



1.0: Project Identification:

The role of seagrass dispersal by marine mega-herbivores: Dugong (*Dugong dugon*) and green sea turtles (*Chelonia mydas*)

James Cook University, Cairns

Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER),
and College of Science & Engineering

Project Leader: Mrs Samantha Tol

Project Participants: Dr Brad Congdon & Dr Rob Coles

2.0: Project Description & Objectives:

2.1: This project is investigating the dispersal of tropical seagrass seeds and fragments by marine mega-herbivores, dugongs and green sea turtles. This is being achieved by:

- (1) quantifying the number of viable seagrass fragments created by foraging mega-herbivores; by
- (2) comparing the germination success of seeds removed from mega-herbivore faeces to that of seeds taken from the plant and;
- (3) quantifying the dispersal potential of seagrass fragments created by foraging mega-herbivores, by determining the time fragments can remain buoyant and viable.

2.2: Our project aims to determine the role marine mega-herbivores play in the dispersal of tropical seagrasses, through the dispersal of seeds and viable fragments. This information will enable us to update connectivity network models on seagrass dispersion, which currently lack data on biotic dispersal. Obtaining a greater understanding of seagrass dispersal would enable us to determine which seagrass meadows are at a greater risk of loss or to have a slow recovery from natural and/or anthropogenic impact. Better informed management of seagrass ecosystems has a flow on effect improving the conservation of animals which rely on them for their food, such as the culturally significant vulnerable dugong and endangered green sea turtle.

3.0: Project over Duration of Foundation Grant:

3.1: There have been no changes to the project.

3.2: This project was designed to collect seeds from marine mega-herbivore faeces and from the seagrass plants, and to run a germination experiment comparing the two seed sources. We also aimed to collect seagrass fragments created by foraging mega-herbivores and to determine their maximum buoyancy time while remaining viable.

3.3: Not all objectives were achieved due to delays in field work, as the project leader was on maternity leave from June 2017 through to April 2018. However, we were able to successfully finalise collection of seagrass fragments created by foraging mega-herbivores, and collect data on seagrass fragment buoyancy time and viability. These two fragment experiments only require minor laboratory work before data analysis can begin. Collection of seagrass seeds, from both plants and faeces, will be run towards the end of 2018.

3.4: In 2016, we successfully ran a germination experiment of seeds found in marine mega-herbivores faeces. However, we were unable to find seagrass seeds from seagrass plants that same year, preventing the comparison component of the experiment. We attempted this experiment again in 2017, but the fruiting season of the target species (*Zostera muelleri* – which is the most common seed found in marine mega-herbivores faeces) occurs between September and November, and I was unable to go in to the field due to maternity leave.

3.5: We aim to finalise all data analysis of the seagrass fragment experiments and begin our write-up of results by the end of 2018; aiming to have this paper published before the end of 2019. We are aiming to achieve two publications from these experiments, combined with an experiment undertaken in 2015 on the effect wind has on the movement speed of seagrass fragments. We also aim to have finalised data collection on the germination experiment by the end of 2018, and aim to have the results written up and published by the end of 2019.

4.0: Academic Outputs:

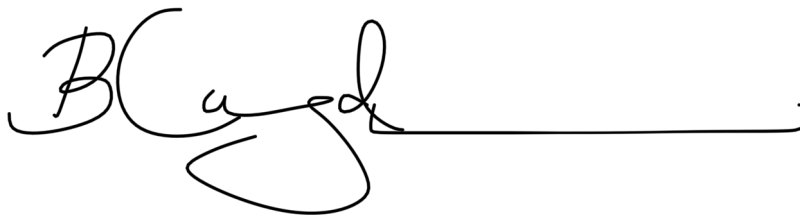
4.1: There are no publications/manuscripts at this moment related to this grant. We have had one publication in a peer reviewed journal and a media release for the research on seagrass seeds found in marine-mega herbivore faeces:

- Tol et al. 2017. Long distance biotic dispersal of tropical seagrass seeds by marine mega-herbivores. Scientific Reports, 4458
<<https://www.nature.com/articles/s41598-017-04421-1>>
- Tol et al. 2018. Dugong and sea turtle poo sheds new light on the Great Barrier Reef's seagrass meadows. The Conversation. <<https://theconversation.com/dugong-and-sea-turtle-poo-sheds-new-light-on-the-great-barrier-reefs-seagrass-meadows-95143>>

4.2: There has been no scholarly impacts or citations at this point in time.



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