

South West Coastal Change Conference 2019

Meeting Summary (December 2019)

Managing Our Coast in a Changing Climate

As we approach the end of another decade there are finally a few encouraging signs that when it comes to carbon emissions, we might just be beginning to get our act together. Although the saga of Brexit continues to dominate domestically, the issue of climate change has undoubtedly risen up both the political and news agendas to the extent that we might be approaching some sort of critical tipping point in terms of public and political recognition of the scale of the problem we are facing and the urgency with which we need to do something about the amount of carbon we pump into our atmosphere.

This is good news, but it is only half the story. What we are still a long way from recognising or really fully accepting, let alone sufficiently planning for, is the impact of the carbon that we have already released and will continue to release over the coming decades. Nowhere will this impact be greater felt than on our coasts, and in our coastal communities, as a result of the inexorable and significant rise in sea-level and increased levels of storminess that *will* occur by the end of the century even if we reduce our carbon emissions to zero by tomorrow.

Organised and hosted by the Devon Maritime Forum in partnership with the University of Plymouth and Royal HaskoningDHV, the South West Coastal Change Conference 2019 aimed to challenge this collective denial or indifference and to wake us up to the urgency and gravity of the situation we are facing.

A diverse range of coastal scientists, community groups, artists, engineers, planners and policy makers convened at Plymouth University's Marine Station on the shores of the Sound to think differently about the how, when, where, who, and why of managing our coast in a changing climate.

Session 1 - The Urgency of the Problem

Following an introductory presentation from Prof. Maltby, the conference began with some stark warnings and blunt messages about the urgency of the situation, the potential scale of the problem and our current unpreparedness.

The Climate Emergency

Doug Eltham, from the Devon Climate Emergency Response Group, set the scene by placing coastal change in the broader context of the current climate emergency, and the steps Devon is taking to reduce its carbon emissions. While the main focus of the day was on managing and mitigating the impacts of climate change driven coastal change that is already 'locked-in' on account of our historic carbon emissions, the key to successfully managing and mitigating the impacts of coastal change in the longer-term is, of course, to take a more proactive approach and radically reduce the amount of carbon we release into the atmosphere.

After revealing the primary sources of Devon's carbon emissions, (for which the top four were On-Road Transportation 28%, Residential Buildings 19%, Commercial/Institutional Facilities 18%, and the Agriculture 16%), and suggesting that national policy would be wholly inadequate to meet Devon's stated Net Zero target,

Doug introduced Devon's Net Zero Task Force, and outlined the process by which Devon would develop a Carbon Plan to identify how, where and by when Devon could achieve carbon neutrality.

Doug Eltham (Devon Climate Emergency) '[The Climate Emergency: Devon's Response](#)'

Sea-level Rise

The quicker we can reduce our carbon emissions to net zero, not just in Devon of course, but globally, the greater the scope we have for limiting long-term sea-level rise and the scale and rapidity of coastal change. However, reducing global carbon emissions to net zero by tomorrow, will not stop sea-level rise. Sea-level has risen and will continue to rise for some time as a consequence of the carbon we have already released into the atmosphere. Explaining why, where, and by how much was Dr. Matt Palmer the Met Office's Sea-level and Ocean Climate lead.

Dr. Palmer began by explaining the different mechanisms (e.g. thermal expansion, glacial melt) through which climate change leads to mean global sea-level rise and how local/regional factors can exacerbate or mitigate the impact on specific coastal areas. As such, he went on to explain, projections of mean sea-level rise around the UK vary considerably by geographic location. They also vary substantially by climate change scenario. By 2100 under a low emissions scenario, for example, the average sea-level rise for the UK is 0.4m, while under a high emissions scenario 0.7m. By 2300 this increases to 0.9m and 2.2m respectively. Dr Palmer also suggested that mean sea-level change of greater than 1m could have a substantial impact on tidal amplitude and other tidal characteristics.

Dr. Matt Palmer (Sea-level and Ocean Climate Lead, Met Office) '[UK CP18 – Marine Projections](#)'

Some Blunt Messages

Today, 520,000 properties (including 370,000 homes) have a 0.5% or greater annual risk of damage from coastal flooding and 8,900 properties are located in areas at risk from coastal erosion. At a 0.1% risk of coastal flooding are 450,000 homes, 530km of railway line (including 80 railway stations), 7,500+ km of roads, 205,00 hectares of high-grade agricultural land, and 110,000 hectares of SSSIs. Moreover, an additional 8,900 properties are located in areas at risk of coastal erosion, and while this figure is significantly less than for coastal flooding the impact is usually irreversible and the loss complete. However, we will almost certainly have to adapt to at least 1m of sea-level rise in the future and this coupled with an increase in population, could potentially see the number of people who have a 0.5% or greater annual risk of damage from coastal flooding reach 3.7 million. Such alarming figures suggest why, according to the UK Government's Climate Change Risk Assessment Report 2017, coastal change remains one of the key climate change risks facing England.

These stark messages were delivered by Dr. Andrew Russell from the Committee on Climate Change, who suggested that current flood and coastal risk management governance structures and mitigation and adaption policies could not be relied upon to deliver effective coastal management and minimise the coastal impacts of climate change. Dr. Russell focused on Shoreline Management Plans, criticising them for being non-statutory and containing unfunded proposals, and suggested that implementing the SMPs would cost £24-41 billion depending on the scale of climate change and that for 149-185 km of coastline it would not be cost beneficial to protect or adapt as currently planned. Concluding, Dr Russell made a number of key recommendations: **firstly**, that the scale and implications of future coastal change should be acknowledged by those with responsibility for the coast and communicated to people who live on the coast; **secondly**, that local government and the Environment Agency need to be enabled by national government to deliver a long-term and appropriately resourced approach to engaging affected communities and stakeholders; **thirdly**, that government should make available long-term funding/investment to deliver a wider set of adaptation actions; and **fourthly**, that plans to manage and adapt specific shorelines over the coming century should be realistic and sustainable in economic, social and environmental terms.

Dr. Andrew Russell (Committee on Climate Change) '[Managing the Coast in a Changing Climate](#)'

Session II – Beyond Hold the Line

The key messages from Session I were that significant sea-level rise is coming and that we are not going to be able to 'hold the line' and rely on hard, engineered defences everywhere we thought we could or planned we would. For significant stretches of coastline, such an approach is not realistic or sustainable in the long-term either economically or environmentally. But what are the challenges, options, and opportunities associated with implementing a different approach to coastal management, an approach that seeks to work with nature and not against it? What are the implications of thinking beyond 'hold the line' – Session II sought some answers.

Managed Realignment

The session's first speaker was Dr. Luciana Esteves, a world leading expert in the concept and practice of 'managed realignment' from Bournemouth University. Dr. Esteves began her presentation by defining what is meant by 'managed realignment' (MR). She suggested that there had been an inconsistent and sometimes confusing number of different terms used to describe the deliberate process of realigning river/estuary and/or coastal defences, and that some of these like 'roll-back' and 'managed retreat' suffered from overly 'negative' connotations that had impeded their development. Preferring the more positive term 'managed realignment', Dr. Esteves argued it offered a more sustainable approach to coastal erosion and flood risk management by benefiting from the natural adaptive capacity of coastlines to respond more dynamically to environmental change.

Giving numerous examples from around Europe, Dr Esteves explained, that managed realignment was an umbrella term used to describe a range of different schemes which included: i.) the removal, breach or realignment of existing defences; ii.) controlled tidal restoration (either through regulated tidal exchange, or controlled reduced tide); and iii.) managed retreat, which involved the relocation of structures and people at risk to areas of lower risk. Despite these numerous examples of successful managed realignment schemes, to be an effective long-term solution to the issue of climate change and sea-level rise, managed realignment needs to be significantly upscaled. Currently, however, there are a number of factors limiting the implementation of MR, including: the absence of long-term planning, the availability of land, a lack of evidence presented as to the multiple benefits of MR at an individual project level, and issues associated with public perception and the engagement of local stakeholders.

To conclude, Dr. Esteves argued that managed retreat must be included in all long-term plans of areas at high risk of coastal flooding and erosion. This can only be achieved, she argued, with education (perception and behavioural change); long-term planning (political will); and a paradigm shift, whereby our default response is to work with natural processes and not against them.

Dr. Luciana Esteves (Bournemouth University) ['Dynamic Coasts: Realities of Managed Realignment Now and in the Future'](#)

Innovative Approaches – The Sand Engine

Picking up on many of the issues identified by the Dr. Esteves, Dr. Dave Watkins (Cornwall Council) and Reinier Zoutenbier (Royal HaskoningDHV) introduced the Sand Engine as an innovative approach to coastal management. The Sand Engine, Reinier explained, is a form of large-scale beach nourishment, which aims to use large sediment volumes to influence coastal processes so that sediment loss is reduced. It allows natural coastal processes to continue and to spread sediment to where it is needed, maintaining beaches and generating wider benefits in addition to a reduced risk of flooding and erosion.

The Sand Engine as an innovative approach to coastal management has its origins in the Netherlands but Dr. Watkins explained how the method was being modelled and trialled in Mounts Bay in Cornwall. In comparison to traditional 'hard' solutions, the Sand Engine, Dr Watkins suggested, offered a number of key advantages: reduced capital costs over the lifetime of the scheme; harnessing natural processes to sustainably manage the frontage; flexible - opportunities for further adaptation in the future if necessary; increased amenity benefits; and aesthetically in keeping with the place-making objectives of the area, although, having recognised these benefits, as a new approach, there remained a degree of uncertainty over the potential long-term environmental impacts of such schemes.

Dr. Dave Watkins (Cornwall Council) and Reinier Zoutenbier (Royal HaskoningDHV) ['Working with Natural Processes at the Coast... in Cornwall'](#)

New Policy Imperatives

Old habits die hard. Tried and tested ways of doing things persist because, they are, well, tried and tested. Adopting a new way of thinking and doing, a paradigm shift, involves creativity, courage, and risk, but for real change to 'mainstream' it also requires policy change. Picking up on this issue Justin Ridgewell from the Environment Agency explored the new imperatives that are shaping new policy directions for Flood and Coastal Erosion Risk Management (FCERM)

Justin identified three new imperatives driving FCERM in new directions: Firstly, addressing the ecological emergency – delivering 'net gain' – halting biodiversity decline and restoring and enhancing habitats and ecology; secondly, addressing the climate emergency – reducing emissions and working toward carbon neutrality; and thirdly, adapting to the risks associated with climate change. These new imperatives require a new way of thinking and doing FCERM, an approach based on natural processes, adaptation and resilience built around nature-based solutions and low-carbon strategies and technologies. The implications for the existing SMP policies of 'Advance the Line', 'Hold the Line', 'Managed Retreat' and 'No Active Intervention', and the relative weight given to each of these, Justin suggests, are very significant, with, increasingly, the latter two coming to the fore.

Justin Ridgewell (Environment Agency) ['Nature Based Solutions: New imperatives for coastal risk management and the implications for SMP policy and designated sites'](#)

Greening the Grey

Thinking beyond 'hold the line', and doing FCERM differently, of course does not mean that in some locations 'hold the line' is not the best and most appropriate policy and approach. In some locations concrete has been and will continue to be the go-to solution for coastal management. Such an approach, while providing effective protection has led to the artificialisation of significant stretches of coastline and a high degree topographic and biotic homogenization. Dr. Louise Firth of the University of Plymouth, however, showed how this need not be case, and that it is possible to 'green the grey' of hard defences.

Dr. Firth demonstrated that small scale considerations with respect materials and substrate, in terms of surface roughness, surface chemistry, pH and even colour can significantly enhanced biodiversity. So too can various types of feature that retain water as the tide recedes. She also introduced the bio-block, a precast concrete unit that could replace traditional engineering features and currently being trialled directly outside the lecture theatre at the Marine Station.

Dr. Louise Firth (University of Plymouth) ['Greening the Grey: BIOBLOCKS'](#)

Session III – Planning for Coastal Change

Thinking beyond 'hold the line' and moving increasingly to managed realignment of the coast and working with natural processes will require much better planning for coastal change, and a much more integrated, long-term joined-up approach. Session III examined the importance of 'planning' for coastal change both in terms of foresight and preparedness and in the professional sense of marine and local area terrestrial planning.

The South West Regional Coastal Monitoring Programme

The session started with a short 'soapbox' presentation from Emerald Siggery, of the Plymouth Coastal Observatory. She reminded the audience of the outstanding and invaluable work of the South West Coastal Monitoring Programme, and that basis of all sound planning and decision making is good data.

Emerald Siggery (Plymouth Coastal Observatory) ['The South West Regional Coastal Monitoring Programme'](#) see also <http://southwest.coastalmonitoring.org/>

Shore Line Management Plans

Graeme Smith from South Devon and Dorset Coastal Advisory Group gave an overview of the South Devon and Dorset 'Shoreline Management Plan' and its forthcoming 'refresh'.

Presentation not available but information on SMPs is available [here](#)

Improving Coastal Resilience: Wave Overtopping Forecasts and Coastal Change Management Areas

Dr. Tim Poate from the University of Plymouth and partners SWEEP project highlighted how community resilience in the face of coastal change requires both planning for singular events and longer-term processes. Dr. Poate began his presentation by introducing the Operational Wave Overtopping Forecast (OWWL) the aim of which is to improve existing coastal forecasts by: increasing wave model resolution; predicting wave runup and overtopping explicitly; provide overtopping warnings for sandy beaches, gravel beaches, and sea defences; and predict overtopping rate and hazard level.

In the second part of his presentation Dr. Poate introduced the concept of Coastal Change Management Areas (CCMAs). Defined by the National Planning Policy Framework 'An area identified in plans as likely to be affected by physical change to the shoreline through erosion, coastal landslip, permanent inundation or coastal accretion', Dr. Poate highlighted the fact that out of >90 coastal LGA only ~20-30 CCMAs are in place, such a low number partly explained by the need for CCMAs to be involved and integrated multi-agency and multi-data processes. He also introduced another SWEEP project which was working with Natural England, East Devon District Council, North Devon District Council and Torridge District Council to trial the implementation CCMAs. Dr Poate concluded by suggesting how the CCMA is defined and adopted will dictate its impact and that community engagement and education was a vital ingredient in its success.

Dr. Christopher Stokes and Dr. Tim Poate (SWEEP, University of Plymouth) '[Improving Coastal Resilience: Wave Overtopping Forecasts and Coastal Change Management Areas](#)'

'Bridging the Gap: Professionals to Communities'

Providing a critical bridge between Session III on 'Planning' and Session IV on 'Community', Tony Burch from Sidmouth Beach Management Plan Steering Group was able to provide a unique perspective on the issue from both sides of the fence having formerly worked for the Environment Agency on issues of coastal management and planning and latterly having been involved with the Sidmouth Beach Management Plan as a community representative. Among many important insights, Tony's excellent, PowerPointless presentation reiterated and reinforced the absolutely essential role early, honest and continued community engagement must play in coastal risk management planning.

Presentation not available

Session IV – Community: Engagement, Health and Well-Being

In the final and crucial session, picking up on Tony's remarks on the need to as early as possible, and at all stages, involve the communities who are in the frontline of coastal change, we heard about two projects looking at how and where community engagement could be done better.

Sustaining Community Engagement

Justin Ridgewell from the Environment Agency returned to introduce delegates to the EA led 'Working together to adapt to a changing climate: flood and coast' project. The project, Justin explained, had two principal aims: to learn more about the distinctive engagement challenges communities and places face in the context of climate change and to develop approaches to engagement that are responsive to these challenges, and that can inform future Flood and Coastal Erosion Risk Management (FCERM) practices.

To understand engagement challenges and to identify effective responses, the project undertook an extensive literature review (250+ publications). From this analysis the key challenges the project identified included: 'readiness'; framing information; climate change, emotions and mental health; place attachment, culture & identity; power & politics. The review also identified interesting approaches to engagement in tricky situations, and practices that might be useful in complex adaptation scenarios. These included: simulations and role plays; visualising change; engaging with narratives & stories; various tools for conflict analysis; and careful attention to process.

Justin Ridgewell (Environment Agency) '[Sustaining Community Engagement](#)' see also <https://www.gov.uk/government/publications/community-engagement-on-climate-adaptation-to-flood-risk>

The CoastWeb Project

The final presentation of the day introduced delegates to the CoastWeb Project, a multi-partner, multi-dimensional project that drew many of the day's previous themes and issues together in one place. The project was introduced by its Principal Investigator Dr. Nicky Beaumont of Plymouth Marine Laboratory. CoastWeb's aim, Dr. Beaumont outlined, was to holistically value the contribution which saltmarshes make to human health and wellbeing, with a focus on the alleviation of coastal natural hazards. Saltmarshes she argued, not only are an excellent natural flood risk management measure but can also play an important role in contributing to human health and well-being, in terms of spiritual and cultural fulfilment, connection to nature, and opportunities for recreation.

As such, Dr. Beaumont continued, people can attach significant meaning and value to such landscapes and locations. Strategies to engage with these communities in the context of coastal management therefore must recognise and account for these values and attachments and must incorporate them into place-based decision-making processes.

Dr. Nicola Beaumont (CoastWEB, Plymouth Marine Laboratory) '[CoastWEB: Saltmarsh, Coastal Protection and Human Health and Well-being](#)'

Twelve Take Home Messages

1. Sea-level will rise, by maybe as much as 70cm by the end of the century, as a result of the carbon we have already released into the atmosphere.
2. Sea-level rise, even at lower estimates, will lead to increased coastal flooding and erosion and will have very significant economic, social and environment impacts.
3. We must wake-up to the reality of sea-level rise and WE MUST ACT NOW!
4. We need to radically reduce the amount of carbon we release into the atmosphere to limit the extent of future sea-level rise and we need to mitigate the impact of, and learn how to better adapt to, the sea-level rise we know is already coming.
5. Many aspects of current coastal management policy and practice are not fit-for-purpose. It is ill-equipped to adequately address the climate and ecological emergencies and its primary focus on 'hold-the-line' is not economically sustainable in the long-term.
6. We need to think and do coastal management differently.
7. We need integrated, long-term planning; whole-scape and ecosystems thinking. Linking coastal and terrestrial processes, coastal management with land-use planning.
8. We need to work with natural processes not against them where we can.

9. We need to recognise, value and communicate the multiple benefits and opportunities (economic, social and environmental) that natural coastal flood risk management can deliver.
10. We need to accept that some new approaches and innovative schemes will fail.
11. We need to work with local communities. It is imperative to listen to and plan with the people whose lives and livelihoods will be most impacted not only by coastal change itself but by the things we do manage and mitigate that change.
12. We need to think of coastal management as part of our broader response to the climate and ecological crisis.