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(Photo: Tauranga City Council)

Revamping Tauranga's waterfront

By Lucy Brake, Contributing Writer

After a decade of planning and community engagement, a design-led construction project on Tauranga's waterfront has proven to be a huge success in reactivating the waterfront and re-engaging the community with the central city and harbour.

Internationally competitive cities have sensational waterfronts. Tauranga City Council's Access to Water Project (including new tidal stairs, pier and pontoon) has been all about reconnecting the city centre to the waterfront. "This is an exciting and important project for Tauranga. This project connects our city centre to the waterfront. It provides an opportunity once again where people can access the water and take advantage of our city environment", says Tauranga City Council Councillor Max Mason, Chair of the Council's Economic and Investment Committee.

A decade of planning

Waterfront master planning and investment has been underway for over 10 years, and has been an ongoing community conversation since 2005. Those discussions include the partnership and dialogue with Ngāti Tapu and Ngāi Tamarāwaho to see their aspirations and values restored to the waterfront. "In working closely with the development sector to review provisions in the City Plan for the city centre, a number of developers pointed to the importance of having high quality amenity, streetscape, facilities and safety, in order to attract people to shop, recreate and enjoy the city centre", says Morgan Jones, Project Leader, City Developments, Tauranga City Council. TCC's Long Term Plan 2015-2025 allocated \$8 million, to be spent in the first five years, for city centre and waterfront development to improve the streetscape, waterfront and open spaces in the heart of the city.

"This is the first project that delivers on The Heart of the City project, which we believe will create a vibrant, safe and successful city centre in Tauranga", says Max. "One of the core principles of the Heart of the City project is to create an environment for partnerships with the private sector to occur, that will grow economic development in the city centre." Elected members approved the Access to Water Project at a Council meeting on 15 December 2015, following feedback from the community, iwi and water users.

Design-led build

The design-led approach, led by landscape and urban designers LandLAB with Beca appointed as engineering designers, has resulted in a high quality and unique design for the new tidal stairs, pier and pontoon. These include the subtle breaking wave face on the steps, a range of curved concrete panels to reflect Māori design, and zones for wide steps for play spaces in the varying tidal depths. "This type of approach enables a more inclusive, explorative and collaborative project process that blurs traditional disciplinary boundaries", explains Henry Crothers, Landscape Designer at LandLAB. "The process and user experience was optimised in this project through a combination of effective stakeholder engagement, iterative design investigation and the utilisation of a 3D design environment to generate, test and refine the design", Henry says.

"The aspiration and creativity of all project participants, including other consultants, stakeholders and the community are embedded into the project from the outset and used to drive project management and design decisions. In our experience

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this process supports the physical manifestation of projects that encapsulate innovation, sustainability and creativity as well as the functional requirements”, Henry continues.

Incorporating artwork into the facility has been important. A karakia and poetry has been sandblasted into the tidal stairs. The karakia tells the story of how the mountain Mauao was hauled from the hinterland to its current location. The poetry, written by Elliot Collins in English, tells a different story of the feeling and experiences people have on the waterfront these days. Innovative lighting that has been specially designed by Marcus McShane, New Zealand artist and lighting designer, will be installed along the pier to add to users’ enjoyment of the facility at night.

Safety was also a key consideration during the planning, concept development, design, and construction of this facility. It was important to provide a place where people can access and use the water, but where they can do so safely. The project included a number of safety features being incorporated into the facilities and the education and water safety messages are ongoing, as they are in other coastal and harbour locations across Tauranga.

Short timeframe for construction

The construction contract awarded to HEB Construction had a value of \$2.8 million. This included delivering 50 metres of tidal stairs, a new 27 metre pier and a new 24 metre floating pontoon. Construction began in late October 2016 and was completed in April 2017. During this time 1,500 m³ of Mudcrete was used and 128 precast units built to make up the tidal stairs. There were 20 precast units (weighing between 0.5 and 10.5 tonnes) installed each day to build up the stairs. “The timeframe was relatively short to deliver such a key construction project; forward planning and having a skilled team working additional hours were needed to ensure the tidal stairs and pier were completed on time for the Jazz Festival weekend”, says Dean Taylor, HEB Project Manager.



Cranes move the precast concrete steps into place (Photo: HEB Construction).



Tidal stairs being constructed (Photo: Tauranga City Council).

During construction, ongoing engagement with key stakeholders and the community was critical; for example, a time-lapse camera allowed the public to view construction as it happened and drone images built excitement prior to the opening. HEB sponsored and installed a new sandpit and digger in the playground adjacent to the site so that children could come and join in the construction activity. “The focus was definitely on delivering a high quality product”, says Richard Conning, Tauranga City Council Project Manager. “The HEB team has been outstanding to work with on this project, which has been completed on time and on budget. Whilst we faced a number of challenges along the way, we always managed to overcome these through some innovative thinking and solid team work.”

Successful opening

Following the opening in early April 2017, the stairs have been heralded a success, with positive reports in the local media and many people in the community praising the facility through different channels. Media headlines included ‘Tidal stairs prove immensely popular’ and ‘Tidal steps opening proves Tauranga drawcard’. A very successful waterfront festival was held on 6 May, which included Tauranga’s inaugural bombing competition.

“Public led facilities such as the new waterfront steps are a good example of how urban amenity can be significantly improved to attract people and increase demand for residential living in our city centre”, Morgan says. People from all sectors of the community are now heading down to the waterfront and enjoying the new facility, sitting on the stairs, bombing off the platform, or just engaging with the water again.

Video link

A short video of the story behind the Access to Water project, including a time lapse video of construction, can be viewed at:
<https://www.youtube.com/watch?v=AhMndebKYgw>

Contributing to Coastal News

We always welcome contributions for forthcoming issues of *Coastal News*. Please contact the Acting Editor, Charles Hendtlass, at cellwairmonk@gmail.com if you’d like to submit an article, contribute some news items, or have content suggestions. The submission deadline for the next issue is 1 October 2017.

World's southernmost wave buoy measures huge wave

By Tom Durrant (MetOcean Solutions), Sally Garrett (Defence Technology Agency) and Peter McComb (MetOcean Solutions)

A wave buoy in the Southern Ocean has measured a 19.4 m wave. The instrument, which is the southernmost moored open-ocean wave buoy in the world, was deployed on February 8, 2017 as part of a collaborative project between the New Zealand Defence Force and MetOcean Solutions.

Located 11 km south of Campbell Island, the buoy is moored in 150 m of water in a location infamous for its harsh conditions. The combination of persistent westerly winds and the largely unbroken expanse of sea produces enormous fetches, resulting in the Southern Ocean experiencing higher wave heights for longer periods than any other body of water. The moored buoy is fully exposed to the predominantly westerly wave systems created by the relentless procession of mid-latitude storms, and so is ideally situated for measuring large waves.

The buoy was deployed to gather data on Southern Ocean waves in a project initiated by the Defence Technology Agency (DTA). DTA is the main provider of research, science and technology support to the New Zealand Defence Force and the Ministry of Defence, and they plan to use the buoy data to design vessels that can withstand the extreme conditions of higher latitudes. The data will also be used by DTA and MetOcean Solutions to produce better wave models for the Southern Ocean, helping to improve the forecasts available to these vessels as they undertake often perilous patrol, search and rescue, and remote re-supply missions in the Southern Ocean.

The gathered data will also be of great value to the scientific community. The Southern Ocean is known to play an important role in the climate system, cycling heat, carbon and nutrients. Waves modulate the air-sea fluxes and exchanged properties are redistributed primarily via the Antarctic Circumpolar Current. The waves generated in this region have far-reaching effects, contributing significantly to the wave climate in all the major ocean basins. They are also important locally, where New Zealand's west coast is periodically battered by large swell systems generated in Southern Ocean storms.

Due to the harsh ocean environment and remote location, the Southern Ocean is the least observed of any ocean body. While satellite altimeter data can be used to estimate the surface variance, the wave spectral characteristics cannot be measured remotely, and consequently the directional wave spectra in the area are not well understood. The buoy data will add valuable insight into the region, and in recognition of this value, will be made freely available to the scientific community.

On 20 May this year, the buoy measured a maximum wave height of 19.4 m, the biggest in situ wave measurement in the Southern Hemisphere so far.

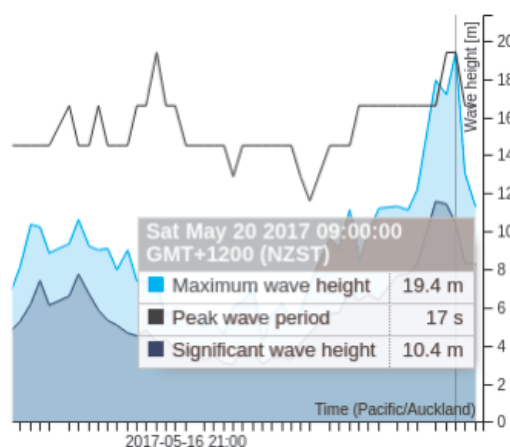
Generated in a sea of significant wave heights* of 10-12 m, the wave coincided with a low pressure system moving across sub-Antarctic seas. Both MetOcean Solutions and the New Zealand MetService are thrilled that the buoy has been able to capture these extreme conditions in the Southern Ocean for the first time.

As winter descends, and the storms of the Southern Ocean intensify, the potential exists to measure an even bigger wave. However, it is a race against time. The buoy is powered by solar panels, and as the hours of winter sunlight reduce, the batteries will progressively lose power until the buoy is no longer able to transmit data. This is expected to occur some time in June.

Until that day comes, live data from the wave buoy can be seen at www.metocean.co.nz/wave-buoy. If you need the data for research, please contact us at enquiries@metocean.co.nz.



The buoy was deployed on 8 February 2017, 11 km south of Campbell Island (Photo: MetOcean Solutions).



A 19.4 m wave was measured on 20 May 2017 (Graphic: MetOcean Solutions).

* Significant wave height is the average height of the largest one-third of waves. Corresponding roughly to the height of waves as estimated by a trained observer at sea, it provides a good measure of the forces experienced by vessels, structures and instruments located at sea.

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NZCS Award winner at the Delft IHE

Peter Quilter of Tonkin + Taylor was recently awarded the NZ Coastal Society Professional Development Award, allowing him to undertake a two-month sabbatical at the Delft Institute of Hydraulic Engineering (IHE) in the Netherlands. In this article, Peter reveals why he has dedicated his career to coastal engineering and why studying abroad has been so beneficial to him both professionally and personally.

Heading over to Delft in the Netherlands to study coastal engineering at post graduate level is a substantial step from my post graduate study in New Zealand, simply due to the experience of the teaching staff and the research facilities, which present opportunities to push beyond the status quo. The Delft Institute of Hydraulic Engineering (IHE) Masters in Coastal and Port Development traverses a range of subjects, with some being more relevant to New Zealand than others. Fortunately two of them, namely Coastal Systems and Coastal and Port Structures, followed one another in the academic calendar and I was able to be admitted into these courses independent of the wider Masters programme.

My teaching staff included Professor Van der Meer (renowned designer of coastal structures), Professor Ranasinghe (who holds the AXA Chair in Climate Change Impacts and Coastal Risk at the Department of Water Science and Engineering), Professor Roelvink (expert in coastal hydrodynamics and numerical modelling), and Associate Professor van der Wegen (who specialises in estuarine morphodynamics).

Having fewer than 20 classmates allowed me plenty of time with the professors. The international mix of students – many from developing countries – meant that the many challenges we face in coastal engineering were frequently discussed in context with those countries most vulnerable. Those contacts made with colleagues and teaching staff will undoubtedly benefit my continuing professional development.

It appeared to be commonplace for coastal engineers in the Netherlands to have a mix of private, non-profit, and public sector work. This mixed work load created opportunities that would not have arisen within a single organisation. The variety of avenues is well suited to coastal engineering, which encompasses a diverse range of clients and specialisations. In New Zealand a similar situation occurs in medical practise, with its mix of public and private practise work.

Also interesting to see were the smaller consulting business models now flourishing in the Netherlands. A shift from an export/import economy to more local design and manufacture through innovation is apparent in the rapid growth of shared working environments like CiC (<http://cicrotterdam.com>), which are helping to drive both innovation and entrepreneurship. The CiC facility encourages networking between disciplines in a shared working environment with the aim of collaborating and fast-tracking innovation and business development. CiC is adding another eye-watering 13,000 m³ of downtown office space next year to support approximately 800



First day back at school at IHE (Photo: Peter Quilter).



TU Delft physical modelling laboratories (Photo: Peter Quilter).

start-ups, which reinforces the global transition in developed countries where sustained growth demands innovation.

There is also an apparent transition towards other open source tools such as Python and associated open source libraries, which are being developed by a collaborative user base as opposed to private software developers.

A number of people have asked me how coastal management in the Netherlands differs from New Zealand. Of course, they face similar challenges such as sea level rise and coastal erosion, however their approach is quite different. For example, many low lying developments susceptible to inundation are located within a network of delta systems, some of which have been protected at their seaward extent by extensive flood gates. While a reduction in flood risk has been gained, the consequence is that large areas of estuarine ecosystems have now been flooded with freshwater.

Extensive beach monitoring and nourishment programmes are ongoing along the exposed sandy dune coasts using sand dredged and transported from the North Sea. This occurs on a scale that has significant cost advantages compared to beach nourishment in New Zealand.

My time in the Netherlands has extended my theoretical understanding of coastal systems and breakwater design and enlarged my community of international contacts. I am extremely grateful to the New Zealand Coastal Society and Tonkin + Taylor for providing this opportunity. With this chapter of study behind me, I'm very much looking forward to applying my enhanced knowledge and experience in the future.

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NZCS Conference: Review and preview

With the 2017 conference now five months away (see below), we look back at the 2016 conference held in Dunedin.

Once again the highlight was the great talks and networking of the NZCS community. Every year the standard of talks, from both seasoned presenters to those presenting for the first time, is very high and Dunedin was no exception – in fact, we had to run three concurrent streams to accompany all those that submitted. What was also very encouraging was the high proportion of new attendees to our annual conference.

The location provided ample opportunity to mingle and catch up with new and old friends. The choice of field trips along the coast, on the harbour and at the Port also provided variety to accommodate the various professions and interests. All in all another successful NZCS conference!



NZCS in Dunedin 2016: Conference session (above) and dinner (bottom right); Conference field trips (top right and middle right) – complete with genuine southern weather! (All photos: Rick Liefting).

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NZCS 2017 Conference: Changing Coasts

15-17 November 2017, Tauranga Moana

The NZCS Conference is your annual opportunity to share knowledge across a range of coastal management topics and meet with peers from around New Zealand. The 2017 Conference theme 'Changing Coasts' is supported by a local saying 'Papaki kau ana ngā tai o Mauao', meaning the waves beat continuously against the rocky cliffs of Mauao (Mount Maunganui). This theme reflects the constant change of our coasts through coastal processes, biodiversity, climate, development, and also geological processes as recently experienced in Kaikoura.

The Conference venue at Trinity Wharf connects you to the Tauranga Harbour and offers accommodation options close to the city's waterfront. Field trip options will include a boat tour of Tauranga Harbour, and excursions to Papamoa Beach, the Kaituna River re-diversion project, and the ecological restoration projects happening in the Maketū Estuary and its surrounds.

We encourage students to attend and share your latest research. The NZCS 2017 Conference will host the popular student breakfast to provide a unique opportunity to chat openly with a group of coastal professionals.

Keep a look out on the NZCS website (www.coastalsociety.org.nz) for registrations and call for abstracts. In the meantime, have a look at the presentation topics below and start thinking about how sharing your work could benefit others:

- adaption to coastal change
- estuaries and harbours and their management
- balancing coastal pressures while protecting natural resources
- management across coastal and policy boundaries
- coastal hazards and risk
- communities and our coast.

University updates

By Murray Ford, University/Education Coordinator

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Waikato

Karin Bryan and Julia Mullarney have just finished a special issue of their Mekong delta (Vietnam) mangrove work, which will be appear in the *Continental Shelf Research and Oceanography* magazine. Together with postdoc, Erik Horstman, they recently completed three additional experiments on contrasting mangrove inter-tidal morphological development at Firth of Thames, Whangapoua estuary and Whitianga estuary.

Vicki Moon and Willem de Lange have been kept very busy with the landslides at Omokoroa, which have been extremely active over the past few months. Conrad Pilditch and Karin Bryan are in the process of getting the Sustainable Seas 'tipping point' experiments and modelling up and running. The experiments are a series of similar designs across sites in New Zealand where nutrients have been added to the sediments in a consistent way. The experiments involve benthic ecologists from almost every university and NIWA, and they will provide the data needed to test a model for sediment functioning being developed by Karin Bryan and Giovanni Coco at Auckland. We are also in the midst of planning our first large experiment on tidal and surge propagation in Tauranga Harbour as part of our contribution to the Auckland Natural Hazards platform project (led by Giovanni Coco).

The Surfbreaks project with eCoast, Terry Hume and Jordan Waiti is well underway now, with all our stakeholder meetings complete, and our first camera installed at Manu Bay (four more to go!). Data will be freely available for anyone who wants to use it (as soon as we get our data portal sorted). Finally, we have all been working on a series of Vision Matauranga workshops to better incorporate Māori viewpoints into a research planning and teaching.

Massey

PhD student James Veitch is progressing with his project investigating the Holocene coastal and fluvial evolution of the lower Wairarapa valley. James recently got back the first results of OSL dating from sand dunes adjacent to Lake Wairarapa, which indicate that the dunes are mid- to late-Holocene in age. James is currently working on testing hypotheses for the drivers of dune formation in the valley.

Auckland (Engineering)

Cheng Chen got his paper on tsunami impact on coastal structures, 'An experimental investigation of tsunami bore impacts on a coastal bridge model with different

contraction ratios', accepted in the *Journal of Coastal Research*.

The tsunami research group has been investigating tsunami impact on port structures in large-scale experimental studies and the potential of coastal flora for tsunami mitigation in numerical modelling. Both topics are scrutinised in terms of New Zealand perspectives.

Auckland (School of Environment)

Low-lying coral reef islands are considered by many to be extremely vulnerable to inundation due to the effects of climate change, specifically sea level rise. In a collaboration with Plymouth University, Auckland University PhD student Megan Tuck has been attempting to address these concerns by conducting physical modelling experiments in Plymouth's COAST (Coastal Ocean and Sediment Transport) lab.

A 1:50 scale model of Fatato Island, a reef island located on Funafuti atoll, Tuvalu, and its underlying reef platform, has been constructed in the 10x15 m Coastal basin within the COAST lab. By manipulating specific water levels and wave regimes Megan has been able to explore the effect of changing sea level and wave heights on reef island morphodynamics. In the basin the island was subject to many scenarios, including sea level rise up to 1 m above high tide and waves up to 5 m. The results of the experiments indicated islands are able to adjust to changes in both sea level and wave regime, indicating reef islands may be more resilient to climate change than currently believed. This research collaboration, supported by the Royal Society of New Zealand Catalyst Fund, provides a better understanding of reef island trajectories in response to anticipated climate change.



(Top) PhD student Megan Tuck standing in front of the 1:50 scaled reef island (Photo: Gerd Masselink); (below) Fatato Island, Tuvalu (Photo: Paul Kench).



News in brief

New coastal monitoring technology launched in Fiordland

Meridian Energy has teamed up with Cawthron Institute to launch New Zealand's first ever hybrid-energy powered water monitoring buoy. Custom designed technology for Meridian Energy, this buoy is a quality made-in-Nelson product collecting data on ocean conditions.

Cawthron Senior Marine Scientist Paul Barter launched the buoy last month and has received excellent data so far. "The launch went very well. The buoy is now collecting information on weather, ambient light, and water salinity/temperature and sending it back to us here at Cawthron via the Iridium satellite network. To our knowledge, this is the first buoy in New Zealand to gather and send data to its HQ using power generated by both solar and wind power. We've designed the power generation in this way to address the challenge of monitoring the extreme Fiordland waters year round. In the winter there is very little daylight, so solar energy alone is not reliable; by adding wind power we ensure continuous monitoring."

Due to the anti-biofouling technology used in this buoy, it should run for a full year without needing a service. Currently technicians have to service Meridian's water quality monitoring buoys four times a year, so this advancement will represent a substantial cost saving over time.

Meridian's Statutory and Compliance Strategy Manager Andrew Feierabend advised his organisation has a long-standing relationship with Cawthron and water monitoring. "Meridian has had an 18 year relationship with Cawthron Institute overseeing the adaptive monitoring programme at Doubtful Sound – which monitors the tailrace discharge at the Manapori power scheme. Buoy technology provides us real time access to data to understand any changes in the marine environment. If there are unexpected changes, we will be able to deploy appropriate research teams to go out and identify what those changes are and what's causing those changes," said Mr Feierabend.

Cawthron Institute custom designs and builds water-monitoring buoys for a range of uses. There is an expanding network of these buoys around New Zealand. The buoys collect important data that help scientists, industry, and councils to better understand our coastal environments.

A video is available at <https://vimeo.com/206505198> and for more information contact Nicole Taber (nicole.taber@cawthron.org.nz).

Coastal Effects Assessment Guideline

The Transport Agency has developed the Coastal Effects Assessment Guideline in response to the Agency's focus on long-term climate change impacts, such as sea level rise, increased inundation, and various environmental effects to ensure resilience of the New Zealand highway network.

The guide describes a coastal environment risk assessment approach intended to inform the planning, design and management of state highway assets in coastal environments. It outlines key questions to be considered based around risks to the assets and their effects on changing coastal dynamics, such as sea level rise and increasing tide or storm impacts.

The guide was developed for project teams involved in the project approval and consenting stages, as well as in the design, construction and management of coastal assets to:

- identify environmental effects that may influence the maintenance, renewal, new development or management of assets in the coastal environment over the course of the asset's design life
- undertake a qualitative risk assessment of environmental effects identified using this guideline
- develop measures to address effects on the Transport Agency's assets and/or the coastal environment.

The risk assessment process outlined in this guide summarises and documents key threats to assets and coastal environments, enabling project teams to develop suitable mitigation and management solutions. The guide itself does not provide solutions to mitigate the identified issues. The guide is available from <https://www.nzta.govt.nz> (use the title in the search box).

Mapping New Zealand's palaeotsunami

A palaeotsunami is a tsunami that occurred before written records existed, which have subsequently been identified using geological and anthropological evidence. Once stored in old spreadsheets or in historic documents, this information has now been



put into an interactive map and database on NIWA's website, allowing users to search for palaeotsunami records by their location, time and strength of scientific validity. While palaeotsunamis have occurred along most parts of the New Zealand coastline, the map shows that the largest concentrations have been on the east and west coasts of the upper North Island.

Based on the work of former NIWA scientist Professor James Goff (now based at the University of New South Wales in Australia) the free-to-use New Zealand Palaeotsunami Database can be found at <http://ptdb.niwa.co.nz>, and has been provided by NIWA with funding assistance from the Ministry for Civil Defence and Emergency Management. A technical report is also available (<http://docs.niwa.co.nz/library/public/NIWAtr131Pt1.pdf>).

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Chair's message

by Hugh Leersnyder

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'Changing Coasts' is a very appropriate theme for our annual conference to be held in Tauranga from 15 to 17 November 2017. It will be 10 years since the Society last met in Tauranga and it will be exciting to see what has changed over this time. The city and hinterland have faced considerable growth pressure, finding the balance between accommodating an expanding population while maintaining the quality of the natural environment and lifestyle that makes the Bay of Plenty such a special place. The port has continued to develop to face the new challenges of catering for increasingly large vessels. The disastrous grounding of the *Rena* on the Astrolabe Reef in October 2011 has changed a considerable amount in terms of how we work together to respond, recover and manage the incident's ongoing effects. I read with interest in this edition Lucy Brake's feature article on revamping Tauranga's waterfront, the gestation period which has coincided with our conference's return to the aptly named Bay of Plenty. There will be much to see, to hear about and to discuss in Tauranga!

There is also a tide of change within the Executive of the Society. I have picked up the reins as Chair from Rick Liefting. Rick filled this role for a period of three years and led the Society magnificently. His calm, sensible, collaborative and pragmatic approach have seen the Society continue to flourish. We are indebted to Rick for his wisdom and contribution. Another person to move on to new and exciting opportunities is Shelly Biswell, our *Coastal News* Editor. Shelly has made an amazing contribution in her role. As well as the regular *Coastal News* productions, she has been instrumental in our two special editions: *Adapting to the consequences of climate change* (2016) and *Rena: Lessons Learned* (2014). We are delighted that Charles Hendtlass has picked up the additional responsibility

as Editor for *Coastal News*. Charles is no stranger to the Society or *Coastal News*, having first started desktop publishing *Coastal News* 20 years ago, so is ideally suited to carry the baton forward.

These special editions are an important vehicle for the Society to capture information, stories and lessons from the more defining moments in our country's coastal management. The next edition (see page 16) will focus on the dramatic events surrounding the Kaikoura earthquake, which struck with devastating force in the wee small hours of 14 November 2016. The science, societal impacts and lessons learned will make for great reading in this forthcoming special edition. We look forward to pulling together a range of perspectives and disciplines to describe this significant event, which has changed this section of coast and surrounds so suddenly, physically and emotionally.

As I write, we have just won the Louis Vuitton Cup, giving us the right to challenge for the America's Cup. I reflect on the change to Tauranga's waterfront and think of how much the winning of the America's Cup on 15 May 1995 was a catalyst to changing Auckland's waterfront. By the time of the first Cup defence in 2000 the city's waterfront was on a path of transformation. Bringing people and vibrancy to the harbour has been fantastic. Another boost to the waterfront came with the 2011 Rugby World Cup and we have a magnificent feature visited by locals and tourists alike.

I know there will be a conference to remember in Tauranga later this year. If Peter Burling, that kid from Welcome Bay, and the team bring home a trophy or two it will be icing on the cake! We are blessed with an awesome coast and all that it offers. Let's keep it that way!

NZCS Management Committee

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News from the regions

Northland

Laura Shaft and Michael Day, Regional Representatives

Regional Plan for Northland

The regional council released a draft single regional plan (including a regional coastal plan) and an accompanying draft section 32 evaluation report for non-statutory public feedback in August 2016. Feedback was received from nearly 300 stakeholders.

The council is currently amending the draft plan in response to feedback received and is looking to notify the plan in September.

The new plan will contain more site-specific marine mapping than the existing (coastal) plan. Examples include surf breaks (nationally and regionally significant), historic heritage in the coastal marine area, outstanding natural character, outstanding natural features, regionally significant anchorages, and significant marine biodiversity. This mapping will target the specific uses and values to be protected and enable appropriate development to be considered.

Kaipara harbour sediment mitigation study

Northland Regional Council, Auckland Council and the Ministry for the Environment are working together to better understand the costs and environmental benefits of reducing sediment losses to water in the Kaipara Harbour Catchment. The study involves investigating the costs and benefits of different sediment mitigation options across the catchment and in priority sub-catchments.

Benefits will be identified in terms of quantitative changes in suspended sediment concentrations, water clarity, and euphotic depth in the rivers draining into the catchment and annual average sedimentation rates in key depositional areas in the harbour. The report will look at the associated impacts on important values such as the health of aquatic habitats, the ability to gather kai moana, and recreation. Costs will include sediment and erosion controls, such as increasing planting on vulnerable hillsides, construction of wetlands to trap sediment, and protecting stream banks from erosion. The report is expected to be completed in July this year.

Northland regional marine pathway plan

The regional council recently released its Proposed Regional Pest and Marine Pathway Management Plan. This is the first marine pathway plan for Northland and it aims to set limits on the amount of hull-fouling allowed when boats move to another harbour in the region or popular offshore anchorages. New hull-fouling rules will largely be implemented through the council's existing surveillance programme (this includes 2000 hull checks in the coming financial year).

The council considers that being able to manage the pathways (the way pests are transported from one place to another in the marine environment) provides significantly greater benefits to the region than the

current species-only approach. More information can be found on the regional council's public website.

Northlanders help clean up their beaches and estuaries for Seaweeek 2017

NRC ran a beach clean-up initiative for NZAEE Seaweeek 2017. This year was bigger than ever with 55 groups registering their beach clean-up and an estimated 3000 people taking part. Groups included CoastCare groups, sports clubs, marae and schools. Beach clean-ups took place all around the region, including Baylys Beach, Mitimiti, Taipā, Whangarei Harbour and Ruakaka. Groups who registered were provided with a Beach Clean-up Kit that included rubbish bags, gloves, sunscreen, beach clean collection information, beach id guides, and more. Northland's three district councils all provided free rubbish disposal for participating groups.

As well as taking the time to clean up their beach, 16 groups made the extra effort to audit their rubbish. These groups collected 4670 litres of rubbish from an estimated area of 1430 m². A very high proportion of the rubbish collected was plastic, with this group making up almost three-quarters of the waste audited by some of the groups. NRC's coastal monitoring team have analysed this data and will be using it to work on waste reduction initiatives.



Whananaki residents with some of the rubbish they collected and audited (Photo: Tom Webb).

CoastCare Northland update

Planting has started for the year, with plenty of rain for the plants and some beautiful sunny days for the planters so everyone is happy! One of the sites where planting has begun is at Ruakaka, where work began last year to restore a section of the dune where vehicle access onto the beach had created a large dune blow-out. The plants put in last year are doing well and 1000 spinifex and pingao were added in on 1 June by Pompallier School staff and students and Bream Bay Coastal Care Trust. More planting will take place at the site in the next couple of weeks.

In March the Waipū Cove dune restoration project was named winner of Best Coastal Dune Restoration Project by the Coastal Restoration Trust of New Zealand. The project has been led by Waipū Cove Reserve Board (WCRB) with support from Northland Regional Council CoastCare and the local community.

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Pompallier School students help plant spinifex at Ruakaka (Photo: Laura Shaft).

WCRB is a non-profit voluntary entity with all revenue from the camp ground and other activities used to fund maintenance and improvements in the camp and public reserve. The winning project is restoring Waipū Cove's dunes as natural defences against coastal hazards, while maintaining and enhancing the recreational opportunities there.

The latest stage in the project saw a 100-metre section of the steep bank reshaped back to match the natural dune profile and the removal of historic fill material, some of it placed there decades ago. Rather than try to build the dune forward, which is usually unsuccessful, the erosion scarp was left alone and the dune reshaped landward behind it. The newly formed dune was then planted intensively with spinifex and pingao as well as some back dune plants. The dune has since built forward naturally, forming an incipient dune, which will act as a sacrificial dune or buffer when erosion hits the site again.



Section of Waipū Cove, north of the surf club, in 2014 (top) and 2017 (bottom) (Photos: Laura Shaft).

Auckland

Sam Morgan, Natasha Carpenter and Lara Clark, Regional Representatives

Orewa seawall application

Auckland Council has lodged an application for consent for a proposed seawall to protect the remaining esplanade reserve between Marine View and Kohu Street, Orewa. The proposal includes a 600 m long masonry and rock revetment seawall along with construction of associated walkways and access structures. The current grassed esplanade reserve is narrow and subject to ongoing erosion during storm events. The design is intended to enhance and protect public open space quality and recreation opportunities along this section and onto Orewa Beach, along with walking and cycling connections for persons of all abilities within Orewa township and along the Hibiscus Coast. Submissions for the proposal closed on Friday 12 May and are currently being responded to by the council proposal team before a hearing, which is likely to be scheduled for August.



Orewa seawall visual simulations before (left) and proposed (right) (Auckland Council).

Huia Domain foreshore works

A consent application has also been lodged by Auckland Council for the proposed foreshore protection works at Huia Domain, Waitakere Ranges. The works take a soft engineering approach to protect the valued recreation space and existing seawall from further damage. The proposal includes the construction of two semi-detached groynes combined with beach renourishment, with sediment sourced from the intertidal area. The project takes an integrated approach to coastal management by enhancing the fronting beach to provide additional protection to the seawall while enhancing the recreation and amenity value of the foreshore and



Huia Domain proposed design (Auckland Council).

modifying the incident wave climate. The proposal has been developed through extensive community engagement with a range of options being considered from managed realignment through to the construction of a new seawall.

Kennedy Point Marina

Kennedy Point Limited (KPL) submitted an application for all necessary resource consents for the construction, maintenance and use of a proposed 186 berth marina at Kennedy Point, Waiheke Island, Auckland. The marina is designed to accommodate vessels of 12-25 m in length and would be protected by two floating attenuators along with the existing SeaLink rock breakwater. The marina's proposed deep water location negates the need for dredging and a range of enhancements of the area are proposed as part of the project, including a floating public use building and viewing deck. The proposal went to hearing on 5 April 2017 and, following an approved extension, a decision is expected to be made in the next few weeks.



Kennedy Point Marina visual simulations before (top) and proposed (bottom) (Boffa Miskell).

Waikato

Christin Atchinson and Jacqui Bell, Regional Representatives

Firth of Thames water quality monitoring

Monitoring of water quality conditions in the Firth of Thames under the NIWA Coasts and Oceans research (Productivity project) has continued this year with four seasonal trips to the two mooring sites completed this year. Results are showing large oxygen and pH depressions at the inner Firth of Thames, consistent with mapping of these parameters made in previous years (2012-13). The results show more intense effects in the inner Firth than outer Firth mooring site with considerably higher primary production at the inner Firth site than outer Firth site. The work informs stakeholders as to the state of ecosystem stressors arising from nutrient loading in this key New Zealand waterway. [NIWA: Niall Broekhuizen, John Zeldis, Fiona Elliott, Scott Graham]

Managing mangrove expansion

Until recently little was known about the effects of mangrove removal on the environment or the best practices for mangrove removal to minimise or avoid adverse impacts and achieve desired removal results.

NIWA has recently released best practice guidelines for managing mangrove expansion while maintaining the ecological integrity of estuaries and harbours in New Zealand. These guidelines summarise the state of knowledge on mangrove removals based on analysis of removals undertaken at over 40 sites throughout the upper North Island. The manual provides guidance on different removal techniques, alongside advice on where mangrove removal is unlikely to achieve the desired outcome, or is likely to be costly to maintain in a mangrove-free state.

Download the Guidelines for managing mangrove expansion in New Zealand here: <https://www.niwa.co.nz/freshwater-and-estuaries/management-tools/managing-mangrove-expansion>, or contact Carolyn.Lundquist@niwa.co.nz for more information.

Waikato Beachcare programme

Waikato's Beachcare programme kicked off the planting season on Queen's Birthday weekend. The programme is a joint initiative between Waikato Regional Council, Thames-Coromandel, Hauraki and Waikato District Councils, DOC and numerous trusts, iwi and community groups. Every year, thousands of volunteers help us restore native dune ecosystems by planting over 50,000 native fore-dune, back-dune and coastal forest species. The firm favourites are spinifex and pingao, which thrive in salty, windy conditions no other plant will tolerate and have an astonishing ability to trap wind-borne sand to grow dunes seaward. Honourable mentions are wiwi and pohuehue, which together create a damp microclimate in the back-dunes, suitable for a broad range of species. For more information on upcoming Beachcare planting bees, watch WRC's Facebook and Twitter feeds or email Moniqua.nelson-tunley@waikatoregion.govt.nz

Extreme sea levels and coastal risks in a changing climate

In December 2016, Scott Stephens attended the special interest group session at the 2016 AGU fall meeting (San Francisco) where he gave a talk addressing the different types of uncertainty that occur when assessing coastal hazards, and how to separate and present these uncertainties to allow more robust adaptation to sea-level rise. AGU Fall Meeting is massive (more than 23,000 posters and talks in one week), but the special interest groups and the four hour poster sessions are excellent. Scott identified a trend towards building global datasets and global models, such as global extreme-sea-level models and global river flood models. The effect of climate change and sea-level rise interactions with river floods has not been addressed much yet in the literature. Several institutions are beginning now to tackle this problem, with NIWA working in the Waihou River (Hauraki Plains). [NIWA: Scott Stephens, Glen Reeve]

Tairua Wharf re-development project progressing

The Tairua Wharf and Boat Ramp re-development is proceeding nicely with the floating crane and construction equipment now on site and dismantling work underway. The existing concrete wharf is being removed, along with the concrete support piles from

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the seabed. The next step will be constructing the new wharf, then the existing boat ramp will be widened and extended to improve launching at low tide, and two new 30-metre floating pontoons are to be erected. One pontoon will go alongside the wharf to increase the number of boats that can launch, as well as improving safety due to the tidal flows of the harbour; and the second pontoon will be on the seaward side of the ramp at an angle to provide for safer launching. Throughout this construction period the ferry service between Tairua, Pauanui and Paku was closed until Friday 30 June. The budget for the Tairua Wharf project is \$1.4 million with the plan to improve trailer boat launching facilities for Tairua as well as catering for larger recreational boats, commercial fishing and charter operators.

For the full story visit: <https://www.tcdc.govt.nz/Your-Council/News-and-Media/News-and-Public-Notices/News-Archived-Articles/March-2017/Tairua-Wharf-re-development-project-progressing/>

Two local district councils unite to fight mangrove spread

This week Thames-Coromandel and Hauraki District Councils passed a resolution to proceed with a joint Mangrove Management Bill, which proposes each council may prepare a draft mangrove management plan in relation to its coastal area and maintain acceptable levels of mangrove vegetation in order to restore, protect or enhance the amenity values and/or ecosystems of the coastal area. The draft local bill will now be publicly notified and presented to Parliament by Minister Scott Simpson, MP for the Coromandel Electorate.

For the full story visit: <https://www.tcdc.govt.nz/Your-Council/News-and-Media/News-and-Public-Notices/News-Archived-Articles/May-2017/Two-local-district-councils-unite-to-fight-mangrove-spread/>

Sediment-source tracing

The demand for compound specific stable isotope (CSSI) methods for sediment-source tracing is growing in regional and central government agencies. Key questions relate to identifying major contemporary and legacy sediment sources to estuary sedimentation, for example the contribution of production forestry, pastoral agriculture, horticulture, road construction and riverbank erosion.

CSSI methods are being employed for annual resource consent monitoring of fine sediment inputs from rivers discharging to the Ramsar Whangamarino Wetland (Waikato), and the Sustainable Seas 'Submarine Canyons – connecting coastal and deep-sea ecosystems' aims to identify the contributions of various rivers to sedimentation in the Kaikoura and Hokitika submarine canyons.

Recently the Firth of Thames fine-sediment sources study identified major contemporary and legacy sources of sediment accumulating in the Firth. Further development and new applications of the CSSI sediment sources and dating methods will be a focus of the 'Managing Mud' fine sediment research programme, which includes collaborations with

scientists from Asian, Middle Eastern and European nations as part of the International Atomic Energy Agency. [NIWA: Andrew Swales, Max Gibbs].

Bay of Plenty

Jonathan Clarke and Kieran Miller, Regional Representatives

Rena update

The Environment Court has now issued an interim decision on the appeal to leave the remains of the *Rena* on Otaiti/Astrolabe Reef. The decision is to confirm the consent subject to finalising the conditions. The conditions that were proposed by the applicant and the regional council at the end of the hearing are generally accepted, with the court suggesting a few changes. The court has now allowed a period of about three months for the parties to discuss and, if possible, to agree on a set of revised conditions for the court to confirm.

Tauranga Harbour Marine Precinct

Six marine companies will soon have a purpose-built hub in Tauranga in which to develop their businesses. The Tauranga Harbour Marine Precinct is intended to become a hub for marine servicing in the Bay of Plenty and beyond, catering to both black and white boats. By the end of this year the precinct will include serviced lots for these marine businesses, a 6200 m² hardstand, deep-water marina berths for large vessels and New Zealand's largest vessel hoist (350 tonne lift capacity and extra-wide). Construction is progressing on the precinct site – demolition has been completed, most underground services installed, and work has started on the hardstand and sheet piling of the lifting bay.

The new owners of the precinct cover a wide spread of specialities, from fibre-glassing to marine engineering, vessel painting and timber decking to composite building, a specialised workboat fleet and a fishing fleet. This means increased potential for collaboration among precinct occupiers and with other marine businesses in the area. This is the first step towards providing a one-stop-shop for customers getting their vessels serviced in Tauranga (for more, see www.vesselworks.co.nz).



The Marine Precinct, located near the Tauranga CBD (Photo: Tauranga City Council).

Opotiki Harbour development

October 2016 marked Whakatōhea Mussels Ltd's harvest of their first commercial load of mussels for the domestic market. The mussels were raised in the

Eastern Bay of Plenty and represent the very first commercial harvest of shellfish from the Eastern Seafarms Ltd waterspace situated eight kilometres off the Opōtiki coast.

New rules for coastal consents

New rules to care for the Bay of Plenty's coastal environment are now in place. BOPRC gave public notice that the rules in its new Regional Coastal Environment Plan would have legal effect from Wednesday 12 April 2017. The Coastal Plan puts controls in place for activities in the coastal marine area, like building sea walls or boat ramps, dredging, discharges to sea, mangrove removal, mining and aquaculture.

Hovercraft mangrove mower

The hovercraft mangrove seedling mower has been certified by Maritime NZ and started operations in March. However, seedlings in the estuaries surveyed so far have been too small for mowing. Operations are able to take place from March to August. No large-scale removal of mature mangroves are planned by the council in the future.

Coastal hazards study

The Tauranga Harbour Coastal Hazards Study is in progress. The study is in partnership with Emergency Management Bay of Plenty, Western Bay of Plenty District Council, Tauranga City Council and Bay of Plenty Regional Council. Risk assessment and mitigation planning stages are to follow.

Tsunami hazard modelling

Tsunami hazard modelling is in progress for Waihi Beach, Pukehina and Maketū in partnership with eCoast Ltd. Risk assessment and mitigation planning stages to follow.

Kaituna River redirection

Work began in March on the Kaituna river redirection and Maketū estuary enhancement project. This project will significantly increase the volume of water (particularly fresh water) flowing from the Kaituna River into the Maketū estuary. It will also re-create at least 20 hectares of wetland habitat, partially restoring the landscape to what it looked like before 1956.

Tsunami evacuation planning in Tauranga

Tauranga City Council recently won the Director's Innovation Award at the Civil Defence Emergency Management Awards in Wellington for its tsunami risk management work. For the last four years, Tauranga City Council, assisted by Tonkin + Taylor Ltd, has been focused on building tsunami safety and resilience – providing Tauranga's at-risk communities with easily accessible safe zones that can be reached quickly, using sign-posted evacuation routes. This has included construction of a vertical evacuation station – a first outside Japan and the US West Coast.

Ongoing works planned for completion by 2022 include three more VES for Wairakei, along with further evacuation signage and possible additional bridges and evacuation routes.

Hawke's Bay

Oliver Wade, Regional Representative

Coastal hazards

An assessment of erosion, storm surge inundation and tsunami hazards, plus associated consequences, has been completed as part of the HBCoast project (www.hbcoast.co.nz) covering the coastline between Tangoio and Clifton. The erosion assessments were led by Tonkin + Taylor, whilst the inundation and tsunami hazard assessments were led by river engineering/modelling staff. Stage 3 of the project has commenced involving the formation of two community reference panels, who will consider local options for local challenges.



Erosion of coastal properties at Haumoana during a storm event (Photo: Oliver Wade).

SOE monitoring and reporting

SOE monitoring in Hawke's Bay is ongoing. Changes to our programme have been to halt sandy beach infaunal monitoring, except for a benchmark site at Opoutama, whilst we explore more suitable ways to monitor the ecology of our beaches. Intertidal reef monitoring has moved from finescale transect/quadrate monitoring to more broadscale habitat mapping and zonation characterisation using high-definition maps created using UAV imagery. Water quality and estuarine SOE monitoring continue as usual.

State and trends for years up to 2013, and the 2014-2015 years are available at www.hbrc.govt.nz/hawkes-bay/state-of-the-environment/soe-five-yearly/

A report published on the Waitangi and Ahuriri estuary monitoring programmes to inform the TANK plan change process identified large issues with water quality in both estuaries. Monitoring is ongoing with gaugings and catchment investigations to try to ascertain loads and sources of sediments and nutrients.



The Waitangi Estuary (Photo: Oliver Wade).

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Marine biosecurity

HBRC are currently undertaking a review of their Regional Pest Management Plan and are looking to include *Styela Clava* and *Sabella spallanzanii* as pest species. Also, as part of this plan, will be the initiation of regular port monitoring.

The Ahuriri Estuary reportedly has one of the 'best' examples of *Ficopomatus enigmaticus* invasion in the country. We have been watching the spread of this worm with concern and are trying to get funding to actively manage its extent.



*DOC staff establishing quadrats to monitor the extent of *Ficopomatus enigmaticus* in the Ahuriri Estuary (Photo: Matthew Brady, DOC).*

The Hawke's Bay Marine and Coastal Group

Localised depletion of fish stocks in Hawke's Bay has led to community concern over the impact of commercial fishing and river inputs on the marine environment. HBRC is the chair of a multi-stakeholder group (the Hawke's Bay Marine and Coastal Group) that has been tasked with addressing these concerns. The first step is to improve the understanding around the CMA and a marine research strategy for Hawke's Bay is currently in development incorporating ecological needs and community values and priorities.



The Hawke's Bay fishing fleet in the Napier Inner Harbour (Photo: Oliver Wade).

West Coast

Don Neale, Regional Representative

The Department of Conservation's Community Conservation Fund has recently helped with community-based activities to improve coastal habitats and recreation areas at Greymouth's Cobden Aromahana Sanctuary (www.greydc.govt.nz/our-district/current-project/cobden-island/Pages/default.aspx) and Westport's Kawatiri River Trail ([www.stuff.co.nz/travel/news/89345406/westport-wasteland-transformed-by-volunteers-into-](http://www.stuff.co.nz/travel/news/89345406/westport-wasteland-transformed-by-volunteers-into-beautiful-river-trail)

www.okarito.net) and habitat restoration at Punakaiki (<http://conservationvolunteers.co.nz/what-we-do/land-management>).

The recent weather patterns have not been kind to the West Coast beaches, and NIWA has been busy providing advice to WCRC about ongoing erosion issues and coastal hazards at a number of sites, including Granity-Hector, Carters Beach, Punakaiki, Cobden, Hokitika and Jackson Bay.

The West Coast Penguin Trust's ongoing work with Te Papa and others (www.bluepenguin.org.nz) has included recent satellite tracking of blue penguins at Charleston, and results were recently published in the *NZ Journal of Zoology*.

An initial survey was done by DOC of the intertidal ecology in the Hautai Marine Reserve, which was one of five reserves established on the West Coast in 2014.

Canterbury

Justin Cope and Deepani Seneviratna, Regional Representatives

Multi-hazard study of eastern Christchurch

CCC have commissioned consultants Jacobs and Beca to undertake a multi-hazards assessment of eastern Christchurch City, including the interactions of coastal hazards with those traditionally viewed as more terrestrial (coastal inundation and erosion, tsunami, pluvial and fluvial flooding, and liquefaction). This piece of work will inform decision making around floodplain management in Christchurch. The work is due for completion before the end of the year. For more information contact Peter Kingsbury (peter.kingsbury@ccc.govt.nz).

Lyttelton Port capital dredging project hearing completed

In May a hearing panel heard the application for the Lyttelton Port Company's capital dredging proposal. The application seeks to extend the existing shipping channel by 6.5 km, widen it by 20 m and deepen it by up to 5-6 m. The 18 million cubic metres of spoil will be mostly dumped at a disposal site approximately 6 km offshore. Approximately 50 submissions were received, with the major submitter in opposition being Ngāi Tahu, citing concerns over mahinga kai values in the harbour. (For more information on the project see: www.lpc.co.nz/port-development/dredging)

Kaikoura harbour earthquake repairs

Kaikoura harbour repairs have reached a new milestone with the arrival of the dredging barges – one has a 47-tonne excavator aboard while the other is a hopper barge for carrying waste material. The two barges work in tandem; the excavator dredges up to 400 m³ a day from the seabed and deposits it onto the hopper. A tug boat then pulls the hopper out to sea, depositing the excess material approximately 2 km from the shore. Dredging is required as the Kaikoura harbour seabed rose by more than two metres in the 2016 North Canterbury earthquakes making access to the South Bay Marina

and the Coastguard boat ramp impassable. This has had a huge impact on the marine and tourist businesses in the region (from NZTA *Kaikoura Updates*, 28 April 2017).

Conferences

It's a busy first six months of 2017 for coastal-themed conferences in Canterbury. In March Christchurch hosted the Coastal Restoration Trust of New Zealand's (CRT) annual conference. The CRT works with community groups, iwi, councils and government departments, research agencies, industry and educational institutions to share information and carry out projects that support and improve the restoration of coastal environments around New Zealand, and the annual conference brings together people to share and exchange knowledge, experiences, up-to-date research and visions for coastal restoration. The March conference had a very practical-based programme with delegates visiting coastal dune and other coastal restoration projects at New Brighton, South Shore, Taylors Mistake, Sumner, Kaitorete Barrier, Tumbledown Bay, Woodend, Amberley and Leithfield Beaches, and Gore Bay. (For more information about the Coastal Restoration Trust see www.coastalrestorationtrust.org.nz)



Coastal Trust conference delegates viewing a dune restoration project at Sumner Beach (Photo: Coastal Restoration Trust).

Christchurch will also host the New Zealand Marine Sciences Society (NZMSS) Conference, July 4-6 2017. The NZMSS is New Zealand's major professional association of marine scientists. It is a non-profit organisation dedicated to advancing marine science and our understanding of the marine environment within New Zealand, supporting our up-and-coming scientists of the future, and provides advice to government on marine environment, resource, conservation and policy issues.

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NZCS Regional Representatives

Every region has a NZCS Regional Representative who is available to help you with any queries about NZCS activities or coastal issues in your local area.

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NZCS Mission Statement

The New Zealand Coastal Society was inaugurated in 1992 'to promote and advance sustainable management of the coastal environment'. The society provides a forum for those with a genuine interest in the coastal zone to communicate amongst themselves and with the public. The society currently has over 400 members, including representatives from a wide range of coastal science, engineering and planning disciplines, employed in the engineering industry; local, regional and central government; research centres; and universities.

Membership applications can be sent to NZCS Administrator Renée Coutts (nzcoastalsociety@gmail.com).

Kaikoura earthquake subject of upcoming NZCS special publication

The November 2016 M7.8 Kaikoura earthquake sequence caused unprecedented changes to the natural and built environment, creating some 5000 landslides, damaging buildings in Wellington, cutting key rail and roading links, and radically altering the landscape.

In a complex sequence that lasted for about two minutes, the earthquake ruptured along a record 21 faultlines. Much of the northeastern coast of the South Island, from about 20 km south of Kaikoura, north to Cape Campbell, was uplifted during the quake by between 0.5 m and 2 m, and up to 5 m in some localised areas. Parts of the South Island have been shunted 5 m closer to the North, while on land, horizontal shifts of up to 12 m have been recorded.

The tsunami that followed the earthquake reached a peak height of about 7 metres in Goose Bay. In some places, marine and freshwater flora and fauna were found 250 m inland from the high tide mark. The effects continued offshore, as huge mudslides wiped out all organisms living in the seabed in parts of the Kaikoura Canyon.

NZCS are planning a special publication to come out towards the end of this year to cover the event, the impacts, and the responses since.

Contributions are welcomed on all aspects of the event including:

- The earthquake event itself and the physical effects



Waipapa Bay uplift (Photo: Tonkin + Taylor).

- The wider impacts on the ecological, social and built environment
- The longer-term response and rehabilitation
- Any photos that you would like to share.

Please send the proposed topic and a short abstract (about 100 words) and/or photos to Charles Hendtlass (cellwairmonk@gmail.com) or Renée Coutts (nzcoastalsociety@gmail.com).

Previous NZCS Special Publications

- Rena: *Lessons learned* (2014)
- *Adapting to the consequences of climate change: Engaging with communities* (2016)

For copies, email nzcoastalsociety@gmail.com

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