reef-associated fisheries provide important values including jobs, cultural value, and a social safety net. The annual direct economic impact of coral reef associated fisheries is estimated at Rp. 18.457.253.643 (US$ 2 million) per year for South Bungu and Rp. 7.103.481.905 (US$ 0,7 million) per year for Menui Archipelago. Keywords: coral reef, economic valuation, mapping, marine resources, monitoring.

Abstract ID – 943

Theme 1: Coastal habitats and ecosystem services

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Distribution of fish in different macrophyte habitats

Hartvig Christie[1] and Frithjof E Moy[2]

1) Norwegian Institute for Water Research, Gaustadalléen 21, 0349 Oslo, Norway
2) Institute of Marine Research, Flødevigen Marine Research Station, 4817 His, Norway

hartvig.christie@niva.no

Abstract

The different macrophyte species form habitats of different structural properties that may influence on association of invertebrates and fish. On the other hand, distribution of fish may by top down effects on grazers influence on the macrophyte composition. In Scandinavian waters, kelp and seagrass habitats have been overtaken by filamentous algae with consequences for fish distribution as well as overfishing may influence on effects of fish predation. At the south coast of Norway, we did night and day fishing in four different habitats: Laminaria hyperborea kelp forest, Saccharina latissima kelp forest, eelgrass beds, and turf algae beds. Fishing was done with traps and gillnets of different mesh size, and by fishing on two locations on consecutive days and months, each habitat was fished 8 times at day and 8 times at night. More than 20 species of fish were recorded, while the most abundant were 5 species of cod family (Gadidae) and 5 species of wrasses (Labridae). The cods were most active at night, while wrasses were active both days and night. The wrasses were most abundant in kelps and turf algae, while cods were most common occurring in the seagrass. The importance of the habitat as feeding area and the top down effects of the fishes will be discussed based on fish abundance and fish stomach content related to fauna composition in the habitats.

Abstract ID – 944

Theme 1: Coastal habitats and ecosystem services
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Integrated Coastal Zone Management
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3 – 7 July 2011

The role of suspended mussel farming (*Mytilus edulis)* in nutrient dynamics of oligotrophic systems

H.M. Jansen, Ø. Strand, M.C.J. Verdegem and A.C. Smaal

Institute for Marine Research
Research Group benthic habitats and shellfish
Nordnesgaten 50
5817 Bergen, Norway.

henrice.jansen@imr.no

Abstract

Cultivation of the blue mussel (Mytilus edulis) in coastal ecosystems raises questions about the ecological consequences and sustainability of this type of activity. Mussel populations play a role in the cycling of nutrients in coastal habitats through a variety of biological processes (i.e filtration, excretion, faeces production) and feedback systems (see diagram). These processes show seasonal variability, reflecting environmental fluctuations and endogenous metabolic requirements of the mussels. Sustainable mussel production is often described in terms of carrying capacity. However, understanding the interaction of mussel culture and their ecosystems is complex, and requires an approach that integrates different spatial scales. Carrying capacity models for mussel culture have addressed farm to coastal ecosystem scales, but are typically based on individual growth models. Such an approach does not address potential population or community specific effects related to mussel culture units, such as metabolic activity of associated fauna and decomposing organic material on mussel ropes. Results will be presented of an extensive study on nutrient cycling by mussel culture under oligotrophic conditions, including (i) annual fluctuations in metabolic activity related to nutrient turnover in individual mussels, (ii) annual fluctuations in rope scale nutrient release rates as a function of fauna and organic material associated with mussel ropes, (iii) comparison between individual and rope scale nutrient fluxes, (iv) decomposition rates of mussel biodeposits as a function of biodeposit quality. A nutrient budget will be established and interactions between mussel cultures and their ecosystem will be discussed, with special emphasis to deep oligotrophic fjord systems.

Abstract ID – 991

Theme 1: Coastal habitats and ecosystem services

Presentation: Poster

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A study of the environmental profile of the southern coasts of the Caspian Sea and related threats

Abbas Jafari, Mohammad Ghasemi, Komeil Jahanifar and Arezou Jafari

Islamic Azad University Qaemshahr Branch
Young Researcher Club
Qaemshahr
Iran

jafary.ab@gmail.com

Abstract

The Caspian Sea is the largest lake in the world which is surrounded by Russia, Iran, Azerbaijan, Kazakhstan, and Turkmenistan. The southern coastline of the Caspian Sea which is about 990 km ling is located in Iran. The involved area in this research which covers the southern coasts of the Caspian Sea, there is a national park, a national natural monument, seven wildlife refuges and four protected areas with a total area 538521 hectares equal to 4.45% of the protected area in Iran. Moreover, there are six international wetlands, one biosphere reserve and eighteen special biological regions. The status of these areas and the prospective threats are studied in this research.

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Theme 1: Coastal habitats and ecosystem services

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The 2nd International Symposium on
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MOLO - A management system integrating environmental effects and area adaptation in Norwegian aquaculture

A. Ervik[1], P.K. Hansen[1], Ø. Strand[1],I. Døskeland[2] and A. Hageberg[3]

[1]Institute for Marine Research, Nordnesgate 50, 5817 Bergen, Norway.
[2]Hordaland County, Agnes Mowinckels gate 5, 5008 Bergen, Norway
[3]Christian Michelsen Research AS, Fantoftvegen 38, 5892 Bergen, Norway

E-mail: arne.ervik@imr.no

Abstract

The exploitation of the coastal zone is increasing with new stakeholders, activities and interactions. At the same time, new and more complicated principles of coastal zone management are being applied including the ecosystem approach and biodiversity maintenance. The management of the coastal zone is thus becoming increasingly complex.
This poster presents an integrated management system MOLO (environmental monitoring - location) is being launched to regulate a broader scale of environmental effects and area adaptation in aquaculture. Localisation will be a central feature of the new system for zoning and environmental adaptation. Part of this will involve guidelines for coastal zone management planning for aquaculture areas regulated by the Norwegian Planning and Building Act.

Abstract ID: 844

Theme 1: Coastal habitats and ecosystem services

Presentation: Poster

The 2nd International Symposium on
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Study on natural feeding of Persian sturgeon (Acipenser persicus Bordin,1987) in southern part of Caspian Sea (Iranian water) under 10 m depth

Kourosh Haddadi Moghaddam

International Sturgeon Research Institute
Department of Ecology
P.O. box: 41635-3464 Rasht
Iran

khmoghadam@yahoo.com

Abstract

Natural feeding of Persian sturgeon caught under 10m depth using bottom trawl net by research vessel during winter 2006, summer and winter 2007 and spring 2008 in east, central and west of southern parts of Caspian Sea,then,their diets were investigated. During 136 trawling in the aimed seasons, 108 un matured Persian sturgeon with 1 to 2 years old and 179.67±0.2gr (BW) and 29.97 ±0.4 cm (TL) captured. Examination of stomach contents in the sturgeon specimens revealed tat the food spectrum was composed of bony fishes (Neogobius sp., Atherina sp. and Clupeonella delicatula), invertebrates belonging to the family Ampharetidae polychaeta worms including (Hypanai sp. and Nereis diversicolor), various crustaceans (Gammarus sp. and Paramysis sp.). Investigation on stomach contents of sturgeon Acipenser persicus caught under 10m depth in 2006 to 2007 surveys showed that there is significant difference in the consumed food.The most food diversity have been observed in winter 2007 ,Also Polychaeta is the primary consumed food and crustacean is the secondary one (P>0.05)., no new types of food (such as bony fishes or benthics) have been observed on food chain of Acipenser persicus and shows no significant difference (P>0.05).

Abstract ID - 865

Theme 1: Coastal habitats and ecosystem services

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The 2nd International Symposium on
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Fauna of Farwa Island

Tarek Bashir Jdeidi

Alfateh Univerasity
Science faculty / Zoology Department
Tripoli
Libya

jdeidi@yahoo.com

Abstract

Farwa island considered as one of the most important island in Libya, it located in the Mediterranean north western part of Libya, it has a suitable climatic condition and unique diverse habitats of extensive tidal area, sand dunes, trees, mud flat, marshes, drying salt lakes, and beaches. The mean annual temperature is 19ºC and the mean annual rainfall reaches 200mm. These different conditions provide a good habitat for many plant and animal species. The most common mammal species seen in Farwa island are Lepus capensis, Vulpes vulpes, Poecilictis libyca, Hystrix cristata. There are many kinds of reptiles like lizards, snakes, and sea turtles. And also there are many kinds of arthropods like beetles, butterflies, moths, ants, bees, wasps, locusts, spiders and scorpions. Water birds form the most important fauna elements in Farwa island. This island is the most important area in Libya for many migratory birds, especially for the birds which are under world wide danger of extinction like sterna bengalensis, Larus audouinii, Phalacrocorax aristotelis, Aythya ferina, Numenius tenuirostris. There are many migratory bird species breeding at this island, the most common are Sterna albifrons, Sterna caspia, Sterna hirundo, Tringa tetanus, Larus cachinnanus, and Charadrius alexandrinus. Fawa island provides many kinds of birds with proper conditions for nutrition, reproduction, sheltering and wintering, because of its different habitats and convenient climate condition.

Abstract ID - 893

Theme 1: Coastal habitats and ecosystem services

Presentation: Poster

The 2nd International Symposium on
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Five years of kelp monitoring in Western Norway - effects of trawling and sea urchins

Henning Steen

Institute of Marine Research
Marine Research Station Flødevigen
Nye Flødevigenvei 20
4817 HIS
Norway

henning.steen@imr.no

Abstract

The kelp species Laminaria hyperborea forms the kelp forests along the Norwegian coast. Kelp forests are highly productive and species rich coastal ecosystems and reductions of kelp vegetation may therefore have substantial ecological and economical implications. Sea urchin grazing and kelp harvesting are two of the main disturbances in the kelp forests along the Norwegian coast. Kelp is harvested by trawl along the west coast of Norway, from Rogaland in the south, to Sør-Trøndelag in the north. Kelp harvesting is regulated by dividing each county into sectors, open for harvesting every fifth year (every fourth year in Rogaland) in a cyclic rotation. Sea urchin grazing is most pronounced along the coast of northern Norway where the species Strongylocentrotus droebachiensis have grazed down the kelp vegetation over large areas. In the county of Sør-Trøndelag, the sea urchin species Echinus esculentus is abundant, reducing the kelp vegetation in some areas. The Institute of Marine Research surveys the state of kelp forests and effects of kelp harvesting on the west coast of Norway on a yearly basis. The kelp vegetation is monitored in both harvested and reference areas by underwater video, along fixed transect, where kelp coverage, density, canopy height, epiflora, recruitment, and sea urchin abundance is estimated. If trawl tracks are observed, the recovery pattern of the kelp vegetation is monitored over subsequent seasons. Results from the kelp monitoring program on the west coast of Norway in the period 2005-2009 are presented here.

Abstract ID - 904

Theme 1: Coastal habitats and ecosystem services

Presentation: Poster

The 2nd International Symposium on
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New data sets and new platforms for knowledge transfer for coastal fishing and management

Terje Thorsnes[1], Jan Henrik Sandberg[2], Gjertrud Røyland[3], Per Arvid Jakobsen[3], Oddvar Longva[1] and Børge Holte[4]

1 - Geological Survey of Norway, 6315 Sluppen, 7491 Trondheim, Norway
2 – Norges Fiskarlag, Pirsenteret, 7010 Trondheim, Norway
3 – Norwegian Hydrographic Service, PO. Box 60 Sentrum, 4001 Stavanger
4 – Institute of Marine Research, PO. Box 6404, 9294 Tromsø, Norway

terje.thorsnes@ngu.no

Abstract

Modern technology such as multibeam echosounders combined with other instruments allows the coastal seabed to be mapped in great detail, with respect to bathymetry, and acoustic hardness, resulting in a wide range of optional thematic maps such as sediments, habitats, suitability for trawling, or suitability for anchoring. Detailed seabed maps of the coastal zone has a great potential for supporting a more efficient as well as environmentally more viable fishery, causing less impact on the seabed, decreased energy consumption, less CO2 and NOX emissions, and at the same time increased profitability. They have also a great potential for underpinning sustainable management of other use of the coastal zone, e.g. aquaculture. So far, such data have only been used for scientific, industrial, military and to a certain extent environmental purposes. They have not been accessible on standard platforms for fishermen, the aquaculture industry or other non-governmental users. The ongoing project "New marine base maps in the fishing and aquaculture industry" is breaking down this barrier. Through a cooperation with commercial companies delivering Electronic Chart Display and Information Systems (ECDIS) such as OLEX, we have started to make detailed seabed data available through standard platforms used by the fishing and aquaculture industry. The data sets include detailed bathymetry, acoustic hardness and geological/thematic layers such as grain size maps. The project is funded by FHF (The Fishery and Aquaculture Industry Research Fund) and run by the partners NGU (Geological Survey of Norway), NHS (Norwegian Hydrographic Service) and IMR (Institute of Marine Research).

Abstract ID – 931

Theme 1: Coastal habitats and ecosystem services
Presentation: Poster

The 2nd International Symposium on
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EMODNET geology - European Marine Observatory Data Network - making detailed seabed information available for science and management

Terje Thorsnes[1], Alan Stevenson[2], Anu Kaskela[3], Ingemar Cato[4], Jørgen Leth[5], Sten Suuroja[6], Tatjana Shadrina[7], Algimantas Grigelis[8], Szymon Uscinowicz[9], Annemiek Vink[10], Manfred Zeiler[11],Sytze van Heteren[12], Vera Van Lancker[13], Fabien Paquet[14], Koenraad Verbruggen[15]

[1]Geological Survey of Norway (NGU), [2]Natural Environment Research Council – British Geological Survey (NERC-BGS), [3]Geological Survey of Finland (GTK), [4]Geological Survey of Sweden (SGU), [5]Geological Survey of Denmark and Greenland (GEUS), [6]Geological Survey of Estonia (EGK), [7]Latvian Environment, Geology, and Meteorology Centre (LEGMC), [8]Lithuanian Institute of Geology and Geography (LIGG), [9]Polish Geological Institute – National Research Institute (PGI), [10]Bundesanstalt fur Geowissenschaften und Rohstoffe (BGR), [11]The Bundesamt für Seeschifffahrt und Hydrographie, Germany (BSH),
[12] Geological Survey of the Netherlands (TNO), [13]Royal Belgian Institute of Natural Sciences – Geological Survey of Belgium (GSB), [14]Bureau de Recherches Geologiques et Minieres, France (BRGM), [15]Geological Survey of Ireland (GSI)

terje.thorsnes@ngu.no

Abstract

The European Marine Strategy Framework Directive has been implemented in order to allow a more holistic and multidisciplinary approach to the management of Europe's seas and oceans. In support of this legislation the European Commission has initiated the European Marine Observation and Data Network (EMODNET) to assemble existing but fragmented and inaccessible marine data and to create interoperable, contiguous and publicly available information layers which encompass whole marine basins. EMODNET is being created from a network of existing and developing European observation systems linked by a data management structure covering all European coastal waters, shelf seas and surrounding ocean basins. The marine departments of the European Geological Surveys form the partnership of the EMODNET-Geology project, part of a suite of EMODNET pilot studies that also cover marine chemistry, marine biology, marine habitats and hydrography. The project will share methodologies and technologies with One Geology and OneGeology-Europe (1G-E) in order to deliver the EMODNET integrated geological map products through both the One Geology/1G-E portals so providing geoscientific information for the seas around Europe to the One Geology system. EMODNET-Geology will adopt those standards implemented in One Geology including the use of GeoSciML as well as other open web service technologies including OGC, WMS, WFS etc EMODNET-Geology will have a distributed map service with each of the work packages delivering a specified layer which will include seafloor geology, seabed sediments, mineral resources and geological events such as submarine slides and earthquakes. Further information about the EMODNET project can be found at: http://ec.europa.eu/maritimeaffairs/eu-marine-observation-data-network-mission_en.html

Abstract ID – 974

Theme 1: Coastal habitats and ecosystem services

Presentation: Poster

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What are the potential benefits of a small scale intertidal area closed to anthropic disturbances on a species targeted by shellfish gathering?

Coz Richard, Fichet D., Le Duigou M. and Radenac Gilles

CNRS/Univ La Rochelle
Laboratoire LIENSs
2 rue Olympe de Gouges
17000 La Rochelle
France

rcoz@univ-lr.fr

Abstract

The main objective of an Integrated Coastal Zone Management (ICZM) plan is to implement the sustainable development of various activities within a coastal area. In France, the management of recreational fishing is now part of one such ICZM strategy. In Oléron Island (Bay of Biscay, France), the shellfish gathering has been increasing over the last few decades and is related to the simultaneous intensification of tourism. The velvet swimming crab, *Necora puber*, is one of the species that is particularly impacted by this practice occurring during the low water spring tides. In order to assess the potential benefits upon N. puber population of a closed intertidal area to fishing activities, a sampling protocol has performed since May 2009 using the catches per unit effort (CPUE) method on two adjacent intertidal rocky shores: one protected and one open to shellfish gathering. The results showed abundance of individuals and a proportion of females significantly higher in the protected area. The most interesting result is the proportion of ovigerous females in the mature part of the population which is more than a twice in the fishing closed area. Due to the southward littoral drift, the presence of high hatching larvae at the North West of the island can supply a stock restoration or enhancement of further south fishing areas. Understanding the benefits of such small scale protected area is necessary to use it as a conservation tool in the future establishment of a Marine Protected Area and in a context of an integrated coastal zone management.

Abstract ID – 975

Theme 1: Coastal habitats and ecosystem services

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Recreational fish fishing in the "Pertuis charentais" and the Gironde estuary (France)

Mathieu Vaslet and Gilles Radenac

Laboratory LIENSs UMR 6250
CNRS-University of La Rochelle,
France.

mvaslet@gmail.com

Abstract

As part of the strengthening of the French strategy for marine protected areas, the "Pertuis charentais" and the Gironde estuary were chosen for the establishment of a Marine Natural Park. The present study contributes to the knowledge of the recreational fish fishing local activity, in a context of sustainable and concerted activity and resource management. Specifically, the main objective is the characterization of this local activity, from a geographical point of view, but also considering the angler's profiles, the techniques used and the nature and volume of their catches. A survey was carried out and supplemented by logbooks catches. Moreover, a network of stakeholders has been involved relaying these tools or providing additional information including associations, federations, tackle shops or skippers of angling charter boats. The tourism feature of such area incited to create a typology of anglers based mainly on the type of residence. This classification with "annual", "secondary" residents and "tourists", allowed discriminating important variations in the catches weight including seabass (D. labrax) from 1kg per year and per angler "tourists" to 15kg per year and per angler "annual" in boats. The inclusion of this activity in the context of the French national resource management seems inevitable as an ecological, economical and social point of view.

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Theme 1: Coastal habitats and ecosystem services

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The feasibility of HAB to assess the health of coastal ecosystem based on three decadal observations in Korean coastal waters

HakGyoon Kim[1], ChangKyu Lee[2], WolAe Lim[2],YoungTae Park[2], JeongMin Shim[2], ChangSu Jung[2] , and YoungSang Suh[2]

1) Pukyong National University, 599-1 Daeyeon-dong, Nam-gu, Busan, Rep. of Korea
2) National Fisheries Research & Development Institute, Kijang-gun, Busan, Rep. of Korea

E-mail: hgkim@nfrdi.go.kr

Abstract

Through three decadal regular harmful algal bloom (HAB) monitoring in Korean coastal waters since 1980s, we have observed that an aestival diatom bloom prevailed till 1980s was succeeded by small dinoflagellate bloom in 1990s, which was replaced, in turn, by large dinoflagellate since 1995. The eutrophic level of the coastal water was peaked as of meso-saprobic state from mid-1990s to early 2000s. The seasonal change of the dominant species at HAB has revealed good relation with the progress of coastal eutrophication. Taking into account of the environmental preference of those species, the change of dominant species at HAB could be viewed as one of ecological consequences induced by the environmental changes. It means that the species composition and dominance at HAB is consistent with the concomitant changes of coastal water quality. Such species change at HABs makes it possible to assess the coastal ecosystem health.

Key words; monitoring, HABs, dinoflagellate, succession, eutrophication

Abstract ID - 1527

Theme 1: Coastal habitats and ecosystem services

Presentation: Poster

The 2nd International Symposium on
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Mapping scallop *Pecten maximus* beds in Norwegian coastal areas using interferometric sonar

E.S. Grefsrud[1], Ø. Strand[1], T. Strohmeier[1], H. Olsen[2] and R. Bøe[2]

[1] Institute of Marine Research, PO Box 1870 Nordnes, 5817 Bergen, Norway
[2] Geological Survey of Norway, PO Box 6315 Sluppen, 7491 Trondheim, Norway

E-mail: ellen.sofie.grefsrud@imr.no

Abstract

The "Biological Mapping and Monitoring Program – marine activities" directed by the Norwegian Directorate for Nature Management aims to map seafloor habitats and key species along the Norwegian coast. The great scallop *Pecten maximus* is one of the selected key species, being a valuable fishing resource and in areas of high density they represent a strong benthic-pelagic coupling.

Abundance of the great scallop is strongly associated with shell-sand deposits and the great scallop prefers slopes and v-shaped troughs probably because these under-water structures provide enhanced current velocity and food availability. However, little is known about whether the great scallop prefers one type of shell-sand above another. The objective of this study was to assess the use of interferometric sonar in mapping of great scallop habitats. Based on knowledge about shell-sand abundance and the scallop stocks off the coast of Sør-Trøndelag in Mid-Norway, an area in Froan was chosen for the evaluation. Detailed bathymetry and data on sediment type was obtained using Geoswath interferometric sonar. A seabed map showing the sediment composition was made and compared with data from sediment samples taken by grab hauls and SCUBA divers. Sediments were analyzed for grain-size and carbonate content. Scallop abundance was mapped using a vessel-towed camera platform collecting real-time video along the survey line. These video records also provided information used to adjust the sediment composition map from the backscatter data. Preliminary results will be presented on correlations between scallop abundance and two types of shell-sand described, sand with gravel and gravel with sand.

Poster Session

Theme 2:
Adaptation/mitigation to change in coastal systems

Abstract ID – 947

Theme 2: Adaptation/mitigation to change in coastal systems.

Presentation: Poster

The 2nd International Symposium on
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Cumulative impacts of the coastal and marine activities: case study of Lithuania and South Eastern Baltic region

Saulius Gulbinskas, Rosita Mileriene, Sergej Suzdalev and Nerijus Blazauskas

Coastal Research and Planning Institute, Klaipeda University
H. Manto 84
Klaipeda
LT 92294
Lithuania

saulius@corpi.ku.lt

Abstract

Baltic Sea marine space many years was used for traditional economic activities - fisheries, coastal recreation, shipping. However, rapid economic development of the region encourages the origin of new activities - offshore oil extraction, electricity networks, gas pipelines and LPG terminals, offshore wind energy parks. Ports expansion fosters the rapid grow of shipping intensity. Furthermore, pressure on coast from recreation is growing together with the demand for residential property. The cumulative impact of all activities could lead to the unsustainable pressures on fragile coastal environments. Facing new opportunities and difficulties coastal region of South Eastern Baltic started the approach of ICZM principles. This process as a way of inter-sectoral thinking is bringing together all coastal stakeholders – national and local authorities, ports, tourism organizations, nature conservationists, coastal communities – to share their knowledge seeking to implement existing policies in a more effective way. South Eastern Baltic region's scientific, governmental, NGO and other institutions are participating in the preparation of scientific projects, helping to reach challenges described in EU Strategy for the Baltic Sea Region. Number of international projects – Baltic Master, SMOCS, BaltSeaPlan, Brisk, DENOFLIT, POWER – are devoted to resolve cumulative impacts of coastal and marine activities. Lithuania being a part of the South-Eastern Baltic region also confronts challenges and problems of ports developing, dumping of dredged sediments, building of wind energy parks and electricity transmission networks. Resolving these issues methods like environmental impact assessment and maritime spatial planning are of major importance and can be successfully applied on national and regional levels.

Abstract ID – 953

Theme 2: Adaptation/mitigation to change in coastal systems.

Presentation: Poster

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Coping With Disaster: Insights from a Coastal Community in Bangladesh

Subrata Sarker and M. Shahadat Hossain

Institute of Marine Sciences and Fisheries
University of Chittagong
Chittagong-4331
Bangladesh

subratasrkr59@gmail.com

Abstract

Bangladesh is one of the most disaster-prone countries in the world. Present study was conducted at the lower Meghan deltaic region under Lakshmipur district to identify people's assets and indigenous ways of coping with increasing disasters. The study relies on extensive field survey to collect data from different sources through questionnaires interviews, key informants interview, focus group discussions, and participatory observation and analyzed using SPSS software. Findings show that local people have 5 types of capital. Human capital includes fisher man, net sewer, livestock raiser, day labor and boat man. Natural capital crop land, grass land, fisheries, forestry and pond. Financial capital includes cash income, savings, liquid assets, credit and shop. Physical capital includes land, house, net, boat and sewing machine. Social capital includes fishermen association, social harmony, labor association, microcredit organization and education. Analyzing the survey data revealed that going to the shelter center and relatives house, formation of temporary cluster house on embankment, buy land in upward areas and migrate to nearby urban districts, taking loan from money lender, relief , selling liquid assets, borrowing money from relatives, utilizing previous saving , mortgage land, travel long distance for drinking water collection , use water purification tablet, exercise herbal medicine, visit village doctor and depend on religious superstition are the identified coping options in the study area. Physical, financial, human and social have positive and significant correlation of 0.231, 0.606, 0.487 and 0.427 respectively at 0.01 significant levels where natural assets have no significant correlation with coping strategies.

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Theme 2: Adaptation/mitigation to change in coastal systems.

Presentation: Poster

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Study impact of climate change on sturgeon in Caspian Sea

Kourosh Haddadi Moghaddam

International Sturgeon Research Institute
Department of Ecology
P.O. box: 41635-3464 Rasht
Iran

Tel: +98 1325882156-57; Fax: +98 1325882220
khmoghadam@yahoo.com

Abstract

The Caspian Sea is the largest inland body of water in the world and its coastlines are shared by Azerbaijan, Iran, Kazakhstan, Russia, and Turkmenistan. World wide, sturgeon are an important source of food and income. The total fish biomass constitutes about 2900 thousand tones marine and fluvial ichthyofauna has species and subspecies including 25 commercial and sturgeon Fisheries occupy a prominent place in the economy of southern part of Caspian Sea. Despite the entire positive a negative measures carried out to prevent their extinction, climate change play important role in sturgeon living mechanism. Unfortunately, this trend has changed after the break up of former Soviet Union. The fisheries in the basin develop under the influences of complicated interactions of natural and anthropogenic factors which necessitate the elaboration of a system of purposeful measures providing conservation and rational exploitation of bioresearches. In its turn, the definition of the most effective measures in possible only if based on an analysis of conditions formed during a period of time, assessment of priorities in change of ecological situation and productivity of the water body.The problem of the conservation the Caspian Sturgeon and some representatives of this family from other water bodies of concern to the world community. solve this problem the following measures need to be implemented: Halt poaching in a joint effort of Caspian Sea, Provide a pass of breeders to the spawning ground.

Key words: Sturgeon, Caspian Sea. Climate changes

Poster Session

Theme 3: Coastal governance

Abstract ID - 886

Theme 3: Coastal governance

Presentation: Poster

The 2nd International Symposium on
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Federalism, Governance Structures and Coastal Management in Australia

Nicole Pelton

University of Adelaide
Geographical & Environmental Studies
North Terrace Campus
Adelaide SA 5005
Australia

nicole.pelton@adelaide.edu.au

Abstract

This study proposes that Australia's political system has had a notable affect on the approaches taken towards Integrated Coastal Zone Management (ICZM). Australia is a federal parliamentary democracy. Today, a convoluted array of national, state, regional and local governance bodies are involved in decision-making influencing the coastal zone. Although it is well recognised that this division of power is a significant factor contributing to many natural resource management problems in Australia, the effect of federalism on coastal management in particular has not been closely examined. In this preliminary desktop review, the current arrangements for coastal management in Australia, using South Australia as a case study, are presented in detail to illustrate the complexity of the institutional system in place. In addition, this study attempts to consider the impact of the broader political environment on coastal management initiatives at different scales of governance. It is proposed that the political context and governance structure can profoundly shape decision-making concerning sustainable management of the coastal zone. An in-depth understanding of the institutional system and the influence of social-political factors on decision-making could therefore facilitate the design of more effective ICZM strategies for Australia in the future.

Abstract ID - 894

Theme 3: Coastal governance

Presentation: Poster

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Use of new knowledge on marine biological diversity and fisheries in Norwegian local coastal zone planning

Knut Bjørn Stokke

Norwegian University of Life Sciences
Department of landscape architecture and spatial planning
P.O. Pox 1433 Ås
Norway

knut.bjorn.stokke@umb.no

Abstract

The south-eastern part of the Norwegian coastal zone (Skagerrak) is under pressure because of increasing urbanization and unplanned “piece by piece” utilization for e.g. civil and industrial engineering, constructions of marinas and piers, dredging and dumping of mud, laying of pipes and cables, and establishment of artificial beaches. Up to date this development is carried out without any comprehensive plan, and without knowledge about the impacts to natural resources. This paper presents experiences with coastal zone planning in four municipalities along the Skagerrak-coast, with particular focus on the use of knowledge from the ongoing national program for mapping and monitoring of marine biological diversity and habitats along the Norwegian coast. In Norway, integrated management of the coastal zone is primarily intended to be achieved through spatial planning carried out at local level in accordance with the Planning and Building Act. The responsibility for planning for use and conservation of the coastal zone (both terrestrial and marine areas out to one nautical mile outside the baseline) is delegated to the municipalities. The paper is based on an ongoing research project carried out by the Norwegian University of Life Sciences, the Norwegian Institute for Urban and Regional Research, Institute of Marine Research in Norway and the Norwegian institute for Water Research. The project is funded by the Fishery and Aquaculture Industry Research Fund, the Ministry of Environment, Norwegian Directorate for Nature Management and the Ministry of Fisheries and Coastal Affairs.

Abstract ID – 924

Theme 3: Coastal governance

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Users' expectations in a Mediterranean natural beach: A key factor for sustainable beach management?

Juan Pablo Lozoya[1], Rafael Sardá[1] and José A. Jiménez[2]

1) Centre d'Estudis Avançats de Blanes (CSIC). Carrer d'accés a la cala Sant Francesc 14, 17300-Blanes, Girona, Spain
2) Laboratori d'Enginyeria Marítima, ETSECCPB. Universitat Politècnica de Catalunya. C/ Jordi Girona 1-3, Campus Nord ed. D1. 08034-Barcelona, Spain

jplozoya@ceab.csic.es

Abstract

Beaches are coastal systems providing different functions and services, with many of them being directly exploited by humans such as those related to their recreational use. Due to the significant contribution of coastal tourism to GNP of tourist countries, beach managers usually give priority to the recreational use versus other functions such as natural or protection ones. This has resulted in a large homogenization of management practices which are designed and applied in a uniform manner for urban and semi-urban beaches, which are the main target of coastal municipalities. On the other hand, natural beaches are usually non-considered in management plans (with some few exceptions) or, if included, without considering their different profile. This could lead to an important oversight and a crucial policy mistake: to overlook a potentially important target market like natural beach users (especially important in mature destinations), and to manage different beaches with different users, using the same strategies. Within this context, this paper characterizes users' expectations and perceptions in a natural beach located close to an intensive-tourism area to identify requirements to promote a sustainable beach management. This illustrates the bottom-up approach in ICZM, where users' perceptions should be considered to design policies for the use of beaches in the Natural Park of els Aiguamolls de l'Empordà (Costa Brava, Spain). A total of 350 completed questionnaires were collected during summertime, allowing a clear picture about user's profile, expectations, motivations, perceptions and willingness to pay in a Mediterranean natural beach.

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Theme 3: Coastal governance

Presentation: Poster

The 2nd International Symposium on
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Territory and function reconsidered, in light of ICZM and marine spatial planning

Arild Buanes

Norut Tromsø
Tromsø Science Park
9294 Tromsø
NORWAY

arild.buanes@norut.no

Abstract

The territorial aspects of socio-spatial organization have had an ambiguous position in the planning literature, driving one commenter on Friedmann & Weavers monography on “Territory and function” (1979) to describe the relations between the territorial and the functional a "cosmic contradiction" in societal planning. Although one could argue that the territorial ought to be rephrased aqua-torial or mare-torial in relation to marine spatial planning, considerations of "territoriality" and territorialization within the social sciences are highly relevant for analyzing the development of ICZM. In Norway, assessments of the suitability and quality of coastal areas for different kinds of uses and users have undergone significant developments and changes since the nationwide suitability analysis of coastal waters for aquaculture (LENKA) in the late 1980s. Probing the concepts of territoriality and territorialization provides us with analytical tools for bridging issues of natural qualities, societal interests and instirutional structure in socio-political analyses.

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From Managing Responsibilities to Managing Results: towards the sustainable use of beach environments

Rafael Sardá[1], Juan Ramis[2], Juan Pablo Lozoya[1], Eduardo Ariza[3] and José A. Jiménez[4]

1) Centre d'Estudis Avançats de Blanes (CSIC). Carrer d'accés a la cala Sant Francesc 14, 17300-Blanes, Girona, Spain
2) ESADE Business School. Av. Pedralbes 60-62. 08034-Barcelona, Spain
3) Laboratory for Coastal Research. Florida International University. University Park Campus. Marc 360. 33199-Miami, USA
4) Laboratori d'Enginyeria Marítima Universitat Politècnica de Catalunya. Carrer Jordi Girona 1-3. Campus Nord, ed. D1. 08034-Barcelona, Spain

sarda@ceab.csic.es

Abstract

Beach management has traditionally orientated to deal with geomorphic hazards and recreational uses. This requires different actions to enhance different beach qualities such as maintaining a stable environment, ensuring safe conditions for users and preserving good natural qualities. Although ICZM should integrate these actions, the common situation is the presence of highly fragmented management structures where these different qualities are considered separately by different actors having different objectives and responsibilities. This reality is a key impediment for the sustainable use of beach environments. Thus, beaches must be considered multi-dimensionally and multi-functionally environments that to be properly managed need to consider their varied components and their interactions. In this paper, we describe a roadmap to improve beach management moving from traditional to integrated approaches. We are advocating for bringing the present situation where we manage beaches by managing different allocated responsibilities into a management framework based on results, based on the correct functioning of these social-ecological systems. To do so, we should consider all its social-ecological processes in integration, we should analyze where missing important points and responsibilities are observed, and we should fill these forbidden aspects by managing these interfaces. New governance mechanisms should be created both at the strategic objective and at the operational levels. To this end, we make use of the Ecosystem-Based Management System (EBMS), a managerial framework combining classical Environmental Management System theory with the policy application of the Ecosystem Approach concept. We will apply it to two coastal towns (Blanes-Lloret de Mar, NW Mediterranean, Spain).

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Geology and derived thematic maps for coastal management – a case study from Northern Norway

Terje Thorsnes[1], Liv Plassen[1], Oddvar Longva[1], Tone Rasmussen[2], Børge Arvesen[3]

1 - Geological Survey of Norway, 6315 Sluppen, 7491 Trondheim, Norway
2 – Sea-Eco, Hagebyveien 66, 9404 Harstad
3 – Kleiva Fiskefarm AS, 9455 Engenes

terje.thorsnes@ngu.no

Abstract

The Norwegian coastal zone is very important for value creation based on marine resources. At the same time, knowledge of the environmental conditions is pretty limited. Much of the planning of coastal activities is based on old and often outdated information. For example, standard nautical charts provide very limited information on bathymetry, and virtually no information on submarine landscapes, sediments, currents and other environmental parameters. In order to optimize value creation, in a sustainable way, better knowledge is required. This increased knowledge should also facilitate reduced conflict in the use and development of particular areas. In Troms County in northern Norway, a group of local municipalities have joined forces to make better plans for the management of their marine areas. The plan covers location of fish farms, fishing- and spawning areas, environmental status, and the location of infrastructure to optimize the use of their areas. As part of the project, The Geological Survey of Norway has provided swath bathymetry data for the fjords and done ground truthing by video and grab sampling. The benthic faunal assemblages and content of pollutants in the sediments have also been mapped by the project partners. All data have been incorporated in a Geographic Information System (GIS) for office use by local managers. Most of the data have been exported to the electronic chart systems like OLEX onboard local fishing and aquaculture vessels, where they have been tested in every-day use. The presentation will address the possibilities and experiences from the project.

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Data and models for comprehensive planning in marine areas

Martin Lund-Iversen

Norwegian Institute for Urban and Regional Research
Gaustadaleen 21
0349 Oslo
Norway

martin.lund-iversen@nibr.no

Abstract

In Norway we now see a rapid expansion of the development and availability of GIS-modeled data with relevance for planning, including both the protection and subsequent development consents for projects in land and marine areas. Impact Assessment regulations for planning, with the introduction of the EU Strategic Environmental Assessment directive in 2005 (in Norway), has become increasingly concerned with each level of decision-making serving its own purposes with regard to data. The paper argues that data and models developed under the iCoast research-project (such as sea-floor topography and sedimentation, currents and distributions in the water bodies, etc.), and by The Norwegian Institute for Water Research (mapping of marine nature) are adequate for use in municipal comprehensive planning of marine-areas and also form a basis for subsequent data-collection. To do that data-requirements for Impact Assessment of planning presented in the literature and the investigation of this matter in Norwegian municipalities is used to argue the case for the suitability of these data.

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Preliminary study on coastal tourism development recreation category in Bungus Bay, Padang City, West Sumatra province

M. Si. Yulius

Research & Development Center for Marine & Coastal Resources
Ministry of Marine & Fisheries of The Rep. Indonesia
Gedung BRKP Lantai 3, Jalan Pasir Putih I Ancol Timur
14430 Jakarta , Indonesia

yulius.lpsdkp@gmail.com

Abstract

Bungus Bay is the focus area of coastal tourisms development of Padang City. The objectives of this study are (1) to identify land suitability for coastal tourism, recreation category, (2) to study the development of coastal tourism, recreation category, which suitable with biophysics, economy, social, culture, and institutional the community aspects, and (3) to formulate the directive policy and the strategic development plan for coastal tourism with recreational purpose. The methods used in this study are: (1) spatial and tabular analysis using GIS for land suitability, and (2) descriptive and SWOT analysis for development planning. The result shows that Bungus Bay is suitable for coastal tourism in recreation category (33,76% of total development area of 200,43 ha). Carolina Beach, Carlos Beach, and Bungus Beach are the suitable locations for further coastal tourism development. Some existing tourism activities in Bungus Bay are swimming, canoeing, and picnic. Beach sport and fishing are the promising activities for further development. Based on SWOT analysis among the total 12 strategies for coastal development, recreational category in Bungus Bay, the three main alternatives strategy are (1) increasing people awareness and ability by counseling and management, (2) developing promotion programs to coastal tourism in Bungus Bay, and (3) monitoring and law enforcement to protect utilization of existing resources potency.

Key words: coastal tourism, space utilization, coastal region, Geographic Information System (GIS)

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Maritime archaeological remains preservation in the context of coastal and small islands management in Indonesia

Ira Dillenia[1] and L. P. A. Savitri Chitra Kusuma[2]

1) Research Center for Maritime Territory and Non Living Resources
2) Research Center for Marine Technology

Agency for Marine and Fisheries Research, Ministry of Marine Affairs and Fisheries
Jl. Pasir Putih I, Ancol Timur, Jakarta Utara 14430, Indonesia

iradillenia@yahoo.com

Abstract

Maritime archaeological remains can be found in many coastal areas throughout Indonesia, such as ancient shipwrecks, war aircraft wrecks, ancient lighthouses, and old harbours. Maritime archaeological remains is a significant aspect in Indonesian history, and they hold potentials not only in scientific and educational terms, but also in economic and social terms. Related to tourism, various maritime archaeological remains together with their surrounding environment are cultural and natural tourism attractions for coastal and marine tourism development that can provide economic benefits. In the other side, maritime archaeological remains are vulnerable to many threats, and they need to be conserved to protect them from damage and to preserve their long-term uses and benefits. Therefore, it is needed to understand the types, potentials and importance of maritime archaeological remains available in Indonesia and the threats they face. This paper will first offer a general review of maritime archaeological remains in Indonesia. The authors then look at the status of maritime archaeological remains in coastal and small island areas in Indonesia, with case studies in Pesisir Selatan Regency, West Sumatra Province and Thousand Islands Regency, Jakarta Province, and also the challenges and opportunities of in situ preservation for maritime archaeological remains in the study areas and Indonesia in general as well. Finally this paper will conclude by discussing the preservation of maritime archaeological remains in the context of coastal and small islands management in Indonesia.

Key words: maritime archaeological remains, preservation, in situ, coastal and small island areas.

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Development dynamics and impacts of coastal land use of the Pärnu County

Merle Looring

University of Tartu
Institute of Geography Vanemuise Str. 46
51014 Tartu
Estonia

merle.looring@haademeeste.ee

Abstract

The present research deals with the time-spatial analysis of coastal development and research focus to construction and impacts to land use of coastal regions of Estonia in Pärnu County. In a nutshell the proposed research field has to explore the relations between land development i.e. building and land-use intensification with their impacts on the coastal land use and sensitive coastal landscapes. The research will be based on an analysis to understand the change in coastal areas, integrating both socio-economic and natural dimensions. The study will examine the societal driving forces that influence the development of coastal areas and land use.

In Pärnu County is highest number of tourists in the summer holiday season. In Pärnu County half of the population increase in the summer season may be attributed to second home visitors. This article will focus assessment holiday homes located in the investigation areas. Relatively high proportion of second homes in rural communities and municipalities has a significant impact to the local population level.

Key words: coastal development, coastal land use, second home, seasonal residents

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Engaging stakeholders for science-policy integration in Izmit Bay: Results of the SPICOSA project

Leyla G. Tolun, Aslı S. Dönertaş, Y. Sinan Hüsrevoğlu, Selda Murat-Hocaoğlu, S. Çolpan Polat-Beken and Ahmet Baban

TUBITAK Marmara Research Center
P.O. Box 21
41470 Gebze, Kocaeli
Turkey

Leyla.Tolun@mam.gov.tr

Abstract

The Izmit Bay, a semi-enclosed, stratified body of water, is located at the eastern end of the Marmara Sea. The Bay, proclaimed a hot spot and a sensitive area, is one of the most polluted coastal areas in Turkey, subject to surrounding domestic and industrial discharges since the 1970s.
As one of the study site areas of the EU-FP6 integrated project SPICOSA, "Systems Approach Framework (SAF)" has been applied to the Izmit Bay. One of the main goals of this effort was to engage our end-users and to make sure they are informed and involved in each of the steps of the SAF application. To this end, two large and seven one-to-one meetings have been organised in the 2008-2010 period. Initially, SPICOSA objectives and methodology were presented and discussed with the Izmit Metropolitan Municipality and other related public offices. A list of the relevant stakeholders (sectors, institutions, persons) hence was decided upon as invitees to the first stakeholders meeting in accordance with the main human activities in the region (e.g., urbanization, industrialization, maritime activities).
The SPICOSA approach has proven substantially effective for the development of stakeholder based coastal zone management for the Izmit Bay. The approach has especially been instrumental in understanding the complexity of the coastal system and in developing a common and simple language for its management. Science and policy integration results in a more effective and sustainable coastal management scheme and the SPICOSA approach successfully demonstrates and illustrates this process to policy makers and planners.

Key words: Integrated coastal zone management, SPICOSA project, stakeholder engagement, Izmit Bay

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Norwegian Aquaculture Expansion and Integrated Coastal Zone Management (ICZM): Simmering Conflicts and Competing Claims; What Can be Learned from the New Zealand Experience?

Rachel Tiller

NTNU
Dragvoll
7491 Trondheim
Norway

E-mail: Rachel.Tiller@svt.ntnu.no

Abstract

The concept ICZM (Integrated Coastal Zone Management) was born in 1992 during the United Nations Conference on Environment and Development (UNCED). ICZM is defined as a decision-making process focused on sustainable use, development and protection of seaside terrestrial and coastal marine areas and their resources, in continuous realization. Norway does not have a national ICZM policy and is dependent upon the commitment and motivations of the municipalities to create coastal zones in their areas, all of which can later be overturned by the national government. With the forthcoming harvest of the zooplankton redfeed in Norwegian and surrounding waters, the Aquaculture industry could be in a situation of expanded feed resources, which would ensure its expansion. This would also be in line with the Norwegian government future plans for this industry. A government endorsed expansion of the Aquaculture industry with the advent of near unlimited feed resources through redfeed harvest will add fuel to the simmering conflicts concerning the use of the national coastline in Norway. New Zealand has had ICZM implementation through a national policy for a long time and has already dealt with many of the same user group conflicts that Norway will likely be further challenged with regarding the expansion of the Aquaculture industry. Looking to New Zealand's current and future plans and implementations for coastal zoning choices can shed light on how to best avoid future conflicts in Norwegian coastal regions.

Keywords: ICZM, New Zealand, Redfeed, Calanus finmarchicus, Competing Claims, Coast, Aquaculture

Poster session

Theme 4: Linking science and management

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Theme 4: Linking science and management

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Indicators of trawling disturbance on ecosystems to improve management practices

Juan, S., Demestre, M. and Muntadas, A.

ICM-CSIC
P. Maritimo de la Barceloneta 37-49. 08003, Barcelona
Spain

sdejuan@icm.csic.es

Abstract

Fisheries resources are one of the most valuable marine ecosystem good and services, but at the same time trawl fishing causes one of the strongest impact on marine communities and habitats, consequently reducing these ecosystem goods and services. In this context, there is an urgent need of adopting an ecosystem management approach of trawl fisheries worldwide. But to achieve this we must select indicators of disturbance that assess the ecosystem health at the same temporal and spatial variability of trawling activities. The proposed indicators represent the vulnerability of the benthic community to trawling based on the biological traits composition. These indicators compile the biological traits of the epifaunal species that are known to positively or negatively respond to trawling. Indicators were calculated from benthic samples collected at 11 areas through the Mediterranean that were subjected to different fishing intensities. Simultaneously, we estimated the effort at each area at a small spatial scale using side-scan sonar to reflect the trawling impact. Additionally, we obtained information from the activity of the trawl fleet operating in each area. These data sources have been combined on maps of indicators vs. impacts that will allow taking into account the spatial component of communities as valuable information for spatial management of fishing activities, including the restriction of trawling from sensitive habitats.

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Tsunami Risk Assessment to Support Coastal Zone Management

Ratna Sari Dewi, Nurwadjedi and Niendyawati

BAKOSURTANAL
Jl. Raya Bogor KM.46
Cibinong - Bogor 16911
Indonesia

dewi.rsd@gmail.com

Abstract

Coastal areas have always been the most preferred location for settlements, since they provide the attractiveness and many economic opportunities, such as tourism, small-scale industries and fishery. These make people and facilities are threatened by the destructiveness of tsunami. Southern coast of Java Island is very vulnerable to tsunami. This area has been struck by tsunami in 1889, 1994 and 2006. Hundreds of thousands of people died and there were a great damage since many cities are located in coastal area. Moreover, the region occupies low-lying areas near the sea and it is possible for the area to be struck by tsunami in the future. This research tried to assess the risk of tsunami to alarm coastal communities and give recommendation for supporting coastal zone management. Tsunami inundation map derived from simple model and land use map of the area were used as the components for assessing the risk of tsunami in the area. Keywords: tsunami, risk assessment, coastal zone management

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Theme 4: Linking science and management.

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Co-learning in marine protected area for integrated coastal zone management

Siddique, M.A.L, S. Zafrin, S. Myers, T. Smith, R. Babcock, and R.W. Carter

University of the Sunshine Coast
4 Panamuna Crescent
Buderim, QLD 4556
Australia

latif@dal.ca

Abstract

The nature of marine systems and the multiple stakeholders directly (and indirectly) exploiting marine ecosystem services demands a stewardship and co-management approach to conserving marine resources. At the heart of co-management and stewardship is co-learning. The Moreton Bay Marine Park is one of the most biologically diverse coastal and marine regions in South East Queensland, Australia. It is in management's interest to determine the optimal approach in conserving this diversity. There is also a need to instill public confidence that the best management approach is applied and that stakeholders are involved in the decision-making process. Little research has focused on shared or co-learning for improving management outcomes. This study aims to understand the mechanisms of sustainability learning systems and processes to improve on existing management strategies. The study is based on a desk-top analysis of planning instruments and participatory methodologies in the context of adaptive learning through the case of the Moreton Bay Marine Park. The paper identifies approaches to identifying pathways and barriers to developing a co-learning approach to management to achieve Integrated Coastal Zone Management (ICZM) through creating a resilient management and stakeholder society.

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Lobster reserves in coastal Skagerrak: a field laboratory for science and management

Even Moland, Esben Moland Olsen, Halvor Knutsen, Alf Ring Kleiven and Jan Atle Knutsen

Institute of Marine Research
Flødevigen Marine Research Station
Nye Flødevigvei 20
N-4817 His
Norway

even.moland@imr.no

Abstract

Scientific documentation of marine reserves as a means to conserve species and ecological processes has reached a level where this management tool is considered a critical component of ecosystem based management and successful rebuilding efforts. However, because there are opportunity costs to conservation, there is a continuing need for science based assessment of marine reserves whenever this measure is introduced to new areas, species or systems. Experimental lobster reserves were implemented along the Norwegian Skagerrak coastline in 2006 as a collaborative effort between the Norwegian Institute of Marine Research and the Directorate of Fisheries, with support from commercial fishers. The primary aim was to provide a science based evaluation of small-scale reserve effects on local lobster populations, with potential to improve management of this iconic species. In addition to long term monitoring inside reserve and control areas, launched in 2004 (two years prior to protection), complementary studies were conducted within the framework of three research projects. These incorporated socio-economics, lobster ecology and -demography, and lobster population genetics in marine reserves context. Results from this multidisciplinary approach suggested rapid rebound of lobster within reserves, strong stakeholder support for the reserves, high site-fidelity and increased survival of protected lobsters, and weakly structured lobster populations along the Skagerrak coast. Here, we highlight some of the most important findings and discuss their implications for lobster management in particular, and more broadly, for introduction of marine reserves as a management tool in northern temperate coastal waters.

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An integrated modelling approach to mitigate microbiological contamination of the Thau lagoon (France)

Alice Vanhoutte-Brunier, Annie Fiandrino, Rémi Mongruel, Thierry Laugier, Johanna Ballé-Béganton, José A. Pérez Agúndez, Valérie Derolez, Michel Lample and Gilles Brocard

IFREMER
Département d'Economie Maritime
BP 70
29280 PLOUZANE
FRANCE

avanhout@ifremer.fr

Abstract

The Thau lagoon is subject to recurrent events of microbiological pollution due to a strong demographic growth and the tourism development. This dynamics and some failures in the wastewater treatment systems drive to contamination events which affect both traditional shellfish farming and recreational activities. Local managers need decision-support tools to assess technical and organisational measures for pollution mitigation. For that purpose, an integrated simulation platform based on dynamic system modelling was developed during the SPICOSA (Science and Policy Integration for Coastal System Assessment) project. This simulation tool integrates i): a watershed module which represents the microbiological contamination sources and wastewater treatment devices ii): an ecological module which takes into account wind induced water circulation into the lagoon to simulate spatialized levels of contamination in seawater and shellfish iii): a monitoring and regulation module to determine the sanitary classification of shellfish areas and bathing water quality according to European regulation rules, and iv): a cost/effectiveness module to assess and compare different management measures. Exploratory scenarios have been built with local managers so as to foresee the development patterns of the local economy until 2018 and possible changes in the sanitary rules and monitoring system. Within this context, strategic exploratory scenarios consider technical interventions on the most critical contamination sources and alternative measures (street washing, impact mitigation). This integrated modelling platform enables decision-makers to explore various combinations of management measures and to design a local policy action plan for mitigating the microbiological contamination of the lagoon and the impacts of residual pollution.

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Information architecture for coastal zone development

Knut Torsethaugen

Sintef
Norway

knut.torsethaugen@sintef.no

Abstract

Challenge: How can actors involved in coastal zone development communicate and use "state-of-art" knowledge from political, social, economic and natural science in their daily work? How to bridge the gap between advanced science and local coastal zone management? Method. The architecture concept is a top-down holistic description of all elements that are expected to be part of coastal development. Elements are divided into a) framework elements like goals, tasks, actors, experience, existing models and cross-disciplinary knowledge and b) a reality model divided into a political model, a management model and an implementation model. This paper give a short overview of the concept and demonstrate how it is used in a case study.

Key words: Architecture, coastal zone, reality model, case study

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Identification of potential marine reserves by habitat suitability modelling

Haugland J. K., Olsen E. M., Kleiven A. R., Moland E., Espeland S. H. and Olsen T.

University of Oslo
Bergendalshøgda 13
4912 Gjeving
Norway

jonkhau@student.matnat.uio.no

Abstract

The use of species habitat suitability modelling is increasing as an approach in detecting important areas in integrated coastal zone management. European lobster (Homarus gammarus) is currently listed as near threatened in the Norwegian red list, according to IUCN (International Union for Conservation of Nature) criteria. Past management regimes were insufficient to rebuild the lobster population after a considerable decline that mainly occurred in the 1960s and -70s. Catch per unit effort (CPUE) has indicated rapid population increase in experimental lobster reserves in Skagerrak, suggesting that marine reserves can be an effective management tool in successful rebuilding efforts. In the process towards establishing full scale marine reserves, new methods are addressed to supplement experimental fishing surveys. This study reveals important topographical factors for lobster habitats through modelling of randomly designed experimental fishing. Slope and exposure were good environmental predictors for CPUE. A habitat suitability map was generated to predict lobster habitats, hence possible areas for placing reserves. The data thus obtained were compared with local lobster fishers' placement of traps to assess local ecological knowledge and the possibility of using mapping of trap distribution as a tool to verify good lobster habitats. Lastly, based on the individuals sampled in the experimental fishing surveys we give a characteristic of the lobster population in the municipality of Tvedestrand. Using lobster as a model, this contribution uncovers the potential of habitat suitability as a tool in the process of implementing marine reserves in coastal Skagerrak.

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Total catch an order of magnitude above officially reported landings for a red-listed marine species

Alf Ring Kleiven, Esben Moland Olsen and Jon Helge Vølstad

Institute of Marine Research
Havforskningsinstituttet
Nye Flødevigveien 20
4817 His
Norway

alf.ring.kleiven@imr.no

Abstract

Accurate information on total catch and effort is essential for successful fishery management. However, officially reported landings might be underestimates of true catches in the fishery. We investigated the fishery of the national red-listed European lobster (*Homarus gammarus*) in south-eastern Norway by combining estimates of Effort (E) from probability-based strip transect surveys and Catch Per Unit Effort (CPUE) data obtained independently from volunteer catch diaries, phone interviews and questionnaires. We estimated that recreational catch account for 65 % of the total catch in the study area. Moreover, our study show that only a small proportion (23 %) of the commercial lobster landings are sold through the legal market and documented. In total, the estimated catch of lobster is found to be nearly 14 times higher than the officially reported landings. Our study highlights the need for appropriate data collection of catch in coastal areas and is a warning sign to management authorities of the consequences of ignoring coastal illegal, unreported and unregulated (IUU) fisheries and the potential impact of recreational fisheries.

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The prototype of spatial analysis on line to support the development potential of Coastal Zone Management

Sri Lestari Munajati, Ati Rahadiati and Suzan N. Gill

Bakosurtanal
Jl. Raya Jakarta - Bogor KM 46
Cibinong, Bogor
West Java - 16911
Indonesia

munajati@yahoo.com

Abstract

An archipelago state, Indonesia has a wealth of marine and coastal areas are very large. Coastal areas have land-use problems because the region is experiencing population growth pressures and also waste originating from the mainland. Preparation of coastal and marine zoning is one attempt to provide an alternative source of information for development of coastal and marine areas that can attract local and foreign investors. Central and local governments are very interested to have information on potential areas to support the spatial development of sustainable national and regional. Now, the development of computer technology is increasingly enabling the exchange of information in the virtual world increasingly given a role for the development of coastal and marine-based spatial. Therefore, it is necessary to develop an application (prototype) spatial analysis online. This application is a development system based spatial model that aims to provide input and spatial information of potential national and regional marine resources that are needed for sustainable marine resource management. The result of these research is a prototype of the online spatial analysis.

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Assessing socioeconomic impact of the changes in water quality, river discharge and sediment budget in the Guadiana Estuary

Tomasz Boski, Carlos Sousa, Maria Helena Guimarães, André Mascarenhas and Tomaz Dentinho

CIMA - Universidade do Algarve
Campus de Gambelas
8000-139 Faro
Portugal

tboski@ualg.pt

Abstract

Although still in a satisfactory state of environmental preservation, the Guadiana Estuary is under a considerable number of human pressures. The application of the System Approach Framework (SAF) in the Guadiana Estuary focused on water quality, which was identified trough the survey of stakeholders as the most important issue. Impact of river discharge on local fisheries and coastal sediment budget were also identified as important issues. These choices reflect both the drastic river discharge reduction due to damming and an increasing release of untreated or poorly treated wastewater, over the last decade. SAF application aimed in providing the best science based integration of ecological, sedimentary and socioeconomic processes in Guadiana Estuary. We present here the development and evolution of the (GUADEX) simulation model, which couples key environmental indicators with the socio-economic process. Water quality was assessed in terms of faecal coliform, and nutrient concentration, while sediment balance was evaluated from aerial photos and field survey. The socioeconomic impacts and pressures were quantified through cost-benefit analysis and the Economic Base Model. According to the stakeholder's feedbacks, GUADEX provided useful information to the dam management, tourism, recreation, and fisheries. This could be attributed to the SAF approach and at the same time to the introduction of a self-explanatory graphical interface, between the model outputs and the end user. The stakeholders acknowledged the model's importance in demonstrating the benefits of a healthy environment to the local economy. They also manifested the intention to apply the System Approach Framework to other policy issues.

Overview Timetable

Sunday 3 July 2011

1700 - 1900 Registration

1900 - 2100 Welcome reception. Host: Arendal municipality and Mayor Torill R. Larsen

Monday 4 July 2011

0800 - 0900 Registration

0900 - 0920 Opening ceremony

0920 - 0930 Opening Symposium - **County govenor Øystein Djupedal**

0930 - 1010 **Introductory lecture:Thomas Sawyer Hopkins (USA):**The Role of Science in the Transition to Sustainability: Coastal Zone Examples

1030 - 1800 **Theme 1: Coastal habitats and ecosystem services**

1030 - 1100 Key note speaker: Torjan Bodvin (Norway): Mapping and valuating of marine habitats – a basic knowledge for coastal management and surveillance

1230 - 1430 Lunch

1930 - 2130 Reception at Institute of Marine Research

Tuesday 5 July 2011

0900 - 1700 **Theme 2: Adaptation/mitigation to change in coastal systems**

0900 - 0930 **Key note speaker: Frede Thingstad (Norway)**: Variable nutrient pathways through the microbial part of the pelagic food web – an insight relevant to management issues?

1200 - 1330 Lunch

1330 - 1400 **Key note speaker: Tim Smith (Australia):** Enhancing the Ability of Coastal Regions to Respond to Climate Change

1700 - 1900 **Poster Session**

Wednesday 6 July 2011

0900 - 1545 **Theme 3: Coastal governance**

0900 - 0930 **Key note speaker: Daniel Pauly (Canada):** Small-scale fisheries: an evaluation of their role in the coastal zones

1200 - 1330 Lunch

1400 - 1430 **Key note speaker: Peter R. Burbridge (UK):** Non-stautory approaches to integrated coastal management based on UK experience

1615 - 1800 **Theme 4: Linking science and management**

2000 Banquet at Tyholmen hotel

Thursday 7 July 2011

0900 - 1500 **Theme 4: Linking science and management**

0900 - 0930 **Key-note: Andreas Kannen (Germany):** Science Policy Interactions: Between policy fragmentation, integration and new paradigms for planning and management

1200 - 1330 Lunch

1330 - 1400 **Key note speaker: Denis Bailly (France):** The social factor in the system approach for ICZM - challenges and options

1500 - 1545 Summing by Session Chairmen; Synthesis and future directions

1545 - 1600 Awards - closing remarks

List of participants

Name	Country	email
Christine Crawford	Australia	christine.crawford@utas.edu.au
Jan-Olaf Meynecke	Australia	j.meynecke@griffith.edu.au
Kathryn Chartrand	Australia	chartrkm@yahoo.com
Melissa Nursey-Bray	Australia	melissa.nursey-bray@adelaide.edu.au
Mohammad Siddique	Australia	latif@dal.ca
Nicole Pelton	Australia	nicole.pelton@adelaide.edu.au
Russell G. Richards	Australia	r.richards@griffith.edu.au
Tim Smith	Australia	TSmith5@usc.edu.au
Shahadat Hossain	Bangladesh	hossainms@yahoo.com
Subrata Sarker	Bangladesh	subratasrkr59@gmail.com
Fabian Hinds	Barbados	fhinds@coastal.gov.bb
Victoria Judith Isaac	Brasil	biologiapesqueira@yahoo.com.br
Daniel Pauly	Canada	d.pauly@fisheries.ubc.ca
Rachel Long	Canada	Rachel.Long@SMU.CA
Xuegong Xu	China	xxg@urban.pku.edu.cn
Gustavo Arencibia Carballo	Cuba	Garen04@gmail.com
Mercedes Isla Molleda	Cuba	merisla@cip.telemar.cu
Nicholas Kathijotes	Cyprus	nicholas.kathijotes@cut.ac.cy
Josianne Støttrup	Denmark	jgs@aqua.dtu.dk
Søren Anker Pedersen	Denmark	sorenap@ices.dk
Merle Looring	Estonia	merle.looring@ut.ee
Alexandre Magnan	France	alexandre.magnan@iddri.org
Denis Baily	France	denis.bailly@univ-brest.fr
Esméralda Longépée	France	esmeralda.longepee@univ-lr.fr
Gwendoline Bodin	France	gwen.bodin@hotmail.fr
Fabien Thomas	France	f.thomas00@laposte.net
Julien Rochette	France	julien.rochette@iddri.org
Mathieu Vaslet	France	mvaslet@gmail.com
Michel Lample	France	lample@univ-brest.fr
Raphael Billé	France	raphael.bille@iddri.org
Richard Coz	France	rcoz@univ-lr.fr
Xavier Lafon	France	xavier.lafon@developpement-durable.gouv.fr
Andreas Kannen	Germany	Andreas.Kannen@hzg.de
Beate Fiszkal	Germany	beatefiszkal@web.de
Helge Bormann	Germany	helge.bormann@uni-oldenburg.de
Jan M. Landman	Germany	jan.landman@uni-rostock.de
Jesko Hirschfeld	Germany	jesko.hirschfeld@ioew.de
Karin Röttgers	Germany	karin.rottgers@wur.nl
Zoi Konstantinou	Greece	zkon@civil.auth.gr
Dagný Arnarsdóttir	Iceland	dagny@uwestfjords.is
Joseph Sebastian Paimpillil	India	psjoseph@eth.net

Shadananan Nair	India	nair59@yahoo.com
Dr. Nurwadjedi	Indonesia	nurwajedi@yahoo.com
Ira Dillenia	Indonesia	iradillenia@yahoo.com
M.Si Yulius	Indonesia	yulius.lpsdkp@gmail.com
Ratna Sari Dewi	Indonesia	dewi.rsd@gmail.com
Sri Lestari Munajati	Indonesia	munajati@yahoo.com
Abbas Jafari	Iran	jafary.ab@gmail.com
Asghar Abdoli	Iran	asabdoli@yahoo.com
Kourosh Haddadi Moghaddam	Iran	khmoghadam@yahoo.com
Rahman Patimar	Iran	rpatimar@gmail.com
Donata Melaku Canu	Italy	dcanu@inogs.it
Thomas Sawyer Hopkins	Italy	tom.hopkins@iamc.cnr.it
Jun Shoji	Japan	jshoji@hiroshima-u.ac.jp
Masahide Kaeriyama	Japan	salmon@fish.hokudai.ac.jp
Tarek Jdeidi	Libya	jdeidi@yahoo.com
Rosita Mileriene	Lithuania	rosita@corpi.ku.lt
Saulius Gulbinskas	Lithuania	saulius@corpi.ku.lt
Illisriyani Ismail	Malaysia	illisriyani@gmail.com
Nici Gibbs	New Zealand	nici.gibbs@seafood.co.nz
Yemi Akegbejo-Samsons	Nigeria	samsons56@yahoo.co.uk
Alf Ring Kleiven	Norway	alf.ring.kleiven@imr.no
Anne A. Hageberg	Norway	anne@cmr.no
Anne Blanchard	Norway	anne.blanchard@svt.uib.no
Annelise Chapman	Norway	lise@rundecentre.no
Ann-Lisbeth Agnalt	Norway	ann.lisbeth.agnalt@imr.no
Arne Ervik	Norway	arne.ervik@imr.no
Arne Tesli	Norway	arne.tesli@nibr.no
Arnt Olsen	Norway	arnt.olsen@fiskeridir.no
Audun Sandberg	Norway	audun.sandberg@uin.no
Bjørn Hersoug	Norway	bjorn.hersoug@gmail.com
Einar Dahl	Norway	einar.dahl@imr.no
Eirik Mikkelsen	Norway	eirik.mikkelsen@norut.no
Eivind Oug	Norway	eivind.oug@niva.no
Ellen Sofie Grefsrud	Norway	ellens@imr.no
Erlend Moksness	Norway	moksness@imr.no
Even Moland	Norway	even.moland@imr.no
Frank Jacobsen	Norway	frank.jacobsen@fiskeridir.no
Frede Thingstad	Norway	Frede.Thingstad@bio.uib.no
Frithjof Moy	Norway	frithjof.moy@imr.no
Hallvard Godøy	Norway	hallvard.godoey@imr.no
Hartvig Christie	Norway	hartvig.christie@niva.no
Henning Steen	Norway	henning.steen@imr.no
Håkan T. Sandersen	Norway	Haakan.T.Sandersen@hibo.no
Håkon Kryvi	Norway	hkr@fmho.no
Ina Holter Aamodt	Norway	Ina.Holter.Aamodt@imr.no
Inge Døskeland	Norway	Inge.Doskeland@post.hfk.no

Jon Helge Vølstad	Norway	jon.helge.voelstad@imr.no
Jon Kristian Haugland	Norway	jonkhau@student.matnat.uio.no
Kari Grundvig	Norway	kari.grundvig@fiskeridir.no
Knut Bjørn Stokke	Norway	knut.bjorn.stokke@umb.no
Larus Thor Kristjansson	Norway	larus-thor.kristjansson@fiskeridir.no
Martin Lund-Iversen	Norway	martin.lund-iversen@nibr.no
Rachel Tiller	Norway	Rachel.Tiller@svt.ntnu.no
Ragnar Sandbæk	Norway	ragnar.sandbak@fiskeridir.no
Scott Bremer	Norway	scott.bremer@svt.uib.no
Sonja Elin Kleven Jakobsen	Norway	Sonja-Elin-Kleven.Jakobsen@fiskeridir.no
Terje Thorsnes	Norway	terje.thorsnes@ngu.no
Thomas Kiland-Langeland	Norway	tcl@fmaa.no
Toft Kari Østervold	Norway	kari.oestervold.toft@imr.no
Tone Rasmussen	Norway	tone@sea-eco.com
Tore Nepstad	Norway	tore.nepstad@imr.no
Torjan Bodvin	Norway	torjan.bodvin@imr.no
Torstein Pedersen	Norway	torstein.pedersen@uit.no
Trine Bekkby	Norway	trine.bekkby@niva.no
Trond Haukebø	Norway	trond.haukebo@fmmr.no
Trond Ivarjord	Norway	trond.ivarjord@uit.no
Trude Borch	Norway	trude.borch@nofima.no
Øivind Strand	Norway	oivind.strand@imr.no
John Icely	Portugal	alicely2@gmail.com
Maria Helena Guimarães	Portugal	mguimaraes@ualg.pt
Renata Goncalves	Portugal	rgoncalves@ualg.pt
Changhoon Lee	Rep. of Korea	clee@sejong.ac.kr
Hak-Gyoon Kim	Rep. of Korea	hgkim@nfrdi.go.kr
Dimitri Pavlov	Russia	pavlov@DPavlov.home.bio.msu.ru
Dubrava Kirievskaya	Russia	dubrava.kirievskaya@gmail.com
Natalya Emelyanova	Russia	enata@rambler.ru
Sheku Sei	Sierra Leone	seisheku@yahoo.com
Juan Pablo Lozoya	Spain	jplozoya@ceab.csic.es
Rafael Sarda	Spain	sarda@ceab.csic.es
Silvia de Juan	Spain	sdejuan@icm.csic.es
Emma Risén	Sweden	risen@kth.se
Fredrik Gröndahl	Sweden	fgro@kth.se
Frida Franzén	Sweden	frida@enveco.se
Joseph Pechsiri	Sweden	pechsiri@kth.se
Stephanie Janssen	The Netherlands	stephanie.janssen@deltares.nl
Gulsen Avaz	Turkey	Gulsen.Avaz@mam.gov.tr
Loraine McFadden	UK	l.mcfadden@mdx.ac.uk
Paul Tett	UK	paul.tett@sams.ac.uk
Peter R. Burbridge	UK	p.r.burbridge@newcastle.ac.uk
Robert Bensted-Smith	UK	robert.bensted-smith@fauna-flora.org
Samantha Murray	USA	smurray@oceanconservancy.org

INSTITUTE OF MARINE RESEARCH
HAVFORSKNINGSINSTITUTTET

Flødevigen Marine Research Station

Flødevigen Marine Research Station near Arendal was founded in 1882, as a "hatchery" for cod fry. Now 126 years old, it is one of the oldest stations of its kind in Europe. The hatching facility was started on the initiative of Gunder Mathiesen Dannevig, who wished to regenerate the cod stocks of the Skagerrak coast, which had been much stronger "in the old days". During the first thirty years of its existence, the work of the station focused on hatching cod and trying to demonstrate the usefulness of the procedure. This led to what were often lively debates, that have been of great importance for our understanding of recruitment mechanisms in marine fish species. It also meant that the important series of shore net-hauls that continue to this day were properly organised from 1919 onwards. The station developed from being a purely privately financed institution in the direction of a growing dependence on public-sector support, and was finally taken over by the state in 1917. From 1911, G.M. Dannevig's son Alf was director of the station. Little by little, it assumed the character of a marine biology research station, which in the course of the years worked on a large number of problems in the field and the laboratory. However, it retained its name of "hatchery" until 1957, when a third-generation Dannevig – Gunnar – took over, since when it has been known as the Flødevigen Biological Station. In 1974, the station became part of the Institute of Marine Research. The station was upgraded and expanded in 2011 to further increase its ability to perform research of high international standard.

All-round research

Flødevigen has the equipment and the competence to perform a wide range of research in the field, the laboratory, indoor aquarium facilities and in its large outdoor basins. Today, resource management-oriented and basic research in a wide range of fields is carried out at Flødevigen:

- Coastal zone ecology and mapping of biological resources in the coastal zone
- Environmental conditions on the coast and in the Skagerrak and the North Sea
- Zooplankton and planktonic algae, including the hazardous algae that make shellfish toxic to human beings.
- Coastal resources such as lobsters, eels and coastal cod
- Shrimp, herring, sardines and industrial fish resources in the Skagerrak and the North Sea
- The deep-sea resources of the North-east Atlantic.

Flødevigen hosts the secretariat of the important international MAR-ECO project, which is studying the marine zoology of the Mid-Atlantic Ridge between Iceland and the Azores. You can read more about MAR-ECO at www.mar-eco.no.

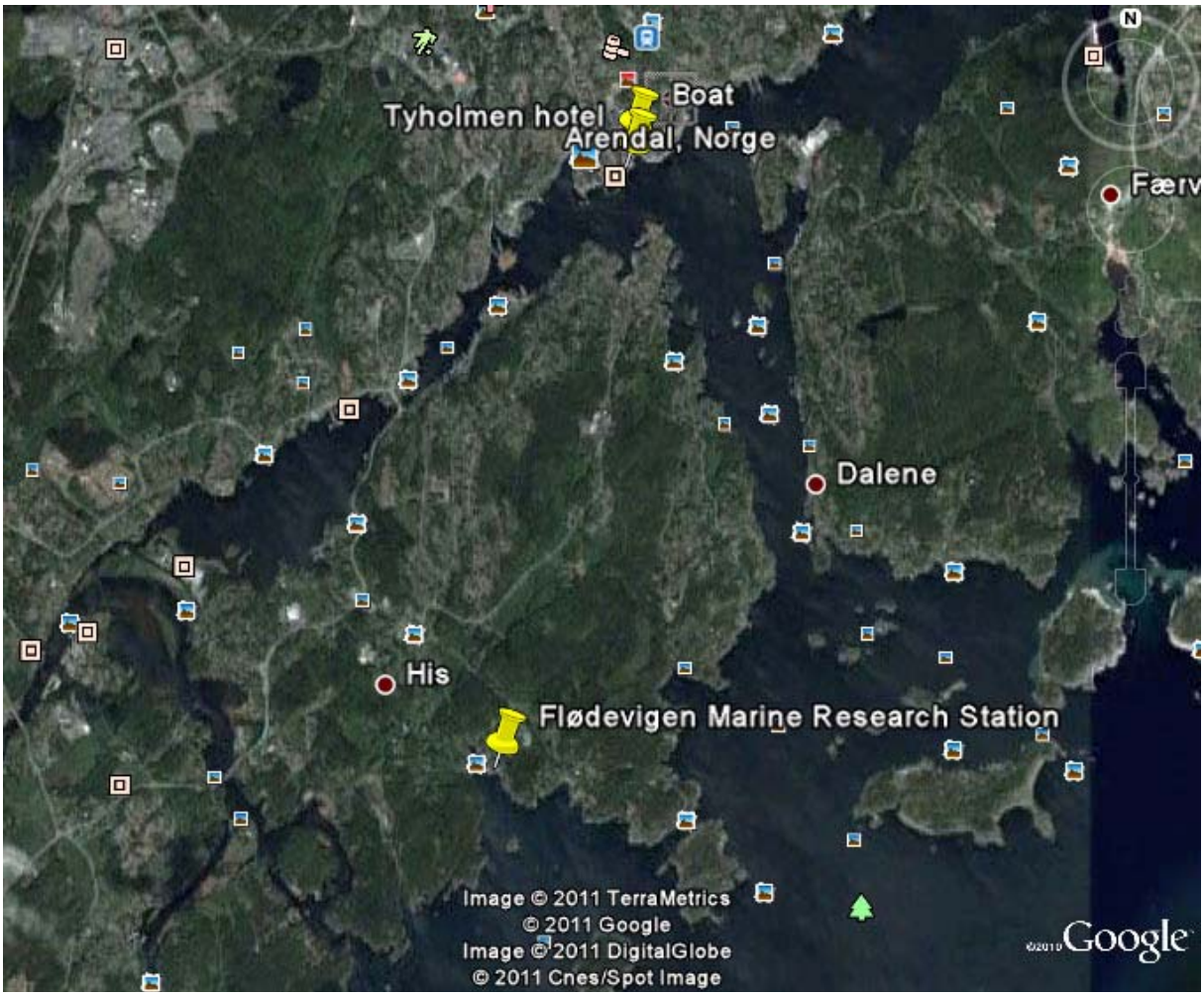
Monday 4 July 2011

Reception at the Institute of Marine Research, Flødevigen Marine Research Station

Boats leave at 1830

M/S Nidelv

M/S Patricia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Boat
Arendal, Norge
Dalene
His
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