Responses of a nearshore seagrass community to *in situ* CO_2 fertilization

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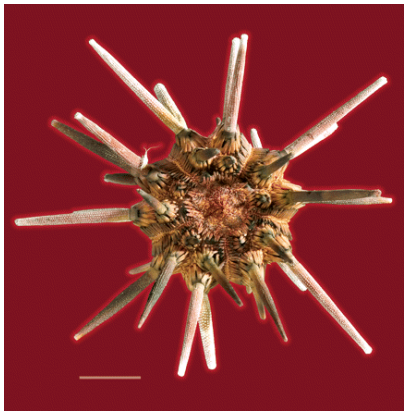
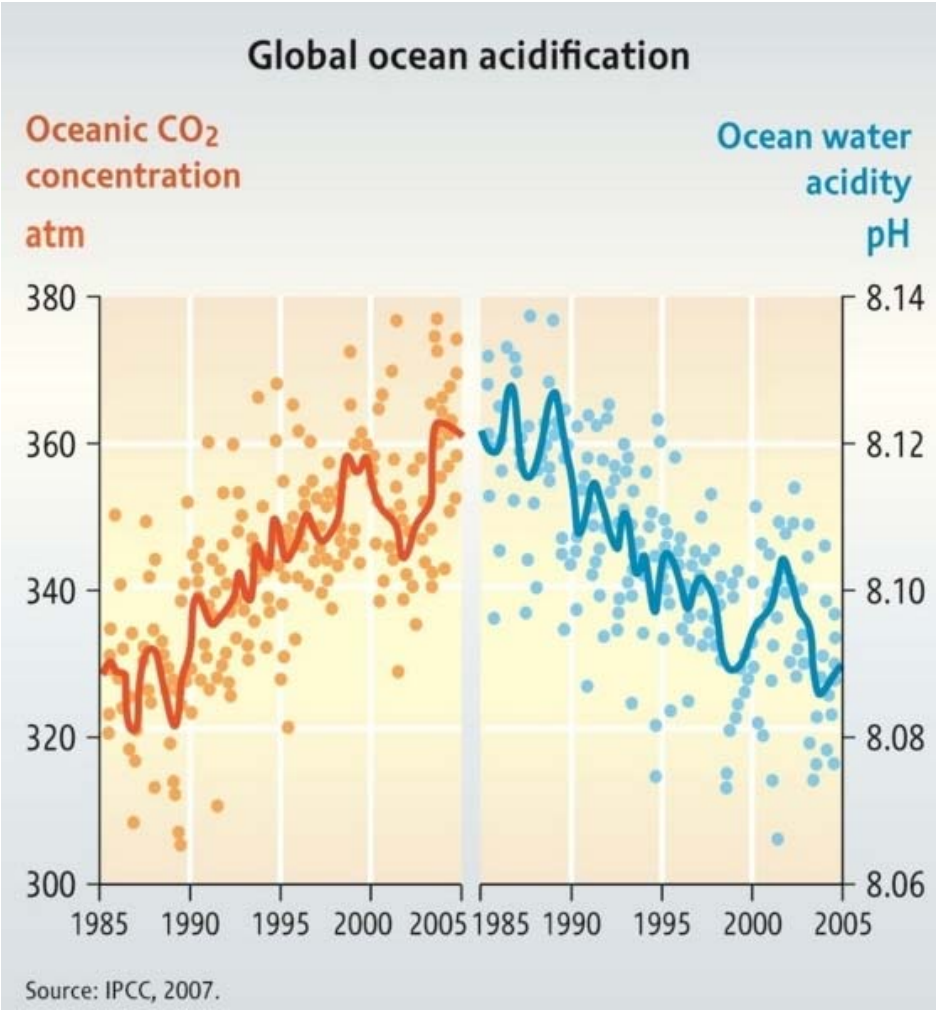
Introduction- Ocean acidification

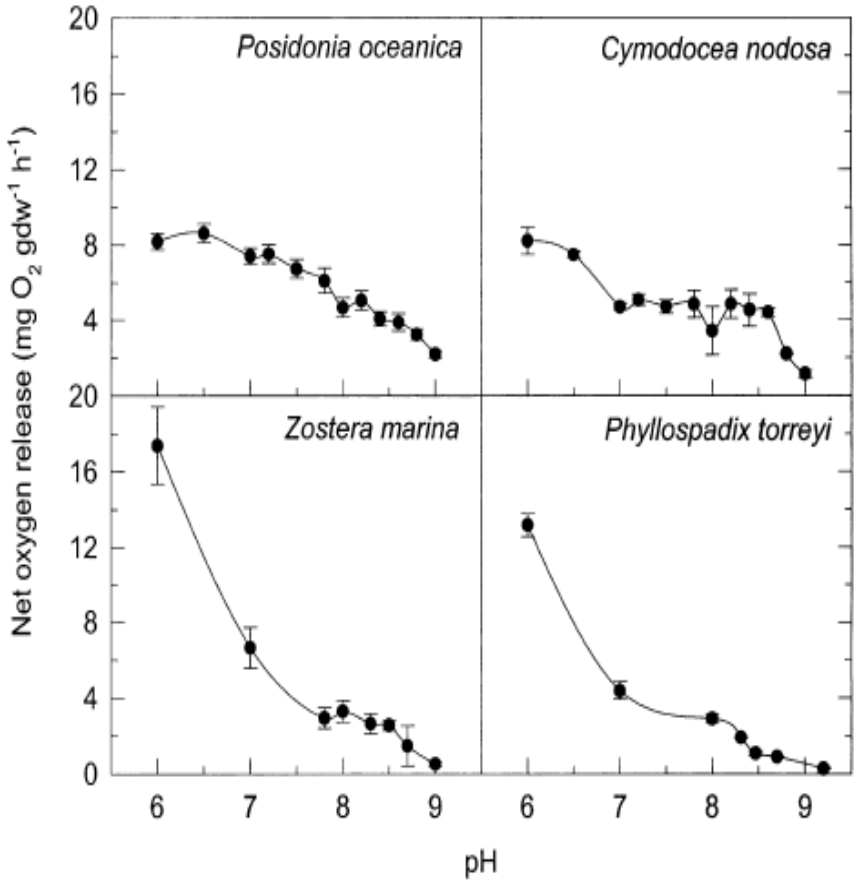




Introduction – Seagrass response

Highly productive plant communities

Predominantly rely on the diffusive flux of dissolved CO_2 as a substrate for carbon fixation



Enriquez 2006
Invers et al 2001
Zimmerman et al 1997
Durako 1993

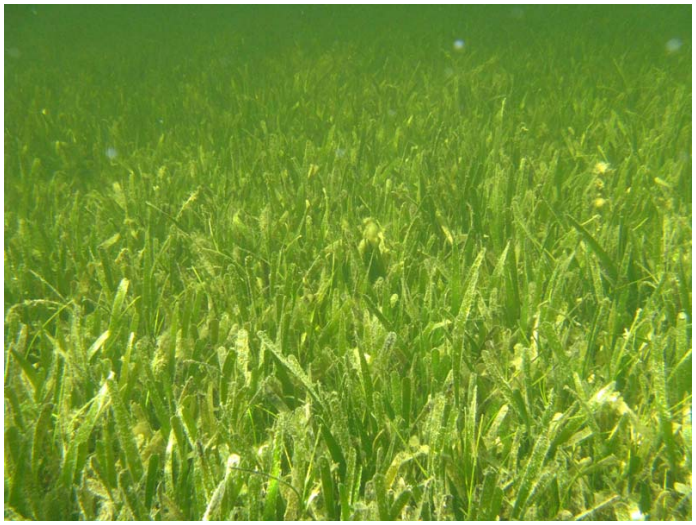
Introduction – Research questions

How does CO_2 enrichment impact:

Seagrass growth

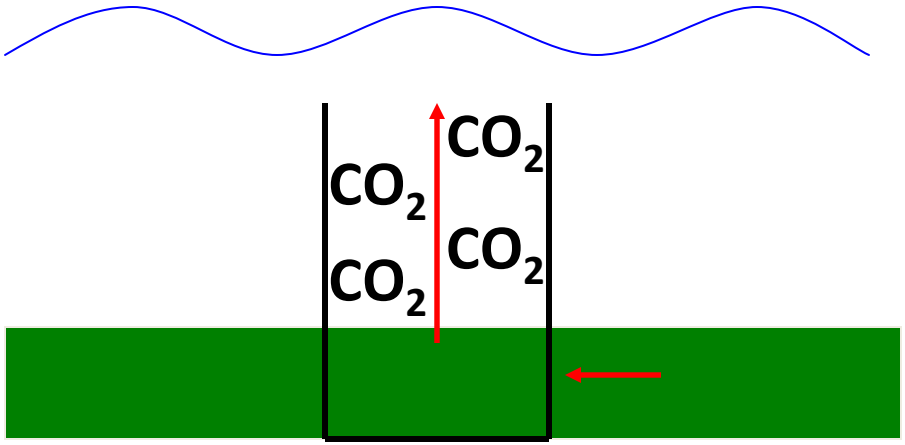
Seagrass nutrient status

Seagrass community calcification rates



Methods – In situ carbon enrichment

Submerged flow through seawater system utilizing clear open top chambers



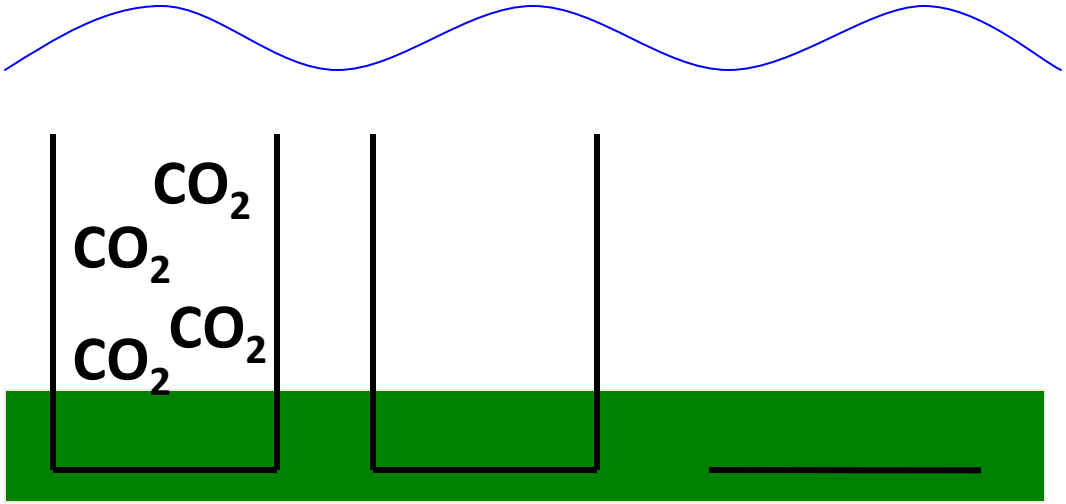
Methods – Experimental design

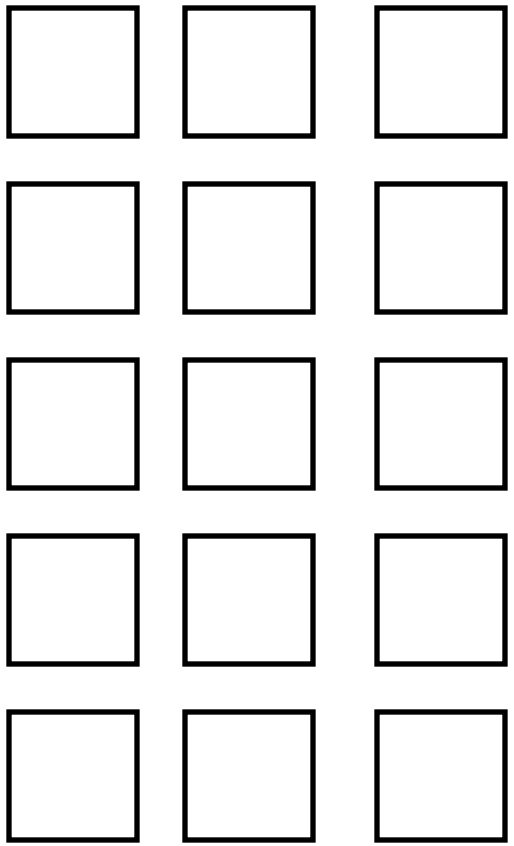
Treatments

1) CO_2 enrichment within chambers

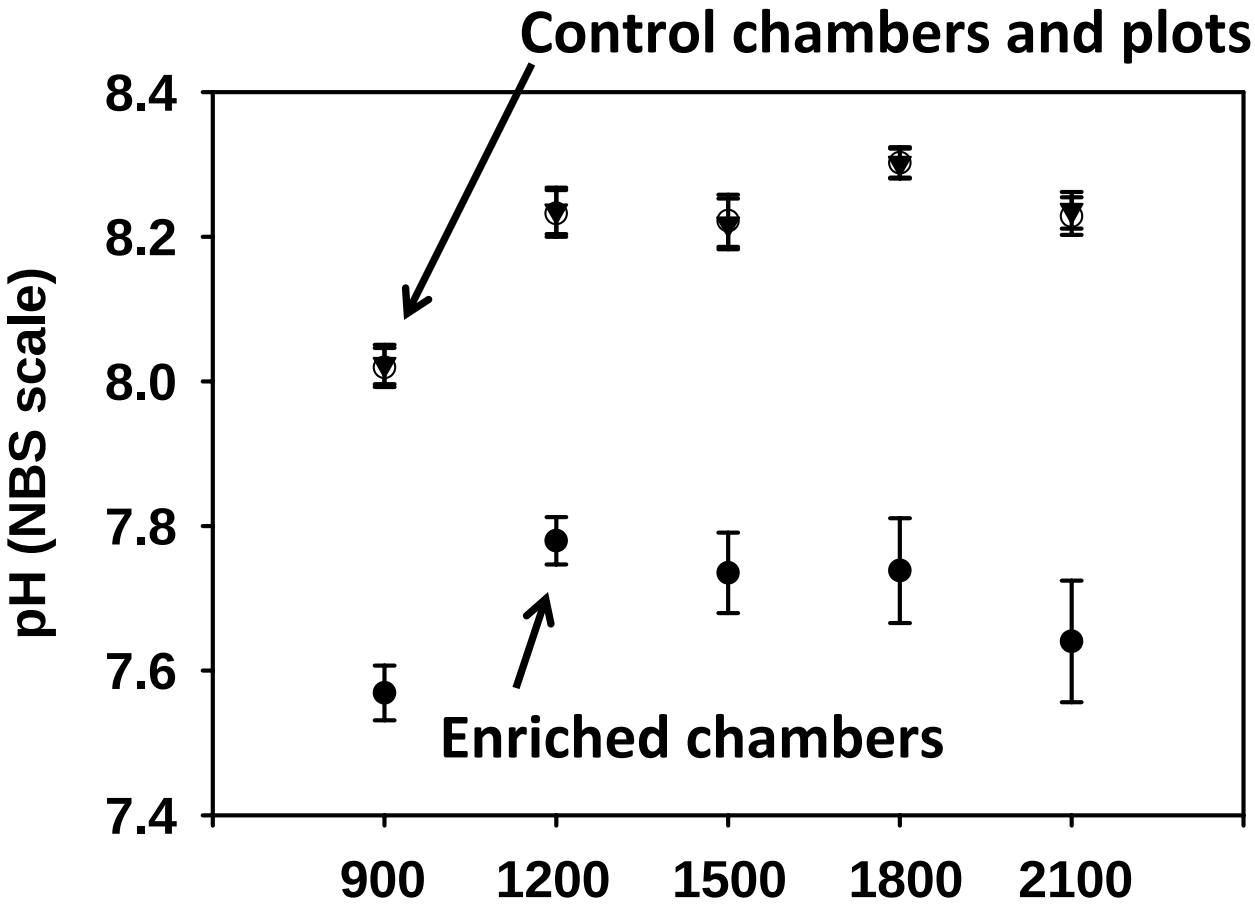
2) No CO_2 enrichment within chambers

3) Control plots with no chambers

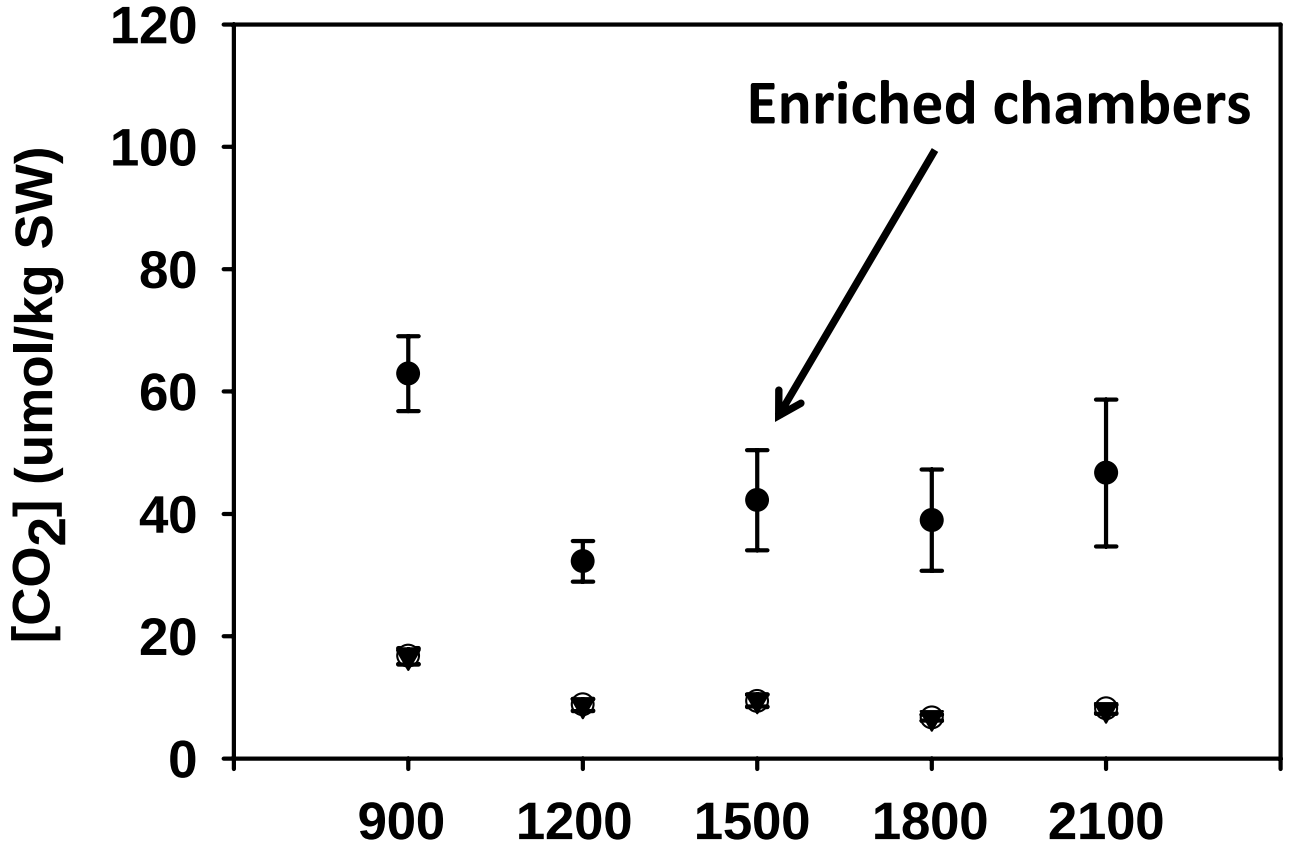




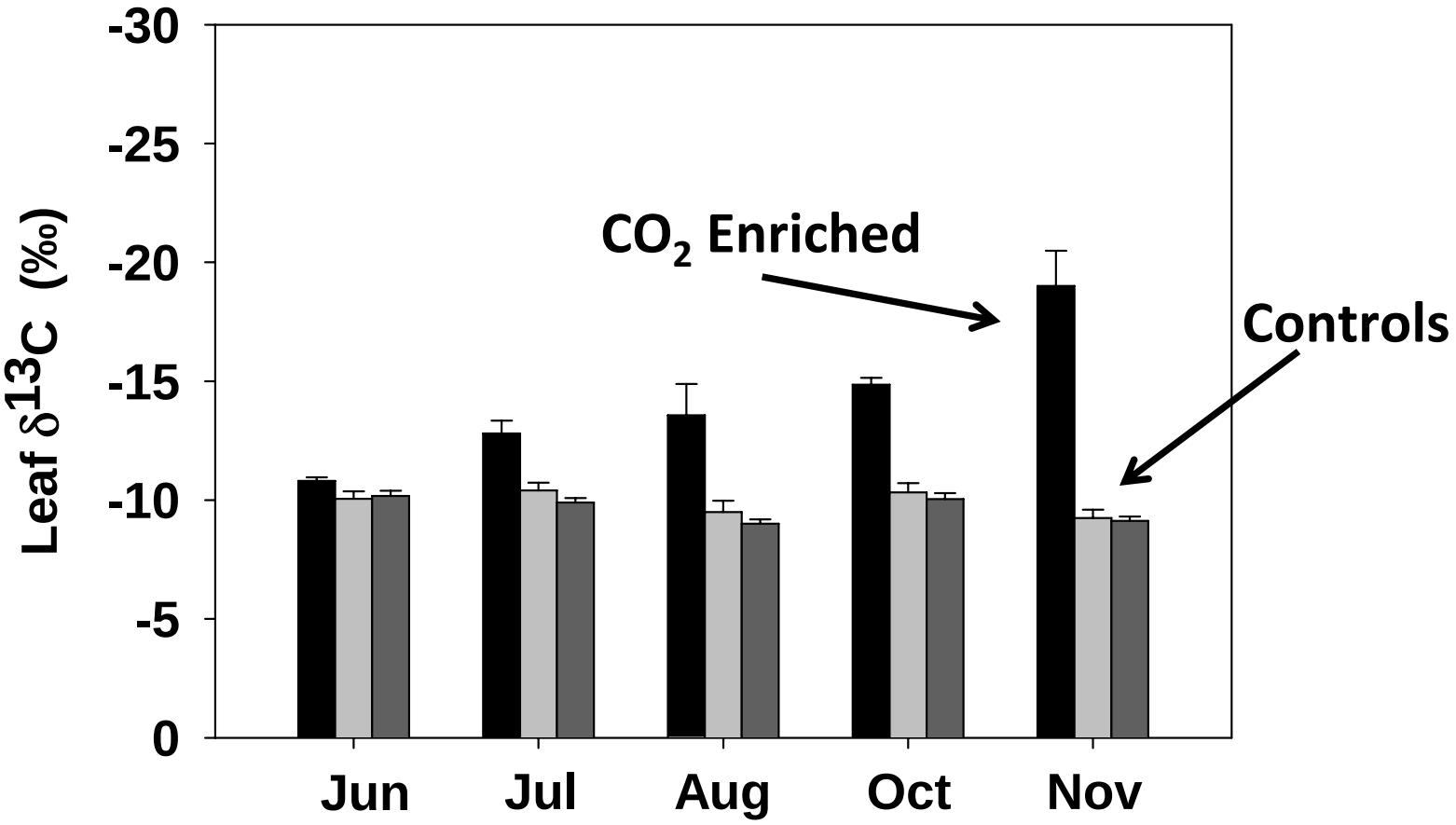
Results – Carbonate parameters



Results – Carbonate parameters



Results – Leaf Stable Carbon Isotopes



Methods – Seagrass responses

Productivity / Nutrient Status

Seagrass productivity measured monthly using the needle punch method (Zieman 1974)

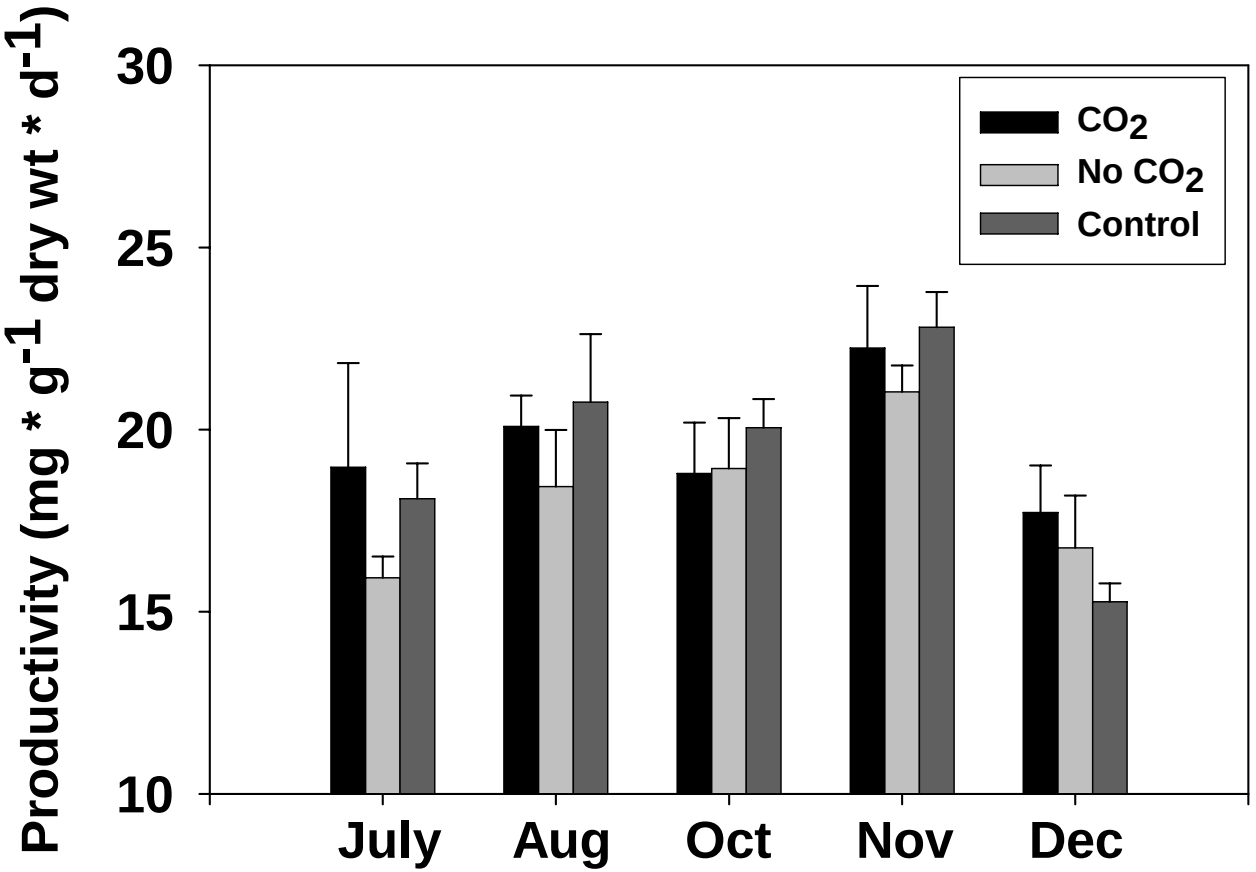
CNP elemental analysis
- CHN analyzer
- P content determined via a colorimetric analysis (Fourqurean et al 1992a)

Calcification

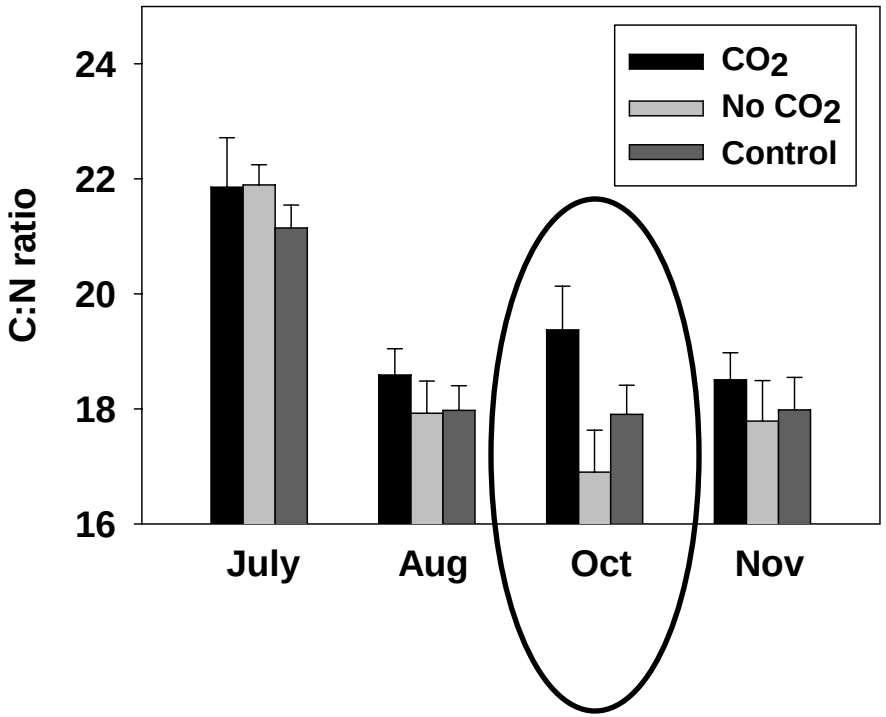
Visual counts of calcareous green algae within each Chamber conducted monthly

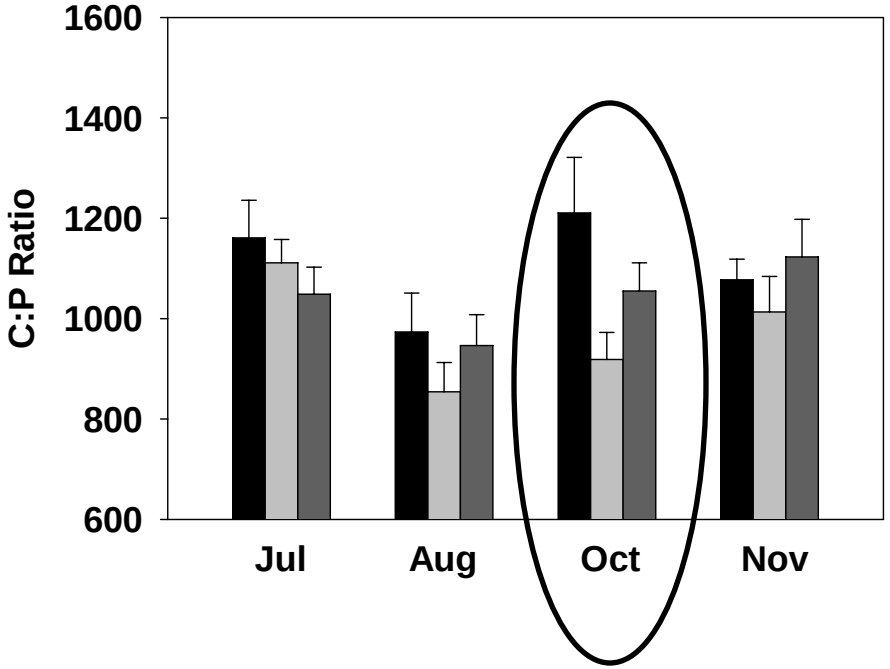
Quantification of epiphyte carbonate load on replicate seagrass leaves during November

Results- Seagrass productivity

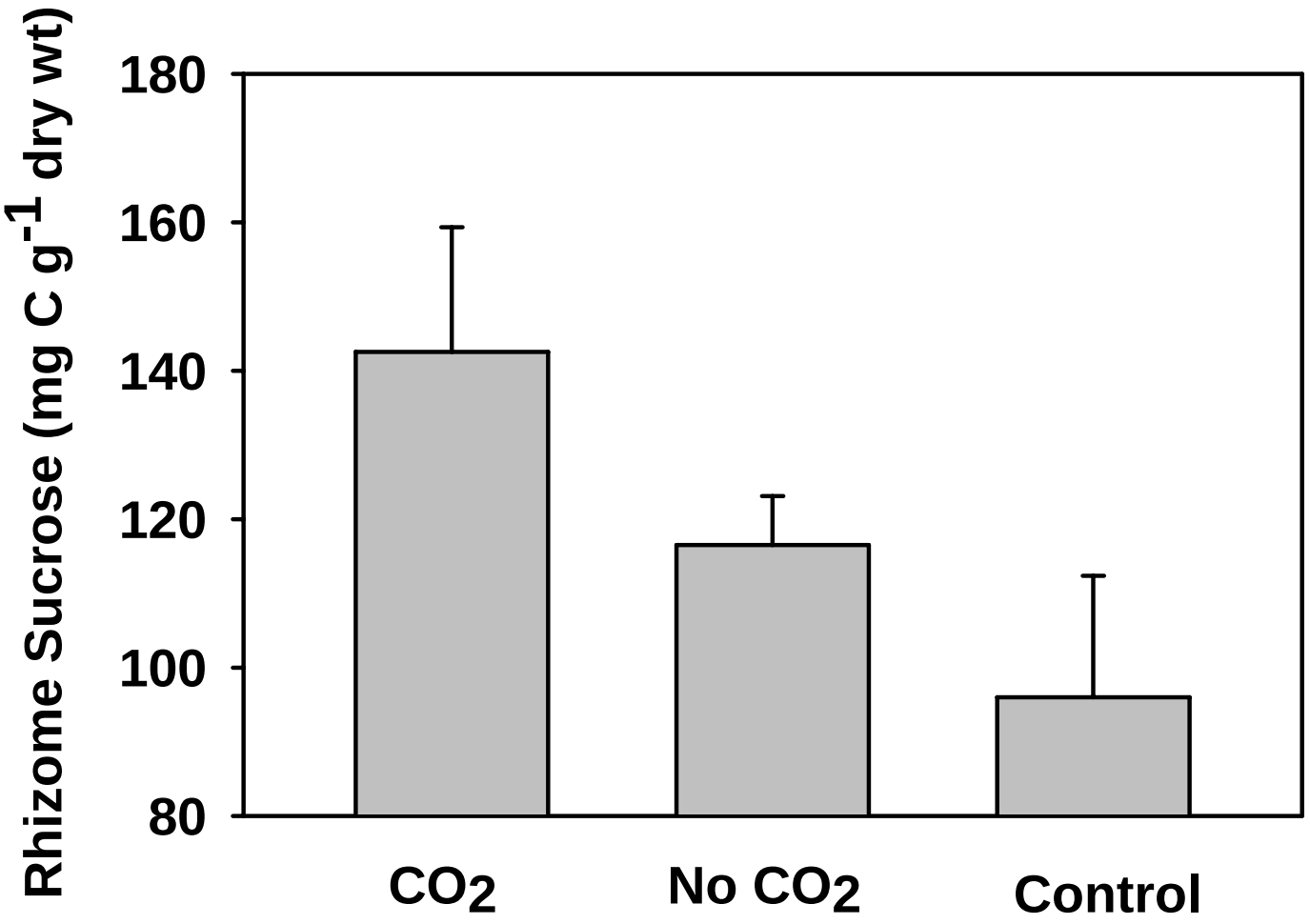


Results – Elemental analysis

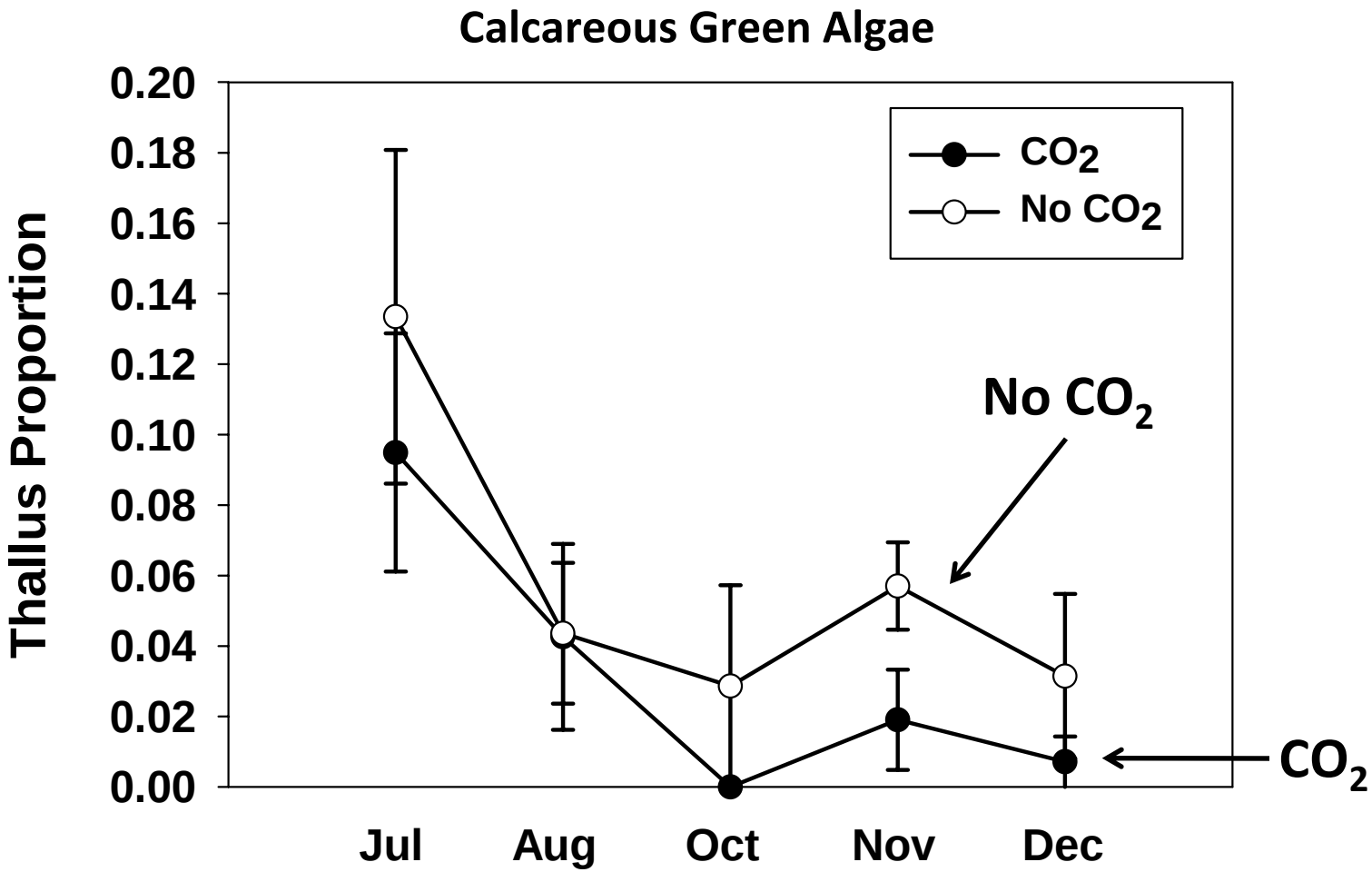




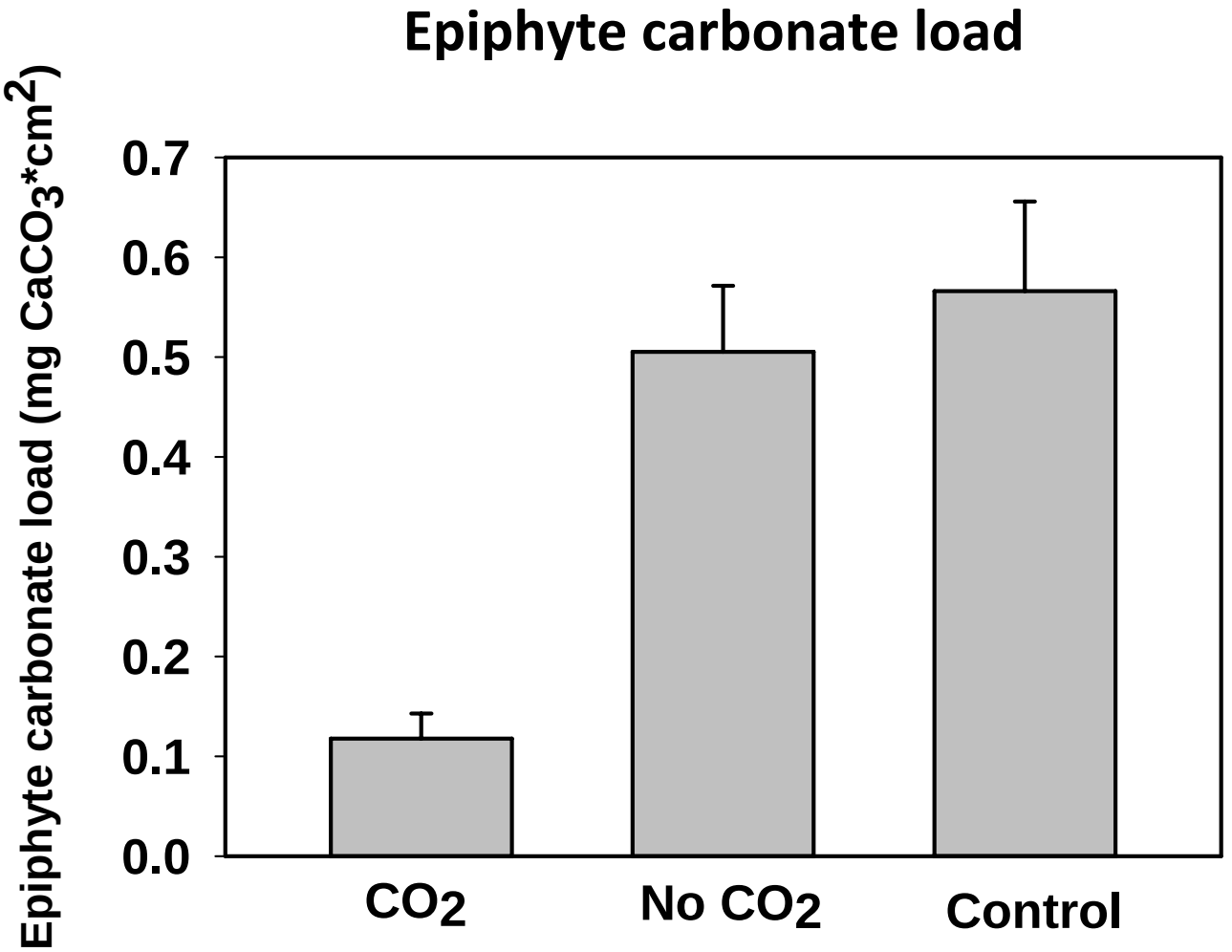
Results – Rhizome Soluble Sucrose



Results – Calcification



Results – Calcification



Conclusions

- **Seagrass response to future carbon enrichment may be strongly regulated by the availability of alternate resources**

- **Seagrasses may store excess carbon in belowground structures, implications for future rates of carbon burial**

- **Alterations in seagrass community calcification rates may represent a large component of the seagrass response to future ocean acidification**

Acknowledgements

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