BLUE URBANISM: OUR URBAN FUTURE AND THE VALUE OF HEALTHY COASTAL MARINE ENVIRONMENT

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ABSTRACT

Sea level rise, urban growth, and stricter water-quality rules challenge traditional perspectives. Yet they present opportunity to deliver smarter water management for liveable resilient cities.

By 2050 it is expected 70% of the world's population will live in cities. There is growing research round the importance of connecting with nature for health and wellbeing. What does this mean given our blue planet is becoming even more urbanised?

Exploring relationships between cities and sea, the term Blue Urbanism aims to identify how intimately connected cities are to marine environments. It aims to promote understanding partnerships between disciplines and increase awareness of urbanites about the significance of links between city and sea.

Wellington City is a Biophilic Cities research programme partner being led by Prof Tim Beatley of Virginia University. Founded on biophilic values, Council launched Our Living City programme to strengthen urban nature connections and expand quality of life.

Wellington's Blue Belt is a Living City showcase project. The sea surrounding Wellington plays an essential part of our environment, heritage and economy. Blue Belt is about highlighting the natural advantage the harbour offers for the city.

Policy makers and residents understand the desire for a Blue Belt. It is an idea that has gained traction and found its way into official plans.

Alas, data for Wellington Harbour and streams show contaminants above guidelines for healthy aquatic life. During storms drainage systems are inundated causing flooding and sewage into the harbour. These problems compromise the Blue Belt vision.

Council sees these challenges as opportunity to deliver a range of projects to successfully connect economy, environment and enhance liveability and community health and wellbeing, in realising the Blue Belt vision.

The paper will focus on the collaborative journey to develop technical guidance and policy, to forming alliances to facilitate and implement Blue Urbanism.

KEYWORDS

Blue Urbanism, Wellington, Water Sensitive Design, Communities, Adaptation

PRESENTER PROFILE

Nicci has over 10 years experience in water resource management and policy development. An earth-scientist by training, through her career she has worked across

disciplines to apply scientific knowledge to infrastructure management. Nicci is passionate about the natural environment and integrated working. She has become a known and respected stormwater practitioner in Wellington.

1 INTRODUCTION

Our planet is a blue planet. Some 70% of the Earths surface is covered by the sea. Our bodies are also 70% water, and it reflects the fact we evolved from the water.

We are now in a global urban age; nearly 70% of the world's population will likely live in cities by 2050. Wellington's strategy is to be a Smart Capital City, positioned Wellington as an internationally-competitive city with a strong economy and an increasing population, with new houses, infrastructure and services developed to support this growth.

Water plays a central role in almost every aspect of our urban environment and quality of life in our cities. Alarmingly, the combined impacts of rapid population growth and climate change are now posing a severe threat to the liveability and resilience of our cities. What does this mean that our blue planet is becoming even more urbanised?

Our urban future and ocean world are intimately intertwined in numerous ways. As we anticipate further growth in urbanisation on the blue planet it is timely to recast the role of cities and to begin to understand how a viable and compelling vision of the future can fuse the urban and the blue.

Urban Demands on Marine Environments

Coastal cities have treated our oceans as liquid landfills and open sewers for centuries, combined with the multitude of threats to our oceans (industrial overfishing, excessive pollution and waste, and the severe impacts of climate change). Protecting oceans for the future will require unprecedented efforts from cities and urban populations in unprecedented ways, today and in the years ahead.

Human and urban activities generate contaminants that, have increased in step with population growth. Traditional piped stormwater networks efficiently move these contaminants to the sea. Contamination of stormwater can result in public health risks; closed beaches and negatively effects on water based recreation, shellfish gathering, and have adverse effects on cultural and tourism values.

Conventional stormwater management has traditionally focused on flood-risk management. Urban development needs and flood issues have been dealt with by building pipes and burying streams and wetlands underground. However pipes disconnect communities from their natural environment, adversely affect biodiversity and offend cultural values. They are also expensive to build and maintain.

Wellington City's stormwater discharges have historically been contaminated with sewage as a result of interconnected sewers and storm drains because of historic design, current-day illegal cross-connections, leaky joints or old cracked pipes. While significant investment has been made in sewer management, recent data shows contaminants above guidelines for aquatic life, and during storms drainage systems are inundated causing flooding and sewage overflows to the harbour. The wet-weather overflow from the main trunk sewer a stormwater culvert and the faecal content at certain major stormwater outfalls remain at levels which are a concern for public health.

Land use and growth decisions can positively or negatively affect coastal and marine environments.

The recently released draft Wellington Urban Growth Plan identifies that the city's population will increase by about 50,000 over the next 30 years, resulting in the need for an about 21,000 additional residential dwellings by 2043. It is intended to provide for this growth through a range of housing options roughly split between central city intensification, residential infill and greenfield development.

This growth agenda and a healthy environment with strong urban-nature connections are not mutually exclusive. However the approach poses complex planning and urban design challenges. These combined, new efforts must represent a shift toward embracing the "blue urbanism' ethic.

2 DISCUSSION

2.1 BIOPHILIA AND BLUE URBANISM

Surrounded by hills and a rugged coastline, Wellington is situated on a stunning harbour, offering tremendous opportunities for enhancing quality of life and forging meaningful contact with the sea. Wellington City is a partner in the Biophilic Cities research programme which is led by Prof Tim Beatley of Virginia University. Founded on biophilic values, the Council launched Our Living City programme to strengthen urban nature connections and expand quality of life.

Blue Urbanism is related in important ways to the concept of biophilia—the innate attraction and emotional sustenance that humans feel for nature. Exploring relationships between cities and sea, Blue Urbanism aims to identify how intimately connected cities are to marine environments as well as promoting understanding partnership between disciplines and awareness of urbanites to the significance of the relationship between city and sea.

The agenda of biophilic 'green' cities includes the actual green: the nature -trees, birds, parks, and green-space elements -that we need to be healthy and happy. Similarly water can be showcased in our cities to improve liveability: celebrating rainwater and making it more visible in the city, water based recreation, aquariums, coastal trails. There are clear and undeniable biophilic attractions to marine environments and evidence that we are an ocean species on an ocean planet. The attraction of coastal settings, moreover, is intuitive to most of us. The visual beauty of sea, the sounds of surf and crashing waves, seagulls, and tactile contact with the water world through snorkelling or beachcombing — we are responding to a deep need to see, touch, feel, and experience marine environments.

To progress this connection and the values to our quality of life, Blue Urban cities must recognise and manage the ways that land-based activities and development affect water processes and marine environments. This approach will require increased planning and regulatory attention to moderate negative impacts.

Many cities around the world are realising their watercourses and seascapes are major attractions, that need protection. Blue Urban cities consciously acknowledge that their footprint extends beyond their immediate communities. These cities take the benefits received from oceans into account in city plans, practices, and policies.

2.2 NATIONAL AND REGIONAL CONTEXT

National legislation and regional and local policy opportunities in Wellington can support initiatives that educate and connect urbanites to the marine resources around them.

We understand that land management and activities drive water quality and water quantity and that water management affects land activities. The effects are efficiently moved from terrestrial to marine receiving environments with impacts on streams and coastal ecology and recreation value. Integrating the management of land and water resources at a catchment level makes sense.

Whaitua is a Māori term for a designated area. In its Regional Plan Greater Wellington Regional Council (GWRC) uses the word 'whaitua' to describe a catchment or sub-catchment managed as an integrated system. GWRC is using the whaitua process to 'give effect' to the National Policy Statement for Freshwater Management 2014 (NPS-FW).

The NPS-FW aims to improve freshwater management in New Zealand. It does this by directing regional councils to establish objectives for fresh water in their regional plans to meet community and tāngata whenua values, and to take a more integrated approach to managing fresh and coastal water.

The Regional Council has identified five whaitua areas that place different demands on land and water resources and is enlisting the support of local people to help understand local needs and make recommendations on how they are to be managed.

These Whaitua Committees will be responsible for developing a Whaitua Implementation Programme (WIP) that will outline regulatory and non-regulatory proposals for integrated land and water management within the whaitua boundary. The WIP will be added as a chapter in the Regional Natural Resources Plan. Wellington City Council would then have to have regard to the WIP through its District Plan which will affect such things as earthworks for urban expansion in growth areas.

This project is a partnership among city and regional authorities, planners, scientists, and urbanites which allows our region to pursue a more complementary relationship between city and ocean.

2.3 LOCAL SOLUTIONS

Wellington, a city mostly surrounded by water, is actively cultivating its connections to the marine world. Locally the City Council is beginning to look at the impacts on marine environments in its plans and visions for the future in such a way that the city environment is actually more liveable and welcoming.

In pursuit of this outcome key projects to deliver the "Blue Belt", are integrated catchment planning, water sensitive urban design and climate change adaptation- all supported by strong community engagement.

2.3.1 BLUE BELT

The Blue Belt is a Living City showcase project. The marine environment around Wellington is unique. It contributes to our heritage, identity and economy and is highly significant to mana whenua. The Blue Belt is about highlighting the natural advantage the harbour has for the city.

Our diverse marine environment is home to a wide variety of habitats and a unique collection of plants and animals, including dolphins, rays, orcas, blue penguins and giant kelp. It also provides many opportunities for recreation and tourism.

Wellington has a long tradition of preserving and protecting greenspaces and nature on land via its historic and highly prized Town Belt system. Wellington has a powerful new vision of its Blue Belt; the network of open and piped streams that drain to the harbour and south coast. Recognising, promoting, protecting them.

There are 5 objectives of the Blue Belt work programme -

- Improve and restore the ecology and water quality of Wellington Harbour.
- Celebrate the harbour and its many values that we sometimes take for granted
- Promote understanding and awareness and educate the significance of the harbour's features to Wellingtonians and visitors
- Make connections between the Harbour, the Green Belt and the South Coast (hills to harbour)
- Investigate the potential for marine protected areas in the harbour.

Policy-makers, politicians and residents understand the desire for a Blue Belt. It's an idea that has gained traction and found its way into official plans. Precisely what the project components of this Blue Belt are is still emerging, but it is a comprehensive vision, and one that ties into the city's recent efforts at water-sensitive urban design, catchment based approaches, its impressive network of walking and biking trails, its public art and its waterfront public spaces.

2.3.2 INTEGRATED CATCHMENT MANAGEMENT

It is true that NZ territorial local authorities do not have much legal control beyond the edge of land, but there are many things under their control that will impact nearby marine environments, from disposal of sewage to land management. City planning can and should see land-based catchments and oceans as interconnected and undertake protection of marine life and ecosystems, just as we have put protections in place for terrestrial systems.

A Blue Urbanism approach to planning calls for, in part, a rethink of how we manage urban land and adding consideration of the health of marine environments as a planning agenda item.

Wellington City Council has proactively worked, especially in the last 20years, to ensure appropriate wastewater and stormwater controls are in place and to understand, improve and monitor water quality and effects on receiving environments. However data for Wellington Harbour and streams show contaminants above guidelines for healthy and sustainable aquatic life. During storms drainage systems are inundated causing flooding and pouring sewage into the harbour. These issues affect credibility and risk the Blue Belt vision.

In March 2011, new 10year stormwater discharge consents were granted to the City Council. They were designed to drive longer-term improvements in the quality of stormwater discharges to marine waters. Integrated Catchment Management Plans (ICMPs) form the basis of this work.

A strong emphasis on community liaison also means community groups have had a say in the development of the ICMPs on what they value in the catchment and the receiving environments. Another of the consent condition is developing an understanding of the

contaminants in stormwater runoff and the effects they have on the marine receiving environment.

Stage one of the ICMPs have been completed. The first stage of the ICMPs:

- describes the city's stormwater catchments
- identifies flooding and contaminant sources in the catchments
- assesses the effects of stormwater discharges on water quality, recreational enjoyment, ecological health and iwi values
- set out methods for addressing land-based issues which impact the coastal water values
- prioritises the catchments, and provides a timetable and costs for preparing more detailed stage 2 plans.

The stage-2 ICMPs will include a prescribed programme of rehabilitation works and building models to fully understand the hydrodynamic characteristics of the networks, their catchments and the risks posed by climate change. This information will be used to identify and evaluate solutions to network and land-use issues. Water quality monitoring will play an essential part in driving the solutions, isolating problems, and monitoring the effectiveness of rehabilitation works.

This work can then ensure that rigorous stormwater protection standards are adopted and supported through a creative mix of land use planning rules and urban greening, from trees to rain gardens. Such an approach will bring more native flora and fauna into the heart of the city, while providing ecosystem services like water retention and purification, cultural and aesthetic services, improving quality of life and attractiveness of the urban environment in addition to realising the Blue Belt vision.

2.3.3 WATER SENSITIVE WELLINGTON

It is being realised that conventional systems for managing our water resources are not viable in the long term; digging up streets to replace existing drainage pipes with even larger ones is not the answer. It is extremely disruptive, prohibitively expensive to customers and unlikely to provide a sustainable long-term solution.

So-called water sensitive urban design (WSUD) creates water sensitive cities that enhance and protect the health of watercourses and wetlands, mitigate flood risk, and create public spaces that harvest, clean and recycle water. Much progress has been made in these areas as cities around the world have implemented various forms of low-impact development and water-sensitive urban design, through green rooftops, swales, rain gardens, permeable paving, and tree planting, among other techniques.

Encouraging and guiding WSUD in Wellington will reduce existing impermeable areas of the city, decrease the pressure on drainage networks, reduce sewer overflows to the sea and filter out pollutants from stormwater. The take-up of WSUD for stormwater management will provide these water quantity and water quality benefits- as well as cultural, economic and environmental benefits; more green spaces, creating shade, form ecological networks, protecting our waterways and the creatures that live in them, while preserving and enhancing Wellington Harbour as our premier asset.

To progress a multi value WSUD approach, a guidance document for Wellington was developed. The objective of the guide is to inform the requirements for stormwater management practices that will provide both water quantity and water quality gains, as well as other benefits. It defines the minimum standards in the design construction and

maintenance of WSUD concepts to ensure consistency in design standards. In implementing the WSUD guide we will increase the potential for diverting rainfall instead of it overwhelming the drainage networks and polluting our beaches.

We are now working on ways of turning policy into practice to implement the guide. Looking at where there is opportunity within public space to implement WSUD, including opportunities in the roading or drainage forward works programmes to fast track WSUD.

The Pukeahu National War Memorial Park will be the latest example of WSUD in Wellington. The park will incorporate terraced rain gardens to detain stormwater, while also paying homage to the historic piped Waitangi Stream to the east of the site. Storage tanks under the parade ground will be used to irrigate the park.

2.4 OUR NEXT STEPS

2.4.1 STREAM STREETS

There is around 5km of lost streams buried in pipes beneath the central city. Seven historical streams run under the city- Pipitea, Tiakiwai, Tutaenui, Waipiro, Kumutoto and Waitangi streams. Most local people are unaware of their existence.

We are aware of the benefits that natural watercourses and a healthy local environment bring to people's lives. Daylighting these lost streams and integrating them back into the community- provides valuable urban habitat and recreational opportunities, gives a sense of identity and economic benefits (e.g. attracting businesses, increasing property values). Having aquatic habitat visible in the urban environment offers huge educational opportunities and forms stronger cultural connections to the environment- as well as creating awareness of the need to protect water quality.

The City Council will be looking at daylighting, or opening up, lost streams wherever possible. Where daylighting is not possible, due to the space and current land use constraints, the streams will be reflected in the streetscape using WSUD, landscaping or through art.

The first stream street opportunity has been presented through the Cenotaph Precinct upgrade. The design includes making reference to the lost Waipiro stream in the surface treatment of the precinct.

2.4.2 RAISING AWARENESS AND CHANGING ATTITUDES

Blue Urbanism challenges us to imagine how we, as 'terrestrial urbanites', can understand our role as people of the sea and understand the ocean's role as part of our urban environments. Appreciating that we are inhabitants of the blue world, we must begin to develop a more robust system of stewardship over this watery realm.

First-hand education and experience-based connections with the sea are critical elements in marine protection- urbanites must have opportunities to touch, feel, see, and learn about aquatic life. For some, opportunities for interactions with ocean life will be primarily about recreation and casual enjoyment of the sea. For others it will be about helping to advance our scientific knowledge; there are many different ways for people to become excited about the wondrous diversity of the sea.

The presence of marine nature and the marine world in daily urban life can happen in many ways, including through art and architecture. These art projects, murals, and

architectural details have the power to make land and water connections in a way that brings the community closer to the sea and the sea part of the urban environment

In Wellington public art and new urban development and redevelopment with connections to water serve to connect people -physically and visually- with the water. These include Nga Kina, Tail of the Whale, the Kumutoto Stream sound installation, Historic Shoreline demarcation, Rays at Oriental Bay, Great Harbour Way pedestrian and bicycle access and Waitangi Park and beach.

Beach clean-ups offer one clear opportunity for engaging urban populations in direct action that can make a difference. Annual clean-up events can meaningfully involve communities in positive action and educate about the impact of urban littering. The annual Educate to Eliminate harbour clean up-, is a grass-roots initiative that aims to reduce the amount of litter entering the harbour through education around how it gets there, what it is and how to keep it out of the sea. Volunteer divers bring the rubbish and the marine life to the surface to let people see the extent of the litter and experience the marine life under the wharves in the central city.

2.4.3 ADAPTATION

Improving quality of life for city dwellers and improving water quality for marine life are admirable goals in themselves, but planners, politicians, and designers in coastal cities must also prepare for the effects of climate change. In coastal cities around the world, the main concerns are rising seas and storms and flooding becoming ever more frequent and damaging. Driven by the need to confront sea level rise, coastal cities need to invest in resilience, which will present opportunities to design buildings and the interface of the sea and land in ways that better connect us to the water.

Wellington City Council appreciates the significant risk to coastal communities (human and natural) and the vulnerability of the city to sea level rise. Existing coastal property and infrastructure are likely to be at increasing risk over coming decades presenting a significant challenge for the Council and community.

Sea level rise of 140mm has occurred in Wellington since 1990, while the average annual rate of sea level rise in Wellington Harbour is 2.8mm per year (1900-2012). The Wellington area has been subsiding tectonically in recent decades, exacerbating sea level rise effects and giving Wellington the highest absolute rate of sea level rise in New Zealand. Ministry for the Environment advice recommends that councils plan for sea level rise of at least 500mm by 2050, 800mm by 2090 and beyond 2100 an additional 100mm per decade. Continuing sea level rise will have implications for storm surges, high tides, storm inundation and rates of coastal erosion. The National Institute for Water and Atmospheric Research (NIWA) expects these effects to be worse in Wellington/Cook Strait areas than other parts of the country.

By linking an informed and engaged community, suitable regional planning and long-term decision making, Wellington will work towards resolving coastal hazard issues that our coastal communities will face.

The huge swells generated by the severe southerly storm that lashed Wellington in June 2013 caused widespread damage including the undermining and collapse of the seawall in Island Bay. Before we committed to fully reinstating the wall, the Council believed the community should take the opportunity to look at possible changes to the beach and foreshore. Initial consultation with the community has shown there is interest and

support in exploring the future look of the beach area replacing seawalls with softer engineered options that could better cope with storm surges and rises in sea levels.
. This project has potential to enhance our quality of life and promote understanding and awareness to the significance between land and sea.

3 CONCLUSIONS

Currently modern planning, policy, and design of cities ignores the marine environments, maybe paying attention to climate-change driven sea level rise concerns and little more. This is a positive time for coastal cities to explore and experiment with new relationships to water. There are also many ways to rethink traditional approaches to policy making and urban development and promising opportunities for creating a more holistic approach to stewardship of the ocean environments that offer us so many fundamental benefits.

We need to continue to modify our designs and planning in the future to ensure that these benefits continue to expand, and that they help further progress in improving water quality and in appreciating the abundant biodiversity that exists in these aquatic realms.

Wellington City Council sees these sea-level rise, urban growth, and regulatory and non-regulatory proposals for integrated land and water management as opportunities to deliver a range of projects to realise the Blue Belt vision of a successfully connected economy and environment with enhanced liveability and community health and wellbeing.

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This paper was inspired when Tim Beatley visited Wellington in August 2013. He spoke then of his book "Blue Urbanism: Exploring Connections Between Cities and Oceans" (Island Press, 2014). I would like to thank Prof Beatley for his encouragement and praise of Wellingtons Blue Belt concept, and his support from afar of this paper. I hope I have managed to convey just some of his enthusiasm for the wonder found in the marine environment and the concept of Blue Urbanism.