

# MILESTONE PROGRESS REPORT



# FRDC

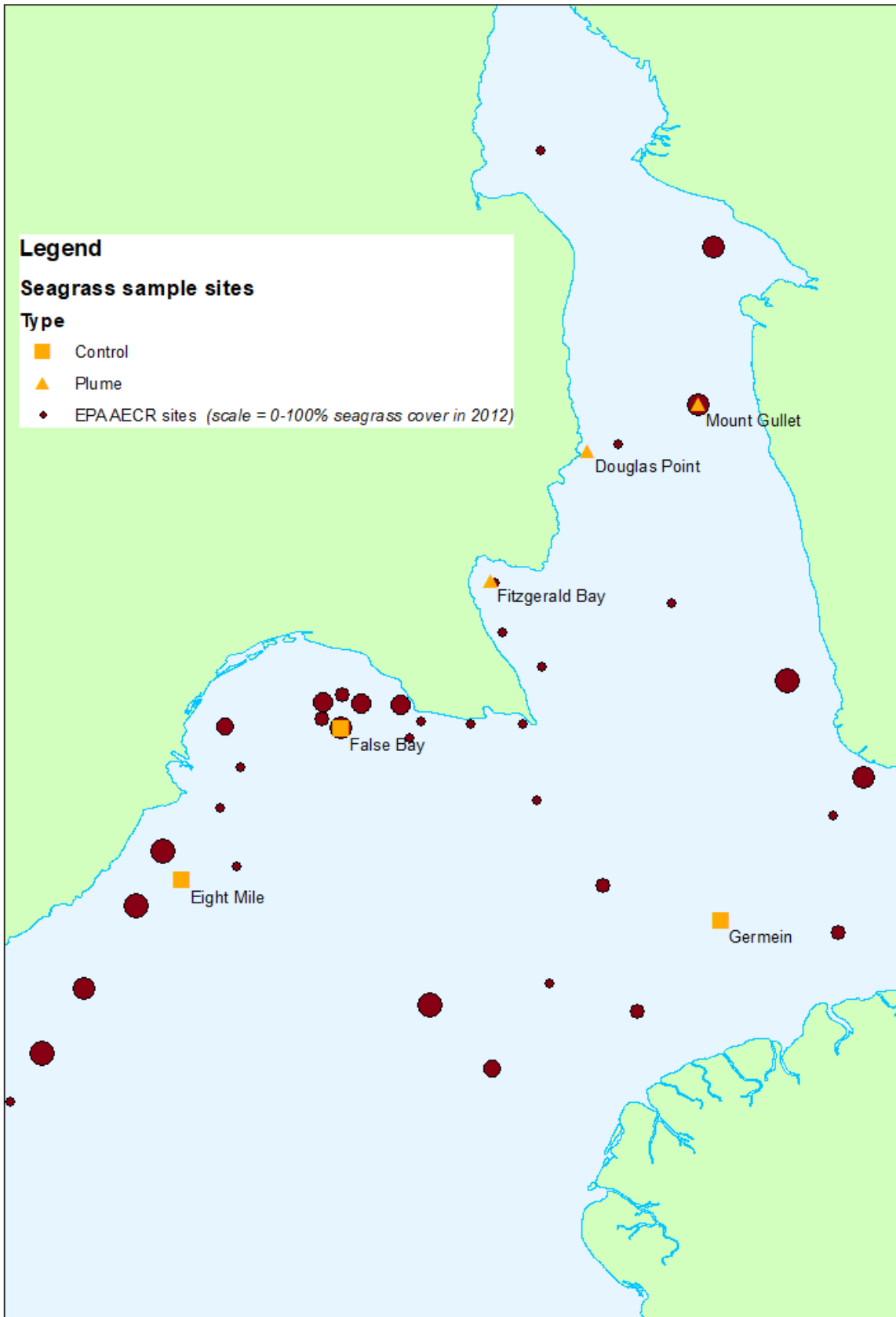
FRDC PROJECT NUMBER: 2018-186

## 1. ORIGINAL MILESTONE DATE AND DETAIL:

Complete 2019 field surveys and mooring deployment

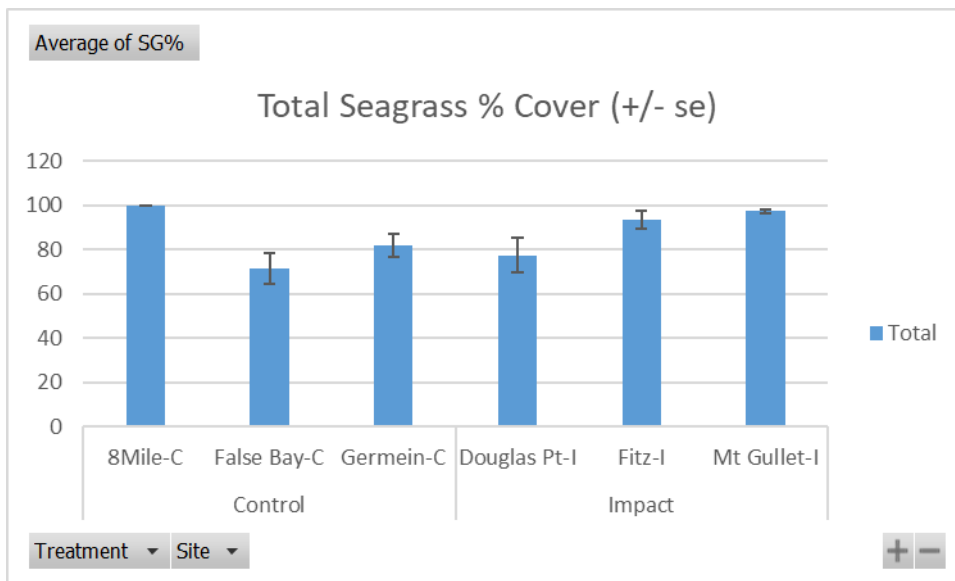
## 2. PROGRESS AGAINST MILESTONE DETAIL:

Field surveys were completed in and around Fitzgerald Bay from May 17-25. A total of six sites were sampled, three of which were predicted to be in the nutrient plume from yellowtail kingfish farming, and three outside the plume (Fig 1). All sites were selected to be in 6-8 m water depth on high density seagrass. Where possible, EPA Aquatic Ecosystem Condition Reporting (AECR) sites were used, as these have data on seagrass cover from 2012 and 2018 to provide some historical context. In some cases, sites had to be moved in order to meet the depth and cover requirements. At each site, a series of 8 50m long video transects were undertaken ~ 50m apart, which will provide data directly equivalent to that obtained by the EPA. In addition, in situ sampling of seagrasses was undertaken. Three subsites ~25 m apart were sampled by a diver, who collected 3 core samples and measured chlorophyll fluorescence on 20 leaves of *Posidonia* seagrass at each subsite. Samples were immediately frozen, and returned to the laboratory for future analysis.

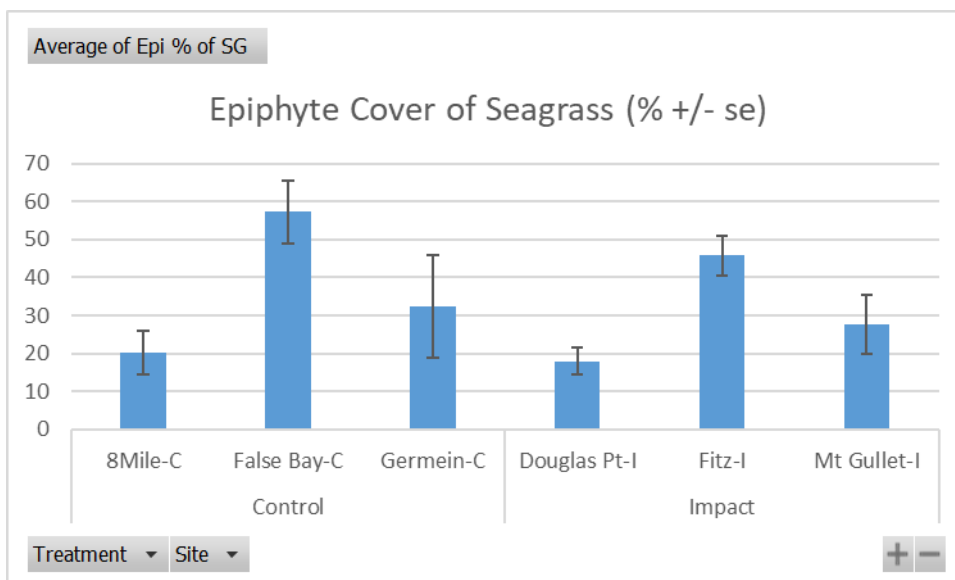


**Figure 1:** Map showing sampling sites (orange), and EPA AECR sites (brown, scaled to % cover of seagrass in 2012).

Seagrass cover at the three control sites ranged from 71-100%, while at the impact sites it ranged from 77-97% (Fig 2). Most sites were dominated by *Posidonia*, although one was dominated by *Amphibolis*. Only *Posidonia* was collected during the in situ sampling. Epiphyte cover ranged from 20-57% (Fig 3).



**Figure 2:** Total seagrass cover from eight video transects at each site.



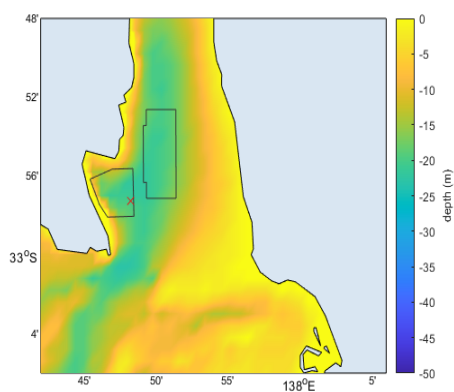
**Figure 3:** Total epiphyte cover, as a percentage of seagrass cover, from eight video transects at each site.

The oceanographic mooring was deployed on the 21<sup>st</sup> of July at a location (32°57.255 S, 137° 48.227 E) within the western aquaculture sector of the Fitzgerald Bay aquaculture zone (Figure 4). The mooring site location was selected to provide baseline measures needed for the calibration and validation of the coupled hydrodynamic-biogeochemical-seagrass ocean model currently under development, as well as baseline time-series data for several key water quality parameters prior to the addition of finfish aquaculture.

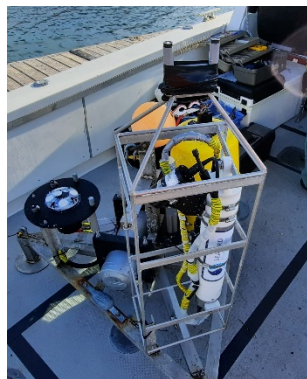
The mooring (Figure 4) consisted of a Nortek Signature 100 Acoustic Doppler Current Profiler (ADCP) to measure current speed and directions at 1m intervals throughout the water column. Current measurements will provide information on the strength and direction of tidal and residual (i.e. tide-

filtered) flows in the region. Additional sensors on the mooring will provide information on sea level, temperature and salinity necessary for ocean model validation. Water quality variables measured by sensors on the mooring include chlorophyll *a* concentration, turbidity and dissolved oxygen concentration.

Following deployment of the mooring, near surface and bottom samples were taken using a Niskin bottle to form a composite sample from which sub-samples for nutrients (total nitrogen, nitrate and ammonium), chlorophyll *a* and total suspended solids were processed, stored and sent to the SARDI analytical laboratory for analysis. Results from the water sampling will be used to calibrate and validate the equivalent variables measured by moored sensors and/or predicted by the ocean models. Finally, JFE DFEI2-L photometers provided by the EPA, were attached to the mooring frame at 0.55 m and 1.35 m above the seabed. The light meters will provide information on the underwater light attenuation necessary for model calibration. An additional light meter was deployed on land at the SA Water Whyalla site to provide information on the surface light field necessary for model forcing.



The mooring will be recovered after a minimum period of 8 weeks. This timeframe will minimise mooring, sensor and data loss due to fouling issues which influence shallow water mooring deployments in the South Australian Gulfs.



**Figure 4:** (Left) Location of the mooring (red cross) deployed in the western sector of the Fitzgerald Bay Aquaculture zone. (Centre) Picture of the mooring pre-deployment. (Right) Picture of the SAIMOS mooring recently recovered from upper Spencer Gulf off Point Lowly showing the extent of fouling after 6 months in the water.