

Blue Guide | Community of practice

Newsletter 4 May 2022

Flood reflections: every day is Earth Day

By Sally Moore

Having just lived through the worst floods in recorded history in my coastal region of northern New South Wales (Australia), the need for investment in mitigation, adaptation and preparedness was starkly highlighted.

More than 5,000 homes were deemed uninhabitable and thousands left homeless. In some affected townships, a new highway appears to have been a major factor in creating a hazard in places that had never previously flooded to this extent. Hard structures did not allow flood waters to drain away naturally. In other locations, development that had been allowed in previous wetlands led to waterlogged areas backing up and covering houses to their roofs.



Aidan Ricketts from Lismore steers his boat. He lost his house but rescued 16 people and their dogs from Australia's worst recorded floods. Photo: Eddie Lloyd

Residents and government are considering planned retreats and relocation to higher ground. As climate change impacts increase around the world, such questions and options become very real and must no longer be seen as possibilities but necessities.

April 22nd was **Earth Day**, this year under the theme 'Invest in our planet'. Earth Day is a day for everyone to appreciate our planet and take better care of it, to get outside and enjoy the spectacular natural resources Mother Earth provides, such as beaches, forests, waterfalls, deserts and everything else in between.

However, this year, given the destruction and challenges we are facing here, I reflected on what it means for me. Understanding how we are impacting on the environment and Earth allows us to reflect on how we can support the protective elements of nature.

While we are still in the throes of cleaning mud and recovering homes and livelihoods, we need to also think about how we can change the ways we live and work to be more in tune with the Earth and its protective benefits. After all, isn't every day Earth Day?

In this final newsletter from the Blue Guide team, we talk with Simon Boxall from the Cayman Islands about a strategic retreat from coastlines as an adaptation strategy (as rising sea levels impact his home country). Patrick contributed an article on the difficult decision that lie ahead on implementing adaptation actions but anticipatory planning can help us reduce impacts of climate hazards.



Cayman Islands take some hard decisions

By Sally Moore

I sat down with **Simon Boxall**, Blue Guide training graduate and Communications, Public Awareness and Training Officer for Hazard Management, Cayman Islands. We discussed climate-related challenges the country is facing, and how a managed retreat may form part of the approaches to helping people adapt to climate change.

The Cayman Islands is a self-governing British Overseas Territory in the western Caribbean Sea, the largest by population. The territory comprises the three islands of Grand Cayman, Cayman Brac and Little Cayman and is located to the south of Cuba and northeast of Honduras. The Caymans depend heavily on tourism, and its natural environment is a major attraction.

A study by the Caribbean Catastrophe Risk Insurance Facility (CCRIF 2010) assessed present and future expected losses on the Cayman Islands from hurricane-induced winds, coastal flooding from storm surge and inland flooding from hurricanes and tropical storms under three climate change scenarios. The potential losses were estimated using an approach similar to that applied for calculating insurance premiums, with 45% of losses attributed to coastal flooding.

The study found that annual expected losses (already high at 5% of GDP) could increase to 7% by 2030 under a high climate change scenario. The Cayman Islands is one of the highest loss jurisdictions in the Caribbean, and many properties are close to the "limit of insurability" (CCRIF 2010).¹

The Caymans' average elevation is just 7 feet above sea level. Simon explained how beaches have been traditional open access ways, as well as sites for leisure activity for locals and tourists.

Seven Mile Beach, an unencumbered stretch of pristine white sand that lies within a Marine Protected Area (MPA) is home to many residences and resorts that, up to a few years ago, were at least 125 feet back from the shoreline. The Caymans are dealing with extreme beach erosion, which many see partly as the result of hard structures being built too close to the high-water mark and this in turn is leading to scouring of beaches.

The Department of Environment has clearly stated that in order to save Seven Mile Beach in the long term, the Caymans must now begin a managed retreat of existing beach structures. It is unlikely that existing structures will be removed, but new developments may no longer be allowed so close to the shoreline.

One option flagged for Seven Mile Beach is a series of T-shaped groynes along the beach followed by beach nourishment with sand from private sources in the region. However, this grey and natural option has created concerns not only about the aesthetics, but also the sense of ownership that could result from the divisions to the natural long open stretch of sand. The solution could also be short-lived and extremely costly.

The Cayman Islands Tourism Association and hotel owners have been concerned for some time. Different options that have been applied in the past included reef-balls and others, but nothing has been particularly successful.

Many of the tourism operators are desperate to find solutions, and there is some level of commitment to short-term solutions. However, financing and co-support expected from local property owners is unclear so far.

Following the most recent elections, the Ministry of Sustainable Development and Climate Resiliency was formed, which sits directly under the Premier. A working group has been established to re-gazette the setbacks along the coastline in the Cayman Islands.

Currently, there are arbitrary set-backs for development of 50 feet along the 'iron shore formation', an old coral reef that was formed during the last ice age (within the last 120,000 years). In addition, the Planning and Development Plan is in review, which could change the way buildings are approved along the coastline.

Housing and structures would potentially need to include some methods such as building on stilts to allow for wash through ground floors and ensuring resistance to hurricanes. An engineering company designed a 'climate proof' cottage to demonstrate what housing should look like that is

1. Johnston, W., Cooper, A. (2022): *Small islands and climate change: analysis of adaptation policy in the Cayman Islands*. *Reg Environ Change* **22**, 45.

sustainable, safe, and able to withstand the conditions the Caymans will face around 2050. The design features homes with wash-through ground floors, renewable energy systems that create more energy than homes would consume (solar, wind and battery), sustainable building materials, and an overall design that is able to withstand a category 5 hurricane.²

Longer-term risk scenarios include a UK government funded climate change risk analysis which is due to be received in June 2022. The National Oceanic and Atmospheric Administration (NOAA) has committed to produce storm surge modelling which could result in detailed coastal impact models for up to 120,000 simulations of hurricanes with difference intensities, durations, wind speeds and approach paths to assess the threat levels. Furthermore, the UK Government recently conducted imaging of the marine areas around all three inhabited Cayman Islands. This data will result in a detailed map of coastal depths down to a depth of 90 feet. This information is a critical for modelling storm surge and wave impacts.

In an interview with the national newspaper Cayman Compass, Simon stated that US government satellite radar data showed very clearly a rise in sea level in the region by over 1.3 feet off the west coast of Cuba over the last century. The concern though is that this data needs to be factored into the new Planning and Development Plan, requiring greater collaboration between the Hazard Management and Planning and Development teams.

Given that a managed retreat from coastlines is not considered a no-regret option, I asked Simon about the extent to which costs and benefits were incorporated in the analysis. The Department of Environment has been looking at the value of the natural environment, and analysis showed that the Caymans' natural assets had an economic value of more than USD 3 billion to the islands and its people — protecting beaches, coral reefs, mangroves makes sense.

The aim of this new project, funded by the UK Darwin Initiative, is to put tangible figures behind some of the services that ecosystems provide so that planning and development decisions can begin to contemplate what is being lost and gained when significant projects are considered. The plan is to update this on an annual basis by the Economics and Statistics Office and the Department of Environment.²

Simon pointed me to a great summary article in the local Cayman Compass⁴ which has been running a series of in-depth articles on core threats to the Caymans from climate change. Many of these approaches are already being adopted by the Government while others are in

consideration. Importantly, solutions are there and in abundance. If the will is there, they can be adopted.

The ten solutions proposed for 'climate proof' Caymans are:

1. Rethink where we build.

A critical action in the overhaul of the Development Plan, it should be ensured that homes are not built too close to the ocean, that infrastructure is sufficient and climate proof, and that the islands preserve their natural resources, including flood defences like mangroves and coral reefs.

2. Rethink how we build.

Use of new tech solutions and designs for climate resilient housing and infrastructure.

3. Manage population growth strategically.

Population growth is not easy for government to control without tinkering to ill-effects with the levers that make economic wheels turn but the question of Cayman carrying capacity must be considered.

4. Retreat from the beaches.

The long-term fix is to move hard structures off the active beach, using a strategic retreat approach.

5. Factor in nature's value.

The impact of reefs in sustaining fisheries and providing storm protections, the carbon captured by the coastal mangroves and the significance of beaches to tourism are all factored into what amounts to a budget document for the natural world. Using this information to balance the case of new development against the natural value of what is being lost needs to be factored into on the ground decision making.

6. A national public transport system.

Reliable public transport, bike paths and footpaths, ride-share initiatives and policies to reduce the number of cars on the road and the subsequent reduction of emissions.

7. Accelerate the switch to renewable energy.

Making the islands more self sufficient and energy secure is a nationwide desire. While it won't have much impact on global emissions, it will create and build the communities' resilience and independence.

8. Step up marine park reinforcement.

More officers, better technology, intelligence style policing and tougher deterrents are needed to ensure Marine Park protection and give opportunities for healthy marine systems.

9. Good data is key to climate solutions.

Good data helps Hazard Management authoritatively say which areas are at greatest risk and inform planning processes.

10. Cayman's financial industry can help create a greener world.

Ensuring the vast sums held in portfolios are diverse and climate proof, geared towards resilient infrastructure and business investment that is current in a carbon neutral world could be considered as due diligence for asset and fund managers.



Simon Boxall
Photo: Hazard Management Cayman Islands

2. Whitaker J, Cayman Compass March 31 2022.

3. Whitaker J, Cayman Compass March 16 2022.

4. Whitaker J, Cayman Compass April 22, 2022

Come hell

Nature-based solutions (NbS) hold huge potential to adapt to climate change. Yet, the debate on NbS is often simplistic and negates the climate impact on ecosystems themselves. Difficult decisions lie ahead.

or high water

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Opinion

Patrick Bolte
Banyaneer Consulting

1. The risk to coastal and marine ecosystems is severe and illustrated in the 2022 IPCC WG2 report (see [page 18](#)). Under a 1.5C warming scenario, there is already very high risk to warm water corals and moderate risk to all others. [Walz et al. \(2020\)](#) offer a good analysis of disaster-related ecosystem losses.

2. The use of NbS as part of DRR has come a long way over a short period of time, and there are now many partnerships between environmental and humanitarian/ development organisations. This convergence is rather strong at the strategic level but has yet to transcend to more local-level partnerships for actual implementation of NbS.

3. This erosion is attributed to a mix of flow dynamics in the Red River delta, as well as land subsidence and sea-level rise ([Nguyen and Takewaka 2020](#)).

Adapt or perish. When facing threats we cannot control, these are the basic options. Throughout history, these options have held true for empires and cultures, systems and businesses. Failures to adapt to changing climate are now seen as factors for the demise of the Maya civilisation in the 9th century (following a 200-year mega-drought, see [Turner & Sabloff 2012](#)) as well as the collapse of the Khmer empire in the 15th century (following a 30-year drought as the inter-tropical convergence zone moved south, see [Buckley et al. 2010](#)).

Climate change is something we still have some control over: our actions and policies over this decade will fundamentally shape the future path of the planet. The latest [IPCC report](#) was unequivocal in that message.

While we don't know what scenario we end up with, it is clear that even in the most optimistic case, things will turn much worse. Coastal communities will be hit hard.

Nature-based solutions (NbS) have been heralded as key components to help mitigate climate change and adapt to it. Indeed, they hold great potential. Yet, the debate around NbS, and DRR more generally, is often simplistic and short-sighted — for three reasons.

First, we need to better understand and address the fact that the ecosystems whose protective benefits are to be harnessed and strengthened are themselves threatened by climate change and disasters.¹ *Second*, we need to create more

holistic solutions that incorporate perspectives of future risk. *Third*, the convergence between environmental and risk management agendas remains incomplete.²

In an effort to maximise the true potential of NbS, let us focus on the various lines of defence as a framework for more proactive adaptation and long-term risk reduction.

In 2011, I was asked to evaluate a large-scale mangrove afforestation project in Vietnam. As part of this evaluation, I came to Hay Li commune in Nam Dinh province (pictured). That commune had been affected by coastal erosion for years; a typhoon in 2005 caused major damage, leaving an old cathedral as a marker of the past. In response, the community was re-settled to an area now protected by a newly elevated levee. (NbS were not used in the process).

It had been clear for many years that the community would need to be relocated due to severe and ongoing erosion.³ Yet, it took a storm and lots of damage for action to proceed. But how long will this solution last, considering sea-level rise and persistent dynamics that caused the erosion in the first place?

Re-settling is costly and usually meets with resistance of locals. In the context of climate change adaptation, it is known as a 'regret option': if the risk scenario that was to be addressed does not eventuate, there is only cost but no or little

benefit. I am not necessarily advocating for widespread resettlements of coastal communities as such. But I believe that DRR practitioners must keep a long-term perspective in mind: whatever we do to mitigate risk, it must stand the test of time and account for climate and risk pathways.

Without such a forward-thinking approach, adaptation will be ineffective or even counter-productive: in the worst case, known as maladaptation, risk is actually increased over the long term (Schipper 2020).

Reducing exposure

Lowering exposure to hazards can principally be achieved by (1) removing the hazard, (2) removing the community, or (3) putting something in the way between hazard and community. In coastal contexts, option 1 is not feasible and option 2 usually seen as undesirable.

Thus, most focus tends to be on option 3, with NbS used as **'speed brakes'** (e.g., reefs and mangroves absorbing wave energy, coastal forests deflecting wind), **'stabilisers'** (mangroves and seagrass reducing erosion) and **'barriers'** (dunes preventing coastal flooding).

The problem is that with climate change, many of these ecosystems will be affected as well. Coral reefs will be severely stressed even under the 1.5C warming scenario and may disappear altogether if temperatures increase any further. Other ecosystems such as mangroves will suffer from 'coastal squeeze', the notion that the natural ability to progressively move inland is prevented by levees and other infrastructure. There are some solutions such as T-fences to promote mudflat restoration (Albers 2016).

In the long run, though, there is an inconvenient truth. To reduce hazard exposure in low-elevation coastal communities, we may need to combine options 2 and 3 (Ferris and Weerasinghe 2020).

In many places, retreating away from current coastlines will be inevitable eventually, like it or not. Rather than waiting for coastal communities being devastated by disasters, proactive adaptation would spare much of that damage. Moving inland would cost a lot, but it is a cost that will occur anyway at some point.

Clearly, there are numerous other associated challenges, including the need to convince communities that a managed retreat is in their own best interest, and for low-elevation island nations, the lack of areas to retreat to (necessitating arrangements for international resettlement).

The process of auto-retreat is already underway: hampered by disaster losses and decreasing yields, many of the world's low-elevation zones (such as the Meghna Delta in Bangladesh and the Mekong Delta in Vietnam) already see high rates of out-migration. Bangladesh may see up to 19.9 million internal climate migrants by 2050 (Rigaud et al. 2018: 148). Better frameworks for and support to climate migrants will have to emerge on development and adaptation agendas.

While there are some limits to adaptation (IFRC 2021:197), we should recognise the opportunities that come with managed retreats: where long-term frameworks exist for communities to retreat from coastlines, space can be created for coastal ecosystems to flourish. Removing levees could prevent coastal squeeze, and allow mangroves and marsh lands to assume their protective function for decades to come. Further inland, shelter belts could be planted to absorb some of the storm load from cyclones and hurricanes.

Combining nature-based solutions and managed retreats may sound unreasonable and will be a hard sell. Yet, if we wait too long, we will be overrun by reality: instead of adapting in a proactive fashion, we will merely react (with coastal communities paying the price through disaster losses).

Additional lines of defence

While a strong focus on reducing exposure should be a cornerstone of adaptation, such action must be compounded by actions related to the other lines of defence listed in the Blue Guide (The Nature Conservancy 2021:33).

As DRR practitioners, we can and must do more to decrease sensitivity,⁴ improve preparedness,⁵ enhance coping capacity,⁶ and raise adaptive capacity.⁷

DRR has been hugely successful in reducing disaster-related fatalities. Economic losses meanwhile continue to increase and may shoot through the roof without proactive adaptation.

We have saved lives but must get better at saving livelihoods. With their multi-faceted benefits for DRM, livelihoods and food security, NbS should clearly be part of resilience pathways.

At the same time, we should consider them as part of a wider toolkit and must also recognise their limitations. Only a sober analysis will enable sustainable outcomes towards truly resilient communities that can prosper and grow in the face of climate change.

Remember the two basic options: adapt or perish.

4. Decreasing sensitivity can include **stronger and adapted homes** (much retrofitting can be done at low cost), **diversified livelihoods** (with greater shares of non-agricultural income) as well as **climate-smart agriculture** (floating gardens, more salt-tolerant crops and seed varieties) — reducing the risk of people losing everything after a hazard.

5. Investing in early warning and preparedness structures must be maintained and further improved. DRR practitioners should be encouraged by the great success of their work, which helped reduce fatalities from storms eightfold in just two decades (1990s to 2010s).

6. Anticipating that even with reduced exposure, decreased sensitivity and improved preparedness, there will still be hazard-induced damages and losses, we need to enhance the ability of coastal communities to deal with residual risk. This can include risk transfer, the creation of buffers, strengthened social capital, and alternative food and income sources in times of crises.

7. Underpinning the various lines of defence is the capacity to adapt: this includes access to information on emerging risk, the ability to re-assess risk (and the adequacy of current DRR measures), plan and decide on adjustments, and the resources to implement them.

New resources

UNDRR (2022) **Global Assessment Report on Disaster Risk Reduction 2022. Our World at Risk. Transforming Governance for a Resilient Future.**

The key report for disaster risk reduction, GAR22 highlights that understanding and reducing risk in a world of uncertainty is fundamental to achieving genuinely sustainable development. The best defence against future shocks is to transform systems now, to strengthen resilience by addressing climate change and to reduce the vulnerability, exposure and inequality that drive disasters.

GAR22 is essential reading for all DRR practitioners; its part II (on the role of biases and communication in DRR) and aspects on systematic risk governance (part III) are particularly thought-provoking.

Mehvar, S., Filatova, T., Dastgheib, A., de Ruyter van Steveninck, E., & Ranasinghe, R. (2018)

Quantifying economic value of coastal ecosystem services: A review. *Journal of Marine Science and Engineering*. MDPI AG.

The saying that 'what gets measured, gets managed' bears a lot of truth, and this paper is an excellent overview of putting values to the services provided by coastal ecosystems.

Jie S., Friess, D. & Gasparatos, A. (2021)

A meta-analysis of the ecological and economic outcomes of mangrove restoration

Mangrove restoration has become a popular strategy to ensure the critical functions and economic benefits of this ecosystem. This study conducts a meta-analysis of the peer-reviewed literature on the outcomes of mangrove restoration.

Conferences

On the sidelines of the **UN Ocean Conference** from 27 June through 1 July in Lisbon, the International Coral Reef Initiative, the **Global Fund for Coral Reefs**, and the **Mirpuri Foundation** will host the 'Reef Action Hub'. The Hub will feature coral-focused side events, including workshops and roundtable meetings, aiming to accelerate action for coral reefs and showcase solutions.

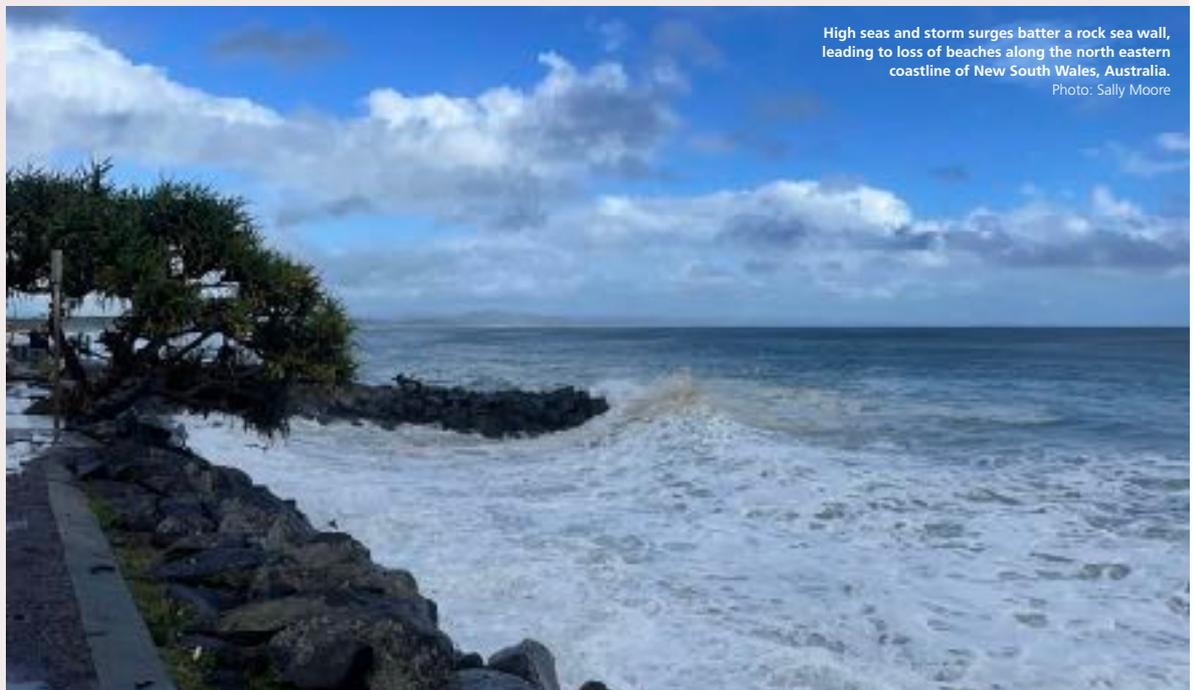
The seventh session of the **Global Platform on Disaster Risk Reduction** will be held in Bali (Indonesia) from May 23-28. This conference offers a wide range of thematic sessions, including one on **NbS for DRR on May 26** (supported by PEDRR). Some events require **registration**, others are live-streamed.

We hope you have enjoyed the newsletters over the past twelve months and wish you the very best in supporting climate vulnerable people wherever you are.

If you would like to re-visit any of the newsletters or share with colleagues, head to the **Nature Protects** website to find them along with many more resources.

Warm wishes,

Sally and Patrick.



High seas and storm surges batter a rock sea wall, leading to loss of beaches along the north eastern coastline of New South Wales, Australia.
Photo: Sally Moore