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PARYS DECLARATION

on the

IMPORTANCE OF WETLANDS IN DRYLANDS

December 2014

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Preamble

Approximately half of the global land surface is covered by hyper-arid, arid, semi-arid and sub-humid regions, collectively termed 'drylands'. These regions are characterised by net annual water deficits resulting from an excess of evapotranspiration over precipitation, and many are subject to high interannual variability. As permanent or temporary surface water resources, the numerous lakes, rivers and wetlands are critical features of these otherwise dry regions. In particular, wetlands in drylands – which may incorporate features as diverse as floodplains, marshes, swamps, pans, playas and oases – form 'hotspots' of ecosystem services. Ecosystem services are defined as the benefits that people obtain from ecosystems. In wetlands in drylands, ecosystem services may include:

- Forming habitat for a diversity of plant and animal species;
- Providing a dependable resource base (e.g. water, foods, medicinal plants and building materials) in otherwise dry and climatically-variable environments. For some dryland communities, wetlands are the *only* resource base;
- Regulating the source-to-sink dispersal of water and constituent matter, including nutrients and contaminants;
- Mediating fluxes of biogeochemically-reactive elements such as carbon, nitrogen, and phosphorous that play a role in key Earth system cycles. Many of these fluxes integrate geological, hydrological, ecological and atmospheric processes from local to global scales;
- Enhancing human culture, particularly through facilitating aesthetic, spiritual, educational and recreational opportunities.

These ecosystem services are fundamentally important yet critically threatened, especially in the context of projected future changes to dryland climates (typically warming, drying, and/or greater variability), land use, and population. A workshop was held near Parys, South Africa, from 9th-12th November 2014, to provide a scientific forum to advance understanding of ecosystem services in wetlands in drylands in the past, present and future. The workshop was administered by the Royal Society and jointly funded by the Department for Business Innovation and Skills (UK) and the National Research Foundation (South Africa). The workshop was attended by 17 scientists, representing 11 universities in South Africa and overseas.

Declaration

Drawing inspiration from similar initiatives¹, the participants of the Parys workshop on *"Wetlands in Drylands: Past, Present and Future Trends in Ecosystem Service Provision"* declare the following:

Current Challenges

- Wetlands occupy transitions between fully terrestrial and fully aquatic environments, and thus exemplify in microcosm the complex interactions between the atmosphere, geosphere, hydrosphere and biosphere that characterise the Earth system. As part of living and working landscapes, wetlands also are coupled with human systems, thus interfacing with social, political, and economic spheres. Consequently, comprehensive study of ecosystem services in wetlands in drylands demands approaches that draw on many different academic and non-academic perspectives.
- Threats to, and impacts on, ecosystem services in wetlands in drylands are increasing from site to catchment scales as a consequence of human activities (especially agriculture, mining, and water abstraction) and environmental variability and change (especially related to climate and hydrology). To support management of wetlands in drylands and their sustainable use, there is a need for enhanced interest and engagement in pure and applied scientific research.

- Various local, regional, national or global policies and legislations supporting wetland conservation and sustainable use exist, but these do not extend to some important wetlands in drylands and/or are poorly implemented. New holistic, integrative analyses of ecosystem services in wetlands in drylands are needed to promote and support policy implementation and to sustain the provision of benefits to society.

Future Needs

- Expansion of an international forum to facilitate wide ranging, informed discussion of key issues related to the science and management of wetlands in drylands and their ecosystem services.
- Sharing and exchange of field, laboratory, remotely-sensed or computational data, as derived using rigorous methods (both qualitative and quantitative) that are based on an innovative mix of established standards and, where opportune, new techniques.
- Holistic analyses of past, present and possible future ecosystem services in wetlands in drylands. For instance, studies of past wetland dynamics and their importance to human evolutionary and cultural development can improve societal appreciation of wetland values, provide context for present management challenges, and help to anticipate, manage, and plan for future changes to ecosystem services in wetlands in drylands.
- Promotion of policy, legislative and management approaches that integrate wetland protection, sustainable use, rehabilitation/restoration and artificial construction with 'source-to-sink' catchment management approaches.
- Assessment of trends in wetland geomorphological, hydrological, and ecological dynamics to develop and test strategies for climate change adaptation and mitigation. Wetlands in drylands and their ecosystem services may form a key part of developing society's resilience to climate, land use and population changes.

Action Plan

State-of-the-science position paper on "Wetlands in Drylands: Past Trends, Present Condition and Future Priorities in Ecosystem Service Provision". Based on the workshop discussions and further collaborative review, participants will publish a position paper that identifies and promotes the research required to delineate and close knowledge gaps on wetlands in drylands and their ecosystem services.

Global assessment of the status and trends in wetlands in drylands ecosystem services. Ongoing analyses will document the changes occurring in wetlands in drylands, highlight existing data and knowledge gaps, promote sustainable use, forecast potential threats, and assess their role in climate change adaptation/mitigation strategies.

Future meetings on wetlands in drylands. A workshop on wetlands in drylands will be held every three to five years, with the aim of expanding and disseminating scientific knowledge on wetland origins, dynamics, values, status and threats. This will contribute to the growth of the "Wetlands in Drylands Research Network", extending coverage beyond southern Africa to other drylands in Africa, Australia, the Americas, Asia and Europe.

Moving Ahead

The proposed actions will be implemented in the years 2015-2017 so that during the next wetlands in drylands workshop (to be held in 2017), ongoing activities can be evaluated and further initiatives planned. This will include establishing and strengthening links with other organisations involved in wetland and dryland science and management, and engaging in education and outreach initiatives.

The Parys Declaration recommends that a collaborative international initiative involving scientists and practitioners is required to promote holistic scientific analysis and sustainable management of wetlands in drylands, and their surrounding hydrological, geomorphological, ecological, and social landscapes, in order to emphasise the benefits these systems bring to humanity.

¹The "Vienna Declaration on the Status and Future of the World's Large Rivers" (13th April 2011) recognised that human pressures and environmental change are impacting negatively on the many benefits to humankind provided by large rivers, some of which are associated with wetlands in drylands. The Parys Declaration on the Importance of Wetlands in Drylands draws on this initiative in concept and style.