WATR201: Video Interview Transcript.

UC Group 4: Urban River Running Adjacent to a Dual Carriageway.

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Video Link: https://youtu.be/db96_HccZ2I

The red text represents the host/person interviewing.
The black text represents the person being interviewed
The four reference required are also in red text within the final reference list at the bottom

Interviewer: Hello, welcome back to water news. In today's segment we will be discussing urbanisation, specifically roading and dual carriageways. We are also interested in knowing how these may work in water systems, how they affect water, other implications and impacts. Anyway, to keep it local and interesting, we are going to look at the Waikato River today. It is present in the north island. Firstly I would like to welcome Seth to give us a bit of an overview on the current state of the Waikato river and just a few fun facts about it, just to set the scene.

Seth: Yea, hey. The Waikato river, New Zealand's longest river, flows for 425 kilometres starting at Lake Taupo and it ends in the South of Auckland at Port Waikato (Britannica, n.d.). At points River Runs the river runs next to State Highway 1. However it is also surrounded by a lot of Agriculture and other urbanisation and in the form of towns like Hamilton and there's also a lot of dams spotted along the river for hydroelectric power. In terms of the state of the river itself there is a lot of heavy metals in the river and pH has been altered by chemicals from the runoff of industry and urbanisation (Gadd et al., 2020). Furthermore eutrophication occasionally occurs in the form of algal Blooms. You have to check before you go swimming on the current state of the river this is done because of nitrogen phosphorus runoff from the agricultural systems (Waikato Regional Council, n.d.). In terms of the heavy metals I spoke about just before these mostly come from the roads, copper from the brake pads, lead from exhausts and just rubber from general tyre wear and tear. In terms of the riparian zone itself the surrounding of the river you theres definitely room for improvement as you can see from these photos in terms of the urbanisation and high runoff places these definitely an effort being made but in my opinion it could be better (Collier et al., 2010).

Interviewer: Wow, that's really interesting stuff, has it always been that way or has there been a bit of change due to human impact recently or far in the past?

Seth: Yea so the waikato river actually used to have a lot of wetlands that would improve water quality. This is actually talked about in a book called Water Always Wins by Erica Gies she advocates for a lot of slow water approaches currently the states does not allow for these types of natural filtration to occur through the wetlands (Gies, 2022). Furthermore, the reduction of these wetlands systems unfortunately has removed a lot of biodiversity and available habitat for native and exotic Species that provide a lot of the ecosystem services in the rivers (Pingram et al., 2014). It's a shame to see unfortunately.

Interviewer: Thanks for that overview Seth. We have Noah to explain what is driving these state changes.

Noah: Good morning or good afternoon, My name is Noah and I am the head freshwater consultant for the Waikato district council and it has been brought to my attention that people want to know what drivers have an influence on the Waikato river.

Interviewer: So that's interesting so what exactly is a driver?

Noah: A driver is essentially the human activities that are responsible for the pressures we see in our environments. Which can include but are not limited to, 'Drainage, land-use (agriculture, urban development), irrigation, household/business behaviour', and infrastructure (Rachel Teen, 2024).

Interviewer: And which drivers are related to the Waikato River?

Noah: There are a variety of human-related drivers which influence the Mighty Waikato. As we know the Waikato river cuts through a large portion of the North island from its journey beginning at Lake Taupo through to Port Waikato. The river travels across large sections of agricultural land and through Hamilton which is one of the country's largest cities. The river is also subject to large scale damming for hydroelectricity as well as infrastructure and urbanisation as the river travels north alongside SH1. (Dr. Issie Barrett, 2024 & Waikato Regional Council, 2024)

Urbanisation especially near Hamilton and Cambridge has caused large amounts of pollutants to enter the river as humans have continued to sprawl along the river. Constant construction of buildings and roads such as the SH1 motorway has resulted in far more runoff carrying heavy metals, oils, pollutants and other unwanted nutrients down through the soils and into the Waikato river which drives the pressures we see today.

Next is the agricultural industry which is responsible for introducing approximately 70% of the total current nitrogen concentrations from excess fertiliser into our soils, which has led to large amounts of nutrients leaching through the soils and into our waterways. Poor past farming practices and waterhealth knowledge has led to agriculture becoming one of the most well known drivers of poor water quality (Hannah Ritchie, 2021 & Rachel Teen, 2024).

Extensive damming for hydroelectricity is another driver which contributes to the pressures within the Waikato river. The Karapiro dam just south of Cambridge is one of the 8 dams on the river which holds back large volumes of water to turn into hydropower. The dams contribute to decreased water flows, increased water residence times and sedimentation that we see further downstream. An interesting fact is without any dams the average time for water to travel out to sea would be less than 7 days and whereas it takes up to several weeks in its current state. (Waikato Regional Council, 2024 & Land, Air, Water Aoteatora, 2024)

Interviewer: So overall there are more than just one driver that we need to focus on?

Noah: Yes! Ultimately the Waikato river is subject to the unwanted input from many drivers such as agriculture through urbanisation, human pollutants, and infrastructure development and run off which contribute to pressures we see in the river soon to be described by Josh.

Interviewer: That's sad to hear. Now we have Josh who can give some insight into what the pressure acting on the Waikato River are

Noah: There are numerous pressures acting on the Waikato River system because of the activities and infrastructure in and around the river. Due to the river's proximity to a major highway, the main pressure in these areas is contaminant runoff from the road. Rainfall washes these contaminants off the road, into stormwater drains and the river itself. These contaminants include heavy metals from car brake pads such as copper and zinc (Hwang et al., 2016), and chemicals such as methane and nitrous oxides from car exhaust (Twigg, 2007). With an increase in chemical contamination of the river, algal blooms are becoming more frequent with greater nutrient levels, causing the river to become eutrophic (Tiwari & Pal, 2022). Other pressures on the river include those introduced by agriculture. According to NIWA, between the years 1992 and 2002, the number of cows in the Waikato District increased by 37 percent. This would be a main contributor to the levels of nitrogen and phosphorus increasing by 40 and 25 percent respectively over the same time period (Proffitt, 2017). With the increased animal waste and fertilisers adding more of these chemicals to the river via surface runoff, nutrient levels in the river continue to rise, bringing it closer to a eutrophic state (Dr. Issie Barrett, 2024). In addition to this, agriculture can introduce more sediment into the river, leading to sedimentation and an overall reduction in water quality. These factors combined with increasing urbanisation close to the river are building up the pressures on the river system, resulting in many negative environmental and social impacts.

Interviewer: We have now Arnie. We've heard a lot about things that could be driving change and putting pressure on the Waikato, what are some of the impacts of this?

Arnie: Kia ora! Yeah. So, one of the key impacts we're setting is on macroinvertebrates. These are a very sensitive species, especially to the heavy metals and arsenic which have been running into the Waikato River from the roads that are adjacent to it. Now, I've brought along a juvenile midge for you to see, and you can just, ohh, just see him in the centrifuge tube wriggling around there. And I fished him out of one of the healthy sites this afternoon. However, as you can see in the depiction here, most sites are experiencing a decline in macroinvertebrate communities (LAWA, 2024). There's also degradation in the communities from the tributaries of the Waikato River (LAWA, 2024), which means the scale of impact really isn't limited to the local scale, it's much more regional. What we're seeing is as the macroinvertebrates like caddisflies, stoneflies and mayflies are declining, more Hardy species like the New Zealand mud snail are stepping up to replace them (Glenjarman, 2017). This is disrupting the natural ecosystem balance, and it means that there's wider ecosystem impacts as well (Glenjarman, 2017).

Interviewer: So that's interesting about the invertebrates, but have we got any impacts on people?

Arnie: We definitely have seen impacts on people. This map shows the marae for Waikato-Tainui, and as you can see the marae are mostly situated on the Waikato River, or on the Tasman Sea. This is as iwi have relied on mahinga kai for centuries (Environment Team, 2013). Unfortunately, local iwi have reported a decline in white bait and watercress. This is backed up by data. We have seen a 75% decrease in white bait numbers since the 1930s (Waikato Regional Council, 2024). These species are considered at risk, declining, however they are not protected and continue to be overfished annually. This is upsetting for Waikato Tainui and impacts them because land health is deeply connected through whakapapa to the mana of iwi and individuals. A podcast by Shelley McDonnell recently noted that shortcomings

in collaboration with Māori has contributed to river degradation in much of New Zealand (MacDonell, 2024). And that is definitely true for the impacts in the Waikato.

Interviewer: That is concerning, if whitebait are declining, are we also seeing a decrease in recreational value?

Arnie: Absolutely we are. While the upper Waikato River is in a pretty good condition, the lower Waikato River has very little sites in conditions that are appropriate for recreational activity (Bates, 2020), (Waikato Regional Council, 2021). Whitebait fishing would be difficult here, and this is partly linked to the decline in macroinvertebrates which whitebait feed on. We're also seeing a decline in sites that are safe for swimming and for dogs to swim in as well. This impacts the wider community and is upsetting for many of the locals but that's all I have to say for now. So that's all from me and the midge.

Interviewer: Now, after hearing about these negative impacts on the Waikato River, what can be done to mitigate and reverse these harmful impacts? We now go to Anton, a key member of the Waikato River Authority.

Anton: Is the Waikato River's future in jeopardy? Concern is growing as the river's health deteriorates in the face of increasing urbanisation and pollution. But there is hope.

In fact, an array of solutions is presented to us. As the impacts are affecting many different parts of the environment surrounding the Waikato River, coming up with a solution requires a multifaceted approach where all of these interconnected parts of the environment are addressed and remediated.

The Waikato River is protected by a number of laws and policies that the NZ government has put in place, including the National Policy Statement for Freshwater Management and the Resource Management Act. The objectives of these regulations are to preserve aquatic habitats, reduce pollution, and maintain water quality. This is especially important for the Waikato River, as these laws and policies are what create a foundation for the preservation of the river itself and its biodiverse surroundings (Ministry for the Environment, 2023).

The Waikato River is also actively protected by local communities. To increase public awareness of the significance of the river, a multitude of community groups and organisations have launched campaigns including habitat restoration projects, river clean-ups, and educational campaigns (Fox et al., 2017).

The problems threatening the Waikato River have also been addressed in part by technological developments. Rain gardens and bioswales, for instance, are examples of green infrastructure solutions that have been used to catch stormwater runoff and reduce pollutants. This natural infrastructure has the ability to create an environmentally friendly barrier to reduce the impacts of harmful runoff into the Waikato River. Riparian planting on the banks of the river is another way that pollutants can be filtered while also promoting a healthier aquatic ecosystem (Simcock et al., 2014).

Interviewer: And why are these actions so important?

Anton: Through the mentioned responses and techniques, the Waikato River's sustainability and health can be greatly enhanced, guaranteeing future generations benefit from it. To remedy

pollution entering waterways such as the Waikato River, government organisations, local businesses, communities, and individuals must work together to ensure our human interactions and infrastructure have as little environmental impact as possible. We should always be looking out for new solutions and mitigation strategies. As the environment changes around us, we too must change our approaches to supporting and enhancing all waterways and aquatic ecosystems.

Interviewer: Perfect, thank you guys, see you all next time

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