

**GORGON PROJECT ON BARROW ISLAND
OUTCOMES OF ADDITIONAL MARINE GROUND-TRUTHING
STUDIES TO INFORM IMPACT PREDICTION**

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BACKGROUND

Following release of the Draft EIS/ERMP in September 2005, ongoing marine field studies have resolved some questions of coral distribution around the Lowendal Islands that directly relate to the assessment of dredging related impacts to benthic primary producers and their habitats (BPPH). See Section 11.4.2 of the Draft EIS/ERMP for the initial assessment. For reference, a copy of Figure 11-13 from Chapter 11 of the Draft EIS /ERMP showing the Management Units and the existing map of marine habitats has also been attached to this report below.

Hydrodynamic modelling of the behaviour of the dredge plume indicated that areas to the south of the Lowendal Islands, along the eastern edge of the Lowendal Shelf, would be exposed to elevated concentrations of suspended solids for long periods. Coral sensitivity criteria were established based on published coral responses to natural and artificial sedimentation and turbidity stress. In the absence of directly relevant data, very conservative sensitivity criteria were adopted for predicting the probable zones of impact associated with the dredge plume. The prediction of 'moderate' and 'high' impact zones, based on varying concentrations and exposure times, was used in assessing the probable impacts of the proposed Gorgon Project dredging. The accuracy of these predictions is therefore dependent on both the accuracy of the hydrodynamic model in predicting the behaviour of the dredge plume and on the applicability of the coral sensitivity criteria to coral habitats in the area of influence.

The modelling and coral sensitivity criteria lead to the prediction of a moderate impact zone encompassing a small high impact zone over a large proportion of the 'unconfirmed' coral habitat in the area. The assessment of BPPH loss in the Draft EIS/ERMP was based on the distribution of 'unconfirmed' coral in the existing broad-scale CALM map of the region and scant ground truth data of the distribution of corals in this area. To ensure conservatism, the assessment was based on the assumption that all of the unconfirmed coral areas were sensitive and well developed coral communities.

The original assessment of BPPH impacts in MU2 and MU3 in the EIS/ERMP states: There are no known areas of benthic primary producer habitat in these management units that would take longer than 30 years to recover under the worst case scenario. However, in the absence of adequate mapping data, it is assumed that all of the unconfirmed coral benthic primary producer habitat in the high and moderate impact zones may be long-lived *Porites* bombora or well developed *Acropora* communities. This approach is expected to greatly over estimate the representation of these benthic primary producer

habitat types, given their rarity in other areas, and will similarly over estimate the extent of potential impacts. Ongoing field surveys will confirm the distribution of these communities on the Lowendal Shelf and around the Lowendal Islands.

The current investigations were to establish the presence of well developed coral habitats in the area on the eastern Lowendal Shelf that was predicted to be subject to moderate – high impacts from the plume of suspended solids (Figures 11.4 & 11.5 in Chapter 11 of the Draft EIS/ERMP).

SURVEY RESULTS & INTERPRETATION

Field surveys conducted in September/October 2005 revealed that there is little coral in the predicted impact area to the south of the Lowendal Islands. While there are coral bombrora in places along the edge of the eastern Lowendal Shelf, the large expanses of ‘unconfirmed coral’ (Figures 11.4 & 11.5) have been reclassified as limestone pavement supporting variable cover of macroalgae and scattered corals. The scattered corals are generally isolated colonies and do not represent coral communities. This habitat (green in the figures) is very widespread in the area and BPPH impacts have been assessed primarily on the basis of the predicted impacts to the dominant macroalgae BPP.

Consequently, the highly conservative calculation of cumulative loss thresholds has been revised for the Lowendal Island Management Units (MU2 & MU3) and for two Barrow Island Port Management Units (MU5 & MU6).

Field validation of the 3D hydrodynamic modelling in September 2005 supported the original modelling outcomes (refer to GEMS report) and zones of impacts to corals associated with dredge plumes and sedimentation (see Section 11.3) have not been revised. The accuracy of the predicted cumulative impact levels is necessarily dependent on the assumed accuracy of the hydrodynamic modelling. The recently acquired validation data for the hydrodynamic model is currently under consideration by the EPA.

Ongoing ground-truth surveys supported the prediction that corals were over represented in the impact area by the existing map. The over representation of corals in the area and the conservative approach to the impact assessment led to over estimating the proportion of coral BPPH that would be affected by dredging. The cumulative losses of coral BPPH within each management unit have been revised in the following.

MANAGEMENT UNIT 2

Ground truth data indicate that the unconfirmed coral in MU2 that falls within the moderate impact zone of dredge related impacts is macroalgae dominated BPPH. Only 7 % of the remaining confirmed and unconfirmed coral BPPH in this management unit lies within the moderate impact zone and this largely comprises resilient corals that would not suffer high mortality. The small coral community off Abutilon Island that would be exposed to moderate impacts from the predicted TSS plume is dominated by resilient *Porites* corals. These corals and the macroalgae dominated BPPH in other parts of the TSS plume are expected to recover from partial mortality completely within 30 years and the cumulative loss of BPPH is considered to be zero for this management unit.

Under the best, anticipated and worst case scenarios, the turbid plume would affect less than 2 % of the known coral BPPH in the management unit or less than 1 % of the total of confirmed and unconfirmed corals (in unsurveyed area to the north). The predicted temporary impacts to coral BPPH in management unit 2 will be less than the cumulative loss thresholds of 10%. Damage to the macroalgae dominated BPPH would be temporary and these areas are expected to recover full functionality within 5 - 10 years.

MANAGEMENT UNIT 3

Ground truth data indicate that most of the unconfirmed coral in MU3 that falls within the moderate impact zone of dredge related impacts is macroalgae dominated BPPH. Of the mapped 613 ha of unconfirmed coral, one small area (1 -2 ha) of *Porites bombora* was confirmed on the edge of the Lowendal Shelf and the remainder was re-classified as macroalgae dominated BPPH. The moderate impact zone includes <2 % of scattered coral community BPPH in this management unit. Most of the affected coral in the moderate impact zone is resilient *Porites* coral *bombora* and these communities are expected to recover from partial mortality in less than 30 years. There are no well developed coral communities within the high impact zone.

The coral and macroalgae dominated BPPH in this management unit are expected to recover completely from dredge related impacts within 30 years and the cumulative loss of BPPH is considered to be zero for this management unit.

Under the best, anticipated and worst case scenarios, the losses of coral BPPH in Management Unit 3 will be less than the cumulative loss threshold of 2 %. The damage

to the macroalgae dominated BPPH would be temporary and these areas are expected to recover full functionality within 5 - 10 years.

MANAGEMENT UNIT 4

Ground truth data indicate that the unconfirmed coral off the north eastern coast of Barrow Island in MU4 is a well developed coral community dominated by acroporids and poritids. This supports including this area of BPPH in assessing the total area of coral BPPH in the management unit. Therefore, the cumulative loss total remains less than 1 %, within the 10 % cumulative loss threshold.

MANAGEMENT UNIT 5 & 6

Ground truth data indicate that the unconfirmed coral in MU5 and MU6, that falls within the moderate impact zone of dredge related impacts, is macroalgae dominated BPPH. No well developed coral communities have been found within the moderate impact zone on the eastern side of the Lowendal Shelf.

Cumulative impacts to macroalgae BPPH is considered to be zero as these areas will recover full functionality within 30 years.

CONCLUSIONS

Field ground-truth data from the areas of 'unconfirmed' coral habitats along the eastern edge of the Lowendal Shelf indicate that coral habitats are grossly over estimated in this area. The 'unconfirmed' coral habitats have been re-classified as macroalgae on pavement reef. Estimated losses of coral BPPH in Management Units 2,3 ,5 and 6, that exceeded the BPPH guidance cumulative threshold criteria in the EIS/ERMP, were revised on the basis of the new habitat data and do not exceed the relevant thresholds.

The responses of corals and other BPPH to cumulative turbidity and sedimentation exposure will be examined on the basis of an ongoing literature review and the zones of impact will be re-defined as necessary to inform the EPA's assessment.

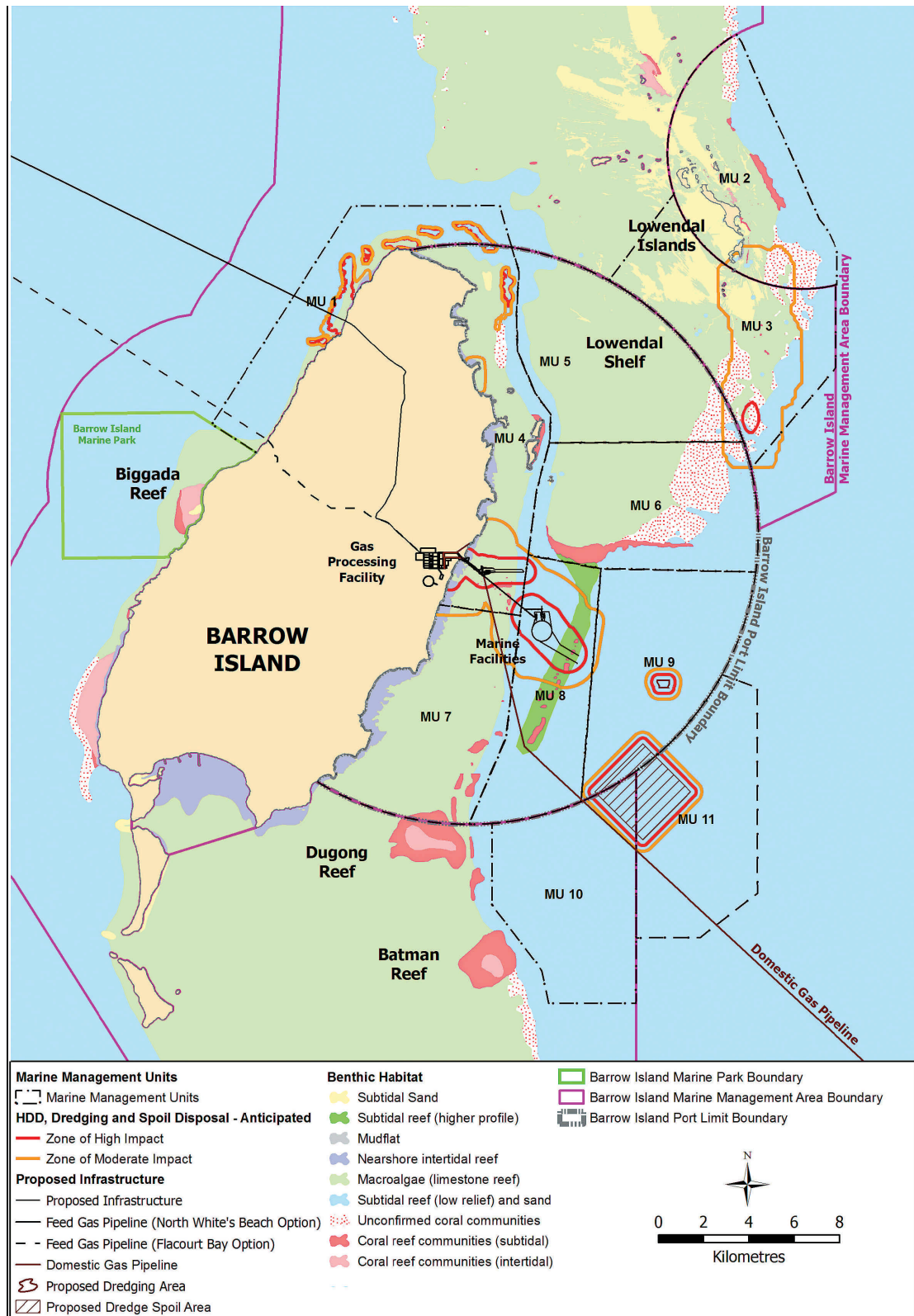


Figure 11-13 from Chapter 11 of the Draft EIS/ERMP