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Key threatening processes in NSW

Introduction of fish to fresh waters within a river catchment outside their natural range

INTRODUCTION

In November 2001, the introduction of fish to fresh waters within a river catchment outside their natural range was listed as a key threatening process (KTP) under the *Fisheries Management Act 1994*.

A threatening process is defined under the Act as 'a process that threatens, or that may threaten, the survival or evolutionary development of a species, population or ecological community of fish or marine vegetation'.

Threatening processes that adversely affect threatened species, populations or ecological communities, or possibly cause others that are not currently threatened to become threatened, may be eligible for listing as a KTP.

Anyone can nominate the listing of a KTP. Nominations are assessed by the Fisheries Scientific Committee (FSC), an independent body of scientists, which is responsible for determining whether any threatening processes should be listed as a KTP.

The complete list of key threatening processes is contained in Schedule 6 of the *Fisheries Management Act 1994*.

WHAT INTRODUCED FISH ARE CURRENTLY PRESENT IN NSW?

At least eleven non-native species currently have self-sustaining populations somewhere in the waterways of NSW. These include:

- Brown trout (*Salmo trutta*),
- Rainbow trout (*Onchorynchus mykiss*),
- Carp (*Cyprinus carpio*), including the ornamental koi strain,
- Goldfish (*Carassius auratus*),

Redfin perch. *Photo Gunther Schmida.*

- Oriental weatherloach (*Misgurnus anguillicaudatus*),
- Gambusia (*Gambusia holbrooki*),
- European perch or redfin (*Perca fluviatilis*),
- Banded grunter (*Amniataba percoides*),
- Speckled mosquitofish (*Phalloceros caudimaculatus*),
- White cloud mountain minnow (*Tanichthys albonubes*), and
- Swordtail (*Xiphophorus helleri*).

Brook trout or char (*Salvelinus fontinalis*) and tench (*Tinca tinca*) have been taken in NSW waters in the past, but don't appear to have self-sustaining populations at present.

Atlantic salmon (*Salmo salar*) are also stocked into NSW waters but are not thought to have established self-sustaining populations.

Roach (*Rutilus rutilus*) and tilapia (*Oreochromis mossambicus*) may also have access to NSW waterways and may establish self-sustaining populations in the future.

Introduced goldfish are often misleadingly called native carp. *Photo: Gunther Schmida.*

Gambusia. *Photo: NSW DPI.*

HOW HAVE THESE FISH BEEN INTRODUCED?

Some species of fish have been introduced for a specific purpose such as to enhance recreational fishing opportunities (*e.g.* redfin) and assist with pest control (*e.g.* gambusia).

Trout have been introduced into NSW and are annually re-stocked into many of the State's high-country rivers and dams. They are not considered pest species by the NSW government as they form the basis of a highly valuable recreational fishery. Trout stocking is done in accordance with the NSW Fish Stocking Fisheries Management Strategy to maintain the recreational fishery and minimise impacts on native aquatic species.

Other species have been introduced accidentally into NSW waterways (*e.g.* oriental weatherloach, released from aquariums).

Some species, such as banded grunter, are thought to have been accidentally translocated in farm dam or fish farm stocking activities.

WHAT IMPACTS DO INTRODUCED FISH HAVE ON NATIVE FAUNA AND FLORA?

Introduced species can impact upon native fauna and flora in a number of ways:

Direct predation

- Trout are known to have caused a decline in native *Galaxias* populations,
- Gambusia predate on eggs and larvae of native fishes, as well as nip fins, and
- Redfin perch are known to eat the young of all native species with which they co-occur. Predation by redfin has been considered one of the potential factors in the decline of Macquarie perch which is listed as vulnerable under the *Fisheries Management Act 1994*.

Competition for resources

- Introduced fish compete with native fish for food, spawning sites and habitat,
- Competition by redfin has been suggested as one of the factors in the decline of the endangered trout cod, and
- Based on their known diet, competition for food by redfin has also been implicated in the decline of Macquarie perch.

Habitat degradation

- Habitat degradation and modification by introduced carp, through uprooting vegetation and disturbance of sediments is considered harmful to many native fish species,
- The spread of redfin and carp coincides with the decline of a number of Murray River drainage fish species.

Spread of diseases

- Introduced fish can promote the spread of disease in native species,
- Redfin are known carriers of Epizootic Heamatopoietic Necrosis Virus (EHNV), which can spread to some native fish species. This virus is a possible factor in the declines of threatened Macquarie perch and silver perch. Silver perch are also affected by goldfish ulcer disease.
- Translocated native fish can carry damaging diseases such as Barramundi picorna-like virus that affects Murray cod, Macquarie perch, and silver perch.

WHAT THREATENED FISH ARE AFFECTED BY THIS KTP?

The introduction of fish to fresh waters within a river catchment outside their natural range has been listed as a KTP because of its negative impacts on several threatened species and populations, including:

- Murray hardyhead (endangered);

Koi carp rapidly revert to feral pest strains in the wild. *Photo: Gunther Schmida.*

- Eastern freshwater cod (endangered);
- Trout cod (endangered);
- Oxleyan pygmy perch (endangered);
- Southern pygmy perch (vulnerable);
- Macquarie perch (vulnerable);
- Silver perch (vulnerable);
- Western population of the purple spotted gudgeon (endangered population); and
- Western population of the olive perchlet (endangered population).

WHAT HAPPENS AFTER A KEY THREATENING PROCESS IS LISTED?

The listing of this KTP does not automatically change existing laws regulating fish stocking and other types of fish introductions in NSW.

For example, under the *Fisheries Management Act 1994*, a person must not release any live fish into any waters except under the authority of a stocking permit or an aquaculture permit.

However, once a KTP is listed, the NSW Department of Primary Industries may prepare a 'threat abatement plan' to identify actions required to manage the KTP so as to abate, ameliorate or eliminate its adverse effects on threatened biodiversity. Threat abatement plans identify responsible persons or public authorities for each action, and set out a timetable for implementation. Public authorities are required to report their progress in implementing relevant actions in their annual reports to Parliament.

Threat abatement plans recognise existing actions to manage the threat. For example, the Department of Primary Industries has prepared the NSW Fish Stocking Fisheries Management Strategy. The management strategy outlines the rules, regulations and programs proposed to manage the activity and was subject to an assessment under the *Environmental Planning and Assessment Act 1979*.

Threat abatement plans may also result in some changes to the future management of the threatening process in future.

When preparing threat abatement plans, the Department of Primary Industries must consider ways to minimise any social and economic consequences that may result from the listing, as well as options for community involvement. Draft threat abatement plans are publicly exhibited for a minimum of 4 weeks, during which time any interested party may comment.

Listing as a KTP establishes formal assessment requirement in development control processes established by the *Environmental Planning and Assessment Act 1979*.

HOW ARE THREAT ABATEMENT PLANS IMPLEMENTED?

The successful implementation of threat abatement plans is dependent on the assistance and cooperation of public authorities, local councils and the community.

When preparing threat abatement plans the Department of Primary Industries consults with relevant authorities and seeks their cooperation in implementing the measures included in the plan.

Threat abatement plans inform and influence other planning processes and must be considered by public authorities when making decisions. For example, local councils and other public authorities must consider threat abatement plans when assessing proposed developments or activities.

Public authorities should take any action available to them to implement measures in the plan for which they are responsible, and should not make decisions that are inconsistent with the provisions of the plan. However, there are no penalties for individuals or organisations for not complying with the plan.

REDUCING THE IMPACTS OF THIS KTP

Some of the possible actions that may be undertaken to reduce or eliminate the impacts from the introduction of fish to areas outside their natural range include:

- Improving education to avoid accidental release of these species;
- Stocking native species only in waters within their natural range;
- Ensuring stocking activities comply with the NSW Fish Stocking Fisheries Management Strategy;
- Promoting and implementing the Hatchery Quality Assurance Program for fish breeding

and stocking activities to reduce the risks of translocating pest species and diseases;

- Avoiding stocking if it will negatively impact on listed threatened species or critical habitat;
- Taking care to only stock fish of suitable genetic make-up;
- Giving unwanted aquarium fish to a friend or pet shop, rather than releasing them into the wild;
- For aquaculturists - complying with aquaculture permit conditions designed to prevent the escape of fish (e.g. screened water outlets) and keeping to the prescribed species list;
- Declaring fish that pose particular threats to the aquatic environment as noxious fish. There are 3 classes of noxious species, representing the different levels of threat they pose, and different rules apply for each class in regard to their possession or sale. For example, Class 1 fish (including tilapia) cannot be kept, bought or sold;
- Managing issues such as water quality, environmental flows, fish passage and snags to maintain or return river conditions to those that best suit native fish;
- Investigating methods to restrict the further spread of alien species. Diseases such as viruses can be used as biological control to manage alien species, although it can be difficult to find a species-specific disease that will not affect other fish.

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This publication is based on information contained in the Fisheries Scientific Committee Recommendation for listing the 'Introduction of fish to fresh waters within a river catchment outside their natural range (Ref. No. FR20) as a key threatening process.

FOR FURTHER INFORMATION

Phone 1300 550 474

Contact the DPI Threatened Species Unit

Port Stephens Fisheries Centre
Private Bag 1, Nelson Bay, NSW 2315
Fax (02) 4916 3880
Email tsadmin@fisheries.nsw.gov.au

Website

www.dpi.nsw.gov.au

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