Cotter Reservoir Alien Fish Management Plan

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Document management

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1. Introduction

Icon Water is committed to managing impacts on threatened fish in the Cotter Reservoir and Cotter River arising from operation of the Cotter Dam. In addition to full compliance with the Commonwealth and Territory approval conditions underpinning the Enlarged Cotter Dam project, Icon Water's *Fish Management Plan* objective for the operation of the reservoir is:

"To ensure that operation of the Cotter Dam for the supply of community drinking water continues to support aquatic communities, particularly threatened native fish and crayfish species."

A variety of reviews identified the likely impacts of increased alien fish abundance or incursions of new species into the reservoir prior to the construction of the Enlarged Cotter Dam (Lintermans 2005, 2012; Enlarged Cotter Dam (ECD) EIS (2009)). The *Cotter Dam Enlargement Fish Risk Assessment* (SKM 2013) reiterated the likely increase in alien fish numbers, following construction of the enlarged dam, and identified the importance of managing trout and Redfin perch impacts on (*Macquaria australasica*) and Two-spined blackfish (*Gadopsis bispinosus*). The assessment also identified the need for an *Alien Fish Management Plan*, which must include management and mitigation measures to ensure the risks to native fish are managed.

The development and implementation of this adaptive *Alien Fish Management Plan* will ensure Icon Water meets its regulatory obligations with regard to the management of alien fish species in the Cotter Reservoir and upstream Cotter River. This plan should be read in conjunction with the overarching *Fish Management Plan* and associated sub-plans.

2. Impacts of alien fish on native fish species

Alien fish species currently identified in the Cotter Reservoir are (Lintermans et al. 2013):

- Rainbow trout (*Oncorhynchus mykiss*);
- Brown trout (*Salmo trutta*);
- Goldfish (*Carassius auratus*);
- Oriental weatherloach (*Misgurnus anguillicaudatus*) ; and
- Eastern gambusia (*Gambusia holbrooki*).

Alien fish have the potential to impact the self-sustaining populations of the endangered Macquarie perch and Two-spined blackfish in the Cotter Reservoir and Cotter River through predation and competition for habitat and food resources, as well as providing a food source to facilitate expanded populations of native predators such as cormorants (Lintermans, et al. 2013). However, it is well accepted that of the species already present in the Cotter Reservoir, trout species (rainbow and brown) have the greatest potential to create negative impacts on the Cotter Macquarie perch and Two-spined blackfish populations.

An increase in the abundance and/or size of alien fish, in particular trout, has the potential to result in an increase in the rates of predation on and competition with native fish, which could have 'moderate' consequences for the native fish population, but is unlikely to result in the loss of a sustainable population *(Cotter Dam Enlargement Fish Risk Assessment* (2013). Most recent findings from the ongoing *ECR Fish Monitoring Program* in relation to alien fish found that there was no difference in the abundance and size of Rainbow trout in Cotter Reservoir and Cotter River compared to any other year of monitoring (Broadhurst et al. 2018). Brown trout abundance in the Cotter Reservoir however has increased in the past two years, and could lead to changes in predation upon Macquarie perch and Two-spined blackfish. Anecdotally, Brown trout are considered more piscivorous and as such, potentially more damaging to threatened fish populations of Macquarie perch and Two-spined blackfish than Rainbow trout (NSW Fisheries, 2003). Alien species besides trout continue to be detected in the reservoir, particularly Goldfish which have increased since filling commenced, but have decreased over the past three annual assessments, so much so that most recent monitoring reflects that of baseline years (Broadhurst et al. 2018).

The *ECD Food Resources Study* (Norris et al. 2012) also identified that the loss of fringing macrophyte beds may result in a reduction in the abundance of decapod crustaceans, the preferred food resource of Macquarie perch. Whilst this could adversely affect the condition of Macquarie perch, it could also change competition dynamics in the reservoir between trout and native fish to the detriment of native fish. The ongoing monitoring of food resources within the reservoir in relation to threatened fish is carried out in the *ECR Fish Monitoring Program*.

The alien species Redfin perch (*Perca fluviatilis*) and Carp (*Cyprinus carpio*) are not currently present in the Cotter catchment upstream of Cotter Dam (Lintermans 2005; Lintermans et al. 2013). Redfin perch has the greatest potential to impact native fish species, in particular Macquarie perch, through the introduction of the EHN virus. EHN Virus is not recorded from the Cotter Catchment upstream of Cotter dam (Whittington 2008). Redfin perch are also a competition and competition threat to native fish species. Icon Waters management of the risk of EHN virus entering the catchment from Icon Water's activities opposed to other land management practices and recreational pressures is managed through the *EHN Virus Management & Response Plan.*

3. Alien Fish Management

3.1 Key elements

This *Alien Fish Management Plan* is designed to be an ongoing and adaptive document. The Plan will have sub-plans developed that will identify trigger levels and more detailed implementation plans for proposed mitigation measures.

The key elements of Icon Waters alien fish management are:

1. Collect baseline and ongoing alien fish and native fish data in the Cotter Reservoir and river reach through the *ECR Fish Monitoring Program*. This work commenced in 2010.

2. Analyse management options for controlling alien fish species in the Cotter Reservoir and upstream Cotter River. This work is ongoing, in collaboration with external agencies and stakeholders.

3. Implement recommendations arising from (2) above, when required.

4. Include expertise from a range of sources and stakeholders in decision making processes.

5. Regularly review and adapt to ongoing monitoring results and effectiveness of mitigation measures.

This *Alien Fish Management Plan* involves the ongoing monitoring of alien fish species, with a particular focus on trout, in the Cotter Reservoir. This monitoring is being undertaken through the *ECR Fish Monitoring Program* which commenced in early 2010 and includes the monitoring of alien fish abundance and distribution (Lintermans et al. 2013). Further collection of data throughout the operation of the reservoir will allow more robust estimates of baseline levels of alien fish abundance, and will facilitate the setting of trigger levels for management actions.

3.2 Management options and analysis

While data are being collected to provide a robust data set for alien fish populations, Icon Water will compile detailed information on viable management options for the management of alien fish impacts in the Cotter Reservoir and river. This information will include:

- feasibility
- costs
- resourcing requirements
- maintenance requirements, and
- information on community and stakeholder acceptance.

Icon Water will work closely with the ACT Government to determine community and stakeholder acceptance.

The gathering of this information in parallel with the collection of abundance and distribution data for alien fish species will allow thorough options analysis of alien fish management measures as soon as a robust baseline data set is available.

Some management options which have already been proposed for consideration include:

- Targeted netting of trout spawning runs for consequent removal the Cotter River directly upstream of Cotter Reservoir
- A trout trap on the Cotter River immediately upstream of Cotter Reservoir, designed to trap spawning trout for consequent removal from the Cotter system
- Targeted angling efforts during trout spawning season for consequent removal from the Cotter system
- Targeted riverine electrofishing in the Cotter River directly upstream of Cotter Reservoir.

These options all require further examination in order to better understand the environmental, social and financial implications of their implementation. Additional options may also be identified for examination. It should also be noted that multiple options may need concurrent or rolling implementation and will be required to be in collaboration with ACT Government.

3.3 Trigger Levels

The preferred method to set trigger levels or thresholds for management actions is yet to be decided. These triggers may be based on trout numbers, trout size, trout distribution, trout to native species abundance ratios, or other appropriate metrics.

The method to be used to set trigger levels and analyses of management options will be undertaken by Icon Water in consultation with the Fish Management Plan Steering Committee (FMPSC). Icon Water may also engage the services of additional experts in the field of alien fish management, and will regularly update the ACT Government and other stakeholders on the progress of the *Alien Fish Management Plan.*

4. Reporting and Adaptive Management

Icon Water will report on the progress of the Alien Fish Management Strategy (strategy, options analyses and implementation) through the annual Fish Management Plan Performance Reports.

The *Alien Fish Management Plan* is designed to be adaptive, as it needs to respond to the information coming from the *ECR Fish Monitoring Program*; changes to best practice management of alien fish in Australia; and any legislative or regulatory directives.

5. References

ACTEW Corporation 2009, Enlarged Cotter Dam Environmental Impact Assessment, Canberra.

ACTEW Corporation 2013, Enlarged Cotter Dam Fish Management Plan Version 3, Canberra.

Broadhurst, B. T., Clear, R. C., Fulton, C. and Lintermans, M. (2018). *Enlarged Cotter Reservoir ecological monitoring program: technical report 2018*. Institute for Applied Ecology, University of Canberra, Canberra.

Lintermans, M. 2005, ACT Future Water Options Fish Impact Study: A Review of Potential Impacts on Fish and Crayfish of Future Water Supply Options for the Australian Capital Territory: Stage 1. ACTEW Corporation. Canberra.125 p.

Lintermans, M. 2012, Managing potential impacts of reservoir enlargement on threatened Macquaria australasica and Gadopsis bispinosus in southeastern Australia. Endangered Species Research 16: 1-16.

Lintermans, M., Broadhurst, B. and Clear, R. 2013, Assessment of the potential impacts on threatened fish from the construction, filling and operation of the Enlarged Cotter Dam Phase 1 (2010-2012): Final Report. Report to ACTEW Corporation. Institute for Applied Ecology, University of Canberra, Canberra.

Norris, R. H., Wright, D. W., Lintermans, M., Bourke D. F., Harrison, E. T. 2012, Food resources for Macquarie perch in Cotter Reservoir. Final Report to the Bulk Water Alliance. Institute for Applied Ecology, University of Canberra, Canberra.

NSW Fisheries. 2003. *Environmental Impact Statement on Freshwater Fish Stocking in NSW*. NSW Fisheries, Cronulla.

Sinclair Knight Merz (SKM) 2013, Cotter Dam Enlargement Fish Risk Assessment Report to ACTEW Corporation, Canberra

Whitington, R 2008, Testing for EHNV Cotter Dam, Report to ACTEW Corporation, Faculty of Veterinary Science, University of Sydney, Sydney.