

Freshwater fish in the Southern Fitzroy Floodplain

This bulletin reports on the freshwater fish population, habitat condition and management issues for wetland sites of the Southern Fitzroy Floodplain.

What fish are out there?

Fishery assessments were undertaken by Queensland Department of Primary Industry and Fisheries (DPIF) Northern Fish Community and Fishway Monitoring team in conjunction with Infish Services in Spring (September) 2006. The fish species identified at each of the wetland sites varied which is possibly due to factors such as the size and diversity of the wetland habitat, its connectivity and its proximity to estuarine reaches and the presence of predatory species. Refer to Table 1 for further details of the fishery assessment.

Overall the five sites had:

- 20 fish species (19 native and 1 exotic)
- Up to ten species at any one site
- 1,382 individual fish.

Freshwater Habitats

Fish habitats in the area include lagoons of the Fitzroy River Floodplain that link following good rains and include seasonal and perennial streams of the coastal catchments. Migratory marine fish breeding species of importance to both recreational and commercial fisheries are barramundi, sea mullet and mangrove jack. These species may also spend time in freshwater habitats.



Fish sampling at larger lagoons such as Toonda Lagoon (12 Mile Ck), was conducted by DPIF using a boat mounted electro-fish survey technique that temporarily stuns fish enabling them to be dip netted, measured, recorded and released unharmed. Cast net sampling was also conducted by Infish Services and was the only type of sampling at the Duckpond site. (Photo courtesy Bill Sawynok)



Large (1.2 m) Barramundi captured at Yeppen Lagoon during the survey highlights the productive fishery potential of permanent floodplain lagoons. (Photo courtesy Bill Sawynok)

Large populations of bony bream, gudgeons and rainbow fish in freshwater floodplains produce accelerated growth rates in predatory species such as barramundi and this contributes to overall fishery productivity. Freshwater fish populations play an important role in food chains by supporting birds and other wetland fauna.

Ecological pressures such as land and water use, weeds, fish passage barriers and climate change affect habitats. For migratory marine breeding species, one of the key issues is accessing coastal freshwater habitats. A local example is the barrage located on the lower Fitzroy River that denies access to 80% of the freshwater habitat historically utilised by migratory species.

Features of a fish habitat Influence of habitat size, diversity and condition

Survey results indicate that larger wetland sites record the greatest diversity of fish species. This could be contributed to the larger wetlands containing a mix of fish habitat features including mixed depth pools, snags, submerged and emergent aquatic plants, overhanging riparian vegetation and associated root masses and a mixture of bank profiles including undercut banks. Yeppen Lagoon, while large, lacks many of these features and recorded only seven fish species while Duck Pond is a relatively small waterhole and recorded only four species.

A stark contrast in fish catch was observed in sampling of a *Hymenachne* (Class 2 Declared weed) infested reach of Larcom Vale Creek which produced only two individuals of a single species in comparison to a catch of ten species and 388 individuals recorded for a *Hymenachne*-free downstream reach.

Connectivity allows fish movement

A greater number of marine breeding species were recorded for sites that were in close proximity to, and/or maintained connectivity with areas influenced by both saline and freshwater. For example, the groundwater-fed semi permanent Larcom Vale Creek site, located less than two kilometres from tidal waters, recorded six estuarine dependent species including a relatively large number of 1st year barramundi and mixed size sea mullet. The absence of large land locked barramundi also indicated recent and more regular connectivity to the estuary. In contrast, Yeppen Lagoon which is only connected to estuarine reaches during infrequent flood flow recorded only three estuarine dependent species including very large (>1m) land locked barramundi and large sea mullet (averaging 0.4m).

The impact of large predator fish

Sites with barramundi present recorded a reduced number of smaller fish species. This was particularly pronounced at Yeppen Lagoon which contained very large (> 1m long) land locked barramundi. The predation pressure from the barramundi, combined with low habitat features of the site, appear to have effected species diversity. In contrast, Springers Lagoon and Toonda Lagoon contained a more diverse and abundant small fish fauna.



Before: Larcom Vale Creek infested with *Hymenachne* prior to chemical treatment. Only one fish species was recorded at this site with the weed acting as a barrier for fish migration. (Photo courtesy FRCC)



After: Larcom Vale Creek after chemical spraying of *Hymenachne*. (Photo courtesy FRCC)



Yeppen Lagoon, on the southern outskirts of Rockhampton, is an example of a permanent wetland system with fishery values. (Photo courtesy Jim Tait)

Fish Habitat Management

Findings from the freshwater fish surveys confirm the importance of these wetlands as fish habitat, but also highlight some existing and potentially emerging management needs.

Fishery Values

Two sites contain important commercial and recreational fishery species being barramundi and sea mullet. In the case of the large land locked barramundi at Yeppen Lagoon these could be expected to be exceptionally productive breeders once they have the opportunity to return to the marine environment. The fast growth rates of barramundi in freshwater habitats underlie the importance of these habitats to overall barramundi population recruitment levels. The semi-perennial flows and good connectivity of the Larcom Vale Creek site also make this site important as strong habitat values support a relatively high number of barramundi and sea mullet. From a fishery value perspective the absence of barramundi at Toonda Lagoon and Springers Lagoon is a concern given anecdotal records of the species at these sites.

A place of refuge

In a seasonally dry environment such as that of the lower Fitzroy Basin, permanent freshwater habitats provide a place for freshwater fish communities to produce recruits that will recolonise non-permanent habitats when the floodplain connects in wet season flows.

As the Fitzroy Barrage provides a barrier to estuarine dependent fish species gaining access to freshwater habitat within the Fitzroy Basin, the importance of downstream freshwater wetland systems south of Rockhampton becomes even more important.

Fish Passage

The absence of barramundi at two of the lagoons where they had been historically recorded (Springers and Toonda Lagoons) and an absence of smaller size barramundi at Yeppen Lagoon potentially highlights reduced fish passage connectivity as a result of poor wet seasons since the early 1990's. At Toonda Lagoon which is in close proximity to estuarine reaches, the presence of estuarine dependent mullet (a highly mobile species) and tarpon (a low dissolved oxygen tolerant species) suggest that fish passage still exists despite being impaired by low flows and poor stream channel conditions including sections being overgrown with ungrazed para grass.

Ways Forward

Protecting habitats

Controlled grazing, fire management, revegetation, riparian and aquatic weed control are important activities that serve to improve the ecological condition of wetland sites in the Southern Fitzroy Floodplain.

The significance of aquatic weeds on fish habitat and their ability to restrict fish passage means the management and control of these weeds is important. Hymenachne control in Larcom Vale Creek has already commenced and followup work may be necessary.

Fish passage needs at some local wetland systems have already been assessed and structures constructed however further investigation may be required across the Floodplain.

Climate change

The lack of significant wet season rainfall in the last decade is placing increasing stress on freshwater fish habitats and fish populations. Increasingly, the emergence of longer term rainfall reduction trends on the east coast of Australia is being attributed to climate change and predictive modelling by CSIRO suggests that such trends will continue. Efforts on the Fitzroy Floodplain may be best prioritised by protecting the few remaining wetlands with good habitat values located with semi-permanent streams such as Larcom Vale and Raglan Creeks and ensuring that any impediments to fish passage between estuarine reaches and habitats are rectified to facilitate as much movement as possible during less frequent wet season flow events.



Large barramundi perished in the recent 1 in 100 yr drying event in Woolwash Lagoon highlighting the increased importance of perennial lagoons to provide refuge and sparks consideration of the impact that climate change will have on wetland management. (Photo courtesy Jim Tait)



Springers Lagoon is a permanent waterhole with important habitat values for floodplain freshwater fish communities. It is also highly valued by the community for its recreational values and historically held barramundi and other estuarine dependent species but no longer does due to reduced fish passage connectivity. (Photo courtesy Bill Sawynok)



Bank erosion at Blacks Waterhole has been fenced. This is a critically important permanent waterhole on the Southern Fitzroy Floodplain. (Photo courtesy Jim Tait)



Rubber vine has been chemically controlled in the riparian vegetation of Blacks Waterhole, a critically important permanent waterhole on the Floodplain. (Photo courtesy Jim Tait)



Cast net fish sampling of semi permanent waterholes at the Duckpond Environmental Reserve. (Photo courtesy Bill Sawynok)



Australian Government

The Queensland Wetlands Programme - Great Barrier Reef Coastal Wetlands Protection Programme is funded by the Australian Government. The main objective of the Southern Fitzroy Floodplain project was to engage land managers in activities and practices to help manage and enhance the area's important wetland values.

Queensland
Wetlands Programme

Further information

The information series is available on-line from the FRCC website or by request and includes Helping Wetlands, Fish, Fire, Grazing, Getting Involved and Waterbirds.



WetlandCare Australia
PO Box 114 Ballina NSW 2478
Phone (02) 6681 6169
Fax (02) 6686 6866
www.wetlandcare.com.au



Fitzroy River and Coastal Catchments, Inc.
PO Box 288 Rockhampton QLD 4700
Phone (07) 4921 0573
Fax (07) 4921 0528
www.frcc.org.au



Fitzroy Basin Association
PO Box 139 Rockhampton QLD 4700
Phone (07) 4999 2800
Fax (07) 4921 2860
www.fba.org.au



Table 1. Fish population data collected in September 2006 from five wetlands in the Southern Fitzroy Floodplain

Estuarine Dependent Species	Yeppen Lagoon	Duck Pond	Springers Lagoon	Larcom Vale Creek	Toonda Lagoon
forked-tail catfish				1	
long finned-eel	2		42	1	14
barramundi	2			14	
sea mullet	4			25	4
tarpon					2
bullrout				1	
swamp eel			1		
long tom	1			1	
Freshwater Species					
bony bream	116	16	37	323	139
Hyrtl's tandan		5			
agassiz's chanda perch			34		1
banded grunter	5	6			
fly-specked hardy head			88	4	212
mouth almighty				14	1
empire gudgeon			31	4	3
western carp gudgeon			91		1
spangled perch			97		
eastern rainbow fish					30
sleepy cod	1	2	1		
mosquito fish+			1		
TOTAL NUMBER INDIVIDUALS & (SPECIES)	135 (7)	29 (4)	423 (10)	388 (10)	407 (10)