Report to the Commonwealth Department of the Environment and Energy: Annual Performance Report (2017) against the Enlarged Cotter Dam Fish Management Plan Version 3

Version 1.00, 4 April 2018

Document management

Document summary

Title	Report to the Commonwealth Department of the Environment and Energy: Annual Performance Report (2017) against the Enlarged Cotter Dam Fish Management Plan Version 3
Version	1.00
Document status	Final
Date of issue	4 April 2018

Document development

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Version control

Version	**Author**	**Date**	**Description**	**Approval**
1.00	John Hyam	04/04/2018	Final	Benjamin Bryant

Contents

Introduction

This performance report outlines Icon Water's performance against Version 3 of the Enlarged Cotter Dam (ECD) Fish Management Plan (FMP) V3 as required under the Commonwealth Department of the Environment and Energy's conditions of approval:

'*The person taking the action must implement the Plan. Every year the person taking the action must submit to the Minister a report covering performance against the Fish Management Plan. The date of the first report must be provided on 19 January 2011, with each subsequent report to be provided 12 months from the date of the previous report*'

Icon Water has completed all the requirements of the ECD FMP V3 and associated sub-plans throughout the reporting period (2017). This performance report is structured against each of the sub plans.

This Performance Report should be read in conjunction with the ECD FMP Version 3 available on Icon Water's public website at http://www.iconwater.com.au/Water-and-Sewerage-System/Sustainability-and-Environment/Environmental-management/Cotter-Dam-operational-compliance.aspx.

Background

As a condition of approval for Icon Water to construct and operate the ECD, the Commonwealth Environment Minister directed Icon Water to manage the potential environmental impacts to five threatened native aquatic species in the Cotter River system, particularly the rare and threatened species protected under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (EPBC Act). The specific fish and crayfish species to be managed are listed below.

Table 1 - EPBC Listing Status

Species	EPBC Act Listing Status
Macquarie Perch (*Macquaria australasica*)	Endangered
Trout Cod (*Maccullochella macquariensis*)	Endangered
Murray Cod (*Maccullochella peelii*)	Vulnerable
Two-spined Blackfish (*Gadopsis bispinosus*)	-
Murray River Crayfish (*Euastacus armatus*).	Endangered

Icon Water's approach to minimise and manage threats to threatened aquatic species is documented through a series of ECD Fish Management Plans and projects as shown in **Figure 1**. To date three versions of the ECD Fish Management Plan have been completed. The final plan (ECD Fish Management Plan V4) is under development and is planned for release in 2018/19.

Version 1 of the Fish Management Plan (FMP) documented the projects that provide information required for the management of threatened aquatic species. Version 2 of the FMP provided information and measures, based on the results of Version 1 projects, to help protect aquatic communities in the Reservoir and Cotter River during the construction of the ECD. Version 3 of the FMP, valid since November 2013, has focused on the ongoing management of threatened aquatic species during the filling and operational phase of the ECD.

The objective of FMP V3 is "*To ensure that the filling and operation of the Enlarged Cotter Reservoir does not compromise the maintenance and rehabilitation of native fish and crayfish species*." The FMP (and associated sub-plans) is:

- designed to prevent or mitigate risks to threatened aquatic fauna and their habitats arising from the construction and operation of the enlarged Cotter Dam

- scientifically based, using adaptive management
- robust in terms of stakeholder involvement, peer review and public transparency
- timely and updated on the basis specified in the approval conditions
- developed as part of the overall requirements of the Enlarged Cotter Dam, and
- effective in terms of use of resources and expertise whilst at the same time ensuring the protection of threatened species.

The sub plans and key activities of the FMP are:

- Barriers and spawning habitat identification (project 8)
- ECD Fish Monitoring Program (project 9)
- Management of Macquarie perch During Filling Phase Plan
- Alien Fish Management Plan (project 6)
- EHN Management & Response Plan (project 4)
- Macquarie perch translocation (project 5).

The delivery of the Fish Management Plan 3 is overseen by the FMP Steering Committee and Working Group, chaired by Icon Water and comprising representatives and experts from the Commonwealth Government, ACT Government and University of Canberra.

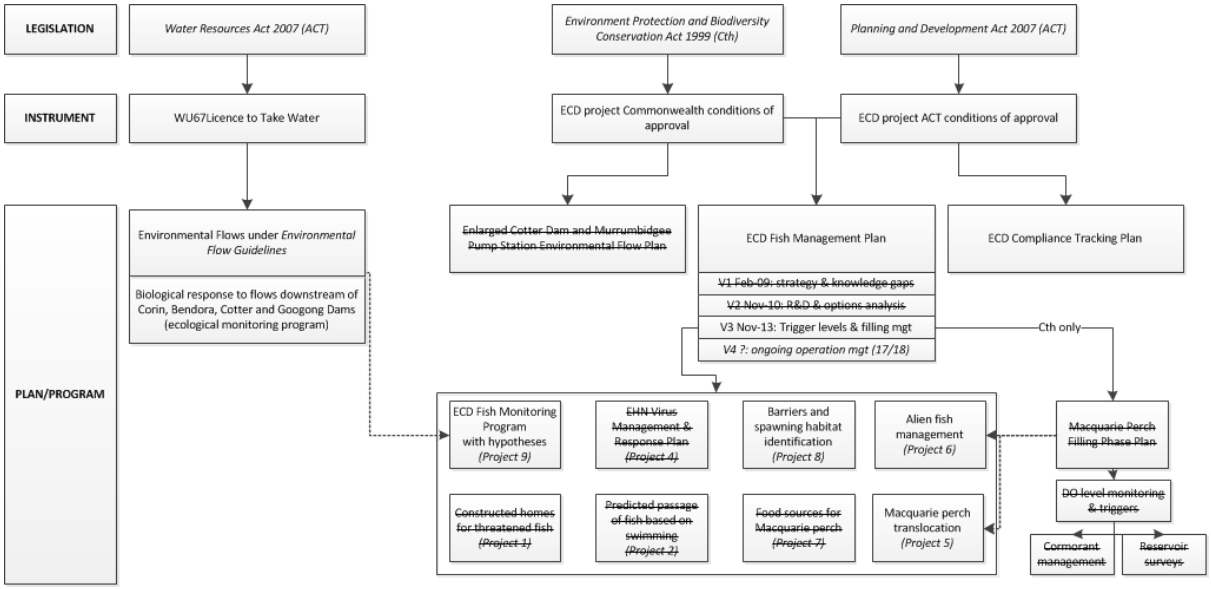

Figure 1. ECD FMP Framework[1]

Fish Steering Committee and Working Group

Icon Water has continued to meet with and report to the Fish Steering Committee and the Working Group. During the reporting period, the Fish Steering Committee has met once and the Working Group has met two times. The Commonwealth is an invited member to these forums.

[1] Strike-through means completed or achieved.

Barriers and spawning habitat identification project

In June 2017, Icon Water funded the second year of a two-year research project with the University of Canberra with acoustic tagging of a representative sample of Macquarie perch and installation of monitoring gateways along the Cotter River upstream of the full supply level of the Cotter reservoir.

The additional components of the research project include monitoring and analysis of the various habitat available to Macquarie perch upstream, and includes broader conservation research of Macquarie perch in the whole Cotter River system.

The 2016 spawning event was considered successful with significant recruitment and demonstration of fish ability to pass medium barriers under natural flows to suitable spawning habitat.

The University of Canberra scientists provided preliminary data from the research project that indicated that the tagged Macquarie Perch had limited movement upstream in efforts to spawn (speculated due to unfavourable seasonal conditions). The official outcomes of the 2017 spawning season will be confirmed following Icon Water's mandatory fish monitoring program in 2018, conducted by the University of Canberra under contract to Icon Water. The outcomes will be formally reported to the Commonwealth in the *2018 Annual Performance Report against the ECD FMP*.

ECD Fish Monitoring Program

The ECD Fish Monitoring Program is a key requirement of the ECD FMP V3. The Fish Monitoring Program focusses on 10 management questions (**Annexure 1**) that aim to:

- determine the impact of the filling and operation of ECD on populations of the two focal species (Macquarie perch and Two-spined blackfish) and potential threats (predators and competitors) in the ECD and river upstream
- inform management actions to minimise and/or mitigate the impact to those populations.

A team from the University of Canberra and the Australian National University undertake the monitoring program on behalf of Icon Water. The *Enlarged Cotter Reservoir Ecological Monitoring Program: Technical Report 2017* presented to the FMP Working Group describes the results of the monitoring conducted in 2016/2017.

The report outlined that no discernible change has been detected in the population of Macquarie perch in the ECR between Phase 1 and 2, other than the greater condition of adults since filling began. Encouragingly successful recruitment to juveniles was detected in 2017 for the first time since the enlarged Cotter Reservoir started to fill in 2013. Indeed Macquarie perch recruitment was detected at all riverine sites as well in 2017, the first time this has occurred since monitoring began in 2010. The mechanisms behind the catchment-wide recruitment success of Macquarie perch are not immediately clear, though it is likely that the "unregulated" flows that persisted during the spawning season contributed to this success. It is still unknown whether managed flows can be used to facilitate spawning of the reservoir population and this needs to be resolved.

Abundance and distribution of Macquarie perch in the Cotter River upstream of the ECR remains relatively stable since monitoring began in 2010. Abundance of young-of-year Macquarie perch was different among years, and these differences were mixed between years of baseline and filling phases suggesting that spawning of Macquarie perch in the Cotter River is sporadic and likely reflects the small resident riverine population.

There were no recommended changes to the monitoring regime or recommended management interventions at this stage.

Alien Fish Management Plan

The Cotter Dam Enlargement Fish Risk Assessment identified a likely increase in alien fish numbers in the Cotter Reservoir following construction of the ECD and identified the importance of managing trout and Redfin perch impacts on Macquarie perch and Two-spined blackfish

The risk assessment also identified the need for an Alien Fish Management Plan (under the ECD Fish Management Plan), which was consequently developed (November 2013) and includes management and mitigation measures to ensure predation risks to native fish are managed. The development and implementation of the adaptive Alien Fish Management Plan ensures Icon Water meets its regulatory obligations with regard to the management of alien fish species in the Cotter Reservoir and upstream Cotter River.

The Alien Fish Management Plan identifies the need for monitoring of alien fish numbers in the Cotter Reservoir and river. This work was undertaken in 2016 though the ECD Fish Monitoring Program (specifically related to management questions 4, 5, 6 and 7). Refer to the summary of the monitoring results related to these questions in the ECD Fish Monitoring Program section above.

Should alien fish numbers increase to unsustainable levels, options to address the issue will be discussed further at the FMP Working Group and Steering Committee meeting(s) in 2018 in order to better understand the environmental, social and financial implications of their implementation. Several management options have already been proposed for more detailed consideration, and 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.

EHN Management & Response Plan

Epizootic Haematopoietic Necrosis (EHN) Virus is a native ranavirus, a member of the Iridoviridae Family, and is associated with sudden high fatality rates in fish (especially during spring and summer). The Macquarie perch is a species known to be highly susceptible to EHN mortality.

Icon Water operates within the Cotter catchment, where EHN Virus and vectors are not known to be present. While Icon Water was constructing the ECD, the risk of transporting the virus into the reservoir and catchment was far greater than during standard operations; and consequently, rigorous protocols and mitigation measures were applied throughout the construction period. It is accepted that Icon Water's operations post construction of the ECD are not a major contributor to the risk of EHN Virus entering the catchment in contrast to other land management practices and recreational pressures. In order to ensure appropriate mitigation of the risk, Icon Water has established the EHN Management & Response Plan to ensure that the risk, albeit small, is monitored and managed.

The EHN Management & Response Plan requires Icon Water to monitor for signs of EHN Virus infection in fish in the Cotter Reservoir and upstream river. This requirement was fulfilled via the Cotter Fish Monitoring Program in 2017. During the course of the 2017 monitoring, all fish collected were inspected for signs of EHN infection (e.g. bleeding near the fins or gills, swelling of the stomach and erratic swimming near the surface of the water). No evidence of the virus was detected in the fish samples collected.

Icon Water has developed a work instruction for staff and contractors working near or in waterways in the Cotter catchment. This work instruction includes measures to be taken to avoid the spread of the EHN Virus and is a mandatory induction requirement for staff and is included in contractors' contract conditions.

Icon Water is also required to notify the ACT Government of any suspected EHN Virus infections; however no signs of infection were identified in 2017.

It is noted that Icon Water's controls are not exhaustive, considering the Cotter catchment is largely open to the public. Therefore efforts to prevent introduction of the EHN Virus to the catchment need to be met by other land managers of the area, such as the ACT Parks and Conservation Service.

Fish Management Plan V4

The enlarged Cotter Reservoir reached Full Supply Level (FSL) of 550.8m on 7 July 2016. Modelling by Icon Water indicates that it is likely to remain at or near FSL for 2016/17 as Cotter River water will continue to be drawn from the gravity fed pipeline from Bendora Dam. This an indicator for completion of the FMP V3 (to address the period of post construction to full inundation).

During 2018 Icon Water will commence development of Version 4 to address the ongoing operational requirements for the Cotter reservoir and any outstanding or ongoing activities required to minimise and/or mitigate the impact to the protected fish populations.

References

Broadhurst, B. T., Clear, R. C., Fulton, C. and Lintermans, M. (2017). Enlarged Cotter Reservoir ecological monitoring program: technical report 2017. Institute for Applied Ecology, University of Canberra, Canberra

Annexure 1

The 10 management questions that underpin the Enlarged Cotter Reservoir Ecological Monitoring Program are:

1. Has there been a significant change in the abundance and body condition of Macquarie perch in the enlarged Cotter Reservoir (Young-of-Year, juveniles and adults) as a result of the filling and operation of the ECD?
2. Has there been a significant change in the abundance, body condition and distribution of the Macquarie perch in the Cotter River above and below Vanity's Crossing as a result of the filling and operation of the ECD?
3. Have Two-spined blackfish established a reproducing population in the enlarged Cotter Reservoir and are they persisting in the newly inundated section of the Cotter River?
4. Has there been a significant change in the abundance, distribution and size composition of adult trout in the enlarged Cotter Reservoir as a result of the filling and operation of the ECD?
5. Has there been a significant change in the abundance and size composition of trout in the Cotter River upstream of the enlarged Cotter Reservoir as a result of the filling and operation of ECD?
6. Are Two-spined blackfish and Macquarie perch present in trout stomachs in the Cotter River?
7. Has there been a significant change in the abundance and distribution of non-native fish species in the enlarged Cotter Reservoir as a result of the filling and operation of the ECD?
8. Has there been a significant change in the abundance, distribution and species composition of piscivorous birds in the vicinity of the enlarged Cotter Reservoir as a result of the filling and operation of the ECD?
9. Have macrophyte beds re-established in the enlarged Cotter Reservoir?
10. Are there adequate food resources (particularly decapods) for the Macquarie perch following the filling and operation of the enlarged Cotter Reservoir?

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