

# The Journal of Coastal Conservation, 1995 – 2004

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**Abstract.** This paper concludes the publication of the *Journal of Coastal Conservation* from 1995-2004 after the European Coastal Union and the Publishers decided to terminate the production of the journal. We look back at the 206 research papers published in this period while concentrating on Geographical and ecological variation, Focuses and trends, and Progress in European coastal conservation and management.

Three indices are added: (1) a list of the 206 papers; (2) an Author Index; and (3) a Subject Index based on the titles, keywords and some additional important subjects found in the tables and figures.

**Keywords:** Beach; Delta; Dieback; Dune; Ecohydrology; Estuary; EUCC; Foredune; GIS; Grazing; Integrated Coastal Zone Management; Lagoon; Modeling; Recreation; Salt marsh; Seed dispersal; Stabilization.

## Introduction

Ten years ago the *Journal of Coastal Conservation* was launched by coastal scientists and practitioners, in the strong belief that EUCC, then called *European Union for Coastal Conservation*, would need, and profit from, a journal on coastal conservation research and practice for its own members. We have been involved in the journal from the very beginning, as Consulting Editor and one of the Chief Editors, respectively, and we have been in close touch ever since. Although the name of the journal pointed to conservation as a main interest, *JCC* has focused rather on 'integrated research and management of the coastal zone', as the opening Editorial makes clear. The name 'coastal conservation' was chosen in order to emphasize its status as official organ of EUCC, but 'Integrated Coastal Zone Management', then a relatively new approach, and 'sustainable use of the coastal zone', a new concept as well, were explicitly mentioned as foci of the journal.

It has been difficult to encourage coastal experts to submit manuscripts to *JCC*. Only for colleagues from the United Kingdom and The Netherlands *JCC* has been a popular journal, not only for submitting papers but also to subscribe to. For Europe as a whole the interest in

submitting and subscribing has remained below the level of our original expectation and in the end these were the decisive reasons for both editors and publishers to terminate the journal. We feel very sorry about this development.

Now *JCC* will come to an end we would like to try and summarize what the main trends in coastal research and management have been and what the journal has achieved in contributing to these trends.

In this survey we have looked at in total 206 papers published in the ten volumes of *JCC*. These are contributions where new research results or/and opinions were expressed; so we have disregarded a few reports and announcements. App. 1 lists these papers in the sequence they have been published. Ideas on trends and major results have been partly based on statistics derived from the Author Index listing all first- and co-authors involved (App. 2) and particularly the Subject Index (App. 3) which consists mainly of the important words in the titles and the keywords added to the articles.

## Geographical and ecological variation

According to the scope 'the journal focuses on the European situation, but authors from outside Europe also are invited to contribute'. This focus has indeed been established and maintained, with a majority of papers devoted to European coasts and occasional papers from elsewhere, mostly North America and South Africa. Indeed, The Netherlands with 19% and the United Kingdom with 15% are the countries which received by far the most attention. Thanks to a series of Special Features on Mediterranean coastal management – which will be discussed below – the western and central Mediterranean countries involved in these Features, particularly Spain (8%), Italy (4%), Mediterranean France (3%) and Portugal (2%) as well as the Mediterranean Sea at large (10%) are also reasonably well represented. On the other hand, the North Atlantic, Baltic, Black Sea and eastern Mediterranean regions are underrepresented.

Regarding the ecological variation, the four major

ecosystems expected to be covered by *JCC*, as indicated by the titles of the respective volumes in the series *Ecosystems of the World* (edited by David W. Goodall), are *Wet coastal ecosystems* (Vol. 1; Chapman 1977), *Dry coastal ecosystems* (Vol. 2 A-C; van der Maarel 1993a, b, 1997), *Intertidal and littoral ecosystems* (Vol. 24; Mathieson & Nienhuis 1991) and *Estuaries and enclosed seas* (Vol. 26; Ketchum 1983). These volumes, landmarks in coastal ecology, had been published before or (Vol. 2C) shortly after the start of *JCC* in 1995 and they can serve as a touchstone for an evaluation of the progress made since then.

Amongst the wet ecosystems, temperate NW European and Mediterranean salt marshes are the major systems treated in *JCC*; about 10% of all papers deal entirely or mostly with salt marshes. Mangrove systems are marginal to the journal, which is related to the journal's focus on Europe.

Intertidal and littoral ecosystems are treated in ca. 20% of the papers, and estuaries in a little over 10%, while 5% are dealing with deltas (note that the Dutch Delta region in the southwestern Netherlands is no delta at all but a complex system of estuaries).

Of the five dry coastal ecosystem types distinguished by van der Maarel (in van der Maarel 1993): coastal dunes, sea cliffs, beaches, raised reefs and skerries, dunes with 20% and beaches with ca. 18% (including 3% shingle beaches), are the most frequently appearing ecosystems, with the other systems hardly appearing at all, even though cliffs and skerries are important European systems. Most cliffs are relatively free from direct threats because they are generally inaccessible, which may explain that they are not often treated in a conservation or management context. Nevertheless, several European regions with maritime rocks and cliffs suffer from human impact, particularly recreation – including hunting – and this seems to be particularly the case for the probably most important region of all, the northern Adriatic coast of Croatia, with giant cliffs, gorges and caves (Lovrić in van der Maarel 1993).

## Focuses and trends

### *Research, conservation and management issues*

Papers published in *JCC* have varied much regarding their focus. At one side we have reports from natural scientists, particularly ecologists and geomorphologists, on fundamental research with an applied character. This sort of paper matches articles in journals such as the *Journal of Applied Ecology* and *Applied Vegetation Science*. Throughout the journal's existence manuscripts of a more purely ecological (or more seldom geomorpho-

logical) character have been submitted. Although most of these papers have been rejected or became thoroughly revised in a more applied direction, a few published papers remained rather little concerned with conservation and management. However, the vast majority of natural science papers have a clear applied character. Examples here are studies of vegetation and soil in permanent plots in dunes (e.g. Vestergaard & Alstrup 2001, paper 136) or salt marshes (e.g. van Wijnen et al. 1997, paper 35) in order to understand the natural or human-induced causes of long-term changes observed). Geomorphological examples are studies of the sediment accretion rates in the Ebre Delta (Ibáñez et al. 1997, paper 55) and the hydrogeology of a Scottish dune system (Soulsby et al. 1997, paper 51).

A small group of papers deals with the protection of the coast. Here beach nourishment is an important management tool, e.g. Hillen & Roelse (1995, paper 2). Typically environmental issues – which were not specifically included in the scope of the journal – are treated as well, for instance the study on plastic degradation by Williams & Simmons (1996, paper 22), and the study of the self-purification of Baltic coastal waters (Schiewer & Schernewski 2004, paper 192).

At the other end of the spectrum we find sociological studies, for instance on visitor counting (Beunen et al. 2004, paper 201), and contributions on planning, for instance of the coastal region of Zeeland (Colijn & Binnendijk 1998, paper 74).

The vast majority of contributions deal with conservation (more than 20%) and particularly management issues (more than 50%). In addition to the above-mentioned papers with a natural science basis, many management-oriented papers are of a methodological and/or theoretical nature. They often centre around relatively new terms such as vulnerability, evaluation, prediction and decision making. They usually present and discuss flow diagrams of steps to be taken. They are often conceived in a regional or national context. In retrospect such papers do not add much to similar studies known from the 1970s and 1980s (e.g. Westman 1985). We find such contributions in almost every issue. Their common fate is that they are largely disregarded by later authors. The first of us can testify this with similar contributions of his own, one of which (van der Maarel 1979) even dealt with coastal dunes in considerable detail. And even a paper on dune management we wrote together (van der Meulen & van der Maarel 1989), which contained a straightforward suggestion to change the management boundaries from those given by the complex land owner structure to lines following the natural dune zonation, remained unnoticed.

An important group of papers deal with formalized methods, particularly models. These are partly adopted

and adapted from other disciplines and developed for specific coastal problems. We find their application over the entire range of coastal disciplines as well as in multidisciplinary approaches. A useful geomorphological model is the digital terrain model which can be used to simulate aeolian dune-building processes (e.g. van der Wal 1996, paper 21; Arens 1997, paper 40). This model was also used to predict sediment yield and distribution off the Holderness Coast in NE England in relation to the serious erosion of the local cliffs and foreshore (Newsham et al. 2002, paper 149).

Models for the response of plant species along environmental gradients – or time axes – such as the well-known HOF model (Huisman et al. 1993) are used in some papers on succession in dunes and salt marsh (e.g. van Wijnen et al. 1997, paper 35).

Vegetation ecological models to simulate large-scale changes in vegetation related to climate change (e.g. van der Meulen et al. 1991 for coastal dunes), which usually focus on forest change (e.g. Steffen et al. 1996) have not yet been applied to coastal vegetation. However, models to predict the response of coastal ecosystems to sea level rise are available elsewhere (e.g. Noest et al. 1995). Sea level rise is an actual theme in *JCC*, even if only simple models are used. Finally, the important matter of choosing the appropriate space and time scales the model should relate to, is well known to coastal researchers, as demonstrated in the paper by Capobianco et al. (1998, paper 58).

Another important development is that of remote sensing techniques. Repeated sensing and digital treatment of the pictures obtained is an excellent method for detecting changes in land and land use patterns. The classical study of dune vegetation development over 50 years on the basis of comparison of traditional air photographs (van Dorp et al. 1985) was followed by all kinds of sequential analysis, several of which reported in *JCC* and often with series of coloured maps. For instance, a similar comparison of aerial photographs combined with vegetation analyses was used to reconstruct a primary succession on a beach plain which became interrupted by a heavy storm (van der Veen et al. 1997, paper 43). Sequential aerial photographs were also used in a study of the retreat of dune slacks in a dune system in South Wales (Shanmugam & Barnsley 2002, paper 151).

Applications are also known from aquatic systems, for instance on the distribution of *Posidonia oceanica* beds off the east coast of Corsica (Pasqualini et al. 1998, paper 64), lagoon development studied through comparison of Landsat images (Brivio & Zilioli 1996, paper 18) and the tracing of coastal plumes and run-off in the Mediterranean Sea based on Coastal zone colour scanning (Barale & Larkin 1998, paper 63).

Finally, the use of bio-indicators, organisms to indi-

cate the condition of the environment, and particularly changes therein, a technique known since the 1970s (e.g. Westman 1985), is also applied to coastal systems, especially in aquatic systems. Mzoughi et al. (2002, paper 161) describe how mercury contaminations can be detected in the tissues of mussels (*Mytilus galloprovincialis*) and Casazza et al. (2002, paper 162) give an overview of the use of bio-indicators in the marine environment (of the Mediterranean).

### *Special Features*

From Volume 2 onwards Special Features have been published. Special Features are formed by collections of papers presented at international symposia and workshops or based on such presentations. They either filled an entire issue or made up the major part of it. As a coincidence, we published ten Special Features in the ten volumes of *JCC*, meaning one per year on average. They indicate at least two aspects of coastal conservation research and practice, (1) the actuality of topics, and (2) the ambition to approach these issues from different angles.

The themes were as follows:

- *Estuaries and coastal waters: Research and management*, based on contributions presented at an international symposium in Dublin, edited by M.J. Costello, K.S. Kelly, J.G. Wilson & C.S. Emblow (Issue 2-2, papers 24-33);
- *Ecology and restoration perspectives of soft coastal ecosystems*, based on contributions presented at the 5th conference of EUCC in Swansea, edited by A.P. Grootjans, P. Jones, F. van der Meulen & R. Paskoff (Issue 3-1, papers 34-48);
- *Estuaries and coastal waters: Research and management*, based on contributions presented at the 2nd MEDCOAST 95 conference in Tarragona, edited by E. Özhan (Issue 4-1, papers 57-61);
- *Coastal dynamic lowlands – The role of water in the development of The Netherlands: past, present, future*, based on contributions presented at the 28th International Geographical Congress in The Hague, edited by J. Visser & R. Misdorp (Issue 4-2, papers 70-77);
- *Integrated coastal management*, based on contributions presented at the transdisciplinary Euroconference on Coastal management research in San Feliu de Guixols, edited by J. Dronkers (Issue 5-2, papers 90-101);
- *Aspects of coastal zone management in the Mediterranean and Black Seas*, based on contributions presented at the third MEDCOAST conference in Malta, edited by A.T. Williams & A. Micallef (Issue 6-1, papers 102-111);

- *The data-into-information pathway for coastal studies*, edited by D.R. Green & S.D. King (Issue 8-1, papers 144-153);
- *Ecological research for integrated coastal zone management*, based on contributions presented at the 5th MEDCOAST conference in Hammamet, edited by C. Pergent-Martini, G. Pergent & E. van der Maarel (Issue 8-2, papers 156-164);
- *Towards integrated coastal zone management, with a special emphasis on the Mediterranean Sea*, from the same MEDCOAST conference, edited by A.S. Micallef, A.T. Williams & M. Cassar (Issue 9-1, papers 168-180);
- *Coastal management: Issues and tools*, based on contributions presented at the 6th MEDCOAST conference held in Porto, edited by F. Taveira Pinto & E. van der Maarel (Vol. 10, papers 189-198).

Clearly, the majority of these Special Features deal with integrated management and it is also obvious that Mediterranean colleagues have been very active in organizing such series of papers. As a result the contents of *JCC* form a fair balance between the two major European regions where coastal research is carried out, NW Europe and the Mediterranean.

### Progress in European coastal conservation and management research

A European overview of characteristics and management of coastal dunes, the main object of coastal research, was presented by Arens et al. (2001). *JCC* has paid special attention to the following items.

#### *Blowouts in dunes*

One of the more interesting developments in coastal dune geomorphology is the further confirmation of findings from the 1980s (e.g. van der Meulen & Jungerius 1989) that dune stabilization in broad dune systems with local formation of parabolic dunes is not necessary to prevent the formation of large-scale blowouts. Local blowouts always remain of a limited extension and their formation contributes to the landscape diversity of a dune system (e.g. van Boxel et al. 1997, paper 41).

#### *Dieback of *Ammophila arenaria**

A typical achievement in the field of soil biology has been the further unravelling of the process of dieback of *Ammophila arenaria* in the yellow dunes, where soil invertebrates suppress early successional species and thereby enhance later-successional species. This work of W. van der Putten and associates has been partly reported in *JCC* (de Rooij-van der Goes et al. 1997, paper 50; see Kuyper & de Goede 2005 for a review) has further stimulated the idea of rejuvenation of stabilized dunes.

#### *Ecohydrology of dune slacks*

This relatively new ecological branch includes the study of the flow and chemistry of groundwater and the significance for the distribution of wetland plants. Of special interest is the circulation of calcium and the response of calciphilous species, many of which are rare and vulnerable. Through the work of A.P. Grootjans and colleagues we now much better understand the position of such species, e.g. *Schoenus nigricans* in dune slacks as well as the effect of mowing and sod cutting (e.g. Sival et al. 1997, paper 44) and the importance of maintaining low levels of nitrogen and phosphorus (Lammerts & Grootjans 1997, paper 45).

#### *Grazing*

A much debated but still insufficiently analysed piece of management in dunes is the introduction of large herbivores in order to open up the rapid encroachment of vegetation as a result of succession and eutrophication, particularly through atmospheric deposition. One obvious aspect is that dune grassland is kept open and that grass encroachment is counteracted, as was also made clear in *JCC* (e.g. Kooijman & de Haan 1995, paper 12, for Dutch dunes; Provoost et al. 2004, paper 193, for Flemish grey dunes). A study of a dune vegetation mosaic with scrubland and woodland showed that already after five years of introduced grazing by horses and cattle the surface area covered by tall shrubs and trees had diminished (de Bonte et al. 1999, paper 87). From various other ecological viewpoints extensive grazing would be an optimal solution, as was also indicated by Bonte et al. (2000, paper 118) referring to the diversity of spider communities.

Grazing on salt marshes is a hardly disputed management tool because wild grazing (for instance by geese) has always occurred while domestic grazing has taken place since hundreds of years. Bakker (see Bakker 2005) summarized recent research in this field. One interesting research result is that grazing by livestock improves the feeding conditions for geese on the high salt marsh (van der Graaf et al. 2002, paper 166). Kleyer et al. (2003, paper 183), who followed the succession on a German salt marsh where different grazing intensities had been introduced, found that cattle grazing at intermediate stocking rates were optimal for plant diversity conservation, with the balance between halophytes and glycophytes dependent on the groundwater table. A different result is the retarding influence of small herbivores, notably hare, on salt marsh succession (Kuijper & Bakker 2003, paper 188).

#### *Seed dispersal*

Seed dispersal, particularly by herbivores, recently reviewed by Poschlod et al. (2005) has been recognized

as a major way of re-introducing plant species in nature areas under restoration. J.P. Bakker and colleagues (see Bakker 2005) have introduced mowing and grazing schemes adapted for an optimal seed availability in grassland and heathland reserves. A first paper on this topic in *JCC* is concerned with seed dispersal in a South African dune system with thickets where both exo- and endozoochory are important for the dispersal of characteristic dune species (Castley et al. 2001a, b, papers 130 and 131).

#### *Recreation*

It remains a matter of discussion whether the scenic quality of a recreation area can be described, but there are attempts to 'quantify qualities', for instance the video panorama assessment of beach landscape aesthetics through rating by groups of coastal managers and students of standard series of photographs of beaches as described by Morgan & Williams (1999, paper 82).

#### *Integrated coastal zone management*

Multidisciplinary approaches to the management of coastal systems have been proposed since the 1970s (e.g. van der Maarel 1979; Mörzer Bruyns & Wolff 1983) and *JCC* has supported developments towards what is now generally called Integrated coastal zone management, ICZM. As Dronkers & de Vries (1999, paper 90) in their introduction to the Special Feature on Integrated coastal management made clear, the ideal development would be transdisciplinary, meaning that coastal management is not just simultaneously approached by experts from different disciplines, but that these experts co-operate and incorporate elements of each other's scientific approach in their own field. They suggest a triangular model  $\delta$ , where the traditional  $\alpha$ ,  $\beta$  and  $\gamma$  sciences are integrated. This transdisciplinary cooperation can be seen as horizontal integration. In addition the different governmental levels, from (inter)national to local, should cooperate: vertical integration.

As Green & Penning-Rowsell (1999, paper 98) in the same Feature explain, management includes decision-making on conflicts which inevitably arise when the different stakeholders, participating in the integrated management put forward conflicting planning and management options (see also Otter & Capobianco 2000, paper 105). De Ruyck et al. (2001, paper 137) elucidated for the Belgian coastal dunes how different stakeholders can disagree on the importance of different management options and also how the lack of integration of the (often too many) responsible public authorities and organizations hinders ICZM. Hastings & Fischer (2001, paper 143) described a similar conflict situation regarding the management of Magdalena Bay, southern Baja California and point to the necessary first step in

resolving conflicts, the listing of management priorities. Rockloff & Lockie (2004, paper 198) approach such conflicts through what they call stakeholder analysis. Finally, Cassar (2003, paper 178) reports on the apparently successful integration of habitat rehabilitation, preservation of ecological and landscape values, regulation of recreation and education in two Maltese coastal areas where the management responsibility is given to a foundation. In a related paper Micallef & Williams (2003, paper 185) apply the technique of Function Analysis (which appears to originate in the functional approach of van der Maarel, e.g. 1979) to the compatibility of natural and socio-economic values of Maltese bathing areas.

#### **Epilogue**

Research and management are indispensable for the future quality of the coastal environment. But they should be dynamic and flexible, just as the coast itself.

The ten years of the *Journal of Coastal Conservation* have contributed to the development of science for management of the coastal zone and its inhabitants. They reflect trends that have shaped those years. Sometimes environments have drastically changed and behaviour of the managers too. What was cause and what effect?

We cannot measure to what degree *JCC* has helped to bridge the gap between science and management but on the basis of our own experience we believe it has.

Nowadays, important questions in dune management are about the increasing pressure of recreation. And about the acceptance by the general public of why and how managers manage coastal environments the way they do. This is especially the case in densely populated European countries, where more and more people have leisure time and enough money to spend in environments which are believed to be theirs. Managers have to explain about the costs and the benefits of management, and stakeholders are consulted in choices that are being made (e.g. van der Meulen et al. 2004).

The coastal environment is of outstanding beauty. Much of that can be easily destroyed. May coastal research and management develop together in synergy, in order to care for the restoration and proper development of the coastal zone, and to raise the quality of life of so many coastal people.

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**App. 1.** List of papers which appeared in the *Journal of Coastal Conservation*, Volumes 1-10.

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