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Over 100 people drown in New Zealand waters each year. Photo: Rita Hague

Forecasting Currents Could Save Lives

Rip currents are approximately shore-normal, seaward-directed jets that originate within the surfzone and broaden outside the breaking region. Rip current velocities exceeding 2 m/s have been measured and where they occur they pose a significant danger to beachgoers as they can pull even the strongest swimmers into deep water. In a New Zealand context over 100 people drown each year, a significant number of these due to rip currents on recreational beaches. Improving our ability to predict the presence of rip currents is desirable to aid lifeguards and to help forewarn and increase awareness amongst beachgoers.

The research explored a method of forecasting rip occurrence from offshore wave forecasts. The rip forecast was based on an empirical probabilistic relationship constructed from five years of coincident rip observations and hindcast waves at Tairua Beach. Rips at Tairua Beach were identified from video images collected between 2001–2005 — see Figure 1 [www.niwascience.co.nz/services/camera/sites/tairua]. A wave model provided wave data for correlation with the rips [www.niwascience.co.nz/rc/prog/chaz/news/waves]. Empirical joint probability matrices were constructed from the 5-year video-imaging database of rips coincident

with hindcast waves. The probability matrices were used to calculate the probability of rips occurring over the period 2001–2005, based on wave hindcast information. In Figure 2 the predictions are compared with observations for the arbitrary period March–August 2003. The probability matrix based on significant wave height (H_s) showed potential for predicting the presence or absence of rips. Peak period (T_p) and Peak Direction (D_p) showed little variation and no predictive trend. The joint probability matrix of H_s and T_p model correctly predicted the presence of rips 76 % of the time during 2001–2005. Adding an autocorrelation function allowed us to



Figure 1: Time-averaged image from 940 images collected at 1s intervals beginning 24 Feb 2001 15:00.

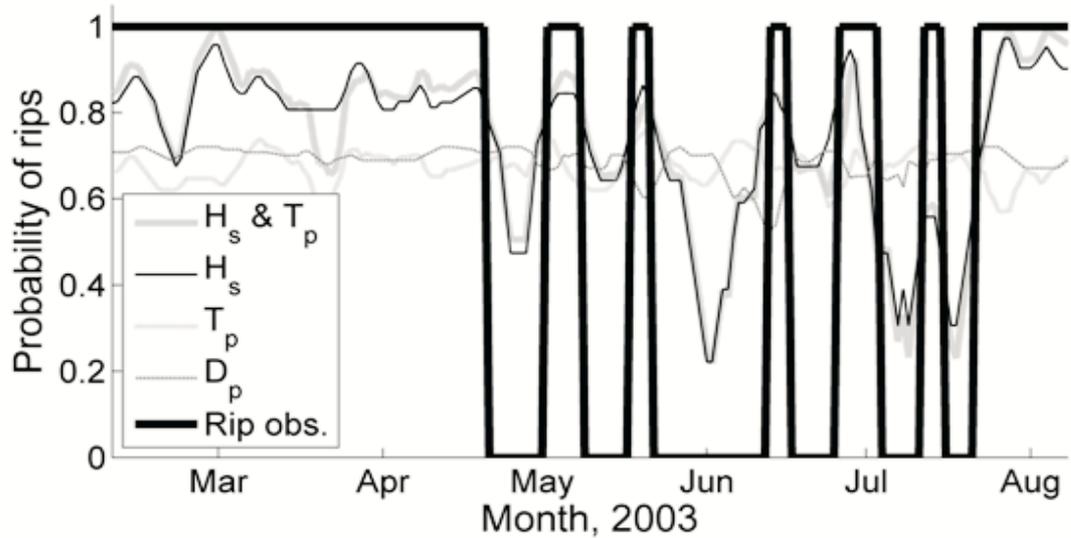


Figure 2: Example timeseries of predicted probability of rip presence and observed rip presence, using empirical probability matrices based on H_s , T_p and D_p . Probability timeseries have been smoothed using a 5-day running average to reduce noise.

correctly forecast rip occurrence up to 91% of the time. This indicates that knowledge of the existing beach state can in some cases be a better predictor than the probability matrix based on wave forcing, and it suggests that the beach morphology may be at least as important to the formation of rips as wave forcing.

Future advances in rip forecasting will then require models that can predict morphological evolution and feedback between morphology and hydrodynamics. Although breakthroughs in modelling concepts have recently been made, operational forecasting of rips remains a difficult task. It appears for now that beach 'hazard indices' are still likely to be the most practical form of forecasting, using forecast indices customised for local shorelines. Such existing beach hazard forecasting systems are practical as the outcome is a hazard rating, not a beach state nor the presence of rip currents. This hazard rating approach, incorporating forecasts of wave heights and general knowledge of beach types and variability, is also being developed for New Zealand beaches as part of complementary research being carried out by NIWA.

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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 incorporates over 300 members.

Members include representatives from a wide range of coastal science, engineering and planning disciplines, and are employed in the engineering industry, local, regional and central government, research centres and universities.

Applications for membership should be sent to NZCS Administrator
Hannah Hopkins (e-mail: hannah.hopkins@ew.govt.nz)

Tsunami Sources in the Bay Of Plenty

There is a wide range of potential tsunamigenic sources in the Bay of Plenty including local faults, subduction zone fault ruptures, volcanic eruptions, collapsing seamounts, and submarine landslides. There is also a lot of geological information indicating that large tsunamis have inundated the coastline in the past. But:

- What are the most likely sources for generating a catastrophic tsunami?
- Can you link the geological evidence with a specific source?

A part of our work at NIWA has been to use prehistoric data in conjunction with computer modelling to evaluate the most likely sources for catastrophic tsunamis. In the Bay of Plenty, NIWA's RiCOM model was used to simulate generation, propagation and runup of tsunamis from a suite of different potential sources. Separate studies of the geological record were also carried out on coastal sediments to produce a database of contemporaneous events across the whole region. When you put all of this together you find some interesting results.

We decided to try and simulate the largest possible events from the sources that seemed to offer the most concern. In this way, if the resultant tsunami was too large to match up with the geological data, we could always scale the event down, or look to other sources to see if they offered a better match for the information. As far as local faults go, we chose to model tsunamis generated by three representative composite sources - the White Island, Volkner, and Astrolabe faults. These are all normal faults. In all cases, the tsunami separates from the point of rupture and propagates in opposite directions away from the fault - each of these separate waves has different characteristics. For the tsunami with a small positive leading wave (initially moving away from the direction

of fault dip), the positive peak remains small and the resultant runup on land is relatively insignificant. However, for the other tsunami with a negative leading wave, the positive peak is amplified and runup in local areas was shown to be up to 2 m. While potentially catastrophic, this was far too small to match up with the geological data that indicated runup of over 6 m in some places.

An alternative option for matching with the geological data is the collapse of a seamount or submarine volcano. However, these are point sources and the resultant tsunami tends to decay rapidly with distance away from the source. Important factors that control the size of a tsunami in these cases are the volume of the material that collapses, and the direction and depth of the collapse. As an example, an entire collapse of the nearest large seamount to the Bay of Plenty coast, Tumokemoke Knoll, was modelled. The knoll is about 4 km in diameter at the base, about 300 m high from its base, and 200 m below mean sea level. The volume of material that collapses is approximately 1.2 km³. As expected, the tsunami decays rapidly with distance from the seamount source and the wave height was less than 1.5 m when it reaches the nearest shore. This is potentially locally catastrophic but would be unlikely to leave any geological evidence.

What else is out there?

Most of the Bay of Plenty is directly exposed to tsunamis generated by subduction zone earthquakes immediately north of East Cape (the Tonga-Kermadec Trench). For the most likely maximum credible event, a Magnitude 8.5 fault rupture was modelled to strike the coast at Mean High Water Spring (Figure 1). As with local fault scenarios, the initial wave separates into two waves. In this instance the waves are of roughly

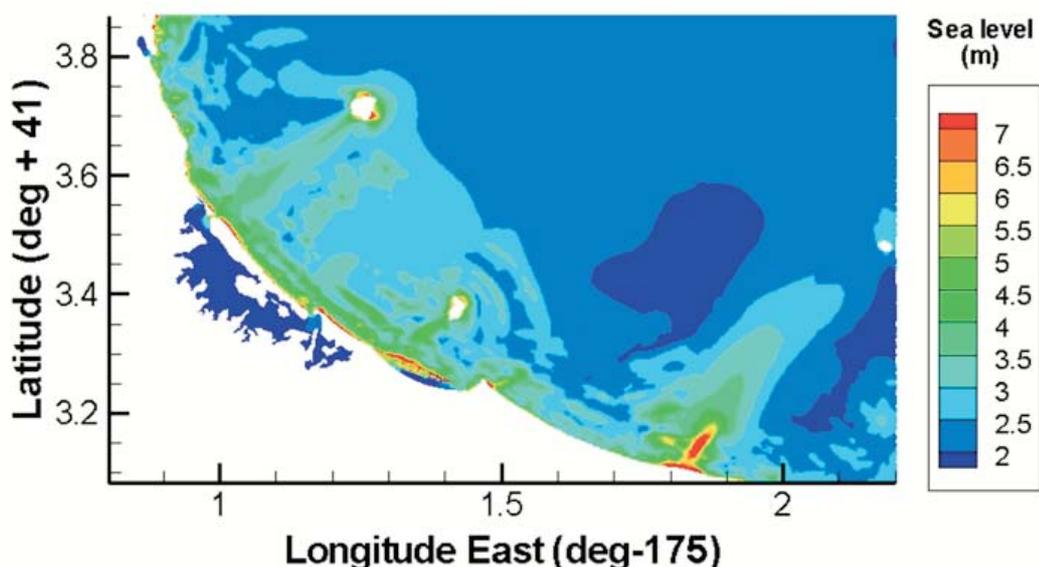


Figure 1: Maximum water surface elevation showing wave focusing behind Motiki Island



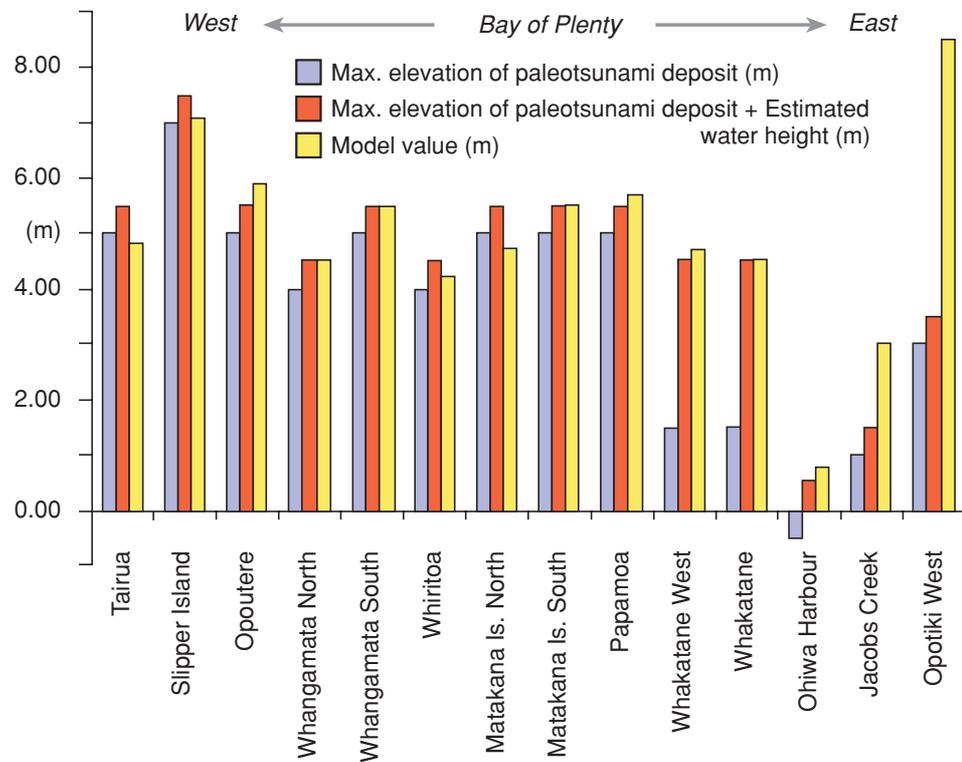


Figure 2: Summary diagram of comparison between model values (maximum water surface elevation at the shoreline) and palaeotsunami-related data.

equal size - one propagating onshore and the other propagating offshore to become a remote tsunami elsewhere. The wave directed onshore is partially refracted around East Cape and comes ashore in the Bay of Plenty. The main part of the wave travels westward to the area around Tauranga and to the north. In the central part of the Bay of Plenty, the wave crest is stretched by refraction into the bay. Waves however converge around Motiti Island and other islands, amplifying the tsunami on the adjacent coast. The general pattern of tsunami crest height showed low values in the southeast part of the Bay of Plenty (2 to 3 m) with increasing height toward the northwest (5 to 7 m). For example, maximum tsunami runup height in the central portion was 5.4 m onshore from Motiti Island, arriving 70 minutes or so after fault rupture. Waves breached the coastal sand dunes at this location.

The patterns of wave height along the whole of the Bay of Plenty shoreline are in good agreement with wave heights derived from the independently analysed geological data. This was a catastrophic event for the Bay of Plenty. By combining the independent interpretation derived from the numerical model RiCOM and geological data, a strong case has been made for the most likely source for generating a catastrophic tsunami - the Tonga-Kermadec Trench. When combined, the two datasets show remarkable agreement (deviations between the two datasets to the east of the Bay of Plenty are the result of poor bathymetric and topographic data). Results suggest that subduction zone events are the most significant tsunamigenic source over timescales of 500 to 1000 years.

Acknowledgements: Much of this work was financially supported by Environment Bay of Plenty. We would especially like to thank Russ Martin, Stephen Lamb and John Mandemaker for their continued support.

James Goff & Roy Walters, NIWA, Christchurch

Agreement Limits Pacific Trawling

In a move to protect deep-sea ecosystems, more than 20 nations have agreed to strict, voluntary limits on the practice of bottom trawling on the high seas of the South Pacific region. The agreement calls for closure of areas to bottom fishing where vulnerable ecosystems - including seamounts and cold-water corals - are known to exist or likely to occur.

The agreement takes effect on 30 September 2007. Observers and vessel-monitoring systems will be used to track compliance, and vessels must stay at least five nautical miles from previously identified vulnerable areas or from areas where they encounter vulnerable ecosystems during fishing.

New Zealand put forward the proposal that largely shaped the agreement, despite the fact its vessels account for 90% of bottom trawling in the region. The NZ delegation acknowledged the agreement will "severely constrain" its fishing industry. Orange roughy is the main target fish on the South Pacific high seas, and its annual commercial value is estimated at roughly US \$10 million.

Mangrove Issues in the Auckland Region

New Zealand's mangrove *Avicennia marina* subsp. *australasica*, known as "Manawa", is a native plant and it, or a very similar species, has been present in New Zealand for around 19 million years. Manawa is the most southerly growing mangrove species in the world, and can be found in the shallow intertidal margins of sheltered coastal and estuarine areas of the North Island. It grows north of about latitude 38° S; from Kawhia Harbour on the west coast, and Ohiwa Harbour on the east coast.

The value placed on mangroves has varied over the years. In the early 20th century mangroves and mudflat areas were not highly valued, and mangrove forests were significantly reduced by drainage and reclamation, frequently grazed by cattle, and often used for landfills. Over the years the ecological value of mangroves was increasingly recognised, and in 1977 legislation was introduced to control reclamation of mangrove areas for farmland.

With the introduction of the Resource Management Act (RMA) in 1991, more formal recognition of indigenous vegetation values was provided, particularly through the policies of the New Zealand Coastal Policy Statement (NZCPS) which sought to protect mangrove ecosystems for their ecological values and role in mitigating coastal erosion. At the time of drafting Regional



The Waiwera Estuary (Photo by ARC)

Coastal Plans in the early 1990s the emphasis, in giving effect to the RMA and NZCPS, was generally on the protection of mangroves.

Over the last ten to twenty years the rate of mangrove colonisation in some areas has increased substantially. A reaction to the spread of mangroves has been increasing challenges to the high ecological values accorded to mangroves, and claims that mangroves are displacing other valued marine habitats.

For some coastal communities the spread of mangroves, and the subsequent effects on access, recreational opportunities, amenity values, views and food gathering areas has become a significant issue. Mangrove removal is often a controversial activity which can result in polarising communities. In some places unauthorised mangrove removal has been undertaken.

In recent years the matter of mangrove removal has emerged as a significant resource management issue for the Auckland Regional Council (ARC), along with the other regional councils with mangroves located in their coastal marine area (Environment Bay of Plenty, Environment Waikato and Northland Regional Council). The ARC response to these issues has been:

- i) To raise awareness that mangrove spread is a response to sediment and nutrient inputs into the marine environment from changing land use activities and is a "symptom" of broader estuary changes rather than being the primary "cause".
- ii) To encourage communities concerned about



Lush mangrove growth in the Waiwera Estuary (Photo by Megan Stewart)



Illegal mangrove clearance at Wattle Downs (Photo by Micah Butt)

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mangroves to consider the issue of removal in the context of the wider estuary or harbour, and promote integrated land and water management.

- iii) To help dispel misinformation about mangroves and provide a current information base. The ARC has commissioned a detailed technical review of the information and research available on mangroves in New Zealand. A summary booklet; "New Zealand's Mangroves" has recently been published, and both the booklet and the full technical publication will be available from the ARC website in the near future (www.arc.govt.nz).
- iv) To prepare a plan change to the Auckland Regional Plan: Coastal (ARP:C) that addresses seabed disturbance such as vegetation removal (including mangroves).

A plan change is necessary as the operative ARP:C does not recognise mangrove colonisation as an issue, and does not contain policies that provide specific guidance in respect of mangrove removal activities. There are also inconsistencies with some of the existing rules. The present rule prohibiting mangrove removal in ecologically significant and vulnerable Coastal Protection Area 1 (CPA1) areas has proved problematic, particularly for major infrastructure that needs to be located partly within a CPA1 area.

The draft plan change does not represent a significant shift in position from the present management approach of the ARP:C. In most cases, other than for some limited permitted activities, mangrove removal will continue to be assessed on a case by case basis and will require a resource consent. This approach is considered the most appropriate for managing mangrove issues on a regional basis, particularly given the remaining gaps in our knowledge of mangroves,



*The Pahurehure Inlet Protection Society undertake community based monitoring
(Photo by Dominic McCarthy)*

and that their social, cultural, economic and environmental values, services and functions vary depending on the location.

The proposed plan change is presently at the pre-notification consultation stage, and will be refined as a result of feedback received. The final form of the proposed change will be submitted to an ARC committee for approval in July, with the intention of publicly notifying the plan change in August 2007.

A 'mangrove section' will be included on the ARC website which will include links to the booklet and technical publication relating to mangroves, and provide information on the proposed plan change, key dates, and submission form and advice relating to the statutory process once the change is notified.

If you would like further information on the matters discussed please contact mangroves@arc.govt.nz.

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Strategic Policy Analyst
Auckland Regional Council*

NZCS Management Committee

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Conference Review

9th International Coastal Symposium

16-20 April 2007 Gold Coast, Australia

With around 400 delegates, 200 oral and 30 poster presentations, five plenaries and a relaxed day-long cruise to wrap up a week of Gold Coast sunshine and warm ocean waters, the 9th International Coastal Symposium (ICS) proved to be a very successful and productive conference (Figures 1-2).

By far the most valuable aspect of the conference was the enormous potential to meet colleagues from across the coastal world. For New Zealand delegates the week also provided a rare, if somewhat expensive, opportunity to catch up on work done at home.

Organized by Charles Lemckert and Griffith University's School of Engineering in conjunction with the Coastal Education and Research Foundation (CERF), this conference focused on three broad areas - coastal environments, coastal zone management and coastal engineering - with subthemes including beach processes, climate change, modeling, evolution, GIS, sediment transport, wetlands, estuaries, inlets and barrier islands.

Although variable in quality, overall the presentations provided a wealth of coastal science and management information. Given the sheer number and variety of papers to be included in the 50th Special Issue of the Journal of Coastal Research, the proceedings also promise to be a useful resource for a diversity of coastal researchers, managers and educators.

The conference plenaries comprised a long but thought-provoking examination of the limitations of Integrated Coastal Management (including a call for better communication between scientists and politicians) by Larry Hildebrand, Environment

Canada; and a fascinating and disquieting talk about coastal restoration and protection efforts in Louisiana following Hurricanes Rita and Katrina by Syed Khalil, Louisiana Department of Natural Resources. John Middleton, University of New South Wales, talked about problems with many current numerical models of long-period, coastal trapped waves; and Sydney University's Andy Short steered the audience through his new, predominantly-Australian beach morphodynamics classification scheme, including the role of wave height, period, tide and sediments.

Prizes for the best oral presentation and best student presentation went to the University of Queensland's DP Callaghan, P Nielsen and R Ranasinghe for "Estimating extreme beach erosion frequency from a Monte Carlo simulation of wave climate", and to Waikato University Masters student Lauren Steeghs for "Tidal inlet configuration and bathymetric changes resulting from active sedimentation, Buffalo Bay, New Zealand".

The location of the next ICS has yet to be set but is rumoured to be Portugal. If you have the opportunity to attend I'd recommend the experience and look forward to seeing you there (that is, if I haven't already retired to Queensland).

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Figure 1: Gold Coast City view northeast from the Crown Plaza conference venue towards Surfers Paradise. The Gold Coast region stretches 60 km, from 80 km south of Brisbane to the New South Wales border, and is home to over half a million people. The region's heavily-developed coastal strip comprises a narrow sand barrier and artificial islands between the ocean and a network of waterways and former wetlands.



Figure 2: Gold Coast view south towards the suburb of Broadbeach with dune fences, scaevola and spinifex plants binding light golden, predominantly siliceous, medium sand. This main Gold Coast beach, currently in an accreted state, was nourished with 3.5 Mm³ sand from the nearby Broadwater estuary between 1999 and 2003.

Conference reviews:

Conference reviews is a new feature in *Coastal News* aimed at keeping the New Zealand coastal community up to date with significant coastal meetings overseas and in New Zealand. If you are going to attend a major coastal conference or meeting and would like to contribute a review please e-mail Deirdre Hart deirdre.hart@canterbury.ac.nz



John Duder – Life Member



At last year's Coastal Society conference in Kaikoura John Duder deservedly became the first Life Member of the Society. This was a fitting tribute, given in recognition of his substantial contribution to the Coastal Society as well as to science and engineering in relation to the New Zealand coast.

John's specialist fields are water resources and coastal engineering. He was appointed a Director of Tonkin & Taylor in 1982 and retired in 2003 to practice on his own account. After working for a consultancy in London early in his career, he was based in New Zealand and also worked on numerous projects overseas.

As a practicing engineer, John has also provided support to students and peers throughout this career. He has lectured part-time in New Zealand, contributed to over 30 technical papers to various publications, and has delivered lectures and presentations to various seminars and courses, both in New Zealand and overseas.

John's commitment to the coastal profession has extended throughout his career, through his involvement with the Coastal Society, in his membership of the IPENZ Standing Committee for the Environment and Sustainability, and in his practice of coastal engineering. John was made a Fellow of IPENZ in 1995 and was awarded the IPENZ

Professional Commitment Award in 2004 in recognition of his significant contribution to coastal engineering in this country.

Outside the profession John is a keen sailor and has been a trustee as well as serving as a volunteer deck officer for the Spirit of Adventure Trust. He has been involved with the Trust for over 30 years. John has also been active in local government with several years service as a member of the Devonport Community Board.

John's role with the Society began with its very inception. It was during the 10th Australasian Conference on Coastal and Ocean Engineering, chaired by John, that a group of New Zealand participants met with representatives of the Australian National Committee on Coastal and Ocean Engineering to discuss establishing a similar organization in New Zealand. Throughout 1992, John was part of a small team that included Andrew Laing, Terry Hume, Robin Falconer and John Lumsden, that set about organizing the structure of what was initially called the New Zealand Society for Coastal Sciences and Engineering.

The name, of course, was later changed to the New Zealand Coastal Society, but the strength of the organization today is due in no small part to the enthusiasm of people like John and his role in ensuring that the Society was properly established on solid foundations.

John was a member of the NZCS Management Committee from 1992-1999 and chaired the Society during 1994-1997.

John Lumsden

Student Travel Scholarship

The New Zealand Coastal Society offers two annual scholarships for currently enrolled students to support their attendance at the annual conference, which is being held in Tauranga this year.

The scholarships in 2007 will consist of \$500 towards travel expenses and a free registration. These will be presented at the conference.

The scholarship aims to encourage all students researching the New Zealand coast to share their results and ideas with the wider coastal community as well as facilitate interaction between them and the wider professional community. All suitable eligible people are

therefore encouraged to apply.

To apply, simply fill out the application form available on the NZCS website (www.coastalsociety.org.nz) and send it, via email or post, along with an abstract of your talk/poster, to Dr Deirdre Hart at the University of Canterbury.

When writing your abstract consider how it relates to the aims of the Coastal Society which is to "promote and advance sustainable management of the coastal environment".

All successful applicants will be required to present their research at the annual conference in either an oral or poster format.

Making Good Decisions in the Coastal Environment

Lives, livelihoods and the coastal environment can be profoundly affected by the decisions that Resource Management Act 1991 (RMA) hearing panel members make on resource consent applications so it is important that they get it right.

The Ministry for the Environment and Local Government New Zealand designed the Making Good Decisions Programme to equip people with the skills they need to run fair and effective hearings, and to make informed decisions.

Under the RMA councillors and independent experts are often appointed by councils to RMA hearing panels to make decisions on proposals for coastal subdivision, tourism ventures and the like. The Minister of Conservation is represented by an appointee on panels considering applications for restricted coastal activities (RCAs). RCAs might include marina, reclamation or waste discharge proposals, for example.

Running hearings requires great skill and tact in dealing with emotionally fraught situations and people, conflicts over resources, different points of view, and conflicting evidence. The job demands legal, technical and interpersonal skills.

The Making Good Decisions Programme is focused on equipping people with the skills they need to

run fair and effective hearings, and to make informed decisions. Decision-makers who enrol in the programme, which is delivered by the University of Auckland's Centre for Continuing Education, must attend a two-day workshop and complete a series of assignments. They receive a fully developed workbook and, if successful, a certificate, which recognises their demonstration of the competencies required of decision-makers.

Certificates are valid for three years and there are on going professional development opportunities for those who wish to renew their certification. Obtaining certification is the key means of fulfilling the accreditation requirements for panel members under the RMA, which were introduced by way of amendment in 2005.

To date, 881 councillors, community board members, independent commissioners, and RMA specialists have achieved certification. They include those regularly appointed to hearing panels by the Minister of Conservation and councils. For more information on the Programme, and for a full list of certificate holders, go to www.mfe.govt.nz/rma/practitioners/good-decisions/index.html

*Mark Leggett
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Marine Reserve Approved

The Tapuae Marine Reserve off the Taranaki Coast was recently approved. The reserve will protect 1426 hectares of coastal waters near New Plymouth from Herekawe Stream to Tapuae Stream. The

new reserve contains a variety of marine environments that are not represented in any other current marine reserves and will be a haven for more than 80 species of fish.

NZCS Regional Coordinators

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

North Island

Northland	André Labonté	labonte@xtra.co.nz
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The New Zealand Coastal Science Forum

Coastal scientists from New Zealand universities gathered at Birdlings Flat, Kaitorete Spit (near Christchurch) recently in May to discuss the status of coastal science and education in New Zealand and to explore avenues for closer collaboration. An outcome of the meeting was to establish the New Zealand Coastal Science Forum (NZCSF).

Those attending were university researchers with interests in coastal processes, geomorphology and management. The impetus behind the meeting was that the progress of coastal geomorphology research in New Zealand has been hampered by a number of wide-ranging issues, such as the small number of coastal scientists in New Zealand universities, their spatial separation and the disparate research interests and backgrounds of the scientists. Much has changed over the past decade to warrant reconsideration of how the coastal academic community in New Zealand might operate, including:

- The limited funding regime for coastal science.
- The trend for government research funds to be dispersed to larger research consortiums.
- The demand for robust coastal science to support coastal management.
- Rapidly increasing pressure on coastal systems.

Those gathered at Birdlings Flat agreed that the objectives of the NZCSF should be:

- To promote coastal geomorphic research in New Zealand.
- To foster collaboration between coastal geomorphologists in New Zealand in teaching and research.
- To ensure the effective application of research to support environmental management of New Zealand's coastline.
- To provide commentary on coastal management practice in New Zealand.

Membership of the NZCSF will comprise New Zealand university staff that are active in coastal research and teaching. University academics are faced with a unique set of issues that may be best explored, and perhaps resolved, through the NZCSF. In order to best fulfil its objectives, the



On the rocket pad, Kaitorete Spit, May 2007: (from the left) Paul Kench (University of Auckland), Karin Bryan (Waikato University), David Kennedy (Victoria University), Craig Sloss (Massey University), Deirdre Hart (Canterbury University), Mike Hilton (Otago University), Scott Nichol (University of Auckland). Willem de Lange, Waikato University, was unable to attend.

NZCSF will remain independent from the New Zealand Coastal Society and New Zealand Marine Sciences Society, but should complement the work of these organisations wherever possible.

The NZCSF recognises that it has a responsibility to:

- Provide independent and objective comment on topical coastal management issues (e.g. sand extraction, development pressure at the coast, natural character).
- Provide independent analysis and comment on the decisions of the Environment Court.
- Comment on the efficacy of coastal planning and management in NZ.
- Advocate and practice the use of coastal science to support coastal management and planning decisions.
- Publicly raise the profile of coastal science and coastal management issues.
- Foster learning about, and participation in, coastal issues in NZ.

The forum welcomes your comments on this initiative.

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Missed an article in Coastal News?

Back issues (from Issue 6, April 1996) are available as pdf downloads from www.coastalsociety.org.nz - follow the Publications link on the front page.



Word from the Chair



The IPCC sea level rise estimates are now out, and have been debated among coastal scientists and practitioners. The level of awareness of climate change and how our coastal areas may be impacted upon has

increased significantly in the last decade. Better information will hopefully lead to better planning and better outcomes for our coastal communities.

New Zealand Coastal Society members will continue to play a key role in making this happen.

The 2007 Australasian Coasts & Ports Conference is being held shortly, 17-20 July in Melbourne. It is only a short trip across the Tasman and the more New Zealand delegates we can get there the better. The conference is held every two years, with every third conference being held in New Zealand. See the conference website www.coastsandports2007.com.au for more details.

Preparations are continuing for New Zealand's turn in hosting the Australasian Coasts and Ports Conference at Te Papa in Wellington in September 2009. Any thoughts, comments or offers of sponsorship are welcome to the Conference Chair, Andrew Laing, who can be contacted at a.laing@niwa.co.nz.

A reminder that our annual New Zealand Coastal Society Conference for 2007 "Pushing the Boundaries" is to be held from 21-23 November in Tauranga at the Sebel Trinity Wharf Hotel and Conference Centre. More details have been posted about the conference on the coastal society website. Remember to check the website for updates www.coastalsociety.org.nz/conference. The conference organising committee is expecting over 150 people to attend the two day conference, with keynote speakers including the Chief Executive of the Port of Tauranga and the Minister of Conservation.

The theme of the 2007 conference reflects our growing coastal communities and the increasing challenges coastal managers face with people wanting to live, play and develop within our coastal margins. Papers for the 2007 Conference are being called for, with oral and poster papers sought related to the conference themes. Registrations will open in the next month, so be in quick.

As a Technical Interest Group of IPENZ (Institute of Professional Engineers of New Zealand) the Society has had input to policies and guidelines around the way in which we operate. The annual IPENZ Forum held in April, confirmed the amended Intellectual Property Policy, with the NZCS being responsible for administering the policy for its own events and activities, which is good news.

Our Auckland and Waikato branches have held regional events in the last couple of months, which were highly successful and well attended with international and local speakers. We hope to have more regional events in other regions during the year to provide an opportunity for members to become more involved and informed. If you have any ideas, then please contact your local regional coordinator. Contact details are listed in *Coastal News*.

I am pleased to see that with the changes to our membership structure, we have increased the number of individual members, although as expected this has been at the expense of some of our corporate members. Our Membership Coordinator, Vaughan Cooper, is working hard to maintain and increase membership, and will be in touch with our corporate members in the next couple of months to ensure we are delivering the services we said we would. You will also see a corporate members page added to the Society's website shortly, which acknowledges the support of those organisations.

A couple of initiatives are underway for our student members which we will advise you of in the next few months, again make sure you visit the Society's website regularly. I can't give too much away but one initiative is a scholarship towards tertiary research. There are also the two \$500 student travel scholarships to attend the 2007 NZCS Conference in Tauranga, with application details on the website conference page.

Remember that we now have the NZCS Digest which is e-mailed every week or so to members to disseminate announcements, information and notices. Members are welcome to send information for inclusion in the digest to Hannah Hopkins (NZCS Administrator) at hannah.hopkins@ew.govt.nz.

I look forward to seeing as many of you as possible at the 2007 NZCS Conference later in the year.

*David Phizacklea, Chair
New Zealand Coastal Society
david.phizacklea@envobop.govt.nz*

Seeking Contributions to *Coastal News*

Your contributions to *Coastal News* are welcome. These contributions are important to keep NZCS members informed about coastal issues in New Zealand and around the world. Contributions may be in the form of advertisements, notification about conferences or workshops, short news items, or longer articles of 400-800 words plus photos or diagrams.

For further information or to submit an idea please contact Alex Eagles, Editor *Coastal News*, on penguins@clear.net.nz.

**Coastal
News**



News From the Regions

Hawkes Bay Region

Gary Clode, Hawkes Bay Regional Coordinator

Dune Restoration

Coastal dune restoration is alive and well in the Hawkes Bay. The Waimarama Development and Protection Society is one of several community groups actively involved in the protection and enhancement of local dune environments.

The Waimarama group is now in their second year of fencing and planting an expanding area of dunes. These had been so seriously degraded by vehicles, visitor impacts and weed infestation, that they had lost most of their natural character. The sand trapping spinifex and pingao planted last year is growing well and the fore-dune is already showing evidence of accretion.

As well as providing habitat for rare plants and animals, coastal dunes provide a buffer against high seas and coastal erosion. Hawkes Bay Regional Council offers 'regional landcare' grants to community groups and individuals wishing to undertake coastal biodiversity protection and enhancement projects.

A three-way cost sharing agreement at Waimarama sees the Hastings District Council and Hawkes Bay Regional Council share the cost of purchasing plants and materials. The community group then provides its share through carrying out the actual 'hands on' labour.

Following the success at Waimarama, community led dune projects are also underway at Waipataki, Ocean Beach and Porangahau. Unfortunately the national demand for pingao and spinifex currently exceeds supply. For this reason initial restoration efforts focus on site preparation and seed collection. These seeds will be carefully propagated in nurseries for planting the following year.

Wellington Region

Iain Dave, Wellington Regional Coordinator

Regional Policy Statement

Greater Wellington Regional Council is preparing a second generation Regional Policy Statement, which now has to 'give effect to' the NZCPS 1994. The coastal environment section has focused on three issues of regional significance: natural character, coastal water quality and ecosystems, and coastal processes (which includes coastal hazards). The natural hazards section also contains policies that will strongly govern development in the coastal environment.

The new provisions are much clearer and more specific in what is required from other RMA plans (district and regional) in the spirit of the new 'give effect to' environment. The list of regionally significant sites has been revised and enlarged and the emphasis regarding coastal hazards has

shifted from 'defending against' to 'working with' coastal processes. The draft RPS sections are on the GW website at www.gw.govt.nz/rps and feedback is welcome before 6 July to Piotr Swierczynski (coastal) (piotr.s@gw.govt.nz) and Iain Dawe (hazards) (iain.dawe@gw.govt.nz).

Castlepoint Seawall

A new rock revetment seawall has been built at Castlepoint, a popular summer holiday destination on the Wairarapa Coast. Castlepoint is regarded as having nationally significant natural character. The 'castle' is a large limestone block that has been connected to the mainland by sand deposition to form a tombolo, lagoon and reef complex that attracts thousands of visitors every year.

An episodic erosion problem removes sand from the foreshore during storm conditions and leaves the main access road vulnerable to undermining. After considerable planning and consultation, Masterton District Council decided a rock revetment seawall was the most viable option to protect the road access into the village. The project cost \$840,000 and used 8500 tonnes of rock.

Greater Wellington declined consent to extend the revetment into an adjacent dune area, a decision that has been appealed and is currently in mediation. The local Residents and Ratepayers Association is unhappy about the decision and wants the dune area walled to allow all-tide access to the beach area.

Marine Education Centre

The controversial Marine Education Centre proposal was recently approved by a panel of three commissioners. The \$20 million development is to be built at Te Raekaihau Point, between Lyall and Houghton Bay on the Wellington south coast. However, an appeal has been lodged and it will be back to the Environment Court on July 2. The main contention surrounds coastal character issues. Many locals have voiced opposition to the development on the basis that it will spoil the wild natural character of this section of the coast.

Kapiti Coastal Strategy

The Kapiti Coast District Council recently released its coastal strategy for public comment. Much of the coastal strip of the Kapiti Coast is heavily developed, and there is great pressure on the Council to continue allowing development in surrounding greenfield areas. A big focus of the strategy is sustainable management of these precious and limited resources. The Council sought wide ranging public input into the development of the strategy and has earned a good reputation for actively engaging the local community. Input from submissions is currently being worked through by staff and the strategy is due for release later this year.

Coastal News



Lyall Bay Surf Reef

The proposed Lyall Bay surf reef proposal is on the rocks and the reef development trust behind the project is unsure about its future. Greater Wellington approved the project in 2003, when it was projected to cost around \$1.5 million dollars, but costs have since ballooned by an estimated \$1million dollars. The main issue surrounds the supply of sand for the geotextile bags that make up the ASR designed reef. Initially it was thought that sand dredged from the harbour could be used for this purpose, but the port company, CentrePort, has put dredging on hold until large draft vessels require all-tide clearance. Alternate sources of sand would cost upward of \$500, 000.

Bay of Plenty Regional

Reuben Fraser, Bay of Plenty Regional Coordinator

Ohiwa Harbour Strategy

The Draft Ohiwa Harbour Strategy was released for public consultation late last year and has recently been through hearing and deliberations. The Strategy is a joint project between Environment Bay of Plenty, Whakatane District Council, Opotiki District Council and local iwi, and aims to achieve integrated management of the Harbour. It sets out a vision for the harbour, identifies issues, key community values and aspirations and recommends actions to achieve those.

A total of 53 submissions were received during the eight week consultation period on a wide range of issues including the management of mangroves, sedimentation, fisheries, development and access to the harbour. The Hearing Committee, having considered the submissions, recommended that a number of amendments be made to the Strategy, such as the addition of a new action aimed at protecting bird species and their habitat. The Hearing Committee will be reporting back to the three Councils shortly, recommending that the Ohiwa Harbour Strategy be adopted.

Also considered by the Hearing Committee was whether or not Ohiwa Harbour should be nominated as a wetland of international importance under the Ramsar Convention. The Hearing Committee recommended that conditional support be given to nominating Ohiwa Harbour as a Ramsar Site subject to targeted consultation with selected groups.

Further information on the Strategy can be found at www.envbop.govt.nz.

Regional Coastal Environment Plan Review Reports

The Council's Bay of Plenty Regional Coastal Environment Plan (RCEP) was developed in the early 1990s and made operative in 2003. Council decided in 2005 that there were parts of the RCEP planning maps that need reviewing, the primary reasons being:

- The studies that many of the layers on the planning map are based on are over 10 years old.
- There have been changes to the physical environment and how we view it.
- To ensure consistency with the recently developed Heritage Criteria in the Regional Policy Statement.

We identified three priority areas for review:

- Outstanding natural features and landscapes.
- Significant areas of vegetation and habitats of indigenous fauna.
- Historic heritage.

We commissioned three different consultants to undertake the reviews. The reviews are now complete.

Outstanding landscapes and natural features

Outstanding Natural Features and Landscape: Bay of Plenty Coastal Environment (Boffa Miskell Ltd, 2006)

Boffa Miskell Ltd undertook this review. The existing outstanding natural features and landscapes in the RCEP planning maps are based on a 1993 report by Boffa Miskell Ltd.

Key findings of the review are:

- Sixteen of the 43 original outstanding and significant natural features and landscapes require amendments to their landward boundaries.
- The seaward boundaries of all the outstanding and significant natural features and landscapes have been extended a standard 200m offshore.
- There has been no decrease in the quality of outstanding and significant natural features and landscapes.
- Three new outstanding and significant natural features and landscapes have been identified.

Significant areas of vegetation and habitats of indigenous fauna

Significant Indigenous Vegetation and Significant Habitats of Indigenous Fauna in the Coastal Environment of the Bay of Plenty Region (Wildland Consultants Ltd)

Wildland Consultants Ltd were contracted to undertake the review of significant areas of vegetation and habitats of indigenous fauna. They are shown in the RCP maps and are based on two 1994 reports. Key findings of their review are:

- There are changes to the way 'significance' is determined.
- There is an increase in the total area of significant areas of vegetation and habitats of indigenous fauna.

In addition to the significant areas, they identified key ecological zones in Tauranga Harbour, i.e. the most significant areas of vegetation and habitats





of indigenous fauna in Tauranga Harbour.

Historic Heritage

Historic Heritage Inventory Coastal Historic Heritage Review Project (InSitu Heritage Ltd, 2006)

No historic features are shown on the existing RCEP planning maps, other than a small number of shipwrecks. InSitu Ltd were contracted to identify features and areas of significant historic heritage value in the coastal marine area. They identified 111 potential historic sites, of which 12 were confirmed. (It's often very difficult to determine whether a site, such as a shipwreck, still exists). Eight archaeological areas are identified and generally include harbour and estuary margins.

Sea Lettuce

Every summer, sea lettuce hits the local newspaper headlines in the Western Bay of Plenty. In January sea lettuce washed up in large quantities at Omanu Beach, Mt Maunganui. Environment Bay of Plenty, Tauranga City Council and Western Bay of Plenty District Council have been working on a joint agreement for the management of sea lettuce, particularly within Tauranga Harbour.

The purpose of the agreement is to:

- Develop an agreed understanding about the management of sea lettuce within the western Bay of Plenty sub-region, focusing on Tauranga Harbour, Maketu and Little Waihi Estuaries.
- Ensure that consistent advice is given to the community on sea lettuce.
- Educate the community that sea lettuce results from natural occurrences.

The community consider nothing is being done about sea lettuce, despite Tauranga City Council funding its removal from high amenity areas and Environment Bay of Plenty funding research and regular monitoring.

Since 1991, Environment Bay of Plenty has undertaken two-monthly monitoring of sea lettuce abundance in Tauranga Harbour. That work has shown that the abundance of sea lettuce is related to the Southern Oscillation Index, being the El Nino/La Nina weather pattern. This weather pattern produces nutrient upwelling at times and causes nuisance blooms of sea lettuce.

A fact sheet will be launched later in the year to pre-empt the usual complaints surrounding rotting sea lettuce on harbour foreshore areas. The fact sheet will inform the public and harbour users that sea lettuce is a natural occurrence and is not the result of pollution or excess nutrients in the harbour.

It is also proposed to establish a sea lettuce alert notification for commercial shipping, harbour users and central government agencies advising of the expected status (abundance) of sea lettuce in the Tauranga Harbour for the next 3 months. Critically this will give a lead-in to the summer

months (October-March) when sea lettuce can reach nuisance bloom levels. The alert levels will be similar to fire danger warnings. Fortunately, the 2007/08 summer is looking to be a low-bloom period with La Nina conditions prevailing.

Approaches have been made from several groups for the possible harvesting of sea lettuce for use as fertiliser, stock feed and other products. This may see a win-win scenario with self-sustaining management of sea lettuce.

Tauranga Harbour Sedimentation Study

A three year study is underway to investigate sedimentation within Tauranga Harbour and its catchments. The first phase of this work will identify sediment sources and those catchments where resources should be prioritised.

Waikato Region

Jenni Paul, Waikato Regional Coordinator

Beach Care Features on National TV

Dune restoration at Marokopa on the West Coast of the Waikato region was featured on TV1's "Close-Up" programme on May 9th 2007. The report focussed on the involvement that local identity Mrs Kahu Hohaia has had over the years. Key beach care messages including the importance of dune plants for dune rebuilding, protection from storms, and the negative impact vehicles can have on dunes, were delivered to the whole nation!

The dune restoration work at Marokopa was initiated in the late 1990s in response to major community concern about the significantly degraded dunes being overtopped by storm waves and inundating the township. A Beach Care group was initiated in 1998 and has been supported by Environment Waikato through the supply of plants, materials and advice. Since then, approximately 50,000 dune plants have been planted (Spinifex and Pingao) resulting in dune elevations being increased by several metres. There is now little to no danger of the dune being breached during a storm.

Over this time the Maori land owners have maintained a very strict control on human use and access so that minimal human damage to plantings, especially from vehicles in the dunes, has been experienced. Without this change in land use, the results we are seeing today would not have been possible.

The show can be viewed online by following the link on Environment Waikato's Beach Care webpage :
www.ew.govt.nz/enviroinfo/coasts/beachcare/index.htm

For more information please contact Harley Spence (harley@coastline.co.nz).

Shore Futures

The Waikato, Otorohanga and Waitomo District

Councils, Environment Waikato and the Department of Conservation have been working together on a joint planning project for the Kawhia and Aotea Harbour catchments termed "Shore Futures". The project team are also working with tangata whenua and other interest groups and agencies such as Federated Farmers, the Ministry of Fisheries and the Historic Places Trust.

It is recognised that pressure for land use change and subdivisions is increasing within the catchments, particularly near the coastal margin. The purpose of the Shore Futures project is to provide for the integrated and consistent management of the Kawhia and Aotea catchments. This means coming up with ways of managing activities and development, both on land and in the coastal marine area, while taking into account the special aspects and features of these west coast catchments.

Using the information gathered and feedback received through consultation, a non-statutory report will be produced that identifies key resource management issues and recommends policies and objectives to guide the future management of the Kawhia and Aotea catchments. The final step will be to take the recommendations in the Shore Futures report and incorporate them within council plans and other regulatory and non-regulatory mechanisms.

To inform the project the agencies commissioned an assessment of the landscape and natural character of the catchments and this work has recently been finalised. This study confirmed that these areas have considerable values and the challenge is now to determine how and from what they should be protected while also ensuring the sustainability of a community that has a declining permanent population.

The agencies hope to release a draft report for comment early in 2008.

For more information please check the Shore Futures webpage (www.ew.govt.nz/shorefutures) or contact Jenni Paul (Jenni.Paul@ew.govt.nz), Natasha Hayward (Natasha.Hayward@ew.govt.nz), Andrew Loe (andrewl@otodc.govt.nz), John Moran (johnm@waitomo.govt.nz), Allan Turner (allan.turner@waidc.govt.nz) or Vicki Carruthers (vcarruthers@doc.govt.nz).

Experimental Aquaculture

Environment Waikato is considering a plan change to amend the rules applying to existing Aquaculture Management Areas (AMAs) in the region. Currently the Regional Coastal Plan (RCP) provides for shellfish aquaculture and prohibits all other forms of marine farming.

Since the marine farming chapter of the RCP was written in 1999, several more species have been tested for their aquaculture potential and some are ready for sea trials. Leading the charge is the yellowtail kingfish with a successful hatchery established by NIWA at Bream Bay and a kingfish

farm operating in the Marlborough Sounds.

Fish farming has the potential to generate much greater returns per hectare than shellfish farming (compare returns of \$35k to \$45k per hectare for shellfish to just over \$1M for salmon). Other potential species include groper, snapper, seahorses, lobsters, paua, seaweeds and sponges.

The plan change will establish a framework for trialling new types of aquaculture to determine its environmental sustainability in the Waikato Region, particularly in the Firth of Thames. Consultation started at the end of March 2007 and is expected to continue until at least September.

For more information about this project please contact Graeme Silver (Graeme.Silver@ew.govt.nz).



Kingfish farm, Port Lincoln, Australia.

Managed Retreat

Managed Retreat is a concept, which is not well understood in the New Zealand context. A report was commissioned by Environment Waikato in partnership with Environment BOP, Auckland Regional Council and Thames Coromandel District Council, to investigate the ins and outs of managed retreat as a viable management tool for responding to coastal erosion hazards. This report characterises Managed Retreat and reviews the main options available for implementation.

The focus of this project was to provide an overview of various methods by which managed retreat could be implemented to assist in identifying whether Managed Retreat is financially and technically feasible in a given situation.

The report is available online at www.ew.govt.nz/publications/technicalreports/tr0648.htm

For more information please contact either Annabelle Giorgetti (Annabelle.Giorgetti@ew.govt.nz) or Vernon Pickett (Vernon.Pickett@ew.govt.nz).

Hazards Plan Change

Since the 2002 "Weather Bomb" Thames Coromandel District Council has been aware of the need to review the natural hazard provisions of the Proposed District Plan. A combination of climate change induced sea-level rise and





increasing coastal property values on the Coromandel Peninsula, specifically in coastal hazard zones, is creating pressure on resource management agencies to adopt a more pro-active and strategic stance to managing the impacts of coastal erosion and flooding on community assets, both public and private.

TCDC has subsequently been working closely with Environment Waikato to undertake detailed flood modelling work for 14 catchments/communities on the Coromandel Peninsula. Draft District Plan provisions have been prepared and landowner and community input on these draft provisions has been sought.

The coastal erosion provisions are based upon information developed by Environment Waikato in 2002 and contained in the report entitled "Coromandel Beaches – Coastal Hazards & Development Setback Recommendations". Although these recommendations are currently enforced via the Building Act 2004, the proposed hazards plan change seeks to confirm these recommendations in the District Plan.

TCDC is currently considering the results of the pre-consultation phase and making necessary amendments before proceeding to notify any changes to the Proposed District Plan.

For more information contact Leigh Robcke (leigh.robcke@tcdc.govt.nz). The 2002 EW report can be viewed online at: www.ew.govt.nz/enviroinfo/hazards/naturalhazards/coastal/summary.htm.

Regional Event

The Waikato region was lucky to have two international speakers at the April regional event. Professor Tarmo Soomere (fast ferry wakes and rogue waves – article in *Coastal News*) and Professor David Huntley (latest techniques in video imagery) gave very interesting talks, which were well received by those attending. Thanks to all those who helped in organising the event, especially Professor Terry Healy and Dr Karin Bryan from the University of Waikato.

Muddy Feet

The Muddy Feet Phase II project aims to identify risks to the internationally important Ramsar wetland in the inner Firth of Thames, and to recommend actions to minimise the risks identified.

The project is funded collaboratively by Environment Waikato, Auckland Regional Council, Department of Conservation, and the Thames Coromandel, Franklin and Hauraki district councils. Matamata Piako District Council, Ministry of Fisheries and the Cawthron Institute are also collaborating on the project.

A risk analysis for the Ramsar site was carried out, identifying the key risks to the site, and the species and habitats present at the site. The risk analysis was followed by a gap analysis, which identified recommended actions that were currently not being undertaken by any of the participating agencies.

Reports from the project are currently being peer reviewed. The final reports will prioritise actions for agencies, and provide recommendations to ensure that risks to the internationally important Ramsar site are minimised.

For more information contact Malene Felsing (Malene.Felsing@ew.govt.nz).

Wharekawa Harbour Sediment Sources

A study into the sources of sediment into Wharekawa Harbour has been commissioned. The study is carried out by NIWA, using a sediment 'fingerprinting' technique based on stable isotopes, which enables the determination of sources of sediments in terms of catchment land use (i.e. distinguishing the proportion of sediments at a given site in the harbour that are from areas covered in native bush, exotic forestry, pasture, etc.). A final report on the findings of the study is expected in July 2007.

For more information contact Malene Felsing (Malene.Felsing@ew.govt.nz).

Peninsula Project

Implementation of the integrated approach to flood mitigation on the Thames Coast is well underway. To improve the health and stability of the upper catchment Environment Waikato and the Department of Conservation jointly fund the animal pest control component of the project. Around 1500 goats have been hunted and killed on private and Crown land and possum control operations have been carried out over nearly 35,000 hectares of private and Crown land so far. Results show that possum numbers have dropped well below target levels, vegetation is already showing signs of recovery and residents in the area have reported increased numbers of birds.

In the lower catchment engineering works, such as stream channel protection works, are being constructed in key communities. The Waiomu campground, recently purchased by Environment Waikato and Thames-Coromandel District Council as a high flood risk property, is in part being re-shaped to form a channel that will hold the capacity of the stream in a flood event.

Across the Peninsula landowners have been keen to get involved in river and catchment projects,



Pushing the Boundaries

NZCS Tauranga Conference – 21-23 November 2007

The theme of this year's conference focuses on the ever-growing populations of coastal communities and the increasing challenges coastal managers face.

The theme was chosen as it is particularly relevant to the western Bay of Plenty. Tauranga, situated on the coast, is New Zealand's second fastest growing city.

Preparation for the conference is going well. We have a great organising team who have committed a lot of time and effort. It's amazing how much work actually goes into organising these conferences!

The conference is being held at the Sebel, Trinity Wharf Tauranga. It's a classy setup, sitting out over the water in downtown Tauranga.

For many, the highlight of the conference is the conference dinner. This year's dinner will be at Mills Reef. In their own words – "Mills Reef Winery Restaurant has established itself as an award-winning Tauranga landmark situated on 20 acres of beautifully landscaped grounds with stunning rural vistas and relaxed surroundings". I can vouch it's a great spot.

The call for papers is out – check out the website for details if you're interesting in giving a presentation (www.coastalsociety.org.nz).

Registrations for the conference will be open late June/early July.

I look forward to seeing you there!

Ben Lee
Conference Convener

Regional News continued

particularly where there is an opportunity to enhance biodiversity as well.

For more information contact Julie Beaufill (Julie.Beaufill@ew.govt.nz).

Coromandel Blueprint

This is a joint project between Environment Waikato, Thames-Coromandel District Council, Department of Conservation and Hauraki Iwi, to identify what and where appropriate use, development and protection of the Coromandel Peninsula's natural and physical resources should be, both on land and on the sea.

Work is underway on identifying and mapping trends and implications of current land use policy as well as collating information from community plans and other documents that show the aspirations of Coromandel Peninsula communities. Profile statements relating to bio-physical resource constraints (e.g. water), hazards and landscapes are underway. Population and housing projections are being revised based on 2006 census data.

For more information contact Rosalind Wilton (Rosalind.Wilton@ew.govt.nz), Katherine Palmer (Katherine.Palmer@tcdc.govt.nz) or Matthew Vare (mvare@doc.govt.nz).

NZ Coastal Society Satisfaction Levels Remain High



The annual NZCS satisfaction survey was undertaken in November/December 2006 in order to determine how the Society can provide improved services to its members. Survey forms were distributed to all attendees at the NZCS conference in Kaikoura and also emailed to all NZCS members. A total of 55 forms were received.

Levels of satisfaction with the annual conference continue to remain high and have increased slightly from the previous survey (see figure below). Several people supported the move to holding the conference in November rather than October.

Satisfaction with regional events was again quite

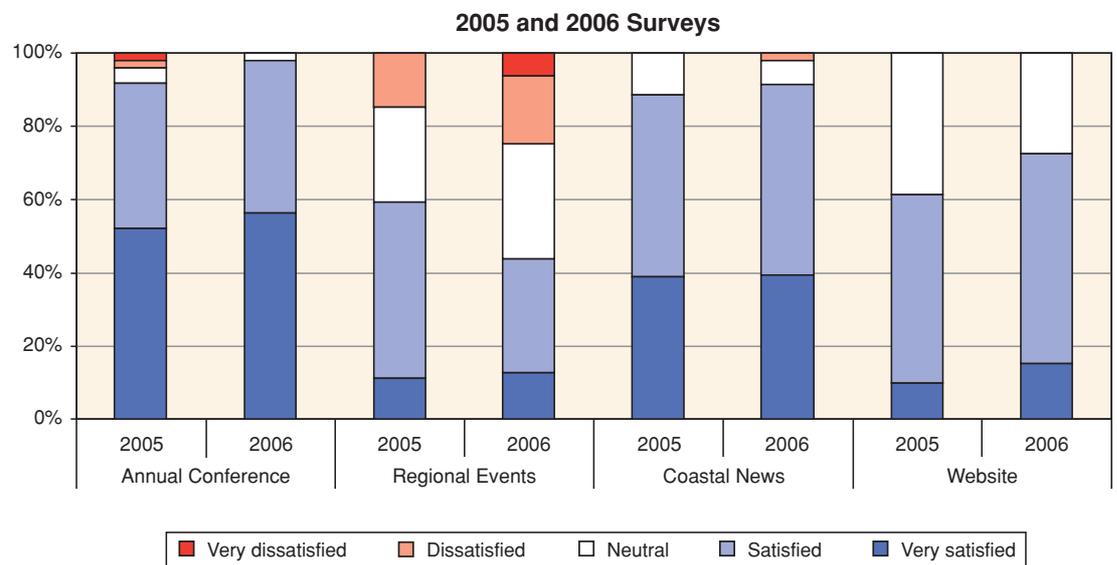
a lot lower, probably reflecting the infrequent occurrence of such events in many regions.

Seventy two percent of respondents said they 'always or often' read Coastal News and 75% access the NZCS website 'sometimes'.

Satisfaction remains at similar levels to the 2005 survey.

Thanks to all those who returned the survey forms. Your feedback is very useful for the NZCS committee in planning conferences, events and making improvements to Coastal News and the website.

A longer description of the survey results is available on the NZCS website.



Profile: Vaughan Cooper



Vaughan Cooper is part of the Planning and Policy department of the Northland Regional Council, where he has worked for the past five years. Vaughan is responsible for the Regional Policy

Statement for Northland, which includes involvement in district plan preparation and submitting on national initiatives that may affect the Northland region. Whilst this role has more of a broad planning focus a watchful eye is always kept on all things coastal!!

Vaughan graduated from the University of Auckland with a Bachelor of Science and Post Graduate Diploma in Science in Physical Geography (Coastal Geomorphology).

Vaughan is a new member to the society – a flow-on effect from organising the 2005 Tutukaka conference.

Vaughan is a born and bred Northlander and makes the most of the outdoor lifestyle that Northland provides – whether its playing sport; hockey, soccer, squash and volleyball – out on the water: fishing, diving, wakeboarding and jet boating or just soaking up the sun in the winterless north.

"Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has." – Margaret Mead

Rogue Waves: Do Ship Wakes Strike Back or Help Us?

Particularly high and steep (freak, monster, or rogue) waves on the sea surface are observed much more frequently than might be expected from surface wave statistics. Many properties of such waves are similar to those of the catastrophic tsunamis. Although greatly different in time and size, both phenomena have much in common with waves from contemporary fast ferries.

Ships sailing at high speeds at moderate depths may excite specific types of disturbances such as high, long, long-crested, and highly nonlinear leading waves, or solitary wave trains ahead of them. The waves' behaviour in coastal areas frequently resembles several features of tsunamis, and interaction of such waves may lead to the formation of long-living freak waves.

Unusually frequent overtopping occurring when waves reflect from a vertical wall was noticed in coastal engineering as early as in the 1950s, and explained by the end of the 1970s. A specific feature of this phenomenon is that the crests of the incident and the reflected wave merge into one structure, the height of which may be four times as high as the heights of its counterparts.

The resulting structure resembles 'Mach stem', which is known to be responsible for many inconveniences in aviation. As a matter of fact, one does not need the wall in order to have extremely large waves: intersection of long (optionally ship-induced) shallow-water waves with appropriate heights and propagation directions does exactly the same job [1]. The wall – that can be imagined at the intersection point where the wave height reaches its maximum – has no effect in such cases at all!

A situation in which the resulting wave is higher than the sum of the heights of the counterparts is called nonlinear. The idea that an appropriate nonlinear mechanism could be responsible for extreme waves has been employed in many studies [2]. A simple but amazingly rich in content mechanism causing at times considerable increase of the local wave height is the nonlinear interaction of shallow-water solitons propagating in slightly different directions. This process can be studied, to a first approximation, in the framework of the Kadomtsev-Petviashvili (KP) equation, a two-dimensional generalization of the Korteweg de Vries equation, the famous equation for long waves in shallow water.

The KP equation predicts that intersection of highly nonlinear waves may lead to surface elevations that can be up to four times as high as the incoming waves. A pronounced feature of freak waves is that they are particularly steep. This feature is also reproduced by the KP equation. The profile of the wave hump close to the

intersection point is very steep: its slope may be 8 times as large as the slope of the counterparts [3].

The physics of waves is exactly the same for identical waves of any origin. Therefore extremely high and steep waves may easily occur when two systems of long-crested waves cross each other, no matter whether its swell or ship-generated solitonic waves. Also, much more devastation compared with simple overtopping of a seawall or breakwater may be caused by an analogous unfavourable combination of the properties of a tsunami and the geometry of the coast.

The good news is the moderate extent of the area where considerable amplification of wave heights may take place. Substantial areas of extreme elevations only occur if the heights of the incoming waves, their intersection angle (resp. incidence angle for a tsunami wave) and the local water depth are specifically balanced. Therefore this mechanism becomes evident relatively infrequently and the fraction of sea surface occupied by extreme waves is small.

Yet such structures do appear often. One can recognise them frequently in places where waves approach from different directions, for example, in the lee of small islands or seamounts.

The bad news, first recognized by Professor E Pelinovsky (Russia) in a private discussion in 2003, is that the high wave humps, theoretically, have unlimited life-time and may cross large sea areas in favourable conditions. This feature may substantially increase the probability of occurrence of extremely high and steep waves and matches the markedly frequent appearance of freak waves.

The extraordinary steepness of the front of the high wave hump is a most interesting feature of the soliton interactions in this framework. Such a 'mountain of water' may easily become unstable and break in regions where its counterparts usually do not break. The possibility of the breaking of this hump makes it exceptionally dangerous [1].

In populated or industrial areas, its possible hit on an entrance of a channel (harbour entrance, river mouth etc.) may cause serious consequences. This wave structure is basically different from the straightforward superposition of two linear waves. It concentrates energy of both incoming solitons in one structure, the further behaviour and stability of which is yet unclear.

The discussed mechanism is only applicable in relatively shallow water. In order to become effective, there should exist at least two long wave systems propagating under a certain angle, and the whole situation should satisfy the restrictions



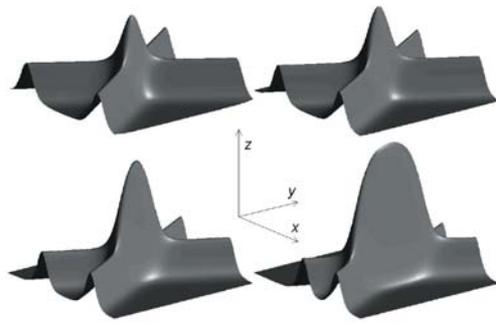


Figure 1: Surface elevation owing to interaction of equal amplitude solitons with different angles between their crests.

of the KP equation [4]. Yet its potential appearance is extremely important for shipping safety, because marine transport is only reasonable when ships at times make a port call, that is, cross shallow areas near the ports.

Finally, studies into ship waves have led to simple explanations of many essential features of wave dynamics occurring in shallow coastal areas, and to the discovery of some effects, smart usage of which may essentially increase shipping safety as well as reduce safety problems caused by fast ferry traffic. Further studies into nonlinear ship waves are therefore of paramount importance, not only because they offer an insight into new forcing factors of the coastal environment in certain areas [5] but mainly because of the progress that science, and naval and coastal engineering, as

well as society as a whole, can achieve by using them as a small-scale model for studies of otherwise extremely dangerous tsunamis and rogue waves.

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Figure 2: A small freak wave caused by nonlinear superposition of crossing waves near Goat Island, April 12, 2007