National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Exemplar for Internal Achievement Standard

Geography Level 1

This exemplar supports assessment against:

Achievement Standard 91933

Explore an environment using data

An annotated exemplar is a sample of student evidence, with a commentary, to explain key aspects of the standard. It assists teachers to make assessment judgements at the grade.

New Zealand Qualifications Authority

To support internal assessment

Grade: Achieved
For Achieved, the student needs to explore an environment using data. This involves presenting processed data from primary and/or secondary sources. Findings about an environment using the presented data and how data can strengthen or limit understanding of the environment are then described. Data about the waterfront environment has been processed into bar graphs, a pie graph, and maps. Some geographic conventions have been applied. Using the presented data, findings about the waterfront environment are described. For example, the processed transport data shows that more vehicles are travelling west, and most people on Quay Street are walkers. The student has described how the Auckland wide data can strengthen understanding of the waterfront environment. For Merit, the student should explain findings about the environment using the presented processed data. In addition, there should be an explanation of how data can strengthen and limit understanding of the environment. At a word count of 947, this evidence is at the upper end of the expected response length.

Achieved

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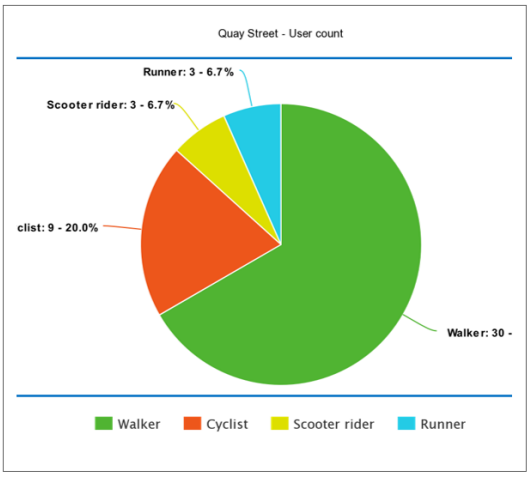
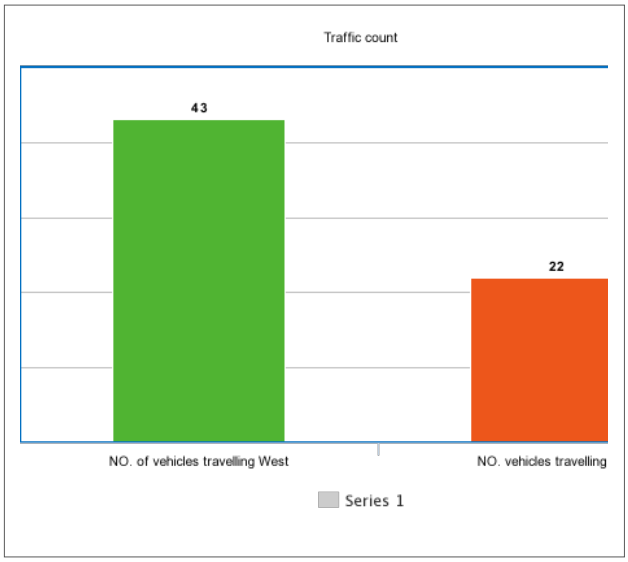
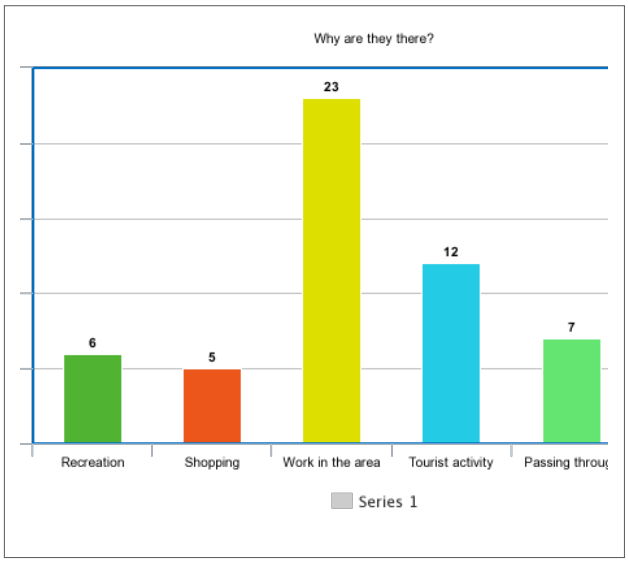
- In this pie chart we can see that majority of the people on Quay Street are walkers with 30% then the second most efficient way is cycling at 20% and then scooter riders and runners are tied at 6.7%.
- This data tells us that majority of the people on Quay ST are walkers and including my bar graph on slide 4 it shows a lot of people work in the area so lots of people may be walking around on their breaks to get lunch or just walking from a where their cars are parked to get to their work



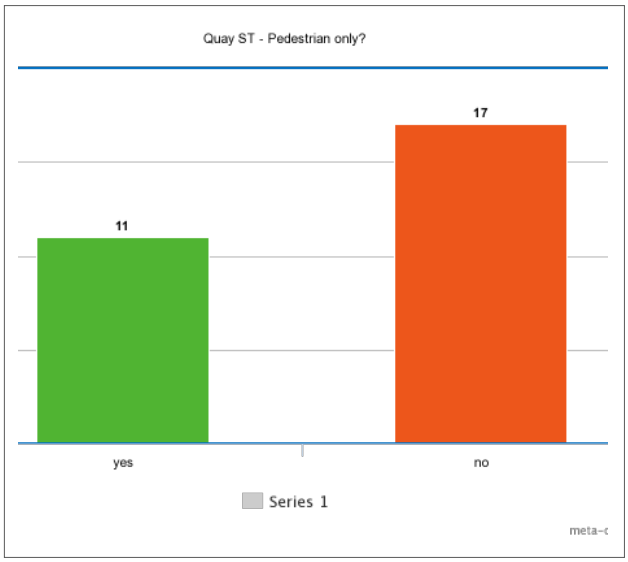
- Here in this bar graph we can see that the number of vehicles travelling West is more than the vehicles travelling South by 21 over 10 minute period. This data could have easily changed over the week/month as this data is from just 1 day.



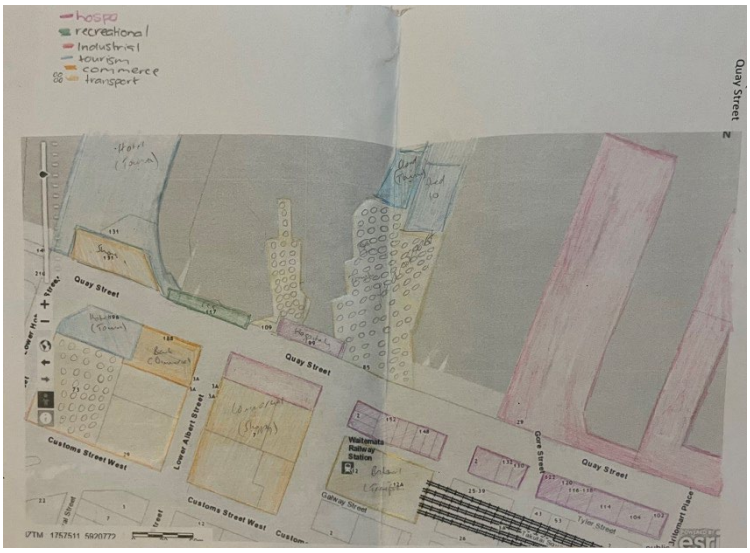
- Most of the people that are on Quay street are there for work because they work in the area and then the second most people that are there tourist activity with 12 people, next is people just passing through and that's 7 people then 6 people are there for recreational purposes, then the rest (5) people were there for shopping.
- This shows us that majority of the people here are for their jobs or the rest are tourists.



- The amount of people who think that Quay Street shouldn't be pedestrian only tops the amount of people who think it should by 6 people.
- Why people think Quay ST should not be pedestrian only? People who drive through Quay ST may find it easier to drive through and park somewhere if they are going to work or if they are going shopping. It can be a lot easier and more efficient to drive through instead of walking. Majority of the people think that Quay ST should not be pedestrian only
- Why people think it should be pedestrian only? People might want Quay ST just to stay pedestrian only because it would be a lot easier to cross streets if there no cars and would also free up traffic.



Map of the land use on Quay ST



Map of the land use in Wynyard Quarter

The differences between the two land use maps

- Some of the differences between the two maps are that..
- On Quay ST we can see that it includes shops, banks, transport, hospitality, hotels and compared to the Wynyard Quarter map it includes the marine, transport, the events centre, the fish market and hospitality. So both of these maps include at least hospitality and transport which can be quite handy to have both of these resources on both maps. I would say Quay ST definitely includes more Transport, Commerce, Tourism activities, Recreational buildings and Hospitality, therefore another reason to not make Quay ST pedestrian only, because there are more useful buildings on Quay ST rather than Wynyard Quarter

Strengths

- Some of the strengths that we have are we have data from Auckland transport which is very supporting because the data has come from people all over Auckland. This can give us more understanding about the waterfront because the data is from a big area. AT transport is a transport company that most Aucklanders use as a way to get around as a economic and cheaper way. Their main focus is to stop people from using cars as much and make it affordable so more people are enticed on using public transport.
- We are also lucky to have gone to Wynyard quarter and surveyed people who gave their honest opinion on the questions we asked. Since we had multiple students asking multiple people this helped us to get as much results as we could because we had a lot of data and can use this to tell us about the waterfront.

Limitations

- Some of the limitations that we faced is we didn’t survey many people which means less data which leads to less accurate results.
- We didn’t survey all people Quay ST because there weren't a lot of people since we went in quite an unbusy time of day.
- We also didn’t ask people in cars who were on Quay ST and that leads us to quite inaccurate results since their answer for the survey on if Quay St should be pedestrian only or not, might have been different since they were driving cars on Quay St themselves.

Conclusion

- In these graphs it shows us all different data about Quay ST and Wynyard Quarter. People go here a lot because it is quite convenient with there being hospitality so it's easy to go out for lunch for quick bite after doing some shopping. People also use lots of transport like ferries, trains, busses, lime scooters etc to get to these hospitality places or even to get to hotels or to people's jobs or even just to run errands. Auckland transport makes it super easy and affordable for people to get around Auckland.
- There are lots of shops down these streets and it makes the business for these companies to make profit especially when the streets get busy in the weekends.
- The data shows us that the mass of people who were Quay ST agree that Quay ST should not be pedestrian only and that could be for many different reasons. People may find it easier and more efficient for people to get through Wynyard Quarter while driving or it might be easier to park there for people working in the area or just having a quick lunch, shop or just a walk.
- In my opinion I think that Quay ST should not be pedestrian only because I think that if Quay ST was pedestrian only it could cause a lot of traffic in the area with that road being cut off and then would also make extra traffic for public transport like busses. Using the data from AT transport it shows around 20,000 people use busses so this could create lots of disturbance for people who do use public transport and even the drivers of busses. In the data we have been giving it shows that this road is very slow and light already so there would be no need to get rid of the road. This is also a quick and easy street to pick up people from their ferries, trains, and busses where as if you couldn’t drive through here it wouldn’t be as efficient to pick people up. Making Quay ST pedestrians only could also impact retail stores because there's a possibility less people would know that their stores were there if their main way of transport was a car and they couldn’t drive down this road and see the shops.

Grade: Merit
For Merit, the student needs to interpret an environment using data. This involves presenting processed data from primary and/or secondary sources. Findings about the environment (using the presented data) are then explained, and how data can strengthen and limit understanding of the environment. Data about the waterfront environment has been processed into bar graphs, pie graphs, and maps. Some geographic conventions have been applied. Using the presented data, findings about the waterfront environment are explained. For example, the map and pie graph show there is no industrial land use due to the economic reasons explained. The student has also explained how the data can strengthen and limit understanding of the environment. For example, the explanation of how the Commercial Bay data could limit understanding, and how primary data can strengthen understanding. For Excellence, a valid conclusion about the environment (using findings) should be drawn. The student should also discuss further how additional data could be used to improve understanding of the environment. At 1171 words, this exemplar is at the upper end of the expected response length.

Merit

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Land use survey and map

LAND USE SURVEY

The map on the following page is of the area you will be conducting your research. Complete the key below and map as instructed by your teacher.

LAND USE TYPE	KEY CODE/ COLOUR	WYNYARD QUARTER	VIADUCT HARBOUR	COMMERCIAL BAY
INDUSTRIAL (warehouses / factories etc)	1	|||	∅	∅
COMMERCIAL (office / business / banks etc)	2	|||| ||||	||||
RETAIL (cafes / shops / tourist facilities / restaurants etc)	3	||||| ||||| |||	||||| ||||| |||	||||| ||||| |||
RESIDENTIAL (apartments / houses etc)	4	||||	||||| |||	∅
RECREATION (public space / play parks / sculptures / sitting areas etc)	5	|||||	||||	||
ACCOMMODATION (hotels, backpackers, motels)	6	|||	||	|||
CARPARK	7	|||||	||		
OTHER	8	||	∅		(train station)

4

LAND USE MAP

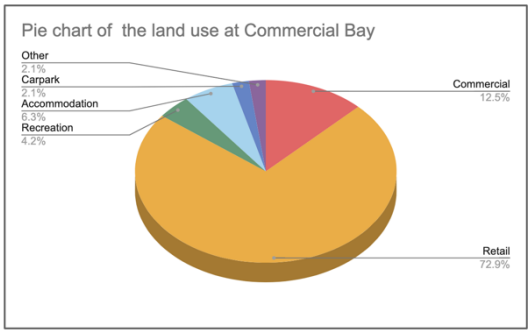
5

Findings

Land use at Commercial Bay

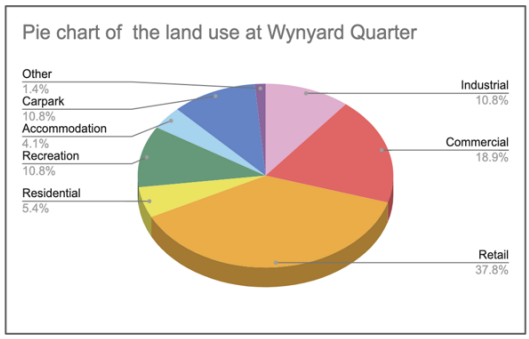
Commercial Bay is the one of the most visited areas in Auckland city as it has multiple features that have shaped what this area is used for. The data collected shows that 72.9% of the land around the Commercial Bay area is used for retail purposes. This is the majority of how the land is being used with most of these shops and restaurants

being inside of the Commercial Bay mall. This shows the pattern that most (72.9%) of the land is being used for retail purposes in comparison to only (27.1%) being used for other purposes such as commercial offices, accommodation, and recreation purposes. As shown on the graph there is no industrial uses or residential uses for land at Commercial Bay and very little, only 2.1% being used for car parks. This is because of the central location of the Commercial Bay precinct. The central location makes the land more desirable which therefore increases the price of the land. Many land uses such as industrial and residential cannot afford this land so they are driven to the cheaper areas of the city.



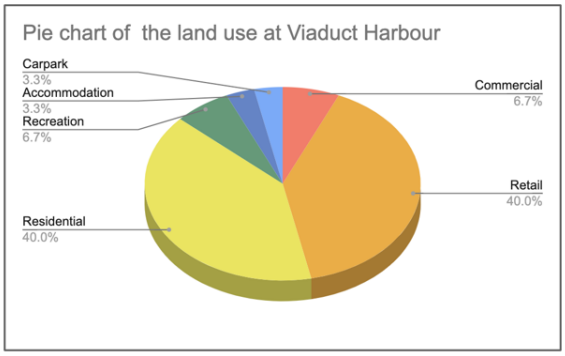
Land use at Wynyard Quarter

Land at Wynyard Quarter has the most diverse uses in comparison to Commercial Bay or the Viaduct Harbor. This is although it is still mostly used for retail purposes which are restaurants which is shown on the graph as Retail uses make up 37.8% of the land. Wynyard Quarter was originally used as an area for ships to store supplies in the large silos that still remain around Wynyard Quarter but has since been transformed into a public space to host events such as the America's cup and the Rugby world cup. Land at Wynyard Quarter is more on the outskirts of the city, so it is more affordable. This allows there to be more variety in land uses such as Industrial areas and large recreational parks that are at Wynyard Quarter. This is shown in the data with there being 10.8% of the land being used for recreational uses such as parks and another 10.8% being used for industrial purposes.



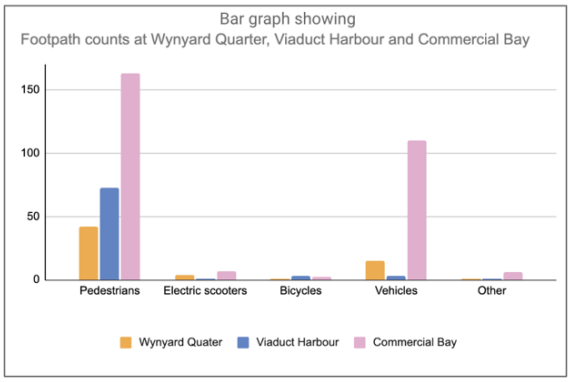
Land use at Viaduct Harbour

Viaduct Harbour has Retail and residential areas that each make up 40% of the land with the remaining 20% of the land being used for other purposes. The unique aspect of the marina being in the middle of the Viaduct Harbour makes this area nicer and more enticing of a place to live. Although Retail and Residential land uses make up 80% of the total land uses making them the two most popular land uses at this precinct, there are also some commercial offices and the public spaces that make up 6.7% of the land used. I think there are not many car parks with only making up 3.3% of the land in this area because the land is desirable to live in, so the land prices are too high for parking use.



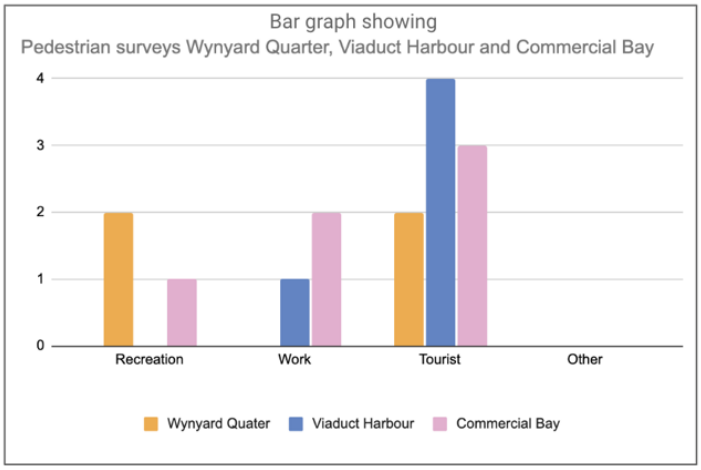
Footpath counts

This multi bar graph shows that the more central the area the more people it has travelling through it. This is why the amount of foot traffic and vehicles was significantly more at Commercial Bay than in comparison to Wynyard Quarter and Viaduct Harbour. For example, in Commercial Bay there were 90 more pedestrians than in viaduct and there were 121 more pedestrians in Commercial Bay than in Wynyard Quarter. Because most of the facilities in the city are within walking distance, in all three locations pedestrians were counted the most.

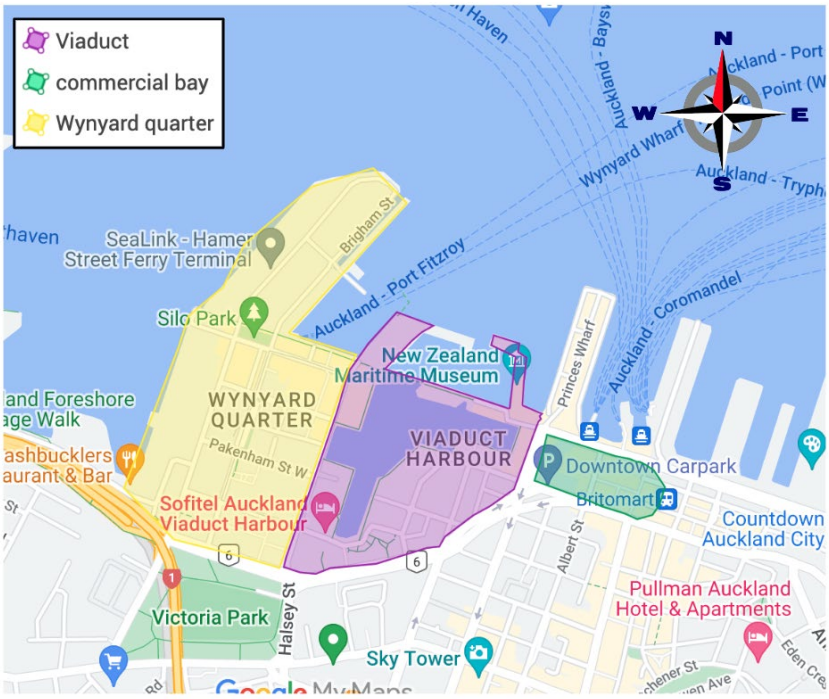


Pedestrian surveys

There are different reasons that people come into the city for whether it's for work, shopping or as a tourist exploring the city. The time that the responses were taken impacted the results, for example as on a Monday around midday, most of the people we asked were tourists. This is because most adults would be at work and children would be at school. At Commercial Bay there was the most variety of people with 40% being tourists, another 40% being for work reasons and 20% being for recreation purposes.



Map of Auckland's waterfronts three precincts



Evaluation

The collection of the data faced many limitations. A limitation that could have affected my understanding was that the group was not able to count the individual shops in the mall of Commercial Bay because of time restraints, however if Commercial Bay would have just been indicated as one cluster of Retail shops it would change the overall data, as having just one point on the graph would not show that the majority of the Commercial Bay precinct was Retail, as there would not be as many Retail data points on the graphs. This is why making an informed assumption was better,

although it is not truly accurate. So, this could have limited my understanding of Commercial Bay and the waterfront environment because the data was not accurate. Another limitation with the data which could have affected my understanding was that it didn't account for multilevel buildings that would have different uses on each floor such as Commercial Bay. The lower levels of Commercial Bay are used for Retail shops and Restaurants but higher up there are Commercial offices and a hotel is currently being built on top. As the land use map is only 2 dimensional it makes it difficult to account for these different uses which also makes the data less accurate and could have limited my understanding.

For the collection of the footpath path counts, the problem that was encountered was that they were only taken once in each location and at a random time in the day. This means that with a slight change of time or day of the week the results could have been completely different and limited my understanding. Such as if the data would have been collected early on the Monday morning there would have been many more people counted because of the work rush hour. Likewise, if the data would have been taken on the weekend there would be more people in each location for different reasons such as recreational shopping. So, more data from more times or days would strengthen my understanding of the waterfront because the little daily differences would not change the results of my overall understanding of the waterfront.

Although the data had many limitations, one of the consistent strengths is that the data is primary data. This guarantees that the collection of the data is consistent and fair throughout and could have strengthened my understanding of the waterfront environment. Another strength was that each footpath count was measured for the same amount of time.

To further improve the data, it could be compared to secondary data however it could be difficult to find data that is taken under the same conditions as the primary data.

Conclusion

In conclusion, the three precincts of Wynyard Quarter, Commercial Bay and the Viaduct Harbour along Auckland's waterfront have different land uses because of the different natural features that each area has to offer. In the three precincts Retail land uses make up most of the land, but in Wynyard Quarter Retail and Residential uses each make up 40%. This data comes to the conclusion that the more central the area the more densely used the land becomes.

Grade: Excellence
For Excellence, the student needs to analyse an environment using data. This involves presenting processed data from primary and/or secondary sources. Findings about the environment using the presented data are then explained, and a valid conclusion drawn. The evidence should explain how data can strengthen and limit understanding of the environment, and also discuss how additional data could be used to improve understanding of the environment. The student has described and explained the findings by processing data about the fluvial environment into annotated maps, photos, and field sketches. The data has been processed into bar graphs and geographic conventions have been applied. Findings about the fluvial environment using the presented data are explained, and a valid conclusion about the environment using those findings has been drawn. For example, differences in water clarity at the two locations are explained, and a valid conclusion is drawn about the health of the fluvial environment. The student has explained how the data can both strengthen and limit understanding of the environment. For example, how the strengths of the SHMAK kit data (including ease of use, 12 tests, and rapid response) can strengthen understanding of the awa's health. How additional deeper water data could be used to improve understanding of the environment has been discussed. This exemplar exceeds the expected response length.

[Please copy in the student work – Excellence]

Figure 1
Sampling locations

Location 3: Guppy Road - Tūtaekurī River

Location 2: Tennant Road - Tukituki River

Location 1: Red Bridge - Tukituki River

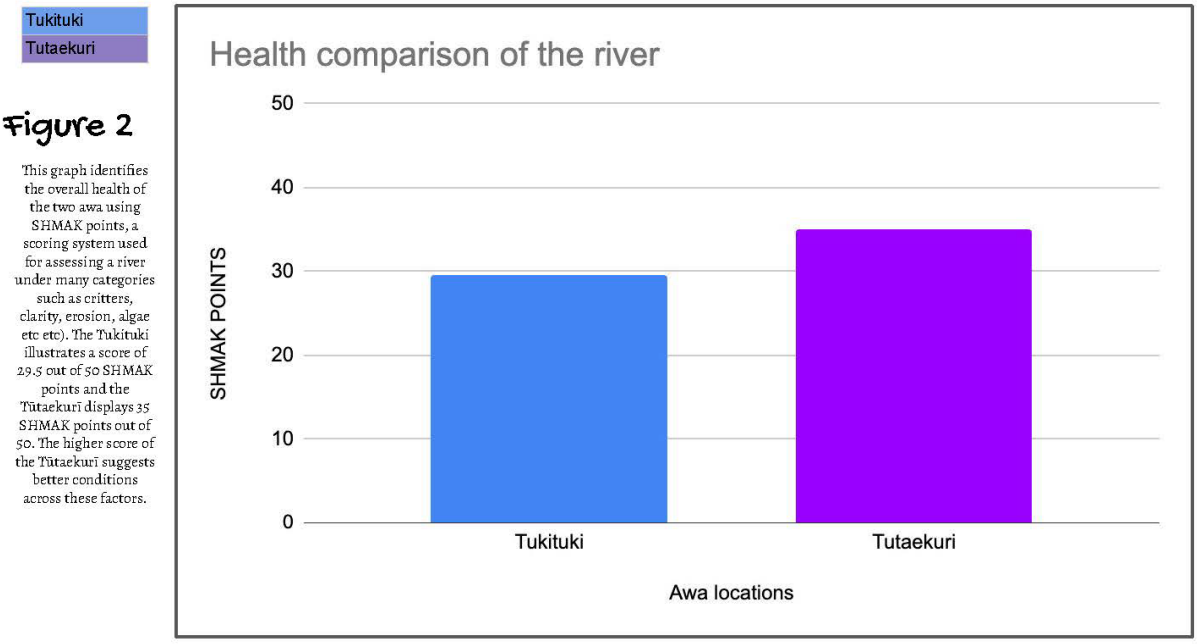


Figure 2

This graph identifies the overall health of the two awa using SHMAK points, a scoring system used for assessing a river under many categories such as critters, clarity, erosion, algae etc etc). The Tukituki illustrates a score of 29.5 out of 50 SHMAK points and the Tūtaekurī displays 35 SHMAK points out of 50. The higher score of the Tūtaekurī suggests better conditions across these factors.

Tukituki
Tutaekuri

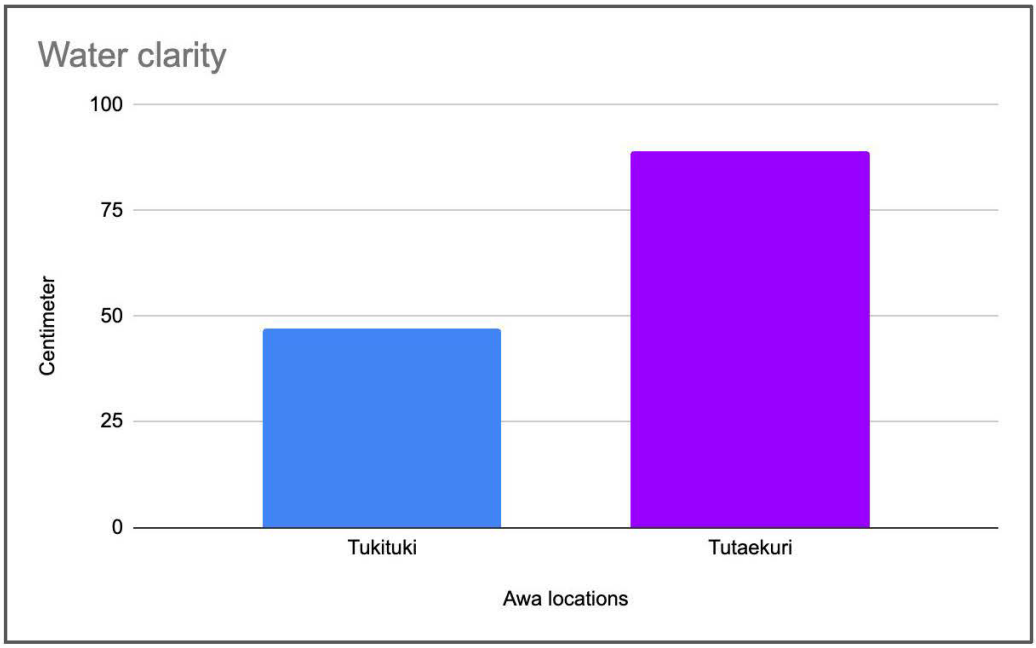


Figure 3

For this water clarity graph, the Tukituki river scores a solid 47 out of 100 centimeters, whereas the Tūtaekurī boasts an impressive 89 centimeters out of 100. We efficiently identified the water clarity of each river by filling a long clear tube from each river with water, then, using two magnets and dragging them down the tube until the person looking down the tube would indicate when they couldn't see the magnets anymore.

Figure 4 - Tukituki river, Red Bridge

Red Bridge was the first location we embarked on. While the location was difficult to get too, it could be seen from the bridge above it. As there was a popular bridge overhead of the river, this demonstrated the river could possibly be more polluted compared to other areas of the river.

As Tukituki is in close proximity to Te Mata Peak, this could result in a negative effect of Sediment runoff (the buildup of eroded soil particles that are transported in runoff from their site of origin, and deposited in bodies of water*). Steep slopes and soil disturbance associated with Te Mata Peak could contribute to sediment run off into the Tukituki river, leading to many negative consequences such as habitat loss for critters or degraded water quality.

This was where we were located.

As this was the most inland location of the Tukituki river that we visited, we noticed there was less infrastructure compared to other areas closer to the ocean (houses, schools etc).

*https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/benviron/water/permits/ripdes/stwater/pdfs/factsh1.pdf

Figure 5 - Tūtaekurī river, Guppy Road

This is where we were located

This area of the Tūtaekurī river, is very populated and surrounded by houses and infrastructure, displaying the area is urbanized and developed. This indicates many negative consequences such as water quality degradation of this area of the river. Runoff from roofs and roads during rainfall may contaminate the river, as this runoff often contains heavy metals, oils and fertilizers. Overall, urbanization may lead to loss of natural habitats along the river.

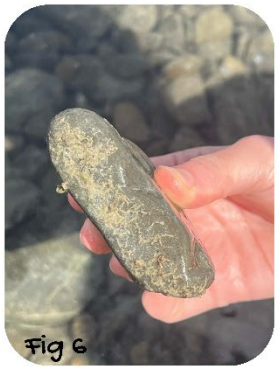
As I have mentioned, this area around the Tūtaekurī is a bustling community, and this includes paddocks and livestock. This may contribute to both negative and positive impacts on the river. For example, positively, the livestock may help naturally fertilize the soil, making riverbanks and plants healthy. However, if this is uncontrolled, too much livestock manure may lead to pollution of the river, affecting many areas such as water clarity and aroma

Tūtaekurī river runs through many urbanized areas, which could contribute to both positive and negative consequences of the river. It's a notably well-used river for swimming, and is often used for many recreational activities such as canoeing and kayaking.

Algae

In the Tukituki river, a thin to medium film or mat is observed, mainly on the top part of the rocks, gently coating the riverbed. We discovered that the further you went out into the river, the thicker the Algae became.

Location: Red Bridge
River: Tukituki



Location: Tennant Road
River: Tukituki

In comparison to the Tukituki, the Tūtaekurī presented stringy, thick mats of Algae clinging to rocks and floating across the river.

Location: Guppy Road
River: Tūtaekurī

The differing Algae formations the two rivers have to offer link to Mauri: the Tūtaekurī algae suggests a delicate balance and positive quality of the water, whereas the Tukituki algae suggests a potential imbalance or stress within the water.

Fig 9 - Vegetation & River Banks
Tūtaekurī river - guppy road

The Tūtaekurī river consisted of large bushy trees close to the river bank, providing not only adequate shading for the river but temperature regulation as well. As this cooled the river, it established a supportive community for critters were they can grow and reproduce, overall improving the quality for the aquatic environment.

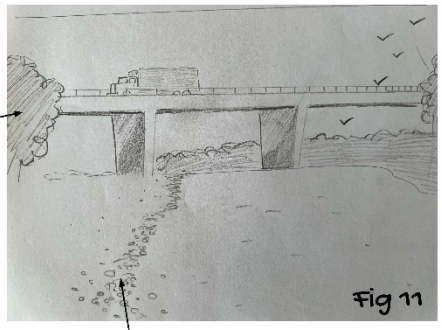


Fig 11

The bushy trees and nature also linked back to bank stabilization, helping to stabilize the river banks, reducing erosion and sedimentation. The stabilization will assist in preventing soil runoff into the river in the future.

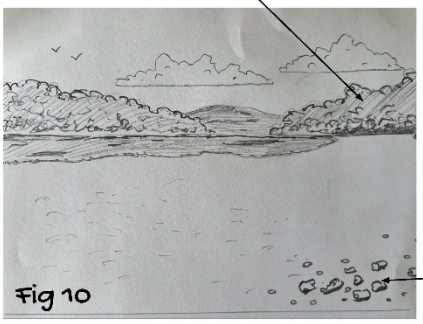


Fig 10

The Tūtaekurī also had noticeable stones and gravel circling around the river. This creates erosion protection, acting as a barrier to help prevent the river bank from being potentially washed away by the waters force. As the gravel and stones prevent erosion, it indicates there are less sedimentation in the river, displaying that the river is fast flowing and has a strong current.

Findings/Conclusion, Part 1

The comparison of the Tukituki and Tūtaekurī river displayed a diverse contrast of these factors, water clarity, algae, erosion and river bank and the overall health of the two awa. Understanding these numerous aspects of the river provides us with insights of the vitality of the river for us and the community. In figure one, we identify the respective conditions of the two rivers. The Tukituki scores an average of 29.5 out of 50, whereas the Tūtaekurī scores 35 out of 50. The graph illustrates the pressing need for conservation efforts in the Tukituki river, while also raising questions about it's health score compared to Tūtaekurī. What has inflicted the low score Tukituki has exhibited?

To begin with, the water clarity graph in figure 2 illustrates a significant difference between the two rivers, with the Tukituki ranking 47 out of 100 and the Tūtaekuri ranking 89 out of 100. Various factors play a role in the significant difference of clarity between the two waterways, including the amount of erosion or stream-bed disturbance upstream. This is often caused by land use practices (agricultural runoff) and natural process (recent heavy rainfall) which impact elevated sedimentation levels. Cyclone Gabrielle's devastating effect on the river played a major part in today's clarity. During the cyclones passage, increased rainfall upstream lead to runoff of the riverbanks surrounding the river, carrying sediments and debris into the water. The intense increase of water flow and erosion caused by the runoff also disrupted the riverbed and surrounding areas, further contributing to sedimentation. The effects upstream travel downstream, overall affecting the entire awa. Therefore, it's reasonable to assume that Cyclone Gabrielle has particularly degraded the Tukituki awa. According to secondary data* which displays a clarity graph for the Tukituki river from January 2022-Early 2023, it shows a slow positive increase in clarity in the months leading up to the cyclone, before significantly decreasing, presuming the cyclone was the cause of this sudden decrease. To add, the damage and destruction caused by the cyclone will take many years to stabilize. However, understanding out roll of Kaitiakitanga is essential for preserving the awa and is a crucial opportunity for the community and others.
For reference, this gives you an idea of what the Tukituki awa looked like before and after the cyclone ↓


Before


After

Furthermore, algae had an interesting effect on both rivers and there was a diverse range of algae presented at the rivers. The Tukituki, as shown in figure 6 and 7, displayed a thin to medium layer on the riverbed. However, the Tūtaekurī river demonstrated stringy, thick mats of algae attached to its river bed, as you can see from figures 8-9. Long filaments like the ones found in the Tūtaekurī river indicate that there is a high enrichment of phosphate and/or nitrogen (conductivity). The conductivity score on the Tūtaekurī river was 370, demonstrating the factors are true as this score is particularly high for a river. Nutrient-rich awa provides an environment for a robust ecosystem to flourish, making the awa a common home for critters. The potential thriving ecosystem reflects interconnectedness with Te Taiao, where the health of the river is connected to the ecosystems living amongst it and providing a healthy awa for growth. In comparison, the Tukituki river delivered a different algae profile. This may indicate lower nutrient levels in the water, influenced by elements such as agricultural runoff, potentially affected by Cyclone Gabrielle. The two destinations of the Tukituki river give a combined average of 221 for conductivity, which is relatively low. A total Nitrogen 2022 - early 2023 graph presented from secondary data* illustrates a trend that is likely decreasing and states it's in the 'worst 50% of all sites'. The graph shows a decreasing trend near the end of the year from October - December, indicating the conductivity has been recently worsened, overall contributing to the state of the algae.

*https://www.lawa.org.nz/explore-data/hawkes-bay-region/river-quality/tukituki-river/tukituki-at-red-br-niwa/

Findings/Conclusion, Part 2

Finally, while sketching and photographing the two rivers, I observed many things related to vegetation and river banks. To begin with, the Tūtaekurī river, as illustrated in figures 10-11, lush vegetation is common and large bushy trees are distinguished along the river banks. The presence of vegetation not only provides adequate shading and temperature regulation, but also a many native plants to flourish, providing essential habitats for the ecosystem and aquatic organisms living in the river. The surface of the area surrounding the river consist of gravel and stones, providing protection against water force and acts as a barrier to prevent erosion. All these factors prevented the river from possibly being more extensively damaged by Cyclone Gabrielle, compared to the Tukituki which didn't have these factors as strongly as the Tūtaekurī. Vegetation wasn't uncommon at the Tukituki awa, but was less extensive as the Tūtaekurī, we can see from this photograph below that trees and bush were situated much further back from the riverbank. As the Tukituki river is less densely vegetated, it results in less shading of the river, impacting temperature regulation and habitat diversity along the river, potentially impacting the growth and reproduction of aquatic life. The sparse vegetation of the Tukituki river left it vulnerable for damage inflicted by Cyclone Gabrielle, as it had less protection compared to the Tūtaekurī. While the surface of the Tukituki was littered with gravel which is good for erosion prevention, the limited distribution of vegetation could leave the awa with more long-lasting damage after weather events, making it harder for the community to reconstruct it. Understanding the variations of vegetation between the two rivers is crucial and is important for ensuring the preservation of it's Mana Whenua, emphasizing the rivers significance to the local community and what we can do to help.

Photo of the Tukituki river at Tennant Road

In conclusion, the analysis between the Tūtaekurī and Tukituki awa has provided us with extensive knowledge and insight of the ecological and cultural significance of the two waterways. Overall, the factors at play have illustrated that the Tūtaekurī river is healthier than the Tukituki, boasting lush vegetation, healthy algae and stunning water clarity. These aspects indicate a thriving ecosystem with favorable conditions for aquatic life, and for the community to enjoy. Cultural characteristics like Mauri and Mana Whenua highlight the rivers importance to the community and how dedicated they are to make it enjoyable for everyone else by keeping it clean and well maintained.

Strengths, Weaknesses & Improvements

During any type of testing, there will be notable things that work well, and things that don't. In light of these findings, opportunities become available such as potential improvements to enhance a better understanding of the awa.

Looking back on our observations about the awa, numerous strengths were identifiable, such as the ease and accessibility of the equipment that was used to test the water. Considering how easy the SHMAK equipment was to use, like the clarity tube and the critter search tray, it enabled us to gather crucial data we needed, that overall assisted us in making informed conclusions of the awas health. We conducted 12 tests, some which were quantitative and some which were qualitative, and this resulted in a range of data. Taking part in 12 different tests, such as water quality, temperature and conductivity, helped us to comprehend the various aspects of the awas health, and identify whether the rivers were healthy or unhealthy. Another strength was the rapid responses we were able to collect from the equipment. Compared to other equipment, which could possibly take days to give results, the SHMAK equipment allowed real-time results of the water quality, water temperature, and various other things. These strengths were beneficial because they allowed for timely action analysis and rapid responses for potential problems to be quickly identified and assessed.

One notable limitation during our data collection was the fact that we only tested things such as the water clarity and velocity, near the edge of the river. Testing the SHMAK material further out into the water could have given us much different results. The depth limitation hindered our ability to access deeper into the water and therefore missed out on studying potential habitat conditions and quality in other sections, overall not fully capturing the overall water quality of that section of the river.

In summary, we managed to get a good general understanding of the awas health, using the resources and amount of time that we had. However, if we were looking for a more precise analysis, I would suggest expanding our locations further down the river, and allowing a whole day to do extensive research about the awa. Starting from southern Hawkes Bay towards Haumoana to test the Tukituki river, and stopping roughly every 25 km to test. The same goes for the Tūtaekurī, beginning at the Kaweka Range and finishing just south of Napier, using all 12 testing methods for every 25 km. By covering multiple points across the river, and engaging in more extensive research such as habitat assessments, a wider range and depth of data could be collected, capturing different conditions the water may be in and a diverse range of habitats. We could also have a better opportunity to really unpack everything at the river, rather than having to write everything down and quickly move on to the next location. Another suggestion would be to utilize digital resources for a more accurate result, an example would be an iPad, that we could enter the results directly into. This would be easy to compare to other teams results. Furthermore, testing during different seasons and weather conditions would enable insight into how the data varies over certain seasons, and the environmental impacts. By adding these improvements, it would make the data more reliable and valid, ultimately allowing a better understanding of the health of the awa.