Coastal News

Newsletter of the New Zealand Coastal Society

A Technical Group of IPENZ

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Contents

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Coastal Hazards Database

One of the great challenges in coastal hazard management is having adequate information available to properly assess the vulnerability of an area to hazards, and the risk they might pose to existing or proposed development. Too often, development occurs, or coastal protection works are authorised due to a lack of knowledge of the coastal processes operating in an area and the ability of the land masses (beaches, cliffs, etc) to resist those forces. The result can be developments in high risk locations, damage or destruction of public and private property, high Civil Defence costs and expensive shoreline "protection" works.

The ARC has instituted a range of interrelated programmes to address these long standing problems. These include the development of a coastal hazards strategy, an improved coastal monitoring network throughout the region, the preparation of a Coastal Erosion Management Manual (CEMM), and the deployment of a directional wave rider buoy to better understand the wave climate of the Hauraki Gulf. The Coastal Hazards Strategy is a long term programme aimed at meeting the requirements of the Resource Management Act, as well as the directions established for the Auckland region in the proposed RPS and RP:C (Regional Plan: Coastal).

The Hazards Database (see Figure 1) is a key step in the avoidance and mitigation of coastal hazards. The database forms the first stage of the coastal hazards strategy. The objective of the database is to ensure that all relevant information relating to coastal hazards in the Auckland region is brought into a single database, and in a form which can be easily accessed by ARC staff, local authorities, consultants, university, researchers and the general public.

The establishment of the database leads into the next stages of the coastal hazard strategy. The information on the database will assist in the determination of pilot sites where appropriate hazard identification techniques can be applied. The database also highlights information needs and provides links to other coastal science programs including the coastline monitoring program, the wave strategy, the coastal erosion management manual and the CoastCare program. The information on the database will also be useful for coastal permit, subdivision consent and building consent applications.

Querying the Database

The information on the database has been classified by various different parameters. Information can be found by using any single parameter, or a collection of these e.g.:

subject = waves; or

location = Waitemata Harbour; or

corporate author = Auckland Regional Council

or a mixture of these. The total range of queries is displayed on the query screen of the database (Figure 2). The query is answered with a list of references that meet the requested requirements. The reference list can then be printed.

Figure 1: The Front Screen of the Coastal Hazards Database

Future Developments of the Coastal Hazards Database

It is proposed that the database be added to the ARC Internet web site. At the web site, users would be able to search for and view information. The site would also contain e-mail and address contacts for the coastal hazards database

continued on page 2

Coastal News

IPENZ Sustainable Management Action Plan Proposed Technical Group Activities

Professional Education

- Develop sustainability courses, workshops and programme or components aimed at all levels of membership as part of continuing Professional Development.
- Foster exchange of ideas and methods on sustainability management and technology.
- Promote interchange between disciplines (engineering, science, law, economics...).

Research and Development

- Sustainability issues should be a fundamental component of research wherever appropriate.
- Groups should support, endorse and promote research projects related to the conservation of resources.
- Research funding should be conditional on suitable consideration of conservation of natural resources.
- Research should address life cycle issues.
- Encourage authors of papers to address conservation of resources.
- Publications Committees/reviews should ensure that papers address sustainability in an appropriate way.
- Conferences/seminars should include sustainable management of natural resources wherever appropriate.

Implementation

- Publicise projects which incorporate the application of new sustainable approaches/technology.
- Encourage overseas specialists to visit New Zealand and discuss sustainability to benefit from global developments.
- Provide awards for application of innovative approaches/technology to ensure conservation of resources.
- Ensure that Standards/Codes and QA programmes address sustainability issues where appropriate.

It is suggested by the management committee of the NZ Coastal Society that we adopt these guidelines.

Let us have your views and any suggested additions or changes.

continued from page 1

administrator at ARC where new additions to coastal hazard research could be sent and then added to the database. It is also expected that the database information will be displayed on the ARC's ARCVIEW G.I.S system.

Figure 2: Query Data Screen of the Coastal Hazard Database

Harvey Brookes, Libby Boak, Auckland Regional Council Ph (09) 366 2000

Contributions to *Coastal News* can be made to:
Jim Dahm, Environment Waikato, PO Box 4010, Hamilton Phone 07 856 7184
e-mail jimd@wairc.govt.nz

Coastal Erosion Management Manual

The Auckland Regional Council is to produce a Coastal Erosion Management Manual (CEMM) for the Auckland Region. The primary objective of the CEMM is to provide up-to-date information and advice on a range of management options to aid in the selection of the most appropriate management response.

The CEMM will largely be of use for mitigation and remedial activities. Though it may also help avoid problems, the avoidance of coastal hazards is the primary objective of the Coastal Hazards Strategy also currently being developed by the ARC. The Manual will not address other coastal hazards, such as storm surge and sea-level variation, tsunami, risk, except to the extent they are relevant to coastal erosion management.

The basic philosophy behind the CEMM is the need to bring together all relevant information (legislative context; environmental matters to be considered; range of options available,

continued on page 3

continued from page 2

etc) together to help promote better informed decisions. It should lead people away from thinking that the only option for coastal erosion management is the construction of a seawall. If a seawall is determined to be an appropriate option, the CEMM will aid in the selection of the most appropriate type of seawall.

The CEMM is being prepared jointly by a team led by Beca Carter Hollings & Ferner Ltd, and the ARC and is expected to be completed by late July 1998.

If you would like further information on the CEMM please do not hesitate to contact Andrew Benson at the ARC, ph 09 366 2000, extn 7029.

Chairman's Notes

How Sustainable Sustainability?

And what's its relevance to our coasts ? Obvious in one sense in that inadequacies in sustainable management will result in detriment. But how do we sustain and even encourage the progressive shift in attitudes , corporate and individual , that will be needed to continue progress towards sustainability (which some would liken to survival)?

IPENZ through its Standing Committee for Engineering and the Environment, developed an Action Plan three years ago to progress the issue of sustainability. The essence of that document as relevant to Technical Groups such as our Society is given on page 2, and your Management Committee endorsed it as a guiding principle at its last teleconference meeting (very sustainable in our saving of air fares and time!).

But how big the gap between idealism and the reality of meeting budgets and deadlines and the sometimes conflicting demands of developers and regulators? Inertia and the entrenched habits of consumerism will be with us for some time I fear but there are some encouraging signs that the yeast is working:

- *The IPENZ Centre for Sustainable Development is up and running with its cosponsors University of Auckland and Unitech;*
- *The REBRI programme has recently been launched, to reduce waste by Resource Efficiency in the Building and Related Industries;*
- *The IPENZ 1999 Forum has Sustainability as one of its key themes; and*
- *IPENZ is co-sponsoring with IEAUST the Environmental Engineering Conference in Christchurch in September 1998.*

Is there a Little Yeast in a Corner of your Working Life?

Let's use this newsletter to hear about those individual grassroots efforts that are progressing us towards sustainable management of our coasts.

The 1998 Coastal Society Seminar

In our 1996 seminar we looked at the question of just how sustainable is our present use and management of the coastline.

This year, October 29/30 in Mount Maunganui (in your diaries now please!) we will be looking at *Sustainable Coastal Management – Measuring Progress*. How do we measure progress towards the big goals of sustainable coastal management?

The seminar will coincide with the release of the environmental performance indicators for coasts and estuaries, simple measures designed to monitor how well, *how sustainably*, we're using and managing the coast. If we can get these core indicators right, they have the potential to provide the back-bone of a nationally consistent coastal monitoring programme that can provide coastal managers, developers, consultants, and communities with clear, simple and agreed measures of progress.

The seminar is designed to introduce practitioners to the concept of coastal indicators and then to examine and discuss some of the suggested indicators for core coastal management issues of today. We have good speakers to introduce the issues and the indicators, but the seminar is designed to be informal and participative, to share experience and ideas and so considerable emphasis will be given to facilitated discussion.

The venue is as near perfect as we could arrange — on the beach-front at Mount Maunganui, one of New Zealand's most popular holiday resorts! And the second day will be spent looking at a wide range of coastal management issues — the problems of developed and undeveloped ocean and harbour coasts, port related issues, estuarine issues and local community participation programmes.

So mark it in your diary NOW! More details will be posted to all members in mid-August.

John Duder, Chairman, Management Committee.

Coastal News

Coastal News

Coastal Research: Waikato University Geography Department

The Department is in the School of Social Sciences and this is reflected in the nature of its coastal research – which examines the way people construct their coastal environment through their social interactions with it. Coastal places become the places we carry in our mind when we interact with them. These interactions (which reflect cultural, social, political, spatial, experiential, and economic factors) become the stuff of our research just as sediment flows and mangrove productivity (both of which are also human constructs!) are the focus of more traditional coastal geographers.

As staff have many years of non-academic work experience, our coastal research is targeted at applied problems and receives support from a range of organisations. Recently completed masters projects which illustrate the nature of our research include Anji Davies' "Life or land: the linkages between beach access and public safety at the beach" and Adrian Housley's "Coastal port development: Containerisation and its implementation for port operation, management and planning under the Resource Management Act framework".

Anji's research, funded in part by Environment Waikato and a NZ Water Safety Council EGGAR Scholarship, highlighted the difficulties in marrying the objectives of councils and NZ Water Safety Council. The work noted that beach access location is generally not significantly influenced by the NZWSC objective of providing safe swimming. That councils need to ensure they consult with surf lifesaving clubs in deciding on locations for car parks and access points is clear. Anji also drew on feminist, post-structuralist, 'new' cultural, and humanist theories to explore peoples' relationship with the coast further and backed this with empirical studies of beach users. The results suggest that even with more swim-safe locations the demand for beach access/ parking, cultural relationships and expectations of social crowding will lead to continued unsafe swimming practices. The need for education to focus more on how to survive if caught in a rip, as opposed to rip recognition, was also clear. Anji's research usefully compliments her earlier work on rock fisher hazard awareness and the work on beach danger geophysical indices being undertaken at Massey by Dr Patrick Hesp (outlined in a separate article in this newsletter).

Adrian's research, partly funded by Ports of Auckland Ltd, sought to place the day-to-day consents for new port developments and facilities (eg the expansion of the Fergusson Container Terminal) within the context of a globalized container trade and theoretical concepts of intermodalism, seaport evolution and participatory planning. The research highlights a flaw in the RMA in that by devolving responsibility to communities to make decisions on the basis of community needs and concurrently leaving social factors and concepts of efficiency to the market to resolve, central government has abandoned any sense of national infrastructure planning. Drawing on an interesting Delphi study and comments from overseas-based experts, Adrian suggests that more attention needs to be given to integrating port planning with regional policy statements and plans (perhaps along the lines of the San Francisco Bay Conservation Development Commission's Sea Port Plan), and a need for a national forum for discussion on port development. Adrian's research confirms Auckland as the national hub port for the foreseeable future, but warns that national overcapacity in container port facilities will occur unless port companies take realistic voluntary actions to curb the tendency to expand their container facilities.

In 1997 the Department was also successful in a bid to the Sustainable Management Fund for support for research into the transfer of functions to iwi under the RMA Section 33. The research is being carried out by Hamish Rennie, Tikitu Tutua-Nathan, and Eclectic Energy's Jill Thomson. Early indications from the research suggest that iwi have shown considerable interest in functions relating to the coast. If the research is successful, iwi may in future play a much more significant statutory role in the coastal environment than they do at present. The outcomes of the research (due for completion in July 1999) will be reported here.

Hamish Rennie, Geography Department, Waikato University

Conference Announcement

Coasts & Ports 1999: Challenges and Directions for the New Century

14-16 April 1999 ~ Perth, Western Australia

For more information contact:
The Conference Secretariat
Congress West Pty Ltd
PO Box 1248
West Perth WA 6872
Australia
Phone +61 8 9322 6906 Fax +61 8 9322 1734

The New Zealand Dunelands Inventory

This century has been a bad one for New Zealand's sand dunes and associated flora and fauna. The area of dune habitat has been reduced by afforestation, invasion by introduced species, conversion to pasture and other activities, with concomitant reduction in the range and abundance of many dune plant and animal species. Some of the bird species associated with dunes, the New Zealand Dotterel and New Zealand Fairy Tern for example, are close to extinction, while a range of dune plants, including Euphorbia glauca and Gunnera hamiltonii are close to extinction in the wild. In some regions key and once common plant species are threatened - Pingao (Desmoschoenus spiralis) will soon be lost from Otago and Southland coasts as a result of marram invasion, except at a handful of intensively managed sites.

Few readers will be surprised by this introduction, or the State of New Zealand's Environment 1997 account of the decline of the natural character of New Zealand's dune environments. What is not clear is exactly how much dune habitat remains, how rapidly duneland is being lost, and the degree to which remnants are representative of the natural diversity of dune environments (hereafter "dunelands"), landforms and habitats. This information is necessary if we are to evaluate the effectiveness of the New Zealand Coastal Policy Statement 1994 (particularly Policy 1.1.2), and plans and policy statements prepared under the Resource Management Act 1991 and Conservation Act 1987.

A team of staff and graduate students in the Departments of Geography, Zoology and Surveying have been engaged in a study of New Zealand's dunelands over the last 18 months. Phase One of the Dunelands Project, nearing completion, has involved mapping the location and area of dunelands from the 1950s to the present for all regions. Dunelands were identified using early topographic maps, geologic and soil maps, the New Zealand Land Resource Inventory, the Coastal Resource Inventory (Department of Conservation), the Dune and Beach Vegetation Inventory (of Peter Johnson and Trevor Partridge), published reports of the Protected Natural Area Programme and information provided by DoC and local authority staff. The historic dune maps were derived largely from topographic and geologic maps. The 1990s maps were developed from the most recent aerial photography held by regional council and DoC offices which, in most regions, was flown over the last 3-5 years. Individual dunelands were mapped at scales of between 1:10,000 and 1:50,000, the 1990s maps being largely based on 1:10,000-1:25,000 colour aerial photography. Data has been captured and stored using the ARCHINFO GIS software.

The draft dune maps have been returned to regional councils and DoC offices over the last few months for checking to confirm that all remaining dunelands and most dunelands are mapped accurately. The maps currently being distributed were printed at a scale of approximately 1:500,000, which is too large to allow the precise boundaries of the smaller dunelands to be confirmed but necessary given the number of maps required. The accuracy of the maps is being researched by resurveying and field checking representative dunelands. The initial results are encouraging. We anticipate the sequence of dune maps will be of use within local authority state of the environment monitoring programmes.

Phase two of the Project will involve working more closely with local authority and DoC staff to refine the maps and incorporate key fauna and flora data. Our 1990s dune maps include the dune vegetation rankings derived by Johnson and Partridge but measure only area. Indicators of habitat quality are also needed. Some of the dunelands mapped have been invaded by weed species and contain few or no native plant species. We plan to develop a wider suite of environmental performance indicators and identify cost-effective field survey and data storage methodologies for use by local authorities and DoC.

Our definition of "dunelands" warrants some discussion and clarification. Dunelands comprise coastal sands covered or partly covered by native or introduced sand-binding grasses (namely Desmoschoenus spiralis, Spinifex sericeus and Ammophila arenaria) and associated dune species (eg Coprosma acerosa, Austrofestuca littoralis, Pimelea arenaria and Raoulia australis). We have not mapped dunes covered in pasture, plantation or native forest or woody shrubs, even though the underlying substrate may be of dune origin and duneland consistent with our definition might form were the vegetation cover to be

continued on page 6

Coastal News

continued from page 5

disturbed. We do include inter-dune hollows occupied by wetland species (eg. Leptocarpus similis) where they occur within a duneland and should, at some point conduct a similar inventory of dune forest.

Our initial definition emphasized habitat in which eolian sand movement was a significant ecological factor. In fact, wind blown sand may not be significant far beyond the foredune, particularly in east coast settings. Recent work on Stewart Island and along the Southland coast has, perhaps, made us overmindful of eolian sedimentation in exposed dune habitats. While dunes are by their very nature the result of the interaction of wind and sand a variety of duneland habitats consistent with our definition may persist in situations of infrequent or no sand movement.

Related dune work includes studies of the process of marram invasion, marram control using herbicide and development of cost-effective dune survey methodologies.

Mike Hilton

Coastal News

Coastal Dune Vegetation Network Holds First AGM

The Coastal Dune Vegetation Network, a research collaborative, was officially launched on 1st July, 1997 - after extensive consultation between Forest Research (formerly FRI) and coastal management agencies. The Network aims to provide a forum for the free exchange of information on sustainable management of coastal dune ecosystems - with emphasis on the use of vegetation to restore natural character, form and function. Activities, which include targeted research into aspects of coastal dune vegetation and effective information transfer to coastal managers, are funded by financial members (largely regional and district councils) who pay $3000 – though non-financial members are also welcome to participate in network activities and to receive publications.

The first annual general meeting of the Network (held at the Papamoa Surf Club on the 12/13 March) brought together over 60 representatives from regional and district councils, the forestry industry, Department of Conservation, local community groups (eg Coast and Beach Care groups), iwi, coastal consultants, educational institutes, staff from nurseries growing coastal plants and researchers from Forest Research.

The first day of the meeting involved a field trip to sites of interest along the Bay of Plenty coast, hosted by Greg Jenks, Coast Care coordinator for Environment Bay of Plenty. Sites inspected included ongoing community-based restoration projects at the Papamoa and Mount Maunganui beaches (where there are significant human use pressures on the coastal systems), a replanting scheme for areas of the mountain where vegetation was destroyed by fire in December 1997 (where emphasis is being given to the planting of appropriate indigenous species while controlling the regrowth of gorse and other weeds), a magnificent stand of kanuka on coastal dunes at Thornton, the Whakatane District Council nursery which has been successful in raising spinifex and other coastal plants, and coastal dune sites with various weed problems.

During the technical and business sessions on the second day, researchers reported on the various trials currently funded by the Network. These include a series of nursery based trials (located at Naturally Native nursery, Tauranga) designed to determine cost-effective and reliable methods for the large scale production of spinifex seedlings. Also a fertiliser (urea) trial on Bay of Plenty foredunes which is being monitored annually to determine the effects of application rates and timing on spinifex and pingao performance. The Network is also producing a series of technical bulletins for coastal managers. The first (on the native sand binding grass, pingao) is due to be published later this year and a second (dune geomorphology) is being prepared.

If you would like to know more about the Network and its activities contact either myself or Greg Steward at Forest Research, Private Bag 3020, Rotorua (ph 07- 347-5899; fax 07-347-9380.

Dr Fiona Ede, Coordinator - Coastal Dune Vegetation Network, Forest Research

Conference Announcement

Australasian Environmental Engineering Conference

26-28 April 1999 ~ Christchurch, New Zealand

For more information contact:
The Conference Secretariat
Conference Innovators Ltd
PO Box 1370
Christchurch, New Zealand
Phone +64 3 379 0390 Fax +64 3 379 0460
e-mail: megan@conference.co.nz

SeaViews Conference: February 1998: Marine Management: What is needed for an ecosystem approach?

Ideas turned up by the SeaViews conference organised by ECO in Wellington in February 1988 were varied, fascinating and challenging. Remarkably, there was quite a large measure of agreement, though also some strong areas of disagreement.

Management and Indicators:

Paul Dayton, eminent marine ecologist from the Scripps Institute, San Diego, pointed to the need to manage human activities affecting the sea to retain the large, slow-growing, long-lived species. He advocates a reversal of the burden of proof for fishing so that areas are closed unless fishing is demonstrated to be sustainable and that we pay attention to the non-commercial species as well as commercial. Management should be risk averse, given the collapse of many marine ecosystems, but supported by good science.

Indicators of coastal ecosystem health should include attention to whether species still occupied their original range, and management should include this as an objective, according to CSIRO's Trevor Ward. He gave comprehensive advice on the selection of indicators.

Simon Thrush of NIWA in Hamilton urged that management be adaptive, with close attention to the management question before the scale of measurement is chosen - because the scale of observation can influence what you see as important.

Community Initiatives:

Community initiatives for coastal care were reported on by Australia's Marine and Coastal Community Network, by NZ's Neighbourhood Biology, Environment Waikato, the Koroareka Marae Society, and by John Locke of the Giru Dala Council of Elders Aboriginal Corporation. Carole Donaldson spoke of the community engagement initiatives in the Atlantic Coastal Action Programme.

These presentations made it clear that communities are keen to engage and can become potent forces for coastal care while management allows a range of suitable uses and for some areas of reservation. There was a great deal of practical advice given on how to engage the community.

Fisheries: Devolution of research, databases to the industry

The moves of the Minister and Ministry of Fisheries to hand over some of the fisheries research, the running of fisheries quota system databases, and other aspects of fishery management to the fishing industry were most contentious. The industry is very keen, most of the rest of the conference goers strongly disapproved.

Since SeaViews, the Cabinet has approved just such "devolution" which conservation organisations call industry capture of fisheries management.

Key Outcomes from the Conference include:

- That while the RMA provides for reasonably coherent management of the coast, the same is not true of the sea, especially beyond the 12 nautical mile limit where there is no coherent environmental management or provision for public input into decisions. Serious work is required to correct this inconsistent, fragmented and incoherent administration and law in the area beyond 12 miles.
- More research should be done on ecosystem issues and on ecosystem approaches to management, but in the absence of information management should be precautionary.
- Precautionary management should manage for both uncertainty and risk;
- Any property rights framework must recognise and protect the benefits we and other species derive from ecological functions, from non-extractive uses and from biophysical processes. One of the major problems with many property rights approaches is that they tend to ignore public rights and the rights of future life in favour of privately appropriable rights.
- Community partnerships and good public access to decisions is a basis for robust management but this needs funding.
- A national strategy for marine management and a science strategy are required to provide management data and to implement risk management and to help avoid irreversible or significant adverse effects, of human activity.

This is only a taste of the conference - there were many other papers and workshops. For more information contact Cath Wallace (04)389-1696 or Joe Buchanan at (04)385-7545. Email: Cath.Wallace@vuw.ac.nz or eco@reddfish.co.nz. Proceedings will appear in due course at the ECO website http://www.converge.org.nz/seaviews/

Cath Wallace

Coastal News

Launch of the ARC Buoy

Coastal News

ARC's long awaited wave buoy is finally in the water. After arriving in December, the buoy was delivered to the Leigh Marine Lab in January, and made it into the water on 20 February. So far everything is going well, with the buoy reporting waves between 2.2 and 3.0 metres from the north over the past few days as a depression passed over the country. We hope to provide you all with some initial data in the next few weeks, to give you an idea of way things are going. In the mean time, here is a brief account of how the launch day went.

Planning for the deployment and operation of the buoy began in late 1997 with the creation of a project team comprising members from the ARC and the Leigh Marine Lab. During that time the team became familiar with the operation of the buoy, and the procedures for its deployment and operation.

The site for the buoy had been determined on a nautical map, and was then refined by running over the site with an echo sounder to both find an exact preferred site, and to log that site using GPS. This enabled the site to be revisited with precision, to avoid time wasted in finding the best possible location.

The buoy had been tested in the Physics Department of Auckland University by attaching it to a rubber bungy and "bouncing" the buoy by a known amplitude. The buoy's transmitted data was then checked for accuracy. The procedure for the deployment of the buoy had begun on shore with the construction of a base station and its connection to the WAREC receiver. Following painting, antifouling and application of decals (Figure 1), the buoy was transferred to the fishing vessel Melodeon at the Leigh wharf. The Melodeon (despite appearances) was a very reliable vessel and proved itself as the ideal launch platform. The trip to the launch site took a leisurely 4.5 hours on a calm sunny day. ARC staff followed and observed on the University research vessel MV Proteus.

Initial impressions of the Islands are of an exposed oceanic coastal location. At this distance the mainland is not even visible, and Little Barrier has also become reasonably distant in view. The buoy location is about 2 km north west of Burgess Island and about 2.5 km north east of Groper rock. At this location the buoy is well clear of both island masses, and is exposed to the ocean for about 270 degrees (only being sheltered from the south east by Burgess Island). Some slight sheltering might be expected from Groper rock, but since this is from the south-west, such waves would be travelling well away from the coast in any case.

Actual launching of the buoy was a procedure which took time and a fair degree of patience. It was found that the GPS on board Melodeon did not locate the launch site in exactly the same location as the Proteus. The Proteus therefore relocated the site using its GPS and echo sounder, and anchored on the site as a surrogate marker buoy for the Melodeon. Once the mooring had been laid out on deck, preparation was made on board Melodeon for the launching of the radar marker buoy. The buoy was constructed to ensure that the wave buoy itself was more "visible" to ships using radar. This was since the buoy sits low in the water, and on anything but a calm day is very hard to see. The radar buoy consisted of a 100 litre plastic bin, which was filled with two-pot polystyrene foam and sealed. A steel tube was fitted through the middle of the bin, to which the mooring was attached. The top end of the tube acted as the base for the boom holding the radar deflector and light. The 2 metre boom was constructed of light-weight, high-strength carbon fibre, and supported a standard aluminium radar reflector and a orange flashing light.

Launching of the radar buoy was relatively simple. The buoy was put overboard about 250 m south of the required site, and the Melodeon steamed towards the site and the Proteus. Once

continued on page 9

Figure 1: Wave buoy following painting and preparation (note packing case)

continued from page 8

over the required site, the weight (two wagon wheels and heavy duty chain) was released. The buoy then made a rapid trip over the surface of the water and settled in position.

Launching of the main buoy followed the same basic pattern. Care was taken to ensure that the two buoys were sufficiently distant from each other to avoid entanglement. Preparing the moorings and determining the precise point to start the deployment process took about 45 minutes. Once underway the process was smooth and proceeded without any hitches. The buoy was eased over the stern of the ship on ropes attached to buoy's handles, which were left attached to allow diver inspection. Unlike the radar buoy, the wave buoy didn't go for a "surf" once the mooring was dropped over the edge, probably due to the rubber bungies stretching and allowing the buoy to travel slowly to its final position (Figure 2). Divers inspected the system, ensuring that all shackles and connections to about -30 m were secure.

We were lucky enough not to encounter any problems with the system until the buoy was well in the water. Shortly before launch we were aware that the receiving station was not picking up a signal from the buoy. However at the time this didn't present too many concerns as the manuals had suggested that a signal might not be picked up until the buoy was at sea level. However after launch still there was silence from the receiver at the lab. This left us with a buoy in the water which wasn't doing what it was meant to be (or so it seemed). After discounting the possibility of an aerial fault, we returned to Leigh satisfied that at least the buoy was in the water, but slightly worried by the lack of signal, and also the fact that we couldn't track its position to be sure it was still where it should be. Fortunately Proteus was due back at the islands a few days later for an extended stay, so our chances of loss were, hopefully, low!

Another slight setback was to follow when the Proteus returned to find only the wave buoy but no radar buoy. At the moment we have no idea what has happened to it, but find mooring failure hard to believe given the calm weather we have experienced. Sinking also seems virtually impossible. At this stage we suspect theft, but hope to resolve the mystery by recovering the mooring system and see if things are broken, cut or something else. We are left hoping that nobody runs over the wave buoy in the middle of the night, but until the exact cause of the loss is known, we will rely on the main light on the buoy for safety.

The mystery of the lack of signal was quickly resolved by lab staff who found that a component in the receiving antenna supplied by Datawell was faulty and prevented transmission of the signal to the receiver. Once removed the signal came in loud and clear, and has been working faultlessly ever since. We have found that the signal becomes slightly weak during heavy rain showers, however the buoy has sufficient memory to store that data and re-transmit it later.

The next step is to complete the data connection from the lab to the ARC, thus allowing complete archiving of the wave data, and its dissemination via the internet. Completion of the connection is expected to be completed in the next 6 weeks, and from there we will work on establishing a link to the ARC web site so that you can all use the data.

Harvey Brookes, Auckland Regional Council (Ph 366 2000 ext 8190), Arthur Cozens, Leigh Marine Lab Ph (09 422 6111)

Figure 2: Wave buoy shortly after deployment

A further story on the ARC Wave Buoy Project appears on page 16

Coastal News

Environmental Education: Yes, It Is Relevant To Coastal Management!

Coastal News

When the World Conservation Strategy was released in 1980, EE was the acronym for Ecosystem Evaluation, now it refers to Environmental Education! The 1997 Bangkok conference "Educational Innovation for Sustainable Development" was organised by UNESCO and ACEID (Asia-Pacific Centre of Educational Innovation for Development), to focus on issues associated with improving EE at all levels to improve the capacity of individual nations to achieve Sustainable Development.

It was a large conference, over 1,000 delegates, from most countries in Asia and the Pacific. The aim was to produce set of principles about sustainable development to assist government agencies, non-governmental organisations and educational enterprises at all levels to communicate sustainable development objectives, and to develop better decision-making processes. A secondary purpose was to provide more detailed information about existing good EE in Asia and the Pacific. The associated symposium on "Greening Higher Education" was aimed at presenting best practice in university/polytechnic education levels. Areas of particular concern to delegates included coastal management global environmental change (particularly in the Pacific!), and integrating consideration of economic imperatives. In most countries EE is seen as an integral part in enabling communities to care for their own environments.

Many of the educational institutions in Asia and the Pacific are run by religious orders. Often the spiritual beliefs underpinning a community influence the way in which sustainable development is interpreted and implemented. Since many communities are actively involved in the primary and secondary education of the children, the community's environmental aspirations are often communicated through the education system. Therefore, there are wide variations between communities and regions in implementing this universal ideal. In most countries, major efforts are focused on the primary and lower secondary levels of education, because these have the broadest impact.

In one Philippines programme, a university contracted to carry out management activities in a local National Park, so a range of disciplines could have students carrying out practical exercises (ie surveying vegetation, planting and managing trees and building facilities) while achieving community benefits. That University has also committed to an campus environmental policy and a health policy (a non-smoking campus!!). While the project is acclaimed as a success, there have been problems. Success of individual efforts depend on the character of individual faculty members, and at the moment there are faculty members who see it as a passing fad. Numbers of students available varies each year so a park project may be put on hold whenever students are not available to participate.

Another tertiary project involves both Brock University (Canada) and local Thai universities in a collaborative project which sees Canadian experience and technology being applied by teams of Canadian and Thai students in Thailand. In the current project, the student teams analyse waste in Bangkok's landfills to determine content, the chemical characteristics of leachate, and potential recycling/re-use opportunities.

A few speakers addressed community learning. In one case study, villagers who were having difficulties with erosion, flooding, scarcity of fish resources etc, visited other villages which had achieved success in the specific problem area. Several factors influenced the success of these type of project. The first village had to recognise there was a problem. Villagers then had to be take responsibility for dealing with the associated issues, and finally, visits to successful villages and subsequent learning had to be carried out in groups. It was found that as the group talked over different viewpoints and acknowledged the common purpose, agreed solutions evolved more easily. The role of the policy person in this instance was more of a midwife, bringing groups together and nurturing each project.

Out of the conference papers it is possible to derive one principle which should underpin all EE:

Improve exchange of information, skills and technologies to improve the capacity of local communities to solve problems using local knowledge and skills.

Communication is most effective when educational institutions and environmental agencies work together to:

continued from page 11

- Ensure that standards and protocols exist to enable transfer of information between databases.
- Develop national databases where issues are of national concern.
- Ensure that information is presented to decision-makers and the community in a useable form (NO JARGON!).
- Develop better monitoring programs to understand the environment and the effects of plans and strategies.

New Zealand seems to be alone in almost excluding consideration of social and economic issues in sustainable management of natural and physical resources. Most speakers in the conference and symposium linked issues of social justice, equity and economic well-being with notions of sustainability

The national level of government in NZ does little to set standards for EE. It does not provide assistance to subnational agencies by developing national databases. At sub-national levels of planning, there are some imaginative landcare, stream care and coast care projects. However, we generally seem to use EE for non-specific environmental issues which are politically sensitive or which cannot be solved over a short period. Both reasons are considered inappropriate in international strategies about EE.

NZ's deficiencies are important because most environmental issues have been delegated to sub-national levels of planning without any generic transfer of funding or delegation of various powers to tax environmental externalities. At a local government level all efforts to undertake long term community environmental projects are hampered by financial restrictions. Yet we don't seem to think about the imaginative solutions developed in Asian and Pacific communities, preferring to think that we have something to teach them.

Jo Rosier, Department of Resource and Environmental Planning, Massey University

Coastal News

Coastline Survey — Beach Hazard Ratings

Dr Patrick Hesp, a coastal geomorphologist in the Geography Programme, School of Global Studies at Massey University is presently conducting research on, and deriving hazard ratings for, 200 New Zealand beaches. This work was initiated by Surf Life Saving NZ (SLSNZ) and is also supported by the Lotteries Board. The hazard ratings are derived using a matrix developed by Associate Professor Andrew Short (Sydney University).

Ratings are obtained by firstly assessing the typical or modal surf zone state or morphology and secondly, the mean wave height. These are combined to obtain a hazard rating for each surfzone - beach system. The rating scale varies from one (very low hazard) to ten (extreme hazard).

Since many beaches vary in their wave energy and morphology seasonally or aperiodically (as storms and calm periods occur), aerial photography has been extensively utilised to obtain an understanding of the longer term variability of each beach. Field surveys are also undertaken.

The research and hazard rating attempts to cover all recreational pursuits on beaches and adjacent rock platforms/cliff areas. It is common, for example, to find dangerous rock fishing sites adjacent to surfzones with high hazard ratings.

continued on page 12

Porpoise bay near Invercargill. The surfzone is characterised by a complex arrangement of transverse bars and rips. The rips (indicated by the dark water without breakers) intensify at low tide and are a dangerous hazard to swimmers.

Castlepoint. This area has a variety of beach-surfzone types ranging from relatively low energy (and low hazard) - the topmost northern beach and the "lagoon" behind the "reef" to high energy (and high hazard) - the foremost beach in the picture. The "lagoon" is deceptive, however, because at high tides and during large swells water surges across the "reef" into the lagoon and forms a high velocity, channelised flow along the eastern margin of the promontory. The "reef" and lower cliffed areas here are also some of the most dangerous fishing spots in NZ.

Coastal News

continued from page 11

The principle aims of the work are to:

- Potentially increase the safety of the public at beaches;
- Provide a more scientific basis for determining beach and surfzone hazards;
- Provide a scientifically based system for education of the public and lifeguards;
- Eventually to provide well researched, scientifically sound, informative guides to the public on NZ beaches, their resources, their hazards, and advice on how to avoid dangerous and hazardous situations.

The work also has relevance to the design and location of beach infrastructure (eg parking, toilets, accessways, Surf Life Saving Clubs) since some of these facilities may have been located in the past at sites which are now regarded as relatively hazardous.

The *Journal of Coastal Conservation* is an International scientific journal for integrated research and management of the coastal zone. It is the official scientific journal of the European Union for Coastal Conservation and is now in its fourth year of publication. Its emphasis is on natural resources and their sustainable use in the context of past and future social and economic developments. The journal covers both natural and human sciences as required for a thorough understanding of the patterns and processes in coastal systems, particularly geomorphology, physical geography, hydrology, soil science, plant and animal ecology, vegetation science, landscape ecology, recreation studies, urban ecology, coastal engineering and planning, and coastal management. Manuscripts on any coastal topic would be welcomed from NZ.

The NZ editor is Dr Patrick Hesp (Geography, Massey University, Private Bag 11222, Palmerston North). Manuscripts may be submitted to him or Dr Ingela Frost, Department of Ecological Botany, Uppsala University, Villavagen 14, S75236 Uppsala, Sweden.

Recent Coastal Consents: Waikato Region

The coast of the Waikato Region is facing considerable development pressure – particularly in the Coromandel Peninsula. The following Coastal Consent proposals are indicative of some of these pressures, the issues they raise and the response of the Regional Council. Thanks to Sherilyn Hinton, Maria Wood and David Pearks for this information.

Marine Farming Applications

Environment Waikato is facing significant demand for the occupation of coastal waters for marine farming in the Firth of Thames – particularly in the Wilson's Bay area, on the West Coast of the Coromandel Peninsula.

During 1997, nine applications totalling 799 hectares were considered by the Regional Council and declined. One of the reasons for declining these applications was the effect that the granting would have on the aquaculture chapter of the Regional Coastal Plan. The decision of Council was subsequently appealed by all of the applicants; the Environment Court has not set a date

to hear these appeals. One application from this group was placed on hold at the request of the applicant; this area totals 54 hectares.

Council received a second group of applications in late 1995/early 1996. This group includes 16 applications and totals 1399.1 hectares. Of this total area, 585.05 hectares is considered to be over existing applications and 814.05 hectares is for areas adjacent to existing applications. All of these applications have been placed on hold pending the provision of further information. However should that information be supplied these applications could not be processed until the Coastal Plan aquaculture chapter has been finalised.

A third group of applications was received in 1998. There are ten applications in this group totalling 636.685 hectares, all of which are over existing applications. All of these applications have been placed on hold with further information being requested. None of these applications could be processed until the previous applications are completed.

At present, the Wilson's Bay area has 293.1 hectares of authorised marine farms, half of which were granted by the Regional Council prior to the Regional Coastal Plan being developed. If the Coastal Plan was completed and it allowed for the operation of marine farms in the Wilson's Bay area, another 1667.05 hectares could be authorised resulting in a total marine farming area of 1960.15 hectares.

Staff are currently drafting a variation to the aquaculture chapter of the Regional Coastal Plan. This will replace the existing objective, policies and methods in the proposed Regional Coastal Plan. This draft is currently being peer reviewed by key parties such as the Ministry of Fisheries, Department of Conservation, iwi, other local authorities, Mussel Industry Council, resource management consultants. It is intended to have the new chapter ready for public release by early September 1998.

Whangamata Marina

The applicant proposed to develop a 205 berth all-tide marina over approximately 4 hectares of inter-tidal mud flat. The proposal involved a total excavation of 125,000 cubic metres for the marina basin, and 53,000 cubic metres for the access channel, with the majority of the excavated material to be disposed of on the adjacent land (including an area of saltmarsh which has already been subject to infilling) to form the base of a car park and amenities for the marina. Twenty three submissions were received in opposition and fifteen in support.

The hearing was held over three days in August 1996. Concerns included effects on the saltmarsh and habitat succession, shellfish beds, bird life, removal of sediment out of the coastal system, change in natural character by development, customary fishing rights, pollution, surface water space, and the NZCPS. The hearing was adjourned to allow for further consultation with iwi. The deliberations resulted in a split decision between the Regional Council Committee and the Minister's (Conservation) representative.

The Committee found the decision difficult but was of the opinion to grant because the site was already modified, the loss of aquatic habitat would be minor in comparison to the harbour as a whole, and mitigation was to be undertaken by enhancing a suitable equal area. The facilities would also help reduce moorings in the harbour and provide improved hardstand and pump-out facilities, for an area that was under increasing demand.

The Minister's representative thought the application should be declined because adverse impacts on shellfish beds (including access to these) and supporting ecosystems was a breach of tikanga Maori and impinged on kaitiakitanga, and customary access. The operations would adversely impact on the relationship between Maori and their culture and traditions with their customary fishing grounds especially in the light of expressed opposition of tangata whenua to the marina proposal. The representative also noted that while the salt marsh area was compromised, enhancement and restoration was possible.

The decision to approve the proposal was appealed by iwi groups, and the Department of Conservation. A number of conditions were also appealed by the applicant, and the golf club. A hearing date was set but not upheld due to the timing of the release of the Waikato Regional Council Proposed Regional Coastal Plan, and a second hearing date has not yet been set. Some of the appeals have been worked through and are likely to be settled out of court.

Ocean Sports Club Proposal: Whitianga

An application was received from the Mercury Bay Ocean Sports Club is to construct and operate a two-storey clubhouse and associated facilities in the coastal marine area adjacent to the southern side of Whitianga Wharf. The building, separate from the wharf sufficiently close at some points to allow access, was intended to incorpo-

Coastal News

Coastal News

rate a meeting/function room, office and radio room and tiled deck on the upper floor – with a meeting/lounge/dining area, kitchen, shop, bar, deck and floating pontoon on the lower floor. The total foot print of the proposed building was approximately 390 square metres (with the decks being additional to this), with floor of the bottom storey approximately half a metre higher than the adjacent wharf decking and the top of the second storey just over 8 metres higher.

Within the prescribed period six hundred and forty one (641) submissions were lodged, 161 in opposition and 480 in support. The application was declined on a number of grounds – including operational difficulties for the wharf owner, adverse impact on natural character, significant cumulative adverse impacts on the amenity values of the area, and lack of an operational need to be located in the coastal marine area (the latter a requirement of the proposed Regional Coastal Plan). However, it was the opinion of the Committee that some services (Harbour-master's office, etc) could be provided on the wharf as long as they were related to the commercial activities of the wharf, were of suitable character and small size. The Committee also recognised the needs of recreational users including the applicant and suggested that the local Community Board may wish to be proactive in helping the applicants identify suitable alternative sites – noting one such possibility in their decision.

The evidence on natural character and amenity values were particularly interesting features of the case. Analysis of the effects of this application on natural character were provided by three experts with striking differences in evidence and conclusions. Overall, the Committee was of the opinion that the proposal would have an adverse impact on the natural character of the area.

Also significant was evidence provided by community members and others arguing a number of adverse effects on amenity values and public access – including use of alcohol in a building adjacent to the wharf (which area is extensively used by the public, including children), loss of a beach area utilised by members of the public, loss of public space to private use, increased noise levels and visual impacts. When considered cumulatively, it was the opinion of the Committee that these would be adverse impacts of significance.

The decision to decline the application has been appealed with a date not yet set for the hearing.

Environmental Performance Indicators for the Marine Environment

It has been a busy six months in the Environmental Performance Indicators (EPI) Programme since the last article in this newsletter.

One question still being asked is "What are environmental performance indicators". The distinction between environmental performance indicators and general environmental indicators or monitoring lies in their policy relevance. Environmental performance indicators are used to measure the effectiveness of our environmental management. The diagram below shows the relationship between indicators and general environmental monitoring.

The Ministry has run a number of workshops over the past four months to progress the development of indicators for marine and coastal issues.

The first of these workshops, in early February, bought participants together from central and local government, environmental interests, science, tangata whenua and industry. One outcome was to merge the fisheries, coasts and estuaries and marine biodiversity components of the programme – providing a more holistic, ecosystems approach to indicator development for the marine environment.

The major topics for discussion during the early workshops were the policy aspects (eg

continued on page 15

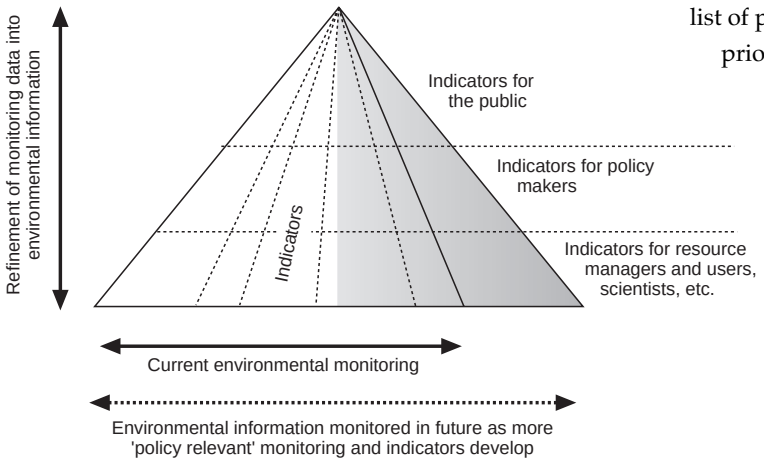
Coastal Zone '99

San Diego, 24-30 July 1999

Coastal Zone conferences are large, with around 1,100 attending the 1997 event. The organisers are hoping for a similar number at the 1999 conference. Given the number of attendees, and the very broad range of topics, there is something for all coastal management practitioners.

The conference organisers are deliberately seeking a more international view of coastal zone management. As such, you are encouraged to submit an abstract no later than 1 August 1998.

Further information can be obtained on the internet at: http://omega.cc.umb.edu/~cz99



The base of the triangle represents the broad base of environmental monitoring information. Wherever possible, indicators will be selected using parameters in the existing information base. However, over time, indicator monitoring will allow us to identify gaps in current information and we will move into the 'shaded' zone, developing new indicators which extend the monitoring base as a whole.

continued from page 14

policy goals) and the indicator development framework. The difficulty of making the leap from existing policy to environmental performance indicators was highlighted, requiring a step between the analysis of policy goals and the development of indicators.

In response to this, the Pressure-State-Response framework was adapted to include a policy/issues based approach to indicator development.

The basic concept of the framework and a simplified example is outlined below.

Participants in the April workshop worked in small groups using the adapted framework to develop a list of priority indicators for the top priority issues. The issues-based approach for developing indicators provided the much needed link between policy and indicators. At the end of the two days all of the groups had developed a list of proposed indicators for the priority issues.

The next stage for indicator development will be to determine how to measure and monitor priority proposed indicators, where, with what and by whom. This will determine those indicators that are ready to go now, and indicators where further development is required before they can be implemented.

An integral aspect of the EPI Programme is the input of the tangata whenua into development of indicators for the marine environment. During the April workshop the Maori participants worked together to develop a model which gives a Maori perspective of environmental monitoring and reporting. Using this model they identified issues for Maori with respect to the marine environment and proposed potential indicators.

The collaboration and communication between all those involved to date has been tremendous and we look forward to wider involvement and feed-back from those involved with our coasts and marine environments as draft indicator documents are circulated in the coming months. Anyone who wishes to receive further information on the indicators for the marine environment please contact:

Megan Linwood, Ph: 04 917 7511, e-mail: megan.linwood@mfe.govt.nz ***or*** *Kirsty Johnston, Ph: 04 917 7471, e-mail: kirsty.johnston@mfe.govt.nz*

Coastal News

Indicator Development Framework

Topic e.g. Natural character, features, landscapes and seascapes
Issue (marine environment issue) e.g. The above continue to be impacted by coastal development and activities
Policy Goals (existing policy and legislation relating to the issue) e.g. Preserve natural character (NZCPS)
Policy Gap (any identified)

Part 1		Pressure	State (condition)	Response
	Identify the 'pressure', 'state' and 'response' components of the issue	e.g. structures litter	e.g. effects all parts of coastal environment	e.g.coastal planning monitoring
	Measures to best represent pressures/ conditions/responses	e.g. inventory of cma structures	e.g. cma structures listing litter monitoring	e.g. areas where development restricted in district and regional plans
	Reasons for choosing above	e.g. measurable	e.g. measurable	e.g. measurable

Part 2	Proposed Indicators	Assessment Criteria				Priority Status of Indicator
		A	B	C	D	(high, medium or low)
	e.g. Inventory of cma structures					
	e.g. Marine debris survey					

A, B, C, D = criteria chosen to assess proposed indicators

The ARC Wave Buoy Project

Coastal News

ARC's long awaited wave buoy has a critical role in assisting the Council to sustainably manage the resources of the coastal marine area. Its main purpose is to collect long term information on the wave processes which operate in the Hauraki Gulf, and to allow the development of a "wave climate" for the east coast of the Auckland region.

This "climate" will allow the ARC, local authorities and members of the public to make better management decisions based on an improved knowledge of the frequency of storm waves, those parts of the coast which are most susceptible to certain events, and the engineering implications of better wave information for foreshore management works. The collection of wave data using wave buoys is now a standard technique for the management of coastal areas throughout the world.

After arriving in December from the Netherlands, the buoy was delivered to Auckland University's Leigh Marine Lab in January and installed at a site near the Mokohinau Islands. This remote location allows the collection of information before waves are modified by local islands. The buoy was successfully deployed on 20 February, and is expected to be located on site for at least the next five years (see the article on page 8).

Data from the buoy is telemetered from the buoy back to the Marine Lab at Leigh, and then on to the ARC. Once collected, it is analysed to reveal patterns in wave height and other important characteristics. Below is some data collected from the buoy immediately during and after a storm event early in May 1998. Figure 1 illustrates wave height (as maximum wave height, H1/10, significant wave height, H1/3, and average wave height.

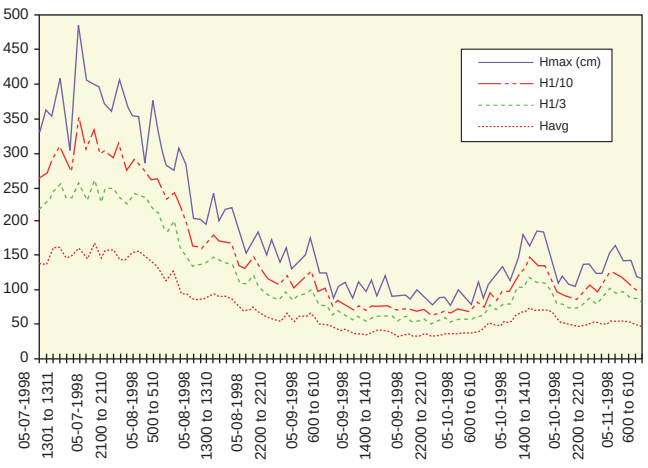


Figure 1: Wave Heights 7 - 10 May 1998

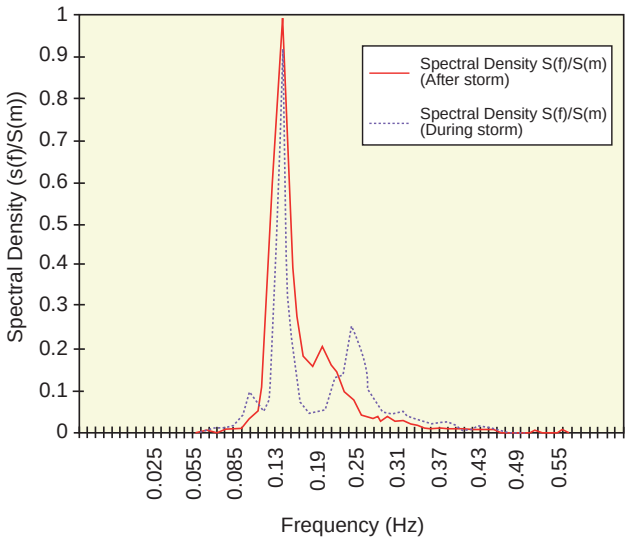


Figure 2: Spectral Densities during and after storm of 7-8 May 1998

Figure 2 illustrates spectral data from two 10 minutes periods - one during the same storm, and one immediately after. The graph illustrates that wave energy at both times is concentrated in the 0.13Hz frequency (7.7 seconds), with a lesser peak during the storm at 0.25Hz (4 seconds).

Data from the wave buoy will be collected to form a long term "climate" of wave data for the east coast of the Auckland region. The longer time over which the data is collected, the better picture will be able to be gained of the annual and longer term cycles in wave characteristics which affect the Hauraki Gulf. The data will be used to drive computer models of nearshore coastal processes at those locations which are affected by deep water waves.

This programme will be complemented by a shallow water wave strategy. This strategy will allow the determination of wave climate in those areas which are not affected by deep water waves. In these areas, wave hindcasting techniques will be used to reconstruct wave climates based on the generation of modelled wind fields.

Each month, the data will be summarised, and at the end of each year an annual report will be produced. Summary information from the buoy will also be placed onto the ARC internet site in the near future.

For further information on the wave buoy, contact Harvey Brookes, (09) 366 2000 ext 8190