

Aquatic diversity in the Staaten Catchment



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Is it really wild?

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If a “Wild River” is defined as a catchment with no towns, limited roads and very few people then yes, the Staaten River is WILD!

After more than a decade conducting fish surveys throughout the Gulf of Carpentaria and Cape York, this catchment was one of the most challenging to access. There were station tracks long forgotten, river crossings only suitable for quad bikes and unseasonable rain to make said tracks even more adventurous.

With the aid of topographic maps, satellite imagery, GPS and a laptop we bush bashed through scrub and launched a tonne of boat over steep banks to conduct a first ever survey

of fish and aquatic macro-invertebrate populations.

During 20 long days we covered 25,000 sq. km of catchment, collecting data on 21 sites from the western Tablelands to just above tidal influence. The diversity and abundance of fish was excellent, with 42 species being recorded including one which may be a new species.

Water quality and habitat were excellent throughout the catchment and the lack of weeds particularly noteworthy.

Interestingly, fish distribution appears strongly influenced by the proximity to neighboring river systems. The southern

portion of the catchment shares similarities with the Gilbert River and the northern catchment with the Mitchell River.

This highlights the importance of maintaining flood flows which merge catchments during the wet season.



We didn't go to the end of the earth, but you could see it from here!

June floods induce fish spawning!

During the first week of sampling in June, heavy rainfall occurred over a large portion of the catchment making travel adventurous and access to sites impossible. We had a two weeks delay to allow roads to dry out.

While this wasn't desirable, the unseasonal rainfall was a blessing in disguise.

Rivers flowed like the beginning of the summer wet sea-

son...*in winter*. Fish were always thought to require the onset of the wet season to initiate spawning. These Gulf fish proved otherwise. There were fish with running ripe gonads, juvenile fish everywhere and prawns and crayfish were carrying eggs.

While this was a one-off sample, it is impossible to mistake and hard to ignore the evidence. Management decisions,

particularly water resource planning, could be based on incorrect data on fish spawning behaviour.



Collecting fish with electrofishing boat in lower catchment

Special points of interest:

- 1,781 fish measured
- 42 fish species found
- 1 probably new
- 52 macroinvertebrate families
- Unusual winter fish spawning after unseasonal river flows



Station owners/managers provided valuable local knowledge and learnt about aquatic ecology and water quality in return



Some locals were extremely welcoming, while others were less so :- or maybe he was just licking his lips???

"it's powerful enough to kill a human yet fish are only unconscious for up to 90 seconds"



Swapping knowledge

An important part of this project was to increase the capacity of NGRMG staff and Gulf residents to understand and become familiar with the different ways to describe and assess catchment condition.

Several members of the NGRMG, local residents and landholders participated in field sampling, giving them basic aquatic ecology skills. They were able to identify many more fish species, measure and interpret water quality and assess basic habitat

condition.

All landholders were supplied with a written summary of aquatic habitat, water quality and the fish species found in their waterbodies.

Feedback from participants was extremely positive. We also used the extensive local knowledge to gain a greater understanding of local land management practices, climate and flood history and particularly the behaviour of local animals, especially fish.

The sharing of knowledge has

provided landholders with further information about their local environment and us with important local knowledge to incorporate into our reports.



EPA also participated in sampling in national parks.

Catching fish with electricity

Electrofishing is the best way to capture large numbers of fish quickly without harming them or any other animal in the water. An electric current basically anaesthetizes fish. For very small waterbodies we have a backpack unit powered by a battery, and for everywhere else, a boat mounted unit powered by a 7.5KVA generator. We use up to 1000 volts and 7 or more amps,

more than enough to kill a human, yet fish are only unconscious for up to 90 seconds. And before you ask, yes it does stun crocodiles ... briefly!

Electrofishing only works in freshwater. Many factors influence its effectiveness, including water hardness, high temperatures and operator skill. It is not as easy as it

looks. Electrofishing requires lots of experience to pick the most effective settings to collect whatever fish are present.

Fish were identified and up to 20 of each species measured and recorded then returned unharmed to the water.

Any fish that were "new" or different were preserved and sent to the Queensland Museum for positive id.

Pig heaven!

While weed abundance was low throughout the Staaten catchment, pig numbers were astronomical. Most pigs appeared oblivious to our presence and several even wandered through our camp during breakfast!

The catchment is ideal for pigs, with large areas of shallow water and swamp. There are also large tracts of land,

including national park, that are inaccessible, making control difficult.

Also notable were the large numbers of wild horses, particularly in the Staaten National Park.

The combined damage these two pest species can do to the environment include disturbing soft bank edges, removing vital aquatic vegetation and

contributing to high water turbidity levels during rainfall.

Controlling the numbers of these pests needs to be a high priority not only for the environment but also bio-security. They also affect grazing productivity.

The NGRMG is already investigating ways to source government funds to manage this feral animal problem.

Fish distribution—a tale of three rivers.

While site specific data was kept confidential by request, trends within the fish population on a catchment scale were obvious. No secret fishing spots revealed in this segment ... sorry.

The Staaten River catchment is unique in being almost encircled by the Lynd and Mitchell Rivers in the north and the Einasleigh and Gilbert Rivers in the south. Unknown volumes of water flood across from these encapsulating rivers into head-

waters and other reaches of Staaten River tributaries, providing opportunities for fish to migrate and occupy much of the Staaten catchment.

The data collected shows the northern sector shares species with the Mitchell and the southern sector shares fish species with the Gilbert/Einasleigh. Each sector is different. For example, saratoga are only found on the Mitchell side while none are present on the Gilbert side. This theme is also present with other species.

This interesting fact needs careful consideration by stream managers when considering water development such as flood harvesting, as reduced water flows could prevent fish movement between catchments. Potentially the fish biodiversity and abundance in the Staaten will be dramatically reduced. So will the aquatic habitat. The Staaten will be a lot drier.

The interconnectedness of these rivers invalidates the traditional river classification systems, such as stream order.



Largest gulf grunter ever captured by our team.



Barramundi were recorded up to 90cm

Floods and flows are vital

The most interesting aspect of the Staaten River catchment is its hydrology. There is an urgent need for stream gauge data throughout the catchment. Current discharge estimates are derived from models which are providing highly variable information.

Our on-ground coverage of the catchment and use of satellite imagery confirms that significant floodwaters cross from neighbouring catchments, contributing signifi-

cantly to water flows and floods in the Staaten River.

The Staaten is relatively dry. Many lagoons at the end of the wet are only two metres deep. These would be dry at the end of most dry seasons.

There are some deep water lagoons. These are mostly confined to larger creek and river channels. These act as dry season refuges for not just the aquatic biodiversity but all other animals as well. These

deep water lagoons should be looked after.

If large scale water diversion in the Mitchell or Gilbert catchments occurs in the future, the impacts on the Staaten could be significant not only for the environment but also landholders. Reduced overland flows are likely to reduce the carrying capacity for grazing by reducing water availability and nutrient deposits as well as reducing the biodiversity.



Lagoon covered in lillies

"Most pleasing was the lack of weeds"

Water quality and habitat "fantastic"

Water quality across the catchment was excellent. Dissolved oxygen, pH, temperature, conductivity and turbidity (water clarity) were measured. Conductivity (softness) was low at nearly all sites. Water at the top of the catchment was amazingly soft. Some turbidity readings were high due to the unseasonal heavy rainfall.

We recommend a specific set of water quality guidelines be

developed for the gulf catchments. This is a unique environment, often experiencing extremes that local fish species have adapted to. Local guidelines would provide land holders and relevant authorities with information to better manage this special and unique environment.

Fish habitat was first-rate and plentiful at most sites, with overhanging trees, roots, snags and aquatic plants.

The catchment is only lightly grazed, with minimal infrastructure. It has a good vegetation cover and erosion and siltation is hardly noticeable. The Staaten catchment could be regarded as in near natural condition.

Current land management practices appear to have had little impact on the aquatic and riparian environment. Feral animals are causing the most noticeable damage.



Recommendations

The following recommendations are the views of the authors and may not be adopted by NGRMG. They are considered necessary to increase the knowledge required for informed management. Further discussion is presented in the technical report.

1. Determine the hydrology of the catchment, including the permanency of the wetlands, direction and duration of flows, the groundwater dynamics, and particularly the locations and volumes of inter-basin flooding.
2. Form a catchment wide group to develop a pig and other pest control programs.
3. Develop water quality guidelines for wet and dry seasons in Gulf rivers based on the water quality found in the Staaten and Gilbert catchments.
4. Encourage research into the spawning biology of freshwater fish in Gulf rivers.
5. Facilitate research into the groundwater biodiversity of the region.
6. Encourage a smart engineer to design a new, cheap, quick road formation that isn't a river in the wet.



The future

Aquatic biodiversity studies of the Gulf catchments have been conducted since 2004. All major catchments have been surveyed from top to bottom with the exception of the Norman and Mitchell rivers.

These two systems have had portions of their catchments studied but not a catchment wide study.

We believe by applying the same methods to these two river systems, an invaluable, complete fish,

macro-invertebrate and water quality dataset will exist for one of the most important aquatic environments in Australia.

This information will be vital to manage proposed future development of the region.

Most of the catchments are still in excellent condition and with valid information, informed decisions can be made that would maintain the future prosperity of the region.



Sunset - Staaten River National Park

Thanks

We sincerely thank the NGRMG and staff for commissioning and supporting this study. We are most grateful to the local pastoralists who provided advice, access and personal knowledge. We hope you continue to enjoy your environment. Special thanks to the Qld museum, and also to staff in EPA, DPI&F and DNRW. Photos by Adrian Dickson, Alf Hogan and Ian Beeton.

Further Information



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Queensland Government



List of fish species found in the Staaten River catchment during a post wet season survey in 2008.

Common name	Species	Perma nent (12)	Seas onal (8)	Status
Spangled perch	<i>Leiopotherapon unicolor</i>	12	8	widespread in northern Australia
Eastern rainbowfish	<i>Melanotaenia splendida</i>	12	8	widespread (may be a number of subspecies)
Bony bream	<i>Nematalosa erebi</i>	11	7	widespread in northern Australia
Mouth almighty	<i>Glossamia aprion</i>	10	5	widespread in northern Australia
Striped sleepy cod	<i>Oxyeleotris selheimi</i>	9	6	widespread in Gulf, NT, several colour variants
Banded grunter	<i>Amniataba percooides</i>	11	3	widespread in northern Australia
Sleepy cod	<i>Oxyeleotris lineolata</i>	10	4	widespread in northern Australia
Gulf grunter	<i>Scortum ogilbyi</i>	10	3	widespread in Gulf, NT
Reticulated perchlet	<i>Ambassis macleayi</i>	9	4	widespread in Gulf, NT
Archerfish	<i>Toxotes chatareus</i>	8	3	widespread in northern Australia
Carpentaria catfish	<i>Sciades paucus</i>	7	3	widespread in Gulf, previously recorded as <i>Arius midgleyi</i>
Rendahl's catfish	<i>Porochilus rendahli</i>	3	7	new record, range extension
Sooty grunter	<i>Hephaestus fuliginosus</i>	8	1	widespread in northern Australia
Hyrtl's tandan	<i>Neosilurus hyrtlilii</i>	5	4	widespread in northern Australia
Toothless catfish	<i>Anodontiglanis dahli</i>	6	3	widespread in northern Australia
Golden goby	<i>Glossogobius aureus</i>	6	3	widespread in Gulf, NT
Saratoga	<i>Scleropages jardinii</i>	7	1	new record, range extension
Long tom	<i>Strongylura krefftii</i>	6	2	widespread in northern Australia
Sailfin perchlet	<i>Ambassis agrammus</i>	4	4	widespread in northern Australia
Fly-specked hardyhead	<i>Craterocephalus stercusmuscarum</i>	6	1	widespread (may be a number of subspecies)
Yellow-finned perchlet	<i>Ambassis elongatus</i>	1	4	new record, range extension
Berney's catfish	<i>Neoarius berneyi</i>	3	1	widespread in Gulf, NT
Gilbert's grunter	<i>Pingalla gilberti</i>	2	1	reported as uncommon
Northwest glassfish	<i>Ambassis sp.</i>	1	1	new record, range extension
Northern trout gudgeon	<i>Mogurnda mogurnda</i>		1	widespread, patchy distribution,
Salmon catfish	<i>Neoarius leptaspis</i>		1	widespread in Gulf, NT
Loud grunter	<i>Scortum sp. 1</i>		1	possibly a new species
unknown goby	<i>Glossogobius sp.</i>	1	-	possibly a new species
Swamp eel	<i>Ophisternon sp.</i>	1	-	possibly a new species
Barramundi	<i>Lates calcarifer</i>	7	-	widespread in northern Australia
Papuan river sprat	<i>Clupeoides cf. papuensis</i>	5	-	new record, range extension
Forktailed catfish	<i>Neoarius graeffei</i>	4	-	widespread in northern Australia
Freshwater anchovy	<i>Thryssa scratchleyi</i>	3	-	reported as uncommon
Square-blotched goby	<i>Glossogobius sp. 2</i>	2	-	widespread in northern Australia
Tarpon	<i>Megalops cyprinoides</i>	2	-	widespread in northern Australia
Concave goby	<i>Glossogobius concavifrons</i>	1	-	new record, range extension
Giant glassfish	<i>Parambassis gulliveri</i>	1	-	new record, range extension
Pikey bream	<i>Acanthopagrus berda</i>	1	-	marine vagrant
Giant herring	<i>Elops hawaiiensis</i>	1	-	marine vagrant
Silver biddy	<i>Gerres filamentosus</i>	1	-	marine vagrant
Diamond mullet	<i>Liza alata</i>	1	-	marine vagrant
Sea mullet	<i>Mugil cephalus</i>	1	-	marine vagrant

Notes:

1. There were 20 sites surveyed. The number of sites listed is an indication of how widespread each fish species is. A low number does not necessarily indicate a species is rare. "Seasonal" are waterbodies we suspect dry out in most years.
2. This list is incomplete. A wider survey should find more species, particularly in lower reaches that were too boggy to access.