Department of **Employment, Economic Development and Innovation**

NQ Dry Tropics
Fishway Trap Sampling Report
2010

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Toward Q2 Tomorrow's Queensland | Queensland Government

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Cover Figure: Photographs of barriers to fish passage (Clockwise: Bogie River – Tondara Crossing, Kirknie Creek, The Rocks Weir and Hazelwood Creek), photograph of barramundi by Gunther Schmida

Contents

Glossary of Terms

Diadromous - Diadromous fishes are truly migratory species whose distinctive characteristics include that they (i) migrate between freshwaters and the sea; (ii) the movement is usually obligatory; and (iii) migration takes place at fixed seasons or life stages. There are three distinctions within the diadromous category, catadromous, amphidromous and anadromous.

- Catadromous - Diadromous fishes which spend most of their lives in fresh water, and migrate to sea to breed.

- Amphidromous - Diadromous fishes in which migration between freshwater and the sea is not for the purpose of breeding, but occurs at some other stage of the life cycle.

- Anadromous - Diadromous fishes which spend most of their lives at sea, and migrate to freshwater to breed.

Potamodromous - fish species whose migrations occur wholly within freshwater for breeding and other purposes.

Introduction

In 2007 NQ Dry Tropics (formally Burdekin Dry Tropics) completed a fish passage study that examined potential fish barriers within the Burdekin Catchment. From this study the report, 'Final Report: Burdekin Dry Tropics NRM Region Fish Passage Study' (November 2007, Alluvium Consulting) was generated and delivered. This report identified 31 high priority potential barriers to the migration of Australian native fresh water fish species in the Burdekin Catchment.

Following the delivery of the report, a field assessment was undertaken in March, 2008 involving several parties: Jason Carter (Alluvium), Jim Tait (Econcern), Ross Kaptitzke (James Cook University) and Tim Marsden (Fisheries Queensland). Each of these parties brought together extensive expertise in fish ecology and passage, waterway management and environmental engineering. The field assessment examined the 31 barriers identified in the report, and considered fish passage requirements in relation to the existing barrier structure and waterway condition. Following this assessment, recommendations and prioritisations for their remediation were made.

Fisheries Queensland were then contracted by BDTNRM to undertake the production of fishway concept design reports for those fish barriers ranked highest on the priority list for remediation works. Between 2008 and 2009 six of the priority sites had rock-ramp fishway constructed. Of these six fishways four were sampled in April 2010, the results of this sampling for each individual fishway will be discussed in this report.

Location

The Burdekin River catchment is the second largest coastal catchment in Queensland, covering an area of 129,860km^2. The basin stretches from Alpha in the south, 600km northwards to the Valley of Lagoons, inland from Ingham. The Burdekin River catchment consists of seven interconnecting rivers with the main channel of the Burdekin River originating in the Great Dividing Range north of the Valley of Lagoons, it then meanders southwards to Charters Towers, east through Burdekin Falls Dam and then north to Ayr where it enters the Coral Sea in Upstart Bay.

All four of the fishways that were trap sampled in April 2010 are found within the Burdekin River Catchment. Three within the upper reaches of the Bowen River (upper Hazelwood, lower Hazelwood and Exe creeks) and one within the Bogie River (Figure 1). The three sites in the upper reaches of the Bowen River are approximately 30km west of Eungella dam while the Bogie River site is 70klm south west of Bowen.

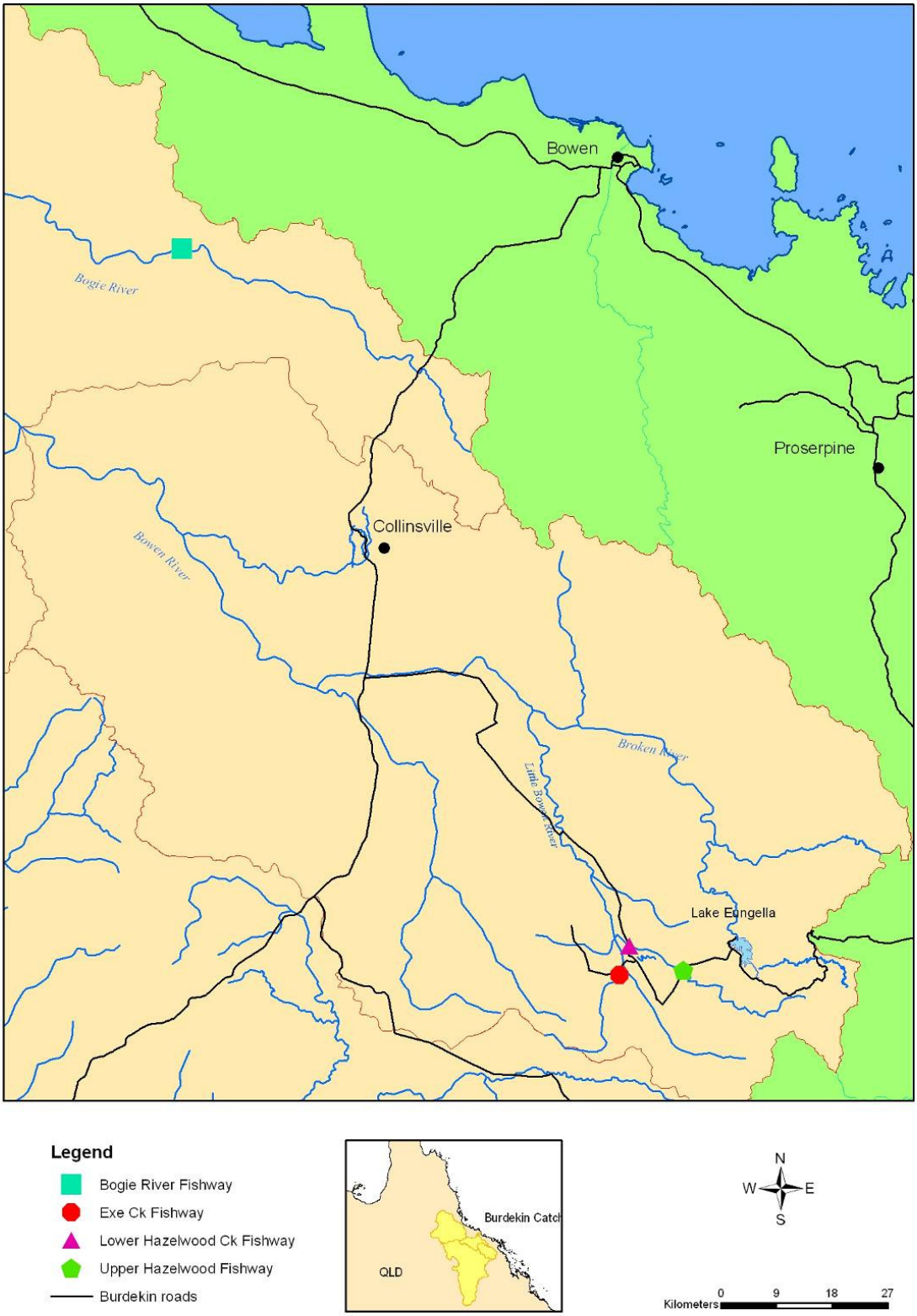

Figure 1: North Queensland Map indicating the four fishways trap sampled, April 2010.

Bogie River

Catchment Description

A substantial sub-catchment of the Burdekin River, the Bogie River catchment covers approximately 2274 km^2. Starting high in the Clark Ranges (east of Collinsville), the Bogie river runs west for almost 130km, (BOM, 2008), where it then joins the Burdekin River near Millaroo. This wide, sandy ephemeral system flows through mostly grazing country, where hill-slope, gully and soil erosion have contributed much of the sediments within the river. Within the river there are limited large permanent waterholes, with much of the permanent habitat in the lower reaches of the system, (NQ Dry Tropics, 2009). During the dry season much of the river is dry and sandy, however there is some residual flow in the sand bed. The wet season brings fast flows with up to 37 000 megaliters per month recorded in the river (NRW QLD, 2007). However these flows drop quickly to almost a trickle with the beginning of the dry season, (Marsden and Ferguson, 2008).

Site Description

The Bogie River site, located along Tondara Road at Gumlu, (20°08.082'S, 147°34.993'E) is a 140m long by 5m wide road causeway which traverses the Bogie River around halfway up the system and stands up to 1m high on the downstream face. The river bed upstream is composed primarily of river sand that has aggraded to the height of the crossing. Vegetation including Melaleuca, Callistemon and Leichardt trees growing in the river bed on the downstream side have stabilised the substrate and influences a small amount sediment deposition, (Marsden, T., Ferguson, M., 2008).
Two rock-ramp fishways were constructed in late 2008 on the downstream side of the crossing. A wooden nib wall was also installed on the downstream edge at the causeway in the vicinity of the fishways. This nib wall was constructed to maintain maximum flow into the fishways, while also creating one definite attraction flow at the fishway entrances (Figure 2).

Method

A single entry trap was positioned in the direct line of flow in front of one of the fishway's exit chamber for three 24 hour periods. Netting wing walls were attached to the trap to direct fish that have exited the fishway (following the direction of flow) into the trap. As this is an active road crossing it was necessary to place the trap on the upstream side of the road to ensure the safety of motorists, (Figure 3). After each 24 hour period the trap was checked and all fish removed, measured and released upstream.

Figure 2 – Bogie River Road Crossing, Figure 3 - Trap Sampling at Bogie River

Results

Fish Species

During the very short duration of trapping late in the wet season only 2 species were captured and one other observed. Of these two species nine Spangle Perch (*Leiopotherapon unicolor*) and one Eastern Rainbow Fish (*Melanotaenia splendida*) were captured in the trap over the three trapping days. Two Banded Grunter (*Amniataba percoides)* were observed but were not captured. A large number of Spangled Perch were observed in the fishway moving between the cells, they were also noted exiting the fishway and moving across the road into the upstream pool where they joined numerous schools.

Size Ranges

Both the Spangled Perch and Eastern Rainbow fish captured were juvenile to sub-adults, ranging from 33mm to 41mm, (see Table 1 and Figure 3).

Table 1:- Species captured at Bogie River, April 2010

Species	Size
Spangled Perch *(Leiopotherapon unicolor)*	33 - 41
Eastern Rainbow Fish (*Melanotaenia splendida)*	37

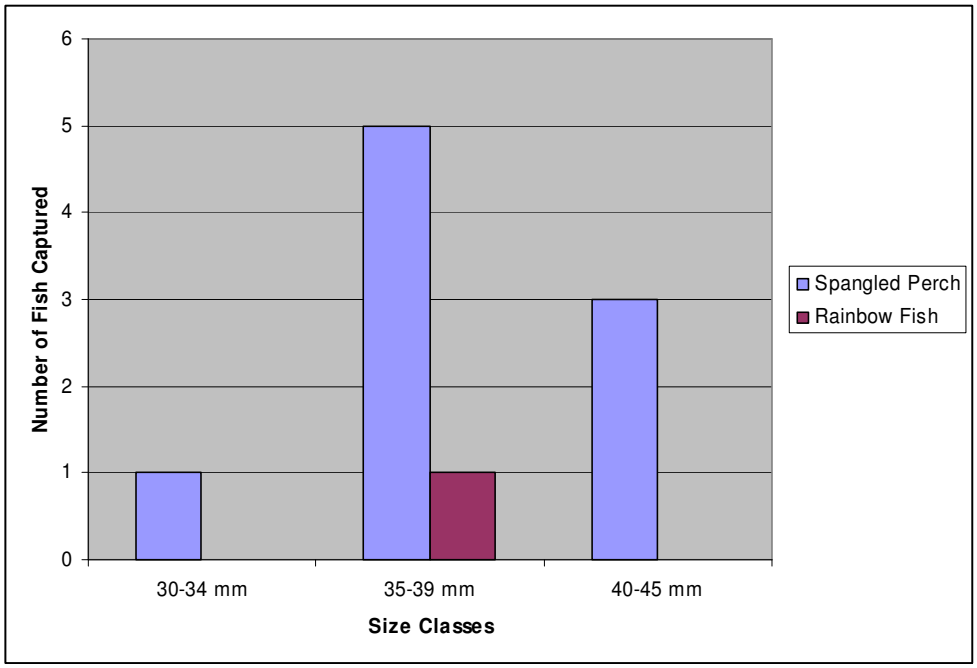

Figure 4. Size frequency of the fish captured in the Bogie River, April 2010

Discussion

The sampling undertaken demonstrates that for the limited number of species present at the time of sampling the fishways were able to successfully pass these species upstream.
The Bogie river is known for its short fast flows, which usually only occur during the wet season (November to March), with as much as 37,000 megaliters per month, (NRW QLD, 2007). The sampling period was undertaken when seasonal flows were coming to an end, and the number of fish utilising the fishway was low, (flow ceased within weeks of the sampling period), however those fish still migrating were able to pass successfully through the fishway and into the pools upstream.

The low number of fish captured in relation to the large number of fish observed exiting the fishway was most likely due to the positioning of the trap. Securing the trap to the exit chamber would have been dangerous to all traffic using the road crossing, by securing it opposite the exit chamber on the other side of the road, the hazard was eliminated. A net was strung around the trap and beyond the direct flow path, but due to the width of the river (140m) the netting could not be strung across its entire length. By doing this, an exact number of fish using the fishway could not be obtained, as fish could swim along the road (away from the direction of flow) and around the netting, avoiding the trap altogether.

Upon inspection of the second fishway, it was discovered that flow had ceased completely through the fishway with all of the flow being diverted through the culvert at the base of the fishway. This diversion has created a much faster flow than what it would normally have been though the fishway, significantly reducing the level of the upstream pool. This diversion has created a fast attraction flow at the base of the (non-flowing) fishway resulting in stranded fish and rendering this fishway inaccessible during low flows. The culvert is normally blocked with sand, but had been cleared out by persons unknown, thus limiting flow to this fishway.

Recommendations

- Sediment should be removed out of the top cells of both fishways when flows recede, to ensure optimum accessibility through the fishways is achieved for migrating fish. A method for reducing this sand buildup should be considered for future flows.
- Permanently blocking the culvert at the base of the second fishway should be considered to ensure the fishway is operational for the duration of the flows for maximum migration time and to ensure the upstream pool level is not reduced prematurely.

Hazelwood Creek (Upper and Lower Fishways)

Catchment Description

The Hazelwood Creek system is located within the upper reaches of the Bowen River catchment. Originating in the Connors Range, (Crediton State Forest, Eungella), Hazelwood Creek runs for approximately 40km where it merges with Exe creek and joins the Little Bowen River. This system, via the Bowen River, eventually joins the Burdekin River, (Marsden, Moore and Ferguson, 2009).
Much of the creek system is river sand, bedrock and rock gorges, during most years this system is ephemeral, however due to the morphology of the catchment it does receive good rains in its head water region. Many of the permanent waterholes that have good fish habitat are fed by the head waters of the rainforest which are of high ecological value, (NQ Dry Tropics, 2009).

Upper Hazelwood Creek

Site Description

The first fishway sampled on Hazelwood creek is located on Lizzie Creek Road west of Eungella Dam. This fishway is the lower of the two Upper Hazelwood Creek fishways constructed in 2009, (21°11.212'S, 148°18.711'E). It is situated at the bottom end of a gorge, and receives high flow velocities in the peak of the wet season, which contributed to scouring of the downstream side of the crossing in the years prior to fishway being constructed. The creek banks upstream of the fishway have relatively good riparian vegetation, the creek also separates into two channels – high flow and low flow, (Jennings, D., 2009).

A rock-ramp fishway was constructed in 2009, (Figure 5), the nature of the site dictated that a short fishway that incorporated the bend in the bank directly downstream of the crossing be built. As there was no concrete utilised in the construction of this fishway, it was expected that some of the fine material would be dislodged during the first flows.

Methods

A Fike net with wing walls (Figure 6) was utilised at this site due to the limited amount of water present. Upper Hazelwood creek was sampled over three 24 hour periods on a low flow. As the trapping was designed to capture those fish exiting the fishway the trap was positioned on the opposite side of the road so as not to disrupt traffic using the road. After each 24 hour period the trap was checked and if any fish were caught they would then be released upstream.

The type of net use was secured across the entire width of the creek (i.e. no fish could swim around it). This particular Fike net extends backwards from the opening, with 6 circular hoops along its length to keep it open. Attached to these hoops is 6mm netting that form throats which help to direct fish towards the back of the net, where they can be collected. The end of the net is drawn together with a drawstring, the net is then pulled tight and secured to a star-picket, ensuring the net does not move or collapse.

Figure 5 - Upper Hazelwood Creek Fishway
Figure 6 - Trap location on Upper Hazelwood Creek

Results

Fish Species

No fish were caught during this trapping period. Observations taken noted no fish in the sizeable pool upstream of the fishway, no fish in the fishway and only a small number of juvenile rainbow fish in a pool directly below the fishway (this pool had an undercut bank of tree roots). A little further downstream (100m) in a permanent pool (bedrock base) a large number of spangle perch, rainbow fish and a clutch of juvenile Hyrtl's Tandan (Neosilurus hyrtlii) were observed. The Spangled Perch and Rainbow Fish were mostly sub-adults to adults and only juvenile catfish were sited, no adults were seen.

Discussion

The lack of fish captured does not reflect the ability of this fishway to successfully pass fish. This may only reflect that migration has ceased in the upper reaches of Hazelwood creek. Due to the short nature of the site, the fishway was built for maximum migration on medium flows, during sampling the flow were noted to be quite low indicating that passage may not have been optimal or the attraction flow was not enough to attract the fish from downstream. Flows were very low during the sampling

indicating that the flow would have ceased shortly after the sampling period. Generally flows in this system are short and moderate.

Recommendations

- As this fishway was designed to operate on medium flows, it is recommended to have further monitoring on these medium flows to obtain the results required for a definite success rate of the fishway's ability to pass fish. The method of monitoring may potentially be different to trap sampling due to the depth and velocity of water passing over the road in medium flows, making trapping unsafe.

Lower Hazelwood Creek

Site Description

Along the Collinsville/Elphinstone Road, near Turrawulla Station lies Hazelwood Creek crossing, (21°09.426'S, 148°13.931'E). This concrete causeway is approximately 30m long and 3m wide with a number of pipes underneath the crossing. The creek bed upstream of the crossing is composed primarily of river sand and is protected by a relatively thick and mature riparian zone. On the downstream side, the river bed is composed of river sand, cobble and bed rock. Exposed bedrock in the middle of the stream and a high deposition zone has formed a vegetated island that separates the downstream flow into two distinct channels that eventually meet up further downstream. Riparian vegetation is less mature than upstream due to the dynamic nature of this downstream zone. Casuarina, Eucalypt, Melaleuca and Callistemon trees are the main riverine species present, (Marsden, T., Moore, M., Ferguson, M., 2009)

In 2009 a partial width rock-ramp fishway was constructed (Figure 8) in the northern channel. A nib wall was installed between the vegetated island and the road crossing to direct water to the fishway and to back water up through the pipe under the crossing. Two further pipes in the southern channel were blocked to ensure flows through the fishway.

Methods

A single entry trap was positioned in the direct line of flow in front of the fishway for two 24 hour periods (Figure 8). Netting was attached to the trap to direct fish that have exited the fishway (following the direction of flow) into the trap. As the trapping was designed to capture those fish exiting the fishway the trap was positioned on the opposite side of the road so not to disrupt traffic using the road. After each 24 hour period the trap was checked and all fish removed, measured and released upstream.

Results

Fish Species

During the sampling period, twelve Spangled Perch (*Leiopotherapon unicolor*) and one Eastern Rainbow Fish (*Melanotaenia splendida*) were captured. A number of fish (both Rainbow Fish and Spangled Perch) were also observed moving through the fishway and crossing the road into the permanent pool upstream.

Three spangled perch carcasses were found on the dry road directly above the pipes, being attracted there by the flowing water (out of the pipes) they had tried to jump the barrier, unfortunately dying where they landed due to the lack of water.

Size Ranges

A mix of juveniles, sub-adults and adults were captured in the sampling period ranging between 25mm and182mm, (see Table 2 and Figure 7.).

Table 2:- Species captured at Hazelwood creek fishway, April 2010

Species	Size
Spangled Perch *(Leiopotherapon unicolor)*	20 - 182
Eastern Rainbow Fish (*Melanotaenia splendida)*	81

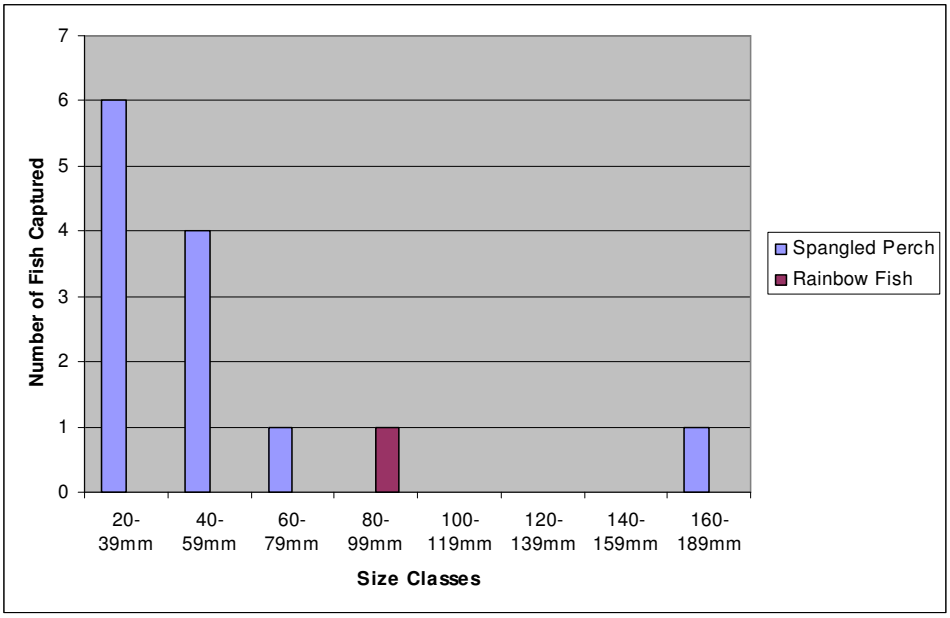

Figure 7. Size Frequency of the fish captured in Hazelwood Creek April, 2010

Discussion

From the results obtained it is clear that this fishway is successful in its ability to pass fish. Unfortunately only two 24 hour periods were sampled due to water being diverted away from the fishway through the pipes under the crossing on the outside of the fishway. At the time of construction these pipes were blocked, however on returning to the site the pipes had been opened, possibly to reduce the amount of water pooling over the road (Figure 9).

Upon discovering this they were temporally blocked with sandbags and rocks so the sampling could be completed. Flow immediately returned over the road crossing and through the fishway. Within a few minutes of this return, fish were then seen migrating through the fishway and swimming safely across the road and into the permanent pool upstream.

As with the upper Hazelwood creek site, this area also receives fast flows during the wet season. The flows at the time of sampling were still moderate and without disruption flow should have continued for another month or so.
The positioning of the trap directly in front of the exit cell was not a viable option, as this would have created a traffic hazard. So by positioning the trap opposite the fishway on the other side of the road, the hazard was eliminated.

A net was attached around the trap and beyond the direct flow path, due to the width of the river, and the presence of bedrock the netting could not be strung across its entire length. By doing this, an exact number of fish using the fishway could not be obtained, as it meant that it was possible for fish to swim along the road (out of the direction of flow) and around the netting, avoiding the trap altogether.

Figure 8 - Hazelwood creek fishway in flow with trap after pipes were blocked to continue sampling.
Figure 9 - Hazelwood creek road crossing dry due to flow diversion through pipes instead of the fishway.

Recommendations

The two pipes on the outside of the fishway require a permanent seal to ensure maximum flow through the fishway. However constructing a second fishway below these pipes to back up water to the pipes would ensure passage is available on both sides of the creek. Depending on the defining budget either idea would ensure maximum migration opportunities for fish populations of Hazelwood creek.

Exe Creek

Catchment Description

Exe Creek originates in the Denham Ranges south west of Eungella, beginning in Homevale National Park. This system runs for approximately 40 km until it meets and joins Hazelwood creek, from there the system runs into the Little Bowen River. This system eventually flows into the Burdekin River via the Bowen River.
This ephemeral system is largely a sandy system, with much slumping and deposited sediments. This area receives periodical wet season rains that provides suitable habitat for the permanent waterholes seen in some sections of this creek.

Site Description

Exe creek crossing is situated along Redcliffe Vale Road close to Turrawalla station, (21°10.425'S, 148°13.374'E). This 40m long by 3m wide concreted rock-fill crossing has been stabilised on the downstream side by a combination of log pillars, retaining logs and boulders. The river bed upstream is composed primarily of river sand and bedrock that has aggraded approximately 200mm below the height of the crossing. On the downstream side, the river bed is composed of sand that lies approximately 800mm below the height of the crossing. A small patch of Casuarina trees are growing in the centre of the river bed on the downstream side, stabilising the substrate, (Marsden, T., Moore, M., 2009,).

In mid 2009 a partial width rock-ramp fishway was constructed on the downstream side of the crossing (figure 10), a nib wall was extended on either side of the top cell to ensure water flows through the fishway (and not around it). This crossing is located approximately 5km upstream from where Exe creek meets Hazelwood creek.

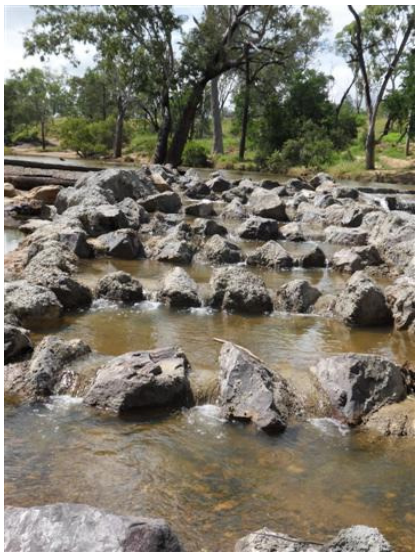

Figure 10 - Exe Creek Fishway in flow.
Figure 11 - Exe creek with a dry fishway (Water pooling on the road and in the top cell)

Methods

A single entry trap was positioned in the direct line of flow in front of the fishway for two 24 hour periods. Netting was attached to the trap to direct fish exiting the fishway (following the direction of flow) into the trap. As this is an active road crossing it was necessary to place the trap on the upstream side of the road to ensure the safety of motorists. After each 24 hour period the trap was checked and if any fish were captured they were removed, measured and released upstream

Results

Fish Species

Two species were captured during the sampling period, these included one Bony Bream *(Nematalosa erebi)* and two Spangled Perch (*Leiopotherapon unicolor).* A number of other Spangled Perch were also observed on the road as well as in the pool upstream.

Size Ranges

Size classes included sub-adult to adult Spangled Perch and a sub-adult Bony Bream, (see table 3 and Figure 12.)

Table 3:- Species Captured at Exe Creek Fishway, April 2010

Species	Size
Bony Bream (*Nematalosa erebi)*	125
Spangled Perch (*Leiopotherapon unicolor)*	58 - 130

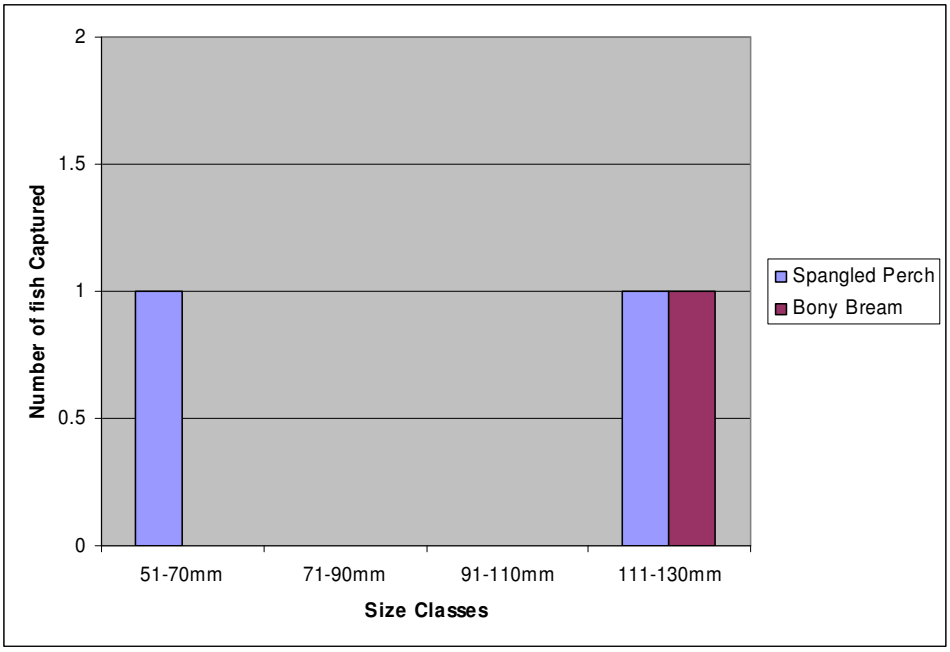

Figure 12. Size Frequency of the fish captured at Exe Creek, April 2010.

Discussion

Only one 24hr trapping period was achieved during this round of sampling. After the first 24 hour period, it was discovered that flow had ceased in the fishway. This meant that more sampling could not be achieved at this time. Due to the design of the first and second cell a significant amount of the water was flowing around the fishway and had created some scouring along the edges of the fishway.

Although only one 24 hour period was sampled, and flow did cease, three fish were captured in the trap. With netting wing walls attached to the trap and secured across the entire width of the creek, the risk of fish swimming around the net was significantly reduced. As flows are usually short and fast that taper off quickly at the end of the wet season in Exe Creek, capturing the three fish (sub-adult to Adults) at this time was interesting. These adult fish were still looking to migrate even though flow was diminishing. The fishway was able to cater for their migratory passage.

Recommendations

It is recommended that more rock be added along the length of both sides of the fishway to ensure scouring does not continue. The nib wall on one side requires raising by at least 100mm and the height of the first and second cell ridges needs to be lowered to ensure flow is maintained through the fishway and water is not pooled across the road once flow has ceased. A few holes in the bottom of the cells were also discovered and require patching.

Conclusion

Three of the four fishways sampled within the Burdekin River catchment successfully passed fish up and over barriers that would normally have stoped migration. All the fish captured and observed were all potamodromous species that require free movement within the freshwater for spawning, habitat, protection and food during the wet season.

The fourth fishway (were no fish were captured) was sampled during low flows, however as it was constructed for maximum migration access during medium flows, this does not indicate an unsuccessful fishway, however further monitoring is required to ensure medium flows can accommodate the fish species observed downstream of the fishway. Three of the four fishways do require some minor repairs to enhance passage ability, this should be undertaken in the dryseason, when water levels are at their lowest at each site. Hazelwood creek (lower fishway at Turrawalla Station) is the most important fishway to repair. If the pipes are left open without any modification downstream (ie another fishway), then the fishway that has proved to be very successful in this wet season, will be rendered useless on low and medium flows.

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Appendix 1 – Freshwater Fish Species Identified in Trap Sampling, April 2010

Bony Bream - *Nematalosa erebi* (Gunther, 1868)

Maximum Size: 400 mm

Biology: Bony bream are a schooling species that commonly inhabit lowland streams. They are frequently noted in large shoals feeding on benthic algae, but also feed on insects and small crustaceans. In the north of their spawning may occur repeatedly during the wet season, while in the south spawning probably occurs on an annual basis in the spring.
Distribution: Bony bream are one of the widest spread freshwater fish species within Australia. They are common in streams of northern and eastern Australia, south-western Papua New Guinea, Fortesque River near Dampier Archipelago in Western Australia and eastward through the Northern Territory and Queensland. They have also been found in the Murray-Darling and Lake Eyre catchments in central Australia as well as the Bensbach River and Digoel River in PapuaNew Guinea.
Favoured Habitats: Although they have a wide range of habitat types, larger watercourses running through rainforest, dry open eucalyptus forest or desert areas, are often most favoured, they prefer slower flowing, quiet waters however they can still negotiate fast flows for sustained periods when migrating.
Migratory Requirements: Potamodromous species that undertakes extensive dispersal migrations throughout the year, with peaks in the summer/wet season.
Population Status: The population of bony bream may have increased in recent times due to increased nutrient input to waterways (increasing algae) and reductions in predator species from over fishing and barriers to migration.
Potential Threats: Barriers to migration, destruction of habitat, poor water quality.
Conservation Status: Not listed.
References: Merrick and Schmida 1984, Allen 1989, Allen *et al*. 2002, Pusey *et all*, 2004

Eastern Rainbowfish - *Melanotaenia splendida* (Peters, 1866)

Maximum Size: 140 mm

Biology: This species forms small shoals near the surface of the water body, commonly near woody debris and aquatic vegetation. Breeding occurs throughout the warmer months, with multiple spawning occurring if conditions are good. Rainbowfish feed on a variety of small insects and macro-invertebrates along with submerged vegetative matter.
Distribution: The Eastern rainbowfish is common throughout its range of north-eastern and central Australia.
Favoured Habitats: The Eastern rainbowfish can be found in a variety of different habitats, with a variety of different substrate types, such as rivers, creeks, swamps, marshy lagoons, lakes and reservoirs. In the Burdekin system they are mostly found in slower flowing systems, however they are more than capable of negotiating fast flows
Migratory Requirements: The Eastern rainbowfish is a potamodromous species that undertakes extensive dispersal migrations during high flow periods.
Population Status: One of the most common species captured in previous sampling efforts throughout Queensland. Still common in most streams, however does not occupy highly degraded streams. There is no information about population changes for this species, however is likely to have undergone reduction due to extensive habitat modification.
Potential Threats: Barriers to migration, destruction of habitat, poor water quality.
Conservation Status: Not Listed.
References: Merrick and Schmida 1984, Allen *et al*. 2002, Marsden, *et al*, 2003, Pusey et al, 2004

Banded grunter - *Amniataba percoides* (Gunther, 1864)

Maximum Size: 180 mm

Biology: Banded grunter are found throughout river systems from the headwaters to estuarine areas, being more common in upper reaches. This species can tolerate both fresh and brackish waters, and is found in both fast flowing and still waters. Banded grunter feed on crustaceans, insects and plant material and are recognised as an aggressive species, despite their small size.
Distribution: The Banded grunter is widely distributed in coastal streams across northern Australia from the Ashburton River (WA) to the Burnett River (Qld). It also occurs in inland drainages of the north such as Lake Eyre.
Favoured Habitats: Although they are rarely found in high gradient tributary systems, they can be found in a number of different habitat., In the Burdekin system they are most commonly found in shallow systems with a course substrate, usually sandy creeks and escarpment pools.
Migratory Requirements: The Banded grunter is often found migrating in low numbers on a variety of flows. They are a very capable migratory species, passing barriers that most other smaller species are unable to negotiate.
Population Status: The species is commonly found within its range and there is no evidence of change in the abundance of this species in the Burdekin region.
Potential Threats: Barriers to migration, destruction of habitat, poor water quality.
Conservation Status: Not listed.
References: Merrick and Schmida 1984, Allen *et al*. 2002, Pusey *et al,* 2004.

Spangled perch - *Leiopotherapon unicolor* (Gunther, 1859)

Maximum Size: 300 mm

Biology: Spangled perch are found throughout rivers systems from the headwaters to estuarine areas, being more common in upper reaches. This species is believed to survive drought situations by aestivating in wet mud or under moist litter on the bottom of ephemeral waterholes. The spangled perch feeds on insects, crustaceans and small fish. Spangled perch undertake extensive dispersal migrations whenever flow is available, they have even been recorded moving across flooded land to reach isolated waterholes.

Distribution: This species is one of the most widespread freshwater native fish of Australia. They have been found to occur in systems north of the Greenough River (WA) through the top end of Australia and down the east coast to the Hunter River (NSW), They also occur in the northern section of the Murray-Darling system and are found inland in the Lake Eyre/Bulloo-Bancannia drainage system.

Favoured Habitats: Spangled perch occupy a variety of habitats including pools, riffles billabongs, rivers, streams and even isolated bore drains. In the Burdekin River they are most common in tributary streams that have a sandy substrate. Although this species is capable of negotiating fast flows, they often prefer to live within systems of low flow.

Migratory Requirements: They are a very capable migratory species, passing barriers that most other species are unable to negotiate.

Population Status: The species is commonly found within its range and there is no evidence of change in the abundance of this species in the Burdekin region.

Potential Threats: Barriers to migration, destruction of habitat, poor water quality and recreational fishing.

Conservation Status: Not listed.

References: Merrick and Schmida 1984, Marsden 2000, Allen *et al*. 2002, Pusey *et al*, 2004

Hyrtl's tandan - *Neosilurus hyrtlii* (Steindachner, 1867)

Maximum Size: 350 mm

Biology: As Hyrtl's tandan is found in many geographically isolated regions, it is quite possible that this fish may represent more than one species. Hyrtl's tandan feed on insects, worms, molluscs and crustaceans. In the dry tropics region, this species has been recorded migrating upstream to shallow riffle zones to spawn, before returning to the main river. Juveniles move downstream from the spawning zones shortly after hatching. They are a benthic species often found in a wide range of depths, and shoaling is very common is juveniles.
Distribution: This species is very common throughout most of Queensland and the northern parts of the Northern Territory and Western Australia. It is also very widespread through central Australia.
Favoured Habitats: This species can be found in a diverse array of habitats including, riffles runs and pools. Still waters are best suited to this species but they are capable of ascending reaches with substantial velocities. Often they are found in areas of sandy or muddy/rocky substrates and Juveniles can be found in lowland lagoons and sandy creeks in the late wet / early dry season.
Migratory Requirements: Spawning migrations occur during the flood flows of the wet season.
Population Status: Information gathered indicates this species is wide spread within the Burdekin River system.
Potential Threats: Barriers to migration, destruction of habitat, poor water quality.
Conservation Status: Not listed.
References: Merrick and Schmida 1984, Orr and Milward 1984, Pusey *et al*. 1995, Allen *et al*. 2002, Pusey *et al*, 2004