Coastal Informatics:
Web Atlas Design and Implementation

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Foreword

Coasts, seas and oceans are being threatened by an unprecedented range of pressures including land-based coastal and marine pollution due to poorly managed sewage and industrial waste and agricultural run-off, fragmentation and habitat loss through unsustainable extraction practices and industrial zoning, over-exploitation of marine resources, invasive species infestations and climate change.

The impacts of these pressures have been widespread and generally adverse: over the past 50 years we have observed declines in the abundance of many high-profile, commercially important marine species, loss of genetic diversity, detected alterations in ecosystem functioning and reductions in critical habitats such as coral reefs, coastal wetlands and mangroves. Some 30% of coral reefs – which often have higher levels of biodiversity than tropical forests – have been seriously damaged through fishing, pollution, disease and coral bleaching. Some 35% of mangroves have disappeared over the past two decades and in some cases up to 80% have been lost nationally through conversion to aquaculture and storms. More than 50% of wild marine fisheries are fully exploited, with a further 25% over-exploited.

And yet, coasts are the home of 50% of the world's population whilst more than a billion people rely on fisheries as their main source of protein. In addition, the newly established evidence of a rapid acidification of our oceans starts bringing large-scale disruptions to key components of the food sources.

The damaged resilience and adaptive capacities of our coasts is informed by observations, science and continuity in information systems, such as coastal atlases. The whole point here though is that the "patient science" of relatively slow ecological and biological cycles of such complex systems can easily escape the attentions of fast public news gatherers. Let's face it: the proliferation of the www. and 24-hour news outlets, of scores of television and radio channels, and of personalized modes of receiving and delivering data and opinions has revolutionized the media through which complex science must pass to reach a multiplicity of publics. Dumbing down of much of the media and the seemingly shortening attention span of audiences is reducing the capacity to communicate complex science like that relating people to their dependency on coastal assets resources?

However, the problems arising from the new media technologies and configurations are accompanied by opportunities. For example, people with local and practical knowledge of coastal resources often experience and know about the reality of hazards well before the experts recognize them. They and citizen journalists can report on what's happening in their communities using new means of communication to get their knowledge out to wider publics in ways that were not possible just a decade ago. At the EEA we believe that if we are to tackle our environmental problems we need to move beyond conventional systems of data collection and management and adopt approaches such as the coastal web atlases described in this book. If we want to stimulate a change to the way we all live and confront natural processes it is no longer sufficient to develop passive lists or reports to "inform" citizens. Information is still too

often made available as lists of figures or spreadsheets that only experts can interpret. Imagine if all the statistics that inform our evening weather forecasts were presented in this way, or all the data that drives popular software like Google or Facebook – do you think they would continue to be as popular – and be able to draw the benefits from participation?

We believe that the current achievements and future activities in relation to coastal web atlases will provide useful operational services to a large community of practitioners and users across the world. To encourage participation we need to present our information in a way everyone can understand; the environmental monitoring and reporting systems designed in the 20th century will not be able to cope with this increasing demand for higher quality, faster access, cost efficient systems to respond to today's emerging complex issues, e.g., climate change at our coastal door-step. Producers and providers of environmental data will have to move from centralized information management towards distributed data and information systems, both at a geographical scale, from local to global, as well as thematic integration. This book shows practical examples of how that is being achieved.

The EEA therefore looks forward to ongoing cooperation in these developments towards interoperable coastal information systems. This book will be tremendously useful in this regard, especially in view of services such as the methodological outcomes and content-based information, so as to help actions in the field of coastal zone integrated assessments, including coastal zone use potentials, vulnerabilities and adaptation needs to environmental changes.

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Professor Jacqueline McGlade *became Executive Director of the European Environment Agency on June 1 2003. Prior to this she was Natural Environment Research Council Professorial Fellow in Environmental Informatics in the Mathematics Department of University College London where her main areas of research included spatial data analysis and informatics, expert systems, environmental technologies and the international politics of the environment and natural resources. Previous appointments have included Director of the UK's Centre for Coastal & Marine Sciences, Director of Theoretical Ecology at the Forschungszentrum Jülich Germany, Associate Professor at the Honda funded International Ecotchnology Research Centre, Senior Scientist in the Federal Government of Canada and in the USA, Adrian Fellow at Darwin College, Cambridge and Professorships at Warwick University and Aachen. Professor McGlade has won various prizes including the Minerva Prize, the Swedish Jubileum Award and the Brno University Gold Medal. She also has Honorary degrees from Wales (Bangor) Kent and is a Fellow of the Linnean Society and the Royal Society for the Encouragement of Arts, Manufacture & Commerce. Professor McGlade has worked extensively in North America, south-east Asia and West Africa; she has published more than 100 research papers, written popular articles, presented and appeared in many radio and television programmes, including her own BBC series The Ocean Planet and Learning from Nature and more recently Our Arctic Challenge, a film about sport and tourism in Greenland. She has given public lectures worldwide on sustainable development, conflicts over environmental impacts of industrial and natural activities, environmental technologies and the use of multimedia in developing countries. Professor McGlade was Chairman of The Earth Centre and a Board Member of the Environment Agency. She is currently a Trustee of the Natural History Museum, and a member of the Environment Advisory Committee of the European Bank for Reconstruction and Development, UK-China Forum and UK-Japan 21st Century Group. She is also Director of the software company, View the World Ltd. Recent books: Advanced Ecological Theory (Blackwell 1999); The Gulf of Guinea Large Marine Ecosystem (Elsevier 2002).*