



## The frequency of connection of coastal water bodies to the ocean predicts *Carcinus maenas* invasion

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**ABSTRACT:** Semi-enclosed coastal water bodies range from permanently open estuaries to lagoons that are periodically isolated from the ocean. The proportion of time these are connected to the ocean may influence biological invasions by determining recruitment opportunities, environmental conditions, and available biogenic habitats. Along the south coast of New South Wales, Australia, we tested whether the abundance and persistence of the nonnative crab, *Carcinus maenas*, varies among coastal water bodies according to the proportion of time their entrance is open to the ocean. In quarterly sampling over 2 yr in 14 estuaries and lagoons varying in the percentage of time they were closed to the ocean from 0 – 100% crab presence and abundance was correlated with the proportion of time the entrances were open. Crabs were absent from lagoons with entrances closed to the ocean > 60% of the time and consistently detected in open estuaries. Crab abundance increased with the connectivity of coastal water bodies to the ocean and was influenced by habitat availability. In water bodies where conditions supported mangroves, this habitat contained higher abundances of crabs than seagrass, saltmarsh, oyster habitat, or bare substrate. Entrance morphology initially predicts the likelihood of the crabs' arrival by influencing their population connectivity between estuaries or lagoons and the open coast, and the probability of establishment by influencing abiotic conditions. Entrance morphology may also affect crab abundance by influencing the available habitats. Hence, the geomorphology of semi-enclosed coastal water bodies should be considered when managing marine bioinvasions.

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