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Hatching Conflicts: Trout Reproduction, Properties of Water, and Property Ownership in South Africa

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ABSTRACT

Trout were introduced to South Africa in the late nineteenth century with colonial fanfare, but since the 1990s, post-apartheid legislation has declared trout alien and sought to reduce their numbers. Both the initial introduction of trout and contemporary debates are entangled with 'properties', in the dual sense of land claims and biophysical traits of fish and waters. Trout introductions were part of colonial enclosures; now, attempts to control them are seen by many white owners as a state attempt to undermine private property. Trout become a site for conflict because they struggle to spawn in South African waters and are largely dependent on hatchery reproduction, which makes them available for legislative acts that can eliminate owners' ability to maintain private stocks. Attention to links between these dual meanings of property illustrates how contestations over land-waters in contemporary South Africa are shaped by the ongoing effects of more-than-human colonial projects.

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A retired fisheries biologist is sitting opposite me at a small local cafe. We're looking out at a dense fog that has reduced the visibility to less than a metre, and he has just expressed surprise that I managed to make the three-hour drive from the Drakensberg, South Africa, trout farm from where I am conducting fieldwork. John has been involved with trout management for decades and is a leading figure in the transition to a more science-based watershed management policy for fish as well as aquatic environments. He comes across as mild mannered and soft spoken, and I'm thus surprised when he echoes sentiments that I have heard repeatedly over the last months: that the environmental authorities' fight against trout as an alien invasive species has

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> *nothing to do with environmental concerns but is instead a government attempt to control natural resources through licensing and rent-seeking. 'You know,' he says, 'they [the ANC] are dealing with private land, and they believe that they have absolute sway over everybody. And in a way that goes back to the old apartheid nationalist government, where there was a command-and-control philosophy. Is that the right word – sentiment or philosophy? And that's carried over in the ANC government, where there is a strong drive to central control over everything.' Previously, I had quickly categorized this argument as merely some of many expressions of white fear linked to a majority Government. Yet upon hearing it again, I began to realise that it also contains a claim that should be treated seriously: that trout management is fundamentally entangled with assertions of and challenges to patterns of private property rights and ownership.*

The argument that state regulation of alien species, especially trout, is a front for state efforts to limit and reduce private property rights and ownership first appeared when the Department of Environmental Affairs set out to have trout listed as an alien and invasive species that required special permits to handle or stock these fish. This assertion of a special connection among trout, private property, and state control, we argue, is not just situational or coincidental, but rather reflects a long history in South Africa of using trout as modes of making property claims and appropriating landscapes in the process of dispossessing Black communities. While contemporary white discussions of trout elide this history, they point toward the long-standing and ongoing links between these fish and property claims. The ways trout come to act within various efforts to make property claims, we argue, are crucially shaped by the biological properties of fish and the physical properties of the aquatic environments in which they live. Examining the relationship between these dual meanings of property – as control over resources and land and as the properties or traits of fish and environment – is not just clever wordplay but a move that allows us to explore how contestations over property claims in contemporary South Africa are concretely shaped by the ongoing effects of more-than-human colonial projects.

To do so, we examine how trout ended up in South Africa in the first place, and how their transplantation and propagation constituted an appropriation of South African landscapes that went hand in hand with colonial dispossessions of land. This first appropriation, we argue, had implications for property relations as the colonial government sought to regulate access to fishing. We contrast these processes of colonial appropriation with present post-apartheid government attempts to control trout in stillwaters, mostly on white-owned farms. Some white farmers highly resent government attempts to impose restrictions on what they can do with the water on their farms, as they interpret these restrictions as a step toward land reform and property nationalisation. We argue that these new state efforts to limit farmers' abilities to rear trout on what is currently considered private property – and thus to potentially shift notions of property rights – is made uniquely possible by the biophysical properties of this northern hemisphere cold-water fish and the traits of the relatively warm southern hemisphere waters in which they swim.

The first half of this article explores the techniques of trout introduction in South African waters to illustrate how they were intertwined with larger projects of colonial possession and settler belonging, and how substantial state involvement in trout promotion produced complex structures of private ownership. In the second half of the article, we turn to the present, where the post-apartheid South African state no

longer has a strong commitment to maintaining trout, and where the Department of Environmental Affairs, which now seeks to regulate and reduce trout numbers, comes into conflict with white landowners who continue to desire robust trout populations on their titled properties. After presenting these two different configurations of ownership-state-trout, we then return to questions of how, precisely, the properties of fish and water matter to conflicts over property claims in post-apartheid South Africa.

In considering the colonial histories of trout and the ongoing conflicts they produce, we focus here primarily on historical and ethnographic material from the white settler communities that have been closely intertwined with the promotion of these fish. We do so not to support their positions, but to critically describe how white residents have and continue to use trout to assert their possession of land and waters to the exclusion of Black communities. We see this attention to ongoing structures of white land-ownership dominance in South Africa as important for crafting new paths to more just land distribution and racial justice. Our efforts are inspired by and in implicit dialogue with wider literatures on Black South Africans' long-standing relationships to waters and how their interactions with them continue to be marginalised and restricted within neoliberal government policies and conservation projects (Kepe 2009; Ngcoya 2015; Ramutsindela and Shabangu 2013; Sello 2022)

The 'Anglification' of South African Waters

In addition to making rivers productive by stocking them with fish that could provide both food and sport, British colonists introduced trout to South Africa because fly-fishing for these fish was an important part of reproducing British identity. In the midst of forceful dispossessions of land, colonists also sought to make the landscape home. Trout were introduced into South Africa in the late nineteenth century, when most arable farming land in what was then Natal was already in the hands of white settlers, following the sustained British military efforts to undermine the Zulu kingdom and dispossess its people of their land, which culminated in the Anglo-Zulu war of 1879 and the destruction of the Zulu kingdom.[1] It was this situation, where opposition to British rule had been defeated and Natal made an integral part of the British empire, that attempts at introducing trout took place in the British colonies of Cape and Natal, as colonists sought to 'domesticate' the region's land and waters, i.e. to make them in the image of those in Britain (Swanson et al. 2018). Yet this was a form of domestication with a twist: rather than taming a wild landscape in the traditional sense of the term 'domesticate', trout introductions were meant to make South African landscapes 'natural' in a way that resembled streams in the UK. Domestication here was a form of re-shaping land and waterscapes that went hand in hand with the many other forms of colonial dispossessions of land taking place at the time.

In a chronicle of trout introduction in Natal, ecologist and fly-fisher Jake Alletson (1990) begins his text with a reference to the compelling force of homesickness as a:

> *most unpleasant affliction and it has caused people to do many things which they might not otherwise have done. Sometimes the results are tragic or fatal but not always so. For it was*

> *almost certainly homesickness or something like it that led to the introduction of trout to Natal and that action has resulted in a century of enjoyment, both sporting and culinary, to an untold number of people.*

As this quote indicates, the initial motivations for introducing trout were linked to affects and pleasures, rather than to monetary gain. Well-connected men spent a considerable amount of their own time, money and efforts to introduce trout to South Africa. A key motivation was the 'improvement' of nature and in these efforts, the nature of 'home' was valued over South African nature. This valuation is clear in much of the nature writing from colonial South Africa. Although writing in a later period, in his 1947 book *Trout Streams of Natal*, Neville Nuttall (1947) describes a dislike of the indigenous Natal yellow fish (scaly) and yearnings for trout common to many British gentlemen:

> *The trout-fisherman despises the troublesome scalies. On some trout streams this indigenous nuisance will snatch your fly with all the ill-bred greed of the common tyke, and you disengage the hook from his leathery, bearded mouth with disgust. Some say he fights well, but compared to the swift power of the Rainbow and the subtlety of the Brown Trout, his tactics are childish and unimaginative. And as for eating him – well, you must be pretty hungry and quite impervious to bones!* (1947: 80)

Nuttall does go on to explain how the indigenous yellow fish grows on him, but the sentiment and valuation of proper fish over coarse fish and, by implication, Britain over Africa remains. While most of his writing is marked by respect for the indigenous landscapes and animals he encounters, this respect is nonetheless shown through relentless comparisons with British homelands in quite explicit ways:

> *Wordsworth, I always think, was rather foolish about the Scottish Yarrow. In 1803 he wrote 'Yarrow Unvisited' and made a great fuss about not going to see its beauties; eleven years later, in 'Yarrow Visited,' he made rather a song about what he had missed. And neither poem is his best. But because he was Wordsworth, the fact that he first did not, and then did, visit the river has made its name famous. Silly. There it is though. The name rings a bell, and people from Britain approach our Natal Yarrow in an attitude of mind that less familiarly named rivers like the Mooi, the Umzimkulu, and the Tugela cannot create.*

Note that the Natal waterscape is here domesticated twice over: first, through the naming of an African river after a Scottish river; and then, second, through later visitors' comparisons between the two. Yet such domestications were always material, as well as rhetorical. As the British exercised control over Natal, including through land dispossessions that were amplified via segregationist policies such as the 1913 Land Act and the apartheid regime, they sought not only to reap economic benefits, but also to possess and occupy the region by 'anglifying'[2] it and part of doing so was through the introduction of trout.

Trout Introductions

Trout were first successfully introduced to the Southern Hemisphere when Australian and New Zealand waters were stocked in April 1864. These transplantations demonstrated that trout could be sent across the equator, and sparked attempts to have trout introduced to South Africa as well. In 1867, the Cape Colonial Government

passed a bill 'for encouraging the introduction into the waters of this colony of fishes not native to such waters' (Curtis 2005: 36), but it took six years before a Mr AR Campbell-Johnston undertook the first attempt at introducing trout to South Africa, when he shipped a consignment of brown trout eggs that were to be shared between the Cape and the Natal colonies. None of the eggs survived the journey, however, and nothing more happened for several years.

In the 1880s, attempts at trout transplantation resumed in South Africa, but now they took divergent paths in different South African provinces. In Natal, the man credited with finally introducing trout was John Clarke Parker. Parker was born in Barnsley in Yorkshire in 1847 and came from a well-to-do landed family. He was an engineer by profession, but settled in South Africa as an immigrant farmer at the age of 33, in January 1881. The year after, in 1882, Parker bought a farm with his brother Edward, which was situated in the Curry's Post area in the Natal Midlands, between Mooi River and Howick, and which was considered one of the better farms in the area at the time (Alletson 1990).

Parker must have more or less immediately set out to investigate how to stock the rivers of his new home with trout. He wrote to the editor of the English magazine *The Field*, which to this day remains the quintessential outlet of the hunting, shooting, and fishing class, and asked how fish could be introduced to Natal. Not sure what to do with the request, the editor gave the letter to his friend, Mr Frank Buckland, who in 1864 was the first to demonstrate that it was possible to move trout and salmon around the world, as he had found that one could freeze salmon eggs for as long as 100 days (Alletson 1990).

Buckland was an English surgeon, zoologist, natural historian and one of the key members and founders of the acclimatisation society in Britain. Although he was seriously ill when he received Parker's letter, he passed the letter from Parker to the owner of the Howietoun hatchery in Scotland, Sir James Maitland, who agreed to help. Sir James offered 10,000 brown trout ova free of charge, and on 27 February 1882 they arrived in Durban on the *Anglican*, owned by the Castle Steamship Company which also shipped the ova free of charge.

The route of the ova illustrates the role of British gentlemen's vast private-professional networks in trout introduction projects. After their free ride on the steamship, the ova were quickly cleared through customs and put on the mail train to Pietermaritzburg, where they were placed in an ice house before being taken by an 'omnibus' owned by the Crown Hotel to hatching facilities at a private farm in the Karkloof area. Despite the collaborative transport efforts, only 18 juvenile fish hatched, and they died soon after. Parker was disappointed by the failure, but Sir James urged him to continue and sent another 10,000 ova the following year, in 1883. The shipment followed a similar route, but this time the results were even worse: all ova were dead before reaching their final destination. Parker confessed in his diary that he was extremely disappointed with these failures and he temporarily abandoned the project. Despite their investments and connections, private individuals were not successful in establishing trout in South Africa (Alletson 1990).

Colonial Government Enters the Scene

These failures, however, did not mark the end of efforts to introduce trout. Instead, they marked a new phase of efforts that enrolled the colonial state in a new way. In 1889 attempts at introducing trout were revived with much more substantial government support. Mr Cecil Younge, member of the Legislative Council of the Natal Parliament for the Pietermaritzburg County, proposed that the government grant 500 pounds to the project of introducing trout, and a committee consisting of himself, Lt. Col. Henry Vaughan as well as Parker, was given responsibility for the task (Crass 1986: 138)

The farm Boschfontein on the main railway line between Lidgetton and Balgowan (Crass 1986: 138) was selected as a hatchery site. It had a cool stream flowing through it, and was conveniently placed not far from the railway line, allowing for easier transports of fish eggs. A small dam was built by creating a brick weir across the stream, and seven wooden egg hatching troughs were set up on brick pillars. Debris flowing with the stream was removed by a screen of perforated zinc, followed by flannel filters.

The stream was selected because it was shaded by trees and ran down a south-facing slope. Because the British had already realised that local waters were at the edges of the temperature range tolerated by trout, they sought a site that would reduce the temperatures – hopefully enough for the ova to survive. Yet even with this strategy, the water temperatures were still dangerously high for young trout. To solve this problem, the group turned to apparatuses of the colonial state to craft a technical fix. Parker constructed what amounted to a refrigerator: an insulated box with 84 feet of coiled lead pipe inside, 1 inch in diameter. By filling the box with ice, he was able to reduce the temperature from 18 degrees Celsius to 7 degrees, and still maintain a flow of 135 litres per hour through the pipe. However, for this contraption to work, he needed 250 kg of ice every 24 h (Crass 1977: 6). To overcome this problem, the colonial government built a dedicated side railway line to facilitate ice deliveries and the Governor of Natal arranged with the Colonial Secretary to set up a system with daily delivery of ice, as well as a system of signalling the trains' arrival by flags.

On 7 March 1890 the S.S. Trojan arrived in Durban, with 32,000 brown and brook trout ova. Most of the eggs were alive when Parker collected them from the train at Hutchinson's crossing at 11.30 on the following day, Saturday March 8. After two days the eggs hatched, and two weeks later, Parker was content to note that 2000 fry were alive and feeding. This was the first substantial hatching of trout in South Africa, and in May the same year, 1890, Parker believed the young brown trout ready for stocking. He concentrated on the rivers of the Natal Midlands, close to where he lived. Together with his fellow committee member, Henry Vaughan, he made the first plantings of trout in South Africa (Crass 1986: 139).

This initial round of stocking had taken tremendous efforts and funds, both state and private. A male colonial network was used to obtain ova and shipment free of charge, and the state helped with infrastructure such as building a rail branch line and providing ice. This initial stocking had cost more than 1300 pounds, of which the Natal Government had supplied more than 1000, with the rest coming from

private donations. As Alletson (1990) points out, the government may well have wondered whether all the money spent had had any effects. But doubts about the effects of the first rounds of introductions were soon put to rest. By 1899 reports began coming in of excellent trout fishing, and the then-Minister of Agriculture, Mr D H Winter asked Parker to ramp up the stocking of rivers (Crass 1986: 139). Parker agreed to do this at cost and without profits, as long as his actual expenses where covered.

Parker failed to establish a brood stock in Natal based on the brown trout that he much favoured, but parallel experiments in the Cape, first with brown trout and then rainbow trout, proved much more successful. The Jonkershoek hatchery outside Stellenbosch did manage to establish brood stocks in the first decade of the twentieth century, first of brown trout and then rainbows. South African hatcheries could now produce their own trout eggs, and this made further imports from the UK unnecessary. From Jonkershoek, and eventually other hatcheries, trout ova would be sent to riparian owners free of charge together with instructions for how to successfully hatch them. In this way, most rivers that could sustain trout populations were eventually stocked. Many of these rivers had the necessary physical properties for trout to reproduce, and reports tell of rapid growth of trout populations in the first years after initial stockings, until a new balance was found with smaller but more stable populations. With trout now reproducing in rivers, the need for hatcheries fell away. Instead, fish would be caught in already stocked rivers and then transported to other waters (Crass 1986: 142–143). Trout had thus been 'successfully' introduced to South Africa.

Appropriation and Exclusion of Landscapes

As trout became more widespread, the provincial governments began to take a stronger role in regulating fishing for them. South African conservancies adopted restrictive fishing practices based on English notions of sportsmanship and class, such as fly-fishing only. These practices were modelled on those associated with the sporting ethos developed by the Victorian bourgeoisie on English chalk streams. Yet even as the physical trout landscape that was created in Natal and elsewhere in South Africa was intended to mimic the English chalk streams on Hampshire estates, in South Africa, there was an explicit attempt to create a different set of property relations and access to trout. In England, trout were only accessible to wealthy estate owners and their invited guests, as rivers and fish were considered the private property of those who own the lands through which they flowed. Few of the colonial officials who promoted trout in South Africa would have had the wealth and status to access salmon and trout in England; in the colonies they had an opportunity to access an upper-class hobby and gentlemanly identity as a sports fisherman that was inaccessible to them in England. This partial 'democratisation' of fly fishing to middle-class white men was an essential part of colonial trout worlds. As Draper (2016) points out, there was a sense in which trout fishing in the colonies – in places like New Zealand as well as South Africa – was part of building new national cultures beyond the rigid class structures and land ownership patterns of England where white men from diverse class

backgrounds could have access to sports fishing and gentlemanly masculinities, rather than having those limited by an elite class system and land-owning class (2016: 182).

The person responsible for instituting these relations in the then colony of Natal was Cherrington Sutton, who was appointed to the post of Inland Fisheries Officer in 1936. Cherry, as he was known, was a farmer and the son of the former Prime Minister of the Colony, Sir George Sutton. His main legacy was to negotiate a system of access for the white public to trout streams, acceptable to farmers, fishers and the state. Knowing that farmers 'hate like poison' anything to do with writing, he relied on personal contacts with farmers, river conservancies and Honorary Fishing Officers (Alletson 1990). Sutton persuaded the farmers to lease the fishing rights to the Provincial Administration, which would then sell fishing licences to the public. Fishing rights in this context meant access to riverbanks from which to fish. In South African law at the time, fishing and shooting rights were not legal entities separate from the ownership of land, as was the case in the UK. South African law only made it an offence to fish without the land-owner's permission. Sutton negotiated a system where the landowners would receive a fee for allowing fishers on to their land, as well as assistance with the management of trout streams.

The system instigated by Sutton continues to operate in a very similar way today, with the one difference that fishing clubs rather than the province negotiate with the landowners. The establishment of fishing clubs like the Underberg-Himeville Trout Fishing Club (1954) and the Natal Flyfishers Club (1972) in KwaZulu-Natal is explained in a series of contrasting, sometimes contradictory, narratives: an attempt to halt the process of private syndication of trout waters and democratise access (the annual subscription fees have always been very modest); a defence against state plans to expropriate trout fishing waters on privately owned farms; a philanthropic effort on the part of farmers to grant fly fishers access to their trout waters; the culmination of the diplomatic efforts of Inland Fisheries Officer Cherrington Sutton and his successors; and so on. Perhaps an admixture of all of the above is most accurate, but the effect of the clubs was to dramatically expand access to waters for white middle-class fly fishers, while under apartheid either tacitly or explicitly excluding black members, and criminalising unauthorised fishing ('poaching').

Black communities were denied access to trout waters in multiple ways. From the late nineteenth century, trout were granted extensive legislative protection, and while their propagation and distribution were initially in the hands of private individuals, colonial government soon stepped in to provide state support. Historically, once trout had established a successful breeding population in a river, it would be proclaimed a 'trout river', and several restrictions would then apply: the need for a freshwater angling licence; flyfishing only; bag limits; and a closed season. Nuttall puts it like this in his 1947 book: 'For the convenience of the beginner it may be as well to indicate what the law is about trout fishing in Natal. It can be summed up in the sentence: "No gentleman ever catches a trout on a worm" but here are the details … . The use of bait or lure other than the fly on any trout water shall be an offence against both the law and common decency' (Nuttall 1947: 15). In more recent years, a strict catch and release only policy has also been added across all the Western Cape streams.

Most trout rivers ran through private farmland or through state proclaimed conservation areas, from which black people were almost universally excluded. Even if they had a right to dwell in the vicinity of trout waters, whether as labourers on white farms or where such rivers ran through tribal trust land, they would be restricted from accessing them (even to fish with bait for indigenous fish), because of the need for a licence and the imperative to use fly only tackle. There were numerous 'poaching' convictions throughout the twentieth century for fishing with bait, without a licence, or in the closed season, even when it was not clear that the intended quarry was trout. So, for example, the residents of the little village on the banks of the Mooi River just outside the gates of the Kamberg reserve in KwaZulu-Natal would not have been allowed to fish the river that ran past their doorsteps, nor would the local community around the Cata River in the Eastern Cape (though, post-apartheid these communities now run successful trout fishing and guiding operations aimed mainly at white anglers, see Brown (2013: 39–40) and Brown (2019: 47–48)). The fact that the isiZulu term for 'trout', *uhlobo lwenhlanzi edliwayo*, is listed in Nyembezi and Dent's isiZulu dictionary, originally published in 1969, as meaning 'the fish that is good to eat' does however suggest that the controls were not necessarily that successful (Dent and Nyembezi 1969).

Make New Trout Homes: Stillwaters, and the Reappearance of Hatcheries

As this structure of fishing clubs, landowners and white fishing access to rivers stabilised over the twentieth century, a new development would radically transform both properties of water and property relations. By now, all rivers that could sustain trout had been stocked, but these were few and far between. Because brown and rainbow trout struggle to spawn in waters above 12.5 degrees C, temperature limits the range of trout to high altitude areas, mainly to the rivers near South Africa's Drakensberg escarpment. In addition, a river must have the right gradient and the right flow for trout to reproduce – steep enough to produce bubbly riffles with the high levels of oxygen that trout eggs require, but without severe scouring floods that would wash away eggs and juvenile fish. Because spawning female trout make rocky nests at the bottom of streams into which they lay their eggs, they require gravel beds for spawning: substrates of silt or mud will smother trout eggs by stopping the flow of oxygenated waters. Therefore, potential habitat for independently-reproducing trout in South Africa was, and still is, severely limited.

The contours of trout habitat changed dramatically, however, with the rapid expansion of artificial stillwaters built for irrigation in the wake of the Second World War, and then again during a period of agricultural expansion in the 1970s and 1980s. These new waterbodies extensively expanded the potential habitats for adult trout, at the same time that they altered the relationship between the state, trout and property owners.

Stillwaters range in size from large bodies of water of up to 100 hectares or more, to smaller ponds ranging down to half a hectare or less. Most are fed by some perennial or

seasonal water source (small streams, springs), and others by runoff from the drainage basins in which they are built. At the smaller scale are 'ponds' on trout estates in which large fish are stocked on the basis that they will be caught before the natural feeding deficit would ensure their mortality. Trout stillwaters are located almost entirely on privately-owned lands, mostly on white-owned farms, though there are also a few municipal reservoirs. Access is via fishing club membership, membership of an exclusive syndicate, or else as a paying guest of the landowner.

One of the estates that regularly purchased fish from the hatchery where the first author was based during his fieldwork illustrates the differences among these waters. The estate is a gated holiday resort with self-service cabins spread out in a manicured garden. Dotted between the guest houses are small ponds, often no more than 50 m^2. We delivered fish to these ponds every week, usually on Sundays when most guests had left and before the next guests arrived. Fish up to two kilograms were stocked in these ponds for the guests to catch on flies. The fish did not stand much chance of survival. In such small ponds, the fish were easy to catch, even for holiday makers with limited fly-fishing experience. However, the estate also contained a large stillwater, which although artificial, had the appearance of a lake. Here smaller fry were stocked every 6 months and left to fend for themselves. The fish that survived to a catchable size had survived months of perils, including avian predators, and thus posed a lively and difficult catch for skilled fly-fishers.

Despite these differences, the fish in the lake and the ponds have something important in common. With very few exceptions, trout do not breed in stillwaters, as their spawning requires a flow of oxygen-rich water, cool temperatures, and gravel beds that stillwaters rarely provide. But because adult trout can tolerate a much wider range of water conditions, stillwaters can be trout waters – if the fish are added to them. Almost all trout stillwaters require stocking with fish, at least on an annual basis but often much more frequently, as seen in the case above. Without the transplantation of hatchery fish into stillwaters, the temporal presence of trout within them is limited: they have fairly short lifespans (around five years for a rainbow trout; possibly slightly more for a brown trout). A stillwater that has not been stocked for five years or so is thus likely no longer to be a trout water. These properties of trout and stillwaters are key to understanding how trout management and conservation came to be seen as a site for state engagement.

In the years following WWII, the state saw stocking and maintenance of trout and trout waters as a key part of their nature conservation efforts. In present-day KwaZulu-Natal, the Natal Parks, Game, and Fish Preservation Board was formed in 1947; almost all its directors were fly fishers and had started out their careers as fisheries officers. The Board re-established hatcheries, largely abandoned since the 1920s, to help stock the many new trout waters that had become available with the construction of stillwaters for irrigation. At first, the Board gave away trout to anyone with a suitable water, but as aquaculture production of trout became established from the 1960s onwards, the Board started to charge market prices for its fry.

Today it might seem strange that a nature conservation body should be preoccupied with the propagation and distribution of alien species for sport, but managing

environments and species for sport rather than for biodiversity or ecological integrity did not break with overall conservation efforts of the time. Conservation authorities, having grown out of hunting interests, still saw it as their responsibility to preserve those animals classified as game and exterminate those seen as vermin, including lions and jackals. That nature conservationists should see it as part of their responsibility to raise alien fish in hatcheries to supply the many stillwaters that were constructed for irrigation from the 1950s onwards was therefore in line with this way of managing environments (Nustad 2018). However, this sensibility began to change in the 1980s, when new ideas about conservation took hold in South Africa as well as internationally. At this point, the fact that most South African trout populations required intervention in the form of hatcheries and regular stockings then came to have profound impacts on their future.

The 'Trout Wars'

As we have seen, maintaining trout populations in stillwaters requires hatcheries, management, and constant care. If these activities were to stop, most stillwaters would not contain any trout after five years. This reliance on an apparatus of production also makes trout populations on private farms amenable to state control without nationalision or explicit challenges to private property itself.

Throughout most of the twentieth century, trout were the only freshwater fish to have legislation and policies aimed at their protection: they were only allowed to be caught via fly-fishing, closed seasons were observed during spawning, minimum sizes and bag limits were imposed, and they were to be actively stocked in various waters. But on 1 January 1986, the Cape Department of Nature and Environment Conservation (CDNEC) announced that they would withdraw all legal protection for trout. According to Duncan Brown, in his book *Are Trout South African?*, this was, in essence, a sensible position: CDNEC, a nature conservation body in a time when conservation had come to mean native biodiversity, no longer saw it as a priority to protect an alien species and wanted others to take over the responsibility (2013: 52).

The debate intensified in the early 2000s, when a diverse group of white conservationists and Black government officials began to raise concerns about the ecological properties of introduced trout, who sometimes adversely affect other species (Cambray 2003; Shelton 2013; Shelton et al. 2015). These parties called for the reduction, and sometimes the complete eradication, of trout populations in the region, ultimately leading to debates about whether or not trout 'belong' in South Africa (Brown 2013). The arguments that followed became known as the 'trout wars', alluding to the heated nature of the debate. Brown speculates that the controversy over this fish evoked a perceived connection between trout fishing and elitism and, in the South African context, divisions between Afrikaners and the English. The 'war' ended initially in a truce: the CDNEC pulled out of trout management and transferred responsibility for managing trout to fishing clubs such as the Cape Piscatorial Society. The end result was thus that the responsibility for managing trout fisheries was passed from the government to private landowners and fishing clubs.

In 2004, debates about trout resurfaced in connection with the adoption of the National Environmental Management: Biodiversity Act (NEM:BA) and its listing of trout as alien and invasive. While linked to important concerns about biodiversity and alien species, arguments for reducing trout populations often took on uneasy overtones of biological purity (Brown 2013: 55), where the 'natural' was defined as ecosystems predating Western colonial expansion (Aardenburg and Nel 2019; Brooks 2005; Lien 2007; Nustad 2015). These debates resulted in another kind of compromise: a proposal for a zoning system, where introduced species such as trout would only be allowed within clearly demarcated boundaries and exterminated outside these (Nustad and Swanson 2022). Landowners would have to apply for permission to stock new waters. These initial rules were tolerated by most landowners and fishermen. However, in 2014, the debates over trout flared up yet again. The Department of Water and Environmental Affairs (DEA) proposed an amendment to the NEM:BA Act, listing a total of 352 invasive alien species and how to manage them. Among the species listed were brown trout and rainbow trout. The responses from the Federation of South African Fly Fishers (FOSAF) and other interest organisations were two-fold. First, they argued that while trout were clearly alien, they should not be treated as invasive. As a hundred-year history has shown, they argued, trout do not tend to spread to new waters, even if they sometimes do displace native fish in the waters where they are stocked. Second, they pointed out that listing trout as an invasive alien species would entail policies to contain and destroy them, and that this would ruin the R 1.4 billion trout industry – which had since diversified to include both fishing and food production.

At that time, the industry consisted of around 40 privately owned hatcheries that produced trout both for food and for stocking rivers and stillwaters for fishing, in addition to a myriad of businesses associated with trout-based real estate and fly-fishing tourism (du Preez and Hosking 2011; du Preez and Lee 2010). This economic argument was, according to some, targeted at a contradiction in the alien species listing: economically important introduced species such as pines, wattles, eucalyptus and vines were not listed in existing alien species registers, presumably because of their economic importance, and even though some are decisively invasive. By stressing the economic importance of trout and the trout industry, it was hoped that trout would be considered in the same way. Years of legal wrangling ensued, with trout initially being listed as invasive and hence subject to strict control, and eventually removed from the list, after the FOSAF and lawyers challenged the process on technical legal grounds, arguing that the minister had not given sufficient notice of the amendment to NEM:BA.

Over the past decade, the economic importance of trout and the potential for the state to control and regulate their production through laws targeting hatcheries has led landowners to new interpretations of the government measures to manage trout: that it is really not grounded in concerns over alien species or about reducing trout numbers. It is, some trout advocates say, not about trout at all. What is at stake, they claim, is an extension of state control over property and natural resources, using trout regulations as a proxy.

They base this understanding on their interpretation of the new Aquaculture Development Bill, which severely limits the number of hatcheries in addition to placing those that remain under strict control via a licensing regime. South Africa is divided into zones where hatcheries are allowed, and zones where no production is allowed. No hatchery production or stocking can take place in the restricted zones, and even where hatchery production is allowed, a government license is needed. Further, all transport and stocking of trout needs additional licensing to prove that only allowed zones are stocked. In effect, then, this severely limits the number of hatcheries that are allowed to operate and places the rest under tight governmental control. Since most stillwaters are on privately owned white farms, it also imposes restrictions on what farmers can do with their own property, through requiring licenses and government approval before stocking waters with trout. It is this licencing regime that had led some land owners and fly-fishing advocates to argue that trout regulation is predominately an act of government control and an attack on private property, rather than a sincere attempt to improve ecological health.

Alien Species Regulations as Property Claims

> *We are driving a load of fish to a nearby holiday lodge specialising in fly fishing. Before putting the fish in the lake, we go to the manager's office to have the paperwork signed and to ask whether he wants to come and witness the stocking, to make sure that he receives the number and size of fish for which he has paid. I'm introduced as a researcher interested in trout, and I can sense the manager's wariness. Most scientists with an interest in trout are invasion biologists who propose their eradication, or at least strict control. He relaxes visibly when it is made clear that I'm an anthropologist who also fly fishes. Inviting me in for a coffee, he launches into a long, heated lecture about the stupidity of attempting to remove trout from South African waters, and that this has nothing to do with conservation. The government's anti-trout policy, he says, is not actually about controlling alien species, but is instead part of larger government attempts to exercise control over natural resources, including the trout production.*

This, as we have seen, is the same sentiment that was expressed by the fisheries biologist at the beginning of the article. Some landowners and trout advocates extend this argument and claim that environmental concerns about alien species in the late 1980s have been hijacked by a post-colonial state obsessed with 'control', using trout as a proxy. 'Control' – as concept within white land-owning worlds – is a complex set of concerns, bound up with fears of lost security, making it important to circle back to see trout in relation to issues of property in a historical perspective. As we have shown, introducing trout in South African rivers was part of an appropriation of waterscapes, with very real consequences for property claims and the exclusion of Black people from rivers and stillwaters. These fish introductions also took place as part of larger processes of colonial land dispossessions, and it is the ongoing attempts to grapple with these dispossessions – along with the aforementioned dependence on hatcheries for fish reproduction – that shape current trout conflicts.

Within contemporary South African debates about land reform and nationalisation, landowners tend to see trout regulations as an attack by the post-apartheid government on mostly white private property. There have been widespread debates in

South Africa over the last years about the failure of the ANC government to effect a real economic transformation, and improvements in the lives of Black citizens, especially when it comes to access to land and land ownership. As a consequence, the National Assembly adopted a motion for amending the constitution in 2019 to allow for the expropriation of land without compensation in order to address the vast racial inequalities in land ownership. An ad hoc committee was established to explore ways to implement expropriations, but its recommendations were turned down in December 2021. A new expropriation bill is still on the table, however, which includes the possibility for 'nil compensation' to existing land owners under certain circumstances. These debates have sparked fear among some land owners that private property, especially parcels with valuable natural resources, are 'under attack' by a government that wants to redistribute them.

The position that trout regulations are not really about controlling trout as an alien species, but are about broader attempts by the government to restrict private property owners' rights as a precursor to outright appropriation is most clearly argued in an opinion piece by Ed Herbst, a doyen in South African fly-fishing circles, titled 'Why trout?'[3] Singling out trout for risk assessment and listing them as invasive is bizarre, he argues. 'This is not just because these "risk assessments" try to pass off prejudice as science but because only ten of the other 550 or so species that are currently listed as invasive were subjected to this process'. So why trout? Herbst goes on to answer his own question: '*this is not really about trout. It is about the ANC's obsession with control. It is about government gaining direct permitting control over all biological resources and trout are a valuable biological resource*'. This, he argues, is part of a wider campaign in government to deploy environmental laws in an attempt to place access to and the right to use natural and biological resources under direct state licensing control:

> *Once this has been achieved – and the process is already well advanced – it will be a criminal offence to possess or use any natural or biological resources or any product derived from biological resources without a licence or exemption granted by government. A manifestation of this is the Aquaculture Development Bill that has just been approved by cabinet. It will make it a criminal offence for anyone to engage in aquaculture or the subsequent processing of products derived from aquaculture without a licence issued by government. Thus, if this process is successful, government will become a rent-seeking operation where citizens ultimately work as labour tenants of government and corruption will be legalised.*

According to this narrative, trout have transitioned from being the quintessential colonial-state fish to a possible instrument for attempts by the post-apartheid state to reverse colonial dispossessions and take control over natural resources.

Property, Properties and Appropriations

Whatever the actual aims of South African governmental scientists and environmental officials, whose various commitments to and motivations for alien species reductions and limitations on trout reproduction are difficult to discern, the perception that the state seeks control over natural resources and uses the combination of the dependence

of trout on hatcheries and alien species legislation to insert itself into waters located on what is currently private property is a further chapter in a long history of entanglements between properties of water and property claims, where the specificity of South African waters is of upmost importance. The 'anglificaction' of South African waterscapes via trout introductions was filled with obstacles that required heavy colonial-state interventions and technological fixes to achieve. These processes of building trout fisheries for a white public also went hand-in-hand with usurpation and Black exclusion, thus helping to create white property ownership regimes in South Africa. While trout did eventually begin reproducing in some rivers, they eventually became most prominent in the stillwaters built for agricultural irrigation and fully ensconced within white-owned land parcels, as the white people who had come to own the land via acts of dispossession were also those who saw trout as familiar, appealing, and desirable.

The creation of stillwaters fundamentally changed the relationship between state, fish and property. Because trout are fundamentally unable to reproduce in still waters, viable trout populations require hatcheries, a technique more amenable to state control than 'natural' fish reproduction. While the small numbers of river trout are likely to persist, as they can reproduce in their flowing water and cannot be easily eradicated without poisoning entire river systems, stillwater trout – despite their location on private property – are indeed more feasible for the government to manage and/or eliminate. All government has to do is shut down hatcheries and the majority of trout in South Africa – including all of those in private stillwaters – will disappear within 4–5 years. Whatever one wants to make of the claim that the ANC wishes to nationalise natural resources and limit private property rights, the efforts of the government to manage or reduce trout numbers in private waters and the material possibilities for doing so are shaped by a history where the properties of waters, the state, and property claims have been long and fundamentally intertwined. In the case of trout in South Africa, we see how the materiality of water has shaped the colonial dispossessions of which trout have been a part, as well as present debates over the futures of trout on what are currently predominately white-owned farms.

Fluid Dispossessions and the Materiality of Water

While numerous scholars have described the heated debates over introduced species in South Africa and other former colonies (Beinart and Wotshela 2011; Green 2020; van Wilgen et al. 2020), we – in line with this special issue – take up a new angle on this topic by shifting from a focus on introduced organisms themselves to *the physical traits of South Africa's waters*. The material properties of the region's stillwaters and rivers, we argue, are essential to understanding the particularities of both the colonial introductions of trout and these ongoing conflicts about their persistence. In turn, this attention to the material properties of these waters, which are frequently at the outer edges of the temperature ranges that can support trout, shows how bio-physical parameters play a substantial role in how people try to remake ecologies through private property claims and their contestations.

The physicality of water matters strongly to the process through which trout were introduced to South Africa: Because these cool water fish do not reproduce well in the region's relatively warm waters and because its streams often lack the gravel beds that trout require to spawn, the large-scale acclimatisation of trout to the region became a complex undertaking that required substantial technological and infrastructural investments in trout hatcheries and the subsequent transportation and stocking of hatchery-born fish into rivers and stillwaters. Due to the capital required, white residents mobilised the colonial government to help establish trout in settings that push the limits of their biological capacities.

These same materialities of water continue to play a strong role in current trout debates: While there are indeed a few places where trout reproduce on their own, the majority of trout now live within waters where they cannot reproduce. Thus, in contrast to most introduced species, which often expand rapidly and are very challenging to control, trout could be removed from a large swath of South African waters simply by shutting down the hatcheries that reproduce them. This reliance on reproductive technology makes trout populations more amenable to state regulation than many other introduced organisms, as the government has the right to restrict and revoke permits for hatchery facilities. In turn, this combination of trout dependence on hatcheries and the possibility of relatively easy government regulation of hatcheries has created the conditions where South African trout management debates have become deeply entangled with white fears of government control of resources and property, as well as the ongoing failures of redistributive justice almost thirty years after the end of apartheid.

Projects that seek to colonise or otherwise politically and economically control a place frequently do so by altering the flows of its waters – by introducing irrigation systems for agricultural development projects, dams for drinking water and hydropower, and various groundwater extraction initiatives (Mitchell 2002; Rademacher 2011; Worster 1992). In this regard, South Africa is no exception, as colonial projects involved white control over water for farms and municipal use. At present, rights to water continue to be of crucial concern (Green 2020). By focusing on trout, we have sought to explore another process of colonial dispossession – one that unfolded through leisure-time identity-making projects of white men, rather than through acts of economic extraction (Christensen 2019). In doing so, the article seeks to broaden our attention to the forms of dispossessions and appropriations that are intimately bound with the material properties of water, i.e. what this special issue calls *fluid dispossessions*, which were enacted alongside overt projects of land usurpation. Through translocating animals and plants in the name of pleasure and recreation, waterscapes were possessed and made home by white settlers through processes that differed from the direct land dispossessions that they accompanied. Trout, we argue, are essential not only for understanding such processes, but also for understanding how present-day environmental conflicts unfold within waterscapes and propertyscapes shaped by colonial practices.

Thus, while the story of trout in South Africa contributes to scholarship on colonial landscape-making, this very South African story about how the properties of water and

a colonial fish become entangled in arguments about property regimes has implications beyond the specificities of South Africa. We see it as a call to further expand conversations about the *materiality* of water in anthropology and allied fields such as the environmental humanities. In the past decade, attention to water in these disciplines has dramatically increased (Ballestero 2019). While much of this research has brought a materialist approach to water, central analytical texts have often focused on general aquatic traits such as fluidity, wetness, powers of dissolution, and connectivity (Alaimo 2012; Hayward 2012; Neimanis 2012; Strang 2014). In contrast, we have focused on more specific *physical and chemical characteristics* of particular bodies of water, such as temperature, rate of flow, shade, dissolved oxygen, and substrate, as they come to intersect with the bodies of trout, a specific fish. To explore such stories, we need to turn not only to natural science fields, such as fisheries biology to learn about the limits of trout temperature tolerance, but also to history, as current conflicts are animated by material and technological arrangements that have come into being over multiple time scales. In shifting our attention to the details of such physio-chemical properties while maintaining a historical and socio-political orientation, we have sought to demonstrate how one might approach water-focused cases with an approach inspired by the growing body of research that focuses on how the particularities of organisms, substances, ecological relations, and geochemical cycles matter to the robust worlds that anthropologists and allied scholars study (e.g. Mathews 2020; Tsing 2015; for an example from STS, see Abrahamsson et al. 2015). Thinking through the dual meaning of property, we have argued, is a useful entry into this work. By focusing on the term's joint reference to ownership and material traits, we have been able to better understand how the properties of water and fish have come to matter to practices of ownership, debates about land reform and environmental futures in South Africa.

Notes

1. For a detailed account of this process, see Jeff Guy (1982).
2. This is a term coined by the third author. We use it here to gesture to the inseparability of fly-fishing and British masculinity. In this way, anglification also intends to point to the racialisation of South African waterscapes. This is evident in the quote from Nuttall above, where the characterisation of indigenous fish as childish compared to the power and subtlety of trout is part of colonial efforts to mark the white male as 'adult' and justify intertwined acts of landscape transformation and racial subjugation. We thank one of the anonymous reviewers for encouraging us to clarify this point.
3. https://www.politicsweb.co.za/opinion/why-trout. Accessed 8 February 2022.

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