

## Deep-water seagrasses in the tropics – resilience, recovery and establishing thresholds and drivers of change

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**Abstract:** Global seagrass research and assessment efforts have focused on shallow coastal and estuarine seagrass populations. Comparatively little is known about the dynamics of deep-water (>10m) seagrasses despite evidence they form extensive meadows in some parts of the world and may be highly productive compared with their shallow counterparts. Deep-water seagrasses are subject to a similar range of anthropogenic threats as shallow meadows particularly along the Great Barrier Reef (GBR) in Queensland, where they occur close to major population centres and adjacent to the coast. We examine the dynamics of deep-water seagrass populations in the GBR through a range of research studies including long term (>8 years) assessments of change; impacts of major dredging programs; resilience and recovery from severe tropical storms and; targeted research investigating the drivers, thresholds and tolerances behind seasonal and inter-annual change. Collectively these research programs have provided new insight into deep-water seagrass dynamics. Despite considerable inter-annual variability deep-water seagrasses had a regular annual pattern of occurrence at some locations, a low level of resilience to reduced water quality, but a high capacity for recolonisation on the cessation of impacts. While susceptible to large scale loss from severe storms these meadows were quick to re-establish compared with nearby shallow coastal seagrasses. The results of the work are establishing a series of key management thresholds and stress indicators that can be applied to ensure greater protection of these seagrasses.