

# Under pressure... how to succeed as a deepwater seagrass

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## Aims

- Define potential light intensity and temperature thresholds that drive deepwater seagrasses
- Use this information to build management-driven thresholds for dredging and coastal development impacts

## Background & Objectives

Deepwater seagrasses of the GBR lagoon are a poorly described resource yet cover > 31,000 km<sup>2</sup>. *Halophila* spp. dominate at these depths however there is little distinction into species-specific growth characteristics.

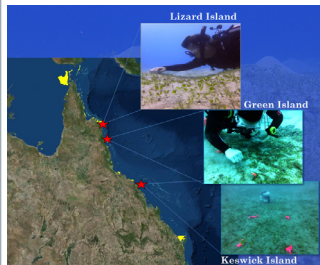


Dredge turbidity plume

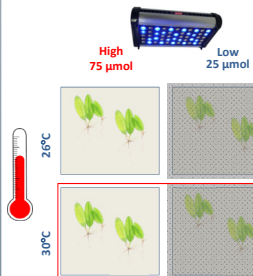
Recent port expansions and dredging campaigns threaten the light environment and are the major driver to understand the functionality of these more cryptic seagrass habitats.

## Methods

- Halophila decipiens* and *Halophila spinulosa* were collected from long-term monitoring sites

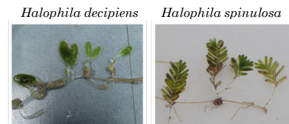
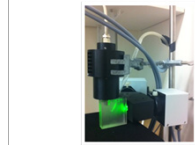
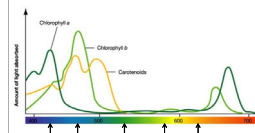


- light intensities and temperatures tested over 4 weeks in 2 x 2 factorial design



- Metrics tested:
  - Shoot density
  - oxygen production & respiration
  - optical properties
  - wavelength-specific photochemical efficiency (MC-PAM)

**Multi-colour PAM...What is it?**  
Excites and illuminates at specific bands of light to study wavelength-specific efficiency and absorption by PSII (Sigma II)

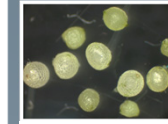


**Take-home:** 1) Not all deepwater *Halophila* species are created equal.

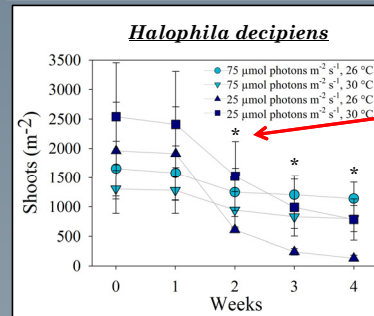
2) Deepwater seagrasses are affected by both light intensity and spectral quality which may lead to rapid loss from pressures such as dredging-induced turbidity.

## Next steps:

- Long-term monitoring indicates seasonal die-off is not due to low light or warming temps.
- Regular die-off coincides with fruiting and replenishment of a large seed bank... time for sex education?!

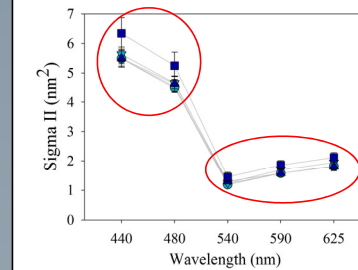


*H. decipiens* seeds



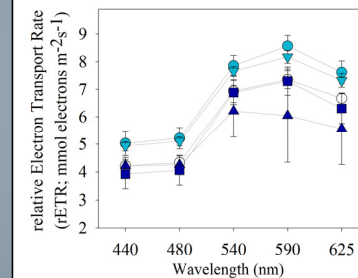
Shoot loss after 2 weeks & 4 weeks under 1.1 mol photons m<sup>-2</sup> d<sup>-1</sup>.

Temperature had no bearing on shoot densities of either species.



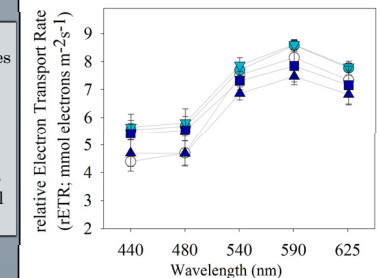
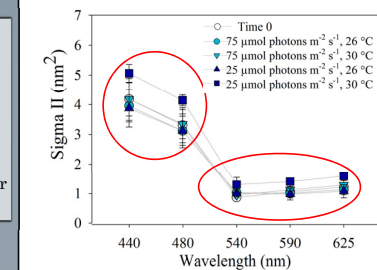
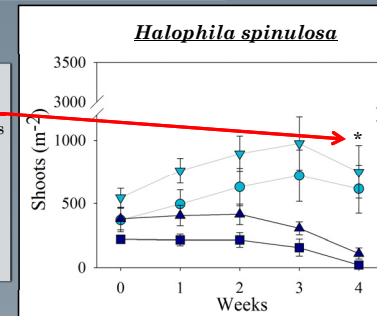
Both species have greater absorption at 440 and 480 nm compared to 540, 590 and 625 nm.

No treatment effect for either species.



Reduced relative electron transport rates (rETR) and effective yields\* (both p<0.05) under low light regardless of temp  
No treatment effects on non-photochemical quenching (NPQ)\*

\* Not shown



## Long-term monitoring data – Green Island site

