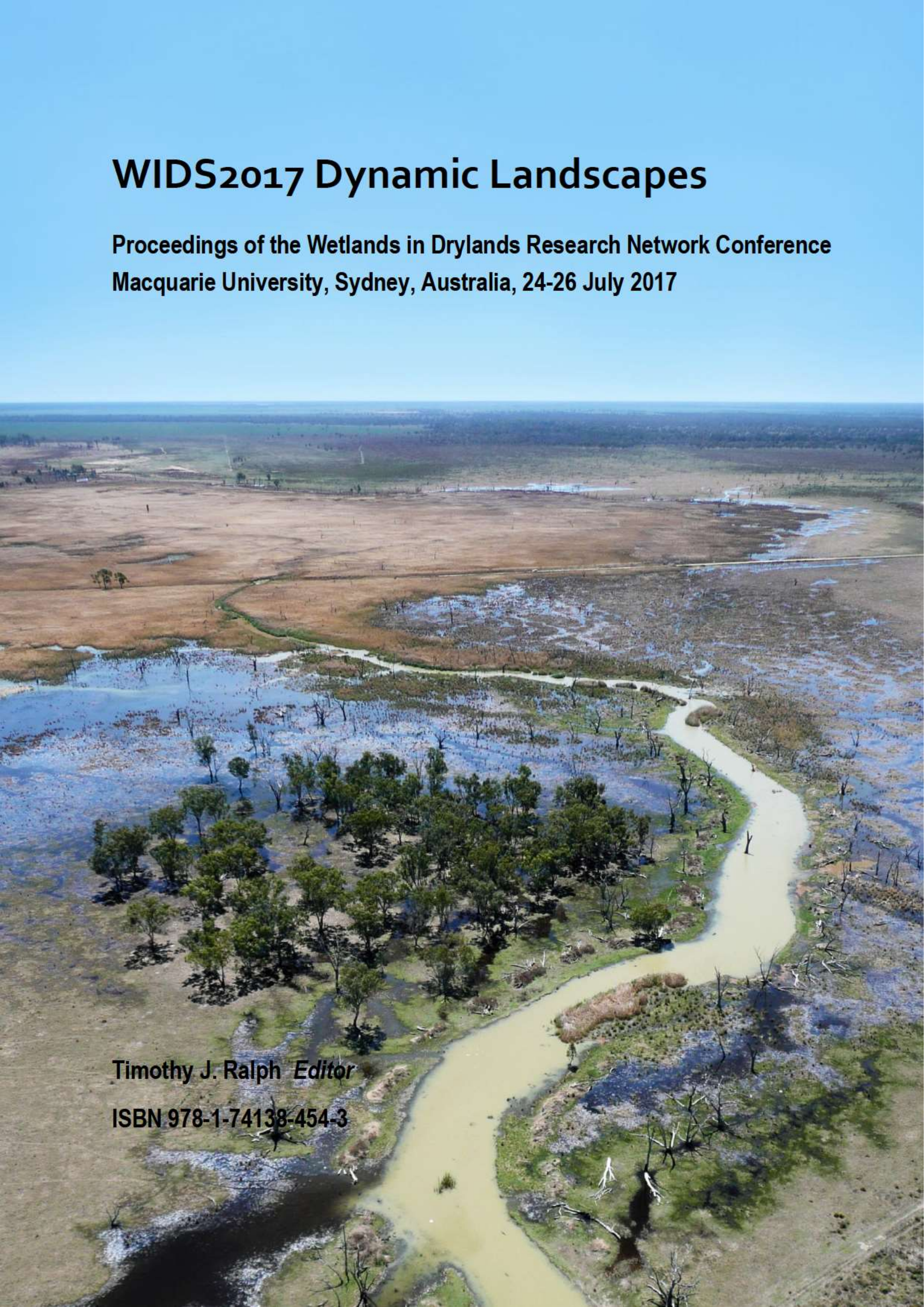

WIDS2017 Dynamic Landscapes

Proceedings of the Wetlands in Drylands Research Network Conference
Macquarie University, Sydney, Australia, 24-26 July 2017

Timothy J. Ralph ***Editor***

ISBN 978-1-74138-454-3

Historical channel change in the Okavango Panhandle, Botswana

Zacchary T. Larkin[1], Timothy J. Ralph[1], Stephen Tooth[2], Kirstie A. Fryirs[1] and Terence McCarthy[3]

[1]Department of Environmental Sciences, Macquarie University, NSW 2109, Australia. Email zacchary.larkin@hdr.mq.edu.au; tim.ralph@mq.edu.au; kirstie.fryirs@mq.edu.au
[2]Department of Geography and Earth Sciences, Aberystwyth University, Aberystwyth, United Kingdom. Email set@aber.ac.uk
[3]School of Geosciences, University of the Witwatersrand, Johannesburg, South Africa. Email terence.mccarthy@wits.ac.za

The Okavango Delta in northern Botswana is characterised by ongoing morphological, hydrological, and ecological adjustment and change over seasonal, interannual, and longer timescales. Understanding the natural, historical range of variability in the Okavango is critically important for implementing successful management strategies. The Okavango Panhandle is a ~10 km-wide entry corridor of permanent swamps with a meandering trunk channel that is anabranching in some reaches. By using historical aerial photographs for detailed geomorphological mapping and morphological analysis of channel variables, we investigated the types and rates of change occurring in the anastomosing channels of the Okavango Panhandle. Throughout the second half of the 20th century the main Okavango channel has been progressively losing water to the Filipo channel to the east. Vegetation encroachment into the failing Okavango channel has reduced the channel width from ~40-50 m to ~20 m, whilst the Filipo channel has either remained stable or increased in channel width up to ~55 m. Changes to the water balance between channels is largely manifest in channel width changes, and there is no evidence of discernible lateral channel migration along any of the channels investigated. Given low historical rates of channel migration, meander belts likely take decades to centuries to develop, but given the current rate of vegetation encroachment along the Okavango River, we estimate that the failing Okavango channel may be blocked in various sections and essentially abandoned in the near future. Our findings have implications for the community of Sepopa and local tourism lodges that rely on the failing Okavango channel for water and transport.

Some thoughts on the biogeochemical dynamics of wetlands in drylands (WIDS)

Terence McCarthy and Marc Humphries

University of the Witwatersrand, Johannesburg, South Africa. Email terence.mccarthy@wits.ac.za; marc.humphries@wits.ac.za

WIDS generally occur in regions where rainfall<PET, which usually results in a negative water balance. On the other hand, wetland mass balance, which excludes water and considers only particulate and dissolved solids, and solids derived from gases (CO_2 and N_2), can be positive or negative, reflecting net aggradation or degradation respectively. Particulate solids are introduced into WIDS as aerosols (dust) or by fluvial transport. Dust may form an important source of nutrients in some wetlands. It is uniformly deposited over permanently wet areas, but accumulation can become localized, especially in seasonally inundated wetlands, contributing to wetland micro-topography. The total quantity and grain size of fluvial sediment (bedload/suspended load ratio), as well as stream power, influence the character of distributary channel systems in wetlands. The geohydrological structure of WIDS plays an important role in the manner in which physical and biogeochemical processes are expressed. Biogeochemical processes in WIDS differ substantially from those in wetlands where rainfall>PET. They operate alongside and interact with physical processes,