

Editorial: Understanding change in the ecological character of internationally important wetlands

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The origins of the Ramsar Convention on Wetlands lie in the increasing concern expressed during the 1960s over the rapid drainage, conversion and degradation of wetlands, particularly in Europe and North America, and its impacts on wetland biodiversity, specifically migratory waterbirds (Matthews 1993), as the full legal title of the Convention ('Convention on Wetlands of International Importance especially as Waterfowl Habitat') conveys.

Those pioneering waterbird scientists who championed the call for an international agreement between governments to address this pressing issue were remarkably far-sighted and inspirational in their vision of what was needed, and helped craft a Convention text that has stood the test of time. The Convention text not only recognises the need to conserve wetlands for the biodiversity that depends upon them. Very importantly (and way ahead of its time), it also recognises the 'interdependence of Man and his environment', and that 'wetlands constitute a resource of great economic, cultural, scientific, and recreational value, the loss of which would be irreparable' – a resource whose importance has only become more widely recognised in the last 10 years, and which we nowadays call 'ecosystem services' (MA 2003).

After years of negotiation and discussion, that Convention text was agreed and signed in the city of Ramsar, Iran, in February 1971, making the Ramsar Convention the first of the modern global intergovernmental environmental agreements (Matthews 1993; Gardner and Davidson 2011).

In the adopted Convention text, the Convention's Contracting Parties (member governments) expressed their desire to 'stem the loss and degradation of wetlands now and in the future' – something that has proved to be a very challenging desire over the past 45 years since its adoption, given that recent evidence indicates that wetlands are continuing to be destroyed, and in some regions faster than ever (Davidson 2014), with ~30% of the area of wetlands that existed in 1970 now lost (Dixon *et al.* 2016).

At the heart of the Convention is the commitment of Contracting Parties to the 'wise use' of all wetlands, with the mechanism to achieve wise use of wetlands being the maintenance of their 'ecological character' by all concerned. Originally, ecological character maintenance was a commitment specifically focussed on Wetlands of International Importance (Ramsar Sites) designated by Contracting Parties, but since 2005 this undertaking has been recognised as applying equally to all wetlands, whether Ramsar Sites or not (Ramsar Convention 2005; Pittock *et al.* 2010).

The Convention describes ecological character as 'the combination of the ecosystem components, processes and benefits/services that characterise the wetland at a given point in time' (Ramsar Convention 2005). From an ecological perspective it is implicit in that description that all wetlands do for one or other reason change their character over time, whether that change is through 'natural' vegetational succession, change in climatic conditions or through the (often damaging) actions of people. However, there is a strong sense from the way in which some parts of the Convention text were worded almost half a century ago, and subsequently in many adopted decisions, that the thinking at that time was to manage wetlands to maintain a stasis of their ecological character, often at that time, for the primary purpose of wetland species conservation.

Since 1971 the Convention has adopted a considerable body of scientific and technical advice and guidance on wise use and ecological character maintenance (Ramsar Convention Secretariat 2010a; b), prepared at the request of Contracting Parties by the Convention's subsidiary body, the Scientific and Technical Review Panel (STRP). However, there remain some significant gaps in the available guidance, and this has led to confusion and ambiguity concerning what ecological character to maintain for a wetland, a problem often compounded by a lack of knowledge of the extent of short- and longer-term variability in the character of a wetland.

For example, when a wetland is designated as a Ramsar Site the designation requires an Information Sheet on Ramsar Wetlands to be completed, which includes a description of the site's ecological character at the time of the designation (or rather, given the administrative processes concerned, at some time before the designation is completed). This requirement is simply a description of the character at that time and no more than that, not least because the precise date of designation of a Ramsar Site is largely politically and administratively (not ecologically) determined. That ecological character description is intended to help inform management planning, but may not necessarily be the ecological character that must be the objective of management planning implementation.

However, some Parties seem to have interpreted this requirement as being the ecological character to maintain for all time, through management. This is erroneous, not least since a Ramsar Site is not required to be pristine at the time of its designation, so maintaining such a wetland degraded by, for example, pollution in its polluted state would be a nonsense. The decision by the

Contracting Parties that confirmed the need to submit a description of the ecological character of a Ramsar site also makes it very clear that the description can be adjusted as new information becomes available or if the site is changed as a consequence of management interventions or 'natural' (e.g. vegetation succession) change. The impacts of the changing climate on ecological character add a further layer of complexity to assessing and reporting such changes.

Since all wetlands are in some way or another affected by humans, what type of place it should be is also a matter of societal choice. A chosen baseline for management purposes is thus often a reference condition for a time in the past when the wetland is perceived to have been more 'natural'. However, all too often there is very limited, or no, knowledge of the character of the wetland and how it has changed over longer periods than a few years, or at most a human generation. In part this is because people forget, or do not pass on their knowledge to the next generation (MacKinnon 2013), and in part because researchers and managers too often have a penchant to (incorrectly) regard old data as out-of-date and irrelevant. This is where the great value of the palaeoecological record comes into play – a source of incredibly valuable information long recognised by the archaeological community but much less by the wetland management community (Finlayson *et al.* 2016). As the case study examples in this important collection of papers in this Special Issue amply demonstrate, palaeoecology can reveal some big surprises about the very different past character of wetlands over different time-frames (Gell and Finlayson 2016) (see also MacKinnon 2013).

Ramsar's STRP has always worked through engagement with external networks of wetland experts to bring in the best available expertise to prepare its advice and guidance for Contracting Parties. Recognition of the potential of the palaeoecological record to provide better understanding of past wetland ecological character, and trajectories of such changes, led members of the STRP and the Ramsar Secretariat to jointly organise the 2013 workshop (held in Queenscliff, Australia) with the International Geosphere–Biosphere Programme's (IGBP) Past Global Changes (PAGES) network. This was probably the first occasion on which wetland management practitioners and palaeoecological experts sat together to review and discuss the value and relevance for the two communities of working more closely together.

The 2013 workshop's key recommendations that (1) understanding past and present trajectories of ecological change as the basis for future wetland management planning is a more relevant approach in a rapidly changing world than setting management objectives for a past baseline state; and (2) provision of guidance for wetland managers on the relevance and importance of the appropriate use of palaeoecology in their management planning and preparation of ecological character descriptions would be valuable support to achieving the Ramsar Convention's wise use of all wetlands (Gell *et al.* 2016), are important and should be taken up through Ramsar processes.

The Ramsar Convention has always sought a strong science-base to support its policy and implementation. However, despite the value of guidance on these ecological character issues for supporting improved implementation of the Convention, bringing such complex science into Convention processes is increasingly challenging. Although the Convention has continued to grow (e.g. in terms of the number of its Contracting Parties and designated Ramsar Sites), its technical capacity to support Parties' implementation has been relatively diminishing, both in terms of scientific and technical resources and in the political will of its Parties to adopt policy decisions based on sound science, for example on issues of wetlands and climate change.

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