

PROTECTION FOR FUTURE GENERATIONS (103110)

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Abbreviations

ATF – Australian Trout Foundation

VFA – Victorian Fisheries Authority

DEWLP- Department of Environment, Water, Land and Planning

DEECA – Department of Environment, Energy and Climate Action

CMA – Catchment Management Authority

WTFMP – Wild Trout Fisheries Management Program

NECMA – North East Catchment Management Authority

CSIRO – Commonwealth Scientific and Industrial Research Organization

ARI – Arthur Rylah Institute

Abstract

Rivers are vital ecosystems supporting diverse aquatic life, including fish populations. However, human activities such as habitat degradation and river regulation, as well as climate change, have led to the decline of native and non-native fish habitats in Australia. River restoration techniques, such as riparian planting, rock seeding and re-snagging, have emerged as effective strategies to mitigate habitat loss, improve water quality and enhance fish populations. This paper provides a description of a citizen-science led process of joint stakeholder participation for riverine improvement. Community participation spanned the divide between indigenous and of non-indigenous fish species whilst improving water quality and habitat for all freshwater aquatic species. A mixture of science-informed evidence and local angler advice led to priority restoration areas being identified proving a potent mix for environmental riverine restoration.

Introduction

Non-indigenous salmonoid species presence in Australian waters and environmental stream recovery may appear to be strange and even contradictory bedfellows. However, the Australian Trout Foundation have managed these competing elements with great success in Victorian rivers and streams over the past 11 years. The ATF was incorporated in Victoria in 1992. Its initial mission was to protect and improve our wild trout fisheries for future generations. This period was fraught with a somewhat combative context between trout fishermen, the VFA and water management authorities.

In 2013 significant press coverage and internal discussions between anglers and the VFA centered on what became known as a “trout drought”. The economic and social impact of this situation was recognized in regional areas with local press and statewide regional newspapers lamenting the attraction of anglers and subsequent drop in visitor numbers and revenue.

Cooperation

The ATF realized that a combative approach to any recovery in fish stocks (indigenous and non-indigenous) in these areas was going to be unproductive. The ATF set about building bridges to major government instrumentalities, academic institutions and community organizations interested in the sustainability of the indigenous and non-indigenous fishery. The government instrumentalities and

academic institutions included the VFA, the then Department of Environment, Water and Planning (DEWLP now DEECA), the ARI and relevant CMAs. The ATF was representative of many individual anglers as well as Angling Clubs, NFA and statewide fishing organizations. These stakeholders formed the WTFMP. The WTFMP completed stocking trials commencing in 2014 and studied research available from overseas and Australia. However, it was felt a more comprehensive approach may be required given the challenges facing the indigenous and non-indigenous freshwater fishery in south-eastern Australia.

Science Informed Approach

These challenges, well recognized by the scientific community for some time through climate change, were summed up in a presentation by the NECMA to the Alpine Valley Leadership Program in 2022. Using CSIRO mapping data NECMA suggested the challenges included:

- Increased maximum temperatures.
- Increased minimum winter temperatures.
- Increased minimum temperatures from October to May up 1-2 degrees.
- Lower winter rainfall with changing rainfall patterns
- Increased river and stream temperatures
- Decreasing riverine and stream flows.

In addition to these climatic factors many rivers and streams in the priority catchment areas had already suffered significant environmental degradation since European settlement. This degradation included alluvial mining, dredging, erection of dams/barriers, removal of in-stream habitat by Water Trusts, land clearing and nutrient-rich run-off from industrial farming and continued stock access to streams causing erosion and water pollution.

Dr John Morrongiello from Melbourne University, in a presentation to the Talk Wild Trout Conference held in Mansfield in 2015, indicated climate modelling suggested reduced stream flows across priority trout streams, elevated water temperatures and gradual recession of fishing waters into back country areas often inaccessible to all but the hardy few.

Presented with these challenges and the prospect of a declining freshwater fishery the WTFMP, having sought advice from many sources including international experience (Dr Dan Dauwalter, Trout Unlimited) and the ARI, and urged by the ATF, decided that a major segment of the recovery process for the fishery should be a long-term environmental recovery program. The argument put by Dr Dauwalter was 'if you take care of the fish the fishing will take care of itself'. By this he meant in-stream restoration and improvement in stream-side habitat was the primary long-term road to recovery for any fishery under environmental stress.

A New Approach

Challenged by these circumstances facing the Victorian freshwater fishery the ATF strengthened the stakeholder relationships within the priority catchments and with the VFA. The ATF also took the unprecedented step of altering its constitution to include as an additional aim in its mission statement:

To protect and enhance the health of our waterways and fisheries for future generations.

To ensure these words translated into action the ATF took a citizen science approach. Funded in part by VFA and DEWLP (DEECA) workshops were convened in priority catchment areas across Victoria. Fishing clubs, individual anglers, industry representatives and relevant government instrumentalities were invited to attend. Led by presentations from the ARI all stakeholders were informed of what was required to return the fisheries to a better state of health.

Remedial action for stream health described by Dr Jarod Lyon in presentations to those in attendance included boulder seeding, bank stabilization, snag re-seeding, riparian planting, fencing and off-stream stock watering.

Lyon addressed some of these issues. Riparian vegetation provides numerous benefits to fish habitats, including shade, shelter, and food resources (Kelly & Kelly, 2024; Arthington et al., 2016).

Re-snagging, involving the deliberate placement of woody debris and other habitat features to restore structural complexity and enhance fish habitats, was seen as an important restorative process.



Image 1. Re-snagging and bank stabilisation on the Nariel Creek

Research conducted by Lintermans (2013) highlights the importance of re-snagging in improving fish populations in Australian rivers. The study found that re-snagging projects led to significant increases in fish abundance and species richness, particularly for native freshwater species.

Officers attending from the relevant CMAs also emphasised the importance of bank stabilisation to prevent erosion due to vegetation removal, mining activity, livestock access and increasing adverse climate events such as bushfire and flooding.

Armed with this information all stakeholders responded with enthusiasm drawing up a list of priority action areas for riparian improvement. The ATF took a lead coordination role enlisting professional and volunteer support for environmental restoration for stressed waterways. The ATF had a contact list of over 1000 to call upon for various volunteer roles. Funded by various grants from CMAs and Recreational Fishing Licence grants the ATF and CMAs set about a long-term partnership to achieve remarkable outcomes in stream and fishery rehabilitation. Larger works such as bank stabilisation and boulder seeding were undertaken by contractors. Riparian revegetation was undertaken by the ATF assembled volunteers.

To date the work of the ATF and associated stakeholders and volunteers has resulted in significant in-stream and riparian recovery. Listed in the table below are the more significant outcomes over a seven-year period.

ATF Riparian Improvement Events 2016-23

Stream	Plantings	In-stream	Volunteers	Total Works	No. of trees	\$ saved @ \$3/tree
STEAVENSON	3	-	30	3	2000	6000
Rubicon	1	2	35	3	1000	3000
Delatite	3	1	30	4	2000	6000
Howqua	3	1	25	4	1500	4500
Jamieson	2	-	36	2	1000	3000
Goulburn	2	1	50	3	2000	6000
Buckland	1	1	26	2	1000	3000
Ovens	3	3	52	6	1500	4500
Mitta Mitta	1	1	22	2	500	1500
Nariel	2	5	60	7	10000	30000
Wonnongatta	1	1	25	2	3000	9000
Macalister	2	-	40	2	2500	7500
cobungra	1	1	10	2	600	1800
Total	25	17	411	42	28600	\$85,800

At time of writing a further three large projects are either underway or are being planned for Autumn and Spring 2024. This work includes 25,000 trees and plants and significant in stream work on the Ovens River, Nariel and Livingstone Creeks.

Case Study

The endeavour of the ATF thus far has been driven by a combination of academic inquiry and citizen science. Caution needs to be exercised when making claims about improvements in water and stream quality. The same caution needs to be exercised when making claims for catch rates since this can vary due to angler skill, time of year and seasonality.

However, the results from a project undertaken on the lower Buckland River in 2020 would indicate that these projects have produced encouraging results for the fishery and the waterways.

The area identified for in stream and riparian regeneration on the lower Buckland was a shallow pebbly run which heated quickly in summer, provided little streamside shade and terrestrial insect life and rendered poor catch rates of salmonoids.

Log pinning and rock seeding were undertaken to increase hydrological energy whilst preventing bank erosion. Riparian vegetation was undertaken to increase shading and encourage terrestrial insect life. Log pinning also provided fish habitat and subaquatic insect life. Increased rainfall in the subsequent years to this work being undertaken provided the ideal conditions for channel deepening and increased plant strike rate. The area now is defined by a much deeper channel, cooler water and improved streamside shading. It is also a location visited more regularly by anglers due to increased catch rate and increased fish size.



Image 2. Re-Snagging and Rock seeding on the lower Buckland River. The channels have deepened since works were completed

Conclusion

Through the endeavours of the Australian Trout Foundation a once polarised sector between indigenous and non-indigenous fish species has been largely mollified. Stakeholders seeking common ground for the improvement of inland waterways for water quality and fish stock improvement have been united in this cause. Government Departments and instrumentalities including the VFA and CMA's have joined common cause with local communities, fishing interests and the ATF to further the work of waterway recovery. The outstanding success of this united endeavour has seen the emergence of a cooperative, volunteer led process providing a win/win for the waterways and the fishing public, no matter what species is being targeted. The social licence has been improved for non-indigenous species and the standing of the ATF in the eyes of Government and community has improved greatly. There remains much more to be done but the ATF is committed to maintain its focus on waterway improvement.



Image 3. A Volunteer Army in action

References

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