

## Valuing the Native: River Blackfish vs. Rainbow Trout in Late Nineteenth and Early-Twentieth Century Victoria

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In the late-nineteenth and early-twentieth century the American rainbow trout (*Oncorhynchus mykiss*) was successfully introduced to Victoria amidst concerns that it would cause the extinction of the native river blackfish (*Gadopsis marmoratus*). These concerns provoked attempts to protect the river blackfish from extinction. Previous colonial attempts to protect native species, such as the black swan in Tasmania and game birds in New South Wales, revealed a lack of knowledge about specific threats to the species or they attributed declining numbers to human hunting (Bonyhady 134; Stubbs 23-56). The protection of river blackfish from the introduction of rainbow trout was the first attempt in Victoria, and possibly Australia, to protect a native species from an invasive non-indigenous species. It was neither a total success, nor a total failure. Rainbow trout continued to be introduced to Victorian rivers throughout the twentieth century, and are in fact stocked in Victorian waterways today. However, concerns about declining river blackfish numbers did not go completely unnoticed; attempts were made to breed blackfish artificially and to extend their legal protection. By studying this case in detail it will be possible to build upon the most recent acclimatisation historiography and enrich our understanding of the complexities and contradictions of environmental attitudes in colonial Victoria. This detailed case study focuses on Victoria where there is a good survival rate of records of the period, and to provide a useful microcosm of how broader Australia-wide, and indeed global, studies of salmonid acclimatisation and understanding of invasive species could be conducted.

Early Australian environmental history provides accounts of progressive views in which environmental awareness is seen to incrementally increase over time—best exemplified in Hutton and Connor's *History of the Australian Environmental Movement*—and the view that colonists were inherently hostile to the Australian environment and animals – best articulated in Bolton's *Spoils and Spoilers: Australians Make Their Environment, 1788-1980* (Bolton, 23; Hutton, 15-16). More recent scholarship argues that Australian colonists frequently valued the local flora and fauna, but this appreciation was held in constant tension with a strong development ethos. As observed by Dunlap (98-105) and Bonyhady (93-111), by the late-nineteenth-century, there was a greater aesthetic appreciation of Australian fauna and flora. Franklin saw in this process a form of 'environmental nationalism' that privileged native animals and select introduced species (Franklin 113-20). Simultaneously, however, this period was a time of great environmental transformation as irrigation was institutionalised, agriculture vastly expanded, and Australian fauna declined (Powell; Tyrrell, 1999, 70-100; Cathcart, 199-205). Coupled with this expansion there was, according to Griffiths (121-150), a pastoral aesthetic that romanticised the countryside and rural pursuits such as trout fishing. Angling, like many elements of rural life, was to be maintained and restored through the application of scientific management and technology. However, Frost has argued recently that early twentieth century Victoria had more interest in conservation than previously thought (285-303). Rather than see the period as characterized by untrammelled belief in development and rational land and river management interspersed with a couple of lone voices-in-the-wilderness environmentalists, Frost argues that there was broad interest in resource conservation in early-

twentieth-century Victoria. Paradoxically, resource conservation was part of the belief in development, not its polar opposite. Current scholarship is yet to fully engage with the international dimensions of the development ethos inherent within aquaculture nor with colonial environmentalists' understanding of extinction and evolution. However, acclimatisation scholarship in Australia follows the same trend as broader environmental historiography and focuses on the study of formal acclimatisation societies.

The Acclimatisation Society of Victoria (ASV) was formed in 1861 by a consortium of local scientists, landowners and journalists, including newspaper proprietor Edward Wilson and natural historian Frederick McCoy. It was dedicated to the introduction of 'beautiful and useful' exotic organisms into Victoria and the protection of useful native organisms, and was part of an international network of acclimatisation societies (Osborne, 135-40). Early explanation for the popularity of acclimatisation in Australia emphasized the urge to recreate Britain in Australia, and emphasised the colonists' alienation from the local fauna and flora (Gillbank, 30-40; Dunlap, 203-10). Recent acclimatisation historiography has emphasised the hybrid landscapes that acclimatisers were attempting to create and their efforts to restore damaged environments (Tyrrell, 2004, 135-60; Beattie, 100-20). The scientific mechanism of acclimatisation was understood differently by the various acclimatisation societies (Osborne, 145-51). McCoy, the first professor of Natural Science at the University of Melbourne and ASV council member, devised a unique theory that guided acclimatisation in Victoria (Minard, 2013, 1-10.) He maintained that successful acclimatisation was dependent upon discerning transcendental similarities of form and function, acclimatising animals from equivalent climates as dictated by latitude, and ascertaining local gaps in the economy of nature that could be filled with representative species. The ASV attempted to introduce Atlantic salmon to Australia because of perceived similarities between native fish and salmonids, and to establish a fisheries industry that would improve and repair damaged colonial waterways (Minard, 2015, 177-199). While the ASV failed to establish Atlantic salmon, it inadvertently introduced brown trout to Australia.

In this article I argue that acclimatisation thinking in Victoria was influential for much longer than previously thought and was taken over by regional fish acclimatisation societies and later the state. These organisations continued but transformed the ASV's aquaculture program, creating links with the United States Fisheries Commission and eventually privileging recreational angling over commercial fisheries. Additionally I will investigate the importance of the scientific arguments that were used to argue against rainbow trout acclimatisation and how this effected the development of environmental thought in Australia. Finally, I foreshadow for future investigation the increasingly classed element of aquaculture and fishing in early-twentieth century Victoria. But before these arguments can proceed it is necessary to explore the cultural and scientific conceptualisation of the two fish species in the mid-nineteenth century.

### **The Fish Species**

The rainbow trout (*Oncorhynchus mykiss*) is native to the Pacific coast of North America and the far eastern coast of Russia (Halverson, 59). It is now found in over eighty countries in six continents (Lever, 25-30). The iridescent trout's range was extended by aquaculture in the late-nineteenth century when it gained a reputation for hardiness, and caught the eye of American sportsmen. Robert Barnswell Roosevelt (the uncle of President Theodore Roosevelt) was the first and most prominent sportsman to sing its praises. He believed that rainbow trout could survive in degraded and polluted streams on the east coast of the United States. To this end, and to promote the regeneration of damaged commercial fisheries, Roosevelt helped found the United States Fisheries Commission (USFC) and encouraged the work of the California

Acclimatisation Society (Halverson, 17-34). The latter organisation, through its able aquaculture expert Seth Green, first artificially propagated rainbow trout in 1871. It was not, however, until the USFC industrialised rainbow trout production later in the decade that rainbow trout began to spread world-wide, eventually arriving and threatening native fish in Australia.

The river blackfish is native to Australia, and is distributed throughout the Murray Darling River system and in Tasmania. Blackfish are members of the perch family, and are possibly closely related to Murray Cod (Humphries and Walker, 332). They are extremely slow growing with low fecundity, and are vulnerable to extinction due to siltation, snag removal and competition by introduced species, particularly trout (Jackson, 725-42). In 1848, the species was first identified by British navy surgeon and naturalist John Richardson (Sanders, 64-65). Early Victorian colonists held the river blackfish in considerable contempt. In 1861, one anonymous angler wrote that the blackfish was 'a soft indifferent fish (as I take it), deficient in flavour and abounding in bones. If the Cod eventually 'improves him' away altogether, I, for one, shall not regret his departure' ('The Murray Cod,' 21). Edward Wilson, the president of the ASV, thought that the blackfish's small size and poor flavour was a clear justification for acclimatising salmonids in Victoria (6). It was not until the late-nineteenth century that anglers, and professional fisheries scientists such as William Saville-Kent, began to reassess the virtues of blackfish.

### **The Road to Rainbow Trout**

As mentioned, the ASV spent several years attempting to acclimatise Atlantic salmon in Victoria and only moved on to brown trout acclimatisation once salmon failed to establish and brown trout proved easy to breed in Tasmania (Clements, 60-98). In 1874 the ASV established a trout breeding facility at Gisborne. Despite raising and distributing a modest quantity of trout, the facility never really achieved full production due to uncertain water supply, poor maintenance and the depredations of cormorants and poachers (Clements, 170-71). By 1880 the ASV had abandoned its attempt to breed trout at Gisborne it was much more cost effective to import trout from Tasmania and to encourage private breeders in Victoria.

In spite of its limited success, the ASV's aquaculture program was an important step towards the acclimatisation of rainbow trout in Victoria. First, the program provided a scientific justification for salmonid acclimatisation. Second, it demonstrated that salmonids could survive in Australia. Thirdly, it created a pool of aquaculture expertise in Victoria that would prove critical to the establishment of rainbow trout. Finally, and perhaps most importantly, the ASV created an avid group of Australian trout anglers who founded the regional fish acclimatisation societies.

Multiple regional fish acclimatisation societies formed in Victoria in the 1870s. The most important were the Geelong and Western District Fish Acclimatising Society (GWDFAS) and the Ballarat Fish Acclimatisation Society (BFAS). These societies were well funded, maintained their own fish breeding facilities and had independent links to American and European aquaculture experts. They were inspired by the ASV but operated separately from it, and aimed to improve angling in the colony. To this end both the BFAS and the GWDFAS established their own fish breeding facilities and direct links with the United States Fisheries Commission. They gathered brown trout ova from Tasmania, New Zealand, the ASV, and to lesser extent directly from England. These ova were used to establish self-sustaining breeding colonies and to stock rivers all over Victoria. The regional fish acclimatisation societies learnt how to raise and distribute fish from the ASV, with critical further knowledge learnt from the USFC.

The USFC was formed in 1870, its original purpose being to investigate declining commercial fisheries and make regulatory recommendations (Taylor, 72-76). Its purview quickly expanded to include establishing federal fish hatcheries, acclimatising fish species throughout the United States and supplying fish ova to recreational and commercial fishermen upon request. Over time the USFC instigated scientific studies of fisheries. It also became an important storehouse of aquaculture knowledge and organisation worldwide.

The USFC and the books it published directly inspired the regional fish acclimatisation societies in Australia. USFC employee Livingstone Stone's book *Domestic Trout - How to Breed and Grow Them* was quoted at the launch of GWDFAS's fish-breeding facility, indicating awareness of the USFC's work and its importance to the regional fish acclimatisation societies (Geelong and Western District Fish Acclimatising Society, 1). The BFAS sourced ova and young fish from the USFC. In 1884 the USFC arranged for the BFAS to receive one million whitefish (*Coregonus clupeiformis*) ova collected by the United States Acclimatisation Society from Lake Michigan. They survived the journey to Sydney, but then died on-route to Ballarat and were never established in Australia.

The prominent fisheries scientist William Saville-Kent was also inspired by the USFC and thought that American salmonids would thrive in Australia. He admired the USFC's determination to study not just the lifecycle of economically useful fish but also 'to know the histories of the animals and plants upon which they feed, and upon which their food is nourished; the history of their enemies and friends, as well as the currents, temperatures, and other physical phenomena of the waters in relation to migration, reproduction, and growth' ('Fisheries of Victoria'). However, Saville-Kent also drew on the USFC idea that extensive artificial propagation and stocking could provide a technological solution to declining riverine fisheries. He was part of a new generation of professionally trained fisheries scientists emerging from Europe, Britain and North America in the late nineteenth-century (Harrison, 419-29). He spent much of his career working in Australia and conducted parliamentary enquiries into the fisheries of Tasmania, New South Wales, Western Australia and Victoria and his recommendations in all the colonies were remarkably consistent. Saville-Kent believed in tightened controls over riverine fisheries via the devolution of enforcement to local acclimatisation societies and angling clubs, and the artificial breeding and stocking of rivers with both native and introduced fish. He was particularly fond of river blackfish and Australian grayling and thought that Atlantic salmon would never become established in Australia because the climate was too hot. Instead he advocated for the establishment of Pacific salmon in Victoria and New South Wales (Saville-Kent, 26). Saville-Kent can be seen as a transitional figure, enthusiastic for acclimatisation but aware of the virtues of native fish.

One of Saville-Kent's and the regional fish acclimatisation societies' heroes, and founder of the USFC, Spencer Baird, was a great spruiker of the hardiness of rainbow trout and its toleration of varied temperature. It was this hardiness, coupled with regional fish acclimatisation societies' respect for the USFC and enthusiasm for trout fishing, which led to the initial small-scale experiments in rainbow trout acclimatisation in the last few years of the nineteenth-century. Australian fishery managers and acclimatisers began discussing the merits of introducing rainbow trout in the early 1880s. In 1882 the *Launceston Examiner* reproduced a British newspaper article quoting Roosevelt on the hardiness and temperature tolerance of rainbow trout ('Correspondence'). The GWDFAS began contemplating rainbow trout acclimatisation in 1887; in 1889 the New South Wales government began importing rainbow ova directly from the United States ('Tuesday, December 27<sup>th</sup> 1887' 2; 'American Salmon for New South Wales,' 7). When the GWDFAS imported the first ever rainbow trout ova stock to Victoria in 1897 it did so because of the species' renowned temperature tolerance, which was

an important consideration because Victoria was in the midst of a decade long drought ('Angling,' 22). Furthermore, because rainbow trout became established in New Zealand in the 1880s ova could, by the 1890s, be purchased cheaply and on mass from across the Tasman, aiding the species' establishment in Australia. Nevertheless rainbow trout did not truly become established in Victoria until the state takeover of fish-breeding in the first decade of the twentieth century. It did, however, attract considerable opposition from local communities, anglers and scientists who thought that rainbow trout would decimate blackfish populations.

### **Rainbow Trout and Blackfish in Conflict**

As already noted, the campaign to protect river blackfish from rainbow trout was the first Australian attempt to protect a native species from a previously valued introduced species. The campaign was not successful or coordinated; rather, it was composed of a loose collection of individuals with diverse concerns who fought the issue to a stalemate. Rainbow trout continued to be stocked in Victorian rivers, but some desultory attempts were made to artificially breed blackfish and to increase its protection. Critical factors behind the resistance to rainbow trout include acclimatisation's loss of scientific credibility in Australia and abroad, increased appreciation of native Australian fauna by colonists and a perceived class divide between blackfish and trout anglers. The campaign stalled because of the power of recreational trout fishermen and the rhetoric of environmental improvement embedded within rainbow trout acclimatisation, and because key proponents of blackfish protection still thought its decline was scientifically inevitable. Key protagonists within this campaign were nature writer Donald MacDonald, scientist Sir Walter Baldwin Spencer, Labor politician Mick Prendergast and the Chief Inspector of Fisheries and Game Frederick Lewis.

Donald Macdonald was a significant late-nineteenth and early-twentieth-century Australian journalist and nature writer. He wrote extensively on colonial cricket, was a war correspondent during the Boer War and wrote nature columns for the *Argus* and *Australasian* newspapers from the 1880s to the 1920s (Griffiths, 118-20). These columns have been described both as searching for a lost 'pastoral haven' and inspiring a nationalist appreciation of Australian nature amongst school children and colonists (124). Macdonald loved both the agricultural landscape of his youth in rural Keilor (now a suburb of Melbourne) and the native fauna and flora of the Australian bush; he regretted the passing of both in the increasingly urbanised Australia of the early twentieth century. Nostalgia and ambivalence inflected Macdonald's early writings on blackfish and trout. He believed that blackfish were a 'truly Australian fish' unsurpassed in flavour, and that the 'English trout are annihilating them' (Macdonald *Gum Boughs* 173, 100). As blackfish numbers declined and rainbow trout were introduced, Macdonald became ever more strident in his scepticism of trout. Rainbow trout acclimatisation was, in his opinion, futile and unwise because either the rainbow trout would be wiped out by introduced or native perch, or they would eat or otherwise out-compete blackfish. As rainbow trout acclimatisation accelerated Macdonald kept the debate about blackfish alive, publishing reports by A.H. Moore in Tasmania about the destructive effect of trout on blackfish populations, and inflaming colonists' fears that trout 'may eventually turn out a pest like the rabbit' (Macdonald 'Nature Notes and Queries' 11 February 1916, 8). But in spite of his scepticism of trout and love of Australian nature, Macdonald was never absolutely sure whether blackfish could or should be saved. In 1916, in his *Argus* column 'Nature Notes and Queries,' Macdonald asked:

Can we artificially and profitably preserve the blackfish? If we can, is it worth it? Will our sportsmen remain here or go to other States where they have stocked trout for years? I think I am right in saying the brown trout is the best asset, and even without him the days of the blackfish and many others are numbered. (Macdonald 'Nature Notes and Queries' 25 February 1916, 5)

Macdonald was never able to reconcile the two conflicting urges within his nature writing: the English gentleman naturalist who valued trout fishing as a rural pursuit emblematic of a lost 'pastoral haven,' and the ardent Australian nationalist who saw blackfish as a symbol of the beauty and uniqueness of Australian nature. This conflict exemplified the stalemate that emerged over the protection of blackfish. That being said, Macdonald's importance can be overplayed. He was just one of many people who valued the flavour and angling potential of blackfish and he followed rather than led scientific debate about the vulnerability of Australian animals to extinction.

Saville-Kent began the reassessment of river blackfish amongst scientists. In his 1897 book *The Naturalist in Australia* he described river blackfish as 'excellent table fish' and wrote with pride of his Tasmanian experiments in transplanting the fish to new rivers (Saville-Kent *Naturalist*, 156). The next generation of Australian fisheries scientists was even more convinced of the virtues of river blackfish. James Ogilby, a curator and ichthyologist at the Australian museum in Sydney, wrote in *Edible Fish of Queensland* that river blackfish were to be praised from an epicurean perspective and that anglers in New South Wales valued it as a sporting fish as it took the bait 'readily and showed fight' (Ogilby, 78). This brings up an important point, that in the early twentieth century many Australian anglers began to value river blackfish as much as, or more than, trout. This is evidenced by numerous angling books that spent equal time discussing trout and blackfish, including *How, When and Where to Catch Fish and Trout, Perch and Blackfish: How to Catch Them* (Ryan; Scott).

Although Australian anglers were newly interested in blackfish, evolutionary thought and the nascent science of ecology presented rainbow trout as a threat to river blackfish. The important Australian figures in this debate were Baldwin Spencer, Victorian government entomologist H.W. Davey and the ecologist Donald Serventy. They were influenced by the British and American ecologists Aldo Leopold and Charles Elton. Together these figures, combined with the disastrous effects of the 1890's rabbits plague, questioned the science of acclimatisation that underpinned rainbow trout introduction in Victoria.

Baldwin Spencer was appointed the first professor of biology at the University of Melbourne in 1887 and was a committed evolutionary biologist. He was the institutional successor but intellectual opposite of ardent acclimatiser and anti-Darwinist Frederick McCoy. The two men were said to despise each other (Mulvaney and Calaby, 79, 149-50). Spencer believed that evolutionary superior European animals would displace inferior native animals and was disdainful of acclimatisation. A paper called 'Australian Animals' presented by Spencer in 1888 to the Ormond College Literary and Debating Society purported to be a simple description of the history and distribution of Australian animals, but in fact it contained an attack on McCoy and acclimatisation. Spencer argued that Australian marsupials were vulnerable to extinction as a result of competition with introduced species. They therefore needed protection. It was an implicit rejection of acclimatisation. To advance the protection of native species, Spencer supported the creation of Wilson's Promontory National Park to protect vulnerable native marsupials (Mulvaney and Calaby, 259-61).

Unlike Spencer, H.W Davey and Dominic Serventy explicitly stated that introduced fish were a direct threat to native species. Davey blamed English perch for destroying blackfish and Murray Cod populations in his wide ranging paper 'Upsetting the Balance of Nature' published in the *Victorian Naturalist* in 1917 (Davey, 151-54). He extended his analysis of how this might occur to include fecundity, growth rates and a prediction that an 'absence of enemies allows it [English perch] to increase and consume the natural food of our native fish (shrimps, &c.), forcing them to become more cannibalistic than they are at present, as the food supply is, after

all, the controlling factor' (151-54). Davey extended his theory outwards, arguing that there was a natural law, which applied to fish, terrestrial vertebrates and even invertebrates. The law was simple: 'an introduced species displaces the indigenous kinds' (151). In 1936, Dominic Serventy, the Western Australian Cambridge-educated ecologist, maintained that all attempts at acclimatisation harmed native species (189). He rejected the idea of neutral or harmless acclimatisation, arguing that any successfully acclimatised organism, including trout in streams, successfully established itself by displacing native creatures from their ecological niches.

Given the mounting evidence that trout acclimatisation was a threat to native fish populations, and the extent to which colonists were starting to value river blackfish, the question must be asked: why did rainbow trout acclimatisation continue? First, the intellectual inheritance of both the ASV and the USFC suggested to the state government that declining fisheries could and should be restored simply through artificial stocking and that native and exotic fish can live happily side-by-side. Second, fisheries managers and parliamentarians, particularly Labor politicians, began to believe in the industrialisation of the fisheries to maximise food production. Finally, the state as well as trout fishermen remained committed to rainbow trout acclimatisation.

Victorian Labor MLA, and briefly Premier, Mick Prendergast was simultaneously no friend to trout fishermen and an advocate of fisheries industrialisation. He once accused a local trout fisherman of being 'a member of the capitalist class' and campaigned against the release of rainbow trout into the Maribyrnong River in order to protect his local constituents who angled for blackfish in the river (Legislative Assembly 'Fisheries Inquiry Board,' 855). Two consecutive enquiries into the Victorian fishery industry were convened at his behest—one in 1908 and another in 1919—both of which discussed the decline in local blackfish populations and rainbow trout acclimatisation. Their primary focus, however, was on breaking perceived cartels in the Victorian fish markets, increasing the amount of fish for sale, lowering prices and expanding the Victorian fisheries fleet. The 1908 Fisheries Inquiry Board recommended establishing a trawling industry in Victoria, harmonising the fisheries laws between the Australian states, offering a bounty on cormorants and suggesting that, 'in addition to English Trout, suitable species of native fish, such as Perch and Blackfish, be hatched under Government control for the stocking of appropriate streams and other waters' (899). The administration of the fisheries was to be placed under a separate branch of government directly accountable to a minister.

The Fisheries and Game Branch of the Department of Agriculture was established to administer Victoria's fisheries laws and manage and expand its aquaculture program. Its brief included protecting native fish, regulating commercial fisheries and angling, and breeding native and introduced fish. Between 1908 and 1916 the Fisheries and Game Branch operated brown and rainbow trout hatcheries at Royal Park and Studley Park. These facilities were never very efficient and were replaced with a series of small, volunteer run, but government funded, trout hatcheries throughout rural Victoria. The hatcheries, established in the wake of 1908 enquiry, successfully established rainbow trout in many Victorian rivers.

Anglers, parliamentarians and the ever-energetic Donald Macdonald kept the debate about blackfish and trout alive. They applied pressure on the Fisheries and Game Branch to justify rainbow trout acclimatisation and to protect river blackfish. The task of responding to these accusations fell to the Acting Chief Inspector of Fisheries Frederick Lewis, who argued that blackfish numbers were declining in all rivers, whether trout were present or not (Fisheries and Game Branch). Their decline was attributed to habitat destruction as waterways were cleared,

and to amateur anglers who took blackfish 'by the sugarbag full' with no regard for closed seasons or size restrictions. Lewis further argued that the 'blackfish provides no sport' and that creating a hatchery for blackfish out of 'mere sentiment' was a waste of money that could be more effectively spent on trout acclimatisation (4). For Lewis, and the Fisheries and Game branch, introduced trout truly were the best asset local rivers had to offer to sportsmen, whose recreational preferences outweighed scientific worries about exterminating blackfish and the value that other anglers gave to the fish.

The 1919 Fisheries Royal Commission institutionalised the stalemate between river blackfish and rainbow trout. In many ways it was a rerun of the 1908 enquiry, with concerns about the cartelisation of the Victorian fisheries, declining catches, high prices and antiquated equipment (Legislative Assembly 'Fisheries Royal Commission,' 4-14). In one important respect it was, however, different. By 1918 conservationist and socialist David Stead had attempted to reform the New South Wales fisheries, establishing a state-run deep-sea trawling industry and recommending the extensive artificial cultivation of both native fish and introduced salmonids. This example deeply influenced Prendergast and the other members of the 1919 Fisheries Royal Commission, who recommended extensive state takeover of the fisheries industry (4-10). Drawing from Stead's earlier investigation of the New South Wales fisheries, the 1919 Fisheries Royal Commission also advised that Australia's inland rivers and lakes had vast untapped potential to increase the food supply through the artificial cultivation of native fish, including river blackfish, and trout (16-17).

Cultivating river blackfish proved much harder in practice than in theory. In 1925 river blackfish breeding experiments were conducted at Traralgon and a summer was spent gathering mature blackfish and stripping their eggs. However, it proved very difficult to acquire male specimens and to fertilise the eggs (Fisheries and Game Branch). The experiment was ultimately abandoned as unfeasible and the decision was made to attempt to preserve blackfish through restricting angling during breeding seasons and enforcing size restriction. The Fisheries and Game Branch considered it much more feasible instead to continue and expand rainbow trout aquaculture, a policy that persisted until after World War Two when new attempts to cultivate native fish were made for reasons that go beyond the scope of this article.

## **Conclusion**

Continuing conflict over rainbow trout revealed how a changing web of science, technology, sentiment and transnational fisheries management effected how colonial Victorians understood and interacted with native and introduced species. It has implications for the history of acclimatisation, broader themes within Australian environmental history scholarship and suggests possible future avenues of enquiry. The first half of my article demonstrated that the introduction of rainbow trout to Victoria was a continuation of the ASV's aquaculture program taken over and reconfigured by regional fish acclimatisation societies and the state. During the course of this takeover, drawing both from ASV and the USFC, salmonid aquaculture became established as the solution to declining fisheries. The significance of these findings are twofold. The acclimatisation movement remained influential in Victoria far beyond the mid-nineteenth century where it usually placed. The USFC had a strong influence on environmental management and thought in Australia; promoting an orthodoxy that maintained that environmental degradation could be counteracted by stocking vigorous alien species.

The second half of my article looked at how this orthodoxy was simultaneously challenged and entrenched in the early twentieth century. It responded to these contradictory developments in two ways. First, it argued that blackfish protection arose from increased appreciation for the angling properties of the fish, scientific doubt about the advisability of acclimatisation and a perceived class divide between blackfish and trout anglers. Second, it demonstrated that the combined power of the belief in industrial progress and the love of the rural idyll of trout fishing trumped environmental nationalism and scientific concerns about the danger of acclimatisation. Existing Australian environmental history scholarship does not sufficiently discuss the involvement of the early labour movement in the development of the fisheries or the importance of Darwinian science and ecology to conservation in Victoria. Both of these areas would be useful topics to investigate in future work.

Beyond the immediate context of the history of aquaculture and the Victorian fisheries, unpacking the ways in which debates over rainbow trout and blackfish stalled, it is possible to see that in the late nineteenth and early twentieth century attitudes towards native and introduced species were complex and nuanced. The aesthetic appreciation of blackfish reinforces Dunlap's and Bonyhady's argument that the late-nineteenth century encouraged a greater aesthetic appreciation of Australian fauna and flora. Together, rainbow trout acclimatisation and blackfish preservation can be seen as a form of resource conservation that was tied to a developmental ethos. Both of these proved critical in the blackfish trout debates and warrant future investigation. Detailed studies of Australia's riverine environmental history shed new light on how species have been understood and valued.

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