Impacts of carp in Australia

Introduction: Are carp a genuine cause of environmental damage in Australia, or are they merely a symptom of the poor health of our inland waters that has resulted from other causes?

It is certainly true that carp are very good at exploiting degraded systems due to their ability to tolerate a wide range of water conditions. However, it doesn’t necessarily follow that they prefer degraded conditions as is often claimed. It also does not mean that they caused the habitat degradation in the first place. What they will do is make it more difficult to restore these systems to a healthy condition.

Many of the claims regarding carp’s environmental effects are difficult to confirm because of the lack of information on waterway health before their introduction. For many waterways the decline in quality took place before the presence of carp – due to activities such as catchment clearing, removal of bankside vegetation, stream channelisation, pesticide use and overfishing of native species. However, when a species makes up more than 80% of the biomass at some sites, as has been recorded for carp in Australia, it is difficult to believe that their environmental impact will not be significant.

“No species can move into a new habitat without having some impact on the system. These impacts may be relatively minor, or they may lead to total removal of one or more original species and dramatically change the ecosystem balance. Carp in Australia now have roles as predators, prey, competitors and habitat modifiers that affect other species and ecological processes” 2.

Environmental impacts: Carp cause their main environmental impacts through their feeding habits. As adults, they usually feed on the bottom of rivers and ponds.

They feed by sucking soft sediment into their mouths, where food items are separated and retained and the sediments are ejected back into the water. This habit (known as roiling) leads to a suspension of sediment in the water.

When carp are present in high densities, the resultant suspended sediment can result in a number of problems, including:

- direct deterioration of water quality due to sediment and increased nutrient levels
- reduced light penetration, resulting in reduced plant growth
- smothering of plants, invertebrates and fish eggs
- clogging of gills of other fish species
- inhibited visual feeding by other fish species.

The process of feeding can also result in fewer aquatic plants: carp will graze on plants directly and uproot plants during feeding. Carp are also effective grazers of surface films on plants and rocks.

Their direct impact on plants can also have a number of related impacts, including:

- reduced populations of invertebrates that are dependent on the plants
- reduced stability of bottom sediments through loss of aquatic vegetation.
Juvenile carp in particular also feed directly on zooplankton in the water. If zooplankton numbers are reduced, algal growth might increase, as the zooplankton normally feed on algae. There are also records of carp feeding on fish eggs and on small fish.

The introduction and/or spread of disease by introduced species are often cited as a likely impact threatening native fauna. No diseases are known to have been introduced with carp and their lack of close relatives in the Australian fish fauna makes this unlikely. Some parasites such as the external parasitic anchor worm *Lernaea cyprinacea* and the tapeworm *Bothriocephalus acheilognathi* might have been introduced with carp and they are now found on or in native species. The impact of these parasites is unknown.

Carp can potentially impact Australian native fauna through a variety of mechanisms:

- indirectly, through habitat disturbance and alteration
- directly, through competitive exclusion, predation and possible pathogens.

The end result of one or a combination of these impacts will be reduced water quality and/or reduced abundance and diversity of native species. Attempts to critically evaluate these effects in Australia have produced inconclusive results. As biological systems are naturally highly variable, it has been difficult to separate the cause from the effect.

There is also no doubt that some native species of fish and birds have adapted to using carp as a food source. While these species might need to adjust their diet if carp numbers rapidly declined, most of these native fishes and birds were more abundant before carp were introduced, so there is no obvious reason why they would not re-adjust again.

Despite limitations in the methods used in trying to determine the impacts of carp, it is impossible to conclude that our inland ecosystems would not be better off without them. Carp are certainly consuming resources that could otherwise be available to native species.

**Economic impacts:** Putting a realistic value on environmental impact and loss of biodiversity is virtually impossible, as ‘the environment’ is not normally bought or sold. However, some aspects of the presence of carp that can be valued are the industries associated with them. There are commercial fisheries for carp in Australia and while carp are generally of low value, the high volume of catch has at times made this a significant industry. The koi carp farming industry also has commercial value in those states where it is allowed.

There are minor recreational fisheries for carp that can also have a positive social value. Recreational fisheries in Australia are a major industry. The value of the freshwater component of this industry (20% of the national fishing effort) was estimated at $0.36 billion in 2000-2001. An estimated 2.1 million carp were caught in one year between May 2000 and April 2001. If carp were not present, it is unknown how native fish species numbers might increase, and then how much of that increase in native fish would be transferred to angler catches. It is certainly the case that the presence of carp, and the prospect of only catching carp, does put many anglers off going fishing. In turn, this can have an impact on regional economies in particular.

**Social impacts:** The social impacts of carp are felt by communities through a loss of environmental quality and amenity. Communities are not proud of the condition of many of their waterways because of the presence of carp. The perceived absence of good recreational fishing deprives the community of the opportunity to pursue a healthy outdoor recreational activity. The loss of economic returns from fishing can also lead to decreased social opportunity for some people.

**Summary:** There may be some doubt as to the actual extent of the impacts of carp on Australian ecosystems, but there is little doubt that the agreed perception is that communities and the environment in general would be better off without them.

**Further information:**