

Northern Gulf NRM Plan (2016-2021) - Climate change risk assessment COASTAL & MARINE ASSETS

Author: Jim Tait

Key				
Probability (P)	UC- Uncertain	P- Possible	L- Likely	Almost Certain- A.C
Consequences (C)	UK- Unknown	L- Low	Mod- Moderate	M- Major
Risk rating (R)	L- Low	Mod- Moderate	H- High	Cr-Critical

Climate Hazard	Coastal Lands	Aquatic and Marine Habitats	Fisheries	Coastal and Marine Biodiversity
Increased incidence of destructive wild fires	<ul style="list-style-type: none"> Decreased fertility and resilience of coastal grasslands on self-mulching clays. PCR – PModMod Reduced stability / integrity of fire sensitive beach foreshore and dune vegetation. . PCR - PModMod Increased capacity for soil erosion / mobilisation PCR - PModMod Increased grazing pressure on unburnt pasture refugia PCR - PModMod 	<ul style="list-style-type: none"> Increased mobilization / elevated sediment loads from basin and coastal land sources and reduced trapping capacity wetland riparian vegetation PCR – PModH Fire incursions to margins of intertidal mangrove and salt marsh / couch habitats PCR - PModMod Fire incursions into and degradation of fire sensitive wetland riparian communities PCR - PModH 	<ul style="list-style-type: none"> Reduced quality nursery habitat associated with intertidal saltmarsh, mangrove fringes PCR – PLL Reduced viability of aestivation habitat utilised by freshwater long-neck turtles PCR – PLL 	<ul style="list-style-type: none"> Loss of fire sensitive species from regional ecosystems associated with land zones 1, 2 and 3. PCR - PModH Fire impacts to beach and dune systems resulting in reduced stability and shading and higher sand temperatures with potential impacts on nesting turtles PCR - PModH

<p>Increased intensity of high rainfall events (flood and cyclones)</p>	<ul style="list-style-type: none"> • Increased capacity for soil erosion / mobilisation and scalding and gulying of frontage areas adjoining wetlands and drainage lines PCR - ACMCr • More sustained inundation of coastal grass lands resulting in reduced cover (during recovery period) and impacts to resilience and carrying capacity of grassland communities. PCR - AModMod • Greater water based dispersal of basin weed infestations to new lower catchment/coastal infestation sites PCR - LModMod 	<ul style="list-style-type: none"> • Greater magnitude (loads/extent/duration) sediment plumes exported from river mouths to turbidity sensitive marine habitats (sea grass, reefs) PCR - ACMCr • Increase in sea grass density where nutrient benefits of river discharge experienced independent of turbidity impacts (NGRMG) PCR - ACLL • Expansion of mangrove forest area on areas of elevated intertidal sediment deposition PCR - ACLL • Potentially beneficial scouring /flushing of exotic aquatic weed infestations from coastal wetlands providing enhanced control opportunities PCR - LModMod • Greater prospect of contaminant loads within basin retention facilities (i.e. tailings dams), being released via overflow events to aquatic ecosystems PCR - LModMod-H 	<ul style="list-style-type: none"> • Subject to event timing, potentially beneficial impacts to fisheries recruitment via nursery habitat inundation, nutrient transfers to coastal and inshore areas and provision of basin habitat connectivity. PCR – AModH • Potentially significant losses of prawn nursery habitat due to cyclonic impacts on sea grass beds and associated reduction in offshore caches PCR – AModH 	<ul style="list-style-type: none"> • Reduced abundance sea-grass beds and carrying capacity for dependent fauna e.g. dugongs, turtles with resulting mortality / population reduction PCR - ACMCr • Contraction of light dependent / sediment sensitive coral reef communities in marginal areas subject to sediment plume influence PCR - PModH • Conflict between stock and native fauna and flora in limited flood free refugia PCR - PModMod
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Climate Hazard	Coastal Lands	Aquatic and Marine Habitats	Fisheries	Coastal and Marine Biodiversity
Increased storm surge and rising sea levels	<ul style="list-style-type: none"> Degradation and retreat of beach foreshores and adjoining dune systems PCR - ACMCI Landward migration of marine plain /salt pan – coastal grassland interface PCR - ACModH Saltwater intrusion into coastal land drainage networks previously fresh PCR - ACModH 	<ul style="list-style-type: none"> Elevated sea levels and pulsed turbidity affecting light availability to impact sea grass productivity and density/extent. PCR - ACMCI Potential expansion of mangrove forest area via colonization of inundated coastal areas PCR - ACLL Breaching of coastal inter-swale swamps by tides/storm surge and alteration from fresh to brackish/saline with loss of associated fringing vegetation communities PCR - ACModH Upstream retreat and replacement of freshwater riparian vegetation by marine communities PCR - ACModH 	<ul style="list-style-type: none"> Reduction in fisheries productivity reliant on seagrass (and attached algae) either as nursery habitat or for nutrition in adjacent habitats. PCR - ACModH 	<ul style="list-style-type: none"> Erosion and increased inundation of coastal beaches and salt marshes will impact sea turtle and crocodile habitats, nesting area stability and hatching success PCR - ACModH Potential loss /reduction in area of low lying island based turtle nesting /basking sites PCR - ACModH Reduced productivity / carrying capacity for sea grass dependent fauna e.g. dugong, turtles with resulting mortality / population reduction PCR - LModH Salinisation of coastal freshwater wetlands and marginal vegetation utilised by breeding aggregations of waterbirds PCR - LModH Reduction and fragmentation of breeding habitat for shorebirds and seabirds dependent on low-lying sandy foreshores PCR - PModMod

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Climate Hazard	Coastal Lands	Aquatic and Marine Habitats	Fisheries	Coastal and Marine Biodiversity
Continued warming of temperature, including more hot days	<ul style="list-style-type: none"> Promotion of some weed species sites PCR - LModMod Exceedance of thermal thresholds for some coastal vegetation community plant species – leading to loss of species and reduced resilience of native vegetation cover PCR - ACModH 	<ul style="list-style-type: none"> Decline in abundance or/loss of some species of intertidal sea grass. PCR - LModH Decreased dissolved oxygen carrying capacity and increased respiration rates (and DO consumption) in shallow freshwater, estuarine and marine waters PCR - LModH 	<ul style="list-style-type: none"> Reduced dissolved oxygen in shallow coastal wetland and upper estuarine nursery habitats decreasing productivity and recruitment levels PCR - LModH Reduced sea grass dependent fishery productivity / recruitment PCR – LmodH Reduced availability and altered distribution of prawn nursery habitats, and decreased growth and survival of targeted prawn species PCR – LmodH 	<ul style="list-style-type: none"> Changes to long term sex ratios, hatching size and success of sea turtles and crocodiles PCR - LModH Changes to the nesting period utilised by turtles / crocodiles with a potentially earlier nesting season utilised under elevated temperatures PCR - PLMod Higher sea surface temperatures are likely to impact on the foraging and subsequent breeding success of migratory sea birds PCR - LModH

Climate Hazard	Coastal Lands	Aquatic and Marine Habitats	Fisheries	Coastal and Marine Biodiversity
Increasing atmospheric CO ₂ concentration and ocean acidification	<ul style="list-style-type: none"> Woody vegetation growth promoted relative to grassy vegetation promoting woodland thickening PCR - PModMod 	<ul style="list-style-type: none"> Corals, coralline algae and benthic molluscs will continue to experience reduced calcification / increased dissolution rates PCR – ACMH Growth of mangroves and seagrasses, being of terrestrial origin, may be stimulated by additional CO₂ levels in the atmosphere and ocean respectively PCR - PModMod 	<ul style="list-style-type: none"> Increased mortality of fish larvae and juveniles may result from acidification effects on sensory systems and behavior, leading to decline in recruitment to adult populations. PCR - PModH Reduced aerobic capacity in some fish due to acidification could exacerbate other climate change impacts (e.g. reduced dissolved DO). PCR - PModH 	<ul style="list-style-type: none"> Plant foliage will become more sclerophyllous and nutritive value of plant material consumed by herbivorous animals including arboreal mammals will reduce relative to energy required to digest it PCR - PLMod