

Supplementary Material S3 - Bayesian design methods for improving the effectiveness of ecosystem monitoring

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Supplementary Material S3 Exploratory analysis of the historical data

In this Supplementary Material, we show some results from an exploratory analysis of the historical data available for the Whitsunday region in the Great Barrier Reef. This analysis was undertaken so that we could gain a better understanding of the data, the potential relationships covariates have with hard coral cover and to determine whether certain modelling assumptions appear reasonable. For example, it appears that coral cover reduces (on average) as bathymetry increases (for the range of bathymetry values found in these data), and this relationship seems fairly consistent over the survey years and between the majority of reefs, see Fig. S1. Such a relationship seems reasonable given the role light plays in coral growth, survival and bleaching. In addition, modelling this as a linear term in our model seems reasonable as potentially a linear relationship is seen with the logit of coral cover (noting that this plot does not take into account other covariates). Summaries for the other covariates i.e. coral bleaching, chlorophyll, CoTS and CRS_T_AV, and how relationships change over time and between reefs can be made by examining the remaining plots.

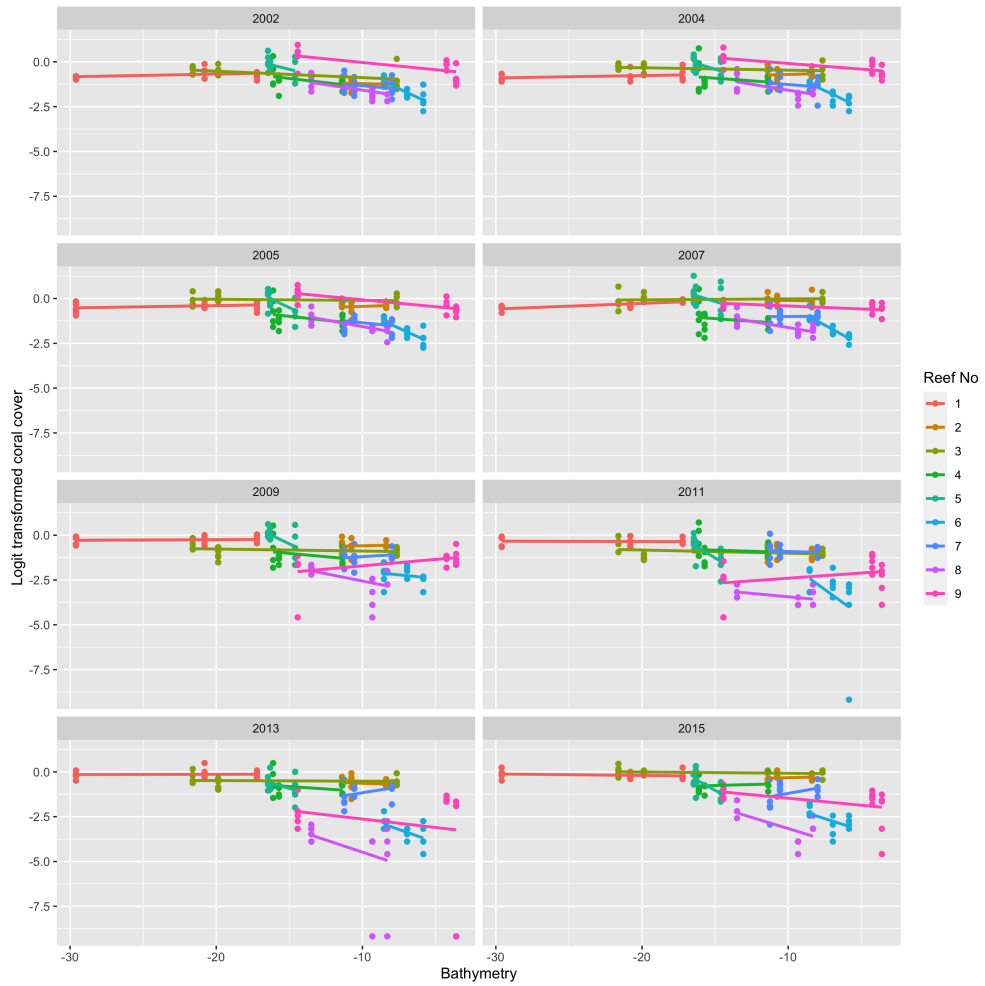


Fig. S1 Visualisation of logit transformed coral cover with respect to bathymetry in the Whitsunday region of the Great Barrier Reef. The data collected from different reefs in the Whitsunday region are shown using different colours. Refer to Table 1 for more details on covariates

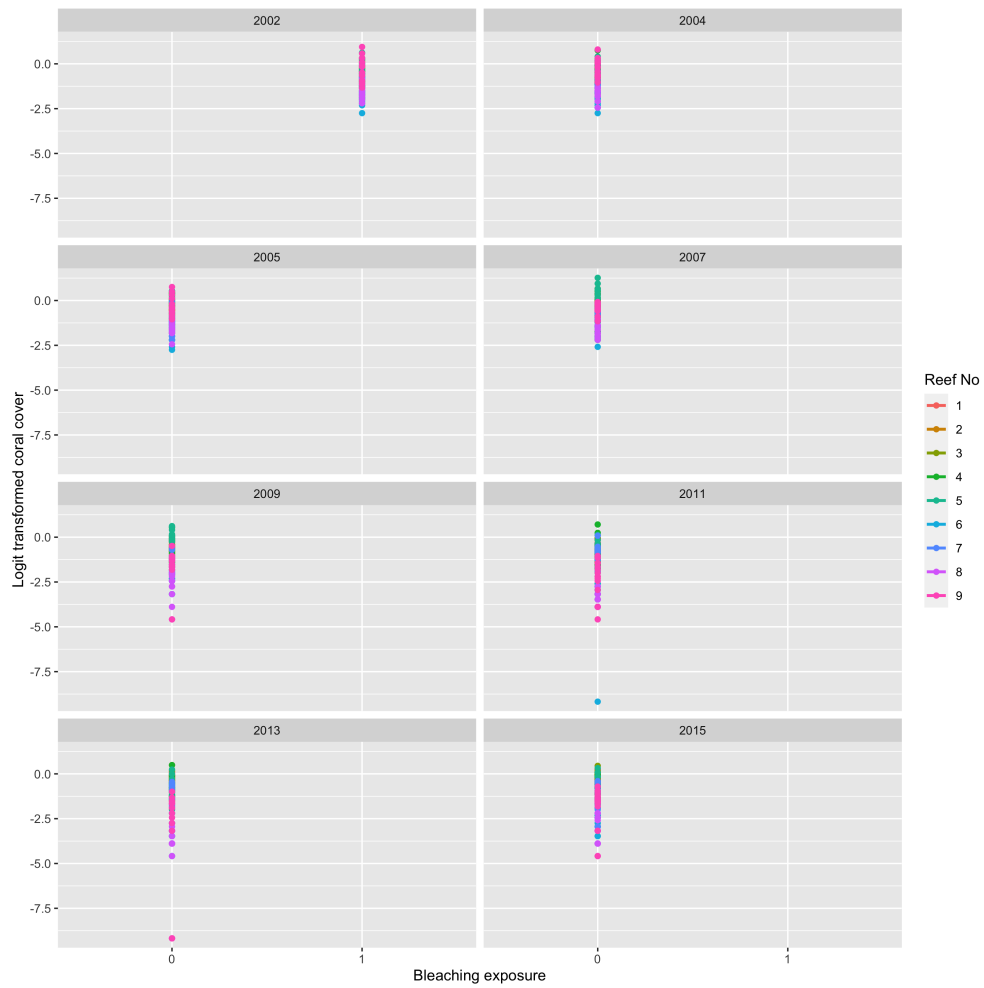


Fig. S2 Visualisation of logit transformed coral cover with respect to bleaching exposure in the Whitsunday region of the Great Barrier Reef. The data collected from different reefs in the Whitsunday region are shown using different colours. Refer to Table 1 for more details on covariates

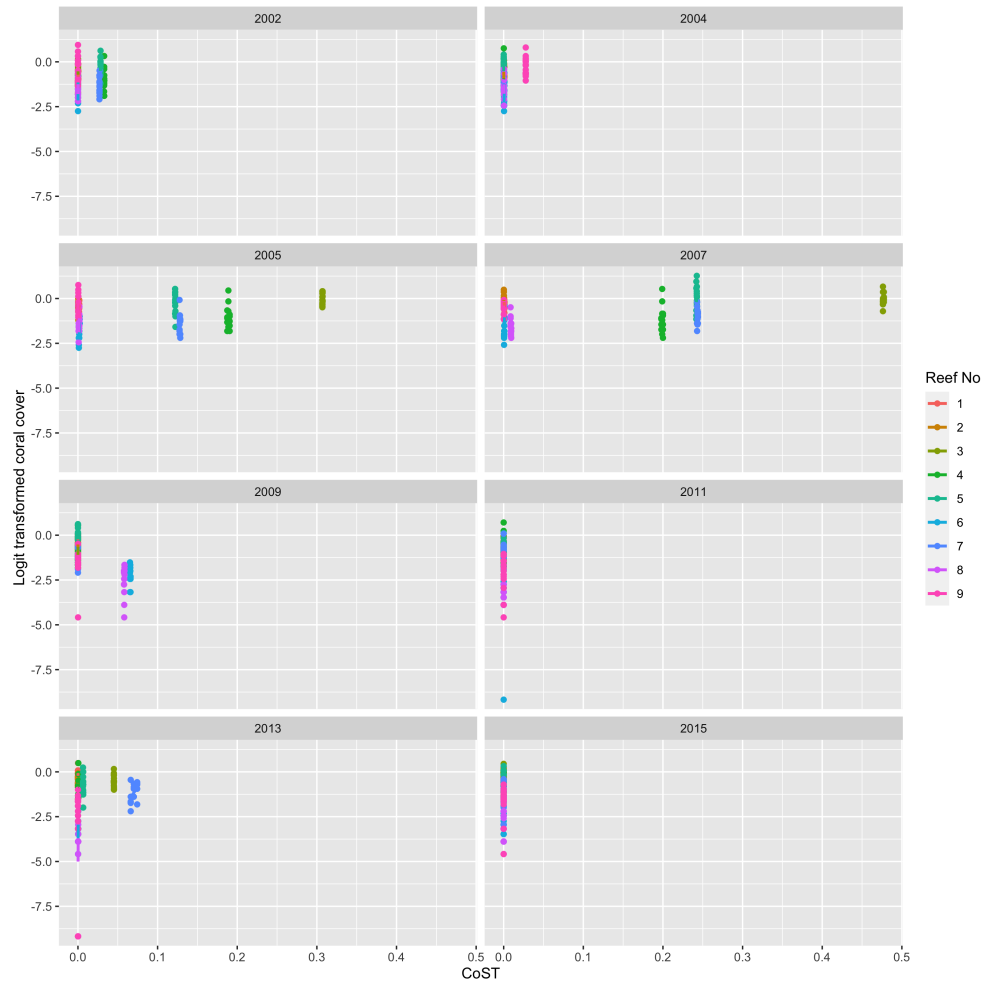


Fig. S3 Visualisation of logit transformed coral cover with respect to CoST in the Whitsunday region of the Great Barrier Reef. The data collected from different reefs in the Whitsunday region are shown using different colours. Refer to Table 1 for more details on covariates

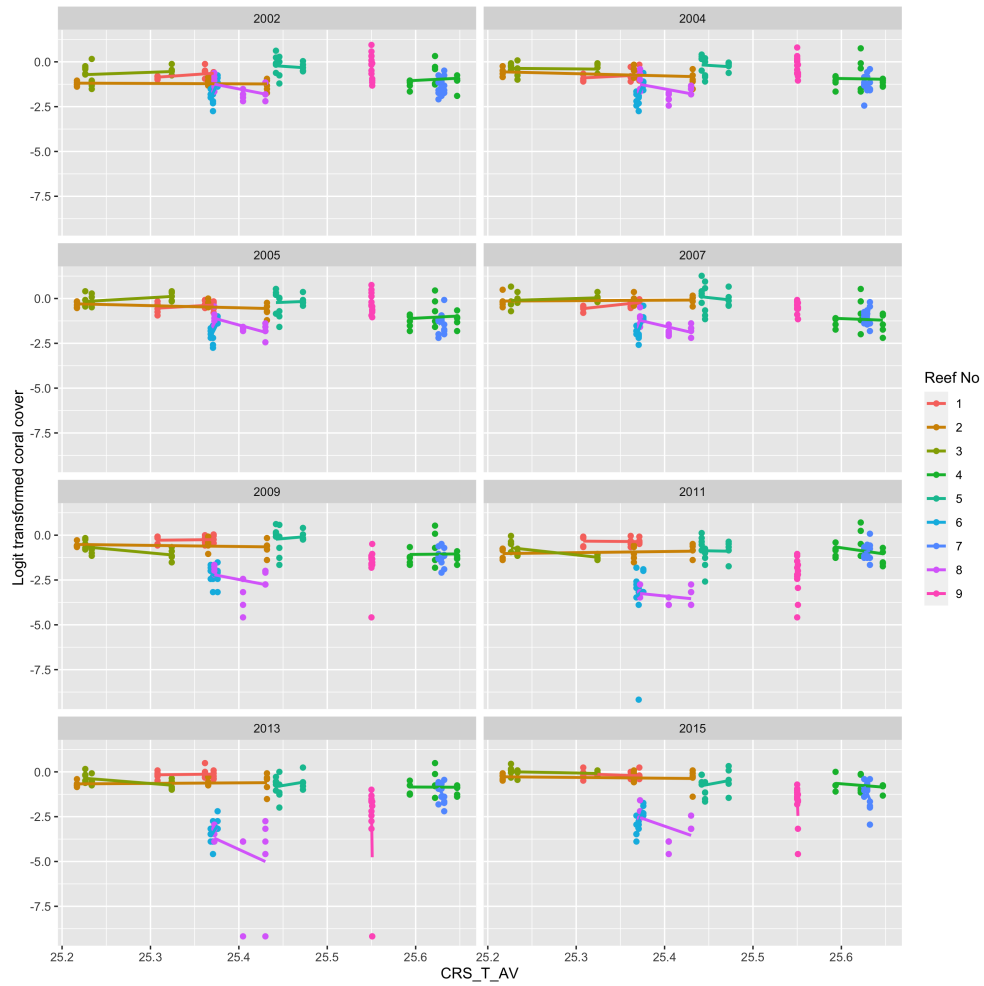


Fig. S4 Visualisation of logit transformed coral cover with respect to CRS_T_AV in the Whitsunday region of the Great Barrier Reef. The data collected from different reefs in the Whitsunday region are shown using different colours. Refer to Table 1 for more details on covariates