Issue 56 • August 2014

Coastal News

Te Hunga Takutai o Aotearoa
NEW ZEALAND COASTAL SOCIETY

CONTENTS

www.coastalsociety.org.nz

ISSN 1172-6938

Poverty Bay may hold the Key to Better Understanding Earthquakes

In May, as part of a multi-year project, a group of international scientists went to Poverty Bay to deploy instruments that measure earthquake activity and slow-slip events where the Pacific and Australian tectonic plates meet. At the same time, the scientists also retrieved instruments that had been deployed last year. The project is expected to provide insights into the earthquake and tsunami potential of the Hikurangi subduction zone – where the Pacific plate is subducted beneath the Australian plate. The zone is east of Gisborne, several kilometres below the seafloor. Subduction zones are responsible for generating the world's largest earthquakes, sometimes called megathrust quakes.

This year's deployment included 32 instruments individually placed 25 to 100 kilometres off the coast east of Gisborne in water depths ranging from 100 to 4000 metres. The instruments belong to the United States and Japan and will remain on the seafloor for one year to record earthquakes and slow-slip events.

Silent earthquakes

A particular focus of this multi-year project is to learn more about slow-slip events or "silent earthquakes" that occur in the Poverty Bay area. Slow-slip events are similar to earthquakes in that they involve more rapid movement than normal across a fault. Slow-slips, however, occur more slowly, in a matter of weeks to months, compared to earthquakes which occur in a matter of seconds.

Photo – Voyage co-leader Dr Stuart Henrys of GNS Science with some of the 32 deep-sea seismic instruments that were placed on the seafloor off Poverty Bay. Photo: John Callan, GNS Science.

Happening at roughly 18-month intervals in the Poverty Bay area, slow-slip events involve large parts of the region moving eastward by up to two centimetres over one or two weeks, as detected by GPS instruments that are part of the GeoNet national network. The last such events occurred in July and October 2013. The July event occurred east of Tokomaru Bay and the October event was just offshore between Mahia and Gisborne.

Poverty Bay is one of about a dozen areas worldwide where these events occur regularly. The region is unique, however, in that they occur at depths ranging from 5 to 15 kilometres under the seafloor. In most other places in the world they occur 20 to 40 kilometres under the surface. The shallow depth of the events makes Poverty Bay an attractive area for scientists to investigate this phenomenon.

Scientists hope the data collected will help to establish if periodic episodes of high earthquake activity are connected to slow-slip events.

Taking measurements

The instruments being used this year include ocean bottom seismographs (OBS) and seafloor pressure sensors.

OBS accurately measure earthquakes beneath the seafloor. They are housed in either metal or glass cylinders capable of withstanding pressures at depths up to 3.5 kilometres. They have anchors that keep them firmly grounded on the seafloor and they are able to store up to a year's worth of data. The OBS will be collecting data on the structure of the Earth's crust down to about 15 kilometres beneath the seafloor. When the time comes to retrieve them,

Dr Kimi Mochizuki of the University of Tokyo prepares one of the ocean bottom seismometers prior to deploying on the seafloor off Poverty Bay. Photo: Margaret Low, GNS Science.

scientists will send an acoustic signal and the instruments will detach from their anchor and float to the surface where they can be picked up by a waiting ship.

Pressure sensors measure any very small up and down movement of the seafloor. All the instruments will remain recording on the seafloor for a year. In that time, scientists anticipate at least one slow-slip event will occur and the instruments will record the various phenomena associated with it.

Retrieving data

While deploying the 32 instruments, the scientists also retrieved instruments that were deployed last year and were able to take an initial look at the data that had been recorded on them. The instruments retrieved were designed at Tohoku University, Japan, and record pressure changes on the seafloor.

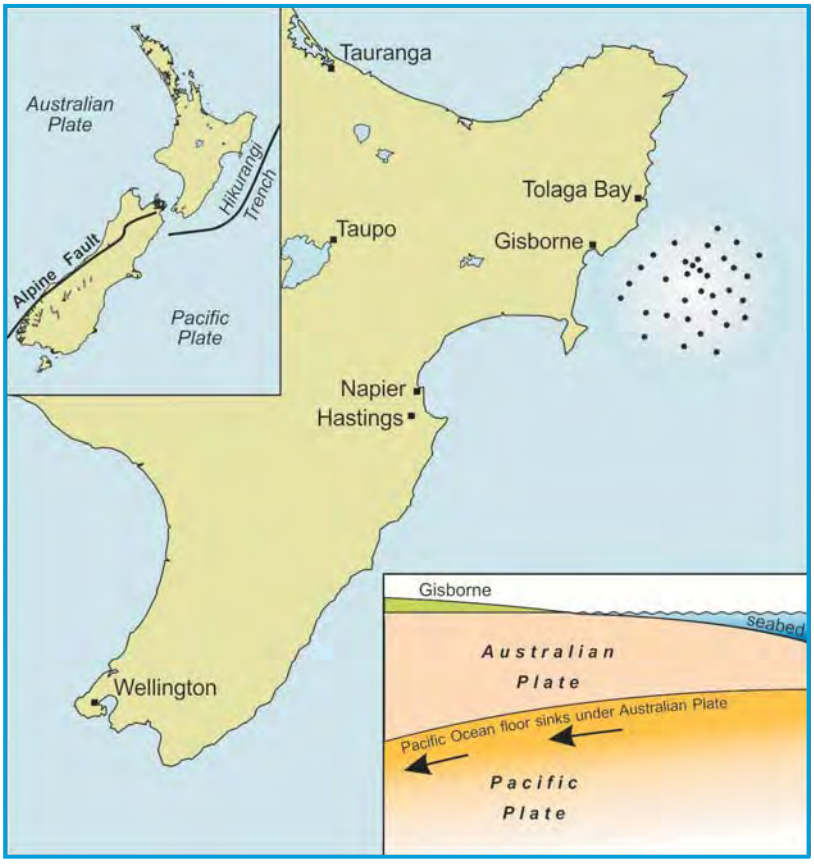
Preliminary analysis suggests the recovered instruments may have captured the offshore signal of two slow-slip events along the east coast of the North Island in the past 12 months. The events were also recorded by land-based equipment. The combination of the land and seafloor observations will enable scientists to better define the location of the two slow-slip events.

This year's deployment will be followed by smaller deployments off Poverty Bay in the coming years.

To learn more, contact project co-leader and GNS scientist Dr Stuart Henrys at s.henrys@gns.cri.nz.

www.gns.cri.nz

Dr Spahr Webb of Columbia University in New York with some of his university's ocean bottom seismometers before setting off for Poverty Bay where they were placed on the seafloor for one year. Photo: Margaret Low, GNS Science.



Scientists deployed 32 instruments on the seafloor near Poverty Bay to record a range of information on seismic activity on the boundary between the Australian and Pacific tectonic plates below the seafloor.

The instruments will remain on the seafloor at the locations shown for about one year. The aim is to gain a better understanding of slow-slip earthquakes that are a regular feature of this part of the North Island.

Rena – Resource Consent Process

The Astrolabe Community Trust was formed by the *Rena*'s owner (Daina Shipping Co) and insurer (The Swedish Club). Following a consultation process, the trust lodged an application to leave the remains of the wreck on the Astrolabe Reef. Consent is being sought to leave:

- the reduced bow section, which is now in several pieces;
- the aft section, including what remains of the accommodation block, engine and machinery rooms, as well as degraded containers of cargo that remain within the holds; and
- the debris field following further clearance which will focus on removing, where practicable, plastic beads, TCCA canisters, aluminium ingots, other inorganic material, and entanglement and other diver hazards to a depth of LAT -30m.

A discharge consent is also being sought for any future release of contaminants from the remaining parts of the wreck and cargo.

The consents are sought for a 10-year period and will be subject to conditions that include:

- an environmental monitoring programme, including sampling and testing sediments and marine species at the reef and surrounding area;
- monitoring of the condition of the wreck over time and after major storms;
- monitoring and reporting on the cultural effects through a Kaitiakitanga Reference Group, to be made up of representatives from Motiti Island, Maketu and Tauranga Moana iwi;
- a Wreck Access Plan to educate and inform visitors to the reef;
- a Shoreline Debris Management Plan to respond to and recover any debris from the *Rena* that washes up on the shoreline; and
- a restoration and mitigation package for the communities of the Bay of Plenty.

The application consists of three volumes. The first volume contains the description of the Proposal, the assessment of environmental effects, statutory assessment and details of the restoration and mitigation package and monitoring programme, as well as a section explaining security over compliance with conditions of consent. The second volume contains the technical reports from over 15 experts, including ecology and fisheries, water quality and ecotoxicity, marine mammals, navigation, recreation, social and cultural. It also contains a Consultation Report that documents the consultation with the Bay of Plenty community, iwi and stakeholders that the owners of the *Rena* have undertaken over the past two years and how the Proposal has been modified to address concerns. Volume three has the background to the application, including information on the salvage work undertaken by companies commissioned by the owner and insurers of the *Rena* since the grounding in October 2011. This work has been significant and makes the *Rena* the second most expensive shipwreck salvage in history (the *Costa Concordia* in Italy being the most expensive). Volume three also contains an assessment of alternatives to the Proposal.

The application was publicly notified on 13 June 2014. The public had 40 days (from 13 June to 8 August 2014) to make a submission on the application. Once the submission period closed, the applicant had the option to make a request to the Bay of Plenty Regional Council that the application be referred to the Environment Court to be determined as opposed to being determined by the Regional Council Hearing Panel. This request must be made within five working days. The regional council then has 15 working days to make a decision on the request, and, if approved, the process will be forwarded to the Environment Court.

For more information contact Cushla Loomb at cushla.loomb@beca.com.

For complete information on the *Rena* resource consent process visit www.renaresourceconsent.org.nz.

Going, going, gone? The Rena*, from first grounding (top), to salvage (middle) and finally underwater wreckage (bottom). Photos: MNZ (top and middle); Andy Belcher & Darryl Torckler,www.renaproject.co.nz (bottom).*

Modelling an Oil Spill

by Shelly Biswell, Editor

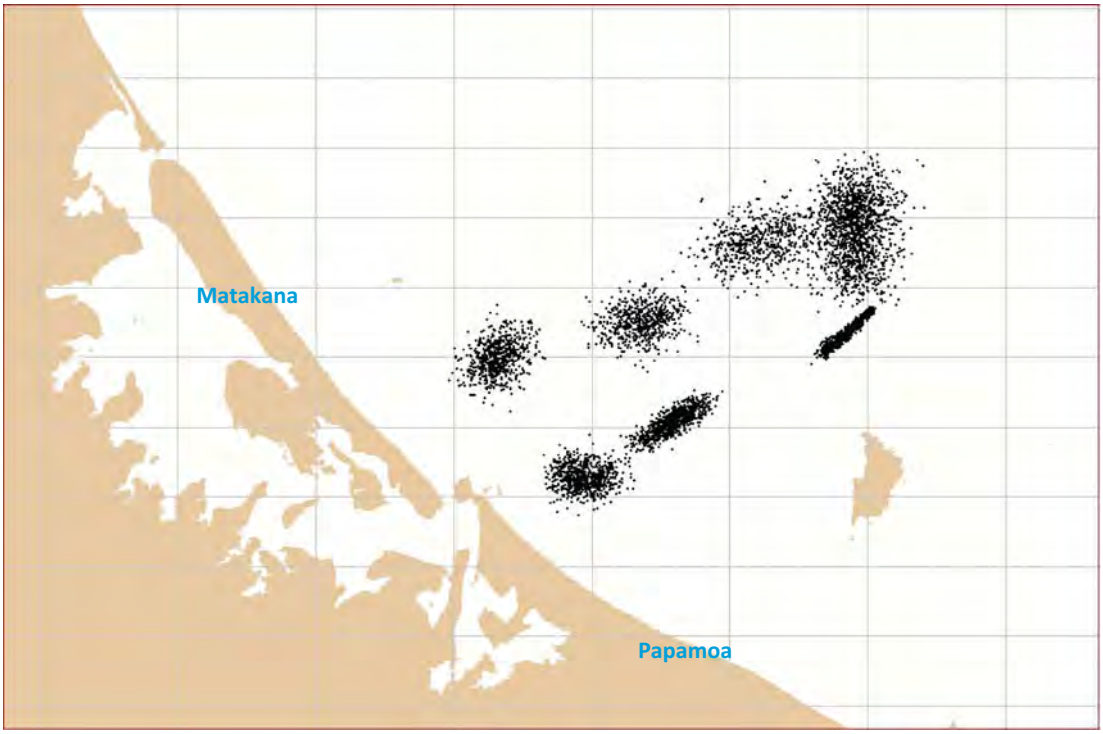
Shortly after the *Rena* grounded on the Astrolabe Reef on 5 October, Maritime New Zealand declared a Tier 3 response and mobilised the National Response Team. Over the coming hours, days and weeks, as the team ascertained the loss of oil from the vessel, Brett Beamsley and a group of scientists from MetOcean Solutions modelled the oil spill trajectory in an official capacity for the National Response Team.

"Dispersion modelling can be a useful tool to determine how and where oil will spread," says Brett. "For predictive purposes it requires accurate metocean forecast data, including wind and current data, at a suitable spatial and temporal resolution to predict the fate of the oil within the receiving environment. Particle tracking using these data allows transport pathways to be determined, irrespective of the quantity of oil released. While with enough information on the chemical composition of the oil and the receiving environment, weathering of released oil can be simulated."

While Maritime New Zealand maintains and operates an oil spill trajectory model; during the *Rena* event an Emergency Response Interface developed by MetOcean Solutions, as part of the work they undertake for the offshore oil and gas industry in New Zealand, was used to serve high-resolution wind and current data fields that were used to predict the fate of oil released from the *Rena*. The atmospheric model Weather Research and Forecast (WRF) was used to provide wind guidance, while an implementation of the Princeton Ocean Model (POM) at the Bay of Plenty scale, nested within a New Zealand domain, was used to provide current fields. The same numerical models, in conjunction with a Bay of Plenty SWAN wave model domain, were used to provide accurate site-specific marine forecasts for the salvage operators both over the timeframe of the initial response and during subsequent salvage operations.

The trajectory of the oil was predicted using an industry standard oil trajectory model called GNOME (General NOAA Operational Modelling Environment), which is a freely available oil trajectory model developed by the US National Oceanic and Atmospheric Administration (NOAA); as used during the 2010 Gulf of Mexico oil spill. GNOME predicts how winds, currents and diffusion might move and spread oil within a receiving environment using well-defined numerical equations.

The key to providing good guidance on the potential fate of a spill is the underlying metocean data (winds and currents). Accurate predictions of oil spill trajectories cannot be made without accurate forecast data at a suitable temporal and spatial resolution. The "spin-up" time for getting these types of numerical models up and running with appropriate bathymetry and boundary conditions means that from an emergency response perspective, it is necessary that the models providing these data are operationalised and running before an event occurs. Currently there is no national directive to have these higher resolution



During the initial stages of the event, oil was being released around each low tide, so simulations of a staggered release were undertaken. As the weather worsened the release became constant. The above image shows the individual spills from each low tide and the beginning of the constant release of oil moving within a high-resolution spatially and temporally variable wind and current field. Simulated by the GNOME model.

Main picture – An oil sheen, between 10-60 m wide, is visible stretching about four km northeast of the Rena *on 12 January 2012 (Photo: LOC). Inset (top) Oil sheen observed on 16 January 2012 (Photo: MNZ); Inset (bottom) Oil washing up on the shoreline of Tauranga,12 October 2011 (Photo: Mark Alen).*

model data available at a New Zealand scale, and we as a country rely on relatively coarse global datasets which do not always accurately characterise the wind and current fields around New Zealand's complex coastline. However, this capacity exists within private companies and organisations within New Zealand.

While the GNOME model can take into account basic weathering of the spilled product, actual weathering will be highly specific to the chemical composition of the oil and dependant on the physical environment of the receiving water, such as water temperature and wave actions.

During events such as the *Rena*, while it might be important from a public relations perspective to convey released volume and weathering information, neither of these impact the actual transport pathways of the spilled oil or where the oil is likely to beach, and hence where to send first responders. In fact, during emergency events such as the *Rena* it is unlikely that exact released volumes, let alone actual chemical composition and therefore weathering characteristics of the spilled oil, will be known.

During the *Rena* event, the first oil arrived on Mt Maunganui Beach on the morning of 10 October and by midday there were long lines of stranded oil. Later that evening, there were reports of oil reaching as far south as Papamoa. Feedback from onsite responders suggest that the predicted timing and location for the beaching of the plume was highly accurate and provided respondents with confidence both in the oil trajectory model predictions and in the response management teams decisions. As the event unfolded and the oil plume was tracked further afield, scientists back at the MetOcean offices were able to operationalise the 3-dimensional baroclinic model Regional Ocean Modelling System (ROMS).

"Each model has its strengths, so analysing the results of several models helps to create a more accurate picture, especially as baroclinic currents became more important in determining the oil transport pathways. As time went on, we were able to determine which modelling package was most reliable in a given situation," Brett says. MetOcean now runs both forecast ROMS and POM operationally within New Zealand and at various locations around the world.

Lessons learned

Brett says one of the positive lessons learned from the *Rena* grounding is that the National Response Team approach works. "We went from about 20 to 25 people on the team in the first 48 hours to about 300 team members. That transition was extremely well organised and focused. A key aspect to a response like that is the ability to prioritise and I think that's something the team leaders did extremely well."

He adds that to be effective and sustainable, a response requires a coordinated effort beyond just the assigned National Team. "They were pulling in experts from around the country and the world for the response. While I might have been at the front of the modelling work, for example, there was an extremely competent and dedicated team behind the scenes."

One of the other lessons learned is that the approach to modelling needs to be nationally coordinated. "At a national level, we're still relying on global data for much of the country's response modelling. We need to move to more accurate high-resolution data to respond to these types of incidents."

This article is an excerpt from *Rena: Lessons Learned*, which will be published by NZCS later this year.

Protecting Migratory Godwits

by Bruce McKinlay, Department of Conservation

A recent report revealed that a number of bar-tailed godwits have been recaptured more than 18 years since they were banded! Even though these are Australian birds, the implication of travelling each year from Australia to the Yellow Sea then to Siberia for breeding and then back over 20 times is pretty mind boggling for a bird that weighs a maximum of 400 grams (males) to 600 grams (females).

Even more impressive is the report of a red knot that was last seen in 2012, more than 22 years after it was banded. That's a 100-gram bird travelling from New Zealand to Siberia each year for 22 years. That is a serious amount of airpoints dollars (or in this case, polycheate worms).

However, both the bar-tailed godwit and the red knot are declining. The best science we have shows that declines in both these and other shorebird species is due to habitat changes in the Yellow Sea where they stopover on their migrations to and from the Arctic breeding grounds to refuel and gather food.

Why is this important?

These birds are all part of the East Asian-Australasian Flyway (EAAF), which is one of seven flyways that circle our world. The EAAF extends from Awarua Bay in the south of New Zealand to the North Slope in Alaska, and from as far west as Myanmar to Alaska in the east. It is one of the most significant biological features of planet Earth and it is in trouble.

Reclamation, pollution and hunting are causing declines in the numbers of bird species of five to nine percent per year. The most important driver of change is reclamation in the Yellow Sea, where remote sensing research has shown a 35 percent loss of intertidal habitat area across six key areas since the early 1980s. Protection of the New Zealand populations of bar-tailed godwits and lesser knots requires engagement with partners as far away as Russia and USA, but in particular China and North Korea.

What's being done?

New Zealand is now a member of the EAAF Partnership. This is the key body seeking to guide governmental and non-governmental action to ensure that the decline of migratory waterbird populations is reduced and that key habitat along the flyway is protected and, where possible, enhanced for the migratory birds. A key partner in this work is the Pukorokoro Miranda Naturalists Trust which has a long and respected history as an advocate for shorebirds and has had a sister reserve partnership with the Yalu Jiang National Nature Reserve in northeast China for the last 10 years.

The Department of Conservation's Carol West, Terrestrial Ecosystems Manager, and Bruce McKinlay, Technical Advisor, Ecosystems and Species, recently visited China and North Korea with Pukorokoro Miranda Naturalist Trust representatives Adrian Riegen, Vice Chair; Estella Lee, Councillor; and Keith Woodley, Manager, thanks to financial support from the Ministry of Foreign Affairs' Seriously Asia fund. The visit was a chance to celebrate this relationship and to engage with both governments about how to work better into the future and to protect shorebird habitat.

It is hoped that the release of a report on 10 years joint survey work at Yalu Jiang will raise the profile of this work at all levels in the Chinese government and provide the basis for further work and exchange of ideas and cooperation.

First published on the DOC intranet in June 2014.

Eastern bar-tailed godwit. Photo Dick Veitch, DOC. Crown Copyright: Department of Conservation Te Papa Atawhai, 2014.

The East Asian-Australasian Flyway extends from Awarua Bay (pictured) in the south of New Zealand to the North Slope in Alaska, and from as far west as Myanmar to Alaska in the east. Photo: Wynston Cooper. Crown Copyright: Department of Conservation Te Papa Atawhai, 2014.

Contributing to *Coastal News*

We always welcome contributions for forthcoming issues of *Coastal News*. Please contact the Editor, Shelly Farr Biswell, at shelly@biswell.net if you'd like to submit a news in brief, article, or have content suggestions. The submission deadline for the next issue is 15 September 2014.

Winners of the Annual NZCS Student Research Scholarships

This year, NZCS received a number of excellent applications for our 2014 Student Research Scholarships. It was a tough but rewarding job for our judges who were impressed by the calibre of applications. The NZCS Management Committee would like to congratulate our two winners: Rebecca Gladstone-Gallagher and Josie Crawshaw.

Masters student – Josie Crawshaw

Josie Crawshaw of the Department of Marine Science, University of Otago, received a scholarship for her work on looking at whether benthic infauna facilitates denitrification in coastal eutrophic sediments.

Josie wrote in her application, "It has been reported that major nutrient transformations are occurring in Te Waihora/Lake Ellesmere, a large, shallow, brackish coastal lagoon located southwest of Banks Peninsula, Canterbury. Denitrification is expected to be the major removal pathway of bio-available nitrogen from the water. This nitrogen would otherwise be available for primary production, which can lead to toxic algal blooms. Benthic infauna can simulate denitrification, by irrigation of their burrows, creating oxic zones and transporting nitrate from the water column into deeper anoxic sediment where denitrification can occur.

Josie Crawshaw

"Due to the high population abundance of chironomid larvae (*Chironomus zealandicus*) present in the lake, we surmise they will have a large impact on denitrification processes, creating hotspots of denitrification. Through my research I aim to understand the effects of the benthic infauna on the sediment-water interface, by extension of the oxic layer into the anoxic sediment layer via bioturbation, and how this influences denitrification processes. I hypothesise that denitrification rates will be primarily driven by coupled nitrification-denitrification in the sediments and these processes will be positively correlated to benthic infauna densities."

PhD student – Rebecca Gladstone-Gallagher

University of Waikato PhD candidate Rebecca Gladstone-Gallagher received a scholarship for her work on the role of cross-boundary subsidies of macrophyte detritus in soft sediment ecosystem function.

As Rebecca wrote in her application, "Through a series of manipulative field experiments and sampling events, my thesis explores whether marine macrophytes in temperate estuaries provide a spatial subsidy of detritus to adjacent coastal ecosystems."

In temperate New Zealand estuaries, Rebecca aims to:

1. quantify the tidal transport of leaf litter from estuarine vegetated habitats, away from growing sites to unvegetated areas, such as sand flats;
2. determine the role of the exported and deposited leaf litter in subsidising benthic marine food webs, through the release of nutrients during leaf litter decay; and
3. explore the role that sediment-dwelling organisms, such as crabs, play in processing this leaf litter after it has been deposited in the sediments.

She says that with increasing anthropogenic changes and degradation of coastal habitats, it is important to consider the connectivity between coastal ecosystems to maintain ecosystem function.

"My research contributes to the knowledge of this connectivity and of the ecological services that temperate estuarine vegetated ecosystems provide to the wider coastal environment."

Rebecca Gladstone-Gallagher

Both Josie and Rebecca will be recognised at the NZCS conference, which will be held in Raglan, 18-21 November, 2014.

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Sea Star Wasting Syndrome hits North America's West Coast

A wasting syndrome has killed millions of sea stars along much of North America's west coast. The wasting syndrome is associated with a number of symptoms, including lesions that appear on the ectoderm of affected sea stars. Once a sea star is affected, the disease can spread quickly and lead to death within a few days. The cause of the syndrome is unknown, but researchers are investigating possible links to pathogens and environmental factors.

While wasting syndrome has impacted sea star populations in the past, it has never been recorded at this magnitude or across such a large geographic area. The current wasting syndrome was first noted in ochre stars (*Pisaster ochraceus*) in June 2013 along the coast of Washington state during monitoring surveys conducted by researchers from Olympic National Park.

Since that time, monitoring groups have found the wasting syndrome affecting *Pisaster ochraceus* populations and several other intertidal sea star species from Alaska down to the US/Mexico border. Many more species are affected in the subtidal, including the sunflower star, *Pycnopodia helianthoides*, which has experienced massive declines in some areas.

In an effort to better understand what is causing the die-off, researchers from Cornell University, UC Santa Barbara and other universities are undertaking molecular sequencing work and culturing bacteria present on tissue from affected sea stars to identify possible viruses and bacteria that could be the cause.

www.seastarwasting.org

Diseased Pisaster ochraceus.*Photo Laura Anderson.*

Coasts & Ports 2015 returns to New Zealand

The Coasts & Ports Conference series is the pre-eminent forum in the Australasian region for professionals to meet and discuss issues extending across all disciplines relating to coasts and ports. The conference theme for 2015 will be:

> *Environomics – environment and economics – can we have both?*

The idea behind this theme is the balancing act between protecting the environment and achieving economic growth and prosperity.

Coasts & Ports 2015 will be held in Auckland, New Zealand from 15 to 18 September 2015. The conference venue is at the Pullman Hotel and Conference Centre.

The organising committee includes the Institution of Professional Engineers of New Zealand, the New Zealand Coastal Society, the National Committee for Coastal and Ocean Engineering, Engineers Australia and PIANC. The conference is an amalgamation of the 21st Australasian Coastal and Ocean Engineering Conference and the 14th Australasian Port and Harbour Conference.

Abstract submissions open on 3 November 2014 with a deadline of 27 February 2015.

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Word from the Chair

by Rick Liefting

Hello members!

One of the great things we get to do on the NZCS committee is to award the annual Student Scholarships. This year we had a very good group of applicants which made the judging very close. So congratulations to the two worthy winners: Rebecca Gladstone-Gallagher and Josie Crawshaw (see the article on page 7). Thanks also to the executive committee members who judged the applicants, not an easy job this year.

Speaking of awards, I hope all you coastal professionals have considered the NZCS Professional Development Award in your career plans. This is a great opportunity to augment your career development with up to $10k of funds to spend. See the NZCS website for more details on eligibility and how to apply.

The new NZCS committee is bedding in well with a few meetings (February, April, June and August) under our belt. We have increased the frequency of the meetings by adding teleconferences between the face-to-face meetings. We have already seen an improvement in the way the committee operates with the April and August teleconferences, but with no additional expense to the NZCS. Please let myself or any of the other committee members know if you would like to add an agenda item for one of our upcoming meetings.

The Raglan conference (18 to 21 November) is shaping up to be a great event. Jose Borrero and the organising committee are doing a great job. However, the success of our annual conference is really up to our members. Having great talks and great people at the conference really does make the difference. If you haven't presented at a conference at all, then the NZCS conference is a great way to get that experience in a friendly environment. While we aim for these conferences to be relaxed and friendly, the coastal expertise and knowledge that is represented is world class.

Lastly, let's all try and get networking and communications going within the NZCS. Use the email digest to connect with the NZCS network. I am sure that if you have a coastal issue or need information, there is a NZCS member there to help!

Onwards and upwards!

Vernon Pickett Eulogy

by Amy Robinson

NZCS member Dr Vernon Pickett passed away in May, aged 63, following a brief battle with cancer. Vernon had worked at Waikato Regional Council as a coastal scientist since 2005. He undertook his work with passion and integrity. Vernon had a particular interest in coastal processes, tsunami and geology. He made an extensive contribution to coastal knowledge in the Waikato region.

Vernon completed his PhD under the supervision of the late Professor Healy at the University of Waikato. His thesis explored the application of equilibrium beach theory to coastal hazard identification in Bay of Plenty. Vern's passion was such that he completed his PhD work part-time whilst working full-time at Opus as a surveyor and resource management consultant.

When not working, Vernon spent time with his wife and three adult children, and pursued interests such as rowing, travelling, mountain biking and surfing.

Vernon was a good friend to me and a mentor. In his final weeks, I was continually inspired by his positive attitude and wide smile. He was a truly special person and I feel honoured to have been part of his life. Vernon, you were a gentleman and a scholar, and you will be sorely missed by your family, friends and coastal colleagues.

In Vernon's own words... *"All I have tried to do is seek out good science based on sound theory to benefit our communities. And I guess that also means looking at new or innovative ways of doing things, including the modelling and instrumentation and field data to build our understanding ... I hope that others will take up the challenges involved and I know that they will."*

Photo courtesy of Andrew Swales.

Central Government Update: Environmental Protection Authority

Trans-Tasman Resources Ltd

The Environmental Protection Authority (EPA) received an application from Trans-Tasman Resources Ltd (TTR) to mine 66 square kilometres of seabed in the Exclusive Economic Zone (EEZ) of the South Taranaki Bight for iron ore and to process it aboard a floating production, storage and offloading vessel before export.

The application includes excavation of up to 50 million tonnes of seabed material per year. TTR's proposal is the first to be assessed under the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012.

A total of 4850 submissions were received on the application. Issues raised through submissions include the effect of the operation on the seabed, marine mammals, seabirds, and commercial fishing.

An EPA-appointed decision-making committee (DMC) heard submissions from March to May 2014. In June, the DMC issued a decision refusing the consent. The major reasons for this were the uncertainties in the scope and significance of the potential adverse environmental effects and those on existing interests.

Overall, the DMC found that the application did not meet the sustainable management purpose of the EEZ Act, including that it was not satisfied that the life-supporting capacity of the environment would be safeguarded or that the adverse effects of the proposal could be avoided, remedied or mitigated, given the uncertainty and inadequacy of the information presented.

Following the DMC's decision, TTR lodged an appeal on 8 July 2014 with the High Court.

www.epa.govt.nz

Chatham Rock Phosphate Ltd

Chatham Rock Phosphate Ltd (CRPL) recently lodged an application with the EPA to mine phosphorite nodules from up to 10,192 square kilometres of the Chatham Rise. CRPL's application will be assessed under the EEZ Act 2012. Submissions on the application closed on 10 July 2014.

Image of Chatham Rise (proposed operations would be about two-thirds of the way down). Photo: CRPL.

Every Now and Then

by Don Neale

If I could start my coastal career over again, one thing I would do is take more photo-points of coastal places that are likely to change over my lifetime. Photos can really tell the story of our dynamic coasts.

The two photos below show me at Torea Rocks (Granity, Buller District) in 1966 and 2009. The lowering of the gravel beach ridge, plus the shrub growth on the rocks, illustrates some of the history of this shoreline that has been subject to coastal hazards in recent years. And they also show that the sun always shines on the West Coast!

So what's the best "before and after" pairing of coastal photos that you've taken?

Send them to me (dneale@doc.govt.nz) and we'll put some of the best ones into *Coastal News* (with credit to you of course!).

Torea Rocks in 1966.

Torea Rocks in 2009.

News from the Regions

Auckland

Sam Morgan and Paul Klinac, Regional Coordinators

Hauraki Gulf Marine Spatial Plan

The development of *Hauraki Gulf Marine Spatial Plan: Sea Change – Tai Timu Tai Pari* is underway. *Sea Change – Tai Timu Tai Pari* is an initiative designed to secure a healthy, productive and sustainable future for the Hauraki Gulf. It will deliver a marine spatial plan by September 2015. This plan will ultimately inform how the Hauraki Gulf is shared, used and stewarded for future generations. For more information and to sign up for updates, visit http://seachange.org.nz/.

Coastal projects underway or nearing completion

Onehunga Foreshore Reclamation: The majority of the 6.8-hectare reclamation adjacent to the South Western Motorway (SH20) has been completed. Construction of the headland and beaches is now underway, and landscaping on top of the reclamation has also begun. Completion is expected in mid-2015, but there are plans to have a partial opening by December 2014.

Rangitoto Island Wharf: The new wharf has been completed and will provide improved access for the increasing numbers of visitors to the iconic island. Demolition of the old wharf is now being undertaken and expected to be completed in August.

Sandspit Marina: Construction of the marina has begun with the outer breakwater partially constructed and pier 1 completed. Some dredging of the site has also begun. The project is expected to take 18 to 24 months.

Waterview Causeway: Progress on the Northwestern Motorway causeway expansion continues with the reclamation and bridge extensions. The project is expected to be completed in early 2017.

Gibbs Farm mangrove removal: A 48-hectare mangrove removal along the eastern shore of the Kaipara Harbour is nearing completion. The removal has been timed with removal of historical *Spartina* plantings, which is thought to have contributed to the rapid colonisation of this particular mangrove community. A large mulcher has been used for the bulk of the operation and proven to be an efficient method for removal in areas where there is firmer sediments. With the site being relatively exposed, with fetches across the southwest to northwest, there has been significant removal of the mulched material from the site.

Hawke's Bay

Neil Daykin, Regional Coordinator

Proposed Whakarire Breakwater

The Napier City Council is continuing to work through their resource consent application with the Hawke's Bay Regional Council for their proposed H-shaped Whakarire Breakwater. This notified consent is stated as being for coastal erosion purposes, but with a secondary benefit of creating a recreational beach. The consulting engineer's supplementary report for the consent highlights (see table below) that the

Option	Description	Relative Cost [a]	Benefits	Adverse Physical Effects
W1	Enhanced seawall	1	• Land protection	• Similar to existing
W2	Enhanced seawall with infilling of backshore	2	• Land protection	• Similar to existing
W3	Groyne to limit wave focusing	5	• Land protection • Reduced wave energy on beach	• Surfing • Loss of CMA
W4	Wave spending beach	7	• Land protection • Reduced wave energy on beach	
W5	Attached breakwater	6	• Land protection • Reduced wave energy on beach • Recreational beach	• Surfing
H-shape breakwater	As per resource consent application	8	• Land protection • Reduced wave energy on beach • Recreational beach	• Surfing (although minimised)
Alternative 1	Breakwater in road reserve with existing seawall	3	• Land protection	• Similar to existing • Catchment drainage
Alternative 2	Breakwater in road reserve without existing seawall	4	• Land protection	• Similar to existing • Catchment drainage

[a] Lowest cost is 1, highest cost is 8

Whakarire Breakwater options. The source document can be found on www.hbrc.govt.nz, keyword 'CL130253R'.

Coastal News

Te Hunga Takutai o Aotearoa
NEW ZEALAND COASTAL SOCIETY

Napier City Council's proposed option has the highest relative cost, but with the added benefits of a recreational beach and reduced wave energy on the adjacent beach.

Clifton Motor Camp update

The problems at Clifton Motor Camp have continued despite the construction of a $200,000 temporary 80-metre limestone seawall that was consented at the end of 2013 by Hastings District Council. Erosion has continued unabated on the downstream side of the seawall, with end effects evident already (see photos below). Vehicle access to the camp and fishing club have again been suspended due to safety concerns as the new road is teetering on the edge of the sea.

Erosion has continued on the downstream side of the Clifton Motor Camp's seawall. Photo: HBRC.

Vehicle access has been suspended due to safety concerns. Photo: HBRC.

Marine oil spill exercise

May 2014 saw another oil spill exercise in the Hawke's Bay by the Hawke's Bay Regional Council. The exercise was held in Napier's inner harbour. The scenario for the exercise involved a boat aground at the entrance to the inner harbour spilling fuels and oils. The aim was to trial response options for protecting the inner harbour and Ahuriri Estuary, focusing on deploying equipment, such as booms, as well as setting up oil removal and decontamination zones. The team also took the opportunity to practise environmental risk assessment with science staff with support from wildlife response experts. Coastguard vessel *CK Rescue* was again used to manage the on-water tasks, such as deploying the booms. The exercises are a good reminder of the labour-intensive nature of such operations.

Shore crew hard at work feeding out the rapid deployment boom. Photo: Neil Daykin, HBRC.

Coastguard towing the rapid deployment boom. Photo: Neil Daykin, HBRC.

Rapid deployment boom in place, closing off the whole of the inner harbour. Photo: Neil Daykin, HBRC.

New NZCS publication

Now in the final stages of preparation, *Rena: Lessons Learned* will be released later in the year.

Major topics covered are:

- The *Rena* response
- Modelling an oil spill
- Operation Beach Clean – volunteers, communities and lessons learned
- Public health and the *Rena*
- Lessons from oiled wildlife response shape best practice worldwide
- Legal implications of the *Rena*.

Availability will be advised in *Coastal News*.

Survey of Northland's Coastal Waters

Earlier this winter, NIWA scientists surveyed the coastal habitats off the east coast of Northland and found a rich diversity of macroalgal meadows, shellfish beds, sponges, and rare fish species, including a frogfish and possibly a new species of seahorse.

The survey was conducted using a small beam trawl research net with GoPro cameras attached, as well as dropped stationary cameras both with and without bait to attract fish. The use of GoPro cameras is a new science technology development for the team.

The survey was conducted to identify what types of habitats were present and what juvenile and small fish were associated with them. The results contribute to a national fish-habitat classification and inventory of New Zealand's coastal and shelf zone.

NIWA marine ecologist Dr Meredith Lowe says, "Our knowledge of what lives in the coastal zone is scant. For instance, while we believe estuaries provide critical nurseries for a range of fish species, we cannot prove that until we know their relative contributions compared to possible alternative coastal nursery areas. During our survey, 'new' snapper nurseries and associated habitats were found in Te Rawhiti Strait, Bay of Islands, and in inner Doubtless Bay. We can now combine these data with previously collected estuary data to estimate what the relative nursery values are.

"We also know this coastal region is one of the most species diverse nationally, and this work has shown that this rich diversity also extends to seafloor habitat types and the fish species which live in them. As an additional bonus, a number of new species of red algae were also discovered."

Frogfish. Photo: Crispin Middleton.

Seahorse. Photo: Crispin Middleton.

A seahorse found during the survey is undergoing scientific identification to determine whether it is a new species. Meredith says it will be some time before scientists can confirm its identity and how rare it is worldwide. The seahorse is about three-centimetre long and predominantly brown in colour.

www.niwa.co.nz

NZCS Regional Coordinators

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

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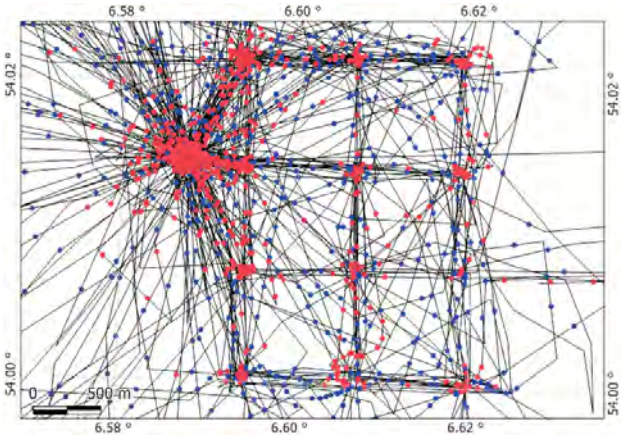
Offshore Wind Farms may Attract Seals

In the recent issue of *Current Biology*, Deborah J F Russell of the Univeristy of St Andrews in Scotland and her colleagues have published their research on harbour seals that appear to be foraging at wind farms off the coasts of Germany and England.

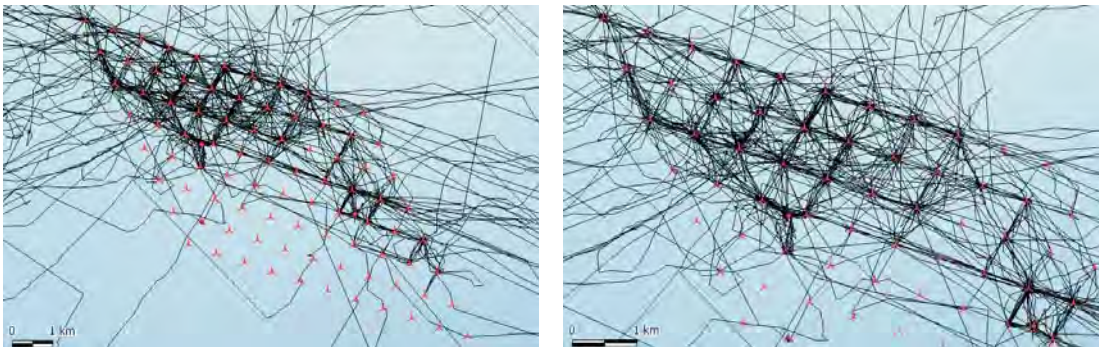
The researchers tagged harbour and grey seals (*Phoca vitulina* and *Halichoerus grypus*) on the British and Dutch coasts of the North Sea with GPS trackers. They mapped the seals' movements and found that 11 of the tagged harbour seals visited two active offshore wind farms – Alpha Ventus off Germany and Sheringham Shoal off of England. Three of the farm-visiting seals were tracked moving from windmill to windmill.

In their article, the scientists highlight the ecological consequences of this behaviour. Russell first presented this research at the 2013 Biennial Conference of the Marine Mammalogy Society in Dunedin last December.



Tracks of a harbour seal around Alpha Ventus. Points show locations at 30-minute intervals; red indicates higher chances of foraging and blue higher chances of travelling. The individual appears to forage at all 12 turbines and the meteorological mast to the west of the windfarm. Graphic: Sea Mammal Research Unit.

A harbour seal from this study tagged with a GPS phone tag (SMRU Instrumentation). Photo: Sea Mammal Research Unit.



Tracks of a harbour seal around Sheringham Shoal with the turbines and sub-stations shown in red. Graphic: Sea Mammal Research Unit.

An aerial view of Sheringham Shoal wind farm. Photo M.Page www.mike-page.co.uk.

Maritime New Zealand Reviews Coastal Navigation Safety

In July, Maritime New Zealand (MNZ) initiated a review of coastal navigation safety to identify risks and assess current and potential safety measures.

MNZ Director Keith Manch said when announcing the review, "We are seeing an increased number of ship visits to New Zealand, an international trend toward larger ships, and technology changes in the field of navigational aids – all these factors mean a review of coastal navigation risks is timely."

The first phase of the review is expected to take about 12 months and will involve assessing the nature of risks around coastal navigation and how they are being managed.

Keith says the first thing to do is establish what risks actually exist and what measures are in place to address them. "If changes are recommended as an outcome of the risk assessment, then the next step will involve consideration of options to improve coastal navigation safety," he says.

The review process will involve consultation with government agencies, local government and private sector interests. It will consider such issues as the types of activity being carried out in the coastal environment, human factors, and technology.

"The review is not a response to any particular incident, but obviously we will consider what can be learned from major incidents such as the grounding of the *Rena*," he says.

The annual numbers of ships, voyages and port calls have continued to increase each year since 2009/10. Voyages are defined as ships arriving, leaving, or arriving and leaving New Zealand within the stated time period. In the 2010/11 year, 790 ships made 2167 voyages and 5386 port calls. In the 2012/13 year, 869 ships made 2342 voyages and 5622 port calls.

www.maritimenz.govt.nz

A review of coastal navigation safety is timely with an increased number of ship visits to New Zealand, an international trend toward larger ships, and technology changes in the field of navigational aids. Photo: S Biswell.

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.

Applications for membership should be sent to NZCS Administrator Renee Coutts (email: nzcoastalsociety@gmail.com).