

### Supplementary Material

#### **Impacts of necrotising disease on the Endangered cauliflower soft coral (*Dendronephthya australis*)**

*Rosemary Kate Steinberg<sup>A,B,C</sup>, John Turnbull<sup>A,D</sup>, Tracy D. Ainsworth<sup>A,\*</sup>, Katherine A. Dafforn<sup>C</sup>, Alistair G. B. Poore<sup>A</sup>, and Emma L. Johnston<sup>A,D</sup>*

<sup>A</sup>Evolution and Ecology Research Centre and Centre for Marine Science and Innovation, School of Biological, Earth and Environmental Sciences, Faculty of Science, University of New South Wales, Sydney, NSW, Australia.

<sup>B</sup>Sydney Institute of Marine Science, Mosman, NSW, Australia.

<sup>C</sup>School of Natural Sciences, Macquarie University, Sydney, NSW, Australia.

<sup>D</sup>School of Life and Environmental Sciences, University of Sydney, Sydney, NSW, Australia.

\*Correspondence to: Tracy D. Ainsworth Evolution and Ecology Research Centre and Centre for Marine Science and Innovation, School of Biological, Earth and Environmental Sciences, Faculty of Science, University of New South Wales, Sydney, NSW, Australia Email: [tracy.ainsworth@unsw.edu.au](mailto:tracy.ainsworth@unsw.edu.au)

## Methods

### *Mapping*

Colonies were mapped by attaching a waterproofed GPSMaps2 to a dive float and taking a time-stamped photograph of each colony with a ruler for scale. Landmarks were also photographed as reference points for the platforms and colonies. The mapping area included the two rock platforms that make up the main Botany Bay population of *D. australis* and the seaward area ~200 m beyond the rock platforms.

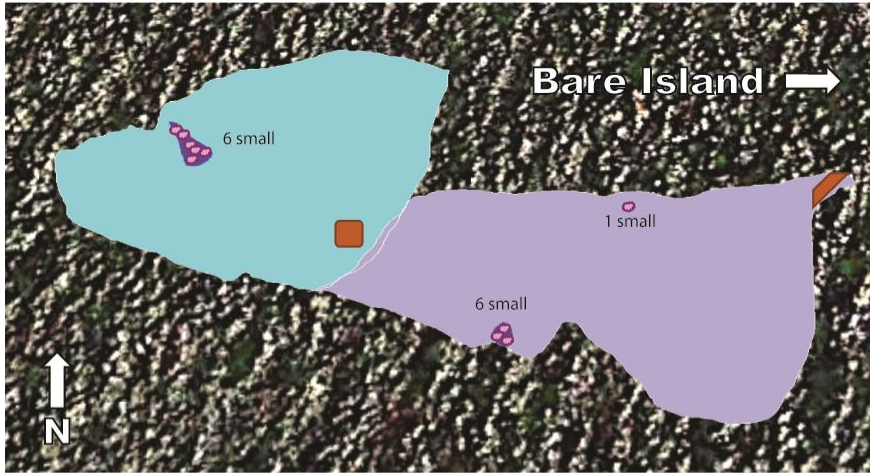
## Results

### *Mapping*

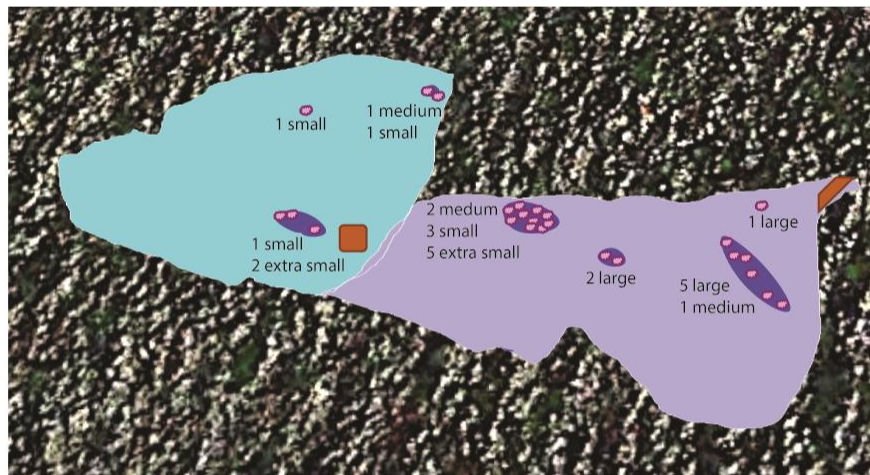
During pre-survey dives of the upper and lower platforms on 30 January 2018 and 19 March 2018, 19 and 15 colonies were photographed respectively (Table 2, Fig. S3, S4). In addition, in a single photograph at least 15 large colonies of *D. australis* were visible on the upper platform from the collection dive on 25 September 2018 (Fig. 3a). As the photographs were taken incidentally to sample collection, they do not represent the full population of *D. australis* on the study sites and would underestimate colony density, as such density was not calculated. Full platform photography was not possible as visibility during dives was always below 10 m. Colony decline was first observed on 22 December 2019 with possible predation damage to colonies noted and a nearly 50% decline in colony abundance estimated visually (J. Turnbull, pers. obs.). On 24 January 2020, only nine large colonies were found on survey, five of which had necrotic lesions (Fig. 2c). A few small colonies were also observed, though not surveyed. On 23 September 2020, despite extensive searching of both the upper and lower platforms, no large colonies and only a few small colonies were found, and photographs of the platforms showed no signs large of *D. australis* colonies (Fig. 3b). Landscape photographs of the platforms were taken from multiple angles to cover as much area as possible as the exact site of the initial photograph was unknown. Adjacent sponges and *Capnella* sp. octocorals appeared unaffected.

During surveys on 23 September 2020, we found 10 small colonies in two clusters (one of six and one of four individuals) on the upper platform, and only 3 colonies in one cluster were found on the lower platform. Results from the follow-up surveys on 9 October 2020, 9 March 2021 and 30 April 2021 are presented in Table 1 and Fig. S4. In addition to the colonies documented on the platforms, three large colonies were surveyed on 9 October 2020 ~125 m seaward of the platforms. On 9 March 2021, three medium and two small colonies were also surveyed ~90 m seaward of the platforms. On 30 April 2021, three medium, five small, and one extra small colony were found ~150 m seaward from the platforms.

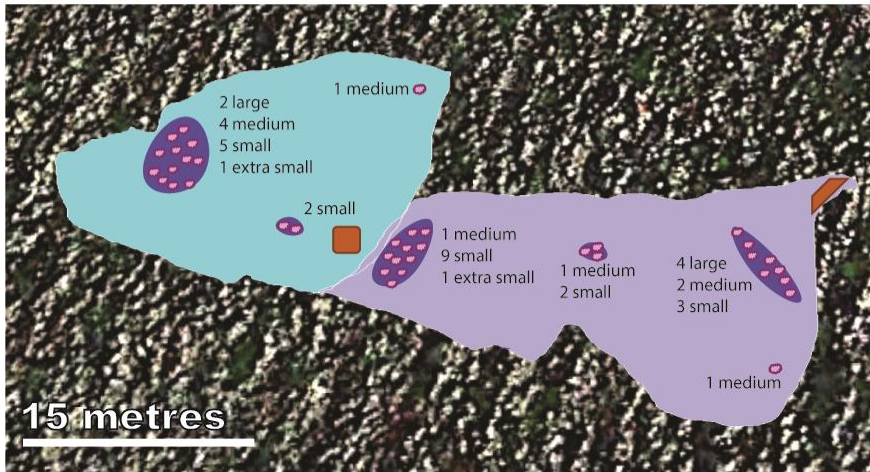
9 October 2020



9 March 2021

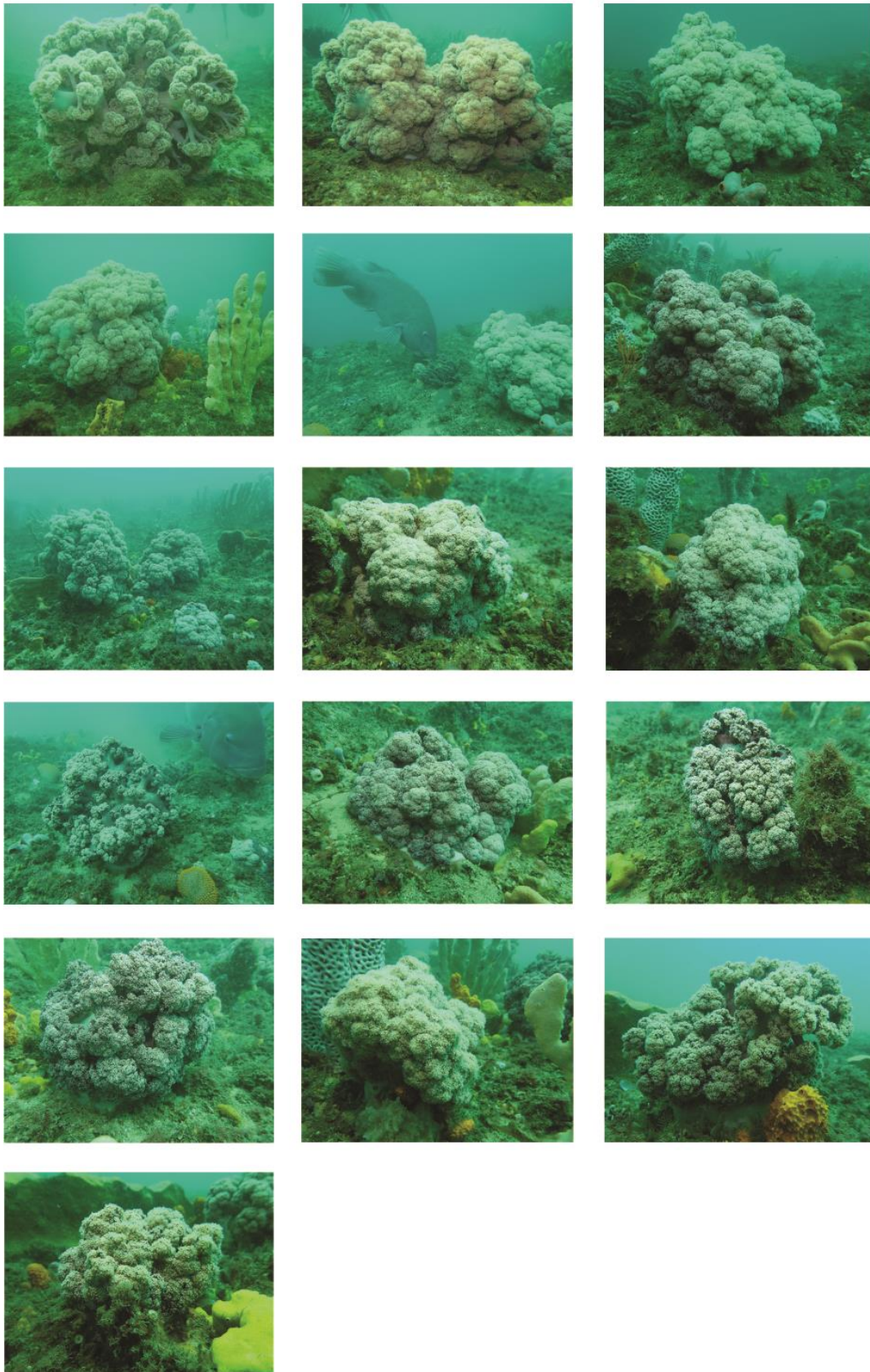


30 April 2021



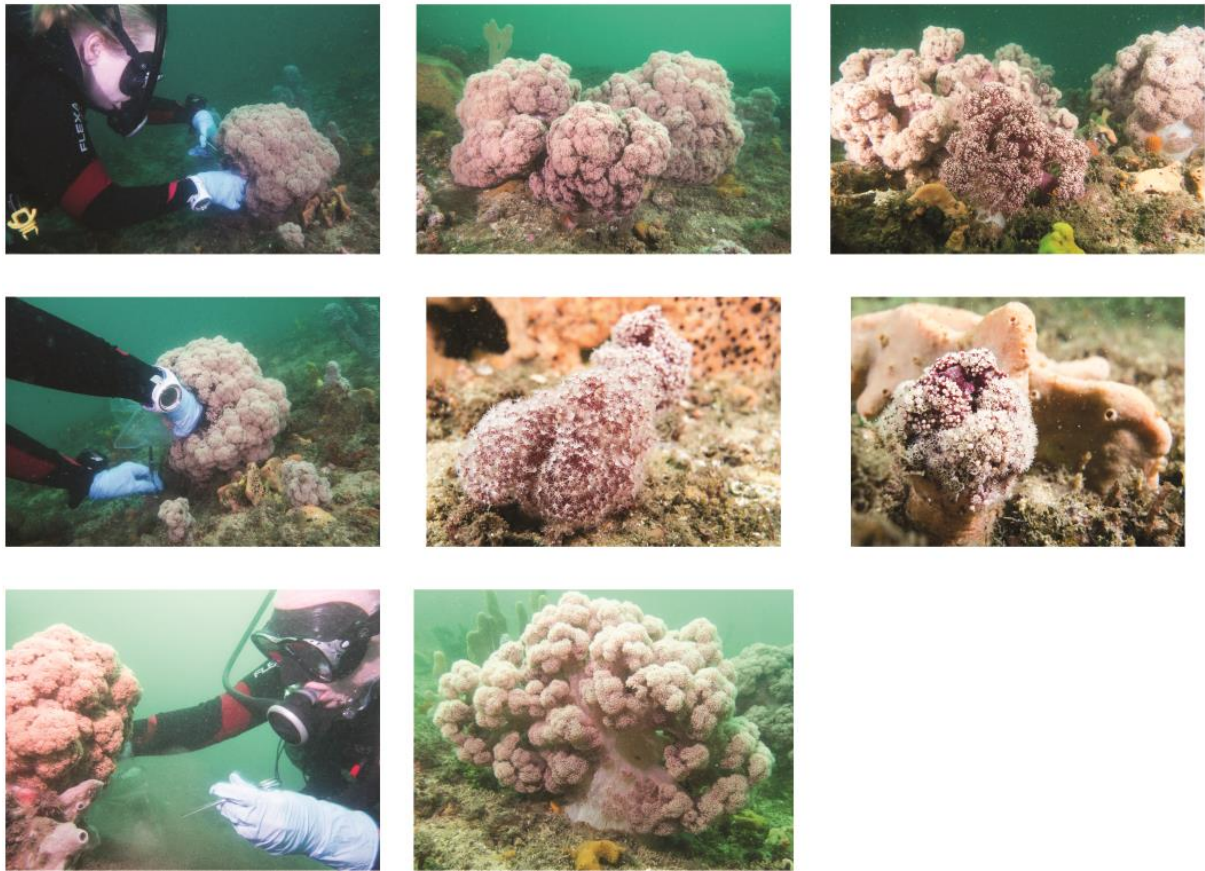
**Figure S1.** Maps of platforms and (a) surveyed *D. australis* colonies eight months after declines, (b) surveyed colonies 14 months after declines, and (c) surveyed colonies 16 months after declines. The upper platform is displayed in purple and the lower platform in blue. Brown polygons represent landmarks used in mapping. The lower platform perimeter measures 72.7 m, and the area measures 312 m<sup>2</sup>. The upper platform perimeter measures 94.3 m, and the area measures 347 m<sup>2</sup>. Map created in Google Earth Pro.

a) 30 January 2018



**Figure S2.** Photos of *Dendronephthya australis* taken during a non-survey dive on 30 Jan 2018. Each photograph is of a different colony or set of colonies.

19 March 2018



**Figure S3.** Photos of *Dendronephthya australis* taken during a non-survey dive on 30 January 2018. Each photograph is of a different colony or set of colonies.

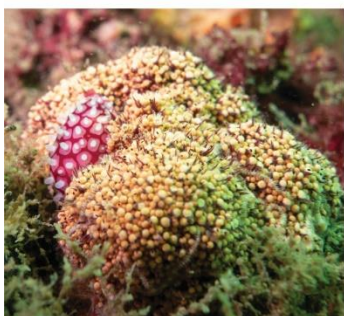
a) 24 Jan 2020



b) 24 Jan 2020



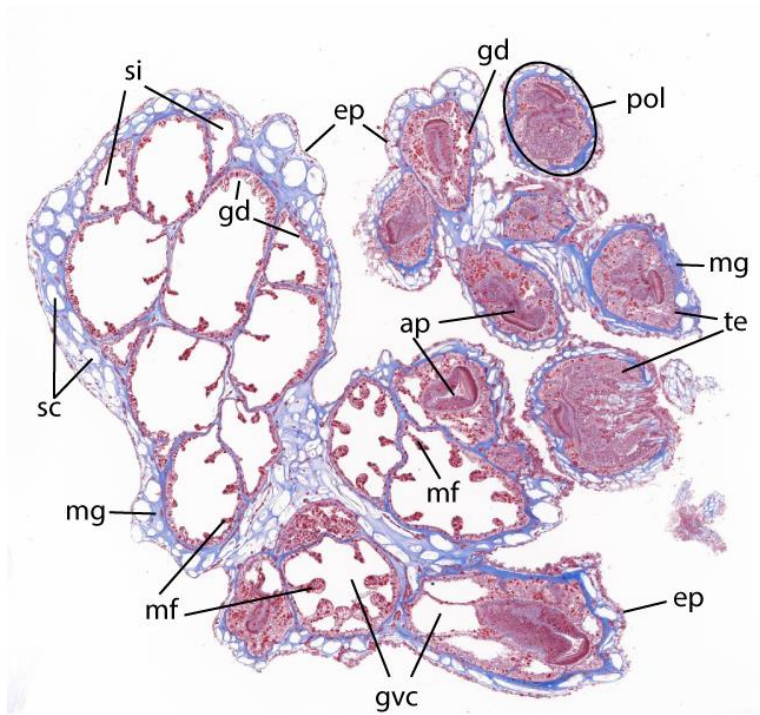
c) 9 Mar 2021



d) 30 Apr 2021



**Figure S4.** Egg cowries, *Globovula cavanagh*, on *Dendronephthya australis* through time. (a, b) *G. cavanagh* with eggs on large *D. australis* colonies, (c, d) *G. cavanagh* on small and extra small *D. australis* colonies.



**Figure S5.** Anatomy of *Dendronephthya australis*. Histology slice stained with Masson's Trichrome. Structures are labelled as follows: ep, epidermis; gd, gastrodermis; gvc, gastrovascular canal; si, siphonophores; mf, mesentery filaments; pol, polyp; ap, actinopharynx; te, tentacles; mg, mesoglea; and sc, sclerites.