Turtle, dugongs 'at risk under climate change'

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The "turtle and dugong capital of the world", the northern Great Barrier Reef (GBR) and Torres Strait region, faces increased pressure under climate change from human actions such as fishing, hunting, onshore development and pollution.

"Depletion of turtle and dugong numbers increases their vulnerability to other threats and lowers their ability to cope with climate change," Dr Mariana Fuentes of the ARC Centre of Excellence for Coral Reef Studies and James Cook University will tell the Coral Reef Symposium in Canberra today.

Dr Fuentes says that turtles in particular are vulnerable to the effects of climate change, which include decreases in hatching success, loss of nesting areas and overheated beaches, which will decrease the turtles' reproductive output and may significantly alter the sex ratio of their offspring.

Dr. Fuentes' research into the green, hawksbill and flatback turtles and well as dugongs in the northern GBR and Torres Strait is seeking to establish priorities for the management of marine megafauna to increase their resilience to climate change.

"Managers face the challenge of addressing the direct effects of climate change, as well as ongoing threats that dugongs and sea turtles face throughout their geographic range," she explains. "For logistical, financial and political reasons, managers cannot address all threats

simultaneously, and so need to prioritize their actions.

Of particular concern is the effect of climate change on the gender balance of turtle population, Dr Fuentes says: "The temperature of the beach sand determines the gender of the hatchlings – warmer sand produces more females while cooler sand produces more males."

"Under current conditions the nesting grounds are already producing more females. With an increasing temperature, these turtles are at risk of stretching out the ratio, though we can't yet predict exactly when it will cause an unbalanced population."

"While sea turtles have survived large climatic fluctuations during their evolutionary history, modern rates of climate change are much faster, and are coupled with additional human pressures," says Dr Fuentes. "We still do not know whether turtles can adapt to modern rates of climate change."

Dugongs may experience indirect effects of climate change and human activity through impacts on their main food source, seagrass. Seagrass diebacks are linked to lower reproduction, increased mortality and emigration of dugongs.

Dr Fuentes has been working closely with indigenous communities in the Torres Strait region and northern GBR to monitor turtle numbers and condition and to track the movements of dugongs.

She says it will be important to take a range of short-term and long-term measures to protect turtles and dugongs from climate change, including:

- reducing the negative stresses that they are currently subject to.

- actively trying to change the habitat they use (e.g. by shading nests, re-vegetating beaches, and replacing lost sand).

- protecting areas that seem to offer the best conditions as refuges in the future.

"Turtles and dugongs have numerous roles – apart from their cultural and spiritual significance to the indigenous community, they are important for the tourism industry. Being at the top of the food chain also means that they have high ecological significance."

The loss of these species would have a huge impact on the northern Australian marine environment and on indigenous communities, she warns.

"There are still many uncertainties over how turtles and dugongs will be impacted by climate change. For the time being the best prospects for their survival are to mitigate climate change (by reducing carbon emissions) and to reduce negative pressure on turtles and dugongs from activities such as hunting and coastal development."

"However, as the impacts of climate change become more extreme, more 'active' adaptation strategies may be necessary. The success of each adaptation option will depend on climatic impact and local social, economic and cultural conditions, and therefore needs to be considered on a case by case basis, and at a local scale," Dr Fuentes explains.

Dr Fuentes will be presenting the results of her research on Friday the 8th October at "Coral reefs in a changing environment", at the Academy of Science's Shine Dome. Media are invited to attend the coral symposium and interview the scientists.