Cairns Marine Plant Management Strategy process and update

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Abstract

Cairns Regional Council lies within the Wet Tropics of North Queensland where a dense network of waterways and tidal creeks can be found in close proximity to urban areas. A key management issue for Cairns Regional Council, therefore, has been managing marine plant growth within and adjacent to these waterways for flood mitigation, public safety and access purposes. Fisheries Queensland also has an interest in managing these waterways suitably as they contain important fisheries habitat.

Cairns Regional Council and Fisheries Queensland have jointly developed the Cairns Regional Council Marine Plant Management Strategy (MPMS). The MPMS provides a strategic framework for the management of fish habitats, in particular protected marine plant communities. The primary aim of the strategy is to strike a balance between the maintenance and construction of public infrastructure and the ecological functioning of fish habitats for long-term community and fisheries benefit. To achieve this, the strategy provides site specific operational plans in 33 drainage catchments - with each plan displaying the relevant marine plant management action/s to be applied for the purpose of achieving a particular purpose e.g. flood mitigation whilst maintaining important fisheries values.

The benefits of the MPMS include adaptive approaches to fish habitat management through the inclusion of innovative techniques, such as hedging and selective removal of mangroves, whilst reducing red tape and costs for numerous development applications. The strategy also enables council greater flexibility by endorsing the MPMS under the Fisheries Queensland self assessable code MP06 (Minor impact works in a declared fish habitat area of involving the removal, destruction or damage of marine plants). Based on these merits, Fisheries Queensland strongly encourages the increased adoption, development, and implementation of Marine Plant Management Strategies throughout Queensland for the management of fish habitats by local governments and other coastal management authorities.

Introduction

Fisheries Queensland, a part of the Department of Agriculture, Fisheries and Forestry (DAFF) manages fisheries resources within Queensland. Currently all marine plants in Queensland are afforded protection under the *Fisheries Act 1994*.

Marine plant communities are provided this protection given their important role as fisheries habitat. Marine plants provide important fish habitats through structural complexity, shelter for food organisms and for juvenile and forage fishes at high tide, and feeding opportunities for fish, crabs and molluscs. (Couchman *et al.*, 2006). With 75% by weight and 80% by volume of the Queensland commercial fishing catch derived from species that spend all or part of their life in mangrove associated estuarine habitats, the contribution of these habitats to fisheries production is $15.2 million annually (State of Queensland 2009). Queensland recreational catch, targeting many of the same estuarine species as found in the commercial catch, generates additional value to the economy. Cairns is know to have a number of commercially viable species such as the leader prawn (*penaeus monodon*) and

barramundi (*lates calcarifer*) present in the urban waterways (Clarke et al1996). The *penaeus mondon* breeding grounds within Saltwater Creek in Cairns is one of only two known locations in Far North Queensland where this occurs.

Marine plants have other values; assisting with improved water quality by supporting nutrient uptake from receiving waters and also assisting with erosion control by stabilising creek banks. Coastal marine plants are also known to provide protection from storm surge (Bell 2013). The marine plant vegetation within Queensland has been mapped from the Tweed border to the Northern Territory border. Mangroves occur in approximately 18% of the coastal environments. Queensland has 39 species of mangroves and 32 species of saltmarsh making it one of the most diverse areas in Australia for coastal habitats (Duke 2006, Johns 2010)

Under the provisions of the *Sustainable Planning Act 2009* development approvals can be issued by Fisheries Queensland to disturb or destroy marine plants if in accordance to the State development assessment provisions. Historically local governments throughout coastal Queensland have required numerous marine plant disturbance approvals for works maintaining existing infrastructure or to reduce flood risks within urban areas. More recently local councils have been able to do maintenance works that involve removal or damage to marine plants through the Fisheries Queensland self assessable code process. There are a number of self assessable codes allowing minor disturbance to marine plants which local councils can use for works with the main two listed below:

Maintenance works on existing lawful structures (other than powerlines and on-farm drains) in a declared Fish Habitat Area or involving the removal, destruction or damage of marine plants
MPO2 January 2013
http://www.daff.qld.gov.au/__data/assets/pdf_file/0015/51603/MP02-Existing-lawful-structures-2011.pdf

Minor impact works in a declared Fish Habitat Area or involving the removal, destruction or damage of marine plants
MPO6 January 2013
http://www.daff.qld.gov.au/__data/assets/pdf_file/0010/73927/MP06-minor-new-works-June2012.pdf

Rather than councils submitting numerous notifications for works under these self assessable codes, a number of councils have produced Marine Plant Management Strategies (MPMS) which encompass all maintenance works involving marine plant disturbance which is endorsed by Fisheries Queensland under the MP06 self assessable code. The MPMS process establishes a structured co- management approach for long term community and fisheries benefits. To date there are three MPMS with the following councils:

- Bundaberg Regional Council (2005, updated 2010 and 2012)
- Cairns Regional Council (2010 updated 2013)
- Fraser Coast Regional Council (2011)

Cairns Regional Council was the first local government to produce a MPMS with all the operational plans in place outlining specific works for each site. Since its implementation in 2010 a number of new areas of work have been identified and the MPMS has been reviewed to streamline the operational implementation of the document.

Background

Built on the coastal lowlands within Queensland's wet tropics region, Cairns urban area lies primarily between the coastal wetlands and the Great Dividing Range. Given its low lying landscape Cairns is prone to flooding especially when heavy rainfall events coincide with high tides. There are dense networks of natural and artificial waterways within the Cairns urban area which are both tidal and freshwater. These waterways provide a valuable nursery area for many species of fish and prawn but also have to service the region by providing adequate flood mitigation to residents and business' alike (Clarke 1996).

Cairns has had an urban drainage network in place since World War II primarily to drain wetlands where mosquitoes were a health problem, carrying malaria and Ross River fever. In the 1970s improvements to the drains occurred including widening and deepening to try and improve flood capacity. The effectiveness of these works is not clear although it did allow further saltwater tidal intrusion upstream modifying freshwater ecosystems into now tidal wetlands. The colonisation of these waterways by marine plants has created an ongoing maintenance dilemma for Cairns Regional Council often restricting flood flows and increased sedimentation.

Cairns has a high biodiversity of mangroves compared with other major coastal cities in Queensland. Whilst Brisbane has around 5 species of mangroves, Cairns boasts around 32 different species throughout the region and within the urban modified waterways. Not only are there more species of mangroves in Cairns but the growth rate of mangroves in the region are at a greater rate than southern regions. Certain species of mangroves within the Cairns waterways can grow up to 1.5 metres in a 12 month period. This growth rate increases the management responsibility by Cairns Regional Council.

The Cairns region can receive approximately two (2) metres of rainfall each year falling predominantly during the summer months between December and April (BOM, 2010). Certain areas of Cairns are still subject to localised flooding and the majority of Cairns urban drainage system is seen as under capacity to accommodate a 100 year ARI flood event (GHS 1994). Existing, future and residual flood risks need to be managed to reduce the social and economic impacts of flooding on the community. A major task for Cairns Regional Council, therefore, is managing Cairns' waterways to mitigate flood damage whilst taking into account their fisheries and biodiversity values.

'Managing' waterways for flood mitigation purposes has a long history in Cairns and many strategies have been adopted to achieve the current level of flood immunity. Historically, most of these efforts have targeted improving and/or maintaining the hydraulic functioning using a hard engineering approach eg waterway straightening, deepening, and widening in addition to the installation of flood gates.
Whilst some of these methods may have improved the flood mitigation potential of Cairns' waterways they often reduce habitat values for fish and also reduce the water quality throughout the catchment which ultimately can impact on the adjacent Great Barrier Marine Park.

Aims of the Marine Plant Management Strategy

The Cairns Regional Council produced their first Marine Plant Management Strategy in 2010. The aims of the strategy were to:

- Foster a common understanding of the importance of estuarine habitats to fisheries production and to the social, economic and environmental values of the local community
- Identify, endorse and document key marine plant communities that will be protected from future development and/or enhanced based on the extent of marine plants in 1990
- Ensure fish habitat resources under Council responsibility are managed in an ecologically sustainable manner
- Provide a strategic framework for local government planning and public infrastructure maintenance and construction works within or adjacent ot fish habitats
- Develop **innovative** marine plant management techniques such as trimming, canopy lifting and restoration of degraded marine plant communities to achieve long term protection of fish habitats and meet community requirement for access and passive recreational use and
- Reduce administrative cost for both Local Government and Fisheries Queensland associated with the integrated development assessment system (IDAS) process and fisheries development approvals (there are no fees associated with a Marine Plant Management Strategy endorsement)

The 2010 MPMS contained 14 catchment operational plans mostly in the inner city catchments of Cairns. There are four categories of marine plant treatments

1. protect marine plants
2. restore marine plants
3. marine plant free and
4. modify marine plants

The experience so far

During the first three years of operation of the CRC MPMS Cairns Regional Council submitted approximately 100 notifications for works under the MPMS. Many of these were maintenance of infrastructure such as bridges and stormwater outfalls, but a majority were associated with waterway maintenance to mitigate flooding impacts on the community.

One of the innovative techniques implemented by Cairns Regional Council under the 2010 MPMS was the hedging of marine plants on one bank to allow dredging to still occur within the bed of the waterway. This method maintained bank vegetation to assist with fish movement and habitat but also allowed desilting and increased hydraulic capacity within the waterway.

Certain marine plant species can survive trimming whilst other species are more sensitive and don't have the capacity to send out new growth (Clarke, 2002). The adaptive management process of the MPMS, as previously discussed, allows each site identified by council requiring flood mitigation maintenance, to be dealt with individually. Where there are tall mature mangroves on a waterway that requires maintenance the management option agreed to by Fisheries Queensland is to remove the vegetation from one bank to allow access for removal of silt or mud then allow natural revegetation of the cleared bank and future trimming and hedging of young mangrove plants. When mangroves are trimmed at an early part of their growth cycle

they often survive. To trim mature trees at the same location would often result in the death of the tree. In some locations trimming of mature trees from the outset of maintenance worked effectively.

A number of waterways in Cairns have had their mangroves hedged. Initially the result can be severe with exposed trunks and minimal foliage. Often within 6 months the mangroves have recovered and new thick foliage is evident. Where trees have not recovered successfully Cairns Regional Council has either actively revegetated the banks or natural recruitment has taken place.

After 3 years of the MPMS being in place it can be determined that the hedging component is effective in addressing both Fisheries Queensland and Cairns Regional Council requirements.

Whilst this method of trimming is suitable for Cairns Regional Council requirements it might not be as effective for other councils given variation in mangrove species and growth rates. This is where the MPMS can be adaptive with different management regimes identified depending on the requirements of the council or entity producing the strategy.

In the new updated MPMS that CRC have produced additional sites have been added which previously were identified under the MP02 self assessable code or else new works on waterways now requiring flood mitigation management. An additional 19 catchment operational plans have been added to the MPMS with a majority encompassing maintenance of existing infrastructure.

Conclusion

The benefits of the Marine Plant Management Strategy process is that both local government and Fisheries Queensland can discuss management options that are more flexible for both parties which can achieve both infrastructure and community benefits and fisheries benefits at the same time. It also allows work program certainty for council and improved collaborative monitoring and data exchange between local government and Queensland government.

Although Cairns Regional Council management of marine plants is fairly unique on the Queensland east coast due to its annual rainfall and low lying nature the concept of adaptive management arrangements can be reflected in MPMS's for other councils, ports or public entities.

It is recommended that any MPMS be reviewed on a regular basis. Originally the Cairns Regional Council MPMS was going to be reviewed every two years but with time constraints and the scope of works proposed it ended up being a three year review which resulted in a better, more comprehensive strategy.

Take home message

Marine Plant Management Strategies reduce red tape, encourage innovative ways of managing marine plants and ultimately reduce costs to local governments.
Developing marine plant management strategies meets the objectives of the State's planning reform agenda by reducing red-tape and costs for public infrastructure maintenance and construction.
Fisheries Queensland encourages other local governments, ports or public entities to engage with Fisheries Queensland to develop a Marine Plant Management Strategy and adopt a more strategic, less bureaucratic, approach to marine plant management.

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