

## TECHNICAL REPORT NO. 5:

### Impact Of Tourist Pontoons On Fish Assemblages On The Great Barrier Reef

#### EXECUTIVE SUMMARY

**This project by Dr Hugh Sweatman of James Cook University\* studying two carnivorous fish species, provides further insight into the impacts of fish feeding at tourist pontoons on the Great Barrier Reef and the requirements for management.** Both fish species, the spangled emperor, *Lethrinus nebulosus* and the red bass, *Litjanus bohar*, commonly aggregate around tourist pontoons and vessels in response to feeding. While behaviour of the two species varies, feeding reinforces spatially located aggregating behaviour around the actual tourist pontoons. Fish feeding for both species is observed to be the primary cause of formation of aggregations and, as such, feeding must be a key component to any management regime required around tourist pontoons.

For many tourists, observing schools of fish is an important part of the day's visit, whether it be watching the fish naturally in the water while snorkelling or diving or controlled feeding activity from the boat or pontoon. Many Reef managers have been concerned about the impacts this feeding might have on the natural regime of reefs. Concerns include possible depletion of aggregating species from other sections of the Reef and a concentration of feeding activity (and thus impact on other species) around tourist pontoons. Monitoring programs for tourist pontoons have been put in place by Reef managers based on the assumption that one or both of these impacts were occurring. For example, monitoring programs often require that fish census be taken at pontoon sites with aggregations and at control sites without aggregations.

**The project has shown however** that such a monitoring system based on 'presumed change' may be inappropriate. Both these species, and many others that are found in aggregations around pontoons, naturally form aggregations at particular sites on reefs or at least spend the day time within a restricted area.

Regarding the second assumed impact of increased predatory effort around the tourist pontoons, the project has, through observation of fish behaviour and analysis of densities of likely prey, determined that this impact is minimal, probably of no consequence. Certainly for red bass, predation on natural prey is very limited. A comparatively significant but still very small subset of the spangled emperor aggregations did feed on their natural prey. The impacts of this predation are not readily detectable within the bounds of the methods available.

**So, in summary, what are the management requirements of aggregations around tourist pontoons?** From this project it appears the only area of management activity might need to be the quantity and quality of the feed itself. Fairly obviously, from a fish health perspective, it can be assumed, based on experiences with feeding terrestrial wildlife, that the closer fish food mimics the fishes' natural diet, the better.

Regarding the quantity of food provided, time and logistic constraints meant that it was not feasible to determine just what proportion of their daily ration the fishes in the aggregations obtained from the fish feeding events. If the natural daily ration is augmented significantly in this way, two kinds of impacts can be foreseen. Increased food intakes could lead to increased survival rates and hence higher local population

levels. Alternatively the additional food intake may lead to increased reproductive output. Since natural prey are available and given the intense physical competition among members of the aggregation for the extra food, the second alternative is more likely. The aggregations represent only a small proportion of the population on a reef and considering the likely dispersal trajectories of planktonic larvae, any such increase in reproduction is likely to be diluted over regions rather than reefs and so will be vanishingly small.

**The findings of this project suggest** that the quantities of food currently provided, while certainly sufficient to ensure aggregation, are having at most a very limited impact on the populations of fishes or their prey. Managers may need to set limits on total quantity of food and specify food quality as the only monitoring requirements for fish aggregations at tourist pontoons.

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