Copeton Dam • Gwydir River

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NSW FISHERIES

This project was funded by the Natural Heritage Trusts' Murray-Darling 2001 Fish Rehab Program and NSW Fisheries.

Fish Everywhere

An Oral History of Fish and their Habitats in the Gwydir River

Craig Copeland
Emmaline Schoonenveldt-Reid
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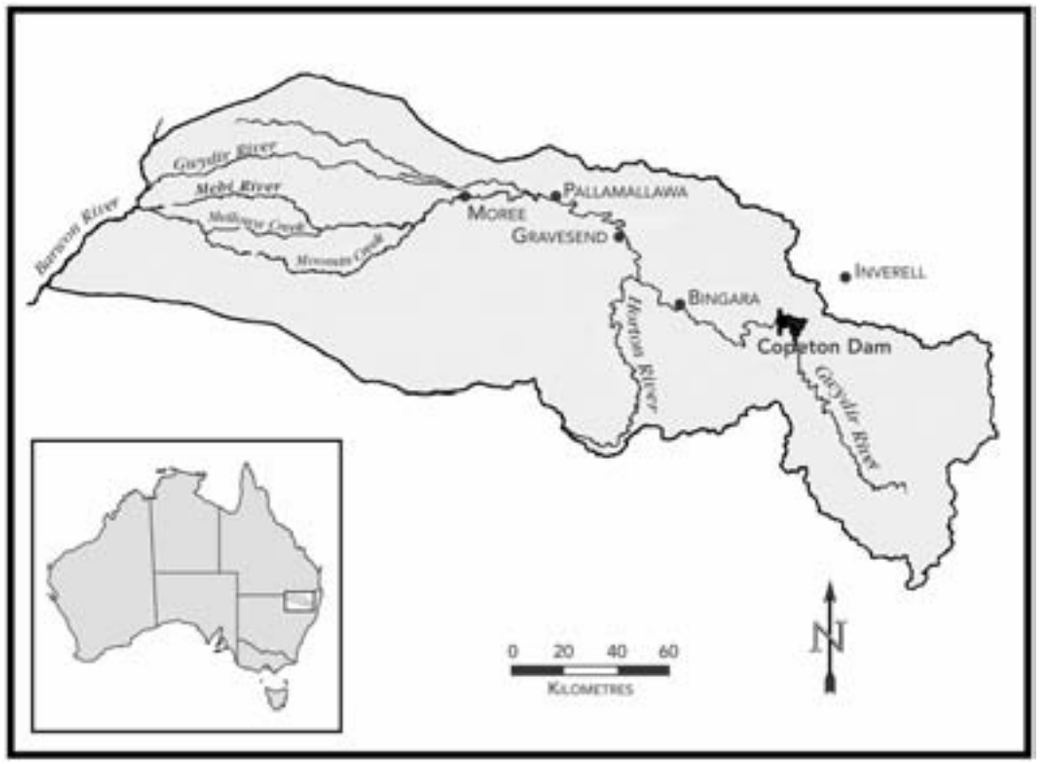

Introduction

Australian inland rivers continue to deteriorate despite efforts towards more co-ordinated management approaches and, as a result, most species of native fish in these waterways are under great pressure.

The massive and erratic fluctuations of many rivers have been drastically altered and regulated before they have been fully understood. In addition, land clearing, barriers to fish passage, introduced species and pollution have been detrimental to native fish.

Given the variability of inland river systems, forming a long view on ecological change is important, yet a major difficulty for ecologists studying these systems and their freshwater fish is the shortage of information on their historic conditions.

In addition, for the community to utilise best management practices relating to native fish and the river ecosystem as a whole catchment, an understanding of what has been lost is essential.

Yet despite the lack of historical information, researchers seldom ask community members their views about the causes and implications of environmental change.

The Gwydir river system in northern NSW was chosen for historical research precisely because there is so little written evidence describing its significant ecological shifts over time; and because the major changes to the system occurred only in recent memory.

The Gwydir flows west from the Great Dividing Range in a catchment area covering 26,584 km^2. The major river regulator is Copeton Dam, near Inverell. From the dam wall the Gwydir flows downstream to a number of weirs which divert water down the Mehi River, Gil Gil Creek, Moomin Creek, Gingham Channel and Big Leather Channel which flows into the Gwydir Wetlands.

Fish Everywhere! An oral history of fish and there habitats in the Gwydir River tracks ecological change through the memories of 33 longterm residents from different communities within the catchment area below Copeton Dam. Their recollections date back to the early 1900's and, in this text, are supported by historical documents from as early as 1827.

The interviewees were chosen on the basis of their length of residence in the area, their interest in the river, and their reputation as knowledgeable people. Although they represent diverse opinions, they are only a fraction of the community members who are knowledegable about the river.

All the people interviewed by field officer Emmaline Schooenveldt-Reid had child-hood memories of the Gwydir River system, and the overwhelming majority were older people with very close and sympathetic relationships to the river. A number of these people said that the river was the most special place in their lives and one man described it as his church.

Most older Kamilaroi people who grew up around Moree lived in the town camps on the banks of the Mehi River. Being excluded from much of the town activity, the camp residents spent a great deal of time in communion with the Mehi River and often went swimming in the Gwydir for recreation. These Aboriginal people, who had received

some traditional education about the natural world, had very sharp and detailed memories of all aspects of river life – water quality, fauna, fish and instream vegetation.

Although the research focus was on the impact of the Copeton Dam, which came into operation in 1976, the emphasis of the in-depth interviews was on putting open questions (which could not be answered yes/no) and soliciting interviewees' independent descriptions so that meaningful comparisons could be made between participants' recollections.

Those interviewed gave detailed, often colourful information on the state of the river and its fish life both before and after the construction of the dam. Their recollections indicate a richness and depth of knowledge and in many instances, a cohesiveness of similar memories held by geographically distinct sections of the community.

Many of the interviewees' memories of the river system were coloured by grief. They mourned the loss of native fish, river animals and vegetation, water clarity, deep river holes and even the unpredictable but regenerative power of the river prior to regulation:

> There was a terrible lot more fish around say forty, fifty years ago, than there is now. (AB)

> Poor old platypus, never see a platypus now, do you? Not here in our river. Used to see them often... Poor old platypus, yes, and poor old water rats... Poor old turtles. (KM)

> Yeah, we used to get rushes. We don't get that now. We used to call them reed beds and they were along the edge of the river. They seemed to be in permanent spots. And I know where there's a bit now, but there's not much. (RK)

> ... it used to be really clear once. You could see right down into the water, see the logs and fish under the surface. We used to drink the water all the time, it was good water, nothing wrong with it. Not salty. Never seen any algae in it. It was very clean, you could drink out of it, do anything. They seem to have got green scum on it and different things now. (RA)

> ... when I was a kid we used to ski on a hole at Bingara, we used to ski with boats, before the dam. Now you would never ski there. [Now] in places [it is] eighteen inches. In places you cannot even pass in a flat bottom boat. (SG)

> I know when I was a kid lying in bed of a night, we were four kilometres from the river... and I remember in the fifties, sixties, when there was a big flood, you could hear the logs roaring and crashing into each other as they were going down the river. You don't see that anymore. (DB)

According to river residents, Copeton Dam is not the only factor adversely affecting the native fish and other fauna and flora of the Gwydir. A number of river residents spoke about the side effects of cropping and irrigation.

In this text the residents' memories celebrate their deep personal knowledge of the Gwydir and its plants and animals; the quotes track their ever-evolving relationship with the river.

A tellingly poignant indicator of this changing relationship is the history of fishing clubs in the Gwydir catchment region. In the 1970s, Moree reportedly had 12 active fishing clubs. It now has two.

It is hoped that an examination of these river residents' memories and opinions on the cause and effect of environmental change will have practical outcomes. It may prompt new research or generate specific public debates; that they may catalyse environmental education programs. Hopefully it will provide leads for the fishers and other residents participating in the rehabilitation of this once beautiful river.

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– Interviewees for the project were: –

Aub Brooks
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Chris Faulkner
Clancy McMahon
"Courallie" residents
Cyril Macey
Des Hurst
Dick Bell
Eric Kinchella
Howard Rose
Hugh Munro
Jeff and Sylvia Macey
Kath Macey
Kevin King
Lloyd Fletcher
Lyle Swan
Max Humphries
Noelene Briggs-Smith
Norman Boughton
Peter Glennie
Peter R Guyer
Reuben Austin
Richard Ping Kee
Rodney King
Ron Hardman
Ross Thompson
Steve Goodworth
Ted Murphy
Vince Kemp

CHAPTER 1

A History of Decline

The Gwydir before and after regulation

River residents vividly recalled the Gwydir, in its somewhat unpredictable cycles of flooding and extended dry times before Copeton Dam was built.

For example, VK recalled thirty-three months when the Moomin Creek did not run during the early 1940s, while TM spoke of the 1956 floodwaters. A flood like that, he explained, would sink in deeply and the soil would not dry out for many months afterwards.

Residents reported significant changes to its flow regime since the construction of Copeton Dam. For instance, floodwaters which escape the regulatory system now travel much faster and do not soak into the ground as deeply. They attribute these changes to weirs, private storages and the loss of thick vegetation.

A major consideration raised in several interviews was the drastic reduction in wetland area, most notably the reduction of sags or marsh clubrush (*Bolboschoenus fluviatilis*). Some residents attributed the drying out of the wetland areas to river regulation. Others linked the massive wetland shrinkage to agricultural activity.

The Drama of Flooding Rains

The men were often away mustering or looking for country and the original Emma Bull was there with several of her twelve children and there was a flood — presumably this was in the 1860s or 70s. She and her children took refuge on the roof of the building slab hut, reputedly with only a pumpkin to eat for two or three days. This is in the family history. (MB)

One particular flood I can remember, about '53 or '54, and the river broke its banks overnight. Very early one morning, the milkman was down on the river milking the cows. Dad yelled to him that the river had broken its banks. He let the cows out of the baling yards and took off and got around the water. But the cattle couldn't. We watched those cows, one particular cow led them to a certain spot on the bank of the river, and it was the shallowest all through that flood, and they stood in about a foot of water for about a day and a half. (CB)

The 1955 flood was devastating. It was the result of very heavy rain in the upper reaches of the Gwydir. Inverell was severely flooded. The weather was quite dry here [Gingham Channel], it was very dry underfoot. It came down with a great rush of water, and it actually created clouds of dust in places. The water went into the cracks and caused the dust to rise. Even in this flat country it was half a fence high ten yards

behind the lead of the water. It was just this great rolling mass of water. Yet its forward progress was relatively slow because of the dryness of the ground, it sort of held it up. It was quite incredible. (TM)

In the 60s we had something like twelve months when we couldn't get a vehicle into *Wandoona*. They were probably six mile away. It was just too wet and stayed too wet to drive in or out. We rode in with saddle horses and pack horses and then at one stage we carted wool out with a tractor and trailer, to get the clip out. Actually we brought the shearers in on the tractor and trailer to shear, and we had a track that deep in the black soil from *Wandoona* to Bullarah, that we could put the tractor in the tracks with a load of wool in the trailer and go back and sit on the trailer and have a yarn because the tracks were that deep the vehicle couldn't get out. (BS)

Historic Floods

Anon, January 1910 Flood:

This was described as the most destructive flood ever experienced in the northwest [since the arrival of Europeans]. Northern section of Moree was submerged to a depth of 6 feet (2m), Bingara to 3 feet (1m).

Yilaalu No 20, 1992,
Moree and District Historical Society.

"The biggest flood ever known occurred shortly after I went to Meroe Station [currently approx. 70km west of Moree], the waters coming down on 18 Feb 1864. We were 8 days on the house and the water never varied one inch till it went away suddenly on the 8th day. …during this time the mosquitoes were very bad so I tore my singlet up to protect Mr. Benson and myself from the mosquitoes by creating a smoke from the singlet. …on one occasion I swam to a tree and discovered a big brown snake about a foot up out of the water coiled around the tree. I quickly got on the other side and shoved myself off and swam to another tree. …The water was four to five feet deep anywhere within five miles of us."

Extract from an interview with Mr. C. Boughton, "Waymond" Pallamallawa, by a representative of the *North West Champion* 1928, reprinted in *Yilaalu*, Vol. 2, No. 2, Dec. 1978.

During the 1974 flood we flew around quite a bit by plane, and really the river spread from the Queensland border to the Pilliga scrub. It was water all the way, with just dry ridges through it, so I suppose the whole area was the bed of a river. (BS)

In Praises of Freshes

[Before the dam was built], we used to get clean outs of the river, with the freshes. The people in the western area used to look forward to them because they'd reinvigorate [plant] growth, feed. (DH)

From the *Wandoona* homestead every morning, the first thing we done when we walked out the door was look to the east, for birds. If there was big flocks of birds, we'd know there was a fresh in the river, and then from the direction of where they were flying, what channels would be running. (BS)

We used to get lots of little floods. It'd rise and run through, couple of days and it would be dropping. Those little floods are all gone now. We'd still get them, except for the weirs and the dam up there. (LS)

Dry Times

We've been in the bottom of the river in years gone by [prior to 1976] with a bulldozer taking logs out. It was dry. I can remember the fish were gravel-rashed on their bellies and sunburnt on their backs. And I can remember a big hole of dead fish from no water at all. The puddle holes has dried up and they had run out of oxygen and died. (PG)

1967 was a big drought and the river went down to a trickle then. I don't recall the Gwydir ever stopping, but it used to dry back to pools, connected by a small stream. (HM)

There was a dreadful drought in 1908 or 1909 when dad first took this place up. Where the river had been deepest, it was just a trickle. But the river's different now. At one time there were two tributaries down there, but not now. (KM)

River Regulation

The seasonal pattern of flow has changed considerably since Copeton Dam was built. The dam built in 1976, has a capacity of 1,360,000 megalitres and regulates 55% of the total inflow to the Gwydir River. A natural winter peak in flow volumes has been removed, low and medium flows are greatly elevated in summer (with irrigation deliveries) and flood flows are greatly reduced (McCosker *et al*, 1999). Figure 1 shows the changes in the flows of the Gwydir River, under 'natural' conditions and the reduction in seasonal flow as a result of river regulation . (Thoms *et al*, 2001)

River regulation is strongly linked to the decline in populations of over 20 native fish species in NSW rivers. (NSW Fisheries, 2001)

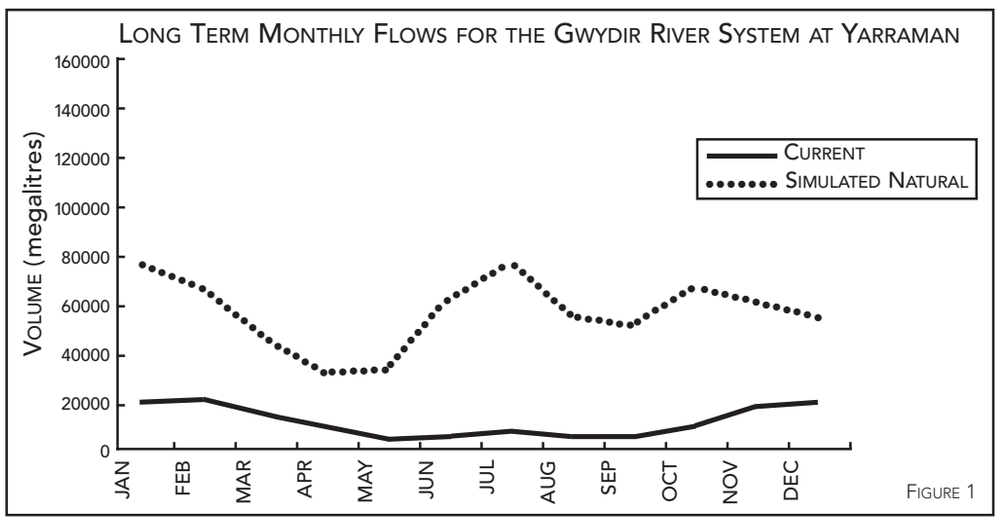


Figure 1

Water Quality

The loss of water quality, one of the most consistent themes in the interviews, was mourned by many river residents.

They recalled the clarity and warmth of the water in years past, and contrasted these qualities with the contemporary river, which they described as dirty, turbid, cold and possibly chemically contaminated.

Close to Copeton Dam, the discolouration of the water was generally attributed to tannins in the water from rotting vegetation. It is only in the Bingara area that the water was not reported as being very muddy; from Gravesend westwards, the mud wis a severe problem. This muddiness, some claimed, has been caused at least in part by the impact of carp. Carp seek food in soft sediments. As they feed, they suck up muds and sort through them for food bits. This feeding behaviour raises sediment into the water and uproots plants.

(See Chapter 3 for more details).

People who live in the wetlands cited the loss of vegetation, particularly grasses, which previously filtered the water.

(See Chapter 5 for more details).

People living at the eastern end of the study area expressed strong concerns about the extremely cold irrigation flows in the Gwydir. They called the water "freezing" and told of having witnessed the fish, including carp, moving out of the river and up the smaller creeks to escape it. Further west, water temperature became less of an issue, and past Moree, it was rarely mentioned.

an Historic View

Botonist and explorer Allan Cunningham 1827: [We had no] "sooner quitted the ground on which we had encamped, than at a distance not exceeding 200 yards, we came upon the right bank of a stream forming a very handsome reach of deep water 70 yards wide, with steep, soft banks, and bending around the northern extreme of the lofty range to the NW. This river we traced on its right bank, upwards of a safe ford, by which we had crossed to it's opposite side over a bed of gravel measuring 146 yards in breadth. Above the bed of the river, which the prolonged season of the drought had reduced to a very low level, we remarked the traces of floods 55 feet in the branches of the swamp oaks skirting its channel. When, therefore, in seasons of great rains, the river is swollen … the rush of the impetuous torrent bearing logs of timber down its channel to a depressed interior must be awfully grand."

Wiedemann, E. (1981)
A world of its own: Inverell's Early Years.

Wiedemann estimates Cunningham was travelling in a southwards direction, parallel to the western range and states that this ford was about 5 km upstream of the Gineroi homestead.

Cunningham's mention of a "depressed interior" reflects his search for the dreamt-of inland sea.

Loss of Clarity

I remember in the '65 drought, we were lure fishing behind a boat and the river had stopped running around here, and you could actually see the fish behind, like thirty metres behind the boat, come up and follow you down the river, and then go back to their log. You could look out and see the fish, they'd just follow the lure. You could see down about ten or twelve foot. Yeah, it was actually crystal clear. It never really clears to any extent now. It hasn't got that crystal clear [quality] about it anymore. (DB)

It used to be clear. When we were kids, before we got water on down the mission, they used to always get their waters from the river. It was just like spring water. When they put the water on Moree, it used to be beautiful water. But they got everything in it now, so it's shocking. It's changed a lot. The water's changed, everything's changed. (EK)

You could look over and you could see the darn animals. They'd be swimming around, but you couldn't catch 'em. But the water was that clear you could see fish in the water, in the daylight you could. (LF)

Triple Trouble:
Tannin, carp and salinity

Anything in [Copeton] dam's shocking to eat. They're yellow flesh, you know. I think it's just the food that they're eating, you know, they're living on weed and mud. We get the odd catty out here [Gravesend], and they're real white flesh. Fellows out at the dam, the flesh's coming out yellow. So it's something to do with what they're eating. (SG)

Water clarity has deteriorated very badly since the dam, mainly they say it's because of the green vegetation rotting on the bottom of the dam. But as far as mud goes, there's not a lot of difference. We always used to get mud in the river when there was a fresh in it, [but it would settle, and then] it was absolutely clear, beautiful water. It would be just a matter of a couple of days, or after a big flood, a few weeks... It's always been beautiful water. You could go down there and drink it. It was crystal clear. My word, I drink the water now, and it's still good. It's discoloured but the quality is still alright, I think. But apparently, if the dam is low and then fills quickly, the people in Bingara with their washing, it discolours their clothes as well. This is the tannins, mainly I think. (CB)

What has changed the clarity has been the European carp and the destruction of the plant life. You don't have that filtering [anymore]. There's more stirring up because of the carp. It's a big difference. You try and tell the kids how the water used to be. It was almost as clear as looking into your swimming pool and seeing something on the bottom. (RPK)

It's like a soup mix. They [carp] just keep turning it around and around. (PRG)

I went fishing last weekend on the Mehi and the water was rising and falling because of those two big storms over near Warialda, and along the high water mark I could see a crusty line of white salt, which I never would have seen twenty years ago. You could just about taste the salt in the water. I mean, I hope it was salt! (PRG)

Changes Since Copeton

There's no doubt it was changeable [before the dam]. We could often have a flood and a drought in the same year. In fact we did most years one way and another. I think they've killed this country to be quite honest. (BS)

The dam has been a godsend in many ways because it has guaranteed water, but here, as far as we're concerned, the dam has been an absolute nuisance. We've got country on both sides of the river and it makes it difficult to get cattle across when they're releasing the water... I don't think you're going to see [the river shifting] as much now, since the dam was put in. Going back many years, in the big floods, the river would cut a new path, but very rarely would it do it now. (CB)

From the amount of [irrigated] farming here, the river is just not flowing. Most probably the average depth when I was here 25-30 years ago would be three metres. Now I could walk from Pallamallawa straight up to Yagobie without it going over my head. (CM)

1832 Water Quality

In January 9, 1832, Major Thomas L. Mitchell and his party came to the Gwydir at Mungie Bundie (currently approximately 15km east of Moree, midway to Pallamallawa). They saw "a fine lagoon of considerable extent and brimful of the finest water."

(Milliss 1992, *Waterloo Creek*, p.84)

Why Wetlands Matter

About six percent of NSW is wetlands and these are estimated to support 52 fish species in various ways:

- feeding, spawning and nursery areas for many species of freshwater fish
- permanent waterholes become essential refuges for fish during dry times
- wetlands act as natural flood regulators
- they absorb, recycle and release nutrients
- wetland inundation often triggers biological activity. Some fish time their breeding to coincide with this activity.

Wetlands are depressions that are inundated with water on a temporary or permanent basis. The water in wetlands can be flowing or stationary, and it may be fresh, brackish or saline.

Wetlands remain one of our most threatened resources. In NSW, for a number of reasons, they have been reduced in area and degraded drastically, reducing their effectiveness as fish habitat.

The Mehi Experience

I think the dam has done a lot of good because you've got water in most of the river all year round, and I think that's the reason why a lot of those cod came up here into the Mehi. We're catching cod that can't all have been introduced because they're just too big. (CF)

Shrinking Wetlands

Anywhere where the dead trees are is where the swamp used to be, and the green trees are on the higher spots. As long as I can remember, up until the dam was built, it was just permanent water. (MH)

I can take you on properties west of Moree and show you hundreds of acres of Coolabah trees dead because there's no water going through it, west of Garah-Moree. Acres and acres, Coolabah that's stood there for three or four years, now it's all dead. (CM)

The loss of wetlands is quite devastating. The less water that's allowed in here and the less duration that it's allowed to flow for has encouraged newcomers to the area to farm more and more country and then suddenly the wetlands have less and less supporters. People have a vested interest in keeping it dry. [There's now] wheat growing in country that could best be described as wetland, no question. I've seen the water running over it for all bar three weeks in eighteen months straight. (TM)

Once Were Wetlands

Mr. Alexander Rogers, 9 May 1885:

-Do you know the swamp shown on the map in the Bernaba and Courallie Counties?

-Yes. It is known as the "Big Leather Swamp".

-What is the cause of that swamp?

-It is an old riverbed – it has been the channel of a big river; it spreads out from 3 to 5 miles. The river is an immense reed-bed now; it is quite dry but in flood times it is up to the saddle flaps in water and is about 4 miles across.

Extracted from the *Minutes of Evidence for the Royal Commission on Conservation of Water,* 1885, cited P.A. Keyte (1994) *Lower Gwydir Wetland Plan of Management 1994 to 1997,* Report by NSW Department of Water Resources for the Lower Gwydir Wetland Steering Committee, Sydney

A.H. Grace, 1954:

The Gwydir River used to run through the town [Moree] long before my arrival there, the river bed is still there, about 40 feet deep in some places, but about a mile above the town a sand bar formed, blocking the river for 100 or 200 yards and this diverted water into flat channels and formed what is now called the Watercourse where lucious green feed grew and was quickly taken up by graziers from the Richmond District.

From *Yilaalu* Vol. 1, No. 2, Dec 1977, Moree and District Historical Society. A.H. Grace was 94 at the time he wrote the letter.

Cold Water Pollution

One of the most significant effects of regulation is cold water pollution which can cause fish kills and significantly affect their capacity to breed. The major cause of cold water pollution is the release of water from the colder denser layer of water near the base of major dams. It is estimated that up to 3,000 kilometres of mostly lowland river habitat in NSW is affected by this phenomenon.

What this means for native fish

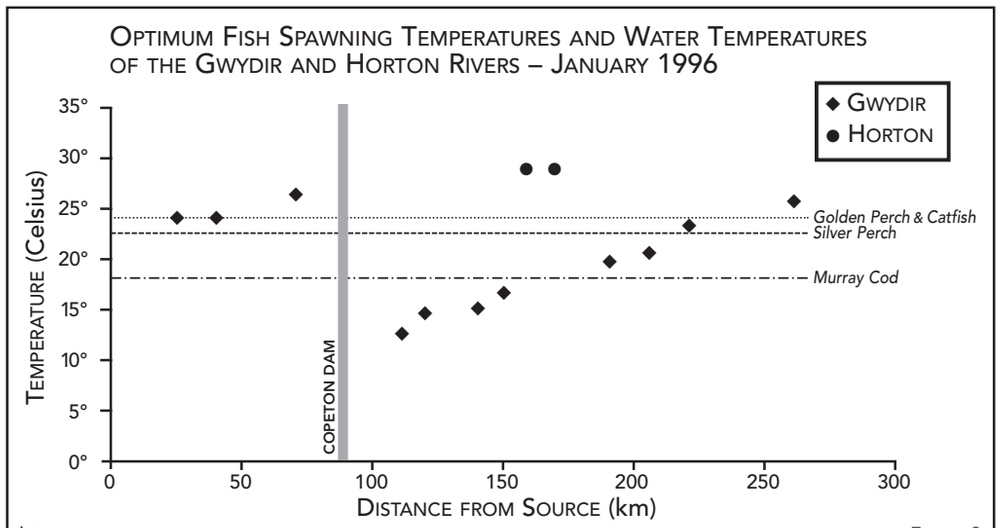
Cold water pollution is one of the key factors behind the reduction in the range and abundance of native freshwater fish species in NSW. Native fish, along with other aquatic animals such as turtles and frogs, are cold-blooded. Their survival, growth and reproduction depends on the temperature of their environment.

Cold water pollution can reduce the growth of fish and even reduce their chance of survival. A study by NSW Fisheries at Burrendong Dam compared silver perch survival and growth in cold and warm water releases. Results showed 100% survival in the warm channels (18-24°C) compared with 25% survival in the cold channels (12-14°C).

Also fish will not breed if conditions are unfavourable. Even in the right season for breeding and with appropriate rises in the river, breeding may not occur if seasonal temperature changes and thresholds are not reached.

Young fish depend on zooplankton blooms as a food source. Low water temperatures can delay or prevent the development of these blooms, eliminating an important food source.

The following table (figure 2) is from data gathered by McCosker (1996) after an irrigation release of 5,000ml/day from Copeton Dam.



* *Dotted lines on the graph illustrate optimum temperature for spawning for these native fish*

Figure 2

Ecological Enemy Number 1

But this I do know: we need to address thermal pollution. I see that as the number one destroyer of our ecology in the water. (RPK)

You can definitely notice the water temperature. When there's water coming through from Copeton for the cotton and so on, it's definitely changed the water temperature. It's cold and you've got a job to get a shrimp. The shrimps know it's cold water and you can't get them. They must go back into the banks, like I suppose when they experience winter. Yeah, they must go back up into the bank there. If you go for a swim, you'll notice the water's colder. And when I came from Copeton for skiing one weekend, on the way back we pulled in near Bingara and jumped in there for a swim and just about froze to death. It was freezing, you know. That was at Christmas time. Even when it gets down here [Moree area] the water temperature is far too cold for the fish to breed and it's about now [late November] that the fish should be starting to spawn. Well that's why they close the cod season for September to November because that's their spawning season. But that's [also] the time of year they let the water go for the cotton, so ... that's why we (the combined fishing clubs of the Moree district) decided to start the restocking committee and do something about it. (CF)

The water is very cold here at Glenroy station. It limits the breeding seasons for cod. (HM)

But now they've got the dam there, holding the water up. And when they let the water out – I've been saying this for years – they let it out from the bottom of the dam, and it's interfering with the fish. See, when they let the water out the bottom of the dam, it's cold. (LS)

It was after the dam. The carp came and then the other fish dropped off. Maybe because they let some water out that's a different temperature, and the fish, they got certain time to breed and certain temperature to breed. That's got a lot to do with it. (EK)

Fish and Fishers: Tracking the Changes

The general tone of the river residents' recollections of fish populations over the decades was bittersweet. The past was evoked as a time of abundance for native fish, while the present and recent years – restocking notwithstanding – were generally viewed as depleted and uncertain times.

In all but the most western regions, people reported a massive drop in catfish numbers. The decline in silver perch was more variable, but in some places equally severe.

Since restocking began, there appear to be far more Murray cod in most areas of the river than at any time that residents could recall. This is most notable in the Mehi and Moomin areas where Murray cod were extremely rare prior to the introduction of irrigation and restocking.

Most interviewees saw the increased cod numbers as beneficial, associating them with a reduced carp population (Murray cod fingerlings appear to prey on juvenile carp). However, several interviewees expressed concerns about the long-term impacts of increasing the population of such a significant predator.

There was a total absence of sightings of the river blackfish, which no one reported ever seeing in the Gwydir system; and a near total absence of sightings of Australian smelt.

The majority of residents stated concerns about cold water pollution from Copeton Dam water releases affecting fish breeding and a high proportion spoke about the devastating effects of carp on native fish and their habitat.

Fish were identified from photographs and are cited according to this identification, since local names vary considerably. For example, *Nematolosa erebi* are known as bony bream, flatfish, forkytails, silver bream and even silver perch.

Clearly, the kind of fishing a person does will affect which fish they see. River residents frequently remarked that there were more small, native fish in the river in the past, but they could not identify them.

The fish expected to live, or to have lived in the study area are:

Freshwater Catfish (aka catty or jewfish) *Tandanus tandanus*
Murray Cod (aka codfish) *Maccullochella peelii*

Golden Perch (aka yellowbelly) *Macquaria ambigua*
Silver Perch (aka blackbream) *Bidyanus bidyanus*
Purple-spotted Gudgeon *Mogurnda adspersa*
Mountain Galaxias *Galaxias olidus.*
Crimson-spotted Rainbowfish *Melanotaenia fluviatilis*
Olive Perchlet *Ambassis agassizii*
Spangled Perch (aka bobby cod) *Leiopotherapon unicolor*
River Blackfish *Gadopsis marmoratus*
Bony Bream (aka forkytail, bobby bream) *Nematolosa erebi*
Australian Smelt *Retropinna semoni*
Flyspecked Hardyhead *Craterocephalus stercusmuscarum*

Days of Plenty

We were about to cross [the Gwydir River] on horseback, and we looked down and we could see flashes of fish in the water. And dad said: "I wonder what's going on down there? It looks like the fish are coming up to spawn." The crossing was stone, it wasn't rapids or anything else, just a crossing... I didn't know what was happening. And so we rode into the water and the horse didn't like it real much because there were fish all around his feet! So we took the horses back out and tied them up, and dad got into the river and just quickly kept throwing the fish out, straight to my feet. And I put them in a bag. They were yellowbelly and big black bream. They were all going up the river that particular moment and I tell you we got that many. It was probably autumn 1948. I should have been at school that day. I was in sixth class, but I got the day off to go and help dad. (HR)

I caught many bony bream as a child. You would find them in the morning or late at night. Particularly early in the morning the river would be alive with bony bream breaking the surface. Where I lived on the river, every morning, if you went fishing early, you'd hear bony bream slapping – dozens, if not hundreds... (RK)

I remember when I was a kid it'd be nothing to catch like, in an hour, forty to fifty catfish, like easy, no worries at all, you'd pull a wheat bag full. Out the Horton junction I remember in the sixties, seventies, catching two hundred and fifty in one afternoon session and another two hundred and seventy in another afternoon session. (DB)

Could be seventy, eighty years ago... Down there where the weir [Macey's] is now there used to be a lot down there... I used to go fishing with dad and mum. [We caught] lovely big codfish, yellowbellies, jewfish... Oh yes, thousands of [little coloured fish], they'd come up in the shallow water, all those different ones, shoals of them, all the different colours, reds, silvers, golds, every colour... See the silver ones had little black spots on them, and the red ones would have black spots and all that. (KM)

During the depression my father would fish to get food for us to eat you know to keep us going. He was a very keen fisherman. He could mostly sit all night to catch fish, We probably ate fish a couple of times a week. (JSM)

We never caught the little fish. We used to rake for craybob sometimes and we'd rake them out with the raking net, the tiny little fellas. A lot of them had big eyes. And we used to get another one called the bobby fish; we used to get them out of pools. There were lots! Heaps! We used to get them on silver paper. You get your hook and just a little bit of silver paper, you'd move it, and just haul them out. (LS)

The only catfish that I've caught in big numbers is down on the Gwydir at Pallamallawa. Twenty years, thirty years ago we used to catch a lot down there then – sixty in two hours you could catch. That was with four or five people fishing. (KK)

Came on to a new part of the river. A big tree had fallen out of the ground and left a hole and it was just full of catfish that were more than pansized. It was fantastic. I got home late for lunch. (HR)

and Regrettable Folly

Shouldn't say it, but we used to use them [frogs] for fishing bait, the brown sort, and we used to go down to a place called Macey's Crossing [near Pallamallawa] and you always got hundreds of 'em there, and you can't get 'em there now. Haven't been able to get 'em there for years, since the dam started running, and I put that down to the cold water, too. (SG)

It's a sin now. When the water comes down muddy, all the fish come to the surface and people who've never fished in their lives would hear on the bush telegraph and they'd come from Croppa Creek and everywhere with their pitchforks and garden rakes. I don't know what they do now, and quite often you'd see catfish later with rake holes in them... they'd come along and take more fish than they'd want... One guy from Biniguy rang a guy from Croppa Creek and said there's a stack of yellowbelly at a certain gum tree, but when he come in, they're all rotten. So it was a waste of fish. A waste. (NB)

So down we went to the river, in the dark, blundering along over logs in the rain and ...I saw fish like I've never seen before. You could literally have picked your size and your type. There was everything from codfish that were two foot long to Jews [catfish] that were two feet long. And we took, that night, a lot of fish just for the heck of it, you know. I mean, I know it shouldn't be done, but it was done, and everyone else was doing it too and it was a darn shame, really. Because, I mean, we used what we took, but a lot of people just took them for the sake of taking them. (SM, from JSM)

I can remember catching catfish to the point where we just caught them and threw them back because we had enough. We did it for the fun. (RPK)

When a fresh came through... the fish used to come up because of the muddy water. They'd come to the top and people would get fish to eat then. We used to only pick out the odd ones, but silly people they used to just kill them, throw them out on the bank. They'd say they would come back and pick them up [but] the flies would blow them and they would be left there in the sun to go rotten. (RA)

In Particular

At Keera the fish we caught in descending order, were catfish, bony bream, golden perch and Murray cod. I remember shrimps were very prevalent and they were often used as bait. (HM)

Mountain galaxia

Not very big. Not so much in the Gwydir but I have seen them in Bora Creek and in the Horton. There [were] a lot of these little fellows in the Whitlow creek too, when we lived there, but I haven't been out there for twenty years. (HR)

Catfish

They're still there but not in the same numbers as they used to be. That was probably the predominant fish in my early days, [19]40s, 50s, but even [in] my father['s] time the catfish was the main fish. They were plentiful. (CMB)

Yes, there was plenty of jewfish. I wouldn't say there was more [in the Mehi], the Gwydir was the one I caught all the jewfish in. It seemed to be full of the jew-fish early in the piece, and as I say, they gradually got less and less and less. (AB)

In the Gwydir you could catch as many catfish as you wanted, sixty or seventy at a time if you wanted to... They seem to have gone in the later years; ten to twelve years ago or a bit before that they started to deteriorate. They were dropping away and you still don't get many catfish now...

Spangled perch

You still see a few... Bobby cod, the little spangled. There's two varieties actually, one they call the Boomi cod, that one's got a blue spot on him, and the other one's got a brown spot on him. They've [Boomi] disappeared to a big extent. We used to go down and catch them in thousands. (CM)

Silver perch

Yeah, we used to catch a lot of black bream. But them days you could take 'em out of the rivers.

Murray cod

No none whatsoever! The only codfish I ever caught, I fished here from when I was about five and I never saw a codfish until I was about fourteen. We caught him down about three miles from Pallamallawa... From then on, every now or then for the next five or ten years you used to get an odd codfish, but I fished more or less like a thousand times in the Gwydir, but I never ever hooked a codfish [in that period, 1939-48]. (RA)

Yellowbelly

I can remember bobbing yellowbelly in The Raft before the dam went in and it was spectacular. Had a breed event. It was before the carp came. Early 70s we went down

one night. There was three boats of us and it was a very big catch. Mainly cod. I've spun yellowbelly following at the Raft but I was mainly interested in bait fishing then, but I wish I'd been interested in lures then. I would have had a ball. (RPK)

After the Dam, Slim Pickings

Weirs affect fishes. Tareelaroi Weir, you can go there anytime of year and catch yellowbelly fingerling by the hundreds. You get two metres above that wall and you don't catch a fish. These fish ladders do not work. 'Cause when the gates are open, the force is too great.

All [they] have to do [to make fish ladders work] is make them into a series of pools so they fill and they've only got a short amount of fast water to get over and then they've got a resting stage. Not this, five or six metre[s] straight down wall.

I've seen fish down there, big fish, and you can see their fins out of the water where they've been trying to get up, and they just can't get up, and they've bashed themselves. Well I know they're pretty stupid, but Jesus. Yeah, that's where they're going and they can't get there. I don't think they can even get there in a flood because the amount of pressure that comes through those gates is just too great. You go down there when the river's high. We get fish that come up here when the river comes high, when the dirt comes in big amounts, the fish actually come up because they can't breathe. And you don't see 'em out in the middle. They're always on the edge. You go fishing, you catch your fish, your good fish within ten feet of the bank. You don't catch 'em out in the middle. They don't travel in the middle.

I've got mates who've got fish finders; they say that they see fish on their fish finders laying in the middle, but they don't live in the current, they swim on the edge of the current. And if that water [is] coming out of that dam with as much pressure as I see, there's no possible way of [their] getting up there, not unless they've got a jetboat up their anus. (SG)

Fishways

Fishways are essentially a water passage around or through a barrier which are designed to reduce the energy of water flow in order to allow fish to pass without undue stress (Sharp and Fairfull, 2000).

Between 1930 and 1985 a number of fishways were built into dams on NSW rivers including the Gwydir River. However, these fishways were an overseas design, called a submerged orifice fishway. These suited large, fast swimming fish such as salmon. Most Australian native fish species are adapted to slow moving waters, and so, cannot use the submerged orifice fishway effectively (Mallen-Cooper and Copeland, 1997).

Since 1985, NSW Fisheries and the Department of Land and Water Conservation have designed, constructed and monitored several fishway designs on different types of dams and weirs. These are all proving successful at allowing native fish to pass barriers such as weirs.

You can take 'em [silver perch] out of the dams but not the rivers. They've been gone a long time, they're like the jewfish. You're lucky to go and catch a jewfish in the Gwydir. You'll catch more of that carp, or you'll catch more yellowbelly, but black bream, he's pretty scarce and so's the jewfish. But if you go up to Copeton, well we call that the catfish dam there, because it's full of blooming, you know. (LF)

People knew the impact of dams on the streams below, and they knew what was coming. I saw the Lachlan denuded from Cowra through Eugowra out to Forbes, and even out as far as Condoblin in the mid to late 60s, and it was virtually impossible to catch a yellowbelly or a Murray cod above Jenalong Weir. There were no shrimps in the water, no weed beds during summer. And it's exactly what's happened to the Gwydir. But that's forty years ago and people should have known. The fishermen knew. I just don't understand why other people didn't know and take notice of it. (RK)

[So how has the fishing changed over thirty or forty years?]

It got to the stage where six years ago a friend of mine sold his boat and put his rods and reels away. I stopped fishing in the river at that time and fished mainly on the dams after that. This was a common occurrence around that time. (RPK)

That catfish, yes, now that's one fish that seems to have gone. You can blame the carp for that. [In the 1950s] .. Bunnah Dam particularly you'd hardly get time to bait your hook... I think the black bream's even gone out of the Barwon, and I think it's because of European carp. People who know, old fishermen and that, they blame the carp. Haven't caught [a black bream] for fifteen years I think, and then I only got one. That's a sad story. (VK)

[The fish] were here before I left in '62 and when I came back in '88 they were not. I came back and went fishing regularly in between that and they just weren't there. (RK)

Since the dam started to run they [catfish] don't breed. It's too cold. When I was a kid, you'd walk along the river and in the shallow gravel spots you'd see their nests, which was a big circle of rocks, and you don't seem 'em no more... They [spangled perch] went like the catfish. There was a lot for a long time, and then when the catfish started to deplete... I put it down to the [cold] water. At present, there's supposed to be a lot released in the Gwydir, but we're still not catching them. I don't think they're making it. They're either getting eaten or the river's too cold and they're dying. (SG)

Catfish nests, you never see them. They're diminished. You never see them at all. (CM)

That Carp Again

The fish died out. There was a lot of years we couldn't catch a fish here in the Mehi for the European carp. They go them and that was it. Late 70s and the 80s, 90s yeah. When you put a line in you'd get thirty carp to one yellowbelly. And they were big carp, real big carp. Carp are dropping away [now] because they have a carp muster here every twelve months. We get 'em big. Charlie Carp. (EK)

You'd find that whenever you'd go [fishing], for every yellowbelly you caught, you'd catch anything up to thirty carp. (CF)

Once the carp arrived, they took over just about all waterways in huge numbers. They even got into the bore drain systems. We were delving one bore drain and the bank was just silver, about three to four carp to the foot right along the bank. Because European carp are a bottom feeder, they totally destroyed the bottom vegetation by digging up the root system of the plants so that bottom vegetation disappeared very quickly. When you went to catch yellowbelly or Murray cod, they were getting very scarce, and it was nothing to get forty European carp on a fishing expedition. (PRG)

Fish Kills

I don't remember anything like that in this river. I've only heard about them out west. (RK)

Yep. I was at Copeton Dam, Gwydir, once when the water rolled, and the forkytails, those little fellows, they died in their thousands. Yeah. The water rolled, they told us. Yeah, it's like an inversion layer of air. You get the cold and the hot and it turned, and what was in the way of the cold, died... (LS)

I never seen the fish killed in my life like I'm seeing now, and I've lived all my life on the Mehi, all the camps on the Mehi. I've never seen fish killed like now and it's definitely cotton that's doing it. I've seen the Mehi dry up in holes and I never seen no fish dead, I never seen them like this before, and I've seen them now on television, the fish kill. Never seen that until a couple of years ago. There were fish everywhere, along the Namoi, the Barwon, the Gwydir. (LS)

Most of the fish kills I saw were due to pelicans. They'd come in as the holes dried out and .. in this hole there would have been against this tree ten Murray cod all in excess of thirty pound. The pelicans herded the fish all up on end and they just dive bombed them. And once they were full, they just killed them for the sport. The forkytails [bony bream] were there but the Murray cod and things confounded me. The fish would have been under stress because of lowered oxygen levels, high populations of fish. The mud was stirred up. You could see that the water quite often was a little bit stagnant. That's not to say some of the fish wouldn't have died anyway. I remember seeing this on a farm and taking a photograph of it. I was probably about twelve when I saw that [1956]. I fished the hole after the pelicans had been there and I saw the skeletons draped on the tree because it didn't have a flood flush out. There were goannas everywhere. You could see where the pigs had been in the water and broken them up. But there was enough skeletons, especially head skeletons to identify what had been killed. And that hole took probably six years to come back. And I've had a set against pelicans ever since. They're graceful birds but they just don't mix with freshwater species. (RPK)

Six or eight years ago... this plane was spraying the cotton and he was going from west to east, and when he turned to going east, he'd go over the river and turn and come back. He wasn't cutting his sprays off when he went over the river. We had a big fish kill and he paid for it. I think it cost him something like fifty odd thousand dollars. Yeah. We had dead fish... mainly these sort of bream. They're shallow feeders,

I believe, and that's the reason why they were poisoned, they tell me. The other fish were killed, too, but not so much. Some were about ten inches to a foot long. Not many yellowbelly or black bream, but these silver bream [bony bream]. (RH)

Restocking

Apart from the restocking, the fish are not breeding. There was a dramatic decline in fish numbers. Till the last eight years, you just wouldn't catch a fish. But since the fishing clubs are restocking, they're making a really good comeback. The cod population is the healthiest I've ever seen it; catfish are the lowest numbers I've ever seen in the river. Silver perch is really a rarity. Big decline in the European carp. Their numbers have gone down over the period we've been restocking. I'd say the Murray cod are definitely preying on the European carp. (CM)

I've got a theory on restocking. I don't think that they like the cold water, and they make their way up [creeks]. I do feel there's more fish being caught in the Horton River than there are in the Gwydir because they seem to head down that way...[black bream/silver perch] They were a kind of consolation prize. If you got a couple of yellowbelly and a cod, you'd throw the black bream back. They did a lot of restocking of silver bream [silver perch]. Just a natural extinction. I think they would have dropped away [if they weren't stocked]. Except for the jolly carp. (HR)

The average sized Murray cod caught now would probably be bigger with the stocking, because cod grow very quickly to about eight or nine pound. (RK)

Back in those days, even in the Gwydir, if you got a cod, even if he was a little fellow, it was a big thing, 'cause the cod was very rare. I'd say [we used to catch] one [cod] to three hundred yellowbelly in the Moomin. And then the Gwydir I couldn't really tell you. I remember when I was a kid I never ever caught a cod in the Gwydir. I remember dad catching one big one once, but that's all we catch now. That's through restocking. [The cod] are stopping the carp down the river. We don't catch a sixteenth of the carp we used to catch. (SG)

All the fish that are caught in this area now, you can almost put them down to certain releases back over the last five or six years, the numbers that went in. You can almost tell which year they were put in. (RT)

In the Mehi, down where the golf club is now... many years ago... I'd say yellowbelly, catfish, we caught a lot of catfish down there. Very rarely now, very rare, oh, but they are starting to come back now... They're restocking. That's a good thing. They put thousands of fish in, I think twice a year. And that's yellowbelly and cod. (EK)

Probably in the last five years we've stocked maybe 15,000 cod fingerlings and in excess of 200,000 golden perch fingerlings into the system, in the Gwydir and Mehi. This is the Moree Restocking Committee [only]. (RPK)

I think what's going to happen, the cod are going to dominate everything... now that the carp have kinda disappeared to a certain extent... But there comes a saturation point with cod where there's no room for them, they're a top predator. They take everything out... I'd sooner see catfish put in the river, as far as maintenance. It's sort of like starting from scratch again. But if there's no silt in the river, there's no bottom sort of debris. See this [high flow] churns all the debris up... With this water coming down at such a rate it turns it over and keeps the floor moving and nothing can breed on it. So you're buggered from day one... A big cod would cover probably a two hundred metre stretch of river. They're like lions. they've got a base, but they will move out to hunt. They'll eat whatever they can get a hold of. I really think they're starting with the food chain at the wrong end, like everybody wants to catch a marlin but they've got to start with plankton and work their way up. (DB)

More cod now than what we've ever got ... Yes, with the restocking. And the Moomin was never known to have cod in it except one or two. Now there's heaps of cod in there, since the irrigation. And the Mehi, all you can catch is cod. (VK)

[Yellowbelly?] Yes, I've heard people say they're starting to catch them again now, but they went away for a long time after the dam.

Native Fish of the Gwydir River

The following excerpts have been taken from Morris et al (2001).
Illustrations by Jack Hannan

Murray cod
Maccullochella peelii

The species prefers deeper holes near cover such as fallen trees, rocks and overhanging vegetation. Murray cod reach sexual maturity at 4-5 years of age when they are 2.5 to 4kg in weight. They spawn in small anabranch streams during spring-summer when water temperatures are approximately 20^{o}C. Eggs are shed in hollow objects, under fallen timber and on the substratum. Murray cod larvae migrate downstream at a clearly defined size of 9-14mm. At 40-50mm juvenile cod become aggressive and territorial. Optimum larval conditions for survival include food productivity and recruitment dispersal triggered by inundation of floodplains during a spring-summer. Adult Murray cod feed on other fishes, crustaceans and molluscs. Larvae and juveniles feed on zooplankton and aquatic insects. The Murray cod has been recorded to 1800mm and 113.5kg. It is more commonly caught at sizes of around 10kg or less.

Overfishing by a large commercial fishery caused a decline in Murray cod populations between the mid 1800s and the floodplain management in the 1900s led to the construction of weirs and dams which have adversely altered the flow and thermal regimes of the major inland rivers in the MDB. This river regulation has seriously affected juvenile recruitment and dispersal by reducing the frequency of floods and the consequent large blooms of aquatic microorganisms that larval cod feed on, leading to a drastic and lasting decline in stocks since the 1950s. River "improvements" such as de-snagging have removed fallen timber which is necessary for refuge and concealment.

Bag limit: 2 per day. *Size limit:* 50cm. 4 in possession, only 1 over 100cm.
Closed season: 1 September – 30 November.

Spangled perch
(Jewel perch, bobby cod)
Leiopotherapon unicolor

This species prefers main river channels, seasonal streams, sandy lowland creek-beds, lowland backflow billabongs and corridor waterbodies. It usually occupies areas with little vegetation, in both turbid and clear waters.

Spangled perch spawns from November to mid-February. Males may mature at 58mm in length, while females mature at 78mm in length. In southeast Queensland spangled perch cease feeding and lose weight during winter if water temperatures fall below approximately 16^{o}C. This species has exceptionally good dispersal abilities and has been recorded travelling up to 16 kilometres in two hours along wheel ruts during thunderstorms. Spangled perch is an opportunistic omnivore, feeding on a variety of aquatic and terrestrial invertebrates, fish, detritus, algae and macrophytes. The main reasons for the decline of this species in the southern half of the Murray-Darling Basin can be attributed to cold water pollution and barriers to fish migration.

Freshwater catfish
(Eel-tailed catfish, jewfish)
Tandanus tandanus

Spawning may take place from late spring until mid-summer, usually in nests up to 200cm in diameter built of pebbles or gravel. Water temperatures of around 24^{o}C may induce spawning, which occurs several times, preceded each time by an elaborate courtship display. Sexual maturity is reached at about the same size in both sexes, in the third to fifth year of life, at lengths of between 350-400mm.

Adult catfish are essentially carnivores and bottom feeders, taking molluscs, crustaceans, insect larvae and small fishes.

This species has been known to grow to a length of about 900mm and a weight of 6.8kg. Fish of less than 2kg, however, are more common. The decline of freshwater catfish is especially due to a reduced frequency of flooding and a decline in the number of suitable habitats such as billabongs, floodplains, wetlands and backwaters. Cold-water pollution is also likely to have played a role in the decline of this species. Short term fluctuations in water levels during the spawning months of this species can cause the abandonment of nests as they become exposed above the water level.

Bag Limit: Dams – 5 per day. *Size Limit:* 30cm. 10 in possession.
Streams – 2 per day. 4 in possession.

Southern purple-spotted gudgeon
(Purple-spotted gudgeon, kurrin)
Mogurnda adspersa

Purple-spotted gudgeon occurs in weedy slow moving or still waters of rivers, billabongs and creeks. It can be found amongst benthic structures such as rocks and snags, and amongst aquatic vegetation. Purple-spotted gudgeon spawns during summer when water temperatures exceed 20^{O}C and food is abundant. The male cleans a prospective egg-deposition site such as a rock or log, and then exhibits an elaborate courtship display. Up to 1300 eggs can be laid in a single batch. It feeds mainly on insect larvae, but also consumes worms, tadpoles and small fish. This species reaches 120mm, but is more commonly found at around 70mm. It was once widespread throughout most of the Murray-Darling River system, being commonly used as bait for Murray cod by line fishermen. Today this distribution has been massively reduced. The decline of purple-spotted gudgeon has been correlated with the invasion of gambusia *Gambusia holbrooki* into its habitat.

Also, the adhesive eggs of gudgeons are deposited in patches and would probably not be able to survive marked water level fluctuations. Habitat destruction, and especially the loss of macrophytes from large sections of the Murray and Darling Rivers, may have also contributed to the decline of this species.

Olive perchlet
(Glass perchlet, silver spray, doody, Agassiz's glassfish, western chanda perch)
Ambassis agassizii

Inhabits the vegetated margins of rivers, lakes, creeks and swamps. It is usually found in waters ~ 1m deep, with little or no flow, near overhanging vegetation, and especially in backwaters. It is most commonly found amongst logs, dead branches and boulders. Olive perchlets often form large aggregations containing hundreds of individuals that disperse during darkness and congregate amongst suitable shelter during the day. It spawns between November and December, or when the water temperature reaches 23^{O}C. The adhesive eggs are scattered amongst aquatic vegetation. It is a nocturnal feeder, preying mainly on microcrustaceans, aquatic and terrestrial insects, small spiders, algae and very small fishes. The maximum length of Olive perchlet is about 70-80mm, but it is more commonly found at lengths of under 60mm. It is most likely that a combination of removal of woody debris, associated pressures of alien species, thermal pollution and the loss of the natural flow regime have all contributed to the removal of this species from most floodplain and riverine habitats.

Not a recreational target species

Silver perch
(Bidyan, black or silver bream)
Bidyanus bidyanus

This species inhabits both warm, sluggish, standing waters with cover provided by woody debris and reeds as well as fast-flowing turbid waters. Silver perch are a schooling fish with distinct migratory movements before and after spawning, which takes place in spring-summer in areas behind the peaks of floods. Recruitment of

silver perch may be more localised and opportunistic than previously believed and fish may spawn both during inchannel flows and during large floods. Females shed 300,000 or more semi-buoyant eggs in a few days. These eggs develop to free-feeding stages that drift downstream. Males mature at around 3 years of age when about 250mm in length, and females mature at around 5 years when about 290mm in length. Silver perch have been recorded to live to at least 27 years of age. Adults and juveniles feed on small aquatic insects, molluscs, earthworms and green algae. Larvae feed on zooplankton. Silver perch commonly grow to around 300-400mm and 0.5kg-1.5kg, but are known to attain 8kg. Factors leading to the general decline of silver perch populations include degradation of instream habitats, alterations to river flow and water temperature regimes, and the construction of weirs and dams.

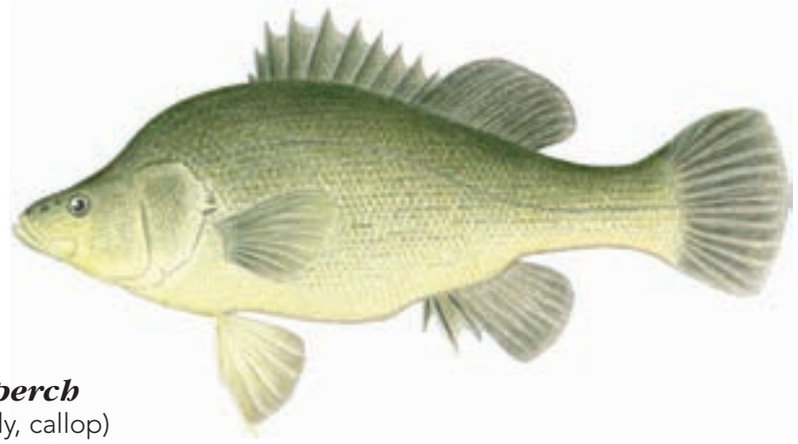
Bag Limit: Dams – 5 per day. *Size Limit:* 25cm. 10 in possession.
Catch and release only in streams and rivers.

Crimson-spotted rainbowfish
(Inland rainbowfish)
Melanotaenia fluviatilis

The Crimson-spotted rainbowfish inhabits rivers, streams, billabongs and swamps. It prefers slow-flowing or still waters with dense aquatic vegetation. Spawning takes place between October and January as water temperatures rise. Eggs are held amongst the foliage of aquatic plants and hatch into larvae 7 days after fertilisation at water temperatures between 25 and 29^{o}C

The Crimson-spotted rainbowfish is essentially carnivorous, feeding on both aquatic invertebrates associated with its weedy habitat and spiders and other insects which may fall onto or alight on the water's surface. Rainbowfish, inhabit thickly vegetated areas and may be rapidly declining in some areas as a result of predation by redfin perch. Loss of riparian and instream vegetation may also have influenced their decline and resulted in the recent patchy distribution of this species. There is also a high incidence of protozoan and bacterial infection of this species at low water temperatures which may restrict population abundance in systems affected by cold water pollution.

Not a recreational target species.



Golden perch
(Yellowbelly, callop)
Macquaria ambigua

Golden perch is found in habitats ranging from clear, rocky headwaters to generally turbid, slow-flowing rivers, creeks, billabongs and backwaters. Juvenile golden perch may occur in large numbers in extensive inundated floodplain habitats adjacent to western rivers that retain a natural flow regime.

Golden perch are a migratory species, with both adults and juveniles moving upstream following increases in flow during spring and summer. Triggered by a rise in water temperature to 23^{o}C, sexually mature specimens begin to congregate for spawning. Up to 650,000 eggs are shed together only once per season. Four days after hatching the larvae commence schooling, and at 5 days they disperse and commence feeding. Golden perch are opportunistic carnivores. Adults and juveniles prey largely on fish in winter and yabbies in summer as well as freshwater molluscs and aquatic insects. Golden perch have been recorded up to 760mm and 23kg, but are more commonly caught at sizes of less than 5kg.

Impacts derive from the reduction in inundation of floodplains and the construction and poor management of dams and weirs, unnatural seasonal flow and temperature regimes, and the effects of alien fish species.

Bag Limit: 5 per day. *Size Limit:* 3cm. 10 in possession.

CHAPTER 3

Carp: A Cautionary Tale

No one appears to have a good word to say about carp.

The arrival of carp in to the Gwydir River system takes the biggest rap for the decline in native fish catches.

The river residents cite various carp behaviours which they believe have contributed to this decline. These include: carp competing for food with native fish; carp eating native fish eggs and possibly juveniles; and carp interfering with the breeding and feeding of native fish.

Carp were blamed for stirring up the river bed, eroding the banks and destroying instream and riparian vegetation, including tree roots. Many of the river's problems – turbidity, siltation, bank slumping, lack of vegetation – were viewed primarily as the result of the introduction of carp.

Carp are thought to have come into the Gwydir system from the Barwon in one of the major floods in the mid-1970s, although there is some disagreement as to which flood. It appears that the species did not establish themselves in all areas simultaneously; rather they appeared in significant numbers at various sites between the early 1970s and the late 1980s. For instance, they do not appear to have been numerous in the Moomin area until the introduction of substantial irrigation flows in that area in the 1980s. The explosion of carp numbers is, however, directly related to the decline of native fish. The damming of the river and its effects reduced the numbers of native fish and allowed the expansion of carp.

Residents describe massive population explosions of carp having a devastating impact on native fish. The carp population seemed to peak in the early to mid 1990s and most interviewees cite a decline in carp numbers in more recent years. Although most gave no reason for this decrease, a number associated it with the restocking of predator species and, in the western areas, with the annual carp musters.

Arrival Dates

1971 would be the first time I'd ever seen a European carp, and I got that out of a bore drain. They weren't in the Gwydir. And then within a few months you had them coming through the Gwydir River system. (CM)

It was about 1975, the breaking of the drought that we saw carp come into the Barwon for the first time, end of '74 start of '75. It wasn't long after that that we saw them in the Gwydir. We weren't getting juveniles, we were getting fish probably the two-to-six kilogram mark. (RPK)

Carp and native fish

The fish fauna of the Gwydir River are dominated by native species, namely the crimson-spotted rainbowfish and bony herring. Alien fish species in the river are mostly comprised of carp. Threatened species in the Gwydir River include silver perch, Murray cod, golden perch and freshwater catfish. (Growns et al, 2001)

The carp *(Cyprinum carpio)* has established itself as a major pest species throughout Australian waters. In high densities carp can contribute to increased water turbidity, nutrient loads and algal concentrations, erosion of stream banks and reduced numbers and diversity of aquatic plants, native fish and macroinvertebrates. Alongside habitat degradation, water quality, reduced environmental flows and barriers to migration, carp have been identified as a major threat to Australia's freshwater fisheries. (NSW Fisheries, 2002)

Carp can compete for food and spawning sites of native fish. Carp feed on zooplankton, plant matter, detritus, insects and small invertebrates. These are also the foods of juvenile native fish, adult silver perch and bony herring. However, most adult native fish consume different foods to carp. For example, golden perch, Murray cod and freshwater catfish consume small fish, shrimps and yabbies. Carp lay their eggs on submerged grass or aquatic vegetation, these spawning sites are also used by gudgeons and rainbowfish, which are native to Australia. (Brown, 1987)

Carp are carriers of the anchor worm *(Lernaea cyprinacea)*. This parasite was first noticed on native fish immediately after carp first colonised impoundments and rivers in the Murray-Darling basin. Many native species of fish and trout are highly susceptible to infection. Heavy infestations may prevent spawning and can be fatal for large adult Murray cod and golden perch larvae. (Brown, 1987)

I saw the first carp in 1976. I didn't know what it was. (DB)

I remember clearly catching the first one. I had seen them in other areas so I knew when the carp arrived we had problems. I think it would be in the 70s, after Copeton. (RK)

I first noticed them in the late 70s. (HM)

Carp? Late 80s. The first one I spotted and I couldn't believe it. (CMB) [Dam to Bingara area]

[First noticed carp] once we had regular water down there – after about 1979 or 1980. I know they were very much there after the first dry spell about 1981-82, after we had irrigation. We drained the dams out and the fish in the dams were mostly carp. (KK) [Mallawa]

European carp only been with us ever since cotton's been growing. (KM)

Plague Proportions

In the late 80s we started noticing them in big numbers. (TM)

The carp here were in plague proportions at one stage. (DB)

But all of a sudden they come and they hit hard when they come. They were everywhere. When the river come up, you'd see 'em swimming up and down the roads and everywhere. They were all over the place, thousands of 'em. Terrible things. (AB)

You ought to see the carp, oh carp, there's millions of them. When they let the water out of the dam, in the first runoff in September and the river rises quite quickly, these jolly carp, they're out on the side of the bank and they're in droves. The young bloke next door, he and a couple of others caught over three hundred of these carp. Catch more carp probably than anything else. (HR)

It's in every bore drain and every waterhole just about. (RPK)

It was [in the late 80s] that you'd ride your horse along the river and you'd see schools of them, literally hundreds, and big ones. (CB)

Carp and Native Fish

I think the population of cod and golden perch dropped significantly when the carp came. The catfish might have persisted a bit. (HM)

I think there's a general decline [in native fish] because a catfish actually makes a nest and guards it, and I think the carp would play havoc with them stirring it all up. (RK)

You'd find that wherever you'd go, for every yellowbelly you caught you'd catch anything up to thirty carp. (CF)

They [native fish] all dropped away when the European carp come... It was after the dam. The carp came and then the other fish dropped off. (EK)

Effect on Banks and Vegetation

Don't mention him. I hate him. They reckon they pollute the river. They're supposed to live amongst the roots of trees and that and they've been known to kill some vegetation, you know, by chewing the roots and that. All I know is they're a terrible pest when you're fishing, because they do bite, and they're not good to eat. (AB)

A lot of trees have fallen in. There's less around the banks, but mainly the reason they've fallen down is the European carp, because they get underneath. They just burrow them out. When the water domes down or a flood comes down, there's not much holding it, it just pops out. (EK)

In Decline

And now they seem to have gone. You still see the odd one, but not in the schools like they were. They've gone up the creeks now. They're moving out of the river and into the creeks. (CB)

I reckon up to about ten years ago they were shocking. We still get bad patches of 'em. Over time, you know. But in the Gwydir at present, I can only speak from experience, I go fishing most weekends. I'm going again this arvo, and I don't catch a sixteenth of the carp I used to catch. Ten years ago that's all you'd catch. But now we just catch cod, which is good. Odd yellowbelly and very rarely a catfish. (SG)

Ten years might be an overestimation. It could be less than that, but there appears to be a lot less carp around. (PG)

I know we went fishing down in the Mehi about three to four years ago and we caught one to two yellowbelly, one to two carp. But I remember a few years back you were only catching carp. (KK)

Musters

They have [declined] in certain areas. We've had about five carp musters and I think to date we've taken about 10,000 kilograms of carp out. (RPK)

Have you heard about the carp muster that goes on here each year, well this is a good spot for the carp... I reckon the carp numbers have [decreased] from what they were ten years ago. (PG)

Since restocking and the carp musters that seems to have depleted them a bit. (CM)

CHAPTER 4

Fewer Creatures Great and Small

Overall a general decline in biodiversity and in the populations of well-known species was reported. These species include freshwater crayfish, mussels, turtles, river snails, platypus, water fowl, water rats and some amphibians, reptiles and insects.

Residents' awareness of commonly eaten and large species was higher than that of smaller ones; so, for example, there were fewer comments on water snails than platypus.

However, residents also commented that freshwater shrimp seemed to cope better with the changed river conditions than most species. It was evident that the shrimp could not tolerate cold water: they weren't sighted near the dam, or in any irrigation flows. But, when the water has a chance to warm up, the shrimp seem to reappear and people living in the mid and western regions indicated that their overall numbers had not declined.

A wide range of species seemed to be affected by cold water pollution. These creatures were once reported to be found in the Gwydir, but are now more common in the creeks flowing into the Gwydir, as these waterways are unaffected by cold water pollution. This pattern is most marked close to Copeton Dam.

Turtles

I don't believe there's as many turtles or tortoise around. I think they've gone. (RK)

Poor old turtles. Nine out of ten people kills a turtle. I don't. I've got pet turtles... There's three different types there. One fella's got a little neck; another fella's got a little bit longer and another fella's [got] a very long neck, but he's a very big turtle. (KM)

You don't see many of them, but you do get an odd one. Mainly you see them on the roads when you're travelling after wet weather. (EK)

I remember that there were turtles because they used to take your bait! No one enjoyed the turtles much, but I must say lately turtles seem to be more abundant in local streams. (HM)

Plenty of turtles. I see [them] sunning themselves on the log and then splashing in the water as you go past. There doesn't seem to be as many, and not as big, either. (CMB)

Yeah plenty of turtles. Huge ones, huge ones everywhere. They were a menace. (RT)

There used to be plenty of turtles around here. You'd get a lot of them in the bore drains, too. Oh, they'd be that round, over a foot across, big fellas. (AB)

Wallabies

I've seen more little wallabies, pretty-faced wallabies there along the river than there used to be. They're coming back. (CM)

Never had a swamp wallaby. These are the dark ones that are always in the swampy areas. They've got yellow or orange underneath. They've only been here forty years. Only in the scrubby parts. We never seen anything like that on the rivers, only an old scrubber, a red-shouldered wallaby. But now in later years there's nothing but swamp wallabies all down the river, and Mehi and even down the watercourse. (RA)

Koalas

Even koala bears I haven't seen for thirty-five to forty years. (CM)

Possums

I know there's not so many possums around. We used to have possums up and down the river, but you don't see them now. They used to live on the old wooden bridge. (RA)

Poor old possums they kill them in their hundreds, that was when I was a girl, only fourteen or fifteen. [1930's] (KM)

Platypus

I've heard people speak, but I've never seen one. (LF)

Two used to live near the bridge, but I haven't seen any now since I was a kid. I used to go down to watch them and they used to get right out in the middle and float there, sunbaking, and then they'd flip and away they'd go. (RA)

...poor old platypus, never see a platypus now, do you? (KM)

Never got a platypus. (LS)

Five or six years ago ... the platypus was out on the beach there. We found it and it was dead already. I think it has been left on the bank because the water has been cut off at the dam and the level of the river had dropped away suddenly. (HM)

We've got three that I know of, and they've been here for years. And there are most west of here. (CMB)

I had a pump on the river, and we saw the platypus there with their young and they were probably there for two or three days, then they shifted on up the river. (JSM)

Birds

I've seen eighty brolgas dance. I don't think many people would have seen that. You'll see a flock of brolgas and two or three'll have a bit of a bob around... but they were actually all dancing at one time and that's something I'll never forget. (BS)

I've seen a flock of short-tailed native hens, possibly five thousand, could have been ten thousand... We were riding home one night. I had a station hand and a jackeroo

with me... We decided to put them in Jenny's tennis court. I thought she'd be delighted when she saw them. We discovered that with a couple of dogs on the wing and a couple of horsemen and treating them quietly, they wouldn't fly... Then something hit the fan and away they went. There was birds going everywhere, flying and running into fences. They left and I never seen them again. (BS)

One thing that's had an effect on the breeding of fish in the area is the cormorants. They eat, consume twenty per cent of their body weight per day in fingerlings. And there's more cormorants around in the last twenty years than there was back in the fifties and sixties. (RT)

I have observed about seventy species of birds so far... over the last several years. (PRG)

Swans nesting, pelicans, we even occasionally see brolgas. We never used to get brolgas years ago. Thousands of ducks. On farm storages. Bush telegraph or something, thousands of pelicans turn up [to eat fish] when you empty a dam... I think we've got more birds now than we ever had, with more water... Those swans came and they actually built their nest on the storage dam. (KK)

Water Rats

I used to see a lot more years ago than I see now. (AB)

We used to trap these water rats, anything up to forty-five or fifty in a night. (RH)

Water rats [dropped away due to] lack of water. See when they dried this country out we had fifteen years of virtual drought. (BS)

Water Dragons

There's a lot of them here at home and they're breeding up. I think they've always been here.They like to camp around the willows and the lake here [in the garden]. (RH)

Western water dragon, miles of them. (CM)

Snakes

It was nothing to see fifty to a hundred on a bit of dry country, and massive sized, as thick as your arm, everywhere. (BS)

I run into a hell of a lot of snakes. (CM)

You get a real cold frosty night and warm morning, bright sunny morning, now I'm going back years ago, and you see the snakes shining like broken glass bottles out on the lawn... (LS)

Frogs

We used to get a lot of frogs but I don't think there's many frogs now... Used to get a hell of a lot of green frogs, brown, different colours, but there's not nearly so many around. (RA)

After a flood when this lagoon fills up, Munro's lagoon, it's deafening of a night here. The flood water brings them out. (RH)

Crustaceans

You could catch all the crays in the rivers you wanted. Fairly big fellas. I think there's a hell of a lot less in the river [now] but there's still plenty of craybob if you know where to go... I've had no luck with [shrimp] for nearly twelve months getting, but when they were good in the early days, you'd get a shrimp a good four inches long. (LF)

We used to live on crawfish [crays] . When I was a kid we used to get them out of the bore drain. Used to get heaps of them... We didn't throw anything out in the old days, and if we got too many, we'd give them to other people. I mean, we didn't waste it, no refrigeration in those days. (LS)

The Mehi and Gwydir must be exceptional for [shrimp] because they've always had big numbers. I've eaten them, they're very sweet. I cooked up a feed on "Redbank" , just by the Gwydir. (CF)

Plenty of [crabs], but you got to know where to go to get them... They like dormant water... Not much around the Mehi and Gwydir. You get them around the dams. (EK)

River mussels they say are on the decrease in most areas. I haven't seen river mussels, the big ones, in years; but the smaller ones along the creeks and in dams... I believe they still are in most dams. But it's also to be noted that when the Mallawa Creek dries out there is evidence that mussels may be increasing because of the water quality improving... (PRG)

Less yabbies, but most of the other rivers that are dammed still have a healthy yabbie population. There's miles of yabbies in the bore drains, but they're just not in the river. (CM)

There's little crabs, odd ones in this river, two to three inches across. You get them odd times in the bore drains [too]. (RA)

Water Spiders

We used to see a lot [of] the little water spiders that used to run along on top of the water. They were brown, like a house spider only smaller, and they used to run along the tope of the water, always in mobs. And they've all gone. I haven't seen them in years and years. (LS)

You do see a lot of them still. The fish love them too, mainly a lot of bobby cod. The big fish chase them. If you go out of a night-time, go fishing, sitting on this bank and you hear this splash and they go after it. (EK)

I can't remember seeing any of them lately. Used to see millions of them, they were everywhere. (RA)

CHAPTER 5

River Banks and Water Plants

Bank erosion and loss of riparian vegetation were both cited extensively in the interviews and attributed to various factors.

In the Bingara area, river banks were reported to have changed significantly with the construction of Copeton Dam. Residents expressed concern that water levels were rising and falling more rapidly than in the past. This, they claimed, was most marked when the banks were saturated for long periods of time, and then the water level dropped unnaturally quickly, causing bank slumping and erosion.

Another matter of disquiet was flooding creeks eroding the main channel at their points of entry into the Gwydir, particularly as the flow of these creeks is no longer buffered by an equivalent rise in the main river. Residents named some sites where the deposition of silt and gravel and the erosion of the bank opposite were very severe. They said that this did not occur before the construction of Copeton Dam.

Grazing (particularly when stock had free access to the river) also caused bank erosion and slumping, some residents claimed. In areas where grazing had decreased, riparian vegetation was described as thicker than before.

A number of residents cited carp as a major cause of damage to banks and tree roots throughout the catchment.

Banks on both the Mehi and Gwydir in the vicinity of Moree were said to be eroded, but the Gwydir was generally described as the less stable of the two systems. The Gwydir at Moree, as at Pallamallawa, has lost its lower ledges and the banks appear to be getting steeper.

During the past 50 years, the number of trees along the Mehi has been significantly reduced, some people maintained. They attribute this to bank erosion and tree removal associated with the introduction of irrigation.

Other residents reported more trees, particularly along the Moomin. They attributed these increases to increased flows since 1979.

Only limited identification of riparian vegetation was pursued in the interviews. Plants were identified with the aid of photos from wetland plant identification books. Residents often made little distinction between riparian and instream vegetation, particularly in wetland areas.

Bank Erosion

They maintain a flow for around two or three months of perhaps a metre or more, and then they cut that back overnight and it drops back by a metre or a metre and a half, and the banks being so saturated, the mainly oak trees, but the odd gum tree, fall into the river. You get a lot of erosion with just the banks falling away as well. (CB)

All the big gums, acacias, river gums, they've virtually all fallen into the river. Banks have been eroded, all that. To me it's sad, it looks awful and I don't go to that area [the Seven Mile] because it does hurt me, a little bit, to think that the river would be subject to that degradation. (HR)

It does appear that the banks are sharper now to what I recall prior to the dam. I don't want to blame the dam for everything, but that's my impression. (HM)

Where I fished as a boy [the river banks have] changed in so far as the river's wider and the banks are higher off the water when the river's back to a low level. Since I was a boy we've probably lost about four or five metres of bank and one particular spot, going outwards, horizontally. Someone one day has got to put a lot of money into it to stop it... There's always been a fair few trees and there's actually more trees now in lots of places because people run less sheep. (RK)

There seems to be something about the rivers here [Moree]; there's absolutely no growth at all on them. It's only just dust, you know. (LF)

These days most of the banks are bare... On the Mehi, the banks are becoming steeper, softer. Trees are most subject to falling. On this section of the Mehi there's not too many trees left because of the 'stream improvements' undertaken by the Water Commission... Regeneration has occurred in places... We use mainly lignum first to re-

River Bank Collapse/Erosion

Although a naturally occurring process, enhanced rates of erosion may be caused by sustained periods of high flow, clearing riparian vegetation, inward encroachment of stream banks and exotic species, such as willow trees. Stream bank erosion is prevalent throughout the Gwydir catchment. Thirty percent of upland areas, 64 percent of slopes and five percent of plains have stream bank erosion. This is related to the extensive soil and gully erosion also present in these regions. (Thoms *et al*, 1999)

Bank erosion is common in highly regulated rivers; excessive rapid changes can be natural in some flood events, however, dam releases and large scale pumping can exacerbate the rate of change in the river height. If the river falls too fast, water cannot drain properly from river banks and they collapse or slump under their own weight. This can destabilise riparian vegetation and may lead to wider and shallower rivers, as banks collapse into the river channel. The sediment that enters the river can settle and smother habitat. (EPA, 1997)

establish.. Once the soil is deposited, then we plant black wattle and red river gum. Red river gum once gathered along the whole river. Most of them were taken out by "stream improvements" in the 1970s. (PRG)

[In the western area of Big Leather Channel] Watercourse country has changed a lot now. Used to see a lot of water lilies, different varieties of them. Lot of bamboo used to grow there, used to see the odd tree... (RA)

The worst thing that happened to the watercourse is lippia weed [*Phyla canescens*]. That is the greatest curse this country has ever seen. The last couple of years it's really taken off. It develops a toxin which kills the other grasses and it just chokes everything out and takes all the moisture out of the soil. Its root system is such that it dries the ground out on the riverbanks and they break away. It's just a terrible critter. (BS)

Banks and Vegetation Changes

Mitchell "crossed some rising ground and saw the obvious litter of past floods, logs and other driftwood" and a line of "gigantic bluegums" beyond, obviously making a significant stream. Mitchell wrote of the "astonishing height and extend of the floods." He "beheld a broad silvery expanse, shaded by steep banks and lofty trees" far deeper and broader in its channel than the Namoi. (Milliss 1992, *Waterloo Creek*, p.84)

Extracted from the *Minutes of Evidence for the Royal Commission on Conservation of Water,* 1885, cited P.A. Keyte (1994) *Lower Gwydir Wetland Plan of Management 1994 to 1997,* Report by NSW Department of Water Resources for the Lower Gwydir Wetland Steering Committee, Sydney

Residents Report

In the 1930s, my grandmother planted a lot of willows. She did it in all good faith, thinking it would be good for the river banks... I'm sure if she thought it was going to affect the fish population, there's no way [she] would have planted them. (HM)

We've planted quite a few willows along the banks to try and protect it along the edges. They've grown into quite big trees now. (JM)

I've got willows growing there now, the root system of the willows stabilise. They do a very good job. I think if you want to catch a fish, you just go down underneath the willows... (RH)

Instream Vegetation

In the eastern end of the study area, those interviewed spoke of a great loss of instream vegetation. In the western end of the valley, residents reported a massive loss of wetland vegetation – most notably *Bolboschoenus fluviatilis* [the sag].

In the eastern and middle sections, there were many references to stock eating large amounts of instream vegetation, and of the current regime of high water flows preventing it growing.

Older people recalled a great abundance of instream vegetation. Sixty to eighty years ago, ribbonweed and pondweed grew sufficiently thickly that horses would not walk through it. One person told of the death, near Pallamallawa, of two swimmers who became entangled in water plants and drowned. Younger residents had little knowledge of such historic abundance.

It seems that the substantial loss of water plants preceded the construction of Copeton Dam, although many residents linked irrigation flows to the ongoing lack of vegetation.

The loss of wetland plants and water generally was described in strong words by some residents and regarded as quite minimal by others.

There [are fewer plants] in the bottom of the river, for sure. In the main channel. It hasn't made a hell of a lot of difference yet, on the edges. (DB)

This area where we are sitting now used to be the main watercourse back in the fifties, sixties, seventies, and round here there'd be sags [*Bolboschoenus* and *Typha*], oh, they'd be a couple of feet over your head when you were sitting on a horse and it'd be virtually impossible to ride a horse through them. (MH)

If you went back to the 1890s there was clearly a lot of water and some of the old hands talk about cumbungi [sags] growing right through here in the 1890s, just out here in front of the house. (MW)

In dry weather, my poor old father would go down with a pitch fork and get a lot of the weeds out of the river to feed his working bullocks. Like seaweed, growing right in the river, tons of it. It kept [the bullocks] alive... Down below Pally, two men got drowned in the weeds. They dived in and got caught underneath the weeds, and the weeds just kept them under... I don't think there's very much weed in the river these days. I don't think it grows. (KM)

[Bidens pinosa] Stickybeak is taking over the banks and virtually covers some sections now. (RA)

We probably had a lot more duckweed . You don't see a lot of that any more. There used to be a lot of it in the Mehi especially, 'cos it was just holes and ponds and so on. You get little bits here and there, but not a lot of it. (CF)

Oh substantially less [water plants] now. There's a big proliferation of lippia. I'm one of the few people who stick up for lippia a bit. It is very good stock feed, especially sheep feed, and it is a very hardy plant. We wouldn't have it only the swamps are so often dry now that it just takes over in the absence of weakened water grasses... We've had a lot to do with trying to eradicate [hyacinth]. I remember when it covered 16,000 acres and affected 32,000 acres. We reduced that back to under 200 acres at best. In the mid 70s, I remember riding a horse through it and it was quite alarming to say the least. It's so heavy you couldn't force your way through it. (TM)

Riparian Vegetation and Native Fish

Riparian vegetation grows on land that adjoins, directly influences or is influenced by a body of water. It forms an important part of a healthy functioning river and has a number of benefits for native fish. It:

- provides shade and shelter, buffers temperature and creates habitat for fish
- provides a source of woody debris, an essential habitat component for native fish
- constantly deposits fine organic materials in the river through leaf fall, providing food for invertebrates and fish
- provides food for fish through invertebrates falling into the stream from the riparian strip (it may form ore than half their diet)
- stabilises riverbeds and banks, binds soil and protects against erosion and slumping

Studies show greater numbers of fish and more species live in areas with good riparian vegetation.

Causes of degradation

Along many watercourses, riparian vegetation has been degraded, either on a local scale or at a catchment level. This degradation can be a consequence of clearing or activities such as gravel extraction, cropping or unlimited stock access. At a catchment scale, changes in flow regimes can also affect riparian vegetation, either directly by drowning, or indirectly through erosion and bank slumping.

Exotic species' effect on fish

In some areas the only vegetation present along streams may be introduced species. These are often willows which are a poor substitute for native plant species because:

- introduced vegetation reduces the diversity of native invertebrate communities
- native fish and other organisms are adapted to the continuous leaf fall provided by native plants
- introduced trees drop all their leaves in autumn, altering the timing and quality of organic debris
- willows affect channel structure. They have a tendency to grow into a stream. Their tight root systems form obstructions and cause water to be diverted around them into the banks, causing erosion.

Preserving riparian vegetation

- Riparian areas should be managed to maintain the health of existing native vegetation, encourage recruitment of juvenile trees and shrubs, and incorporate weed control.
- Areas where little or no vegetation remains should be rehabilitated by replanting or natural regeneration.
- Controlling stock access is probably the most important key to management in rural areas. This may involve limiting access to certain areas or providing alternative watering points.
- Exotic vegetation should be replaced by native vegetation.

CHAPTER 6

River Bed and Channel

When it comes to the loss of deep holes and the slow, insidious siltation of the Gwydir river system, the testimonies of the river residents tell a sorry story.

For example, around Bingara, the deep sand and gravel holes were well known and reportedly ranged from two to six metres deep. Sand, gravel and debris were reported to be building up in a number of these. This siltation was associated primarily with the cessation of regular flooding, which washed out debris and sediment, after the construction of the Copeton Dam.

Further downstream from Pallamallawa, the siltation was regarded as severe, and a number of the residents interviewed thought that local weirs and Copeton Dam were responsible for it.

Several people noted the loss of lower ledges from the river. They told of low flat benches between the main river banks which had been good to camp on and fish from, but which have been completely eroded.

Various residents spoke of the Gwydir changing its course. They described bank erosion, river siltation and the carving out of new channels. They also attributed changes to the flow of the water across the western delta to the (possibly illegal) construction of low dykes around crops and houses. In this area, the slope of the land is so slight that the growth of riparian vegetation in the channel is enough to change the course of the water.

Siltation: A Slow, Silent Death

The river is definitely not cutting deeper. If anything, it's filling up... Silt is building up in different places. In the middle of this big hole in front of the house, for instance, there's an island coming there now. It's dirt and gravel. It's not muddy siltation. It' coarse and gravelly... (CMB)

There were lots of deep holes [up to 6 metres deep]... but today they are not that deep. The river in those days I thought was narrower but generally deeper. Summers we had regular smallish floods and the occasional big flood rearranged the landscape a bit... got rid of surplus silt and that type of thing... Where I live it still is a great spot, but it's not like it used to be. We had a major hole in front of the house, probably four hundred metres long with water trickling in at the top and out at the bottom. (RK)

I know in places the holes have silted up. When we were young fellows, we used to swim across, nearly straight down from here... We used to dive into this deep hole on the other side of the river, just straight down... (RA)

If it was a big flood, it'd clean out... a lot of garbage that was in the bottom of the river and... you'd have a new profile of the river... Quite often we'd find a swimming hole and then you'd get a flood and your swimming hole 'd be gone. And there'd be a different one, so you'd have to find it. (DH)

The Copeton Effect

I don't think anyone disputes that there's more silt there, and it's come from somewhere. It's either come from Copeton and its high water regime, and part of it must be that; or it could well be the action of carp [undermining banks]... I think overgrazing and runoff has contributed to it. (RK)

The Junction Hole ... was a good swimming hole and before we had swimming pools, we had a little diving board set up there. It was a deep hole because I remember I lost my first watch in it. It was where we always used to swim. It would have been at least two and a half body lengths, at least twelve feet deep, where we used to swim on the southern side of the river. But latterly of course, since the dam, that hole is filled up with gravel coming down from the creek. (HM)

When I was a kid we used to ski on a hole at Bingara... before the dam. Now you would never ski there. In places [it is] eighteen inches [deep]... And it's all sedimentation from the dam. (SG)

Below the weir is basically full of silt. (CM)

The deepest hole in the Mehi, I reckon, was the one at the hospital, still is. But that one above the weir, that's all silted up now. You could walk out there. There's more mud than water, used to be a good water hole there. (LS)

There's a lot of places around here you used to get holes twenty feet deep, just natural holes. Now you'd be lucky to find a hole six or eight foot deep... The only holes that have survived the introduction of Copeton Dam and the weirs and so on have been the clay holes, where I think you get a good flush out. The sediment doesn't stay there. It gets washed away. There's a few good holes around here – clay holes – and they're still fairly deep. (CF)

Crops and Irrigation

When we were kids [the river bed] was mainly gravel. Now we're getting a lot of very fine silt and I put that down to farming... and too many farm dams. Harvesting too much of the natural flow water; and holding it and then releasing it at the wrong time. (SG)

From the amount of [irrigated] farming here [Pallamallawa-Tareelaroi area], the river is just not flowing. Most probably the average river depth when I was here 25-30 years ago would be three metres. Now I could walk from Pallamallawa straight up to Yagobe without it going over my head. (CM)

The river was much deeper. Since all the [prickly] pear and the ground's been cleared for the cropping, well it's filled the river up, silted the river. [There were] very deep [holes] in between here [Pallamallawa - Tareelaroi are] and Biniguy. My brother and his cousin used to try bottoming it. They were good swimmers [but] they couldn't. No, it was too deep for them. (KM)

There's no big holes virtually down past Combadello. It runs all the time now, but it's the irrigation water that runs down there. (CMc)

A Special River Feature

'The raft' evolved into a massive blockage in the river channel west of Moree. It consisted mainly of timber and silt washed down the Gwydir and Horton rivers.

According to several residents, 'the raft' most likely formed as a direct result of land clearing and agriculture from the late 1800s onwards. One resident thought it considerably older, saying it had "been here for eons," yet he conceded that agricultural activity may have accelerated its growth.

Several recollections cited two and possibly three fences being built on top of each other at 'the raft' when the bottom ones became buried by the encroaching silt.

From the early to mid-twentieth century, 'the raft' was an excellent fishing ground, particularly for Murray cod. Residents also told stories of visiting 'the raft' to trap water rats, shoot pigs and watch birds. They described an historic abundance of snakes, frogs, turtles and other wildlife, in contrast with the relative lack of wildlife seen today.

The Raft Formation

At Tyreel and Boree, 13 miles below Moree … each having an area of some ten thousand acres, a very strange thing happened.

Some 20 years ago [about 1888] a huge tree fell across the river where the channel is very narrow . Trees and logs were washed down and, being blocked by the fallen tree, formed a wooden dam which in time became covered with silt. Each succeeding year brought it's fresh supply of timber covered with silt until today what is called 'the raft' completely obstructed the river for miles. The result is that the water is thrown back on either side of the stream so that it floods an area of about 30 miles in width and many miles in length.

During the last year the channel has been blocked by a additional three hundred yards of timber – over a portion of Tyreel on the south side of the Gwydir and over Boree in the north, extending to a portion of the property of Mr. John Cameron.

This great area irrigated by the overflow from 'the raft' is known as the Water-course, which grows an immense crop of grass and herbage known as the 'sag'.

Extract from anon., *Australian Country Life*, 1 December 1908, reprinted in *Yilaalu*, Vol. 1, No. 2, December 1977:

Reflections on the Raft

Late 1800s and early 1900s there was a lot of ringbarking and poisoning of trees going on, and they would have washed into the river... I think they cleared a lot of country [1920s and early 1930s]... You'd see massive logs go past. From here [Bingara] down, the number would pick up. I think what's going to happen now is that we're going to have a lot more rafts because of the trees falling into the river all the time. And we're not getting the big floods to take them over this Belleview bridge. It only takes them a short distance. (CB)

Four miles west of the Yarraman area there was a river blockage called 'the raft'. Apparently, many years ago a tree fell across the river and subsequently all the silt and rubbish that got in behind it had created a raft which consisted of logs banked up. At one stage the water resources people decided to do something about it and they to some extent cleared it and allowed the water to create another path. I used to fly people out there and have a look at it, and it was significant. ..And even today you can still see it. And you'll notice every now and then there's a chemical drum. Not many, but there are some, and fuel drums. But mostly debris from trees and stuff. Silt. (DH)

Nature formed ['the raft'] and it was nearly a mile deep [long] there in its big day. You couldn't get across. It were full of snakes and things. The river kept breaking above it and forming another channel and the next flood would fill that channel. That's the way it started... around the turn of the [ninteenth] century when they started to farm around Gravesend, Warialda and through there. That's when the timber started to come down. Big logs... A lot of trees along the river fell in, too. Where the banks had fallen, the trees fell too. Mainly from Bingara down... A hell of a lot of silt built 'the raft'. (CMc)

[At 'the raft' in the 1930s and 1940s] we used to catch catfish and jewfish by the hundreds... Occasional black bream. We used to call them bony bream [*Nematolosa erebi*, called silver bream]... It was a great spot for water rats. That was a profitable exercise really. In those days the wages weren't very much, but we used to trap these water rats, anything up to forty-five or fifty in a night. They were worth a pound or twenty-two shillings each, which was big money in those days. But it didn't last long. They were protected overnight and that was the end of that.

[In the late 1940s early 1950s] I've seen two and three fences be put in over a number of years. One fence would be buried in silt and they'd put another fence in, and they kept doing that... (RH)

I used to go to 'the raft' years ago. It was building up and building up before my time. All started over a few trees. A lot come down the river, you know. Yeah I did a lot of fishing around 'the raft', plenty of fish, that was before they put these dams and weirs in. (LS)

[At 'the raft'] it's everyone else's topsoil and all their logs and thongs. They don't send their left thongs down, though. They only send their right foot thongs, and grader tyres and all their rubbish. Sawn timber, lots and lots of sawn timber down there, truck tyres, car tyres, but worst of all, lots and lots of chemical drums. They've got no right whatsoever being in the river or near the river. (PG)

Conclusion

This project started when one of us (CC) began hearing stories from various recreational fishers, particularly Richard Ping Kee, about the instream habitats that once existed in the Gwydir River. Deep holes, large areas of submerged vegetation, stream banks covered with rushes and lovely river banks covered with bottlebrushes, other shrubs and large overhanging trees. Their stories brought the old river to life and highlighted the damage that it has suffered in recent years.

The idea was developed that if the sites of these former key habitat areas could be identified then NSW Fisheries could assist local fishers and other interested residents to begin the task of restoring the river.

It was clear that this information was not available from documents or scientific papers and therefore the only way of finding out was to talk directly to those with an intimate knowledge of the river.

The proposal, developed by NSW Fisheries and supported by the Murray-Darling 2001 Fish Rehab Program, was intended to identify areas where revegetation and other river restoration works could be carried out effectively. What emerged from the interviews of these residents was something much more important.

A tale of a once magnificent river which is now a mere shadow of its former self. Two periods of river history emerged as having been associated with drastic changes to the river. The first was the era of intensive land clearing around the turn of the last century, which led to huge erosion, faster floods and the formation of the *raft*. The second was the completion of Copeton Dam in 1976, and the impact of this change forms the main topic of the stories contained in this book.

Yet even with the rivers demise fresh in peoples' minds, the enormity of the loss has not been told. It hasn't even been well shared between those intimately linked with the river and its fish.

So the value of this book is to tell, in the residents words, what the Gwydir river was like and in doing so it describes a goal for residents of the Gwydir Valley to aspire to;

Where clouds of catfish make their annual pilgrimage past your vantage point.
Where the river is full of thousands of small fish of all shades and colours.
Where the bottoms of deep holes are full of ribbon grass and the water is so clear you can see the fish that reside there.
Where silver perch are regularly caught and not on the list of threatened fish and probably most of all
Where the people of the Gwydir Valley can once again tell stories of their magnificent river, not as the way it was but as the way it is.

No one could have provided this information except for those who have lived with the river, over many years, and they have described it beautifully. This book is a celebration of those people who have remembered the life of the river, and of those who wish to see it rich with life again.

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Additional information on the value of oral history work and how this study was conducted is available in the following report from NSW Fisheries offices at Ballina and Inverell.

Schooneveldt-Reid, E. (2003). ***Fish Everywhere. An oral history of fish and their habitats in the Gwydir River: Technical Report.*** NSW Fisheries, Ballina.

In addition, recordings and transripts of interviews are stored in the Mitchell Library in Sydney.

Websites:

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Cooperative Research Centre Freshwater Ecology: http://enterprise.canberra.edu.au/WWW/www-crcfe.nsf
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