

Recreation patterns around Te Awa o Ngātoroirangi Maketū Estuary and Kaituna River following rediversion of the Kaituna River

Prepared for Bay of Plenty Regional Council
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Executive Summary

In 2018, work began on the planned partial redirection of the lower Kaituna River into Te Awa o Ngātoroirangi Maketū Estuary. In February, 2020 the culvert gates were opened to allow increased water flow into the estuary. In addition to the anticipated improvements in the estuary ecosystem, changes such as this to the natural environment will likely have social and cultural impacts on the people who live around the estuary and those who visit the area for recreation. Therefore, it was thought to be both useful and important to undertake research to monitor any changes in recreation patterns in response to the changes that are occurring in the natural environment.

In the summer of 2020/2021, research was carried out to investigate social and recreational activities in the Maketū/Te Awa o Ngātoroirangi/Kaituna area. Observations were carried out at five sites in the Maketū area (Maketū Surf Club, Maketū Boat Ramp, Te Tumu Cut, Ford Road Boat Ramp and Bell Road Boat Ramp) to identify:

- Numbers of people involved in recreational activities;
- What activities people were engaged in;
- How these activities varied with season, tide, time of day and weather conditions.

A total of 2,657 observations were completed across the five observation sites. The observations showed that high numbers of people come to Maketū over summer. A range of recreational activities were observed, as expected during the summer period. Walking, sightseeing, swimming and picnicking were all very popular activities. Fishing was also popular, particularly at Te Tumu Cut. Other commonly observed recreational activities included boating, biking, sunbathing, bird watching and sports.

Findings from 2020-2021 have been compared with findings of an earlier study of recreation patterns conducted in 2013, in order to assess whether and how recreational use has changed since the partial redirection of the river. The popularity of recreational activities was very similar to what was observed at the same five locations in 2013. However, the median numbers in the Maketū area were slightly lower per observation period in 2020/2021 than in 2013, while the median number at Te Tumu Cut was slightly higher.

A total of 90 interviews were completed. The participant group in 2020/2021 included more Māori participants than in 2013, and a higher percentage of younger people. People interviewed reported similar recreation patterns to those noted in the observations.

The comments that participants made when interviewed demonstrate the perceived significance of the area to them. The Maketū and Kaituna River areas are valued by some participants as being their home, and for their cultural and spiritual significance. The area is also valued for recreation, from picnicking, swimming and relaxing with whānau to boating, fishing and gathering kaimoana.

Participants reported that they had noticed changes in the tides, with more water flowing through the estuary than prior to the redirection, and boat owners needed to adjust their timing to ensure they could cross the bars safely. Comment was also made by swimmers using the lower estuary around the Maketū diving board that they had noticed the current was a lot stronger and was dangerous at certain times of the tide.

Participants' average health ratings of both the Kaituna River and the estuary had increased from 2013. There were also positive comments about the increase in species such as pipi and about changes in the ecosystem such as the wetlands being restored.

Comments made by key informants demonstrated concern that the redirection has resulted in changes to water flows that may compromise the safety of boats crossing the Kaituna River bar and swimmers in the lower estuary. Further observations will need to be carried out over time in order to ascertain whether and how water flow has changed, and the effects of any such changes on recreation in the area.

This study was carried out less than a year after the opening of the gates to redirect an increased flow from the lower Kaituna River through Te Awa o Ngātoroirangi Maketū Estuary. While participants reported that they had noticed both positive and negative changes following the redirection, the observation data showed that recreation patterns had changed little since 2013. Further monitoring of recreational activities and water flows is recommended, as both may change again over time.



Figure 1: View of Te Awa o Ngātoroirangi Maketū Estuary on opening day (© Bay of Plenty Regional Council – Reprinted with permission)



Figure 2: Waka on the estuary: Kaituna River opening day (© Bay of Plenty Regional Council – Reprinted with permission)

1. Background

The Kaituna River historically flowed through Te Awa o Ngātoroirangi Maketū Estuary into the sea at Maketū. Several diversions were constructed over the years, in particular the opening of a cut at Te Tumu (commonly known as the Kaituna Cut) in 1956. Since this time, the health of the estuary had declined. In 2016, Bay of Plenty Regional Council was granted a resource consent to partially redivert the Kaituna River back into the estuary with the goal of recreating historical wetlands and restoring the health of the estuary through bringing back the freshwater flow. Construction work on the rediversion began in 2018, and in February 2020, the community joined together to celebrate the rejoining of the Kaituna River with Te Awa o Ngātoroirangi Maketū Estuary.

1.1 Recreational Research 2013

In 2013, during preparation of the assessment of environmental effects for the research consent application, a study was commissioned by Bay of Plenty Regional Council to learn more about how people use the lower reaches of the Kaituna River, the estuary and Maketū beach areas for social and recreational purposes (Hamerton, 2014). The research was requested as part of preparation for the resource consent, in order to assess the impacts on users of this proposed partial re-diversion of the Kaituna River back into the estuary.

Research assistants carried out observations on a daily basis at five sites in summer 2013. Observations continued through the autumn-winter period (March – June) on randomly selected days and times to document the following information:

- The numbers of people involved in activities in various places around the river and estuary;
- What activities people were engaged in;
- How activities varied with season, tide, time of day and weather conditions.

In addition, 246 people were interviewed, and asked to rate the health of the lower Kaituna River and Te Awa o Ngātoroirangi Maketū Estuary, to provide information about the value to them of these areas and to give their perceptions of how this proposed partial re-diversion would affect their use of the river and estuary.

The observations showed that high numbers of people come to the Maketū over summer. The most common activities observed were walking and picnicking, followed by swimming (in summer) and fishing. Te Tumu Cut was the most popular spot for fishing, with people observed there at all tide times and even in poor weather. Some activities were tide-dependent and varied with the season, with people collecting shellfish at low tide and more people surf-casting at the estuary mouth during autumn/winter. The counts of vehicles with trailers parked at the boat ramps demonstrated that although numbers are not large, boats are regularly putting out to sea through both the estuary mouth and Te Tumu Cut.

Sixty-two per cent of people interviewed in 2013 were Māori and 30% Pakeha. Ninety per cent lived in the Bay of Plenty and over half were residents of the Maketū /Te Puke /Pukehina area. Many had been visiting Maketū locations for more than five years, and visited at least once a week.

1.2 Kaituna River Rediversion

In 2018, work began on the planned rediversion of the Kaituna River. The following were undertaken as part of this project:

- Earthworks within the estuary in the area of Papahikawai Island to restore the wetlands in the upper estuary and construct a wider channel for the flow from the river into the estuary;
- Construction of a series of 12 culverts, each of which has an automatic control gate that controls the amount of freshwater flowing into the estuary;
- Creation of a 60m wide diversion channel to divert freshwater into the estuary;
- Upgrading of Ford Road Boat Ramp and carpark area from a previously 'private' boat ramp, to one that is now maintained by the District Council;
- Salinity block created to restrict salt water flow into the estuary – this is also now the mooring place for Maketū Coastguard boats. (Further information about the rediversion works is available in Appendix 1.)

Bay of Plenty Regional Council is responsible for monitoring the effects of the rediversion works on both the Kaituna River and Te Awa o Ngātoroirangi Maketū Estuary.



Figure 3: Control gates open into Ford's Cut and estuary (© Bay of Plenty Regional Council – Reprinted with permission)

1.3 Reported Changes since Rediversion

Since the culvert control gates were opened in February 2020, benthic ecology monitoring has been carried out in the estuary, and measures of tidal flow in both the lower Kaituna River and lower part of Maketū Estuary recorded.

1.3.1 Benthic ecology monitoring

The key restoration projects associated with the rediversion returned a total of approximately 45 ha to the estuary (Park, 2020). Monitoring of the area is already demonstrating positive ecological changes within the estuary and surrounding wetlands (Park, 2020). Improvement in sediment condition has been noted, as well as increases in the sea life such as gastropods and crustaceans. Increased current flows through the estuary have been recorded, along with reduction in macroalgae in the channel. In addition, small patches of seagrass have been detected re-establishing in the south east of the estuary (Pim de Monchy, 2 February 2022, personal communication).

Stephen Park (2020) noted that full restoration and improvement would be likely to take some time to reach full potential. He also reported no notable adverse consequences to the ecosystem as a result of the rediversion. Given the kinds of changes reported already, it is possible that recreation patterns in the area will continue to change over time, particularly as shellfish beds and fish return.

1.3.2 Tidal flow monitoring

Tidal flow monitoring over close to a full tidal cycle was carried out by NIWA in February 2021 in the lower Maketū Estuary, and by DHI in December 2021 (Tuckey, 2021). Conditions were not completely similar to the pre-project testing. Nonetheless, measurements of tidal flow showed that the changes in tidal flow were within 20% of predicted flows in pre-project modelling. It is likely that there are multiple factors affecting tidal flow. For instance, the Ford's Cut channel is wider than originally modelled, and the wetland area in the upper estuary also differs from what was modelled. Tuckey has noted that due to these factors, there is likely to be increased water flow both through Ford's Cut and also through the Maketū Estuary entrance (near to the Surf Club).

These studies demonstrate that since the rediversion, increased water flows through the Ford's Cut channel through the estuary are having positive effects on the ecology of the estuary.

2. Aims

Any changes in the natural environment will have social and cultural impacts on the people who live around the estuary and those who visit the area for recreation. Therefore, it was found to be both useful and important to undertake research to monitor any changes in recreation patterns in response to the changes that are occurring in the natural environment of the estuary.

This study investigated social and recreational activities in the Maketū/Te Awa o Ngātoroirangi/Kaituna area. Findings from 2020-2021 have been compared with findings of

the earlier (2013) study, in order to assess whether and how recreational use has changed since the partial diversion of the river.

3. Methodology

Two research assistants carried out observations on selected days at Maketū Surf Club, Maketū Boat Ramp and Te Tumu Cut from 3rd December 2020 to 9th February 2021. As in the previous study, observations recorded the following information:

- Numbers of people involved in activities in various places around the river and estuary;
- What activities people were engaged in;
- How activities varied with season, tide, time of day and weather conditions.

Observations were also carried out at Bell Road and Ford Road boat ramps documenting the numbers of vehicles with trailers parked there, and at what times of the tide. A map showing the observation and survey locations is contained in Appendix 2.

The length of the observation periods varied; on most occasions observers remained at one location for between 2 and 4 hours. If little activity was seen at a site, observers shortened their observation time.

Brief interviews were conducted with people at a number of locations, asking them how often they visited this location, what activities they were engaged in, and what other locations around the Kaituna/Maketū area they also visited and how often. Interviewees were asked to rate the health of the lower Kaituna River and Te Awa o Ngātoroirangi Maketū Estuary, and to provide information about the value to them of these areas. They were provided with information about the partial re-diversion of the Kaituna River and asked how the re-diversion had affected their use of the river and estuary. Demographic information was collected about interview participants that included ethnicity, gender, age and place of residence. A copy of the survey instrument and instructions for interviewers is contained in Appendix 3.

Data has been analysed using Excel to provide descriptive statistics to summarise the observation and interview data. These findings have been presented in tables and graphs below. Comments provided in the interviews were analysed inductively to identify the main themes arising in the data.

4. Findings

In this section, information about weather conditions during the 2020-2021 observation period is summarised first. Following this summary, findings from the observations at each site are presented. For each location, graphs are provided showing total numbers of people counted during each observation period and an overview of the activities in which they were engaged. At the end of each location section is a summary of the observation findings and comparison with findings of the 2013 study. This is followed by discussion of how factors such as tide and weather affected the activities people are engaged in.

The third section contains analysis and interpretation of the interview data, including descriptive statistics of participants’ responses to the questions. The comments that people made are analysed, with quotes provided to illustrate the range of responses received. Interview data is also compared with findings from the 2013 study.

Brief interviews were conducted with some key informants. Their comments are reported following the data from the observations and survey interviews.

4.1 Weather patterns

4.1.1 Sea conditions

During the 10 weeks of observations over summer 2020-2021, sea conditions were generally favourable for recreation. For the majority of observation periods, sea conditions were either smooth or slight. Moderate conditions were observed on a small number of occasions, and slightly more often at Te Tumu Cut than at the two Maketū sites. Figure 4 below summarises the sea conditions over this period.

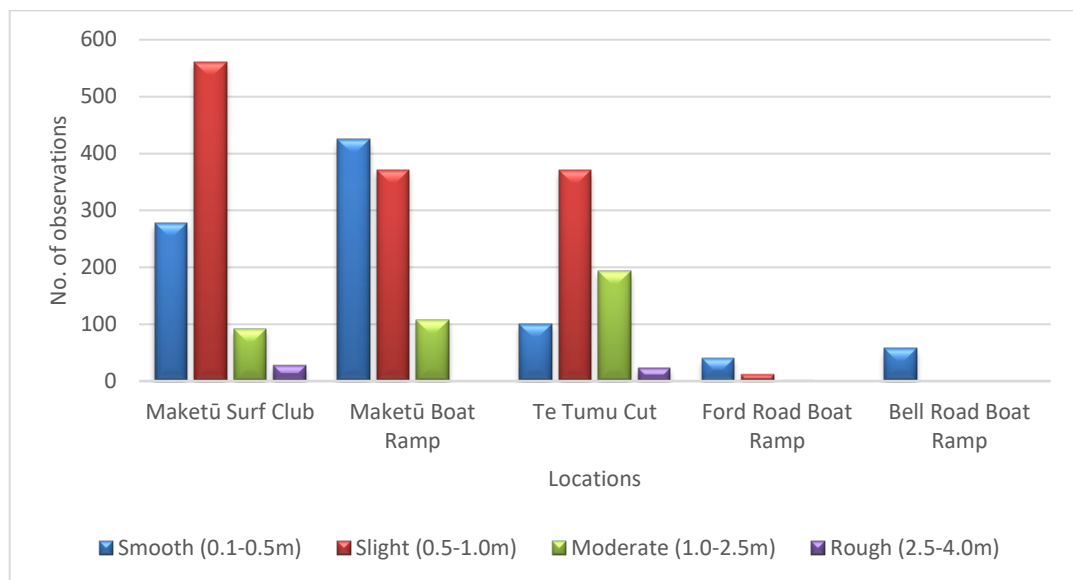


Figure 4: Environmental sea conditions over 10 weeks of observations carried out in summer 2020/2021

4.1.2 Wind conditions

Wind conditions over the observation period were favourable, with either nil or light winds (1-10 knots) during most observations. Medium wind of 11–20 knots was noted only on a very small number of occasions. Figure 5 below summarises the wind conditions during the observation period.

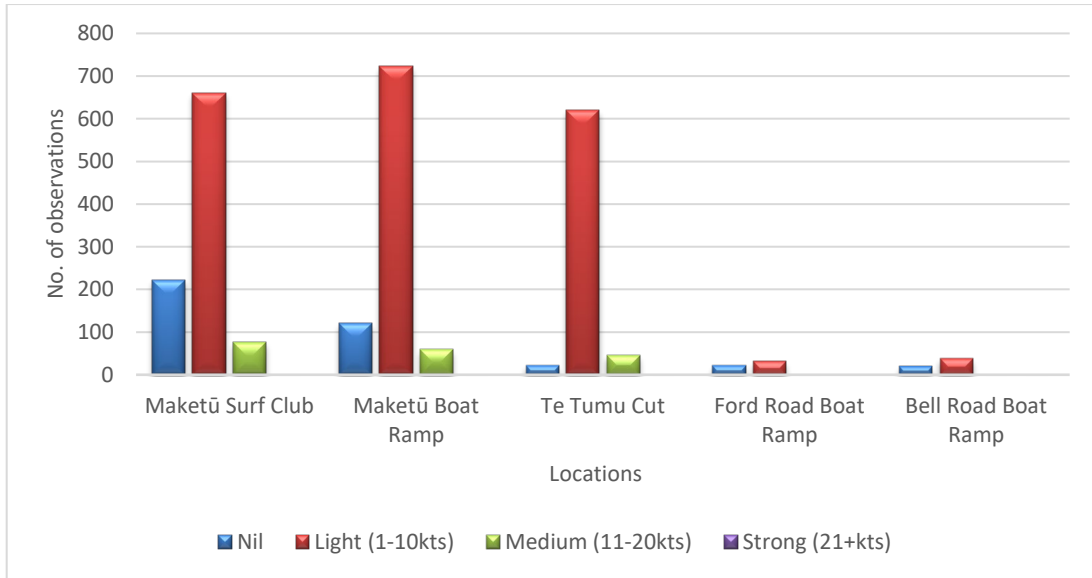


Figure 5: Environmental wind conditions over 10 weeks of observations carried out in summer 2020/2021

4.1.3 Rain conditions

Very little rain fell during the 2020/2021 observation period. Figure 6 below shows the rain conditions during this time.

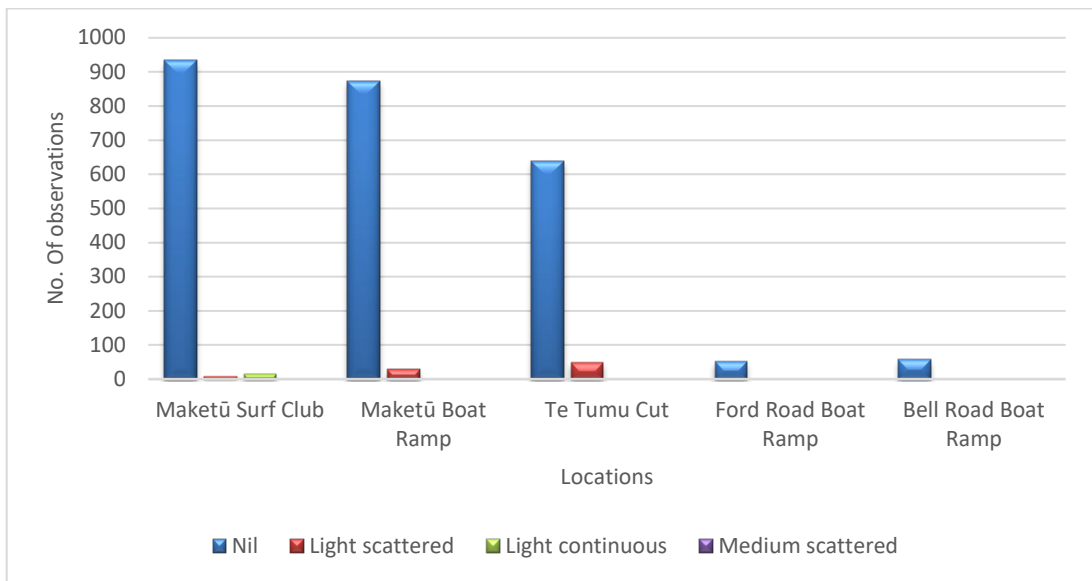


Figure 6: Rain conditions over 10 weeks of observations carried out in summer 2020/2021

4.1.4 Overhead conditions

Conditions were most often either sunny or mainly sunny during the observation period. However, overhead conditions varied across this time, with periods of either mainly cloudy or continuously cloudy weather recorded. Figure 7 below summarises the overhead conditions recorded during this time.

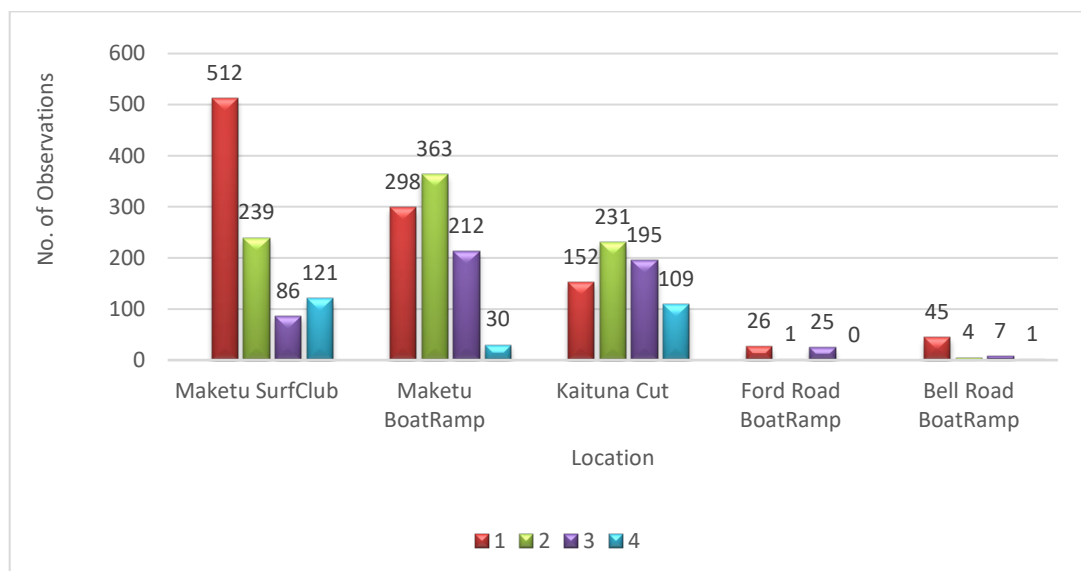


Figure 7: Overhead conditions over 10 weeks of observations carried out in summer 2020/2021

4.1.5 Tide data

Observations were carried out at all locations without any reference to tide times. Tide time data was later extracted from the NIWA Tide Forecaster (www.tides.niwa.co.nz). The following key was used to define tide times:

Tide time	Definition
High tide	30 minutes each side of the predicted high tide time
Outgoing tide	Ebb tide from 30 minute after high tide to 30 minutes before predicted low tide
Low tide	30 minutes each side of the predicted low tide time
Incoming tide	Flood tide from 30 minutes after predicted low tide to 30 minutes before predicted high tide

Information about overall tide times is reported in Figure 8 below. It can be seen from Figure 8 that very few observations at any site were carried out at low tide, and no low tide observations were carried out at Maketū (Surf Club or Boat Ramp) over the summer observation period. Note that Bell Road Boat Ramp has not been included in the tide time data, since it is located approximately 4 kms upstream from the coast.

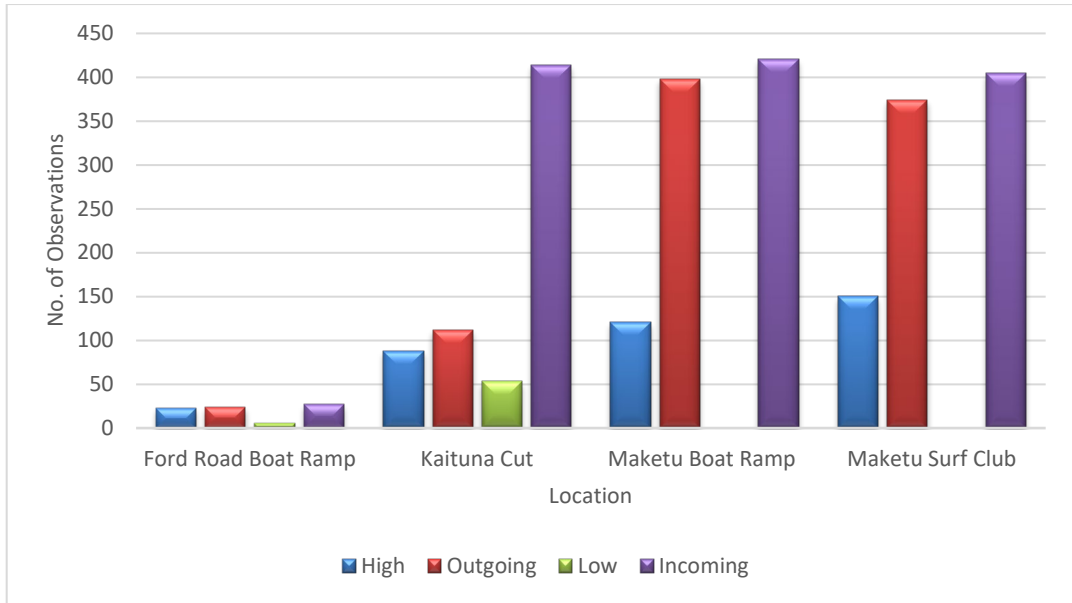


Figure 8: Tide times during observations across the coastal locations

Figure 9 below summarises the numbers of people observed engaging in water-related activities at different tide times across all sites. More people were observed swimming on incoming tides than outgoing tides. A lot more people were observed fishing on the incoming tides. Very few people were observed engaged in activities during low tides, likely due to the small number of observations carried out at low tide.

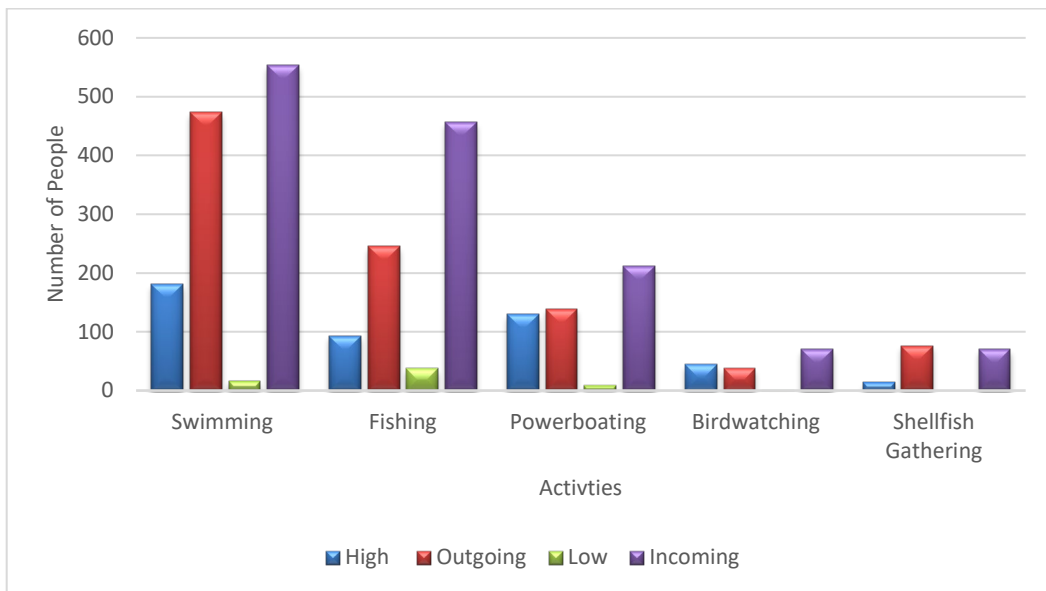


Figure 9: Most common water-related activities at different tide times across all sites 2020/2021

Further comparison of observed activities at different times of the tide is included in the observation findings for specific locations.

4.2 Observations

Regular observations were carried out at Maketū Surf Club, Maketū Boat Ramp and Te Tumu Cut, with less frequent observations at Bell Rd and Ford Rd boat ramps. Information is reported separately for each location.

4.2.1 Maketū Surf Club

Observations were carried out between 2nd December 2020 and 9th February 2021. The weather was fine every day, with rain only on 9th February. Observations were carried out in the mornings on some days, and in the afternoon on others. The average number of people observed in the mornings was 77 people, and in the afternoons the average was 75 people.

The number of people counted in the area (which included the visible beach area immediately out from the Surf Club and the estuary area as far as the “diving board” in the channel) ranged from seven to 157, with the median during this time being 67. Numbers were slightly higher during the January holiday period than in December or February. Figure 10 below shows the totals for each observation time during this period.

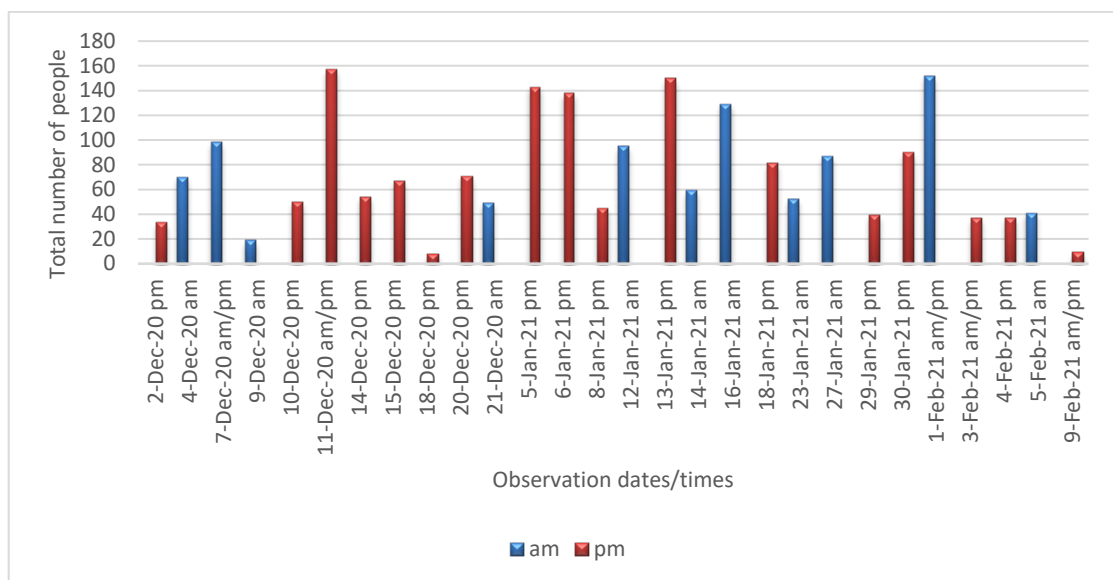


Figure 10: Total numbers of people observed at Maketū Surf Club area Dec 2020 – Feb 2021

Walking was the most popular activity in the Surf Club area, with an average of 35 people walking during each observation period. Sightseeing was also popular, with an average of 30 people. Swimming was another popular activity with an average of 22 people swimming during each observation. However, the numbers of people swimming fluctuated.

Other popular activities were picnicking, with an average of 16 people per observation, biking and surfcasting at the estuary mouth. Smaller numbers of people were engaged in a broad range of other activities in the area around Maketū Surf Club, including sunbathing, powerboating, surfing, boat fishing and sports activities. The average numbers of people observed in specific activities is summarised in Figure 11 below.

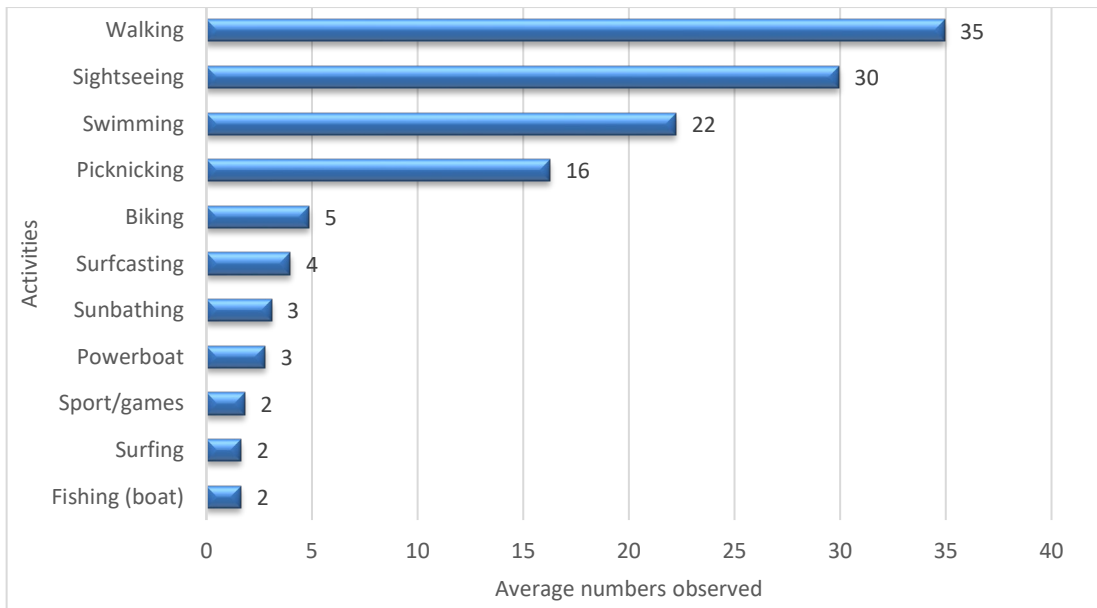


Figure 11: Average numbers of people observed per day engaged in recreation activities

With regard to how activities varied with the tides, more people were observed swimming at Maketū Surf Club on the outgoing tide than at other tide times. Numbers of people fishing were similar on both incoming and outgoing tides. Powerboating was slightly more common on the incoming tide. Figure 12 below summarises the main water-related activities at different times of the tide.

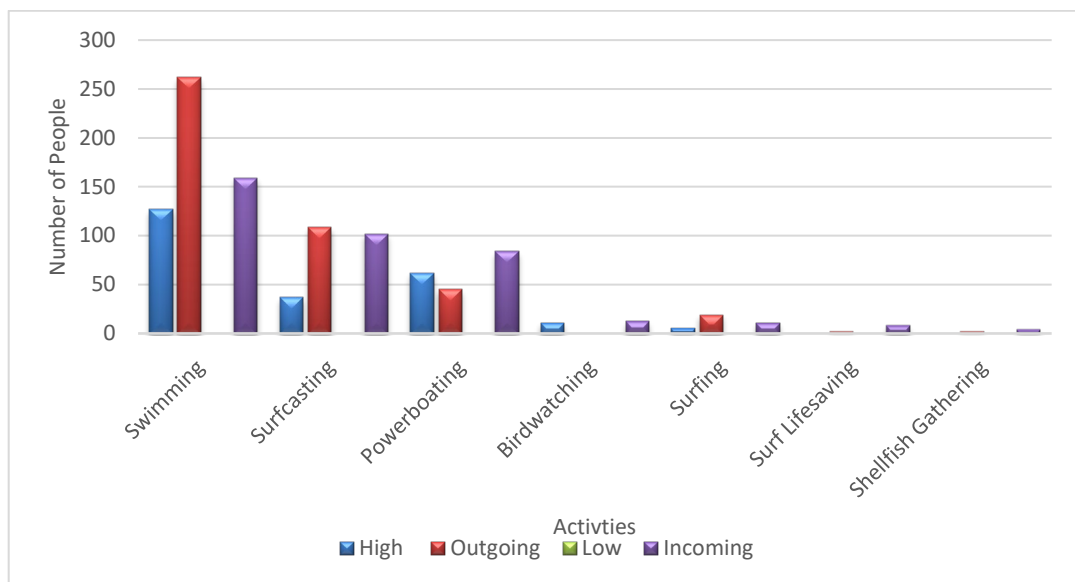


Figure 12: Most common water-related activities compared to tide times at Maketū Surf Club

4.2.1.1 Comparison between 2020/2021 and 2013 activities

The kinds of recreational activities observed in 2020/2021 differed slightly from those observed in 2013. In 2013, more walkers were observed in the Maketū Surf Club area. Also in 2013, more people could be observed sunbathing. In 2021, sightseeing was used as an

additional category, to record those people who were observed either in or close to their cars, who were not engaged in other recreational activities. Sightseeing was not used as a category in 2013. Also in 2020/2021 more people were observed biking in the area. Otherwise, 2013 and 2020/2021 figures were very similar. Figure 13 below summarises the main activities observed in 2013 and 2020/2021.

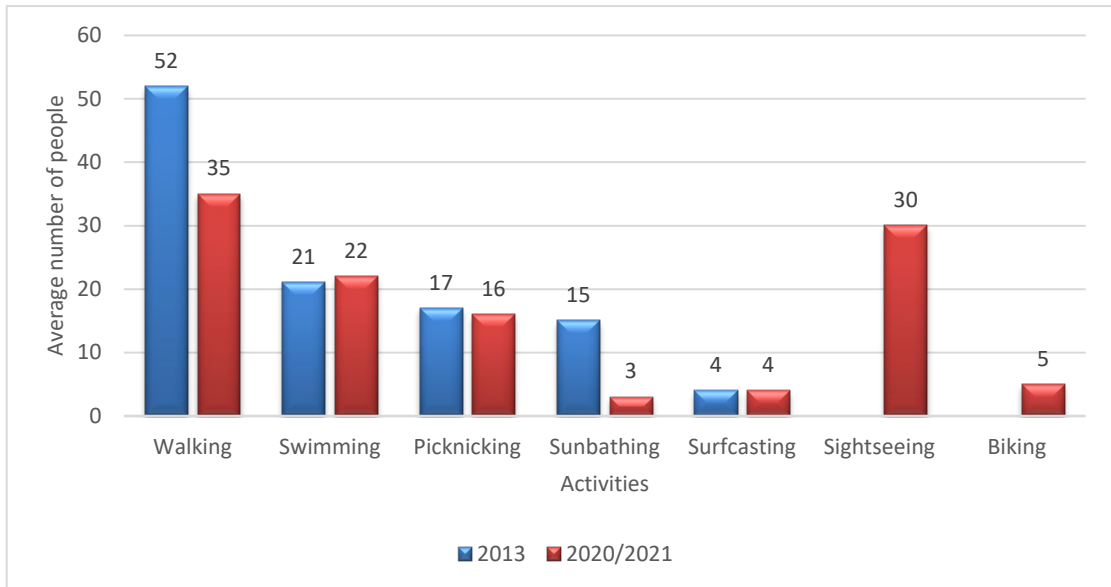


Figure 13: Average numbers of people engaged in recreational activities at Maketū Surf Club in 2013 and 2020/2021

4.2.2 Maketū Boat Ramp

Observations were carried out from the car park adjacent to the Maketū Boat Ramp on most days between 2nd December 2020 and 9th February 2021. From this location, researchers were able to observe activities being carried out in the upper part of the estuary as well as in the car park itself and adjacent park area. The number of people counted in this area during a single observation period varied from 16 to 369, with the median being 61. Numbers of people observed during this summer period can be seen in Figure 14 below. On the day when 369 people were observed in the area, two separate school trips accounted for most of this number.

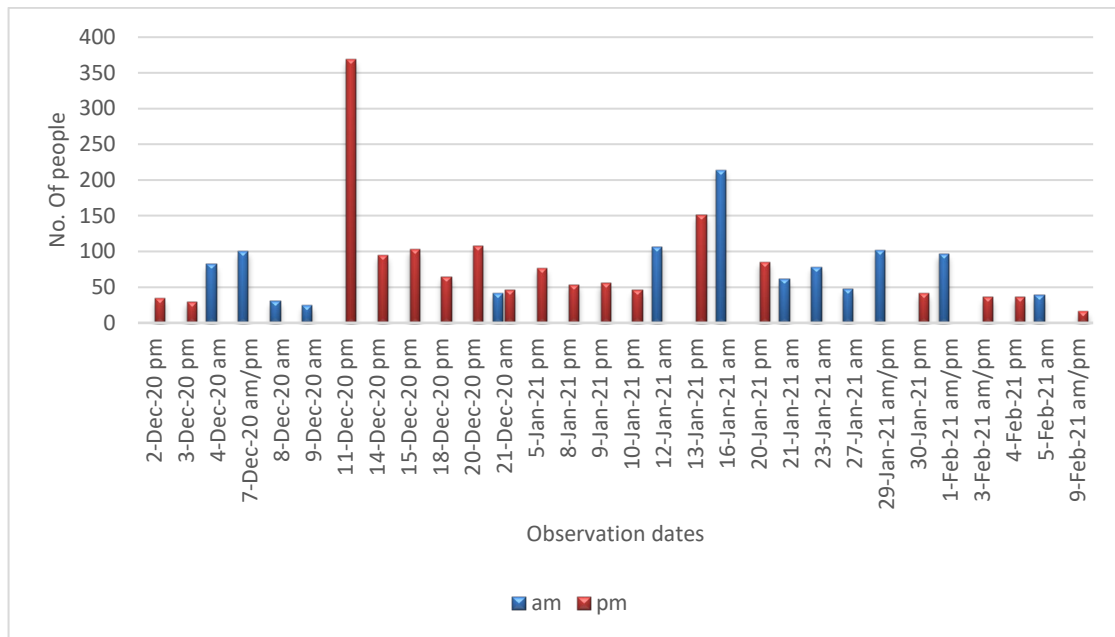


Figure 14: Total numbers of people observed at Maketū Boat Ramp December 2020 – February 2021

Walking was the most popular activity in the Maketū Boat Ramp area, with an average of 27 people per observation. Picnicking and sightseeing were the two next most popular activities; this is likely to be because of the adjacent park area. The highest number of people picnicking was on a Friday before Xmas when two school groups were in the area. Swimming was also popular, with an average of 16 people per observation period, and 222 people observed swimming on the day that the school trips were happening.

Sports, biking, power-boating and shellfish collecting were also popular activities, with people observed gathering shellfish in the estuary above the boat ramp. Both boating and shellfish gathering were tide-dependent.

Figure 15 below illustrates the average number of people engaged in the various activities across the December 2020 – February 2021 period.

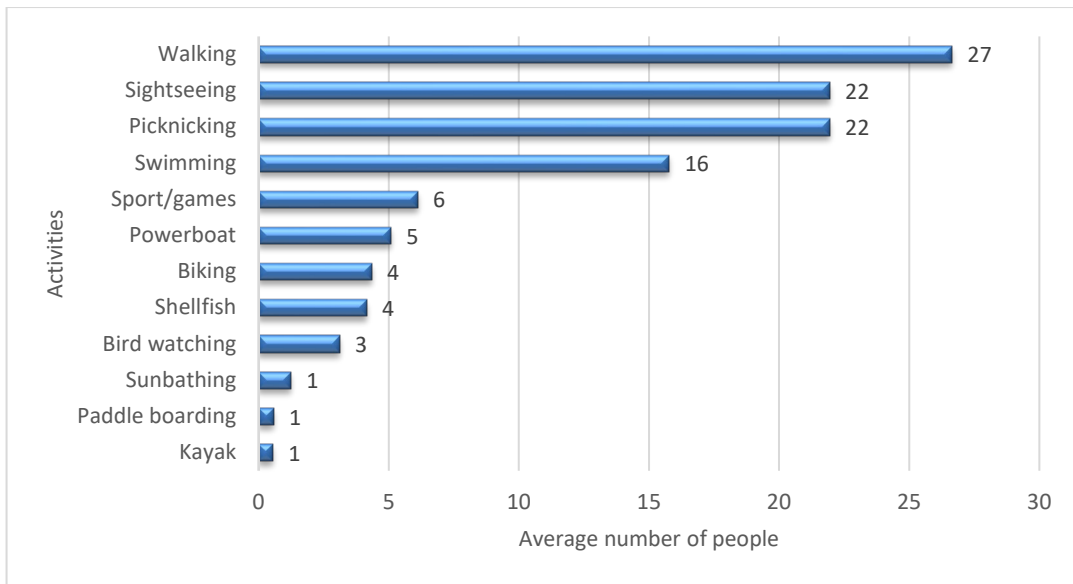


Figure 15: Average number of people engaged in recreation activities at Maketū Boat Ramp December 2020 – February 2021

Information about the numbers of vehicles with boat trailers parked at the Maketū Boat Ramp was also collected during each observation period. The number of vehicles with trailers parked at this location varied from 0 to 19, with the average overall being three. Figure 16 below displays the numbers recorded per observation.

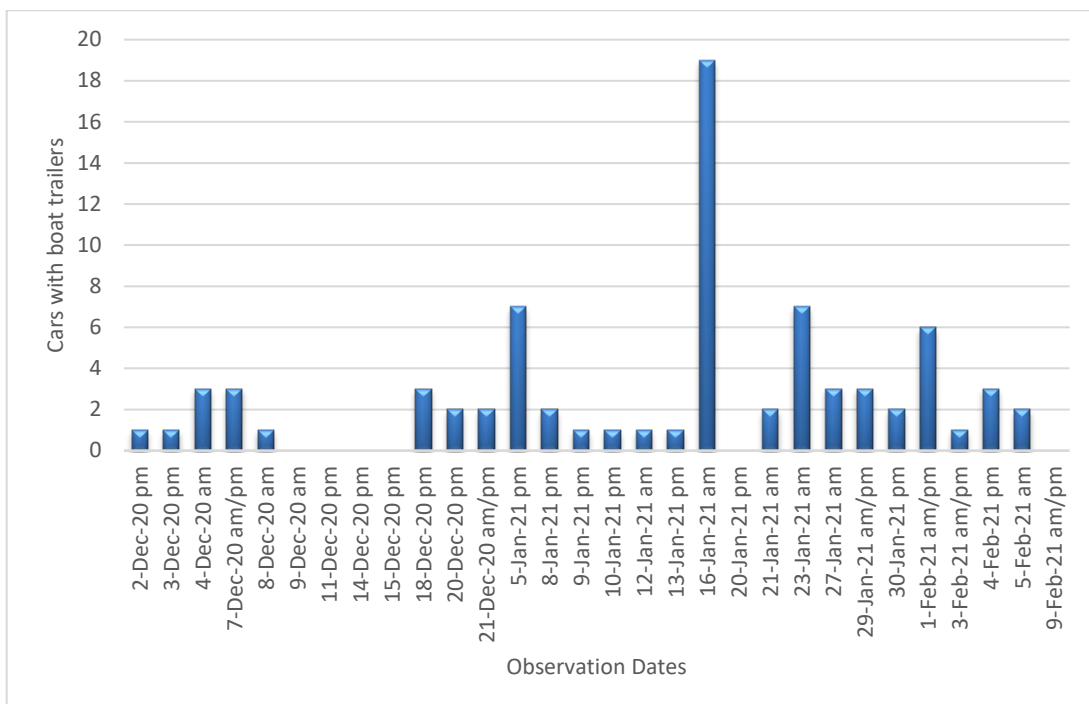


Figure 16: Numbers of vehicles with trailers observed at Maketū Boat Ramp 2020/2021

Fewer vehicles with trailers were observed in 2020/2021 than numbers observed during summer 2013. During the summer of 2013 an average of six vehicles with trailers per observation period was recorded. On 16th January when 19 cars with trailers were counted, observations were carried out at high tide, just as the tide was beginning to go out. During

this observation period, seven boats came in through the bar as the tide was beginning to go out.

4.2.2.1 How activities varied with the tide

At Maketū Boat Ramp the most popular water-related activity was swimming. A lot more people were observed swimming on the incoming tide than the outgoing tide. Surfcasting was also more popular on the incoming tide. Shellfish gathering was popular on both incoming and outgoing tides around the low tide times. Figure 17 below summarises how activities varied with the tide at Maketū Boat Ramp.

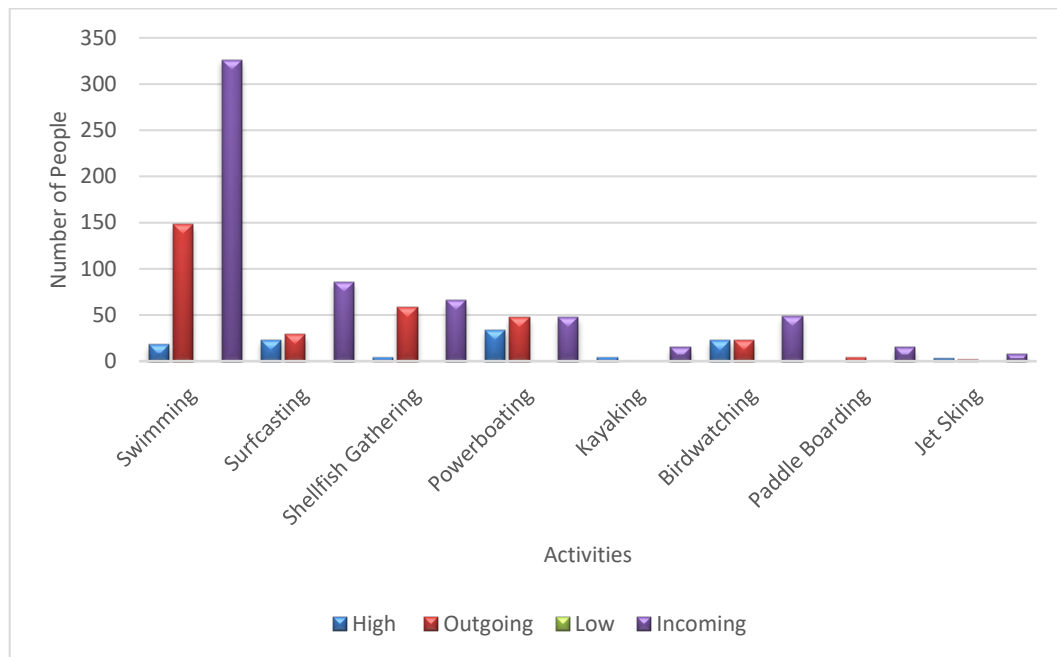


Figure 17: Most common water-related activities at Maketū Boat Ramp at different tide times

4.2.2.2 Comparison between 2020/2021 and 2013 activities

The kinds of recreational activities observed in 2020/2021 differed slightly from those observed in 2013. In 2013, more walkers were observed in the Maketū Boat Ramp area and more people could be observed sunbathing. More people were engaged in sport or games in 2013. In 2021, sightseeing was used as an additional category, to record those people who were observed either in or close to their cars, who were not engaged in other recreational activities. Otherwise, 2013 and 2020/2021 figures were very similar. Figure 18 below summarises the main activities observed in 2013 and 2020/2021.

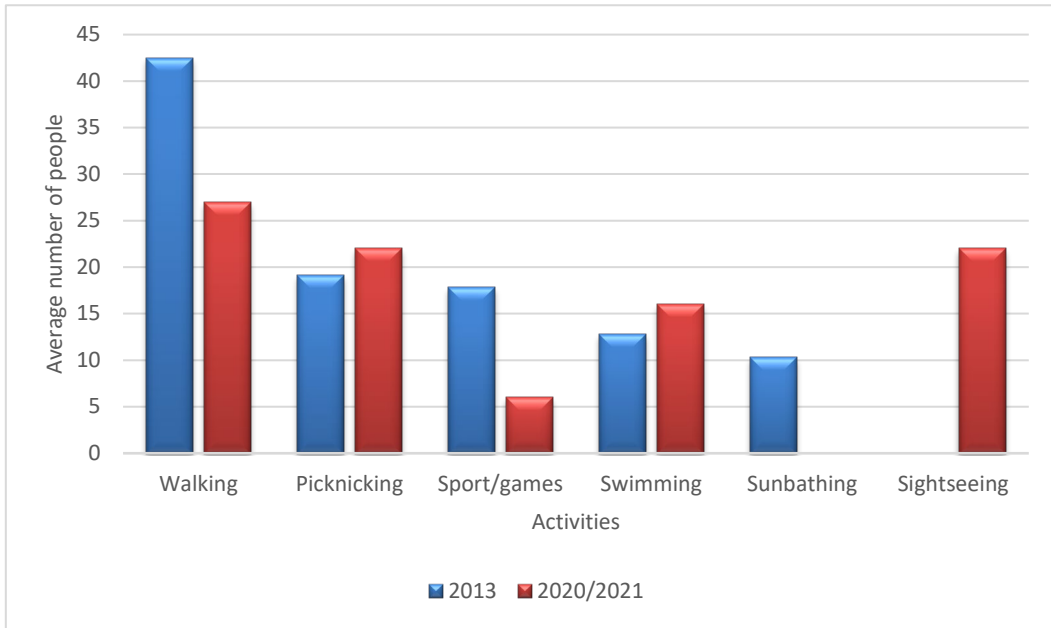


Figure 18: Average numbers of people engaged in recreational activities at Maketū Boat Ramp in 2013 and 2020/2021

4.2.3 Te Tumu Cut

The total number of people at Te Tumu Cut during each observation period varied from five during an early morning in December to 184 people on one weekday afternoon in early January. Overall, afternoons were a more popular time than mornings, with 33 the median number of people observed in the morning, and 65 in the afternoon. There were always people at this location when observations were carried out, even early in the morning and later in the evening. Higher numbers of people were counted on weekends and public holidays. Figure 19 below shows the total numbers counted during each observation period.

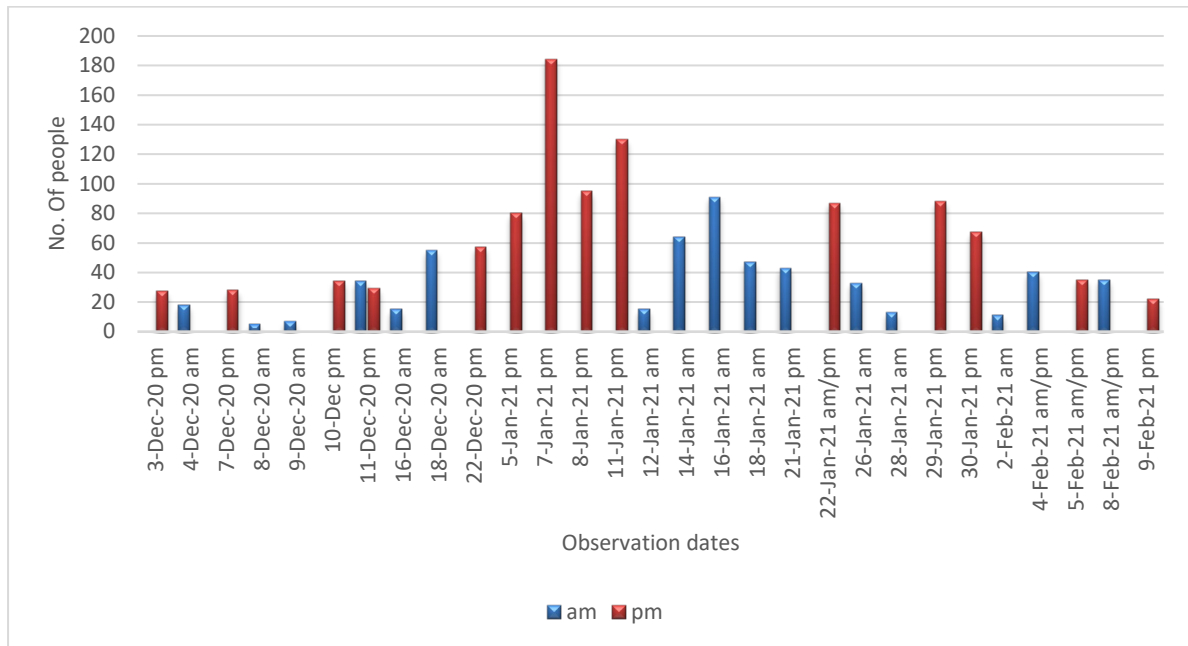


Figure 19: Total numbers of people observed at Te Tumu Cut



Figure 20: Fishing at Te Tumu Cut, January 2021

Figure 21 below shows the main activities in which people were engaged at this location. Fishing was the most popular activity observed at Te Tumu Cut. The fishing category included people surfcasting on the beach, and fishing off the groyne and along the river bank. People fishing from boats have been measured separately. On several days there were no people fishing, and the maximum number observed during one observation period was 59, with the median number being 23. Walking, boating and sightseeing were also popular activities. On average 14 people were walking during each observation period.

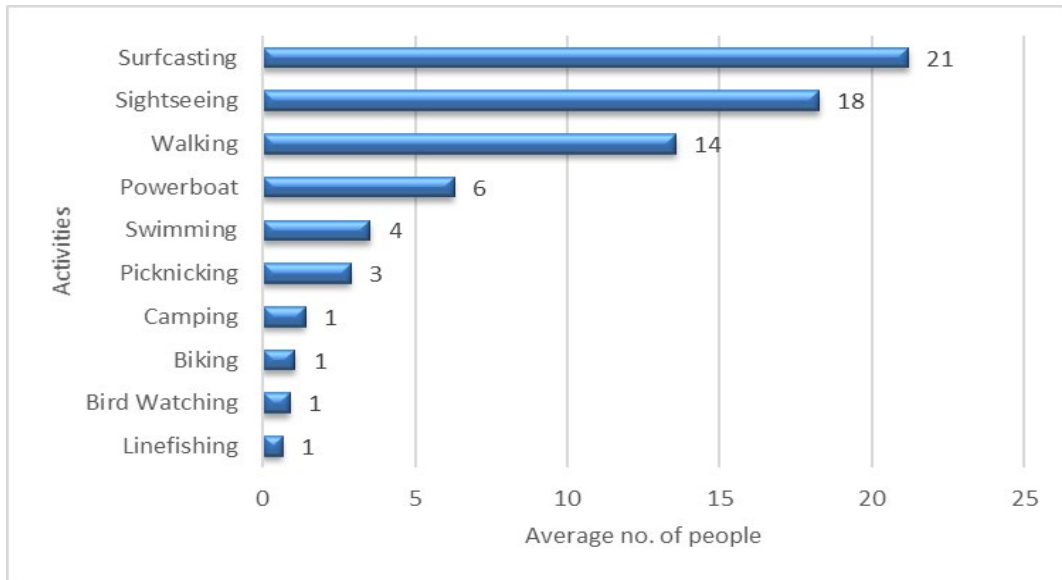


Figure 21: Average numbers of people engaged in recreational activities at Te Tumu Cut

4.2.3.1 How activities varied with the tide

Fishing was much more popular at Tumu Cut on the incoming tide than at any other time of the tide. Swimming and boating were also both more popular on the incoming tide. However, people could be found swimming at the location at all tide times. Figure 22 below summarise the water-related activities carried out at different tide times at Te Tumu Cut.

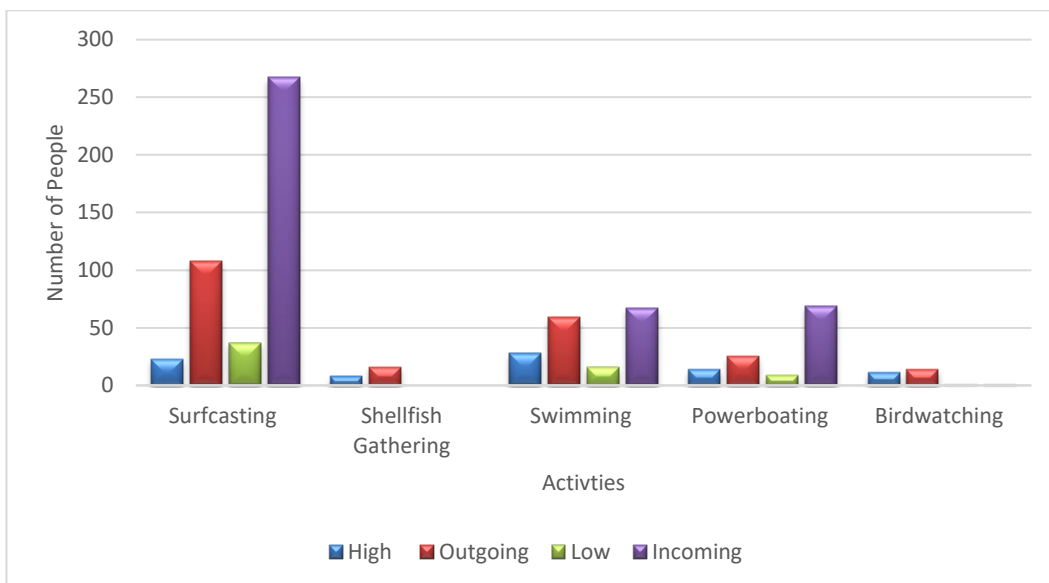


Figure 22: Most common water-related activities at Te Tumu Cut at different tide times

4.2.3.2 Comparison between 2020/2021 and 2013 activities

Fewer people were observed fishing in 2020/2021 than in 2013, although fishing was still the most popular activity observed at Te Tumu Cut. More people were observed walking in the area in 2020/2021, and as mentioned previously people were observed sightseeing. Fewer people were seen picknicking, and noone was observed sunbathing in 2020/2021. The numbers of people swimming were small, and similar for both observation periods. Figure 23 below summarises these comparisons.

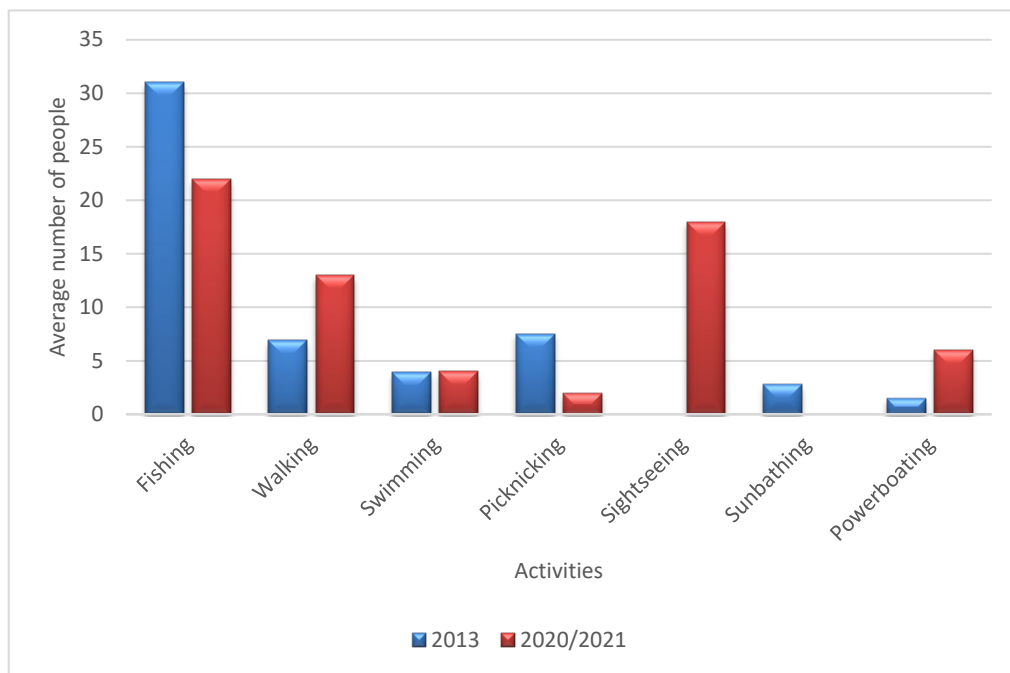


Figure 23: Average numbers of people engaged in recreational activities at Te Tumu Cut in 2013 and 2020/2021

4.2.4 Ford Road Boat Ramp



Brief observations were carried out at Ford Road Boat Ramp on 11 separate occasions between 4th December 2020 and 16th January 2021. The number of people observed varied from one to 31. Figure 25 below shows the total numbers of people in the area at each observation period.

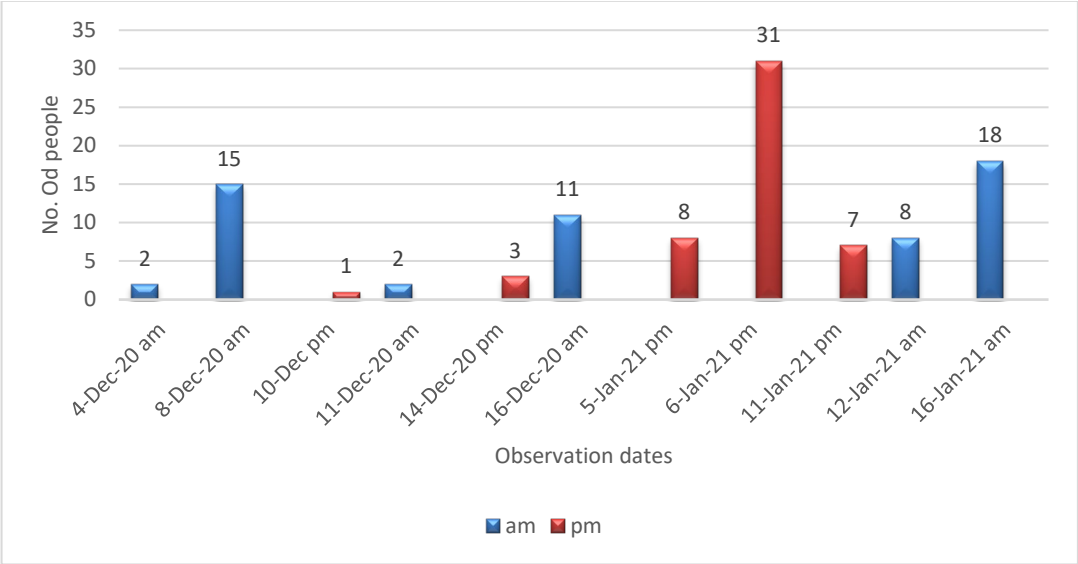


Figure 25: Numbers of people observed at Ford Road Boat Ramp

Although only a small number of people were observed at Ford Road Boat Ramp, they were engaged in a range of activities. Powerboating was by far the most commonly observed activity. People were also observed sightseeing, fishing and in dinghies, with smaller

numbers walking, jetskiing, paddle-boarding and kayaking. Figure 25 below summarises the activities observed.

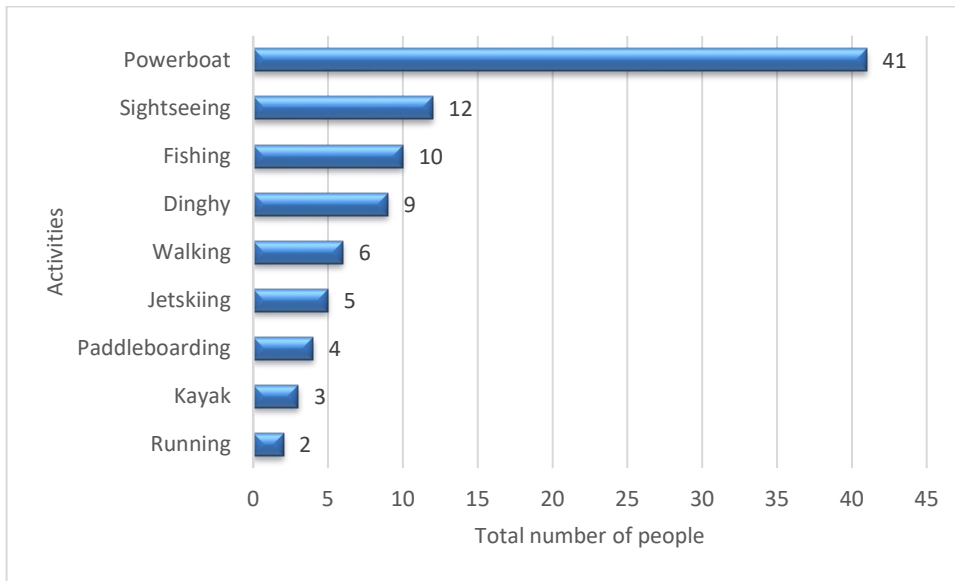


Figure 26: Total numbers of people engaged in recreational activities at Ford Road Boat Ramp

The number of vehicles with boat trailers at Ford Road Boat Ramp was counted at each observation. Numbers varied considerably from some days on which there were no vehicles with trailers, through to 24 vehicles and trailers counted on 16th January 2021. An average of five vehicles with trailers was observed across the observation periods. The median number of vehicles with trailers observed was two. Figure 26 below records the numbers of vehicles with trailers parked at this location during each observation. The large number of vehicles with trailers on the morning of 16th January was counted just before high tide.

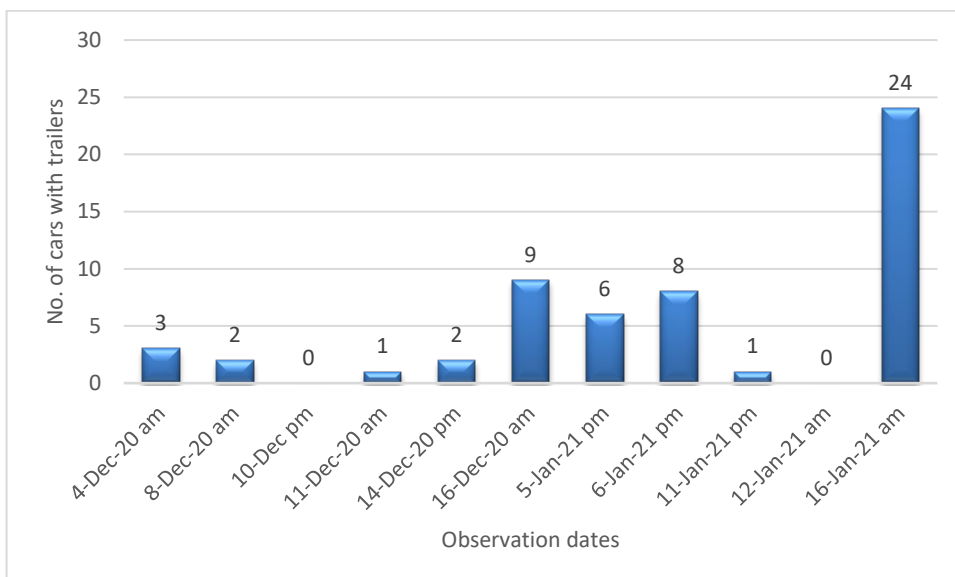


Figure 27: Numbers of vehicles with trailers observed at Ford Rd Boat Ramp

4.2.4.1 How activities varied with tide

Because so few observations were carried out at Ford Road Boat Ramp, it is difficult to say with certainty how activities varied with the tide. A lot of activities were observed at all tide times. Surfcasting and swimming were popular at high tide; birdwatching and paddle boarding were both popular on incoming tides. Figure 28 below summarises how activities varied in relation to tide times.

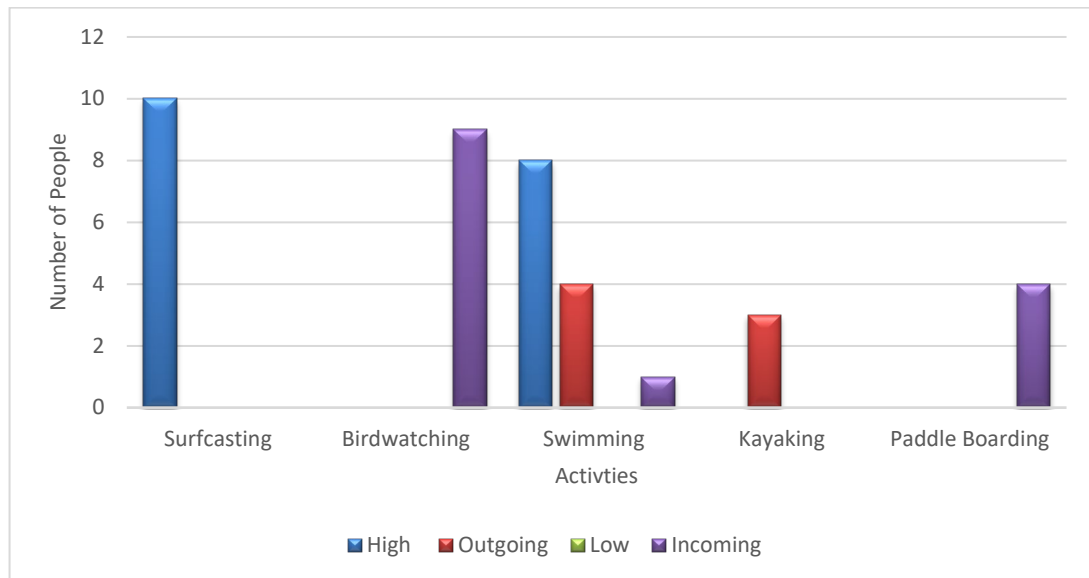


Figure 28: Most common water-related activities in relation to tide times at Ford Road Boat Ramp

4.2.4.1 Comparison with 2013

In 2013, a lot more observations (n=36) were carried out at Ford Road Boat Ramp than in 2020/2021. Patterns in 2013 were very similar, with several days when no vehicles with trailers were observed, and on one day 22. The median number of vehicles observed in 2013 was two - the same as in 2020/2021. However, the average number was lower in 2013 at 3.75, compared with an average of 5 in 2020/2021.

The data demonstrate that usage patterns for the Ford Road Boat Ramp are similar in 2020/2021 to patterns in 2013. In both summers, there were days with no vehicles with trailers, a small number of days with larger numbers, and a median number of two across all the observations. As part of the redirection works, the Ford Road Boat Ramp underwent major reconstruction, but this does not seem to have affected usage patterns to any great degree.

4.2.5 Bell Road Boat Ramp

Observations were carried out at Bell Rd Boat Ramp on ten occasions. The number of people counted varied from one to 52, and the median number observed was six. Figure 28 below records the numbers of people observed at Bell Road Boat Ramp at each observation.

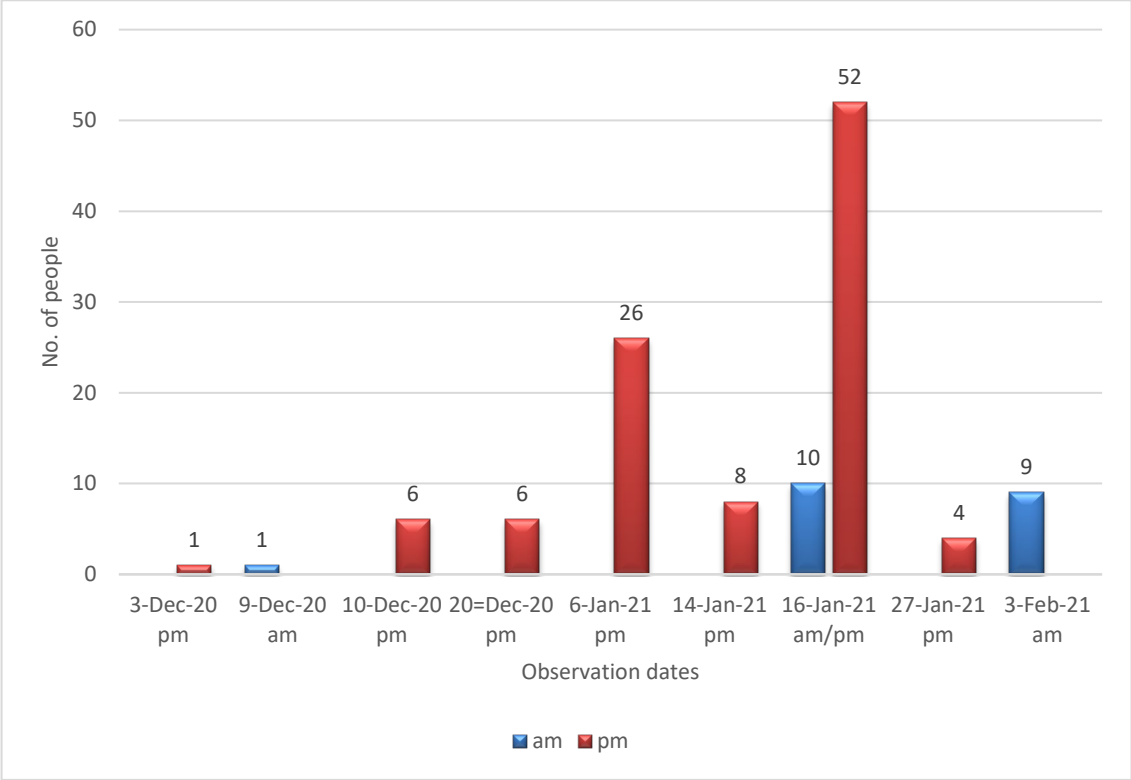


Figure 29: Numbers of people observed at Bell Road Boat Ramp in summer 2020/2021

On most of these occasions, people were observed sightseeing in the area. Powerboating was also a popular activity, since boat owners often launch their boats at Bell Road Boat Ramp and travel downriver approximately four kilometres to access the open sea via Te Tumu Cut. Swimming, walking, biking and jetskiing were also popular activities on some occasions. In addition, people were observed fishing on the riverbank, picnicking and kayaking. Figure 30 below records the activities that were observed at Bell Road Boat Ramp.

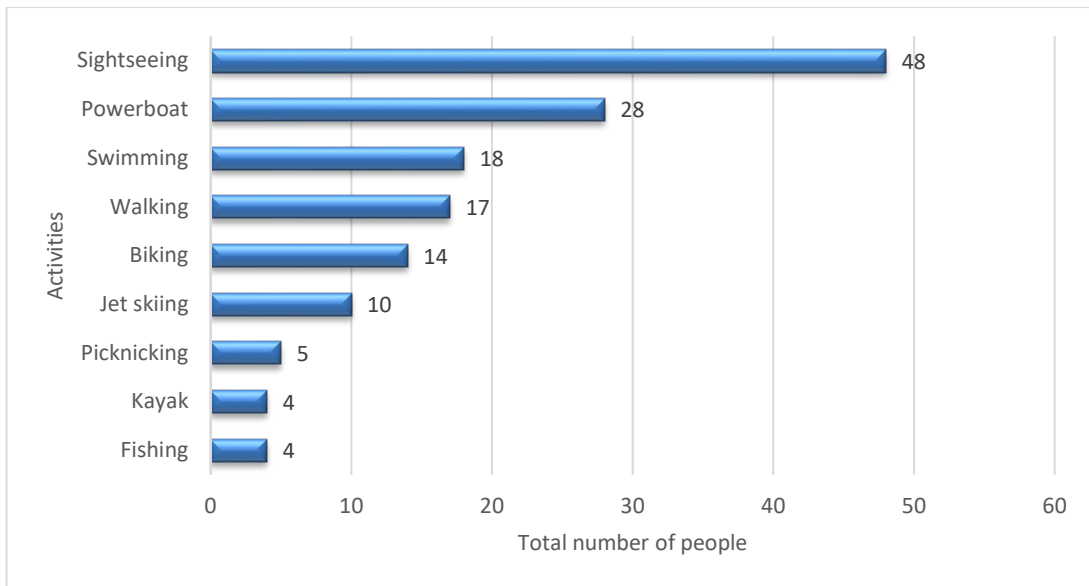


Figure 30: Total number of people engaged in activities at Bell Road Boat Ramp

On three occasions no vehicles with trailers were parked at this location. At the other observation times one or two vehicles and trailers were parked. On one occasion, 18 vehicles with trailers were parked at Bell Road Boat Ramp. The average number of vehicles with trailers per observation was 3.7, and the median number was 1. Figure 31 below summarises the numbers of vehicles with trailers observed.

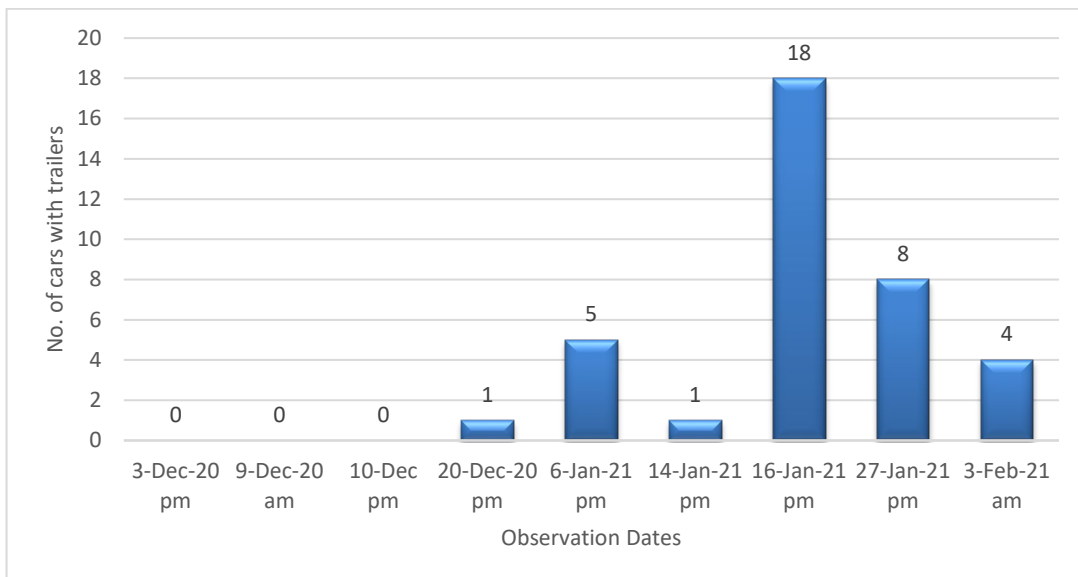


Figure 31: Numbers of vehicles with trailers observed at Bell Rd Boat Ramp

4.2.5.1 Comparisons between 2020/2021 and 2013

Fewer observations at Bell Road Boat Ramp were carried out in 2020/2021 (n=9) compared to 2013 (n=20). In 2020/2021, the number of people at Bell Road Boat Ramp was quite high, and people were engaged in a wide range of recreational activities. However, powerboating remained a popular activity.

More vehicles with trailers were parked at Bell Road Boat Ramp in 2020/2021 compared with 2013. The number of cars with trailers was fairly consistently higher. In 2013, the median number was one, whereas in 2020/2021, the median number was also one. However, the average number in 2013 was 0.9, and in 2020/2021 was 4.1.

With the development of the new Eastern Expressway and the associated cycleway, better access is available for cyclists to Bell Road Boat Ramp. This has resulted in cyclists being observed there in 2020/2021. It is possible that the increase in the number of cars with trailers is also related to the growth in the number of people living in Pāpāmoa. Bell Road Boat Ramp is a very accessible boat ramp for people in Pāpāmoa who may wish to access the ocean via Te Tumu Cut.

4.2.6 Summary of Observation Data

A total of 2,657 observations were completed between 2nd December 2020 and 9th February 2021 across the five observation sites. Throughout the observation period, weather conditions were mostly good.

The observations showed that high numbers of people come to Maketū over summer, with median numbers of 67 people each observation period for Maketū Surf Club and 61 for Maketū Boat Ramp. A range of recreational activities were observed, as expected during the summer period. Walking and sightseeing were the most popular activities across all sites. Swimming and picnicking were also very popular activities. Fishing was very popular, particularly at Te Tumu Cut. Other commonly observed recreational activities included boating, biking, sunbathing, bird watching and sports.

Around the lower part of the estuary (Maketū Surf Club and Maketū Boat Ramp), patterns were very similar, with walking, sightseeing, picnicking and swimming all very popular. At Maketū Surf Club, people were swimming on both incoming and outgoing tides. At Maketū Boat Ramp, people were more often observed swimming on the incoming tide.

At Te Tumu Cut, recreation patterns were slightly different, with fishing the most popular activity, followed by sightseeing and walking. Powerboating was also most popular at Te Tumu Cut.

Vehicles with trailers were observed at all three boat ramps, although there were days at all of these locations when no vehicles with trailers were observed. The presence of vehicles with trailers varied with the tides.

The popularity of activities was very similar to what was observed at the same five locations in 2013. However, the median numbers in the Maketū area were slightly lower per observation period in 2020/2021 than in 2013, while the median number at Te Tumu Cut was slightly higher. Figure 32 below summarises the median numbers of people observed at each of the main sites.

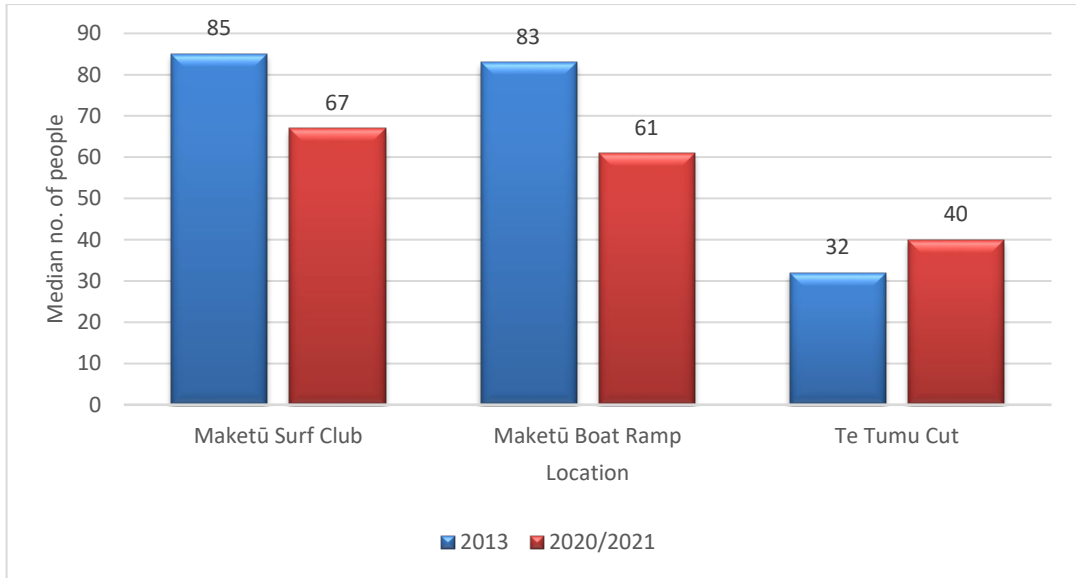


Figure 32: Median numbers of people observed at three main sites 2013 and 2020/2021

Although there are slight changes in both the numbers of people observed and in the most popular activities, there has been very little change in recreation around the Maketū area following the rediversion of the Kaituna River.

4.3 Survey Findings

During their observation periods, the two research assistants also conducted brief surveys with people at each of the sites. A total of 90 surveys were completed. Table 1 below shows the total number of interviews completed at each location.

Table 1: Interview locations

Location	Number of Interviews
Te Tumu Cut	35
Maketū Surf Club	29
Maketū Boat Ramp	20
Ford Road Boat Ramp	4
Bell Road Boat Ramp	1
No location recorded	1
TOTAL	90

4.3.1 Demographic Information

Thirty-one survey respondents were female, and 40 were male. Gender was not reported for 19 people. Respondents could record more than one ethnicity. Seventy-four per cent of participants were Māori and 39% Pākehā. The ethnic breakdown of participants is shown in Table 1 below. These breakdowns have been compared with census data for Maketū from the 2018 census. The percentage of Māori respondents is higher than the census figures, and the percentage of Pākehā is lower than the census figures. Pākehā is the only group under-represented in the survey respondents.

Table 2: Participants' reported ethnicity

Ethnicity	No. of respondents	Percentage¹	Census percentages 2018¹
Māori	67	74.4%	66.9%
Pakeha/NZ European	35	38.9%	47.6%
Pacific Island	11	12.2%	7.8%
Asian	2	2.2%	1.0%
Other ethnicities	9	10%	0.8%

Participants were from a broad spread of age groups. Approximately 53% were aged under 40, and approximately 34% aged 40 or over. Age was not reported for 11 participants. Figure 33 below summarises the age ranges of participants.

¹ Percentages add up to more than 100% because data collection allows respondents to name more than one ethnicity.

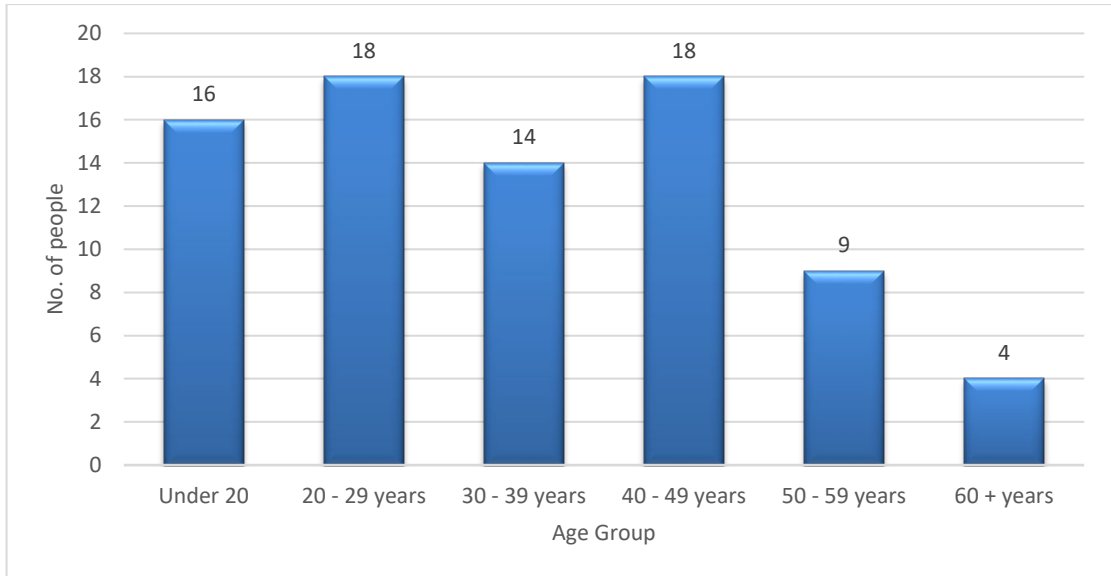


Figure 33: Participants' age groups

Thirty per cent of the people interviewed (n=27) reported that they lived in Maketū, and a further 24% (n=22) were from the wider Tauranga area. Thirty-seven percent (n=33) were from elsewhere in the Bay of Plenty, with only 7% (n=6) living somewhere else in New Zealand. Table 3 below summarises interviewees' reported place of residence.

Table 3: Respondents' place of residence

Respondents' place of residence	No. of respondents	Percentage
Maketū/Te Puke/Pukehina	27	30%
Wider Tauranga area	22	24%
Bay of Plenty	33	37%
Elsewhere in New Zealand	6	7%

4.3.1.1 Comparison between demographics of 2020/2021 and 2013 interviewees

Fewer people were interviewed overall in 2020/2021 than in 2013. As in 2013, Te Tumu Cut was a popular place for interviewing in 2020/2021.

The percentages of people who reported they were of Māori ethnicity was slightly higher in 2020/2021. There was also a slightly higher percentage of Pacific Island people interviewed in 2020/2021. Also, more participants in 2020/2021 reported multiple ethnicities. Table 4 below summarises these differences.

Table 4: Differences in ethnicity between 2013 and 2020/21 interviewees

Ethnicity	Percentage 2013	Percentage 2020/2021
Māori	62%	74.4%
Pakeha/NZ European	30%	38.9%
Pacific Island	1.6%	12.2%
Asian	0.8%	2.2%
Other ethnicities	2.4%	10%

The age range of respondents was different in 2020/2021 and 2013. In 2020/2021 there was a higher percentage of younger respondents than in 2013. In 2020/21, 39% of respondents were 40 years or older, compared with 2013 when 57% of respondents were in this age range. Figure 34 below shows the comparative age group data.

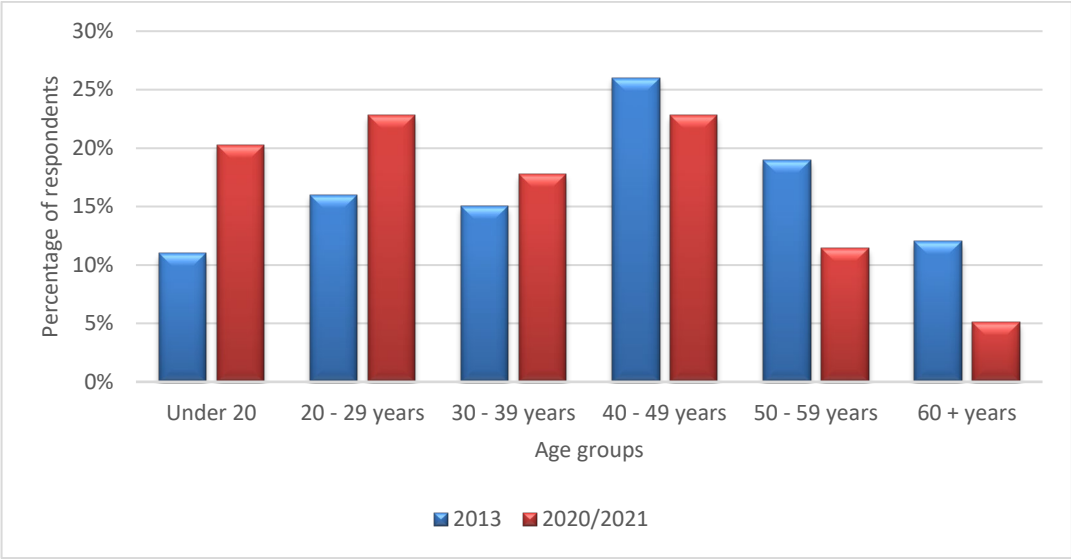


Figure 34: Comparison of survey respondents’ age groups between 2020/2021 and 2013

Slight differences were also found in survey respondents’ reported place of residence. A smaller percentage of respondents in 2020/2021 were from the Maketū area, or from elsewhere in New Zealand. In 2020/2021 Greater percentages of respondents were from Tauranga and the wider Bay of Plenty area. Figure 35 below summarises these differences.

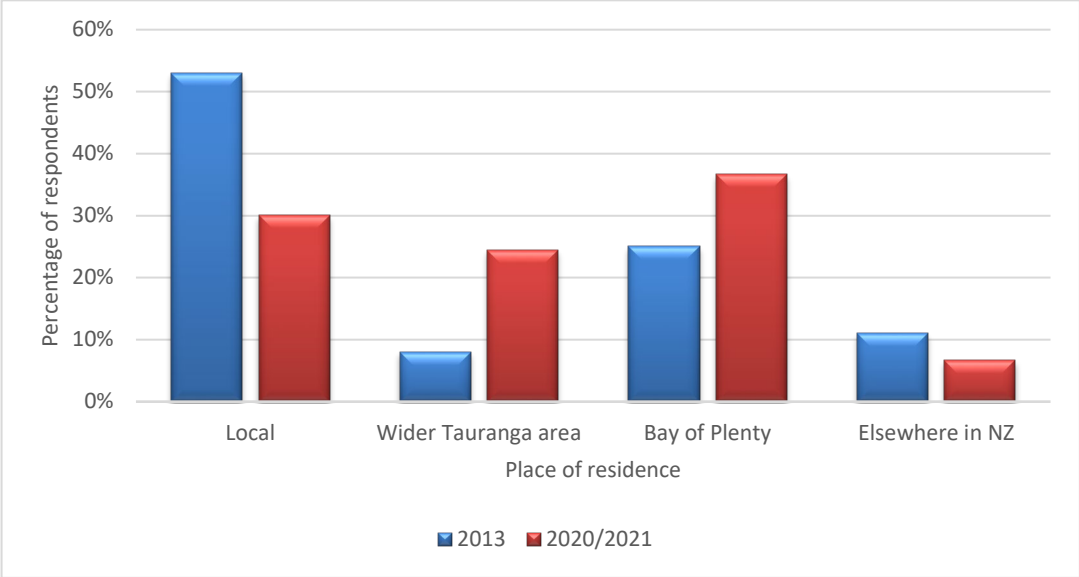


Figure 35: Comparison of place of residence between 2020/2021 and 2013

The comparisons of demographic information between survey respondents in 2020/2021 and 2013 demonstrate that these groups differed slightly in terms of ethnicity, age and place of residence. However, it is not known whether or how any of these factors might have affected survey responses.

4.3.2 Patterns of visiting the Maketū/Kaituna area

When asked how long they had been coming to the particular site where they were interviewed, just over half reported they had been visiting this place for more than five years. A small number (n=9) were visiting Maketū for the first time when they were interviewed. Table 5 below contains full information about how long respondents had been visiting Maketū.

Table 5: Length of time visiting this site

Length of time coming to this site	No. of respondents	Percentage
More than 5 years	46	51%
1 - 5 years	20	22%
Less than 12 months	14	16%
First time today	9	10%

Participants also reported on the frequency with which they visited this particular site. Thirty-eight per cent said they visited this location once a week or more, while 47% visited less frequently. Ten per cent of respondents were first time visitors. Table 6 shows the frequency with which participants visited this site.

Table 6: Frequency of visiting this site

Frequency of visiting this site	No. of respondents	Percentage
Two or more times a week	19	21%
Once a week	15	17%
Once a month	40	44%
Once a year	3	3%
Never been before	9	10%

In addition, respondents were asked which other sites around Maketū they visited. Maketū Beach and Estuary and Te Tumu Cut were the most popular destinations. Figures for all sites are reported in Table 7 below.

Table 7: Other sites also visited

Other sites visited	No. of respondents	Percentage
Maketū Beach	76	84%
Maketū Estuary	66	73%
Te Tumu Cut	65	72%
Ford Road Boat Ramp	30	33%
Maketū Spit	28	31%
Bell Road Boat Ramp	17	19%

Respondents also reported the frequency with which they visited all other sites. Twenty-nine per cent reported they visited other sites once a week or more, while 53% visited other sites less frequently.

Table 8: Frequency of visiting any other sites

Frequency of visiting other sites	No. of respondents	Percentage
Two or more times a week	15	17%
Once a week	11	12%
Once a month	40	44%
Once a year	8	9%

Given that only 30% of respondents lived in the Maketū area, it was unsurprising to find that over half of respondents only visited the area once a month or less.

4.3.3 This visit

Participants were asked how long they planned to stay at this site today. While some people reported they would only stay for a few minutes, over 70% planned to be there longer than two hours. Many planned to spend the whole day there. Some of those people planned to stay overnight, or had already spent the night there.

Table 9: Planned duration of present visit

Length of this visit	No. of respondents	Percentage
Less than 2 hours	26	29%
2 - 4 hours	37	41%
More than 4 hours	27	30%

People were asked to say how many people were in their group. More than half of the people surveyed were in groups of three or more people. Of the four larger groups, three had between 40 and 50 people.

Table 10: Number of people in group

No of people in group	No. of respondents	Percentage
1-2 people	38	42%
3-9 people	48	53%
10 or more	4	4%

The length of reported stays at the present site was similar to the reports of respondents in 2013. In 2020/2021 more of the people interviewed were part of larger groups.

4.3.4 Recreational Activities

Participants reported the activities they planned to engage in at this visit. People were able to report more than one activity. Swimming and picnicking were the most popular activities across all sites. The large number of respondents who reported fishing as an activity is due to the large number of people surveyed at Te Tumu Cut. Figure 36 below shows the number of activities reported at each of the sites where people were surveyed.

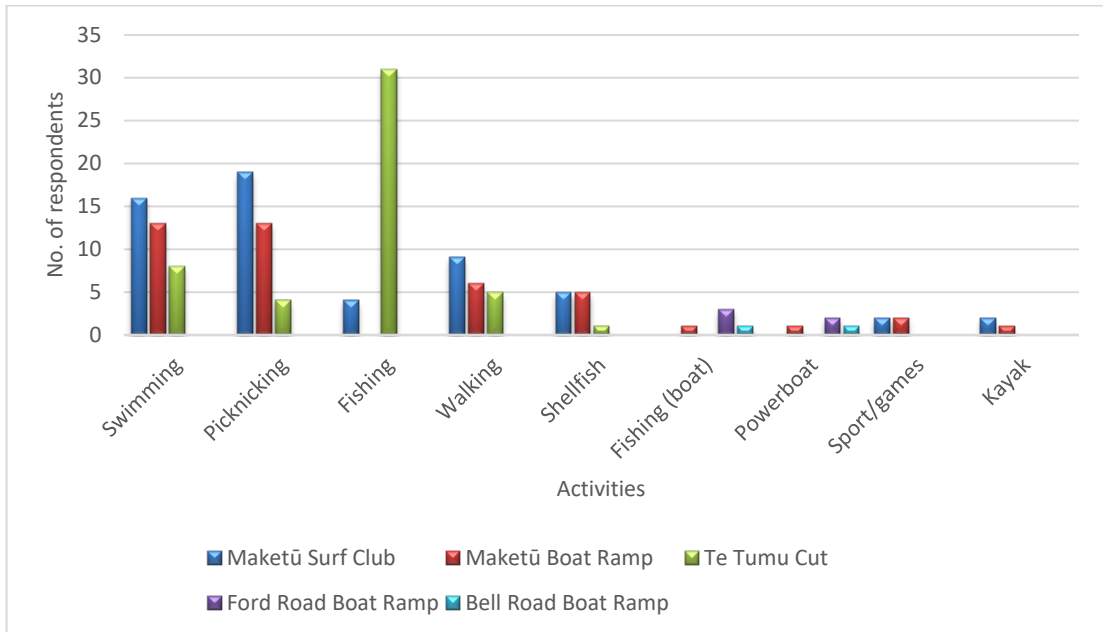


Figure 36: Respondents' reported activities at each site.

4.3.5 Health ratings

Participants were asked to rate the health of Te Awa o Ngātoroirangi Maketū Estuary and lower Kaituna River on a scale of 1 to 10 where 1 = very poor and 10 = excellent. The mean health rating for the lower Kaituna River was 5.9; the mean rating for Te Awa o Ngātoroirangi was slightly higher at 6.7. Both areas were rated slightly above average by respondents. Participants' ratings are reported in Figure 37 below.

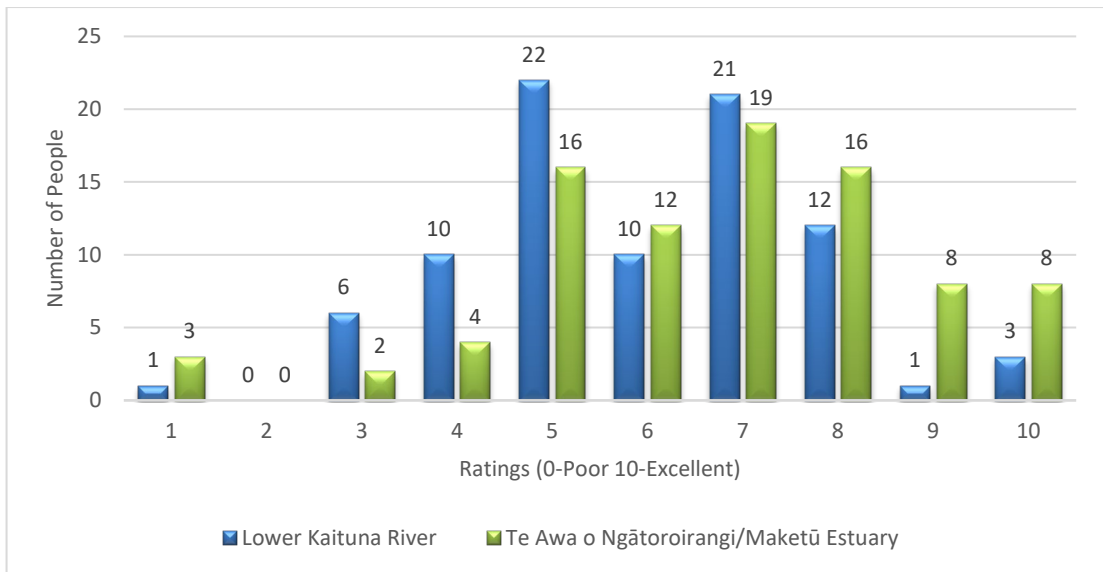


Figure 37: Survey respondents' ratings of the health of the lower Kaituna River and Te Awa o Ngātoroirangi Maketū Estuary

4.3.5.1 Analysis of health ratings by age groups

Analysis of the health ratings by age group showed no difference in health ratings across the different age groups and is reported in Figure 38 below.

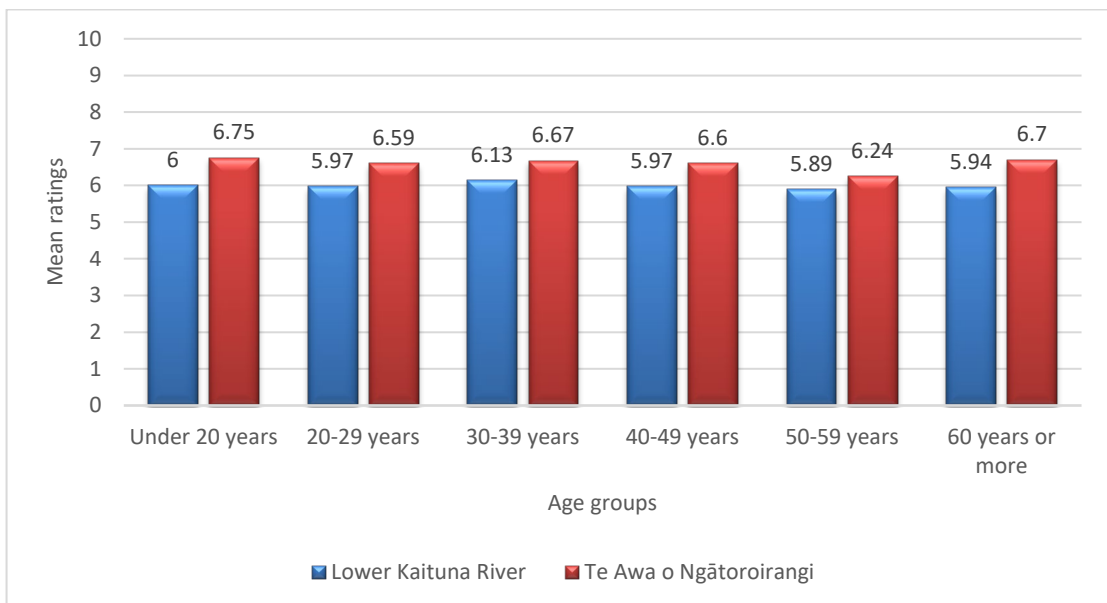


Figure 38: Survey respondents' ratings of the health of the lower Kaituna River and Te Awa o Ngātoroirangi Maketū Estuary across the different age groups

4.3.5.2 Comparison of health ratings 2013 and 2020/21

Participants mean health ratings of both the Te Awa o Ngātoroirangi/Maketū Estuary and lower Kaituna River were compared with mean health ratings from the survey conducted in 2013. Ratings of the health of both areas had increased. Ratings of the health of the Kaituna River show only a very small increase in perceived health since 2013. Ratings of the health of

the estuary show a larger increase in perceived health. Figure 39 below summarises the differences in health ratings between 2013 and 2020/2021.

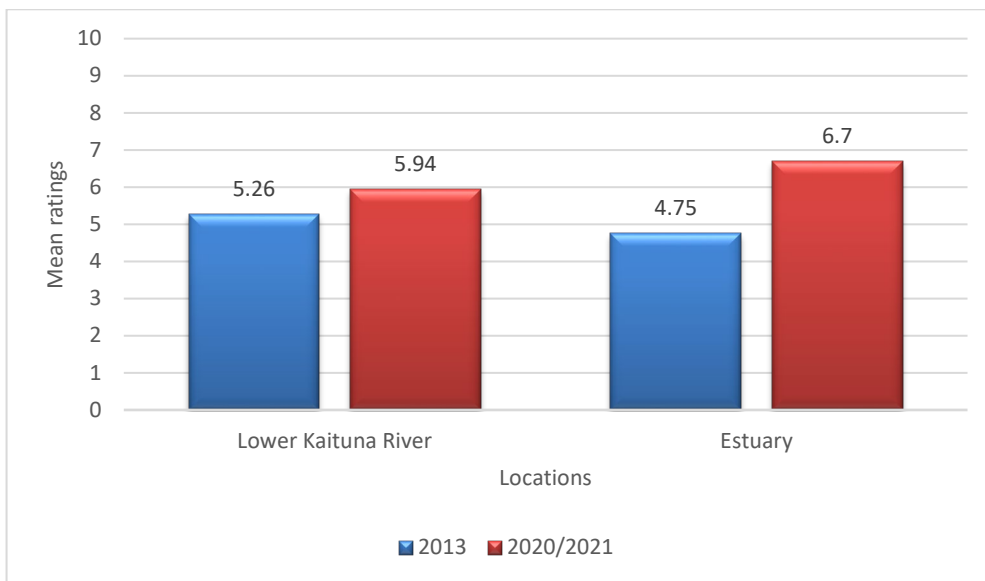


Figure 39: Comparison of health ratings in 2013 and 2020/2021

4.3.6 Value placed on Maketū/Kaituna area

Participants were asked to comment on the value of the Maketū/Kaituna area to them. This was an open-ended question with no response categories supplied. A content analysis of the text of comments identified a number of common aspects that were valued. The area was valued in particular for food/kaimoana and fishing. Twenty-three people reported that Maketū and the Kaituna River were great places for whānau activities, or for visiting whānau. People also valued the recreational opportunities that are available, such as swimming, boating and picnicking.

Some people also reported that the area has cultural and/or spiritual significance for them. Intrinsic natural values such as natural beauty, and peacefulness were also valued. Figure 40 below shows the overall numbers of participants who commented on those aspects that were most frequently mentioned by participants.

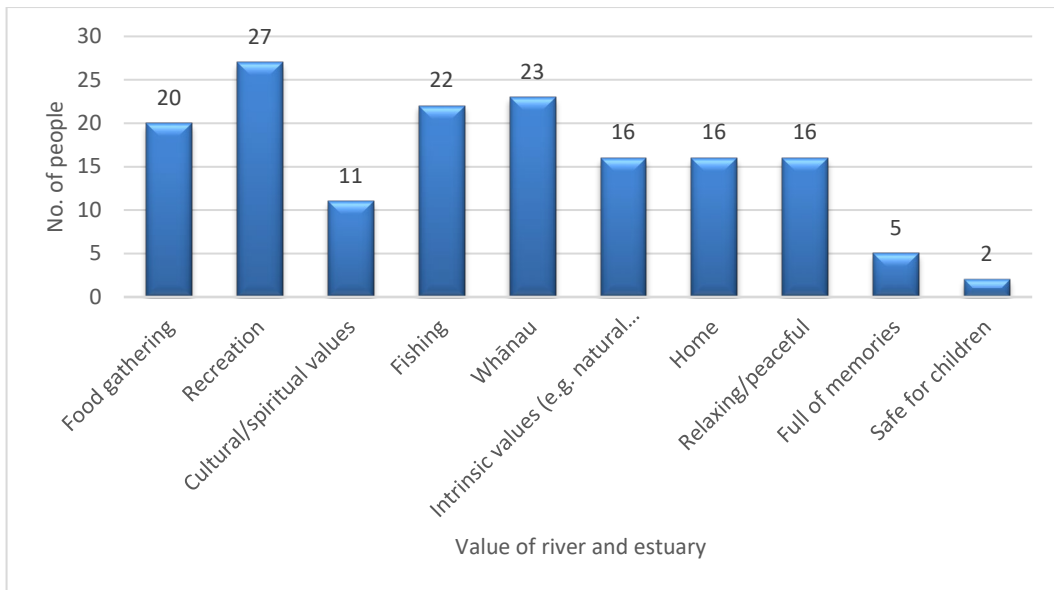


Figure 40: Reported value placed on the Kaituna/Maketū areas

Twenty-seven respondents reported that they valued the Maketū/Kaituna area for the recreation opportunities available. Several people mentioned that it was a great area for camping. For example, one person reported “(it is a) great place to bring the caravan and relax”. Others mentioned swimming, and other water sports:

The estuary is lovely to kayak in, beautiful scenery, spend time with my partner, love to get out of the house (Pākehā respondent)

Dad likes to take us out on the jetski. Its very fun to get to spend time with him (Māori respondent)

Fishing and food gathering were both valued activities, as evidenced by comments such as the following:

Love to fish at the beach and relax with my wife (Māori respondent)

Bring the kids to get pipi, spend quality time together (Māori/Pacific Island respondent)

However, when commenting about the fishing, a small number of people also reported the fishing was not as good as it had been earlier.

Good quick access to fishing spot. Not much fish though - may be overfished (Māori respondent)

Fishing is very poor, only every once in a while, you catch something (Māori respondent)

Another often mentioned thing that people valued was the opportunity to spend time with whānau:

Family gatherings bring us home and back to our whenua. Very special wairua to us (Māori respondent)

I like to fish with family and spend time together, (this area) provides food for family (Māori respondent)

Several people talked about their home being in this area:

Many generations have been here all their lives. This is my home. I descend from Maketū (Māori respondent)

I was born and raised in Maketū, family homestead (Māori respondent)

People also commented on the importance of spiritual and cultural values:

Cultural value: this is the resting place of Te Arawa waka. I feel relaxed when I come here (Māori respondent)

Maketū is a great place to live, feels connected to tīpuna who lived here long ago. Historical significance e.g. Te Arawa landing place (Māori respondent)

Some people commented on the peace, tranquillity and beauty of the natural environment:

Nice to see nature and how it is supposed to be (Pākehā respondent)

My friends come here every year so we decided to join them. I love it is so peaceful and beautiful (Pākehā respondent)

The quotes above are just some examples of people's comments about what it was they most valued about the Kaituna River and Maketū area, used to illustrate the most often mentioned themes.

4.3.6.1 Breakdown of activities by ethnicity

A breakdown of the most valued aspects of the Kaituna/Maketu area showed that Māori respondents valued slightly different aspects than Pakeha. Māori respondents valued recreation, home and whānau, and fishing and food-gathering. They were also more likely to talk about the importance of spiritual and cultural values. Pākehā respondents valued the area for recreation, fishing and food-gathering as well as whānau and relaxation. The values reported by participants were broken down by ethnicity and are reported in Figure 41 below for Māori, Pākehā and Pacific Island respondents. Note that numbers are greater than the total number of respondents since participants could report more than one ethnicity.

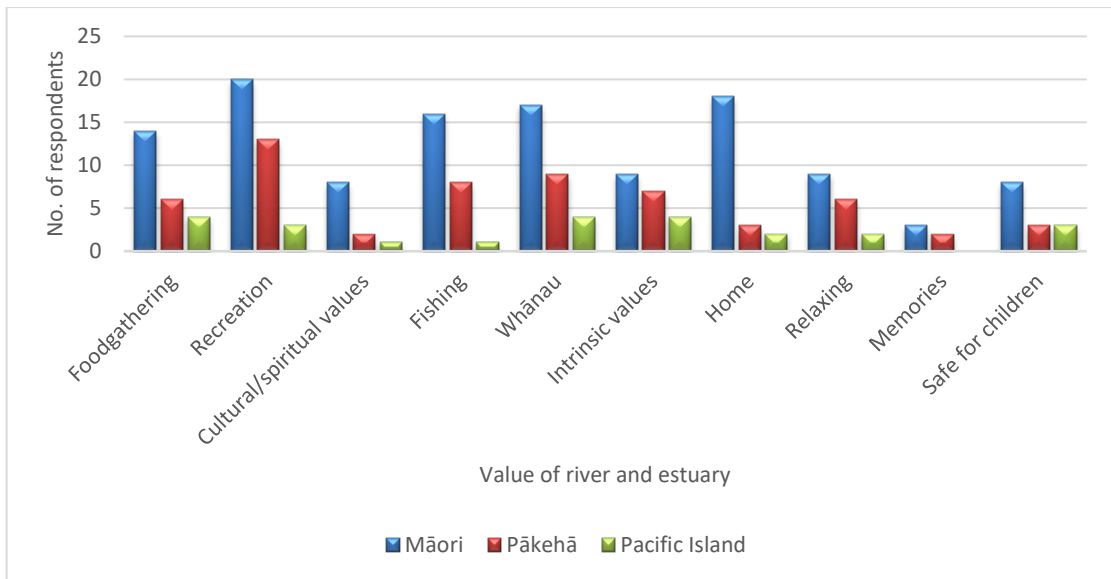


Figure 41: Reported value of the river and estuary for Māori, Pākehā and Pacific Island respondents

4.3.6.2 Comparison between reported values 2013 and 2020/2021

The aspects that were valued by respondents in the 2020/2021 survey were similar to those valued by 2013 respondents. However, in 2020/2021 the most highly valued aspect was recreation, mentioned by 30% of respondents, whereas in 2013 it was food gathering, mentioned by 31% of respondents. Fishing was valued similarly in both time periods. Fewer people talked about cultural and spiritual value in 2020/2021, but more people talked about whānau, home and intrinsic natural values.

It is difficult to interpret the differences in the reported value of the Maketū, estuary and river areas, since people were interviewed randomly, and the 2020/2021 sample contained a greater percentage of young people, and a slightly greater percentage of Māori. Additionally, no response categories were supplied for participants to choose in this question. Participants commented freely on aspects that were important to them. Percentages of respondents reporting each of the valued aspects are reported in Figure 42 below.

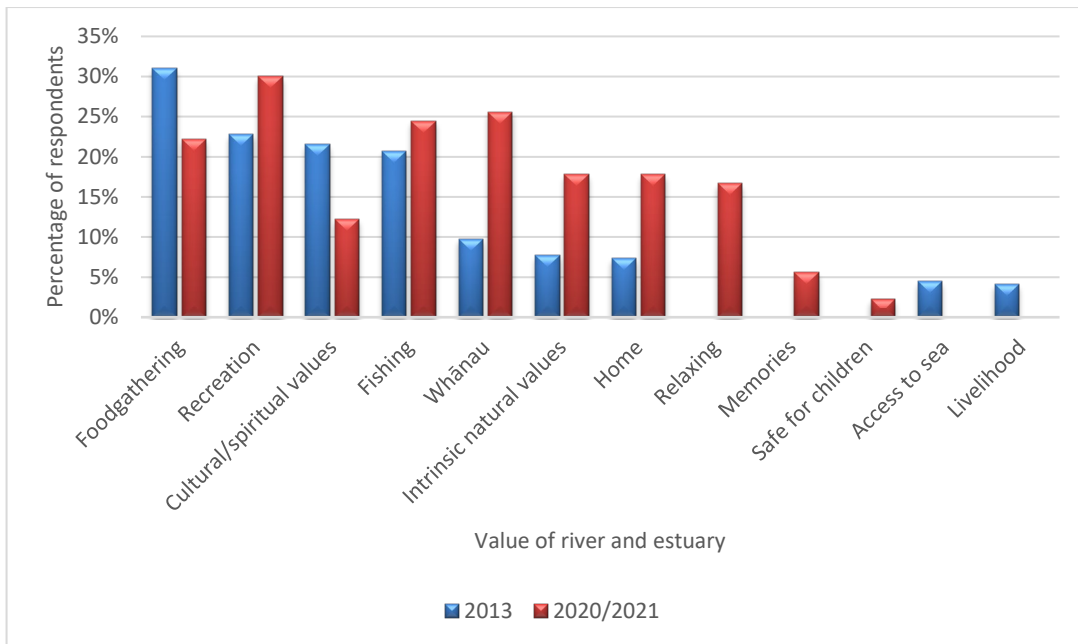


Figure 42: Comparison of participants’ perceived value of the river estuary 3013 and 2020/21

4.3.7 Effects of redirection

Participants were also asked for their perceptions of the effects of the partial redirection of the Kaituna River on their recreational activities. Many participants found it difficult to answer this question, with more than a third (n= 39) replying “don’t know”. Eighteen people reported that the redirection had had no change on their activities, 13 reported a negative effect, and eight people reported a positive effect.

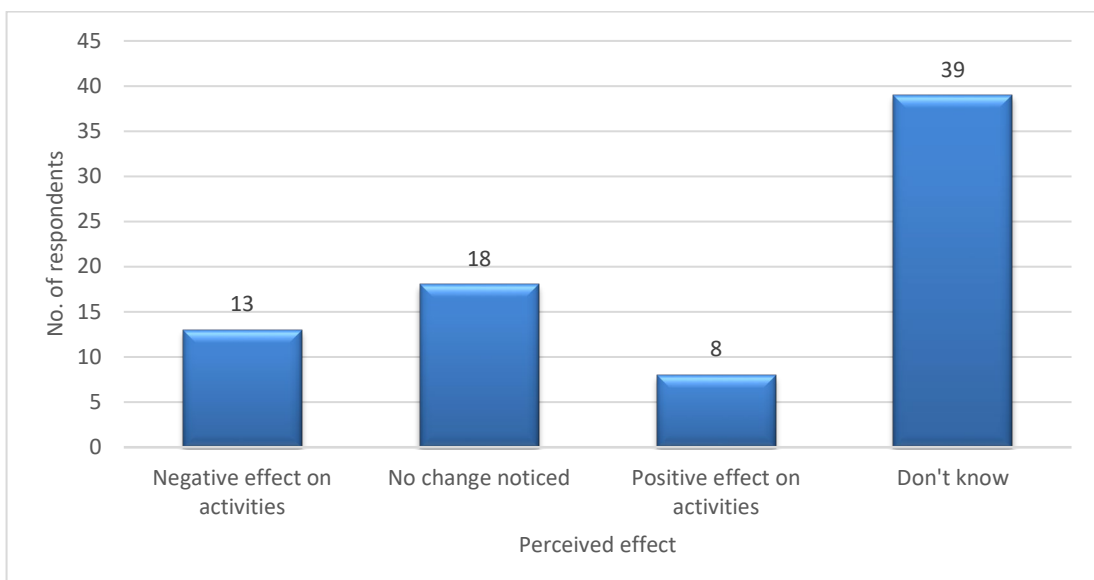


Figure 43: Perceived effect of redirection on recreational activities

4.3.7.1 Comments on perceived effects of rediversion

Participants were asked how they thought the partial rediversion of the Kaituna River was affecting their use of the river and estuary. A wide variety of responses were given to this question. Fourteen people reported that they thought the tides were faster and water flow stronger. Some saw this increased flow as positive for the estuary:

I heard about the diversion from family and think it's great. There is more water flowing into the ocean (Māori participant)

Looks like a lot more water coming into the estuary (Māori participant)

Increased flow was reported for both the river and estuary. In the estuary the change in tidal flow was reported to be affecting swimming because currents were stronger.

For our kids wanting to swim it is more dangerous as tides and current are faster (Māori participant)

Used to come here a lot but don't very often anymore as the current is very strong. We only really swim here on mid tide or incoming when not very strong (Māori participant)

Several people reported there were changes for boats going in and out across the Kaituna River bar, and that this was now more dangerous.

Tides are lower, so go out and in on each high tide (Māori participant)

Current is strong, tides are lower on low tides (Māori participant)

Tides go lower faster so have to go out and in on high tide (Māori participant)

Harder to fish on boats and catch the tide because of the rediversion as tide goes down faster (Māori participant)

Several people reported that there was now more water going into the estuary, however, others thought there was now less water in the estuary. Comments were also made about the water quality. Although some people thought the water quality had improved, others said the water was now not so clear, and thought this might be due to the greater movement of the water, particularly near the Surf Club and diving board:

Water is always murky but I guess that is just from movement (Māori participant)

Very murky and dirty most times in estuary entrance by diving board (Māori participant)

Several people noted that there had been an increase in birdlife and crabs in the area. Pipi were reported to be plentiful in the estuary. However, a number of people reported that fishing at Te Tumu Cut was not as good now as it had been previously, and were unsure about whether this was a result of the rediversion or overfishing. For example, one person said:

Very slow fishing or nothing at all most days. May have been overfished or the diversion might have had an effect on it (Pākehā participant)

Increase in fish species, flounder etc. The pipi beds have grown but not size of pipi. I have noticed more young cockles in the estuary. Cleanliness and clarity of water does not seem to have improved (Māori participant)

People made both positive and negative comments about the effects of the redirection. In addition, some people were unaware of the redirection, and requested information. These participants also suggested it would be useful to provide more signage about the redirection in several areas around the river and estuary.

No noticeable changes since the redirection. I recommend signage to be put up around locations about redirection (Māori participant)

Looks clean but not so sure about the fish. I think they need signs about the redirection (Māori participant)

From the comments reported above, it can be seen that opinions varied considerably regarding changes since the redirection, with some people noting increased water flow through the estuary having a positive effect. Others, however, reported that these changes were negatively affecting recreation, in particular swimming and boating.

4.3.8 Summary of survey information

A total of 90 interviews were completed. The participant group in 2020/2021 included more Māori participants than in 2013, and a higher percentage of younger people. People reported similar recreation patterns as those noted in the observations. Of particular value was the comments participants made about the significance of the area to them. Many spoke about the significance of both the Lower Kaituna River and the Maketū Estuary as being their home, of having a spiritual and cultural connection to the area, and seeing it as a place to relax and become grounded again, as well as somewhere to gather food. They reported the value of the area for recreation, from picnicking and relaxing with whānau to boating and fishing.

Comments made by people who were launching their boats and fishing indicated that many had noticed changes in the tides, with more water flowing through the estuary than prior to the redirection, reporting that they needed to adjust their timing to ensure they could cross the bars safely. Comment was also made by swimmers using the lower estuary around the diving board that they had noticed the current was a lot stronger and was very dangerous at certain times of the tide.

Participants' average health ratings of both the Kaituna River and the estuary had increased since 2013. In spite of some negative comments about the increased water flow, there were also positive comments about the increase in species such as pipi and about positive changes in the ecosystem such as the wetlands being restored.

Of note was that some people interviewed were not aware of the re-division, and when provided with this information said they thought there should be signage to inform the public of the changes.

4.4 Key Informant Interviews

Brief interviews were conducted with spokespeople from the Maketū Surf Club, Maketū Coastguard and a commercial fisherman who crosses the Kaituna River bar daily.

The commercial fisherman has been using the Kaituna River to access the sea for 30 years, and made the following comments:

The Kaituna river bar is not unlike any other bar - they can at times of low rain fall become unstable and vary in depth. However there have been very few occasions when we could not cross the Kaituna at low tide over those 30 years until the diversion. In the short time frame especially since all gates are opening sending maximum water to the estuary, we now find the bar has become wider i.e. further to travel to reach open water, and has become unstable (tends to wander west more often) we are currently operating on a 2 hour from low tide crossing restriction, something we have not had to do in the past.

I understand there has been low rain fall this summer that has contributed to the problem. However, there have been other years with equally low fall but we have managed to navigate the Kaituna river bar with little difficulty.

Over the Easter break I observed four separate vessels in two days that had run aground crossing the bar.

The Maketū Coastguard has been operating within the Maketū area since 2005, with their main vessel Eastpack Rescue located at Ford Road and other vessels and jet skis located within Maketū town, accessing the sea via the Maketū bar. The Coastguard has a long history of using both Kaituna river bar and the Maketū Estuary bar, in all weathers and at various points of the tide.

Prior to the Kaituna re-diversion project, they reported no issues crossing the Kaituna bar, even at low tide. However, in 2021 they reported:

Since the river diversion and the opening of the culverts we are seeing increasing issues with the lack of depth of the Kaituna bar. Our skippers are finding the bar much shallower and its movements are unpredictable. In the past months, on several occasions we have had to decline assisting members of the boating public until higher water, due to lack of water on the Kaituna bar. On other occasions we have only just been able to get out and rescue vessels, but have been forced to tie them to our buoy located at the mouth off Maketū, until the water across the Kaituna bar was sufficient for us to safely tow them back across.

The shallowness of the bar is having a detrimental effect on our vessels, through the sucking up of sand and debris due to shallow water.

The Maketū Coastguard reported they have had complaints from boaties as to how the Kaituna river bar is becoming shallower and more dangerous, noting that: "As an emergency rescue unit, we are becoming increasingly concerned for two reasons:

1. We are not able to operate 24/7 as in the past, meaning some boating emergencies will have to wait.
2. The Kaituna River bar is becoming increasingly more dangerous for the boating public; there may be the need to clear the bar (dredge) when it becomes un-navigable.”

Measurements of Kaituna River flow upstream at Te Matai showed that during “...since September 2020 there have been periods when the river has been at its lowest on record since August 1986” (Stephanie Brown, 2021, personal communication). The low flows recorded have likely resulted in a shallower bar at Te Tumu Cut, as reported by both survey participants and the Maketū Coastguard.

A spokesperson from Maketū Surf Club reported that from their observations the tides in and out of the estuary in front of the Surf Club have become stronger and swifter. They have observed that the outgoing tides are particularly dangerous, and that there is more movement of tides, with the slack tide (when there is little water movement) now being a much shorter time period. Prior to the redivision, she reported there would be about two hours around high tide when the water was still before it started to go out. But now the tide starts to go out again after only 20 – 30 minutes. The Surf Club spokesperson reported that on some days during summer they were unable to put out the flags at all at Maketū, due to the dangerous currents from tide movement in the estuary area.

The reports from key informants seem to confirm survey respondents’ comments about changes to the water and tidal flows in both the river and the estuary. Numerical modelling completed for the Regional Council in 2014 as part of preparation for the resource consent application concluded that “...currents speeds will not increase significantly for the swimming area and therefore there will not be a significant effect on safety of swimming for this area for typical conditions.” (Bay of Plenty Regional Council, 2014, p. 7-11). It cannot be ascertained from the recreational data and key informant interviews whether or not the tidal currents in the lower estuary have actually increased. This will require monitoring over time. However, the reports of participants in this survey do seem to indicate that there is a perception of increased speed of the tidal current, particularly on the ebb tide.

Recent measurement of tidal flows in the lower part of the Maketū Estuary in February 2021 and in the lower Kaituna River in December 2021 demonstrated that the tidal flows are similar to what was predicted by the numerical modelling in 2014 (Tuckey, 2021). However, it was noted that differences between what was modelled and what was constructed, such as a wider channel, may be leading to increased flow through Ford’s Cut and the Maketū Estuary. Tuckey (2021) also notes that at mean tidal flow, the inflow to Maketū Estuary may slightly exceed the consented volume of 600,000m³.

Overall, the comments made by key informants demonstrate concern that the rediversion has resulted in changes that may compromise the safety of boats crossing the Kaituna River bar and swimmers in the lower estuary. Further observations will need to be carried out over time in order to ascertain whether and how water flow has changed, and the effects of any such changes on recreation in the area.

4. Conclusion

A total of 2,657 observations were completed across the five observation sites. The observations showed that high numbers of people come to Maketū over summer. A range of recreational activities were observed, as expected during the summer period. Walking, sightseeing, swimming and picnicking were all very popular activities. Fishing was very popular, particularly at Te Tumu Cut. Other commonly observed recreational activities included boating, biking, sunbathing, bird watching and sports.

The popularity of recreational activities was very similar to what was observed at the same five locations in 2013. However, the median numbers in the Maketū area were slightly lower per observation period in 2020/2021 than in 2013, while the median number at Te Tumu Cut was slightly higher.

A total of 90 interviews were completed. The participant group in 2020/2021 included more Māori participants than in 2013, and a higher percentage of younger people. People reported similar recreation patterns as those noted in the observations.

The comments that participants made when interviewed demonstrate the perceived significance of the area to them. The Maketū and Kaituna River areas are valued by participants as being their home, and for their cultural and spiritual significance. The area is also valued for recreation, from picnicking, swimming and relaxing with whānau to boating, fishing and gathering kaimoana.

Participants reported that they had noticed changes in the tides, with more water flowing through the estuary than prior to the rediversion, and boat owners needed to adjust their timing to ensure they could cross the bars safely. Comment was also made by swimmers using the lower estuary around the diving board that they had noticed the current was a lot stronger and was very dangerous at certain times of the tide.

Participants' average health ratings of both the Kaituna River and the estuary had increased since 2013. There were also positive comments about the increase in species such as pipi and about changes in the ecosystem such as the wetlands being restored.

Comments made by key informants demonstrated concern that the rediversion has resulted in changes to water flows that may compromise the safety of boats crossing the Kaituna River bar and swimmers in the lower estuary. Further observations will need to be carried out over time in order to ascertain whether and how water flow has changed, and the effects of any such changes on recreation in the area.

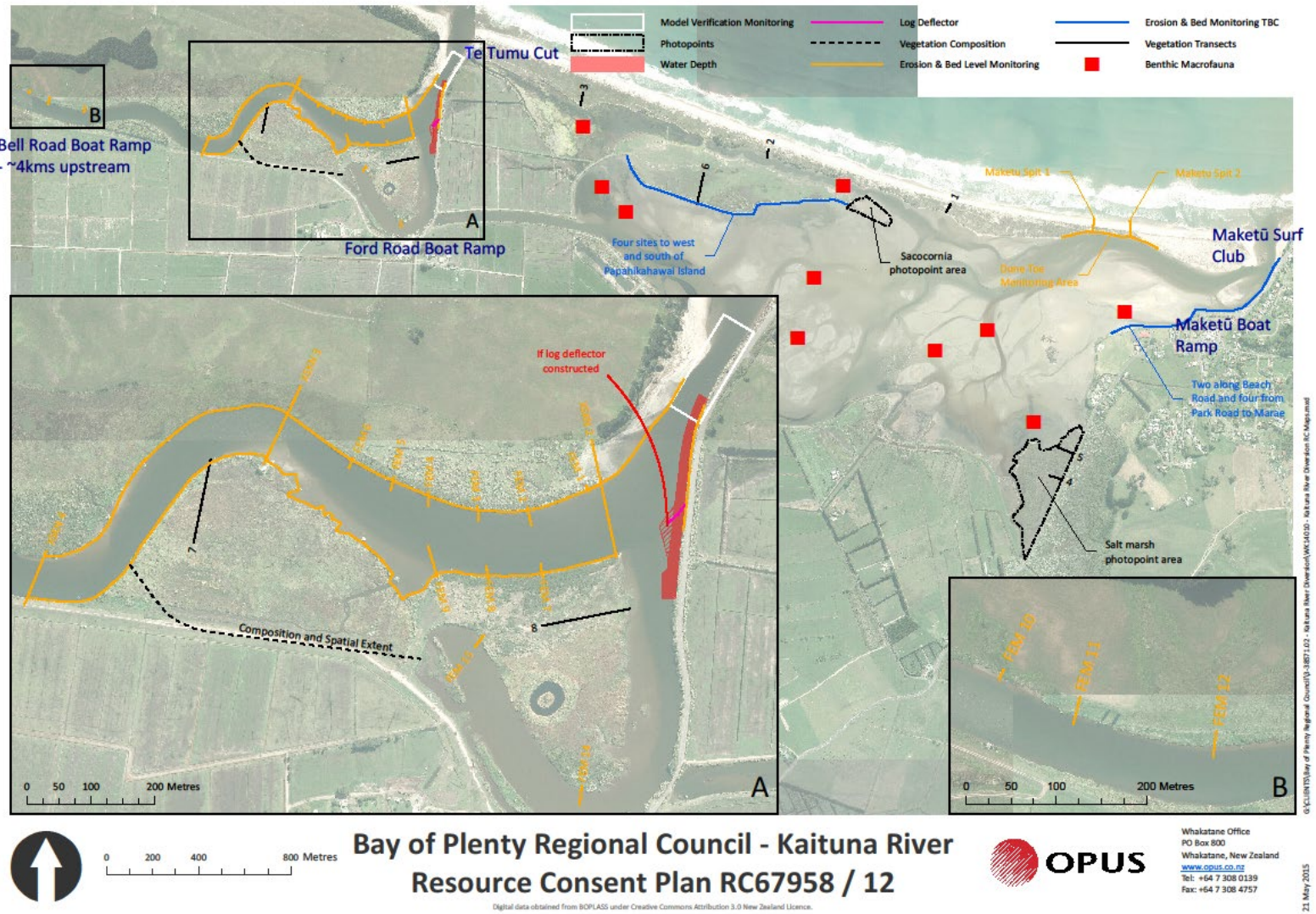
From the data collected, it can be concluded that although there are slight changes in both the numbers of people observed and in the most popular activities, there has been very little change in recreation around the Maketū area following the rediversion of the Kaituna River.

This study was carried out in first summer following the opening of the gates to divert an increased flow from the lower Kaituna River through Te Awa o Ngātoroirangi Maketū Estuary. While participants reported that they had noticed both positive and negative changes following the rediversion, the observation data showed that recreation patterns had changed little since 2013. Further monitoring of recreational activities and water flows is recommended, as both may change again over time.

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Appendix 1: Map of Observation Sites



Appendix 2: Survey Form and Interview Instructions

Kaituna-Maketu Re-diversion Project Survey Questions

Location _____ Date: _____ Time: _____ [Interviewer to complete]

1. What is the purpose of your being at this site today? **[tick all that apply]**
 - (a) Fishing: Netting Surfcasting Kontiki/long line Spearing From a boat
 Whitebaiting
 - (b) Shellfish gathering: Estuary Rocks Beach
 - (c) Swimming: Beach Estuary Snorkelling/Diving
 - (d) Surfing: Surfing Surf lifesaving Kite-surfing
 - (e) Boating: Dinghy Powerboat Kayak Sailing
 - (f) Recreation: Walking Picknicking Conservation Sport/games Other
2. If you have come to fish, is this for recreational, or customary fishing? **[tick one]**
3. How long have you been coming to this site? **[tick one only]**
 First time today Less than 12 months 1-5 years More than 5 years
4. How often do you come here? **[tick one only]** never been before
 2 or more times a week once a week once a month once a year
5. Do you also go to any of these other sites? **[tick all that apply]**
 Maketu Estuary Maketu Beach Kaituna Cut Bell Rd Maketu Spit Ford Rd boatramp
6. If so, how often do you go to any of these other sites? **[Tick one only]**
 2 or more times a week once a week once a month once a year
7. (a) What time did you arrive here today? _____ **[enter time or approximate]**
(b) What time do you plan to leave? _____ **[enter time]**
8. How many people in your group today? _____
9. Ethnicity **[tick all that apply]** Māori Pākehā Pacific Island Asian Other
10. Gender **[Tick one]** Female Male
11. Age group **[Tick one only]**
 Under 20 20-29 years 30-39 years 40-49 years 50-59 years 60 years or over
12. Where do you live? **[Tick one only]**
 Local (Maketu/Te Puke/Pukehina) Wider Tauranga area
 Bay of Plenty Somewhere else in New Zealand
13. On a scale of 1 to 10, how would you rate the health of the following areas (where one = very poor and 10 = excellent) **[Circle one]**:
(a) Lower Kaituna River 1 2 3 4 5 6 7 8 9 10
(b) Ongatoro/Maketū Estuary 1 2 3 4 5 6 7 8 9 10
14. What is the value to you of the Kaituna River and Maketu estuary?

15. What are your perceptions of how the partial re-diversion of the Kaituna River is affecting your use of the river or estuary?
 I haven't noticed any change It is having a negative effect on my activities
 It is having a positive effect on my activities I don't know
Please comment on your answer:

16. Any other comments? **[Write on the back]**

Appendix 3: Information about Kaituna River Rediversion

Cheat Sheet for site tours

Background

In 1956 there was a decision made to cut the Kaituna River out to sea, up-stream of the estuary.

That was good for flood protection and drainage for the lands around here, but no so good for the estuary. Since then it's half-filled with sand, a lot of algae have grown up and as a consequence, both the shellfish and the finfish populations have diminished

Twenty years after bypassing the estuary, the effects on local kaimoana were starting to be felt, with calls for the river to be reinstated starting in 1979.

The objective of this project is to bring back enough freshwater to restore some of the health of the estuary.

Council has been working closely with six different Te Arawa Iwi to make this project a success. They've been a big part of the planning, implementation and also the monitoring of results

Early works were done in 2017 to remove the causeways that linked Papahikahawai Island to Maketu were replaced with a wooden bridge and the 'hard edges' around the island were softened to form cheniers

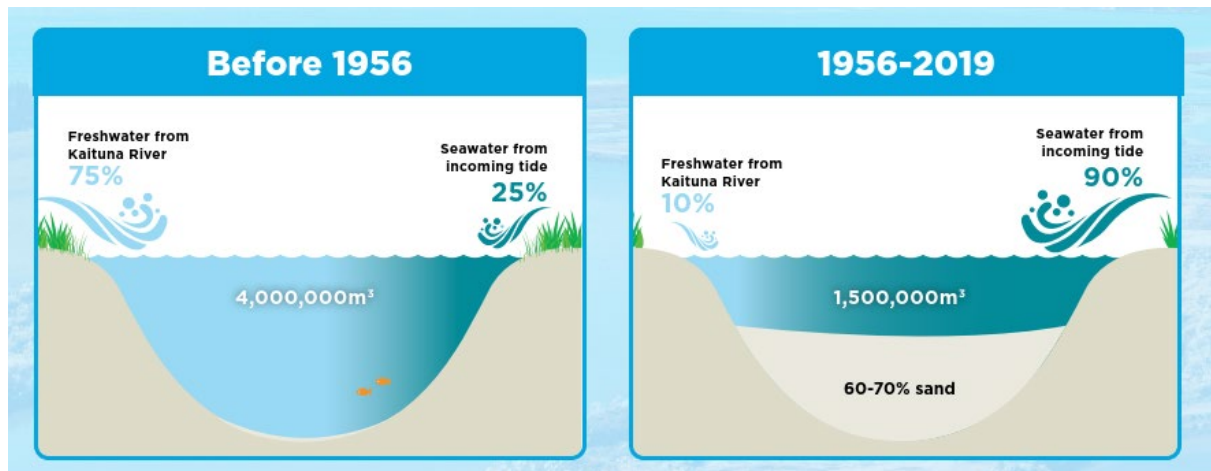
Total cost of project: \$16.6m which includes everything from planning and construction to 3D tidal modelling and the acquisition of 45ha of land

Construction start June 2018, was intended to be 2 year program, has been done in 18 months.

Still some finishing touches needed to complete the project

Gates / Culverts

Before the Tu Tumu diversion in 1956, 75% of the water into the estuary came from the river



Fords Cut was widened to be double the width

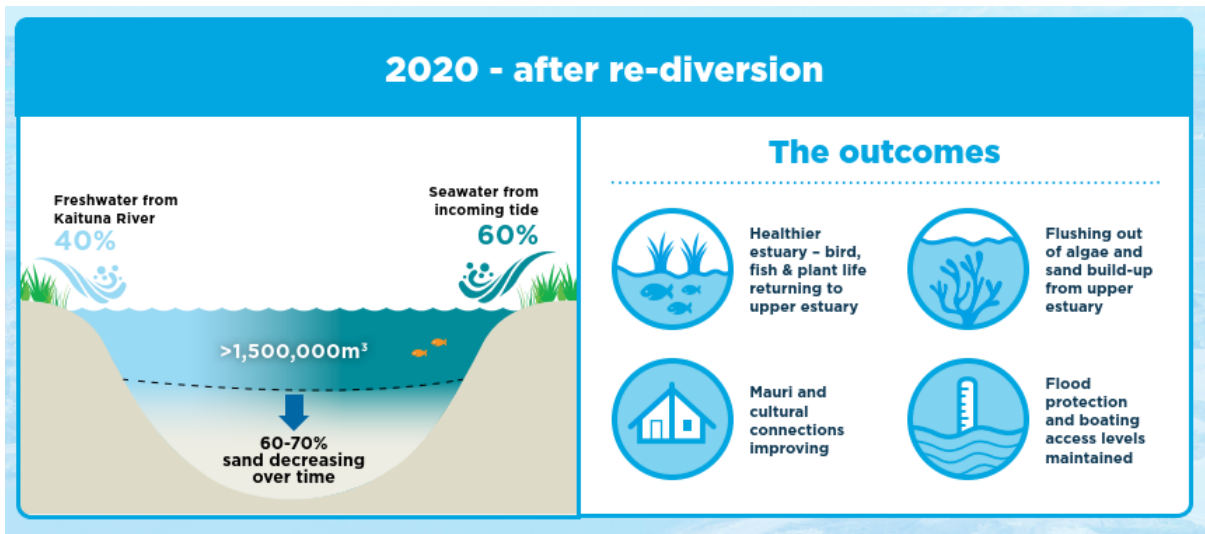
12 boxed culverts that are 2.5m by 2.5m

Each culvert has an automatic stainless steel control gate. The gates are operated based on the tides so the amount of freshwater flowing into the estuary is maximised and the amount of saltwater from the estuary is minimised.

The gates take 16 minutes for all to open or close as they move slowly. Flashing lights and siren sounds before the gates move

Stage 1 allows the diverted river flows to be increased from 150,000m³ to ~400,000 m³ per mean tidal cycle. The increased flow represents nine gates being open.

Stage 2 – in 12 months time will be when we can open all 12 gates - 600,000m³ per mean tidal cycle.



To help flush sediment in the estuary flood waters will go through the culverts BUT we can't change the current flood risk at Maketu township so in certain flood situations a number of gates will need to be shut

Monitoring

Extensive monitoring of the estuary is required as part of the resource consent conditions – this is to ensure that there are no unexpected effects. We expect the estuary to slowly recover – it will take some time

There are also others interested in seeing what happens with the estuary, eg. Waikato University have students looking at what is happening

Te Pa Ika Wetland

Decades ago the area was wetland, land was purchased by the Regional Council

Have created 20ha of saltmarsh wetland

2019 – approx. 65,000 plants planted, included community and schools planting days. Further plants to go in 2020 and 2021

Salinity Block

The block was built to stop saltwater coming from Te Tumu Cut directly into the estuary – we want freshwater to flow into the estuary.

As the conditions around the boat ramp are changing the Coastguard and commercial fisherman are being moved to moorings here. We still need to install the pontoon for the Coastguard

The salinity block also allows access to Ford Island. The Island is privately owned but there is a strip of land around the edge of most of it (not all) that is owned by the District Council.

The landowners have been kind enough to offer public access to the Island for up to 10 years. In return Regional Council are undertaking weed control

Diversion channel

Creation of a new 60m wide channel that extends a km upstream to divert freshwater into the estuary

Land purchased, existing stopbank moved

Wetland area is now owned by the Regional Council

152,6660m³ of material excavated

Boat ramp / car park

Public boating facilities – previously ‘private’, upgraded, to be maintained by the District Council

Some work still to be done in area to tidy up river edge

District Council have plans to extend the cycleway from the Tauranga Eastern Link down the river, along the new stopbank and one day all the way to Maketu

Mural

Incorporates the river and its riches being the tuna, and on both sides of the river are the manaia (guardian) or kaitiaki (minder/steward/caregiver) of the Kaituna River

Part of the mural is dedicated the pa of Okurei being the main pa of its time in Maketu

The purpose of the moon and sun being how the Kaituna River was occupied 24/7 by the people of Maketu

You can also see the people at the river spending their time gathering food for their whanau.