

## COTTON AND CARP

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**European Carp (*Cyprinus carpio*)** or as it should be called **carp**, has been present in Australia for more than 130 years.

Various strains (at least 4) are present in Australia with the strain "Boolara" which was introduced into the Gippsland in 1960 the main "villain" and responsible for the quite massive invasion into natural waterways of the Murray-Darling basin, the Gippsland area, more recently into Tasmania and as is well documented a major explosion into Queensland this year.

There are also carp/goldfish hybrids that have become quite prevalent in many rivers in Australia.

In more recent years however the carp have "taken over" some rivers. In a survey of carp in the Lower Lachlan River by Dr Al Gibbs and Dan McBryde in early 1995 carp dominated the catch with 87.9% of total fish caught in an 80km stretch of the River. Only .6% of the fish caught were native species. There has been some even more recent work by Dr John Harris on the Bogan River which identified carp densities up to 1 carp per square meter of river.

Four catch methods were used by Dr Gibbs, electro-fishing, mesh net, funnel net and fyke net with electro-fishing the most effective.

While not in any way saying carp are 87% of the fish stock in all rivers, it is reasonable to say that in most rivers of the Murray-Darling Basin, except perhaps those above the Hume Dam and other colder waters, they are likely to be by far the dominant species with rates such as 70% not unusual.

**Why is this so?**

Why then have carp flourished when the natives have not? There seems to be several reasons for this.

1. They are very prolific, with females able to produce up to 100,000 eggs per kilogram of weight (Huet 1970) and with 20 kg fish not being uncommon, that is potentially a lot of fish.
2. Carp are well suited to the present regulated river system of still or slow moving water and a reduction of flood events. While native fish are generally inhibited from breeding by these very same regulatory measures. It is interesting to note that in the Riverland of South Australia after the two years of a "natural" flood in 1992/93, increased juvenile natives have abounded.
3. Carp are probably bullies and "kickout" the quieter and more genteel natives.

They are described by John Keohn as "the bikies of the river" and perhaps like some of us if the bikies move to the front bar of the hotel for a drink we move to the back bar.

There are undoubtedly other reasons also for the ascendancy of carp over native species.

**What is the threat of carp?**

Carp have a major impact on river ecology and have been alleged to:

- \* Disturb bottom sediments with their feeding causing turbidity. They tend to feed like a vacuum cleaner, suck it up and blow out what they do not want.
- \* Undermine banks increasing shore and bank erosion. (The recent major "slumps" on the Darling are probably evidence of this.)

- \* Destroy aquatic plants and by that destruction exposing banks/irrigation delivery channels to even more erosion.
- \* Compete with native fish for resources of food and location.
- \* Prey on the eggs and larvae of native fish.
- \* Destroy wetlands and habitat.
- \* Favour blue green algal blooms by preying on the natural predators of algal blooms (Harris 95)

These are all or mostly true and many of these allegations have been scientifically supported.

Scientific knowledge in this area is rapidly reaching an understanding of the issues.

Dr Jane Roberts in a research project concluded, "that in Australia carp appear to have the potential to reduce or even, under the right conditions of high stocking density combined with low food availability, eliminate certain species of water plants".

Given if all the damaging claims are not true, if only some are proven and increasingly more evidence is damning carp not exonerating them, it still points to carp having a major detrimental impact on the freshwater rivers over much of Australia and having a considerable impact on water quality, through increased turbidity, reduction in aquatic vegetation and by assisting in creating a "friendlier environment for algal blooms".

Carp have also been reported by some overseas studies to increase the concentration of phytoplankton within the water column, with the increase of nutrients from direct excretion suggested as the most likely pathway. In Australia no experiments have investigated the interaction of carp and phytoplankton, however one literature review suggested that it would be possible for carp to increase the intensity of algal blooms more than any other fish in the Australian

aquatic environment. (King 1995) This is increasingly being seen as a more and more likely scenario.

Their presence certainly adds to the cost of water treatment although I am not aware of any cost estimation except that the cost could be considerable.

What is the plan to manage and control the problem?

One of the problems at present is that measures being taken to control the problem have been ad hoc and spasmodic.

A National Carp Task Force has been formed and its role will be to co-ordinate the activities being undertaken in a number of places ranging from commercial harvesting to research into biological control.

The task force is in its early stages and has developed its own terms of reference and action plan and also seeking ongoing funding to enable the operation of the Task Force to be implemented.

The Task Force in this formative stage is trying to ensure as far as possible that all stakeholders have representation on the Task Force or at least have access to the group and to ensure that carp issues are fairly and squarely on the national agenda and remain there.

### **ACTION PLAN/TERM OF REFERENCE**

#### **Term of Reference**

The roles of the National Carp Task Force are to develop and facilitate the implementation of a major co-ordinated Action Plan aimed at the eventual eradication of carp, *Cyprinus carpio*, from all Australian waters.

**ACTION PLAN****1. Science**

- 1.1 To promote and commission targeted scientific research into
  - 1. control methodology of carp
  - 2. social and economic impacts of carp

**2. Information**

- 2.1 To facilitate an open exchange of information regarding carp.
- 2.2 To facilitate the development of a series of major field projects to identify and publicise the positive impacts of the removal of carp (e.g. Pilby Creek).
- 2.3 To encourage the production of an appropriate educational and awareness program.

**3. Commercial**

- 3.1 To encourage and where appropriate facilitate the commercial use of carp while always respecting the aim of the eventual eradication of carp from all Australian waters.

**4. Management**

- 4.1 To encourage appropriate management that disadvantage carp
- 4.2 To review and make recommendations regarding legislation in relating to carp management.

**What funding is needed to attack carp**

It has been estimated in a paper by an independent working group to the Prime Minister's Science and Engineering Council in June 1995 that "Carp are a serious pest in our waterways. There are some ways forward but they are costly and might cost about \$10 million".

This statement "about \$10 million" does identify the scale of the problem and the finance likely to be needed to address it. Following that scenario it is reasonable to assume that the cost of doing nothing in both ecological damage and direct costs such as increased water treatment is more than \$10 million.

One of the first actions of the Task Force will be to seek funding to resource an in depth economic assessment of the real cost of carp to Australia and ABARE is being contacted to explore ways they may be able to undertake this work.

Following is a brief summary of some of the present activities that have and are being undertaken.

### **1. Research**

There were a total of nine research papers on carp presented at the Australian Society for Lemnology's Annual Congress in September 1995 (Harris 1995).

These included research into carp population ecology at Adelaide University, Dr Jane Roberts at CSIRO Griffith heads a team working on habitat disturbance and the social history of carp. Work is proceeding in Hobart by CSIRO in biological control options. Other work is being undertaken at Charles Sturt University Wagga Wagga regarding carp's ecological effects in billabongs. Others have looked at carp in the Lachlan and also population genetics.

As well as this work there are other studies in progress looking on the effects of carp on aquatic plants and sediment, the ecology of carp population in various habitats and others. Also State fishing departments have areas of ongoing research as part of their "normal" research.

Again the task force is of the view that research now needs to focus on the development of methods of control as it is felt that enough is now known about carp and their impact to move to this next stage, that of control.

There is also interest in better understanding the role genetic manipulation may be able to play in reducing carp numbers and at least one Ph.D scholar is hoping to look at fertility control as a possible way to go.

## **2. Community Based Projects**

There are a number of these with the best known being Pilby Creek on the Chowilla Floodplain in South Australia's Riverland.

The Murray Darling Association (of which I am the General Manager) together with the SA Field and Game Association and assisted by the Riverland Fisherman's Association obtained funding under the Murray-Darling Basin Ministerial council's Natural Resource Management Strategy program to firstly prepare an inaugural plan to manage a 14 hectare wetland in South Australia's Riverland called Pilby Creek Lagoon on the Chowilla Floodplain adjacent to Lock 6 on the River Murray.

Subsequently additional funds were obtained to construct two control devices to enable the flow of water to be managed to enhance fish recruitment and habitat regeneration.

The project using the flow created by the "head" of water above Lock 6 has been able to manipulate the flow through a natural anabranch system of Pilby Creek and Chowilla Creek to the River Murray below Lock 6. (This had previously been blocked off at Lock 6 pool level).

As the head of water is basically permanent, by opening and closing the control devices it is possible to simulate to a substantial degree pre-lock flow conditions and by firstly removing all carp and then screening the inflow, a carp free environment was created.

What happened then in the context of water quality was particularly interesting. Prior to this change the water in the lagoon was so turbid that visibility was less

than 20 cm but in only a few months visibility had increased to over 1 metre. Various aquatic plants had flourished to the extent that what was a clear body of water is now almost completely filled with aquatic plants such as ribbonweed, *Vallisneria gigantea*. Macro invertebrates have reappeared in astonishing numbers restabilising the food chain which it is hoped will enable native fish to return. Some juvenile fish other than carp are already reappearing.

But as regards to water quality, the water is now less turbid and while monitoring is ongoing other improvements in water quality are appearing. Birds have reappeared in large numbers and the banks are re-vegetating with reeds, altogether a much improved living wetland has been re-established.

### **3. Commercial Enterprises**

The Task Force is also likely to look at options for the commercial exploitation of carp particularly for use in the stock food, pet food and fertiliser industries.

Carp are a good source of protein and can be quite well manufactured into high protein fish meal. This produce can then be the basic ingredient for other highly useable products.

### **4. Government Initiatives**

Besides the above mentioned opportunities for carp management it is likely there will be a further impetus to controlling carp in the Murray-Darling Basin from Government.

One dilemma that is always faced when seeking to exploit a feral pest is that a dependent industry can become established. While the Task Force supports the commercial exploitation where this is feasible investors should be made aware very clearly that any such industry is a “sunset” industry and any investor will need to assess the risks carefully.

The first of these government initiatives, looking at the “big picture” of water quality - River Murray etc was from the Hon Dean Brown, Premier of South Australia’s “Restoring the River Murray” (SA Government 1995) which was looking at the project Murray-Darling 2001 as a Centenary of Federation Project.

While the Murray-Darling 2001 Project document “Restoring the River Murray” (SA Government 1995) does not specifically mention carp, in a special advertising report in “The Australia” of 3 November 1995, the problem of carp was raised.

The Prime Minister in his Environment policy has indicated that rivers (and river health) is a high priority and since the election the Minister for the Environment Senator Hill has mentioned the need for carp management as a major environmental issue several times. In my view river health issues cannot exclude carp. The Murray Darling Basin Commission has also indicated its intention to become involved in the carp issue to a greater extent.

### **Flow Management**

Carp appear to benefit from the present controlled river management as they prosper from the slow moving, placid water way. It is a complete juxta position to the requirements of native fish who often need a flood or at least a high flood for a sustained period to “trigger” breeding.

Changing the way a river flows is not easy, there are lots of competing pressures with carp management just one of these.

Some of these “demands” include:

\* Irrigation Demand

- water on delivery
- as constant as possible
- in summer and autumn rather than spring or winter
- an even water level to reduce the need to more piping infrastructure.

- \* Water supply
  - similar to irrigation demand with a constant supply needed
- \* Environmental Flows
  - regular floods to inundate backwaters/wetlands etc (similar requirement for native fish)
- \* Tourism/Recreation
  - no floods to inhibit movements of e.g. houseboats or flooding of holiday homes etc.

This is only a few of the “demands” while together with water storage which “removes” much of the highs and lows. As all of these demands are completely legitimate and reasonable the trick is to get as close to a win/win for all as possible.

#### **What of the future?**

If a magic wand of say, biological control appears and carp are eradicated the water quality implications are still considerable. Native fish would need to be encouraged to replace the feral carp, bank erosion will need to be remedied, while Pilby has shown that the river system can fight back it will need some managed assistance.

Our river system will never revert to its original pristine splendour nor should it be expected to. The rivers of the Murray-Darling Basin can provide a quality water supply and be of reasonable environmental health if the balance between consumptive and in stream uses can be got right. This can happen if we do not get too greedy and increasingly use the available water as efficiently as possible.

If we can get rid of carp and a few other nasties - all could be well. We have some time, not much, but some to get going.

To recap, carp are a major environmental hazard (in some places the hazard) to many of the rivers in Australia and while they seem to be tolerated in most other countries (except North America) there is no reason for us to do so.

Any water reliant industry such as the cotton industry should be concerned about the carp issue and be involved in finding the solution. A concerted and integrated effort will be needed and the Task Force will need your help, exactly where and when and how is for the future but I welcome you aboard as I know many of you have been for many years.

It will cost money, we must accept the need to provide the necessary resources and start to fix the problem. If we don't move soon and it becomes too late, tomorrow's generation will rightly be very critical of us all. However, if we do get it right, our children and our children's children will rightly acclaim us (especially if they can consistently catch a Murray Cod instead of a carp).

So the ball is in our court and I say - let's get on with it.

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