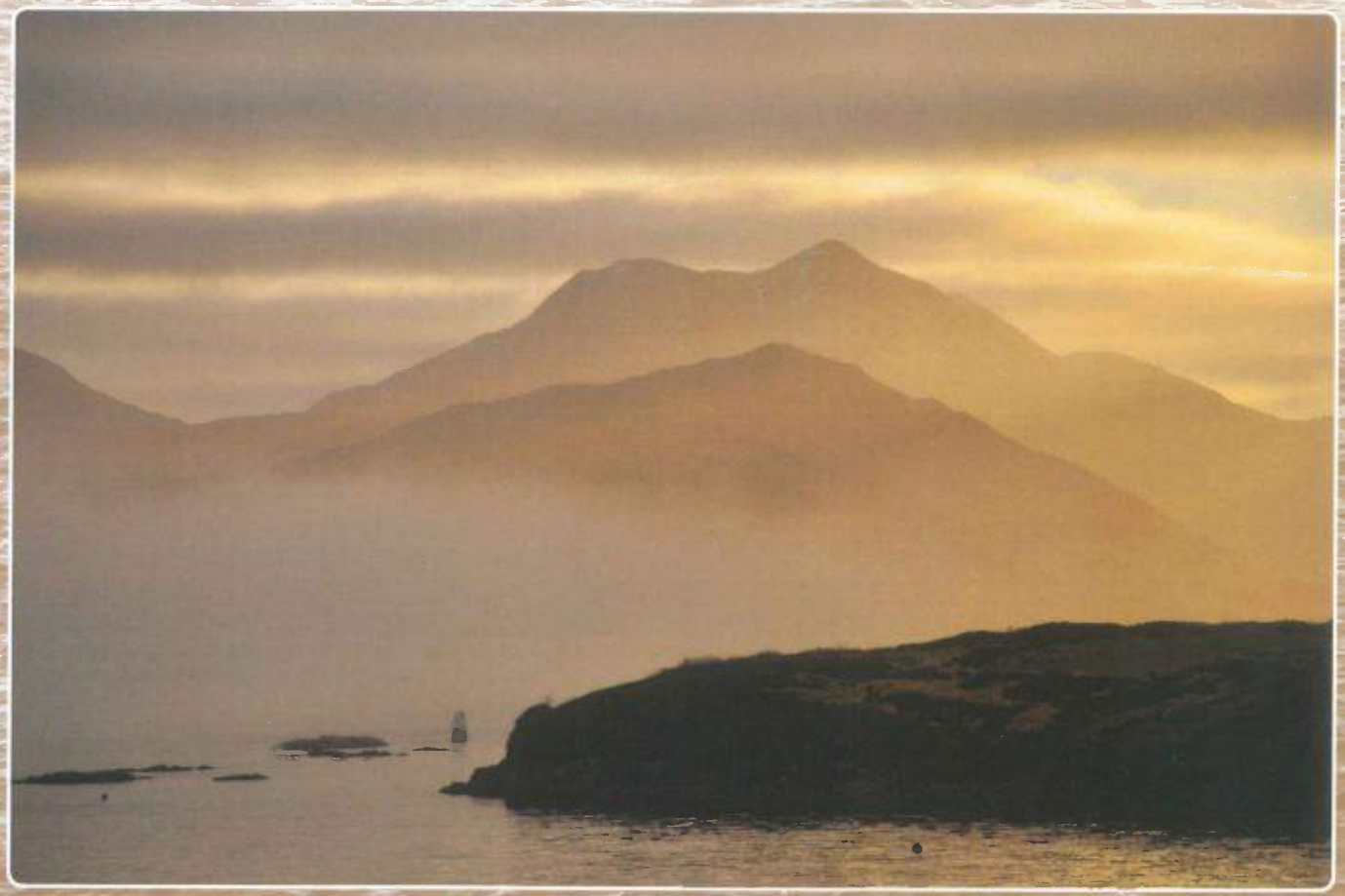
ECSA Bulletin No 61

Summer 2013

ECSA Bulletin

Bulletin of the Estuarine & Coastal Sciences Association



Scotland

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

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BULLETIN No. 60

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with thanks to all contributors.

ECSA Bulletin

Instructions to authors

The ECSA Bulletin is issued in JANUARY and JULY. Articles, reviews, notices of forthcoming meetings, news of personal and joint research projects, etc. are invited and should be sent to the Editor. Closing dates for submission of copy (news, articles, notices, reports, etc.) for the relevant numbers are **15 November** and **15 May**. These dates will be strictly adhered to in order to expedite publication. Articles must be submitted at least ***5 weeks before*** these dates in order to be edited and revised in time for the next issue of the Bulletin; otherwise they may appear in a subsequent issue. Authors are encouraged to consult an earlier issue of the Bulletin and adhere to the style of the publication.

Suggested word limits are as follows: obituaries (1500 words); articles (3000/4000 words); reports on meetings (2000 words); reports on ECSA grants (1000 words); reviews (1500 words); letters to the Editor (500 words); abstracts (500 words). Authors are requested to submit their work electronically as **Word for Windows** documents (no other software is to be used). Figures and photographs must be sent as separate copies in **JPEG format**. Articles in the series "Estuaries in Focus" should present current and planned research on a specific site which will be introduced by text and photographs. The suggested format for these articles is as follows: (1) Site characteristics, (2) current research, (3) future developments. Papers for "Introducing institutions" should be fully illustrated with (as a minimum) a photograph of the building and people at work in the field and in the lab. They should emphasise the expertise of the organisation and give full details with address, telephone number, e-mail, web-site, etc.

All papers and correspondence to:

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jean-paul.ducrotoy@hull.ac.uk

Essaouira, Morocco Photo J-P Ducrotoy

Editorial ECSA 61

In the 1980s fundamental science was popular with the wider general public, including students in colleges and universities. As a whole, society believed that exact sciences would make a major contribution to the solution of crucial problems faced by humanity in a world where famine was still endemic in significant areas of the planet. Whereas international organisations, such as ECSA, enjoy excellent attendances at conferences and other events organised by the Association, science does not seem as popular as it was two decades ago. By the end of the twentieth century, the subject of electronics started to make important advances and unprecedented technological developments followed. Paradoxically, university students' interest in pure and applied sciences dramatically declined whereas business studies and social sciences began to recruit large cohorts of potential managers. Furthermore, through the media, increasing numbers of people developed a taste for the super-natural and other para-scientific approaches. Nowadays, many fictional books, television programs, radio programs, and films have storylines revolving around the para-normal.

Is there a reason why interest in science has declined to the point where many people are suspicious of its meaning? Could it be considered by our contemporaries as threatening to their freedom?

Scientific knowledge implies that everything on Earth is determined in nature. Every effect needs a cause. We have also learned that humans are an integral "part" of the universe and ,as such, are themselves determined. Recent developments in neuro-sciences have revealed that there is no miraculous freedom and that our behaviour is under the control of complex chemicals and networks of brain cells: neurones and astrocysts. Added to that, philosophical thought is unable to demonstrate that freedom does exist: the more we know the world, the less freedom is obvious to us. In nature, everything appears necessary. Research in the Environmental Sciences has discovered that the biosphere of our planet is extremely fragile. Moreover, it has been shown that this world is ever changing and is almost unmanageable by the human species. Our fear of change is rooted in the false impression created by the evolving biophysical baseline that is our sole experiential reference point. We, as humans, did not evolve the innate capacity to comprehend physical changes taking place on a geological time scale(changes that take eons) on the one hand, or, on the contrary, happening over a life time (changes that seem immediate). It often seems more comfortable to put all our hopes in technology and leave our space-ship Earth on auto-pilot.

So, we only experience determinism. But human beings are ambivalent: they also believe in freedom, despite the odds. The notion of freedom comes from intuition and tells us that we should act according to our desire. The only obstacle to freedom is not-believing in it. Freedom is not an object for knowledge, it belongs to our faith but believing is dangerous. Is it not an opinion and, as such, counter-knowledge?

So, where do we stand? Do we have to make a choice between freedom and knowledge? If one believed in absolute determinism, it would make action impossible. If one did not believe in freedom, one could not act anymore and our power to act would be annihilated. So freedom is an illusion but it is essential for action. People think they are free because they ignore the determinism which influences them and so, some of them distrust scientific knowledge. Personally, I believe that knowing the causes which determine our behaviour is a way of regaining freedom and to free oneself.

What is left is the power of ideas. Freedom is dependent on truth: true ideas are the key. So we cannot know freedom because it is a belief. However, believing in freedom, and the ideas this generates, makes us free. Freedom, in fact, consists in formulating appropriate ideas which, in turn, gives intellectual superiority. Wrong, or incoherent, ideas weaken us because they are disconnected one from the other. Obscure ideas about ourselves, and our interface with the natural world, come from the fact that our perception can be wrong and, therefore, misleads us. To get clear ideas and concepts we need robust fundamental science, we need to exchange and confront ideas. So humans need to develop more scientific activity and it is in this crucial respect that associations, such as ECSA, make a critical contribution. Intellectual challenges of a scientific kind should stimulate our physical and mental activity. Activity brings joy. In fact, what makes us free is the power of ideas and the action taken to fulfil these ideas. What is good is what makes us active and so, joyous.

Jean-Paul A Ducrotoy
Bulletin editor
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Elbe estuary, Germany Photo J P Ducrotoy

View from the Chair

Local symposia are a fundamental component of the Association's commitment to the dissemination of excellence in estuarine and coastal science. The Association's recent local symposium on "The Problems of Small Estuaries" and was held in Swansea University under the auspices of SECAMS. It was organised by Ruth Callaway, ably assisted by her colleagues Suzanna Grenfell, Christian Lønborg and Anouska Mendzil. The symposium was a great success, in particular the Practitioners Day which focussed management issues faced by those working in the "real world". The verbal and poster presentations were thought-provoking and on behalf of the ECSA Council I thank the organisers for all their efforts. As far as future meetings are concerned, the UK Local Meetings Organiser for ECSA, Dr Andrew Wither, welcomes offers to host local symposia from interested parties.

The Annual General Meeting of the Association was held as part of the Swansea meeting and a number of important changes in personnel have taken place. John Pomfret declared his intention to retire from Council having participated in its meetings for more than 20 years. The Council is grateful to John for his activities as Publications Secretary and his unfailing commitment to the Association. Also, Professor Victor de Jonge has stepped down from his role as Conference Coordinator. The Association is indebted to him for his supreme efforts to make all our international conferences excellent and, particularly, the development of conference organisation in partnership with the publisher Elsevier. The impact on the global reach of the Association has been remarkable and it is all down to Victor's efforts. Fortunately, Dr Sally Little, currently the Student Representative, will step into Victor's rather large shoes and take on the responsibility of Conference Coordination. At the AGM Victor was appointed to Council as an Elected Member so we are reassured that he will continue to mentor Sally in her dealings on future Annual Conferences. Finally, members may be interested to learn that your current President was re-elected for a further year.

Image 1

Those of you who read Bulletin 60 will be aware of my research interests in the estuaries of SE Asia. It probably comes as little surprise, therefore, that in January 2013 I travelled to Thailand to visit colleagues at Walailak University. The institution, which is making an important contribution to the higher education of people in southern Thailand, is near to the coastal town of Nakhon Si Thammarat, Here major commercial developments along the coastline have impacted pristine mangroves. A mangrove re-planting programme became the inspiration of Professor Shigeru Kato (see image 1) from the Department of Materials and Life Science, Seikei University, Tokyo, Japan, working in collaboration with Walailak University. This annual event has been sponsored by the Shizuaka Tachibana Lion's club from Tokyo since 2011. I draw it to the attention of ECSA colleagues because it was a remarkable occasion in many respects. Firstly, the Japanese guests had flown in for the day, especially to participate in the mangrove planting. Also, there was a substantial turn-out of students from Walailak University, which has a mission to stimulate excellent engagement with its local community. The local community was well represented by huge numbers of school children who turned out and enjoyed getting covered in mangrove mud. The image below (Image 2) shows some of the Thai and Japanese participants in the 2013 Mangrove Planting Project, including the President of Walailak University (in the orange shirt).

Image 2

The ECSA President did his bit and is shown overleaf (Image 3) with Phusit Horpet, from Walailak University about to plant mangrove shrubs, both ankle-deep in soft mud and enduring a searing temperature of 37oC! My grimace is deceptive as I really did enjoy several hours of tropical "gardening". In the background, mangroves of increasing heights towards the coastline can just be discerned, indicating the success of planting over the last three years. It was great to witness the Japanese-Thai commitment to protecting and enhancing these mangroves. Hopefully this type of project could be replicated in other coastal regions of the world where mangroves are threatened by development. Finally, I was very appreciative of the hospitality from Walailak University, particularly members of the Marine & Coastal Resources Management Group, including Pusit Horpet, along with his colleagues Dr Chuthamat Rattikansukha, Dr Damrongsak Noicharoen, Suthira Thongkao and Surasak Sichum. It is notable that these marine scientists have become the first members of the Association from Thailand.

The preparation for our Annual Conference in Shanghai, in collaboration with Elsevier, is now well advanced and I hope that all members can check the website and consider attending. We are hoping that this Conference will give us springboard to opening up the Association to scientists in China. We already have two Chinese members of the Association, Faith Chan and Xingguang Yu who we are keen to meet in Shanghai, along with other ECSA members from across the world.

Best wishes,

Geoff Millward
President of ECSA
Plymouth University
gmillward@plymoutn.ac.uk

Image 3

Stay connected ECSA e-news

ECSA electronic newsletter (e-news) is a service dedicated to ECSA members. It is an easy and rapid way to spread information to the ECSA community, advertising for any events, courses, fellowships/job positions, etc. in the field of estuarine and coastal sciences.

ECSA e-news is fostered by the contribution of all members and can be also a good way to spread ideas to the ECSA community. Members are warmly invited to submit news by sending an email to the e-news editor, Anita Franco, **a.franco@hull.ac.uk.** The subject of the e-mail will be used as title of the announcement in the e-news, hence members are invited to keep it short and explicative. No attachments are allowed.

ECSA e-news is e-mailed to members three times yearly. If you are an ECSA member and you never received the e-news, you should make sure that we have your correct e-mail address by contacting our Membership Treasurer, Clare Scanlan, **clare.scanlan@sepa.org.uk.**

ECSA 53 and Ocean & Coastal Management

Estuaries and coastal areas in times of intense change

13-17 October 2013 in Shanghai, China

Conference Chairs

Victor N. de Jonge, *IECS, University of Hull, UK*

Yunxuan Zhou, *State Key Laboratory of Estuarine and Coastal Research, East China Normal University, Shanghai, China*

Zhongyuan Chen, *State Key Laboratory of Estuarine and Coastal Research, East China Normal University, Shanghai, China (Conference Co-chair)*

Scientific Committee

Victor N. de Jonge, *IECS, University of Hull, UK (Chair)*

Mike Elliott, *IECS, University of Hull, UK*

Eric Wolanski, *AIMS, Townsville, Queensland, Australia*

Jing Zhang, *SKLEC-ECNU, Shanghai, China*

Fangli Qiao, *FIO-SOA, Qingdao, China*

Organising Committee

Xiuzhen Li, *Secretary, SKLEC-ECNU, Shanghai, China*

Li Tan, *SKLEC-ECNU, Shanghai, China*

Yan Sun, *Publisher Aquatic Sciences, Elsevier Beijing, China*

Register Today!

Join us at ECSA's next major Symposium, ECSA 53: Estuaries and coastal areas in times of intense change, from the 13-17 October 2013 in Shanghai, China. ECSA 53 will take place in partnership with the State Key Laboratory of Estuarine and Coastal Research (SKLEC) at East China Normal University, Shanghai, China.

Register today to book your delegate place at the conference. Register online at *www.estuarinecoastalconference.com*

Invited Speakers

Prof. Richard Bellerby, Norwegian Institute for Water Research, Bergen, Norway

Prof. Zheng Bing Wang, Faculty of Civil Engineering and Geosciences, Delft University of Technology, The Netherlands

Prof. Christopher B. Craft, School of Public and Environmental Affairs, Indiana University, Bloomington, IN, USA

Prof. Dr. Rudolf de Groot, WUR, Wageningen, The Netherlands

Prof. Victor N. de Jonge, Institute of Estuarine and Coastal Studies/IECS, The University of Hull, UK

Prof. Pingxing Ding, State Key Laboratory of Estuarine and Coastal Research, East China Normal University, Shanghai, China

Prof. Mike Elliott, Institute of Estuarine and Coastal Studies/ IECS, The University of Hull, UK

Prof. Brian Fath, Department of Biological Sciences, Towson University, USA & IIASA, Austria

Dr. Keita Furukawa, National Institute for Land and Infrastructure Management, Japan

Prof. R. Ramesh, Director of the National Centre for Sustainable Coastal Management, Ministry of Environment and Forests, Government of India

Dr. Andrew Olds (the 2012 winner of the best ECSA student oral presentation), Research Fellow, Australian Rivers Institute (ARI) - Coast & Estuaries, School of Environment, Griffith University, Australia

Prof. Hans Paerl, Institute of Marine Sciences, The University of North Carolina - Chapel Hill, USA

Dr. Fangli Qiao, The First Institute of Oceanography, State Oceanic Administration of China, Qingdao, China

Dr. Henk M. Schuttelaars, Delft Institute of Applied Mathematics, Delft University of Technology , The Netherlands

Dr. Song Sun, Institute of Oceanology, Chinese Academy of Sciences, Qingdao, China

Prof. Eric Wolanski, Australian Institute of Marine Science/ AIMS, Townsville, Australia

Prof. Zuosheng Yang, Institute of Estuary and Coastal Zone, Ocean University of China, Qingdao, China

Prof. Weiguo Zhang, State Key Laboratory of Estuarine and Coastal Research, East China Normal University, Shanghai, China

Organised by

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www.estuarinecoastalconference.com

Forthcoming International Symposia

2013

ECSA 53: Estuaries and coastal areas in times of intense change

13 – 17 October 2013, Shanghai, China

ECSA's next major Symposium, **ECSA 53: Estuaries and coastal areas in times of intense change** will take place in partnership with one of the most important research institutes of China (East China Normal University).

The fast economic growth and related human activities in China during the last few decades are dramatically influencing the environment, from river catchments to estuaries and seas; and natural phenomena further amplify these effects. One of these rapidly changing systems is the Yangtze estuary, with Shanghai, the largest city in China, located close to it. The Yangtze is the 3rd largest river in the world, and constitutes an excellent case study for large scale impacts on ecosystems due to human activities and an excellent place for one of the major global events in 2013.

Conference Topics

- Environmental challenges and remediation in view of climate change and related phenomena
- Effects of engineering or other interventions in estuarine and coastal areas
- Estuarine Wetlands, their restoration, rehabilitation and use as natural filter
- Eutrophication, anoxia and harmful algal blooms
- Economic development and ecological and socio-cultural risks: the socio-cultural-economic-ecology interface
- Biogeochemical cycles of bio-relevant materials from land and sea
- Estuarine ecosystem 'health' and governance
- Strategies and tools for improved estuarine management
- Coastal water - Catchment links, implications and sustainable solutions
- Functioning of estuarine and coastal waters
- Geomorphological, physical and ecological effects of engineering constructions within estuarine systems and coastal waters
- Inputs to aquatic ecosystems of contaminants, nano-particles, nutrients; partitioning, bioavailability, bioaccumulation and health
- Quantifying economic and ecological sustainability
- SKLEC Session - Effects of human activities and global change on hydro-morphological processes in estuaries and coastal areas
- Special sessions organised by EMECS and LOICZ East Asia
- Writing, refereeing and publishing papers

Conference Chairs

Prof. Victor N. de Jonge, ***Institute of Estuarine and Coastal Studies, Netherlands, The University of Hull, UK***
Prof. Dr. Yunxuan Zhou, ***State Key Laboratory of Estuarine and Coastal Research, East China Normal University, China***

Why you should be there:

Attendance at this conference will enable you to:

- Access unique, high-quality content
- Profit from the inter-disciplinary and multi-disciplinary character of the conference: hear world class speakers and leading researchers on all aspects of estuarine and coastal marine science, as well as on the application of science for conservation and environmental management
- Gain an understanding of about other marine, coastal and transitional systems worldwide
- Catch up on new state of the art techniques, and, at the same time, appreciate the constraints of the science and the management
- Present your latest research
- Network with an interdisciplinary group – including researchers from all fields related to estuarine and coastal marine science

2013

Registration
Early Bird Deadline - 28 June 2013

Standard rate student	300.00 USD
Early bird ECSA members	480.00 USD
Early bird non ECSA members	690.00 USD
Standard rate ECSA members/non members	830.00 USD

Inclusions:

- Access to conference sessions, posters and exhibition area
- Conference materials including abstract book
- Lunch will be included Monday-Thursday
- Mid-session refreshments as scheduled in the conference programme
- Welcome Drinks Reception on Sunday 13 October 2013

Important Conference Deadlines

Abstract Deadline	**12 April 2013**
Author Notification Deadline	**31 May 2013**
Author Registration Deadline	**28 June 2013**
Early Bird Deadline for ECSA Members and Non-Members	**28 June 2013**

Registration

Should be done using the online submission system.

Commercial Opportunities

An exhibition will run alongside the conference sessions. Space is available on a first-come, first-served basis. In addition a range of sponsorship opportunities are available.

For full details please contact:

Laurence Zipson
Tel: +44 1235 528881
Email: laurence@lzconsult.com

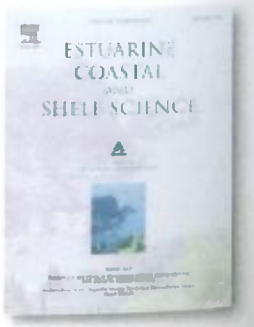
Conference Supporting Journals

Ocean & Coastal Management is an international journal published 12 times per year dedicated to the study of all aspects of ocean and coastal management at international, national, regional, and local levels.

Sustainable development and conservation of ocean and coastal resources requires the insights of a number of monodisciplinary, multidisciplinary as well as integral studies and approaches. The different disciplines may range from the natural and physical sciences to the social sciences, policy analysis, economics, and law.
Articles from all relevant disciplines are invited, but ***all contributions must make clear the explicit link between fundamental concepts and the central improvement of management practice.***
Comparative studies (e.g. sub-national, cross-national, to other policy areas) are encouraged, as are studies assessing current management approaches. Articles involving analytical approaches, development of theory, and improvement of management practice are especially welcome.

Estuarine, Coastal and Shelf Science is an international multidisciplinary journal devoted to the analysis of saline water phenomena ranging from the outer edge of the continental shelf to the upper limits of the tidal zone. The journal provides a unique forum, unifying the multidisciplinary approaches to the study of the oceanography of estuaries, coastal zones, and continental shelf seas. It features original research papers, review papers and short communications treating such disciplines as zoology, botany, geology, sedimentology, physical oceanography.

Supporting Journals



Continental Meetings

2013

EMECS

Global Congress on ICM: Lessons Learned to Address New Challenges
EMECS 10 MEDCOAST 2013 CONFERENCE

29 October – 3 November 2013

Grand Yazici Club Turban Hotel, Marmaris, Turkey

The Tenth International Conference on Environmental Management of Enclosed Coastal Seas (EMECS10) and the Eleventh International Conference on the Mediterranean Coastal Environment (MEDCOAST 2013) will take place as a joint conference from 30th October to 3rd November 2013 at the premises of Grand Yazici Club Turban Hotel in the famous Aegean resort town, Marmaris in Turkey.

This special event will be a world congress dealing with coastal and marine sciences, engineering, policy, governance and management. An international exhibit of coastal and marine products, services and programs will be held parallel to the joint conference.
Since the need for coastal management was accepted four decades ago, significant efforts have been devoted globally with accelerations after the Rio Conference. Over this lengthy period, significant experiences have accumulated. Tools and instruments, simple and sophisticated, practical and scientific, have been designed and refined for effective implementation of Integrated Coastal Management. This Global Congress aims to review the global ICM approaches and experiences and to address emerging issues and new challenges from various perspectives with the purpose of developing a wisdom that would lead us effectively and efficiently into the future in our pursue for sustainability over precious coastal areas of the world.

Organizers

Mediterranean Coastal Foundation (MEDCOAST)
Maraş Mah. Kaunos Sok. No: 26, Dalyan 48840, Mugla Turkey
Tel: +90 252 2844450 Fax: +90 252 2844405 E-mail: medcoast@metu.edu.tr, http://www.medcoast.org.tr
International EMECS Center
DRI East Bldg. 5F, 1-5-2 Wakinohamakaigan-dori, Chuo-ku, Kobe, Hyogo, 6510073, Japan
Tel: +81 78 252 0234 Fax: +81 78 252 0404 E-mail: secret@emecs.or.jp, http://www.emecs.or.jp

Prominent professional, international and national organizations were invited for leading special sessions or for collaborating in organization of the event in other ways. ECSA and Springer Publishers will host the :

ECSA –Springer Special Session on "Estuaries of the World"

Springer

springer.com

Based on the newly launched book series "Estuaries of the World" by Springer International Publishers, the Special Session EOTW will include invited papers and other presentations. It is intended for researchers, practitioners, undergraduate and graduate students in all disciplines who are dealing with complex problems and looking for cutting-edge research as well as methodological tools to set up truly transversal science and technology projects, such as the restoration of damaged estuarine habitats in the context of climate change.

The need for robust science is pressing. Over the last decade there have been numerous advances in both understanding and approach to estuaries and more and more multidisciplinary studies are now available. The available scientific information has come from a multiplicity of case studies and projects local and national levels. Regional and global programs have been developed; some are being implemented and some are in evolution. However, despite the rapidly increasing knowledge about estuarine ecosystems,

2013

crucial questions on the causes of variability and the effects of global change are still poorly understood. Although the perception of politicians and managers of coasts is slowly shifting from a mainly short-term economic approach towards a long-term economic – ecological perspective, there is a need to make existing scientific information much more manageable by non-specialists, without compromising the quality of the information.

Springer is a leading global scientific publisher, delivering quality content (some 2000 journals and 6500 book titles per year) through innovative information products and services, including e-books. We are pleased to publish this prestigious Book Series.

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Springer: Alexandrine Cheronet <Alexandrine.Cheronet@springer.com>

Local United Kingdom Meetings

2013

The ECSA 2013 Local Meeting on the Estuaries and Coasts of North and mid- Wales will be held from 8-10 April 2014 at the Management Centre , University of Wales, Bangor, Gwynedd.

PRIFYSGOL BANGOR UNIVERSITY

The provisional programme is:

Tuesday 8 April – pm.	Optional field trip (dependent of level of interest)
Wednesday 9 April	Full day conference programme at the Management Centre
Wednesday 9 April - evening.	Optional Conference dinner – venue tbc.
Thursday 10 April	Half day or full day conference programme at the Management Centre.

If you would like to offer a presentation or receive further details, please contact **Andrew Wither at the National Oceanography Centre, Liverpool.**

awith@noc.ac.uk

ECSA Local Meeting, Swansea University, Wales,

8 - 11 April 2013

Symposium on the Problems of Small Estuaries

Suzanne Grenfell & Ruth Callaway

This year, the ECSA's local meeting themed on 'Problems of Small Estuaries' was held at Swansea University. The meeting was jointly co-ordinated by the ECSA and Swansea University's SEACAMS research unit. SEACAMS (Sustainable Expansion of the Coastal and Marine Sector) is an initiative funded by the Welsh Government and European Regional Development Fund that focuses on establishing a marine based economy in Wales through developing academic links to businesses. The varied interests of the two organisations created a unique blend as opposite ends of the marine management spectrum were brought together. Academics, consultants and government officials all attended to discuss issues concerning the current and future management of estuaries and coasts.

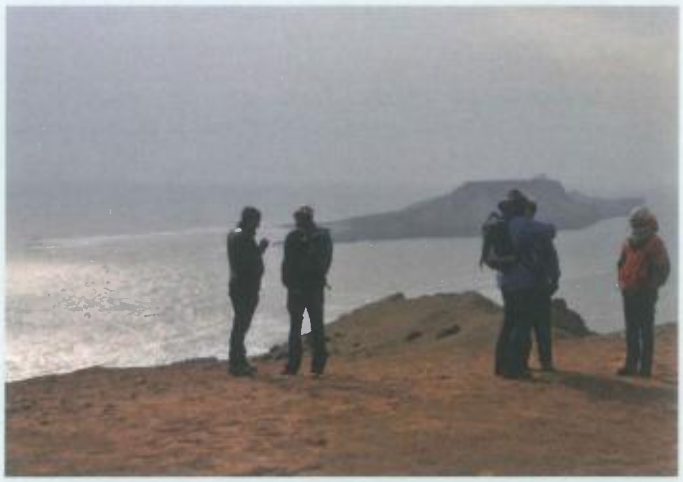
The symposium kicked off with a fieldtrip to the Loughor Estuary and Gower peninsula, providing an opportunity to see the estuary's vast tidal mudflats and salt marshes. In 1976, the Loughor Estuary was the focus of a symposium called 'Problems of a Small Estuary' that was also held at Swansea University. As is now, one of the main concerns at the time were fluctuations in economically important harvests of cockles. During the fieldtrip, delegates had the opportunity to visit one of the Gower's cockle processing plant "Selwyn's Penclawdd Seafoods". A trip of the plant was followed by views across the Gower from King Arthur's Stone and Worm's Head at Rhossilli, before finishing the evening at a Swansea pub.

The conference was opened by Prof. Kenneth Pye, who debated what could be considered a small estuary, before shedding light on how coastal management affected small estuaries through a number of case studies. The following day in his keynote presentation, Prof. Tim Jickells provided insight into the dynamics of nutrient transport through estuaries. Overall, delegates heard about a variety of different environments and management issues, varying from tiny estuaries in Mallorca, cockle population dynamics across the UK and France, the effect of dam building on phytoplankton in Portugal, salt marsh remediation efforts in England, and nutrient dynamics in estuaries in Ireland.

The final day of the symposium, the Practitioner's Day, considered specific issues relevant to applied coastal management through a series of presentations by invited speakers. The day began with fascinating insights into the relationship between science, policy makers and practical decision makers as Prof. Mike Elliot spoke about his experiences in providing data for coastal management.

The conference was well-received, with many delegates specifically highlighting the opportunity to discuss coastal management issues with academics and practitioners as a major positive. There were even some requests to make the event annual to further encourage collaborative problem-solving and improved understanding of each other's needs and goals. Approximately 90 people attended the event over the three days, including one PhD student, Timothy Whitton from Bangor University, who was sponsored by the organising committee.

The symposium highlighted that the subject of 'small estuaries' has moved on from local recognition of problems concerning the Burry Inlet to international awareness of smaller estuarine systems and their own, specific challenges.



The delegates enjoying the a windy walk to Worm's head during the fieldtrip.

Discussion during one of the breaks on the Practitioner's Day.

Tidal flats in the Loughor Estuary, Wales in March 2011.

ECSA Annual General Meeting 2012

Summary of the 42st Annual General Meeting

The 42nd Annual General Meeting of ECSA was held on 10th April 2013 at Swansea University. As previously, it occurred during a lively UK local meeting, this time moving to Wales with a focus on the problems of small estuaries. The minutes of the 41st AGM were accepted and the Secretary and Treasurer gave reports on ECSA activities and finances, respectively.

The Secretary noted the success of the ECSA-50 conference in Venice (600 registrations) and the inaugural ECSA Lifetime Achievement Award, presented to Professor Eric Wolanski. The co-operation with Elsevier for ECSA-50 worked very well and will be continued for ECSA-53, to be held in Shanghai later in 2013. To promote ECSA-53 a number of free registrations have been offered to ECSA student members and it is hoped that this initiative will become embedded in ECSA conference planning. The website has undergone substantial redevelopment and is greatly improved and thanks go to Karen Nicholson for managing this process so patiently. Members were encouraged to have a look and comments are welcome. The ECSA Conference Co-Ordinator, Victor de Jonge, announced that he would step down. ECSA Council is grateful for the work that Victor has put in over the years and thanks were extended to him, on behalf of ECSA.

In terms of finances, the Treasurer was pleased to report a large turn round in the finances from last year. The deficit of £4628 in 2011 has` been converted into a surplus of £3060 for 2012. There were several items that accounted for this. In 2011 we had relied on only two main income streams, membership subscriptions and investment income. We had no additional major sources and the Association's activities could not be supported in full from these two sources alone. In 2012 there were other sources. The largest single item was a donation of £4355 from Elsevier in recognition of our help in organising and publicising the conference in Venice in summer 2012. There was also a surplus from the 2012 local meeting in Oban. Both the main income streams, subscriptions and investments, were also higher in 2012 than 2011. Two of our expenditure headings, council expenses and secretarial were substantially lower in 2012, also contributing on the turnaround.

It was decided that further discussion was needed before presenting an amended constitution to members for approval. This will be discussed by Council at a meeting in early September 2013. A list of 64 applications for membership was presented to the AGM and approved.

Professor Geoff Millward was re-elected for a second year as President. The following members were elected to ECSA Council: Dr Kate Spencer, Dr Sally Little, Professor Jean-Paul Ducrotoy and Professor Victor de Jonge. Dr Alaister Lyndon was re-approved as auditor for ECSA accounts.

Organising major international symposia, "do not panic until the second extended deadline has been passed by three days"

Victor N. de Jonge & Sally Little

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ECSA has a long history organising prestigious meetings on the science and management of estuaries and coasts. Since the early 1990's these meetings have been held with increasing regularity all over the world. ECSA meetings have taken place on five continents (Europe, North and South America, Africa and Australia/Oceania), which this year will for the first time include Asia with ECSA 53 to be held in Shanghai, China, in October (Fig. 1).

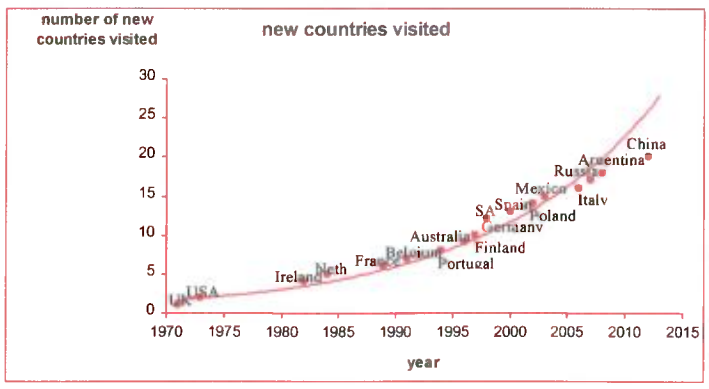

Fig. 1. New countries visited during ECSA's existence.

ECSA organises a number of different types of meeting, designed to match the particular needs of its members. These include workshops and courses, local meetings, and the annual major international symposia. The organisation and logistics of these meetings differ according to the meeting type, however a small organisation team (of not more than three people) is critical in order to avoid confusion and ensure smooth administration through effective communication and management. One key organisational duty is allocated to each team member. These include coordinating the scientific program, arranging excursions and conference events (i.e. conference dinners and receptions) and organising the conference logistics (i.e. registrations and finance).

The above principle may differ slightly during the organisation of the major annual ECSA international symposia. The organising committees of the most recent 'annual' symposia (Venice and Shanghai) have included the Conference Department of Elsevier, who have handled all of the conference logistics (registrations and finance). The collaboration between ECSA and Elsevier was started by the executive publisher of Estuarine Coastal and Shelf Science (Dr Christiane Barranguet) and the ECSA Conference Coordinator (Victor de Jonge) in 2011, later also supported by the executive publisher of Ocean & Coastal Management and officially approved by the Elsevier Board of Directors. Despite the rapid annual growth in the number of ECSA meetings worldwide, working in partnership with Elsevier is a new way of organising the major international symposia and provides ECSA with multiple benefits. The

team member concerned with logistics (i.e. registrations and finance) has now become an entire department, with a suitable web site related registration system, professional budgeting and access to over 67000 potential delegates through relevant mailing lists. The impact of this was highlighted last year at the Venice Symposium, where 350 abstracts were expected, but 864 were submitted, resulting in double the number of parallel sessions (six instead of three) and becoming the biggest meeting that ECSA has organised to date. The Elsevier representative on the ECSA symposia organising committees is Laura Copeland, who has been and is a reliable and ECSA sensitive project leader. For the Shanghai symposia, the additional members of the organising committee include a local organiser (Prof Xiuzhen Li, State Key Laboratory, East China Normal University, Shanghai), who is concerned with organising excursions and the conference dinner, and Victor de Jonge (ECSA Conference Co-ordinator) and Sally Little (ECSA Early Career Liaison Officer) who will construct the scientific program. Sally is shadowing Victor (as the Conference Co-ordinator) in order to take over the ECSA Conference Co-ordinator role at the end of this year.

In practice, however, Victor de Jonge and Laura Copeland are the decision makers in regards to the organisation of ECSA 53 in Shanghai. For important decisions Victor contacts the two additional chairs of the Scientific Committee (prof Yunxuan Zhou and prof Zhongyuan Chen, both SKLEC, ECNU, Shanghai). The Scientific Committee is mainly consulted on decisions regarding themes and topics, session chairs and later the submission and review of papers.

The organisation process itself is driven by mailings, deadlines, a suitable website with registration possibilities, creative website designers, creating the list of topics/ themes, etcetera. It is quite dynamic and flexible and is controlled by the ECSA Conference Co-ordinator.

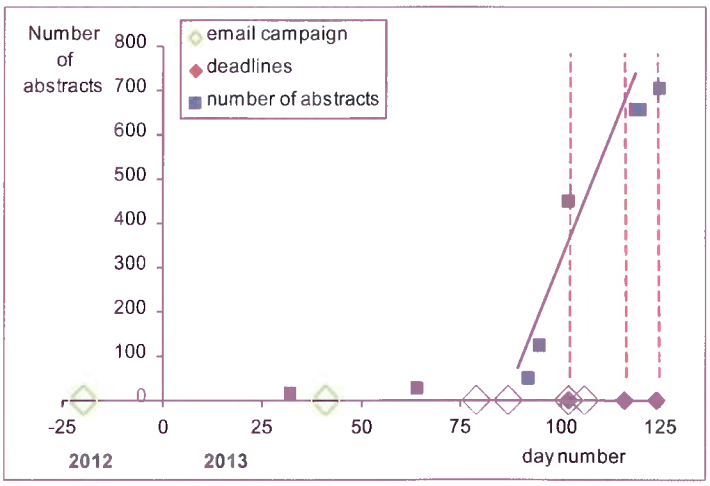

Fig. 2. Overview of the number of email campaigns, abstract submission deadlines set and the development in the number of submitted abstracts as a function of time.

A key part of organising the annual international symposia is the development of the meeting themes and/or sub-themes. It is important that the number of themes/sub-themes relates to the number of expected abstracts, as the maximum number of oral presentations per session (per room) is 80. If the number of oral talks per session exceeds 80, then that particular theme has to be subdivided into two different sessions. ECSA 53 started with 19 themes. After the final abstract deadline, six of these themes had to be merged into two new themes. Additionally, one of the original themes was nearly over-subscribed ('functioning of estuarine and coastal waters') and may be subdivided into two new sub-themes.

Throughout the advertisement and registration process of ECSA 53, it was interesting to note the abstract submission behaviour of our potential delegates. Nearly all waited until the final extended deadline to submit abstracts. The first email campaign began on the 11th of December 2012 (day number -20 in Fig. 2), with the first (and only) abstract submission deadline set at the 12th of April 2013 (day number 102 in Fig. 2) Alarmingly on the 5th of March only 24 abstracts had been submitted, which despite rising to 50 abstracts on the 2nd of April, was still nowhere near the Venice ECSA 50 (and budgeted) target of 864. On the 5th of April we had received 123 abstracts (Fig 2) and on the abstract deadline (12th April) we had 449. Although this number was higher than we ever had before the 2012 Venice success it was still not enough to break even. Our Chinese partners advised an extension of the abstract deadline, stating that their Chinese colleagues were generally slow in responding to advertisements. Their hope was for an additional 50 abstracts! An additional email campaign was thus executed. Three days after the new deadline we had received 655 abstracts. The Chinese partners then suggested one further deadline extension to the 5th of May, which was enacted and resulted in a total of 702 abstracts, which rose to 712 on the 10th of May (five days after the final deadline!) Since then abstracts have continued to be submitted slowly, but steadily. It is remarkable that since 2nd April 2013 (day number 92 in Fig. 2) the increase in the number of submitted abstracts has been about linear. After the first week of May we got the feeling that we had financially reached more quiet and thus safe 'waters'.

The lesson from this part of preparing a major international symposium event is that:

1. budgeting a major event based an unknown number of abstract submissions is a very difficult thing to do
2. you never panic, but prepare for a long, continuous email advertisement campaign, even after the third extended abstract deadline has passed.
3. you need, if possible, to create a contract with the venue that contains some 'flexibility' in the space needed; be prepared for the extremes.

Student Report

Ecosystem Based Management using ECOPATH with ECOSIM

26th to 28th February 2013

Scottish Association for Marine Science (SAMS) Oban, Scotland

From left: Dr Sheila Heymans (lecturer at SAMS), Meii M. Norizam (PhD student, IECS, University of Hull) and Dr Karen Alexander (Postdoc with SAMS)

The Ecopath with Ecosim training provided an excellent opportunity for me to gain better knowledge and understanding of the food web modelling approaches, particularly the balancing steps in constructing mass-balance models in areas with no previous modelling studies. Food web modelling is part of my PhD on the carrying capacity of recreated habitats in the Humber Estuary, UK.

The course was organised by The Scottish Association for Marine Science (SAMS). It was led by Dr Sheila Heymans and Dr Karen Alexander. Dr Sheila Heymans has worked extensively with Ecopath, Ecosim and Ecological Network Analysis. Dr Karen Alexander has worked with Ecospace for her PhD and has extensive knowledge on the fitting of models and spatial analyses.

Dr Sheila Heymans started off the first day by illustrating different approaches and examples of models used for Ecosystem Based Fisheries Management. This was then followed with talks on Ecopath theory and data mining. The day finishes up with hands-on exercises that allowed participants to get their minds around the practical application of Ecopath, from simple food chain to complex food webs. The main exercise was the balancing procedure. In the balancing process, the ecotrophic efficiency should be less or equals to 1. An ecotrophic efficiency value of 0 indicates that the group is not consumed by any other group. On the other hand, a value near or equals to 1 indicates that the group is being heavily consumed or in the fisheries scenario, the fishing pressure is very high, thus leaving no individuals to die of old age. There are no direct steps to reduce ecotrophic efficiency values, but rather checking if the biomass, production to biomass ratio, consumption to biomass ratio and production to consumption ratios are realistic for that group or its predator. Day two focussed on the time series simulation using Ecosim. The time series simulations allow the user to predict species biomass based on fisheries data (catches, fleet, fishing mortality) or environmental data (sea temperature, nutrient loading, primary productivity). Ecosim also allows the user to test how robust is Ecopath models through 'fitting' procedure. In the fitting process, several alternative hypotheses were set up and the hypothesis with minimum difference between model predictions to time series observations would be the 'best fit model'. This three-day course ended with Ecospace theory and practical by Dr Karen Alexander. It was an excellent talk on how she had constructed Ecospace models to assess the benefits of marine renewable energy on some of the species biomass and fisheries sector (in terms of money value). Dr Sheila Heymans and Dr Karen Alexander were not only responsible for the outstanding course programme, but were also excellent for the tour of SAMS laboratories and facilities, lunch time walk to nearby Dunstaffnage Castle through the boggy forest as well as the hillwalking up to nearby Beinn Lora, Benderloch. Above all, I had an amazing experience working on Ecopath, Ecosim and Ecospace models, as well as meeting people with different modelling backgrounds and organisations.

Sopot, Poland Photo J-P Ducrotoy

Calling all members

Dear Fellow ECSA member,
Membership fees are necessary to cover the production and mailing costs of the Bulletin, to support travel to meetings and workshops for young members, and to support ECSA Council in its work. Unfortunately it was necessary to raise the subscription rate this year. Despite reminders not all members have either renewed their subscription or updated their standing order payment. **Please remember to adjust your payment and make up the difference if you paid by standing order at the old rate.** Remember, if you don't pay at the correct rate, you are letting other people subsidise you, and this is unfair – I'm sure that's not the intention of members, but it is a consequence of forgetfulness.

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The Niger Delta
- a hotspot of Nigerian biodiversity and industry

Eyinmisan N Nikatsekpe

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The author is a PhD student working on the project - The social, economic, management, governance and environmental aspects of integrated coastal management of the Niger Delta - Supervisor Professor Mike Elliott; he will be delighted to hear from readers working on similar topics.

Located between latitude 4.83 (4°49′ 60N) and longitude 6(6° 0′ 0E), the Niger Delta region of Nigeria is a biodiversity hotspot. It is located in the southernmost part of Nigeria on the fringes of the Atlantic Ocean and is bordered to the south by the Atlantic Ocean and to the east by Cameroon. The area is drained by several rivers including the Benin, Ethiope, Imo, Calabar, Cross, Nun, Forcados and Niger Rivers. The Niger Delta estuary was formed over thousands of years by the deposition of sediments by the Niger River at its confluence with the Atlantic Ocean's Guinea and Benguela currents. 603km of the about 853km of the Nigerian coast line is located in the Niger-Delta; making it a very important zone politically, economically and scientifically. Located within the Niger-Delta are huge oil and gas reserves (much of which remain untapped) and with a production over 2.2 million bpd (barrels per day), oil and gas provides over 90% of Nigeria's export earnings. The exploration and exploitation of oil and gas in the Niger Delta has led to severe environmental degradation which in turn has led to unrest in the region in the past two decades.

Map of Nigeria, her boundaries and the Niger Delta (highlighted)

There are seven identifiable ecological zones in the Niger Delta, these include

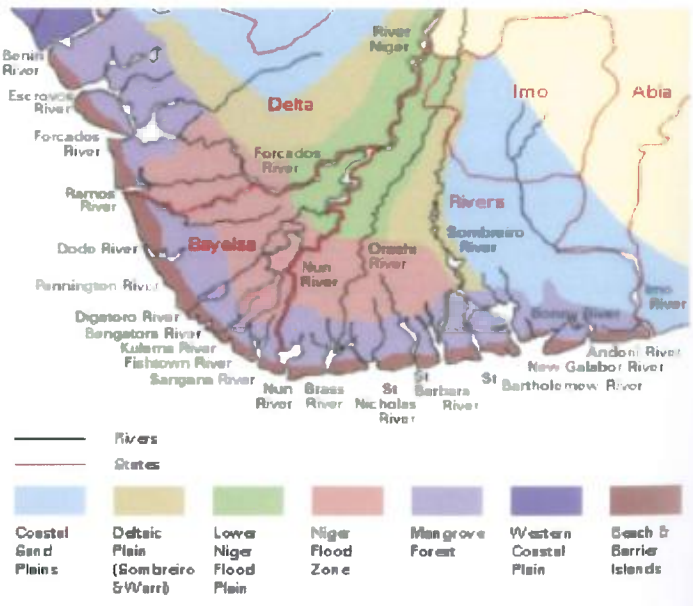
- **the coastal sand plains,**
- **deltaic plains,**
- **lower Niger flood plains,**
- **mangrove forest,**
- **western coast plain, and**
- **The beach barrier islands.**

These seven ecological zones are further consolidated into three zones for simplicity, they are:

- **Upper freshwater riverine floodplain,**
- **The lower tidal floodplain (comprised of estuaries, mangroves and creeks), and**
- **The outer chains of barrier islands.**

There are five geomorphic units present along the Niger-Delta coast. These units based on morphological characteristics, nature of beach materials and sediments, beach slope and vegetation are the barrier-lagoon coastline of south-western Nigeria, the transgressive mud coast, the Niger-Delta flanks, the arcuate Niger-Delta and the strand coastline.

The Niger Delta is a vast flat region; it is one of the largest wetlands in the world with mean annual rainfall over 2,500mm. It is Africa's largest estuary with a temperature range from 21°-33°C with humidity almost at 100% throughout the year. The Niger Delta is home to the Global 200 Eco region #155 and constitutes part of the Guinean Forests Hotspot. The region is also home to many local and global endangered species and accounts for 60-80% of plant and animal species found in Nigeria. The Niger Delta has the third largest mangrove swamp in the world.



Ecological zones of the Niger Delta

This region supports about 25% of Nigeria's estimated 200 million people and the population is expected to increase by the turn of the decade. It is home to 40 ethnic groups speaking almost 250 languages. The Niger Delta belongs to the South-South geopolitical zone of Nigeria consisting of nine states; Abia, Akwa Ibom, Bayelsa, Cross Rivers, Delta, Edo, Imo, Ondo and Rivers. Major cities located in the Niger Delta include Warri, Port Harcourt, Calabar, Benin and Sapele, with Warri and Port Harcourt the most populated cities in the region. The region covers approximately 70,000 km2 (27,027 mi2) and makes up 7.5% of the Nigerian land mass.

With a population density of 480 persons per km (2010 estimates), the Niger-Delta is one of the most densely populated areas of Nigeria. The high population density of the Niger Delta is consistent with high population density observed in and around coastal zones globally. The Niger Delta has been a zone of commerce since early settlements sprung up around the coast. Many of the town and cities of the Niger-Delta, including Warri, Benin, Sapele, Bonny, Calabar, and Opobo have been inhabited for hundreds of years, while some cities like Benin and Warri are mentioned in European literature as far back as the 15th century. With the Portuguese sailing to the Niger-Delta for commerce in 1471 and the subsequent advent of the transatlantic slave trade until its abolition in the 19th century, the Niger-Delta has always been an area of interest both locally and internationally. Europe's first contact with present day Nigeria occurred along the fringes of the Niger-Delta and the European influence is seen to this day in the language, dressing and architecture (colonial styled housing) in the region.

The ubiquitous coconut tree-lined coast of the Niger Delta

Activities and uses of the Niger Delta

Due to international media coverage of the recent upheavals in the region, one is quick to associate the Niger Delta with youth unrest, militancy, piracy, environmental degradation, exploitation and poverty, but there is more to the Niger Delta than the these problems. Beneath the seemingly dangerous and volatile region lies a beautiful (and once peaceful) land endowed with natural resources and potential. The Niger Delta has always been an area of interest prior to the discovery and exploitation of crude oil in the 1960s. There are several activities and uses of the Niger Delta coast which range from ports to nature conservation and several of these activities are summarised below.

The Qua Iboe coastline in Akwa Ibom State

Since the Niger Delta borders the Atlantic Ocean, it is only conceivable that the major ports in Nigeria are located in this region. Ports in the Niger Delta include those in Warri, Port Harcourt, Koko, Sapele, Onne, and Calabar. These ports are the gateways to the nation's economy with billions of dollars of goods and services transiting the ports annually. Major Oil and Gas (O&G) companies also operate in the Niger Delta both undertaking exploration and extraction. Over the years, O&G companies operating in the area have been implicated in the degradation of the environment occasioned by major oil spills. Some of these oil spills are as a result of sabotage by locals in a bid to get 'free' petroleum products from oil pipelines. In addition to the degradation of the environment, sabotage of petroleum products pipelines has led to the deaths of thousands and loss of properties in the Niger Delta. Chevron, Shell, Agip, Elf, Total, Mobil, Texaco, Conoco are some of the multinationals operating in the Niger Delta.

The Niger Delta also plays host to kilometres of oil and gas pipelines running through the fragile ecosystem serving the hinterland with petroleum products and feeding power generation stations with gas. The coast of the Niger Delta is a mine for aggregates mining and extraction and it is not uncommon to see large canoes with mined aggregates along the coast. With increased demands for construction materials, aggregate mining and extraction activities on and around the coast provide employment and a steady source of income for a number of inhabitants along the coast. The activities of aggregates extractors in the Niger Delta are largely unregulated and it is presently a 'free for all' venture.

Kwa Falls near Calabar

The Nigerian Navy has always had an established presence in the Niger Delta prior to the onset of violence in the region. Due to civil unrest, militancy and increasing number of piracy in the Niger Delta, the Federal Government of Nigeria established military bases (a joint operation of the Nigerian Army, Air Force and the Navy) along the Niger Delta coast. The military are charged with providing security for citizens, multinationals and other companies operating in the region while also ensuring that shipping lanes in Nigerian waters are safe. The waters serves as a mean of transport in the Niger Delta; motorised boats and wooden canoes are used for transportation in the complicated maze of creeks and surrounding waters. Fishing is the predominant occupation of the population along the coast; there are hundreds of fishing camps strewn along the creeks of the Niger Delta and the fringes of the Atlantic Ocean. In addition to subsistence fishing, commercial fishing thrives in the Niger Delta. Aquaculture is a booming venture in the Niger Delta; with increasing demand for fish protein and a cheaper alternative to meat, the African catfish *(Clarias gariepinus)* is widely bred in the ponds around the region and it is a major constituent of the local delicacy 'pepper soup'.

The true beauty of the Niger Delta may never be appreciated, largely due to the instability in the area but tourism is being encouraged both by the Federal and individual state governments. The Niger Delta boasts of some of the most beautiful landscape in Nigeria and there are several nature reserves located within the region including the Okomu Game Reserve, Obudu Cattle Ranch, Gele-Gele Forest Reserve. The Niger Delta is home to rare fauna including the forest elephant *(Loxodonta Africana cyclotis)*, the White-throated guenon *(Cercopithecus erythrogaster)*, and the pygmy hippopotamus *(Choeropsis liberiensis heslopi)*. Others include the water buck *(Kobus ellisyprimnus)*, the aquatic antelope (Limnotragus spekei) and the Bate's dwarf antelope *(Neotragus batesi)*. Bird species found in the Niger Delta include the Anambra waxbill *(Estrilda poliopareia)*, the Damar tern *(Sterna balaenarum)* and several fish species.

Threats to the Niger Delta

The environmental degradation caused by oil spills and gas flaring is certainly a major threat to the ecosystem of the Niger Delta but there are several other threats to the environment. These include deforestation, coastal erosion, land claim, over-exploitation of fisheries and land-based pollution. Firewood is a cheap source of cooking fuel in the tropics and as such the locals have found the mangrove as a readily available source of firewood. The activities of the locals has led to significant swathes of mangrove being cut down for fuel. Loss of habitat and biodiversity has accompanied the deforestation of the mangrove swamp. Oil prospecting and exploration activities are also linked with the loss of the mangrove. Untouched, pristine habitats are breached and resident fauna are displaced by the activities of oil and gas companies in the Niger Delta. Another reason for the loss of the mangrove is due to their use in construction around the coast.

While the people use the mangrove as firewood, one of the impacts of their removal along the coast line is coastal erosion. Many coastal communities are continually living in fear of being washed off by rising sea levels. The Federal Government of Nigeria has set in places measures to combat coastal erosion and mitigate its impacts in the Niger Delta. Measures include building boulders along the shores of some coastal communities and relocation of communities under severe threats have been considered also. While there is the need to protect the shores from coastal erosion, the pressures of housing for a growing population has led to the reclamation of wetlands in the Niger Delta. It is not uncommon to see modern housing development on what was once wetlands and this trend is growing at an alarming rate. For example, Ubeji (a suburb of Warri in Delta State) is a town virtually built on reclaimed swampland. Traces of the mangrove swamps can be seen in and around these fast expanding communities while the mangrove swamp forest is gradually being wiped out. This is a worrying development as the expanding human community increases the demise of some of rare plant and animal species that are of scientific interest.

The fishing industry in the region is largely unregulated and fisheries are exploited through the year. It is not uncommon to see juvenile fish and sea produce sold in the market place in a typical Niger Delta city. Local fishermen are only concerned about getting the best catch and selling at profit and not about conservation needs. Over exploitation of the fisheries has led to the depletion of fish stock around the Niger Delta.
The indiscriminate dumping of waste in freshwater bodies inland is a threat to the integrity of the Niger Delta and its environment. Untreated waste are dumped in rivers and streams that feed the Niger Delta estuary posing risks to both humans and the environment as well.

Managing the Niger Delta – an almost impossible task?

Any environmental manager wishing to manage the Niger Delta in its present state will be considered brave given its history of violence. All hope is not lost as the seemingly impossible is very much feasible. To manage the Niger Delta, several factors and players need to be involved, a tough juggling act but it can be done. The region, despite the wealth it generates wallows in abject poverty and the environment is the least of the people's worries. Any management programme in the Niger Delta will be viewed with suspicion as the people have been regularly let down by multinationals which promised but failed to deliver on their promises. To manage the Niger Delta, the people at the grassroots need be educated and sensitised about the need to protect the environment and its resources only then can the process start off. Planning, implementation and enforcement of management laws will require the consent and approval of the people in the region as this will directly affect them. The need to compensate those who will have to give up livelihoods that pose great risk to the environment would also be taken into account. First peace and stability is needed then other things will fall into place for an effective management to be successful in the Niger Delta.

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The Dynamic Humber: Investigating the impact of environmental change on the physical, social and economic state of the Humber estuary

By Sally Little[1]*, Dan Parsons[1], Tom Coulthard[1], David Gibbs[1], Stuart McLelland[1], Mike Elliott[2], Steve Simmons[1] and Chris Skinner[1].

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Introduction

Coastal margins and estuaries are highly dynamic environments where complex hydrodynamic circulation and flows dictate large-scale physical (e.g. sediment transport) and biological phenomena (e.g. nutrient cycling, algal blooms and development of low-oxygen zones) by mechanisms that are both spatially (along the river-to-sea continuum) and temporally (tidal cycle and river flow conditions) variable. However, the scales of these processes and the complex interactions between the physical and biological elements, both within an estuary and at the estuary-sea interface remain poorly understood, despite being critical to holistic system behaviour and the management of responses to changing pressures in a changing environment. Future environmental, anthropogenic and climatic changes will significantly alter the physical and biological dynamics of coastal margins and estuarine ecosystems on currently uncertain vectors. A greater understanding of river-to-sea coupling is required if we are to better predict, and mitigate, the potential impacts of climate change and human activities on estuarine and coastal systems and their associated impact on coastal flood risk, infrastructure and shipping, renewable energy potential and ecosystem functioning.

Dynamic Humber is a research project developed at the University of Hull (through the Centre for Adaptive Science and Sustainability) that aims to increase our understanding of the physical dynamics of the Humber estuary and East coastal margin by investigating the interplay between physical, social and economic flows over the long-term (2000-2100). This project is supported through the Higher Education Innovation Fund (HEIF) and brings together scientists from a range of disciplines (e.g. the physical, social and biological sciences) to address the sustainable economic, social and environmental development of the Humber estuary using an innovative combination of targeted field investigation linked to computer modelling. Long term, high definition surveys and monitoring of the physical processes operating within the Humber estuary will be undertaken and numerical model computer-based simulations developed to forecast the influence of future environmental change under a range of climate scenarios. The results will be evaluated with respect to current and future commercial and social demands upon the Humber estuary. These predictions will guide and inform the strategic planning and management of the sustainable development of this important water way into the future.

This article will introduce the Humber estuary and East coastal margin as a coupled multiple-use system, subject to competing environmental and socioeconomic pressures and demands in a hydrologically and morphologically complex (and currently poorly understood) physical system. This article will also outline the objectives, research strands and methods Dynamic Humber will employ to investigate the impact of environmental change on the long term (2000-2100) physical, social and economic state of the Humber estuary, including current and future research plans.

The Humber estuary and East coastal margin

The Humber estuary is located on the east coast of England and is one of the largest estuaries in the UK (Figure 1) (Andrews et al. 2008). Its rivers (the Rivers Ouse, Wharfe, Aire, Don, Trent, Hull and Derwent) drain one fifth of the total area of England, a catchment area of 24,472 km2, with a population of over 11 million (Hemingway et al. 2008). The combined tidal length of the River Trent and Yorkshire River Ouse (and their tributaries) is 251 km, but the name 'Humber' only applies to the 62 km reach from the confluence of these rivers at Trent Falls, to the estuary mouth at 'the world famous' Spurn point to the North and Donna Nook to the South (Figure 1) (Pontee et al. 2004). The Humber is a well-mixed macrotidal estuary with high suspended sediment loads (up to 20 g L-1 within the turbidity maximum), the majority of which is believed to be

sourced from erosion of the Holderness cliffs, which enters the estuary on the flooding marine tide (Uncles et al. 2001; Andrews et al. 2008). However, to-date our knowledge of the suspended sediment dynamics, sedimentation patterns and bed sediment transport rates within and between Humber estuary and East coastal margin is limited, severely hampering long-term forecasting (Dyer et al. 2001).

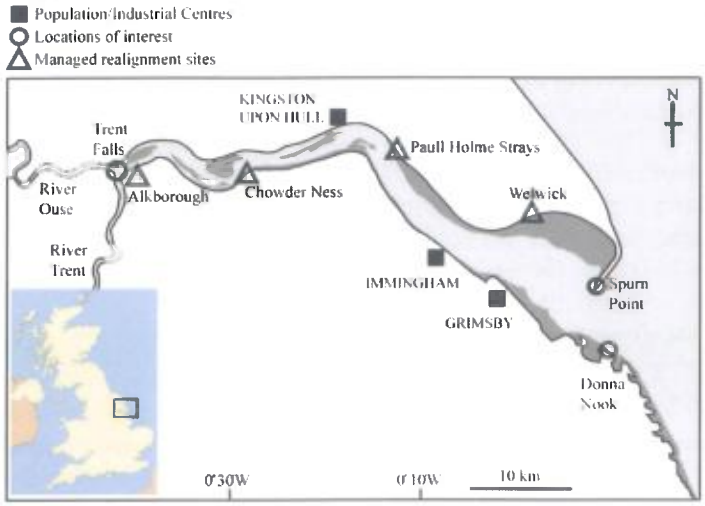
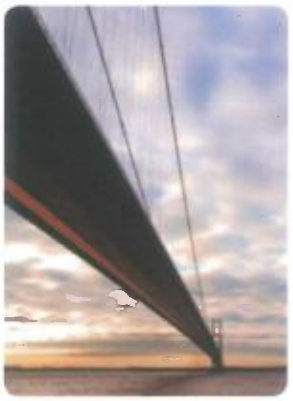


Figure 1. The Humber estuary



The Humber estuary and East coastal margin is a complex dynamic system that is driven by and responds to a wide range of short and long-term processes including human activities and environmental change. Importantly, it is a coupled system with changes in one part of the system often causing significant change elsewhere though the nature of these linkages are difficult to establish (Winn et al. 2003). This does not bode well for the future, particularly as climate change (including extreme weather events and projected relative sea level rise) is likely to significantly alter the dynamics of the Humber estuary (Winn et al. 2003). In order to protect existing resources and reduce and mitigate future risk, it is therefore critical that we improve our understanding of how both the estuary and coastal region are operating and evolving, forecast their response to future change and plan adaptation and mitigation accordingly. Investigating the relationships between hydrodynamics and sediment dynamics in the Humber estuary and East coastal margin has been highlighted as a key area of concern among estuary stakeholders, with coastal erosion, navigable channel sedimentation, intertidal erosion and accretion and coastal and estuary flood potential all impacting on key societal and economic sectors (e.g. ports, shipping, flood risk, renewable energy) and the environment (e.g. pollution, sedimentation, ecological function).

The Humber estuary and East coastal margin is of strategic national socioeconomic importance through its ports and key sector industries (Gibbs et al. 2007). Historically, the estuary has undergone substantial land reclamation, much of which is used as high grade agricultural land, though has also provided key asset sites for dockland development (Winn et al. 2003). The Hull and Humber ports complex is the largest in the UK and is strategically located within the North European Trade

Axis (NETA), the broad trade and transport corridor running from Ireland to the Baltic States and linking several major conurbations in Northern England (i.e Leeds, Manchester and Liverpool) along the M62 corridor (One NorthEast 2010). The Humber region is in a post-industrial recession phase, marked by the decline of traditional industries, factory closures and high unemployment linked to the current economic climate (One NorthEast 2010). However government financial assistance in the form of the Regional Growth Fund, Humber Enterprise Zone and business loans (through Humber Enterprise Partnership) aim to stimulate long-term growth and sustainable jobs through various initiatives including the establishment of the Humber region as a development hub for offshore renewables (i.e. Green Port Hull) and carbon capture (HLNP 2011).

The estuary also provides important recreational and conservation amenity, and has the potential to increase these significantly in the future. The estuary contains a variety of important intertidal habitats (mudflats and sandflats, saline lagoons, saltmarsh and sand dunes) which support a number of protected species (river and sea lamprey), a grey seal breeding colony and large populations of breeding, migrating and overwintering birds (Winn et al. 2003). As such, the Humber is recognised as an area of international importance for wildlife and habitats, and has been allocated the full range of national, European and international statutory nature conservation designations. These include Special Area of Conservation (SAC) and Special Protection Area (SPA) designations under the Habitats Regulations and EC Birds Directive, which are underpinned by 189 consecutive Sites of Special Scientific Interest (covering 37,000 ha) and together form a Natura 2000 protected area (Edwards and Winn 2006). The estuary is also recognised as an internationally important wetland under the Ramsar Convention (Winn et al. 2003). The marine areas (land

covered continuously or intermittently by tidal waters) of the Humber Estuary SAC, the SPA and Ramsar sites together form the Humber Estuary European Marine Site (Edwards and Winn 2006). These designations make a significant environmental and socioeconomic input to the region, both through jobs, ecosystem services and recreation value, with nature and wildlife tourism accounting for approximately £9.5 million per annum to the economy of East Yorkshire, with the potential to increase to £28.5 million by 2022 with anticipated investment in capital projects, marketing and capacity building (ICRT 2012). However, such habitat designations have placed rigid limits on port development and maintenance of flood defences in the Humber estuary, with projects of overriding public interest required to compensate for lost habitat through managed realignment schemes (Gibbs *et al.* 2007) .

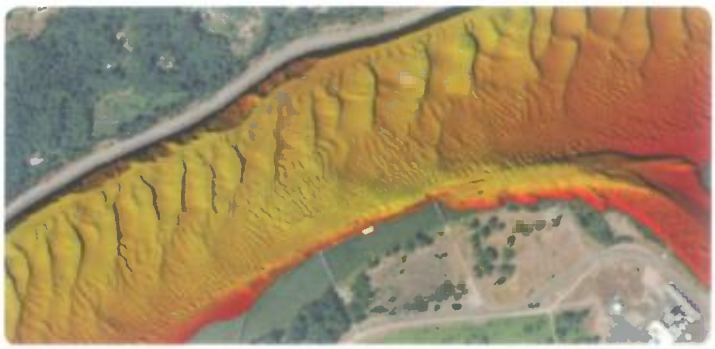
Uncertainties related to the effects and impacts of environmental and climate change on the morphology of the Humber estuary have been highlighted as a key concern for estuary stakeholders involved in these social, economic and environmental sectors. One area of particular concern is that our lack of understanding of current sediment dynamics is restricting our ability to manage competing demands in the estuary (for example the socioeconomic consequences of development delays due to problems successfully compensating for lost habitats via managed realignment) and subsequently achieve future sustainable goals.

Dynamic Humber

The overarching aim of Dynamic Humber is to investigate the impact of environmental change on the current and future physical, social and economic state of the Humber estuary and East coast margin. To achieve this aim, Dynamic Humber is divided into three research strands; morphodynamics, numerical modelling and socioeconomic. These are introduced briefly below.

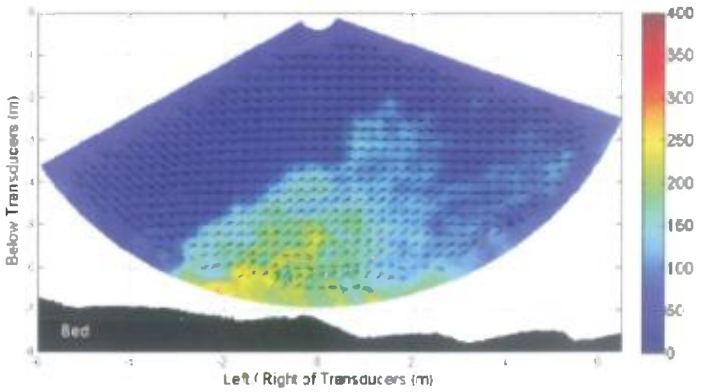
Morphodynamics

The objective of the morphodynamics project strand is to produce high definition field surveys using state-of-the-art equipment and bathymetric sonar techniques to quantify physical fluxes within the Humber estuary. Bed morphology will be mapped using the University of Hull's RESON SeaBat 7125, multi-beam echo-sounder (MBES). The MBES yields high resolution bathymetric data with a vertical depth resolution of between ~6 to 20 mm across a swath of ~1280 comprised of 256/512 individual acoustic beams sampled at rates of up to 50Hz. The three-dimensional bathymetry will be used as a baseline for MBES repeat surveys, measuring sediment transport rates and sedimentation patterns in the estuary over a range of spatial and temporal scales. The acoustic backscatter from the MBES will be analysed to provide information about the suspended sediment dynamics (concentration and flow field vectors) and bed sediment type. Fluid discharge and suspended sediment flux through the tidal cycle will be monitored with acoustic Doppler Current Profilers. The baseline and sediment dynamics survey data will be used to inform and validate models of sediment transport in the Humber, essential for predicting the future state and variability of the estuary system.



Bathymetric image of the River Columbia estuary (data courtesy of USACE (http://www.usace.army.mil) and C. J. Simpson (Fulcrum Graphics))

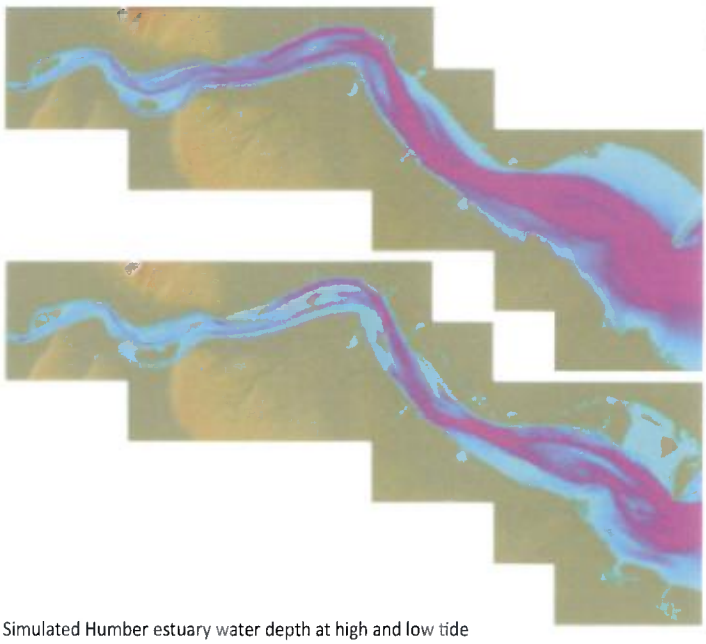
RESON 7215 MBES transducers



Processed water column data from the Mississippi River (see Best et al., 2010 at http://www.agu.org/pubs/crossref/2010/2009GL041852.shtml)

Numerical Modelling

The objective of the numerical modelling strand is to simulate how sediment dynamics might change in response to future climate and environmental change scenarios predicted for the Humber estuary and East coastal margin over a range of spatial (1-50 km) and temporal (10-100 years) scales. Sediment and water fluxes within the coupled estuarine-coastal system will be modelled using the recently developed CAESAR-lisflood model, incorporating field data obtained through the morphodynamic strand and enabling us to quantify fluid fluxes into and out of the Humber, sediment transport vectors and sedimentation rates. The model will generate data on Humber sediment, water flow, contamination and nutrient dynamics. It is envisaged that model outputs will better inform us as to how predicted climate change will affect areas and issues of key concern (e.g. coastal and estuarine flooding, navigability and coastal erosion) on (or in) the Humber estuary and East coastal margin.



Simulated Humber estuary water depth at high and low tide

Socioeconomic

A primary objective of the socioeconomic strand is to combine survey and model data (produced through the morphological and numerical modelling strands) in order to understand current estuarine dynamics and evaluate the impacts of forecasted changes (under future environmental and climatic change scenarios) on the present and future commercial and social demands of the Humber estuary. These findings will be used to guide and inform relevant bodies for the sustainable management and development of the estuary. The second objective is to disseminate research findings to, and engage with, stakeholders, local communities, businesses and government and work with society and commerce to anticipate, plan, adapt and mitigate the potential impacts of environmental change in the Humber estuary in ways that are timely enough to positively affect outcomes on environmental sustainability, economic development and public health.

Current research

Dynamic Humber is designed to be spatially scalable, allowing project scientists to focus in on specific areas of the estuary that are subject to significant physical change and/or are central to the sustainability and management of the Humber. Dynamic Humber is currently working on a number of issues identified by estuary stakeholders as areas of major concern. These include sedimentation in managed realignment sites and navigable channels, the breaching of Spurn Point and boundary issues and conflicts.

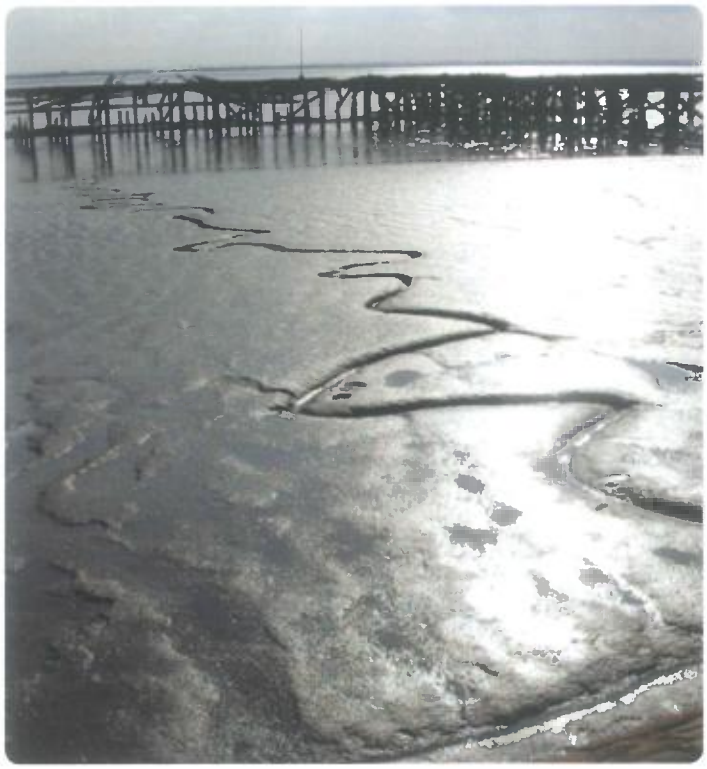
1. Sedimentation in managed realignment sites

In order to reduce flood risk, minimise the cost of flood defences (both implementation and maintenance) and compensate for habitat loss due to sea-level rise (i.e. coastal squeeze) and port development, flood defences in the Humber estuary have been realigned in four sites (i.e. Paull Holme Strays, Chowder Ness, Welwick and Alkborough; Figure 1) (Morris 2013). Managed realignment aims to return reclaimed land into intertidal area, creating specific habitats for key flora and fauna to compensate (like-for like) for losses due to flood risk management and port development (Andrews et al. 2008). The long-term capacity of managed realignment sites in the Humber estuary to compensate for the loss of specific habitats (e.g. intertidal mudflats) is however uncertain, due to rapid sediment accretion and salt-marsh development in existing sites (Morris 2013). For example, sedimentation rates of up to 50 mm per month were recorded at Paull Holme Strays following the initial breach in 2003 (Andrews et al. 2008). The Dynamic Humber team hopes to use the Humber estuary numerical model (developed through the numerical modelling project strand) to reproduce historic sedimentation rates and forecast changes in existing managed realignment sites (i.e. Paull Holme Strays and Welwick) and assess the suitability of proposed sites for the creation of specific habitat (e.g. intertidal mudflat) and development over the long-term.

High resolution Bathymetry and topography at Welwick managed realignment site

2. Sedimentation of navigable channels

Dredging of the Humber estuary is routinely carried out by Associated British Ports (as well as other port operators) to ensure the safe navigation of vessels through the maintenance of shipping channels, whilst capital dredging is occasionally carried out for new port and industrial installations. Dredged material is disposed of within the estuary to maintain the systems sediment budget. There is however only limited understanding of the effects of removing and relocating large quantities of sediment on estuarine hydrology and morphology (Townend and Whitehead 2003). The Dynamic Humber team aims to explore these issues, using both historic and contemporary bathymetry datasets to identify areas of accretion and erosion over a range of spatial and temporal scales. Using the Humber estuary numerical model, the team hopes to forecast changes in sedimentation rates of navigable channels over the long-term.

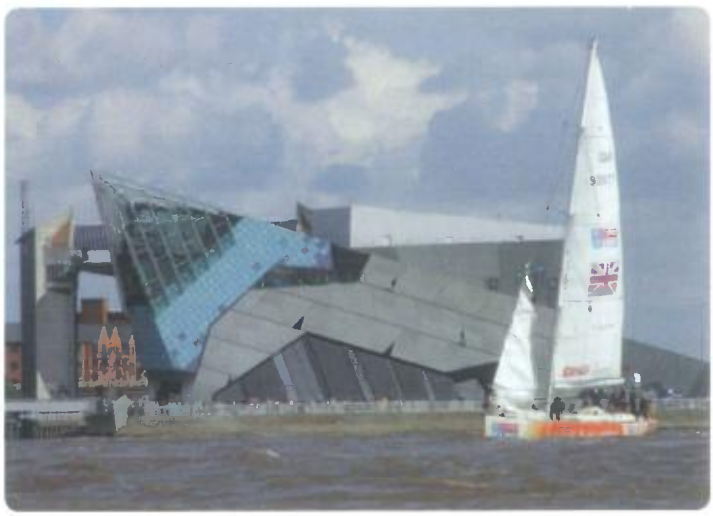


3. Breaching of Spurn Point

Spurn Point is a sand and shingle spit on the North bank of the Humber which is fed by the longshore transport of eroded sediment from the Holderness coast (Figure 1) (May 2003). It is a narrow (30 m to 350 m wide), flat feature (6 m to 9m OD), which extends 5.5 km south-westwards across the mouth of the Humber (May 2003). Historically, Spurn point has breached on numerous occasions (i.e. in 1360, 1650, 1849 and 1996), due to a range of factors including sea level rise, storminess and changes to sediment supply (i.e. gravel extraction and changes to longshore sediment transport) (May 2003). Estuary stakeholders are concerned that future changes in climate (including increases in relative sea levels and storm surge frequency) may result in the permanent breaching of Spurn Point. The Dynamic Humber team will use the Humber estuary numerical model to simulate breaching under a range of climate scenarios and investigate the impact of breaching on estuary morphology and hydrology, including changes to sediment dynamics and flood risk.

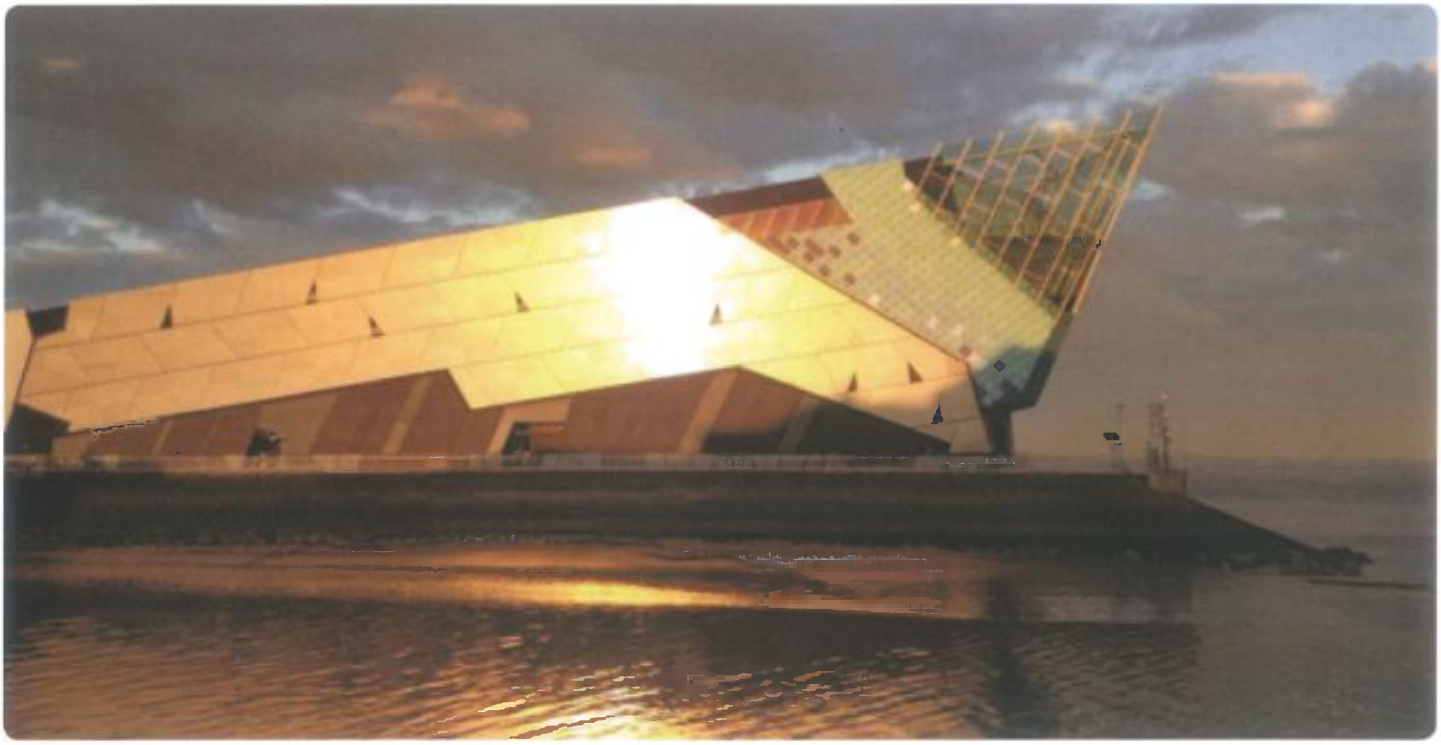
4. Boundary Issues

The Humber estuary is a multiple-use (i.e. recreation, shipping, fishing, ports, industry and environmental conservation), multiple-user resource and as such is subject to multiple pressures and is fragmented by multiple boundaries. The Dynamic Humber team is examining issues related to the delineation of boundaries in the Humber estuary, including the origin, form and function of estuarine boundaries, political, social and economic pressures on boundary delineation and conflicts and disputes arising from estuarine boundary placement. Reconciling conflicts between the environmental, social and economic utilisation and related boundaries of the Humber estuary is recognised as key for achieving integrated management of the estuary and achieving future sustainable goals in a changing climate (Baird 2005).



Future Developments

A key component of Dynamic Humber is to scientifically inform and help local communities, businesses and government to be more aware, and better prepared to adapt to, compensate and mitigate environmental change in the region. This will be achieved through the Dynamic Humber engagement plan, which will explain the current and future physical, biological and societal impacts of environmental change in the Humber estuary and East coastal margin through the project website, public exhibitions and open access briefing documents. Results from the project will be disseminated in high impact factor academic journals.



For more information on the project, including latest news, project updates and outputs visit **www.dynamic-humber.org.uk** and follow us on twitter **@Dynamic_Humber**.

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The Scottish Environment Protection Agency (SEPA)

SEPA's new lab facility, the Angus Smith Building. Source: SEPA

The Scottish Environment Protection Agency (SEPA) is Scotland's environmental regulator. Our main role is to protect and improve the environment. We aim to be an excellent environmental regulator, helping business and industry to understand their environmental responsibilities, enabling customers to comply with legislation and good practice, and to realise the many economic benefits of good environmental practice. We protect communities by regulating activities that can cause harmful pollution and by monitoring the quality of Scotland's air, land and water. The regulations we implement also cover radioactive substances.

SEPA is a non-departmental public body, accountable through Scottish Ministers to the Scottish Parliament. It has similar, though not identical, responsibilities to the Environment Agency in England. SEPA has been advising Scottish ministers, regulated businesses, industry and the public on environmental best practice for over a decade.

We protect the environment and human health through the work of our ca. 1,240 employees who cover a range of specialist areas including chemistry, ecology, environmental regulation, hydrology, engineering, quality control, planning, communications, business support and management functions. Our 22 office locations enable us to work across the whole of Scotland from the Highlands and Islands to the Borders, and our corporate office is in Stirling.

We monitor and report on the state of Scotland's environment and use that sound scientific understanding to inform our independent regulation of activities that may affect its quality. We also publish a wide range of publications and environmental reports. Many of these are available on our website (http://www.sepa.org.uk) and, along with sister agencies, we contribute to SEWeb (Scotland's Environment Web) at http://www.environment.scotland.gov.uk. We are also responsible for delivering Scotland's flood warning system, helping to implement Scotland's National Waste Strategy and controlling, with the Health and Safety Executive, the risk of major accidents at industrial sites.

SEPA has a range of staff dedicated to marine work, with additional staff working on policy and regulatory issues, particularly in relation to aquaculture. Aquaculture is a significant business in Scotland, and we have a dedicated team dealing with this sector. We employ marine ecologists, chemists, modellers and boat crew: SEPA has a several small boats and one larger survey vessel, the Sir John Murray, named after the founder of modern oceanography. Together we provide SEPA, the Scottish government, stakeholders and other customers with an integrated analytical and advisory service. We have a broad range of skills, and aim to be flexible to meet the changing demands of marine science.

SEPA's remit extends out to 3 nm. We operate a monitoring regime in our coastal and transitional waters, which covers the whole of Scotland. With approximately 12,000 km of coastline we have to be selective, and monitoring is a mixture of surveillance and operational. Much of our work comes under the Water Framework Directive (WFD) and we carry out routine (and non-routine) phytoplankton, macroalgae, fish, benthic invertebrates and, more recently, marine angiosperms (seagrass and saltmarsh) work. For the Marine Strategy Framework Directive (MSFD) we are developing capability in zooplankton sampling and analysis. This is being done in partnership with TCV (The Conservation Volunteers) through a TCV apprenticeship funded by National Heritage Lottery funding. We are investigating the use of new technologies, such as remote sensing techniques, to aid in survey work.

We work closely with other agencies in Scotland, such as Marine Scotland and Scottish Natural Heritage to ensure that expensive resources like boats are used cost-effectively, and to maximise our respective skills. We also work closely with other UK and European agencies in relation to various Directives and OSPAR (the Oslo Paris Commission).

Clare Scanlan

SEPA's Aberdeen lab/office (Inverdee House) is an energy-efficient building, shared with SNH and JNCC Source: SEPA

Survey vessel Kelpie. Source: SEPA

Survey vessel the Sir John Murray. Source: SEPA

Grab sampling from the Sir John Murray. Source: SEPA

Water sampling from the Sir John Murray. Source: SEPA

WFD macroalgae sampling in Loch Sween. Source: SEPA

Phytoplankton sampling. Source: SEPA

Fish farm sampling. Source: SEPA

Seine netting near Oban. Source: SEPA

CIR aerial photography of Montrose Basin, Aberdeenshire. Source: SEPA

WFD macroalgae sampling in Loch Sween. Source: SEPA

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Science communication in the social media age: Associations need to e-volve.

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Charitable associations, organisations and societies are increasingly identifying the benefits of using social media as a powerful way of quickly and cheaply boosting their public profiles to much wider global audiences than would previously have been perceived possible. For example, 91% of online adults worldwide now regularly use some sort of social media network (Experian Marketing Services 2012). There are a large range of social media platforms freely available online, the top five most popular include Facebook, Twitter, YouTube, LinkedIn and Flickr. In the UK alone, there are 41 million Facebook users, and more than 10 million tweeters (Arthur 2012).

Scientific associations and societies are using these social media platforms, and the audiences they provide, as a way to publicise their aims and objectives, share journal articles, post updates from conferences and meetings and circulate information about opportunities and upcoming events in the field. Most importantly however, these social media platforms are giving associations a 'voice', enabling them to communicate science more effectively with, and between both their traditional (e.g. scientists, researchers and professionals) and non-traditional audiences (e.g. the media, non-governmental organisations and the general public). In a time of increasing competition for new members, social media profiles can help associations to appear more approachable and inclusive, by revealing the faces and personalities behind professional associations' often 'detached-scientific' image. Social media also gives members a voice, making them feel more like they are actively part of an association by helping to break-down the often stilted barriers between association's council boards and their members. The public visibility and constructive, fast-paced conversations and discussions that take place through these networks may prove essential to the future growth of scientific associations, particularly as it is predicted that the increasing use of online resources (such as blogs and social media) may eventually transform and expand the culture of science as a whole (Bik and Goldstein 2013). To ensure that associations do not become left behind and redundant to the needs of their current and potential future members, it is imperative that associations marketing, communications and publications strategies are embedded within, and evolve alongside developments in social media, ensuring that they remain in-pace and integrated with how scientists and professionals in the field want to discuss and disseminate their research, views and issues.

Despite these benefits, many scientific associations are not strategically using the free tools that are available online to do this. Whilst the use of social media and cutting-edge technology is growing amongst individual scientists and researchers, their adoption and acceptance remains limited across the wider research community (Bik and Goldstein 2013). This is generally recognised as not due to a lack of desire, but rather a lack of skills, time or understanding (Miranda and Steiner 2012). However, as the benefits become more apparent, social media may soon become an integral part of a competitive association's toolkit and to an increasingly social media-savvy generation of scientists and researchers, may be the difference between joining, or not joining an association. Consequently, in today's technology-driven world, lack of an online social media presence can severely limit an association's visibility (Bik and Goldstein 2013).

With this in mind, earlier this year we, ECSA, ventured into the world of social media and we now have a presence on a number of social media platforms. Choosing the right social media platform for the target audience is extremely important. For example, our Facebook group (ECSA Students - Estuarine & Coastal Sciences Association), is specifically targeted to attract students who are studying within the estuarine and coastal sciences (Fig 1). The group has a global reach and has so far attracted around 50 members from multiple continents (including Europe, Asia, the Americas and Australia/Oceania). The group is used to discuss research, advertise studentship/employment opportunities and our inform members about forthcoming events.

Figure 1. The ECSA students facebook group.

In contrast, our LinkedIn group (Estuarine & Coastal Research Group) is designed to attract and bring together science and research professionals already working within the field (Fig 2). The group is used to advertise ECSA membership benefits, forthcoming ECSA meetings and to act as a research discussion board. The group currently has 150 members worldwide and continues to increase in popularity with new requests to join on a daily basis.

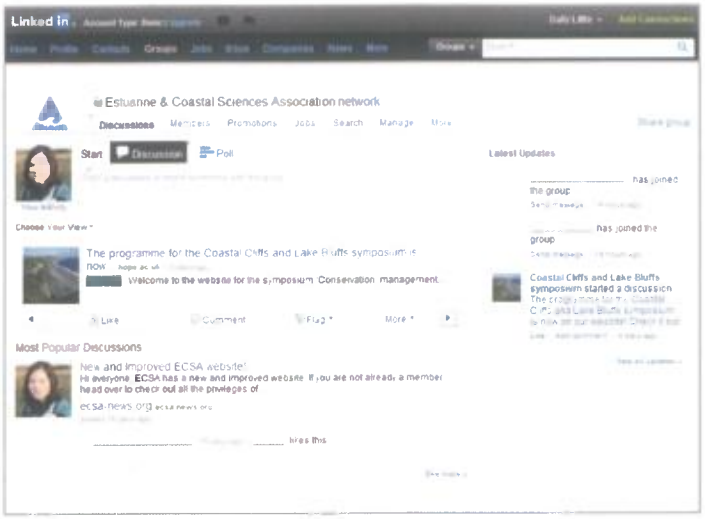

Figure 2. The ECSA LinkedIn group.

We are also on twitter (@ECSAssociation) and we have 224 followers (Fig 3). Twitter is the best social media platform with which to attract wide audience appeal from a variety of age groups and professions, with an up-to-the-minute personalised news feed which can stimulate relevant and meaningful conversations. We 'tweet' the latest news from the association, articles of interest, benefits of membership and deadlines for forthcoming events. We also tweet questions and join in discussions about estuaries and coasts.

Figure 3. The ECSA twitter page and live-feed.

A key part of the growing success and popularity of twitter for science communication is linking twitter feeds with blogs and this is rapidly becoming the new way to disseminate and discuss science and research online. With this in mind, our newest social media platform is the ECSA blog, through which our council members will write about activities undertaken through ECSA and address current issues within the field (Fig 4). ECSA members can follow the blog via email, add comments and suggest suitable blog topics.

Figure 4. The new ECSA blog.

Links to all of our social media platforms (Facebook, Twitter, LinkedIn and the blog) can be found on our website homepage (www.ecsa-news.org; Fig 5).

Figure 5. The ECSA website homepage with links to Twitter, Facebook, LinkedIn and the new ECSA blog.

Whilst the need for ECSA's presence on social media has been highlighted, it is important to note that properly managing all of the groups, pages and feeds can take up a substantial amount of time. An inactive twitter feed or facebook group can look as bad as an overactive one. Tweets and posts should be added at least once a day (where possible). As coordinator of all of ECSA's social media platforms, I spend up to three hours a week updating and participating in the ECSA feeds and groups, time which I am hopeful will be rewarded by ECSA's increasing international visibility and membership base.

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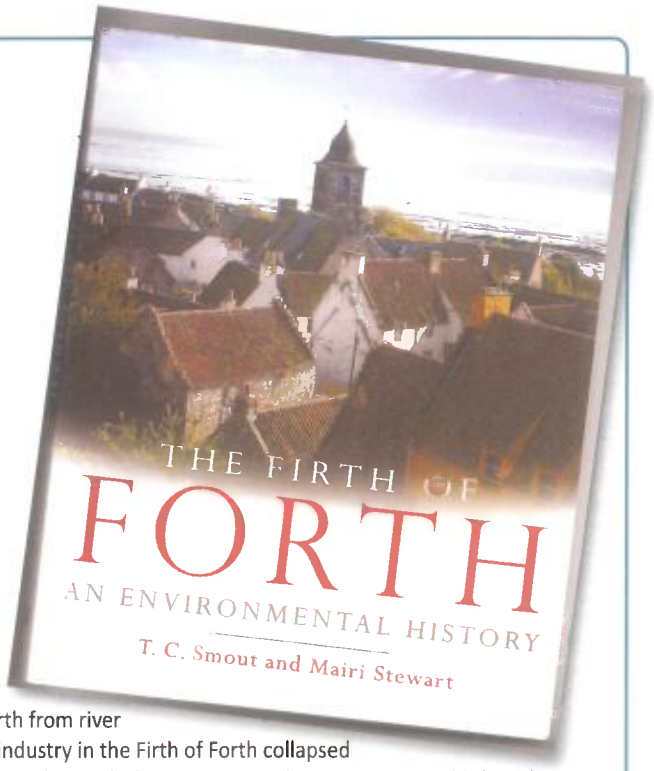


When estuarine and coastal scientists plan or review their studies they very often have to deal with a time span of 3 years, or if they can manage it of 10 years, and only in exceptional and rare cases do they have over 20 years of data. This book on the environmental history of the Forth is a timely reminder of the need to make comparisons of events occurring over decades and centuries.

In a series of well-written chapters, each of which is an essay in its own right, the authors place the environment of the Forth in a clear historical context and show how the impact of mankind over many centuries has produced the Forth as we see it today. T.C. Smout & Mairi Stewart cover the entire aquatic environment of the Forth from river to estuary to firth and attempt to examine the conundrum of how a vibrant fishing industry in the Firth of Forth collapsed never to be reborn, but that there are more fish-eating bird and mammals now living in the Forth that any time in the past. How could there be fewer fish caught, but more fish-eating birds and mammals about? The answer to this question is not simple and this book reveals the many facets of the answer.

As far as the fishing industry is concerned the chapters reveal the collapse of the fisheries was due to over-exploitation by fishermen and a failure of management and science at all levels. Fishing after 1730 was for mainly the "Lammas Drave" which was an inshore fishery for herring between July and September which targeted the spawning stock and its failure by the end of that century is attributable to both natural fluctuations as well as to the over-fishing of a comparatively small and discrete population. The winter herring stock was exploited in the 19th century through periods of boom and bust, until too failed. For oysters the failure was due to over-fishing coupled with an almost total lack of size control, so that small immature oysters were removed for restocking other oyster bed areas such as the Thames. For white fish, a sustainable line fishery was replaced by trawling and attempts to control it were thwarted by Thomas Huxley and William M'Intosh, the leading scientists of their days, who declared that the seas were inexhaustible! By the time that controls did take effect the irreparable damage had been done.

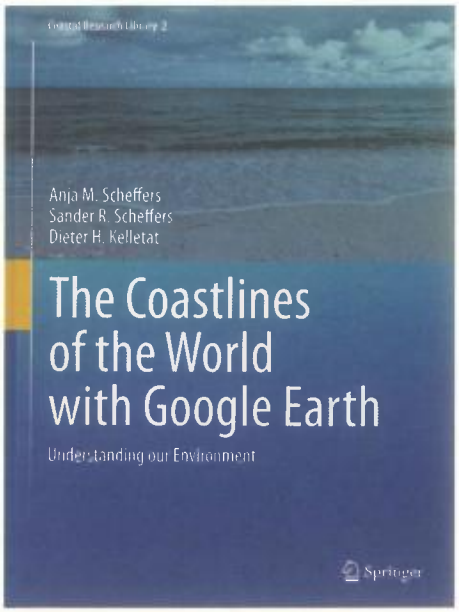
Pollution of the Forth got progressively worse from 1860 to 1960, and various attempts at control were ineffective. Only with the establishment of the Forth and Lothians River Purification Boards in 1951 did matters begin to improve, and then through subsequent legislation and control by the Scottish Environment Protection Agency much of the effects of pollution have been eliminated. Land claim on the shores of the Forth has been undertaken for centuries for reasons of agriculture, sea defence and industrial development and has removed about 50% of the intertidal habitat. Finally even this is now being reversed through re-naturing projects such as at Skinflats.

In contrast to the sorry story of man's destruction of the fisheries, the wildlife of the Forth has flourished in the 20th century. The numbers of gannets on Bass Rock has risen from 3000 pairs in 1904 to a total of 55,482 in 2009. The number of puffins on the May has risen from <100 in 1935 to 72,136 in 2002. The same is true for fulmar, cormorant, shag, gulls, kittiwake, guillemot and razorbills. The reasons seem to be a lack of persecution coupled with a growth in abundance of small fishes such as sand-eels and sprats. Whatever recent fluctuations in bird numbers have occurred they are small compared to their phenomenal growth over the past century. Equally dramatic has been the rise in numbers of grey seal from none in 1892, to 2 in 1935, to 3 in 1950, and then to around 2000 in the late 1990s. This rise appears to have been triggered by culling at the Farne Islands.

Throughout these accounts the authors maintain a clear perspective and show how a combination of natural fluctuations, growth in human population, the development of regulations (often ineffective at first, and sometimes only effective too late) plus changing social attitudes have created the Firth of Forth and its estuary as we see them today. I hope that a future edition will however be able to correct some of the "proof-reading" errors which have slipped in – most annoying to this reviewer is that the Latin name of the Norway Lobster/ Scampi is Nephrops, not nethrops!

The deleterious impact of mankind on the estuaries and coasts has occurred all over the developed world, and the present account of one study area is a timely reminder of the need to view both the harmful effects as well as the opportunities for recovery over a truly historical scale. I strongly recommend it to anyone interested in the Forth as well as to anyone trying to understand long-term changes in their own estuary or coast.

Donald McLusky



The Coastlines of the World with Google Earth

Anja M. Scheffers, Sander R. Scheffers and Dieter H. Kelletat

Volume 2 in the series "Coastal Research Library", published by Springer in 2012
293 pp, many photographs from Google Earth and other sources, index
ISSN: 2211-0577
Price: 90€

For information on the book series: http://www.springer.com/series/8795

Like me, you have probably been impressed by the enormousness of data available on Google Earth but, also disconcerted by the challenge at exploiting it scientifically. Well, Anja M. Scheffers, Sander R. Scheffers and Dieter H. Kelletat have demonstrated that Google Earth is indeed a prodigious source of scientific information.

The aim of the book series "Coastal Research Library" is to disseminate information to the coastal research community. The series focuses on topics that are of current interest and which carry some import as opposed to traditional titles which are considered esoteric and non-controversial by the series editor (Charles W. Finkl of Florida Atlantic University). Indeed, this issue on coastlines is using Google Earth photographs in an innovative way. The way the Google satellite imagery is used is attractive and demonstrates the power of these pictures of the earth seen from space. Personally, I had always felt that the wealth of information provided by satellite photographs was greatly under used. This is not the case anymore after such an interesting work has been produced. But, it is not all; the book also shows the variety of coastal systems and processes. Block diagrams, "oblique photos" (most of them by the authors) and the text make the book much more than a simple catalogue.

The book starts with a description of the World Ocean. Looking at its various characteristics (sedimentology, physics, chemistry, biology, hydrology and geomorphology) leads to classifying coastlines in an effort to characterise their dominant features, be they alive or physical (geological and geographical). After a general presentation of the various landforms, the various coastlines are described in detail in relation to ingression of the sea over the land, destruction by erosion, sediment accumulation or the role of living organisms. The book opens, at the end, on risks which threaten coastlines, in particular in relation to global change and human-made structures.

Anybody interested in coastal geomorphology, ecology or management (students, professionals, scientists...) will immediately get engrossed in the plethora of colour satellite images and their interpretation: a smart book to take with you on your holiday and take back to the office.

Jean-Paul Ducrotoy

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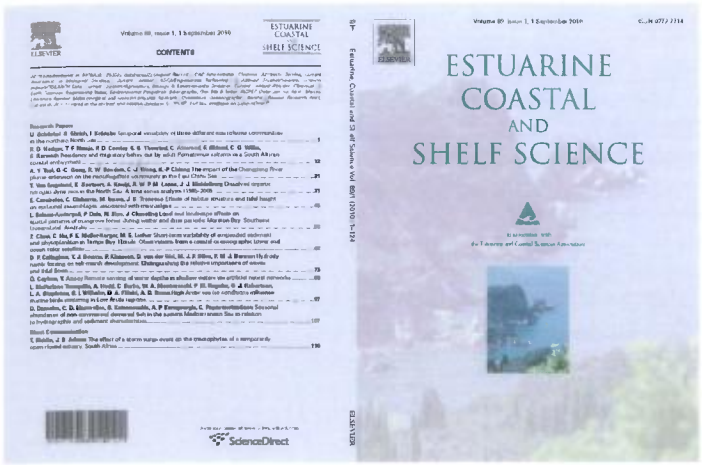

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Martin Wilkinson, ECSA Treasurer

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ECSA Bulletin

The ECSA Bulletin is produced twice a year. Material for the Bulletin must be submitted to the Editors by December 1 or June 1, for issues appearing in January and July respectively. We would be pleased to receive short articles and notices of publications and meetings. Information on change of address, and applications for membership should be sent to the Membership Treasurer and not the Editors, correspondents or publishers.

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The Estuarine and Coastal Sciences Association (ECSA) is a direct continuation of the Estuarine and Brackish Water Sciences Association (EBSA). The association was founded in 1971, and is the major European focus for the communication of research and scholarship in estuarine science. Membership is open to all who are interested in estuarine and coastal marine science, whether in Europe or further afield. The association holds local meetings, where work relevant to one specific estuary or coastal site is presented, and international symposia, where work applicable to a chosen theme of estuarine and coastal science is presented. Many of the symposia have been published. The association has caused to be published Handbooks of Methodology for estuarine studies, and Synopses of the British and European fauna, which are available to members at reduced rates. The association has an associated journal, *Estuarine and Coastal Shelf Science*, which is available at greatly reduced rates to members.
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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