

# KOI CARP

## 1. Description of the problem

### (a) *Location of the case-study*

Several sites in the North Island of New Zealand, plus one new site at the top of the South Island.

### (b) *History (origin, pathway and dates, including time-period between initial entry/first detection of alien species and development of impacts) of introduction(s)*

It is thought that attempts to introduce koi carp to the wild in New Zealand were made in the early 1900s. However, New Zealand's wild population of koi carp probably established in the 1960s when the fish arrived 'accidentally' as part of a goldfish consignment. It has also recently been discovered for the first time in the South Island, in a pond in a public garden managed by the Nelson City Council. There are indications that fish may also have been liberated in other areas in the Nelson area.

### (c) *Description of the alien species concerned: biology of the alien species (the scientific name of species should be indicated if possible) and ecology of the invasion(s) (type of and potential or actual impacts on biological diversity and ecosystem(s) invaded or threatened, and stakeholders involved)*

Japanese koi carp are an ornamental strain of the common carp (*Cyprinus carpio*). A long-lived species, koi carp is a highly productive freshwater fish species native to Europe and western Asia.

Wild self-maintaining populations occur in the Waikato River catchment and some farm ponds in the Auckland and Northland areas. There are also isolated records from rivers and lakes in the Hauraki Plains, Taranaki and one record from a lake in Wellington. However, the distribution is not likely to be limited by environmental factors as they are extremely tolerant of temperature variation, low oxygen levels, levels of water turbidity, and pollutants.

Koi carp have been described as the least desirable species in the New Zealand freshwater fish fauna. While prized as an ornamental fish in some lands, in New Zealand they are found to seriously damage aquatic ecosystems.

They are opportunistic omnivores, feeding on invertebrates, spawn and juveniles of other fish, and plants. Vegetation is often uprooted as the fish feed on benthic invertebrates in shallow water, resulting in increased water turbidity and reduced light levels which directly affect the viability of bottom rooted plants. The ability of koi to damage aquatic vegetation in New Zealand has been demonstrated in ponds in Northland. Impacts of koi in New Zealand are likely to be greatest in shallow wetland and lake areas, which are generally also those areas with extensive weed beds and outstanding wildlife values. These impacts have the potential to alter the fish and wildfowl communities that use the same habitat. The ability of koi to colonise new habitats is related to its high levels of productivity, and ability to use a wide variety of environmental conditions. It is

unlikely that the eradication of koi from the South Island would be possible if it should be established.

- (d) *Vector(s) of invasion(s) (e.g. of deliberate importation, contamination of imported goods, ballast water, hull-fouling and spread from adjacent area. It should be specified, if known, whether entry was deliberate and legal, deliberate and illegal, accidental, or natural.)*

Koi carp were imported 'accidentally' as part of a goldfish consignment. Current wild stocks are either escapees or deliberate releases from pond stocks or aquariums.

The recent incursion of Koi Carp into the South Island was the result of an illegal deliberate release.

- (e) *Assessment and monitoring activities conducted and methods applied, including difficulties encountered (e.g. uncertainties due to missing taxonomic knowledge)*

To date, assessment and monitoring in the North Island has been undertaken only in the conservancies for which koi is a significant issue (rather than nationwide). However, additional funding for 2001/2002 has been obtained for further work to help identify areas in which koi is present. In the South Island, survey work has been undertaken in the Nelson/Marlborough region to identify whether koi are present in the wild. Additional funding has been sought to extend this work throughout the South Island.

## 2. Options considered to address the problem

- (a) *Description of the decision-making process (stakeholders involved, consultation processes used, etc.)*

Since 1990 it has been the government's strategic policy goal to pursue eventual eradication from New Zealand. This goal depends on the development of more effective control technology and legislative tools. Meanwhile, the government has sought to:

- minimise population sizes and impacts within a gazetted containment area;
- remove all feral populations outside that zone; and
- strictly control the movement and possession of koi carp.

The first step, in 1980, was to declare *Cyprinus carpio* and all hybrids a noxious fish species under the Freshwater Fisheries Regulations. These regulations make it illegal to have in possession or under control, or rear, raise, hatch or consign any species classified as a noxious species. It is also illegal to catch or keep fish designated as noxious, and to liberate any fish or fish ova in the waters of any lake, river or stream. DOC staff have powers to enforce the regulations under the Conservation Act 1987.

The second step came in July 2000 when the species and its hybrids were also designated an "unwanted organism" under the Biosecurity Act 1993. This designation gives authorised staff greater powers to act on illegal holdings or releases. It is in addition to the noxious species designation.

- (b) *Type of measures (research and monitoring; training of specialists; prevention, early detection, eradication, control/containment measures, habitat and/or natural community restoration; legal provisions; public education and awareness)*

For a long time national resources have not been provided for monitoring, research, containment or eradication. However, this year DOC has begun a NZ\$60,000 research project to develop improved technology for the eradication and control of koi carp and other noxious fish/unwanted organisms.

Work is currently underway to provide staff with the appropriate authority to access their new Biosecurity Act powers.

- (c) *Options selected, time-frame and reasons for selecting the options*

Management of koi carp includes:

- restricting the species to a designated 'containment area' in the north west of the North Island;
- reducing its distribution wherever possible (through its designation as a noxious species under the Freshwater Fisheries Regulations); and
- eradicating it from any sites outside the containment area.

The new koi population discovered in Nelson in June 2000 elicited an immediate response to try and achieve eradication. Koi were not known to be present in the South Island, and this therefore represented a significant internal biosecurity incursion. This is because it is considered unlikely that koi can be eradicated once a self-sustaining population becomes established.

The Nelson response involved a two-pronged approach:

- direct action by poisoning the pond with the piscicide rotenone, then draining it to ensure all fish are destroyed; and
- a wide-ranging survey of other ponds and rivers of suitable habitat in the wider region

- (d) *Institutions responsible for decisions and actions*

Administration of the Freshwater Fisheries Regulations 1983 and Biosecurity Act 1993 (in relation to koi carp) lies with the Department of Conservation (DOC).

### **3. Implementation of measures, including assessment of effectiveness**

- (a) *Ways and means set in place for implementation*

Since koi were declared an 'unwanted organism' under the Biosecurity Act 1993, authorised DOC staff now have greater powers to act on illegal holdings or releases.

As well, DOC has committed \$60,000 to a research project to develop improved technology for the eradication and control of koi carp and other noxious fish and unwanted organisms.

*(b) Achievements (specify whether the action was fully successful, partially successful, or unsuccessful), including any adverse effects of the actions taken on the conservation and sustainable use of biodiversity*

Until June 2000 when koi were designated an 'unwanted organism' under the Biosecurity Act 1993, DOC staff were limited by a deficiency of powers in the Conservation Act 1987. These deficiencies were in enforcement powers of search and seizure within dwelling places, and in requiring information to be provided. This was exacerbated by a general disregard for the regulations by a few people who have spread the fish extensively throughout the Auckland area.

There were also difficulties in communicating to Councils and community at large the biosecurity risks posed by what they perceive is an attractive ornamental species.

The presence of a growing feral population has also made enforcement difficult.

Combined, these problems have undermined the government's strategic policy to seek eradication because:

- Existing provisions in legislation have not been sufficient to deter fish fanciers from releasing koi carp into waterways;
- National resources have not been provided for monitoring, research, containment or eradication;
- Management by the Department of Conservation (DOC) has not been consistently applied in different parts of the country; and
- Reliable information is lacking on the distribution of koi carp (in captivity and in the wild). For instance, anecdotal evidence suggests the fish are more widely spread than records show.

Declaring koi carp an 'unwanted organism' under the Biosecurity Act 1993, has enabled authorised staff to access the powers under the Act and should overcome previous deficiencies in powers under the Conservation Act. However, it is too early to determine what concrete improvements have been achieved by the June 2000 designation of the fish an 'unwanted organism' under the Biosecurity Act 1993.

*(c) Costs of action*

As an example, the bill for draining and clearing the pond in the Nelson public gardens came to \$45,000.

#### **4. Lessons learned from the operation and other conclusions**

*(a) Further measures needed, including transboundary, regional and multilateral co-operation*

Effective management of koi carp would be helped by:

- Reliable databases on their distribution – both in captivity and in the wild;
- Improved knowledge of the distribution of koi nationwide
- Consistent national management;
- Application of the greater powers conferred by the Biosecurity Act 1993; and
- Public advocacy of the threat the species poses to New Zealand's freshwater ecosystems.

*(b) Replicability for other regions, ecosystems or groups of organisms*

The survey and response work undertaken in Nelson can be transferred to other areas of the country and to other species of pest freshwater fish.

*(c) Information compilation and dissemination needed*

Councils and the public need to be convinced about the threat to New Zealand's biodiversity posed by the fish. These are still generally seen as ornamental and benign.