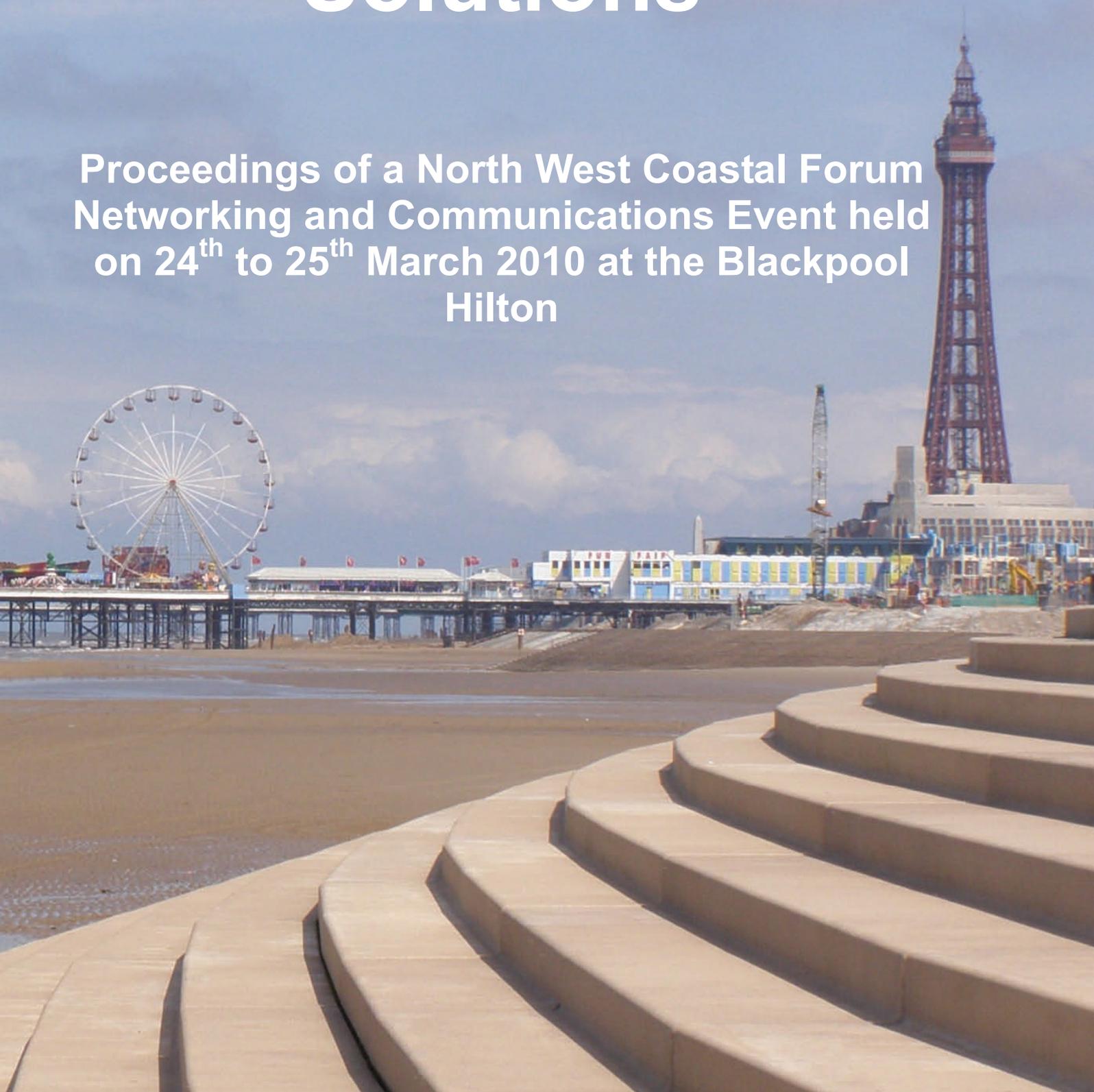


Coastal Engineering Solutions

Proceedings of a North West Coastal Forum
Networking and Communications Event held
on 24th to 25th March 2010 at the Blackpool
Hilton



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Introduction

This report summarises the presentations at the Coastal Engineering Solutions event which took place in Blackpool in March 2010.

Coastal change constantly challenges us to come up with new, innovative, affordable solutions to managing our coastline. Nationally, Government policy is shifting focus from defending at all costs to an approach focusing on defending only where need can be justified.

This event was designed to explore the social, economic and environmental benefits that good schemes can bring, both during construction and in the long-term, for example use of local labour and increased tourism. This was illustrated by good practice case studies of both hard and soft coastal engineering from the North West and elsewhere. The programme also included a look at how coastal management decisions can be aided by development of a strong evidence base and the interface between coastline management and planning. The conference took place in Blackpool over two days, 24-25 March 2010, with a variety of presentations culminating in a site visit to Cleveleys.

The aims were to:

- Highlight the wider opportunities offered by good coastal engineering projects and practice
- Showcase North West examples of innovative coastal defence projects

It brought together key decision making politicians, officers and individuals from across the UK, as well all those with an interest in coastal engineering, regeneration, planning and management of the coast.

The conference was organised by the North West Coastal Forum, supported by the North West & North Wales Coastal Group and Birse Coastal.

The North West Coastal Forum is a not-for-profit regional partnership bringing together stakeholders from the public, private and voluntary sectors working together to promote and deliver integrated coastal zone management in the North West to secure the long term sustainability of the region's coastal zone. For more information on the Forum, please visit www.nwcoastalforum.co.uk

Social and Economic Benefits of Coastal Regeneration

Philip Wright
MD of Birse Coastal

Introduction

This presentation highlighted the social and economic benefits arising from three coast protection and regeneration schemes on the Lancashire coast, spanning from procurement and construction through to longer term benefits to the local area and economy.

The three schemes were chosen as they are geographically close to each other, they were all constructed to some extent concurrently between 2005 and 2010, they were all carried out by the same contractor (Birse Coastal), and they shared much of the same local supply chain. The impacts on the local area were therefore significant. The three schemes were:

- Blackpool Central Area Coast Protection Scheme (Blackpool Borough Council)
- Cleveleys Coast Protection Scheme Phases 2, 3 and 4 (Wyre Borough Council)
- Morecambe Coastal Protection Phases 6 and 7 (Lancaster City Council)

Purpose of the Construction Schemes

The purpose of the schemes was to provide coast protection, flood alleviation, and regeneration and improvement of the local area.

1. Coast protection was required because the existing structures were approximately 100 years old, and in a state of some dilapidation. Erosion naturally occurs on this coastline, so a failure of coastal structures would allow this erosion to continue. The hinterland is urbanised, with housing, hotels, roads, tramway, utilities and other infrastructure at risk.
2. Flooding has occurred regularly along this coastline. With predicted sea level rises flooding was expected to increase in severity and regularity, making flood alleviation a high priority.
3. In common with most traditional seaside resorts, Blackpool, Cleveleys and Morecambe have diminished as holiday destinations over many years, resulting in economic and social decline. Regeneration and improvement is a key strategy in the economic development of the local area.

These criteria can often be conflicting, for example the requirement for a robust sea defence may conflict with the requirement for easy access to the beach for tourists and aesthetically pleasing structures. The schemes were designed to balance these three criteria as far as possible, by taking into account the views of all stakeholders.

Scheme Outline

The schemes cover approximately 6 kilometres of coastline, have a combined value over £100 million, and involve the following principal quantities:

700,000t	Fill Material
280,000t	Rock Structures
95,000t	Beach Recharge
10,500t	Sheet Piles
89,000m ³	<i>in situ</i> concrete
10,000	precast units (100,000 tonnes)
110,000m ²	paved areas

Benefits gained during Construction

- Creating direct employment - 1.9 million man-hours worked on site
- Supporting local businesses, e.g. quarries, concrete suppliers, haulage, plant hire
- A new business started up to supply precast concrete to the schemes, with a factory built on derelict land
- 81% of materials, plant hire and labour were sourced locally
- Positive recognition and publicity (which encourages further investment)
- Community engagement

Long Term Benefits

- 13,000 properties and £1.5 billion of assets protected from flooding
- Local skills improved through training and development (the projects achieved National Skills Academy for Construction status)
- Training included NVQ levels 2 – 4, CPCS and CSCS accreditation, summer and year-out students, sponsorship and day release, science and engineering ambassadors, ICE and RICS training schemes, Blackpool Council and local college ‘sure start’ programme
- Precast factory set up for the schemes continues as a local business providing employment
- Environmental improvements – a good place to live and work
- Increased tourism

An economic study was carried out at Cleveleys, which represents approximately £20 million of the overall investment. This study showed that 208 new jobs had been created, together with an increase in the local economy of £5 million per annum.

In summary, the benefits gained from these schemes are an excellent example of what can be achieved through investment in coastal regeneration, particularly when combined with capital schemes for coast protection and flood alleviation.

Pevensey Bay Sea Defences PFI: Best Practise in the provision of sea defence services

**Ian Thomas, Project Manager,
Pevensey Coast Defence Ltd,**

The Problem

Pevensey Bay's Sea Defences consist of a naturally formed shingle bank, supported by a dilapidated timber groyne field, extending for 9km between Eastbourne and Bexhill in East Sussex. Natural erosion and a lack of maintenance investment had resulted in the embankment becoming dangerously narrow in some places. A permanent breach in the shingle bank would result in

a 50km² area behind the defences flooding at high tide, affecting over 6000 properties, local infrastructure and the Pevensey Levels, a Ramsar protected wetland. By 1997, the erosion was so bad that it was believed that a storm with a return period of 1 in 20 years could breach the defences.

In the late 90s, the Environment Agency, who have responsibility for flood defence, investigated the use of Private Finance Initiative (PFI) as a way of delivering better value for money for procurement of services. PFI is a Government initiative designed to increase private sector involvement in public service delivery, however it differs from privatisation and contracting out in that the private sector are typically responsible for all design, construction and financing. The advantages of PFI are that delivery is often quicker, risks are shared, there are no spending constraints, shareholders are investing and there is a great opportunity for innovation.

PFIs are generally used to deliver solid structures like buildings, roads and bridges with easily predictable maintenance costs, a certainty that doesn't exist with a shingle embankment that is subject to tidal attack and is materially changed twice every day. However, despite these challenges, Pevensey Coastal Defence Ltd (PCDL), a special purpose company set up by shareholders, won the bid and a contract was awarded in April 2000.

The contract defined the service to be provided as protection against flooding from a breach of the defences for all storms of up to a 1 in 400 year event. A breach capable of withstanding such an event was defined, specifying minimum embankment widths and allowable volumes. A key aspect of PFIs is that risk is carried by the party best able to manage them. At Pevensey, these fall into 3 categories: Contractor, PCDL (design, materials, operational costs), Client, EA (instructions, law, outside work impacts) and Shared (obtaining approvals, replacement of shingle for events greater than 1:50).

Management Strategy

As contractor, PCDL were required to improve and maintain the shingle embankment. In June 2000, PCDL inherited a foreshore with 150 groynes in place, nearing the end of their useful life. Rather than improve or replace them, which would have added significant cost, the overall strategy became one of maintaining shingle supply and managing it as it's driven east by wave action. Concentrating on aggregate supply and allowing much of it to move with coastal processes means that down drift beaches benefit too and therefore the long term strategy was to return the area to an open beach.

The strategy involved initially improving the defences to withstand a 1:400 storm, and then maintaining them to that standard. This involved importing 200,000m³ of shingle and building some new structures. Inappropriate property development over the years meant that it was impractical to do away with all the groynes, however the discontinuities in beach alignment can be maintained by maintaining about 6 of the original timber groynes. A variety of methods are used to maintain the frontage, including bulldozers, trucks moving shingle from areas of accretion to depleted sectors and mechanical bypassing of shingle round Sovereign Harbour marina. However, given that there is a net loss of 20,000m³ annually, the most important task is beach recharge, using sea dredged aggregate.

Project delivery & innovation

The main part of project delivery has involved the adaptation of a split-bottom barge into a trailing suction hopper dredger with a shallow draft (3.6m) and a modified rainbowing technique. The shallow draft allows the dredger to operate in previously impossible inshore areas and the modified rainbowing protects shore properties and ensures a discharge mound high up the beach, minimising tidal losses. This strategy has many advantages: a single vessel reduces costs and minimizes impact on local commercial fishing; recovery can be achieved using a single bulldozer rather than several machines as used to be the case, reducing costs and noise pollution, benefiting the public.

The deposition mounds formed using this method have also been found to produce a more natural segregation of material, reducing 'cliffing'. Cliffing is a common problem in newly replenished beaches, caused by high sand content in the formed crest, resulting in an increased rate of loss of defence when under wave attack. However, because the material falls from the nozzle by gravity alone, the mound tends to have a sand fringe with a coarse core, allowing for relatively simple selective recovery.

Other points of innovation have included the installation of scrap tyres into the non-active beach and the use of plastic in groynes. Used tyres are crushed into bales and linked to form in-beach structures that act as a backstop against breaching in storms, with recovered shingle being used elsewhere on the beach. They were installed in 2002 and are continually monitored for leachates. The Pevensey team has also experimented with groyne

components made from recycled plastic, as opposed to the normal tropical hardwoods. Given that groynes are expected to last for at least 25 years it will be some time before any benefits from these experiments are realised and although the results may be of no direct benefit at Pevensey, PCDL and the Agency are keen to help advance our knowledge base in these areas.

Having the same management regime for 25 years provides an excellent opportunity for research into coastal process and as a result PDCL have partnered with several universities, as well as an Interreg III C project, 'Beaches at Risk' and Defra's 'Beach Permeability' study.

Lessons Learnt

As the local communities are the real end client, from the beginning it was decided that involvement at all stages was not only key, but could also be considered to be part of the service requirement. As sea levels continue to rise, this engagement will ensure that everyone is involved in decision making. It has been important that adequate key indicators have been developed and are linked with regular and detailed monitoring of the defence structure, allowing the maintenance strategy to evolve positively. Long term partnering has also been a major benefit to the project, allowing continuity and the development of trust between parties, which has been extremely helpful in project deliver

All involved in the Pevensey PFI scheme agree it has been successful, and a series of national awards stand testament to the fact that it has been a team effort throughout. It is equally important that lessons learnt and what can be demonstrated as improved best practice are taken forward and used to derive a more unified approach to future coastal management.

Hesketh Outmarsh West Managed Realignment

Dave Ranson
Environment Agency

A partnership project between the Environment Agency, RSPB, Lancaster City Council and Natural England, this is one of the largest managed realignment schemes in Europe and recreates 168 hectares of saltmarsh on land formally drained and farmed intensively for arable crops. The site is located 7km west of Preston on the south bank of the Ribble estuary SPA at SD 414 252. This project reinstates natural tidal inundation to a large area of land adjacent to the Ribble estuary forming a natural

saltmarsh sea defence between high tides and the new refurbished sea defence embankment 1km inland.

The newly created saltmarsh contributes significantly to the UK Biodiversity Action plan targets for habitat creation and will be an RSPB reserve. This provides a new recreational and educational asset to the local community and to wildlife enthusiasts in the NW.

By working in partnership both tidal flood defence and conservation benefits have been achieved at the same site; material for the refurbished flood embankment and new cross defence embankment came from the excavation of a former creek network and new saline lagoons which help form the new saltmarsh nature reserve. This prevented the need for 6600 vehicle movements of imported spoil through neighbouring villages, reducing the carbon footprint and environmental impact of the scheme.

Project planning began in October 2003, with habitat creation works carried out during 2007 following site purchase and planning permission. Initial breach works to the outer flood embankment were completed on 16th September 2008, with the 4th and final breach being completed in February 2009. Total cost of the project £2.3million shared between partner organisations.

The refurbished sea defence embankment and new cross defence embankment are seeded with a species rich grassland mix suitable for coastal conditions. In addition to the 168ha of saltmarsh habitat created a further 3ha of wetland habitat has been created adjacent to the new reserve in partnership with Natural England. This includes new freshwater ponds and wetland scrapes to provide natural flood storage capacity in the adjacent watercourse Hundred End Gutter. This project creates 168ha of new saltmarsh and mudflat habitat adjacent to the Ribble estuary, reclaiming land that was previously saltmarsh. This is a huge contribution to the UK BAP target for intertidal habitat creation and is vitally needed to reverse the decline of this habitat as the UK currently loses 40ha of saltmarsh and mudflat each year.

The scheme reinstates natural tidal inundation and estuary processes on the Ribble estuary by creating four 100m breaches in a now redundant flood embankment so that high tides

can flow inland, recreating natural creek networks and saline lagoons and allowing saltmarsh vegetation to colonise the entire site. This is an environmentally sustainable approach to flood risk management, multi benefit project which is cost effective as it achieves the same level of protection to the public as a traditional flood defence scheme but with the added benefits to biodiversity and effective adaptation to climate change and sea level rise.

The success of managed realignment at this site can be used as a flagship example to encourage further managed realignment schemes around the Ribble estuary and other estuary systems in the UK.

Project Team

Clients: Environment Agency/RSPB/Lancaster City Council/Natural England.

Designer: Halcrow Group (through planning stage) and Environment Agency Asset Systems Management (final design and construction phase).

Main Contractor: Environment Agency Operations Delivery.

Sub Contractor (New Tidal Outfall): Askams Construction.

The TERN Project - 10 Years On

Jim Trotman
Tourism Manager,
Lancaster City Council

The problem:

Morecambe grew from the 1850s with the coming of the railways. Much Victorian infrastructure has been inherited but changing markets over the years meant that visitor figures were down to 1.3 million by 1990. Much of this was also low spend, elderly and repeat visitors. The faded infrastructure and old marketing message was attracting fewer visitors in the face of international competition.

Coastal flooding up until 1990 was also a problem. February 1990 was the last time that the sea broke through Marine Road. In the early 1990s Morecambe was awarded an initial grant of £20million from Central Government for coastal defence – the first investment in Morecambe in years. In the past the town had found that nobody will invest if there is flooding and the prospect of coastal erosion.

So what was the best way to improve the shoreline? Build concrete walls or raise the seafront to protect against flooding? Raise the shoreline with beaches as a bonus and have acres of concrete and tarmac? Neither – the TERN Project was launched to enhance the coastal defences and regeneration.

The aims of Morecambe's coastal regeneration included:

- Enhanced coastal protection
- Creation of a new central area for the town
- A new image for Morecambe
- Attracting enhanced visitor numbers and spending

Achieving these would make Morecambe a nice place in which to live, work and to visit.

History of TERN

The TERN steering group was established in 1991 to work with engineers, planners and tourism managers. The TERN project started in 1992 with funds from the Arts Council of England, Lancaster City Council, Wm. Morrisons Supermarket, Lancashire County Council and Lancashire Tourism SRB, plus some other private donations.



The TERN project is linked to the 1993 Touche Ross (NW Coastal Resorts) report, which stated that the birds of the bay were our 'Unique Selling Point', so it was decided to create art to celebrate the importance of the bay for wildlife.

Alteration of Morecambe's image was vital. Artists included Gordon Young, David Kemp, Russell Coleman and Brian Fell. Publicity pictures showed a changing destination and attracted a lot of interest, including from people who had written off Morecambe in the past. Significant moments:

- 1995 - Lord Gowrie open the extended Stone Jetty and the first phase of TERN. More than 100,000 visitors came into the Morecambe Tourist Information Centre (TIC) for the first time.
- 1999 - the Queen open the second phase of TERN and the Eric Morecambe statue. More than 200,000 visitors came into the TIC.

The statue of Eric Morecambe was commissioned because of his role as President Elect of the RSPB and therefore part of TERN and not because of his act. It was funded through public subscription and Arts Council funding at a cost of approximately £140,000 but has generated around £500,000 in publicity through BBC and ITV News and a total of five TV programmes. The statue is now shown on the BBC North West opening titles.

Results from TERN

In 2004 a TERN Evaluation study was produced for the North West Tourist Board. It concluded:

- Year on year there have been 50-100% more visits due to the regeneration programme, including TERN.
- TERN has been directly responsible for an additional 27,000 day visits and 11,000 visitor nights per year.
- Additional annual visits due to TERN and new destination marketing were worth £837,500 (2004).
- TERN enhanced the quality of the built environment and gave Morecambe a distinctive character.
- It added to local pride and identity and reduced vandalism
- The local community has been involved in public art and employment for local artists and professionals has been created
- Additional tourism and inward investment has been attracted.

Table 1: Total Visitor enquiries to the Visitor Information Centre:

Year	Number of visitor enquiries	Comments
1994	73,529	very wet weather
1995	119,946	first phase of TERN opens
1996	109,565	fine summer weather
1997	96,398	
1998	144,334	
1999	253,675	second phase of TERN unveiled - sunny summer
2000	268,815	very wet summer
2001	224,486	Foot and Mouth Disease and poor summer
2002	178,378	

As a result of the coastal defence works, investment was able to start on the landward side of the promenade, concentrating on the centre, including the market, The Platform Arts Venue, supermarket, cinema, restaurants, children’s play areas, Tourist Information Centre, Midland Hotel and there is still more to come.

The TERN project has provided a new identity for Morecambe – one that is not in competition to Blackpool. Work with the RSPB has boosted visits in the spring and autumn shoulder seasons. Examination of markets has led to concentration on young families and 50+ age group, with children’s play areas linked to TERN and aimed at Junior school age groups. The project is fully accessible.

Visitor numbers in 1990 were 1.3 million. By 2008 they were up to 2.5 million with a value of £113 million. By 2004, there had been investment of over £50 million on coastal protection, DLG and the central area regeneration, which by now is nearer to £80 million. TERN itself cost £2.2 million.

There is still work to be done: Interpretation still needs to be enhanced, possibly as part of a larger Morecambe Bay project.

Conclusion

“If you build it they will come!”

Weston-super-Mare Seafront Enhancements

Rachel Lewis
Regeneration Manager, North
Somerset Council

Weston-super-Mare began to develop as a seaside resort in the early part of the 1800's with the coming of the railway and the opening of seawater baths (formative health spas). In the 1870's the towns Commissioners invested the large sum of £27,000 in Seafront Improvements, building over a mile of sea wall and promenade. This sum was quickly recouped through the increase in business rates

generated by the new and expanded hotels and other visitor related business. The town thrived as a tourist resort until the rise in popularity of cheap foreign holidays in the 1970's. Since then, like many other seaside towns the area has declined, suffering from lack of investment in both the private and public realm.

The town has also suffered from significant floods, most notably in 1903, 1981, 1990 and 1996, which has caused extensive damage to quite large areas of the seafront and town centre. There are calculated to be 4500 properties at risk of flooding including 78 residential basements and 637 businesses. The Victorian sea wall provides just a 1:7 year standard of defence. The predicted sea level rise and increased storminess will further increase the risks.

The town has a beautiful setting, with extensive views across the Severn Estuary taking in Steep Holm and Flat Holm islands and the coasts of South Wales, Somerset and north Devon, and is backed by wooded hillsides. The Estuary is of international environmental importance, designated as SPA, SAC, Ramsar, SSSI. There are extensive archaeological sites including Roman villas demonstrating that the area has been inhabited for many thousands of years. The seafront is now all within a built Conservation Area and contains a number of listed buildings ranging from seafront shelters to the Grand Pier.

North Somerset Council has sought to put together a comprehensive set of proposals to not only protect the town from flooding but also to provide upgrading and enhancement of the public realm. This it is anticipated will be followed by investment in surrounding private businesses and be a major driving force in the regeneration of the town.

Grant funding has been secured from;

- o **Defra, Flood Defence Grant in Aid.** £28m has been granted to provide flood defences along 2.4km of coast fronting the town. This grant was awarded in 2007, when special mention was made in the allocation letter from Defra stating that the bid “demonstrates a joined up approach from government by allowing the Council to make use of regeneration funds which might otherwise be lost”.
- o **South West Regional Development Agency, Civic Pride Initiative.** This has provided £11m to be spent on public realm enhancements across 6 sites including over £4m on the

seafront. It has enabled areas to be pedestrianised and good quality signage, paving and other street furniture to be provided.

- o **SeaChange.** £860k was secured from CABI's initiative for seaside towns and will provide 7 major new pieces of public art, commissioned from internationally renowned artists and located on and adjacent to the seafront. These projects have been brought together under the title of Seafront Enhancements.

Smaller amounts of grant were also secured from the Local Transport Plan, Wessex Regional Flood Defence Committee and the Grand Pier Limited.

The project began on the ground in 2007 and will be complete later this year in 2010. It covers 2.4km of seafront and has included the strengthening and repair of the Victorian sea wall and a 1930's causeway impounding a marine lake and the construction of a 'splash wall' between the promenade and the seafront road. The splash wall is clad in a mixture of reclaimed and locally sourced stone and has 10 flood gates at strategic points to allow pedestrian access, these are clad with timber or artist designed stainless steel panels. John Maine RA, a sculptor and stone expert has assisted us with the design and specification of paving, seating, wall and gate cladding and has designed an amazing 7m high stone arch.

Access has been improved with the replacement of various sets of steps with ramps, and better provision for cyclists and bus users. The street lights have been replaced with modern energy efficient low maintenance ones, new improved signage, recycling and rubbish bins installed.

The public art works are being installed over the coming few months and it is hoped that the project will be complete by the early autumn.

The need for the flood defences provided the catalyst for the wider project and assisted the Council in bringing together a wide range of interests. We believe that we have demonstrated economic and social best value through this comprehensive approach. Please come and visit and see for yourselves!

Coastal Change on the Sefton Coast

Graham Lymbery
Technical Services Contract
Leader, Sefton Council

Introduction

The Sefton Coast is comprised of soft and granular deposits of sand, silt, clay and peat, with the coastline forming a wide arc of sand with a hindshore of sand dunes, extending 34km from Crosby to Southport. The dunes, beaches and marshes are one of the most important areas of nature conservation in Europe, with the coastline containing 20% of England's sand dunes and

supporting internationally important animals and plants, such as the natterjack toad and sand lizard. Therefore the coast is protected by numerous designations such as site of special scientific interest (SSSI), special protected area (SPA) and special area of conservation, as well as several local and national nature reserves. The Sefton Coast is also an important visitor destination, for its bathing beaches, open country side and the resort town of Southport, and with all residents within 12km of the coast, coastal defence is a high priority.

Coastal change, specifically physical and human use changes as a result of natural, societal or climate shifts, is occurring continuously in Sefton, and always will. Evidence of this change can be seen all along the coast, from Formby point where prehistoric footprints can be found exposed on the beach and remains of a caravan park and lifeboat station all washed away by the sea in the past are found, to the reclaimed land at both Southport and Crosby which has now been developed into highly desirable leisure and recreational amenities. The extent of these changes not only shows how in the past we have adapted to this change, but also highlights the need to continue to adapt to change, to not compromise the needs of future generation's use of the coast.

Climate change and the Sefton Coast

There is mounting evidence that human activities, not just natural factors, are a major cause of climate change. We are currently locked into a period of change over the next 30-40 years as a result of past emissions of green house gases. These gases remain in our atmosphere for long periods of time and have the ability to influence our climate into the future. In Sefton we are likely to see over the next 50-100 years:

- A rise in maximum summer temperatures by 2-4 °C
- The warmest day of the year to rise by 4 °C
- Increased occurrence of "mini heat waves"
- Summer rainfall may decrease by on average 11%
- Winter rainfall may increase on average by 20%
- Extreme storms may be more frequent and intense with rainfall events in excess of 150-200mm in one day leading to increased flooding events

- Sea levels may rise by 38-45cm

These potential threats are likely to alter our coast dramatically in both a positive and negative way. As we are aware that these changes will occur in the future it is important that we do something about it now, in the form of adaptation and mitigation, to reduce the impacts, enhance the opportunities and reduce the causes of coastal change (partly as a result of climate change).

Adaptation is a solution to reduce the impacts and encompass opportunities to our changing climate to enable us to protect society from the forces of nature.

Mitigation is about reducing the sources and enhancing the sinks of green house gasses to protect nature from society.

Adaptation projects on the Sefton Coast

There are currently a number of projects underway on the Sefton coast specifically looking at the issue of coastal change and climate change. These projects are:

- **IMCORE (Innovative Management of Europe's changing Coastal Resources)** is a European funded project through Interreg IVB. A key aspect of this project is the development of a Coastal Adaptation Strategy in response to coastal change as a result of climate change. There are three strands of work: research to improve our understanding of future scenarios, working with stakeholders to develop the strategy and capacity building amongst stakeholders to improve understanding of coastal change and its implications. Given that school children and young people are seen as key future stakeholders the capacity building will have an education strand.
- **Defra Pathfinder Project**– Sefton is one of 15 local authorities selected to explore new approaches to planning for, and managing adaptation to, coastal change together with their communities. In Sefton this work will focus on Formby Point, given its rapidly changing nature with rates of erosion up to 4 metres per year and will include examining parking issues at the coast, development of a strategy for dune slacks, construction of boardwalks, creation of dune slacks, appointment of a Community Outreach Officer and specific engagement with schools and other key communities on the coast.
- **Lifeboat Road sand dune management project** - Sefton's Coastal Defence team secured funding from the Environment Agency to undertake a Lifeboat Road sand dune management project as part of providing evidence to of adaptation options for sand dunes to feed into the coastal adaptation strategy. The project seeks to quantify the effectiveness of sand dune management techniques for slowing down the rate of erosion and encouraging accretion in order to inform the assessment of adaptation

options for the sand dune system. There will be a two year programme of sand dune management works over a 2.6km length of the coast in order to test the effectiveness of the methods.

- **Community engagement on adaptation to coastal change**

Funding has been secured through Natural England to undertake a cohesive engagement facilitated through the Sefton Coast Partnership around coastal adaptation. Part one of the funding will be completed by October 2010 and will:

- assess the needs of the partnership for engagement at a generic coast wide and site specific level
- take forward a coast-wide community engagement plan on coastal adaptation to ensure key messages of coastal adaptation are delivered by all partners,
- provide training for partners on community engagement
- develop evaluations of the community engagement process on coastal adaptation across the coast by partners.

Subject to funding, part 2 will support partners with the delivery of the coastal adaptation communications plan and provide support to partners on specific projects relating to coastal adaptation.

Conwy Tidal Flood Risk Study and Flood Risk Awareness

Dyfed Rowlands
Environment Manager
Conwy County Borough Council

Conwy Tidal Flood Risk Study

The Conwy Tidal Flood Risk Study was commissioned by Conwy County Borough Council in order to produce a robust scientific appraisal of the probability of flooding from tidal inundation.

A steering and technical group was set up with Environment Agency Wales, Welsh Development Agency (now Welsh Assembly Government), HR Wallingford and Conwy County Borough Council's Environment and Planning Departments as partners.

The study looked at all coastal defences within the county and then a more detailed assessment was carried out for Llandudno (North and West shores), Penrhyn Bay & Rhos-on-Sea and Pensarn to Kinmel Bay.

Stage 1 of the study involved:

- Inspection of existing data
- Updating of defence data
- Examination of historical flooding
- Wave and water level conditions
- Overtopping and breach prediction for each defence

Stage 2 of the study looked in detail at the flood risk in the Llandudno and Pensarn to Kinmel Bay areas and included:

- Defence overtopping and breaching
- Improving existing hinterland topographic data using:
 - NEXT Map Digital Terrain Model - +/- 1m accuracy
 - Manhole cover levels provided by Welsh Water
 - Topographical surveys – Including LiDAR data from EA Wales
- Inundation modelling
- Production of Flood Maps to correspond to TAN15 planning guidance

The model for Pensarn to Kinmel Bay was calibrated using information from the Towyn 1990 flood.

TAN15 was introduced in July 2004 while the study was in progress. Development Advice Maps were produced as part of TAN15 which categorised flood risk into 4 zones:

- Zone A – Little or no risk of fluvial or coastal flooding
- Zone B – Areas known to have flooded in the past evidenced by sedimentary deposits

- Zone C1 – High risk of flooding (within an area protected by defences)
- Zone C2 – High risk of flooding (where no defences are in place)

Within zones C1 and C2 development would be dependant on a Flood Consequences Assessment being carried out and accepted.

A comparison of the Development Advice Maps and the Conwy Tidal Flood Risk Study Maps shows that, although most of Llandudno would be unsuitable for development according to DAM, the more detailed study identifies areas which would be suitable under the TAN15 guidance.

TAN15 gave little advice regarding potential climate change:

“It should be recognised however that while sea level rise and climate change could have a significant impact on flooding consequences for existing flood zones, current information suggest that the actual extent of such areas at risk are not expected to increase significantly.”

TAN 15 Development and Flood Risk, July 2004, page 31

Having witnessed frequent overtopping of Old Colwyn promenade and high tide levels near the top of the quay wall in Conwy we wanted a more scientific appraisal of the effects of climate change, given that by 2108 sea levels are expected to rise by nearly a meter.

The study considers mean sea level rise and changes in wave storminess (height and period). It assumes that defences are maintained to their current geometry and condition, however, the annual probability of failure increases due to the additional loading.

Both the Llandudno and the Pensarn to Kinmel Bay Climate Change Maps show a significant increase in the area at high risk of flooding in 50 years time.

Flood Risk Awareness

The Environment Strategy for Wales 2006 provides the new challenges to “Move away from traditional flood defence approach and focus on managing the risks and consequences of flooding and coastal erosion.”

To assist in achieving this change of approach we have started a Flood Risk Awareness Campaign. We have held roadshows in Towyn & Kinmel Bay and Llandudno and will be incorporating the campaign into our Community Environment Days throughout 2010/11.

We are also in the early stages of producing a School Awareness Campaign in partnership with:

- Environment Agency Wales

- Welsh Water
- National Flood Forum
- Institution of Civil Engineers
- Construction Skills

The Next Steps

We are in the process of developing a website for public access to the Conwy Tidal Flood Risk Study. We plan to review and update the study every 5 years and the detailed models which are now available can be used to explore the impact of climate change, alteration of defences or changes in topography.

We also hope to produce flood maps for other areas of our coastline.

Our Flood Risk Awareness Campaign will continue to inform the public about the dangers of flooding in their area and we intend to work in partnership to deliver the Welsh Assembly Government's key message to our schools.

Coastal Management and Adaptation in North Norfolk

Peter Frew, Head of Coastal Strategy, North Norfolk District Council

Background

In late 2004 North Norfolk District Council published the draft Kelling to Lowestoft Shoreline Management Plan. On much of the frontage it was proposed to change from a policy of defence to one of retreat or doing nothing. While in many respects this move reflected the reality that the North Norfolk has been eroding for thousands of years,

nevertheless it was not a change the Council and its communities found acceptable without some recognition of the consequences and help in dealing with them.

These changes were necessary for two prime reasons: coastal processes and a reflection of the reality that renewal of the defences could not be justified in the simple economic terms used by Government. This latter had been the case for many years and led to an under-investment in the existing defences.

The council embarked on a period of political lobbying. However it accepted that a) the coast was going to change and b) that any change of approach by Government would not happen overnight. It therefore took two significant steps. Firstly it allocated additional funds to give some of its weakest defences an additional 10 years of life. An additional £2 million was made available through its maintenance budget over 10 years starting in 2006. The purpose was to 'buy time' while discussions with Central Government proceeded. Secondly it embodied the SMP erosion risk predictions in its Local Development Framework Core Strategy alongside policies to facilitate rollback. A Development Guide was also prepared to support the LDF. Much of the thinking behind new PPS 25 supplement emanated from these NNDC documents.

One outcome of the lobbying was the announcement of a Coastal Change (formerly Adaptation) Fund. This was followed in 2009 by the publication of a draft Coastal Change Policy and an invitation to bid for funds to trial various approaches to coastal change. North Norfolk District Council submitted a bid with a programme of measures and was successful in securing £3 million to trial a number of projects.

NNDC Pathfinder Programme Summary

Project Outline

The projects will include the following although changes may be made as projects develop:

- Ensuring that investment is maintained in businesses that are vital to coastal communities:
 - by providing bespoke advice to businesses affected by coastal change;

- raising the awareness of business advisors (as well as commercial lenders (including banks)) so that they will be better able to assist with businesses experiencing the impacts or uncertainties associated with coastal change;
 - finding a way to assist with the relocation of caravan parks and other businesses, where necessary, in order to maintain the vital contribution they make to the local economy.
- Ensuring that vulnerable infrastructure is retained/ replaced: for example the cliff top footpath at Cromer's western end, the Pilgrim Shelter (village hall) at Trimingham and the Coast Guard Hut at Happisburgh together with car parks, footpaths, beach accesses and other facilities as appropriate.
- Securing maintenance of 'blighted' properties so that they do not prematurely fall into decline but continue to make a valuable contribution to the viability of the local community and that the owners have freedom to determine their own futures in the same way as those in inland settlements:
 - through the development and implementation of 'purchase and lease-back' options which secure investment and maintenance whilst properties remain useable.
- Improving the coastal and cliff top environment, especially where coastal erosion has caused dereliction.
- Ensuring that actions are joined up so that changes in coastal defences are not made before measures to mitigate the impacts are completed.
- Helping the community of Happisburgh understand, record and manage the impacts of coastal change on their heritage and providing interpretation of the natural and built environment, as well as celebrating Happisburgh's future.

Partnership and Support

Support for North Norfolk District Council's Pathfinder project ideas has come from a wide range of organisations, including many coastal parish councils as well as national agencies. In addition to expressions of support, many organisations also offered to become partners in developing and implementing projects, with some able to offer resources. We are confident that the projects we are developing are oriented towards meeting local needs, because of the work we have previously done with communities. Success, however, will be dependent on a high level of local support and we therefore have to continue to involve local people in the development and implementation of projects. This programme aims to establish ways in which the needs of local communities can be met, not for any solutions to

be imposed; the objectives and measures of success must come from those who are likely to be affected by the outcome of the projects.

Communication and community involvement

As the title suggests this Pathfinder project is experimental and there will be varying degrees of success in the achievement of its stated objectives. However, almost regardless of the substantive outcomes of the various projects, the key measures of success will depend upon:

- The extent to which the projects match the expectations of local people;
- The degree to which those with a legitimate stake in the outcome of the projects feel they are being meaningfully involved in their implementation;
- Maintaining open and accountable decision making;
- The extent to which people consider they are kept informed.

The Pathfinder programme's success will therefore depend upon local 'ownership' of the project's outcomes. Therefore there needs to be a continuing process of community involvement throughout.

Project management

The Coastal Management Board will act as the Pathfinder Project Board. It will be augmented by the chairman of the North Norfolk Community Partnership and the chairman of the Business Forum as well as other key staff as appropriate. Details of the way in which the multiple elements of the Pathfinder programme are to be implemented are yet to be worked out.

North West Regional Monitoring Programme

Paul Wisse
Senior Officer – Coastal Defence, Sefton MBC

The North West coastline

The North West coast is a very varied and complex area including natural habitats, urban communities, industrial areas and associated infrastructure. These landscapes benefit from protection by the coastline, however, the levels of protection vary across the coast and through time. Coastal protection decisions are

made based on the risk of flooding and consequence of flooding. It is essential that these decisions are based on the best possible information and as such appropriate monitoring is important.

Historic data collection

Historically, a wide variety of coastal data has been collected in the North West, with some dating back to the early 1900's. Unfortunately due to the methods of collection and management, much of this historic data has little use for comparison with recent data sets and, as such, a new improved system of data collection and management needed to be developed.

Programme background and aims

The North West England and North Wales Coastal Group (NWNWCG), a partnership of maritime authorities in the North West, national agencies and other relevant parties, provides sound evidence to support the coordinated delivery of sustainable coastal defence management across the North West. The group's responsibility extends for more than 700km from the Great Orme's Head on the North Welsh coast to the Scottish border in the Solway Estuary.

This group took forward recommendations from the first round of Shoreline Management Plans and has established a regional programme of coastal monitoring. The specific aims of the programme are detailed in Box 1.

Box 1.

The key aims of the North West programme are to:

- deliver consistent, repeatable and cost effective monitoring
- provide a robust evidence base
- to support sustainable decision making in Flood and Coast Erosion Risk Management for shoreline management plans, strategies and schemes.
- develop collaboration between local authorities
- improve the local skills base
- provide the necessary data sets to inform national initiatives

Programme design

The programme is designed around a risk based model, which places monitoring emphasis on areas at a higher risk of flooding or erosion than those at a lower risk. This current programme runs for three years (2008-2011), receives 100% grant aid from the Environment Agency and feeds into the national programme for coastal monitoring. The NWNWCG oversee the programme as the steering group and nominated Sefton MBC to coordinate the delivery of the programme and act as the accountable body.

Sefton MBC is a central data hub for the North West, exchanging data with all the partners. It also provides quality controlled data sets for dissemination on the National Coastal Monitoring data web portal at www.channelcoast.org.

Data collection

The data collection can broadly be split into two categories: firstly the forcing factors, the elements that bring energy into the system and drive coastal change, and secondly the response of the coast to these forces (Table 1).

Table 1: Data collection elements

Forcing Factors	Coastal Response
Wind	Topographic Surveys
Waves	Beach profiles
Tides	Lidar
Currents	Bathymetry
Storm events	Habitat extents
	Defence Inspections
	Aerial photography
	Sediment samples
	Post storm surveys

Data analysis, management and reporting

An equally important element of the programme is the data management, analysis and reporting. There is little point in collecting data if it isn't properly checked, referenced using metadata and made available for use. Standardised techniques and templates for analysis and reporting have been and continue to be developed and implemented to produce comparable reports across the region.

Research links

The programme is designed to get best value from the data collected and supports research in the region. Examples of the research taking place includes:

Local authority research:

- Sefton MBC dune toe position analysis and interpretation

Local authority in collaboration:

- Wyre BC and Lancaster university in the Use of ARGUS video system
- Lancaster City Council and British Space Agency using satellite data to monitor Morecambe Bay.

External agencies:

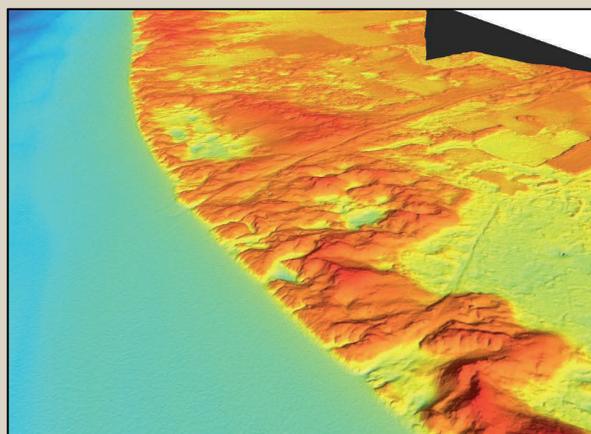
- Proudman Oceanographic Laboratory modelling sediment dispersion in Liverpool Bay.
- Proudman Oceanographic Laboratory using radar systems for monitoring waves and currents.

Future of the programme

In order to continue the collection of these data sets a national network of monitoring programmes has been established to develop a coordinated programme of monitoring for England. A collective application for grant aid is being made to deliver a 5 year programme 2011-2016 by this national network. Securing funding will enable to monitoring to continue and further improve the understanding of the coast in the North West and around England.



Beach topographic survey undertaken atv mounted GNSS



Lidar of Sefton Coast Dunes system



Blackpool © North West and north Wales Coastal Group 2010



Heysham port/ferry terminal © North West and north Wales Coastal Group 2010

The Irish Sea Observatory

M.J. Howarth
National Oceanographic
Centre

Introduction

A pre-operational Coastal Observatory has been functioning since August 2002 in Liverpool Bay, Irish Sea. Its rationale is to develop the science underpinning the ecosystem based approach to marine management, including distinguishing between natural and man-made variability, with particular emphasis on eutrophication, factors

impacting on shoreline management and predicting possible responses of a coastal sea to climate change. The Irish Sea is very extensively used both commercially and for recreation. Liverpool Bay has strong tidal mixing, receives fresh water principally from the Dee, Mersey and Ribble estuaries, each with different catchment influences, and has enhanced levels of nutrients. Horizontal and vertical density gradients are variable both in space and time. The water column stratifies intermittently. The challenge is to understand and model accurately this variable region which is turbulent, turbid, receives enhanced nutrients and is productive.

The Observatory, with emphasis on physical and chemical / biological variables, has three components, for each of which the goal is at least some (near) real time operation – measurements; coupled 3-D hydrodynamic, wave and ecological numerical models; a data management and web-based data delivery system, see <http://cobs.pol.ac.uk>.

Measurements

The integrated measurements are designed as a whole to test numerical models and have as a major objective obtaining multi-year records, covering tidal, event (storm / calm / bloom), seasonal and interannual time scales. The four main strands, each on different complementary space or time scales are, Figure 1:

a) In situ and shore-based fixed point time series. These include tide gauges, a meteorological station on Hilbre Island at the mouth of the river Dee, two in situ sites, one by the Mersey Bar, measuring waves

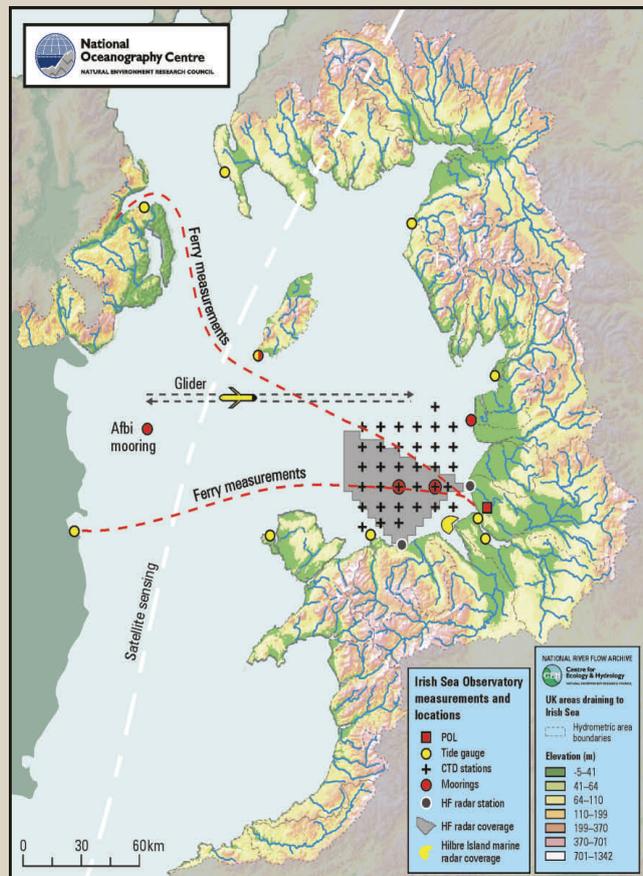


Figure 1. Scheme of measurements

and the vertical structure of current, temperature and salinity, along with a surface CEFAS SmartBuoy whose measurements include nutrients. In addition river flows are gauged by the UK Environment Agency.

b) Regular (eight or nine times per year) spatial water column surveys on a 9 km grid as part of cruises on RV Prince Madog, a coastal research vessel, to service the two in situ sites. The cruises have attracted significant extra interest including making increased measurements of nutrients, pCO₂, pH and total alkalinity, grab sampling, swath-bathymetry, microbial degradation measurements, and twice yearly benthic biological sampling at the two in situ sites.

c) Shore-based phased array HF radar for surface currents and waves in 105 cells on a 4 km grid.

d) An instrumented ferry on the Birkenhead to Dublin route, crossing there and back in a day. The measurements, with an along track resolution of 100 m, include sea surface temperature, conductivity, fluorescence and turbidity. Dissolved oxygen is also measured on the ferry and at the surface and bed at the Mersey Bar site (seen as another avenue for estimating productivity). It is planned to instrument a second ferry, on the Birkenhead to Belfast route.

These measurements are supplemented by weekly composite (because of cloud cover) satellite images of sea surface temperature, suspended sediment and chlorophyll, which has excellent horizontal resolution for surface properties, but poor temporal coverage. In addition an underwater glider with a duration of 20 to 30 days is being deployed.

Numerical modelling

A suite of coupled 3-D hydrodynamic, wave and ecological models forced by forecast meteorology is being developed. The model domains are nested from a 12 km grid for the ocean / shelf domain, to 7 km for the north-west European continental shelf, to 1.8 km for the Irish Sea, finally to 180 m for Liverpool Bay. Seeking to make realistic real time forecasts for comparison with measurements is difficult since the forecast will only be as good as the forcing data, for instance meteorological inputs from numerical models should be on a spatial scale comparable with the oceanographic models'. Also river flow data need to be in real time (climatological mean data are not good enough, especially for local models).

The measurements and model results are displayed on the web site (<http://cobs.pol.ac.uk>), from where they can also be downloaded. Access to the data is free – the largest groups of users are the public, researchers and education. We are seeking to establish better links particularly with local authorities and central government but also with commercial users to improve applicability and usage. The data are banked with the British Oceanographic Data

Centre.

Results

The measurements of winds, waves, currents and temperatures, some now lasting longer than 7 years, show a variety of time scales. Temperatures, for instance measured at the main site by the Mersey Bar, are strongly seasonal, with about 95% of the variance in an annual cycle. Winds, measured on a tower on Hilbre Island, and waves, measured by a directional wave buoy at the Mersey Bar site, show seasonal variability – stronger between September and March. The strongest winds blow predominantly from directions between south-west and north-west, although the wind also blows from the south-east for a significant proportion of the time. The maximum 10 minute averaged wind speed recorded since April 2004 is 31.4 m s^{-1} . Waves are locally generated within the Irish Sea; the largest come from the west and north-west, corresponding to the stronger winds and longer fetches. The largest significant wave height recorded at the Mersey Bar since November 2002 is 5.4 m and the associated period is 8 s. The time scales for currents, measured both by an Acoustic Doppler Current Profiler at the Mersey Bar site and by the HF radar system, are semi-diurnal tidal (96% of the variance) and hence also fortnightly spring / neap. At the Mersey Bar site the maximum near surface current since August 2002 is 1.17 m s^{-1} but current amplitudes increase towards Anglesey, in line with tidal currents. The long term average currents are directed shoreward near the bed and northward near the surface. Salinity, which has a strong influence on density and stratification, has much less well defined time scales – the annual cycle is small and there appear to be longer period variations for which a seven year record is too short to determine with any confidence. Salinity also responds on shorter time scales to events, such as brief high river discharges.

Conclusions

The Liverpool Bay Coastal Observatory is unique, bringing together measurements on a wide range of space and time scales with a comprehensive modelling suite and a data management and web-based data delivery system. After seven years the main scientific challenges remain both to understand the processes and to translate this understanding into predictive models whose accuracy has been quantified. The challenges relate to the physical environment (salinity, circulation in Liverpool Bay, the flow through the Irish Sea, flushing events); the role of sediments in the optical characteristics of the water column; the ecosystem and eutrophication. Only once these building blocks are in place will prediction of possible impacts of climate change be feasible. In the next few years the Observatory will seek to expand collaboratively to encompass the whole Irish Sea, both because of imminent UK and EU legislation but also because the Irish Sea is a better defined oceanographic entity which embraces a wider variety of ecohydrodynamic regimes and is an excellent test bed for any continental shelf sea.

Coastal Monitoring – National Developments

Alison Baptiste, National Coastal Manager, Environment Agency

Introduction

The coast is a dynamic and exciting place that engenders strong feelings in all those that live, work and play there. It's a complex environment and our decisions can have lasting impacts spanning hundreds of years so it's important that those of us who manage the coast seek to understand it and work together to ensure that the legacy we leave for future generations is a good one. The

regular tide and off-shore currents cause changes to the coast over time, with sediments eroding and accreting over time. Historically, coastal data collection was done to support an individual defence scheme. It was often carried out in an ad hoc manner with short term horizons. Data records were not always kept and proper data management principles not applied.

Why is monitoring important?

Coastal monitoring is the evidence base for many flood and coastal erosion risk management decisions. It highlights where beaches are eroding and accreting and therefore how they should be managed for best effect and for best value for money. Specifically, it provides information to support:

- Strategic decisions – providing evidence to support policy development such as Shoreline Management Plans and other strategic coastal management plans
- Investment decisions – where / when to invest, both for capital and maintenance works such as beach recharge / recycling
- Habitats decisions – identifying sites for habitat creation, and providing data for reporting to EU

Accurate and repeatable maritime and coastal data is essential for timely and informed decision making on the coast. Strategic planning documents, such as Shoreline Management Plans (SMPs), depend on reliable historic data as well as up-to-date information. To understand the impacts of climate change and sea level rise, long-term monitoring of the coast is essential. To assess and evaluate the need to maintain and/or improve sea defences, build new ones or allow nature to take its course, authorities need access to reliable good quality coastal data. Most importantly, the monitoring of forcing factors (such as waves) and system responses (such as beach behaviour) should allow for creating a causality link that advances understanding and allows for better 'prediction'.

How it started

Anglian Region began a strategic approach to coastal monitoring in 1991, then in 2002 a

coastal monitoring programme was developed in south east. Having seen the benefits derived from the Anglian and South East Programmes, other Regional coastal monitoring programmes developed around the English coast and there are now six: north east, east riding, Anglian, south east, south west and north west. The Welsh Assembly Government has recently committed initial funding for establishment of a Wales Coastal Monitoring Centre to coordinate monitoring activities across Wales.

Through the existing strategic region-wide monitoring programmes, it has become clear that strategies to direct investment and inform planning decisions would benefit from a more coordinated programme of coastal data gathering for England. A consistent coastal monitoring network is, for the first time, now being developed to cover the English coast with prioritisation for dynamic areas.

A national network

The proposed network seeks to implement a network of strategic regional coastal monitoring programmes for England. The intention is for the programme to be managed in regional coastal cells, with an overarching central coordination to ensure greater consistency with regard to funding arrangements, data collection, outputs and benefits. The regional programmes will retain accountability for delivery, but the national network steering group will have an overseeing governance of national programme taking account of local and national drivers and also encourage and steer delivery of the programme to optimise efficiencies and consistency.

The national network will start in 2011, but already there are a number of short-term gains arising from the collaborative approach. Improved quality of data and cost savings are being gained through collaborative working and data sharing between organisations involved in managing the coast. Existing programmes across the country have demonstrated reduced procurement costs and economies of scale. They have also identified external organisations willing to contribute to the programme such as National Trust, Maritime and Coastguard Agency.

Benefits

Long-term monitoring programmes measuring asset performance reduce the likelihood of over or under engineered projects and the associated additional costs. Post-storm beach surveys and access to wave data and predictive models enable the risks of breaching or over-topping to be quantified. When historic and contemporary coastal monitoring data are combined, it is possible to generate trends reports, which highlight changes in the coast over a period of time. Knowledge of what has happened in the past provides an excellent indicator as to what may happen in the future.

There are opportunities to extend the monitoring to include more habitat monitoring or asset surveys and the national network provides the forum for exploring these new opportunities.

Speakers

Philip Wright

Managing Director, Birse Coastal

Managing Director of Birse Coastal, Phil is responsible for the company's many coast protection and coastal flood alleviation schemes around the country. From a civil engineering background, Phil has been involved in the management and construction of a wide variety of schemes in different sectors of the construction industry before moving into coastal work some 10 years ago. He brings a practical approach, based on site experience, coupled with an overview of coastal work from inception to completion.



Ian Thomas

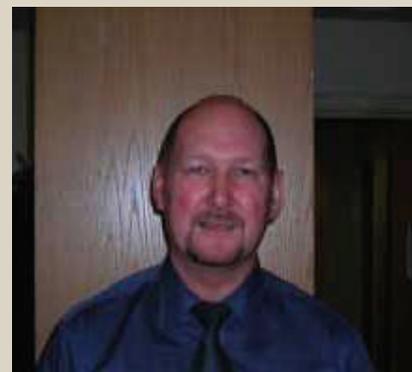
Project Manager, Pevensey Coastal Defences Ltd.

Graduating from the University of Newcastle-upon-Tyne in 1978, Ian has worked in a variety of roles across the broad spectrum of mainstream Civil Engineering. Initially in Contracting, before 14 years spent within the Consulting field, primarily as part of a team representing the client on major construction sites. Almost 7 of these years were spent in the Middle East (Kuwait & Qatar). Caught up in the 1990 Iraqi invasion of Kuwait, he escaped across the desert to Saudi Arabia, returning to the UK to work on major Highways Agency schemes in Kent & East Sussex. During 1998 he project managed a GIS Road Traffic study in Qatar. Since returning to the UK in 1999 he has spent ten years as Project Manager of the 25 year Pevensey Bay Sea Defense PPP scheme.

Dave Ranson

Asset Systems Management Team Leader, Environment Agency

Has worked for the Environment Agency and its predecessor bodies for 37 years, starting his career with Lancashire River Authority in 1973. His primary experience is in Land Drainage, Flood Defence and Flood Risk Management and he has been involved in the successful delivery of numerous major Sea Defence and River Improvement schemes and projects around the North West region. dave.ranson@environment-agency.gov.uk





Jim Trotman

Principle Tourism Officer, Lancashire County Council

Jim Trotman spent the first ten years of his career in education, teaching Geography and History, lecturing, researching and getting involved in education administration at Cleveland County Council. After completing his masters degree in Canada, Jim stayed on to work for Environment Canada and then his introduction to tourism came from working in the national parks service, Parks Canada, for five years. On returning to England in 1987, he worked for the heart of England Tourist Board for two years before heading back north to start working for Lancaster City Council as Senior Tourism Officer in Morecambe. Subsequently, Jim became the Tourism Manager for Lancaster City Council and has so enjoyed the challenges, and beauty of the area, that he has stayed there for a total of 20 years. He plans to stay in the area even after taking early retirement this year.

Rachel Lewis

Regeneration Manager, North Somerset Council

Rachel is the Regeneration Manager at North Somerset Council, focussing on Weston-super-Mare. She has worked for North Somerset Council for the past 9 years and has spent much of the last 7 years developing, securing funding and coordinating the implementation of the Seafront Enhancement project. Prior to that she worked for local authorities in Telford, Torbay and Essex on a wide range of environmental management projects.



Graham Lymbery

Technical Services, Sefton Council

Graham is a graduate from Liverpool University where he studied Civil Engineering; since graduating he has worked for Sefton Council and is now the Project Leader for Coastal Defence. He also Chairs the North West and North Wales Coastal Group and the North West Coastal Forum.

As well as being involved in the development of the Shoreline Management Plans, Graham is currently involved in the development of a Coastal Adaptation (to climate change) Plan for Sefton and research in to the management of sand dunes.

Peter Frew

Head of Coastal Strategy, North Norfolk District Council

Peter is currently the Head of Coastal Strategy at North Norfolk District Council. He is a Member of the Institution of Civil Engineers.

Following over 15 years reclaiming derelict land with various county councils, Peter joined North Norfolk District Council (NNDC) in 1992 as Engineering Manager. He has held a variety of posts with the Council before taking up his present appointment in 2006. He has retained responsibility for the management of the Council's 34 km of coast protection frontage throughout the many changes but now has the additional responsibility of developing a Coastal Management Plan in response to the reaction to the Shoreline Management Plan.



With such a long frontage on an eroding and flood prone coast it is inevitable that NNDC has a significant role nationally and regionally. He was a member of the national steering group for the pilots for second round of SMPs. Currently he is the Local Government representative on the Defra Adaptation Project Board, and Chairman of the East Anglia Coastal Group.



Paul Wisse

Technical Services, Sefton Council

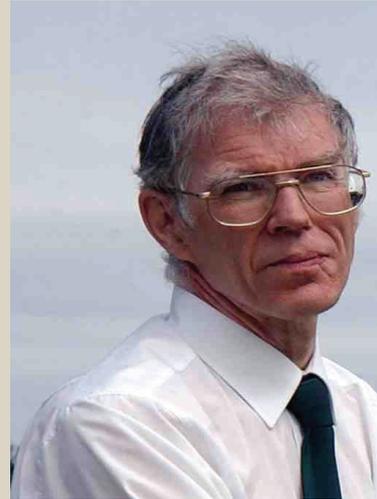
Paul trained as a Marine Biologist in Newcastle and, after failing to get a permanent job looking at tropical reefs, did a Masters in Ecology and Environmental Management at Liverpool. Paul started working on the coast in Sefton in 1999 and after being involved with the planning department and European projects he finally ended up with the coastal defence section. For his sins he now coordinates the North West Regional Monitoring

Programme. Not content with looking at the sea all day he also enjoys exploring under the water whilst scuba diving, though the warm, clear tropical waters are generally preferable to those of North West England.

John Howarth

Leader of Coastal Observatory Programme, National Oceanographic Centre mjh@pol.ac.uk

John studied mathematics at University College, London, graduating in 1969. He then joined the Institute of Coastal Oceanography and Tides at Bidston Observatory, a Natural Environment Research Council research establishment, and has continued to work there through various name changes (it is presently the National Oceanographic Centre), and one site move - onto the Liverpool University campus. He studies the dynamics of tidally dominated continental shelf seas, including their response to meteorological and density forcing, on all scales from turbulence upwards. He has concentrated on obtaining, analysing and interpreting measurements and on their synthesis with theory and numerical models.



Alison Baptiste

National Coastal Policy Manager, Environment Agency

Alison's career started overseas in Nepal and Indonesia where she worked with Tear Fund and Mott MacDonald on water supply and irrigation. She returned to UK and worked with Binnie, Black & Veatch before joining the Environment Agency. She started in capital programme management then went on to lead the flood risk management & navigation teams across Hampshire, Sussex & Kent.

Alison is now applying that practical experience in her current Policy role where she leads the National Coastal team delivering a strategic role within the Environment Agency across England and Wales which is shifting the focus to put people and the environment at the centre of flood and coastal risk management.

Coastal Engineering Solutions

Programme

Wednesday 24th March

Conference Chair: Graham Lymbery, Sefton Council
Chair of the North West Coastal Forum and the North West and North Wales
Coastal Group

13:30 **Registration**

14:00 **Introduction and welcome**
Graham Lymbery, Conference Chair

Session 1: Good Practice in Procurement and Construction

14:05 **Social and Economic Benefits During Procurement and
Construction: Lancashire Coastal Schemes 2006 – 2010**
Phil Wright, Director, Birse Coastal

14:25 **Pevensey Bay Sea Defenses PPP: Evolution of Best Practice in
provision of Sea Defense Services**
Ian Thomas, PCDL Project Manager

14:45 **Hesketh Outmarsh West Managed Realignment Scheme**
Dave Ranson and Robert Ide, Environment Agency

15:00 **Questions**

15:20 **Refreshments and networking opportunity**

Session 2: Regeneration Benefits of Well-designed Coastal Engineering Works

15:50 **The Tern Project – 10 years On**
Jim Trotman, Tourism Manager, Lancaster City Council

16:10 **Weston-super-Mare Coastal Seafront Enhancements**
Rachel Lewis, Regeneration Manager, North Somerset Council

16:30 **Questions**

16:45 ***Summing up – Conference Chair***

17:00 ***Day 1 conference close and opportunity for resident delegates to
network***

Thursday 25th March

**Conference Chair: Alison Baptiste, Environment Agency
National Coastal Policy Manager**

09:30 Registration

10:00 Introduction and welcome
Alison Baptiste, Conference Chair

Session 3: Development and Coastal Change

10:05 Adaptation to Coastal Change
Graham Lymbery, Technical Services Contract Leader, Sefton Council

10:25 Conwy Tidal Flood Risk Study and Flood Risk Awareness
Dyfed Rowlands, Environmental Strategy Manager, Conwy County Council

10:45 Coastal Management and Adaptation in North Norfolk
Peter Frew, Head of Coastal Strategy, North Norfolk District Council

11:05 Questions

11:20 Refreshments and networking opportunity

Session 4: Developing a Robust Evidence Base

11:40 The North West Regional Monitoring project
Paul Wisse, Technical Services, Sefton Council

12:00 The Irish Sea Observatory
John Howarth, Leader of Coastal Observatory, Proudman Oceanographic Laboratory

12:20 Developments at National Level
Alison Baptiste, National Coastal Policy Manager, Environment Agency

12:40 Questions

13:55 Summing up – Conference Chair

13:10 Lunch

13:45 Board coach for site visit to Cleveleys (pre-registered delegates only)

16:00 Return to Blackpool Hilton and Conference Close