ECSA Bulletin

Bulletin of the Estuarine & Coastal Sciences Association

Weser Estuary, Germany

The ECSA is an international society dedicated to the scientific study & management of estuaries and other coastal environments

www.ecsa-news.org

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BULLETIN No. 58

Cover photograph: Jean-Paul Ducrotoy

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with thanks to all contributors.

Editorial ECSA 58

The restoration of damaged estuarine habitats is now considered as a common management practice in North-Western Europe. Restoration site areas may range from a few hectares to several square kilometres in accordance with local politics and ecological setting. Rationales supporting such operations vary greatly: protection against flooding, sediment management or, simply, re-creation of natural habitats for flora and fauna. Whatever the approach, rarely do individual projects fit into a global "vision" of the estuary as an ecosystem. It would seem that, too often, restoration sites are considered independently, with no concerns for a global plan which considers the whole estuary. Strategies need to be defined to establish integrated management plans for estuaries. Such strategies need to be compatible with conservation and sustainable development at the local, regional and European levels. This is where robust science is indispensable and where ECSA can play an important role in facilitating the dissemination of knowledge.

Environmental aspects must be incorporated into a general scheme, which must rely on thorough collaboration between and mutual understanding of all actors and stakeholders, including scientists. Based on a rigorous scientific approach, restoring ecological functionalities in an estuary is dependent on efficient procedures of socio-ecological evaluation including a scientific methodology to assess the ecological quality of systems considered. To make interdisciplinarity work, socio-economics need to be considered in the preliminary and exploratory stages of any restoration programme. As ECSA members, we need to think about a strategy to attract and collaborate with more colleagues from social and economic backgrounds in order to achieve genuine interdisciplinarity. Putting restoration projects into a scientific perspective implies the application of the fundamentals of ecology.

However certain concepts, including biodiversity, productivity, etc. are too often misused and misinterpreted. The concept of habitat, for example, must be correctly understood: a species may disappear but the habitat can continue to be suitable for shifting species in response to global warming. Unfortunately, European and national legislation aimed at protecting habitats are, in fact, focused on species and inflexible criteria dictated by conservation management.

With the arrival of "new" species from the South as a result of climate change, and regardless of whether they will move actively in response to the new conditions or they will need to be introduced artificially, conditions should be made to avoid "fossilisation" of protected habitats. Hence, it may be necessary to accommodate shifts in spatial distribution of autochthon and alien species. However, one may ask whether the legislative framework is fit for purpose when it promotes a purely patrimonial approach. On the contrary, habitats will need to adapt to changing biophysical conditions. Breakdown into geographical barriers or deliberate and inadvertent transport of species by humans could be at the origin of new "emerging" ecosystems, of which the functional characteristics are unknown today, but could be of vital importance tomorrow. It is wrong (and, anyhow, impossible) to attempt to freeze an ecosystem at a particular stage of its evolution. It is of course impossible to turn back the hands of time. Collaboration with academics involved in disciplines dealing with legislation need to increase in order to base future laws on realistic science.

Because, from an ecological point of view, fundamental biological research needs to address the issue of better understanding current and future shifts in ecological niches, rigorous monitoring programs, based on a relevant choice of indicators, should be linked to research and data used more efficiently and for the long-term. Restoring functions at ecosystem level will undoubtedly help guarantee assets to the human societies which depend on them.

Ensuring resilience and adaptability will allow the adjustment of goods and services both to new environmental conditions and to emerging human needs. But, more importantly, integrated management of estuaries will be essential in adapting to local changing conditions (e.g. sea level rise) and to help slow down climate change at the global level. In conclusion, ECSA has an essential role to play in creating a favourable research environment to foster and promote a holistic vision of estuary and ecosystem health, allowing one to get the whole picture.

Jean-Paul A. Ducrotoy
Bulletin editor
j-p.duc@wanadoo.fr

Photo: J-P Ducrotoy

Mud skipper Periophthalmus modestus

Lest We Forget

I am starting this 'View from the Chair' on Remembrance Sunday, which in the United Kingdom is a time to commemorate the contribution of British and Commonwealth military and civilian servicemen and women in the two World Wars and later conflicts. As I grow older it becomes an increasingly sad occasion for me as we all reflect on the sacrifice that so many people, especially younger people, made for us and future generations and the terrible loss of life, wasted opportunities and lost possibilities. One of the reasons for the creation of the EU was the hope that economic interdependence within Europe would strengthen the bonds between neighbouring countries and promote peace throughout the region. The current economic crisis within the EU poses a threat to the euro and to the development of the EU; it is a troubling time for all Europeans and for those who enjoy the freedom of crossing European borders with ease and utilising a common currency whilst doing so. Although conceived in the UK, the ECSA has always sought to be 'European' and indeed global in its outlook, and is a signatory to the Venice Platform:

https://webgate.ec.europa.eu/fpfis/iwt/node/1028

Currently, our Bulletin Editor, Jean-Paul Ducrotoy, is based in France; our Conference Coordinator, Victor de Jonge, in the Netherlands; and, until fairly recently, our e-Newsletter Editor, Anita Franco, in Italy. At the moment, we also have Council Members based in Portugal and Italy, as well as the UK. You can view a complete list of Council Members and other ECSA information on your new ECSA website:

http://www.ecsa-news.org/

If you have comments to make about the new website, or additions you would like to see there, please tell us. Although we have always had strong links with estuarine and coastal scientists throughout Europe, we now need to create a more direct line of communication between ECSA and the EU Commission, in order to further argue the case for our science and its applications; this is something that Victor de Jonge will be taking forward for us.

The world in which ECSA was conceived, that of the 1970s, was very different from our world of internet search engines, smart phones and virtual social networks. ECSA has changed and continues to change in the presence of this 'virtual' environment (and changing societal needs) in order to retain and increase its attraction, its relevance and, lest we forget the most important component, its membership - you. In a letter by Richard Pagett that appeared in the last Bulletin (no. 57), the point was made that a major challenge for estuarine and coastal science is to 'juxtapose itself within the wider landscape of political and economic concerns'. Richard believes that ECSA needs to be realigned - 'rebranded' if you like - in order to be more than a focus for estuarine and coastal science. He makes the following observation, which I paraphrase, that although a clean sea is a good thing, it is not, for many, a priority in a world more occupied with economic outcomes and social concerns. In a way, this picture of an ECSA that is solely focused on science is a little unfair, because, amongst other things, the organisers of our ECSA meetings (especially our local meetings) frequently invite estuarine and coastal managers and policy makers and encourage them to present their work to a wide audience of participants. However, an increased presence of managers and policy makers on ECSA Council would help to ensure that we more successfully place ourselves within the larger world of politics and economics. Some recent changes within ECSA include the election onto Council of a student representative, Sally Little, and our increasing efforts to work more closely with other organisations; for example, we have approached the SedNet European network and have attended meetings with them with a view to working together more closely. SedNet aims to develop new tools for sediment management and to incorporate sediment issues and knowledge into European strategies in order to support the achievement of good environmental status:

http://www.sednet.org/

Our membership as a whole covers a wide range of interests in estuarine and coastal environments, and sediments are often an important part of those interests. Geoff Millward, one of our Trustees, has recently drafted a 'vision statement' for the future of ECSA that is currently being discussed by Council. Several ideas are being explored as part of the vision statement in order to improve our finances and membership and to increase our impact. In addition, we have altered the way Council meetings are run in order to allow more time for strategic discussions. We have also modified the 'ECSA statement' to emphasise that we promote the advancement of multidisciplinary research into all aspects of estuaries and coasts and the application of science and technology for their sustainable environmental management.

I hope you will indulge me at this point and allow me to focus on my own part of the world for a while. When I was very young my family would travel to the south and southwest coasts of England for summer holidays. As I grew older, I went diving and snorkelling off these same coasts. A feature of those trips that were located close to larger coastal towns (in the late 1950s and early 1960s) was the occasionally disgusting state of their near-beach waters, which at that time could be affected by various kinds of outfalls. Although nothing is perfect, it is good to see how things have greatly improved over the intervening years. This last year, almost every beach in the southwest of England reached the EU standard for bathing water quality:

(http://www.bbc.co.uk/news/uk-england-15630473)

Another cause for satisfaction is the summary of final recommendations made by Tom Hooper and his team in their report entitled 'Finding Sanctuary', which details a recommended network of marine conservation

zones (MCZs) around southwest England:

http://www.finding-sanctuary.org

MCZs protect nationally important habitats, species and geology. Presently, only one MCZ around Lundy Island at the mouth of the Bristol Channel has been designated, although the proposed network for southwest England includes a total of 58 newly recommended sites that cover a range of habitats from inshore estuaries and coastal areas to deeper-water habitats offshore. The recommended MCZs have been planned to meet national ecological targets set in the Ecological Network Guidance (ENG) provided by Natural England (NE) and the Joint Nature Conservation Committee (JNCC):

http://www.naturalengland.org.uk/Images/100608_ENG_v10_tcm6-17607.pdf

Other areas of the UK have also received MCZ recommendations – the North Sea, southeast England and the Irish Sea. These projects, taken together, recommend a network of more than 120 MCZs, although the fear is that less than 40 of these sites will be designated by the UK Government next year (2012). If you want to comment on this anticipated situation, then please visit:

http://www.wildlifetrusts.org/blog/joan/2011/11/08/it%E2%80%99s-make-or-break

Finally, I have put this 'View from the Chair' to one side a number of times since starting and it is now almost Christmas, with its abundance of media food topics. I will therefore end with a global food theme, but, seriously, you may be interested to also see the following video interview with Prof. Villy Christensen:

http://www.cfp-reformwatch.eu/2011/05/interview-with-professor-villy-christensen/

In short, our appetite for fish such as cod, tuna and swordfish has led to their depletion, as we know, whereas the smaller fish that make up their diet are multiplying. A proposed solution is to reduce our consumption of the tasty predators and increase our consumption of fish such as sardines, anchovies and herrings. Sound OK to you? Sounds OK to me, but not necessarily for Christmas dinner! My best wishes to you, and may you enjoy a happy and successful 2012.

Dr Reg Uncles
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http://www.pml.ac.uk

Photo Reg Uncles

Plymouth Sound under winter clouds

ECSA Workshop **Macronutrients - Plymouth University**

26 - 28 June 2012

This workshop will focus on practical techniques for the analysis of nitrogen and phosphorus, including the organic fractions, and will also involve contextual presentations from internationally-recognised researchers. The Bio geochemistry Research Centre at Plymouth University has extensive experience in the analysis of N and P, and operates a suite of ISO accredited (9001:2001) instrumentation. It is envisaged that the workshop will be suitable for researchers at all levels who wish to develop their practical skills and understanding of aquatic nutrient cycling and analysis. Further details will be circulated as they become available so please check the ECSA website regularly (http://www.ecsa-news.org/), looking under forthcoming events.

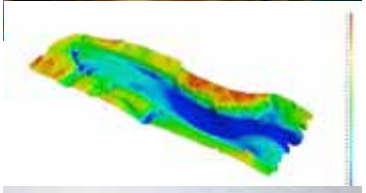
If you are interested in attending this workshop then please e-mail **Dr Mark Fitzsimons (m.fitzsimons@plymouth.ac.uk)** to register your interest.

Estuarine and Coastal Sciences Association

2012 UK Local Meeting
Scottish Marine Institute, Oban 16-18th May

Scottish Sea Lochs & Adjacent Waters









CALL FOR ABSTRACTS & REGISTRATION

The fjordic systems of Scotland provide some of Europe's most interesting transitional water environments: studied for their diverse natural systems, important in the production of food and energy and treasured for their beauty.

'Scottish Sea Lochs and Adjacent Waters' will address all aspects of the sciences and management of these fascinating systems.

Indicative sessions for the meeting include:

- Geomorphology, palaeoceanography and sea-bed mapping
- Physical processes
- Ecological function and dynamics
- Management, policy and communities
- Biogeochemical processes
- Environmental science of aquaculture and marine renewables

To submit an abstract and / or to register to attend the meeting, please download the relevant forms from the event webpages:

www.smi.ac.uk/sealochs

For general enquiries:
E: sealochs@sams.ac.uk
T: Prof. Axel Miller on +44 (0)1631 559263

Principal supporters:

Obituary

Peter Jones – 1945-2011 'If you fell in the Mersey Estuary in the 1970s you were more likely to get poisoned rather than drowned!'

Peter Jones who died in October aged 66 was an ECSA member and councillor of long standing and one of the more notable and colourful characters working on estuaries in the UK. He had given great service to the Association by organising meetings and promoting ECSA wherever possible. A native of the Wirral (Liverpool) he trained as a chemist and started his career with Lever Bros. at their Port Sunlight works but soon decided to be more ambitious and went to Liverpool University's Department of Oceanography where he studied for his PhD. Under the tutelage of John ('JP') Riley his chosen topic was mercury pollution (then a subject of international concern), and so he first came to work on the Mersey Estuary and Liverpool Bay, a topic which was to dominate the rest of his career. Peter joined a large number of chemical oceanographers coming out of Liverpool University who then went on to make their mark on water science and management in the UK and further afield.

Following his stint at Liverpool, Peter went to work for the North West Water Authority who were at that time building their scientific capabilities. In those days (the mid 1970s) the Mersey was blessed in the popular press with the title of the dirtiest river in Europe - a somewhat dubious assertion - but a major estuary suffering from chronic anoxia that clearly needed attention. Peter was instrumental in the first coherent programme to understand the functioning of the Mersey and Manchester Ship Canal and so pave the way for the massive improvement schemes which saw the remarkable transformation of more recent years to a potential salmon river.

He never lost his enthusiasm for the Mersey and its environs of which he had an encyclopaedic knowledge. He spoke extensively on his favoured subject, spreading the message as far away as Shanghai, and later corrected (and received an apology!) from no lesser body than the UN when they dared to print out of date material on the Mersey. Later he undertook much of the early survey work investigating the microbiological pollution of the Sefton and Fylde Coasts, much of it using his beloved 'Sea Jet'- an 8m survey launch he specified and ran for over 20 years.

After the formation of the National Rivers Authority, by splitting the NWWA into the regulatory and water undertaking parts, his talents took him into wider areas of marine science. He helped commission the NRA's coastal survey vessels and undertook much of the coastal monitoring on the West Coast of England and Wales. He was a great innovator and was an early enthusiast for the Acoustic Doppler Current Profiler. His early work, with Dave Prandle from the then Proudman Laboratory to measure estuarine fluxes, using the first broadband ADCP in the UK, remains a notable achievement. He was an advocate of the pontoon buoys in the Mersey for continuous monitoring of water quality. In particular, he had a balance of a very practical and pragmatic approach to water science and management while retaining an academic approach when necessary.

Although very generous to colleagues and brilliant (and very knowledgeable) company at ECSA meetings and workshops, Peter didn't suffer fools gladly, which occasionally brought him into conflict with bureaucratic managements. Later in his career he became somewhat disillusioned with what he saw as a downgrading of science within the Environment Agency and took early retirement. This was not the end of his professional life as he undertook some consultancy work and was recruited by Roger Proctor to help assemble nutrient budgets for the Liverpool Bay Coastal Observatory.

He was never far from water. In his leisure time he was an enthusiastic amateur yachtsman, even up to the end as long as he could physically get on to the boat, and a supporter of the lifeboat service. He was an engaging character with a great sense of humour and a legendary store of (bad) jokes, and knew everybody from the captain of the QE2 to all the local fishermen.

Peter was diagnosed with cancer in 2009 but he didn't let this dominate his life. With the unfailing support of his wife Wendy, he accepted his illness with remarkable forbearance even if the rest of us couldn't understand how he stayed so cheerful throughout the problems. We think his discussions with doctors should have been recorded – it is likely that many of them would have started 'You know this biology stuff and this medical stuff, it's not that precise is it?!'. Throughout he took pleasure in what he could still do rather than brooding on what he could not. Although increasingly frail he remained alert and good company to the end - and his jokes improved not one jot!

He leaves his wife, Wendy, and a married daughter, Natalie. As friends and colleagues we will miss him a lot.

Andrew Wither, on behalf of the ECSA community too numerous to mention.

Charles Malcolm Brown

It is very sad to report the recent, sudden death in Edinburgh of Professor Charles Brown, universally known as Charlie.

In the 1970s Charlie headed a research group in marine microbiology which was originally based at Dundee University in Scotland with links to the Scottish Marine Biological Association (now SAMS) laboratory at Dunstaffnage, Oban, Scotland.

In 1978 he moved to a new chair in Biological Sciences at Heriot-Watt University, Edinburgh, Scotland, and he took his marine microbiology group with him. Soon after this he joined the Council of ECSA, strengthening the microbial ecology discipline in the Association. Charlie served 6 years on the Council in in the late 70s and early 80s and he gave ECSA the benefit of his considerable management skills, which also led to him becoming Vice Principal of Heriot-Watt University in the 1990s. He was particularly supportive of ECSA workshops and training courses of which most of the first ones were run in Edinburgh. Other obituaries have concentrated on his parallel interests in fermentation technology, which led to him becoming the founding Director of the International Centre for Brewing and Distilling (ICBD) at Heriot-Watt University in 1989. ECSA wishes to correct this imbalance and place on record the Association's gratitude for his great help and service to the Association.

Martin Wilkinson

ECSA Annual General Meeting 2012

The ECSA AGM for 2012 will take place on 17th May at 13:30, in the AP Orr Lecture Theatre, Sheina Marshall Building, Scottish Marine Institute Oban, Argyll, PA37 1QA, Scotland, UK

All enquiries to be forwarded to the ECSA Secretary:

Mark F Fitzsimons CChem FRSC
Associate Professor in Organic Geochemistry
Biogeochemistry Research Centre
SoGEES
Plymouth University
Drake Circus
Plymouth
PL4 8AA, UK

e-mail mfitzsimons@plymouth.ac.uk

From the Membership Treasurer

You need ECSA & ECSA Needs You!

Dear Member,

As April approaches, I'd like to remind everyone that membership fees are due on 1st April. This year we're pleased to be able to say that Paypal will be available for online payment. This should make payment much easier for many of us.

ECSA can't function and carry out the useful work it does without its members, so you are all valued greatly. People pay by a variety of means. Payment by standing banker's order is a very efficient way for ECSA to collect subscriptions, but we need members to pay at the correct rate. A number of people are still paying at old subscription rates. In fairness to others paying the correct amount and to cover costs, these members will be deleted from the Bulletin mailing list if they do not amend their standing order. Please check your standing order if you pay by this method – there is still time to amend it before 1st April.

Can I also remind you to let me know of any change of mailing address, to ensure that you carry on receiving your copy of the ECSA Bulletin? This also applies to email addresses. If this isn't updated, you will miss out on the e-newsletter. I still don't have email addresses for all members, so if you're not sure, please contact me at **clare.scanlan@sepa.org.uk.**

Photo: Anita Franco

ECSA Questionnaire

ECSA Council wants to ensure that members are getting maximum benefit from their membership, and we value your views on the benefits ECSA provides. To canvas these, we plan to run a questionnaire, and hope that you will take part. It's most cost-effective to do this online, so again PLEASE ensure that I have your up to date email address.

ECSA Travel and Research Facilitating Grants: An Invitation for Applications

I would like to take this opportunity to remind members that ECSA will consider making small grants available to research workers and students for the following purposes (please note that we cannot consider applications for other purposes):

A1 Travel to participate in academic meetings with personal presentation of the results of their research.

A2 Travel to engage in research relevant to their project and to collect material/ information by:

(i) Visits to libraries or other collections of research materials to supplement research already undertaken

(ii) Visits to laboratories

(iii) Fieldwork

ECSA may also make grants available for the following purposes:

B1 Participation in an academic meeting without presentation of their research

B2 Participation in a training course or workshop

B3 Scientific consumables and minor equipment

Category B will be given support only if funds are available after the payment of category A awards.

Rules and Regulations

a) Applications will be considered on the 1st April and the 1st November each year. Applications should be sent to the Hon. Secretary, ECSA.

b) Applicants must confirm that support is unavailable from other sources.

c) Category A applicants will be granted not more than 85% of allowable costs; Category B applicants will be granted not more than 50% of allowable costs;

d) The total sum any one applicant may receive is £500.

e) Allowable costs are

1) basic travel
2) registration fees
3) accommodation (five nights maximum)
4) consumables and minor equipment

f) Proof of travel etc. and a copy of all receipts must be provided to ECSA no later than 6 months after the date. The applicant must submit a one page report to the Editor of the Bulletin describing the achievements. Reimbursement will be following receipt of claim form and Bulletin article.

g) Applicants will not normally be eligible for more than one award.

All grants are subject to availability of funds and an application form can be downloaded at **www.ecsa-news.org** for completion. Please send the completed form to:

Dr Mark Fitzsimons, Biogeochemistry Research Centre. SoGEES, University of Plymouth
Plymouth, Devon, PL4 8AA
e-mail: mfitzsimons@plymouth.ac.uk

We look forward to receiving your applications

Dr Reg Uncles
ECSA President

Photo: J-P Ducrotoy

Forthcoming International Symposia

2012

Elsevier contract and ECSA

2012: ECSA 50

Mestre (Venice), Italy
NH Laguna Place
(3 – 6 June 2012)

"Todays Science for tomorrow's management"

Scientific Committee: Mike Elliott, Alberto Basset, Pierpaolo Campostrini, Victor de Jonge, Ivan Valiela, Eric Wolanski

Recent decades have seen emergent issues that bear potentially massive risks for the long-term trajectory of coastal environments and the ways we use them. These issues have raised awareness. At a time of economic constraints and of competing issues demanding international attention, this is an appropriate time to take a hard look at the evidentiary basis, current data, and future predictions surrounding these issues.

2012

2012: ECSA 51

Klaipeda, Lithuania
(23 - 27 September 2012)

"Research and management of transitional waters"

Organiser: Arturas Razinkovas, Coastal Research and Planning Institute, Vilnius, Lithuania

art@corpi.ku.lt

ECSA 51st symposium will be co-organized by the Coastal Research & Planning Institute of the Klaipėda University, BALLOON (Baltic Lagoon research Network) and EUROMEDFED (Euro-Mediterranean federation of coastal lagoons and transitional water bodies)

Venue: Campus of the Klaipeda University, H. Manto 84, Klaipeda, Lithuania

The term "transitional waters" is defined as "bodies of surface water in the vicinity of river mouths which are partially saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows". These areas are considered diverse, highly productive, ecologically important systems on a global scale and highly valuable for the services they provide to human societies since at least the Neolithic times. The aim of this symposium is to get to the source of interdisciplinary scientific research carried out and to get the contemporary insight into the conservation, restoration and management problems in these systems. The involvement in the organization of conference of both Baltic (BALLOON) and European and Mediterranean (EUROMEDFED) lagoon research networks brings a special focus to the European lagoons. The conference is also proud to receive support from the South Baltic Programme "ARTWEI" project dealing with the transboundary aspects of lagoon and transitional waters management in the Baltic.
Selected conference presentations are expected to be published in "Estuarine Coastal and Shelf Science" and "Transitional Waters Bulletin" journals.

Information: **http://www.corpi.ku.lt/ecsa2012/**

2012

2012: ECSA 52

Leeuwarden, The Netherlands
(21 - 23 November 2012)

"An integrated approach to emerging challenges in a World Heritage Site"

Theme: Looking from a multidisciplinary (EU Ecosystem Approach) perspective into the direction of ecology instead of the other way around. It involves physics, chemistry, socio-economics, cultural and heritage aspects, biology, ecology, ...

Organiser: Wadden Academy in co-operation with Common Wadden Sea Secretariat, Ministry of Economic affairs, Agriculture and Innovation and ECSA.

Publication: based on this subject, a selection of peer reviewed papers will appear in Ocean & Coastal Management/OCMA

e-mail: **klaas.deen@wur.nl; Klaas.Deen@waddenacademie.knaw.nl**

2013

2013: ECSA 53

Shanghai, China

Working title: intensive changes of estuaries
covering: environment, morphology, ecology, related economic and social-cultural aspects.
Special attention will be given to the forcings that cause many of these changes like climate change and human activities. Stresses on the forcings, like fast economic growth and resource demands, is also an area that should be discussed.

Organiser: Prof Dr Yunxuan Zhou
State Key Laboratory of Estuarine and Coastal Research

e-mail: **zhouyx@sklec.ecnu.edu.cn**

2013

2013: ECSA 5 Portugal or Malta

2014

2014: ECSA 55 and AMSA (Australia)

Perth or Townsville, Australia

Theme: under discussion

Contact person:

Dr Ben Chuwen
Centre for Fish and Fisheries Research
Murdoch University
South Street,
Murdoch WA, 6150

Local UK Meetings

2012

Scottish Sea Lochs and Adjacent Waters

will cover all aspects of the sciences and management of these fascinating systems.

Indicative sessions for the meeting include:

- Geomorphology, palaeoceanography and sea-bed mapping
- Ecological function and dynamics
- Management, policy and communities
- Biogeochemical processes
- Environmental science of aquaculture

Booking forms and further details are available shortly on the conference website **www.smi.ac.uk/sealochs.**

2013

Problems of small estuaries

Period 02 - 12 April 2013, Swansea, UK
Venue: Swansea
Organier: Dr Ruth Callaway
R.M.Callaway@swansea.ac.uk

Research Officer
Room 140 Wallace Building
Centre for Sustainable Aquatic Research
College of Science
SEACAMS Project (Sustainable Expansion of the Applied Coastal and Marine Sectors)

In 1976 scientists met at the University College of Swansea to discuss issues affecting the Burry Inlet (South Wales) and other small estuaries. It was a gathering of geomorphologists, hydrologists, fisheries experts, biologist and governmental managers. They published their findings in the book "Problems of a Small Estuary" (1977, Eds A.Nelson-Smith & E.M.Bridges). Since then much has changed. This meeting will explore developments in the past 40 years and current problems and challenges for small estuaries.

Swansea University
Singleton Park, Swansea, SA2 8PP UK

Workshops

2012

Mark Fitzsimons

Plymouth, United Kingdom,

26 - 28 June 2012

Nutrients Workshop

Organiser: Dr. Mark Fitzsimons
A workshop on macronutrients will be held at the University of Plymouth in summer 2011. The worshop will be suitable for researchers at all levels who wish to develop thier practical skills and understanding of aquatic nutrient cycling and analysis. If you are interested please, contact: Dr. Mark Fitzsimons,

M.Fitzsimons@plymouth.ac.uk

Proposed ECSA co-sponsored meetings / NON-ECSA events

2012

Victor de Jonge

Tirana, Albania

25 - 28 April 2012

International Conference on Marine and Coastal Ecosystems (MarCoastEcos2012):

increasing knowledge for a sustainable conservation and management

Organiser: Dr. Sajmir Beqiraj (marine biologist)

website **http://marcoastecos2012.al**

- the deadline for abstract submission is January 10-th, 2012;
- sponsoring possibilities may be available for some categories of participants (check "Sponsoring" in the menu of the conference website);
- by sending a blank message with the subject **"Interested in MarCoastEcos2012" to contact@marcoastecos2012.al, sajmir.beqiraj@fshn.edu.al** you will be on the conference mailing list.

2012

Carlos Rocha

Centre de la Mer, Aber Wrac'h, Bretagne, France

(late September 2012) to be confirmed

Land-Ocean Connectivity - from a Hydrological to Ecological Understanding of Groundwater Effects in the Coastal Zone

Organisers: Thomas Stieglitz (France), William C. Burnett (USA), Makoto Taniguchi (Japan), Carlos Rocha (Ireland), Henry Bokuniewicz (USA)

Proposal for a GIS Europole Mer Gordon-like research conference in 2012

The coastal zone, where fresh and saltwater meet, hosts some of the most dynamic, diverse and productive ecosystems on Earth. These ecosystems experience significant pressure from human activities, responding to direct and indirect human disturbance and to climatic-hydrologic variability. Hydrological land-ocean connectivity is an important driver of these ecosystems. It greatly affects coastal ecosystem processes such as nutrient cycling, algal and zooplankton community dynamics, ecosystem metabolism or food web dynamics. The critical role of surface water discharge from rivers to coastal ecosystems has been well documented. In the past decade or so, the hidden subsurface flow of coastal (intertidal and submarine) groundwater discharge and associated geochemical and hydrological processes have received an increasing amount of scientific attention. However, the effects of groundwater flow on productivity, composition, diversity and functioning of benthic and pelagic ecosystems along the world's shorelines are not well understood. At a recent special session and Emerging Issues Workshop on future coastal groundwater research at the 2010 ASLO conference in Santa Fe, a better understanding of the ecological effects of ground water flow was considered a major knowledge gap.

2012

Victor de Jonge

Vlissingen, the Netherlands
(17 – 20 April 2012)

Dynamic Deltas

This conference focuses on safety and sustainability in rural delta regions throughout the world. An essential component will be economic cases regarding food production under climate change.

Information: **www.DynamicDeltas.org**
Contact: **secretariate@dynamicdeltas.org**

See also web site **http://www.ecsa-news.org/**
Contact for further information v.n.de.jonge@planet.nl

Photo J-P Ducrotoy

Sardinian Coast

Introducing the Scottish Marine Institute, home of SAMS

In 1884, at the dawn of marine science, while editing the Challenger Expedition Reports, Sir John Murray founded the Scottish Marine Station. The station has undergone a multitude of changes of name, address, structure and research breadth, but it has survived and prospered as an independent charitable organisation, and is now known as SAMS, the Scottish Association for Marine Science. SAMS is a learned society with around 450 members, which elect the governing Council, and employs 150 staff.

Since the late 1960s the Association has been based on the Dunstaffnage peninsula near Oban, and has recently renamed its laboratory as the Scottish Marine Institute.

The SAMS mission is to deliver world-class marine science that supports society with innovative and relevant solutions to developing a sustainable relationship with the marine environment through research, education, services to business, learned society and public engagement activities. The organisation maintains strategic partnerships with the new University of the Highlands and Islands and with the UK's Natural Environment Research Council. It is also part of Scottish pooling initiatives in marine science and geoscience.

SAMS plays a major role in the regional development of Argyll. Beyond its remit of bringing advanced higher education into the area, it has also developed a successful incubator facility for life science companies known as the European Centre for Marine Biotechnology and is now supporting the local enterprise company in developing the European Marine Science Park on its doorstep.

RESEARCH

Research lies at the heart of SAMS and is managed in four departments: Ecology; Microbial and Molecular Biology; Biogeochemistry and Earth Science; and Physics, Sea Ice and Technology. Most of the research focuses on four broad and multidisciplinary themes: Arctic Seas; Dynamic Oceans; Marine Renewables; and People and the Sea.

Arctic Seas research theme: using observational, experimental and modelling approaches to understand system changes in the Arctic marine system

The Arctic is the most rapidly changing region on Earth and it is predicted to lose all its summer sea-ice cover in the next few decades. This will affect marine and terrestrial ecosystems within and beyond the region, and cause dramatic changes in economic and social landscapes.

CCAP cultures at SAMS

Over the past decade scientists from the Scottish Marine Institute have developed significant multidisciplinary Arctic research expertise and international partnerships with circumpolar nations. They make use of numerous platforms – including ships, diving, submarines, aircraft, ice camps and robots – to observe and interpret many of the changes manifesting themselves in Arctic seas. This logistical base supports their state-of-the-art observational, experimental and modeling expertise.

Scientists at the Scottish Marine Institute investigate...

- *Sea-ice physics and remote sensing*
- *Physical oceanography of Arctic seas*
- *Palaeoceanography and past climates in Arctic regions*
- *Pelagic, benthic and sea-ice ecology and biodiversity*
- *Pelagic, benthic and sea-ice biogeochemical processes and cycles*
- *Arctic pollution*
- *Technology development for high-latitude measurements, monitoring and data transfer*
- *Arctic governance, management and policy*

Dynamic Oceans research theme: Understanding fundamental processes that shape our dynamic oceans

The marine world plays a complex role in modulating global and regional climate and experiences constant change – both naturally and through human activities. The theme's research aims at widening and deepening our understanding of many fundamental physical, chemical, geological and biological processes and patterns that occur in the marine environment at a variety of scales. This is a prerequisite for improving predictions and for managing our seas and oceans.

SMI aerial views

Introducing the Scottish Marine Institute, home of SAMS - cont'd

The researchers in this theme undertake large-scale and long-term field observations, microcosm and mesocosm studies, laboratory observations and experiments, and use modelling approaches to investigate:

1. **Microbial biogeochemistry and feedbacks**
   - *Dynamics of greenhouse and climate feedback gases*
   - *Oxygen and remineralisation in the marine environment*
   - *Cycling of key elements*

2 Ocean acidification: We investigate impacts of elevated pCO2 on…
   - *calcification rates in coralline algae and cold-water corals*
   - *benthic carbon and nitrogen cycling*
   - *population dynamics and structure of marine invertebrates*
   - *pelagic primary production*
   - *We also study the environmental impacts of carbon capture & sub-seabed storage*

3. **Ocean mixing dynamics**
   - *Turbulence and mixing in fjords and coastal waters*
   - *Exchange and mixing in strongly tidal waters*
   - *Deep ocean processes*
   - *Oceanic overflows in constriction zones between ocean basins*

BioMara summer NL

Serpula by Hugh Brown, NFSD Scottish Marine Institute

4. **Ecosystem function and response in a changing world**
   - *Detecting and predicting changes in marine biodiversity and species distribution patterns*
   - *Studying consequences of climate change on marine biodiversity*
   - *Investigating the impact of changes on the functioning of ecosystems*

Marine Renewables research theme: Marine energy and sustainable futures through research and innovation

With governments setting stringent targets to reduce fossil fuel consumption, the race is on to develop new renewable power technologies. The marine environment offers numerous opportunities, from exploiting wind, waves or tides to harnessing the intense productivity of marine plants. While exploiting the sea sidesteps a multitude of problems on land, these new industries have potential for significant environmental impacts of their own.

The marine renewables research theme combines the multidisciplinary skills of established researchers and specifically hired staff to provide expert scientific advice to help harness the full potential of marine power and understand its environmental impacts. The theme divides into three sub-themes

- *Methane and ethanol biofuels from seaweeds: developing anaerobic digestion, ethanol fermentation and seaweed mariculture*
- *Biodiesel and biobutanol from micro-algae: identifying oil-producing microalgae; process, optimization and scale-up trials; open pond production and grazer reduction*
- *Environmental interactions of marine renewable energy devices: collision risks with marine life; acoustic footprints of devices; biofouling, smothering and burial; reef effects of offshore structures; ecosystem impacts of devices; survey techniques for tidal sites*

Scottish Marine Institute researchers play an active role in the sustainable development, regulation and capacity of a variety of associated marine industries. Being independent they work directly with industry, regulators, government and the public. Based in Scotland their neighboring waters are their immediate focus but their research is international and finds global application.

People and the Sea research theme: investigating the interactions between social and ecological systems

The management of marine resources and the restoration of ecosystems depend on our comprehension of ecosystem dynamics and social as well as economic forces. Understanding the links and feedbacks that drive coupled social-ecological systems is the basis of ecosystem based management and underpins the reforms to marine governance.

Introducing the Scottish Marine Institute, home of SAMS - cont'd

The People and the Sea theme investigates marine governance, supporting and provisioning service, including...

- *practical and evidence-based approaches to managing the marine environment such as eco-labelling*
- *the sustainability and environmental impacts of fisheries and aquaculture*
- *the impact of marine management on both the ecosystem and its users*
- *the functioning of marine protected areas*
- *the processes, trade-offs and conflicts involved in marine spatial planning*
- *the effects of divers such as climate change, resource extraction, pollution and socio-economic conditions on the quality of marine ecosystems and the services they provide.*

EDUCATION

Being duffed

The organization delivers undergraduate and Masters courses, trains research students, provides short courses in niche markets, and runs a centre for field studies.

Undergraduate courses @ the Scottish Marine Institute

The researchers have developed two four-year undergraduate courses under the auspices of the University of the Highlands and Islands that are delivered largely face-to-face at the Scottish Marine Institute:

- BSc (Hons) Marine Science
- BSc (Hons) Marine Science with Arctic Studies

Both courses are highly multidisciplinary and integrate the studies of marine biology, physical and chemical oceanography and marine geology. The course strengths include

- *diverse and highly relevant modules delivered by researchers*
- *much hand-on fieldwork*
- *integration into a dynamic research culture*
- *small year cohorts and class sizes*
- *excellent learning and teaching facilities including research vessels and aquaria*
- *stunning marine location with access to diverse local habitats*

Exchange opportunities are available during the third year of study, and students aiming to qualify with a BSc (Hons) Marine Science with Arctic Studies must spend at least one semester in year three at the University Centre in Svalbard.

Postgraduate study @ the Scottish Marine Institute

Postgraduate students are a vital component of the life and activities at the Scottish Marine Institute. Currently the Institute offers Masters courses and trains 30 PhD students.

Most postgraduate students are registered with the University of the Highlands and Islands but until the UHI obtains research degree awarding powers their degree awards are accredited by the University of Aberdeen.

Masters courses

There are two opportunities for studies at Masters level

- MRes Ecosystem-Based Management of Marine Systems: a taught programme jointly delivered with and administered by the University of St Andrews
- MSc by Research: a one-year full-time University of the Highlands and Islands programme allowing students to conduct research in any agreed area of our expertise

Other taught Master programmes are under development.

PhD research

Doctoral studies at the Scottish Marine Institute cover most marine science sub-disciplines with projects in all our areas of expertise.

Graduate schools

Scottish Marine Institute staff head the Graduate Schools for the Marine Alliance for Science and Technology in Scotland (MASTS) and for the University of the Highlands and Islands.

Short courses

The Scottish Marine Institute offers a rapidly expanding programme of short courses – including Continuing Professional Development provisions - for researchers as well as a range of customers interested in the sustainable management and conservation of the marine environment. These are largely held at the Scottish Marine Institute but some may be delivered at other venues.

The current course portfolio includes

- *Introduction to ecosystem modelling using Ecopath and Ecosim*
- *Marine planning: the policy background*
- *Marine planning: Mapping and GIS*
- *Beyond conflict – Transforming stakeholder communication*
- *Displaying geo-referenced scientific data using Google Maps*
- *Introduction to molecular methods for algal research*
- *Culturing algae for biotechnology*
- *Cryopreservation of algae and microorganisms*
- *Marine invasive species identification workshop*

Centre for Field Studies

A modern and well-equipped education building was opened in November 2010 that offers excellent field station facilities for visiting groups. The Sheina Marshall Building is located adjacent to rocky, shingle and muddy shores with nearby salt marshes, sea and freshwater lochs, forests and hills. It is also within easy reach of deeper waters. The venue is thus well positioned to host a multitude of field courses.

The Sheina Marshall Building – which is serviced by a wireless network - comprises

- *four ultra-modern teaching laboratories (capacity: from 12 to 60 users)*
- *two lecture theatres*
- *three seminar / meeting rooms*
- *two computing suites for a total of 50 users*
- *study space*

- *student library*
- *canteen 'Café Camus'*

Groups may also gain access to

- *Research vessels suitable for coastal and inshore work*
- *Oceanographic equipment*
- *Modern seawater aquarium facilities*
- *Temperature controlled experimental rooms*
- *Microscopy and image analysis facilities*
- *Molecular biology laboratory*
- *Technical and teaching support*

RESEARCH INFRASTRUCTURE

The Scottish Marine Institute is a modern space equipped to the highest specifications. It is involved with a number of European infrastructure projects that allow easy access for visiting scientists to these facilities and capabilities:

Culture Collection of Algae and Protozoa: a uniquely diverse Microbial Biological Resource (www.ccap.ac.uk)

The CCAP is a uniquely diverse collection of small organisms including cyanobacteria, free-living protozoa, micro- and small macro-algae. The biodiversity of its holdings are complemented by the diversity of the original niches of the organisms from marine, hypersaline, freshwater and terrestrial environments, and their geographical origins from polar to tropical regions and all points in between.

This NERC funded National Facility provides live materials and access to bioinformatic data, via its web-based Knowledgebase, to the scientific community worldwide. The cultures are extensively employed in blue-skies research, as well as training at university level and in targeted CPD courses. Commercial applications include their use in aquaculture, biocide testing and ecotoxicology.

Additionally, CCAP is at the forefront of providing materials and services to the rapidly developing algal-biotechnology sector including the provision of confidential and patent depositories.

National Facility for Scientific Diving (www.nfsd.org.uk)

Scientific diving is an important tool for coastal marine science, and the National Facility for Scientific Diving at the Scottish Marine Institute supports the UK's interdisciplinary marine research all over the world, from ice-covered oceans to tropical coral reefs. Depending on project requirements the NFSD provides divers, equipment, training and/or scientific/technical support to diving-related underwater scientific projects. The Natural Environment Research Council funds the NFSD.

The NFSD includes...

- *an NHS-registered emergency hyperbaric unit*
- *an HSE accredited diving school*
- *an RYA accredited small boat school*
- *the NERC Scientific Diving equipment pool*

As the UK's main coordinating body for scientific diving the NFSD...

- *delivers an extensive underwater research programme*
- *supports the UK Scientific Diving Supervisory Committee*
- *interacts with other diving industry bodies*
- *conducts diving research*
- *evaluates scientific diving*
- *works to ensure that in the UK scientific diving adheres to all relevant Health and Safety legislation*
- *provides focused training programmes for scientists and technicians involved with working underwater*

Centre for Smart Observations

The harshness of the marine environment and the difficulty of accessing the underwater realm of our seas and oceans remains a major constraint on our ability to gain knowledge of marine systems. The highly skilled and experienced workforce at the Centre for Smart Observations is developing and modifying modern technologies to make in situ observations in even the most challenging environments - often from afar.

We are working on an array of smart observation platforms:

- *Drifters: coastal, polar and ocean drifters and 'drifting ears'*
- *Gliders (North Atlantic Glider Facility)*
- *Benthic landers with a range of in situ instruments*
- *Ocean observatories in: Loch Etive, Tiree passage, Wyville Thomson Ridge, and Kongsfjorden (NW Spitsbergen)*
- *Autonomous underwater vehicles*
- *Polar technology – developing novel sensors and platforms to measure sea-ice movement and thickness*
- *Seabed mapping technologies combining side-scan and multibeam bathymetry*

Research vessels

RV *Calanus*

Calanus is a 20m general purpose research vessel for inshore waters suitable for trawling, benthic sampling, and hydrographic and acoustic surveys. She is fitted with a multibeam and sidescan sonar system for seabed investigations and hydrographic surveying. A range of sampling and survey apparatus are available as is an experienced crew. She has a spacious afterdeck, a wet and dry laboratory, a scientific plot room and accommodation (galley, mess and three twin cabins).

RV *Seol Mara*

Seol Mara is a 10.4m general-purpose research vessel largely used to work in confined upper reaches of sea lochs or shallow inshore waters. She has a large open afterdeck, a bench and covered dry hold area that provide storage and mounting space for equipment. Seol Mara has capacity for 8 persons but no overnight facilities.

Alan Ansell Research Aquarium

The aquarium provides state-of-the-art facilities in which temperature and light can be strictly controlled and organisms carefully observed using sophisticated automated systems. It extends over 160m^2 and includes both indoor and outdoor facilities. The aquarium is serviced with pristine sea water supplied using duplicate pump systems. The flow through water supply system has recirculation capabilities. Waste water can be intercepted for isolation experiments.

SAMS Research Services Ltd – delivering services to business (www.samsrsl.co.uk)

SRSL is the commercial arm of the SAMS Group and is based at the Scottish Marine Institute. Since beginning trading (est. 2002), SRSL has built an enviable reputation on delivering independent and high-quality marine environmental survey and consultancy services, underpinned by cutting-edge research. The SRSL mission is to facilitate the sustainable exploitation and management of the marine environment, through the provision of through world-class environmental surveying, sampling, monitoring and analysis.

Introducing the Scottish Marine Institute, home of SAMS - cont'd

RENEWABLES

Baseline Survey and Environmental Impact Assessment services to the Renewables industry are a core business for SRSL. In these assessments, we combine the Biological, Coastal Processes and Metocean requirements of an EIA and offer additional expertise by way of modelling capabilities and long-term technological solutions.

SRSL provides a wide range of Environmental Impact Assessment services in-house, to cover the lifespan of any offshore renewables project; from baseline survey through to operational monitoring and decommissioning;

- *Marine mammal services*
- *Benthic and intertidal surveys*
- *Metocean surveys*
- *Site and resource investigation*
- *Mitigation advice*
- *Marine policy development*

SRSL clients include Scottish Power Renewables, OpenHydro, Voith Hydro, British Petroleum, Marine Scotland, SNH, SEPA, JNCC and many more.

MINING AND OIL & GAS

SRSL provides a range of marine survey and consultancy services to assess and mitigate the environmental impacts of offshore activities, ranging from oil & gas exploration and exploitation to mine-waste disposal.

SRSL is the world leader in best practice and environmental impact of Deep Sea Mine Tailings Placement (DSTP) with over a decade of experience working with industry, landowners and regulators internationally, operating from ice camps in the Arctic to the deep sea in Papua New Guinea.

SRSL provides consultancy and survey services to Mining and Oil & Gas companies including

- *Environmental surveys*
- *Geoscience surveys*
- *Stakeholder engagement*
- *Policy development*
- *Mitigation advice*

Engaging the public in marine science

Ever since its inception in 1884 the organisation has had both professional and lay members. This ensures that public engagement is a core activity of their work that aims to

- *increase awareness of the many benefits a healthy marine environment provides*
- *grow knowledge and passion about our marine heritage*
- *engage the public with marine scientific research*
- *inspire the next generation to study science at school and university*
- *encourage open and evidence-based public debates about the use and protection of our coasts and seas*

Festival of the Sea

The Scottish Marine Institute organises a biennial 10-day long community festival in the area around Oban, Lorn and the islands that celebrates our seas and oceans and encourages people to build a more sustainable relationship with the marine environment. The festival consists of around 50 events including workshops, lectures, debates, open days, art exhibitions and performances, marine sports, walks, a seafood festival and more. The next Festival of the Sea will take place 18-28 May 2012 and is aimed at locals and visitors alike. For details please visit www.obanseafestival.org

May 2008

Scottish Ocean Explorer Centre

SAMS is developing an interactive visitor and outreach centre at the Scottish Marine Institute that will demonstrate the importance of the sea and marine science to locals, visitors and schools throughout Scotland. The Scottish Ocean Explorer Centre aims to provide...

- *an interactive exhibition about the local marine environment and the world ocean*
- *a marine observatory offering webcam views of different marine environments*
- *a cinema showing films on local underwater habitats and latest research projects*
- *an outdoor marine technology garden*
- *a programme of science workshops and events for schools, special interest groups and the local community*

The work will commence as soon as the final £50k have been secured.

Dr Anuschka Miller, 14 December 2011

Photo: J-P Ducrotoy

Cayeux France

'Filling the Gaps in Knowledge' - What don't we know about estuaries and coasts? E.g. The Humber Estuary and Eastern English Coast

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INTRODUCTION

At the Estuarine and Coastal Sciences Association (ECSA) conference on 'The Humber Estuary and the Eastern English Coast', held in April 2011 at the University of Hull and organised by the University's Institute of Estuarine & Coastal Studies (IECS), delegates were asked for their views on 'gaps in knowledge' concerning the scientific understanding and management of the area. This is an edited compilation of those views along with other information that came out of the presentations and discussions at the conference. The actual, potential or perceived gaps are presented as questions. The list is long, reflecting the complexity of these tidal systems, the enthusiasm of the delegates and the nature of scientific knowledge but as yet we have not prioritised these nor arranged them in a logical order. It is likely that many are inter-linked. We emphasise that although produced for the Humber area, the identified gaps are likely to be applicable to many other estuaries and coastal waters.

The questions set out below are categorised by the following topic:

1. Understanding the morphology
2. Hydrogeomorphology and ecological relationships
3. Contaminants, organic matter and nutrients
4. Responses to natural and human physical changes
5. Ecological understanding
6. Habitat creation, structure/functioning, ecosystem services
7. Ecosystem approach – economics and ecology
8. Global climate change
9. Monitoring and modelling for management
10. Management
11. Governance and stakeholders

The key issues coming out of this analysis are:

- How can we maintain and protect the ecosystem services (natural physico-chemical and ecological processes) while delivering economic and social benefits?
- What data, information and understanding do we need to achieve these goals?

By their nature, environmental systems, and particularly estuarine and coastal ones, are very variable. There are competing interests in the use of these systems and wider changes taking place, not the least driven by climate changes. Decisions for management have to be taken on the best available data and information at the time although the uncertainties must be recognised and management progressively refined as further knowledge becomes available. However, the degree of depth of knowledge (and its 'width') required for decisions do depend on the nature of the task being addressed. The resources for science, monitoring, planning and the implementation of actions are also finite. An important rule is the 80:20 principle (or law of diminishing returns) – 80% of the information can be obtained for 20% of the total cost of an exercise; the gaining of the remaining 20% of the information would take the other 80% of the money. Thus, knowing where to draw the line in order to make a decision is important. A rigorous approach to setting priorities for research, investigations and monitoring is a prerequisite.

This can be summarised as getting the scientists and managers to separate the 'Need-to-know' from the 'Nice-to-know'. The scientists will always indicate that they need more data and information and the managers will always indicate that they have to take decisions based on imperfect or incomplete data and information. We are interested in readers' responses to the list of questions below – as shown by the example references at the end of this article, there is an increasing literature helping us to synthesise what we know (and do not know) about estuarine, coastal and marine areas.

1 UNDERSTANDING THE MORPHOLOGY

- How good is our knowledge of the factors affecting hydrogeomorphological functioning, especially on sediment transport, tidal dynamics and estuary shape?
- What are the similarities and differences between the estuaries and related coastal waters with regard to sediment transport and deposition in respect to their tidal and riverine characteristics?
- What factors have an impact on sediment transport and what are the sources and sinks?
- What are the relationships between the coastal sediment supply and estuarine sediment dynamics?
- Do we know if future sediment supply to the coast and estuary will keep pace with sea level rise and so be sufficient to maintain equilibrium morphology and tidal prism?
- How good is the understanding of sediment fluxes between different parts of the coast and the estuary?
- How good is the understanding of hydrodynamic and sediment processes in different parts of the estuary system, and the behaviour of the turbidity maximum?
- How should we extend our knowledge of the effects on the turbidity of processes such as lateral circulation patterns,

transverse variations in longitudinal currents, wind and waves, tidal bores and the presence of fluid mud?
- Can the anthropogenic effects on sediments be detected against the background noise of natural sediment changes in a sediment-rich, highly turbid estuary?
- What further data are required on recent sea-level and tidal range changes, near-shore and offshore bathymetry in the area to reduce the uncertainty in understanding processes and the prediction of future changes?

2 HYDROGEOMORPHOLOGY AND ECOLOGICAL RELATIONSHIPS

- What is the influence of biological processes on physico-chemical structure and processes and vice versa and is our understanding sufficient for management?
- What improvements are needed in our knowledge of linkages between hydrodynamics, geomorphology, physico-chemical functioning and ecology and coastal waters in estuaries?
- What are the interactions between hydrogeomorphology and the light climate (i.e. turbidity and primary productivity), and how can they be quantified?

3 CONTAMINANTS, ORGANIC MATTER AND NUTRIENTS

- How adequate is our knowledge of the current levels and significance of contaminants (physical, chemical and biological), their inputs and sinks, their nature and behaviour?
- How good is our understanding of the budgets of organic matter and other nutrients budgets in the estuary?
- What further understanding is required regarding primary production, its environmental controls and the development of undesirable symptoms?
- Can we quantify fluxes of inorganic and organic nitrogen and phosphorus from rivers to coastal seas and the role of these nutrients in biological production including algal blooms (harmful and otherwise)?
- How good is our understanding of the estuarine reactivity and cycling of ON (organic nitrogen) and OP (organic phosphorous) amounts in the water column and sediments, the ability for algae to use them and turnover times?
- What are sources, fluxes, sinks and impacts of 'new' contaminants, such as biological (pathogens, alien species), physical (energy, noise, structures) and chemical (POPs (persistent organic pollutants) and pharmaceuticals), their fluxes and the sinks of them?
- What is the ecological significance of the seasonal DO sag in the tidal rivers, and what is its cause?
- How good are the measures to prevent major oil or chemical pollution from ships? Are the contingency plans for such emergencies up to date and fully tested? Can oil booms be effective and safely deployed in this macrotidal estuary?
- Can we separate contamination from pollution per se (relating to inputs and amounts and biological effects)?

4 RESPONSES TO NATURAL AND HUMAN PHYSICAL CHANGES

- What are the links between the changing hydrogeomorphology and sediment dynamics, and primary production?
- How well can we determine the loss of habitats due to sea level rise and the means of reversing the loss?
- What are the past and present repercussions of estuary and coastal boundary changes, embankment, land-claim, dredging and other channel modification, and organic matter production?
- What are the critical factors determining the threshold between marsh accretion and erosion?
- How good is our understanding of the actions needed to increase the water space and intertidal habitats? How stable is any created system?
- What are the options for sediment management for habitat creation and improving the ecosystems?
- What further information is needed to plan for 'making space for water', to preserve biodiversity and to decrease the zone of oxygen depletion?
- How good is our understanding of modelling and prediction tools for hydrology, sediment balance and habitat creation? Do some actions conflict with other goals of nature conservation?
- Is the natural system and ephemeral nature of estuaries likely to cause the further loss of wetland habitats?
- What are the effects of 'depoldering' (managed realignment) on bathymetry and hydrodynamics, and subsequently on ecological functioning?
- What are the repercussions for ecology and society of a 'do nothing' approach ('let nature take its course') for erosion along the adjacent coasts?
- Is it true that 'once you start managing a system, then you have to keep on doing so otherwise it reverts to an undesirable state'?
- What are the effects of other impacts such as alien species, noise, construction works and structures?

5 ECOLOGICAL UNDERSTANDING

- How good are our monitoring, data and understanding of the components of the ecology (e.g. benthos, zooplankton, primary production of phytobenthos and phytoplankton)?

Photo: J-P Ducrotoy

Seine Estuary, France

- What is the role of each habitat – tidal marshes, reedbeds, mudflats, sand flats, sand dunes, tidal lagoons and the estuary itself – in the overall functioning?
- What are the dynamics of habitats? Are there tipping points at which irreversible changes occur?
- How are the food webs operating, e.g. changes in phyto- and zooplankton, and how do these affect and are affected by biogeochemistry?
- How well do we understand the functional role of benthic invertebrates, the influence of them on the physico-chemical system and vice versa?
- Do we need to extend our knowledge on oxygen balance, effects of climate change on estuarine functioning and the quantification of ecosystem services?
- Do we understand the role/nature of the estuary in particular aspects of the understanding of estuaries such as ecotone development, connectivity and scale dependency (i.e. the role of knowledge about the estuary in challenging paradigms of estuarine functioning)?

6 HABITAT CREATION, STRUCTURE/FUNCTIONING, ECOSYSTEM SERVICES

- How can ecological carrying capacity be calculated for estuarine areas, regions and habitat types?
- How good is our understanding of sediment budgets for saltmarsh creation, habitat creation and equilibrium achievement?
- What are the optimum and practical areas for the creation of habitat through the managed realignment of floodbanks in terms of the estuary, surrounding land use, landownership, settlements and infrastructure?
- What ratio(s) of re-created area to lost area should be used for habitat compensation projects?
- Once the tide is returned to realignment areas should they be allowed to evolve through the action of natural processes or should further interventions be undertaken to produce desired habitats, for example the planting of reed beds?
- What methods in addition to managed realignment could be used to compensate for potential biodiversity losses and what is an appropriate and sustainable technique for the delivery of reversing those biodiversity losses?
- Is it necessary for habitat creation to deliver compensation in the same 'zone' as the area lost? Can this be expanded to cover the whole ecosystem or even to an alternative system?
- Is it necessary/appropriate to have coincident EU Water Framework Directive water bodies and ecological zones for monitoring and management purposes?
- Is current management of the ecosystem based on a structural approach (i.e. amounts of components at one time), the most appropriate method or is the maintenance or enhancement of ecosystem function (i.e. as rate processes of those components) a more suitable management aim?

7 ECOSYSTEM APPROACH – ECONOMICS AND ECOLOGY

- Can we define and value the Ecosystem Services and Social Benefits?
- What criteria should be used to evaluate the state and health of the estuary and produce a real integrated assessment?
- Can the socio-economic carrying capacity be calculated? If so, how could it be utilised in water, land use and economic planning?
- What is the estuary's value and potential for port and port-related developments?
- How can we increase social and economic activity without the loss of ecological carrying capacity? How can such activity also facilitate the increase in the ecological value?
- Can we reduce actions towards sediment modification, geomorphological change and habitat loss/gain to achieve economic and ecological benefits concerning compensation measures, coastal erosion and flood risk management?

8 GLOBAL CLIMATE CHANGE

- How good is our understanding of the effects climate change may have on the estuarine and coastal environment including for hydrology, geomorphology salinity, temperature, tidal range, water level, tidal pumping, oxygen levels and hence ecology?
- How adequate are our surveillance data to detect changes; are enhancements required?
- How adequate are our modelling and forecasting capabilities for estuarine and coastal processes including sediment dynamics?
- Would we be able to recognise regime-change/tipping points in the system and be able to move from cautious observation/ scientific studies to action plans?
- Do we have the multidisciplinary skills and expertise to explore climate change scenarios and adaptation/mitigation options; can we utilise radical methods to limit flooding, influence sediment pathways, control erosion, increase ecological capital and exploit aquatic resources?
- How good is our understanding of the implications of sea-level rise, possible increased storminess, and catchment discharge changes resulting from climate change?
- What will be the influence of climate change and relative sea level rise on water levels, tidal range, tidal pumping, sedimentation rates, river discharges, salinity variations, temperature rise, oxygen deficiency and other quality parameters?
- What will be the effects of changing hydromorphology on shallow water habitats?
- Are there appropriate and environmentally-friendly ways of enhancing the resilience of estuaries and coastal waters to sea level rise and other climate effects, including those on sedimentation and erosion?
- What effects will changes in abstractions (water use to adapt to climate change) have on ecological functioning?

9 MONITORING AND MODELLING FOR MANAGEMENT

- How good are the marine data produced by each country and sector for the seas; are they comparable, fit-for-purpose and readily available?
- What resources should be employed for surveillance, condition and compliance monitoring, emergency forecasting and warnings (eg for floods) and operational investigations; what are the priorities between types of monitoring and other environmental management; who should pay?
- Given that each Directive and its implementation consider different ways of obtaining information and reaching targets, how do we go about agreeing what should be monitored?
- What further modelling should we do on the main processes such as sediments, hydrodynamics and water quality to inform management and understanding?
- How adequate are our data on the fauna and flora, especially estuarine and migratory fishes, birds and sea mammals, and if necessary how do we improve data collection for management purposes?
- How close can we link ecological and physical modelling for understanding and management?
- What further development should be undertaken of models for hydrodynamic change and response relevant for management of channels?
- Can dredging of a channel be detected on the bed of a turbid estuary and can plumes be detected in a turbid estuary?
- Can we integrate data storage and retrieval, is there a need for a central data repository of verified and quality controlled information over and above the statutory public registers, the biological record centres and, for example, the Humber Environmental Data Centre?
- How can we gain further scientific understanding from reports and investigations for specific developments (the 'grey literature'), bearing in mind matters of commercial confidentiality and quality control?
- What resources should be allocated to R&D, what are the priorities for 'blue skies' and 'nearer market' studies; who pays?
- How can we share our data more effectively, and minimise free data sharing limitations?

10 MANAGEMENT

- Do we have well a defined and agreed vision for the system and the associated objectives and targets, eg for nature conservation, navigation, effluent disposal, etc.?
- How good is our understanding and quantification of ExUP (Exogenic Unmanaged Pressures, i.e. those pressure operating from outside the estuary and for which we have to manage their consequences rather than causes) and EnMP (Endogenic Managed Pressures, those from inside the system and for which we have to manage the causes and consequences)?
- What are the spatial and temporal conflicts between uses/users? Is it possible to get solutions which accommodate the different needs of uses and also ones that provide business opportunities?
- How effective are our environmental controls on anthropogenic activities and what are the effects of unregulated activities (e.g. recreation) on natural features?
- How should the conflicts between land for food crops, biofuels and habitat be resolved?
- Can energy generation and energy extraction (i.e. removal of energy from rides, wind and waves) be compatible with ensuring good ecological status while being economically viable?
- Are human activities and their management fulfilling the '7-tenets' – that our actions must be: ecologically/ environmentally sustainable, economically viable, technologically feasible, socially acceptable/desirable, legally permissible, administratively achievable and politically expedient?

Conservation Management

- Can we define and link habitat needs and conservations goals with plans and management measures for all relevant groups?
- Can we use functional rather than structural management approaches and assessments (i.e. not rely on numerical indices), i.e. focus on the functioning of the system (rate processes such as bird feeding) rather than structure (amounts of components, e.g. number of birds)?
- What is the role of anthropogenically-modified systems such as habitat creation sites and managed realignment sites in the functioning of the estuary (e.g. have the bird, fish and macrophyte populations reached equilibrium)?
- What are the regional, national and international trends in birds; can we identify the influences at the various scales on the populations?
- How should we determine what constitutes a 'significant' change affecting the integrity of a European site?
- Can we manage the status of bird and fish populations against economic activities and change?
- What are the monitoring requirements and investigations to refine the initial marine conservation zones (MCZ) and to assess their effectiveness?
- How will any conflicting interests of the various stakeholder groups over the MCZs be resolved and how will the measures to safeguard them be enforced?
- What options are there to ameliorate the problems associated with land claim and other human changes in the estuary; what are the realistic success criteria and associated benefits or disbenefits for the wider ecosystem?
- What carrying capacity has been/could be lost through past and future industrial and port development; and what is the significance?

Erosion and Flood Risk Management

- Can we reduce uncertainty in intertidal response to past, present and future changes with regards to natural features, developments and erosion-flood risk prevention?
- Is our science sufficient to allow us to advise on firmer policy decisions in the next round of Shoreline Management Plans?
- What is the priority for more detailed shoreline monitoring to allow development trends to be more precisely identified?

11 GOVERNANCE AND STAKEHOLDERS

- How can we develop and promote the ecosystem services approach and its objective application at the regional and local level amongst the disciplines concerned with estuarine and coastal management, and with other decision makers?
- How can we assess and learn from the experiences of implementing the Habitats and Species Directives, Water Framework Directive and Marine Strategy Framework Directive? Is there scope for further rationalisation and integration?
- What are the conflicts between economic developments and environmental governance (national laws, EU Directives, Regional Sea agreements and global treaties), and how should they be resolved? What are the opportunities for business?
- To what extent do the Conservation of Habitats and Species Regulations 2010 impact on the economic development of the estuary and its environs, including energy, industry, urban and port development, recreation and tourism?
- What will the review of public bodies, the 'Big Society', 'Localism' and deregulation mean for the management of estuary and coastal waters?
- If the economic imperative becomes more important could this reduce the importance and concern for ecological sustainability?
- How can partnership working between relevant organisations be developed to deliver effective and valued plans, projects and emergency responses?
- How can the engagement of stakeholders (professional partners, local communities, individuals directly affected, politicians and other decision makers, and the media) be developed, and their views involvement and commitment fostered?
- What are the effective means of communication between partners and with other stakeholders?
- Is the educational and skills base sufficient to deliver science, management and operations for an integrated system?

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Australian Coast

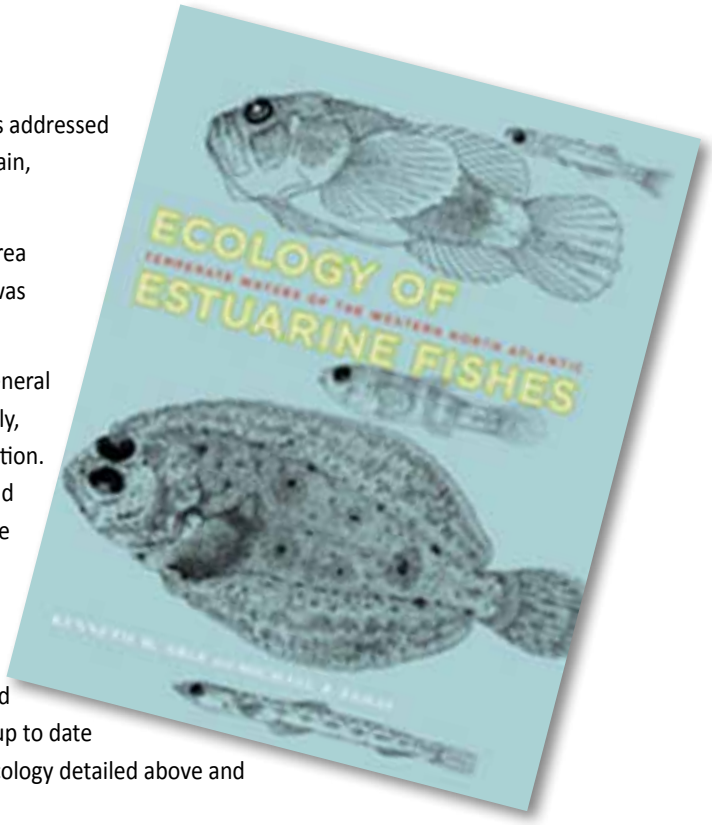
Book review

Ecology of estuarine fishes: temperate waters of the western North Atlantic

Kenneth W. Able & Michael P. Fahay

584 pp., pubished in 2010 by the Johns Hopkins University Press, Baltimore, USA
28 halftones, 347 line drawings

Review by Henrique Cabral



Despite the large volume of papers published in scientific journals, few books addressed estuarine fish ecology. This book is therefor a major contribution in this domain, synthesing available knowledge mainly for north-eastern Atlantic estuaries.

Some introductory chapters present the framework of this work, the study area (primarily the Middle Atlantic Bight) and the methodological approach that was followed (sampling of eggs, larvae, juveniles and adults).

Several chapters focus general aspects of fish biology and ecology, namely general characteristics of temperate fish, reproduction and development, larval supply, settlement, growth and mortality, habitat use, trophic interactions and migration. Climate change was also included in this synthesis, bringing to light recent and most relevant contributions in these fields of research. Future directions were highlighted and surely some of the suggestions for future research made by the authors will be followed in the near future.

A large part of the content of this book explored the major features of near 100 fish species that occur in north-eastern Atlantic estuaries, each presented as a brief chapter. This is of extreme relevance since readers may easily find up to date information on their species of interest, comprising all the aspects of their ecology detailed above and presented in the first part of the book as independent chapters.

Overall, this book is a major contribution for both for specialists in fish ecology and researchers working in other aspects of estuarine and coastal systems. The information presented may be particularly useful for integrative studies and holistic approaches.

The tolerant seaweeds of the changing Mersey estuary

The European Water Framework Directive (WFD) requires quality classification of coastal and transitional (estuarine) waters based on a range of biological quality elements which includes macroalgae (seaweeds). Monitoring tools for this are to be based on species composition and abundance. These two features of seaweed communities vary considerably on the open coast due both to anthropogenic and natural factors, giving rise to many possibilities for approaches to WFD classification. However, in estuaries, there are problems (Wilkinson et al. 2007). There is a very small set of mat-forming opportunist species consistently present in the mid and upper reaches of estuaries, which does not vary greatly with perceived quality and so do not enable quality classification. In the lower part of an estuary there is a species poor flora made up of the more tolerant species from the open coast including one or two dominant fucoid (rockweed) species. At the mouth there will be more species but there is a decline in species number going upstream. There is a dearth of information on the communities of seaweeds in estuaries and how they might change over time.

New Brighton is at the mouth of the Mersey estuary on the north-west coast of England. This estuary has been one of England's most polluted but has undergone very considerable reduction of pollution over the last three decades. Has this resulted in a change in the seaweeds? Being close to the mouth of the estuary with salinity often as high as 28 ppt it might be expected that this would be one of the richest sites in the estuary. When visited in 1983 there was a poor flora of only 16 species mainly of green opportunist seaweeds with scattered fucoids. This rather poor flora for an estuary mouth was assumed to be so because of the pollution. The opportunity arose to resurvey this site last September, 28 years on from the previous visit, in the expectation that more species might be present with the improvements in water quality. What a change was seen in the physical nature of the shore! The two photographs show exactly the same view of the shore 28 years apart. The obvious change is the burial of the shore under sand, obliterating much of the rocky seaweed habitat, as a result of coastal protection works. Surprisingly the same seaweed assemblage was present on what little rock remained. This shows just what an unchanging and tolerant seaweed flora can be present in estuaries and underlines the difficulty of using the seaweed communities as a biological quality element.

View across Mersey estuary from New Brighton in April 1983

The same view across the Mersey estuary in September 2011

Does anyone else who has been watching estuarine biota during the last few decades of environmental improvement have any experiences of change in the biota, seaweeds or otherwise? The author would like to hear of such experiences.

M. Wilkinson, P. Wood, E. Wells & C. Scanlan. 2007. Using attached macroalgae to assess ecological status of estuaries for the European Water Framework Directive. Marine Pollution Bulletin, 55, 136-150.

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Photo: J-P Ducrotoy

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Martin Wilkinson, ECSA Treasurer

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The *ECSA Bulletin* is distributed to all members, free of charge, twice a year; this is supplemented by newsletters and association information and links are updated regularly on the ECSA website. The association has a small grants scheme for younger scientists.

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