

Leigh, Catherine^{1,2,3}, Andrew J Boulton⁴, Núria Bonada⁵, Ken Fritz⁶, Eric Sauquet⁷, Klement Tockner⁸, Bernard Hugueny⁹, Clifford N Dahm¹⁰, Thibault Datry²

¹ Australian Rivers Institute and the Griffith School of Environment, Griffith University, Australia

² Irstea, UR MALY, Centre de Lyon-Villeurbanne, France

³ CESAB-FRB, Aix-en-Provence, France

⁴ School of Environmental and Rural Science, University of New England, Australia

⁵ Grup de Recerca Freshwater Ecology and Management (FEM), Facultat de Biologia, Universitat de Barcelona,

Spain

⁶ National Exposure Research Laboratory, U.S. Environmental Protection Agency, USA

⁷ Irstea, UR HHLY, Centre de Lyon-Villeurbanne, France

⁸ IGB, Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Freie Universität Berlin, Germany

⁹ UMR "BOREA" CNRS, Museum National d'Histoire Naturelle, France

¹⁰ Department of Biology, University of New Mexico, USA

Ecosystem services of 'terrestrial' rivers of the Anthropocene

Abstract:

Intermittent rivers and ephemeral streams (IRES) are watercourses that stop flowing at some point in time and space, creating shifting mosaics of aquatic and terrestrial habitats. Arguably Earth's most widespread type of flowing water, IRES are increasing in prevalence where Anthropogenic climates grow drier and human demands for water escalate. Many are becoming more 'terrestrial', while some more 'aquatic'. These ecosystems tend to be undervalued by society and pose challenges for management and monitoring, jeopardising their restoration or protection from human impacts, and in turn, their provision of ecosystem services. Unfortunately, the provisioning of ecosystem services by IRES is poorly understood. Here, we conceptualise how flow intermittence may govern ecosystem service provision and transfers during flowing and non-flowing (aquatic) and dry (terrestrial) phases. This provides a socio-ecological perspective for assessing impacts of altered flow regimes and comparing strategies to manage IRES in the Anthropocene, along with their ecosystem services.