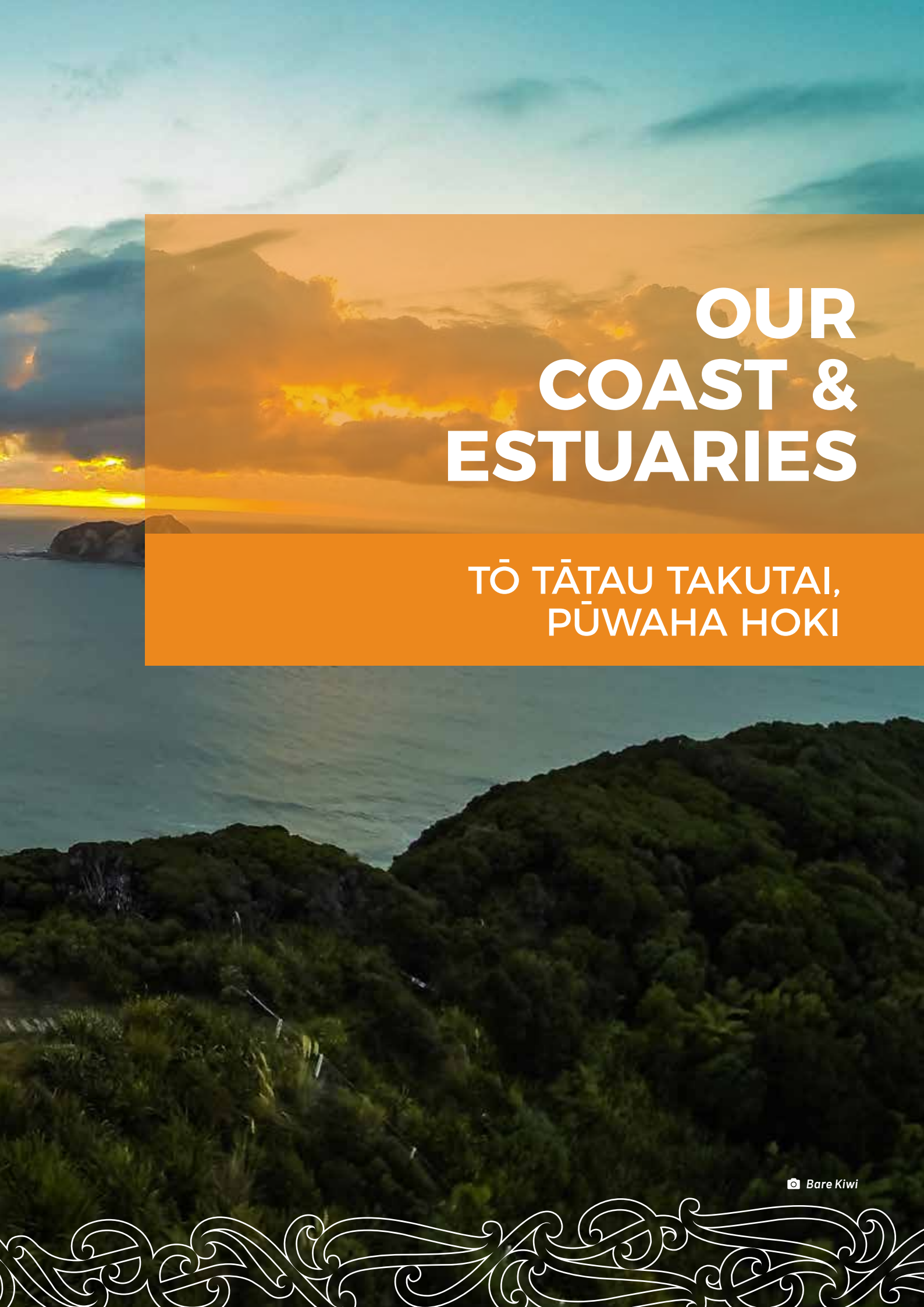




OUR COAST & ESTUARIES

TŌ TĀTAU TAKUTAI,
PŪWAHA HOKI

HIGHLIGHTS

Tairāwhiti has about 700km of coastline with more than 95% of Tairāwhiti's population living within 50km of the sea.

Water quality for summer swimming at our region's beaches is excellent. All of Tairāwhiti's 17 monitored beaches have been graded as suitable for swimming. Each beach had between 97% and 100% of samples graded as being in the "suitable for swimming" category.

Gisborne Port is home to a wide range of marine life including kelps, seaweeds, mussels and starfish. It is also the location of a young crayfish puerulus (post-larva) nursery.

Between June 2015 and May 2020 there were 12 wet-weather overflows from the sewer systems into Gisborne's rivers (and then out into Poverty Bay/Tūranganui-a-Kiwa). Council's DrainWise project is working to reduce these occurrences.

Phosphorus is naturally high in our coastal waters due to sediment from our typically erosive and fine sediment geology. Beaches closer to Gisborne and the Waipaoa River have even higher levels, indicating fertiliser, wastewater and sediment discharge sources. Council is working with the community and industry to develop and implement catchment plans to improve Tairāwhiti's water quality.

Coastal natural hazards are prevalent in our region, with coastal erosion, coastal inundation and hazards exacerbated due to climate change. Council undertakes surveys at several beaches throughout Tairāwhiti each year to understand how these beaches are changing.

Sand extraction remains a valuable source for the construction industry. The amount of sand extracted from beaches remained relatively constant between 2015 and 2018.



OUR COAST

Our region has about 700km of diverse coastline stretching from the steep volcanic headlands of Lottin Point (Wakatiri) in the north to Te Wherowhero Lagoon and coastal reef systems in the south. This diversity provides a wide variety of habitats including coastal cliffs, sandy beaches, estuaries, dunes, rock platforms and reefs.

This range of habitats supports a wide array of species ranging in size from microscopic animals in the sand and mud of our estuaries and beaches to colonies of seabirds (such as gannets, blue penguins and shearwaters), and dolphins, seals and orca who are regular residents of our coastal areas. Tairāwhiti has been associated with whales from the time of Paikea, who in Māori tradition arrived here on a whale's back.

Tairāwhiti is renowned for its beautiful, golden and uncrowded beaches. Nationally significant surf breaks are located at Makorori (Point and Centres), Wainui (Stock Route, Pines and Whales) and The Island. Pouawa is the location of the Te Tapuwae o Rongokako Marine Reserve.

Our region's geological history is plain to see in our many headlands with fractured and contorted layers of sedimentary rock.

Our coast is where many of us come to find food, earn a living, build a home, make a spiritual connection or to relax. The way we use and develop our coastal environment contributes significantly to our region's economy, arts, our social lifestyle and cultural identity. More than 95% of us live within 50km of the sea.

There are many sites and areas of significance to Māori along our coast, including mahinga kai, urupa, pa, kainga and tauranga waka.

The wharves at Hicks Bay, Tolaga and Tokomaru Bay are a reminder of when travel and transport in the region was by sea rather than land.

Our coast provides us with so much – it's our place to live, work and play, a place of relaxation and recreation as well as a source of income and food.

We have great beaches to swim, surf and explore. Diving, snorkeling, fishing, surfing, walking, camping – there are so many activities that revolve around the beach.

It's no surprise that tourism is growing and our coast is a major drawcard with activities including East Cape Lighthouse, Makarori Headland, Cook's Cove, fishing and boat tours, our historic wharves and Tatapouri Ecotours. Cruise ships are now regular visitors to Gisborne.

Our fish and crayfish have high value in the local and export markets and are enjoyed by recreational fishers too.



📷 Brad Hall and Tourism Eastland



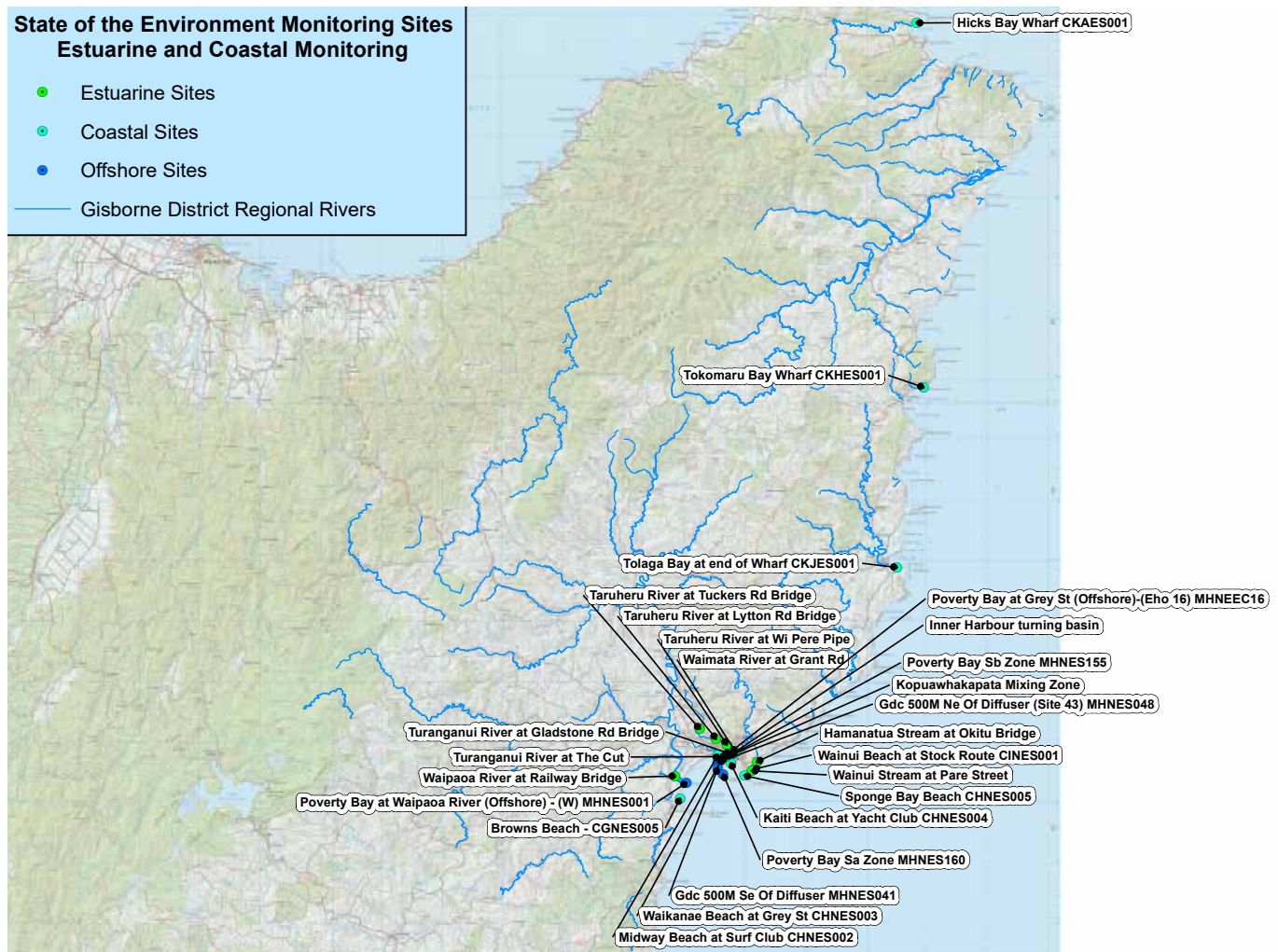
WATER QUALITY

Good water quality is important for the health of marine and estuarine life as well as for recreational use by people. Coastal inshore waters near Gisborne city provide for a range of ecological, social, economic, cultural and recreational activities.

However, these areas are also subject to urban and industrial impacts within Gisborne and rural impacts from land-based activities and are susceptible to a number of water quality issues. Gisborne's roading and stormwater network are often directly connected to the city's three rivers which all contribute to transporting pollutants to the inshore waters of the marine environment.

Gisborne's wastewater is discharged into Poverty Bay/ Tūrangānui-a-Kiwa. Council is currently progressing plans to improve the quality of wastewater discharged.

Contaminants found within city rivers and our coastal environment can contain nutrients, sediments, bacteria, viruses and pathogens, hydrocarbons, and heavy metal compounds. These contaminants can have both chronic and acute effects on marine-based species and can cause degradation of these ecosystems.



Estuarine and coastal monitoring sites which are sampled monthly. Note it does not show coastal recreational waters monitoring sites which are sampled weekly during summer, although some of these sites are also sampled weekly during summer

#01 CASE STUDY | HE TAUIRA

CONNECTING OUR PEOPLE AND THE COAST **Oneroa Walkway**



Oneroa Walkway, our award-winning beachfront cycle and walkway from Waikanae to Midway Beach is a high quality, culturally significant, scenic walkway that tells stories of navigation while improving access to our beaches.

Winner of the Keep New Zealand Beautiful Kiwi Choice Award, Oneroa Walkway was recognised as a favourite spot in New Zealand.

The walkway beautifully responds to its natural and cultural context and is truly a community project.

"The boardwalk itself acknowledges our region's navigation traditions using features like rope, concrete stenciling, timber patterning and furnishings to represent waka, heritage and navigational themes," says Council project manager Kylie Cranston.

"The design uniquely represents Tūranganui-a-Kiwa, which makes it relevant and special."

A custom-designed furniture suite was created by Council's internal landscape architect and have a copyright, meaning it will always remain unique to Gisborne.

The picnic tables, seats, showers, drinking fountains, bike racks and rubbish bins are all made with Totara recycled from the cross arms of old power poles.

Ms Cranston says since the walkway was opened in 2015 it has markedly transformed and invigorated the use of the beachfront and encourages opportunities for business, recreation and tourism.

"It's used by a considerable number and variety of users, and helps promote an active, happy and healthy community."

The 1km long walkway linking Waikanae and Midway Beaches was built with consideration to environmental sustainability, coastal erosion and surrounding animal habitats with dune restoration and pest control a key aspect of its success

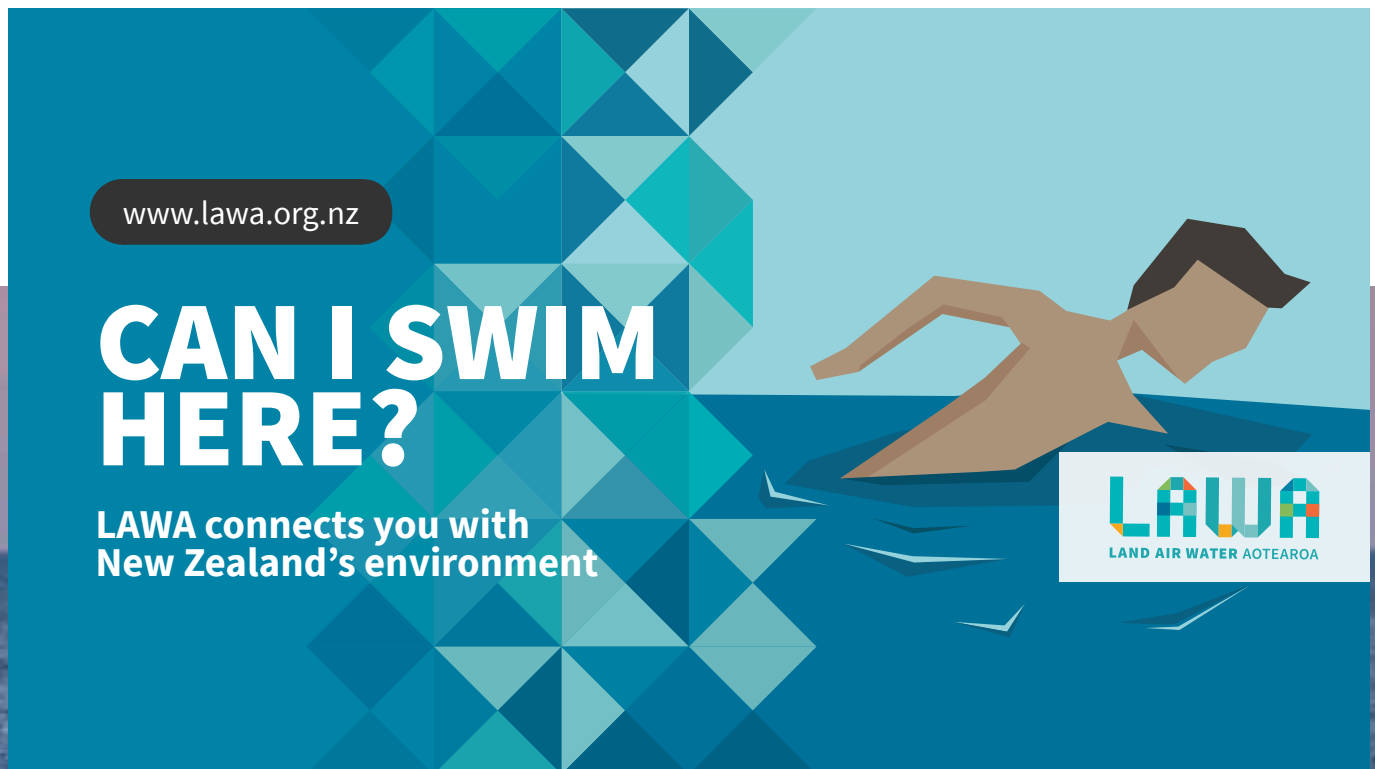
Our water quality for swimming and recreation

Each year during spring and summer, Council monitors popular bathing beach sites for concentrations of faecal indicator bacteria.

A high concentration of faecal indicator bacteria means it is more likely disease-causing organisms are present. These can pose an increased health hazard for recreational activities

such as swimming, surfing and other water contact activities. Council uses the Ministry for the Environment guidelines for enterococci counts to assess bathing water quality risk.

Throughout spring and summer Council provides this data to the Land Air Water Aotearoa website.



www.lawa.org.nz

CAN I SWIM HERE?

LAWA connects you with New Zealand's environment

LAWA
LAND AIR WATER AOTEAROA

Can I swim here?

To check the current water quality of our beaches, please visit the Land Air Water Aotearoa website **www.lawa.org.nz**

Enterococci bacteria from weekly summer swim site sampling

Coastal water quality is monitored at 17 beach sites and six estuary sites and monitoring is done weekly at sites during the swimming season (November to April) and fortnightly throughout the year at Pouawa and Wherowhero Lagoon. Three sites at the top of the East Cape area (Lottin Point, Onepoto Bay and Te Araroa) are also sampled monthly from December to February. Note that this analysis utilises data from samples collected at a regular frequency ("random"), but any data from samplings targeted at high results (such as scour overflows) have been removed unless that sampling happened by chance.

Overall Gisborne bathing beach water quality results are very good. A high percentage of "surveillance" category results combined with low median enterococci counts indicates microbiological water quality of the regions swimming beaches is generally excellent.

Of 1,632 samples collected throughout the region between autumn 2015 and the end of summer 2020, 94% were below the "action" guideline (good). This indicates that in dry weather conditions the risk of becoming ill as a result of faecal contamination of sea water during water contact is very low. Only 68 samples – 4% – were within the "action" (bad) category.

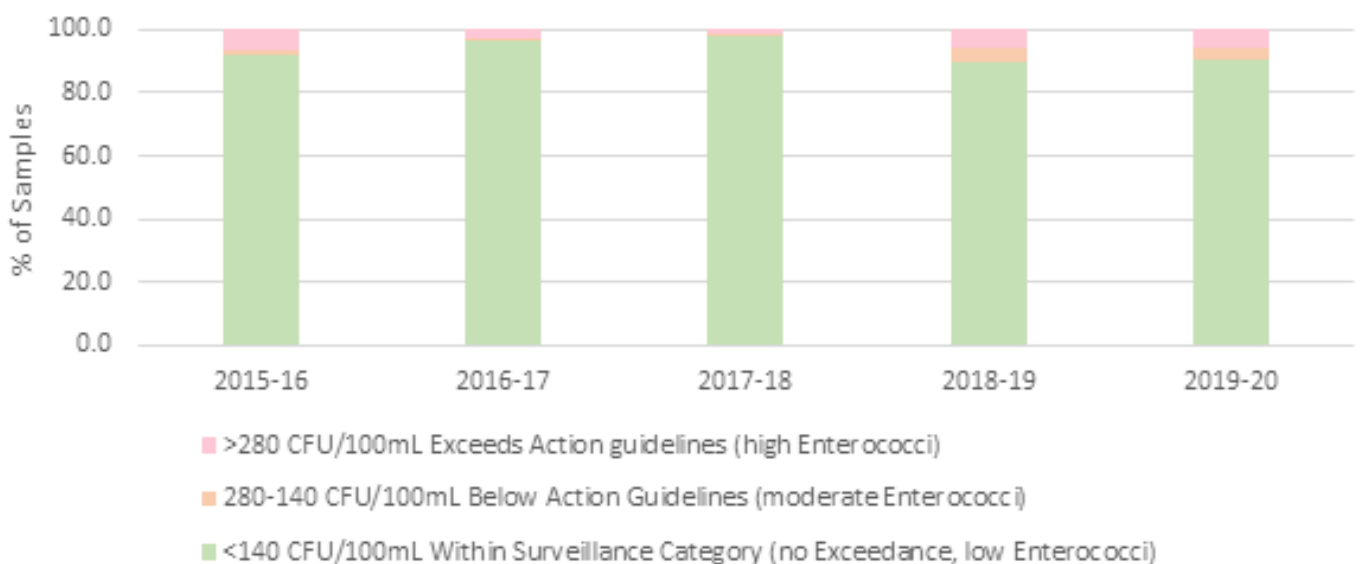
Microbiological water quality guidelines

Indicator	Surveillance	Alert	Action
Enterococci (cfu/100ml)	No single sample >140	Single sample >140	Two consecutive single samples > 280

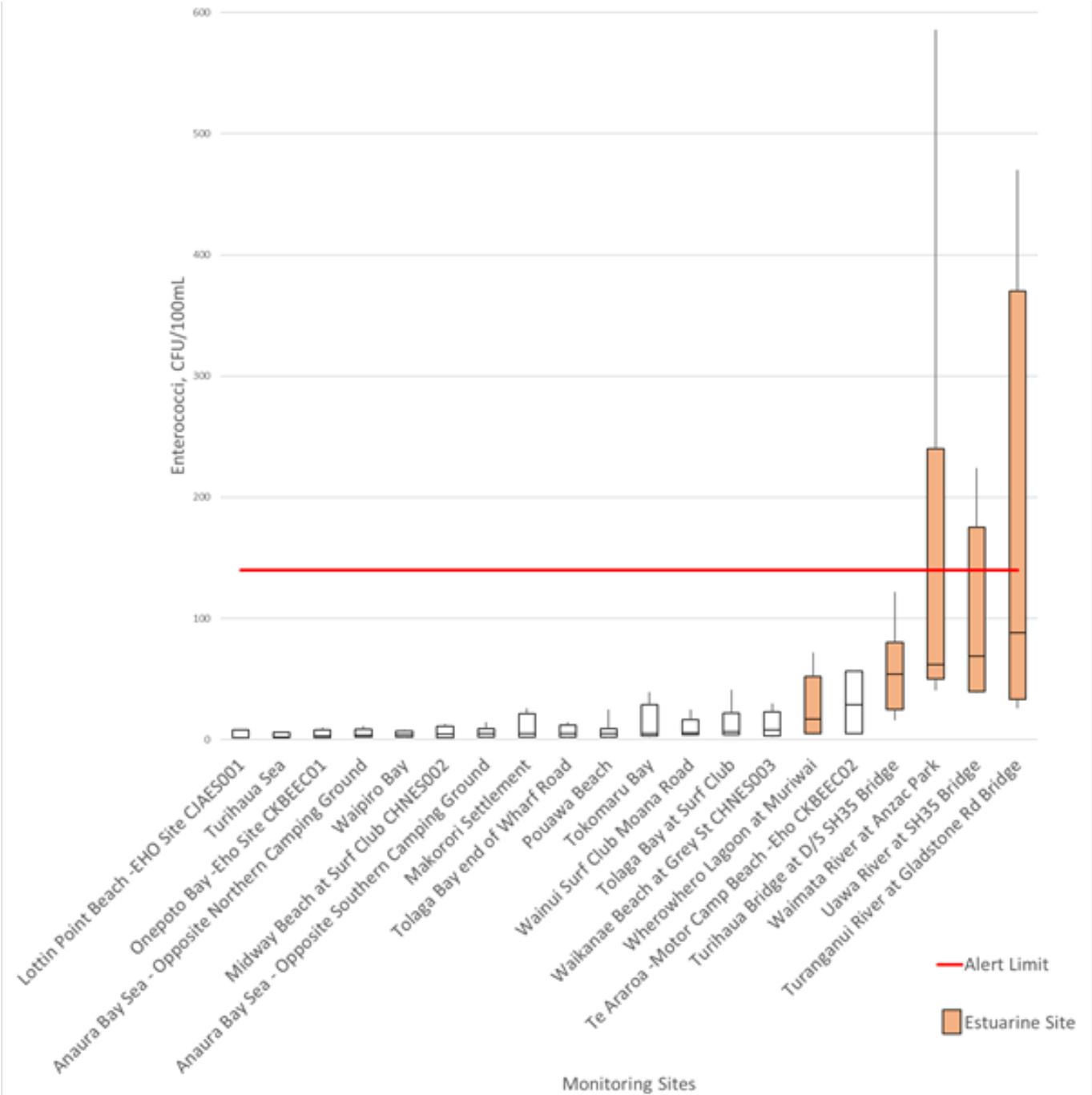
Annual counts of samples within surveillance category and below action guideline

Year	Samples below 140 CFU/100mL	Samples above 140 CFU/100mL	Percent below limit	Samples below 280 CFU/100mL	Samples above 280 CFU/100mL	Percent below limit
2015-16	58	5	92.1	59	4	93.7
2016-17	316	11	96.6	318	9	97.2
2017-18	322	8	97.6	326	4	98.8
2018-19	437	50	89.7	460	27	94.5
2019-20	392	40	90.7	408	24	94.4
Overall	1,525	114	93%	1,571	68	95.9%

Annual % of enterococci samples within surveillance/action guidelines categories



Enterococci levels of beach and estuarine recreational sites 2015-19



This box and whisker plot shows results of monitoring enterococci bacteria at coastal sites and estuaries where people commonly swim. It shows the three sites with the greatest frequency of elevated bacteria levels are estuaries – at Waimata River, Uawa River and the Turanganui River

The majority of sites where samples have been within the “action” category have been at river sites close to urban populations, Waitou Stream at Waitu Rd Bridge in Tokomaru Bay, and the Waimata River and Turanganui Rivers in Gisborne. These high results often occur during or soon (in the three days after) rainfall. This reflects the river water quality in these catchments which is influenced by, animal grazing and urban sources such as wastewater connection to stormwater systems,

as well as dog and bird faecal matter. A small number of “action” samples have also occurred at other beaches and estuaries from time to time. Generally, these have occurred where water quality has been affected by rain washing pollutants off the land and into the sea.

More information on what you can do to keep yourself healthy and safe while swimming in our region can be found in *Our freshwater* on page 65.

What you can do to keep our water clean

To reduce the amount of faecal material going into our rivers and out onto our beaches, it's important farm animals are kept out of waterways, your dog poo is picked up and put in the rubbish, and that wastewater doesn't end up in our stormwater networks and then into our streams and onto our beaches. Visit www.gdc.govt.nz/drainwise for information on what you can do.

- Sinks are not rubbish bins
- Keep stormwater and wastewater separate
- Get to know your gully trap
- Only flush the 3 Ps – pee, poo and toilet paper.

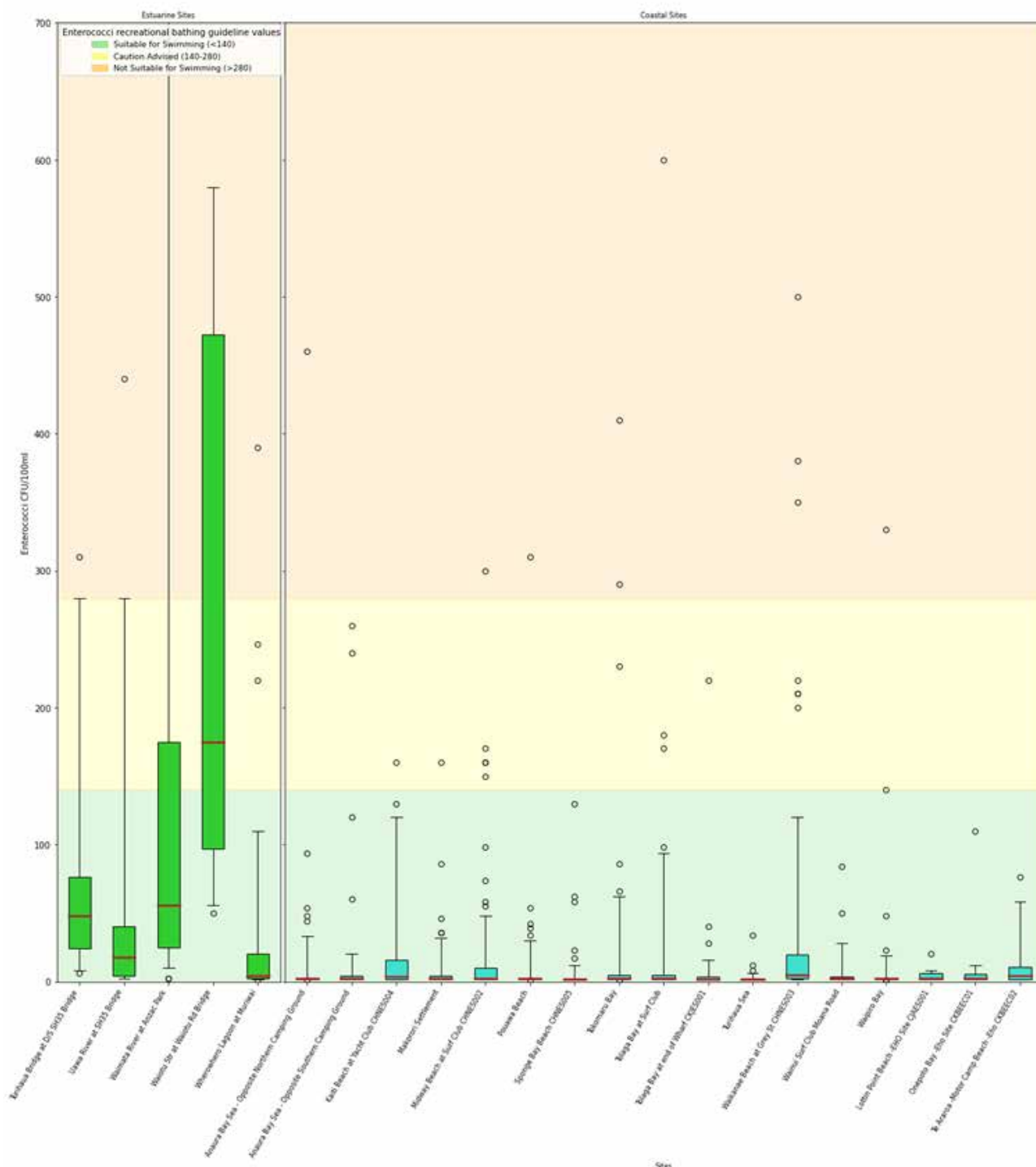
Location	Number of times exceeded Action guideline	Number of times below Action guideline
BEACHES		
May 2015–April 2019		
Lottin Point Beach -EHO Site CJAES001	0 (0%)	15 (100%)
Onepoto Bay -Eho Site CKBEEC01	0 (0%)	18 (100%)
Te Araroa -Motor Camp Beach -Eho CKBEEC02	0 (0%)	19 (100%)
Waipiro Bay	2 (2%)	101 (98%)
Anaura Bay Sea - Opposite Northern Camping Ground	1 (1%)	101 (99%)
Anaura Bay Sea - Opposite Southern Camping Ground	1 (1%)	99 (99%)
Tokomaru Bay	3 (3%)	100 (97%)
Tolaga Bay at Surf Club	3 (3%)	98 (97%)
Tolaga Bay end of Wharf Road	1 (1%)	102 (99%)
Turihaua Sea	0 (0%)	47 (100%)
Pouawa Beach	1 (1%)	125 (99%)
Makorori Settlement	0 (0%)	103 (100%)
Wainui Surf Club Moana Road	1 (1%)	100 (99%)
Waikanae Beach at Grey St CHNES003	6 (4%)	160 (96%)
Midway Beach at Surf Club CHNES002	2 (1%)	160 (99%)
RIVER ESTUARIES		
Uawa River at SH35 Bridge	2 (10%)	19 (90%)
Waimata River at Anzac Park	11 (19%)	47 (81%)
Turanganui River at Gladstone Rd Bridge	33 (28%)	84 (72%)
Wherowhero Lagoon at Muriwai	3 (3%)	109 (97%)
Turihaua Bridge at D/S SH35 Bridge	3 (12%)	23 (88%)
Waiotu Str at Waiotu Rd Bridge	5 (42%)	7 (58%)
Average (all samples)	73 (4%)	1,637 (96%)



**FIX PIPES & DRAINS,
STOP SEWAGE
OVERFLOWS IN
HOMES & RIVERS**

Enterococci bacteria – monthly sampling

Estuarine and coastal monitoring (2015-20) enterococci CPU/100ml



This box and whisker plot shows enterococci results from recreational water monitoring sites at coastal and estuarine sites where people commonly swim. The majority of coastal sites regularly used for swimming had good water quality. The highest enterococci bacteria results are observed at Waiotu Stream in Tokomaru Bay returning five samples (42%) out of 12 that were above the “action” limit, followed by the Waimata

at Anzac Park (19% of samples above action guideline of 280 CFU/100ml). The lagoon at Turihaua Bridge, Uawa River at SH32 bridge, and Wherowhero Lagoon at Muriwai returned generally good results but had results higher than all the coastal sites.

The highest results from coastal swimming sites came from Waikanae at Grey Street and Kaiti Beach at Yacht Club.



There is a lot of high result data not visible off the top of the plot, the highest being a result from Kopuawhakapata above 18000 CFU/100mL. Note that while this graph uses swimming water quality colour bands for context, a number of these sites may not be physically suitable or safe for swimming purposes.

Similar to the E.coli results from **Our freshwater**, the highest enterococci bacteria results are observed in estuaries around the city. The Kopuawhakapata mixing zone site is in front of the Tatapouri Fishing Club in the inner harbour area and the high results from this site align with the very high E.coli bacteria results observed in the freshwater section from the Kopuawhakapata Stream at Hirini Street monitoring site. This clearly shows the effect this stream is having on bacteria levels in inner harbour area. The bacteria levels are then a lot lower between the inner harbour area and the inner harbour turning basin area next to the port loading dock.

There is very little effect of the Gisborne city marine wastewater outfall (approximately 1.3km offshore from Midway Beach on the bottom of the ocean) on observed enterococci values from water samples taken off the waters surface above and around the outfall.

There are often high results (75th and 95th percentiles) at Grey Street (onshore and offshore), Waipaoa River mouth offshore and Kaiti Beach at Yacht Club and Poverty Bay/ Tūrangānui-a-Kiwa sb Zone (offshore between the port exit and Kaiti Beach) sites, likely to be related to the effects rivers close to these sites can have, particularly in the days after heavy rain. This is useful to know this as swimming advice includes avoiding swimming at beach locations close to rivers in the days after heavy rain as there is an increased chance of higher bacteria levels which may make it unsafe to swim.

Wastewater overflows due to heavy rain

During heavy rain in Gisborne the amount of stormwater entering the wastewater system becomes too great for the size of the pipes. This can cause sewage overflows onto residential properties and into water on the streets. To prevent this contamination affecting thousands of residents, the scours are opened allowing stormwater and untreated sewage into the Taruheru, Waimata and Tūrangānui Rivers.

Between 2011 and 2018 Council recorded 24 incidents relating to sewage overflows during heavy rain when the scours were opened. Heavy rain can be short and intense, or less intense but occur over a long duration to cause the wastewater system to become overloaded. Council's DrainWise programme aims to reduce the need for scour openings and overflows by targeting areas where stormwater is entering the sewer system (see the DrainWise case study on **page 66** for more information).

Discharges of wastewater to city rivers	2011/12 FY	2012/13 FY	2013/14 FY	2014/15 FY	2015/16 FY	2016/17 FY	2017/18 FY	2018/19 FY	2019/20 FY
Number of events	4	3	4	1	1	4	3	3	1

Nutrients

Monitoring of total nitrogen and total phosphorus is undertaken at ten coastal sites in our region. These nutrients are key drivers of water quality and clarity in coastal areas. High levels of nutrients result in increased algal growth which clouds the water and reduces ecosystem health. The box and whisker plots show beaches closer to urban areas generally have higher levels of total nitrogen and total phosphorus.

Total nitrogen levels exceed Australian and New Zealand

Environment and Conservation Council (ANZECC) guidelines at all estuarine sites on the Taruheru River and at the Waipaoa River estuary with horticulture being the main contributor. Wainui Stream and Hanamatua Stream also exceed the guidelines – with livestock and septic tank discharges the likely sources.

Ammonia levels are also high in the Taruheru River – this is mainly a concern because ammonia is toxic to native fish.

Median nutrient levels of coastal and estuarine monitoring sites (May 2015-April 2019)

Sites	Nitrate	Ammonia	DIN	Total N	DRP	Total P
Wainui Stream at Pare Street	0.17	0.0575	0.34	0.905	0.27	0.35
Hamanatua Stream at Okitu Bridge	0.016	0.025	0.046	0.39	0.013	0.035
Taruheru River at Tuckers Rd Bridge	1	0.115	1.4	2.1	0.087	0.21
Taruheru River at Wi Pere Pipe	0.12	0.0835	0.55	0.525	0.066	0.09
Taruheru River at Lytton Rd Bridge	0.3	0.0965	1	1.1	0.0755	0.16
Waimata River at Grant Rd	0.0515	0.04	0.13	0.27	0.02	0.028
Turanganui River at The Cut	0.0355	0.039	0.0855	0.165	0.012	0.023
Turanganui River at Gladstone Rd Bridge	0.06	0.045	0.145	0.255	0.019	0.0255
Waipaoa River at Railway Bridge Htl9	0.098	0.0205	0.24	0.3	0.011	0.037
Tolaga Bay at end of Wharf CKJES001	-	-	-	0.075	-	0.012
Tokomaru Bay Wharf CKHES001	-	-	-	0.078	-	0.013
Browns Beach – CGNES005	-	-	-	0.079	-	0.057
Windsurfing Lane (Channel) – (S) MHNES004	-	-	-	0.08	-	0.01
Midway Beach at Surf Club CHNES002	-	-	-	0.1	-	0.0335
Wainui Beach at Stock Route CINES001	-	-	-	0.105	-	0.032
Kaiti Beach at Yacht Club CHNES004	-	-	-	0.12	-	0.02
Sponge Bay Beach CHNES005	-	-	-	0.13	-	0.0515
Hicks Bay Wharf CKAES001	-	-	-	0.14	-	0.0235
Waikanae Beach at Grey St CHNES003	-	-	-	0.14	-	0.0305

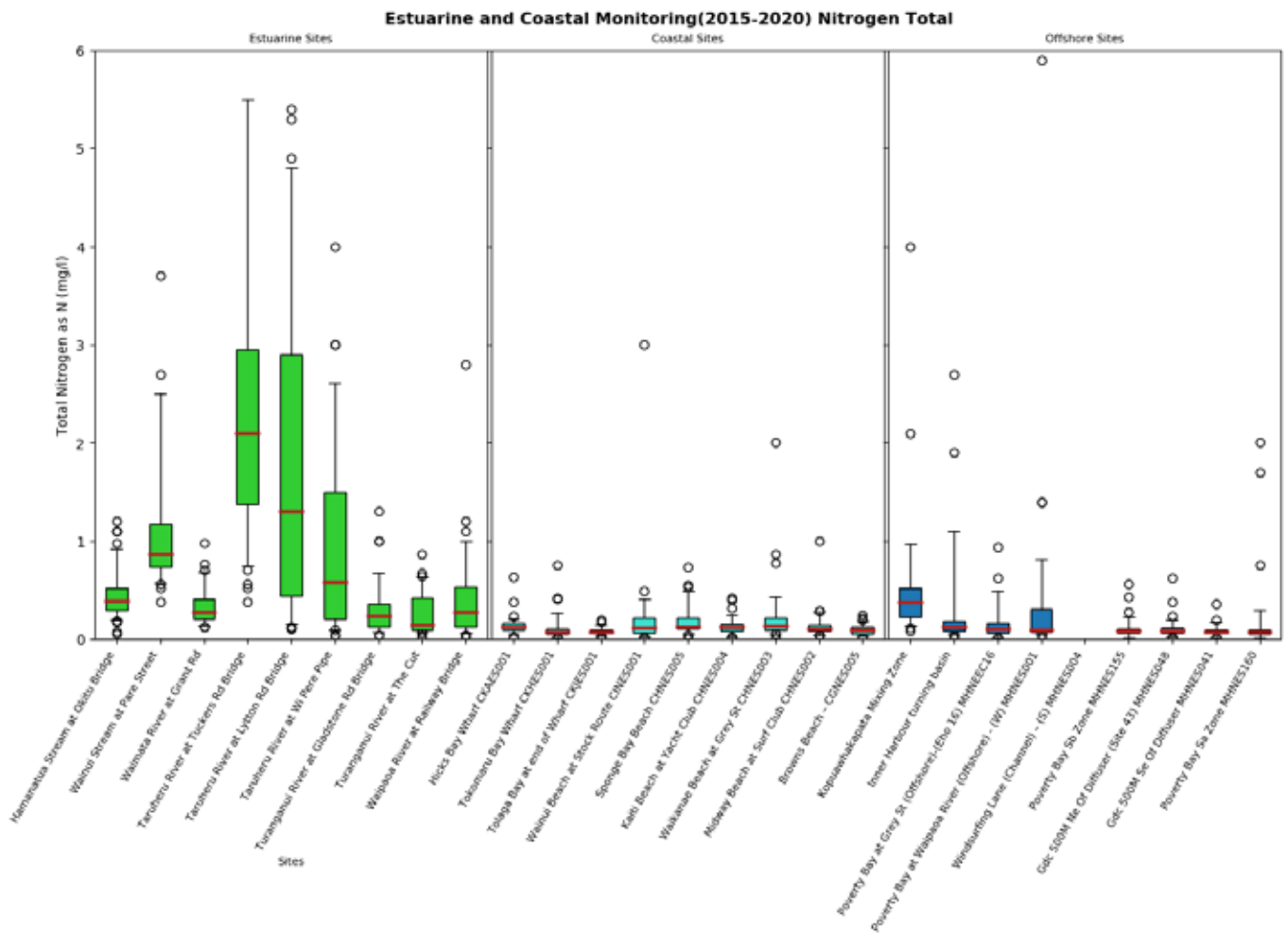
Orange denotes estuarine sites

Nitrogen

While there are no New Zealand standards for nutrients in coastal waters, compared to South Australian ANZECC Guidelines, the median total nitrogen levels indicate a low level of disturbance and are below trigger levels for investigation at Tolaga Bay, Tokomaru Bay, Browns Beach, Poverty Bay/ Tūranganui-a-Kiwa in the main channel, Midway Beach and at

Wainui Beach. Higher levels of total nitrogen are found at Kaiti Beach, Sponge Bay, Hicks Bay Wharf and Waikanae Beach. Of these sites Waikanae Beach and Hicks Bay Wharf have the highest median levels (0.14mg/L total N) and Waikanae Beach has the greatest number of high nitrogen samples.

Estuarine and coastal monitoring (2015-2020) nitrogen total



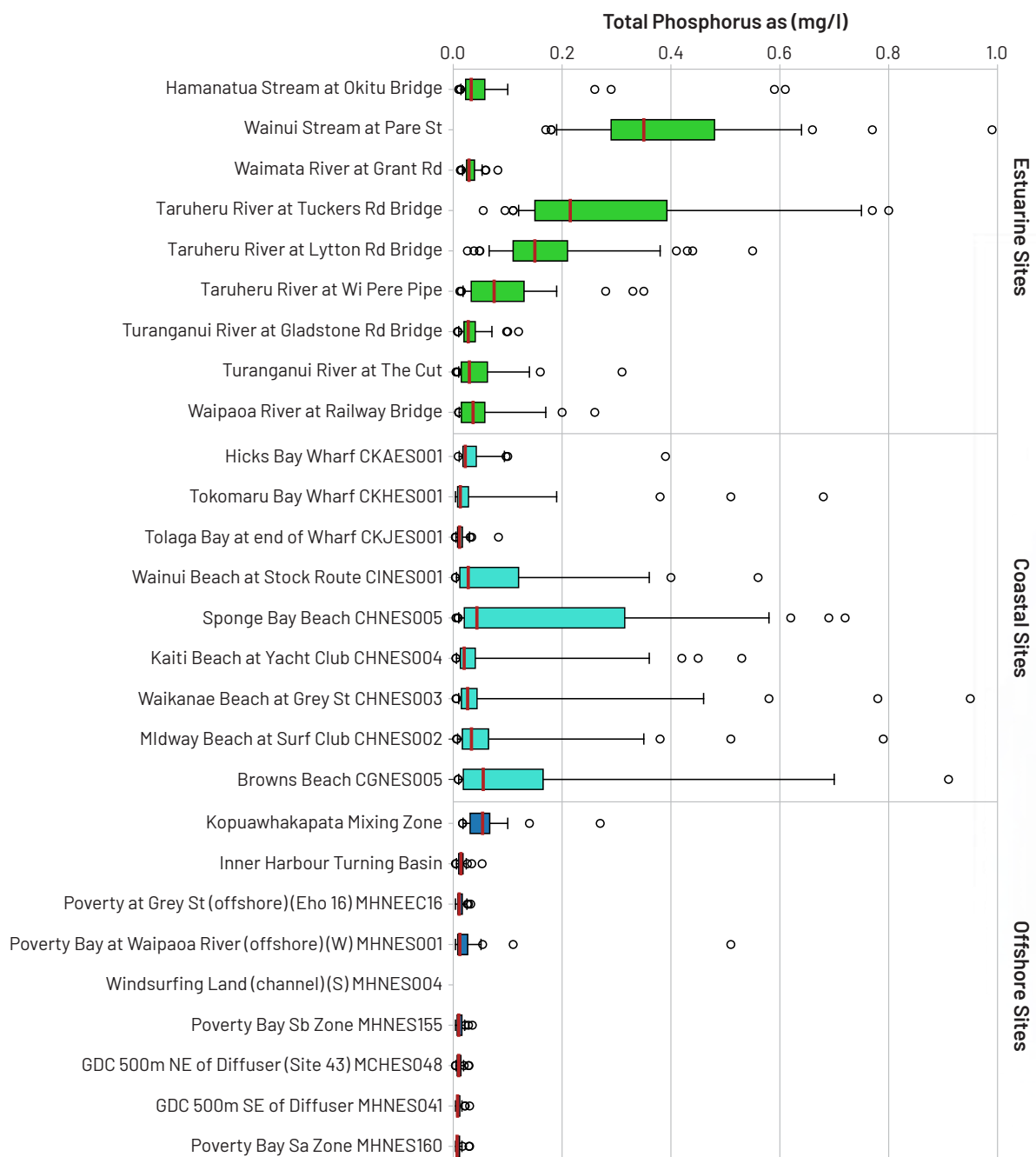
Phosphorus

Total phosphorus levels at all coastal sites monitored are higher than ANZECC South Australian Marine waters trigger levels, largely because Tairāwhiti's geology is naturally high in phosphorus. However, levels at beaches closer to Gisborne are very elevated – reflecting the combined influence of the urban area, wastewater discharges, cropping on the Poverty Bay Flats and the huge sediment discharge from the Waipaoa River.

Gisborne is located on an estuary system and the tide flows eight kilometres inland on the Taruheru River to Tuckers Road.

Our data shows that our estuaries are progressively more nutrient-enriched further upstream. The Poverty Bay Flats horticultural area contributes significant amounts of nitrogen and phosphorus to the Taruheru River. This is gradually diluted by seawater further downstream. ANZECC South Australian guidelines trigger levels for total phosphorus are exceeded at all sites monitored. While there are naturally high levels of phosphorus in Gisborne's rocks, levels are such that human impacts are clearly seen with sites on Taruheru River and Wainui Stream having the highest phosphorus levels.

Estuarine and coastal monitoring (2015-2020) phosphorus total



Other water-quality parameters

See *Our freshwater – technical report* on Council's website for more analyses and information on these parameters.

Total suspended solids

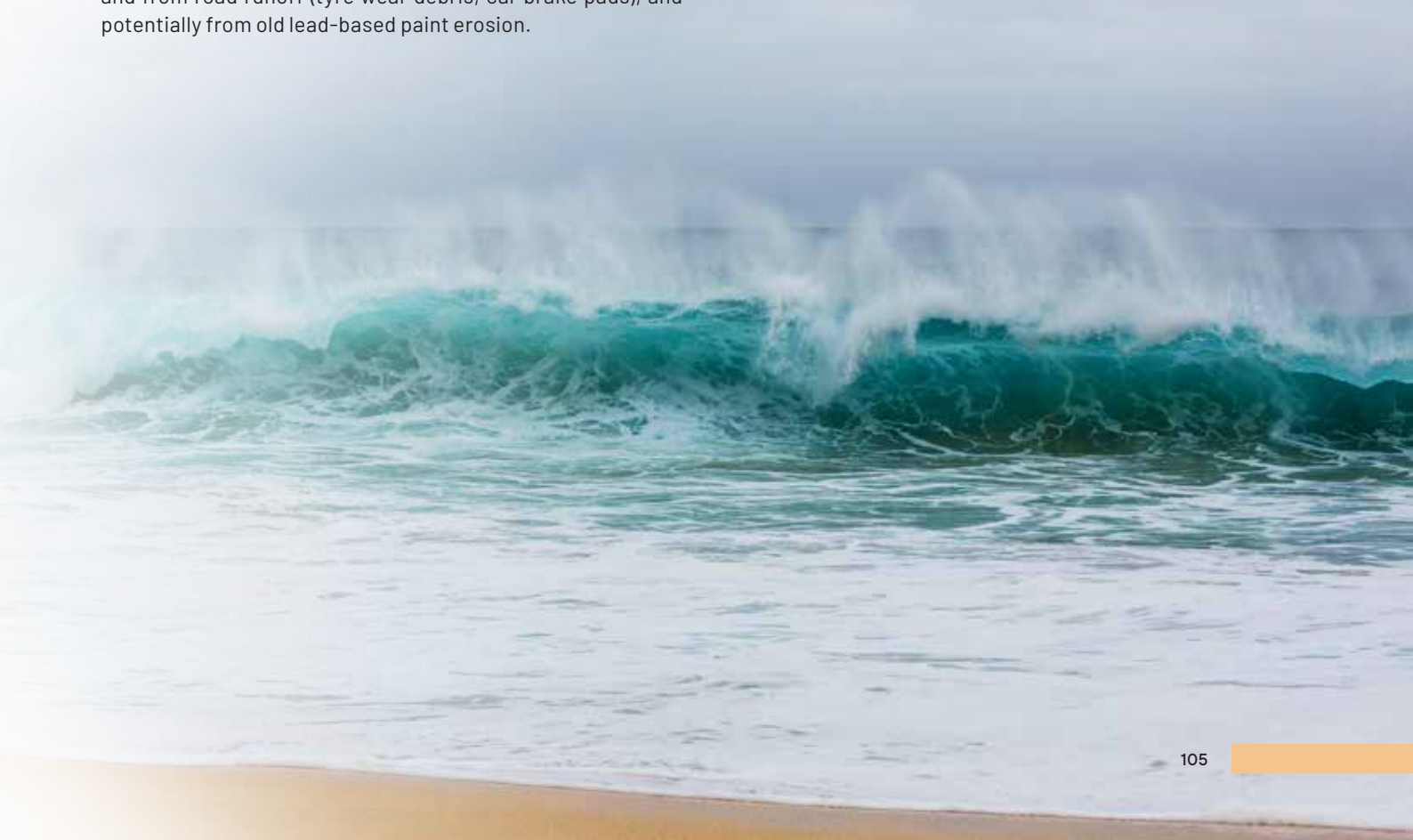
Total suspended solids were typically highest in the coastal sites compared to the estuarine sites. This is likely due to the combination of water currents relocating sediment from nearby sediment sources (coastal erosion or a river sediment source) and then coastal wave energy that can help keep fine sediments in suspension in the water column. This sediment can often be seen in aerial images. These sediments will be the highest in the days after rain and during storms that stir up the ocean. Browns Beach had the highest average suspended sediment results of all the coastal sites (likely due to the significant amount of sediment that comes from the Waipaoa River), followed by Sponge Bay, Midway and Waikanae Beaches, and at Tokomaru Bay Wharf.

Heavy metals

Four key heavy metals are tested for at estuarine and some coastal sites around the Gisborne area to ascertain effects from the urban area. These are arsenic, copper, lead and zinc. Heavy metal contaminants are important as they can bio-accumulate up the food chain, in particular to fish that may then be consumed by humans. Heavy metals can be toxic. Water sampling results show that heavy metals are generally highest in estuaries around the urban area. Sources of heavy metals in and around the Gisborne urban area are thought to be from sources such as corrugated iron roofing and guttering, and from road runoff (tyre wear debris, car brake pads), and potentially from old lead-based paint erosion.

Dissolved oxygen

Dissolved oxygen is important as it greatly affects the ability for estuarine and marine life to thrive and to survive, just as it does for humans. Lower dissolved oxygen levels can cause stress for marine and estuarine life. Using daytime oxygen observations only, dissolved oxygen levels in our coastal areas and estuaries are indicative of generally healthy ecosystems. Sites with lower dissolved oxygen concentrations were typically estuarine sites, the Taruheru River at Tuckers Road location typically had the lowest and levels gradually improved downstream through the city as the sea has an increasing influence on estuary waters closer to the ocean. Wainui at Parae Street also had low oxygen. Of the coastal sites, Tokomaru Bay Wharf had a wide range of dissolved oxygen measurements, sometimes showing high levels while other times showing low levels. Of the offshore sites, the Kopuawhakapata mixing zone site in the inner harbour had the lowest of all the coastal sites.

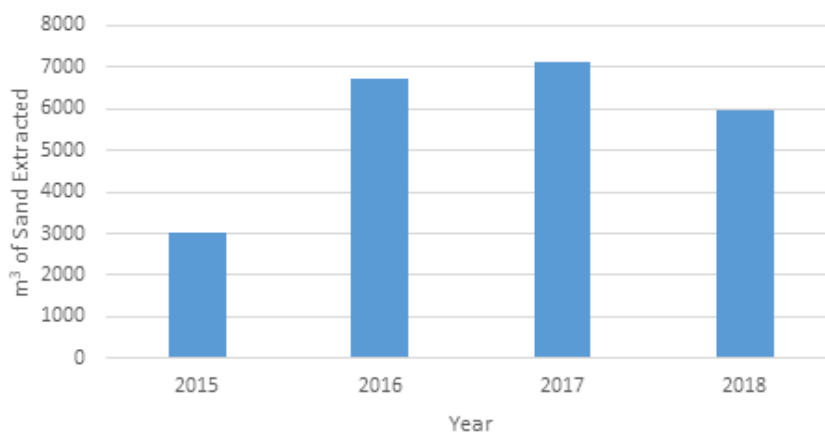




SAND EXTRACTION

There are currently ten consents for sand extraction from the foreshore at the Navigation Beacon site, Centennial Marine Drive in Poverty Bay/ Tūranganui-a-Kiwa. These consents are typically granted for five years after which applicants can apply to renew their respective consents. Sand is mainly used for the construction industry so rates of extraction generally reflect construction activity.

Annual total sand extraction 2015-18





GISBORNE PORT'S MARINE ECOSYSTEM

A survey of Gisborne Port was undertaken in October 2017 to provide a baseline inventory of marine species.

The survey was undertaken alongside the annual biosecurity check for Mediterranean fanworm.

The sampling involved a basic descent and ascent dive profile at a chosen way point with GPS location and the use of a GoPro camera at each location to record marine species.

Results showed a predicted inventory with minimal "unsuspected" species.

Species included a range of seaweeds, gastropods and crustaceans. Some of the common species found were: ecklonia radiata (common kelp), carpophyllum flexuosum (flapjack), corallina sp. (a common red seaweed), semibalanus balanoides (acorn barnacle), perna canaliculus (green lipped mussel), Cookia sulcata (Cook's turban) and common starfish.



Gisborne Port is home to a wide range of marine life including kelps, seaweeds, mussels and starfish. It is also the location of a young crayfish puerulus (post-larva) nursery

Malcolm Rutherford



COASTAL HAZARD MAPPING

Beach cross-sectional surveys are undertaken twice a year to understand beach volume changes at Tūranganui-a-Kiwa/Poverty Bay, Kaiti Beach, Wainui Beach and beaches in Tolaga Bay. These show trends of erosion at:

- the east end of Kaiti Beach Road
- south of Waipaoa River mouth near Te Wherowhero Lagoon
- north of Uawa River to the end of Banks Street
- from Tuahine Point Beach north to Stockroute.

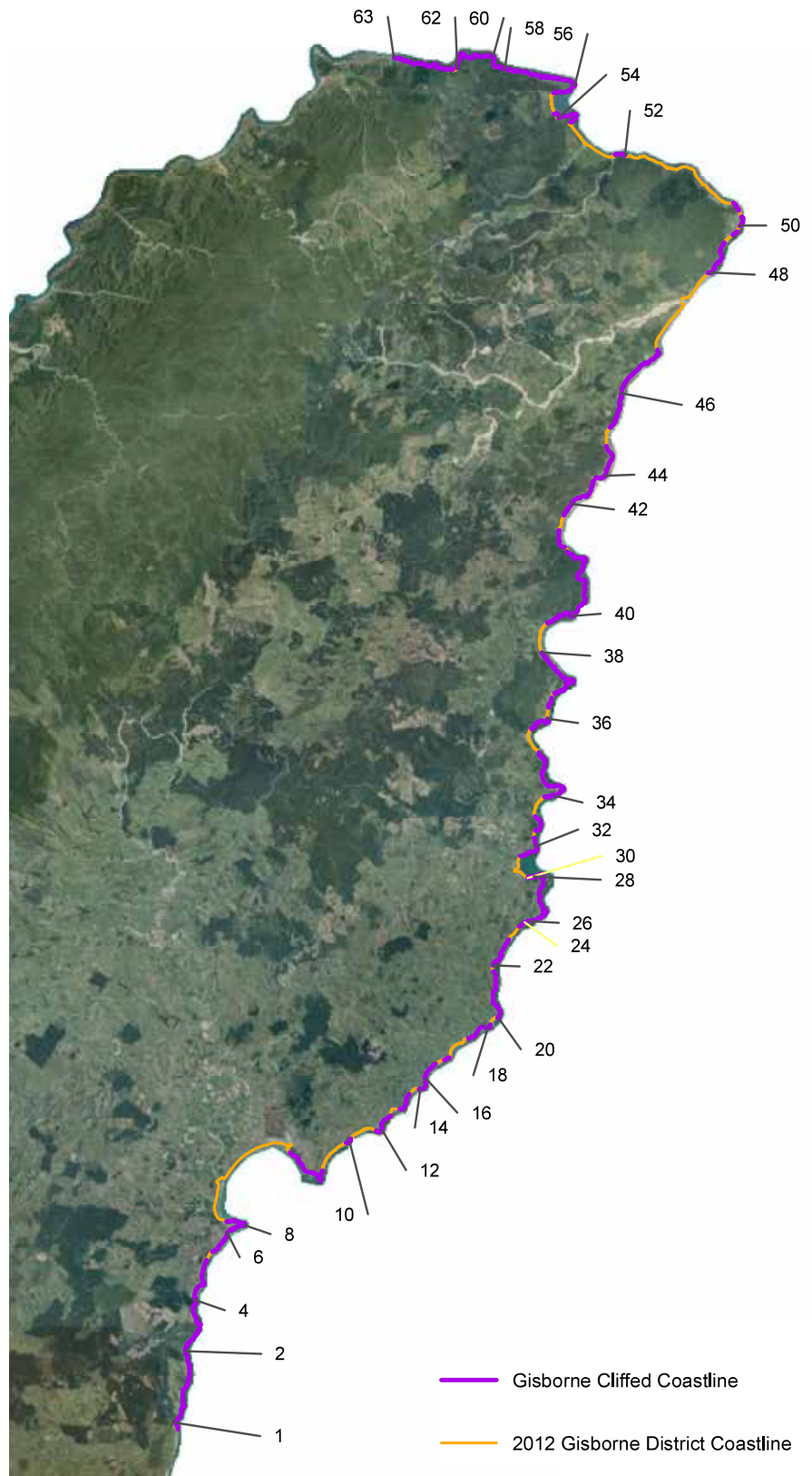
Wainui Beach is a particularly dynamic beach with sand budget and beach level trends dominated by storm events.

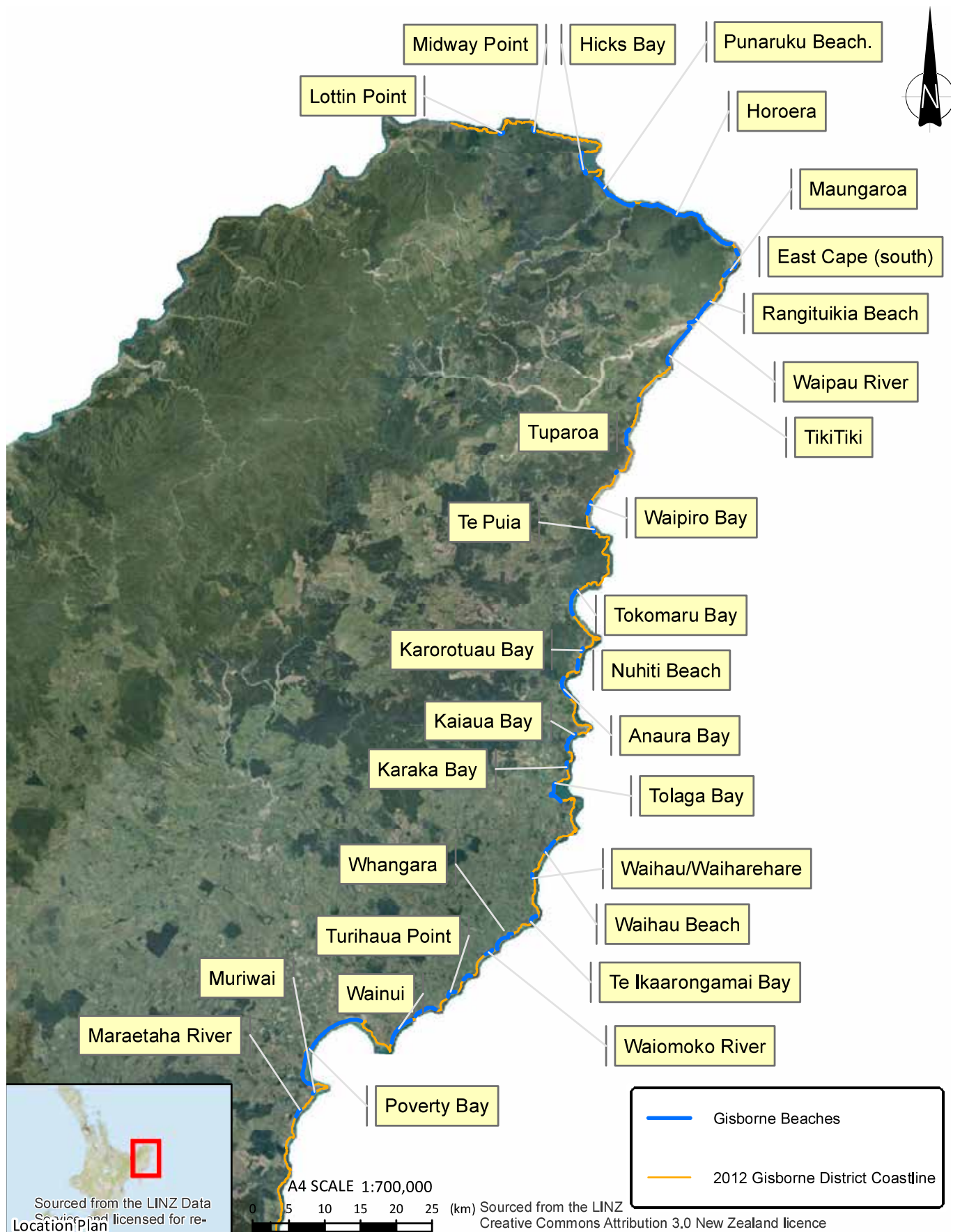
The Wainui Beach Erosion Management Strategy is being reviewed after storm surges in 2019 identified gaps in the strategy.

Coastal inundation and coastal erosion

Coastal inundation is when coastal land is flooded by the sea. At the moment, little inundation is predicted to occur on land where people live. However, low-lying coastal areas are vulnerable to rising sea levels.

Work has been undertaken to assess and map beach and cliff areas considered susceptible to coastal erosion under different risk probability scenarios. If we look 100 years into the future, areas of susceptibility extend 60-180m inland for beaches. Rates of long-term erosion along cliffs range from 0.05 to 0.75m a year. Rates of erosion are expected to increase as sea level rises. Rates of projected sea level rise are estimated to range between 0.65m to 0.95m to the year 2115. A number of our roads are vulnerable to coastal erosion, such as SH35 at Tatapouri and the road to East Cape Lighthouse.





Maps from report "Update of Areas Susceptible to Coastal Erosion Hazard" 2016 report prepared for Gisborne District Council. Reports on coastal hazards can be found at www.gdc.govt.nz/coastal-hazard-reports

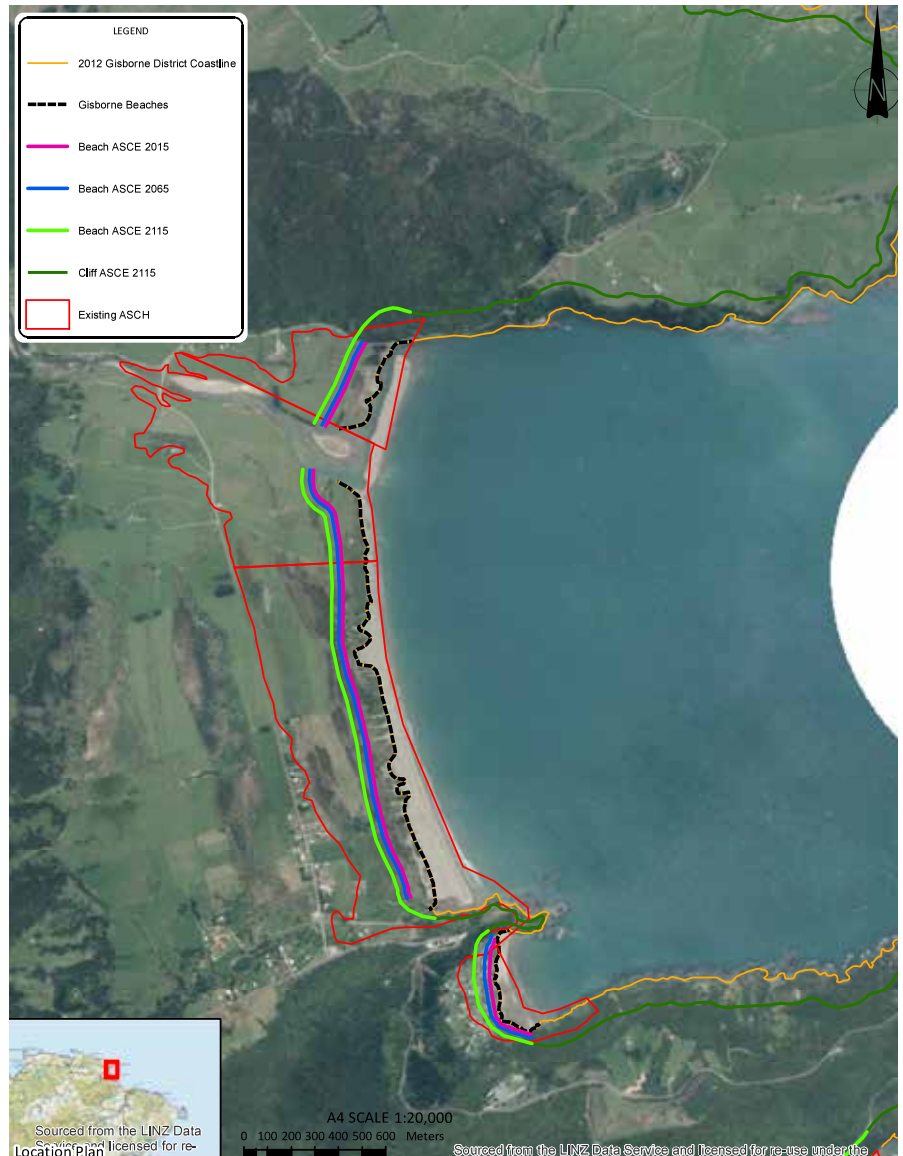
Climate change

Climate change will influence our coastal environment. Major changes expected include:

- more frequent droughts
- increasing westerly winds during winter and north-westerly winds in summer
- more intense ex-tropical cyclones
- sea level rise – possibly around 1m by 2115.

Sea level rise may result in beaches moving further inland as coastal structures come under increasing threat. Historic sea level rise rates have been 1.7mm a year, with an average projected sea level rise rate of 9.5mm a year until 2115.

This is likely to impact on coastal structures and beach forms as well as affecting coastal ecosystems. Beach shorelines are expected to keep their shape, but to recede further inland. Coastal cliffs respond differently to beaches in that when they are eroded, they do not re-form like beaches. Coastal cliffs can erode in different ways, either by gradual retreat due to weathering or by sudden episodic failures. Coastal cliff shoreline retreat in response to sea level rise could be in the vicinity of more than 20m over 100 years for soft sedimentary rock, 5-20m for hard sedimentary rock, and less than 5m for hard volcanic rock.



From 2016 T&T report commissioned for GDC. Example shows modelled future projections of Areas Susceptible to Coastal Erosion and modelled future beach shorelines for Hicks Bay. These future coast shoreline projections can be found on Tairāwhiti Maps which can be found at www.gdc.govt.nz/property-search



NAVIGATION SAFETY & RECREATIONAL INFRASTRUCTURE

Our region hosts a wide variety of water users, both commercial and recreational. Our only commercial port is located in Gisborne. Eastland Port is the second largest log exporter in the country and is also home to a small commercial fishing fleet. The area beneath the commercial wharf is also home to a significant koura rua/crayfish nursery. Recreational usage is widespread throughout our region and the Gisborne-Tatapouri Fishing Club is one of the largest in the country.

Our region features seven sealed boat ramps – four within Gisborne, one at Tatapouri, one at Tolaga Bay, and one at Tokomaru Bay. Eleven water safety signs distributed throughout our region provide general information on boating safety, the Navigation & Safety Bylaw, and swimming water quality.

Our region is home to historic wharves at Hicks Bay, Tokomaru Bay, and Tolaga Bay – of these, only the one at Tolaga Bay is currently open to the public. The wharf at Hicks Bay has been closed due to substantial structural deterioration, including missing and eroded wooden piles with the adjacent boat ramp heavily damaged and no longer useable.

The wharf at Tokomaru Bay is also closed to public use due to structural deterioration. The concrete piles and causeway at the head of the wharf are heavily wasted and a substantial portion of wooden decking at the sea end of the wharf has been washed away. Both wharves will require remediation to prevent additional deterioration and to prevent them from becoming a hazard to navigation.



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