11.2.5. Burdekin River Floodplain

The Burdekin Floodplain includes the area east of Cape Cleveland to the western shores of Cape Upstart. In addition to the Burdekin River, the Haughton River enters the floodplain from the north-west.

Wetlands on the Burdekin River floodplain are mostly old distributary channels from a time when the river was flowing along one of its many previous paths. The distributary system still includes, from west to east, Barratta Creek, Sheepstation Creek and Plantation Creek to the north of the river and Saltwater Creek to the south. The Burdekin River has the highest total average flows of any river running into the GBR Lagoon (Roth *et al*, 2002). The Haughton River also has numerous wetlands that are the result of its geological history.

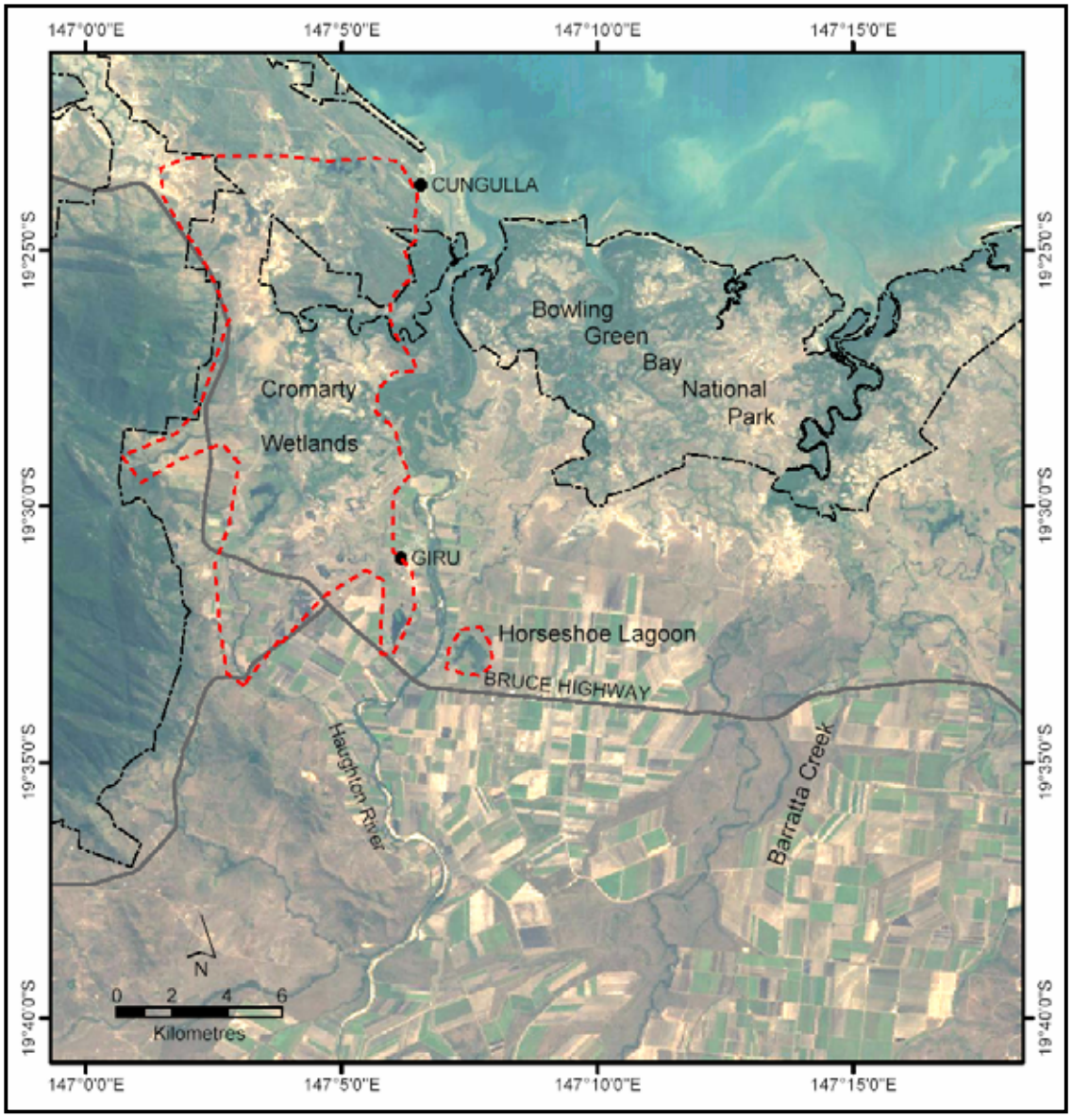
Studies undertaken by the ACTFR have estimated that 50% of large ephemeral wetlands in the Burdekin have been lost (Lukacs, 2004), although this is not specific to those that are productive to the fishery. Most deepwater wetlands on the floodplain still remain in one form or another today but even those that appear healthy are heavily impacted from a fishery perspective due to fish barriers that reduce connectivity (White and O'Brien, 1999). Including riverine areas of the Burdekin River, it is estimated that fish have lost access to more than 80% of the areas that they would have occupied when the district was in its natural state.

11.2.5.1 Haughton River and Cromarty wetlands

The Haughton River has large lagoons on both sides of the river. To the west, the Ironbark Creek network flows through two significant lagoons before draining into the tidal Cromarty Creek (*figure 36*). Healey Lagoon is approximately five kilometres long but narrow, averaging less than 35 metres width. It is heavily impacted by introduced aquatic plants including water hyacinth and pistia and introduced pasture grasses including para grass and hymenacne (*figure 37*).

Healey Lagoon is now part of the irrigation network for the Haughton floodplain and is kept at an artificially constant level with water diverted from the Burdekin Dam. It is used as both an irrigation channel and an aquifer recharge pit. In the past, it has also received nutrient enriched tail-water although recently there have been attempts to reduce the impacts of this (Burrows, 1998). Like nearly all of the lagoons on the northern side of the Burdekin River, constant flow has altered the functioning of these lagoons although there has been no research done on this to assess the impacts on the full diversity of fish species.

Like the majority of remnant lagoons in the developed areas of the GBR catchment, riparian vegetation has been thinned to a very narrow strip of large trees that in most places is only a single row deep or completely missing. Unlike some other lagoons in the district there are no significant barriers to fish movement although some culverts may restrict movement in certain flow regimes.



\Figure 36: Cromarty Wetlands and Horseshoe Lagoon adjacent to the Haughton River

An inspection in January 2004 noted toxic smells of hydrogen sulfide coming from the water, probably as a result of the northern end of the lagoon being choked with aquatic weeds on the surface with dead rotting weeds beneath. This has been recorded previously (Burrows, 1998). It is likely that this water was toxic to fish. It was overflowing from Healey Lagoon downstream into the Reed

Beds Lagoon (see below). In the past, Healey Lagoon was a significant resource for at least 20 species of native fish such as barramundi (Burrows, 1998) but weed infestation and resulting poor water quality may limit its current value.

The Reed Beds Lagoon is a large lagoon downstream from Healey Lagoon. It does not have permanent connectivity in either direction and relies on wet season flooding. Although shorter than Healey Lagoon, it is approximately 200 metres wide in places and has a more diverse range of habitats from tree lined narrow areas to broad open water areas. The Reed Beds Lagoon now has a large weed infestation despite its use as a grazing area that previously limited some of the pasture grasses. It has a significant invasion of hymenacne and other pasture grasses both under the canopy and in open sunlight and is also now affected by aquatic weeds such as pistia and water hyacinth.

Figure 37: Healey Lagoon covered in water hyacinth, pistia and other aquatic weeds (Oct 2004)

Reed Beds Lagoon is on private property and no longer accessible to recreational fishers although barramundi were tagged here from 1985 to 1992. Fish tagged in this lagoon have been recaptured in downstream tidal areas and as far away as Plantation Creek and Hellhole Creek. Reed Beds Lagoon is part of the Cromarty Wetlands and as it is perennial, it is likely to be an important link to wetlands further up the coast. It is clearly significant from a broader environmental view but from a fishery perspective its water quality is now contaminated from catchment runoff including the poor quality water from

Healey Lagoon. Despite this, recent sampling has shown that in open areas it still maintains fishery values.

Risks or threats to Healey Lagoon and Reed Beds Lagoon:

1. Artificial water heights and flows from use for irrigation in Healey Lagoon.
2. Invasive aquatic weeds, particularly water hyacinth and pistia.
3. Loss of riparian vegetation and invasion by para grass and hymenacne.
4. Reduced water quality.

Pink Lily Lagoon is a large shallow lagoon on the western bank of the Haughton River. It has suffered from adjacent farming practices with shallow areas reclaimed for cropping and remaining open areas are weed infested and nutrient enriched with subsequent reductions in water quality. In the past it may have been significant to the fishery but with the degraded state of both the lagoon and downstream areas such as Crooked Waterhole, it is now unlikely that fish could migrate to and from or survive in this lagoon during the dry season.

Runoff from this sub-catchment is suspected as part of the cause of fish kills in the upper tidal sections of Cromarty Creek, although Healey Lagoon also contributes large volumes of de-oxygenated water into the system. On Crooked Waterhole, where the riparian vegetation has not been removed, it has been contaminated by weed infestations including the noxious turpentine weed (*pers comm.* J Luly). Both lagoons have turbid water for most of the year with only gambusia apparent. Three barramundi were tagged in Crooked Waterhole in 1998 after major floods but no fish have been reported since that time (Suntag, 2004).

Risks or threats to Pink Lily Lagoon and Crooked Waterhole:

1. Nutrient enrichment that has promoted weed infestation, including turpentine weed.
2. Chronic low dissolved oxygen levels.
3. Low level and poor state of riparian vegetation.
4. Introduced and noxious fish due to the degraded habitat quality.

Horseshoe Lagoon is a large lagoon to the east of the Haughton River. It is similar in its general description to Pink Lily Lagoon although larger in area. Horseshoe Lagoon drains downstream into Barramundi Creek. Nutrient enrichment from farm and irrigation runoff resulted in an explosion of a native lily that covered the whole of the surface area of the lagoon until it was mechanically removed in mid 2003. It is likely that poor water quality would have limited native fish species use of the lagoon prior to harvesting but the next localised flood should see an increase in fish populations. Horseshoe Lagoon is an excellent example of the commitment of Burdekin district

landholders to ensure that they reduce their impacts on waterways. The Burdekin district has set an example for restorations that needs to be followed by other regions. At the same time, the restorations need to continue and be extended to other waterways in the district.

Risks or threats to Horseshoe Lagoon:

1. Nutrient enrichment that may cause further lily infestations.
2. Invasive aquatic weeds.
3. Loss of remaining riparian vegetation.

The Haughton River once provided access to a network of upstream in-stream and off-stream lagoons including Major Creek and within the river itself. Passage to these waterholes is now effectively blocked by a series of weirs that do not have fishways.

1.2.5.2 Barratta Creek

The Barratta Creek system (*figure 38*) is an overflow system for both the Burdekin and Haughton rivers. In its natural state, Barratta Creek was once a series of isolated in-stream lagoons that were connected during flooding. It is now used as an irrigation and tail-water canal and runs perennially with the associated concerns that this can have on fish migration and spawning (White and O'Brien, 1999). Barratta Creek is the healthiest system still remaining in the Burdekin District. It has relatively wide riparian vegetation for most of its length and pockets of land adjacent to the creek have been reserved as habitat areas. In the mid 1990's, Barratta Creek suffered from unacceptably high nutrient loads (Congdon and Lukacs, 1996). Recent improvements in Sunwater's channel flow management to reduce nutrient loads have resulted in a reduction of algae and aquatic weeds (*pers comm*. J Tait) whilst providing benefits to farmers with water and sediment recycling.

While there is a need for ongoing management and monitoring of Barratta Creek, there is now greater awareness and commitment in the district for this to occur and it is now unlikely that impacts on this system will increase. As there are no barriers to fish migration, a diverse range of native fish are able to use the Barratta Creek system.

Fish have been surveyed in a number of Barratta Creek wetlands along with other Burdekin wetlands. A total of 30 species were recorded across the Burdekin floodplain (Perna, 2003). This is less than that recorded in other systems along the coast with fewer marine species. Reason for the lower number of species may include loss of connectivity (Perna, 2003), naturally lower numbers compared to the Wet Tropics or changes to environmental flows.

Unfortunately, no baseline data could be identified. Barratta Creek is presently being assessed for declaration as a freshwater fish habitat area by DPI&F.

Figure 38: Freshwater lagoon on Barratta Creek

Risks or threats to Barratta Creek:

1. Altered water flow from use for irrigation.
2. Nutrient loads increasing algae and aquatic weeds.
3. Sediment loads increasing siltation.

11.2.5.3 Sheepstation Creek

Sheepstation Creek (*figure 39*) remains one of the major overflow paths for the Burdekin River in flood events that occur, on average, once every 20 years. Sheepstation Creek has a series of deepwater lagoons that are now permanently used as irrigation canals and aquifer recharge pits. In their natural state, these lagoons had significant depth fluctuations and some have been observed almost dry during droughts prior to water diversion from the Burdekin River. The network of wetlands includes at least eight lagoons between 500 metres and two kilometres long and up to 100 metres wide with numerous smaller lagoons. In the past, this entire network held the full diversity of native fish that could be found in this type of habitat but various factors now restrict a number of species from using this system.

Until 1999, these wetlands had been allowed to degrade to weed infested swamps that could not sustain most native fish. Despite being metres deep, weed infestations were so thick that it appeared there was no water at all (*figure 40*). A commitment by the community and support by the Queensland Government resulted in a weed harvester being trialled on Payard's Lagoon. The trial was so successful that the Queensland Government subsequently purchased a machine for use in the district (*figure 41*). This was a very successful initiative and there is now continual improvement to the health of wetlands throughout the Burdekin floodplain. Despite this, weed control will be needed in perpetuity on the Burdekin floodplain and an ongoing commitment is required to ensure that these wetlands do not return to a degraded condition.

Figure 39: Burdekin River floodplain and associated wetlands

The removal of weeds brought about an almost immediate improvement in oxygen content of the water, and within days, bird populations on the wetlands had increased and diversified (*figure 40, 41*). Fish species diversity improved over a period of about seven months and continues to improve (Perna, 2003). Despite the improvements in water quality the system continues to be restricted from a fishery perspective due to physical barriers.

The Sheepstation Creek lagoons are connected by a series of irrigation channels. Long, narrow channels have water running on average at significantly more than 0.3 metres per second and are not conducive to fish migration as most native fish cannot sustain this swimming speed (Clague, 1991; *pers comm.* A Hogan). In addition, there are significant barriers to migration in the form of drop boards that, although less than a metre high, in most cases prevent fish migration (White and O'Brien, 1999) except during major floods.

Figure 40: Before and after water hyacinth harvesting on Payard Lagoon

For the Sheepstation Creek wetlands to again become significant to coastal fishery resources, a system of fish passage devices will need to be designed and installed. While passage at drop boards could be achieved simply (*figure 42*), improving fish migration opportunities in the irrigation channels that join the lagoons may be more difficult.

The lower reaches of Sheepstation Creek have a network of ponded pastures and other tidal barriers that act as both a barrier to fish migration except when they are breached in major floods and as a trap for fish that cannot get either upstream or downstream as flood waters recede. Nutrient enrichment and denial of tidal salt water has seen the proliferation of cumbungi, a native reed that has become an aquatic weed in the district (Perna, 2003). A review of the role and effectiveness of these tidal barriers should be undertaken as with more freshwater now available to manage aquifer salinity, the role of these tidal barriers for agricultural production may be outdated.

Figure 41: Aquatic weed harvester on Payard Lagoon

Figure 42: Drop boards on Sheepstation Creek that prevent fish migration except in flooding

Like many waterways throughout the developed GBR catchment, invasive fish species such as gambusia are now of increasing concern, predating on native species (Ivantsoff and Aarn, 1999). In addition to gambusia, blue-spot gouramis

have been captured in Sheepstation Creek (Perna, 2003) and the long-term impact of these species is presently unknown. Other noxious species have not yet been identified in the Burdekin floodplain although there is the real threat of tilapia infesting the waterways as they are present in large numbers in the Townsville District and have been recorded on farm dams near Clevedon. Tilapia is known to thrive in areas that have degraded habitat or where access to native fish is restricted due to barriers (Arthrington et al, 1983, 1984).

Risks or threats to Sheepstation Creek lagoons:

1. A large number of barriers to fish passage.
2. Altered water flow patterns from use for irrigation.
3. Aquatic weed growth requiring continual control.
4. Introduced fish species, especially gambusia and blue-spot gourami.

11.2.5.4 Plantation Creek

Whilst some lagoons such as Hutchinson's have been maintained as open waterways, many wetland areas in Plantation Creek are weed infested and degraded in its lower reaches and are linked by irrigation channels. The channels, culverts and weed infestations provide effective fish barriers to most native fish species except during floods. Irrigation and tail-water runoff provide a nutrient source to downstream cumbungi, a native plant that has proliferated. As with Sheepstation Creek, this situation is exacerbated by artificial tidal barriers that prevent saltwater from flooding in on the higher tides (Perna, 2003) that would otherwise cause the Cumbungi to die off. Some native fish are able to survive these impacts but restoration is needed for this system to contribute its full potential.

11.2.5.5 The Burdekin River

The Burdekin River remains the main flow path for catchment water in most rain events and rarely breaks its banks. Its importance as fishery habitat should therefore be significant but it is restricted by Clare Weir that presently provides a total barrier to migration. Fishing records from the Collinsville annual fishing competition show that prior to the construction of the weir and for a few years after its construction, barramundi were caught near Collinsville in the Bowen River, a tributary that joins the Burdekin River above the weir. Despite a stocking program in Clare Weir, barramundi have not been recorded upstream in the Bowen River in recent times. Other weirs on the river including sand dams that restrict flows may be reducing the migration window of opportunity and may also be physical barriers.

In August 2004, Tilapia were identified in Keelbottom Creek, a tributary to the Burdekin River. In December 2004, heavy rains in the area washed the fish downstream and they have been confirmed as being at the junction of the two streams.

Risks or threats to the Burdekin River include:

1. A large number of barriers to fish passage.
2. Altered water flow patterns from weirs and irrigation.
3. Introduced fish species, especially gambusia and tilapia.

11.2.5.6 Saltwater Creek

The Stokes Range restricts the Burdekin River overflow paths to the east and south. There are a few small wetlands upstream of the range on Cassidy Creek but their fishery values are unknown. Saltwater Creek is the main flood flow path on the south side (*figure 39*) of the river when it breaks its banks in the vicinity of The Rocks.

Like Barratta Creek and Sheepstation Creek, Saltwater Creek is a series of long narrow lagoons that once provided important freshwater habitat to a range of fish species. Most of these lagoons are now badly degraded and most native fish species are unable to tolerate the combined impacts from the catchment. The most important of these lagoons, being closest to marine environments is Warren's Gully on Sheepstation Creek to the south of Mount Inkerman. This is a moderate-sized lagoon with good riparian vegetation and some deep water. This lagoon does not have the weed infestations that are affecting many of the lagoons on the north bank of the river as Saltwater Creek is not used as an irrigation canal although it receives tail-water from farms in the catchment, particularly during heavy rain events. Warren's Gully has natural connectivity with the estuary and was sampled during the Burdekin floodplain survey.

Risks or threats to Saltwater Creek lagoons and Warren Gully:

1. Weed infestation from hymenacne and para grass.
2. Nutrient runoff during rain events.

Fish have been surveyed in a number of Burdekin floodplain wetlands with a total of 30 species recorded. This is less than recorded in other systems in the region with few marine species and the main reason for the lower number of species being loss of connectivity (Perna, 2003).