Lincoln Planning Review

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Coastal modelling of sea level rise for the Christchurch coastal environment

Whose interests count?

The Malvern Hills Protection Society and an irrigation scheme proposal

A failed attempt at collaborative water planning

Selwyn Waihora Variation 1

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Lincoln Planning Review is the journal of the Lincoln University Planning Association (LUPA) and is an online publication produced twice each year and primarily edited by students

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

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EDITORIAL

At its inception, *LPR* was established as a journal with students at its heart. The editorial team was set up to consist mainly of students who would work together to solicit content, proof-read articles, produce the final publication, and distribute it through local networks. Over the years many articles have also been written by students, and there has traditionally been a dedicated spot for top third year planning students to have their research assignments published in the journal. Profiles of PhD candidates are included to showcase current planning-related research being conducted by postgraduates at Lincoln University; furthermore, the careers of planning graduates "post-Lincoln" are given in the "Where are they now?" section. This formula has arguably been key to the overall success of *LPR*, and the central role of students in the publication was cited in the NZPI Award of Merit bestowed upon Lincoln University in 2011[1].

While students have always been vital to the success of *LPR*, their work is particularly prominent in this issue. In addition to the work done by the student editorial team, we include a number of articles written by current students and recent graduates from a wide range of planning-related disciplines.

We begin the issue with a peer reviewed article co-authored by recent Masters of Applied Science graduate, Ashton Eaves, who uses coastal modelling to assess the impacts of future sea level rise on the post-earthquake Christchurch shoreline. This is followed by a research article written by another Masters student, Nicky Snoynik, who explores the experiences of the Malvern Hills Protection Society during resource consent hearings processes for the Central Plains Water Scheme. Later in this issue we include a research report by a group of first-year Masters of Environmental Policy students on issues and options surrounding housing affordability in the Selwyn District.

In keeping with our commitment to publish articles written by undergraduate students, we include two research papers written as part of the course requirements for ERST340, Environmental Planning. Both provide in-depth considerations of planning theory in the context of Christchurch city. Charlotte Thompson uses a Feng shui-inspired analysis to formulate redevelopment plans for the Eastern red zone; Charlotte Irving assesses efforts to reduce crime through environmental design.

Two visiting PhD students have contributed articles based on their experiences whilst living and working in the Canterbury region. Marta Donolo shares her thoughts on the efforts to rebuild the city of Christchurch, while Francesc Fusté Forné considers the value of promoting "sustainable" tourism experiences in the Selwyn District. Elsewhere in this issue we include articles by recent PhD graduates: a conference report by Nick Kirk, and an opinion piece by Hugh Logan. Hugh now lectures planning-related courses at Lincoln University, so we also include him in the "Staff profiles" section.

It is also worth noting that a number of the original *LPR* student editorial team also feature in this issue. In the "Where are they now?" section we include a profile of Kelly Governor (née Fisher). Kelly contributed to the journal

1 See: *Lincoln Planning Review* Vol. 3(1)

throughout her undergraduate and postgraduate studies at Lincoln, and for the first four issues she worked alongside both myself and Adrienne Lomax. In this issue, I have returned to work on *LPR* as the acting Editor-in-Chief, and Adrienne has contributed an informative article on the management of Te Waihora/Lake Ellesmere. And although he was never a student at Lincoln, it would be remiss not to mention Hamish Rennie, *LPR* founder and long-standing Editor-in-Chief, who has contributed a hard-hitting analysis of recent approaches to water planning in the Selwyn/Waihora Zone.

As we move into our eighth year of publication, it is perhaps a focus on students that will ensure the ongoing success of *LPR* in years to come. Regular readers will know that it has been a struggle to meet deadlines in recent years, resulting in publication delays and combined issues; this issue is, unfortunately, no exception to this trend. As noted in the Editorial for the last issue, ongoing institutional change at Lincoln in recent years has undoubtedly contributed to these difficulties. Nevertheless, a focus on student involvement in the production of the journal could help counteract these problems. *LPR* was founded as a student journal, and it is undoubtedly students who hold the key to its ongoing success. So I would like to end this section with a huge "thank you" to the small but dedicated editorial team who made this issue possible, and also ask other Lincoln students to get involved: we need you!

Sarah Edwards, Acting Editor-in-Chief

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Coastal modelling of sea level rise for the Christchurch coastal environment

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ABSTRACT

Predictive modelling provides an efficient means to analyse the coastal environment and generate knowledge for long term urban planning. In this study, the numerical models SWAN and XBeach were incorporated into the ESRI ArcGIS interface by means of the BeachMMtool. This was applied to the Greater Christchurch coastal environment to simulate geomorphological evolution through hydrodynamic forcing. Simulations were performed using the recent sea level rise predictions by the Intergovernmental Panel on Climate Change (2013) to determine whether the statutory requirements outlined in the New Zealand Coastal Policy Statement 2010 are consistent with central, regional and district designations. Our results indicate that current land use zoning in Greater Christchurch is not consistent with these predictions. This is because coastal hazard risk has not been thoroughly quantified during the process of installing the Canterbury Earthquake Recovery Authority residential red zone. However, the Christchurch City Council's flood management area does provide an extent to which managed coastal retreat is a real option. The results of this research suggest that progradation will continue to occur along the Christchurch foreshore due to the net sediment flux retaining an onshore direction and the current hydrodynamic activity not being strong enough to move sediment offshore. However, inundation during periods of storm surge poses a risk to human habitation on low lying areas around the Avon-Heathcote Estuary and the Brooklands lagoon.

Keywords: Coastal modelling, sea level rise, Coastal hazard planning, ArcGIS, BeachMM tool, NZCPS 2010.

1. INTRODUCTION

The Intergovernmental Panel on Climate Change (IPCC) has proposed that the rate of global sea level rise (SLR) that has occurred since the mid-19th century was larger than the mean rate of the previous two millennia (IPCC, 2013). During the period from 1901-2010 the global mean sea level has risen by 0.19 m (IPCC, 2013), or an estimated mean global rate of 1.7–1.8 mm a^{-1} during the last century (Gehrels, Hayward, Newnham & Southall, 2008). Over the past 7000 years the sea level around New Zealand has remained relatively stable, although evidence suggests that a rapid rise has recently occurred (Gehrels et al., 2008).

New Zealand's dynamic coastal zone is governed by The New Zealand Coastal Policy Statement 2010 (NZCPS 2010) which covers the coastal marine area from the line of Mean High Water Springs (MHWS) to 12 nautical miles offshore (New Zealand Government, 2010). It is a requirement of the Resource Management Act 1991 to be reflected in regional policy statements, regional plans and district plans (New Zealand Government, 2010) to provide planners with robust objectives and policies.

The Christchurch coastal environment has undergone major geomorphic change due to a series of major earthquakes in 2010 – 2011. This created localised uplift and subsidence within the urban environment, altering vulnerability to flood or storm surge inundation for many residents (A. Eaves, observation, 22nd February 2011). A state of emergency gave rise to the creation of the Canterbury Earthquake Recovery Authority (CERA), a new central government department to manage Canterbury's disaster recovery. CERA identified and re-zoned residential areas that suffered significant land damage, and provided public compensation to those residents displaced by the re-zoning. During this period of disaster management, it would be prudent to evaluate the NZCPS 2010 in order to provide a more realistic outcome given the major change in topography.

Predictive models can potentially be used to

understand the future consequences of SLR on coastal environments. These models create the opportunity to simulate and understand the physical processes affecting the coastal environment over varying timescales; providing decision makers with valuable quantitative information about a range of conditions (Silva & Taborda, 2013). Geographic Information Systems (GIS) provide spatial analysis and data integration techniques for the accurate mapping and analysis of coastal features (Allen, Oertel & Gares, 2012). When GIS is used in combination with the statutory guidance and legislative tools of the NZCPS 2010 it enables local and territorial authorities to deliver prudent and effective outcomes for coastal management.

The aim of this study is to use predictive modelling to determine whether CERA's land use zoning meets the obligations outlined in the NZCPS 2010 for future SLR. The modelling allows for an estimation of the extent of the Greater Christchurch shoreline in 100 years, the effects of storm surge, and progradation or erosion outcomes for the foreshore given SLR estimates made by the IPCC. Thus providing robust synthesised scenarios for planners to draw conclusions on the possible outcomes for the future of greater Christchurch's coastal zone.

2. BACKGROUND

2.1 Sea level rise

The constituent drivers to a change in sea level are: isostatic changes in the earth's crust through plate tectonics or post-glacial rebound; eustatic changes through thermal expansion or contraction of the oceans via changes in density, salinity or a redistribution of freshwater storage; and departures from the global mean ocean circulation resulting in regional storm surge, changes to the significant wave height, and non-uniform atmospheric oscillations from temperature and salinity changes (Nicholls & Lowe, 2004). Non-uniform atmospheric oscillations are also known as the climate related Mean Sea Level Anomaly (MSLA), which includes the Interdecadal Pacific Oscillation (IPO) and the El Nino Southern Oscillation (ENSO) (Stephens, Bell, Ramsay & Goodhue, 2013). Stephens et al. (2013) have quantified the sea level components as: long term SLR, MSLA, tide, storm surge, and wave setup and run up. A range of ocean processes have been affected by both the long term progressive changes and the decadal variations in the climate; including global SLR and the enhanced intensities of storms which generate more extreme waves and elevate storm surges (Komar, Allen, Ruggerio & Harris, 2013). SLR observations also contain inherent errors and uncertainties that need to be reported as well as any other diagnostic indicators (Allen et al., 2012).

The IPCC provides science and guidance to nation states on potential outcomes of climate change. Their SLR predictions are driven by greenhouse gas concentration trajectories determined by estimates of future emissions. The IPCC has proposed that the rate of global SLR that has occurred since the mid-19th century was larger than the mean rate of the previous two millennia (IPCC, 2013). During the period from 1901-2010 the global mean sea level has risen by 0.19 m (IPCC, 2013), or an estimated mean global rate of 1.7–1.8 mm a^{-1} during the last century (Gehrels, Hayward, Newnham & Southall, 2008). Over the past 7000 years the sea level around New Zealand has remained relatively stable; however, evidence from saltmarsh cores from southern New Zealand suggests that a rapid rise has recently occurred (Gehrels et al., 2008). Hannah (2004) estimated a rate of SLR for New Zealand of 2.8 ± 0.5 mm yr^{-1} for the 20th century which was a considerably higher rate than that for preceding centuries. This was comparable with the nearest reliable tide-gauge at Lyttelton, where a rise of 2.1 ± 0.1 mm yr^{-1} between 1924 and 2001 was recorded (Gehrels et al., 2008; Hannah, 2004). This rate is higher than the global average of 1.7–1.8 mm yr^{-1}, which can be attributed to regional thermal expansion (Gehrels et al., 2008). Ocean warming will be greater at depth in the Southern Ocean, with best estimates of ocean warming at a depth of about 1000 m by 0.3°C to 0.6°C by the end of the 21st century (IPCC, 2013).

2.2 Planning for sea level rise: the New Zealand context

The effects of SLR require the implementation of effective coastal planning and forecasting for low-lying coastal areas. In New Zealand, the primary statutory document for long term coastal planning is the NZCPS 2010. The NZCPS 2010 outlines statutory directives that regional and territorial authorities must comply with through their planning documents, policy statements and resource consenting processes (New Zealand Government, 2010). These objectives and policies are:

> Objective 5: *To ensure that coastal hazard risks take account of climate change, are managed by: locating new development away from areas prone to risks; consider responses, including managed*

retreat, for existing development in this situation; and protecting or restoring natural defences to coastal hazards (NZCPS 2010, p. 10).

Policy 6: *(1) (i) set back development from the coastal marine area and other water bodies, where practicable and reasonable, to protect the natural character, open space, public access and amenity values of the coastal environment* (NZCPS 2010, p. 13).

Policy 24: *Identification of coastal hazards (1) Identify areas in the coastal environment that are potentially affected by coastal hazards, giving priority to the identification of areas at high risk of being affected. Hazard risks, over at least 100 years are to be assessed having regard to: (a) physical drivers and processes that cause coastal change including sea level rise; (b) short-term and long-term natural dynamic fluctuations of erosion and accretion; (c) geomorphological character; (d) the potential for inundation of the coastal environment, taking into account potential sources, inundation pathways and overland extent; (e) cumulative effects of sea level rise, storm surge and wave height under storm conditions; (f) influences that humans have had or are having on the coast; (g) the extent and permanence of built development; and (h) the effects of climate change on: (i) matters (a) to (g) above; (ii) storm frequency, intensity and surges; and (iii) coastal sediment dynamics; taking into account national guidance and the best available information on the likely effects of climate change on the region or district* (NZCPS 2010, p. 23).

Under the Resource Management Act 1991 (RMA), the regional regulatory authority, Environment Canterbury (ECan), must give effect to the policies and objectives in the NZCPS 2010. Similarly, the Christchurch City Council (CCC), as the local territorial authority, must also give effect to the objectives and policies outlined in the NZCPS 2010. ECan has produced a series of maps outlining the landward boundary of hazard zones and a sea water inundation zone boundary (ECan, 2011). The landward boundary of hazard zone 1 is approximately

Site	ECan Profile	Dune height (m)	Slope	Sea level rise (m)	Shoreline Retreat (m)	Shoreline Retreat range (m)
Spencer Park	C1755	5.0	0.01	1.0	70	30-100
Bottle Lake	C1400	9.0	0.01	1.0	70	30-100
North New Brighton	C1065	5.1	0.01	1.0	70	30-100
New Brighton	C0952	8.3	0.01	1.0	60	30-80
New Brighton	C0815	8.6	0.01	1.0	60	30-80
South New Brighton	C0600	8.7	0.01	1.0	60	30-80
Southshore	C0471	6.9	0.01	1.0	60	30-90
Scarborough	-	3.9	0.016	1.0	60	30-90
Taylor's Mistake	-	4.6	0.025	1.0	40	20-60

Table 1: Summary of estimated shoreline retreat due to sea level rise (information sourced from Tonkin and Taylor Ltd, 2013).

	Avon River	Heathcote River
Area of land inundated by 3.3m level (1% AEP event)[1]	1,226 ha	1,171 ha
Suburbs affected by a 1% AEP event inundation level	Travis Wetland Avondale Wainoni Dallington Horseshoe Lake Bexley	Ferrymead Woolston Linwood Hillsborough

Table 2: Summary of inundation impacts for the Lower Avon and Heathcote Rivers (information sourced from Tonkin and Taylor Ltd, 2013).

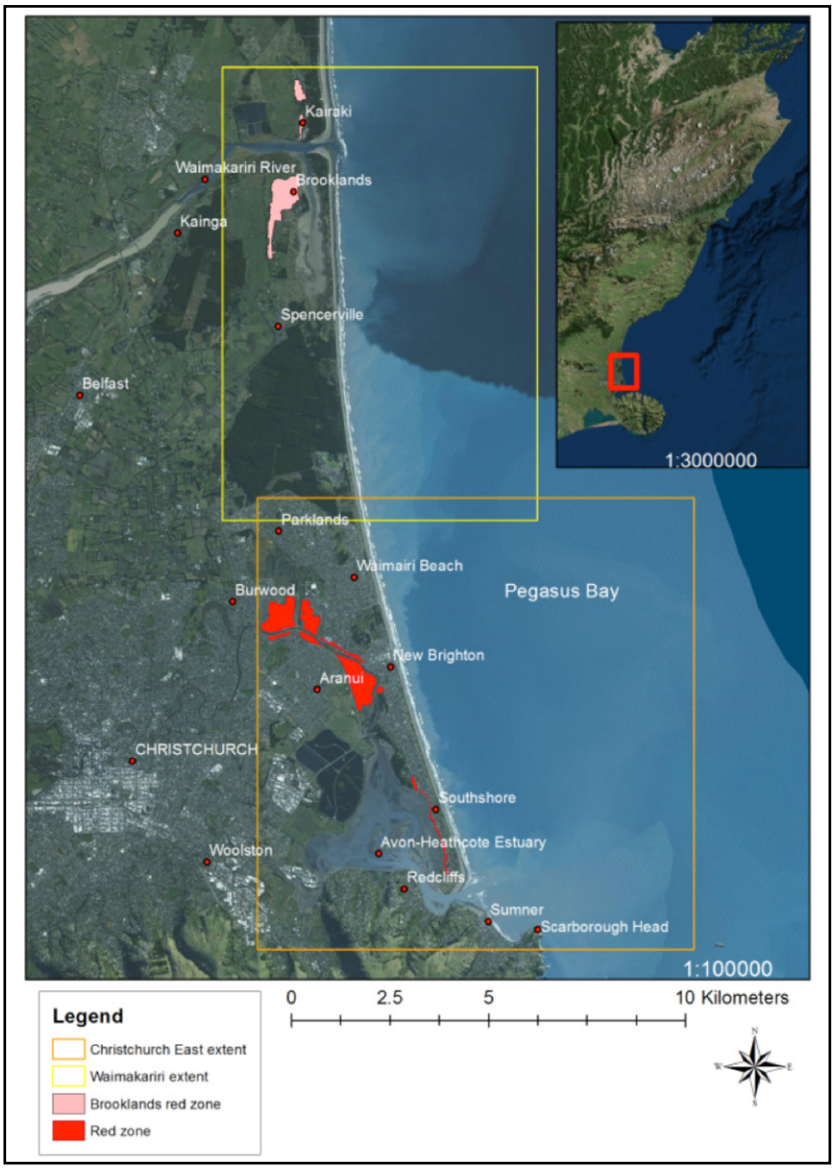

Figure 1: The modelled extent of Eastern Christchurch (main image) and setting within the South Island of NewZealand (upper right image).

aligned with the landward extent of the secondary dune system. The sea water inundation zone boundary has not been mapped by ECan for Eastern Christchurch. These zones do not currently comply with the NZCPS 2010 as coastal processes and the effects of climate change require quantified risk assessment for a 100 year period.

Local government and Crown entities have created zones of increased hazard risk in post-earthquake Christchurch to facilitate the rebuild of the city. CERA was established by central government to facilitate the region's recovery after the earthquake events. Their direction saw the implementation of residential red zones, where residents were financially compensated for their voluntary relocation from areas of significant land damage and likely high risk from hydraulic inundation. This residential red zone comprised areas adjacent to the Avon River, the Avon – Heathcote Estuary and the Brooklands lagoon (CERA, 2014). Similarly, the CCC has created a non-statutory Flood Management Area (FMA) that identifies areas at risk of hydraulic inundation, where it is advised not to build.

2.3 Mechanisms for assessment

Planning and engineering design has historically focused on extremes in climate variability due to the slow rate of SLR and therefore the parameters were considered to be stationary (Ministry for the Environment [MfE], 2008). Now, planning timeframes have had to adapt to increasing sea levels using practical high tide levels such as Mean High Water Spring (MHWS) tide being exceeded 10% of the time, and estimates of extreme high storm tides (MfE, 2008). However, while global climate change is well documented, regional impacts and changes can be less well quantified and may differ between regions, leading to subjective interpretations of the future risk

(Reisinger, 2009).

Current best-practice utilises two theories. The Bruun Rule (Bruun, 1962) is a simple two-dimensional model that assumes a closure depth of offshore sediment exchange, no onshore or offshore gains or losses, no long term seasonal anomaly, instantaneous response to sea level change, and no account of sediment characteristics (Tonkin and Taylor Ltd, 2013). This model was deemed suitable by Judge Bollard in the Environment Court in Skinner v Tauranga District Council A 163/02 as a precautionary approach to coastal hazard planning for open coast beaches (MfE, 2008). Passive inundation, or the "bathtub" approach, is where a certain SLR will intersect the terrestrial contour height; for example, where the MHWS in 2115 will intersect the existing cross-shore profile (EShorance, 2010).

A recent report by Tonkin and Taylor Ltd (2013) considers the implications of a projected SLR of 1.0 m by 2115 in line with MfE (2008) guidelines. The report utilises the Bruun Rule and passive inundation to estimate the extent of inundation. They conclude that storm inundation, greater frequency of extreme tidal levels and the progressive retreat of the shoreline in low lying areas will be the main impacts. Table 1 presents Tonkin and Taylor's (2013) estimates of shoreline retreat due to a SLR of 1.0 m. Uncertainty around sediment supply from the Waimakariri River has led to the assumption that the system is in dynamic equilibrium and that in future there will be no long term trend of progradation (Tonkin and Taylor Ltd, 2013). The risk of inundation along the New Brighton dune system is not expected to have any effect as the elevations are above storm surge levels (Tonkin and Taylor Ltd, 2013). Along the Sumner and Clifton revetments a general lowering of the beach profile will occur due to scouring at the base with inundation likely due to low points in the road and structure in the future, with Clifton beach facing coastal squeeze (Tonkin and Taylor Ltd, 2013). The inundation impacts on the lower Avon and Heathcote rivers reported by Tonkin and Taylor (2013) are given in table 2, which utilises a passive inundation level of 2.15 m (Tonkin and Taylor Ltd, 2013).

2.4 Study area

This study focuses on the Greater Christchurch coastal environment and surrounding coastal marine area in the southern extent of Pegasus Bay. Figure 1 shows the extent of the study area. The Christchurch shoreline had a previous position west of the CBD during the last Holocene high stand, though its current position is now 11 km seaward (Hart, Marsden & Francis, 2008). This progradation of Pegasus Bay is due to the inability of the marine environment to remove wave-eroded sediment from the floor of the bay, leading to gradual nearshore aggradation which is then transported landward to form new berms (Schulmeister & Kirk, 1997). However, this wave dominated environment is strong enough to disperse river derived sediment from the Waimakariri, Ashley and Waipara rivers across the nearshore (Schulmeister & Kirk, 1997)

Pegasus Bay is sheltered from the predominant hydrodynamic forcing by Banks Peninsula leading to nourishment of the bay via a counter-clockwise eddy in the Southland Current; sediment is dragged north from the Canterbury Bight where it settles under calmer conditions (Brown, 1976; Hart et al., 2008; Schulmeister & Kirk, 1997). The Southland Current drives sediment south along the shore in the southern extent of Pegasus Bay (the study area for this paper) and north in the northern extent of the bay (Hart et al., 2008). However, long-shore sediment transport occurs in both north and south directions, with the absence of a dominant drift direction due to the planform equilibrium of the bay (Brown, 1976). Thus, sediment transport is determined by incident wave angle and ocean current. The dominant wave directions in Pegasus Bay are from the east and south-east, with southerly waves refracting around Banks Peninsula which rarely exceed a wave height of 2.5 m (Schulmeister & Kirk, 1997).

3. METHODS AND MATERIALS

3.1 The predictive models

The predictive computer modelling used derives assumptions from general theory through the numerical hydrological equations used in SWAN and XBeach to create idealised representations that were interpreted in ArcGIS via the BeachMM tool (Silva & Taborda, 2012). The third-generation SWAN wave model provides realistic estimates of wave parameters in coastal areas utilising wind, bottom and current conditions (Booij, 2012). XBeach is a recent and open source model for nearshore processes, which allows for the computation of natural coastal response to temporally varying storm conditions that include dune erosion, over-washes and breaching (Roelvink, Reniers, Van Dongeren, De Vries, Lescinski & McCall, 2010). The BeachMM tool is a geoprocessing tool that integrates these two numerical models into the

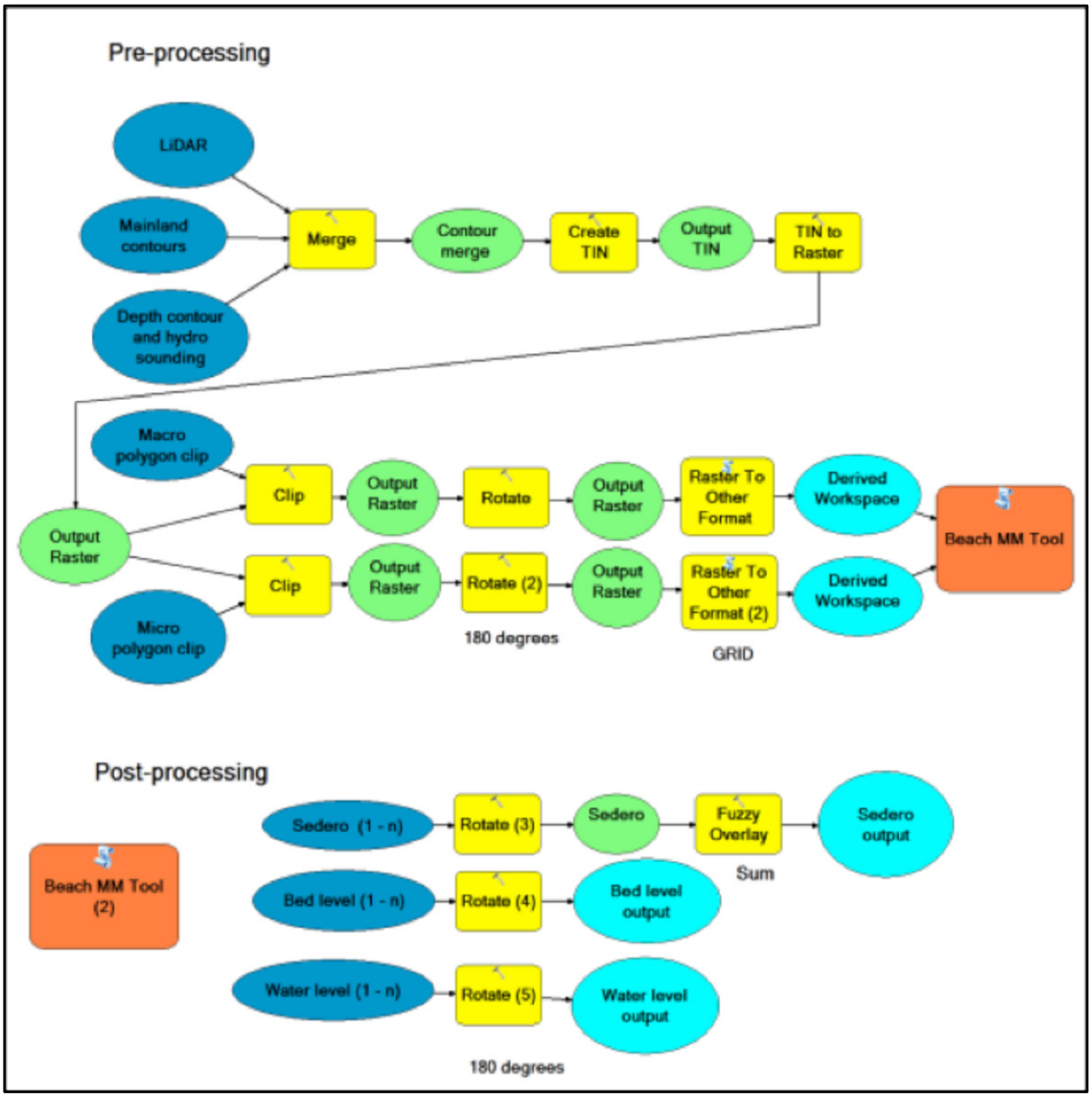

Figure 2: Flow diagram of the ArcGIS tools used for analysis.

ArcGIS platform, streamlining the process for modelling beach morphodynamics (Silva & Taborda, 2012). The application of this tool simplifies dataflow, permits tight coupling, minimises human error, and allows for enhanced visualisation of results (Silva & Taborda, 2012). SWAN provides a very stable environment on which to gather the hydrodynamic forcing information as it has been in development for many years and is therefore well refined. Conversely, XBeach has been developed recently, with little support for those choosing to operate over a GIS platform.

The methods used follow those of Silva and Taborda (2013) to link numerical models with the GIS environment. The models were run utilising local parameters for the present to validate the model output, and again for an estimated sea level projection 100 years from now as directed by the NZCPS 2010 and the minimum and maximum IPCC 2013 projections. To give an overall view, the 100 year minimum and maximum values of 0.26 m and 0.98 m were modelled (IPCC, 2013), as these were the most current predictions at the time of this investigation.

Mean conditions and conditions during storm events were simulated within each scenario. The study area was divided into two grid extents, one focusing on East Christchurch, and the other on the Waimakariri River mouth. The Waimakariri River extent was only examined under the maximum projection. The CERA red zone (CERA, 2014) ECan's coastal hazard boundary (ECan, 2011) and the FMA (CCC, 2012) were mapped alongside the results to consider which extent meets Policy 24 of the NZCPS2010. Data was provided by AAM PTY Ltd (AAM Pty Ltd, 2011), Land Information New Zealand (LINZ, 2013a, 2013b), NIWA (NIWA, 2013), ECan (ECan, 2014a, 2014b), and the IPCC (IPCC, 2013). Figure 2 shows a flow diagram of the procedure.

Simulation	Water level (m)	H sig (m)	T (s)	Sea θ (°)	Wind v (m s^{-1})	Wind θ (°)
Mean	0	1.95	8.8	194.2	5.11	75
Storm	1.96	7.49	13.3	140	9.2	230

Table 3: Parameters used in the simulations.

	Present mean (m)	Present storm (m)	100 year min (m)	100 year max (m)
MHWS	0	1.19	1.19	1.19
Storm surge	0	0.77	0.77	0.77
SLR	0	0	0.27	0.98
TOTAL	0	1.96	2.23	2.94

Table 4: Water level calculations given different scenarios.

3.2 Simulations

To attempt to simulate a realistic scenario, SWAN and XBeach were run for a 10-year period, followed by a 2-day storm and repeated with increasing water levels until 100 years had passed. This created two grouped simulations consisting of twenty cumulative iterations.

These were:

1. Future maximum scenario; with the SLR prediction of 0.98 m.
2. Future minimum scenario; with the SLR prediction of 0.27 m.

The parameters used were: significant wave height (H sig); wave period (T); wave direction (Sea θ); wind velocity (Wind v); and wind direction (Wind θ). Storm conditions were created from peak values of a storm on the 28th of June 2012. This storm is considered an extreme event as H sig falls within the top 1 % of all significant wave heights (Komar et al., 2013). Table 3 outlines the various parameter settings used in the simulations. Water levels have been calculated according to table 4. A storm surge of 0.77 m was calculated by subtracting the predicted tide level provided by LINZ (2013a) from the observed tide level recorded by the offshore wave buoy at the time of the storm. The output variables were net sedimentation or erosion (sedero), bed level and water level.

3.3 Calibration, assumptions and related limitations

Calibration was undertaken through running the model for a short period, then comparing results with field observations. The SWAN graphic user interface was utilised to test the hydrodynamic forcing, bathymetric grid and changing water level. Wave height, wave period, wind direction, and wind velocity were then compared with those forecasted by Meteo365 (2013) and observations from the foreshore and the surf zone.

The modelled scenarios operate as a closed system for sediment flux. River sediment discharge was not included into the models due to a lack of data. Mean measurements were used for climate and hydrodynamic parameters to reduce the workload.

Limitations of the SWAN model were:

1. SWAN does not compute wave-induced currents (Booij, 2012);
2. Unexpected interpolation patterns on the computational grid may arise from the differing resolution of the input grid (Booij, 2012);
3. SWAN can have convergence problems due to the iteration process (Booij, 2012).

Limitations of the XBeach model were:

1. XBeach does not perform well in very shallow water (Roelvink, Reniers, Van Dongeren, De Vries, Lescinski & McCall, 2010);
2. The computational x-axis must be orientated toward the coast and rectilinear (Roelvink et al., 2010).

4. MODELLING OUTCOMES

4.1 Sedimentation and Erosion

The net result of all simulations for sedero over the period for both the minimum and maximum scenarios illustrates a slight progradation of the foreshore with

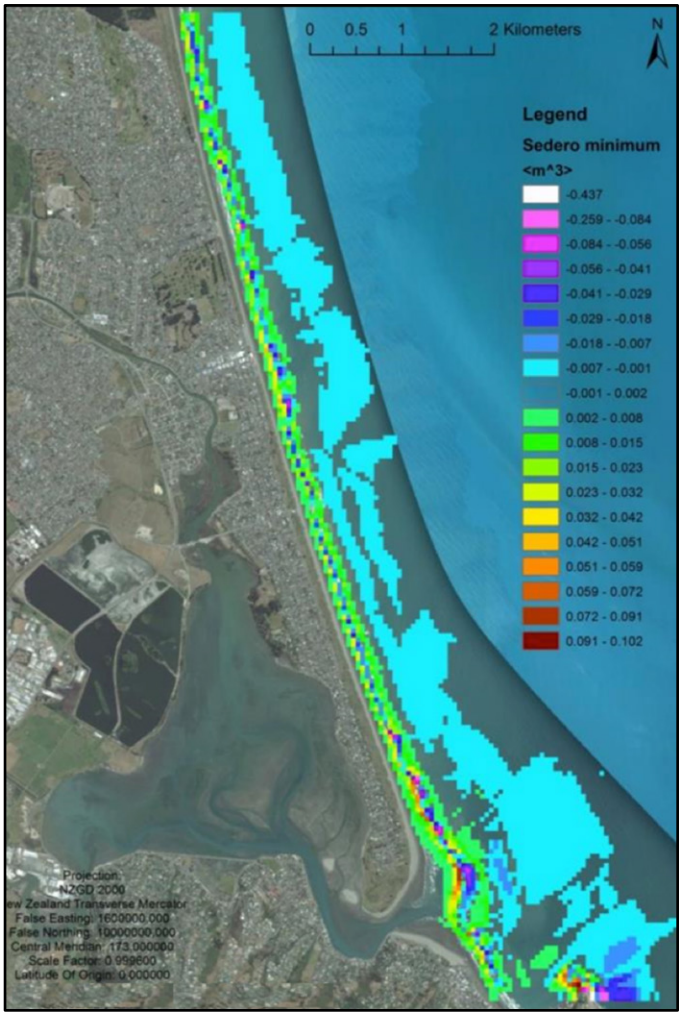

Figure 3: Minimum predicted net sedimentation and erosion for East Christchurch over 100 years. Complex changes in sediment occur at the Avon-Heathcote ebb tidal delta and Scarborough Head.

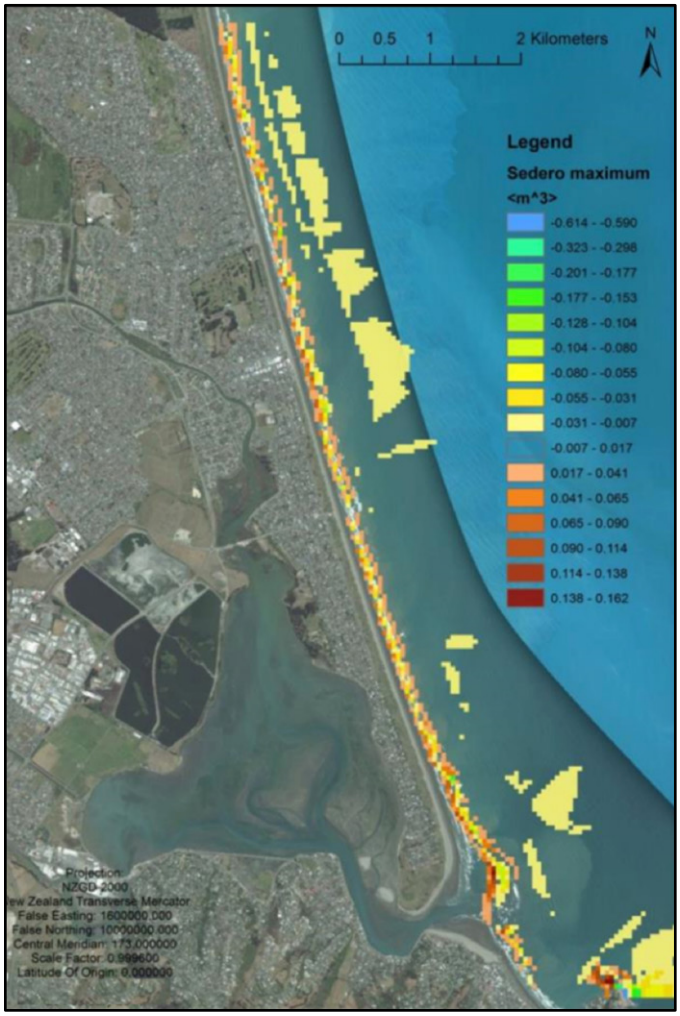

Figure 4: Maximum predicted net sedimentation and erosion for East Christchurch over 100 years. Complex changes in sediment occur at the Avon-Heathcote ebb tidal delta and Scarborough Head.

the majority of the sediment being received from the nearshore. The most dynamic areas were the Avon-Heathcote Estuary ebb tidal delta, the Waimakariri River mouth, and Scarborough Heads.

These results suggest that the future foreshore of East Christchurch may prograde over the 100 year period by 0.008 to 0.041 m^3 per m^2. Conversely, the nearshore seabed will erode by 0.004 m^3 to 0.031 m^3 per m^2 over this closed system under the maximum scenario. Under the minimum scenario, a similar effect will occur to a smaller magnitude. Similarly, the Waimakariri coastal zone foreshore will prograde over the period by 0.095 to 0.158 m^3 per m^2 where the nearshore will be slightly lower by 0.095 to 0.032 m^3 per m^2. The Avon-Heathcote ebb tidal delta appears to aggrade on its inner extent and erode on its outer extent due to wave domination across its surface. At Scarborough Head erosion will occur in areas of high wave climate exposure on the eastern flank and accumulate in the nearby north facing flank. There are complex interactions at the Waimakariri River delta with very high rates of accretion and erosion within a small area due to fluvial discharge. Accretion occurs on the inner extent and a channel is carved on the northern extent of the delta. These results can be seen in figures 3, 4 and 5.

4.2 Future water level

The future minimum and maximum water levels under storm conditions will lead to inundation of coastal areas of Greater Christchurch. The areas affected will be around the fringes of the Avon-Heathcote Estuary, Brooklands and Kairiki due to their low topography. Sumner, the lower reaches of the Avon and Heathcote rivers, and farmland adjacent to the Brooklands lagoon will also be inundated to varying extents.

The level of inundation for both the minimum of 2.23 m above MSL and maximum of 2.94 m above MSL are shown in figure 6 under storm conditions. This extent is similar to that of the CCC's FMA.

The future minimum and maximum under mean conditions or MSL are shown in figure 7. This extent is

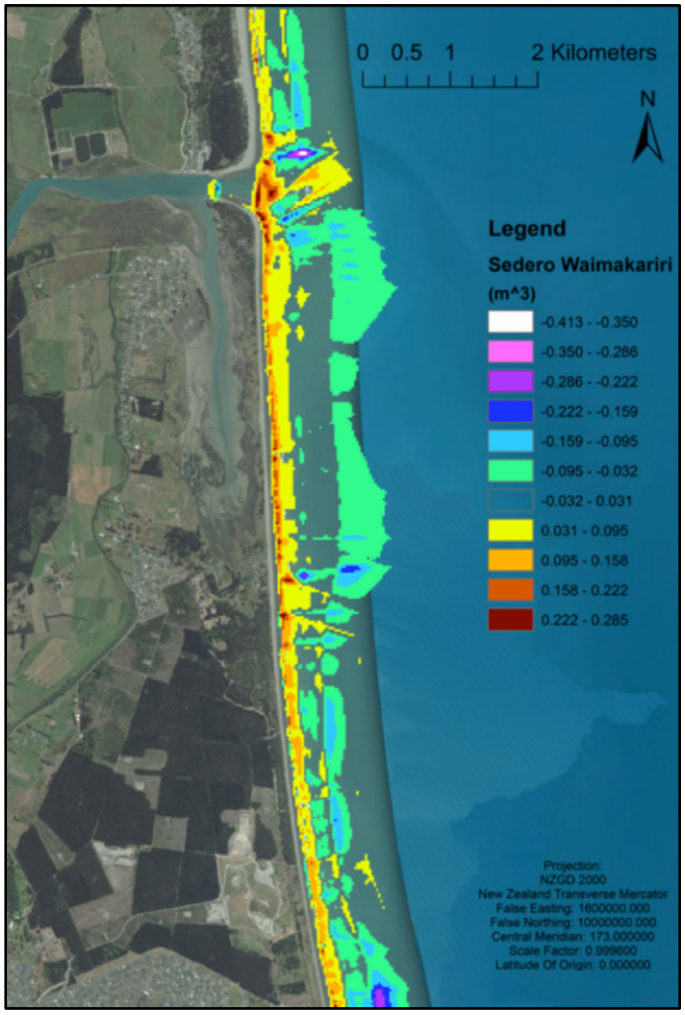

Figure 5: Maximum predicted net sedimentation and erosion for the Waimakariri coastal zone over 100 years. Complex changes in sediment occur at the river mouth with sediment plumes in the nearshore eroded and deposited on the beach face.

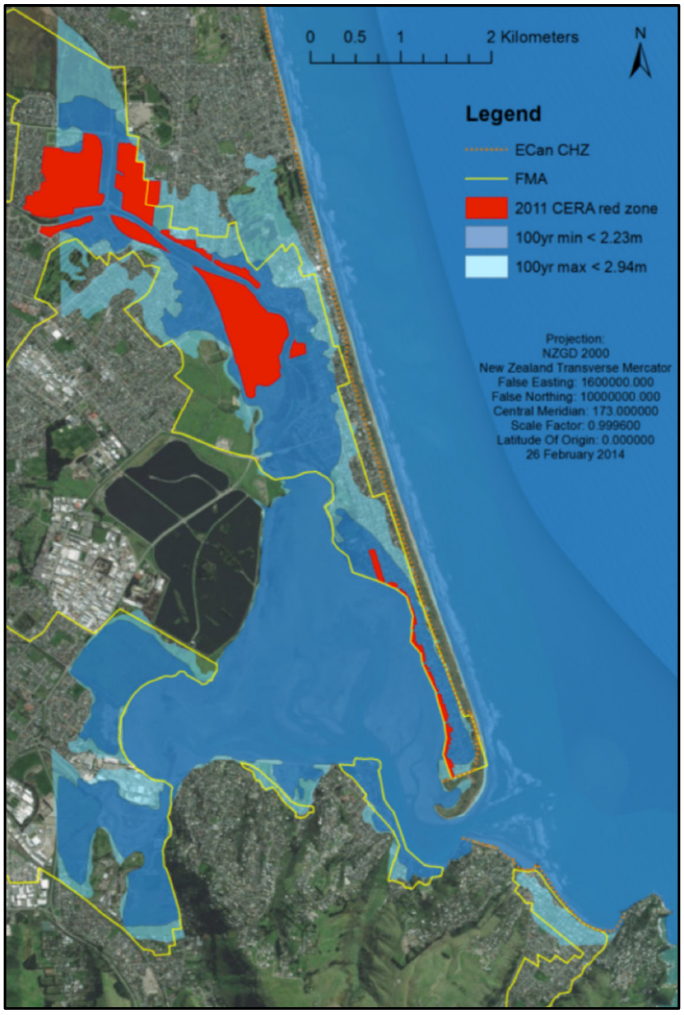

Figure 6: Inundation scenarios modelled under storm conditions for East Christchurch given a sea level rise for 100 years of 0.23 m (min) and 0.98 m (max), a storm surge of 0.77 m, during a MHWS of 1.19 m. Inundation propagates inland beyond the study area.

similar to that of the current MHWS of 2015.

The flooded extent for the Waimakariri coastal environment under the maximum scenario with storm conditions is shown in figure 8. This extent is larger than that of the CCC's FMA.

5. DISCUSSION

The aim of this research was to determine if the current CERA zoning for Greater Christchurch meets the obligations outlined in the NZCPS 2010 for future SLR. The modelling outcomes suggest that it does not. This is because coastal hazard risk has not been comprehensively quantified and the residential red zone requires expansion. However, the CCC's FMA provides an extent to which managed retreat away from this area would reduce the risk of hydraulic inundation of property. Currently, development can still be undertaken on areas that are at risk from predicted levels of inundation. The present MHWS level will frequently be exceeded in the future, particularly in areas with a low tidal range such as those occurring through the central parts of the east coast, leading to storm inundation having a greater influence and driving enhanced coastal erosion (MfE, 2008). Under the RMA 1991, local government is required to effectively identify, account, avoid and mitigate any coastal hazards, vulnerabilities, or consequences over at least a 100 year period to preserve coastal environments from inappropriate development while enhancing public access. Simulating coastal change at timescales relevant to planning and development requires new types of modelling approaches over large temporal and spatial scales. These approaches should incorporate high quality datasets to enable the refinement, calibration and validation of such models (MfE, 2008).

5.1 The future shoreline of Greater Christchurch

The extent of the Greater Christchurch shoreline

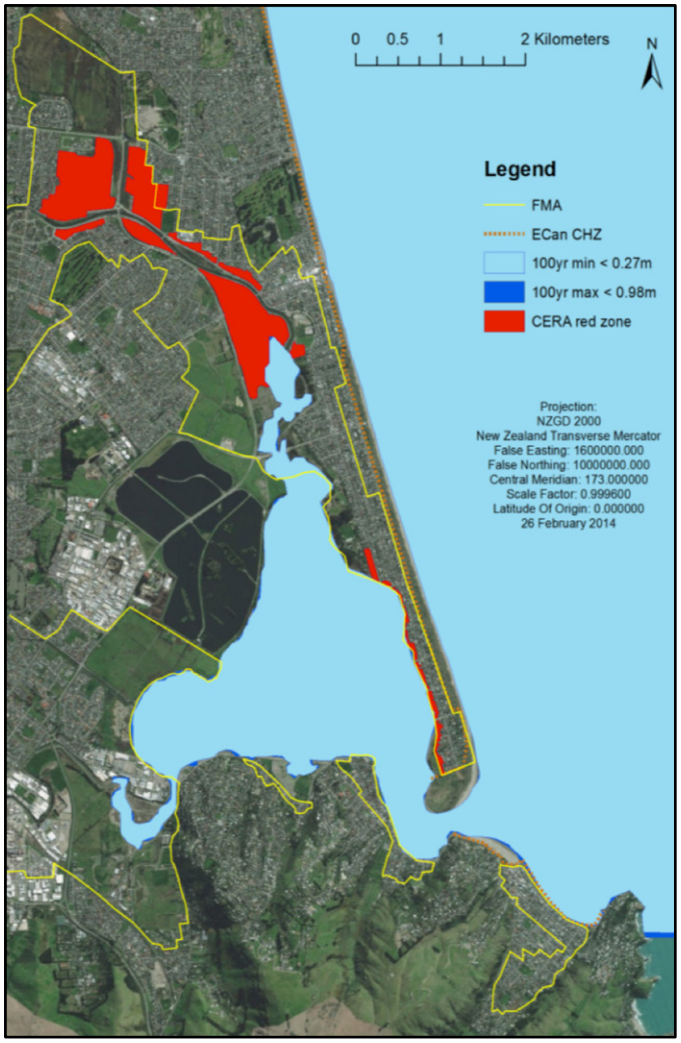

Figure 7: Inundation scenarios modelled under mean conditions for East Christchurch given a sea level rise for 100 years of 0.23 m (min) 0.98 m (max). Inundation is minimal under mean conditions.

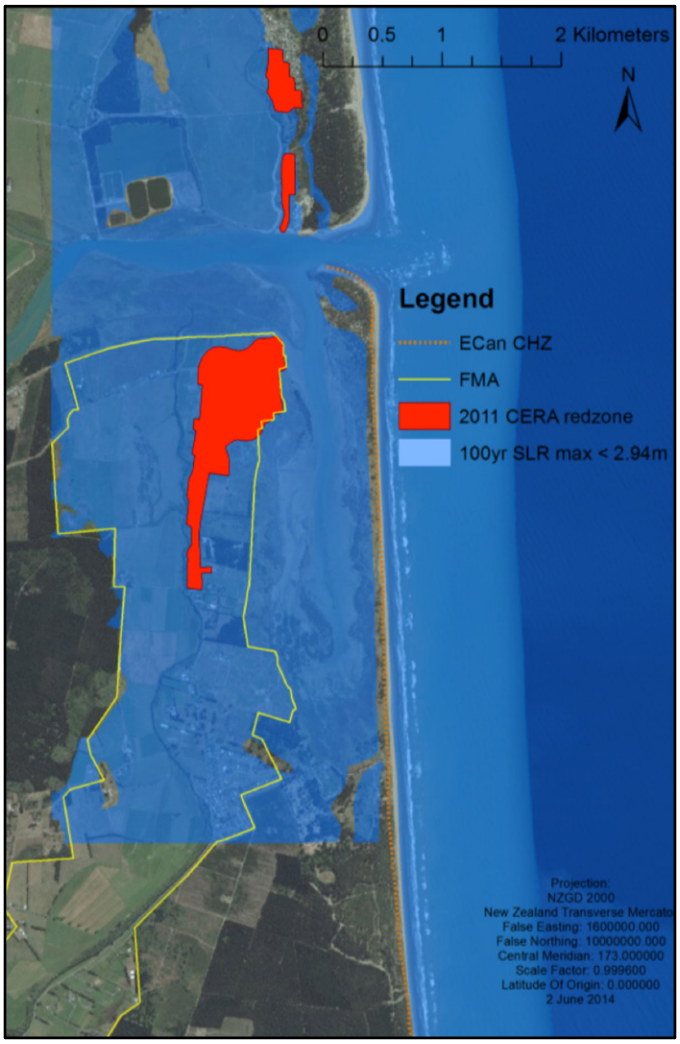

Figure 8: Inundation scenarios for the Waimakariri coastal environment under storm conditions given a sea level rise for 100 years of 0.98 m (max), a storm surge of 0.77 m, during a MHWS of 1.19 m. Inundation propagates inland beyond the study area.

in 100 years will be similar to that exhibited by the maximum inundation scenarios visible in figures 6 and 8 because they quantify storm surge during a MHWS tide. This extent provides a precautionary approach in the absence of scientific certainty. The results indicate that the sandy coastline will continue to prograde under the closed sediment flux, with enhanced progradation likely to occur given continued sediment supply from the Waimakariri River. As Pegasus Bay is marine dominated, where sediment can be dispersed but not removed from the nearshore, what is not lost to deep water during storms will incrementally nourish terrestrial dunes during modal conditions (Schulmeister & Kirk, 1997). Thus, the New Brighton and Southshore dune system will prograde seaward. The accumulation of sediment on the inner fan of the ebb tidal delta of the Avon-Heathcote Estuary may intermittently reduce channel width and depth significantly constricting river and tidal flow. Therefore close sedimentation monitoring of the Avon-Heathcote Estuary will help determine spatial outcomes.

Tonkin and Taylor Ltd's (2013) predictions of Greater Christchurch coastal dune recession with SLR relies on an overly simplified methodology inherent when using the Bruun Rule. The two-dimensional Bruun Rule is considered to be obsolete in predicting the contemporary geomorphology of foredunes in response to SLR (Hilton, 2013). This is because it assumes unconsolidated sediment, no sediment inputs, and no net alongshore flux (Hilton, 2013).

5.2 Zoning for storm anomalies

The current CERA red zone is ineffective at dealing with a flood inundation hazard enhanced by 100 years of SLR. This is because the extent of the area of inundation will be larger than that currently designated. Coastal processes will maintain an adequate buffer against storm surge along the dune system, although storm surge with a MHWS tide will not prevent inundation of low lying areas adjacent to the Avon-Heathcote Estuary and the

Brooklands Lagoon. This paper identifies the minimum inundation hazard zone as the 100 year maximum of 2.94 m above the 2014 MSL outlined in figures 6 and 8, or the setback limit for occupation. Similarly, the FMA provides an acceptable extent to inhibit development. However, given the high risk associated with future inundation, consideration should be given to red-zoning parts of the FMA immediately.

Given the future Waimakariri coast, storm surge will result in extensive flooding of Brooklands, Kairiki and the surrounding low lying area which is predominantly agricultural. The amount of flooding modelled is a modest estimation, as during a period of storm surge precipitation is likely, which would elevate the river discharge and increase the water level in the lagoon at high tide. The CERA red zone at Brooklands was appropriate, although should be extended further landward. An expansion of the Kairiki red zone is advised.

The maximum inundation scenario is not as great as that modelled by Tonkin and Taylor Ltd (2013) as the modelling extent was smaller and coastal processes were accommodated which limited dune overtopping and coastal erosion. The MfE (2008) report claims that the passive inundation approach tends to overestimate the inundation. However, Tonkin and Taylor Ltd (2013) were more accurate in dealing with sections of the coastal environment that were backed by revetments due to grid resolution. Tonkin and Taylor Ltd (2013) employed a similar SLR to this study, although prudently allowed a free board of 0.4 m to accommodate localised wave effects and other uncertainties.

With the advent of accurate predictive computer modelling and the general acceptance of climate change, the use of historical annual exceedance probabilities and return periods becomes increasingly redundant. The use of these static measures prescribed from recent human history for the classification of episodic hazard events becomes very difficult with climate change. The integration of GIS, satellite imagery, sensor technology and numerical modelling provides for a more objective scientific expression.

5.3 Risk mitigation

Coastal hazard zoning is often met with public contestation, as much time and money is invested into the built environment. Predictive geomorphological analysis must therefore be robust to define these zones. In order to mitigate risk, retreat maybe a safe long term option. Compensation payments from government may be an option for those directly affected by land use zoning changes. CERA performed this during the instalment of the residential red zone by offering compensation to those directly affected for their built assets at 2007 valuations. Acceptance of the relocation compensation was voluntary, as the Canterbury Earthquake Authority Act 2011 had no statutory requirement for the compulsory acquisition of land (CERA, 2011). Alternatively, coastal hazard zones could be treated as a physical delineation where local and regional authorities cannot issue future resource consents and occupation becomes a prohibited activity under the RMA 1991. It may be wise for existing residents within a coastal hazard zone to be offered market compensation by government to retreat and failing to accept the authorities' offer would remove all future liability from the authority.

6. CONCLUSION

The statutory requirements outlined in the NZCPS 2010 were assessed against current land re-zoning in greater Christchurch to determine whether the effects of sea level rise were appropriately quantified. This analysis suggests that it does not comply with Policy 24, as coastal hazard risk and coastal processes were not comprehensively quantified by CERA when creating the residential red zone. Silva and Taborda's (2012) BeachMM tool predicted a water level and coastal morphodynamics that aligned more accurately with the Christchurch City Council's Flood Management Area, an extent to which managed retreat is a prudent option to reduce hydraulic inundation risk. At present inundation during periods of storm surge poses a risk to human habitation on low lying areas around the Avon-Heathcote Estuary and Brooklands Lagoon. The results of this research suggest that progradation will continue to occur along the Greater Christchurch exposed foreshore. The BeachMM tool facilitates predictive spatial and temporal analysis effectively and the efficiency of that performance is only limited by computational capacity.

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Whose interests count? The Malvern Hills Protection Society and an irrigation scheme proposal

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1. INTRODUCTION

The Malvern Hills area, located at the western edge of the Canterbury Plains, became the subject of a proposed irrigation scheme in 2000 (see Figure 1). The scheme proposed to take water from the Rakaia and Waimakariri Rivers to store in a reservoir located in the Malvern Hills, then irrigate 60,000 hectares of land on the central Canterbury Plains. A trust, established by Selwyn District Council (SDC) and Christchurch City Council (CCC), would make an application for more than 30 resource consents. Later the trust would establish a company which was granted requiring authority status by the then Minister for the Environment. This allowed the company to use the Public Works Act 1981 to apply to place designations over private land for a dam and a reservoir (CPWT 2005). Some Malvern Hills residents opposed the scheme. This article charts their experience and the outcome of their participation in the Resource Management Act 1991 (RMA) resource consent hearing process.

The process was gruelling and contentious for the community. While the outcome was somewhat favourable for them, over-arching questions remain as to whose interests were represented, the extent of central governments' control, and why the scheme was not declined in its entirety despite the SDC's own experts concluding the scheme was contrary to the sustainable management purpose of the RMA (Boyes 2008, Butcher 2008).

2. BACKGROUND

A document obtained in 2009 under the Official Information Act (OIA, 1982) from the then Ministry of Agriculture and Forestry (MAF) discusses the potential propositions for water storage and irrigation in Canterbury (MAF, 2009). They recommend "any intervention to facilitate the delivery of irrigation development in Canterbury should address the following three key blockages", these being "the uncertain planning framework governing the management of water in Canterbury, the controls set by existing and proposed Water Conservation Orders (WCO) and the conditions attached to existing resource consents which have been developed in the context of the above and therefore lock in suboptimal outcomes" (MAF, 2009, p. 4). The Ministry recommends "two broad options for government intervention": first, to grant itself power to establish a panel to review WCOs and "halt the current process on a Hurunui WCO"; second, "to enhance the existing intervention powers of the Minister for the Environment to enable appointment of commissioners to take over planning functions of the Rakaia and Hurunui catchments" (MAF, 2009, p. 9). MAF advises the choice of intervention would be determined by the result of the performance review of the Canterbury Regional Council (CRC), known as the Creech Report. This latter report recommends establishing new legislation and a new entity for managing water as well as the replacement of councillors with a commission "to manage the necessary organisational change" (Creech, Jenkins, Hill & Low, 2010, p.11). The central government passed the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010 under urgency, dismissed elected regional councillors and replaced them with commissioners with special powers over the management of the region's water resource, which CRC otherwise did not have (Rennie, 2010; Joseph, 2010). Joseph (2010) argues that the Act is "constitutionally repugnant" (p. 194).

Arguably, the establishment of the Environment Canterbury (Temporary Commissioners and Improved

Water Management) Act 2010 was designed to fast track irrigation development in the Canterbury region. Among proposed irrigation schemes identified in the MAF OIA document was the Central Plains Water Scheme.

In 2000, the Central Plains Water Enhancement Steering Committee (CPWESC), established by the SDC and the CCC, was tasked with investigating the feasibility of water storage schemes for the central plains area (CCC & SDC, 2000). The CPWESC spent several months undertaking consultation with the community and later in 2000 produced a summary of issues and outcomes associated with potential water enhancement schemes for central Canterbury (CPWESC, 2000). The committee recommended that as a plan for a water enhancement scheme evolved, "management of the process of consenting and implementation should move to reflect the interests that will benefit from the project" (Watson, 2002, p. 1). The CPWESC also advised council that if resource consents to take and use water were to be obtained, then they "should be owned by an entity that would ensure the interests of the community were paramount, in the way the consents were exercised" (Watson, 2002, p. 1).

In response, the SDC and the CCC formed the Central Plains Water Trust (CPWT). The trust conditions were set out in a Memorandum of Understanding, identifying specifically that "the Trust would not be established purely to pursue commercial objectives" (Buddle Findlay, 2003, p. 7). The original trust consisted of a total of 13 members including two Ngāi Tahu appointments and two appointments made by the Parliamentary Commissioner for the Environment (CPWT, n.d). The trust would apply for and hold resource consents, in the interest of the public, then grant exclusive use to the entity established to build and operate the proposed irrigation scheme (CPWT, 2003). Both SDC and CCC argued public ownership of the resource would be retained by establishing a trust as owner of resource consents, to prevent the region's natural resources from corporate exploitation (Buddle Findlay, 2003; Hutching, 2008).

In 2004, the CPWT established Central Plains Water Limited (CPWL). A Memorandum of Agreement signed in 2004, established the terms of the relationship between the trust and the company, the most notable being CPWT granting exclusive rights to the CPWL to use the resource consents to build and operate an irrigation scheme (CPWT, 2006a). CPWL's purpose as a shareholder-owned company was to progress the resource consent applications, produce a detailed scheme design and construct infrastructure for an irrigation scheme. In November 2004, CPWL undertook its first share offer, succeeding in raising initial capital to advance the resource consent process (CPWL, 2004). Of approximately 400 shareholders, significant holdings belong to a range of corporate dairy farms including Purata Farms Limited, Lynton Dairy Limited, Fonterra, P & E Limited, Camden dairy farms, and Grasslands (NZCO, 2014). CPWL also raised funds through ratepayer funded loans and Crown appropriations (CPWL, 2004; CPWL, 2014; Mitchell, 2007).

The original CPWL scheme proposed a 55 metre high dam and storage reservoir in the Malvern Hills, with capacity for 280 million cubic metres of water and canals to deliver water to shareholders peppered between the Waimakariri and Rakaia Rivers, west of State Highway 1 (CRC, 2008; see figure 1). In June 2006, CPWT made an application to SDC and CRC for more than 30 resource consents for water take and use, discharge, and land use consents. As noted previously, CPWL applied for and received requiring authority status in 2005 from the Minister for the Environment, to use the Public Works Act 1981 for application to designate private land for a dam and reservoir. Under the RMA, CPWL served SDC with a Notice of Requirement (NoR) in June 2006 to designate land for the main headrace canal, the intake canals and the dam site and reservoir (CPWT, 2006b).

In 2001, the first newspaper articles appeared outlining the CPWESC activities. Headlines at the time read "Canterbury farms may get artificial lake" (Robson, 2001a, p. 2) and "Water Fight" (Keene, 2001, p. 18). Robson (2001b, p. 4) reported that Malvern residents were gearing up to fight a massive irrigation lake proposal.

In 2001 the Dam Action Group (DAG) was formed by some Malvern Hills residents to engage in consultation with the scheme proponents. The DAG meeting minutes over the next two years repeatedly report the challenges of extracting any substantial details about the scope of the scheme (DAG, 2002). The DAG's opposition was broad, asserting devastating social impacts, loss of entire properties, environmental degradation, the risk of dam burst and uncertain economic benefits (DAG, 2002). During consultation, it became apparent an application by SDC and CCC to CRC to abstract water from the Rakaia and Waimakariri Rivers had already been lodged (McKinlay, 2001). The community viewed this as a betrayal, serving only to harden opposition to the scheme (McKinlay, 2001; Malvern Hills Protection

Figure 1: Map of the Malvern Hills region, located at the western edge of the Canterbury plains. The top map is based on Statistics New Zealand data (see http://www.stats.govt.nz) which is licensed for re-use under the under Creative Commons Attribution 4.0 International licence. The lower map has been sourced from Land Information New Zealand (see http://www.linz.govt.nz) which is licensed for re-use under the Creative Commons Attribution 3.0 New Zealand licence.

Society, personal communication, April 2015). The public relations company engaged to undertake consultation attempted to reassure the community of the local authorities' need to secure water rights, and to ensure public money spent developing the proposal would not be wasted (McKinlay, 2001).

In February 2003, the Waianiwaniwa Valley in the Malvern Hills was reported by CPWT to be the preferred site for the dam and reservoir (DAG, 2003). The consultation with affected parties was considered by some opponents as poorly executed or non-existent and according to the Coalgate community "totally inadequate, token and often misleading" (Morris, 2008, pp. 24-25). As the impending reality of fighting an irrigation scheme was realised by the community, the DAG needed to become an incorporated society to levy a fee from members, fundraise, as well as protect its members from individual liability that may result from participating in the resource consent process (DAG, 2003). The DAG therefore transformed itself into the Malvern Hills Protection Society Incorporated (MHPS), and developed a constitution. Promotion of conservation, protection and enhancement of the historical, cultural, ecological, and environmental and community values of the Malvern Hills were central to its cause (DAG, 2003; MHPS, personal communication, 24 April, 2015).

Eventually a suite of applications for resource consents under numerous notifications would be made by the CPWT over a period of two years (CRC, 2008). Because of the scheme's complexity, the public submission periods were extended to 40 working days. More than 3000 submissions were received, with over eighty percent in opposition and 174 persons stating they wished to be heard (CRC, 2010). Concerned about the misuse of council funds, a request by the MHPS to the Auditor General to investigate the investment of public money in an unclear public-private arrangement

was lodged by the MHPS. The request was declined on the grounds of being beyond the Auditor General's jurisdiction because of the involvement of private shareholders (Robertson, 2006).

3. THE ENVIRONMENT COURT DECLARATION

Prior to the CRC resource consent hearing, MHPS members were eager to understand the conditions of the NoR. While some landowners were well aware of the scheme, others were informed by way of a letter from the SDC addressed "Dear Landowner". Several would discover a designation after obtaining a Land Information Memorandum report when trying to sell land (MHPS, personal communication, April 2015). In 2007, the MHPS, on behalf of its members, sought legal advice to clarify the matter of the NoR. Legal advisors recommended the society seek a declaration from the Environment Court to determine the scope of the designation. Technical changes were made to the scheme which the community found unacceptable, so acting on legal advice they sought a clarification. The society, as an opposing community group, were targeted by media to share their impassioned thoughts on the scheme. Later this media attention would be used against them in the Environment Court. Last minute changes to the society's legal representation meant an unprepared lawyer was caught off-guard when counsel for the applicant brought this media attention into the court (MHPS, personal communication, April 2015). In *Malvern Hills Protection Society Incorporated v Selwyn District Council C105/2007 [2007] NZEnvC 234*, Judge Smith accused MHPS of "seeking to frustrate CPWL and exhaust its funds, patience and time" and of undermining the Minister's decision to grant requiring authority status. Judge Smith accused MHPS of acting in a "frivolous and vexatious manner" and ruled that power had been abused by the Society (p. 25). Despite the proceedings, in *Malvern Hills Protection Society Incorporated v Selwyn District Council C136/2007 [2007] NZEnvC 318,* Judge Smith ruled the Society did have a legitimate concern, but ordered them to pay costs of $26,000 (p. 9). While the declaration outcome was a harsh financial blow to the society, it served only to motivate and empower the community[1].

4. THE INDEPENDENT HEARING

The CRC resource consent hearing commenced on the 25th February, 2008 (CRC, 2010). Four independent hearing commissioners were appointed. The commissioners concluded early on that the goal of the scheme was to secure water for the benefit of the scheme shareholders and the fact a trust was behind it was irrelevant, agreeing to view the trust and the company as one entity, despite the two being set up for entirely different purposes (CRC, 2010, para. 1.57). The issues were considered by the commissioners as "complex, contentious and critically important both for the community as a whole, and for affected persons as well as shareholders" (CRC, 2010, para. 1.23). The hearing took 68 days, including five field visit days over a period of two-and-a-half years and was described by the hearing commissioners as having a "voluminous" amount of evidence and an "exhaustive process" (CRC, 2010, para. 1.25). The commissioners "adopted an inquisitorial approach and asked a lot of questions" to ensure those most profoundly affected and concerned could be reasonably heard (CRC, 2010, para. 1.26). Every day of the hearing was attended by three members of the MHPS. Many of the society's members presented their own submissions at the hearing with wide-ranging views and critical local knowledge to which the commissioners listened with intent (MHPS, personal communication, April 2015).

Before the close of the hearing, the commissioners released a number of minutes. In April 2009, the commissioners "advised CPWL that we would most likely be recommending that CPWL should withdraw its Notice of Requirement (NoR) for the Waianiwaniwa dam and reservoir… and that we would be declining associated consents" (CRC, 2009a, para. 2). In July 2009, Minute 10 was issued explaining the reasons behind their decision. The commissioners were not convinced that economic benefits of the dam and reservoir would outweigh adverse social, cultural and economic effects on the Coalgate and Waianiwaniwa communities. They concluded that the dam and reservoir components of the scheme did not meet the sustainable management purpose of the RMA (CRC, 2009b, para. 4.2). CPWL accepted the commissioners' recommendations and withdrew the NoR for the Waianiwaniwa Valley reservoir and dam (CRC, 2010, para. 1.9).

1 While the MHPS continued its battle, the level of costs had a chilling effect on at least one community group, influencing it against challenging the actions of a developer in an unrelated case in the Lyttelton Harbour (H. Rennie, personal communication, August 2015).

5. POWER

Despite a gruelling decade, the citizens of the Malvern Hills received a favourable outcome by the withdrawal of the NoR. Regardless of the many hurdles placed in the community's path, public participation in decision-making processes under the RMA succeeded in allowing a fair hearing. However, a raft of questionable actions were also apparent:

- The application for water by the CCC and the SDC during consultation;
- the setting up of a public trust to front a scheme that would provide benefits to corporate shareholders;
- inadequate consultation;
- compulsory acquisition of private land;
- ignoring SDC's own s. 42A report recommendation;
- non-cooperation of the Auditor General to investigate conflicts of interest;
- the legal advice to seek a declaration from the Environment Court and the behaviour of the Judge by imposing costs on the society, despite recognising it had a valid concern;
- the content of the OIA paper;
- the removal of elected councillors from the CRC

These actions highlight that a determined central government was clearly at work with regard to the allocation of Canterbury's water resource (Drage, 2011). Nevertheless, the commissioners' decision with regard to the dam and reservoir reiterates that social well-being should not be compromised at the expense of economic growth and productivity (CRC, 2010).

6. CONCLUSION

The Malvern Hills Protection Society's involvement in the Central Plains irrigation scheme RMA resource consent process demonstrates the effectiveness of community participation in the decision-making process and the independent hearing procedure of the RMA. When a community is organised, supported and informed it plays a legitimate and powerful role in influencing decisions which affect their communities. Decisions under the RMA are legitimised by the participation of the community. Despite the numerous hurdles, the hearing process thrashed out the most comprehensive information available and arrived at a decision. Though a compromise, it was generally acceptable to the community and was not appealed by either side. Such a process demonstrates that power does not necessarily lie in the political or corporate realm, it is just as strong within citizenry. Whose interests the local government, especially the SDC, were representing and why is a topic worthy of further investigation, which future researchers may wish to explore.

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A failed attempt at collaborative water planning: Selwyn Waihora Variation 1

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1. INTRODUCTION

The Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010 (the ECan Act) enabled the elected regional councillors to be replaced by commissioners (ECan Commissioners) appointed by and accountable to the Minster for the Environment and the Minister of Local Government. Among other special provisions, the ECan Act removed the ability to appeal regional plans or policy statements to the Environment Court. The extension in time of this Act from its original 2013 to 2016 before elections for the regional council are allowed (and even then some positions will remain appointed) has meant that those making decisions for the region on its plans have not been able to be held accountable by the ratepayers for their decisions and there is little likelihood that the responsible Ministers will be held accountable by the New Zealand public for the actions of the commissioners. This article contextualises and reports on one of the 13 sub-regional water plans underway to set environmental limits as part of implementing the Canterbury Water Management Strategy (CWMS).

2. DO APPOINTED COMMISSIONERS MAKE A DIFFERENCE?

There has been debate for some time as to whether the Environment Court, who are not elected or accountable to a region's population, should stand above the elected representatives on regional (or for that matter district) plans and policy. The debate has usually been in the context of the regional representatives being elected, not central government appointees, and therefore locally accountable. The difference is important because it is about whether local plans should be subject to the national or the regional interest and, in either case, whether citizens should have recourse to the specialist Environment Court to address matters of substance in the plans, or such recourse should only be to the higher courts with concerns restricted to points of law.

Leaving aside the issue of recourse to the courts, it can be argued that the government has national environmental standards, national policy statements and regulations with which to press the national interest on local government, at least in the context of the Resource Management Act (RMA). It also has financial and other resources that it can offer local government and industries to facilitate gaining its national ends. In passing the ECan Act, it appears the government was convinced that it itself lacked the capability of achieving its ends through the other tools at its disposal and consequently it was most appropriate to suspend regional democracy. In particular, the government considered it appropriate that Canterbury Regional Council (ECan) and the Ministerial appointees should be unencumbered by the checks and balances provided by the Environment Court for every other regional or unitary council in regional planning processes.

It is difficult to compare the performance of the appointed ECan Commissioners with what might have been under an elected regional council with the same powers. However, the ECan Commissioners appear to have departed little from the course set by the former elected council In relation to water issues. For instance, the CWMS was developed by the elected regional and territorial councillors in Canterbury well before the ECan Act and has guided subsequent water planning in the region. Initially the CWMS was driven by a desire to identify 'new' water for intensification of land use, especially assisting conversion from dryland farming to dairying. The consultative process used in developing

it resulted in a much more broad-based approach that placed the environment ahead of intensified land use. The vision and principles of the CWMS were given statutory recognition through the ECan Act. Perhaps what the ECan Commissioners have added is a sense of haste and singularity of purpose for water planning.

3. CURRENT WATER PLANNING IN CANTERBURY

The CWMS has been largely implemented through the Zone Committees. These committees are not established on catchment or political boundaries, but on a blend of each. This makes some sense in a region where the surface flows are difficult to distinguish from and are intricately connected with groundwater. A regional Land and Water Plan has been produced that has region-wide rules, with individual chapters reserved for each zone. These chapters will remain blank until a variation or a plan change has been made to provide more detailed rules in each chapter that are specific to the biophysical and social characteristics of the zone.

The Zone Committees produce, through non-statutory planning processes, Zone Implementation Programmes (ZIPs). Each ZIP is then translated into a zone-based chapter of the Land and Water Plan (a regional plan) through the truncated statutory processes available in Canterbury. Essentially this process involves the Zone Committee, itself a joint committee of the territorial local authority and the regional council under the Local Government Act, putting a recommended plan to the ECan Commissioners. The commissioners then amend the recommendation as they see fit, notify a proposed plan and send it to an ECan Hearings Committee. The ECan Commissioners have appointed Independent Hearings Commissioners (IHCs) as their Hearings Committees. These IHCs hold hearings and then make recommendations to the ECan Commissioners who then approve the plan change. The plan or variation may only be appealed to the High Court and then only on points of law. This therefore removes the specialist Environment Court from the process.

Logically, in the absence of an Environment Court, it would seem incumbent on the commissioners to exercise a more rigorous approach to the review of IHC recommendations on regional plans than might be the norm for elected councils and that they might even reject parts of the plans. However, the ECan Commissioners' perspective, at least for the Selwyn Waihora Variation 1 (SWV1), seems to be that once the recommendation of the IHCs had been received, the ECan Commissioners could only accept or reject a plan in whole, not in part, even if there may be problems with the recommendation[1]. It is unclear on what basis they hold this view; however, it may be on the basis that these are perceived by them to be the community's plans and on that basis should be upheld.

In summary, this whole process has been touted as collaborative and representing the will of the community because of the role played by the Zone Committees[2]. This overlooks the nature of those committees and the context within which they are operating.

Problems with the similarly produced Hurunui and Waiau River Regional Plan have led ECan to release an 'advice note' (in July 2015) indicating that ECan has adopted an interpretation of 'land use change' that means that it will not be giving priority to pursuing compliance of dryland farmers whose land use change reflects the advice note's definition of 'normal' dryland farming[3]. The need for this approach is to address the concern of dryland farmers who felt their needs had not been included in the plan and that they had not been represented in the collaborative process. ECan's pragmatic approach to solving the issue is indicative of faults in the plan that may have been avoided with either fuller community representation on the Zone Committee or an Environment Court process. In the remainder of this article I focus specifically on the first variation to the Land and Water Plan, SWV1 (which subsequently became Plan Change 1 to the Regional Land and Water Plan).

4. THE SELWYN WAIHORA ZONE

The Selwyn Waihora (SW) area (lying predominantly between the Waimakariri and Rakaia rivers and including all tributaries and waters flowing into the lake) is considered over-allocated and the lake has been described, possibly erroneously, as the most polluted in New Zealand (it is hyper-eutrophic, but it is also naturally eutrophic and the extent to which it is polluted above its natural eutrophic state has not been clearly identified). Politically, the area falls within the rapidly urbanising

1 ECan Commissioner Caygill in oral response to questions at a public meeting on 14 May 2015 in Lincoln (after SWV1 had been approved).

2 See: http://ecan.govt.nz/publications/Reports/targets-report-cwms-2015.pdf

3 See: http://ecan.govt.nz/our-responsibilities/regional-plans/hwrrp/Pages/hwrrp_advice_note.aspx

Selwyn District and Christchurch City. The Central Plains Water Project involving, if fully developed, irrigation of 60,000 ha in the upper part of the catchment, was initiated and approved under plans made by the former elected regional council. The first 20,000 ha stage is under construction.

The 16 member Selwyn Waihora Zone Committee (SWZC) comprises three types of people. There are representatives of the six rūnanga with acknowledged interests in Lake Ellesmere/Te Waihora and these are chosen through marae-based processes. There is a representative from the elected members of each of Selwyn District Council and Christchurch City, and an ECan Commissioner. The ECan Commissioner of Ngāi Tahu descent, Don Couch, represented the commissioners for the period of the making of SWV1. Although not representing Ngāi Tahu on the SWZC, his published comments indicate he clearly saw his role as to ensure his interpretation of Ngāi Tahu's values would be part of the outcome[4].

The remainder of the committee comprises 'community members' who were selected by a local authority selection panel. The community members are specifically not, nor do they describe themselves as, 'community representatives', but many perspectives that might be held within the community are represented to a greater or lesser degree, with perhaps the dairy farming interests predominant during the making of SWV1.

The preparation of the SWV1 was facilitated by significant research support. A year of community consultation, conducted by the Zone Committee, on nutrient limits was facilitated by the availability of scientists to answer questions. Dryland farming and not converting large areas to dairying were ruled out early, as was any scenario that did not include the Central Plains Water Project as it had already gained consent.

5. SELWYN WAIHORA VARIATION 1 (SWV1)

SWV1 attempts to implement the SWZIP through the regional land and water plan for the catchment of Lake Ellesmere/Te Waihora.Key features of SWV1 are the:

- nitrogen controls;
- phosphorus controls;
- cultural landscape overlays; and
- approach to equity.

Nitrogen tends to reach waterways through groundwater whereas phosphorus tends to travel through overland flows. The nitrogen controls are similar to those now being commonly employed and critiqued around rural New Zealand. They are based on managing individual farm discharges through input controls using Overseer™ as the modelling tool to guestimate the amount of nitrogen likely to be discharged from the farm to the waterways given particular climate, application methods, soil types, species types and stocking ratios, and crop and arable farming techniques.

A similar approach has been taken to phosphorus, but in this instance in the SWV1 only applies to Phosphorus Sediment Risk Areas (PSRAs). These have been identified based on assumptions of soil phosphorus uptake and soil maps to identify the occurrence of soils likely to be poorly able to absorb phosphorus and hence likely to lead to phosphorous being discharged indirectly into waterways through overland flow. These areas were not part of the ZIP that came from the Zone Committee and are among the contentious surprises in the final plan recommended by the IHC and were subject to High Court appeals that were settled out of court.

Two cultural values overlays, a lake cultural landscape around Lake Ellesmere/Te Waihora and a values management area, including 20m on either side of identified rivers, have been created and are largely combined into one overlay (the Cultural Landscape/ Values Management Area [CLVMA]). The lake zone pragmatically adopts readily identifiable roads and the 1.8m contour as its usual boundary and this means that the zone extends a considerable distance from the lake itself. The most controversial aspect of the cultural zones are the restrictions on farming, which differ significantly for those landowners within the zones and those outside them, and the definition of the boundaries of the river values management area.

In the CLVMA, farmed cattle, farmed deer or farmed pigs are prohibited from the 'bed' and bank of rivers, drains (containing water) and the lake, and access to rivers for all other stock (e.g., sheep) would require resource consents as discretionary activities as soon as SWV1 became operative. There are some pragmatic exceptions for ephemeral streams.

To implement these controls, the IHCs effectively decided that all farms should be required to apply for

4 See: http://www.stuff.co.nz/the-press/business/68674419/lake-ellesmere-cleanup-deal-explained and David Painter, former Selwyn Zone Committee Member, letter to the Editor, The Press, 28 May 2015, p.A12

resource consents to continue their farm activities, but that these would be controlled activities and that among the conditions for consent would be an audited Farm Environment Plan that includes an Overseer™ model for the relevant land use.

Consequently, from the start of 2017, a consent to farm is required if the farm is larger than 10 ha and:

- the farm's nitrogen loss over the most recent four years is higher than 15kg/ha/yr; or
- the farm is in the CLVMA; or
- the farm is in the PSRA; or
- the farm is not implementing good management practices set out in a schedule and under preparation.

Moreover, farm environment plans are required if a farm is larger than 10 ha and:

- the farm's nitrogen loss over the most recent four years is higher than 15kg/ha/yr; or
- the farm is in the CLVMA; or
- the farm is in the PSRA[5].

If it is outside the CLVMA and greater than 20ha in size then similar rules apply. Notably, those farmers who group together as 'irrigation schemes' will have certain advantages over others. This appears to favour corporate structures like Central Plains Water Ltd and attempts to incentivise the joining of such schemes.

The vast majority, in number, of rural land owners in the SWV1 area are lifestylers/smallholders and low emitters, and the CLVMA areas may catch many unawares. Moreover, no increase above a farm's nitrogen baseline, even if it is lower than the 15kg/ha/yr limit, was initially allowed for a farm in the CLVMA. The baseline is the level of discharge of nitrogen and phosphorus estimated to have occurred on average for the years 2009-2013.

In an interview on his retirement, Commissioner Couch claimed the 'inside scoop' was that the CLVMA was added at his insistence[6]. The Zone Committee, with its strong rūnanga representation, had not included the CLVMA in its recommended plan and never approved it[7]. It was not something consulted on during the collaborative community engagement process. The outcomes appear quite inequitable in that they penalise low emitters while allowing high emitters to continue to operate at a much higher level. These outcomes are similar in nature to those experienced in Hurunui and appear justified primarily on the basis of not wishing to terminate the activities of high investment emitters whose consents had been so recently approved by the council.

Significant problems have also emerged through the definition of rivers and Lake Ellesmere/Te Waihora being based on the river bed definition used in the ECan Drainage Bylaw 2013. This means that the boundary of Lake Ellesmere/Te Waihora's lake bed may theoretically extend to the height that it would naturally overtop Kaitorete Spit, perhaps the 4m contour, and effectively cover an area extending well beyond the CLVMA, reaching some kilometres inland from the present lake in places.

The beds of rivers are defined, by reference to the Drainage Bylaw, as the outer toe of stop banks and flood control vegetation, which may be several hundreds of metres further from the 'bed' of a river as it is defined by the RMA. This raises significant issues for landowners who again may be entirely unaware of the new requirements and prohibitions on, for instance, sheep and cattle. It has also led to many questioning whether the definition is itself ultra vires, but ECan Commissioners have confirmed that it is not a priority to introduce a plan change to rectify these problems[8].

6. TAKE HOME MESSAGES

It is quite probable that the year-long consultations over the nutrient limit setting created a level of trust in the Zone Committee and ECan that meant people did not look closely at the notified proposed SWV1. Without further research this is conjecture at this stage, but for whatever reason, there are a number of matters that were introduced by the ECan Commissioners or the IHCs that would normally be appealed to the Environment Court and probably resolved out of court through mediation. ECan staff and commissioners' public and

5 See: http://ecan.govt.nz/publications/Plans/v1_farmer_QA_July_15_final.pdf

6 See: http://www.stuff.co.nz/the-press/business/68674419/lake-ellesmere-cleanup-deal-explained and David Painter, former Selwyn Zone Committee Member, letter to the Editor, The Press, 28 May 2015, p.A12

7 See: David Painter, former Selwyn Zone Committee Member, letter to the Editor, The Press, 28 May 2015, p.A12

8 Letter dated 24 July 2015 from ECan Commissioner Peter Skelton to Hamish Rennie.

steadfast denials of some of the implications of the definitions of the bed of a river until the day prior to appeals to the High Court closed, confusion over what is a point of law and what is a matter of substance, and the higher costs of High Court processes means that some of these issues can now only be resolved through council-initiated plan changes[9]. The consequence is that many landowners now face the costs of resource consent applications that are disproportionate to the scale of their operation and level of their adverse effects, if any, especially when compared with other landowners. The resultant overall improvement to the waterways will be minimal.

Despite these problems, SWV1 is a significant advance in addressing non-point source pollution of waterways. There are four key messages for legislators and planners:

1. The Zone Committee approaches in Canterbury are not truly community collaborative processes and the outcomes lack community legitimacy10.

2. If you are involved in a collaborative project, adopt a 'no surprises' approach, keep your collaborators informed of any changes that might be introduced through behind the scenes dealings before these are made public so that you retain their trust, and draw their attention to the need to consider making submissions on unexpected additions.

3. Removing the ability to appeal council decisions on plans to the Environment Court has significant disadvantages, especially if your decision-makers believe they have no option but to approve all of the recommendations of their hearings committee.

4. Be wary of using mechanisms and definitions for meeting the purposes of one Act to achieve the purposes of another.

9 Plan Change 4 ('Omnibus') to the Land and Water Plan is before IHCs at the time of writing and attempts to address some of these issues, but has also introduced new issues.

10 See: Sinner J, Newton M, Duncan R 2015. "Representation and legitimacy in collaborative freshwater Planning". Prepared for the Ministry of Business Innovation and Employment, Contract CO9X1003. Cawthron Report No. 2787. 45p. plus appendix

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How to make housing affordable?

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1. INTRODUCTION

In 2015, our class of seven Lincoln University Master of Planning students conducted a stakeholder forum regarding housing affordability in the Selwyn District. This was for Advanced Professional Planning Methods and Practice (ERST624), examined by Senior Lecturer Dr Tabitha Combs. We were to act as a consultancy, named "Ellesmere Consultancy Ltd", to provide recommendations to address the growing demand for affordable housing in the Lincoln and Rolleston planning area during the next fifteen years. Affordable housing has become a significant issue in New Zealand's housing market. It has become the topic of media stories each week and has resulted in frustration from many potential home buyers. The population in Selwyn in general, and Lincoln and Rolleston in particular, is forecasted to continue to increase.

We produced a final report which examined how well affordable housing has been provided for in the current planning system. We investigated the current housing supply, demand, pricing history, and also what is considered affordable housing. Plan Change 7 in the Selwyn District Plan, for example, has attempted to address the housing demand. However, we propose that more needs to be done to address housing needs and affordability. We created three maps using the ArcGIS mapping programme to indicate the current planning zones and conditions as well as the locations of recommended residential development.

This article is a summary of our final report. It outlines a stakeholder outreach forum which was conducted to obtain public feedback on the initial recommendations provided and to gather further opinions on affordable housing in the Selwyn District. As with any such study, there are variables that the consultant is not able to take into account due to various factors. These limitations and challenges are discussed. Based on the analysis and public feedback from the forum, a list of recommendations has been provided to address how housing affordability can be better accommodated in Lincoln and Rolleston in order to address housing affordability in the Greater Christchurch area.

2. THE STAKEHOLDER OUTREACH FORUM

A stakeholder outreach forum was conducted to gauge public reaction to our preliminary findings and recommendations on housing affordability in the Selwyn District. It was held between 3.30pm and 5pm on Wednesday 7th October 2015 at Lincoln University, and was attended by approximately 35 people in total.

The aims of the forum were to:

- describe the current housing situation in Selwyn;
- explain our preliminary findings and our recommendations;
- display maps and information outlining our preliminary recommendations;
- allow the public the chance to have a voice in addressing the issues around housing affordability in Selwyn; and
- allow the public to assist us in identifying limitations in our study.

The forum began with a brief presentation which detailed both the house rules and the structure of the session and gave an outline of our findings and recommendations. The public were then given a chance to roam around three different information stations for 20 minutes. The stations contained diagrams, maps, and graphs to display findings and recommendations. Two

consultants from Ellesmere Consulting Ltd were at each station to answer questions from the attendees (see figure 1).

The categories of the three stations were:

1. Plan Change 7 and housing supply/demand.
2. Property prices and affordability.
3. A display of maps and preliminary recommendations.

The public were then split into roughly even groups to be involved in three separate "participation stations".

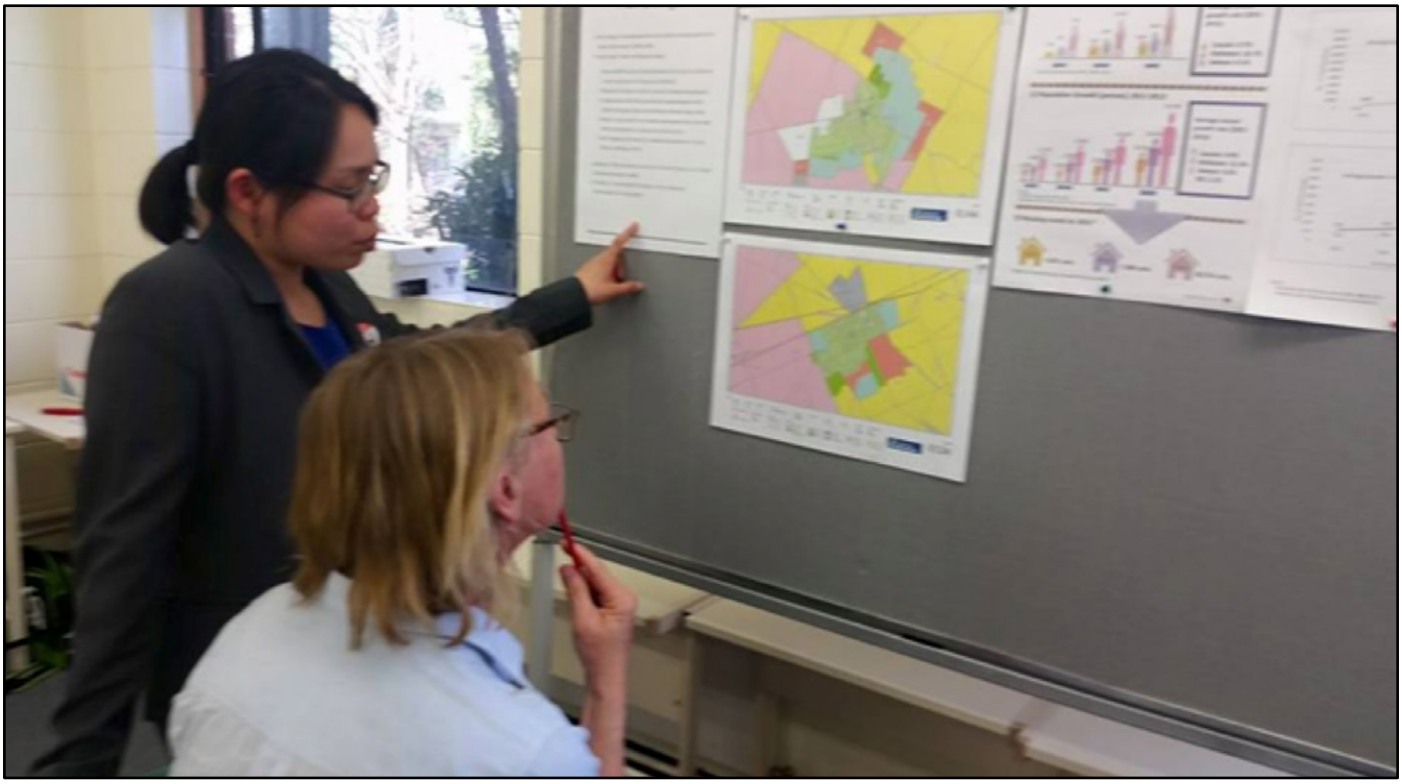

Figure 1: Master of Planning student Sinmeun How talks to stakeholder Nicky Snoyink about her findings regarding housing supply and demand.

Each station involved a different activity for the purpose of allowing the public to put forward their opinions. The public completed the activity and then spent some time discussing the answers they produced. After 15 minutes they shifted as a group to the next participation station.

The three activities at the participation stations were:

1. A constructive feedback station through which the participants were asked to provide (on post-it notes) up to three positive comments and three constructive criticisms in relation to our mapped recommendations (see figure 2).
2. A rating-scale station through which the participants were asked to analyse the statement "housing is affordable in Greater Christchurch". They were then asked to place a post-it note on the rating scale to show whether they agree or disagree with the statement, 1 being strongly disagree and 5 being strongly agree. The participants were asked to write the reasons for their placement on the post-it note, if they desired.
3. A question and answer station through which the participants completed a four-question survey. Their answers were then discussed with the group.

Upon exiting the forum, the public were offered the chance to provide further feedback by filling in a comments form.

3. SUMMARY OF RESULTS

The results from the stakeholder outreach forum helped us to identify a number of limitations in our findings. The responses also aided us in gauging public opinion on affordable housing in Selwyn and ways in which the public feel affordability issues could be resolved. Although we only received one response from the optional comments forms, we gathered data

on a number of different topics from our participation stations.

The issue of a lack of affordable housing in Selwyn was reaffirmed in a survey of the public which showed that 28 out of 29 respondents believed housing was becoming unaffordable in the area. The most common reason given for the increase in unaffordability was a rise in demand for houses in the area which is outweighing the rate of supply. One respondent suggested that the "[Canterbury] earthquakes have increased demand", whilst another argued that "the demand [for housing in Selwyn] is becoming higher as the population grows" and thus prices are being pushed up. Blame was also placed on "greedy developers" and a lack of restrictions on their ability to invest in the housing market which has driven prices up.

The most common theme that arose from public feedback in terms of addressing affordability issues was the concept of higher density housing. When asked whether they would be willing to invest in a smaller lot-size if it was more affordable, 17 participants stated they would, six stated they would not and six stated they were unsure. Members of the public further identified their desire for higher density housing when providing constructive feedback in regard to our preliminary recommendations. One participant argued that "focus needs to be more on what type of housing goes in rather than where, i.e. lot sizes. It should not just be left to the developer." Another participant made a case for "more high density housing that links the main villages", whilst a third member of the public suggested that "the focus should be on high density housing rather than development on existing productive land."

Consideration of housing types was also suggested when discussing higher density as a solution for the unaffordable housing issue. A participant suggested that "limited housing type (multiple story housing and apartments)" was a major reason for the increase in unaffordable housing in Selwyn and another member of the public asserted that "housing and land areas are too big." In discussing their reasons for supporting high density and mixed housing, a number of participants believed it would assist in providing for the rapidly increasing population in Selwyn, and would help to negate the high cost of new infrastructure that is often associated with urban sprawl.

Figure 2: Housing affordability participation station.

Additionally, feedback from the public has helped us to identify a concern around the potential loss of rural productive land in Selwyn if housing affordability is to be addressed through rezoning land for development. The majority of the public recognised the need to provide more houses in Selwyn to address rising prices, but many participants at the forum held concerns that our preliminary recommendation to release land for development would come with the cost of losing productive agricultural land. One participant

issued their concern with the question: "would your recommendations encourage more people to live out of town on productive land?" Another participant suggested our recommendations were too "transport focused" with "no apparent consideration of rural productivity preservation." It was even clearer from discussions with members of the public that they value the rural feel of the area and recognise the importance of the agricultural dollar to the local economy. Thus, a number of participants at the forum requested consideration be given to the value of the land in terms of agricultural productivity before it is released for development. Further, it was suggested that thought be put into the spatial pattern of land being released to ensure land zoned for development will have little impact on the overall rural feel of the area.

The importance of location when recommending areas for affordable housing became apparent through data gathered from the public. We asked the public for the main factors that influence them when choosing the location of a house. The majority suggested proximity to amenities such as supermarkets, schools, and recreational facilities as the most important factor. Access to open and green space was also commonly identified as a factor in choosing the location of a house. A third common theme was the need to be close to public transport networks in order to be able to commute to work or into Christchurch. From discussions with members of the public it became clear that, although housing in the area needs to be made more affordable, it is paramount that consideration is given to the liveability of affordable housing.

4. RECOMMENDATIONS

Much of the feedback we received from the stakeholder outreach forum has been incorporated into the final recommendations of this report. The most common theme that arose from consultation with the public – the concept of higher density housing as a solution to rising house prices – has been given significant consideration. We have included a recommendation that involves the building of a mix of housing types which will create higher density housing developments. This was a method that was supported by a number of the participants at the public forum. Furthermore, we have incorporated a recommendation which suggests the need to make changes to the Selwyn District Plan. These changes include an increase to the current permitted height of a building to allow for the construction of apartment buildings in the area. Additionally, we have suggested the inclusion of a rule which makes it a requirement to develop a percentage of dwellings in a new subdivision at a smaller size (e.g. 250m^2). Again, the construction of apartment buildings was greatly supported during the stakeholder outreach forum as was the concept of smaller dwellings as they would provide for more dense and affordable housing options.

Concern from the public about urban sprawl as a result of releasing more land for affordable housing developments, and the impact this would have on productive agricultural land, has also been addressed in the recommendations made in this report. We have suggested that urban development occur around existing infrastructure so as to reduce the cost of new housing developments. This recommendation will have the additional effect of partially preventing sprawl onto productive land in the area as it will help to ensure urbanisation occurs next to existing development.

Feedback from the public suggested close proximity to amenities makes the location of a housing development more attractive and this has also been considered in our recommendations. We have suggested the development of amenities such as a school or a set of shops within close proximity to new housing developments in order to make affordable housing options more liveable.

Lastly, upon discussions with the public during the stakeholder outreach forum, we noticed a number of participants were in favour of developing a rail network alongside affordable housing which would link the Selwyn District with Christchurch city. This would make living in the area more affordable in terms of travel, given that a number of residents commute to Christchurch for work every day. We have included a recommendation in our report which outlines the need for a rail network as a potential development alongside affordable housing options.

Our recommendations are divided into two parts. The first part consists of broad recommendations for accommodating affordable housing. The second part is specific to the future housing development in Lincoln and Rolleston based on the planning zone maps we produced as part of the full report.

4.1 Broad Recommendations

1. Develop a robust housing demand model: A more comprehensive housing demand model needs to be constructed to better reflect the need of the

population. This includes the analysis for the types of affordable housing required. The model needs to be reviewed periodically to ensure the supply matches the demand for housing. We recommend that there is a mixture of housing available, particularly joined housing, to cater for different housing needs. Mixed housing is becoming more important as can be demonstrated by the increasing income gap. After all, New Zealand houses are among the largest in the world (New Zealand Productivity Commission, 2012).

2. Allocate additional land for residential development: From examining planning documents and gathering public feedback, we recommend that a further 400 hectares (ha) of greenfield land be rezoned to Living Zone Z[1]. We have recommended a maximum of 400 ha because to accommodate for the predicted 13,000 housing increase, with an average of 10 houses per hectare, 1,181 ha will be needed. Plan Change 7, which became operative in 2012 with an aim to provide for future growth within the Selwyn District, has provided for 809 ha of this; at this density, a further 400 ha could therefore be needed.

3. Provide incentives for developers: A wider range of incentives such as tax breaks can be given to developers to encourage them to develop a mixture of housing types and to better respond to the timing of demand for houses. These include releasing land for housing development and relaxation of conditions on land covenants. Matching grants or a public-private partnership approach can also be useful to lower the initial infrastructure development cost for the council.

4. More streamlined and integrated planning system: More streamlined and integrated central / local government initiatives, particularly in planning processes and legislation, will increase planning efficiency and reduce legal costs.

5. Amend planning rules: Rule 4.8.1 of the Selwyn District Plan states that the erection of any building which has a height of not more than eight metres shall be a permitted activity. We suggest that this height is increased to accommodate apartment style housing closer to the town centres. We also propose that Rule 4.6.3, which states that the erection of not more than two dwellings on an allotment in a Living 1 zone shall be a restricted discretionary activity, should be changed to a permitted activity. This would allow for apartment style dwellings. Finally, we suggest the inclusion of a rule which states that a percentage of dwellings in each subdivision do not exceed a maximum area, e.g. 250m^2. This would increase the mixture of housing styles available that will suit a range of incomes

4.2 Recommendations for future housing development based on planning zones

1. Development should be on the periphery of existing higher density housing: We recommend that future housing should be developed around the periphery of existing housing. This will ensure that costs are reduced by utilising already existing infrastructure to accommodate future housing.

2. Amenities should be developed alongside future housing: We recommend that future amenities be located nearby these future housing development areas as, as shown in map one, the relationship between housing and amenities is strong. An example of this relationship would be a school, which effectively acts as an attractor for housing development.

3. Future housing would be better placed away from high speed roads: Developing housing away from high-speed roads will ensure that safety is of the utmost importance. Safety for families is an important part of developing new housing. This will also encourage development to occur around existing infrastructure. Roads that have lower speed zones are located near crucial day-to-day infrastructure, such as water and sewage, reducing the overall cost of developing land for future housing.

4. The Urban Development Strategy should be accommodated within the development: This final recommendation is imperative for the entire region and must be complied with. With increased development of the outer regions of Christchurch,

1 Living Zone Z provides for a range of site sizes and living options, including lower density suburban areas and medium density small sections and townhouses (Selwyn District Council, 2012).

further pressure will be placed on the existing infrastructure such as roads and power. To ensure that the region grows sustainably, development of the road network, for example, will need to be undertaken. Furthermore, new infrastructure may need to be developed in order to relieve congestion on the roads. We recommend that development of the rail network should be investigated as a possible option for transporting the population of these satellite townships into the Central Business District quickly and efficiently.

5. CONCLUSIONS

Housing affordability is a complex issue involving multiple influencing factors. This report has analysed the current housing affordability issue in Selwyn District, with a particular focus on Lincoln and Rolleston, based on key factors such as population and housing stock growth, household income, household spending, property prices and homeownership rates. In addition, issues related to the current planning and development system have also been illustrated.

The population in Selwyn in general, and Lincoln and Rolleston in particular, is forecasted to continue to grow at a high rate. A more comprehensive housing demand model will be needed to better reflect the housing needs of the population in regards to different demographic needs and economic factors. While the majority of the households in Lincoln and Rolleston can afford the housing in the townships currently, initiatives need to be undertaken to accommodate the housing needs for those households in the lower income range, particularly with the increasing rate of property prices and rental. Availability of housing and household data such as house price and household spending at a lower spatial level will increase the accuracy of the analysis.

In terms of future housing development in Lincoln and Rolleston, it is clear that Rolleston and Lincoln will continue to grow and affordable housing is needed to accommodate for every type of family in the community. The new development will need to be located near amenities to reduce costs as well as avoiding high-speed roads to ensure the safety of the community.

Increasing land supply is not the only means for reducing housing costs. Efforts and commitments by various parties are needed in addressing the issue of housing affordability. This include individuals, housing developers, local authorities and the Central Government.

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Sustainable experiences in Selwyn District

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1. INTRODUCTION

There are no foreign lands. It is the traveller only who is foreign (Robert Louis Stevenson)

The World Tourism Organization defines sustainable tourism as a type of tourism that maintains a balance between social, economic and ecological interests. Therefore, sustainable tourism takes into account the sustainable development of communities, not only in terms of income but also considering the socio-cultural and environmental impacts caused by the arrival of tourists, more sensitive in rural areas.

The experience industry is characterized by the relationship between hosts and guests, as part of a range of activities provided with a high degree of participation. This interaction is expected to be sustainable and must originate from collaborative community work, as has happened in some projects in the town of Lincoln (Jarvis, 2009), and always monitored so as to never lose our roots in the planning process (Boutler, 2012).

For example, food and wine are aspects of the lifestyle of territories, and they exercise a powerful influence in terms of involvement and identification (Fusté, 2015; Henderson, 2009). These are examples that reinforce the sense of identity of local communities, contributing to their sustainable development (Berno, 2006); the same happens in the case of tracks and greenways (Mundet & Coenders, 2010). Thus, this paper understands sustainable experiences as those experiences that have their origin in the identity of a place, and are strongly land-related. This means that they promote local and sustainable development of the communities. These communities, by providing experiences (and also enjoying them), are able to enhance their sense of place while hosting visitors who seek authentic knowledge of a foreign culture and its surrounding nature. Cases from Selwyn District in the Canterbury region are used as examples.

2. SUSTAINABLE PRACTICES IN RURAL AREAS

Cultivation of land, restoration of buildings, recovery of tracks, among others, are part of the heritage of rural areas; this heritage is a synonymous with a typical countryside lifestyle. Urry (1990) states that there is a new consumer who feels as though s/he has lost her/his own roots; and as Pearce (1990) says, the universal attraction of rural tourism is found in the daily life routine of communities. So rural areas, as opposed to urban ones, and mostly occupied by flora and fauna, represent the opportunity to learn local ways of life and at the same time to connect with local residents, which give a special role to the rural tourism experience (Lane, 1994). Thus, rural areas constitute an opportunity to establish contact with nature and culture, feeling what is expected to be authentic, in a sustainable environment, and without the stressors associated with urban areas.

According to Díaz and Llurdés (2013), when a community identifies a number of tangible and intangible assets and recognizes them as their own and unique, these would compound their own landscape, a framework that does not exist anywhere else. Landscape, which is experienced through the five senses, is an essential factor for rural and sustainable tourism. In this sense, natural environment and cultural heritage are deeply rooted in a particular place, and are a key identifier of societies and territories. The enhancement of local pride from their unique identity is a process for promoting the development of sustainable practices in rural areas. This is linked to the slow tourism philosophy, a local-based tourism which takes advantage of the resources of the countryside.

Kastenholz, Carneiro, Marques and Lima (2012) point out that the way in which a rural tourism experience is

offered represents a challenge for local communities in their search for identity and integration. This is related to the development of new business opportunities for local suppliers of rural tourism, capable of generating sustainable profits; as well as for tourists, in their search of authentic and meaningful experiences. Residents are expected to share their knowledge of the region's history, culture and natural heritage, and may offer opportunities to establish closer contact with their way of life or local produce, for example through farmers' markets. Therefore, local communities have an active role in creating sustainable practices, which help visitors to discover a more intense experience of places, enjoy them, and also benefit their own development (Fusté, 2015d).

3. THE MEANING OF 'EXPERIENCE'

The word experience includes two meanings: the gradual and interpersonal accumulation of knowledge associated with daily routines; as well as the momentary and intense feelings associated with a "peak". Experience in the second sense of the word is the meaning expressed in the idea of sustainable tourism experiences. The importance of culture and landscape as a parameter in regional planning is further evidence of a trend towards a life highlighted by a high demand for experiences. This is also connected with the experiences of everyday life, because satisfaction with tourism experiences contributes significantly to life satisfaction (Deng et al., 2013; Fusté, 2015c; Neal et al., 1999).

A useful model in order to conceptualise the tourism experience was established by Quan and Wang (2004). This model has two perspectives: one, in relation to the "peak" tourism experience; second, related to daily life experience. The behaviour of tourists who only seek a change in relation to the routine and tourists who seek the novelty, differ from each other in that the latter refers to the situation where people are able to try experiences that are not yet known (Quan & Wang, 2004). Therefore, tourism experience can be an intense "peak", or it can be an extension of everyday life (Mkono et al., 2013).

As Wang (2000) suggests, tourism provides an alternative experience of time: it means time off, which appears as an alternative rhythm, free from the constraints of daily routine. Offering unique and imaginative products or services, destinations can obtain a competitive advantage over those who still offer the same and may have become obsolete (Azevedo, 2009), due to a lack of creativity and innovation. According to Daugstad (2008), modern tourists want to experience first-hand the taste, feel and hear stories about the landscape, since direct experience implies an interaction and involvement of both actors; for example, through agricultural products that provide practical experiences and where tourists could participate in cooking, weaving or milking.

4. SUSTAINABLE EXPERIENCES IN SELWYN DISTRICT

Selwyn District is a rural area in central Canterbury whose economy has been based on agricultural activity such as grain and sheep farms, and horticultural production. Regarding its geographical position, the Waimakariri River is its northern boundary. The eastern borders comprise, from north to south: the city of Christchurch, Banks Peninsula, and also the Pacific Ocean, beyond Lake Ellesmere. The Rakaia River is the district's southern boundary. Selwyn, then, with a population of 44,595 inhabitants (New Zealand Government, 2015), includes two very different environments: the plains and the high country, where the Southern Alps are the western border. Rolleston is the most populous town in Selwyn; other large towns are Darfield, Leeston, Lincoln, Prebbleton, and Templeton. Selwyn District covers 649,000 hectares, and up to one third of the district consists of protected areas.

Sustainable experiences offered in Selwyn are divided into three main activities. These activities are capable of providing a proud identity of this place thanks to their closeness to the landscape. All of these are sustainable practices that have their origin in the authenticity of a place, and promote the local and sustainable development of communities. At the same time, they allow people to get a deep knowledge of the idiosyncrasies of Selwyn District.

First, sporting activities happen in an open-air context where sceneries and vegetation can be enjoyed. Although the main landmark is Arthur's Pass National Park, a wide range of experiences are available throughout Selwyn. There are many opportunities to enjoy walking, biking, climbing, skiing or snowboarding. Golf is a popular open-air activity as well. It is also possible to attend local competitions for sports such as rugby and netball, or equestrian events throughout the district.

Second, the lifestyle of Selwyn District includes

several cultural experiences. The gardens together with the historical buildings are constructions that show the identity of Selwyn's people. Villages display their own local lifestyle which can be experienced; for example, through historical walks in Darfield and Lincoln. Gardens are an example of creativity through land use and sculptures which convey the history and stories of their handcrafters. Selwyn gardens have different distinctions and classifications, and there are up to twenty-nine gardenscapes to be enjoyed.

Third, culinary heritage - food and wine - is part of daily life experience, and this is transmitted to visitors in different ways. Farmers markets are a suitable place to get a taste of the land delivered by their own artisans. Even if these take place weekly (Darfield and Lincoln) or monthly (Prebbleton and Rolleston), they do not include just food produce but also crafts in a community environment. Visits can be made to farms and facilities where vegetables are grown, wine is produced, or cheese is made. There are also a number of local stores, cafeterias and restaurants spread throughout Selwyn District.

5. CONCLUSION

Planning of innovation and the ability to generate unique experiences are challenges that tourism destinations need to face. Fortunately, creativity and community development are not limited to big cities. Rural settlements, as providers of authenticity in the context of sustainable development, can also become places for the implementation and experience of the most innovative tourism activities (Fusté, 2015b). Sustainable experiences aim at the enhancement of local culture and environment; moreover, these experiences can contribute to the success of a sustainable relationship between locals and visitors. This is accomplished through land-related practices that play the role of tourism attractions, but are focused on visitors and locals at the same time. It is also important to note that providing places with a higher degree of experience can be achieved with simple items like a dessert, a plant, or a small path.

In this context, where there is constant encouragement of innovation in the planning world, one of the most important elements that can guarantee sustainability is community involvement (Reynolds, 2015). Some authors have dealt with the case of planning and sustainable development in urban areas such as Christchurch (Tavares, Swaffield, & Stewart, 2013; Wesener, 2015). The planning, development and promotion of new experiences anywhere must include several objectives: to value both natural and cultural resources, and to enhance a respectful framework for environment and traditions. However, rural areas are a great pathway for sustainable experiences that help many aspects of local development. Future research, also in the framework of the environmental planning, needs to look deeply into the impact of these activities in terms of communities' involvement and satisfaction. A focus on *live*, *work* and *play* is needed (Selwyn Times, 2015).

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Environmental planning analysis: Using Feng shui to inform the redevelopment of the Christchurch eastern red zone

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1. INTRODUCTION

This report provides an overview of environmental planning approaches, and considers how alternative methods could be used to inform the redevelopment of Christchurch's eastern residential red zone. The first section assesses environmental planning approaches and discusses traditional approaches to planning. The next section describes current developments in planning theories and practices designed to counteract perceived issues with traditional methods. The final sections provide a summary of the non-Western planning theory of Feng shui, which is used to devise a plan for Christchurch's eastern residential red zone.

2. TRADITIONAL ENVIRONMENTAL PLANNING APPROACHES

Planning techniques in Europe and the UK arose from the industrial era in response to population and environmental issues. Cities such as London and Edinburgh experienced large influxes of rural peoples seeking employment and higher quality of life. As industry further developed, over-crowded cities and decreases in social well-being occurred due to environmental degradation (Healy, 2012). Edinburgh experienced growth limitations due to its physical layout, which contributed to cramped, crowded and unsanitary living conditions. Health issues linked to sewerage were solved through design of sewer systems (Repcheck, 2003). City expansion evolved by creating buildings that extended through vertical space (Repcheck, 2003).

One of the first traditional planners that emerged from the industrial era was Haussmann with the redevelopment of Paris in the 1850s-1860s. This was followed by the City Beautiful Movement in Chicago (1893) and the creation of the first Garden City, Letchworth, in the U.K in 1903 (Fainstein & Campbell, 2012). Concerned with the terrible living conditions within the city, and observing the disconnection of society from the natural environment, theorists such as Howard, Wright, and Le Corbusier began to focus on creating alternative new developments in response to their hatred of nineteenth century cities (Fishman, 2012). They held utopian visions, where planning could facilitate a more peaceful relationship between man and the environment, and provide balance to biophysical, economic and social structures. Each imagined a city where technology relieved pressure on the environment, and social justice was achieved through the reorganisation of wealth and power (Healy, 2012).

Twentieth century plans outlined procedures and rules for zoning and guidelines for master plans, alongside transportation needs (Fainstein & Campbell, 2012). The popular rational comprehensive model of this era was based on the premise that humans are rational beings. It used cost-benefit analysis to achieve planning goals, where expert planners were responsible for making decisions (Fainstein & Campbell, 2012).

Decisions regarding planning using this rational approach were highly subjective, with those in power making the top-down decisions based on scientific and economic projections, while the community was excluded from the decision-making process. (Fainstein & Campbell, 2012). Some also argued that the systems and knowledge involved were too complex and that the expert planners were lacking in co-ordination skills suitable for dealing with the various public and private sectors (Fainstein & Campbell, 2012). This led to the rise in popularity of incremental planning which was thought to address common public interest; however, some argue that this still privileged the powerful over the poor and weak (Fainstein & Campbell, 2012).

3. RECENT PLANNING THEORIES AND PRACTICES

New approaches to planning have emerged in response to the shortfalls of traditional planning practices outlined above. The management of socio-spatial arrangements now places an emphasis on environmental considerations, and uses communicative practices that allow multiple communities to be heard. In contrast to traditional methods, these planning approaches promote the dilution of centralised powers and rise in community engagement, seeing them as core to successful planning. These communicative approaches acknowledge the public stakeholder, and promote self-directed planning provided by communities and for them, guaranteeing endorsement of proposed developments (United Nations Human Settlements Programme, 2009).

Recent planning approaches are holistic and community driven, akin to a bottom-up management style integrating communicative approaches. These recent approaches have been influenced by key thinkers such as Aldo Leopold (1949) and Rachel Carson (1962). Theories including design with nature (McHarg, 1969), adaptive management (Holling, 1978), and green urbanism (Beatley, 2000) have also contributed to this recent planning paradigm shift. Furthermore, non-Western thought is also influencing planning approaches, as evidenced by recent use of Feng shui in a variety of planning practices.

4. FENG SHUI

Feng shui is applied to city and neighbourhood scale planning, as well as the interior and exterior of homes and businesses (Xu, 2003). Yoon (2011, pp. 243-244) defines Feng shui as a "highly systemized ancient Chinese art of selecting auspicious sites and arranging harmonious structures such as graves, houses, and cities on them by evaluating the surrounding landscape and cosmological directions". According to Xu (2003, p. 26), "Feng shui creates mountains and rivers, nurtures plants and animals, and is essential to human life". Favourable sites are selected through geometrical and astronomical analysis of the bio-physical landscape and climate. (Xu, 2003). Western cultures believed Feng shui to be folk lore (Yoon, 2011); however, recent Feng shui examples are found in architecture in New York and Washington D.C (Xu, 2003), and city developments throughout China, Japan and Korea.

Two schools of planning that utilise Feng shui are form school and compass school. Form school modifies landforms in relation to chi, and measures a site's spiritual energy or life-force. Xu (2003, p. 28) describes chi as the "vital energy flow or the breath of nature", and an abundance of chi signifies good health and prosperity. The influential factors determining chi are linked to site orientation, landscape, wind and water (Xu, 2003). An auspicious site has living chi from the land and is surrounded by smooth mountains, clean meandering rivers, rich uncontaminated soil, healthy vegetation and clean warm air. In comparison, dead chi is characterized by steep mountains, fast rivers without bends, poor or damp soil, insufficient vegetation and stale cold or moist air (Xu, 2003).

Compass school uses alternative methods of measurement, based on astronomical placement with a compass utilised for calculations (Xu, 2003). Xu (2003, p. 27) outlines the inter-related principles of Feng shui to be "chi, yin yang, and the five element and the eight trigram concepts". Compass orientations guide trigram concepts, and sites balancing chi at the centre of the yin yang pattern.

The yin yang concept balances the energy of yin (female) elements, and yang (male) elements. The five elements of water, metal, earth, fire and wood are all represented. Gender attribution is given, such as a mountain will be yin (female) and water is yang (male) (Xu, 2003). Each compass direction is allocated a colour, shape and animal (physically and symbolically), and these enable a site to become more auspicious (Tchi, 2015). In the southern hemisphere the feminine south is depicted by the colour blue and represents water. It is also favourable for career paths (Tchi, 2015).

5. APPLYING A FENG SHUI APPROACH TO THE CHRISTCHURCH EASTERN RESIDENTIAL RED ZONE

The plan shown in Figure 1 is a development proposal for the eastern residential red zone that has been designed according to the planning principles of Feng shui. These principles combine elements of both form school and compass school[1].

The plan illustrates six key zones for Christchurch's eastern red zone, including a large and a small residential

1 Although I believe that the correct compass and orientation methods for the southern hemisphere have been used, further analysis is required from a Feng shui expert with regards to orientation of settlements and architectural design details.

zone, a botanical gardens, a retirement zone, wetland restoration zone and a freshwater lake. These zones will be supplemented by a continuous forest tract surrounding the Avon River, central to slowing down chi, as well as wetland restoration to enhance water quality.

Connectivity is promoted with tram lines linking the city centre with the lake, and a cycle/pedestrian path interwoven within the forest with several river crossings. River crossing points featured in this plan will include options for wheelchairs, zip lines and flying foxes.

Large scale land modification will occur with the freshwater lake being trenched, and useful soil sifted from contaminated materials and used to form hills surrounding the main residential settlement. The hills act as a buffer zone for chi, making a site more auspicious, as well as safeguarding inhabitants from flooding and minimises effects of harsh southerly winds. A feasibility study is required to assess the impacts of these large scale modifications.

of character, and the height represents strength and protects the inhabitants below. There will be no large structures built to the north as this direction is not auspicious. This site will also include sub-zones for retail, recreation, education and spiritual and community purposes. More detail of these sub-zones are shown in Figure 2.

The smaller residential zone will be built once the larger one is completed and will reflect the development style found in this settlement.

5.2 Botanical Gardens

Celebrating biological diversity and novel urban ecosystems, this living museum of botany will be mindfully designed to showcase gardens within gardens. This site already has many established blossoming fruits trees and a cherry blossom section is recommended for spring celebrations, as well as use of fertile sites for

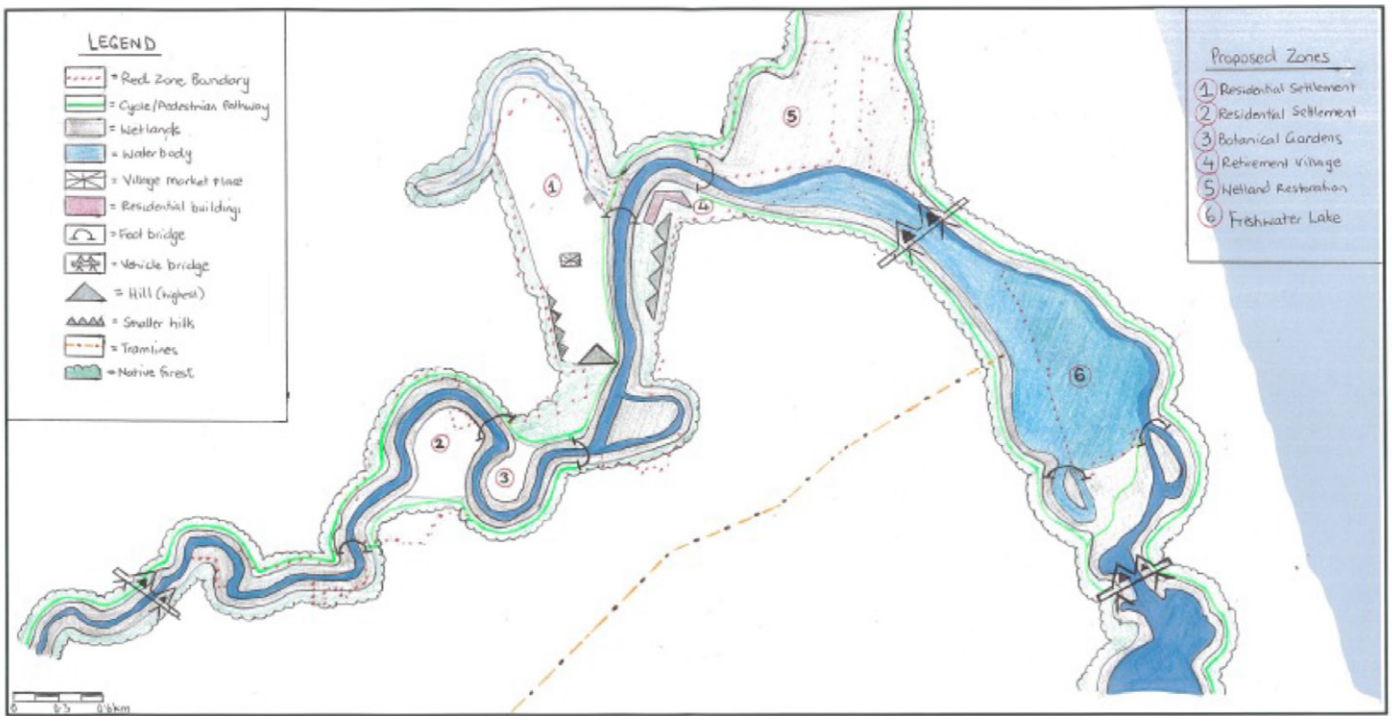

Figure 1: Development proposal for the Christchurch eastern residential red zone, designed according to the principles of Feng shui. Image created by Charlotte Thompson.

5.1 Large residential settlement

The Feng shui compass was superimposed onto a map of the red zone and a location was chosen for a large north-facing housing development, subject to natural landscape modification. The hills surrounding the settlement will be highest in the south, blocking the mother position, and also enclose the settlement on the east and west. For Feng shui the preferred mountainous terrain for settlements is smooth, promoting gentleness

growing heirloom vegetables. Botanical solutions for counteracting excess minerals and heavy metals within the soil may also be trialled in these gardens.

The gardens will include a living outdoor temple for reflection and contemplation, and could be built from bamboo and entwined with kawa kawa.

5.3 Retirement zone

Tall multi-story structures will be utilised in the eastern corner to provide health support through chi, and will be complimented by small foothills and native forest surrounding the village. A Zen style garden with pagodas and water features will complement the eastern health corner while providing alternative visiting space for families. The retirement home will be situated relatively close to Burwood Hospital, and should be situated close to a bridge for easy access. Amphibious building options should also be considered for legacy projects such as this.

5.4 Freshwater Lake

The freshwater lake is identified by air as a dragon shape, with the Avon River forming its tail. The lake's name is Te Taniwha Kahurangi, translated into blue dragon. Symbolically represented in Feng shui, a Taniwha will signify guardianship, and it is envisioned this Taniwha will protect the city inhabitants.

Soil and geological samples are to be taken at various shorelines surrounding the lake. Dredged materials will be assessed and soils deemed uncontaminated will form hills in more central locations. Uncontaminated soil is important to Feng shui, and soil remediation options

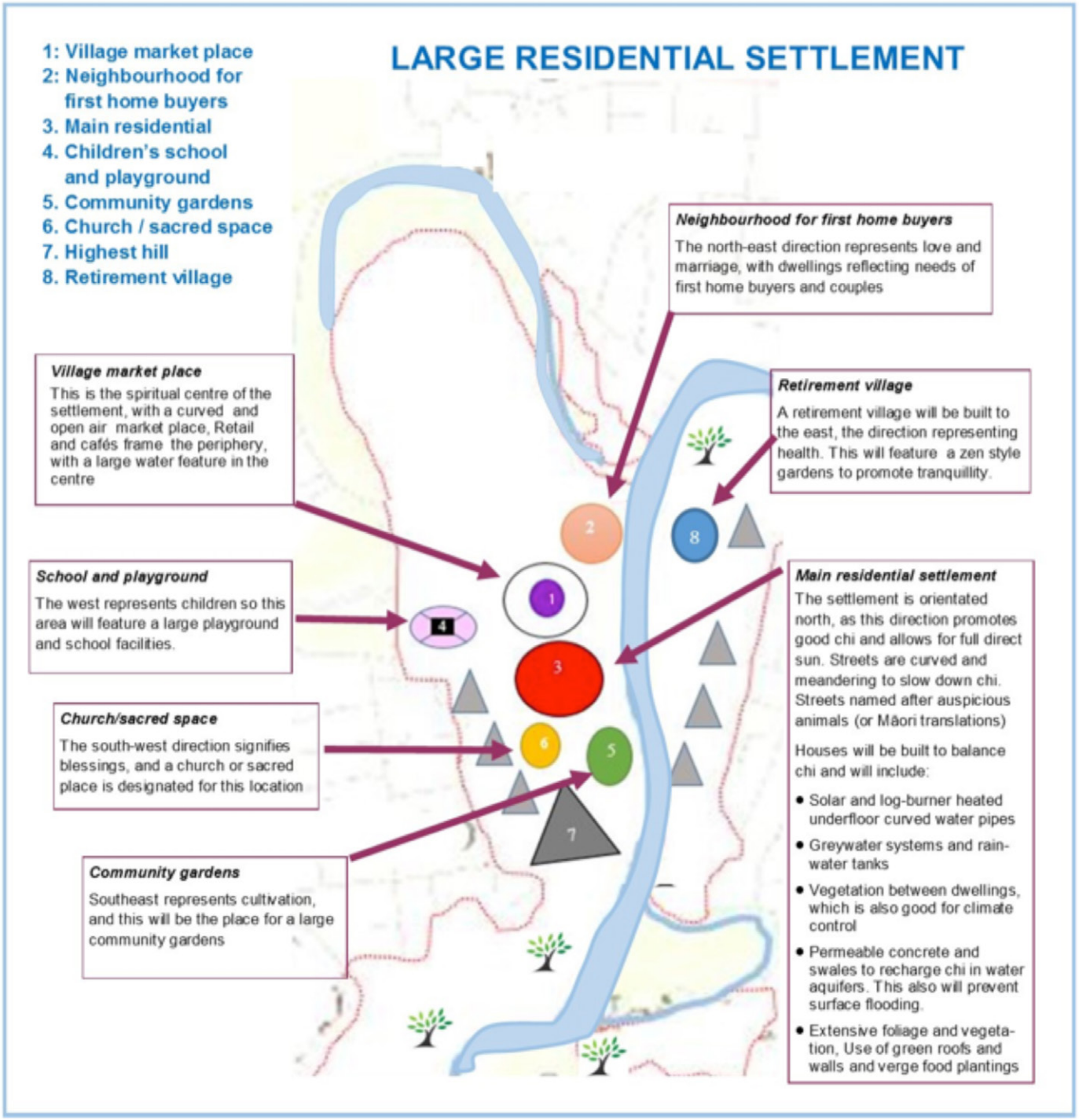

Figure 2: Detailed plan of the proposed large residential zone shown in Figure 1. Image created by Charlotte Thompson.

need extensive review, especially to recover soils such as those from the ex-refuse site in Bexley. If the scale of soil remediation is deemed unfeasible, possibly this soil can be contained and used for hill foundations, or added to earthquake waste used to reclaim land in Lyttelton Harbour.

The lake is a valuable resource for migratory birds. Birds such as Godwits have aviation patterns that include Christchurch's eastern shoreline, and will thrive in this clean freshwater environment. Wildlife celebrations and phenomenon festivals are held on the shore line such as bird watching festivals, fishing competitions, and lunar eclipse events.

The lake is an important recreational fishing ground, with Feng shui symbolised though fish as a food source. The fresh water lake replaces symbolism with food gathering reality.

6. CONCLUSION

Given that it is a non-traditional, non-Western school of thought, Feng shui has the potential to shift dominant planning practices and envisage novel planning solutions. This potential has been demonstrated here by using Feng shui to outline plans for the redevelopment of the Christchurch eastern red zone. The result is not only consistent with Feng shui principles, but also practical and in keeping with the character of the local community.

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Crime prevention through environmental design: Application to Christchurch City planning practices

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1. INTRODUCTION

With unprecedented growth in urbanisation, globalisation and global mitigation have arisen new challenges in maintaining public security and safety. A sustainable community should be widely considered safe, thus urban sustainability should essentially embrace additional measures for crimes and the fear of crime (Cozens, 2007). Consequently, to promote the public's well-being in today's cosmopolitan cities, it is imperative for governments to reach beyond their traditional "target hardening"[1] and policing approach by considering innovative, contemporary strategies to prevent crime and ensure public safety (Sundberg, 2013).

A large amount of academic research (Jacobs, 1961; Newman, 1972; Jeffery, 1971; Kelling & Coles, 1996) supports the assumption that crime can be reduced through informative urban planning and design**.** Crime Prevention Through Environmental Design (CPTED) originates from the theory of Jane Jacob's radical book *The death and life of great American cities* (1961), and the subsequent research of Oscar Newman (1972), C. Ray Jeffery (1971), and George Kelling and Catherine Coles (1996). These academics contested the orthodox urban renewal theories, and pushed towards a revolutionary movement, the current, sustainable New Urbanism movement.

Following the publications regarding defensible space and urban crime prevention, many cities expressed interest in what is currently known as the discipline of CPTED (Ziegler, 2007). On a local level, it is evident that the ideas stemming from these environmental planning theorists have influenced the development of a set of practical design suggestions for improving the safety of public areas and inhibiting crime in Christchurch. Throughout this essay I will analyse the Christchurch Safer Community Council's (CSCC) document written by Doeksen in 1996 titled *Reducing crime through environmental planning and design* (RCTEPD), and discuss how the relevant contemporary environmental crime prevention theorists and theories have influenced its content.

2. CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN: THEORISTS AND THEORIES

As mentioned above, the concept of defensible space was introduced in Jane Jacob's book *The death and life of great American Cities* (1961) and Oscar Newman's book *Defensible space* (1972). C. Ray Jeffery then developed the concept of CPTED further. CPTED associates effective crime control and improved quality of life with innovative physical urban planning and design, and has been adopted in many global urban contexts. CPTED theorists draw upon the notion of environmental determinism; the basic idea that the way individuals live their lives is directly connected to the designed environments that they live in (Eades, 2012).

Jacobs suggests that high-density urban streets and environments that were well maintained generally possessed low occurrences of crime and were observed as being highly desirable places to reside, work and visit (Sundberg, 2013). According to Jacobs (1961) and Newman (1972), bustling, energetic sidewalks deter most violent crimes, especially as the streets become supervised and defended by individuals whom enjoy watching the street activity (otherwise known as "eyes on the street"). For this reason, Jacobs (1961) advocated

1 "Target hardening" refers to measures taken to increase the security of a building, such as putting locks on doors and windows.

diverse land use and the abolition of zoning laws, as she believed neighbourhoods with multi-functional areas (residential, commercial, leisure) attract a constant stream of pedestrians of different ages during the day and night, guaranteeing natural and informal surveillance. This contrasts from Ebenezer Howard's (1982) theory that commercial, industrial and residential areas should remain separate within the Garden City. Despite this, the underlying theme of active, relatively compact, multifunctional areas encouraging ongoing surveillance are prevalent throughout the RCTEPD document. For example, Section 8.3 states that "mixed and compact... commercial, cultural, recreational and residential facilities must be strongly supported in order to have people in the streets and behind the windows looking out… at any time of the day or night" (Doeksen, 1996). In fact, a large component of the RCTEPD document features strategies to promote informal surveillance such as using low street fences, providing adequate pedestrian lighting, locating high-use elements within parks (such as toilets and playgrounds) where they can be observed from adjacent streets, concentrating areas of night life, and ensuring plantings do not obscure lighting.

Jacobs's strong support for dense, vibrant urban environments influenced her deriding the prevailing so-called "decentrists": planning advocates such as Ebenezer Howard (the pioneer of the Garden City) and Frank Lloyd Wright (founder of the Broadacre City) (Wendt, 2009; Callahan & Ikeda, 2003). These urban renewal theorists supported isolated and private neighbourhoods (Hall, 1982), believed that the street was a bad locus for human interactions, and suggested that dwellings should be turned away from the street toward sheltered green spaces (Christens & Speer, 2005).

Jacobs (1961) openly despises low-density urban environments and blames the failure of Detroit due to its "endless square miles of low-density failure" (p. 204). It is interesting that Doeksen (1996) supports Jacobs' idea for a compact city, to effectively attract a variety of people to the city, creating a safer public environment, and also to add economic efficiencies. Although Le Corbusier (advocator of the Radiant City) and Jacobs possessed one potential zone of agreement, the necessity for high-density urban environments (Hall, 1982), Jacobs (1961) created a scathing review of Le Corbusier's design theory. She drew a parallel between the deserted streets of the "decentrists" and the isolated interiors of the extreme centralised high-rise skyscrapers advocated by Le Corbusier. Supporting Jacob's theory, Newman (1972) also argues with reference to his research on New York high-rise apartments that crime is fostered in these buildings as they jeopardise social interactions in public spaces and the corridors are screened from the public vision (Wendt, 2009). Communities are left feeling like they have no control or personal responsibility for such a densely populated area.

It is noteworthy that Doeksen (1996) states that a safe neighbourhood is one in which people feel responsible for shared public space, and is therefore clearly influenced by both Jacobs' (1961) and Newman's (1972) ideas. This assumption is supported by the unsuccessful intensive Pruitt-Igoe housing development that was destroyed from a controlled explosion in 1972, despite its harmonious aspirations, as the isolated interiors of the blocks were "notorious for violence, vandalism and chaos" (Moore, 2012).

Jacobs (1961) developed the notion that crime thrives when individuals do not meaningfully network with their neighbours, as they would be uncertain to distinguish an outsider who may be a criminal. Newman (1972) adds to this, stating that attributes such as mutual ethnic backgrounds and religious values are commonly no longer shared among residents in neighbourhoods, leaving them feeling disconnected with their neighbourhood and more vulnerable to criminals. Doeksen (1996) was clearly influenced by these thoughts, as he notes that like other urban areas, Christchurch has experienced a "general decline in community spirit" and acknowledges that this can cause a number of problems. He then offers further guidelines on how to promote a safer neighbourhood, such as welcoming new neighbours, developing neighbourhood support groups and clearing mailboxes when neighbours are away to give the appearance of occupancy to reduce burglary occurrences (Doeksen, 1996).

Resonating with Jacobs' and Newman's works, Kelling and Coles (1996) introduced the broken window theory: the perception that relatively minor visible deterioration, neglect and abandonment in neighbourhoods cause violent crime, targeted vandalism and associated fear. It is relevant that property maintenance features as a strategy in the RCTEPD document. In conjunction with this, Doeksen (1996) also suggests encourging development of vacant community buildings and sections that could otherwise become areas that attract vanadilism and other criminal activity.

New Urbanism advocates a revitalised vision of

high-density, vibrant, mixed-use, pedestrian-orientated urban developments as an antidote to faceless suburban sprawl (Fishman, 1982; Cozens, 2008), making it evident that Jane Jacobs' ideas that evolved from *Death and life* underpin this important movement (Wendt, 2009). The New Urbanism design has been endorsed to decrease crime by encouraging social street interactions, walkability and increased surveillance opportunities, which in turn promotes a stronger sense of community (Cozens, 2008). As the RCTEPD document is heavily influenced by Jacob's theory, it becomes no surprise that it is a strong expression of the New Urbanism movement.

3. DISCUSSION

It is apparent that the RCTEPD document is grounded on the theories developed by Jacobs, Newman and Jeffery, particularly those relating to informal surveillance. Due to its reliance of these theorists' generalised ideas, the document is unspecific to Christchurch's location and features (e.g. Hagley Park and the Central Business District [CBD]), crime history, and income and ethnicity separation throughout the city. There is no reference to the crime hotspots of Christchurch, such as Aranui. This could be a weakness of the document as crime is associated with low-income areas, locking these areas into a downward spiral of low property values and limited private investment, hence greater poverty and deprivation (UNHSP, 2009; Goodchild, 2008). Also, according to Ziegler (2007), due to significant variances in the "culture of crime" between diverse cities, the one-size-fits-all methodology is destined to fail. The most effective place-based CPTED strategies are those which specific geographic, economic, social and cultural elements of the target community are taken into account, rather than intuition (Cozens, 2002; Ziegler, 2007). However, in Doeksen's defense, the document was only ever intended to be a simple, standardised set of guidelines offering suggestions for planners on how to design a safer physical environment. Planners can then effectively research the spatial patterns of crime in Christchurch, and apply their CPTED efforts and the council's funding to the areas most in need.

Another weakness of the CSCC document is that it was developed in 1996, 15 years before the devastating series of Christchurch earthquakes. Not only did the earthquakes have a significant impact on infrastructure, job stability, and neighbourhood cohesion, they also changed crime patterns. Although the earthquake initially led to an increase in burglary (NZPA, 2011) and family violence offences (Bellamy, 2014) in greater Christchurch, the total recorded crime fell significantly by 22.2 percent from 2010 to 2011 in the aftermath of the earthquakes (New Zealand Police, 2013). This is likely to be a result of many variables such as people migrating from greater Christchurch and the remaining communities becoming more connected (CERA, 2014). In addition, the CBD, historically a high crime location, was closed as a result of the earthquake, and additional police and military patrolled the area.

One might expect that the earthquakes would be able to test the validity of CPTED strategies. Perhaps the CPTED theory should now be questioned, as despite having fewer "eyes on the street" around the city, an increase in "broken windows", more vacant spaces, and high barriers excluding informal surveillance, crime has remarkably decreased. However, as the earthquake indicates, crime is extremely dynamic and complex, and is influenced by irrational behaviours (Saraiva & Pinho, 2011). Thus, the effectiveness of CPTED is very difficult to measure as it is part of a much larger picture of crime prevention in which many elements (such as social programmes, community cohesion, and employment levels) intertwine and influence each other. Furthermore, Du Plessis (1999) justifiably states that although CPTED in isolation is incapable of representing a solution to the multifaceted problem of crime, it can aid social and economic strategies. To be most effective, CPTED must be part of a comprehensive crime prevention strategy that integrates environmental, social, and community development initiatives.

4. CONCLUSION

CPTED is an important, convincing approach with proven benefits. Although it is challenging to measure its efficiency at reducing criminal activity, and the strategies are subject to criticism due to their generalised nature, many researchers have argued that the advantages are much greater. They are founded on logic, common sense, are inexpensive and enduring, and will ultimately decrease the costs of police surveillance. For this reason, the strategies have gained respect and feature in many city plans today. The rebuild of the Christchurch earthquake permits many opportunities to design a sustainable, innovative city that employs CPTED strategies. A city where residents feel safe, secure, and encompassed within their community.

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A tangled web: The complex relationships of governance and management in the Te Waihora catchment

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The management of a large catchment involves multiple parties and the degree of integration of that management is always open to debate. Creating a snapshot of those involved and their key relationships can help to build understanding and highlight opportunities for increased collaboration and integration.

Te Waihora/Lake Ellesmere, located just south of Christchurch, is New Zealand's fifth largest lake by area and incorporates some of our most important wetland systems. To Ngāi Tahu, as Kaitiaki, Te Waihora represents a major mahinga kai and an important source of mana. To the wider community, both within the lower catchment and further afield, the lake is an area of cultural, natural, historic, recreational and commercial importance. Internationally, Te Waihora is particularly significant for its birdlife abundance and diversity.

Te Waihora is one of New Zealand's most degraded lakes and it is widely acknowledged that the water quality of the lake and its tributaries has declined significantly over recent decades, with increasing loads of nutrients and sediment delivered from extensive agricultural development within the lake's catchment. The catchment drains 276,000 ha and stretches from the foothills of the Southern Alps to the Rakaia River, the Waimakariri River, Banks Peninsula and the plains in between. Much remains to be learned about the hydrology and ecology of this catchment and the lake itself is a highly dynamic environment, with the lake level being managed by periodic mechanical openings to the sea.

Many parties have an interest in the governance and management of the catchment and the lake. In 2013, as part of the preparations for the fourth Living Lake Symposium, the Waihora Ellesmere Trust with help from many others developed a diagrammatic representation of the key relationships within the catchment (see Figure 1).

Around the outside of this diagram are the various agencies, organisations and interest groups who play a role in this catchment. To the left and top left are the statutory agencies, both local and national, and manawhenua. Ngāi Tahu is the iwi and they have established a Management Board made up of representatives of Papatipu *Rūnanga* with an interest in the lake. Along the bottom and to the right are the non-statutory organisations and the main interest groups.

In the centre of the diagram is a range of agreements, plans, protocols and management groups, most of which are specific to Te Waihora. Exceptions include the Canterbury Water Management Strategy which is a regional strategy, with the Selwyn-Waihora Zone Committee charged with implementing the strategy in the Te Waihora catchment. The Quota Management System (QMS) is also included as the commercial fisheries of Te Waihora/Lake Ellesmere - tuna/eels, pātiki /flounder and aua /yellow eyed mullet - are managed as part of the national QMS. The lines indicate which organisations have a direct role in each agreement, plan, protocol or group. There are of course many other plans and policies that play an important part in a regional and national context. With the exception of the funding provided by the Ministry for the Environment for the Whakaora Te Waihora Restoration Programme, this diagram does not include funding arrangements. All the parties identified are important but in many cases involvement is ad hoc and related to specific projects rather than ongoing management activities.

As an exercise, the creation of this diagram proved useful. It provided a visual display of the complexities of the relationships and the management challenges and it also highlighted some clear gaps and a lack of connectivity between some areas of the community and those charged with the governance and management of the lake and catchment. For example, at the time of

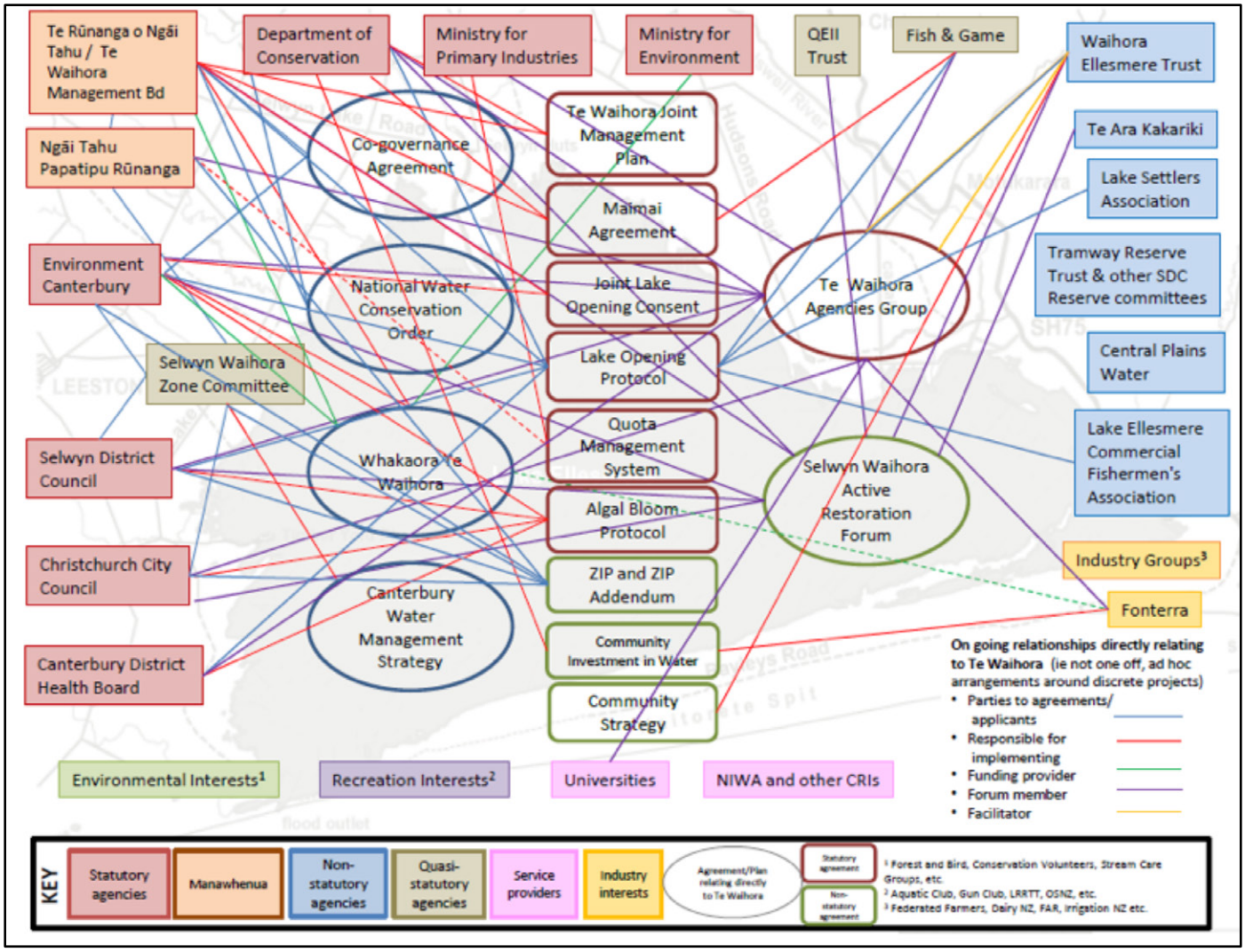

Figure 1. Key relationships in the Te Waihora/Lake Ellesmere catchment. Diagram developed by Laurien Heijs, Adrienne Lomax and Hamish Rennie of Waihora Ellesmere Trust, with help from David Perenara-O'Connell, Environment Canterbury. Updated July 2014.

Abbreviations:

SDC – Selwyn District Council

ZIP – Zone Implementation Programme

CRI – Crown Research Institute

LRRTT – Little River Rail Trail Trust

OSNZ – Ornithological Society of New Zealand

FAR – Foundation for Arable Research

the 2013 Living Lake Symposium, the local universities were not formally connected to any of the agreements or discussion groups related to the lake, although they worked closely with the statutory agencies and others on a variety of projects. In 2014 the group previously known as the Statutory Agencies Group, which provided an opportunity for those agencies to come together to share information and work together, was renamed Te Waihora Agencies Group and now includes the universities.

A postscript: In this dynamic environment, several significant changes have occurred since the time of writing in late 2014. This includes Selwyn District Council formally becoming a party to the Co-governance agreement, and the disestablishment by Ngāi Tahu of the Te Waihora Management Board.

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Resilience or artefact?
The Potters Lane water scheme: an example of local water supply

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Local water supply is a common occurrence in areas of rural New Zealand. Usually these are on a property by property basis, or locally built and run mini-schemes. Mini-scheme examples are declining however at least in peri-urban areas, due to expansion of larger territorial authority reticulated water schemes and increased public health standards for human water consumption. This short note describes the background, recent operating experience, and future prospects of the Potters Lane water supply scheme, in eastern Selwyn District. There may be some lessons for local water supply resilience from this example, or it may simply be an artefact of New Zealand's rural infrastructure history.

Local water supply schemes were a common occurrence in many parts of New Zealand, at least from the late 19th century. In 1958, householders bordering the mid- Halswell River, at the junction of Old Tai Tapu Road, Early Valley Road, and Potters Lane approached the Paparua County Council to establish a local water scheme. Their purpose was in order to replace water takes from the Halswell River, due to declining water quality and uncertain supply. With council support, a 30 metre bore into a gravel aquifer was drilled on land adjoining the Halswell River – possibly on marginal strip. Easements across subscribers' land were created to transport water to a small electric pump and then up to holding tanks (to provide pressure head) on the lower Port Hills, and then back via lines to all subscriber homes and water troughs. The water was used for domestic supply and some stock water.

The scheme currently has ten subscribers. Of these, four households are entirely reliant on the scheme. Others have alternative sources of supply either through the Christchurch City owned and operated Lansdowne scheme or bores on individual properties. Subscribers pay an annual fee, which predominantly funds electricity and six monthly checks and maintenance of the pump systems. Any upgrades or repairs are separately funded: either collectively, or by individual subscribers on the in-lines to their houses. The Selwyn District Council provides informal low key support by water quality testing on request (to date tests have shown excellent water quality from the bore).

The scheme received a severe test in the first Canterbury Earthquake (a 7.1 magnitude event) in September 2010. Apart from loss of power to the pump for two days, and damage to one supply line to a water trough, the scheme survived remarkably well, at least in terms of supply from the well and survival of the header tanks. The leak to the water trough, however, took five days to be discovered and closed off. Repairs to the system were made by volunteer labour and the services of Bay Pump Services, who maintain the pump system. Later Christchurch earthquake events, despite their severity elsewhere, appear to have had no effect. The scheme was able to supply friends and relations from Christchurch city with clean drinkable bottled/container water for more than three months after the February events.

The challenges for the scheme for the future are as follows:

- Although water quality from a relatively shallow bore has been excellent to date, there may be some uncertainty in the future as pressure on Canterbury's shallower aquifers intensify. This presumably will be an issue common to many other semi-shallow bores.

- Questions surrounding the maintenance and replacement of an aging scheme when more than half of the current subscribers have direct access to

an alternative high quality water supply.

- The gradual (and possibly increasing) pressure for closer subdivision along the toe slopes of the Port Hills/Banks Peninsula as Christchurch City expands west and southwards.

The scheme straddles the boundary of Selwyn District and Christchurch City. The third challenge listed above - subdivisional pressure - depends on planning rules for land uses on the Banks Peninsula toe slopes, and land adjoining the Halswell River. Land values in the area are high and reputedly sought-after for lifestyle reasons. River-adjoining land suffered extreme liquefaction, and there is also a flooding hazard from the Halswell River. Surrounding flat areas in Lansdowne Valley and north of Holmes Road are flood plains. Sub-division may, however, make the Potters Lane water scheme unsupportable without significant upgrade, possibly then giving rise to demands to connect to reticulated schemes such as the Lansdowne water supply, or something more extensive coming from Christchurch City in the future.

What might be learned, if anything, in planning terms from the experience of the Potters Lane water scheme? There is a considerable body of literature supporting, or advocating for, local resilience. The scheme is an example of local resilience and community self-support, alleviating pressure on territorial authorities, and demonstrating an ability to cope with disasters that disrupted some other local infrastructure severely (with any damage that did occur to the scheme being fixed with a minimum of fuss). However, experience in running the scheme suggests it relies on a socially cohesive set of subscribers, that it may rely on the relative higher socio-economic status of subscribers to be able to repair and keep the scheme running, and that it relies heavily on sunk investment of the past. Consequently, caution should be exercised in describing the scheme as an example of “local is good”. Rather, it might best be seen as a quaint artefact of historical New Zealand rural and peri-urban infrastructure.

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Quake city and the beauty of lost and rebuilt things

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1. OUR FAULT

L'Aquila, Italy, 2010, the ground shakes. Kathmandu, Nepal, 2015. A magnitude 7.9; the ground shakes again. Christchurch, 2011, another major earthquake for the South Island of New Zealand. The natural calamities are unpredictable, while predictable are the actions of men; some of them, at least. The earthquake in L'Aquila, given its magnitude, should not have had such catastrophic effects. The documentary "Our fault", by Giuseppe Caporale and Walter Nanni, explains such deficiencies in engineering well and the incredible political choices that have led to this human and natural disaster. The responsibilities of manufacturers and politicians are now obvious.

Although buildings in Christchurch are primarily single storey, due to natural causes the damage was considerable, but at least without much human fault. And that makes a big difference. Our choices of quality control for building materials or compliance with engineering standards make a difference. The construction companies in New Zealand do not manipulate prices in order to win government tenders because they are not characterised by corruption. The competition between businesses is genuine, albeit in the post-earthquake environment where it has grown exponentially due to the significant increase in the number of construction companies.

In "the land of the long white cloud", the art of living assumes a different meaning to the typical Italian way. The art of the Kiwi way is to adapt; to live together rather than living in conflict, to dominate, to destroy others in order to grab and achieve something, losing inevitably something precious, such as, in the case of earthquakes, human lives. So fatally similar in natural disasters, yet so different in recovery and rebuilding, New Zealand can be a model for Italian thinking.

2. FROM FILM TO REALITY DOCUMENTARY

Telling the story of an earthquake through celluloid and images is relatively simple because the emotions of those who lived through the earthquake are too difficult to fathom. Recently, the film "San Andreas", a name taken from the San Andreas Fault in California, reminded the citizens of Christchurch of what they experienced a few years ago. Although this is a Hollywood special effects movie like scores of such films made every year in this genre, it is nevertheless based on reality: it depicts earthquakes that are shaking the earth in modern times and the fear that results from this. It is based on the idea of the "Big One", the alleged earthquake of epic proportions which would completely split the San Andreas Fault, causing the separation of California from the American continent.

Here in Christchurch, the real changes caused by the earthquakes have been documented, depicting not only destruction, but also the rebuilding of this city. Take for example the website "Rebuild Christchurch": viewed more than 350,000 times per month, with 24 amazing interactive 360-degree aerial shots, it shows significant changes that have occurred in the city in four years. Most of the damaged buildings have been demolished and weeds have emerged from soil that was once underneath them. The city emerges from its post-earthquake rubble, not only in the city centre, but also in the Residential Red Zone, in the port of Lyttelton and in the spectacular mountains surrounding the city. There is also a permanent show in the RE:START mall, a symbolic name for the Quake City shopping centre, where the City Council has organized a photo exhibition of the earthquakes, the impacts they have had on the people who experienced them, and of the reconstruction of the city. Inside the show it is possible to see shattered pieces of the canopy from the Christchurch Cathedral; a tribute to volunteer groups including the Student Volunteer

Army; and an impromptu collection of photos shot in the days following the aftershocks.

3. BLANK CANVAS

The "blank canvas" that is now the city of Christchurch - one of the cities with the highest quality of life before the earthquake - is a symbol that represents it well. Observing the blanks in the city, as well as the numerous cranes working continuously, gives an idea of what was before and what will be after; what has been lost and what will be rebuilt. The beauty of what has been lost, however, is still present in the yards, in the murals, and in the abandoned and gradually rebuilding spaces. We move cautiously, watching and hoping that the identity of the city will not be washed away, the new cathedral, perhaps made of glass and steel, could withstand the force of nature.

The earthquakes appear to have had a greater effect on older generations, due to their childhood places being ruined and their memories shattered. Young people have found the unexpected courage brought about by new opportunities; the challenge, learning to recognise possibilities for growth and fun. While for some there is still an endless wait for insurance claims or grants to fix buildings in accordance with new building standards, looking at the pictures in the RE:START mall exhibition and active proposals signed by citizens on how they could manage the changes in the city serves to show the positive side of change. In fact, the citizens know that they are the intangible social capital that the city desperately needs.

Being in the midst of reconstruction requires active participation, and for the citizens it means to take part in the management of the commons, or common goods. For example, blank spaces reused by the community, or a public wood oven for sharing the cooking, or rebuilding and reopening a damaged theatre. The purpose is to recreate those spaces that result in social interactions, and made available by the City Council to help the city to be resilient and react quickly to events.

There is a strange beauty in this city. You can feel in the air the strength it takes to rebuild something that you know is not completely lost, but still has to struggle to rebuild; the story of a "Quake City" and its inhabitants.

Update from the Lincoln Envirotown Trust

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Chair of Lincoln Envirotown Trust 2005 - 2015

Lincoln is a small but rapidly growing town in the Selwyn District, 22 kilometres southwest of Christchurch. According to the 2006 census the population was 2,727. It had risen to 3,924 by the 2013 census, is estimated to be approximately 6000 in 2015, and projected to be 9442 by 2025[1].

The Lincoln Envirotown Trust (LET) started in June 2005, and became a Charitable Trust in 2006[2]. As well as being involved in many other community actions to promote environmental sustainability, we have made submissions to the Selwyn District Council (SDC) on township plans. This is because the biggest issue identified from our initial consultation with the community in 2006 was the rapid development of housing and its effect on the environment. SDC responded to the concerns by drafting the *Lincoln Structure Plan* (May 2008)[3] for Lincoln after extensive consultation with the Lincoln community and LET during 2006. However, other plans have superseded or added to this. This issue has escalated since then due to the rapid increase in development since the recent Canterbury earthquakes.

Figure 1: The LET Deputy Chair Ralph Scott consulting with Ngāi Tahu Property on site at Te Whāriki. Photograph by Sue Jarvis.

The 2015 *Draft Lincoln Town Centre Plan*[4] has suggested extending the town "centre" to include two "precincts". This is the original town centre (Gerald Street between West Belt and the Liffey Stream) plus an area centred on the New World supermarket, identified at Precinct 1: Core Retail Precinct. The land adjoining and running between the two areas of Precinct 1 on Gerald Street is Transitional Living Precinct, Precinct 5. The SDC Urban Designer has consulted with LET.

LET has worked with developers such as Ngāi Tahu Property Ltd, who are developing a large area for housing in Lincoln on what was originally the Lincoln University Dairy Farm. The development area, now named Te Whāriki, is a joint venture between Ngāi Tahu Property Limited and Lincoln University. We met them on site before the development was started and they came to a number of our meetings to discuss progress. As it is a very wet area with many natural springs, water was a big issue and we made a submission to Environment Canterbury on the topic. We also encouraged Ngāi Tahu Property Ltd to use ecosourced native plants. Water is now a positive feature together with the large number of ecosourced native plantings.

1 See www.selwyn.govt.nz/__data/assets/pdf_file/0009/157455/SDC-Growth-Projections-2015.pdf

2 Details of the first few years of the LET can be found at http://journals.lincoln.ac.nz/index.php/LPR/issue/view/49

3 See https://www.selwyn.govt.nz/__data/assets/pdf_file/0011/10217/Final-Lincoln-Structure-Plan-May-08.pdf

4 See https://www.selwyn.govt.nz/services/planning/lincoln-town-centre

Figure 2: Installation of the Lincoln Envirotown sign at the entrance to Lincoln. The sign was made by Woodpecker Signs. Photograph by Peter Jarvis.

LET has also worked together with Food Stuffs South Island Ltd when we heard they were planning to build a New World supermarket in Lincoln. They brought their plans to a LET meeting and we responded with a "wish list" for an environmentally sustainable design. We were delighted with the result. Some of the supermarket's sustainable features include generating power using wind turbines and using excess energy to heat its water.

Since 2005 we have shared what we have learnt and have assisted eight other communities to become "Envirotowns". They are all in the Selwyn District apart from one in Oxford, Canterbury. Some communities have been more successful in keeping the initiative going than others.

Our plans for the future include continuing to reassess our action plan, and taking into account the rapid development of Lincoln and other nearby townships. We will always be promoting environmental sustainability.

The experiences of the LET indicate that good outcomes for a community come from planners and developers working with the community.

LET could not have accomplished so much without the extensive support from Lincoln University over the last ten years, as well as support from the SDC, the Canterbury Community Trust and many Lincoln organisations, businesses and individuals.

For more information about our activities please go to www.lincolnenvirotown.org.nz

Update from the New Zealand Association of Resource Management

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Managing New Zealand's resources is a challenging task and an added complication is the fact that knowledge and experience in this area grows by the day. The New Zealand Association of Resource Management (NZARM), as a community of resource managers, is at the forefront of this rapidly expanding sector, with its aim of promoting the philosophy, science and practice of resource (particularly land and water) management in New Zealand.

The association has a long history. It first came into existence in 1953 when, as the New Zealand Soil Conservators Association, it provided a forum for soil conservators and associated fields. The Resource Management Act, which became law in 1991, emphasised sustainable management and so encouraged the association's change from soil conservation to the broader field of resource management.

Currently, the association has a membership of 240 people who are employed in a wide range of jobs: regional councils, research institutes, the fertiliser industry, planning and resource consultancies, and primary industry bodies to name a few. In fact, anyone with an interest in the field of resource management can join.

Each year the Association runs a well-attended conference on a topical issue. In 2015 the conference was held in Hamilton, and was about people and organisations 'coming together' to resolve problems with water. Issues of co-management, collaborative governance, sustainable growth, and policy challenges for farming were covered by a one day seminar. This was followed by a field trip to look at projects that are underway to restore the Waipa River. In 2016, in the Hawkes Bay, attention will turn to the increasingly complex and uncertain world that resource managers face, and look at what a resilience approach could offer. Two well-regarded researchers in this field will be keynote speakers, both from the Australian Resilience Centre.

Besides the obvious networking advantages, a quarterly newsletter and branch events, the association offers members the opportunity to be part of a recognised professional group with its own Resource Management Certificate. This certificate provides evidence of an ongoing commitment to professional development, enabling members to receive career guidance and advice from some of New Zealand's most competent resource management practitioners.

If you would like to know more about the association, or to join, please visit the NZARM web page: www.nzarm.org.nz.

International Congress on Adaptive Urbanism

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On the 23rd and 24th of October 2014, Christchurch hosted the International Congress on Adaptive Urbanism: Thinking Big, Acting Small, organised by Gap Filler with support from Lincoln University (and Dr Vallance's Marsden Fast Start project), Christchurch City Council (CCC), the US Embassy, Goethe-Institut, Warren Trust, and the Festival of Transitional Architecture (FESTA). The Congress was attended by nearly 70 people from around the world, with guests from Australia, USA, South Africa, Germany, Venezuela, France, Poland and Denmark. Participants were planners, architects, developers, community activists, government officials, artists and more. All were interested in the diversity of adaptive urbanism projects undertaken in Christchurch since the earthquakes, from street art to the Re:Start Mall.

Adaptive urbanism is a term referring to a range of practices also associated with DIY and/or insurgent urbanism, often undertaken by residents, artists, community groups, and others who are actively involved in conceiving, designing, implementing, activating and maintaining flexible urban places. This empowered mode of urbanism differs from conventional public and private city-building (where most residents are passive consumers of 'permanent' developments created *for* them) because participants are active producers of evolving public space.

Some of the themes addressed at the congress were:

- Bohemians, outlaws and anarchists or tools of the state;
- (Why) did it take an earthquake;
- A taxonomy of adaptive urbanism;
- Scaling up or scaling out.

A copy of the congress report is available here: http://www.lincoln.ac.nz/Documents/LEaP/adaptive%20urbanism%20report%202014.pdf

Photograph by Suzanne Vallance.

Lincoln University First Annual Cycling Forum

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On 8th September 2015, the Lincoln University Department of Tourism, Sport and Society (DTSS) proudly presented the First Annual Cycling Forum in the Stewart Building. The aim of the forum was to convene cycling researchers, cycling advocates, policy-makers, builders, designers, planners and cyclists for discussion on the current state and future outlook of cycling in the Canterbury region. The forum was timely given the discussions in the media and elsewhere concerning the challenges of road-sharing between motorists and cyclists, the recent cycleway developments, and the build-up to the 2016 Olympic Games where New Zealand cyclists are expected to excel. It provided an opportunity for those involved in cycling research in its various form to present and share their work.

A range of participants from several cycling groups including coaches, sports scientists, cycling advocacy group members, Selwyn District Council members and researchers from the University of Canterbury were in attendance. As part of an unusually broad programme, five experts presented on an array of cycling topics. The keynote speaker, Dr Damion Sturm, revealed the

Figure 1: Speakers at the Lincoln University First Annual Cycling Forum (Left-Right): Michael Hamlin, Catherine Elliot, Jude Wilson, Damion Sturm and Hamish Ferguson. Photograph by David Hollander.

challenges faced by The Home of Cycling Velodrome regarding community engagement in Cambridge. Professional Cycling Coach, Hamish Ferguson, explained how training stress and maximum power is measured in road cyclists. Associate Professor Mike Hamlin of Lincoln University's DTSS presented his research on the effects of altitude training on cycling. Dr Jude Wilson, also from DTSS, spoke about the methodological challenge of surveying cyclists on the Alps to Ocean trail. Finally, Dr Catherine Elliot of DTSS described how cycling can be part of a multi-modal transportation system, improving health and well-being.

Drinks and nibbles followed the presentations where attendees could network and continue discussing the future of cycling in Canterbury and New Zealand. The forum was deemed a success because it gathered a broad array of presenters and attendees together with cycling as the common thread. A Second Annual Cycling Forum will be hosted at Lincoln University in Semester 2 of 2016 as cycling continues to grow and prosper in the Canterbury region.

Lincoln University recently turned cycling research into action by initiating a bike share system. There are three bikes available for hire in front of the Lincoln University Library.

For more information on future cycling research and community involvement, please contact Dr. Catherine Elliot, Catherine.Elliot@lincoln.ac.nz.

The Environment and Conservation Organisations of Aotearoa New Zealand national conference

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The Environment and Conservation Organisations of Aotearoa New Zealand (ECO) national conference was held between the 28th and 30th of August in Christchurch. The conference began at the University of Canterbury Law School with a mihi from the Tuahiwi rūnanga in North Canterbury. The greeting preceded a discussion of Māori approaches to freshwater management led by Sir Eddie Durie and Associate Professor Jacinta Ruru. Durie, a former Justice of the High Court of New Zealand and current co-chair of the Māori council, proposed water policy reform which would set a price on the commercial use of freshwater. Durie proposed that domestic use remain free-of-charge; however, a proportion of the income generated from the tax on commercial use would go exclusively to Māori. Durie argued that the revenue generated from commercial use should pay for environmental protection. Ruru discussed Māori proprietary interests in New Zealand's freshwater.

The conference moved to St Mary's Church in Addington the following day. In the first session, Dr Mike Joy and Professor Bryan Jenkins discussed environmental trends in New Zealand's freshwater as well as the institutional arrangements for managing freshwater in Canterbury. Speakers in the second session discussed the social, economic, and health implications of the environmental trends outlined by Dr Joy. Dr Alison Dewes noted a transition in New Zealand towards farming within limits, however, she argued this approach was threatened by the government's agricultural export agenda. Professor David Hamilton argued that standards for freshwater quality in New Zealand's rivers are currently much weaker than standards for lakes. Professor Hamilton also critiqued New Zealand's approach to managing nutrient pollution through measuring off-farm pollutants rather than restricting the use of inputs such as fertiliser. Dr Alastair Humphrey's presented on the health risks of freshwater pollution, and argued that cyanobacteria, nitrates, and microbiological contaminants were the three primary threats to human health from freshwater.

In the first afternoon session, Linda Te Aho, Dr Ronlyn Duncan, Maria Bartlett and Scott Pearson discussed collaborative governance. Linda Te Aho described the Waikato River Waitangi settlement process, and relatedly, Maria Bartlett argued that collaborative planning exercise ought to treat Māori as a treaty partner rather than as an affected stakeholder. Dr Ronlyn Duncan discussed how collaborative governance of freshwater in Canterbury has shifted the responsibility for setting environmental limits from scientists to the public. The discourse of nutrient limits helped justify irrigation expansion, however the limits are publicly negotiated limits rather than environmental limits. Scott Pearson then presented a critique of the collaborative process in Canterbury. David Caygill, a Canterbury Regional Council commissioner who was in the audience, was asked to respond to Pearson's presentation. Caygill noted that the collaborative Canterbury Water Management Strategy targets are in tension with each other, and these tensions cannot be easily resolved. Despite criticism, Caygill reaffirmed the Regional Council's commitment to limiting nutrient pollution.

In the second afternoon session, Al Fleming discussed the healthy rivers project with a focus on the Waikato River. Chris Livesey and Chris Todd then presented on the Land and Water Forum. In the third afternoon session, Catherine Iorns and Bestan Martin discussed how legal reform could help establish greater public trust in environmental management.

The conference continued on Sunday with sessions on how to engage with the statutory process. These were run by Richard Ball, Steve Abel, Jen Miller, and

Sophie Allen. The conference concluded with the ECO annual general meeting.

Overall, the conference presented a timely discussion of freshwater issues in New Zealand. Despite recent reforms in Canterbury, environmental advocates feel apprehensive about the expansion of irrigation in the region. One solution, which would also redress Māori proprietary desires over freshwater, was presented by Sir Eddie Durie. Perhaps this, and other presentations at the conference, highlight an emerging desire amongst environmentalists to reform New Zealand's freshwater legislation.

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The Australia and New Zealand Association of Planning Schools Conference

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1. INTRODUCTION

The Australia and New Zealand Association of Planning Schools (ANZAPS) is a scholarly society formed by the various urban planning schools of both Australian and New Zealand universities. The association was established in 1994. In October 2015 the Royal Melbourne Institute of Technology (RMIT) hosted the ANZAPS conference. The theme of the conference was "translating urban planning research and pedagogy into practice". The aim was to understand how academia can influence politicians, the profession, and graduate students through the planning programmes taught at Australian and New Zealand universities. There were 45 delegates; 38 from Australia and seven from New Zealand (including three delegates from Lincoln University).

In total, 32 papers were presented at ANZAPS 2015 over the course of three days (23rd to 25th of October) and ten plenary sessions. The conference raised a number of questions relating to planning education. It focused primarily on the skills required to be an effective planner and within that remit examined the role of the "pracademic" (a planning professional who draws on both the practical and academic spheres of planning), the challenges facing early career planning practitioners, the possible role of activism in planning both as a scholar and a practitioner, the role of planning practitioners as narrators, and also offered advice on how to revitalise the planning profession through the use of emotion. These topics are discussed in turn.

2. THE "PRACADEMIC" HYBRID

The "pracademic" is someone who is both an academic and active practitioner in their subject area[1]. It is a form of life wide learning; the parallel learning that happens in life, outside of the workplace.

Part of this is being aware of current planning research when working in practice. Hurley (2015) asked whether planning practitioners engage with applied planning research. A joint paper between Hurley and Taylor (2015) entitled *Not a lot of people read the stuff*, makes it clear that they do not. Hurley concluded that planners can find planning research intimidating, and both difficult to decipher and access. The authors found that planning practitioners face severe time constraints and tend to rely on google scholar for a flavour of what academic research has to offer but do not tend to delve deeper[2].

3. EFFECTIVE EARLY CAREER PLANNERS

There was much discussion about early career planners (a planning practitioner with one to five years of experience). The importance of their contribution was noted; their energy, skills, and potential source of new knowledge in the workplace. However, Grant-Smith noted that a large percentage of pre-graduation professional work experience in Australia is unpaid. While there is value in pre-graduation work experience, Grant-Smith recommended that early career planners should not be taken advantage of, and should therefore have advocates within university institutions to argue for fair pay scales similar to those of the engineering professions[3].

Reeves' (2015) new publication *Management skills for effective planners* also noted the differences between early career planners and managers views on desirable

1 Reeves, D., Professional skills for planners, Session 4

2 Hurley, J., Reading the stuff – the use of academic research by practitioners, Session 1

3 Grant-Smith, D., The costs and value of unpaid pre-graduation professional work experience for early career planners, Session 6

skill sets. In particular the discrepancy between the importance of interpersonal skills (listening and ability to empathise). Early career planners rated interpersonal skills higher than managers. Also discussed was the fact that early career planners should have the confidence to say when they do not know something.

4. THE ROLE OF ACTIVIST SCHOLAR AND PLANNER

A theme that ran through the conference was that planning scholars and practitioners should see themselves as agents for change, and should look to become involved in non-traditional forms of planning. A number of informal planning mechanisms were discussed including community garden and art installations in Christchurch (Vallance, 2015)[4].

In addition, a number of commentators spoke about the use of media such as radio, newspaper, television and social media to communicate planning research in Australia[5]. Taylor and Nichols spoke about their experience of creating a radio show called "The Urbanists" that was broadcast on a Melbourne community radio station over 30 weekly shows[6].

5. A CRITICAL ANALYSIS OF PLANNERS AS NARRATORS

An Auckland specific session looked at Auckland's strategic planning issues. In particular Auckland Council's planning vision of becoming the world's most liveable city and the Tamaki Strategic Framework. These were both thought to be planning narratives based on an over optimistic evidence base[7].

Fergusson focused on the Foucauldian concept of responsibility and how five fictional narratives included in the Council's Tamaki Strategic Framework demonstrate how people of Tamaki (a traditionally socio-economically deprived area of Auckland) should take responsibility for their own lives. It was concluded that this was a means for local government to foreclose discussion about how they can improve the area and tackle inequalities.

Similarly, Auckland's planning vision to become the world's most liveable city was viewed as a "fuzzy" political narrative, premised on an over optimistic evidence base which lacks a sufficient implementation strategy. This is particularly evident in the case of meeting future housing projections for the region[8].

It was concluded that planning practitioners should learn from failed strategic plans and poor outcomes.

6. PUTTING THE EMOTION BACK INTO PLANNING

A thought-provoking session focused on what we do as planning academics and practitioners when challenged by our reality as landowners. How we can be relatively objective when looking at planning issues that indirectly affect our lives, but become emotional when a planning decision has a direct impact on our own property.

The example of New Zealand case law was offered: how a planning specialist cannot provide expert witness evidence on their own behalf because a witness is required to be value free (Rennie, 2015). The following question was asked - Is the price of being a professional losing our passion? There was a call for planning practitioners to be emotional. The rationale being that if you are not emotional, you do not understand the issue[9].

4 Vallance, S., From activist scholar to activist planner (and back again), Session 1

5 Buxton, M., Whitzman, C., Millar, R., Taylor, E. and Nichols, D., Communicating planning research to the public, Session 2

6 Taylor, E. and Nichols, D., Planning on the radio, Session 2

7 Fergusson, E., Narratives of responsibility: unpacking the Tamaki Strategic Framework, Session 8 and Murdoch, N., A critical analysis of the world's most liveable city. Auckland: a case study, Session 8

8 Mohammadzadeh, M., Small scale development in Auckland, Session 8

9 Rennie, H., 'Being in the Plan'. Quandaries of ethical professionalism versus land ownership, Session 9

The 21st International Symposium on Society and Resource Management

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In June 2015, the International Association for Society and Natural Resources (IASNR) held its annual conference, the 21st International Symposium on Society and Resource Management. The conference was held at the College of Charleston in Charleston, South Carolina, the United States of America. The IASNR was formally established in 2001 having already convened many symposia focused on society and natural resources and the establishment of the journal *Society & Natural Resources* (S&NR) which is now in its 23rd year.

The 2015 conference theme was 'Understanding and Adapting to Change'. Most contributions were from across the United States with a number of contributions from Australia and yours truly representing New Zealand. How decisions have been and should be made, how we address resource conflict, shifts in governance, the role of knowledge in decision-making, and adapting to change were important themes that were addressed in many different ways across a range of issues. These issues included natural hazards, wildlife protection, fisheries, forestry, water, energy, air quality and agriculture. Climate change, resilience, and adaptive capacity were issues of concern under discussion.

The most memorable part of the conference for me was a plenary presentation from Queen Quet, Chieftess of the Gullah/Geechee Nation and Director of the Gullah/Geechee Sustainability Think Tank. On a wide stage in an ornate historic theatre in downtown Charleston she talked about her people and her fight for their autonomy, in law, to manage their land and resources. As she told her fascinating story of twists and turns, she put on and took off various pieces of clothing (from traditional shawls to stiletto shoes) from a long table at the front of the stage to illustrate how she had to change and adapt to the political environment that she encountered and navigate her way with her people. It was mesmerising and powerful. Importantly, not a PowerPoint in sight!

I attended as a discussant in a panel session titled 'Water Governance: Boundaries, Collaboration and Conflict'. This session was convened by the editors of S&NR, David A. Sonnenfeld from the Department of Environmental Studies, State University of New York and Peter Leigh Taylor from the Department of Sociology, Colorado State University. Earlier in the year they had called for papers for a special issue on 'Water Crises and Institutions: Governance Challenges in an Era of Uncertainty'. My paper titled 'Reordering water governance in New Zealand: an examination of a hybrid framework of collaboration and statutory force to manage diffuse agricultural pollution in the region of Canterbury' was a finalist candidate for the special issue. Of 120 proposals received from around the world, 16 were selected for consideration. Eight of us travelled to Charleston to present our draft papers. S&NR editors, Peter and David, established the panel session to bring everyone that could attend together to create a special issue that gave authors an opportunity to link with others to strengthen their papers and create a special issue that had cohesion as well as conceptual diversity. In other words, this was an experiment which I found incredibly useful. In the panel session, as well as presenting our papers, we spent the afternoon addressing questions. These related to how governance was addressed in our research, what was the role of the state in water governance and how it had changed, how governance had been shaped by scale, and where was governance heading? My paper is currently moving through the peer review process. Fingers crossed!

Book Review - Planning in ten words or less: A Lacanian entanglement with spatial planning

Michael Gunder and Jean Hillier

Farnham, Surrey, UK and Burlington, VT, Ashgate Publishing, 2009, 243pp ISBN 978 0 7456 7457 3

Many contemporary planning texts are an assemblage of writings by non-planners. However, this book is solely written by two highly regarded planning theorists. Auckland University's Michael Gunder has a reputation for bringing forth the psychoanalysis of French philosopher Jacques Lacan who allows new insights into how ideology shapes reality, in this case, the analysis of spatial planning. His co-author, Jean Hillier, has a strong interest in exploring the frontiers of planning theories which are praxis-based.

The chapter contents are drawn largely from the authors' previously published works. In this comprehensive text, the reader will experience a cross-disciplinary analysis of the finer nuances of commonly used planning words, or 'signifiers', closely associated with contemporary urban spatial planning. As can be gathered from the book's subtitle, the authors interweave the insights of Lacan (and indeed, many other theorists familiar within planning circles) with each signifier, their analysis at times drawing upon Lacan's famous *Four Discourses* as well as the Lacanian concept of 'master signifiers'. Lacan's discourses (broadly: governing/educating/desiring/analysing) represent a linguistic basis which support and produce social effects that create resonance within practical planning.

Chapter 1 begins with the word 'planning' itself. In turn, the authors examine nine additional buzzwords or 'contestable' words: *certainty*, *good*, *risk*, *Smart Growth*, *globalisation*, *multiculturalism*, *sustainability*, *responsibility* and *rationality*. Browse just about any modern planning document and it won't take long to find one or two of these contestable words, which the authors label 'empty signifiers'

Each chapter outlays a theoretical and philosophical foundation for its chosen signifier, often in tandem with metaphorical societal (Lacanian) constructions which then leads into the signifier's relationship to spatial planning. Another characteristic of the book is the frequent use of whimsical headings. Take for example *The Concept of Lack: Thanks Mum!* in Chapter 2. This uses the analogy of the suckling infant who seeks the 'illusion' of constant maternal nurturing, only to be in competition with a sibling or mother's other demands. The theoretical aspects are not always an easy read, but bear with them as towards the end of each chapter the authors cleverly evolve their narrative, entangling the philosophical aspects into more practical aspects of spatial planning and related terminology.

Contestable words see-saw in and out of favour in planning praxis, in large part dependent on the political context, the ideologies, and the 'academic' background of leaders and decision-makers of the day. The words are contestable in the sense that they have concise meanings in their own right. But they can also mean everything - or nothing - depending on the audience. Take *sustainability*, perhaps the most utilised - and abused - 'empty signifier' in the literature, practice, politics and business; a word that can mean 'all things to all people'. For example, future roads, part of a 'smart' network, may be built of reused 'sustainable' materials to support increased volumes of 'sustainable' transport (electric vehicles replacing fossil-fuelled vehicles), which may lead to …'cleaner congestion'!? Is that a desirable, or derisible, outcome?

The authors return often to the notion of *jouissance* (desire, a word central to Lacanian theory), the signifiers being utilised by technocrats and the ruling elite to support the imperative for society to enjoy, consume, accumulate and create wealth, to create the sense or impression of happiness, of desires being fulfilled while simultaneously achieving the stakeholders' specific outcomes.

The authors are not *per se* against spatial planning. They suggest that practitioners tend to predetermine the issues based on their spatial planning signifiers of choice. They contend spatial planning needs a 'reality check', that planning practice is about challenging the appropriateness of pre-determined and often universally defined goals; desirous but unreachable goals that conveniently mesh with the prevailing growth and consumption paradigm.

They suggest the challenge for the modern spatial planning is allowing signifiers to tie too closely with the economic agenda, allowing solutions to define problems, with innovation being lost in the process. Interestingly, the authors define spatial planning precisely, according to British town planning terminology, to be the 'co-ordination, making and mediation of space' (p. 4).

If you are a familiar with topics such as social constructionism, then this book has much to offer scholarly scrutiny. There are also frequent references to Slavoj Žižek's and related 'post-structuralist' perspectives. And while these are important to the authors to build the context for each chapter, the text can at times be a little daunting for the uninitiated reader. However, most chapters contain a wealth of material that can also be delved into by a planning practitioner.

Spatial planning as an approach to town planning has become popular internationally over the last decade. New Zealand cites such as Auckland, Christchurch and Dunedin have in one form or another employed a spatial template to articulate political and community aspirations. In practice, it is perhaps too early in this country to say whether or not spatial planning is delivering the outcomes its sets out to achieve. Urban planners trust that their 'solutions' will not perversely open the door to even more wicked problems.

This book is a useful addition to the planning literature. It is also a must-read for post-graduate planning students. If one is able to 'disentangle' Lacan and process the 'plain English', there is more than enough food-for-thought content for practitioners to mine and explore further.

Reviewed by Mike O'Connell, Senior Policy Analyst, Christchurch City Council.

Where are they now?

Brittany BRADLEY-CANE

SHELLEY WASHINGTON

Shelley undertook a Bachelor of Resource Studies (1996-1998), followed by a Master of Resource Studies (1999-2001). Her Master's thesis was a social and cultural exploration of community groups that undertake native restoration projects.

Shelley started working at the New Zealand Landcare Trust as a Regional Co-ordinator while she was in the final stages of her thesis. The Trust is an organisation that supports farming and community groups to improve sustainable land management. In this work she covered Canterbury and the West Coast. Shelley worked there for six and a half years; since then she has worked at Environment Canterbury in a team that works with community groups and landowners. She currently works in the Christchurch-West Melton Zone, assisting the Zone Committee with its projects and priorities as well as supporting some key community groups in this Zone.

Shelley currently works part-time. She has young twins – a girl and boy – and a teenage step-daughter. Her husband also works at Environment Canterbury and they live in St Martins. In her spare time she likes to spend time with her family, go tramping, and she has recently resumed the sport of rowing.

MICHELLE RUSKE

Michelle studied a Bachelor of Environmental Management and Planning with a minor in professional planning (2010-2012), followed by a Master of Environmental Policy (2013-2014).

Since leaving Lincoln University she has been employed as a graduate planner at Aurecon NZ Ltd in the Christchurch office. In this role she has been exposed to a broad array of resource management processes, with work including audits for telecommunication network upgrades, resource consent applications for regional and district councils on a range of developments, processing consent applications for Christchurch City Council, and policy analysis and research. The wide variety of work that she has been involved in means that life is never boring, and she is consistently being challenged at work. This is great as it ensures she is continuously learning new skills and processes, and is building her confidence as a planner and young professional.

Michelle is a member of the New Zealand Planning Institute Young Planners Branch Committee. Since leaving Lincoln she has enjoyed getting used to the two day weekend, and has taken up some new hobbies, including dancing.

Michelle's advice for current planning students is to make sure they attend relevant events, participate in young professional groups, and build up a network of peers. Not only can this assist in providing great relationships with people going through similar experiences, but professionally these people can become crucial in your role.

GEORGE ENERSEN

George studied a Bachelor of Environmental Management and Planning (2009 – 2011), after which he studied a Master of Environmental Policy (2012 – 2013) which he was awarded with Distinction.

After graduating from Lincoln, George had a number of short-term jobs before beginning work at Opus International Consultants in May 2014 in the Christchurch Environmental Team. He is a Resource Management Consultant, which involves providing planning services on leading infrastructure projects for both the public and private sectors. Some of the key projects he works on are in the education, transport, rural and heritage sectors; stormwater and wastewater management; as well as many other infrastructure development projects.

In addition to working full time at Opus, George is in the New Zealand Men's hockey team. This requires a significant amount of time away from work to compete at international tournaments around the globe. He has recently travelled to Malaysia, Australia and Argentina

for various lengths of time, as well as playing test series in New Zealand. Opus appreciates the need for employees to maintain a work-life balance, and has been very supportive of George's commitment to hockey. This includes allowing him to work out of their Auckland Opus office when he has needed to base himself in the area for hockey training. Thanks to this flexibility in work conditions, George hopes that he will be able to fulfil his childhood dream of representing New Zealand at the Olympic Games.

KELLY GOVERNOR

Kelly Governor studied at Lincoln University from 2008-2013. She completed a Bachelor of Environmental Management and Planning, followed by a Master of Resource Studies.

After graduating, Kelly gained employment at Ashburton District Council as the Compliance Co-ordinator in the Assets team. She was responsible for managing the ongoing compliance requirements associated with council held resource consents, and legislation and standards impacting on service delivery assets and activities.

In May 2015 Kelly was offered a new position as an Environmental Advisor with Te Rūnanga o Ngāi Tahu. In this role Kelly's primary responsibility is overseeing the management of the tribal properties returned to Te Rūnanga through settlement.

Since graduating Kelly has enjoyed the opportunity to apply the skills and learning gained through study. Kelly remains mindful of how the work experience during her time at university has provided her with a variety of employment opportunities.

Staff Profiles

SinMeun HOW

A number of contract and adjunct lecturers are currently working in the Department of Environmental Management at Lincoln University. Four of these staff members are integral to the delivery of planning-related courses; we have therefore included a profile of each of them in this issue.

JEAN DRAGE

Jean Drage teaches postgraduate students in Advanced Urban, Regional and Resource Planning, working alongside Karen Johnston.

Jean studied at Victoria University in Wellington, her postgraduate work focusing on aspects of local government and politics. She completed her Masters with Distinction in Politics in 1996, and her Doctorate in 2004. A subsequent Henry Lang Fellowship resulted in this research being published by the Institute of Policy Studies in Wellington.

Jean's ongoing research, including some United Nations-led projects, have enabled her to work with people from around the world, particularly on projects associated with women in local government. She has also edited several books on aspects of local government. More recently, Jean spent three years working for the Canterbury Earthquake Recovery Authority, with a brief secondment to the Christchurch City Council working on aspects of the recovery process. Today, Jean's research interests mainly focus on the impact that local government restructuring has on political representation and local democracy. She is currently coordinating a new book on New Zealand's local government, which will provide information on how local government works and the major issues of today given the changes of the last few decades.

In her spare time, Jean enjoys her two grandchildren and her two little Westies (Jesse and Skye) who make sure she gets plenty of exercise.

KAREN JOHNSTON

Karen Johnston teaches Advanced Urban, Regional and Resource Planning at postgraduate level.

Karen earned her Masters in Regional and Resource Planning from the University of Otago in 1985. Subsequently, she worked at the Palmerston North City Council where she held a number of positions, starting as a research planning officer before moving on to become the policy manager and later a project manager.

In 1998, Karen decided to take a year off to travel through Asia, the Middle East, and the United Kingdom. Upon returning, she established her own consultancy in Dunedin, which she now operates from Christchurch. Karen focuses on research and policy work for a wide variety of clients in local and central government, as well as the education and community sectors.

More recently, Karen decided to embark full-time on a PhD to extend her research skills. In 2014, she completed a Doctorate in Resource and Environmental Planning at Massey University. Her main research interests are in local government planning, decision-making and politics. Other than her business and

teaching, Karen is also currently preparing a number of journal articles based on her PhD research, focusing on post-politics, planning under the Resource Management Act, urban revitalisation, young people and the night-time economy, and local governance and gender. One of her teaching goals is to produce planning graduates who think and act critically, and who become reflective life-long learners.

HUGH LOGAN

Hugh Logan is teaching two postgraduate courses in the Department of Environmental Management: Environmental Public Policy, and Integrated Environment Management. He is also teaching two third-year landscape courses: Sustainable Design and Planning, and Landscape Assessment and Planning.

Hugh completed his Masters with first class honours in History from the University of Canterbury in 1978. More recently, he completed a PhD in Environmental Public Policy at Lincoln University in 2013. In addition, Hugh has also undertaken a wide range of management studies with organisations in New Zealand, and at Templeton College Oxford.

Hugh has had a long career in the New Zealand public service, mainly in the field of natural resource management. He headed the Department of Conservation for nine years, the Ministry for the Environment for two years and the New Zealand Antarctic Programme (now Antarctica New Zealand) for four years. He is currently serving on a number of committees/groups dealing with environmental research and nature conservation issues, including the Environment Canterbury Regional Water Management Committee. Hugh's research focuses primarily on the formation and implementation of environmental public policy and nature conservation management.

Hugh is an outdoor recreation enthusiast, especially alpine climbing, ski mountaineering, and rock climbing. He is currently the President of the Canterbury Mountaineering Club. Hugh also researches and writes about New Zealand mountaineering history.

NICK TAYLOR

Nick Taylor teaches postgraduate students in Principles of Environmental Impact Assessment.

Nick completed a Masters in Resource Management from Lincoln University in 1975, and a PhD in Sociology from the University of Canterbury in 1981. He was a Senior Research Officer at the Centre for Resource Management at Lincoln University in the 1980s, before going into private practice.

Nick's main research areas involve social impact assessment, natural resource management, rural development, rural tourism, collaborative and community based planning, and rural community formation and social change – especially as a result of agricultural intensification. He specialises in social assessment and community development in rural and urban settings, and has worked in New Zealand, Asia, and the Pacific Islands. He was the President of the International Association for Impact Assessment and is currently assisting the World Bank with their capacity building for environmental and social impact assessment of infrastructure projects in the East-Asia and Pacific Region. He is also serving as a technical expert to Environment Canterbury in social assessment on catchment planning under the Canterbury Water Management Strategy. In addition, Nick is the Principal and Director of Taylor Baines and Associates, a private social research firm.

Awards

Paula GREER

1. STAFF AWARD RECIPIENTS FOR 2014 -2015

Lin Roberts, Senior Lecturer in the Department of Environmental Management, was the Poster Award winner at the Sustainability Science Congress 2014, held in Copenhagen, Denmark. The theme of the congress was "Global Challenges: Achieving Sustainability". Conference delegates voted on the winner of the poster competition. Lin's poster title was *A better life with a smaller footprint? Understanding happiness, satisfiers and nature's contribution*; it was based on the 2015 report, *The nature of wellbeing: how nature's ecosystem services contribute to the wellbeing of New Zealand and New Zealanders* by L. Roberts, A. Brower, G. Kerr, S. Lambert, W. McWilliam, K. Moore, J. Quinn, D. Simmons, S. Thrush, M. Townsend, P. Blaschke, R. Costanza, R. Cullen, K. Hughey, and S. Wratten.

Professor **Hirini Matunga** received an outstanding service award from the New Zealand Planning Institute (NZPI) at its 2015 conference in Auckland. The award was for demonstrating with excellence Papa Pounamu values and service in Māori environmental planning and resource management. Papa Pounamu is a full day hui at NZPI, featuring a variety of speakers presenting on a range of topics including: Tuhoe spatial planning; integrating matauranga Māori with western science; iwi and local government co-governance in practice; and Maori urban and landscape design.

2. STUDENT AWARD RECIPIENTS FOR 2014 -2015

Michelle Ruske was awarded the John Hayward Memorial Prize for 2014. This award is made to the most outstanding Master of Environmental Policy student who has completed the requirements for the degree, and is based mainly on academic performance in core subjects.

This award 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, the precursor of the Master of Environmental Policy degree.

Shona Jowett was awarded the Thomson (formerly Brookers) Prize for Resource Management for 2014. This prize is awarded to the highest performing first year Master of Environmental Policy student, and is based on academic performance in the five core subjects.

Thomson Brookers is the major law publishing firm in New Zealand and has close connections with Lincoln University. Its online and hard copy versions of the Resource Management Act and other legislation enables students to keep up-to-date with relevant changes in planning law.

Roxanne Lloyd was awarded a Rona Scholarship from Te Pūtea Whakatupu Trust for 2015. Roxanne is a Master of Applied Science (Environmental Management) student; in her Masters thesis she is exploring the spatial pattern of marine farm locations throughout New Zealand under climate change conditions using Geographic Information Systems (GIS) and agent-based modelling. In particular, her research focuses on environmental, physical and social variables, and the current thoughts and ideas of marine farmers that may influence the decision-making process in site selection.

3. SUMMER SCHOLARSHIPS 2015

Each year a number of Lincoln University summer scholarships provide select students the opportunity to carry out research projects during the summer holidays. The following students were awarded a summer scholarship to work on projects of particular relevance to environmental management and planning.

Ella Shields*: From plan to practice: Enhancing landholder implementation of expert advice on riparian restoration plans in the Selwyn-Waihora catchment*

Supervised by Hamish Rennie and Adrienne Lomax (Waihora Ellesmere Trust)
Funded by Waihora Ellesmere Trust

Deborah Paterson*: Māori and Indigenous agribusiness pathways*
Supervised by Simon Lambert
Funded by Lincoln University

Jamie Evans*: An investigation into digital farming in Canterbury: How much data is really being used?*
Supervised by Shirley Gibbs, Pat Anthony and Kevin Moore
Funded by the Royal Society of New Zealand (Canterbury Branch)

Olivia Lin*: Future-proofing the Styx website*
Supervised by Shirley Gibbs, Chris Philips and Nick Spencer (Landcare Research)
Funded by Styx Living Laboratory Trust

Zac Taylor*: Managing visitor impacts on the New Zealand sub-Antarctic islands*
Supervised by Emma Stewart, Stephen Espiner and Daniela Liggett (University of Canterbury)
Funded by the Royal Society of New Zealand (Canterbury Branch)