

# Balancing Fish Habitat Management and Impact of Development

Nicole M<sup>c</sup>Kirby<sup>1</sup>, Celeste Bownds<sup>1</sup>, Louise Johns<sup>2</sup> and Melissa Dixon<sup>3</sup>

<sup>1</sup>Southern Fisheries Centre, Queensland Department of Primary Industries and Fisheries, PO Box 76, Deception Bay Queensland 4508

<sup>2</sup>Northern Fisheries Centre, Queensland Department of Primary Industries and Fisheries, PO Box 5396, Cairns Qld 4870

<sup>3</sup>Queensland Department of Primary Industries and Fisheries, GPO Box 46, Brisbane Qld 4001

## ABSTRACT

Coastal fish habitats are critical to the recreational, commercial and indigenous fishing conducted in Queensland's estuaries and inshore waters. These same habitats are often the target of development which extends from terrestrial lands into tidal and subtidal waters. For managers of fish habitats, the challenge is to balance these competing demands in a way that highlights the values (environmental, social, and economic) and roles of fish habitats and the fisheries that these support. The Department of Primary Industries and Fisheries (DPI&F) assesses coastal development applications that may result in fish habitat loss or disturbance throughout Queensland. New developments proposing removal of mangroves or other marine plants, construction of waterway barriers, or placement of new structures in declared Fish Habitat Areas trigger DPI&F's role in development assessment under the *Integrated Planning Act 1997*. As a condition of development approvals, DPI&F often requires that applicants counterbalance unavoidable, negative impacts on fish habitats through appropriate offsets.

Offset requirements for impacted fish habitats are determined by DPI&F policy and in accordance with Queensland fisheries and planning legislation. The Department's policy *Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss, 2002* has recently been incorporated into the *Queensland Government's Environmental Offsets Policy, 2008*. Offsets for marine fish habitat loss or disturbance include habitat rehabilitation and/or creation, conservation of habitats, the surrender of tidal freehold land, and financial contribution to fish habitat research projects. Selected case studies from throughout coastal Queensland describing application and delivery of fish habitat offsets are featured.

## INTRODUCTION

Fish habitats commonly found along the Queensland coast include mangrove, saltmarsh, samphire and seagrass communities, rocky outcrops and reefs, salt pans, shallow sand and mud flats, beaches and coral reefs. Coastal fish habitats, including those that are devoid of vegetation provide for spawning, breeding, migration, feeding, growth and shelter for fish species of significance to Queensland fisheries. These habitats are critical to the recreational, commercial and indigenous fishing conducted in Queensland's estuaries and inshore waters (Meynecke *et al.* 2007). It is estimated that 75% (by weight) of the fish and crustaceans caught commercially in Queensland is derived from species that spend part of their life in estuarine habitats (Quinn 1992).

With the majority of Queensland's population and associated activities located along the Queensland coast line, coastal fish habitats are often subject to direct and indirect, often permanent, anthropological impacts. Activities such as commercial and urban development, tourism and agriculture are increasing pressure and directly impacting on Queensland coastal fish habitats (Zeller 1998 and Lee *et al.* 2006).

The Queensland Department of Primary Industries and Fisheries (DPI&F) protects and manages Queensland fisheries resources and fish habitats under the *Fisheries Act 1994* (FA 1994) and the *Fisheries Regulation 1998*. Fisheries development approvals are required for works that involve the disturbance of marine plants, works within declared Fish Habitat Areas, the raising or building of a waterway barrier and the development of aquaculture activities. The Department administers fisheries development approvals under the provisions set out in the *Integrated Planning Act 1997* (IPA 1997).

Fish habitat management operational policy (FHMOP 005) *Mitigation and compensation for works or activities causing marine fish habitat loss* outlines DPI&F offset (mitigation and compensation) requirements for fisheries development approvals issued in accordance with the FA 1994 (Dixon and Beumer 2002). In 2008 the *Queensland Government Environmental Offsets Policy* (QGEOP) came into effect, providing a Queensland-wide framework for the implementation of environmental offsets (Environmental Protection Authority (EPA) 2008) and recognising DPI&F's FHMOP 005 (2002) as a specific-issue offset policy. The delivery of fish habitat offsets under FHMOP 005 (2002) is now being revised and updated to align with the terminology, principles and objectives of the QGEOP.

An offset is defined as an action taken to counterbalance unavoidable, negative environmental impacts that result from an activity or development (EPA, 2008). This policy also recognised two kinds of offsets: direct and indirect. Direct offsets are those that protect, rehabilitate or conserve existing habitat, while indirect offsets include habitat creation, implementing management plans, contributing to research or the removal of threatening processes. Indirect offsets should complement the direct offsets and together form an 'offset-package'.

While offsets are often conditioned as part of a development approval, they are separate from the decision to approve or refuse the application. The impacts of a development should first be reduced, minimised and mitigated. Residual negative impacts of development should then be offset. Offsets addressing coastal fish habitats losses are considered where the proposed loss is justifiable, unavoidable and acceptable under departmental legislation and fish habitat management policies (Dixon and Beumer 2002).

Two case studies implementing negotiated coastal fish habitat offsets are presented.

### **Case Study 1: The Royal Queensland Golf Course, Eagle Farm**

The Royal Queensland Golf Course founded in 1920 is located in Eagle Farm, Brisbane adjacent to the Brisbane River. In 2004, DPI&F received a development application for the disturbance of a marine plant community, associated with the reconfiguration of the Royal Queensland Golf Course (RQGC). The reconfiguration of the RQGC was a result of the Queensland Government Gateway Bridge Duplication project rendering part of the original golf course unusable. The proposed reconfiguration consisted of constructing a fully functional 18 hole golf course within the remainder of the RQGC land.

The proposed development works involved the filling of a tidal drain partly colonised with marine plants including mangrove and saltmarsh species. Separately, further works involved the disturbance of small areas of both tidal and non-tidal saltcouch and samphire species within the Golf Course. The development application was

assessed and supported, pending agreement on offset measures to replace the loss of the fish habitats.

To offset the disturbance of these coastal fish habitats, creation of compensatory habitat was considered to be the most appropriate offset measure. The habitat creation entailed the profiling of two areas to below Highest Astronomical Tide height: one area of 4773 square metres (western compensation area) and a second area of 1354 square metres (eastern compensation area). The two compensation areas were to be vegetated with both saltcouch and samphire species as saltmarsh is commonly recognised as the most disturbed component of the intertidal marine plant habitat in Queensland, given its immediate proximity to coastal development (Johns 2006). Vegetation of the areas with saltmarsh and samphire species also complemented the functionality of the Golf Course.

During the construction of the created compensation areas in 2005, it was noted that although the profiled levels were correct, tidal inundation of the western compensation area was restricted to extreme high tides. It was also identified that an additional area was available to enlarge the eastern compensation area.

The existing approval was amended under the provisions of IPA 1997 to allow further works to improve tidal inundation of the western habitat creation area through the construction of an inlet structure and the removal of an existing bund wall. Removal of the bund wall and the creation of the inlet structure would also allow for the inclusion of some mangrove habitat within the western compensation area. Profiling of an additional area for inclusion within the eastern compensation area was also provided within the approval changes.

In 2006 the two compensation areas were fully constructed and open to tidal inundation. Vegetation plantings had been started with several areas of salt couch being well established. Planting of the marine vegetation was to be continued as the vegetation became available from the Golf Course reconfiguration works.

An inspection in 2009 of the created habitat compensation areas showed that mangroves, saltcouch and samphire vegetation were well established. As saltmarsh and samphire communities have been greatly reduced in this section of the Brisbane River the saltmarsh and samphire habitats created are likely to provide valuable compensatory habitat for local fisheries. Further research is required to establish the value of these created areas as fish habitat.

### **Case Study 2: Blue Water Development, Trinity Beach**

The permanent removal of approximately three hectares of marine plants for a private residential canal development on freehold land, Half Moon Creek, Cairns was approved in 2003 by DPI&F. The developed lands are adjacent the declared Half Moon Creek Fish Habitat Area. Dredging of the Creek and the removal of protected marine plants were required for construction of a system of canals.

The development proposal resulted in an agreement between the proponent and Queensland State agencies addressing issues such as the loss of marine plants and fish habitats, management of acid sulfate soils and impacts on the declared Fish Habitat Area, and the revocation of marine park zoning as part of the development approval. A formal Deed listing multiple government agency-agreed offset projects comprised the final 'offset package' coordinated by the Environmental Protection Agency.

The offset package included project funding for the monitoring of the fish community following the rehabilitation of tidal fish habitats in degraded wetlands at East Trinity, Cairns and funding for a local fish stocking program. The *East Trinity acid sulfate soils rehabilitation program: monitoring the recovery of fish habitats and associated fisheries values* offset project was established in 2003. Rehabilitation activities included the restoration of tidal flow to parts of a 700 hectare tidal wetland at East Trinity in north Queensland, through the installation of manually operated flood gates.

The monitoring program found that the restoration of tidal flow enabled eight hectares of mangroves to recolonise parts of the East Trinity site (Russell and Preston 2005) as well as other valuable marine plant such as saltmarsh species (Russell D.J., 2009 pers comm. 20 January). The monitoring program indicated that the reinstatement of tidal flow and consequential marine plant recolonisation improved fish habitat values within the East Trinity wetlands. It was found that the fish communities within the site were in a state of transition and likely to change further as the rehabilitation program continued (Russell and Preston 2005). The full benefits of the rehabilitation work will be further realised in the future as both the marine plant communities and associated fish community establish and mature. The monitoring program was also able to provide recommendations for future management activities that would benefit the fish community and fish habitats at the East Trinity site.

This project is also an example of multiple agencies working on environmental outcomes that complement fish habitat management providing for improved fish habitat and fisheries values back to the local community, through increasing available fish habitats for productive fisheries.

### **TAKE HOME MESSAGE**

Each development proposal is unique in terms of its location and impacts on fish habitats. Consideration of offsets needs to be specific to the development and recognise that delivery of the offsets may be onsite, local or regional.

Creation of compensatory habitat of intertidal marine plant communities and the monitoring of fish habitat values and fish communities highlight the capacity of natural resource managers to improve fish habitats as an offset to development related impacts. These two projects meet DPI&F's overall fish habitat management objective of addressing development encroachment over tidal fish habitats, including nursery areas critical to sustaining fisheries productivity.

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