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Salinity variations in the northern Coorong Lagoon, South Australia: Significant changes in the Ecosystem following human alteration to the natural water regime

Svenja Tulipani, Kliti Grice, Evelyn Krull, Paul Greenwood, Andrew T. Revill

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- 4 Svenja Tulipani^{a*}, Kliti Grice^a*, Evelyn Krull^b, Paul Greenwood^{a,c}, Andrew. T. Revill^d
- 5 ^a WA Organic and Isotope Geochemistry Centre, Department of Chemistry, Curtin University, GPO Box U1987,
- 6 Perth, WA 6845, Australia
- 7 ^b CSIRO Land and Water, Glen Osmond, SA 5064, Australia
- 8 ^c Centre for Exploration Targeting and West Australian Biogeochemistry Centre, The University of Western
- 9 Australia 35 Stirling Highway, Crawley WA 6009, Australia
- ^d CSIRO Marine and Atmospheric Research, GPO Box 1538, Hobart 7001, Tasmania
- 11 *Corresponding authors: s.tulipani@curtin.edu.au, +61 (0)8 9266 7628; k.grice@curtin.edu.au, +61 (0)8 9266

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14 Abstract

15 European settlement and drought have significantly impacted the hydrology of the Coorong a shallow 16 coastal lagoon complex in South Australia, which is part of a terminal wetland at the mouth of the River 17 Murray. An increased salinity associated with lower water levels and progressive isolation from ocean flushes 18 contributed to a severe decline in ecological diversity over the past decades. Here we have conducted a 19 molecular and stable isotopic study of a sedimentary core from the northern Coorong Lagoon spanning more 20 than 5000 years to investigate the recent palaeoenvironmental history of the ecosystem. Major alterations were 21 evident in many biogeochemical parameters in sediments deposited after the 1950s coinciding with the beginning of intensified water regulations. The most prominent shift occurred in δ^{13} C profiles of C₂₁-C₃₃ *n*-22 23 alkanes from average values of -23.5% to an average of -28.2%. Further changes included decreases in carbon 24 preference index (CPI) and average chain length (ACL) of the n-alkane series as well as significant increases in algal (e.g. C_{20} HBI, long chain alkenes and C_{29} -alkadiene) and bacterial (e.g. ¹³C depleted short chain *n*-alkanes 25 26 and hopanoids, δ^{13} C: -35.9% to -30.1%) derived hydrocarbons. Long chain *n*-alkanes with a strong odd/even 27 predominance as observed here are typically attributed to terrigenous plants. In the Coorong however, 28 terrigenous input to sedimentary OM is only minor. Therefore changes in the before mentioned parameters were Download English Version:

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