Sea turtles in the Arafura and Timor Seas – management at a regional scale

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Six of the world's seven species of sea turtles occur in the Arafura and Timor Seas. This iconic group of animals have a complex life-cycle and live in or spend at least part of their life in habitats ranging from sandy beaches, coral and rocky reefs, mangroves, seagrass flats and open ocean. They are well known for their ability to undertake long distance breeding migrations between foraging grounds and nesting beaches with such information gathered with a range of techniques including flipper tags, satellite telemetry and genetics. Evidence presented here clearly shows the connectivity of sea turtles between countries bordering the Arafura and Timor Seas and reiterates that sea turtle management requires international collaboration. Effective management at a regional scale will require standardised monitoring of abundance and demographics at key nesting beaches with strategic monitoring in other key habitats, monitoring of environmental parameters, the identification and mitigation of anthropogenic threats, community and school education and training of personnel. Many of the monitoring and management techniques shown here can be low cost and suited to areas with limited resources.

Sediment nutrient fluxes and primary production by microphytobenthos in Perth coastal waters

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Dissolved nutrient levels in Perth coastal waters are generally low but shallow shelf waters support abundant benthic primary producer communities (seagrass and macroalgae). The source of nutrients that sustains this abundant production is unknown, but it is possible that tight cycling between organic matter production and remineralisation contributes. Furthermore, communities such as these that are adapted to low pelagic nutrient concentrations may be particularly susceptible to increased anthropogenic nutrient loads. We have investigated nutrient recycling in sediments and primary production by microphytobenthos (MPB) in near shore sediments off Perth and in Cockburn Sound. These data combine to give us an understanding of the importance of sediment processes in recycling nutrients, associated production by MPB and compares two very different habitats (coastal waters and an enclosed embayment) in terms of exposure to physical processes, sediment geochemistry and anthropogenic nutrient load. PMax normalised to biomass (a measure of production efficiency) tends to be higher outside Cockburn Sound than within. Conversely, respiration in Cockburn Sound was higher than outside the sound presumably reflecting differences in organic carbon load. This north-south difference in respiration was most evident in the summer reflecting seasonal differences in production and/or temperature related constraints on microbial activity. The majority of mean sediment nutrient fluxes encountered outside Cockburn Sound were negative suggesting that consumption of nutrients by MPB out strips supply from the sediments. Positive nutrient fluxes were more common within the sound. For example, ammonium was universally consumed outside Cockburn Sound, in both seasons and in both light and dark experimental treatments. Inside the sound, there was pronounced ammonium release from sediments, particularly in the dark treatments and during summer.

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