

First Records of the Invasive “Upside-down Jellyfish”, *Cassiopea* (Cnidaria: Scyphozoa: Rhizostomeae: Cassiopeidae), from Coastal Lakes of New South Wales, Australia

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ABSTRACT. Scyphozoans of the genus *Cassiopea* (Cassiopeidae) are notable for their unusual benthic habit of lying upside-down with tentacles facing upwards, resulting in their common name, “upside-down jellyfish”. In Australia, five named species of *Cassiopea* have been recorded from the tropical north. *Cassiopea* are frequently noted worldwide as invasive species and here, we report the first records of the genus and family from temperate eastern Australia on the basis of specimens collected from two widely separated coastal lakes, Wallis Lake and Lake Illawarra; these specimens represent southern range extensions of the genus by approximately 600 km and 900 km, respectively. *Cassiopea* from Lake Illawarra and Wallis Lake appear to represent different species, which we assign to *C. ndrosia* and *C. cf. maremetens*, respectively, noting morphological discrepancies from published accounts.

KEYWORDS. Introduced species, coastal lake, *Cassiopea*, Wallis Lake, Lake Illawarra, New South Wales

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The medusa stage of the scyphozoan, *Cassiopea* (Cassiopeidae), is a distinctive marine or estuarine jellyfish, notable for its unusual, inverted, largely sedentary and benthic behaviour, imparting the common name “upside-down jellyfish”. This lifestyle typically involves the jellyfish lying in sheltered, shallow water with the aboral surface of the exumbrella facing downward onto sediments and the oral arms above. This posture and niche provides sunlight to algal endosymbionts (zooxanthellae) within the tissues although the jellyfish are also suspension feeding carnivores (Verde & McCloskey, 1998; Schembri *et al.*, 2009; Marsh &

Slack-Smith, 2010). The severity of stings to humans from *Cassiopea* has been variably reported from mild or absent to severe (Southcott, 1982; Marsh & Slack-Smith, 2010).

Although *Cassiopea* is readily recognized, the species level taxonomy is confused and requires reappraisal (Holland *et al.*, 2004). Worldwide, at least 11 species are currently recognized: *Cassiopea andromeda* (Forskål, 1775), *C. depressa* Haeckel, 1880, *C. frondosa* (Pallas, 1774), *C. medusa* Light, 1914, *C. maremetens* Gershwin, Zeidler & Davie, 2010, *C. mertensi* Brandt, 1838, *C. ndrosia* Agassiz & Mayer, 1899, *C. ornata* Haeckel, 1880, *C. xamachana*

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