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URBAN SEASCAPING

Seaweed as a catalyst for urban shoreline transformation in the age of the Anthropocene

BIODIVERSITY

Managing biodiversity in the Waikato region, Aotearoa New Zealand

URBAN STORMWATER

Urban waterways, water sensitive urban design, and the law: A help or a hindrance?

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Lincoln Planning Review (LPR) is the journal of the Lincoln University Planning Association (LUPA) and is the online publication produced twice each year and primarily edited by students and staff in the Department of Environmental Management.

The vision is *"to be the pre-eminent source of information on planning issues, research and education in and affecting the "central upper South Island".*

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EDITORIAL

In the halcyon days of 2020 we decided to forego publishing the Lincoln Planning Review for a year while we coped with the pressures of Covid. It's fair to say that 2021 has not been quite what we planned for and it says something for the resilience of our authors, reviewers, proof readers, layout and editorial team that, despite another year of lockdowns and constraints, Delta and Omicron, we are again able to welcome you to another (slightly delayed) volume of the LPR.

The three research articles in this volume have a common focus on systems' governance and design. Soo Jyu Park, a Visiting Fellow at Lincoln University's Land Environment and People Research Centre in 2021, sets out a manifesto for urban seascaping. This she sees as a design approach that recognises human-sea relationships and accommodating sea level rise through urban design. Her research is largely based on Danish experience, but in this article she introduces a number of design concepts and principles that could prove of interest in Aotearoa New Zealand. Interestingly, her examples focus on the use of kelp, a sea plant that is receiving considerable attention in this country for its commercial potential. Soo advocates a more holistic approach, focussing on relationships. This is a lengthy article, but we decided to print it as a whole in order to maintain the cohesiveness of the manifesto. It is unlikely to be read in one sitting, but rewards return visits.

Mark Christensen's passion for sustainability drives his comparison of urban design and water in Christchurch and Auckland. This piece, empirically grounded in an analysis of the water planning in these two cities, should inform and engender some debate over how we are planning for the sustainable use of freshwater in urban areas. Mark has presented his analysis in a number of forums and we are glad to be able to provide it in a more permanent form here.

Katie Nimmo critiques implementation of the Convention on Biological Diversity at the local level in the Waikato. Biodiversity loss is one of the major global challenges and Aotearoa New Zealand has been prominent on the international stage, but how well does it really measure up on the home front? Originally undertaken as a student research assignment in 2020 (the year we did not publish), there have been changes at the national level in the time that has elapsed. However, this study still provides an interesting and informative snapshot-in-time, and a baseline upon which future studies could usefully build.

In addition to these more substantial research articles, we also include three articles in our field notes and case studies section. Relationships are the focus of Emily Ireland's case study on the personhood of the Whanganui River (Te Awa Tupua), a legal recognition that has grabbed

attention around the world. Malcolm Campbell and co-researchers provide a field note on the planning and policy implications for the housing and rental markets of Airbnb accommodation. And in the year of the (postponed) Olympic Games, Greg Ryan has provided a brief note on when town planning was part of the games.

We close the issue with our usual collection of book reviews, reports, profiles and lists of relevant awards and publications. In a year in which Lincoln University offered its first online post-graduate courses (including ERST 630 Environmental Policy and Planning), there is a brief report on the online developments in the Master in Environmental Policy and Management, which may be of interest to planning professionals who are looking into options for further study.

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Urban Seascaping: Seaweed as a catalyst for urban shoreline transformation in the age of the Anthropocene

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ABSTRACT

This article offers an introduction to a research project, "Urban Seascaping" (USS), which re-envisions the boundary between city and sea in response to the phenomenon of sea-level rise and frequent storm surge in the age of the Anthropocene. USS seeks to reconceptualise the current business-as-usual waterfront developments and coastal protection by investigating an unexplored solution space of embracing the agency of the sea and its coastal ecosystems as a key driver in the transformation of urban shorelines. With a focus on the coastal regions of Denmark, the research seeks to induce critical trans-disciplinary discussions on the limitations of a "hard approach" to coastal protection dominated by defence-driven mechanical handling of water. Moreover, the research highlights the current lack of marine nature-based "soft approach" in the waterfront area as part of coastal protection strategies. The project proposes a new form of urban commons in the waterfront, particularly exploring the full spectrum of coastal ecosystems using seaweed as a representative of a marine nature-based solution to enhance coastal resilience. The key is to depart from the current dualistic relationship between nature and culture to a more hybrid, interconnected and dynamic zone by incorporating coastal ecosystems as an active part of the socio-cultural cityscape and future resilience.

Keywords: blue urbanism, urban seascaping, nature-based solutions, blue infrastructure, coastal resilience, seaweed.

1. INTRODUCTION

There is a need to rethink the current status quo of urban waterfront developments. Contemporary coastal cities have developed into the sea in the form of land reclamation that is not designed to handle the increasing impacts of climate change nor sensitive to the loss of coastal ecosystems. This article offers an introduction to a research project, Urban Seascaping (USS)[1], which re-envisions the boundary between city and sea in response to the phenomenon of sea-level rise and frequent storm surge in the age of the Anthropocene[2]. USS seeks to reconceptualise the current business-as-usual waterfront developments and

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[1] Urban Seascaping is situated in the emerging approach of blue urbanism and within the interdisciplinary field of urban design, planning and landscape architecture. This article only discusses a small part of the PhD which discusses the ethical and theoretical proposition. The article serves as an introduction and a manifesto for students, practitioners and municipal members who wish to depart from the current business-as-usual urban developments at the coast.

[2] In this article, the term Anthropocene is used to refer to a geological age during which human activity has been the dominant influence on climate and the environment. The article mainly refers to the negative impacts of human activity in the Anthropocene which is causing rise in sea level, frequent storm surge, loss in biodiversity and increasing pollution. There are other appropriate terms such as the Capitalocene which focusses on the current global capitalistic economic

coastal protection by investigating an unexplored solution space of embracing the agency of the sea and its coastal ecosystems as a key driver in the transformation of urban shorelines. With a focus on the coastal regions of Denmark, the research asks: "How can coastal cities integrate the sea and its lifeforms in a way that contributes towards re-envisioning existing and new waterfront development in light of sea-level rise?" The research seeks to induce critical trans-disciplinary discussions on the limitations of a "hard approach" to coastal protection dominated by defence-driven mechanical handling of water. Moreover, the research highlights the current lack of marine nature-based "soft approach" in the waterfront area as part of coastal protection strategies. In exploring this knowledge gap, the project proposes a new form of urban commons in the waterfront, particularly exploring the full spectrum of coastal ecosystems using seaweed as a representative of a marine nature-based solution to enhance coastal resilience. Other added values of seaweed are explored, such as improving biodiversity, filtering pollutants, carbon sequestration, sustainable food production and beauty. The key is to depart from the current dualistic relationship between nature (the sea) and culture (the city) to a more hybrid, interconnected and dynamic zone by incorporating coastal ecosystems as an active part of the socio-cultural cityscape and future resilience.

2. THE WICKED PROBLEM OF LIVING ON THE EDGE

We live in an era of unprecedented ecological crisis. Impacts from global warming include frequent flooding, storm surges and rising sea levels, which are key issues to respond to in this century. Coastal cities will face the brunt of water-related issues. The severity of the impact of water in the future will depend on many complex factors, one of which is a significant need for global GHG reduction (National Center for Atmospheric Research/University Corporation for Atmospheric Research, 2018). The recent release of the sixth assessment report by the IPCC warns that radical, immediate and swift reductions in global GHG must happen within the next few decades as warming is accelerating (IPCC, 2021). It means halving global GHG emissions by 2030 and net-zero by 2050 from 2010 GHG levels to stay within the recommended limit of 1.5°C of global average temperature rise (IPCC, 2018). However, the current emissions rate indicates that global temperatures are expected to surpass 1.5°C of warming (IPCC, 2021). The predictions are now faring more towards the worst-case scenario and continued sea-level rise, contributing to the severity of more frequent and severe coastal storm surge events that previously happened once every 100 years to happen every year by the end of this century (IPCC, 2021). It is looking more likely that coastal cities would need to prepare for the inevitable.

This research focuses on low-lying coastal countries like Denmark[3] that are particularly vulnerable to the impact of water-related issues. Many Danish cities and towns are situated near the coast, river estuaries and fjords. They will face a higher risk[4] of frequent flooding from the sea, streams and rivers, along with stronger storm surge events and heavier rainfalls (Arnbjerg-Nielsen, 2011; Jebens et al., 2016). The challenges of addressing water-based issues in contemporary coastal cities in Denmark is exacerbated by the increase in urban densification that contributes to the rise in impermeable surfaces. These surfaces increase stormwater runoffs (along with urban pollution) that amplify the floods' impact. Worryingly, many existing urban

system as a key proponent in the Anthropocene (Moore, 2017), but due to the general familiarity of the term Anthropocene, it will be used throughout this article.

[3] The main reason behind why Denmark is chosen as a country for investigation as opposed to other countries, is due to the research context of the PhD. The researchers is at a Danish institution and it is part of the PhD to look into Danish coastal cities as a case study. Nevertheless, lessons learned could be applied to other similar contemporary coastal cities.

[4] Denmark's adaptation strategy expects a sea-level rise of 0.1-0.5m by 2050 and 0.2-1.4m by 2100 (DMI, 2018; Olesen et al., 2014). This figure is yet to be updated to the Danish context from the latest IPCC (the sixth assessment report that was released 9th of August 2021)

infrastructures are not sufficiently designed to handle the effects of climatic changes in the future (Zhang et al., 2018). Some examples are the old combined sewage and stormwater drainage pipes in many Danish cities that will overflood in the event of storm surge (contributed by sea-level rise) and heavier cloudbursts. Another example is that many existing buildings (both old and new developments) in risk areas are not equipped to handle inundation and are inflexible to retrofit to adapt to future climatic changes (see Figure 1).

Figure 1: Photos of current waterfront residential development models in the coastal city of Aarhus in Denmark. The residential and commercial development on Aarhus Docklands (Aarhus Ø) started in 2007 on a former container terminal that was reclaimed land. It is 100,000 km^2 with plans to house over 10,000 residents. The Docklands is elevated 2.5m above the previous normal water level based on a future increase in sea level of 0.5m with stone reefs as coastal protection to dampen the waves. However, the Docklands is considered a storm surge risk area, and it seems to be under-estimated to deal with future predictions of SLR and storm surges by the end of the century (Aarhus Kommune, n.d.; Klimatilpasning, 2015). Aerial photo of Aarhus Docklands by Jesper Larsen and JFP.dk.

3. "OCEAN SPRAWL" – UNTAPPED LIQUID SPACE

The industrial revolution saw the onset of rapid urban development for coastal cities where space next to the water became a valuable economic commodity (Firth et al., 2016). It was achieved by land reclamation[5], which is done by dredging ports and harbours to expand industrial economic activity. Thus, the term "ocean sprawl" (Duarte et al., 2013) refers to the act of expanding human activity into the sea by reclaiming land for human use. More recently, the trend in coastal areas in Denmark is reclaiming land for commercial, recreational and residential use for highly sought-after waterfront real estate. This type of urban development pattern is prominent in most Danish coastal cities, as shown in Figures 1 and 2. Ocean sprawl

[5] *Before the industrial revolution, land reclamation was driven by intensifying agricultural activity that drained fertile land, both on land and at sea. Former wetlands, marshes, fjords and beach meadows were drained to make space for farming in Denmark peaking in the 19th century (Stenak, 2005).*

goes hand-in-hand with urban sprawl as the convenience of petroleum transport and the development of pump technology allowed the possibility of creating land out of the water. It resulted in a huge expansion of harbours near the city for trade and higher demand to live near the water, increasing waterfront property prices. As the global economic system became more dependent on unbridled capitalism of endless economic growth, the view of the sea increasingly became an economic commodity, an "untapped resource" to be exploited (Danmark and Ministeriet for Fødevarer, Landbrug og Fiskeri, 2010; Magnason, 2021).

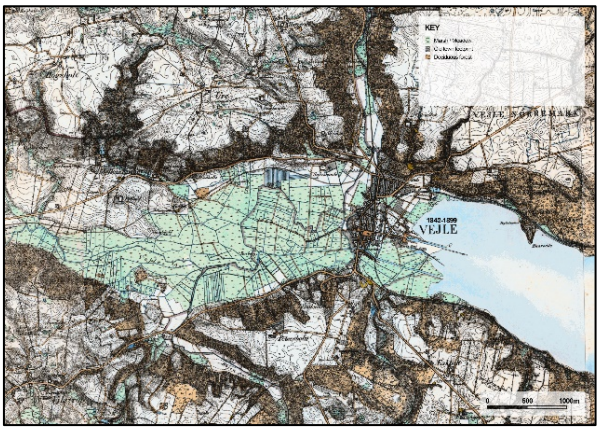
The act of expanding the city out into the sea has not only increased Danish coastal cities' vulnerability towards the impact of rising sea levels but also led to the destruction of former marine habitats and seabeds by removing large amounts of boulders, rocks and stones to use for construction on land (Mørk Jørgensen, 2020; Stubgaard, 2020; Svendsen, 2020). Reclaiming land from the sea creates marine dead zones on the ocean bed because it claims coastal areas ideal for the survival of many marine habitats dependent on specific depths below sea level with access to sufficient sunlight to thrive (Bishop et al., 2017; Palmgren, 2019). Furthermore, the removal of habitat-forming boulders, rock reefs, and small stones resulted in lifeless sea beds as marine habitats like seaweed could not attach their holdfast impacting the food chain[6] (Bishop et al., 2017).

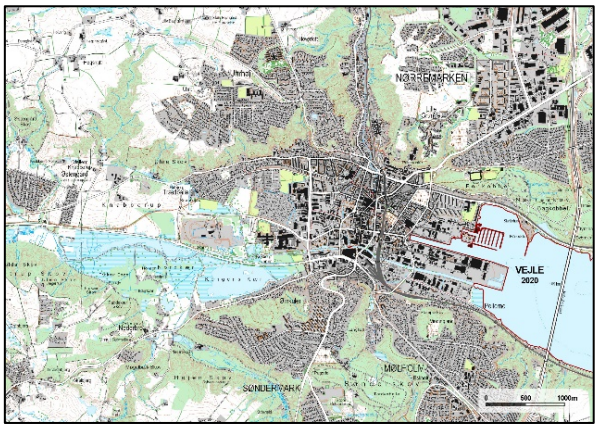
Despite the fact that marine lifeforms are adaptable entities, the destruction of marine habitats through land reclamation and the impact of human activity such as increasing urban water pollution, eutrophication[7], changes in sediment input and temperature rise jeopardises their chance of survival (Pilkey and Young, 2011). The irony is that these marine ecosystems face an unprecedented future that needs to be shielded from the impact of human activities while requiring active human management to survive (Orff, 2016). Therefore, coastal cities have a conundrum of ensuring that it safeguards from future water issues due to global warming without compromising the coastal ecosystems that inhabit the area.

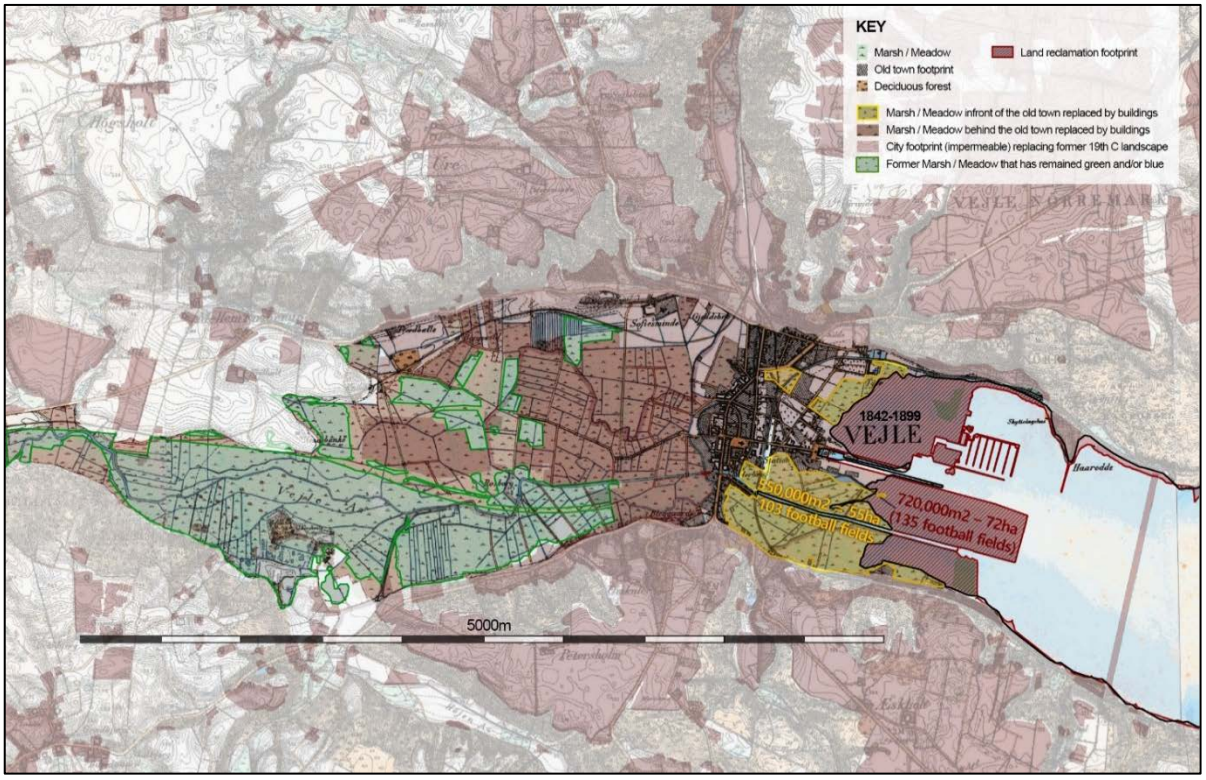
Figure 2 (following page): History of urban transformation in the city of Vejle in East Jutland, Denmark - Vejle 1842-1889. (Top left), Vejle 2020 (top right) and Vejle 1842-1889 map superimposed with 2020 developments. (Second row) The land reclaimed (ocean sprawl) from the fjord is coloured in red, totalling 720,000 square meters/135 football fields worth of new land. The former beach meadows and marsh are in yellow, which is now commercial, industrial and residential developments, totalling 550,000 square meters/103 football fields that used to provide buffer zones in the event of storm surges. The former meadows totalling over 5km are now mainly non-permeable surfaces (in red). Only the green shades remain as green and blue spaces. Historical QGIS map from Miljøstyrelsen Denmark (Miljøstyrelsen, n.d.) and further illustrated by the author.
(Bottom row) Photo of Vejle waterfront area with residential, commercial, recreational and industrial developments. Photo credit: Vejle Municipality (Danske Landskabsarkitekter, 2020).

6 Furthermore, the intensive fishing industry (i.e. bottom trawling) also removed habitat forming substrates like stones, rocks and boulders.

7 Eutrophication defined by the European Environmental Agency: "A process of pollution that occurs when a lake or stream becomes over-rich in plant nutrients; as a consequence, it becomes overgrown in algae and other aquatic plants. The plants die and decompose. In decomposing the plants rob the water of oxygen... Nitrate fertilizers which drain from the fields, nutrients from animal wastes and human sewage are the primary causes of eutrophication" (European Environmental Agency, n.d.).


KEY
1842-1899
VEJLE


NØRREMARKEN
VEJLE
2020
SØNDERMARK
MØLHOLM


KEY
Marsh / Meadow
Old town footprint
Deciduous forest
Land reclamation footprint
Marsh / Meadow infront of the old town replaced by buildings
Marsh / Meadow behind the old town replaced by buildings
City footprint (impermeable) replacing former 19th C landscape
Former Marsh / Meadow that has remained green and/or blue
1842-1899
VEJLE
550,000m2 ~ 55ha
(103 football fields)
720,000m2 ~ 72ha
(135 football fields)
5000m

4. HIDING BEHIND A FALSE SENSE OF SECURITY

To mitigate the water reaching the coastal cities, the prevailing coastal protection model for many Danish coastal cities has a strong tendency to implement the "control and conquer" mentality where human-made structures attempt to control non-human forces at bay (Orff, 2016). This model is often referred to as the "hard approach" (Faragò et al., 2018). It consists of seawalls, dikes, locks and levees, which are engineered infrastructures working as defence systems to manage and contain the water. Moreover, (as shown in Figure 3), the edge conditions where the city meets the sea is riddled with hard concrete edges. These hard approaches contribute to severing the city's visual, tactile and ecological connection to the water.

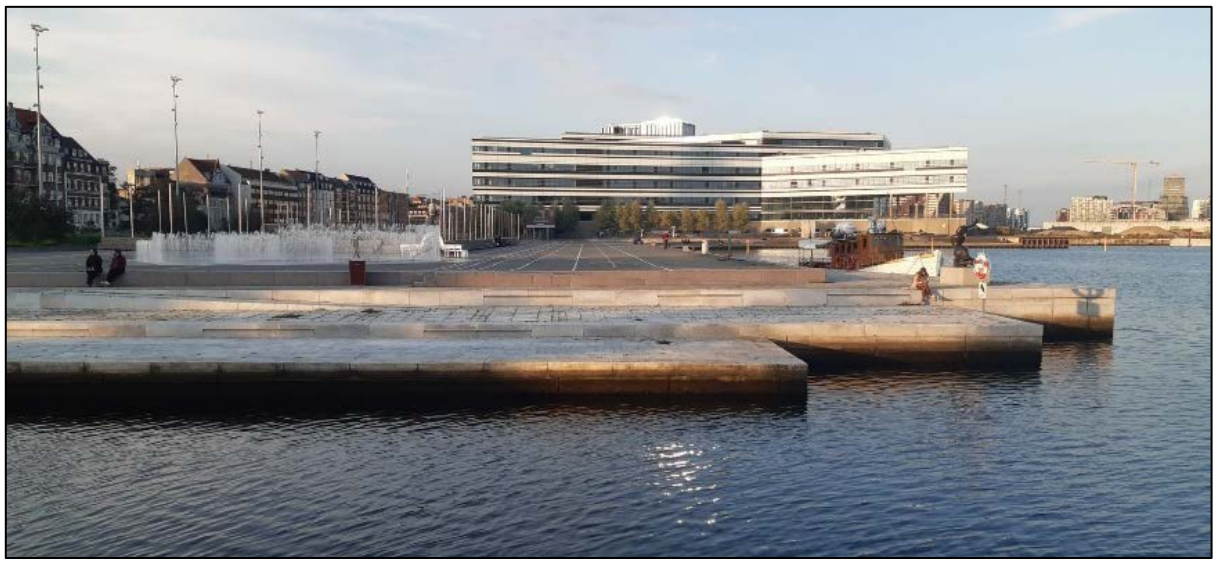


Figure 3: A typical form of urban coastal harbour edge condition with a defined, segregated, hard boundary between land and water that severs a closer and more tactile connection with the water and its life forms. The public space in the waterfront is mainly is made of concrete for humans. Very little consideration is given to terrestrial plants, and there is no designated space for interacting with the marine world. The photo was taken by the author in Aarhus, Denmark, in October 2021.

Furthermore, the heavy reliance on protection systems such as dikes and sea walls provides a false sense of security at the coast[8] that tends to continue business-as-usual harbourfront developments, which are not sufficiently designed to be adaptable for future changes in climate. This phenomenon is called the "levee paradox" to describe the irony of the presence of levees that leads to less awareness of the flooding risks and, in turn, increased development in the so-called "protected" risk area (Smith, 2002). Furthermore, these hard strategies are expensive and inflexible to refurbish, but more importantly, they are temporary solutions in the face of rising sea levels in an unpredictable future (Pilkey and Young, 2011). Nevertheless, hard defence strategies have an important role in protecting the low-lying coastal cities in the short term.

The main problem with these forms of defence strategies is not only that they cannot guarantee 100% protection, but it is also often without future intention to relocate people away from high-risk areas (ibid.). It is not surprising that managed retreat (also known as realignment or relocation) as a coastal adaptation strategy is the least discussed option when deciding how to respond to the water issues for coastal cities in

[8] This is because these seawalls (levees) are constructed at a certain height level based on a prediction of how high sea level rise and storm surges might be in the future. Past storm surge events around the world (e.g. Hurricane Katrina in New Orleans) have shown that these seawalls and levees can be overtopped due to unpredictability of storm levels thus run the risk of underestimation (UC Berkeley News, 2005).

Denmark. Simply put, retreat as a strategy is commonly considered the "elephant in the room." There is a reluctance to address the need to retreat the most vulnerable and problematic areas of coastal cities in the future. Many complex factors are involved in the difficulty of implementing retreat of a big area, such as inflexible existing infrastructure, housing that people's livelihoods depend on, cultural heritage, the associated costs, and the belief that one can always engineer oneself out of these issues. Regardless, there is currently an absence of officially designated "no-build zones" for the future in Danish coastal cities at risk[9]. Furthermore, prolonging the relocation of critical areas can make future responses to sea-level rise more difficult and expensive (Pilkey and Young, 2011).

Another issue regarding hard approaches is that installing impermeable concrete dikes or locks interferes with the sediment flows from rivers to the ocean. It deprives many existing coastal ecosystems such as coastal wetlands[10], salt marshes[11], eelgrass, seaweeds of needed nutrients by trapping them within the physical structures (Pilkey and Young, 2011). These physical defence structures interfere with the existing coastal ecosystem's ability to survive (see Table 1 for details), thus compromising its biodiversity.

Coastal zone	**Supratidal**				**Intertidal**												**Subtidal**			
Coastal defence/ modification	Beach meadows				Salt marshes				Soft-bottom				Biodiversity				Eelgrass			
Harbours	●		●	●	●		●	●	●		●	●	●		●	●	●		●	●
Dikes	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●
Land reclamation	●	●			●	●		●	●	●		●	●	●	●	●		●		
Groyne	●				●				●		●		●	●	●			●	●	●
Breakwater									●	●		●	●	●						
Slope protection	●				●								●							
Beach nourishment									●		●	●	●			●	●		●	●
Seawalls		●				●				●			●	●				●		

Table 1. Examples of major direct and indirect impacts of coastal defences and modifications in selected coastal and marine habitats (i.e. impact on the biodiversity). Impacts represented by circles include habitat loss (red), changed soil/sediment biogeochemistry (blue), erosion and turbidity (yellow), and release of excess nutrients (green) (Quintana et al., 2021).

5. MARINE NATURE-BASED SOLUTION: "THE SOFT APPROACH."

Urbanites often forget that life on land and sea are closely connected by a network of coastal ecosystems which are strongly dependent on each other. For instance, estuaries supply nutrients to coastal areas, and the coastal ecosystems protect inner land from flooding via wave attenuation and help mitigate coastal erosion (Quintana et al., 2021). These coastal ecosystems are seen as alternatives to the engineered hard approach and are referred to as "nature-based solutions[12]" (NbS) or the "soft approach." Examples include

[9] *There are however, a coastal protection zone in nature areas which functions like a no-build zone where only coastal protection systems can be built with municipal permission (except in cities). The local government can allow new developments in flood prone (designate high risk area in the EU floods directive) areas according to the Danish Planning Act if developers are able to protect the new developments from flooding and the local municipalities are obliged to develop flood risk management plans (Miljø- og Fødevareministeriet, 2020).*

[10] *Coastal wetlands are in coastal (transition) zone between land and sea where it is regularly inundated in fresh, brackish, or saline water all or part of the year that contains a variety of vegetation and animals that are uniquely adapted to those conditions (Hatvany, 2009).*

[11] *A salt marsh is a coastal ecosystem in the upper coastal intertidal zone between land and open saltwater or brackish water that is regularly flooded by the tides. It is covered with dense salt-tolerant grasslike plants (Adam, 1993).*

[12] *The European Commission's official definition of NbS: "Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such*

salt marshes, beach meadows, swamps, coastal wetlands, dunes, rocks and reef-building species like seaweeds, oysters and mussel beds (see Figures 4 and 5 for an example of integrating this approach). A softer "division" between land and ocean is a key focus in these efforts. Additionally, these coastal ecosystems - the roots, leaves, fronds and shells form characteristic patch structures called seascapes (Boström et al., 2011) that provide a range of critical ecological and socio-economic services (otherwise known as ecosystem services[13]).

An example of a least explored coastal ecosystem as a potential nature-based solution is seaweed[14]. Seaweed has multiple values and properties that make it a good contender for NbS. However, more research is needed to assess the various potentials of seaweed as this area is understudied. Some of the key characteristics of seaweed as NbS are elaborated below:

i) Wave attenuation

As part of the coastal resilience strategy, kelp forests[15] can reduce the strength of waves from storms (Gundersen et al., 2017). It is dependent on various factors, such as the morphology, strength of the wave, season, size, age and density of the forest, to name a few. (Løvås and Tørum, 2001; Marine Scotland Directorate, 2016; Smale et al., 2013). Kelp is the only known species with wave attenuating properties (ibid.). Although, based on an old study in 1996, research from a natural kelp forest (i.e. Laminaria Hyperborea) in the coast of Norway extending 6-8km offshore has proven to significantly reduce the impact of waves from waves storm surges up to 60% in height. These kelp forests played an important role in protecting the coastal cities behind them by lessening the impact of the waves (ibid.).

ii) Water pollution control

Seaweed improves water quality by filtering pollutants such as retaining fine sediment particles and uptake nutrients (fertiliser runoffs) from the mainland (Bruhn et al., 2020; Seghetta et al., 2016). Thus, kelp forests help combat eutrophication that reduces the threats of algal blooms and hypoxia, improving ecosystem diversity and functionality (Gundersen et al., 2017). However, they have a threshold at which excessive pollutants in the water will prevent it from growing due to murkier waters from floating particles that inhibits sunlight (ibid.).

iii) Blue carbon

Seaweed is regarded as one of the most ecologically productive photosynthesising systems on earth. It has higher carbon sequestration properties than land-based plants and grows rapidly (Boyd, n.d.; Krause-Jensen and Duarte, 2016; Nellemann et al., 2009). Furthermore, seaweed forests do not need fertilisers, pesticides, or land space. It does not burn like forest fires on land,

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solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions… Nature-based solutions must therefore benefit biodiversity and support the delivery of a range of ecosystem services." (European Commission, n.d.)

[13] According to Encyclopedia Britannica: "Ecosystem services, outputs, conditions, or processes of natural systems that directly or indirectly benefit humans or enhance social welfare. Ecosystem services can benefit people in many ways, either directly or as inputs into the production of other goods and services" (Johnston, 2018).

[14] The author hypothesize perhaps it might have something to do with the fact that it is less seen by humans (it is more submerged under water) compared to other coastal ecosystems such as marshes and wetlands that are partially submerged thus visible.

[15] Seaweed forest is also called a kelp forest which is a type of brown seaweed/macroalgae in the Laminariaceae family. Common names of the kelp species available in Denmark are: 'Sukkertang' (Suger Kelp), Fingertang (Oarweed) and Palmetang (tangle or cuvie).

and there are potentials for sinking the kelp to the bottom of the ocean bed at the end of its life, guaranteeing carbon capture (Krause-Jensen et al., 2018; Krause-Jensen and Duarte, 2016). However, the potential of dead kelp material storing carbon for the future is under-researched with no conclusive data yet (Gundersen et al., 2017).

iv) Improve biodiversity

The various forms of seaweeds are habitats, nursery ground and food for fish, marine invertebrates, mobile pelagic and benthic organisms, improving biodiversity and opportunities for recreation (i.e. marine nature reserves) (Orth et al., 2020). Moreover, kelp forests host one of the world's most diverse ecosystems responsible for providing habitat and food for marine animals and humans (Gundersen et al., 2017; Mouritsen, 2013).

Nature-based protection measures are gaining traction in research and practice because they can be more cost-effective than hard strategies. Additionally, ongoing and active management is unnecessary after a certain period, unlike the engineered approach (Pilkey and Young, 2011). However, there are also limitations with nature-based infrastructure. While it provides certain levels of protection from storm surges by dissipating the strength of the waves, it requires a large area (minimum several square kilometres) to reduce a significant amount of the strength of waves in storms (Orff, 2016). Furthermore, it is complex and difficult to calculate the relationship between storm surges and these nature-based solutions. Therefore, it is essential to predict better the ability of NbS to reduce storm surges and flooding impact with computer modelling and testing on-site (ibid.). This area of research requires more investigation to ensure the effective implementation of NbS from its wave attenuating properties (i.e. from storm surge). However, it is important to note that NbS are not the saving grace from sea level rise as it does not provide direct protection. Thus, one should be cautious when promoting restoring coastal ecosystems to avoid a false promise of guaranteeing full security from future water issues (Pilkey and Young, 2011). Furthermore, there are challenges in trying to establish soft approaches in challenging environments[16]. For instance, urban areas that suffer from severe water pollution (i.e. eutrophication), lack of sediment flow due to locks and gates at the mouth of the river, and increasing cloudburst affecting the salinity levels, to name a few. Careful analysis and inter-disciplinary collaboration are required to understand the various factors inhibiting coastal ecosystem restoration efforts.

More importantly, the main issue behind the coastal protection and adaptation is when there is a heavy reliance on one system (i.e. hard approach), making it vulnerable to responding to the complexity of numerous issues that may arise from climate change. Therefore, the presence of a range of different approaches becomes critical to ensure that the most flexible and holistic strategies can be implemented at the coast (Hill, 2015). It is critical that coastal cities move past short-term quick-fix strategies to prepare for future climatic changes and embrace other added-values of coastal protection systems such as one provided by coastal ecosystems to ensure diverse responses to unpredictable future scenarios (Hill, 2015; Pilkey and Young, 2011).

[16] For instance, in the fjord city of Vejle, eelgrass restoration efforts are hindered by the large amount of floating particles from excessive fertiliser use, turning the fjord water murky. The lack of nursery habitat for fish as the eelgrass struggled to grow under these conditions has impacted the food web. The predatory fish decreased in numbers, which exploded the crab population that feeds on the eelgrass. Therefore, unless the water pollution issues and the unbalanced food web is addressed, there will be limits to the eelgrass restoration efforts (Vejle Kommune, 2020).

6. HYBRID APPROACH

Hybrid approaches combine the strengths and limitations of both hard and soft approaches to go beyond the singular aim of defence during extreme weather events and sea-level rise by enhancing the city's coastline by increasing biodiversity (Hill, 2015; Orff, 2016; Wiberg, 2019). Combining hard and soft approaches to coastal resilience and adaptation becomes more of a dynamic system (Depietri and McPhearson, 2017; Sutton-Grier et al., 2015). Hybrid approaches aim to increase many ways to respond to sea-level rise and global warming (Hill, 2015; Lister, 2007). For instance, these hybrid strategies include increasing coastal edge elevations via beach nourishment, bulkheads, tide gates, armour stone (revetments) and drainage devices. Secondly, hybrid strategies can minimise upland wave zones via offshore breakwater, sand dunes, living shorelines, oysters, mussel or rock reefs, coastal wetlands, salt marshes and groins (see Figures 4 and 5). Finally, hybrid strategies protect against storm surge through the integrated flood protection system, such as floodwalls, levees and local storm surge barrier (Orff, 2016). Furthermore, it is important to incorporate a long-term retreat strategy plan in many highly risky coastal zones as part of the hybrid approach. These critical zones[17] need to be designated "no-build zones" in the future, which leads to the question of what these critical zones need to be transformed into in the future as the sea takes over these spaces.

Figure 4: Visualisation by SCAPE Studio – Oyster-tecture, developed for the Museum of Modern Art exhibit "Rising Currents" (2009) by SCAPE in collaboration with Bart Chezar, Hydroqual Engineering, MTWTF, the New York Harbour School, NY/NJ Baykeeper, Paul Mankiewicz and Phil Simmons. The project is a proposal for reviving the former oyster beds in New York, USA, as part of its coastal adaptation strategy. In combination with mussels and eelgrass, oysters reefs are used for wave attenuation and harbour water filtration (Orff, 2016).

7. "BLUE URBANISM" – BEYOND THE GREEN

The increasing influence of ecology in the field of landscape architecture and urban planning, such as ecological urbanism, addresses a shift in focus that integrates better the various environmental and contextual factors (e.g. hydrological, ecological, geological) (Orff, 2016). However, the influence of ecology has primarily been focused on green environmental movements within the territorial boundaries of the land. Nevertheless, this duty of care has been extended to include the "blue" issues, primarily due to the increasing threat of rising sea levels and growing awareness of the ecological footprint of coastal cities that impact

[17] *In this article a critical zone refers to an area where it is at risk of frequent or permanent inundation due to sea level rise or storm surge event due to global warming.*

beyond its immediate vicinity. Coastal cities are intricately connected to the oceans and are dependent on marine resources for food, raw materials, fuel and medicine, to name a few (Beatley, 2014). As the negative impact of human activities on the oceans is becoming more well known, there is a growing awareness of the vital role marine ecologies play in addressing global warming. As a response, an emerging ethical approach called "blue urbanism" by Timothy Beatley highlights the need to change the current overt instrumental relationship with the oceans, along with addressing the exclusion of marine environments in modern policy, planning and design of cities (ibid.). Beatley (2014) calls for coastal cities to exercise more proactive conservation and integration of marine ecosystems (as with land-based ecosystems) to tackle unprecedented risks to ocean health. Therefore, blue urbanism is an argument for heightened awareness and partnership among city governments, planners, designers, scientists and urbanites to become part of a more complementary, mutually sustainable relationship between the city and the ocean (ibid.).

Figure 5. Project by Rafi Segal (AU) and DLand Studios (Susannah Drake) – "Bight: Coastal Urbanism" in New York, USA. This project aims to replace the hard edge that segregates the city and sea with a new "landscape economic zone" — "a buffer that allows land and water commingle, creating new spaces for habitation, conservation, work, and play. This project is an example of long-term retreat as part of the coastal adaptation strategy" (DLand Studio, n.d.).

There is a narrowing window of opportunity for coastal cities to respond effectively to sea-level rise and other associated water issues. Understanding the complex entanglements and interdependency of human and coastal ecosystems is crucial and needs to be explored through various disciplines, contexts and mediums. Therefore, there is a need to include marine nature-based strategies as part of coastal protection and adaptation strategy along with planning regulations, community outreach and educational programs (Gendall et al., 2015).

8. RESEARCH GAP – THE ROLE OF CREATIVE FIELDS IN INTEGRATING MARINE LIFE FORMS INTO THE URBAN SHORELINES

Research in the field of urban design and landscape has the potential to develop a subfield that includes marine lifeforms such as seaweed in creative ways to adapt to the changing climatic conditions that will motivate more restorative relations between cities and the sea. Too often, the realm of coastal protection projects or marine restoration projects is primarily in the hands of engineers or marine biologists without the

inclusion of creative disciplines. Projects of this large magnitude and complexity could benefit from creative inputs from landscape architects, urban designers, planners and artists/designers who could exercise the skill of synthesising different interdisciplinary knowledge into a holistic and creative outcome that engages with the citizens as a form of public space. Fortunately, the benefits of inter-disciplinary collaboration are gaining traction in Denmark and worldwide in many coastal adaptation projects (Wiberg, 2019). The call for interdisciplinary collaboration is a response to acknowledging the various interconnected networks and dynamic processes that highlight the constant synergy between human and non-human, city and sea, short and long-time spans sea-level rise (5-100+ years). Nevertheless, despite recent efforts, there is still a clear lack of implemented (designed and built) holistic "blue projects" at the urban shoreline, and many relevant projects are still unrealised. The lack of implemented projects highlights the gap in research both in academia and in practice with only a limited number of state-of-the-art built projects. Moreover, the persistence of built projects that struggle to depart from the confines of the status quo of static hard approaches is an indication that moving past business-as-usual is still difficult.

9. WHY FOCUS ON SEAWEED? – THE FORGOTTEN ACTOR IN THE "SOFT APPROACH" TO URBAN SHORELINES

Research by Wiberg (2020), Hill (2015), Faragò et al. (2018) and Quintana et al. (2021) assess the various built coastal protection, adaptation and coastal ecosystem restoration projects in Denmark and around the world. The findings indicate a research gap in more dynamic landforms (unlike the static hard approaches) and the need to integrate more nature-based solutions that require further exploration. Furthermore, while there are research and projects on the benefits of integrating wetlands, marshes, meadows and eelgrass near the urban shorelines as part of coastal resilience strategy, very few exist for seaweed forests (see Table 2 – which only refers to seaweed farms for food production) (Quintana et al., 2021). It represents a gap in research of integrating seaweed as part of marine nature-based solutions and as urban landscaping (seascaping) feature that could be an integral part of the coastal city's urban shorelines as a key part of waterfront developments; and as a way to rethink the current boundary between land and water. As global warming pushes the sea to creep further into coastal cities, the question of how these inundated spaces could be transformed into a new urban common[18] inhabited by non-humans remains an unexplored field of possibility. In short, there is an unexplored solution space for seaweeds as a forgotten actor in marine nature-based solutions, as a potential residence of these new critical zones after risk areas are relocated further inland.

Nature-based solutions	Ecosystem services				
	Coastal protection	CO_2 sink (t $ha^{-1}yr^{-1}$)	Nutrient cycling	Biodiversity	Social engagement
Seaweed farms	n.a.	n.a.	●	●	●
Mussel farms/beds	n.a.	n.a.	●	n.a.	●
Concrete structures	●	n.a.	●	●	●
Stone reefs	●	n.a.	●	●	●
Salt marshes/meadows	●	7.6 (2.0)	●	●	●
Soft-sediments (MR)	●	0.4 (0.1)	●	●	●
Eelgrass	●	2.0 (0.5)	●	●	●

Table 2. "Main ecosystem services provided by coastal and marine habitats as nature-based solutions. The green circles represent the ecosystem services that are well documented by scientific research and (n.a.) not available or sufficiently scientifically tested. Coastal protection is referred to as both preventions of coastal erosion and waves attenuation" (Quintana et al., 2021).

[18] *The term urban commons represents shared material and immaterial resources (i.e. land) that belong to or impact the whole community in an urban environment (Hardt and Negri, 2009). It is founded on the guiding principle of equity that fundamentally reconceptualise how we view spaces and entities as something that affects all.*

Furthermore, there is a need to find different ways to spread awareness of the important role of coastal ecosystems in the environment as anthropogenic climate change[19] is profoundly altering the ocean, and continual uninhibited human activity puts these life forms under extra pressure[20]. In Denmark, for instance, most coastal water bodies are in poor ecological conditions due to environmental problems related to intense levels of eutrophication from excessive use of fertilisers for agriculture[21] (see Figure 6). Excessive levels of eutrophication hinder the restoration efforts of coastal ecosystems (MiljøGIS, n.d.). Thus, it becomes paramount that in order to restore the health of these water bodies, a greater emphasis should be directed to formulating more appropriate regulations to reduce pollution sources from agricultural activity and proactive recovery of these coastal ecosystems that have water filtering capacity.

This paper argues that seaweed, more commonly referred to as "the forests of the sea" (kelp forests), deserves more attention as it is an overlooked and underappreciated coastal ecosystem. The health of these marine ecosystems will play an important role in reducing the scale of sea-level rise in the future as they play a key role in climate change mitigation by taking up CO_2 from the atmosphere (Filbee-Dexter and Wernberg, 2018b). Moreover, despite the importance of these marine ecosystems, the protection of these vital ecological habitats are often disregarded at the expense of prioritising the urban environment and its future developments (Filbee-Dexter and Wernberg, 2018a; Galland et al., 2012). Perhaps the territorial bias[22] of human stakeholders, the lack of perceivable visibility, lack of awareness and exposure of the marine world with human actors are partly responsible for overlooking issues below sea level. Careful integration of coastal ecosystems such as seaweeds in the urban shorelines closer to human exposure and educational efforts could contribute to raising awareness about the plight of the forest of the sea.

Moreover, aside from the coastal protection and blue carbon role of seaweed, other values could be considered to support their integration into the urban realm as they have a history of influencing different cultural practices worldwide. For instance, seaweed can provide other ecosystem services[23] such as provisional (i.e. food) and cultural services (i.e. art), setting seaweeds apart from other vegetated coastal

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[19] According to the latest report by the IPCC (2021), the ocean is warming rapidly with more frequent marine heatwaves, accelerating ocean acidification[19] and deoxygenation[19] levels. IPCC (2021) issues a warning that "these changes affect both ocean ecosystems and the people that rely on them, and they will continue throughout at least the rest of this century." Moreover, the continual exploitation, negative impacts of global warming and water pollution are responsible for the global degradation of 66% of marine environments (IPBES, 2019).

[20] Seaweed forests (particularly kelp forests) are disappearing at an alarming rate due to global warming (Filbee-Dexter and Wernberg, 2018a; Harley et al., 2012). They are sensitive to changes in temperature and chemistry of the oceans; hence it has already resulted in a mass migration of these marine species putting pressure on them to adapt to its rapidly changing environment (ibid.).

[21] Land used for agriculture makes up over 60% of Denmark's total land area (as of 2017) and 80% of that land is used to grow fodders for animals (mainly pig feed) (Sådan ligger landet... – tal om landbruget 2017, 2018).

[22] Terrestrial bias is a situated perspective that responds to the fact that humans live on land, thus are bound by gravity and experience daily life as such (i.e. immersion in air rather than water). This parameter restricts human thinking and experiences to the ones on land, and thus lending to bias ways of thinking, perceiving and decision making to prefer the terrestrial realm as the norm. This can be problematic when dealings with the watery realm of the sea with differing parameters and conditions that requires human stakeholders to depart from anthropocentrically terrestrial way of doing things (Jue, 2020).

[23] There are four different categories of ecosystem services. 1. Provisioning services that are those that benefit people which can be extracted from nature such as plants as food, wood for fuel, etc. 2. Regulating services are those that make life possible for people such as plants that produce oxygen, bacteria that decomposes waste etc. 3. Cultural services are non-material benefit that contributes towards advancement of culture such as through art, music etc. 4. Supporting services are those that provide living habitat for humans and non-humans as the basis of all ecosystems and their services (Gundersen et al., 2017).

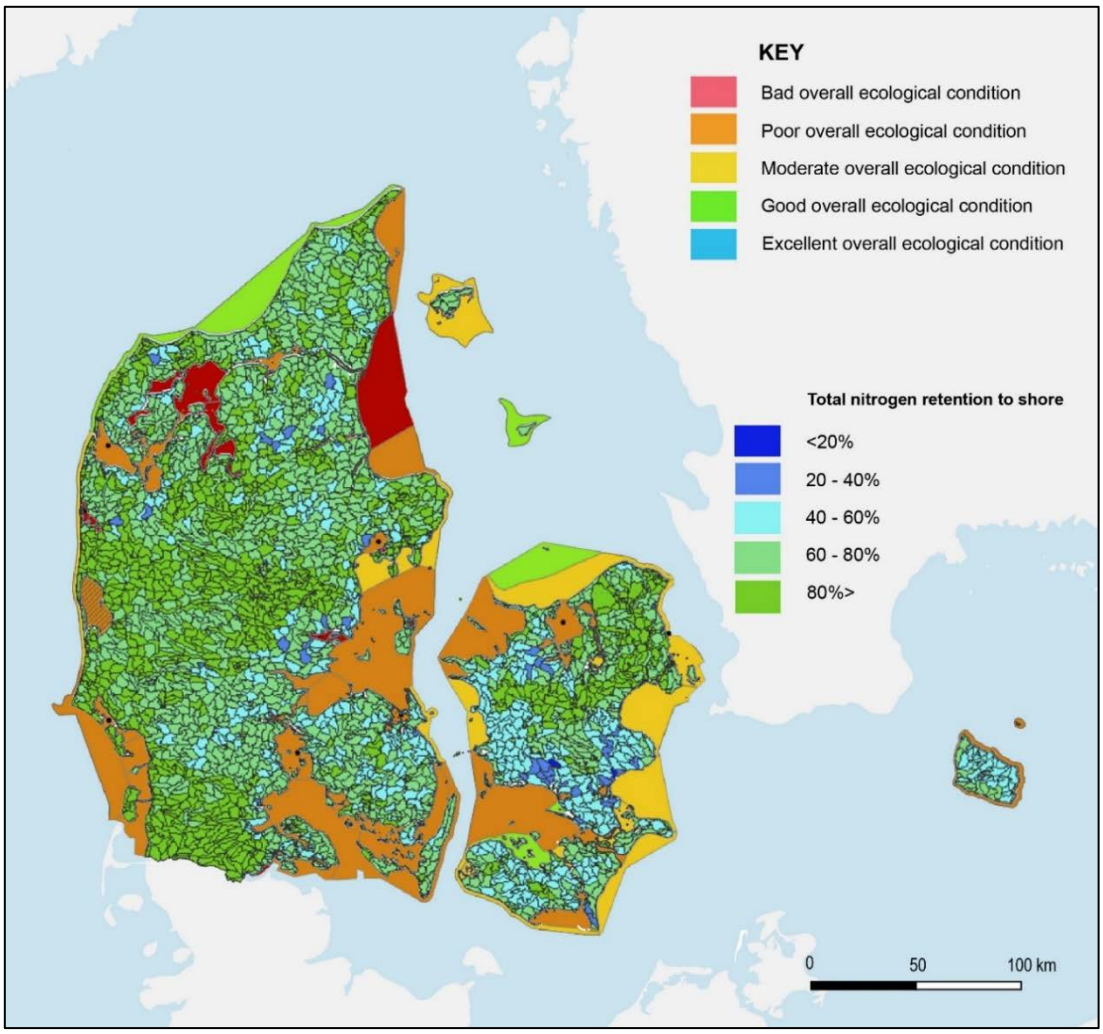

Figure 6. Overall ecological status of coastal waters in Denmark from as of July 2021. The map shows the overall ecological condition of coastal waters based on several quality measures[24] with the nitrogen load on land. The poor condition is mainly due to excessive phosphorus and nitrogen load from agricultural farming. Recent efforts to clean up the coastal waters have shown some levels of improvement in water quality over the years. However, none of the coastal water bodies is in excellent ecological condition.
GIS map from Miljøstyrelsen Denmark (Miljøstyrelsen, 2021) and further illustrated by the author.

ecosystems like salt marshes or wetlands. Some of the influences seaweed has had on human culture are elaborated below:

i) *Provisional Services[25]: Food production*
Seaweed can be eaten by humans, contributing to local, sustainable food production. It has impacted food culture in the Nordic region as early as the 10th century, where seaweed was in the diet of the Nordic people (and Greenland), with stories of Viking voyagers bringing dried seaweed as provisions for long expeditions (Mouritsen 2013). Seaweed was a common substitute during harsh winter months and was also given to farm animals as supplements (fodders) (ibid.). However,

[24] They are: ecological condition of phytoplankton, rooted plants, benthic invertebrates, environmentally hazardous pollutant(MFC) and chemical status of EU's list of substances. There is very little data on the oxygen and light levels of coastal waters which will also impact the ecological condition (Miljøstyrelsen, 2021).

[25] Seaweed (agar) has the added benefit that it can be converted into a wide arrange of uses such as for medicine, beauty products and biofuel, to name a few (AlgaeCenter Denmark, 2013; Hasselström et al., 2018)

with the onset of the agricultural revolution, seaweed was slowly forgotten from the Nordic diet and in the western world. By contrast, in East Asian cultures, seaweed continues to have a strong influence on traditional cuisine. To this day, in South Korea, seaweed soup is eaten as a form of celebration, i.e. on birthdays and when mothers give birth (Jeong, 2013; Korean Food Promotion Institute, 2018). Seaweed has a significant impact in Korea as a cultural symbol of celebrating life, and the different common names are known to the general public. It is not termed "weed", unlike the Anglo-sphere designating its purpose as a nuisance and a useless entity. Nevertheless, seaweed is making a resurgence in Nordic cuisine as a healthy superfood and a form of sustainable food that does not require any land, freshwater, or pesticide to grow and can mitigate food shortages in the future due to global warming (Efstathiou and Myskja, 2018; Krause-Jensen and Duarte, 2016; Krause-Jensen et al., 2018; Mouritsen, 2013). The ability of seaweed to influence the cultural sphere as sustainable food and its unexplored beauty makes seaweed a good contender and a representative of the vegetated marine realm that can fill the current research gap in integrating seaweed into coastal adaptation strategies.

ii) Cultural Services: Cultural and aesthetic value

Aside from seaweed making an impact on food culture, it has also had another cultural impact during the natural history boom of the Victorian period made popular by Darwin. British women who were excluded from the practice of scientific fieldwork engaged in more socially acceptable "fieldwork" to collect seaweed, called "seaweeding", to dry press seaweed showcasing its beauty (Mouritsen, 2013; Trethewey, 2020) (see Figure 7). As a source of beauty, seaweed is an under-explored avenue (unlike terrestrial plants) that could be better exemplified at the meeting place between the terrestrial and the marine world. Seaweeding and other educational initiatives involving seaweed play an important role in marine knowledge centres that teach children about the importance of the sea through the lens of seaweed (Havhøst, 2019; Hjerl, 2019; Palmgren, 2019). Thus, seaweed is a relevant actor that continues to play a role in telling the story of human customs and practices both past and present, and it will continue to do so in the future.

Figure 7. Various dry pressed seaweeds from the coast of East Jutland, Denmark by the author on July 2020. There are over 350-400 different types of seaweed in Denmark (Lundsteen and Nielsen, 2019a, 2019b).

Nevertheless, existing narratives and how seaweed is viewed have predominantly been for its instrumental use to humans (i.e. food, blue carbon and biofuel). There is an emerging field of considering non-human entities for their intrinsic values beyond their instrumental use to humans, i.e. for its own sake. This alternative view has especially been the case with studies of indigenous world views that are much more in line with an intrinsic view of the non-human world, which has been exemplified as a way to think differently about the environmental crisis (Mentink, 2018; Rodgers, 2017). The urban landscape realm (design and planning) could depart from overt anthropocentric worldviews to explore a radically different way to integrate non-human entities by recognising their right to exist and thrive by thinking from their perspective.

The article so far has explored the various complexities involved in dealing with how coastal cities need to move past the business-as-usual approach to respond better to the impending threat of global warming. It highlighted various marine nature-based solutions available to mitigate and adapt to the challenges posed by sea-level rise, storm surge, the biodiversity crisis, increasing urbanisation and pollution. The following sections focus on addressing the research gap of integrating seaweed as a representative of a marine nature-based solution in the field of urban design and landscape architecture. Moreover, the article seeks to explore the potential of seaweed as a representation of multispecies coexistence[26] at the meeting place between city and sea. It addresses the ethical and theoretical point of departure to catalyse urban waterfront transformation in the form of a new urban commons that include marine life (i.e. seaweed) as a key player. Departing from the current status quo in coastal cities is needed to explore what it could truly mean to live not just by the sea but *with* the sea.

10. URBAN SEASCAPING: RE-ENVISIONING THE BOUNDARY BETWEEN CITY AND SEA, HUMAN AND NON-HUMAN

The research proposes a conceptual, ethical and theoretical neologism called "Urban Seascaping" (USS). USS explores the potentials of contributing towards a new form of watery public space that enhances marine-based eco-aesthetics as part of coastal adaptation strategies for this century in light of sea-level rise. The area of concern is the boundary where the coastal city meets the water in Denmark. The importance lies in the fact that the research is focussed on the urban context where these distinctions between nature and culture are either more marked, segregated and destructive. The urban context is where the majority of humans live; thus, it is a place where awareness about the marine realm will be most impactful. Furthermore, it is a challenging site of intervention as terrestrial bias are most at play in the urban context. Moreover, it is precisely the area that will face the biggest challenges of future water issues from the sea.

The neologism of Urban Seascaping is proposed as a linguistic tool to grasp and express the desired changes we want to see in the unforeseeable future (Fink, 2012) for coastal cities. The introductions to new conceptions can form discussions about values that we want to address and, through their frequent use, make the new conceptions more familiar and normative. USS seeks to contribute a framework for decision-making processes that holistically integrate the sea and the non-humans into the urban realm. The main aim of Urban Seascaping is to reflect a more unified concept of nature and culture[27], in this case, the forgotten

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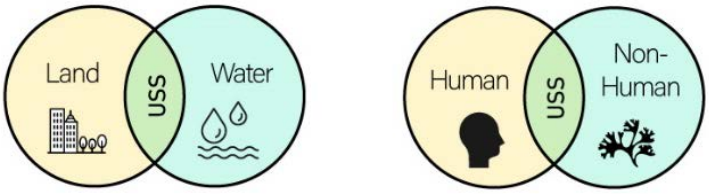
[26] Multispecies coexistence, multispecies future, multispecies cohabitation, multispecies response-ability are one of many terms that deal with the need for co-existing with other species in a more equitable and mutually beneficial manner in the age of the Anthropocene. There are many scholars and proponents of this theory, one of the prominent scholars who made this term well-known is Donna Haraway (Haraway, 2007, 2016).

[27] The discussion on the conceptions and relationship of nature and culture is an age old, on-going debate. Nature in traditional western notion is considered separate and independent from the human. There are many new materialist scholars (and other scholars) that argue for a much more interrelated conceptions of nature and culture. They critique the dualistic conceptions of nature and culture in being responsible for the current ecological crisis (Bennett, 2010;

marine world. It attempts to reimagine the traditional dualistic notions of urban city as "culture" and sea as "nature" to a more hybrid and dynamic zone that may include the often-ignored agency of the sea and its marine life in coastal urban development. The use of "scaping" unifies the two worlds by emphasising their inter-relationality and inter-dependency (see Figure 8).

***URBAN** (CULTURE) + **SEA** (NATURE) + **SCAPING** (INTEGRATION OF NATURE-CULTURE)*



Seascape ~~Landscape~~ architect noun

Definition: *A person who develops ~~land for human use and enjoyment~~ the zone between land and sea for the human and non-human benefit, ~~placement of structures, vehicular and pedestrian ways and plantings.~~ through structures that integrate marine life while strengthening coastal adaptation and resilience in light of sea-level rise (global warming).*

Figure 8: Urban Seascaping – Looking at the inter-relationship between human and non-human, land and water at the urban shorelines. Urban Seascaping seeks to establish a sub-field within urban design, urban planning and landscape architecture. The potential role of a seascape architect is redefined (in red) from the definition of a landscape architect (in black) from Merriam Webster Dictionary (Merriam-Webster, n.d.). Illustration by the author.

The main focus of this research is to explore ways of integrating the sea and its lifeforms, such as seaweed, into the urban coastal landscape by making it more tangible and visible. The development of the USS's theoretical principles provides a foundational basis to include marine restoration as a normative practice in urban design, planning, policymaking, waterfront developments and coastal adaptation strategies. USS seeks to develop further existing theories of blue urbanism and ecological urbanism and utilise the power of design and qualitative methods of inquiry to re-envision coastal cities for a new reality with the sea. Furthermore, it attempts to address the gap in research of reconfiguring the conundrum of ocean sprawl in current waterfront development via utilising the full spectrum of ecosystem services (and NbS) provided by coastal ecosystems such as the seaweed.

The proposed principle of Urban Seascaping is built from existing theories and state-of-the-art practices and establishes a sub-field within urban landscapes. Moreover, the research draws cross-disciplinary knowledge from marine biology, geology, literature and philosophy to add various perspectives to strengthen different affiliations between living things and infrastructure. The USS framework proposes four core principles that can help guide design decisions and form new narratives about coastal adaptation at urban shorelines, looking specifically at the Danish context. The first principle is an ethical proposition of how to live with sea-

Guattari, 2000; Haraway, 2016; Morton, 2012; Rosa, 2019). According to the scholars Scherer and Klingan (2013) "Nature, as we know it, is a concept that belongs to the past. No longer a force separate from and ambivalent to human activity, nature is not an obstacle nor a harmonious other. Humanity forms nature. Humanity and nature are one, embedded from within the recent geological record" (Prominski, 2014). Nevertheless, interconnected conceptions of nature and culture is nothing new, as it has been for many indigenous world views around the world.

level rise in coastal cities. The second and third principle is a spatial proposition of creating a meeting space for urbanites and the sea (and its marine life). The last principle is a design proposition of creating an accessible, safe, visible and beautiful marine nature-based infrastructure that addresses the previous three principles. The four main principles under the USS framework are elaborated in the proceeding sections.

10.1 Principle I: Multispecies coexistence with the marine world

The first core principle of USS discusses what it means to shift from the conventional view of the sea as a threat for coastal cities to a co-resident, forging deeper relations with the "more-than-humans[28]" of the sea. In short, there is a need for a paradigm shift in the current anthropocentric worldview of the water to acknowledge them as an integral part of the entangled network of beings. To respond to the challenges and devastating impacts of climate change that will affect every being on earth to varying degrees, one cannot ignore the notion of justice, equity and responsibility of those who have the power to change the course of action. Reorientating our understanding of the world as interrelated and interdependent will help us understand that the well-being of more-than-humans is congruent to the humans'. It challenges us to think from the perspective of more-than-humans and acknowledge their inherent right to exist besides their instrumental use to humans.

Thus, the first principle departs from Donna Haraway's (2007, 2016) coexisting with the more-than-human. Currently, the needs of humans and more-than-humans seem to be in direct conflict with each other in urban environments. Once we recognise that more-than-humans and humans are intimately linked (as humans also have aquatic origins) and are mutually interdependent, the duty of care[29] should extend to other species. Therefore, this research calls for better inter-relations with coastal habitats such as seaweed as the representative symbol of a marine lifeform in light of sea-level rise. The first principles seek to ask questions about how we can create coastal cities not just for human habitation but also for marine lifeforms and whether the structures we design for them will be received well by them. As the sea continues to rise in the future, one questions how the inundated infrastructures and buildings should be designed for habitation by marine lifeforms as a better meeting place for citizens and marine life (see Figure 9 for examples of this approach).

The first principle of multispecies coexistence is to recognise the need for better protection and restoration of these coastal ecosystems as marine habitats are often excluded in nature protection areas, unlike land-based ones[30]. Furthermore, the implication for better protection and restoration of coastal ecosystems means coastal cities need to address a range of anthropogenic pressures on these coastal ecosystems. These are dealing with the sources of water pollution, restoring the imbalanced food chain and reinstating the sea bed with stone and rock reefs for marine lifeforms, to name a few. Without addressing these barriers to coastal ecosystems, coastal ecosystems will have difficulty surviving the continual climatic changes of warming and acidification.

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28 More-than-human' is a term conceived by the feminist scholar Donna Haraway (Haraway, 2007, 2016) to refer to the entangled multispecies reality (termed Multispecies Response-ability) that goes beyond the human. It is also used to depart from the binary notion of thinking of the world as being human and non-human. The term is used to illuminate new ways of thinking about agency and power of the different living forces. In this article, the term will be used to refer to the marine world, in particular the coastal ecosystems such as seaweed as the main representative marine species.

29 This claim is rooted in the science of ecology and many ecological thinkers that focuses on intertwined interrelations and networks and that care should extend to other living species in order for a mutually beneficial future for all. See (Alaimo, 2016; Bennett, 2010; Guattari, 2000; Haraway, 2016; Latour, 2007; Morton, 2012).

30 Furthermore, European coastal cities need to fulfil the various biodiversity goals set out by the EU directive for coastal ecosystem restoration (European Commission, n.d.).

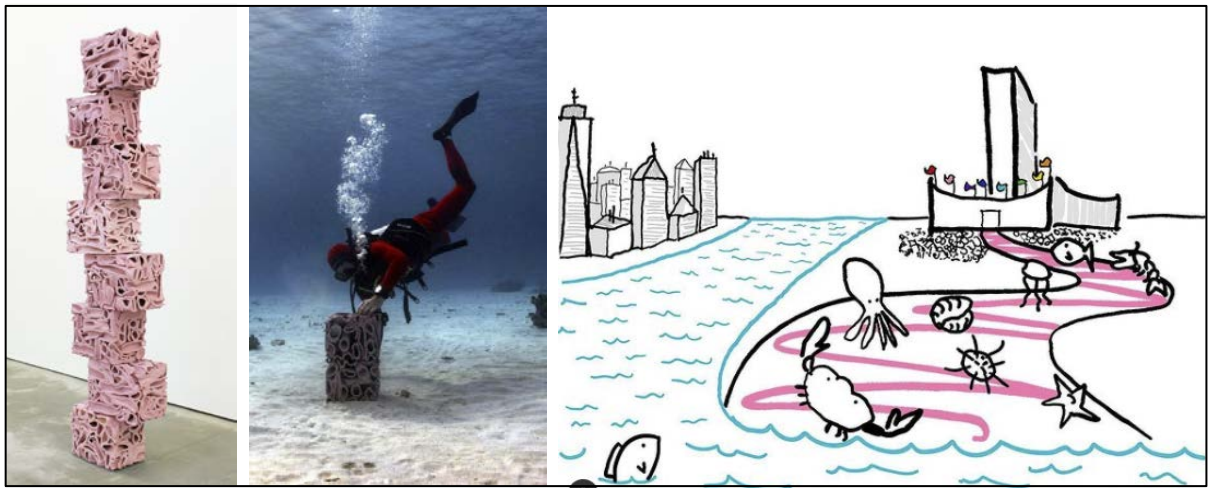

Figure 9. (Left): "Pink Elements" (no.6/Zig Zag Column) is part of the research project called "Deep Sea Minding" by Superflex. The pink sculpture is built with coral friendly bricks for fish. Installed at Galería OMR, Mexico City, 2019. Photo credit: Enrique Macías Martínez (Superflex 2019).
(Middle): A diver installing the pink element to test if the fish would inhabit and interact with the sculpture (Superflex n.d.).
Image credit (right): "Interspecies Assembly" - A drawing of what it means to mark the very first gathering of humans and other marine species on earth, to promote interspecies dialogue and cooperation (Superflex n.d.).

Therefore, the first principle emphasises the need for care of these coastal ecosystems and to ensure that we provide favourable space for them in our coastal cities, so we learn to coexist with them and not just by them.

Marine stewardship

It would be naïve to suggest that urban design and coastal landscape architecture alone would resolve the current nature-culture divide at the coast. Marine biologists, researchers, activists and people who work with ocean advocacy emphasise the critical role of creating a community around ocean literacy parallel to material initiatives (Hjerl, 2019; Mouritsen, 2019; Palmgren, 2019). These can include marine education centres, community outreach programs, marine restoration projects, sea gardens, cultural initiatives surrounding marine food. Local educational outreach programs for young students are essential as this generation will likely face the consequences of global warming and sea-level rise in this century. Therefore, the role of these initiatives is to help people develop "an ethical lens that extends beyond human self-interest" (Beatley, 2014), one that is mindful and respectful toward marine life and which inspires new ways to forge relations with the sea. Hence, USS's first principle of multispecies coexistence reflects the model of stewardship, which advocates integrating educational, restorative and cultural initiatives with coastal urban seascape design interventions to help nurture and sustain the design interventions. Harbouring this network that offers unique experiences to people living near the coast is a positive step towards multispecies coexistence.

Therefore, the first principle of USS is not just merely an ecological or an aesthetic approach dealing with sea-level rise but also an acknowledgement of the importance of education, community involvement, policymaking. They all play a vital role in aiding the material and mental transformation of coastal cities for the future.

10.2 Principle II: Invite the agency of the sea

Water as a connector, an actor, a living entity

Humans have conceived the sea in many different ways, and these conceptions influence how we shape our urban coastal environment. For more than a century of human history, the industrialised nations exercised a

superior proposition of ownership and management of the water by expanding coastal cities into the sea. The current typical physical design of the urban shorelines reflects this sentiment, as it demarcates a clear delineation between land and sea through land reclamation and hard edges. However, there are alternative ways of regarding this dualistic relationship manifested in physical form. For instance, alternative notions from societies such as the Caribbean islands have a concept called the "archipelagic thinking", which emphasises the dissolution of the boundary between the sea and land by conceiving the water as a connector, a bridge between islands, not as a divider (Pugh, 2013). The various island communities do not consider themselves separated by sea but integrally connected as a whole by the water (Pugh, 2013; Shields, 2020). By developing from this type of interconnected thinking, there may be scope for new urban shoreline infrastructures and coastal seascapes to use the agency of the water as a connector rather than a divider where human and more-than-human actors can enhance interaction that can develop over time.

Additionally, other unique and alternate worldviews acknowledge the agency of water bodies, such as the indigenous Māori people of New Zealand. New Zealand was one of the world's first to recognise a more intrinsic value of more-than-human entities in the legal system. The Whanganui River was recognised as a living entity by the New Zealand government (Roy, 2017; Warne, n.d.). They passed legislation declaring that the river and all of its physical and metaphysical elements - "is an indivisible, living whole, and henceforth possesses all the rights, powers, duties, and liabilities of a legal person" (ibid.). This law reflected the Māori relational worldview to see the water as an ancestor, living kin. There are contemporary urban planning applications of these paradigms, where the coastal waters of New York were legally recognised as the "sixth borough" with its human representation and legal frameworks just like the land boroughs (Ameel, 2019). It was a way to recognise that the city and the sea were integral to the urban environment.

Thus, the second USS principle questions the influence of current dominant worldviews of water and how it shapes the way we make decisions at the coast. The second principle is a call to embrace the agency of the sea and alternative views of the water to influence different decisions for the future of coastal cities.

Wet territory as the new commons (after retreat)

The second USS principle takes the proposition that the sea is a key actor and a spatial design driver to influence the meeting place between humans and more-than-humans, city and sea in an increasingly watery world. In the age of the Anthropocene and rising sea levels, water could be an integral part of place-making and identity for coastal cities.

Inevitably for many coastal cities, a long term strategy of retreat needs to be carefully considered by various stakeholders to plan a secure future of coastal cities at the end of this century. There will be areas that will increasingly be high-risk zones that need to be relocated to higher ground. This provides a unique opportunity to experiment with the vulnerable low lying shorelines and urban waterfront as areas of transformation - the new commons (see Figure 9 as an example of interspecies assembly). These new commons can potentially rethink and transform the coastal urban edge conditions to aid in overcoming the perceptual, physical and emotional barriers between sea and land while providing essential services at the coast. Since guaranteeing the full protection of coastal cities from the forces of the sea is not possible without resorting to more drastic measures of higher walls and pumps, USS suggests the radical act of opening up some of the shoreline edges to the sea to provide new connections and opportunities to create softer, more dynamic zones. These zones can better respond to tides, periodic flooding, and long-term rise in sea levels. Inviting the agency of the sea into the coastal cities can inspire the design process by understanding how the water weaves through the urban landscapes.

A relevant reference to an implemented project of reversing the colonisation of the sea[31] is in Gyldensteen Beach in Fyn, Denmark[32] (see Figure 10). Although this is not an urban setting nor a "designed" element, this blue infrastructural strategy led by marine biologists allowed a planned conversion of the hard coastline to an intertidal marine habitat. It did so by breaching the dikes and purposely flooding the farmland as a buffer zone to protect the neighbouring town from coastal flooding. This initiative was possible due to the increasing financial burden of maintaining the dikes that were frequently breached by storms. The former site was a wet marshland that required extensive human effort to convert to dry land. Therefore, understanding the former conditions before human intervention is critical in realising that in the future, it no longer makes sense to resist the forces of the sea to keep it dry. In order to move forward with addressing the challenges of tomorrow, a long-term sustainable solution is needed that considers various factors beyond mere coastal protection.

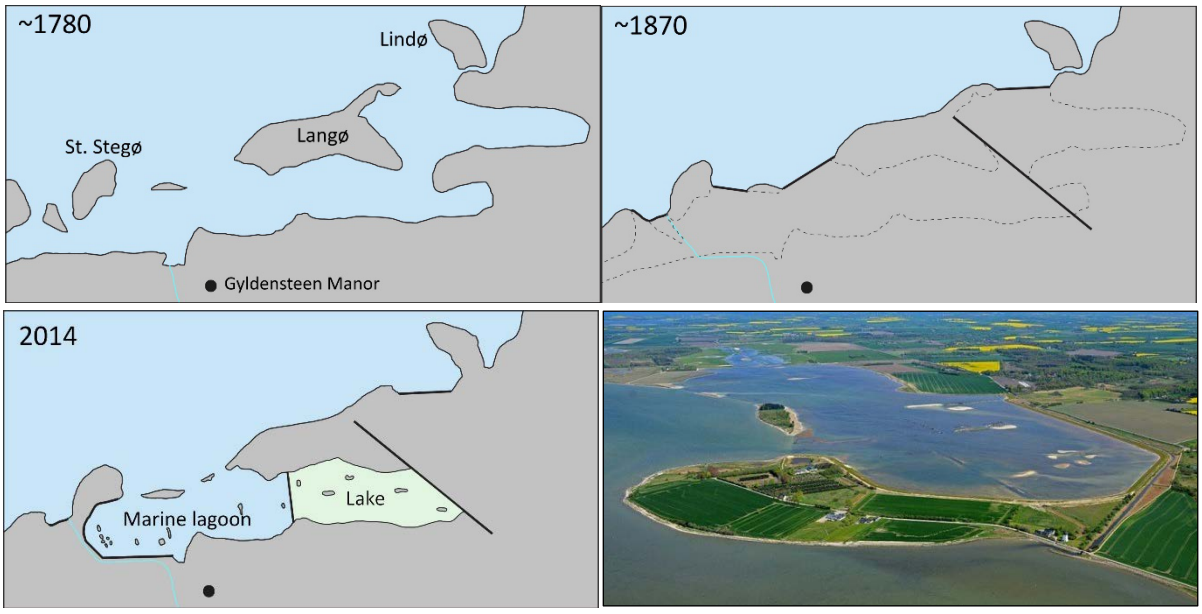

Figure 10. Three maps of the history of land reclamation in Gyldensteen Beach in Fyn, Denmark, from the 1780s to 1870. The land was given to researchers to be purposely flooded in 2014 to create a marine nature reserve. In 1870 dikes were used to block and drain out the sea. In 2014, coastal defences were breached to create intertidal habitat. Maps credit: Cintia O. Quitana and Klimatilpasning (Faragò et al., 2018; Klimatilpasning, n.d.). Aerial image credit: Viggo Lind

Furthermore, USS seeks to tell a story of returning some of the critical areas to the oceans to critically rethink the traditional ways cities occupy the waters' edge. The most appropriate strategy may depend on several complex factors, and it requires careful decision-making and management in what these new commons could be.

Living with wetness

As we expect a much wetter future for Denmark, we need to ask how much wetness we are willing to accept as the new reality of living in the Anthropocene. Water needs to be a key connective force that shapes the

[31] One of the earliest examples of an implemented project reversing the colonisation of the sea (due to land reclamation) was in the UK in the late 1970s, to the marshy northern coast of the County of Norfolk. Note, this is not an urban example, therefore, the idea of reversing land reclamation is noted, rather than the actual relevance of applicability in the urban context.

[32] One of the few examples of managed realignment projects in Denmark where it invites the sea into the former agricultural land to form saltwater lagoon and artificial freshwater lake as a buffer strategy to protect the town (Bogense) from coastal flooding. It also serves as a nature reserve for birds and marine life and a hot spot for recreation with an education centre (Aage V. Jensen Naturfond, n.d.; Klimatilpasning, n.d.; VisitNordfyn, n.d.).

city's relations with water as an integral part of everyday coastal urban life as forces of the sea is expected to have a stronger and unexpected presence in the future. Continuing the "control and conquer" approach of the water (as discussed in the previous sections) will have limitations in a changing climate with negative consequences on humans and more-than-humans. Thus, if the residents at the coastal cities wish to live with the water, they need to accept the new reality of living with a higher presence of water that requires higher levels of adaptation and resilience from the residents.

Finally, an integrated and closer exposure to the sea and its life forms would aid the current and future citizens to discover their encroaching watery neighbour to understand the ephemeral nature of coastlines and more fluid notions of boundaries beyond the concrete edge. Coastal cities have the unique opportunity to explore and experiment with a better relationship to the water by providing a safe, beautiful, educational and innovative meeting place between the citizens and the sea. The more-than-human world should not be subjected to the "out of sight, out of mind" mentality confined to nature reserves but also in the mesh of entanglements in coastal cities where new narratives and spaces can form as a key part of the city's identity.

10.3 Principle III: Beyond Walls

Seaweed as part of the nature-based solution

The third principle of Urban Seascaping seeks to address the unexplored solution space by going beyond the dominant hard approach to coastal protection to one of adaptation. USS argues that it is critical to consider long-term strategies by integrating a marine nature-based approach as part of the coastal adaptation strategy. This long-term thinking means ensuring that the aforementioned critical function of coastal ecosystems such as seaweed is protected, restored and integrated into urban shorelines for the benefit of humans and more-than-humans in light of changing climatic conditions.

From an edge to a zone

Furthermore, going beyond walls means thinking spatially from an edge to a zone. Nature-based solutions require a vast area to achieve a significant level of wave attenuation, carbon sequestration and water filtration. Therefore, coastal protection should no longer be limited to the narrow boundaries of the urban shoreline edge but to expand to a zone to address the interconnection between land and water (see Figure 11). It also means conceiving the site of intervention as a series of networks from a multi-scalar, systems approach to understanding the zone - everything from macro/global to micro/local level.

As the sea continues to rise in this century, the territories of water will no longer be confined within the neat concrete hard edges of current urban shorelines, transforming the current arbitrary boundaries to be more blurred and dynamic.

In the case of seaweed to perform wave attenuating properties, kelp forests (brown macroalgae) inhabit deeper, colder and saltier waters out of human sight (See Figure 11 and 12). Kelp forests can perform the first line of defence as it reduces the strength of waves in the event of storm surges. Thus, by the time the attenuated waves reach the coastal city, it reduces the need to implement harsher hard approaches of coastal protection, such as higher sea walls that severs the connection to the water. Kelp can be grown on buoys and lines (as shown in Figure 12) as a potential method to create a dense forest for coastal protection that will correspond to a rise in sea level in the future due to its buoyancy (Zhu et al., 2021). Moreover, other smaller and more beautiful seaweeds that grow near the coastal shorelines can be integrated as an urban design element, e.g. "sea gardens" to be the visual symbols of sea-level rise, a new resident of the critical coastal zone (the new urban commons). These sea gardens need to provide an opportunity for citizens to engage with the sea and its lifeforms to envision them as an active part of the physical, ecological and

aesthetic coastal cityscape (see Figure 13 as an example of an attempt to integrate marine life into an urban designed public structure).

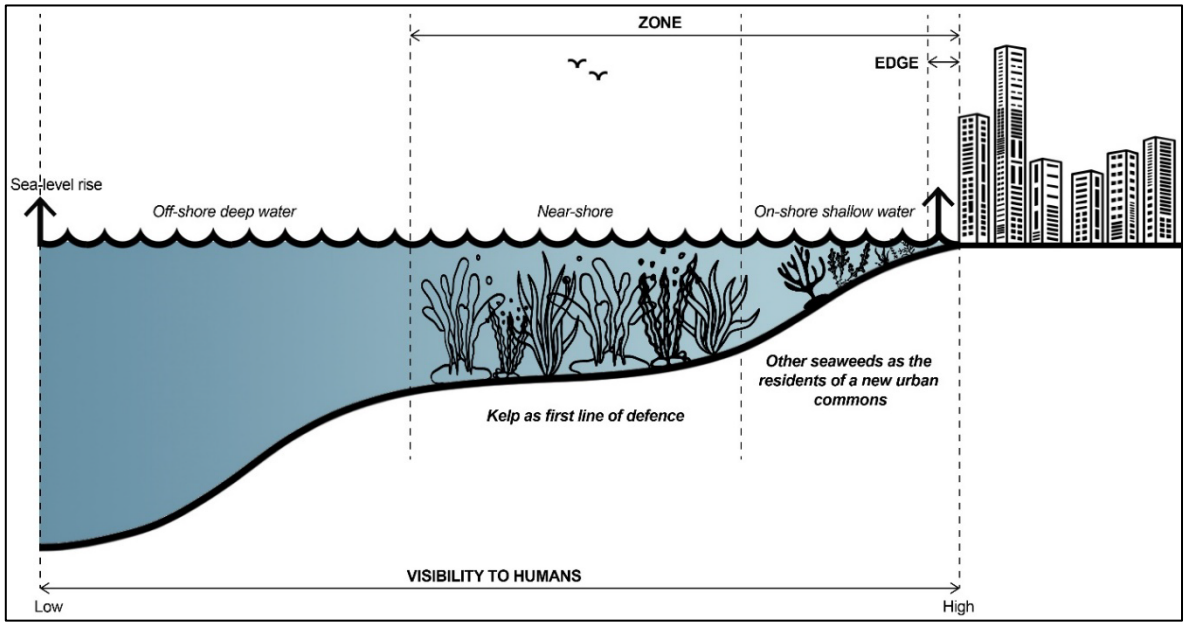

Figure 11. Thinking past edge conditions to a zone when considering water and marine lifeforms into coastal adaptation strategy. Kelp (brown macroalgae) as the "invisible" first line of defence against storm surge via wave attenuation and other seaweeds near the urban shorelines as a visual storytelling element of sea-level rise and as the residents of the new urban commons in the waterfront.

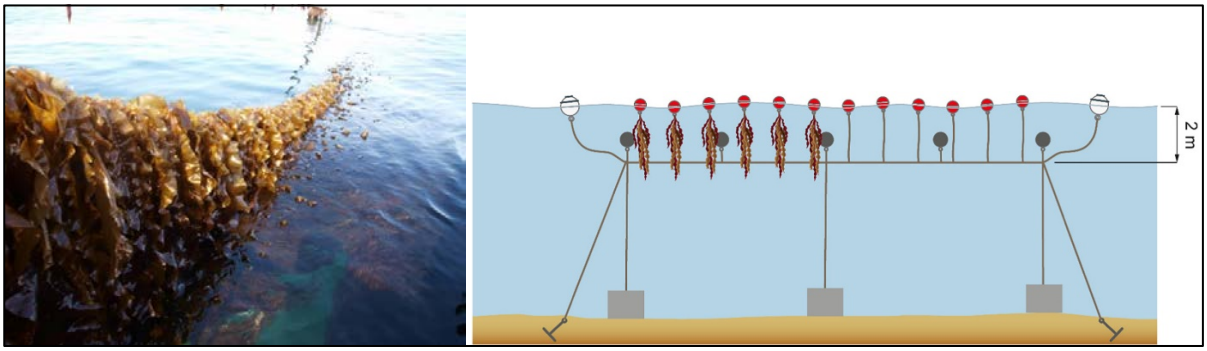

Figure 12. Sugar kelp (Laminaria saccharina) is grown on lines and buoys in Danish waters. There is scope to grow kelp forests in appropriate conditions to dissipate the strength of storm surges (Zhu et al., 2021). (Note that several kilometres of dense kelp forests are required to provide a significant amount of coastal protection. Local testing is required to understand various factors that influence the performance of the kelp). Image credit: Teis Boderskov (Boderskov, 2020; Boderskov et al., 2021).

Additionally, Urban Seascaping emphasises the need for these so-called "sea gardens" at the urban shorelines not only to be a place of observation and interaction but also as a place that challenges our everyday terrestrial experience of the sea. For example, an art installation in Germany called "On Water" (refer to Figure 14) is an example of a tactile and sensuous approach to urban installations using the water. Although it does not integrate marine life forms as part of the design, it encourages the urbanites to cross the water via a partially submerged bridge, enabling the citizens to get their feet wet[33] and providing a different sensory

[33] *Of course this is not always appropriate in every urban shorelines due to strong wave action, but in the calm waters of the Danish coast in East Jutland, Fyn and Zealand, this type of example is much more applicable.*

experience of the watery neighbour. This simple art installation highlights the paradigm shift of challenging the dry urban experience to include water in the design.

Figure 13. Oriental Bay Enhancement by Architecture Workshop in Wellington Harbour in New Zealand. People use this urban designed public space for contemplation and interaction with the sea. The design of the structure incorporated the transient nature of the tides through the use of steps, rock reefs and intertidal pools, allowing people to see and touch the marine lifeforms. Image credit: The photos were taken by the author in December 2019.

Figure 14: A temporary artistic installation called "On water" in Münster, Germany, by Ayşe Erkmen. A project in which people can experience and feel the various qualities of water (i.e. temperature and viscosity) by walking through the submerged bridge. A sensual way to connect the city separated by water by pedestrian access. Image Credit: Left image – Roman Mensing (Mensing, 2017), Right image – Gregory Volk (Volk, 2017)

10.4 Principle IV: Making the invisible visible

Seaweed as the visual, ecological symbol of coastal urban transformation

The fourth and final principle focuses on the importance of integrating seaweed (and other coastal ecosystems) in an accessible, tactile, sensuous and visually beautiful way. This approach means creatively exploring urban design solutions to integrate seaweed (and other coastal ecosystems) into the waterfront fabric to connect to the wider coastal city and its identity.

Thus, the fourth principle emphasises the importance of bringing the invisible and forgotten marine realm into the visible urban realm in light of sea-level rise. USS argues that seaweed can play a visual role as the representative symbol to highlight the importance of marine ecosystems in tackling global warming. Furthermore, "seascaping" (i.e. coastal landscape architecture) the urban shorelines with seaweed aims to celebrate its aesthetic and intrinsic value as an ecological symbol for positively rethinking urban

transformation. Therefore, to design a space that influences a future culture of becoming with the ecosystems of the sea means recognising and fostering the links and constant flux between environment, organisms, and land-use practices – both humans and more-than-human. Moreover, it means identifying and bringing forth the complex processes that tie together different species and systems. USS advocates going beyond human tendencies for territorial favouritism to extend solidarity towards the marine lifeforms by making them a key visible and integrated part of coastal cities. Thus, by turning our gaze not just on land but also below the water, we can start conceiving the invisible, visible (see Figure 15 of the typical seaweed growing in the Danish coastline).

Figure 15. Various seaweeds (macroalgae) are visible to the human eye from the coast in Elsehoved Beach, in Fyn, Denmark. The photo shows green seaweed called "Sea lettuce (Søsalat)" and brown seaweed called "Bladderwrack (blæretang)." The photo was taken by the author in July 2020.

11. CONCLUSION

We are edging closer and closer to the point of no return in our fight against anthropogenic climate change. The IPCC's latest report highlights the need for radical change and radical solutions to meet the necessary emissions reductions required to stay within a manageable temperature range. As the security of a sustainable global future is paramount, Urban Seascaping explores what it means to truly depart from business-as-usual practices, paradigms, and developments at the coast. What does it take to make significant changes needed without romanticising or reverting to the past? The future is one of creative possibilities to re-conceive, reorientate and re-design our relationship with the more-than-human agencies. Thus, Urban Seascaping seeks to contribute to a myriad of narratives currently at play in coastal adaptation.

Here are the key design principles, ethical propositions and coastal adaptation strategies that summarise what it means to Urban Seascape at our urban shorelines:

1) *Multispecies coexistence: Design our coastal cities not just for humans but also for cohabitation with the more-than-human.*

   - Proactive care, restoration and protection of coastal ecosystems are needed. For instance, reinstate the rock reefs back into the sea bed for marine lifeforms such as seaweed and deal with the sources of water pollution.
   - Plan for long term strategies that grow and adapt with time. For instance, design structures in the critical zone for inundation and adaptation at the coastal shorelines. These new structures need to be beneficial to marine life forms in material choice and design.
   - Initiatives must be coupled with local educational and socio-cultural practices that engage individuals and communities' lived experiences.

2) *Invite the agency of the rising sea into the coastal cities as the new meeting ground for multispecies coexistence.*

   - Identify high-risk areas in the future that can transform into new urban commons by inviting the agency of the rising sea and its marine life forms.
   - Acknowledge the agency of water as well as its intrinsic value – narratives and perspectives of water as a connector and a living entity. (for example, give water a legal representation – for better protection and restoration). Be wary of the dualistic view of nature-culture and be conscious of terrestrial bias to understand what it means to live with water in light of sea-level rise.

3) *Beyond walls: Shift our thinking of the coast from an edge to a zone.*

   - Depart from the current view of the water as a threat by going beyond the traditional defence-driven approach to coastal protection to include coastal ecosystems (nature-based solution). For instance, seaweed as a marine nature-based solution as the first line of defence against storm surges by dissipating the strength of the waves.
   - Assign a bigger area of focus (from an edge to a zone). Nature-based solutions require a much bigger area, and the marine world requires inter-relational systems thinking of space and boundaries.
   - The new commons need to understand the networks and processes from a holistic point of view that acknowledges the constant synergy between the urban and the sea.

4) Make the invisible visible: Explore the potentials of seaweed as the representative visual and ecological symbol for positively rethinking urban transformation.

   - There is a need for innovative coastal landscape architecture and coastal adaptation strategies that integrate marine lifeforms (seaweed) in a visible, tactile, accessible, restorative and beautiful manner. Therefore, integrate marine nature-based solutions in the new urban commons as a safe meeting place between urbanites and marine life, increasing their presence and awareness. Coastal ecosystems should be a key part of the future planning of coastal cities to ensure higher resilience to climate change and benefit from richer biodiversity.

These USS principles constitute an ethical call to the creative disciplines to derive new territories for action by giving more-than-human marine species a unified and equal foothold in the urban world. It is one way of envisioning alternative narratives and futures in the age of the Anthropocene; and a small contribution to an ongoing paradigm shift needed in urban shorelines to re-envision what it truly means to live not just by sea but *with* the sea.

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Urban waterways, water sensitive urban design, and the law: A help or a hindrance? A focus on urban stormwater

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ABSTRACT

Traditional urban stormwater management systems have paid little attention to environmental needs. Water sensitive urban design is a low impact development approach to planning and engineering that provides significantly better environmental outcomes, but its uptake has been slow in New Zealand. In 2020, the New Zealand Government released a new National Policy Statement on Freshwater Management. This placed Te Mana o Te Wai - the good health of waterways - at the heart of freshwater planning. This article describes the pre-2020 urban stormwater planning and management approach and critically discusses the new approach, concluding that significant opportunities to improve urban stormwater management have been missed. The argument is supported by a detailed consideration of urban stormwater plans in Auckland and Christchurch.

Keywords: water planning, urban design, green infrastructure

1. INTRODUCTION

Almost all of New Zealand's population growth is and will continue to be in urban areas. Traditional urban and industrial development alters landscapes from permeable vegetated surfaces to a series of impervious surfaces directly connected to surface water. This results in frequent pulses, increased flood peaks and poor-quality stormwater runoff, requiring management. Historically New Zealand, like other industrialised countries, treated stormwater as a liability and nuisance endangering human health and property – this was particularly so in Auckland where sewers and stormwater ran together in combined pipes (and still does in some areas). This resulted in a focus on the design of stormwater management systems to rapidly convey stormwater runoff directly to waterways with no focus on ecosystem health. In such systems, even 2 mm of rainfall generates runoff carrying contaminants (including sediment, heavy metals, oils/greases, faecal material and litter) washed off from impervious surfaces such as roads, footpaths and roofs. These harm fish and aquatic life, which are generally much more sensitive to these contaminants than people or plants. The increased frequency of flows and higher peak flows also alter stream channel morphology and stability, as eroding banks further degrade biodiversity values. In summer, removal of riparian shade combined with stormwater from hot impervious surfaces exacerbates impacts on aquatic life by increasing stress and toxicity of some contaminants (notably ammonium).

In recent decades there has been increasing recognition that urban waterways can be valued ecosystems providing habitat for a range of important fauna and for plant species. Instead of piping or turning our back

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on streams, wetlands and lakes, we've focused new development around them (e.g., Avon River redevelopment, Pegasus town). This movement towards celebrating water and 'holistic stormwater management' has begun shifting the perception of stormwater runoff from a liability and nuisance to that of having value as a water resource, with resulting changes to stormwater management practices. Further impetus to the change of perception has been provided by recent droughts, cost of providing large centralised potable water (a substantial proportion of which of which is used for toilet flushing and summer irrigation), and the increasing appreciation of rain tanks to provide resilience in natural disasters.

The National Policy Statement for Freshwater Management 2020 (NPSFM) came into force on 3 September 2020 and has reinforced the concept of Te Mana o te Wai - a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community.

Water-sensitive urban design (WSUD or WSD) is a land planning and engineering design approach. It integrates the urban water cycle, including stormwater, groundwater and wastewater management and water supply, into urban design to mimic the natural hydrological cycle. This minimises adverse environmental effects and can improve aesthetic, biodiversity and recreational values. WSUD is similar to low-impact development (LID), a term used in the United States; and Sustainable Drainage System (SuDS), a term used in the United Kingdom.[2]

This paper considers the policy and regulatory context for the protection and enhancement of urban waterways and the adoption of WSUD principles and approaches. It focuses on stormwater as one of the 'Three Waters'. However, it does not comment on the regulation of drinking water or wastewater, and acknowledges these are both important elements of water law which relate to urban areas.

To date, while the regulatory context has allowed the adoption of WSUD principles and approaches, their implementation appears to rely on informed and committed individual developers, planners, council staff and decisionmakers. WSUD has, in many cases, been treated as a 'luxury', side-lined by concerns about the cost of maintenance and that property owners will not do that maintenance. Exemplary, integrated WSUD projects have been constructed throughout NZ over the last 10 to 15 years but it is still 'fringe', although mandated in some large infrastructure projects (e.g., NZ Transport Authority projects). In some cases, WSUD has been applied to enable development in highly environmentally sensitive areas such as wetlands (Takanini, Auckland) and upstream of sensitive marine environments (Long Bay, Auckland).

A range of new regulatory and policy initiatives in relation to stormwater are being implemented or proposed. But will they result in the desired improvements?

This paper addresses:

- A brief description of the water quality challenges of urban growth and development practices
- The policy and regulatory environment prior to 2020
- The regulatory and policy changes introduced in 2020

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[2] For a recent seminar and series of papers on WSUD in the New Zealand context see https://www.tauranga.govt.nz/council/water-services/water-sensitive-design.

For a detailed discussion of the issue, see V. Southworth, Increasing the uptake of building-scale water sensitive urban design stormwater management options in Christchurch, New Zealand, Master of Water Resource Management Thesis, University of Canterbury 2019 - https://ir.canterbury.ac.nz/handle/10092/17052

It concludes that the recent regulatory changes are helpful, even if strictly unnecessary. However, these regulatory changes are not sufficient in themselves. Alongside these regulatory changes, the recommendations of both the 'Activating Water Sensitive Urban Design for Healthy Resilient Communities' work of the Building Better Homes, Towns and Cities National Science Challenge and the policy and practice recommendations of the Urban Water Working Group need to be implemented. That includes prohibiting 'business as usual' where these have known adverse effects – such as stream piping, copper and zinc roofing and guttering materials, and direct piping of stormwater to streams. It also means ensuring minimum standards and 'bottom lines' adequately protect receiving environments, providing mechanisms which incentivise all stakeholders to achieve improved outcomes, and having funding mechanisms available to ensure that such outcomes are financially achievable.

2. CHALLENGES OF URBAN GROWTH AND DEVELOPMENT PRACTICES[3]

During urban development pervious surfaces (grasslands, forests, wetlands) are usually replaced with impervious surfaces (roads, buildings, paved areas). This disrupts the natural water balance by reducing infiltration of rainwater into soil and groundwater, thus increasing the volume of water that runs off into streams and reducing baseflow which supports stream flows during dry periods. Urbanised catchments are characterised by flashy flows (impervious surfaces such as roofs and pavement create extreme high flows during rain events, with periods of very low flows in-between).

Impervious surfaces provide a hard surface on which contaminants accumulate (e.g., copper in vehicle brake dust accumulating on roads). A wide range of contaminants are produced in urban areas due to the variety of activities such as transport, industry (e.g., outdoor use and/or storage of chemicals and materials), and residential chemical use (pesticides, cleaning agents, painting). During storm events, water running over these impervious surfaces collects and transports the contaminants into drains and streams resulting in higher contaminant concentrations in urban streams compared to streams in non-urban areas. In addition, some impervious surfaces themselves generate contaminants. For example, zinc is released from zinc-based roofing materials and copper is released from copper architectural material.

Other issues include removal / piping of headwater and ephemeral streams areas and removal of wetlands and seepages which filter and detail water, and support summer stream flow.; modified or channelised stream beds; chemical and physical barriers to fish passage; and low native biodiversity with dominance of tolerant weed or pest species. Furthermore, water in urban streams often has faecal contamination, which combined with sediment (which allows bacteria to survive longer), means urban waterbodies are unsuitable for recreation after rainfall or food gathering at any time.

These pressures, commonly referred to as symptoms of 'urban stream syndrome', need to be addressed to provide for ecosystem health and other community values. Altered stream channels and piping can in some cases have counter-productive effects on urban resilience when piped networks and flow channels reach design capacity and overflow. This can cause damage to property, and in some extreme cases, pose a threat to human life. These issues decrease the social and cultural well-being of urban communities. The loss of urban waterbodies to piping/drainage can also reduce the sense of place that people have with an area.

[3] *For a general description of water quality issues associated with urban areas, see eg Gadd, J and Milne, J. 2019. Monitoring water quality in urban streams and stormwater: Guidance for New Zealand practitioners. NIWA Client Report 2019168AK prepared for Envirolink. MBIE Contract No. Co1X170; Urban Water Principles: Recommendation of the Urban Water Working Group.2018. Wellington: Ministry for the Environment; Implementing Ngā Wai Manga – the Urban Water Principles through policy and practices – the Urban Water Working Group's recommendations to central government and the urban water sector. 2020. Wellington: Ministry for the Environment.*

Impacts on urban waterbodies often go hand in hand with reducing or degrading areas people use (e.g., for recreation, mahinga kai).

In combination, these multiple pressures result in degradation of biological communities and reduced ecological functioning in urban streams. This condition is characterised by fewer sensitive invertebrates and fish species. In New Zealand, urban streams are dominated by pollution-tolerant taxa as demonstrated by lower macroinvertebrate community index (MCI) and Ephemeroptera-Plecoptera-Trichoptera (EPT) scores.

3. THE POLICY AND REGULATORY ENVIRONMENT PRIOR TO 2020

In 2020, several policy and legislative changes were introduced. This section of the paper considers the regulatory and policy context before these changes were introduced to understand the significance of these recent changes. Prior to 2020, the regulatory and policy context for stormwater management comprised the Resource Management Act 1991 (RMA), the National Policy Statement for Freshwater Management 2014 (as amended in 2017), the New Zealand Coastal Policy Statement 2010 (NZCPS), and various Council planning instruments promulgated under the RMA.[4]

3.1 Resource Management Act

To achieve its sustainable management purpose, the RMA sets out the duties and functions of regional and territorial authorities and the hierarchy of planning documents. In regard to the effects of using or contaminating water resources, the responsibility largely lies with regional councils while the control of the effects of land-use activities lies largely with district or city councils. The RMA provides for the preparation of national policy statements, national environmental standards, regional policy statements, regional plans and district plans. The relevant documents, through their objectives, policies and rules, set the resource management context for water, water services and associated infrastructure management. All activities associated with the establishment and operation of water services and infrastructure must be assessed against these plans, which will influence what and where infrastructure can be developed, how it is managed, its development cost and the timing of development.

3.2 National Policy Statement for Freshwater Management 2014 (as amended in 2017)[5]

Regional and district councils had to give effect to this and decisions on resource consents had to have regard to it. The Freshwater NPS required regional councils to recognise the national significance of freshwater for all New Zealanders through including provisions within their regional plans. These set freshwater objectives and environmental standards for all of the freshwater use, discharges into water and integrated management of the effect of land use and development on fresh water.

Policy C2 of the 2014 NPS required all regional councils to make or change regional policy statements to the extent needed to provide for the integrated management of the effects of the use and development of:

- land on fresh water, including encouraging the co-ordination and sequencing of regional and/or urban growth, land use and development and the provision of infrastructure; and
- land and fresh water on coastal water.

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[4] *A detailed stocktake of provisions (objectives, policies, rules and methods) relevant to stormwater in a selection of Resource Management Act planning documents can be found in 'Stormwater Policy and Plan Provisions. Stocktake and Assessment' 3-c2055.00 Rev 1. WSP, Christchurch. 16 March 2020.*

[5] *https://environment.govt.nz/publications/national-policy-statement-for-freshwater-management-2014-amended-2017/*

3.3 New Zealand Coastal Policy Statement 2010

Policies 22 (Sedimentation) and 23 (Discharge of Contaminants) require consideration of the impact of land use on coastal water and consideration of the integrated management of catchments and stormwater networks.

To demonstrate what was able to be achieved in the pre-2020 context, I set out some comments on the regulatory context of New Zealand's two largest urban areas, Auckland and Christchurch.

3.4 Auckland Unitary Plan

The Auckland Unitary Plan was made operative in part at various dates from 2016. The Auckland Council had initially sought specific references to WSUD in the Plan's provisions. However, the Independent Hearing Panel Water did not accept that and instead imposed a comprehensive set of policies relating to 'Water Quality and Integrated Management'.[6]

The Stream Ecological Valuation (SEV) methodology was originally designed to determine the value of Auckland urban streams, but is now being applied by many other regional councils to evaluate effects management proposals associated with impacts of modifying streams. For the most part, the SEV methodology is a robust and effective tool to support decisions on suitable offset packages for the modification or loss of freshwater stream habitats. The SEV methodology has produced successful outcomes and given certainty to regulators and applicants alike.[7] However, in Auckland, the large-scale removal of streams now means there are not enough stream lengths remaining on which to apply mitigation, so mitigation/offsetting often involves expensive stream daylighting projects.

In October 2019, the Environment Court approved a single, regionwide Auckland stormwater network discharge consent (NDC).[8] The single stormwater network discharge consent (NDC) replaces 116 different consents and multiple authorisations with a single consent containing a comprehensive set of requirements for use across Auckland.

The NDC is described as, "a key tool in managing and integrating land uses, stormwater discharges and the region's natural water assets to reduce impacts from climate change and flooding and allow multiple community and environmental outcomes to be realised".[9]

This consent is intended to:

- provide certainty and a regionally consistent set of performance requirements
- provide a framework to support urban growth and development for future urban areas while enabling stormwater management plans to be tailored to specific sites and scenarios

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[6] *See sections 1.2.1 and 3 of the decision of the Auckland Unitary Plan Independent Hearings Panel Hearing topics 46, 47, 48 and 49 dated July 2016 - https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/unitary-plan/history-unitary-plan/ihp-designations-reports-recommendations/Documents/ihp046to049waterqualitystormwater.pdf*

[7] *For a description of SEV and the concept of biodiversity offsetting generally see Biodiversity Offsetting under the Resource Management Act: A guidance document September 2018 available at https://www.lgnz.co.nz/assets/Uploads/7215efb76d/Biodiversity-offsetting-under-the-resource-management-act-full-document-....pdf*

[8] *Kainga Ora and others v Auckland Council. 30 October 2019.*

[9] *Auckland Council Design Manual: Regionwide Stormwater Network Discharge Consent (NDC) available at http://www.aucklanddesignmanual.co.nz/regulations/technical-guidance/ndc*

- improve water quality through robust performance requirements for the public network
- reduce complexity and promote compliance requirements
- deliver accountability, transparency and best practice through regular reporting and reviews.

The NDC applies to:

- existing diversions and discharges of stormwater from the public network, including areas with combined sewers that overflow into watercourses
- new or modified diversions and discharges that result from the upgrading of the stormwater network
- future diversions and discharges that result from the extension of the public network to service intensification and greenfield growth.

The NDC expires in 2052. It has 42 conditions and seven Schedules. Condition 41 enables a review of conditions under s128 of the RMA "to address any unanticipated adverse effects that arise from the exercise of the consent or to adopt any new requirement of a National Policy Statement, National Environmental Standard." However, this is likely to be triggered, given the frequency and volume of sewage overflows in the Eastern Isthmus which are permitted as the "Best Practicable Option', and not addressed by the Central Interceptor (which targets Western Isthmus sewage overflows).[10]

The Auckland Unitary Plan also provides for Stormwater Management Areas in the Auckland section.[11] These apply in areas in Auckland that have higher quality streams. These provisions have been influential in increasing WSUD by providing that all sites within the SMAs must:

(a) provide retention (volume reduction) of at least 5mm runoff depth for the impervious area for which hydrology mitigation is required; and

(b) provide detention (temporary storage) and a drain down period of 24 hours for the difference between the pre-development and post-development runoff volumes from the 95th percentile, 24-hour rainfall event minus the 5 mm retention volume or any greater retention volume that is achieved, over the impervious area for which hydrology mitigation is required.

3.5 Canterbury Land and Water Plan (CLWP)

The CLWP became operative in March 2017. It has several policies relating to stormwater in urban areas. They are not as comprehensive as the Auckland Unitary Plan:

4.15 In urban areas, the adverse effects on water quality, aquatic ecosystems, existing uses and values of water and public health from the cumulative effects of sewage, wastewater, industrial or trade waste or stormwater discharges are avoided by:

a. all sewage, industrial or trade waste being discharged into a reticulated system, where available;

ab. all stormwater being discharged to land or into reticulated system, where a reticulated system is available;

[10] *See https://www.stuff.co.nz/environment/300001629/remuera-residents-gagging-at-eel-and-sewage-miasma*

[11] *https://unitaryplan.aucklandcouncil.govt.nz/Images/Auckland%20Unitary%20Plan%20Operative/Chapter%20E%20Auckland-wide/1.%20Natural%20Resources/E10%20Stormwater%20management%20area%20-%20Flow%201%20and%20Flow%202.pdf*

b. all stormwater being discharged in accordance with a stormwater management plan, where one has been consented;
c. the implementation of contingency measures to minimise the risk of a discharge from a wastewater reticulation system to surface water in the event of a system failure or overloading of the system beyond its design capacity; and
d. any reticulated stormwater or wastewater system installed after 11 August 2012 is designed and managed to avoid sewage discharge into surface water.

4.16 Any reticulated stormwater system for any urban area is managed in accordance with a stormwater management plan that addresses the following matters:

a. the management of all discharges of stormwater into the stormwater system; and

b. for any reticulated stormwater system established after 11 August 2012, including any extension to any existing reticulated stormwater system, the discharge of stormwater being subject to a land-based or designed treatment system, or wetland treatment prior to any discharge to a lake or river; and
c. how any discharge of stormwater, treated or untreated, into water or onto land where it may enter water meets or will meet, the water quality outcomes and standards and limits for that waterbody set out in Table 1, Schedules 5 and 8 and Sections 6 to 15,(whichever applies); and
d. The management of the discharge of stormwater from sites involving the use, storage or disposal of hazardous substances, and
e. Where the discharge is from an existing local authority network, demonstration of a commitment to progressively improve the quality of the discharge to meet condition (c) as soon as practicable but no later than 2025.

4.16A Operators of reticulated stormwater systems implement methods to manage the quantity and quality of all stormwater directed to and conveyed by the reticulated stormwater system, and from 1 January 2025 network operators account for and are responsible for the quality and quantity of all stormwater discharged from that reticulated stormwater system.

4.17 Stormwater run-off volumes and peak flows are managed so that they do not cause or exacerbate the risk of inundation, erosion or damage to property or infrastructure downstream or risks to human safety.

3.6 Christchurch Water Strategy

In 2008, the Christchurch City Council and Environment Canterbury agreed on a 'Protocol for surface water management'.[12] The Protocol sets out how the two councils will work together to achieve integrated management of stormwater in Christchurch. The three primary Principles in the Protocol are:

1. Integrated land-use planning: Ensure that land-use planning and stormwater planning is integrated.
2. A multi-value approach: Improve the water quality, landscape, recreation, heritage and cultural values of surface water resources whilst managing flood risk.

[12] https://ccc.govt.nz/services/water-and-drainage/stormwater-and-drainage/policy-and-strategy/protocol-for-surface-water-management/

3. Collaboration: Work together, at all levels, to achieve Principles 1 and 2 in the most effective and efficient manner.

In September 2019, the Christchurch City Council adopted the non-statutory Te Wai Ora o Tāne Integrated Water Strategy.[13] This strategy addresses eleven key strategic issues relating to managing wastewater discharges, ensuring long term water supply, responding to stormwater management, flooding, and potential sea-level rise issues, improving water quality and waterway health, and ensuring that the community values its many different types of water resources.

The strategy recognises the various roles of local, regional and national governments, public and private organisations and the general public. Additionally it recognises how each can contribute to realising the strategy's vision. The strategy recognises and incorporates the Urban Water Principles - Ngā Wai Manga recommended by central government's Urban Water Working Group (see below).

The strategy also supports the implementation of the Canterbury Water Management Strategy, in particular with respect to the following targets: ecosystem health and biodiversity, kaitiakitanga, drinking water, recreational and amenity opportunities, water-use efficiency and environmental limits.

3.7 Christchurch City Plan

The Christchurch City Plan (2016) contains the following policy:

8.2.3.4 Policy - Stormwater disposal

a. District wide:
    1. Avoid any increase in sediment and contaminants entering water bodies as a result of stormwater disposal.
    2. Ensure that stormwater is disposed of in a manner which maintains or enhances the quality of surface water and groundwater.
    3. Ensure that any necessary stormwater control and disposal systems and the upgrading of existing infrastructure are sufficient for the amount and rate of anticipated runoff.
    4. Ensure that stormwater is disposed of in a manner which is consistent with maintaining public health.

b. Outside the Central City:
    1. Encourage stormwater treatment and disposal through low-impact or water-sensitive designs that imitate natural processes to manage and mitigate the adverse effects of stormwater discharges.
    2. Ensure stormwater is disposed of in stormwater management areas so as to avoid inundation within the subdivision or on adjoining land.
    3. Where feasible, utilise stormwater management areas for multiple uses and ensure they have a high quality interface with residential activities or commercial activities.
    4. Incorporate and plant indigenous vegetation that is appropriate to the specific site.
    5. Ensure that realignment of any watercourse occurs in a manner that improves stormwater drainage and enhances ecological, mahinga kai and landscape values.

[13] https://ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/strategies/te-wai-ora-o-tane-integrated-water-strategy

6. Ensure that stormwater management measures do not increase the potential for bird strike to aircraft in proximity to the airport.
7. Encourage on-site rain-water collection for non-potable use.
8. Ensure there is sufficient capacity to meet the required level of service in the infrastructure design standard or if sufficient capacity is not available, ensure that the effects of development are mitigated on-site.

In December 2019, the Environment Court issued a stormwater discharge permit to the Christchurch City Council which provides for stormwater management across the City. The permit is for a 25-year period and contains 65 conditions and 10 Schedules. The review condition[14] provides that the Regional Council may (but is not required to) review the conditions every 6 months for a range of purposes including:

- Achieving consistency of the consent in regard to catchment management planning and stormwater management with the provisions of the Christchurch--West Melton Sub-regional Section of the Canterbury LWRP within five years of the notification of the sub-regional section;
- Providing alternative Receiving Environment Attribute Target Levels for water quantity;
- Ensuring that improvements of the quality of the stormwater discharge occur over the duration of the consent to reduce any adverse effect on the environment;
- To provide alternative standards for the expected city-wide percentage contaminant load reductions in Condition 19, or targets for the contaminant load reductions set within SMPs that become apparent through the Christchurch Contaminant Load Model or alternative methods developed by the Consent Holder.

The Christchurch City Plan also provides a policy (but no rules) for a new commercial development. It is required to be "well-designed and laid out by" (inter alia) "incorporating principles of low impact design including energy efficiency, water conservation, the reuse of stormwater, on-site treatment of stormwater and/or integration with the wider catchment based approach to stormwater management, where practicable".[15]

3.8 National Science Challenge: Building Better Homes, Towns and Cities. Activating water sensitive urban design for healthy resilient communities

In 2018 and 2019, the Building Better Homes Towns and Cities National Science Challenge funded the 'Activating Water Sensitive Urban Design (WSUD) for healthy, resilient communities' research project.[16] The project delivered a range of research papers with the objective of enhancing capability to address critical current barriers to the uptake of WSUD in New Zealand.

The wellbeing benefits of Water Sensitive Urban Design and GI are summarised in a report, "Assessing the Full Benefits of WSUD".[17] This report notes that the potential benefits of WSUD, relative to conventional urban development approaches, are typically expected to include better hydrology and water quality and

[14] *Condition 63*

[15] *Policy 15.2.4.2. Contrast this with industrial development which is only "encouraged to use a multi-value approach" for stormwater management and no reuse requirement (Policy 16.2.3.3), and residential development where the policy is to "promote" water efficiency, through non-regulatory methods only (Policy 14.2.4.8).*

[16] *See https://www.buildingbetter.nz/news/2019/wsud_green_infrastructure_fundamental_to_wellbeing.html*

[17] *https://www.buildingbetter.nz/publications/urban_wellbeing/Moores_Batstone_2019_Assessing_full_benefits_WSUD.pdf*

healthier aquatic ecosystems. While there remain evident gaps on the delivery of these outcomes, especially in New Zealand, monitoring and modelling methods for their assessment are well developed.

However, assessments of the benefits of WSUD that focus solely on these water-related outcomes are incomplete in their scope. WSUD has the potential to deliver a wide range of other environmental and social co-benefits. For instance: the preservation of natural soils; microclimate moderation; terrestrial habitat provision for native biodiversity; the provision of supplementary water supplies; better public safety; and improved health and wellbeing deriving from the use of green infrastructure (GI).

A number of tools developed overseas provide for assessments of the benefits of WSUD. These draw on established methods from the field of resource economics to infer economic benefits associated with the GI's delivery of a wide range of water-related and co-benefits. Combined with information on infrastructure costs, these methods can be used in assessments of cost-benefit and cost-effectiveness of WSUD compared to conventional water management approaches.

However, these tools are not readily applicable in New Zealand, for reasons that include uncertainty in benefit transfer from one jurisdiction to another, caution over the monetization of environmental benefits and an aspiration to adopt assessment methods that explicitly recognise Māori values.

Recognising this, the research team developed the qualitative 'More Than Water' assessment tool to help communities, designers, and funders compare the nature and extent of benefits of projects with and without Water Sensitive Urban Design.[18] The name 'More Than Water' reflects the potential for WSUD to deliver multiple benefits and cost-related advantages, in addition to more familiar considerations associated with management of the hydrological and water quality effects of urban development. MTW provides for the evaluation of a wide set of benefits and costs criteria using a simple qualitative assessment method. The tool generates graphical outputs that can be used to demonstrate how benefit and cost outcomes may vary under different development scenarios.

The research team also prepared a report on alternative funding and incentive mechanisms to support implementation of WSUD in New Zealand.[19] This report considers the significant challenges in securing funds for stormwater managers to address the costs of operating and maintaining desired levels of service, and for planning for future growth while meeting community aspirations to maintain or enhance the quality of the environment. The report states that there is no 'silver bullet' which can solve the funding gap facing councils and network operators in New Zealand. Rather, a toolbox approach to funding is needed. The exact make-up of this funding approach needs further investigation, but it could include:

- New development (greenfield and large-scale brownfield) CAPEX costs to be funded through development and financial contributions and implemented in a way which provides greater flexibility for councils/ utilities to have more say in what types of assets are delivered;
- Targeted rates for stormwater OPEX funding of existing stormwater infrastructure and to cope with maintenance costs of new infrastructure;
- Incentives and reduced fees for properties incorporating green infrastructure;
- Road user charges to account for contamination from roads (up to 35% of impervious surfaces are located on non-rateable land, and 60% of expenditure associated with pollution control is required because of pollution caused by motor vehicles);

[18] https://www.landcareresearch.co.nz/science/living/cities,-settlements-and-communities/water-sensitive-urban-design/more-than-water-mtw-assessment-tool

[19] https://www.buildingbetter.nz/publications/urban_wellbeing/Ira_Batstone_2019_WSUD_Incentives_&_Funding.pdf

- Cap and trade schemes for urban catchments which incorporate large rural areas;
- Third party operators and/or public private operators to deliver and manage standalone integrated water schemes.
- A national government incentives programme (similar to the Melbourne Water "Living Rivers" programme) which allows regions to sustainably implement the NPS-FM and provides support to WSUD projects in local councils, financing activities and employees to build capacity and facilitate projects which councils would not otherwise take on.

The paper concludes by recommending that future research be undertaken that identifies: the current state of three waters funding by local authorities; opportunities to identify and resource common toolbox mixes of solutions; opportunities for co-benefit based funding; and gaps in capacities to pursue the opportunities afforded by alternative potential funding regimes. These enquiries are motivated around the refinement and investigation of an appropriate incentives and funding policy to support WSUD implementation across regional areas of New Zealand.

3.9 Urban Water Working Group

In 2017, the Ministry for the Environment convened the Urban Water Working Group, a collaborative body comprising practitioners and technical experts working in the field of urban water management. The Group comprised approximately 45 practitioners working in local government, the Three Waters sector, and the wider urban development and design sectors.

In its first phase, the group developed ten high-level urban water principles and values. The principles, or Ngā Wai Manga, reflect the Group's vision for improved urban water stewardship. They are intended to prompt action and promote alignment within government and industry.

These principles are intended to inform:

- urban water policy, planning and consenting decisions
- urban development and infrastructure design choices
- other activities that impact urban water outcomes.

The urban water principles are high-level principles and values, intended to inform urban water policy and planning decisions, infrastructure design choices, and other activities related to urban water outcomes. Overall, these principles are intended to help inform a national vision, promote alignment in government and industry, and prompt action to support the achievement of local and national objectives for urban water.[20] They have no regulatory role.

The ten Urban Water Principles are[21]:

Papatūānuku – Our relationship with the land – papatūānuku – will pre-determine our relationship with water

1. Protect and enhance ecosystem health of all receiving environments.
2. Co-design with nature an integrated and regenerative approach to urban development.

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[20] Urban Water Principles: Recommendation of the Urban Water Working Group.2018. Wellington: Ministry for the Environment. See https://environment.govt.nz/publications/urban-water-principles-recommendation-of-the-urban-water-working-group/

[21] For a detailed set of recommendations about practices for policy makers in relation to these principles see Appendix A: Practices for policy makers and regulators in Implementing Ngā Wai Manga – fn8

3. Address pressures on waterbodies close to source.

Ngā wai tuku kiri – Our waters are a gift of life provided to us by our tupuna

4. Recognise and respect mana motuhake – the whakapapa and relationship that mana whenua have with water ecosystems in their rohe.

Tāngata – Our environments are places of human occupation

5. Identify and consider the community values for urban water and reflect them in decision-making.
6. Optimise environmental, social and cultural benefits when investing in buildings and infrastructure.

Te hāpori me te wai – The community's love and care for water is enduring

7. Uphold and foster kaitiakitanga and custodianship of urban water ecosystems.
8. Collect and share information to promote common understanding of urban water issues, solutions and values.

Tiakina mō apōpō – In building future resilience, our connectedness with the environment is our strength

9. Increase resilience to natural hazards and climate change.
10. Conserve and reuse water resources.

In its second phase of its work, the Urban Water Working Group developed policies and practices that could implement Ngā Wai Manga. These policies and practices are aimed at central government, local government and the water sector.[22]

The Group's policy recommendations are aimed at central government. They are:

- Review primary and secondary legislation to identify changes to be made to protect and enhance Te Mana me te Mauri o te Wai in urban areas.
- Review and amend National Planning Standards to include provisions that require the implementation of Ngā Wai Manga and related practices (such as WSUD)
- Create a hub to share best practice, and develop guidance on best practices for urban water management
- Incorporate Ngā Wai Manga and related practices into guidelines for infrastructure providers and Crown agencies
- Develop a funding and incentives toolbox to promote best practices for urban water management
- Develop the educational pipeline and work with industry bodies to establish a national training and certification scheme for urban water practitioners and related professions, and promote widespread education of, and community participation in, urban water solutions.

[22] *Implementing Ngā Wai Manga – the Urban Water Principles through policy and practices – the Urban Water Working Group's recommendations to central government and the urban water sector. 2020. Wellington: Ministry for the Environment. See https://www.mfe.govt.nz/publications/fresh-water/implementing-nga-wai-manga-urban-water-principles-through-policy-and-practices*

In addition to the policy recommendations, the Urban Water Working Group's also made comprehensive recommendations about practice which reflect current and emerging best practice in New Zealand and around the world. The recommendations are[23]:

We recommend that the government:

- *incorporates these practices into official guidance*
- *leads the further development of these practices and creates a database of examples and case studies in the 'best practices hub' we have recommended*
- *engages with local government and infrastructure providers to promote and encourage the uptake of these practices*
- *considers how funding structures and incentives could support implementation of these practices*

***We recommend that the local government sector as policy makers and regulators**:*

- *incorporates these practices into their resource management plans and other council policies and plans*
- *promotes the adoption, uptake and implementation of these practices, both within their organisations and in their community*
- *works with infrastructure providers to promote the adoption and implementation of these practices*
- *creates pathways to enable innovation, and demonstrates willingness to take the risk on new approaches*
- *measures progress toward meeting Ngā Wai Manga, and provides good information to the public using State of the Environment and other environmental monitoring metrics*
- *resources non-regulatory methods, civic action and behaviour change programmes which support the implementation of the practices.*

We recommend that infrastructure providers (including councils, council controlled organisations and Crown agencies):

- *incorporate these practices into their policies and projects*
- *promote the adoption, uptake and implementation of these practices both within their organisations and in their communities*
- *works with key stakeholders and partners to promote the adoption and uptake of these practices.*

***We recommend that technical professionals**:*

- *adopt and promote the uptake of these practices within their organisations, industry sector, and clients*

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[23] The full recommendations can be seen in Appendices A – D of Implementing Ngā Wai Manga – the Urban Water Principles through policy and practices – the Urban Water Working Group's recommendations to central government and the urban water sector. 2020. Wellington: Ministry for the Environment. See https://www.mfe.govt.nz/publications/fresh-water/implementing-nga-wai-manga-urban-water-principles-through-policy-and-practices

- *support the establishment of a national training and certification programme for practitioners in the urban water sector and related professions*
- *support the establishment and ongoing development of a best practices hub*
- *share knowledge and help upskill and mentor others.*

4. 2020 – THE NEED FOR ADDITIONAL REGULATION

Having regard to:

- The NPSFM 2014;
- The NZCPS 2010;
- The non-regulatory 2019 Urban Water Principles (and the subsequent recommendations on policy and practice by the Urban Water Working Group); and
- The regulatory powers of regional and district councils as evidenced by the relevant Auckland and Canterbury statutory planning documents and the comprehensive discharge permits granted by the Environment Court to the Auckland Council and the Christchurch City Council

Arguably, in combination, there was an adequate regulatory regime for the proper implementation of integrated stormwater management and the adoption of WSUD. Nonetheless, in 2020 several regulatory changes were made to further strengthen the position.

4.1 National Policy Statement for Freshwater Management 2020

The National Policy Statement on Freshwater Management (NPS-FM) 2020 came into force in 3 September 2020. It contains several provisions relevant to stormwater management. The policy on 'Integrated Management' builds on a similar policy in the NPS 2014 (as amended in 2017). This policy provides:

> **3.5 Integrated management**
>
> (1) Adopting an integrated approach, ki uta ki tai, as required by Te Mana o te Wai, requires that local authorities must:
>
> (a) recognise the interconnectedness of the whole environment, from the mountains and lakes, down the rivers to hāpua (lagoons), wahapū (estuaries) and to the sea; and
>
> (b) recognise interactions between freshwater, land, water bodies, ecosystems, and receiving environments; and
>
> (c) manage freshwater, and land use and development, in catchments in an integrated and sustainable way to avoid, remedy, or mitigate adverse effects, including cumulative effects, on the health and well-being of water bodies, freshwater ecosystems, and receiving environments; and
>
> (d) encourage the co-ordination and sequencing of regional or urban growth.
>
> (2) Every regional council must make or change its regional policy statement to the extent needed to provide for the integrated management of the effects of:
>
> (a) the use and development of land on freshwater; and
>
> (b) the use and development of land and freshwater on receiving environments.

(3) In order to give effect to this National Policy Statement, local authorities that share jurisdiction over a catchment must co-operate in the integrated management of the effects of land use and development on freshwater.

(4) Every territorial authority must include objectives, policies, and methods in its district plan to promote positive effects, and avoid, remedy, or mitigate adverse effects (including cumulative effects), of urban development on the health and well-being of water bodies, freshwater ecosystems, and receiving environments.

This policy is strengthened from the 2014 NPS version. For the first time, there is an explicit requirement on territorial local authorities to include objectives, policies, and methods in their district plans to promote positive effects, and avoid, remedy, or mitigate adverse effects on water quality of urban development. Formerly, the NPS only had such requirements on regional councils.

The Regulatory Impact Analysis (RIA) on the NPS is instructive about why the policy in the NPS is not more explicit about WSUD. Several submissions had called for an explicit reference to WSUD to be included. The interim Regulatory Impact Statement[24] noted there would be a range of indirect costs and benefits of the proposed option, and again these would depend on the types of planning provisions territorial local authorities chose to use to give effect to the policy. The proposed policy involved placing a broad requirement on territorial authorities to manage the effects of land use for urban development on water bodies, rather than directing specific approaches that must be used. It "was expected" that "in general" councils would respond to this requirement with some combination of:

- protection of streams, lakes, estuaries etc. and related habitats, or restoration where degradation has already occurred
- use of best practice Water Sensitive Urban Design or Low Impact Design techniques, including regulating impervious surface cover, requiring on-site infiltration, and provision of green infrastructure for stormwater management (this can be promoted through guidelines or by working closely with land developers during initial structure planning and design phases).[25]

The Ministry for the Environment's Interim RIA noted[26] that while water sensitive design can have a range of environmental and community benefits, "these benefits can be difficult to quantify in financial terms and are highly site-specific".[27] It went on to state: "While water sensitive design approaches are the main response envisaged by this policy, the policy is deliberately broad and non-prescriptive to enable [Territorial Authorities] to respond in the most appropriate way for their circumstances".[28]

The final RIA confirmed that position.[29] The RIA states: "By requiring TAs to consider freshwater outcomes in their district plans we are directing them to **think about** urban development and freshwater management in

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[24] *Interim Regulatory Impact Analysis for Consultation: Essential Freshwater. Part II: Detailed Analysis 8 August 2019 Pages 234 - 247* https://www.mfe.govt.nz/more/briefings-cabinet-papers-and-related-material-search/regulatory-impact-statements/interim

[25] *Page 244*

[26] *Page 245*

[27] *Ibid.*

[28] *Ibid.*

[29] *Regulatory Impact Analysis Action for healthy waterways. Part II: Detailed Analysis 6 May 2020* https://www.mfe.govt.nz/regulatory-impact-statements/action-for-healthy-waterways-part-11

an integrated manner. The proposed policy involves placing a broad requirement on TAs to manage the effects of land use and development on freshwater, rather than directing specific approaches that must be used. The existing NPS-FM already requires freshwater to be managed in urban areas to meet freshwater objectives and limits that are set for freshwater bodies in regional plans. This policy is intended **to make it more likely that these requirements would be met**, by ensuring that when urban growth and development occurs it is accompanied by active consideration of, and decisions about, how to manage the effects of that growth on freshwater". [emphasis added]

In relation to WSUD specifically, the RIA stated: "We believe that while there is merit in requiring the implementation of WSUD, the aim of this policy proposal is to not provide specific direction about approaches TAs should use to manage the effects of land use and development on freshwater… Ongoing development in the sector is bringing WSUD forward, and will likely be a key consideration for most TAs, particularly because of the proposed policy requirement for TAs to consider adverse effects on freshwater from use and development".

And "We do not recommend making WSUD a mandatory requirement under the NPS-FM, but we instead propose to offer extensive guidance to councils in the wider implementation package. We also recommend removing the information note in the NPS-FM that reference WSUD as these are better covered in the implementation guidance".

This appears a timid approach and a lost opportunity. Other than this, there is no rationale for not having required all regional and district plans to include the Auckland provisions (or similar). That would have avoided the need for each council to go through its own (possibly lengthy and expensive) process. This could have been done under section 55(2A) of the RMA which means that the changes must be made without using the publicly notified process in Schedule 1 of the Act. If it is good enough for policies to be directly imported in regional plans in relation to wetlands, the loss of river extent and values, and fish passage,[30] then why not for urban design effects on urban streams?

4.2 National Policy Statement on Urban Development 2020

The NPS-UD 2020 recognises the national significance of:

- having well-functioning urban environments that enable all people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future
- providing sufficient development capacity to meet the different needs of people and communities.

This NPS does not address the environmental effects of urban development. As was noted in the Regulatory Impact Analysis on the Freshwater Reforms: "Although we expect the NPSUD will have beneficial effects for streams in urban areas, it is not the purpose of the NPSUD to directly address the management of freshwater and the Ministry does not consider the NPSUD on its own will provide adequate protection for urban streams".[31] This appears to have been left to the NPS-FM.

[30] *2000 NPS Clause 1.7*

[31] *Regulatory Impact Analysis: Action for Healthy Waterways. Part II Detailed Analysis. 6 May 2020 page 43*

4.3 Taumata Arowai - the Water Services Regulator

In September 2019, Cabinet made decisions about the creation of a new Water Services Regulator to administer and enforce the new drinking water regulatory system, while contributing to improved environmental outcomes from wastewater and stormwater.

On 6 August 2020, the Taumata Arowai—the Water Services Regulator Act 2020 became law. The Act establishes Taumata Arowai as a Crown Agent and provides for its objectives:

(a) protect and promote drinking water safety and related public health outcomes; and

(b) effectively administer the drinking water regulatory system; and

(c) build and maintain capability among drinking water suppliers and across the wider industry; and

(d) give effect to Te Mana o te Wai, to the extent that Te Mana o te Wai applies to the functions and duties of Taumata Arowai; and

(e) provide oversight of, and advice on, the regulation, management, and environmental performance of wastewater and stormwater networks; and

(f) promote public understanding of the environmental performance of wastewater and stormwater networks.

In relation to stormwater, its functions include:

- provide national-level oversight, leadership, communication, and co-ordination in relation to the environmental performance, management, and regulation of stormwater networks; and
- identify and monitor matters that affect the environmental performance of stormwater networks, including current and emerging contaminants; and
- provide oversight of, and information to central and local government in relation to (i) the development, operation, and effectiveness of standards, regulations, and other statutory requirements for stormwater; and (ii) compliance with, monitoring of, and enforcement of standards, regulations, and other statutory requirements affecting stormwater networks and stormwater network operators; and
- identify, prepare, or promote national guidelines and good practices that relate to stormwater networks and stormwater network operators.

On 28 July 2020, the Water Services Bill 2020 was introduced into Parliament. Subpart 7 provides for monitoring and reporting on environmental performance of wastewater and stormwater networks.

In relation to stormwater, Clause 136 - 141 requires Taumata Arowai to:

- monitor and report on the environmental performance of stormwater networks and network operators for specified purposes;
- collect information for the purposes of monitoring and reporting on the environmental performance of stormwater networks and network operators;
- establish and maintain public registers for stormwater networks;
- develop, publish, and maintain environmental performance measures for stormwater networks; and
- publish an annual report on the environmental performance of wastewater and stormwater networks and network operators.

In terms of stormwater and wastewater, these reforms are designed to:

- lift the environmental performance and transparency of wastewater and stormwater networks; and
- improve national-level leadership, oversight, and support relating to wastewater and stormwater.

This national body has real potential to make a difference in encouraging and supporting best practice stormwater management. This will depend on it having adequate resources. It may find itself at capacity addressing the (higher profile) issues of drinking water and wastewater, which have more clearly demonstrable links to public health.

4.4 Proposed Ministry for the Environment guidance

The Ministry for the Environment has signalled[32] that it is working on non-statutory guidance in three areas:

1. Model plan provisions referring to WSUD/water quality and integrated management
2. Structure planning provisions for stormwater
3. Model conditions for comprehensive stormwater discharge permits

5. CONCLUSION

In conclusion, good environmental outcomes could have been achieved without the 2020 amendments. As there was no time to assess their implementation, it remains unclear why the 2020 amendments were thought necessary, and what changes in practice the amendments were designed to encourage or require.

The regulation of stormwater management is not enough by itself to bring about the desired changes. The regulatory changes relate to just one of the seven primary recommendations of the Urban Water Working Group. It appears that to achieve the best outcomes, there is a need to implement the other recommendations from both the 'Activating water sensitive urban design for healthy resilient communities' work of the National Science Challenge and the Policy and practice recommendations of the Urban Water Working Group and the Activating WSUD work as part of the National Science Challenge. The latter's recommendations are:

- review and amend National Planning Standards to include provisions that require the implementation of Ngā Wai Manga and related practices
- create a hub to share best practice, and develop guidance on best practices for urban water management
- incorporate Ngā Wai Manga and related practices into guidelines for infrastructure providers and Crown agencies
- develop a funding and incentives toolbox to underpin and support implementation of best practices for urban water management
- develop the educational pipeline and work with industry bodies to establish a national training and certification scheme for urban water practitioners and related professions
- promote widespread education of, and community participation in, urban water solutions
- create capacity within local authorities to be able to move to WSUD as business as usual (which requires understanding of and access to funding)

[32] *MFE's perspective on WSD and freshwater management in urban areas – Tauranga WSD seminar 2019 - https://www.youtube.com/watch?v=ve6rzlZZJe4&list=PLEB3rzfl95tuaxF1fJvboZ2LXc_sHmzlC&index=14*

Alongside the work of the Ministry, the professional services firms who are advising developers and local government in this area (many of whom have access to international resources) will need to exercise leadership and collaborate with each other on supporting local government and developers to identify and apply international best practice on urban stormwater management.

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Managing biodiversity in the Waikato region, Aotearoa New Zealand

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ABSTRACT

A case study approach using discourse analysis of key planning documents is used to describe and review mechanisms used in 2020 by the Waikato Regional Council to manage biodiversity in the Waikato region, Aotearoa New Zealand. It sets out two proposed national-level tools that will change how biodiversity is managed in Aotearoa New Zealand. The case study assesses Waikato Regional Council planning documents against the Aichi Global Biodiversity Convention Targets. It also identifies a number of important barriers to better management of biodiversity in the Waikato region and outlines how these barriers could be addressed. The research was undertaken in the first six months of 2020 and provides a snapshot of the state of play at that time before the Aotearoa New Zealand Biodiversity Strategy 2020 was finalised.

It was found that the Waikato Regional Council appears to be well positioned to meet the Aichi Biodiversity Convention Goals. However, realisation of the Aichi goals through on-the-ground implementation is likely to be compromised due to a lack of adequate funding for both planning and implementation at the district level. Transparent targets or measures of success also threaten to compromise good implementation. Options for addressing these barriers include an increase in funding for district-level planning and implementation, plus strengthening alignment of existing planning tools (such as the Waikato Regional Plan) and measures of success with the Draft National Policy Statement for Indigenous Biodiversity and the draft New Zealand Biodiversity Strategy.

Keywords: biodiversity planning, environmental policy, Convention on Biological Diversity.

1. INTRODUCTION

This is a case study of the mechanisms used by the Waikato Regional Council (WRC) in May/June 2020)[1] to achieve on-the-ground implementation of maintaining, protecting and enhancing indigenous biodiversity in Aotearoa New Zealand. The case study investigates the extent to which New Zealand meets the Aichi Biodiversity Goals at the level of a regional council; a statutory government agency responsible for managing natural resources in Aotearoa New Zealand. Key barriers that prevent the council from meeting the Aichi Biodiversity Goals are identified, and options for addressing those barriers are suggested, taking into account foreseeable national-level mechanisms including the then draft New Zealand Biodiversity Strategy (2019) and the Draft National Policy Statement for Indigenous Biodiversity (2019).

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[1] *These policies and planning mechanisms may change as a consequence of implementing the Aotearoa New Zealand Biodiversity Strategy released in August 2020 and when the draft National Policy Statement for Indigenous Biodiversity is finalised and comes into effect.*

Hardwick (2016) defines a case study as "… the study of a single instance … in order to explore the context of that phenomenon." The WRC is the case study local government body explored here, but the objects of analysis in this case study include a range of WRC planning and policy documents. Qualitative content analysis is used to understand the intentions of the WRC to achieve on-the-ground implementation of maintaining, protecting and enhancing indigenous biodiversity (Luo, 2020). Relevant WRC staff were also emailed to obtain information not publicly discoverable, or to confirm the status of a particular planning tool if this was not clear from the council website or other documents.

2. BACKGROUND

The Convention on Biological Diversity (CBD) promotes the conservation and sustainable use of biological diversity on an international scale. Aotearoa New Zealand has been a signatory to the Convention since 1993 (CBD, 2020b). Biodiversity-related strategies and action plans in Aotearoa New Zealand are therefore required to be consistent with the CBD's Aichi Biodiversity Targets. These targets are expressed as a set of strategic goals for the period between 2011 to 2020 (see Table 1).

Strategic Goal A	Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.
Strategic Goal B	Reduce the direct pressures on biodiversity and promote sustainable use.
Strategic Goal C	To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.
Strategic Goal D	Enhance the benefits to all from biodiversity and ecosystem services.
Strategic Goal E	Enhance implementation through participatory planning, knowledge management and capacity building.

Table 1: Adapted from Aichi Biodiversity Targets, *by Convention on Biological Diversity, 2020a (https://www.cbd.int/sp/targets/)*

These targets were seen as stepping stones towards the 2050 Vision of "Living in harmony with nature" by the end of 2020 (CBD, 2020c) and a post-2020 Global Framework with new goals is currently being negotiated.

2.1 Current national settings for managing biodiversity in Aotearoa New Zealand

National mechanisms for the management of biodiversity by regional, unitary, and district councils in Aotearoa New Zealand include the Resource Management Act (1991), the Local Government Act (2002), and the Biosecurity Act (1993). The Resource Management Act (1991) directs the management of biodiversity, particularly on privately owned land. The Local Government Act (2002) sets processes that determine the amount of resources and funding a regional community allocates to the management of biodiversity. The Biosecurity Act (1993) requires councils to manage a class of biodiversity broadly categorised as pests and weeds, and this Act can influence how other classes of biodiversity (e.g. indigenous biodiversity) are managed. These three acts are described below in further detail.

2.2 The Resource Management Act 1991

The Resource Management Act (1991) (RMA) gives regional councils, unitary councils, and territorial authorities (district and city councils) responsibilities for maintaining biological diversity under sections 30 and 31 (see Table 2).

Statute	Regional council functions, powers	Territorial authority functions, powers and responsibilities
Resource Management Act 1991	Control use of land for the purpose of: maintaining and enhancing ecosystems in water bodies and coastal water (s30(c)(iiia)). Establish, implement and review objectives, policies and methods for maintaining indigenous biological diversity (s30(ga)).	Control of any actual or potential effects of the use, development, or protection of land, including for the purpose of maintaining indigenous biodiversity (s31).

Table 2: Primary functions and powers of local government that affect biodiversity. Adapted from Indigenous biodiversity and the RMA and Roles and Responsibilities*, by* Quality Planning, 2020a

Regional councils must provide for these matters through Regional Policy Statements (RPS) as per s59 of the Resource Management Act (1991). The overall purpose of an RPS is to achieve the purpose of the RMA by providing an overview of the resource management issues of the region, plus policies and methods to achieve integrated management of the natural and physical resources of the whole region. More specifically, an RPS must establish and implement objectives, policies, and methods for maintaining and enhancing indigenous biodiversity. Regional plans (developed by regional councils) and district plans (developed by territorial authorities such as district, unitary and city councils) must then give effect to, or implement that RPS (MfE 2020b).

2.3 Local Government Act 2002

Under the Local Government Act (2002) the purpose of local government is to "promote the social, economic, environmental and cultural wellbeing of communities" (2002, Section 10a). The Local Government Act (LGA) requires regional and territorial authorities to consult with their local communities and determine what public goods and services the community want provided to them (Quality Planning, 2012). Based on this consultation, councils develop and implement Long Term Plans that cover a period of ten years and describe the activities and community outcomes councils want to achieve. Overall funding for biodiversity initiatives is shaped through the Long Term Plan process and influenced by ratepayers via the submission process (Department of Internal Affairs, 2020).

2.4 Biosecurity Act (1993)

Regional councils are required by the Biosecurity Act (1993, Section 12B) to provide leadership in activities that prevent, reduce, or eliminate adverse effects from harmful organisms that are present in its region. Leadership activities include facilitating the development and alignment of regional pest management plans and regional pathway management plans in the region, plus facilitating communication and cooperation among those involved in pest management. District councils also have a responsibility to act as a management agency under the Biosecurity Act (1993, Section 14).

The Biosecurity Act is included in this analysis because biosecurity functions of councils influence the biodiversity planning, capability and initiatives in two ways. For example, the *Waikato Regional Policy Statement* (2016) requires the Regional Pest Management Strategy to have regard to indigenous biodiversity values, thereby safeguarding some ecosystems and habitats from being invaded by unwanted organisms (typically framed as pests and weeds). Secondly, different levels of funding are allocated to biosecurity and biodiversity separately through the *Waikato Regional Council Long Term Plan*.

2.5 Foreseeable national settings for managing biodiversity in Aotearoa New Zealand

At the time of conducting the research, the CBD website referred to a twenty-year-old biodiversity strategy, *The New Zealand Biodiversity Strategy: Our Chance to Turn the Tide* (2000), and a four-year-old *Biodiversity Action Plan* (2016) as New Zealand's current national-level guidance on managing biodiversity (CBD, 2020a). The Department of Conservation updated *Our Chance to Turn the Tide* with a new national-level biodiversity strategy launched in August 2020, *Te Mana o te Taiao- Aotearoa New Zealand Biodiversity Strategy 2020* and the CBD data has been updated accordingly but this is indicative of the potential for lack of alignment between national and international action. The Ministry for the Environment has published and received submissions on a *Draft National Policy Statement for Indigenous Biodiversity*, which has yet to be finalised. Once these national settings are confirmed, they will be key links to the CBD. The analysis for this case study was conducted against the then draft national strategy and draft national policy statement as those provided the context for the documents under study at the time. These two tools are explained in greater detail below.[2]

2.6 Draft National Biodiversity Strategy

The Department of Conservation of Aotearoa New Zealand led the development of a biodiversity strategy discussion document in 2019, which resulted in *Te Koiroa o te Koiora: Our shared vision for living with nature* (DOC, 2019). This document signals some fundamental changes to how biodiversity is managed in Aotearoa New Zealand. A core principle is that the protection and maintenance of indigenous species is privileged over non-indigenous species. The strategy proposes that future management of indigenous biodiversity must include strengthening the conservation and restoration of ecosystems and landscapes on private land, which brings this into the purview of regional and territorial councils. Immediate or short term directions in the draft strategy are outlined in Table 3.

Establish an interim governance structure to oversee the new biodiversity strategy's implementation planning and delivery	Immediate (Y1)
Deliver the National Policy Statement for Indigenous Biodiversity to regulate the way we manage biodiversity on land through council plans and resource consent decisions	Short term (Y1–2)
Review system responsibilities, governance, leadership and statutory roles and responsibilities to ensure that these are fit for purpose. Implement the recommendations of this review. At a national level this will include regular reporting, and independent audit of progress against the strategy, and independent advice on the key actions to be taken in development of the next round of action planning in 5 years' time	Short term (Y1–2)

Table 3: Short term directions proposed in the Draft Biodiversity Strategy. Adapted from Te Koiroa o te Koiora: Our Shared Vision for Living with Nature. A Discussion Document on Proposals for a Biodiversity Strategy for Aotearoa New Zealand, by the Department of Conservation.

A submission by the WRC to the proposed strategy made the following points:

- the WRC was largely supportive of the Draft National Biodiversity Strategy;

[2] *Despite the Aichi Biodiversity Targets also being updated or replaced in the post-2020 Convention on Biological Diversity Conferences of the Parties' negotiations there is no requirement in law for Aotearoa New Zealand to compulsorily adjust national-level tools to align with the updates.*

- a National Policy Statement for Indigenous Biodiversity is essential for implementing the strategy effectively;
- additional central government resourcing is required to give appropriate effect to the Biodiversity Strategy and the National Indigenous Biodiversity Strategy (WRC, 2019).

2.7 National Policy Statement for Indigenous Biodiversity

National Policy Statements (NPS) are instruments issued under section 52(2) of the RMA. An NPS prescribes objectives and policies for matters of national significance that are relevant to the RMA. An NPS includes direction for how local authorities are to give effect to that NPS (MfE, 2020c). A National Policy Statement for Indigenous Biodiversity (NPSIB) is currently under development by the Ministry for the Environment (MfE, 2019). It is a key tool that will support the implementation of the proposed Draft National Biodiversity Strategy. The final version of the NPSIB will have significant implications for how indigenous biodiversity is managed on all types of land tenure, including public, Māori, and private land.

The proposed NPSIB will require regional councils to prepare a Regional Biodiversity Strategy in collaboration with territorial councils, tangata whenua, communities, and other identified stakeholders. This in turn will be linked to the Draft New Zealand Biodiversity Strategy (MfE, 2019). Local authorities must then have regard to the relevant regional biodiversity strategy when developing restoration and enhancement objectives, policies, and methods for inclusion in RPSs and plans.

All councils will be required to identify areas with significant indigenous vegetation and habitats, Significant Natural Areas (SNAs), using criteria developed by ecologists. SNAs will be protected through regional and district plans and consent processes under the RMA (MfE, 2019). Indigenous biodiversity (on private land) that exists *outside* SNAs is also included, and councils will be required to determine where and when to manage adverse effects on these areas. The latter requirement will broaden the management of indigenous biodiversity beyond the constraints of SNAs, with the intention of enabling planners to take into consideration ecosystems and habitats at a larger spatial scale (MfE, 2019).

Consultation on the proposed NPSIB closed in March 2020, and a final version was planned to be gazetted approximately mid-2020, but this has yet to happen. Once gazetted, all local authorities will need to give effect to the proposed NPSIB by updating their planning documents in line with one of two possible implementation time frames:

1. Implementation as soon as reasonably practicable – SNAs identified and mapped in five years, scheduled and notified in plans in six years.
2. Progressive implementation programme – SNAs identified and mapped within seven years, scheduled and notified in plans in eight years (Ministry for the Environment [MfE], 2019).

A submission by the WRC to the proposed NPSIB is similar to that of the WRC submission to the Draft Biodiversity Strategy in that the council was largely supportive, noting that much of the Council's approach already set out in the WRC Regional Policy Statement aligns well with the draft NPSIB. However, WRC again argued that effective implementation of an NPSIB would require significantly more resources, and asked that central government contribute directly to the costs of implementing it (WRC, 2020e).

3. MAINTAINING, PROTECTING AND ENHANCING BIODIVERSITY IN THE WAIKATO REGION

In the Waikato a key mechanism for maintaining or enhancing indigenous biodiversity is the Waikato Regional Policy Statement (WRPS). This second generation WRPS became operative in the Waikato Region in May 2016 (WRC 2016). Chapter 11 sets out the planning framework for indigenous biodiversity through a hierarchy of objectives, policies, and methods that give effect to the RMA. The RPS provides for a mix of

regulatory (rules) and non-regulatory methods. The latter methods include information gathering, biodiversity inventory, threatened species information, district plan development, pest management, funding and assistance, and Local Indigenous Biodiversity Strategies (WRC 2016, Part B. 11-1 to 11-13).

3.1 Achieving action on the ground and Aichi Biodiversity Goals

One way to assess if WRC planning mechanisms meet Aotearoa New Zealand's obligations to the CBD is to identify and map which WRPS objectives, policies, and methods (at least notionally) give effect to each Aichi Biodiversity Goal. National-level legislation, policy statements, and policy directions are also included in this assessment, because they are relevant to Aichi Goals A and D, which require whole-of-society or national-level outcomes.

This mapping exercise is demonstrated in Table 4, and suggests that (on paper at least) each Aichi goal can be matched with at least one national-level mechanism, or a WRPS policy, objective and method. WRC could therefore be regarded as achieving Aichi Biodiversity Goals, and if considered as a proxy for management of indigenous biodiversity at a national level, Aotearoa New Zealand as a nation would also be achieving the Aichi goals.[3] However, a closer look at some key council documents suggests that, in practice, realisation of the Aichi targets in the Waikato region is likely to be compromised under the current planning and funding arrangements. This is explored in the following section.

4. BARRIERS TO BETTER ACHIEVING LOCAL IMPLEMENTATION OF NEW ZEALAND'S GLOBAL RESPONSIBILITIES.

The WRPS, supported by national-level legislation (both current and foreseeable), appears to position the WRC well to meet the CBD Aichi targets. However, a closer examination of council documents has identified four issues[4] which may act as barriers to achieving local implementation of New Zealand's global responsibilities for biodiversity. These include:

1. Funds allocated in the WRC Long Term Plan
2. Planning to link action on the ground
3. Alignment of the Waikato Regional Plan
4. Measures of success

This section explores these barriers in greater depth.

[3] *A key point of difference worth noting between the Aichi targets and the WRC RPS is that the Aichi Biodiversity Goals do not explicitly declare indigenous biodiversity as a priority, whereas the WRC RPS does (as does the draft National Policy Statement on Indigenous Biodiversity and the Draft Biodiversity Strategy). Conversely, the WRC RPS does not give effect to protecting, enhancing, or planning for non-indigenous biodiversity that may support or enhance indigenous biodiversity in general. An example might be non-native plants that provide an important food source for tui and bellbirds at certain times of the year (Banks Peninsula Conservation Trust, n.d.). Note that RPS makes provision in 11.1 and 11.2 etc. for areas of significant habitat of indigenous fauna, which could include non-indigenous vegetation.*

[4] *This is not intended to be a comprehensive review of barriers to protecting or enhancing biodiversity in the Waikato Region.*

Aichi Biodiversity Targets	National Legislation and Policy Directions	RPS Objectives[5] (WRC 2016)	RPS Chapter 11 Indigenous Biodiversity Policies (WRC 2016)	RPS Chapter 11 Indigenous Biodiversity Methods (WRC 2016)
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.[6]	RMA (1991) DRAFT Biodiversity Strategy (2019) DRAFT NPSIB (2019)			11.1.11 Local Indigenous Biodiversity Strategies
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use.	Biosecurity Act (1993) RMA (1991)	3.1 Integrated management 3.2 Resource use and development 3.12 Built environment		11.1.2 Adverse effects on indigenous biodiversity 11.1.9 Pest management 11.1.4 Recognition of activities having minor adverse effects on indigenous biodiversity 11.2.4 Identify threats to areas of significant indigenous biodiversity
Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.	RMA (1991) Draft Biodiversity Strategy (2019) Draft NPSIB (2019)	3.4 Health and wellbeing of the Waikato River 3.7 Coastal environment 3.19 Ecological integrity and indigenous biodiversity 3.16 Riparian areas and wetlands	Policy 11.1 Maintain or enhance indigenous biodiversity Policy 11.2 Protect significant indigenous vegetation and significant habitats of indigenous fauna Policy 11.4 Safeguard coastal/marine ecosystems	11A Criteria for determining significance of indigenous biodiversity 11.1.1 Maintain or enhance indigenous biodiversity 11.1.3 Avoidance, remediation, mitigation and offsetting (for indigenous biodiversity that is not significant) 11.2.1 Identify areas of significant indigenous vegetation and significant habitats of indigenous fauna 11.2.2. Protect areas of significant indigenous vegetation and significant habitats of indigenous fauna

[5] WRC RPS Objectives, policies and methods can be relevant to multiple Aichi Goals. In order to keep the above table simple, overlapping connections are not mapped.

[6] Aichi Objectives A and B are interpreted as requiring national-level legislation, policies, and strategies and methods as well as regional policies, objectives and methods.

Aichi Biodiversity Targets	National Legislation and Policy Directions	RPS Objectives[5] (WRC 2016)	RPS Chapter 11 Indigenous Biodiversity Policies (WRC 2016)	RPS Chapter 11 Indigenous Biodiversity Methods (WRC 2016)
Strategic Goal C continued			11A Criteria for determining significance of indigenous biodiversity	11.2.3. Assess significance 11.2.4 Identify threats to areas of significant indigenous biodiversity
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services.	Draft Biodiversity Strategy 2019: See footnote 6	3.8 Ecosystem services		11.1.10 Funding and assistance 11.3.2 Education and advocacy
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building.[7]	Draft Biodiversity Strategy (2019) NPSIB (2019) LGA (2002)	3.1 Integrated management 3.9 Relationship of tangata whenua with the environment	Policy 11.3: Collaborative management (Chapter 11)	11.1.5 Information gathering 11.1.6 Biodiversity inventory 11.1.7 Threatened species information 11.1.8 Plan development: incentives, financial contributions, economic instruments 11.1.10 Funding and assistance 11.1.11 Local Indigenous Biodiversity Strategies 11.3.1 Working with tangata whenua 11.3.2 Education and advocacy 11B: Significant indigenous biodiversity roles and responsibilities

Table 4: National and regional mechanisms aligned with Aichi Biodiversity Goals

Adapted from: *The Waikato Regional Policy Statement: Te Tauākī Kaupapahere Te-Rohe O Waikato* by Waikato Regional Council, 2016

[7] *Ibid*

4.1 Funds allocated in the Waikato Regional Council Long Term Plan

A Waikato Regional Council Long Term Plan (WRC LTP) covers a period of ten years and describes the council's activities and community outcomes it wants to achieve. While a WRC LTP cannot override the functions of an RMA, it is required to reflect the priorities and interests of the communities in the region. The WRC LTP subsumes biodiversity initiatives and activities under "Integrated Catchment Management" (WRC 2018). Biodiversity activities encompass three main functions: empowering communities, advancing restoration, and promoting the benefits WRC activities bring to the region's biodiversity.

A simple analysis of levels of funding for biodiversity initiatives through the WRC LTP compared to other activity areas is revealing. Biodiversity initiatives are subsumed in the WRC LTP into an area of activity called "Integrated Catchment Management" (WRC 2016). This is a non-statutory initiative which resources and coordinates management operations. Tables 5 and 6 offer a comparison of levels of expenditure both within Integrated Catchment Management group activities, and across all council activities for 2020/2021.
Table 5 (and Appendix A) demonstrates that expenditure on biodiversity initiatives *within* the Integrated Catchment Management group is only 10%. At 50%, the lion's share of expenditure is spent on catchment management and planning, and biosecurity receives a third. In addition, there is a significant difference in investment between biodiversity and biosecurity.

Breakdown of Integrated Catchment Management Expenditure 2020/21	**$(000)**	**Percentage of expenditure on Integrated Catchment Management**
Catchment management and planning	15,815	50
Biosecurity	10,587	33
Biodiversity	3,011	10
Land management advisory services	2,091	7
Total	**31,504**	**100**

Table 5: Breakdown of Integrated Catchment Management Expenditure 2020/21. Adapted from: 2018-2028 Long Term Plan: Te Marahere Roa by *Waikato Regional Council, 2018*

Expenditure in WRC LTP Activity Areas 2020/21	**$(000)**	**Percentage of total expenditure**
Public transport	39,000	24
Science and strategy	32,592	20
Integrated Catchment Management	31,504	19
Flood protection and control works	24,866	15
Resource use	17,460	11
Community and services	14,795	9
Civil defence and emergency management	2,561	2
Regional hazards and emergency response	2,072	1
Total	**164,850**	**100**

Table 6 Expenditure in all WRC LTP Activity areas 2020/21. Adapted from: 2018-2028 Long Term Plan: Te Marahere Roa by *Waikato Regional Council, 2018*

If expenditure is compared across all council activities for the years 2020–2021, transport receives the highest level of funding overall at 24%, with the Integrated Catchment Management group of activities receiving about 19%. Investment into biodiversity-specific activities is therefore only 2% of the expenditure across all council activities (Table 6 and Appendix B). The need for ratepayers to travel around their region is clearly

prioritised over and above protecting ecosystems and non-human species in the Waikato Region. Allocation of funds constrains or enhances council activities (and outcomes) and the relatively small proportion of funds allocated to biodiversity activities by the WRC LTP is a significant constraint.

4.2 Planning to link action on the ground

The Waikato Region is split into nine spatial management areas called "zones" (Figure 1). These are based largely on water catchments, and each zone must develop a Zone Management Plan. The primary purpose of a Zone Management Plan is the implementation of *all river and catchment management activities* [emphasis added] in the Waikato region (WRC, 2020f).

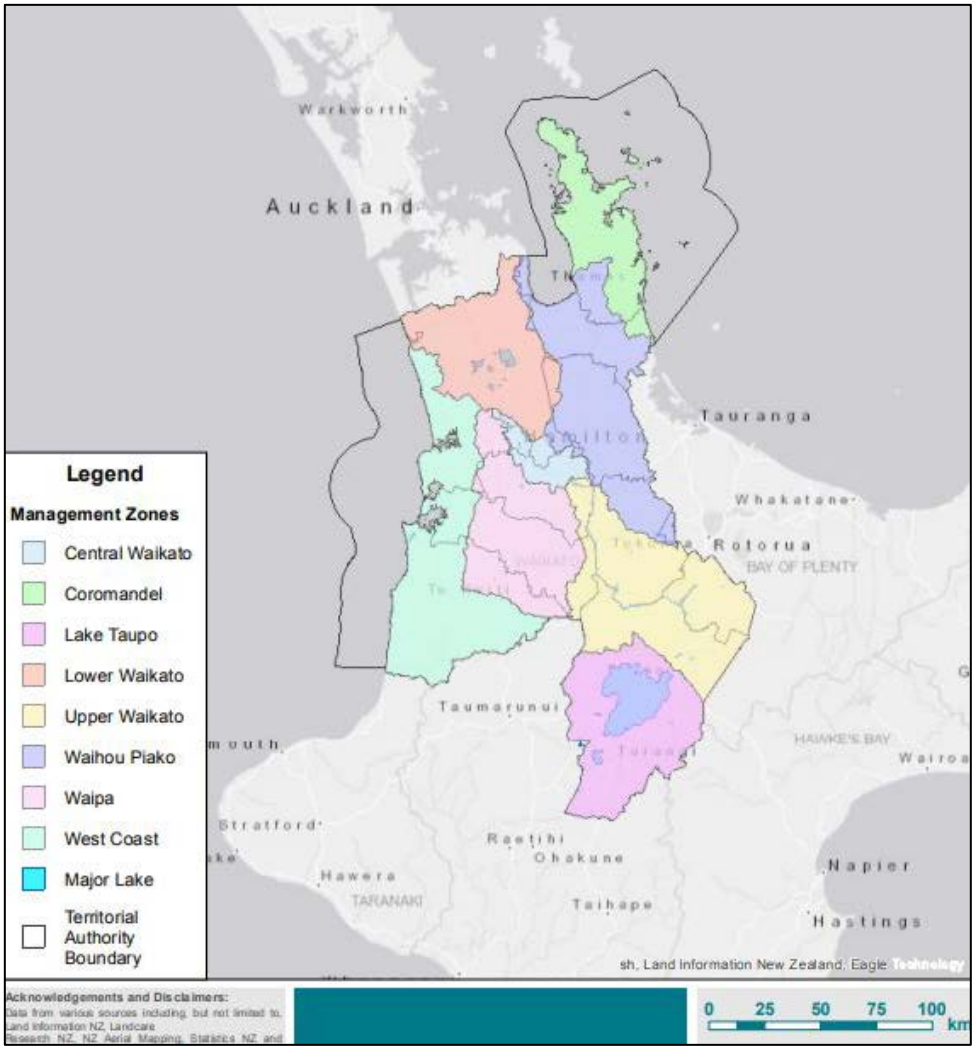

Figure 1. Waikato Regional Council Management Zones (Source: Waikato Regional Council (2020) Catchment Management Zones*)*

Zone Plans encompass a range of complex, competing activities, and it is hard to gauge the priority that different Zone Committees will give to a biodiversity plan among the other initiatives and outcomes they must deliver. There is potential for a Zone Committee to award the development and implementation of an indigenous biodiversity plan a similar priority to that which is commensurate with funding allocated in the Long Term Plan. In other words, flood management, drainage, and biosecurity is prioritised over an indigenous biodiversity plan.

Under the current WRC RPS, the responsibility for developing a Local Indigenous Biodiversity Strategy (LIBS) was intended to be handed over to the 11 district councils in the region (Method 11.1.11). Two LIBS were

piloted (Source to Sea and Hamilton Halo), and in the case of the Hamilton Halo LIBS, it became a policy directive which the Central Waikato Zone Plan had to take into account (see Figure 2). Planning for biodiversity at a local level therefore had a formal, recognised status in the Central Waikato Zone Plan.

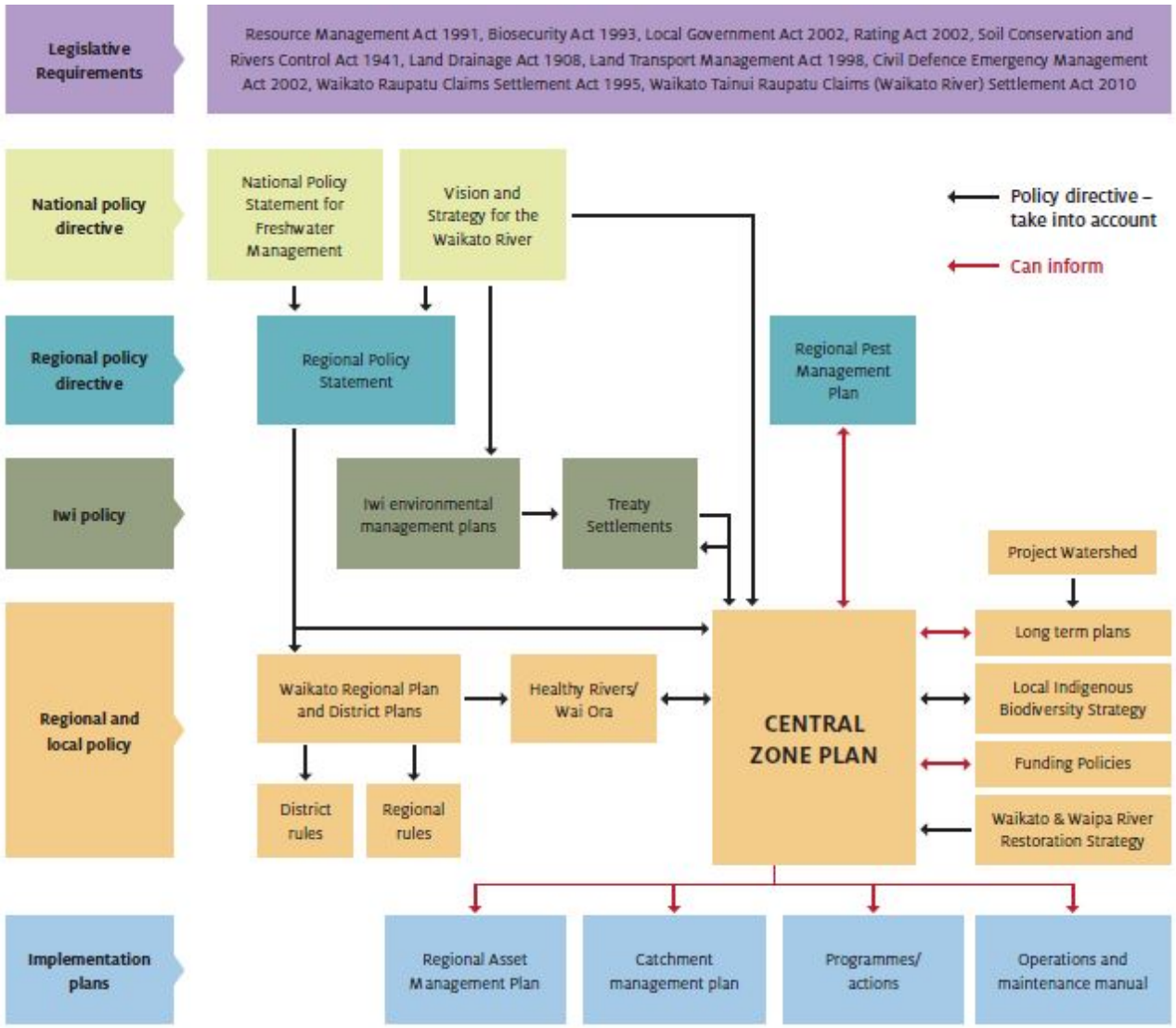

Figure 2: Summary of legislative and policy framework for the Central Waikato Zone Plan (Source: Waikato Regional Council (2017) Central Waikato Zone Plan: Te Mahere o Waikato Waengapū)

However, after conducting the LIBS pilots, it was found that WRC does not have the resources to undertake similar processes for other district councils. An evaluation of the environmental outcomes of the RMA by the Environmental Defence Society in 2016 found that constrained capacity related to lack of financial resources was a widespread problem among environmental management agencies (EDS, 2016), and this is yet another example of such a problem. The LIBS model as proposed through the WRC RPS appears to be stalled, and the pilots are instead informing a "collective impact approach process" at a regional scale (Personal Communication, Andrew Thomas, WRC Biodiversity Officer 4 June 2020).

A consequence of lack of resources to develop additional Local Indigenous Biodiversity Strategies (either by WRC or district councils) could mean that WRC Zone Committees make decisions or approve processes via Zone Plans that are not well aligned with the biodiversity issues at a district council or local, place-based ecosystem scale. Without district council–driven LIBS, the opportunity to raise awareness about biodiversity, build capability at a district level (both within councils and among place-based communities) and achieve

action on the ground is also compromised. It also brings into doubt the extent to which the WRPS is able to give effect to meaningful biodiversity outcomes.

4.3 Alignment of the Waikato Regional Plan

The purpose of a regional plan is to assist a regional council to carry out its functions to achieve the purpose of the Resource Management Act (1991 s63.1). Regional plans must give effect to and implement national and RPSs (Environment Guide, 2020b). The current Waikato Regional Plan that became operative in 2009 is not aligned with the 2016 RPS. The protection and enhancement of biodiversity is excluded in the 2009 Waikato Regional Plan, and the Regional Policy Statement on Indigenous Biodiversity appears to have been functioning as a proxy chapter of the Waikato Regional Plan instead, taking direction from the RMA as national-level direction.

4.4 Measures of success

Measures of success help to determine what progress is being made on a strategy, programme or a plan. Measures of success should also ensure agency accountability, particularly if the planned outcomes are not achieved (EDS, 2016).

The WRC LTP requires two on-the-ground indigenous-biodiversity *projects* to be completed each year as a performance measure (WRC, 2018). The scale or purpose of these "projects" is not clear, and the measure uses vague language that cannot easily be linked to the RPS. It is possible that two small protection or restoration "projects" per zone would satisfy this measure, but have no broader outcomes that are required by the RPSs, such as buffering or corridors (WRC, 2016).

Current public reporting on indigenous biodiversity by WRC is restricted to the following environmental indicators:

1. Extent of freshwater wetlands.
2. Coverage of indigenous vegetation.
3. Forest fragmentation.
4. Indigenous coverage of protected areas on land (WRC, 2020b).

The web pages (see WRC, 2020b) reporting the above data do not comment on any targets and the reader is left uninformed about the trends and their relationship to the progress or success of WRC RPS biodiversity policies, objectives, and methods.

Under the RPS, one of the tasks of an LIBS (11.1.11(b)) is to 'establish indigenous biodiversity targets to enable local authorities to prioritise resourcing, track progress and monitor effectiveness in achieving indigenous biodiversity objectives' (WRC, 2016). Measures of success on the protection and enhancement of biodiversity in the Waikato Region against the RPS therefore appear to be in stasis, with no systematic way to prioritise resourcing or determine progress in a transparent, meaningful way, particularly at a district level.

5. OPTIONS FOR BETTER ACHIEVING IMPLEMENTATION OF NEW ZEALAND'S GLOBAL RESPONSIBILITIES FOR BIODIVERSITY

Barriers to achieving on-the-ground implementation by regional and district councils include: inadequate funds allocated by the WRC Long Term Plan; poor links between Zone Plans and action on the ground; weak alignment of the Waikato Regional planning mechanisms; and inadequate measures of success. The following sections explore options for addressing these barriers.

5.1 Increased levels of funding for planning and action on the ground

The suspension of Local Indigenous Biodiversity Strategies as a tool to inform future Zone Plans and achieve action on the ground (assuming LIBS continue to be perceived as too expensive to develop) is problematic. Zone Plans are no longer informed at the "ground level", and the opportunity to raise awareness about biodiversity, build capability, and implement action on the ground at a district level is therefore compromised.

One option to address this is to argue that the development of a LIBS or a similar planning process and more biodiversity interventions in general is not "too expensive". Instead, a different way of viewing the problem is that at 2% of the total expenditure for biodiversity activities in the Long Term Plan (for the year 2020/21), biodiversity activities in general are grossly underfunded and deserve more support. Increases in funding and investment that are commensurate with the actual planning and project costs could bring local planning for biodiversity back into the Zone planning process, and boost implementation of on-the-ground activities.

Submissions by the WRC to both the Draft Biodiversity Strategy and the proposed NPSIB are emphatic on this point, arguing that additional central government funding is required to resource the implementation of both national mechanisms.

5.2 Alignment of Plans

The current Waikato Regional Plan, which became operative in 2009, is not aligned with the 2016 RPS. Consequently, the protection, maintenance and enhancement of indigenous biodiversity of any sort are not included in the 2009 Waikato Regional Plan. Regardless of this lack of alignment, those operating under and implementing the WRP still have to give effect to the WRPS, but having an out of date plan makes this more difficult and less apparent.

The Waikato Regional Plan is under review, combined with a review of the Waikato Regional Coastal Plan (2020). If the proposed NPSIB is gazetted, the next generation Waikato Regional Plan would have to give effect to its direction. This could be achieved by co-opting a range of existing policies, objectives, and methods that have been proven to be effective from the WRC RPS.

If the draft NPSIB is gazetted with minor changes only, WRC will also be required to develop a Regional Biodiversity Strategy. In the absence of LIBs, a Regional Biodiversity Strategy would provide better direction and set high level targets that measure the success of a broad range of initiatives (instead of ad hoc targets limited to the Long Term Plan or restricted to localised zone plans). This appears to have been anticipated by the council through the development of a "Regional Scale Collective Impact" programme. This programme is based on findings from the LIBS pilots and identifies the need for an "overarching framework and underlying support structure" to improve alignment across groups and initiatives within the region (WRC 2020c).

Based on current and foreseeable mandates and mechanisms, biodiversity planning through Zone Plans would be strengthened by direction from a national level (the New Zealand Biodiversity Strategy and the NPSIB), and a regional level (WRC Regional Biodiversity Strategy), and supported by an updated Waikato Regional Plan.[8] Improved levels of funding would strengthen planning and action at a local level by reinstating key processes identified as effective through the Hamilton Halo and Source to Sea pilot LIBS. Planning, management, and action to maintain and enhance indigenous biodiversity in the Waikato Region would therefore be informed by and held to account at all levels of governance.

[8] *It is assumed that no additional Local Indigenous Biodiversity Strategies will be developed due to lack of resources.*

5.3 Improved measures of success

Measures of success or targets for biodiversity planning in general and action on the ground across regional, zone, and district planning levels need to be better defined whereby measures or targets are benchmarked against the New Zealand Biodiversity Strategy, the NPSIB, and a Regional Biodiversity Strategy. In addition, while it is not the task of the WRC Long Term Plan to determine how biodiversity is managed in a region, high level measures could be drawn from a Regional Biodiversity Strategy to inform the LTP. A key advantage of aligning measures of success from a local to a national level is that they become more transparent and more readily compared against the Aichi Biodiversity Goals. This would enable a better assessment of New Zealand's level of achievement against its international commitments.

In summary, options for addressing barriers to achieve implementation on the ground for indigenous biodiversity in the Waikato region include an increase in funding for district-level planning and implementation, plus strengthened direction from a national level by aligning existing planning tools such as the Waikato Regional Plan with the proposed NPSIB and the New Zealand Biodiversity Strategy. Measures of success at district and regional levels should also be aligned with national-level direction to enable accountability at all levels, and a transparent means by which progress on maintaining and enhancing indigenous biodiversity in Aotearoa New Zealand can be tracked.

6. CONCLUSION

The purpose of this case study was to determine if New Zealand is able to meet the CBD Aichi current goals, using the WRC as an example. A combination of (current and foreseeable) national-level policy settings and a range of policies, objectives, and methods from Chapter 11 of the WRC RPS was mapped against the Aichi Biodiversity Goals. The mapping exercise found that the WRC appears to be well positioned to meet the Aichi Biodiversity Goals, because each Aichi goal can be matched with at least one national-level mechanism, or a WRC RPS policy, objective, and method.

However, a closer look at some key council documents suggests that, in practice, realisation of the Aichi targets in the Waikato region through on-the-ground implementation is likely to be compromised for a number of reasons. Examples highlighted include lack of clarity for biodiversity management through the Zone Planning process, resulting in inadequate funding for planning and funding at the district level. Secondly, the WRC Long Term Plan measure of success for Biodiversity is vague and unclear, and any existing biodiversity indicators are not tied to transparent targets or measures of success.

Options for addressing barriers to achieve implementation on the ground for indigenous biodiversity in the Waikato region include an increase in funding for district-level planning and implementation, and strengthened direction from a national level by aligning existing planning tools (such as the Waikato Regional Plan) and measures of success with the proposed NPSIB and the draft New Zealand Biodiversity Strategy.

If these significant barriers are addressed, the WRC appears to be well positioned to make good progress on maintaining, protecting, and enhancing indigenous biodiversity in its region. As a case study, the council's approach will also serve to place Aotearoa New Zealand in a positive light in an international setting. However, there are ten other regional and five unitary councils in Aotearoa New Zealand, all at different stages of developing their unique biodiversity planning and management tools. Therefore, this case study of a single council cannot be extrapolated to a national scale using an assumption that indigenous biodiversity is managed in the same way across the whole of Aotearoa New Zealand.

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8. LIST OF LEGISLATION

Biodiversity Act 1993

Local Government Act 2002

Resource Management Act 1991

9. APPENDIX A: WRC Regional Council Long Term Plan: Expenditure on integrated catchment management activities

Cost of service statement

Integrated catchment management

	2017/18 Annual Plan ($000)	2018/19 LTP ($000)	2019/20 LTP ($000)	2020/21 LTP ($000)	2021/22 LTP ($000)	2022/23 LTP ($000)	2023/24 LTP ($000)	2024/25 LTP ($000)	2025/26 LTP ($000)	2026/27 LTP ($000)	2027/28 LTP ($000)
Catchment planning and management	11,563	14,526	14,743	15,815	16,302	16,531	16,633	16,713	17,041	17,414	17,834
Biosecurity	7,036	7,998	8,764	10,587	9,738	10,216	11,227	11,123	9,263	12,255	12,575
Biodiversity	2,559	2,770	2,854	3,011	2,831	2,876	2,920	2,965	3,015	3,066	3,120
Land management advisory services	1,853	2,022	2,014	2,091	2,165	2,203	2,018	2,050	2,087	2,125	2,164
TOTAL EXPENDITURE	23,011	27,316	28,375	31,504	31,036	31,826	32,798	32,851	31,406	34,860	35,693

Source: Waikato Regional Council, 2018, *2018-2028 Long Term Plan: Te Marahere Roa.* https://www.waikatoregion.govt.nz/council/policy-and-plans/long-term-council-community-plan-annual-plan-and-annual-report/long-term-plan-2018-2028/

10. APPENDIX B: WRC Regional Council Long Term Plan: Expenditure across all activity areas

Expenditure											
Community and services	9,938	10,512	14,404	14,795	12,429	13,048	12,936	12,793	13,551	13,587	13,426
Civil Defence and emergency management	2,192	2,464	2,515	2,561	2,611	2,657	2,648	2,703	2,747	2,791	2,834
Regional hazards and emergency response	1,602	1,937	1,983	2,072	2,034	2,093	2,190	2,245	2,298	2,355	2,404
Flood protection and control works	19,037	21,847	23,892	24,866	25,525	27,372	27,335	27,503	28,999	29,589	30,482
Integrated catchment management	23,011	27,316	28,375	31,504	31,036	31,826	32,798	32,851	31,406	34,860	35,693
Resource use	15,236	16,140	16,718	17,460	18,676	19,227	19,537	19,785	20,180	19,488	19,852
Science and strategy	27,759	24,593	27,387	32,592	28,493	27,760	33,182	27,069	27,572	35,410	28,761
Public Transport	23,786	26,773	35,414	39,000	40,547	41,568	41,919	42,670	43,693	44,705	45,745
Corporate and self funding	911	3,964	2,452	(769)	42	33	10	(25)	(59)	(65)	(80)

	2017/18 Annual Plan ($000)	2018/19 LTP ($000)	2019/20 LTP ($000)	2020/21 LTP ($000)	2021/22 LTP ($000)	2022/23 LTP ($000)	2023/24 LTP ($000)	2024/25 LTP ($000)	2025/26 LTP ($000)	2026/27 LTP ($000)	2027/28 LTP ($000)
Council controlled organisations	137	160	162	167	173	177	180	183	187	190	194
Total expenditure	**123,609**	**135,706**	**153,302**	**164,248**	**161,566**	**165,761**	**172,735**	**167,777**	**170,574**	**182,910**	**179,311**

Source: Waikato Regional Council, 2018, *2018-2028 Long Term Plan: Te Marahere Roa.* https://www.waikatoregion.govt.nz/council/policy-and-plans/long-term-council-community-plan-annual-plan-and-annual-report/long-term-plan-2018-2028/

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Reframing the relationship between people, nature and authority: The Te Awa Tupua (Whanganui River Claims Settlement) Act 2017

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1. INTRODUCTION

Situated in the North Island of Aotearoa, originating in the slopes of Mount Tongariro and ending in the Tasman Sea, flows New Zealand's longest navigable river - the Whanganui River (NZ Government, 2020) (Fig. 1). Not only is the Whanganui River valued for its great length, but it is also held in high esteem by the Whanganui Iwi for its mana[1], its previous sizeable bankside population of more than 100 pā sites, genealogical and spiritual ties, and treasured for the resources it gives (Waitangi Tribunal Report, 1999). The cultural significance of the river led to the eventual signing of Ruruku Whakatupua, the Whanganui River Deed of Settlement at Rānana in 2014 between Whanganui Iwi and the Crown[2] (Raumati, 2016). This Deed of Settlement gave rise to the enactment of the Te Awa Tupua (Whanganui River Claims Settlement) Bill 2017, which conferred legal recognition of the Whanganui River as a person (NZ Government, 2020).

A legal personality *"is an entity that has the same rights and responsibilities as a person" (NZ Parliament, 2017, para.2).* The rights given can vary from a few legal rights considered essential for the entity's functioning, to a whole plethora of fundamental rights for protection (Khandelwal, 2020); In New Zealand, the Te Awa Tupua Act 2017 represents the latter. A new legal framework was established (known as Te Pā Auroa nā Te Awa Tupua) to support the Whanganui River as Te Awa Tupua, which means: *"an indivisible and living whole, comprising the Whanganui River from the mountains to the sea, incorporating all its physical and metaphysical elements"* (Te Awa Tupua Act s 12). Furthermore, under section 14 of the Te Awa Tupua Act 2017, Te Awa Tupua is declared to be a legal person with *"all the rights, powers, duties and liabilities of a legal person*" (s 14).

The Te Awa Tupua Act 2017 has received much international attention for representing a world first, for a river, in legislation and has been recognised for applying a Western concept of law (legal personality) but with the lens of an indigenous worldview, a legislative approach that has inspired other such innovations in the US, Australia and India (O'Bryan, 2017; C. Clark et al., 2018). In this article I begin by discussing that while this concept may seem revolutionary at face-value, research by Stone (2010), demonstrates that this concept of denoting personhood status to other non-human entities has been happening for years within many

[1] *Iwi: Tribe. The literal definition is "bone", indicating descent from a remote founder ancestor. (van Meijl, T., 1995) Mana: Power, prestige, authority (Reilly, M. P. J., 2010)*

[2] *The crown is a legal term used to describe the monarch as head of state; the position of monarch is synonymous with the crown. The two are not separable and cannot be used to mean different people. The crown refers to the sovereign of a particular state.*

Figure 1: Map of the Whanganui River. Image taken from Te Ara: The Encyclopaedia of New Zealand. (https://teara.govt.nz/en/map/2174/map-of-the-whanganui-river). CC BY-NC 3.0 NZ

judicial systems often for the purposes of separating legal obligations from shareholders and directors. I argue that this extension of personhood to nature is confronting to people with an anthropocentric world view because of the instrumental value they place upon nature. Conversely, I illustrate that perceiving nature as possessing its own power and personality has always been upheld by Māori, who had been fighting with the Crown for this recognition in relation to the Whanganui River for almost 148 years (Raumati, 2016).

I then demonstrate how granting personhood status to the Whanganui River in Aotearoa, symbolizes a step towards embracing a Māori worldview and kaupapa of caring for the environment that is neither anthropocentric nor ecocentric, but instead recognizes the interconnectedness between human and non-human entities. The purpose of this article is to address how the extension of legal personality to the Whanganui River represents the valuable contribution a Māori worldview can make to New Zealand's legal system by providing an opportunity to reframe the relationships between people, land, and authority.

2. GRANTING OF RIGHTS AND LEGAL PERSONHOOD

The extension of a legal personality beyond that of human beings has been described as *"one of the most noteworthy feats of legal imagination"* (Salmon quoted in Khandelwal, 2020, n.p. number). While this concept may have sounded strange and abstract to early jurists (Stone, 2010), since the late 1800s, several non-human entities have received legal personhood status to separate legal obligations from shareholders and directors, such as companies, trusts, and societies (Solaiman, 2017); This separate corporate personality is now recognized in all legal systems (Solaiman, 2017). Theorist Christopher Stone, one of first to pursue the concept of giving natural entities legal standing in his book *'Should Trees have Standing?- Toward Legal Rights for Natural Objects'* (1972), in a later article (2010) states that lawyers today are so well familiarized with the concept of corporations having their "own rights'' and being a "person" or "citizen" for so many judicial

purposes, that the idea of giving non-human entities legal personality is no longer a deviation from the norm (Stone, 2010, p.3). Stone (2010) suggests the reason these ideas are at first confronting for people, is that one cannot see beyond the non-human entities use to oneself or society. Instead, non-human entities are idealised and perceived only for their use and ability to fulfil anthropocentric needs (Stone, 2010; Whiteside, 2002).

Before something can be granted legal rights, it first must be seen and valued for itself. Stone (2010) gives the example of the first woman in Wisconsin who wanted the right to practice law. At the time, she was denied by the court because *"the law of nature destines and qualifies the female sex for the bearing and nurture of children of our race and for the custody of the homes of the world…"*, and therefore women were deemed to be as ill-suited for engaging in judicial conflicts as they were for *"the physical conflicts of the battlefield*" (Stone, 2010, p.3); Women were not perceived intrinsically for what they were and what they could become beyond their performative and socially constructed gender roles (Stone, 2010).

3. LIMITS OF ANTHROPOCENTRISM

This instrumental view of women can also be applied to the environment and its natural resources. Western society operates within a moral framework that takes humanity as its key point of reference for political and economic decisions (Youatt, 2014). This concept, also known as anthropocentrism, is the ideology that human beings are more significant than other life forms (Youatt, 2014). Anthropocentrism perceives nature as an object to serve humanity and is understood only in instrumental terms (Whiteside, 2002). Like with women in the Wisconsin case, nature is mainly seen as a resource valued by the extent to which it can satisfy societal norms.

Perceiving nature as an instrument for human benefit has consequently permitted the continuous exploitation of the environment (Cook, 1997). For example, current mechanisms for environmental protection, such as market approaches and regulatory structures and agencies, maintain an anthropocentric view that often favours economic development over environmental protection (Khandelwal, 2020). Market mechanisms used for environmental protection are grounded in neoliberal theory, which, operating on notions of democracy and individualistic autonomy, enables nature to be subjugated by humans to fulfil personal interests (De-Shalt, 1995). As a result, environmental planning is embedded with language that promotes individualistic human desires (Youatt, 2014). For example, governments and agencies tend to promote and educate the public about the value of nature and biodiversity through the term 'sustainable development'. Sustainable development encourages us to live in harmony with other species, while maintaining the perception of ourselves as superior and as consumers, and of non-human entities as a resource to enable further societal growth and development (Youatt, 2014).

According to Youatt (2014, p. 211) the term 'sustainable development' creates a weak sense of "ecological orientation" within individuals and the community. By continuing to operate under existing paradigms of individualism, this approach fails to call for any real sacrifice or change in environmental philosophy, thus encouraging "enlightened self-interest" among society (Leopold, 1989 [1949], p. 208). Within this neo-liberal market system, environmental protection remains largely ineffective as *"the costs of pollution in the neoliberal market are distributed unequally to the environment and other users and not the polluter itself"* (De-Shalit, 1995, p. 296). This is referred to as negative environmental externality, where environmental pollution and damage caused by industrial production processes and the use of subsequent products, are not directly captured in the market and instead remain "external to private sectors" (Ding et al., 2016, p. 463).

Consequently, producers an avoid paying for the full cost of their damage as this is borne by nature as well as by other regular citizens who also share the environment; this is simply the way of the neoliberal economy

(De-Shalt, 1995). More often than not, the producer will forego reducing their negative environmental impact for increased profit. This is evident in a study conducted by Xepapadeas (1992) where producers were found to always choose higher than socially desirable levels of emissions if, by doing so, they could raise their profits. Thus, the external cost to the environment was not a factor producers considered in decision-making in the absence of environmental regulation. This illustrates the challenges of motivating producers to internalize their negative environmental externalities and to move away from a largely anthropocentric and instrumental perception of nature, as well as the importance of having robust environmental regulations in place.

4. POTENTIALS OF ECOCENTRISM

Many theorists of environmental philosophy believe the answer to solving our environmental issues lies with adopting an ecocentric approach within our political, economic, and resource management systems (De-Shalit, 1995; Stone, 2010). Ecocentrism represents a shift from valuing nature to the extent that it benefits us to perceiving nature and its ecosystems as living entities that possess their own integrity and *intrinsic* value (Argyrou & Hummels, 2019). This concept has been implemented on a global level; For example, the United Nations' World Charter for Nature acknowledges the intrinsic value of nature, proclaiming in 1982 that *"every form of life is unique, warranting respect regardless of its worth to man …"* (Shelton, 1991, p. 109). While it may seem impossible to separate from our human perspective when regarding the environment, thinking ecocentrically is a means of shifting our moral and political frameworks to align with nature (Youatt, 2014). Instead of reinforcing dominant Western worldviews and legal approaches within environmental management[3], ecocentrists believe that humans should listen more closely to ecological feedback signals from nature in order to develop a stronger moral relationship between ourselves and non-human entities (Leopold, 1989 [1949]; De-Shalit, 1995).

5. CRITIQUE OF ECOCENTRISM

Despite this seemingly logical rationale, ecocentrism, too, has its flaws. For example, many forms of ecocentrism value nature for its intrinsic value and perception that nature is morally significant due to a 'two-term metaphysic' within modern science which relates the mind and nature as subject and object (Hoffman & Sandelands, 2005, p.147). In this way, ecocentrism promotes the notion that nature is the object which dominates man -the subject. Nature is taken to be everything, whereby nature has its own creation story and man is simply one flower *"upon one limb of the great tree of existence"* (Hoffman & Sandelands, 2005, p.147). Hence, this ecocentric ethic, only valorises nature in a new way and fails to question its identity or change ones' way of understanding the environment (Whiteside, 2002). The stark dichotomy between anthropocentrism and ecocentrism - either perceiving humans as the core and nature as having to accommodate itself to human self-interests, or nature as the core and humans possessing obligations to make room for the prosperity of the environment - implies that a 'centrism' of some kind is essential to environmental thinking (Youatt, 2014). A caveat in both these perceptions is that they fail to recognise the interdependence of humans and nature (Whiteside, 2002).

A way to overcome this "centrism" way of thinking and to accomplish better environmental protection can be taken from Leopold (1989 [1949]). Leopold states that a collective "extension of social conscience" (p. 209) from the community to the land is required to ensure a change in the role of *Homo sapiens* from a master of nature, to a simple citizen of it. If successful, Leopold states that this way of thinking may result in

[3] For instance, encouraging one to obey the law, join relevant environmental organisations and undertake conservation practices that are profitable on private land etc.

an internal change within ones' loyalties, intellectual emphasis, and convictions, and therefore, ultimately produce a stronger sense of ecological orientation and obligation to nature among the community, enabling a type of 'land-ethic' to develop (Leopold, 1989 [1949]).

6. MĀORI WORLDVIEW

Applying a Māori worldview demonstrates a third understanding of the relationship between nature and humanity, one that does not rely on 'centrism' of any kind. This perspective has similarities to Leopold's land-ethic ideology in that there exists a system of laws and values which define the users of natural resources as possessing an ethical responsibility to act as kaitiaki (guardians) of natural resources (Roberts et al. 1995). A traditional Māori worldview understands nature and humanity as mutually dependent and indivisible from one another (Argyrou & Hummels, 2019), without the existence of a fundamental dichotomy between the two, or as humans having sovereignty over nature (Patterson, 1998). Deeply rooted within Māori culture is a rich and complex cosmology, which tells of the interconnectedness of all things in the universe, inanimate and animate via whakapapa (genealogy) to their ancestors (Lyver et al. 2018). Within this cosmology, everything is essentially linked via the gods; Papatūānuku (earth mother) and Ranginui (sky father), from whom came many offspring with the role of guardianship over specific natural phenomena (Roberts et al.1995). Tāne, the greatest son of Rangi and kaitiaki of the forests, had eight wives, which resulted in the birth and creation of nine species of large trees such as the totara and matai (B. Clark, 2018). Other tawhito (ancient ones), e.g. Tangaroa, is kaitiaki of the sea and all sea creatures, and he produced grandchildren Ika-tere and Tū-te-wehiwehii, who are the ancestors of all fish and reptiles. Furthermore, it is said in some tribal whakapapa that human beings are the progeny of the god Tūmatauenga (Roberts et al. 1995). While human beings are able to cultivate and harvest these flora and fauna, such as trees and fish, they are required by duty to thank and appease the kaitiaki of these natural phenomena (Te Aho, 2019).

The personification of natural entities allows these environmental systems to be perceived as analogous to human bodies (B. Clark, 2018). For example, the streams of water that flow through Papatūānuku (earth) act as her arteries which carry essential nutrients for her to drink and give to her offspring, as well as canals to flush away waste (Marsden & Henare, 1992, cited in B. Clark, 2018). Just like plants, her offspring (tangata whenua - people of the land) have the potential to "flourish and multiply, or wither and die" (Salmond, 2018, p. 183). An example of the existence of this deep whakapapa connection was presented at the Waitangi Tribunal when Whanganui elders spoke with great sadness of dead tuna (eels) and trout along the banks of the Whanganui River, their awa tupua (ancestral river). They stated that as their river was stagnant and dying, therefore emphatically, they were dying too (Salmond, 2018). This perpetuates the concept of natural entities as living conscious beings and accentuates the connection of people to place. The traditional pepeha (introduction) exemplifies this connection, and is used by tangata whenua to introduce and locate themselves in relation to their ancestors of the environment, i.e., mountain or river (Te Aho, 2019).

Through this lens, Māori have undertaken what Western systems term 'sustainable development' for generations before European contact (Te Aho, 2019). Within a Māori worldview, natural and physical resources such as rivers, lakes, rocks, trees, as well as men and women, all carry mauri (life-force), and are connected to each other through this life-force; each entity depends on the health of the other to function (Patterson, 1998). Mauri ensures the continuation of life and development of these entities and if harmed (e.g. through pollution), will lead to spiritual damage and further deterioration (Kā hui Wai Māori Report, 2019). To prevent this, whanau, hapū[4], and iwi, share a responsibility to act as kaitiaki of these taonga (highly

[4] *Whanau: Extended family. The basic unit of Māori society. (van Meijl, T., 1995)*
Hapū: Sub-tribe. (van Meijl, T., 1995)

valued object or resource), which may be exercised through granting or refusing access to resources. For instance, placing a rāhui (protection through prohibition) over certain wai tapu[5], or undertaking activities such as water quality monitoring, species monitoring within catchments, overall ecosystem health, and restoration projects so that these elements may benefit future generations (Tipa & Associates, 2015). This Māori worldview, in contrast to anthropocentrism and ecocentrism, does not create a dichotomy or 'centrism' between human beings and nature, but instead celebrates the interdependencies and inalienable connection between people, their ancestral lands, and environs, and recognises their inherent obligations to these sacred places and spaces (Tinirau et al, 2020). The granting of legal personhood to the Whanganui River has enabled this 'third way' of thinking to be legally acknowledged, creating a new pathway from the dualistic ideologies of the past, and one that recognises the significance and special connection between the Whanganui Iwi and the awa (river).

7. SIGNIFICANCE OF THE WHANGANUI RIVER

Since time immemorial, the banks and major tributaries of the Whanganui River have been home for numerous people. However, it was previously home to people who built their life solely around the river; the Whanganui Iwi (Waitangi Tribunal Report, 1999). During the 1840s, a substantial Māori population resided along the 290km route, with an estimated 143 marae[6] once dotted along its banks (Waitangi Tribunal Report, 1999). These populations of iwi and hapū continued to exercise their rangatiratanga (absolute authority) over the Whanganui River as their ancestors had before them. These ancestors used to frequent the waters from the ancient Pa of Putiki Wharanui, using the river as a major highway (Feeney, 1952). According to Māori cosmology, Ranginui, 'the supreme universe', created Mount Ruapehu, and when Ruapehu expressed loneliness, Ranginui then placed two teardrops under the mountain's feet, one became the Tongariro River and the second, Te Awanui-a-rua; The Whanganui River (Royal, 2018).

In this worldview, the relationship between the Whanganui River and the Whanganui Iwi transcends beyond the simple physical world. As previously mentioned the river is their ancestor, their *tupuna awa* (Waitangi Tribunal Report, 1999). This is still true for Whanganui Iwi today, many of whom still visit the river to cleanse themselves, to pray, and call on as a friend and caregiver (B. Clark, 2018). Moreover, the people of the Whanganui River have been taught to treasure the river for what it is and to act as kaitiaki of it, not just to protect the river but also to protect themselves; As the expression goes, *"Ko au te Awa, ko te Awa ko au"* ("I am the River, the River is me") (s 13 Te Awa Tupua Act).

8. COLLISIONS IN PERCEPTIONS

Unfortunately, differing views and relationships with the Whanganui River between Pākehā (white Europeans settlers) and Māori created significant conflicts in regards to management of the river. After the signing of the Treaty of Waitangi in 1840, the Crown purchased an 86,200 acre block of land through which flowed the lower reaches of the Whanganui River (New Zealand Government, 2020). The Crown then applied an anthropocentric approach to the river's management and allowed neoliberal interests to take hold. By 1891, a majority of the eel weirs constructed by Māori had been destroyed and the Wanganui River Trust Act 1891had been enacted, which contained no provision for Māori membership on the Trust's Board (New Zealand Government, 2020). The Whanganui River also suffered from a number of diversions to fuel the Tongariro Hydro Power Scheme in 1958. The Whanganui Iwi were not consulted on these diversions and

[5] *All natural water, be it in a river, stream, wetland, pond or drain is highly valued by whanau. Water itself is tapu. (Tipa & Associates, 2015).*

[6] *A meeting house for Māori*

were strongly opposed, stating that these diversions reduced water flows which were damaging the health and well-being of the river (New Zealand Government, 2020).

This interference with the river and blatant disregard for considering tikanga Māori, led to enormous distress and an eventual state of crisis for the Whanganui Iwi, who were losing their sacred affinity with the river as a result of damage to its mana and mauri (Rāwiri, 2020; Waitangi Tribunal Report, 1999). In 1998, the Whanganui River Māori Trust Board was formed with the aim of negotiating Whanganui Iwi claims associated with the River (B. Clark, 2018). Disputes continued, however, and tensions peaked in 2011 during an election campaign in which the National Party announced it would partially privatize several state-owned assets, including three power companies; This would ultimately affect the associated rivers, one being the Whanganui River (Salmond, 2014). The view held by then prime minister, John Key and the National Party-led government, to sell the river's water rights to private owners, while simultaneously upholding that 'no-one owns the water', stemmed from an anthropocentric colonial paradigm (Sanders, 2018). This view sees the common pool of resources such as water flows, electricity dams, forests, flora and fauna, seabed, as assets for sale to private consumers, and subverts Māori customary rights and responsibilities to nature (Lyver et al. 2018). The New Zealand Māori Council's submission to the Waitangi Tribunal in 2012 stated that partially privatising these power companies would indeed be detrimental to Māori interests in freshwater (Salmond, 2014). They claimed that privatisation of the power companies would allow private owners, not bound by the Treaty of Waitangi, to disregard reparation for the loss of Māori water rights, including the ability of Māori to participate in governance of the river, and to obtain shares in the power companies (Salmond, 2014).

Challenging the government's anthropocentric perception and position further, at a national discussion with the prime minister the Māori King Tūheitia[7] declared that Pākehā laws were created to reduce Māori mana (ancestral prestige) while maximizing Pākehās'. He added that, "We have never ceded our mana over the river to anyone" (New Zealand Herald, 2012 quoted in Salmond, 2014, p.290). It was these clashes in perceptions that led to the formation of Ruruku Whakatupua, Whanganui River Deed of Settlement to settle grievances which was signed in August 2014 by both the Crown and Whanganui Iwi. (Salmond, 2014). The Deed of Settlement subsequently led to the Te Awa Tupua (Whanganui River Claims Settlement) Act 2017, which conferred the legal recognition of the Whanganui River as a person (Salmond, 2014).

9. RECOGNITION AND REPRESENTATION OF THE RIVER

After years of exploitation and conflict surrounding the Whanganui River, this agreement signalled the final settlement of all historical Treaty of Waitangi claims by Whanganui Iwi in relation to the Whanganui River arising from Crown acts or omissions (Raumati, 2016; New Zealand Government, 2020). This Deed of Settlement stands as a formal apology by the Crown for Treaty breaches and its failure to protect the interests of the Whanganui Iwi and the grievances caused (New Zealand Government, 2020). Many iwi perceive this legislation as a mechanism capable of bringing about equality within New Zealand's decision-making as it represents the beginning of a shared understanding that within this nation, there are two peoples and two world views that work alongside each other (Rāwiri, 2020).

The Te Awa Tupua Act 2017 represents a significant shift from usual legislation in New Zealand as it embraces the duality of peoples' perceptions about nature, and creates a new relationship between human beings and the Whanganui River, with tikanga Māori values at its heart, that is neither fully anthropocentric nor

[7] King Tūheitia is the 7th monarch of Kīngitanga (The Māori King Movement). A movement founded in 1858 with the aim to unite Māori under one sovereign (Rewi, 2015; Papa & Meredith, 2012)

ecocentric (Salmond, 2014). For example, articles in the Te Awa Tupua Act (s12 & s13) recognise the river as an indivisible and living entity that possesses both physical and spiritual values (Argyrou & Hummels, 2019). This source of spiritual and physical sustenance fosters the 'inalienable connection' between the Whanganui Iwi and the river and the need to protect the river for future generations; The well-being of the river and all its life, and the well-being of its people, are one in the same (Argyrou & Hummels 2019). This belief is reflected in the four Tupua te Kawa (Māori etiquette and protocols) that make up the essence of Te Awa Tupua and prescribes intrinsic values to the River, these are;

A) Ko Te Kawa Tuatahi

> *Ko te Awa te mātāpuna o te ora:* the River is the source of spiritual and physical sustenance.

B) Ko Te Kawa Tuarua

> *E rere kau mai i te Awa nui mai i te Kahui Maunga ki Tangaroa:* the great River flows from the mountains to the sea.

C) Ko Te Kawa Tuatoru

> *Ko au te Awa, ko te Awa ko au:* I am the River and the River is me.

D) Ko Te Kawa Tuawhā

> *Ngā manga iti, ngā manga nui e honohono kau ana, ka tupu hei Awa Tupua:* the small and large streams that flow into one another form one River.

(s 13, Te Awa Tupua Act 2017).

A wide array of administrative decision-makers under other Acts must recognise, provide for and have regard to the legal personhood status of Te Awa Tupua and these four Tupua te Kawa (s15, Te Awa Tupua Act 2017). Moreover, as the river cannot appear in court itself, the Act provides for two representatives to act as guardians of the river, called Te Pou Tupua. The two guardians, both mutually chosen by Whanganui Iwi and the Crown, are to stand as the human face of the river and are required by law to act and speak on behalf of Te Awa Tupua in accordance with Tupua te Kawa (O'Donnell & Macpherson, 2019).

Furthermore, the Act establishes a multi-stakeholder governance body known as Te Kōpuka, a committee including Māori representatives, the government, local authorities, recreational and commercial users, and environmental groups. Issues related to the environmental, social, cultural, and economic health and well-being are to be discussed within Te Kōpuka, who are encouraged to work collaboratively to achieve better health and well-being outcomes for the river (Argyrou & Hummels 2019). In addition, the Act establishes other implementation entities and tools, such as Te Karewao (an advisory committee for the two guardians), as well as the Te Awa Tupua Strategy document (New Zealand Government, 2020). These governance bodies provide a platform for discussing the many different views and values regarding the Whanganui River and its management. For example, Te Kōpuka must promote unanimous decision making or consensus decisions (Sanders, 2018). Neither the Crown, Iwi, nor other stakeholders may proceed with a measure without having a high degree of support from some of the other representatives (Sanders, 2018). This process places a high value on every member's opinion and an effort made to enable a longer conversation between parties if needed to deliberate further; a step that fully supports tikanga Māori values (Sanders, 2018).

10. CONCLUSION

The Te Awa Tupua Act 2017 recognises that there are two differing views regarding river management and anticipates disagreement by creating co-governance bodies to encourage reciprocal learning and resolve

disputes (Lyver et al. 2018). It is for this bicultural approach that the Te Awa Tupua Act 2017 should be praised and valued, as the Act does not favour one value system over the other but instead encourages the opportunity to reframe the relationships between people, land and authority in a way that reanimates Pākehā anthropocentric perspectives of the natural world (Rāwiri, 2020).

While giving a non-human entity a legal personality may seem bizarre to those with instrumental perceptions of the environment, this is not the case for Māori, who have always maintained that nature possesses its own power and personality. For far too long, colonial norms have dominated our governance bodies in Aotearoa and thus far have largely failed to produce successful social and environmental outcomes. Therefore, the Te Awa Tupua Act 2017, stands as an apology and serves as intergenerational justice for the prejudice and adverse effects by the Crown caused to Whanganui Iwi.

This unique piece of legislation recognises the valuable contribution a Māori worldview can make to our legal system. If implemented effectively, it will provide a way for fundamental differences in the relationship between people and nature to be expressed, enable the opportunity to learn from one another, and spark the transformation of individual and community values (Lyver et al. 2018). In a diverse world, where conflicts over the relationship between people and nature will inevitably continue, the mechanism of granting legal personality, which sees a joining of Western systems and indigenous worldviews, should certainly be seen as an exciting step in the right direction. This legislative mechanism has real potential to achieve successful environmental outcomes so that as a nation, we can learn to care and use natural resources in a way that will enable the wellbeing of the whole of Aotearoa into the future.

A note from the author

Within this article, I provide a description of the beliefs and interpretations of nature and Māori cosmology from a Māori perspective. To achieve this, I have relied upon academic literature from a variety of sources, including as far as possible publications by Māori researchers. It is acknowledged however, that there is no single Māori perspective or cosmology as each iwi (Māori tribe) has its own distinctive, yet similar, views and traditions. Thus this article draws on common literary perspectives of Māori worldviews, each of which may be partial, and thus it also represents a partial approach to understanding Māori worldviews; one that does not claim to encompass all the many diverse values and attitudes held by each iwi. Other difficulties arise when attempting to explain the concepts and belief systems of one culture while using the language of another culture. During this process, it is inevitable that there will be a loss of information, as using English to translate Māori terms will never truly achieve transportation of the meaning itself. While reading this article and the parts that seek to describe a Māori worldview, it is worthy to keep in mind that “Maoritanga is a thing of the heart rather than the head." (Marsden quoted in King, 1992, p.191).

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12. LEGISLATION

Te Awa Tupua (Whanganui River Claims Settlement) Act 2017

Lincoln Planning Review, 11(1-2) (2021) 84-89

Accommodation-sharing platforms and small towns in the Covid-19 era

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ABSTRACT

Accommodation-sharing platforms, such as Airbnb, provide the owners of accommodation, including private homes, with the opportunity to offer all or part of their home, or bed space in it, for accommodation-sharing. Accommodation-sharing platforms are seen as inherently and deeply disruptive to the conventional accommodation sector and rental markets in many cities and regions worldwide. In regional towns in Aotearoa New Zealand, accommodation sharing is seen as an important part of the total visitor accommodation and an important influence in the rental accommodation and housing markets. The aim of this short field note is to share some thoughts on the planning and the policy implications of Building Better Homes, Towns and Cities National Science Challenge: Ko ngā wā kāinga hei whakamāhorahora research that sought to demonstrate the likely 'spill-over' effects of accommodation-sharing on local housing waiting lists and rental prices over time. It draws on insights gleaned from a series of local government workshops focused on accommodation-sharing, and collaboration with the Waitaki Housing Taskforce supporting the development of a district housing strategy.

Keywords: Accommodation-sharing, small towns, Airbnb, housing, Aotearoa New Zealand, Waitaki District.

1. INTRODUCTION

This short field note arises from a study of accommodation-sharing platforms in Aotearoa New Zealand (Campbell et al., 2019). The aim of the study was to demonstrate the likely 'spill-over' effects of accommodation-sharing on local housing waiting lists and rental prices over time, and to share the planning and the policy implications of our findings. To review the full content and context of these studies, see Campbell (2019), Campbell (2020, 2019, 2021) and Perkins et al. (2019).

Accommodation-sharing platforms, such as Airbnb, provide the owners of accommodation, including private and holiday homes, the opportunity to rent all or part of their home, or bed space in it. As a research team, we often discussed the categories of 'owners' of accommodation-sharing having different motives for offering accommodation to visitors. For example, some may wish to extract maximum economic value from

an asset that they are living in or only use part of the time, whereas others may be more interested in the social and sharing aspects of 'hosting' guests in their own homes and providing an enjoyable experience of their locale. Our reflection is that it was whole homes rented by absentee 'hosts' that stretched local acceptance of accommodation-sharing platforms, rather than those hosts offering only a room. Accommodation-sharing platforms are seen as inherently and deeply disruptive to the conventional accommodation sector and rental markets in many cities and regions worldwide (Adamiak, 2019, Campbell et al., 2019, Crommelin et al., 2018, Dudas et al., 2017, Gurran and Phibbs, 2017, Gutierrez et al., 2017, van Holm, 2020, Wachsmuth and Weisler, 2018). In regional towns and cities such as Oamaru in the Waitaki District of Aotearoa New Zealand's South Island, accommodation-sharing is seen as an important part of the total visitor accommodation and an important influence in the rental accommodation and housing markets (Campbell, 2020).

In this short field note we share a few observations from our research for those interested in housing policy and the effects of accommodation-sharing. We conclude by noting some implications for those interested in accommodation-sharing platforms as they affect regions and their small towns, a relatively under-studied phenomenon when compared to larger urban areas. These issues have been discussed in workshops held across Aotearoa New Zealand in the pre-Covid-19 era. At the time of writing, the COVID-19 pandemic is ongoing and has led to significant disruption to the international tourism industry (Higgins-Desbiolles, 2021). Concurrently, there have been notable changes to patterns of immigration and emigration (Guadagno, 2020), with reductions in flows of movement in both directions.

Our work is part of a wider programme of research on regional development and small-town regeneration in Aotearoa New Zealand, funded by the Building Better Homes, Towns and Cities: Ko ngā wā kāinga hei whakamāhorahora National Science Challenge (BBHTC) (Perkins et al., 2019). In our work, we have examined both absolute and relative measures of intensity of accommodation-sharing to interpret the impacts of accommodation-sharing and examine local responses to the phenomenon.

2. WORKSHOPS

In 2019, our research piqued the interest of local authority planning and housing policy personnel and several workshops were organised by BBHTC with local governments in Auckland, Rotorua, Queenstown, Westport and Christchurch. During these workshops we gained a much deeper appreciation of the challenges faced by local authorities in responding to an accommodation-sharing platform (Airbnb) that was relatively unregulated.

It became apparent in our work that the impacts of accommodation-sharing varied considerably between places – with Queenstown being a particular 'hotspot' (Campbell et al., 2019) leading to a mix of local experiences, challenges and responses. Overall, however, the disruptive impact on local communities was framed mainly in terms of the accommodation-sharing phenomenon being an issue for local housing provision as seen in other international contexts (Gurran and Phibbs, 2017), even though it was widely acknowledged as a 'good idea' to make the most of underused accommodation to support a booming tourist industry (pre Covid-19). Other reported benefits of accommodation-sharing include the genuine ('homey') authentic nature as well as the enjoyment, authenticity and social experiences that differ from other accommodation options (Sthapit et al., 2021, So et al., 2018). The workshops highlighted the challenges of regulating accommodation-sharing in combination with the consequences to local communities. There was widespread agreement on the need for a central, independent source of administrative data which would allow the quantification and mapping of accommodation-sharing within a particular locality. In smaller districts, such as the Waitaki this source of data can help to address a lack of resource for informed policy making and strategic responses to housing issues.

Concerns raised at the workshops included moving from anecdote to data. There was also a desire to see more specific and targeted mechanisms to allow regulation of accommodation-sharing. A series of comments in the workshops emphasised the need to assess compliance with existing district plans, and building regulations, especially the fire design safety and accessibility components, as these could be a source of risk.

A pernicious issue that featured in workshops was the impact on housing availability and affordability. There was widespread recognition of the need to improve housing affordability and that waiting lists for social housing were increasing (and have subsequently grown even further). A more contested set of comments related to the local impacts on existing accommodation providers, for example the motel and hotel owners. This was especially the case in places which already had an established commercial holiday accommodation sector. Specifically, 'fairness' in relation to taxation, as well as regulation, was seen as a particularly important issue to resolve when compared to the regulatory regime applied to accommodation-sharing.

Participants also noted the positive aspects of accommodation-sharing, especially in relation to increased revenue, a greater choice for where visitors can stay, and an increase in visitors to an area with otherwise limited capacity. The more 'traditional' holiday hotspots related that there is a need for short-term accommodation capacity during peak tourist season, or during local events or festivals.

3. THE WAITAKI DISTRICT STORY

The research data on accommodation-sharing was applied in a case study of Oamaru, and the development of a district housing strategy. Over a two year period the Oamaru case study research team of the Thriving Regions Programme contributed to development of a Waitaki District Housing Strategy, building on the first phase of research into regeneration initiatives in the region (Mackay, 2018). The research adopted a co-production of knowledge approach, working with Safer Waitaki, a "whole-of-community project" of the local Council focusing on community safety, health and well-being, including housing needs. Safer Waitaki established a Housing Task Force that brought together key community members, councillors and agencies in the housing sector.

The housing strategy directly used the BBHTC programme research findings relating to population, housing and community wellbeing (Taylor, 2020). From the first available data in 2018, Airbnb has been a new presence in the Waitaki rental housing market. These data showed, for instance, that the number of Airbnb listings in the Waitaki District had increased steadily from 263 in July 2018 to 322 in July 2019, since when, the number of listings fell noticeably to 235 by July 2021, presumably as demand in the hospitality sector was affected by COVID-19. Maps showed the spatial distribution of these Airbnb listings included a concentration in the town of Oamaru but also listings in the small settlements along the main local tourism routes.

The Airbnb listings appear high for the size of the population, and they potentially remove up to 200 houses or apartments from the rental housing supply and the number of listings of places to rent. The main effect of Airbnb is likely to be on rental prices. While these prices have stayed relatively stable since 2017, the data on the level of affordability (rental prices in relation to household income) was a concern to the Housing Taskforce, as was a steady rise in the waiting list for social housing (Campbell, 2020) and increasing demand for emergency housing, which draws on visitor accommodation such as motels if necessary.

In developing a housing strategy based on these data, the community organisations and agencies involved in the housing sector found that the availability and affordability of rental housing was their primary concern. Alongside that concern, were issues of discrimination in a pressured housing market and of the particular needs for housing migrant workers in the farming and food processing sectors.

4. CONCLUSION: COVID-19 AND BEYOND

Accommodation-sharing is a disruptive factor in regional housing markets. While accommodation-sharing was emerging as a disruptive force in its own right, the Covid-19 outbreak during 2019-2020, led to an unprecedented disruption to travel around the world (Conrow et al., 2021), which subsequently disrupted the international tourism industry (Higgins-Desbiolles, 2021). This then led to a switch in focus to the domestic visitor market. In tandem, the changes to patterns of immigration and emigration (Guadagno, 2020) have led to changes in local communities and have altered previous assumptions about population growth or decline and the different demand for housing.

As an additional complication, the role of rapid and unsustainable house price growth in general has lowered the aspirations of many low(er) paid and young(er) buyers to become home owners, exacerbated by the negative externalities of accommodation-sharing (Nieuwland and van Melik, 2020).

The 'affordability' problem in relation to housing was already contentious pre Covid-19 (Rehm and Yang, 2021). In this environment, the disrupted 'normal' operating in tandem to a 'disruptive' accommodation provider, means there is likely to be a particularly challenging period ahead as the strain on certain socio-economic and demographic groups reaches a peak, especially low-income, migrant workers.

In a world that is slowly returning to a level of pre Covid-19 movements as the vaccine rollout gathers pace, there will likely be the return of the old 'disruption' of accommodation-sharing. Currently, international travel bans affect close to 90 per cent of the world population (Gössling et al., 2021). As travel returns and as home affordability has markedly and materially worsened, we suggest that this trend will generate many more heated and difficult discussions about the nature of housing as an asset, rather than as a home and as part of a local community. Will we see a policy response which aims to balance the needs of local communities with the desire to see a tourism revival? If there is not a policy response which addresses the needs for visitor accommodation alongside challenges of local housing affordability and their impact on housing for local residents, deleterious social consequences may result.

Future research should focus on development of a central, independent source of administrative data which would allow the quantification and mapping of accommodation-sharing within a particular locality and a more detailed understanding of both positive and negative impacts. This could be supplemented by estimating 'what-if' revenue and taxation scenarios, using simulation, as has been used successfully in other research areas such as health or economic policy (Campbell and Ballas, 2016, 2013) or better understanding spatial patterns (Campbell, 2011). Furthermore, a qualitative study which aims to understand the precise motives of those engaged in accommodation sharing, and how communities are responding, could be conducted on a case study area with a high concentration, for example Queenstown.

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Town planning at the Olympic Games? Yes, it really happened!

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Medals were awarded for town planning, as a sub-set of the architecture category, at the Olympic games from 1928 to 1948 as part of the Olympic art competitions. These also included literature, music, painting, and sculpture. Baron Pierre de Coubertin, the founder of the modern Olympic movement, believed that such competitions alongside sport were vital in emphasising the human ideal of physical prowess in combination with a healthy and creative mind and best reflected the original Greek approach to Olympism. By the 1920s the art competitions were considered internationally relevant to campaigns for promoting public awareness of art as a whole.

All entries to the art competitions had to be inspired by sport. Hence successive town planning gold medals were awarded for stadium designs for Nuremberg and Liverpool, a Reich Sport Field in Germany, and an athletics centre in Varkaus, Finland. Whether any of them were actually built is not recorded. Anyone familiar with the windswept New Zealand sports stadiums that were endured until the 1990s will realise that local town planners never entered.

The art competitions were abandoned after 1948 in part because they lacked international organising structures and were therefore more difficult than sport for Olympic hosts to organise, and also because the likes of artists and town planners were considered to be professionals who may benefit materially from their Olympic success whereas Olympic athletes were required to be amateur and competing purely for the love of sport.

See: Richard Stanton, (2001) The Forgotten Olympic Art Competitions, Victoria: Trafford Publishing

	Gold	Silver	Bronze
1928	Alfred Hensel (GER)	Jacques Lambert (FRA)	Max Lauegeur (GER)
1932	John Hughes (GBR)	Jens Klemmensen (DEN)	André Verbeke (BEL)
1936	Werner & Walter March (GER)	Charles Browning Lay (USA)	Theo Nussbaum (GER)
1948	Yrjo Lindegren (FIN)	Werner Schindler & Edy Knupfer (SUI)	*Ilmari Niemeläinen (FIN)*

Table 1: Olympic Games Town Planning Medallists (Adapted by editors from: Wikipedia)

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Book Review

Te Mahi Oneone Hua Parakore: A Māori Soil Sovereignty and Wellbeing Handbook

Edited by Jessica Hutchings and Jo Smith

Christchurch, New Zealand, Freerange Press, 2020, ISBN: 978-0-473-51659-2

Te Mahi Oneone Hua Parakore: A Māori Soil Sovereignty and Wellbeing Handbook provides an in-depth look at the role of soil in Māori health and well-being. Hua Parakore is a nature-based Kaupapa Māori (indigenous) system and framework for growing organic kai (food). The book is divided into two sections. Part one investigates various components of the framework used to understand Hua Parakore, while part two consists of examples of the connection between Māori and oneone (soil). The aim of the book is not to present soil as the economic resource it is often viewed as, but rather as an integral part of the indigenous realities of Aotearoa New Zealand. This is done by demonstrating how its mana (supernatural force) can be elevated by understanding the links between soil, whakapapa (genealogy), tūpuna (ancestry), rangatiratanga (sovereignty), and hauora (well-being).

Part one consists of four chapters, which address the topics of developing an understanding of soil health and well-being, the role of soil in human health, and the depth of Māori soil knowledge. The first chapter, written by the editors, describes the six interconnected core values of Hua Parakore. The chapter then explores how these values are incorporated into discussions around soil health and well-being, through the health of the wider environment. The framework acknowledges that different landscapes have different requirements, and the values of Hua Parakore can be used to identify suitable management practices and strategies for enhancing soil health and well-being. The values of the Hua Parakore framework provide a starting point for land management decisions that integrate the needs of the wider environment, including the relationship between people and soil.

Chapter two, by senior Māori environmental scientist Garth Harmsworth, looks at how the health and well-being of Māori is driven by connections to the soil. These connections include whakapapa, ancestral stories and legends, and turangawaewae (sense of place), which are important aspects of identity. The chapter also discusses the link between Māori well-being and the environment by using four hauora frameworks, each encompassing various physical, mental, spiritual, environmental, and cultural aspects as drivers of health and well-being. There is emphasis throughout the chapter on considering humans as part of the environment, not separate from it.

Chapter three, written by Kaupapa Māori researcher and Hua Parakore farmer, Jessica Hutchings, demonstrates the importance of advocating for the rights of ancestral soils to honour the relationship between Māori and soil, and to re-establish the links between soil and health to improve all dimensions of well-being. The chapter begins with a discussion of the importance of soil in the connections between people,

culture, and the environment through the introduction of concepts including tikanga (customs) and kaitiakitanga (guardianship). Using the Hua Parakore framework, Hutchings then presents ways that food production and soil management can be returned to natural processes and practices to improve soil and human health and well-being.

The final chapter in part one is provided by Nick Roskruge, a horticulturalist, ethnobotanist, and an expert in Māori resource and environmental management. This chapter continues to define the links between Māori and soil through whakapapa, horticulture, and the practices involved in the naming and classification of soil by Māori. A list of 60 names given to different soils by Māori describing their properties and identifying their features or uses, demonstrates extensive knowledge of the functions and limitations of soils across the New Zealand landscape. A seemingly obvious, but often forgotten point raised by Roskruge is that soils were, and are, relied upon for survival, and if the mauri (life force) of the soil is degraded, the health of those reliant on it is also affected.

Part two comprises nine examples of the relationship between tāngata and whenua, people and the land, obtained through kōrero (interviews). These kōrero were conducted by various Māori researchers with individuals and groups who are described as soil heroes. A range of interviewers and interviewees were used to produce chapters which highlight the importance of the connections between people and soil in a variety of situations. These kōrero include advocating to return the soil to a natural, organic state that is representative of Papatūānuku (earth mother), the processes of building a rammed earth house, school involvement in food production and regenerative planting, the role of soil in homeopathy, and the importance of soil in healthy food production. The individual and community benefits arising from connecting with and improving the mauri of soil is a recurring theme throughout part two of the book.

Of the chapters in part two, I found chapter seven the most interesting because of the way in which the schools connection with the soil resource benefits the wider school community. In this chapter Yvonne Taura, a kairangahau (Māori researcher) and science communicator has kōrero with Hōhepa Hei, a kaiako (teacher) at Te Wharekura a Maniapoto in Te Kūiti. Hōhepa describes an initiative developed by the wharekura (indigenous Māori secondary school) to enhance the learning of the tauira (students) and grow their understanding of kaitiakitanga, strengthen their connections to the whenua and soil, and learn practical skills to enable them to support their whānau (families). The programme includes the building, use and understanding of pātaka kai (traditional food storage), establishment of a māra kai (vegetable garden), and running a native nursery. These project-based learning opportunities have been developed into the school's curriculum, with tauira able to gain NCEA science credits. The establishment of the māra kai in response to the needs of the community, provides an opportunity for the tauira to grow kai to take home to their whānau, while learning about harvesting tikanga (protocols), how to care for and develop the soil into healthy and productive growing beds, and grow connections with their community through working bees and distributing kai. The aim of these projects is to do more than just grow food and plants, it is to develop a greater understanding of kaitiakitanga, traditional skills, and to enhance community health and well-being through good kai and community connection.

This book was easy to read with detailed chapters that were broken into smaller sections. The book incorporates a large amount of Te Reo Māori, with ample translation so that even those with little to no knowledge of the Māori language would be able to read and understand the book. Key concepts are supported by diagrams, enabling readers to visualise the various links and interconnections that are common themes throughout the book, and photographs enable greater connection to the stories being told. As a soil scientist, this book demonstrated to me the often-overlooked, in-depth knowledge of soil and soil management that Māori have. This book also provides an understanding of the need for interdisciplinary and transdisciplinary research to progress soil science, as it clearly demonstrates that soil is not only important

for food production but is also central to social connections, health and well-being. Everyone from home and community gardeners, people interested in sustainability, Hua Parakore and mahika kai, to scientists would benefit from reading this book. The ways in which people are connected to the soil and how these connections can be enhanced are set out in a variety of different ways, so there is something everyone can take away from this and apply or consider when carrying out their own mahi (work) related to food production or environmental protection.

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New Zealand Planning Institute Conference, 24 – 26 March 2021

Vanessa MANNIX

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As the recipient of the 2021 Papa Pounamu Whakatutukitanga Scholarship, I was invited to attend the annual New Zealand Planning Institute (NZPI) conference in Nelson, lasting 3 days. The theme of the conference was *Values, Voices, Visions.* The conference focused on the diversity of voices and values within our communities, and future visions in planning for the world's current challenges, like COVID-19 and climate change. This year it was a "hybrid conference,", accessible to both in-person and on-line attendees who were unable to make it due to COVID-19 restrictions. This also meant people from all over the world could present their work and knowledge which took the conference beyond the New Zealand (NZ) context.

As a third-year planning student from Lincoln University who had never attended a conference, I had no idea what to expect. I was slightly nervous, but very excited. I hoped to gain a deeper understanding of how my planning career could evolve, and to improve my awareness of the types of subjects' planners are currently focused on.

While there, I was able to enjoy many thought-provoking sessions on a wide range of topics. The overall sub-themes were climate change, placemaking & identity, local & national vision, and Mātauranga Māori. Under these sub-themes, keynote speakers presented ideas around smart cities, resilience, risk reduction, transport, regeneration, treaty-based governance, and urban design.

One presentation that stood out for me was by Nicki Williams, a landscape architect at the Christchurch City Council. She advocated for gender-sensitivity to be incorporated into the planning of future spaces, as different genders have different needs within a city. She used the example of a children's playground where girls tended to be less interested in skateparks, soccer fields, and bike tracks than boys; The addition of activities that are more attractive to girls, like fun hangout zones for them and their friends, could help attract more girls back to the playground, especially older ones. She discussed how beneficial it would be to apply a gender lens to our policies and plans. Vienna, Austria has already done this, and all genders of all ages are reaping the benefits.

Nicki Williams also discussed current initiatives that are starting to merge gender-sensitivity and planning together. For example, the "Free to Be" initiative in Australia. This initiative is a crowd mapping tool targeted at women, it allows them to map where they feel safe and unsafe within a city and explain why. This is so people, like planners, can have better insight into where more gender-sensitive design is needed around a city. After this presentation I talked to multiple planners who said they hadn't really thought about this aspect of planning before, which I found very interesting. Personally, my Lincoln University courses had already exposed me to this connection between gender and place, but I found it very beneficial to dig into this idea more and see real life examples of it.

The reform of the Resource Management Act 1991 was also discussed briefly by Hon. David Parker. He talked about how the three new acts will have a stronger inclusion of mātauranga Māori, how joint committees will be created consisting of central, regional, local government and mana whenua to create district plans, and how these plans will reduce down to 14 across NZ. This discussion provoked mixed reactions from planners attending the conference.

Overall, I entered the NZPI conference not knowing a single person, with no expectations, and left with a greater appreciation for what planners do, some new knowledge under my belt, and excited for what lies ahead.

Figure 1. Emerging Planners Conference social event in Nelson, 2021

Figure 2. Acceptance speech for the Papa Pounamu Whakatutukitanga Scholarship 2021

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New Zealand Farm Forestry Conference: 'Trees in a Political Landscape', 24 – 28 March 2021

Mawardah Nur HANIFIYANI

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The New Zealand Farm Forestry Conference with the topic "Trees in a Political Landscape" was held from 24 – 28 March 2021 at Te Papa, Wellington. Although a five day conference, I only attended the regulatory session on Thursday, 25 March 2021. I came across the conference from its Facebook page and I have worked in forestry in Indonesia so decided to go to the conference to gain more understanding about the provision of plantation forestry in New Zealand.

There were five presentations in the regulatory session: Regulation of Log Traders and Forestry Advisers Amendment Act 2020 and Wood Legality Assurance Bill presented by Kay Shapland (Manager Forestry & Plant Sector, Ministry for Primary Industries (MPI)); the National Environmental Standards for Plantation Forestry (NES-PF) presented by Susan Secker (Manager, Forestry Operational Policy, Resource and Land Management Directorate, MPI); Climate Change – Farms, Forest, and Fossil Fuel presented by Simon Upton (Parliamentary Commissioner for the Environment); Essential Freshwater Reforms presented by Bryan Smith (Chief Advisor for Freshwater, Ministry for the Environment); and Phytosanitary Options for Export Logs presented by Don Hammond (Chair, Stakeholders in Methyl Bromide Reduction).

From all the presentations, the NES-PF presentation was the major reason why I attended the conference. The NES-PF is the focus of my dissertation, and I thought the presentation will benefit me, especially to gain early information about the one-year review of NES-PF which had not yet been published (it has since been released on the MPI website). The NES-PF was issued to manage the adverse effects of plantation forestry, especially for eight-core activities (afforestation, prune and thin, earthworks, river crossing, forestry quarrying, harvesting, mechanical land preparation, and replanting). The national direction was made to make a consistent plantation forestry provision across the country.

Susan Secker briefly talked about the results of the NES-PF implementation review, her team found that the capacity and capability at the regional level still needs support from the MPI. High staff turnover and multiple job desks at the same time are one of the findings. The presentation also mentioned the progress of the Resource Management Act (RMA) reforms and the potential future of the NES-PF under the new or replacement RMA.

Overall, the presentation was really insightful. It reminds me of when I was working as a forester in plantation forestry back in Indonesia. In general, the main problems in plantation forestry in Indonesia and New Zealand are quite different (but not entirely different). However, the lack of capacity and capability, as well as the frequent staff rotation at the local level has been one of the obstacles in implementing the forestry provision in Indonesia. The conference has given me a good learning experience to see the plantation forestry provision from a New Zealand perspective. Moreover, it was nice to see all the stakeholders from government ministries and the forestry farmers interact with each other to discuss the future of plantation forestry.

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Environmental Defence Society 2021 Conference: 'Transforming Aotearoa – The Government's Environmental Reform Agenda' Christchurch, 4-6 August 2021

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The Environmental Defence Society's (EDS) conference this year was centred around the numerous environmental reforms that the government is undertaking. The focus was especially on the reforms on the Resource Management Act 1991 (RMA), freshwater, oceans & fisheries and conservation. The conference was attended by a diverse crowd, with a mix of public servants, academics, lobbyists and politicians, as well as farmers and activists.

A reminder about the need for integrated and sustainable management preceded discussions on freshwater and land-use, especially regarding New Zealand's agricultural sector. While Ministry for the Environment representatives presented the new policy objectives to address freshwater, we were reminded of the extensive land-use changes that New Zealand underwent in recent decades and the implications for freshwater and climate change targets. Resilient land-use strategies with a shift towards a regenerative approach were discussed as ways to address environmental issues while maintaining New Zealand's image in international markets. This is especially relevant to management of significant and vulnerable environments, such as the high country. The need for land-use policies to address cultural values as well as environmental ones was proposed as a way to avoid and mitigate the effects of land alienation and disruption of social cohesion experienced by many iwi and hapū.

The greatly anticipated session on the RMA reform was opened by Hon Tony Randerson QC detailing the vision for the reform and commentary around the Natural and Built Environments Act exposure draft. The details around purpose and principles of the exposure draft are limited, although it contains provisions for a national planning framework to be prepared by the minister and a proposal to combine plans (regional and district) to improve efficiency and environmental outcomes. The main objectives of the reform are environmental protection and restoration, the ability to address climate change concerns, the consideration of environmental limits and process improvements. The exposure draft includes slightly broader provisions to address Māori interests, especially through the inclusion of 'Te Oranga o Te Taiao' in the purpose of the act and provisions to 'give effect to' Te Tiriti. Questions around implementation of these principles and inclusion of matauranga Māori in processes were voiced, with the main message being that 'hard conversations' need to be had to truly harness the potential of equal partnership. Despite the uncertainty around the exposure draft, most speakers endorsed the reform.

The conversation around oceans and fisheries reform kicked off with a vision for the future of New Zealand's blue economy that recognised marine resources beyond their financial value. An overview of overseas and national policy followed, including indigenous and industry perspectives. The current framework is fragmented across a plethora of legislation, with the suggestions to develop an overarching oceans policy

and implement integrated-management tools. Support for a cross-sectoral approach to the reform also highlighted the role of Māori as Treaty partners, especially regarding fisheries and marine reserve proposals.

The Minister for Conservation, Hon Kiritapu Allan, made a case for a conservation reform to address the current ad-hoc, fragmented and dated approach. The conversation was centred around conservation management issues, the strengthening of the role of Māori, inclusion of matauranga in legislation and the relationship between conservation and tourism. EDS has released a new paper discussing conservation reform issues, which will make a good read for anyone interested in this topic (available from: https://www.eds.org.nz/our-work/publications/reports/conserving-nature-conservation-reform-issues/).

Overall, the conference provided a stimulating and timely discussion on the environmental reform agenda, bringing together a range of perspectives. Strong cases were made for these reforms, and it will be interesting to follow their development. I encourage fellow students and practitioners to look at the recorded conference sessions available on the EDS website (https://www.eds.org.nz/our-work/eds-conferences/2021-conference/).

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Department of Environmental Management Staff Profiles

Compiled by Jocelyn HENDERSON

Master of Environmental Policy and Management student, Lincoln University, Christchurch, New Zealand

HAMISH RENNIE

Hamish Rennie has been teaching environmental management and planning at Lincoln University since March 2007. He started his career as a land resources scientist after gaining a BSc Hons in Geography from the University of Otago but, while employed at the Ministry of Works and Development Head Office, where he earnt his practising certificate as a resource manager, he realised that they ''had the science to address soil conservation, but couldn't change behaviour." This realisation sparked an interest in human geography which led him to Memorial University of Newfoundland to undertake research with an indigenous people's fisheries cooperative.

After returning to New Zealand, he embarked upon a wildly varied career with the New Zealand government, working for the Ministry of Foreign Affairs and the Ministry of Health before moving to the Department of Conservation in 1990. Here he was involved with writing the coastal tendering section of the RMA, (blame him for any problems) and dealing with the interface between the RMA and fisheries and marine farming legislation, as well as developing the first NZ Coastal Policy Statement. He then moved to managing DOC's International Unit, working on the Convention for Biodiversity and implementing the Antarctic Treaty Environmental Protocols. He describes this as a dream job, which he only left for another dream job as a geography lecturer at Waikato University. During his 12 years at Waikato he completed his PhD on the geography and planning of marine farming in New Zealand, and became a member of the NZPI. Amongst his

wide-ranging achievements, Hamish is particularly proud of arguing for the 2010 NZCPS to include provisions to protect surf breaks – a world first with real planning impact – and of creating the Lincoln Planning Review. Despite his full teaching schedule and the constant demands of caring for his wife's beloved flock of Ryeland sheep, Hamish also does pro bono work as a hearings commissioner and expert witness to maintain the sharpness and connection with application that he feels is critical to the courses he teaches.

When asked for his perspective on planning today, Hamish was fairly dismal about it. He particularly worries about "the general level of ignorance about how the RMA is supposed to work among the public, media, politicians, and unqualified people required by employers to do planning work." Hamish thinks that the potential of the RMA and the advances it made have been undermined by central government reforms, in 2017 especially, and by central government's use of National Standards. Public participation has been stifled, democracy has been lost and instead, "it has reintroduced a political and allocative approach, while removing much of the transparency, and taken us backward to activities-based planning." However, he thinks replacing the RMA is a bad move due to litigation and difficulties in setting in place the new approach, both of which will challenge planners. "It took two decades to get a strong NZCPS, two and a half decades before the Supreme Court fixed an early error by a lower court that had hamstrung the RMA, and three decades to get a strong National Policy Statement for Freshwater Management. How long will it take for the legislation to have working instruments and appropriate precedent-setting court cases? My guess – at least two decades. If all the people working on the reforms were working on implementing the RMA it would be a much better use of resources."

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Master of Environmental Policy and Management: A popular programme at Lincoln University goes online!

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Lincoln's Master of Environmental Policy and Management (MEPM) is now in its 6th year, and judging from the steady increase in enrolments and high employment rates of graduates, it is filling a clear need. Awareness of the scale and complexity of global challenges is steadily increasing, and with it, recognition of the urgent need for effective action. As a result, there has been a sharp increase in the number of organisations recruiting for staff with environmental expertise and in students interested in developing their skills in these areas.

With the on-campus MEPM programme well-established, an online version was launched in 2021 as the Faculty of Environment, Society and Design's first online qualification. The two core courses and six 'soft core' courses are available online from 2022, and these can be supplemented with online electives or on-campus block courses from across the university. The online option has proved very attractive. Many of the online students study part-time alongside existing work, and the online version enables students stranded overseas by Covid or living in other parts of the country to upgrade their environmental policy and management skills without having to be in Lincoln.

The Covid disruption, combined with the Lincoln University decision to make Masters level courses 'fees free' until the end of 2022, appears to have been seized upon by many people as an opportunity to reassess their options – in some cases returning to university to complete partial postgraduate study from some years before, and a number expressing a desire to change to a career where they can contribute to addressing some of the global challenges humanity faces.

The MEPM is a 180-credit taught Masters which can be completed in three semesters of full-time study, or spread out over more semesters if studying part-time. It was established as part of a revamp of Lincoln's postgraduate programmes. While the closely related Master of Planning is a specialist programme accredited by the New Zealand Planning Institute (NZPI), the MEPM allows students greater scope to study a range of courses related to environmental policy and environmental management.

The programme has flexibility in both when and how students begin. Study can commence in either the first semester (February) or the second (July). "Staircasing" has proven popular, especially for those returning to study after a prolonged break or changing career. This means starting with either a Postgraduate Certificate (three courses/60 credits), or a Postgraduate Diploma (six courses/120 credits) and after 'testing the waters', transferring to the MEPM (subject to grades).

Students develop advanced research and analytical skills, along with an in-depth understanding of the socio-cultural, political and economic contexts of environmental management, and practical skills. Courses covering sustainability, environmental economics, Māori resource management, planning law, ecology and GIS are common choices.

MEPM graduates are now found in a wide range of positions in government agencies, regional and local councils, environmental and business consultancy firms, industry organisations and businesses, international agencies, non-government organisations (NGOs), and advocacy groups.

Most of the research of the staff and students in the Department of Environmental Management relates to the broad fields of environmental management and sustainability transitions, but academic staff are also active in the day-to-day practice of environmental policy and management. They bring this experience on advising government, local authorities, NGOs and businesses to their courses, providing first-hand opportunities for students to engage with and take direct action to address global challenges locally. This is part of the almost 50 years of environmental policy and management heritage of the university's Department of Environmental Management, and the online MEPM is part of making this expertise and these opportunities accessible to more people as part of responding to Covid and the environmental and social challenges facing the world.

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Planning-relevant Peer-Reviewed Publications by Lincoln University Staff in 2020

Compiled by Hamish G. RENNIE

Department of Environmental Management, Lincoln University, Christchurch, New Zealand

Once students graduate from university it is often difficult to stay in touch with developments in their field beyond the day to day work experience. This means the opportunity for intellectual stimuli are reduced and major research findings may be overlooked for some years. The *Lincoln Planning Review* (LPR) was established in part to bridge the gap between academia and practice. Over a decade later, many research organisations now employ people paid to translate research findings into short policy briefs intended to heighten the research impact, and perhaps to advance particular agenda. A trend we have noticed is the increased difficulty in getting past website 'policy briefs' to the technical or research reports on which they are based. Here we subvert that process to the extent we can, by providing a collation of the peer reviewed publications written by the core planning staff at Lincoln University, together with other staff publications that in the, admittedly biased view of the collator, are planning relevant. Unfortunately, 'planning-relevant' is not a criterion on which documents are usually catalogued and some of our staff may have yet to upload relevant published articles to our online databases. There are certain to be omissions and I apologise for any such.

Several staff are involved in the early stages of refunded National Science Challenge research projects that were not in research publication mode. This compilation is for publications in the year 2020, a year when we all learned that 'covid' was a word and when much research stalled or was considerably delayed. Many of the articles would have been written pre-pandemic and reflect the pre-occupation of the time. It will be interesting to compare future compilations to see how much the pandemic might have affected planning-related research.

The following publications have been identified by trawling manually through individual staff publications stored in Lincoln University's internal Performance Based Research Fund (PBRF) Elements software database. Only peer reviewed journal articles or book chapters have been included. There are probably at least double, perhaps triple that number in conference presentations, discussion documents, LEaP Reports, Op-Ed and Newsletter contributions that have been omitted.

Cheng M, Houge Mackenzie S, Degarege GA. (2020). Airbnb impacts on host communities in a tourism destination: An exploratory study of stakeholder perspectives in Queenstown, New Zealand *Journal of Sustainable Tourism* 19 pages

Duncan R, Robson-Williams M, Edwards S. (2020). A close examination of the role and needed expertise of brokers in bridging and building science policy boundaries in environmental decision making *Palgrave Communications* 6:12 pages

Fountain J, Charters S, Cogan-Marie L. (2020). The real Burgundy: Negotiating wine tourism, relational place and the global countryside *Tourism Geographies* 21 pages

Fountain J, Cradock-Henry N. (2020). Recovery, risk and resilience: Post-disaster tourism experiences in Kaikoura, New Zealand *Tourism Management Perspectives* 35:11 pages

Guerello A, Page S, Holburn G, Balzarova M. (2020). Energy for off-grid homes: Reducing costs through joint hybrid system and energy efficiency optimization *Energy and Buildings* 207:11 pages

Hehir C, Stewart EJ, Maher P, Ribeiro MA. (2020). Evaluating the impact of a youth polar expedition alumni programme on post-trip pro-environmental behaviour: A community-engaged research approach *Journal of Sustainable Tourism* 20 pages

Jaksic C, Steel GD, Moore K, Stewart E. Person-environment fit: A cross-national and cross-temporal study of human adaptation to isolated and confined environments *Polar Science* 26:7 pages

Juschten M, Page S, Fitt H. (2020) Mindsets set in concrete? Exploring the perspectives of domestic travellers on New Zealand's (auto-)mobility culture *Sustainability* 12(18):21 pages

Karaminejad Z, Vallance S, Montgomery R. (2020). Building the foundations of collaboration: From housing development to community renewal *Current Urban Studies* 8(4): 599-622

Mamboleo AA, Doscher C, Paterson A. (2020). Investigating geospatial patterns of elephant crop damage adjacent to the Serengeti National Park and Grumeti Game Reserve, Tanzania *Journal of Environmental Informatics Letters* 4(1):32-39

Marsh L, Doscher C, Cameron C, Robertson LA, Petrović-van der Deen FS. (2020). How would the tobacco retail landscape change if tobacco was only sold through liquor stores, petrol stations or pharmacies? *Australian and New Zealand Journal of Public Health* 6 pages

Marsh L, Vaneckova P, Robertson L, Johnson TO, Doscher C, Raskind IG, Schleicher NC, Henriksen L. (2020). Association between density and proximity of tobacco retail outlets with smoking: A systematic review of youth studies *Health and Place* 24 pages

Matunga H, Matunga H, Urlich S. (2020). From exploitative to regenerative tourism: Tino rangatiratanga and tourism in Aotearoa New Zealand *MAI Journal* 9(3):295-308

Nissen S, Prendergast K, Aoyagi M, Burningham K, Hasan MM, Hayward B, Jackson T, Jha V, Mattar H, Schudel I, et al. (2020). Young people and environmental affordances in urban sustainable development: Insights into transport and green and public space in seven cities *Sustainable Earth* 3:12 pages

Nissen S, Wong JHK, Carlton S. (2020). Children and young people's climate crisis activism – a perspective on long-term effects *Children's Geographies* 7 pages

Purdie H, Hughes Hutton, Jessica, Stewart E, Espiner S. (2020). Implications of a changing alpine environment for geotourism: A case study from Aoraki/Mount Cook, New Zealand *Journal of Outdoor Recreation and Tourism* 29:10 pages

Safa M, Maxwell T, Doscher C. (2020). Developing an app to estimate pasture fertiliser application on dairy farms *The Journal(NZIPIM)* 24(1):37-41

Teen R, Roberts L, Challies E. (2020). Disruption as opportunity for transformation? Insights from water supply contamination in Havelock North, New Zealand *Local Environment* 25(10): 810-827

Urlich S. (2020). Opportunities to manage sediment from forestry more effectively in the Marlborough Sounds and contributing catchments *New Zealand Journal of Forestry* 65(2):28-35

Urlich S. (2020). The Motiti decision: Implications for coastal management *Resource Management Journal* April 2020:14-19

Urlich SC, Handley SJ. (2020). From 'clean and green' to 'brown and down': A synthesis of historical changes to biodiversity and marine ecosystems in the Marlborough Sounds, New Zealand *Ocean and Coastal Management* 198:18 pages

Urlich S, Handley SJ. (2020). History of pine forestry in the Pelorus/Te Hoiere catchment and the Marlborough Sounds *New Zealand Journal of Forestry* 65(3):30-35

Wesener A. (2020). Growing resilient cities: Urban community gardens and disaster recovery after the 2010/11 Canterbury/Christchurch earthquakes In *Urban Resilience in a Global Context: Actors, Narratives, and Temporalities*. Editors: Brantz, Dorothee, Sharma, Avi. 77-100. Verlag, Bielefeld, Germany

Wesener A, Fox-Kämper R, Sondermann M, Münderlein D. (2020). Placemaking in action: Factors that support or obstruct the development of urban community gardens *Sustainability* 12(2):29 pages

Yazdanian M, Ingham J, Kahanek C, Cradock-Henry N, Fountain J, Dizhur D. (2020). Analysis of damage data collected for wine storage tanks following the 2013 and 2016 New Zealand earthquakes *Bulletin of the New Zealand Society for Earthquake Engineering* 53(2):83-100

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Awards, Prizes and Scholarships

Compiled by Sarah EDWARDS[1] and Jaclyn PHILLOTT[2]

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Each year Lincoln University students and staff gain merit-based recognition. A number of students also receive Summer Scholarships, usually externally funded, to work on research projects under staff supervision during the summer vacation period. We record these awards in the earliest edition of *LPR* after they have been announced.

1. Student awards

The John Hayward Memorial Prize 2020 – Jocelyn Henderson

The John Hayward Memorial Prize was created after the death of John Hayward in 1993. John Hayward was the founder of the Centre for Resource Management at Lincoln, as well as the Master of Science (Resource Management) degree, a precursor of the Master of Environmental Policy and Management degree. This award is given to the most outstanding Master of Environmental Policy and Management student who has completed the requirements for the degree, and is based mainly on their academic performance in core subjects. In 2020, the recipient was Jocelyn Henderson, who is currently working as a communications officer at the Department of Conservation.

Papa Pounamu Whakatutukitanga Scholarship 2021 – Vanessa Mannix

The Papa Pounamu Whakatutukitanga Scholarship is supported by WSP and the New Zealand Planning Institute (NZPI). It is awarded annually to a student at the undergraduate or post-graduate level studying towards an NZPI accredited planning degree. The scholarship recognises excellence and attainment by a student planner involved in Māori planning in an environmental framework. It considers a student's academic and physical work and how that work might impact or change the understanding or practice of planning in New Zealand. The recipient also receives holiday work experience at WSP for up to 10 weeks and is awarded the scholarship at the annual NZPI Conference. In 2021, the recipient of this scholarship was Vanessa Mannix, who is currently studying towards a Bachelors of Environmental Policy and Planning (with Honours) degree at Lincoln.

2. Staff Awards

New Zealand Geographical Society's President's Award for Graduate Research Supervision in Geography 2020 – Associate Professor Hamish Rennie

The New Zealand Geographical Society (NZGS)'s President's Award for Graduate Research Supervision in Geography is for New Zealand-based geographers who demonstrate excellence in their supervision of student research over the last five years. In 2020, the recipient was Associate Professor Hamish Rennie. Hamish supervises student research in applied geography, including legal geography/planning and environmental management, with a particular emphasis on commons and global challenges such as climate change, disaster resilience and sustainable development. Over the five years from 1 January 2015- 1 January 2020, he supervised 21 research students to completion: six PhD theses, eight Masters theses and seven MPlan dissertations. A further six were at various stages of their study as at 1 January 2020. Hamish's nomination was supported by statements from a number of these research students, showing just how well deserved this award is.

The award citation noted that Hamish brings his expertise in and enthusiasm for geography to a wide variety of cross-disciplinary postgraduate research projects at Lincoln University. He enables students to achieve their research goals and beyond as they progress into academic and professional careers, and is a mentor, colleague and friend to all. In addition to the research he supervises directly, Hamish also makes an outstanding contribution to postgraduate research across the faculty through his administrative roles, including as Editor-in-Chief of *Lincoln Planning Review*.

Commonwealth Association of Planners Awards 2021: Planning for Equitable and Inclusive Cities and Human Settlements – Te Whaihanga, New Zealand (Ako Aotearoa, Auckland Council, Te Hana Te Ao Marama)

Te Whaihanga is a two-year project to help built environment professionals and students learn why and how to effectively engage with Māori. It was announced as winner of an Outstanding Planning Achievement award at the 2021 Commonwealth Association of Planners (CAP) Awards, held in Malaysia on 8th November. Lincoln University's Professor Hirini Matunga was an advisor and mentor to the project led by Professor Dory Reeves and Lena Henry (University of Auckland), along with planning and design colleagues from Victoria University, Auckland University of Technology, Ako Aotearoa, Auckland Council and Unitec.

The award citation noted that many planning systems across the Commonwealth are legacies of the colonial era. As such they paid scant regard to the values and culture of indigenous peoples. Training and practice rendered many planners blind to this inequity and to its discriminatory consequences. In New Zealand, Māori remain a disadvantaged group. The Te Whaihanga project is a multi-faceted training project that is building the capacity of planners and other built environment professionals to engage with Māori and build a long-term relationship. Workshops can be accessed face-to-face or online. The concept and content have been shaped and led by Māori. Te Whaihanga contributes to delivery of several SDGs. It embeds key Māori principles that define human responsibilities to the natural environment and landscapes. It is a model that could be adapted to many Commonwealth countries to make planning a more inclusive and equitable practice.

The Te Whaihanga project featured a foreword by Hirini, who stated: "Theories, concepts, ideas, even history – including the Treaty of Waitangi – must meet practice," noting that the Te Whaihanga report, and the research underpinning it, fills a critical gap between theory and that practice.

3. Summer scholarships 2019-2020

Alana Hamilton: Understanding how to communicate conservation to children in ways that support their developing empathy and commitment to the natural world
Supervisors: Stephen Espiner, Emma Stewart, Annabelle Studholme (DOC)
Funding: Department of Conservation; Lincoln University

Ollie Rutland-Sims: Evaluating effectiveness of new rip safety signage at Sumner Beach, Christchurch
Supervisor: Stephen Espiner, Emma Stewart, Amy Johnston Bray (Parks Unit CCC)
Funding: Christchurch City Council

Adrian Xu: Oral histories of the Waitaki Hydro-electric power scheme.
Supervisors: Lloyd Carpenter, Stephen Espiner, Mel Schauer (Meridian)
Funding: Meridian

Gemma Coutts: Te Hoiere Pelorus historical social research project
Supervisor: Steve Urlich
Funding: Department of Conservation; Lincoln University

4. Summer scholarships 2020-2021

Jazmynn Hodder-Swain: Understanding the issues for Brooklands Lagoon
Supervisors: Steve Urlich, Lesley Bolton-Ritchie (ECan)
Funding: Environment Canterbury; Lincoln University

Kate Marshall: Purau Bay, Stream and Catchment Whakaraupō
Supervisors: Steve Urlich, Karen Banwell (ECan) and Paul Dahl (ECan)
Funding: Whaka-Ora Healthy Harbour; Environment Canterbury; Lincoln University

Jaclyn Phillot and Anna Sapsford: The changing landscape of volunteering: Perspectives of youth leaders in Canterbury, New Zealand
Supervisors: Sylvia Nissen, Lloyd Carpenter and Sally Carlton
Funding: Marsden Fund

Oscar Savage: Recreational use of the Canterbury coast

Supervisors: Hamish Rennie and Jane Doogue (ECan)
Funding: Environment Canterbury; Lincoln University

Nika Kent: Environmental risks and hazards in the wine industry: A literature review and case study analysis
Supervisors: Jo Fountain, Nick Cradock-Henry (MWLR)
Funding: Resilience to Nature's Challenges NSC – RPM/Rural

Susanna Blakely: Community initiatives to enhance food security and local supply chains in the context of COVID-19
Supervisors: Jo Fountain, Nick Cradock-Henry (MWLR)
Funding: Resilience to Nature's Challenges NSC – RPM/Rural