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5N4	Speaker	Title	5S3	Speaker	Title
8:45	Sean Fitzsimons	Opening address			
9:00	Margaret Winter	A mixed sand and gravel beach classification scheme for the lakeshores of the South Island, New Zealand		Gillian Elliot	What role do Web 2.0 enabled experiences of nature play in young peoples' conceptualisations of the character and significance of the natural world?
9:15	Emma Fordyce	Tidal fluctuations of groundwater and the potential influence of sea level rise in South Dunedin, New Zealand		Brigitte Allen	Improving the integration of urban freight activity in transportation and land-use planning
9:30	Daniel Castleton	Geomorphic development of foredunes following vegetation stress		Matthew Curran	Effective participation for children and young people in council decision making
9:45	Alenka Abazovic	The role of storm waves on boulder-strewn shore platform morphodynamics		Stephen Dennis	Evaluation and monitoring of crime prevention through environmental design projects in New Zealand
10:00	Teresa Konlechner	Colonising ability of <i>Ammophila arenaria</i> through hydrochoric dispersal		Elodie Letendre	Planning for the effective reuse of materials in the New Zealand building industry
10:15	Bin Chen	What is the contribution of abrasion to the sediment budget of a mixed sand and gravel beach?		Marina Hetaraka	Natural hazard planning: the contribution of Cook Island Māori to traditional knowledge in the Cook Islands, South Pacific
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11:15	Rachel Batchelor	The politicisation of EIA within hydropower debates in the Mekong basin		Toby Mandeno	Urban tourism: a driver for public transport investment?
11:30	Jerram Bateman	'Development through sport': the		Jonathan Ryan	Medium density housing and outdoor space use

		'Indianisation' of cricket and its potential for development			
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14:15	Adrian Nel	Money doesn't grow on trees... except with carbon offsetting		Chris Ross	Local authority disability strategies – do they work?
14:30	Mai Tamimi	Long term environmental sustainability, the challenge for young people living in fragile environments characterised by on-going political conflict: a case study of Palestine		James McKibbin	Uplifting small towns in post-apartheid South Africa: the experience of the Amathole Economic Development Agency
14:45	Brandon Vista	Agrarian reform and sustainable livelihoods: evidence from Bicao Agrarian Reform Community, Philippines		Jaimee Semmens	Planning for New Zealand towns: the value of Cittaslow in achieving sustainable development
15:00	Afternoon Tea	Catered in the Post-Graduate Common Room			
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15:45	Jono Conway	A nine-month record of surface energy and mass balance on Brewster Glacier, New Zealand		Nathan Stocker	Relationship dynamics within New Zealand territorial authorities
16:00	Jillian Hetherington	Predicting plant invasions		Ben Payne	Beyond 'interfering greenies': the contested place of tenure review in New Zealand's High-Country
16:15	Jamie Howarth	Reconstructing earthquake-driven erosion in the Southern Alps, New Zealand		Navé Wald	Vivimos Luchando: rural challenges, social mobilisation and integral development

		using the sedimentary record			
16:30	Drinks Reception	Catered in the Post-Graduate Common Room			

The role of storm waves on boulder-strewn shore platform morphodynamics

Alenka Abazović

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High magnitude events, such as storms, have a significant role not only in contemporary nearshore morphodynamics but also in long-term evolution of rock coasts. Even so, understanding the role of storms remains problematic, with most evident advances in coastal boulder research having culminated only recently. According to Paris et al. (2011), most significant issues for researchers include frequent misuse of applied models and limited verification of those models due to lack of empirical data on boulder responses to high energy events. Thus, systematic observations of boulder emplacement, transport and deposition processes during storm events are needed. Also, while the interactions between waves and shore platform morphology create complex hydrodynamic patterns, there is still a lack of detailed research in this area (Marshall and Stephenson, in press). Additionally, the distribution of wave energy across shore platform determines its long-term development (Hall, 2011).

Therefore, the aim of this study is to monitor and assess dynamic coastal processes driven by storm events and, consequently, address the impact of waves on evolution of boulder-strewn shore platform. The research is to be carried out at Shag Point, where the study area is characterised by boulders accumulated on an intertidal shore platform that is episodically affected by storm waves. Thesis objectives are: (i) to examine the relationship between shore platform morphology and storm waves; (ii) to determine wave energies required to initialise boulder transport and identify boulder transport modes; and (iii) to observe and interpret the effect of boulder transport on shore platform evolution.

Geomorphic development of foredunes following vegetation stress

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Coastal foredunes are formed by wind-blown sand being caught and deposited among the rougher parts of the backshore surface, e.g. driftwood or vegetation. In the first stage of development small incipient foredunes normally form around such vegetation patches or flotsam and jetsam. With continuous accretion of sand through time they can grow into very stable, symmetrically formed and densely vegetated ‘type 1’ foredunes as classified by Short and Hesp (1982).

The main purpose of this study is to examine the geomorphic development of these established ‘type 1’ foredunes, following rapid vegetation change. Two main objectives include: (i) examining the changes in patterns and extent of aeolian sedimentation of sand (Davidson-Arnott and Bauer, 2009) on one such established foredune in Mason Bay, Stewart Island, following vegetation stress caused by an anthropogenic activity in form of herbicide spraying; and (ii) analysing a series of future scenarios of the development of the coastal dune system at different stages, with predictive capacity based on results and observations of the field data analyses over a two year time period.

Principal methods for obtaining such a unique dataset, which will allow an in-depth analysis of the changes in balance of processes, include: (i) continuous surveys of topography and vegetation change across the foredune; (ii) observations of wind flow and sand transport over the foredune using multiple sonic anemometers and photoelectronic sensors; and (iii) modelling of airflow behaviour over the foredune and within blowout terrains using computational fluid dynamics simulation software.

Understanding Knowledge Workers in ICT4D in South India

Rakhee Chatbar, Tony Binns and Douglas Hill

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New information communication technologies are being increasingly deployed to bridge the digital divide and improve rural lives across the globe. One such intervention to foster social development by providing access to information is the Village Knowledge Centres (VKCs) and Village Resource Centres (VRCs) movement run by an NGO in India. The NGO responsible for this program asserts that the Centres seek to “empower the community through providing access to information, micro enterprise training and establishing linkages” (www.mssrf.org). In this public model of telecentres, the Centres are managed by volunteers known as Knowledge Workers (KWs) from the village in which the Centre is located. These KWs function as a vital interface between the community and the NGO. Based on interviews with 34 KWS as part of a larger study of Information and Communication Technologies for Development (ICT4D) in South India, this paper interrogates the complex and contradictory role of the KWs as volunteers in the telecentre movement. The paper argues the position of KWs offers significant opportunities for empowerment but at the same time also disempowers them in the process. The paper concludes with suggestions on how the KWs can be productively included in the larger development process in these villages.

What is the contribution of abrasion to the sediment budget of a mixed sand and gravel beach?

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Abrasion, as an output, is thought to have a significant influence on the sediment budget of mixed sand and gravel beaches. Currently, it is unclear how much sediment is lost from mixed sediment beaches within the greater Waitaki catchment as a result of abrasion. In this project, an abrasion rate model and a sediment budget model will be built for the mixed sand and gravel beaches along the Waitaki coast from Timaru to Oamaru. The inputs and outputs of a sediment budget model will be identified and quantified during both storm events and calm intervals. It is hypothesized that the difference between storm and calm intervals is significant for abrasion rates. During storms, cliffs are eroded resulting in the delivery of sediment to the beach, this sediment source is a primary contributor for the sediment budget. Simultaneously, during storms the transport of sediment alongshore and across shore can be amplified, which results in enhanced abrasion. In contrast, bedload from the Waitaki River is the main provider of sediment when there are no storms. The intensity of movement of sediment along and across the beach becomes reduced compared to that during storm events. This project combines laboratory and field based experiments to determine the overall sediment budget of the coast from Timaru to Oamaru and the role of abrasion in that budget.

A nine-month record of surface energy and mass balance on Brewster Glacier, New Zealand

Jono Conway, Nicolas J. Cullen

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A detailed understanding of the atmospheric controls on glacier mass balance is needed if past and future changes in mountain hydrology, paleo-climatic use of glacial records, and contributions of mountain glaciers to sea level rise are to be properly understood and informed. In the New Zealand context this is especially important as glaciers provide an important regulator in the seasonal flow regime in hydroelectric catchments. Additionally, in southern hemisphere glacier mass balance records are sparse and studies that describe the temporal variability of surface energy balance, melt and accumulation are generally limited to short periods of a few weeks or months. In the maritime environment of the Southern Alps of New Zealand, the interplay of subtropical and polar air masses impinging on the Southern Alps creates large changes in the availability of melt energy and the dominant terms in the energy budget on daily timescales. The Brewster Glacier, situated in the central Southern Alps, now has the longest mass balance record in New Zealand, accompanied by a periodic but high quality meteorological record. For the first time, measurements of daily melt and accumulation have been captured through an entire summer season over a New Zealand glacier surface. Combined with high quality meteorological records from both on and off the glacier, this presents a unique opportunity to examine the variability in surface loss and gain over this period and link this to the energy balance terms that ultimately control it. With an increased understanding of the variability in, and drivers of, glacier energy and mass balance, past and future changes in these systems can be reliably attributed.

What role do Web 2.0 enabled experiences of nature play in young peoples' conceptualisations of the character and significance of the natural world?

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Young people have always experienced nature in different ways, i.e. through *direct contact* ('wild' nature), *indirect contact* ('domesticated' nature) and *mediated contact* (through print and analog media). While it is generally accepted that direct contact with nature is 'ideal' (for the health of the individual, communities and the natural world), we cannot turn back the clock. The future is, in part at least, a digital one and Web 2.0 is very much part of that future. With its elasticity of time and space and blurring of the 'real' with the virtual, Web 2.0 introduces a mediated experience of nature quite unlike that experienced by any earlier generation, anywhere on the planet. It introduces new challenges, but also new potentials for a different type of engagement with the natural world. Young people spend increasing amounts of time experiencing the natural world through a range of Web 2.0 'social media' (such as Facebook and Youtube); it is important to understand what role, if any, these *virtually mediated* experiences play in young peoples' conceptualisations of the character and significance of the natural world.

Predicting plant invasions

Jillian Hetherington¹

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Plant invasions are successful when the physical environment provides an opportunity for the plant to initially establish, and the plant itself possesses a suite of characteristics that will ensure establishment and then invasive spread across the area into which it has been received. The establishment opportunity presented to the plant by the environment is linked to disturbances (of varying spatial and temporal scale), that result in the fragmentation of large contiguous areas of vegetation into smaller areas of varied shape and size. The shape and size of an area of vegetation is theoretically the key to predicting the potential for a plant to invade, highly irregular shapes and a smaller area have higher potential for invasion than an area close to circular and large.

Utilising two methods for calculating invasion potential, the susceptibility of native plant communities across the Kaitorete Spit dune ecosystem to invasion of the introduced *Lupinus arboreus* Sims was investigated with GIS software. The potential for invasion varied between methods, to the extent that one method would indicate a high invasion potential and the other an unlikely chance of invasion for some patches and vice versa for other patches of native vegetation. The applicability of these methods to predicting plant invasions is questionable; the discrepancy between these outcomes indicates an area for further research, as there are a number of other methods for calculating patch shape and size and therefore potential for plant invasion.

Reconstructing earthquake-driven erosion in the Southern Alps, New Zealand using the sedimentary record

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Studies of active mountain belts have concluded that large earthquakes are significant drivers of erosion. However, relatively few studies have directly quantified the volume of earthquake-driven erosion because these events occur infrequently and are rarely recorded using instrumental measures of erosion such as suspended sediment yield from rivers. Deposits in sedimentary basins adjacent to mountain belts afford the possibility of developing records of mountain building processes that capture the impact of large earthquakes. This paper reports a study of erosion and depositional processes over multiple seismic cycles that are preserved in a small lake in South Westland, New Zealand. The sedimentology of three 6m cores was investigated using high resolution grain-size, TOC and C:N ratios to identify the sedimentary record of co-seismic mass wasting in Lake Paringa. The co-seismic sedimentary signature consists of megaturbidites that exhibit complexly graded fine sandy bases, overlain by normally graded silts and a clayey silt cap. High resolution radiocarbon dating shows that the megaturbidites record the 1717 AD ($M_w > 7.9$), 1620 AD ($M_w > 7.6$) and 1430 AD ($M_w > 7.9$) Alpine Fault earthquakes; and two additional Alpine Fault earthquakes between 1166-1061 AD and 868-449 AD. The co-seismic sedimentation is followed by a sequence of normally graded turbidites that are interpreted as the sedimentary product of increased post-seismic erosion. The post-seismic turbidite sequences are overlain by sediments deposited in quiescent

depositional conditions. Together these two phases of deposition represent sedimentation over a complete seismic cycle and provide the basis for reconstructing erosion driven by Alpine Fault earthquakes. Over the last ca. 1200 years five ruptures of the Alpine Fault have contributed nearly half of the total erosion in the catchments that drain into Lake Paringa. Furthermore, these new insights into sedimentary responses to co- and post- seismic disturbance open the possibility of deriving catchment denudation rates and quantifying the role of large earthquakes in the mass flux from range-front catchments.

Governing Adaptation for Sustainable Coastal Communities

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Coastal communities are particularly vulnerable to issues caused by the intermingling of human activities and natural processes. Climate change adds an extra layer of complexity to the management of the already highly dynamic land-sea interface, challenging governance systems better equipped for addressing singular issues and operating under assumptions of relatively stable background conditions. ‘Adaptive governance’, used in social-ecological resilience literature, describes a governance system that handles complexity and is responsive to change. Using eight literature-derived adaptive elements as an analytical framework, my aim is to assess the potential for adaptive governance in a New Zealand context.

The research focuses on the local-regional level of governance because of the importance of local knowledge and context. Focusing on the northern South Island region, I am carrying out in-depth studies of three small urban communities, each corresponding to a different unitary authority, to offer a deeper understanding of the way governance shapes sustainability outcomes. The case studies consist of semi-structured key informant interviews, community surveys and document analyses as well as case studies within case studies – studying particular local government processes for each area to shed light on the governance system. In studying these processes I am using a critical ‘political lens’ perspective focusing on the interplay between knowledge and power to assess the potential for achieving sustainable communities.

Colonising ability of *Ammophila arenaria* through hydrochoric dispersal

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Ammophila arenaria (L.) Link (marram grass, european beach grass) is a ubiquitous component of the temperate dune flora. It spreads through the fragmentation and subsequent transportation of its rhizome network by wave and ocean currents. Despite general recognition of this process, few specifics are known. Key questions include; 1) how readily does the rhizome material regenerate, 2) how tolerant is the rhizome material to immersion in seawater, and 3) how do the hazards of the coastline affect establishment post transportation? This study has determined that the rhizome of *A. arenaria* regenerates readily once fragmented, displays a high tolerance to immersion in seawater and can establish under most coastal conditions. It can be concluded that this species is well suited to dispersal in the ocean.

Money doesn't grow on trees... except with carbon offsetting

Adrian Nel

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As the global economy seeks a shift towards a system that will encourage emissions reductions, various new economic instruments are being developed that are designed to create a market for carbon at different scales. My PhD research is concerned with examining some of these mechanisms for carbon offsetting in East Africa, looking in particular at the REDD (Reducing the Effect of Deforestation and Degradation) framework that is aimed at forestry in non-Annex I countries of the Global South. I argue that in order to fully conceptualise how these changes can be understood theoretically, insights from political economy, governmentality and debates concerning the conceptualisation of nature-culture must all be deployed. All of these perspectives help us to understand the commodification of the abstract idea of 'carbon', which is framed here as an organising principle in the re-production of different and variegated geographies in a contemporary neoliberal policy context. To understand these issues, the presentation highlights several approaches that can help us understand offsetting as a mode for continued 'capital accumulation by de-carbonisation' (Bumpus and Liverman, 2009). Since my research is still at a pre-fieldwork stage, I will use an anecdotal approach drawn from a Kenyan Case study to illustrate these points. In doing so, I argue for an approach that moves beyond a basic critique of offsetting to examine the 'actually existing assemblages' of particular carbon offset projects. This allows reflections upon the dynamic impacts, resistances and contradictions facing the lived reality of the communities and 'socio-natures' reshaped by 'Carbon'.

Long Term Environmental Sustainability, the Challenge for Young People Living in Fragile Environments Characterised by On-going Political Conflict: A Case Study of Palestine 2008-2011

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In fragile environments, particularly those subject to political conflict, such as in Palestine, ways of ensuring long-term sustainability are a planning priority. In such unstable contexts young people's vulnerability is enhanced. This thesis therefore seeks to ascertain the nature of young people's learnt and culturally acquired knowledge, understandings and consciousness, with a view to developing effective environmental programmes in Palestine. The aim of this study is to explore the young Palestinians' relationship with their environment and to investigate the key factors including formal or curriculum-based knowledge as well as community-based knowledge that help in building and developing this relationship. The primary focus of the study is an assessment of young Palestinians' environmental relationships, in terms of young people's knowledge, understanding, attitudes and practices and the various elements contributing to these factors. The study shows that young Palestinians are environmentally sensitive and knowledgeable. Young Palestinians contact with nature has been modified by socio political factors mainly gender, Israeli occupation and culture. Family and school are the main sources of environmental knowledge and young Palestinians appreciate the role that media and community play in that regard. The main environmental challenges in Palestine are pollution due to rubbish and water scarcity. Young people, their teachers, parents and key informants highlighted the important role that young people can play in promoting sustainable behaviours but stressed the importance of provision of support from adults and government.

Agrarian reform and sustainable livelihoods:

Evidence from Bicao Agrarian Reform Community, Philippines

Brandon Vista

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Rural poverty and inequality of access to land and productive resources has been one of the most highly contested development issue in the Third World over the last century. The implementation of agrarian reform, and its predecessor land reform, is seen as a major strategy to alleviate the plight of the landless farmers and farm workers, and thereby eliminate social injustice in society. In fact, in the international development policy arena, agrarian reform is considered *sine qua non* with sustainable livelihoods. However, many of the studies have centred their perspectives on the politics, economics and dynamics of land and agrarian reform, and less on its livelihood dimension. My study attempts to address this gap in the literature by assessing agrarian reform from a sustainable livelihood standpoint. Based on field-based research, my study aims to find out whether agrarian reform has brought about sustainable livelihoods as conceptualised through the lens of the Sustainable Livelihood Approach (SLA). In this paper, I will present field-based evidence from two selected villages of Bicao Agrarian Reform Community (ARC) in Bohol Island in the Philippines. Specifically, I will examine the different livelihood assets – natural, physical, human, social and financial – and the livelihood strategies that farmers have adopted to have favourable livelihood outcomes. Findings from the field suggest that agrarian reform has contributed towards sustainable livelihoods to some extent.

Vivimos Luchando: Rural Challenges, Social Mobilisation and Integral Development. MOCASE-VC and Red Puna in Northwest Argentina

Navé Wald

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Economic and political changes over the past three decades in the states of Latin American have presented great livelihood challenges to disadvantaged rural social groups, while at the same time creating the opportunity for the emergence of civil society organisations to contest these changes. A notable feature of this period has been the (re)emergence of numerous *campesino* (peasant) movements across the Latin American continent, that have sought to challenge the new hegemonic neoliberal paradigm and have been demanding, *inter alia*, access to land and citizenship rights. In this research study I investigate two *campesino* organisations in Northwest Argentina, the MOCASE-VC from the lowlands of Santiago del Estero and the Red Puna from the highlands of Jujuy. Both these organisations articulate demands for ‘integral development’, which to them constitutes a profound and simultaneous change to the existing polity, society and economy, in favour of inclusive radical democracy, social equality and Food Sovereignty. While in Santiago del Estero the struggles are concerned with an expanding ‘agriculture frontier’ of intensive agribusiness that advances into previously marginal land, often at the expense of cultivation by *campesinos* for subsistence and petty trade, in the highlands of Jujuy livelihood challenges are mainly associated with the mining industry, which uses scarce water and pollute the environment. Both case studies, however, demonstrate the array of challenges that stem from adverse incorporation into global commodity trade, and a political order that enables and facilitates a predatory capitalist market. In this research study I critically engage with macro and micro-level challenges and solutions, focusing on the integral development model these organisations offer as a possible alternative.

The Politicisation of EIA within Hydropower Debates in the Mekong Basin

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Hydropower is being rapidly planned and developed in the Mekong riparian countries, both on the main branch of the Mekong River as well as its many tributaries. Many stakeholders are promoting and pursuing hydropower for a variety of reasons, most clearly the governments of the region, who view these projects as the engine of economic growth and regional integration. However, there is also much opposition to these hydropower projects, on the basis that they have the potential to cause significant environmental and social impacts such as altering river flow regimes, ecosystems and river morphology as well as impacting on the livelihoods of millions of people who live alongside the rivers of the Basin.

One particularly significant aspect of the hydropower debate in the Mekong that is arguably under-researched is the use of Environmental Impact Assessment (EIA) as a tool for assessing the potential impacts of a development prior to a project's construction. EIA has gained worldwide recognition and popularity and, when done correctly, is a very powerful means to predict impacts and mitigate against them, which would be valuable in the context of hydropower development in the Mekong. However, based on field work conducted in Thailand, Laos and Cambodia in February and March of this year, it is argued that instead of producing quality EIAs to avoid the negative impacts of hydropower, a range of stakeholders are manipulating EIAs by influencing the methodology used and ensuring a positive report results in order to serve their underlying aims of hydropower development, and in doing so are using EIA to silence critics of hydropower development. These findings highlight the ways in which scientific and technical knowledge can become politicised and the ways in which knowledge imbalances can support power imbalances.

‘Development through Sport’: The ‘Indianisation’ of Cricket and its Potential for Development

Jerram Bateman and Tony Binns

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Cricket was introduced to India through British colonialism in the 19th Century, and became cemented in Indian culture and identity following independence in 1947. More recently, processes of globalisation have seen cricket at the elite level in India emerge as a source of immense wealth which, in turn, has led to the Board of Control for Cricket in India (BCCI) gaining unprecedented control of the global cricketing landscape. Concurrent with this so-called ‘Indianisation’ of global cricket has been the increased attention given to the concept of ‘development through sport’ in international development literature. Within this literature, however, there has been little discussion of the implementation of ‘development through sport’ initiatives in India. It is argued here that the extraordinary levels of wealth, global administrative power, and global television exposure currently attached to cricket in India, coupled with cricket’s status as one of the most coalescing features of Indian culture, presents it as a potentially powerful tool for development. As such, this research explores emergent themes from the ‘development through sport’ literature in the context of development initiatives in India which explicitly use cricket for wider social purposes.

Tidal fluctuations of groundwater and the potential influence of sea level rise in South Dunedin, New Zealand

Emma Fordyce

Supervisor: Mike Hilton

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In coastal aquifers, ocean processes can influence groundwater; in some cases this interaction can be observed as a fluctuation of the water table in response to tides. Where groundwater levels respond to a rising tide, it is reasonable to consider that they may also respond to rising eustatic sea level. The implication of this is that a rise in sea level may lead to an elevation of groundwater levels near the coast. The objective of this research is to explore the potential influence of changes in sea level, both temporary and long-term, on water table elevations, using South Dunedin as a case study. South Dunedin is a coastal urban area characterized by a low elevation above mean sea level, and a water table close to the ground surface. This water table is known to exhibit tidal fluctuations, making this an ideal site to explore the influence of sea level on groundwater elevations. This research aims to investigate where the water table is located in relation to the ground surface in South Dunedin, and how it responds to ocean processes such as tides and storm surges. This will require characterisation of the aquifer itself and will be achieved by establishing a network of piezometers across South Dunedin to monitor water table levels. This research will also explore how water table elevations in South Dunedin respond to various scenarios of future sea level rise, and storm surges. A numerical modelling approach will be used to project water table elevations under a range of sea level rise and storm surge scenarios.

Connecting the partitioning of nutrients from groundwater, through-flow and surface water flow pathways within the near-stream zone, Silver Stream, New Zealand.

Amanda Fountain and Sarah Mager

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The mobilisation of nutrients through different hydrological pathways into a stream network, is an important concept to understand the origin and delivery of nutrients to streamflow. Literature suggests that hysteresis, comparing peak flow with peak constituents through an event, is indicative of pathways and sources of nutrients. There is however, considerable variation amongst the studies found for various nutrients. This indicates that the processes of variable sources and pathways are much more complex than first thought. The aim of this research is to understand the processes involved within an integrated hydro-chemistry system at the near stream zone. An SR50A sonic ranger, an YSI sonde and an automatic water sampler were installed within a naturally vegetated portion of the Silver Stream network to record stage, and measure and collect samples for surface water quality. Multiple suction lysimeters and piped wells were also installed to enable sampling of through flow and groundwater flows. Another related aspect to nutrient mobilization is the nutrient and sediment transfer effects through changes in channel morphology. Surveys were taken before and after each major event to establish channel changes. Analysis will begin with a simple comparison of nutrients and other water quality constituents between base flow and event flows. Secondly hysteresis will be tested for its appropriateness by comparing with isotope analysis and looking at groundwater, through flow and surface flow chemistry rather than purely surface flow analysis. The channel morphology changes will be examined by comparing the channel surveys between major events and linking this to nutrient and sediment concentrations.

Mai le Tunoa I le Masini – From Umu to Machine

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This research intends to critically evaluate the “overwhelming complexity” of renewable energy development in Pacific Island Countries (PICs). Attempts at initial renewable energy systems in PICs were made in the 1980s; however, these have largely failed to develop into successful alternative forms of energy generation. Recent research into the development of renewable energy in the region highlights the importance of understanding scientific and cultural dimensions underpinning the longevity of renewable energy developments. In 2011 this literature continues to neglect and oversimplify the complexity of renewable energy systems. I assert that the evaluation of renewable energy systems is critically important and suggest that there is need to analyse such systems in order to untangle the scientific and cultural parameters that determine whether they can be defined as a success. The aim of this research is to investigate how successfully a biomass gasification system can be redefined by attending to both scientific and cultural dimensions. As a result this research adopts a mixed- method approach to data collection and analysis. The study was carried out in the village of Patamea on the island of Savaii, Samoa. An area identified by Samoa’s Ministry of Natural Resources and Environment (MNRE) as suitable for a biomass gasification system. The presentation will detail preliminary findings from this fieldwork and explain the importance of this research in addressing current renewable energy development challenges in PICs more broadly.

‘Orphanage Tourism’ in Cambodia

Tess Guiney

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With only 21 state-run orphanages in Cambodia, foreign donors and tourists are responsible for a significant proportion of financial support for the remaining 248 orphanages in the country. Cambodian orphanages are acutely aware of this reliance and accordingly many advertise to encourage visitors and volunteers to their centres, with some holding so-called “cultural performances” by resident children as further enticement. Questions are being asked about whether “orphanage tourism” is supporting an unsustainable and unsavoury orphanage sector in Cambodia. While the actual number of orphans has declined, the number of orphanages has undergone a 76 percent increase in the last five years, coinciding with a 76 percent increase in tourist numbers. Rooted in qualitative methodologies, with in-depth interviews conducted with 42 key informants in country from March to May 2011, this research focuses on the interaction between tourists and orphanages in Cambodia, primarily exploring “voluntourism” and orphanage visits by foreigners. Particular attention is placed on how tourist-orphanage interactions play out on-the-ground through an examination of (non)existent regulatory frameworks, the different rationales that inform individual orphanage policies, and the implications that such programmes have for both orphans and tourists. Situated at the interface between the “voluntourism” literature and a theoretical framework that seeks to illustrate the rationale behind the recent increase in tourist numbers to orphanages in Cambodia, this study explores the constructions of places, the commodification of poverty, and the processes of ‘Othering’ that underpin and condition tourist-orphanage relations.

Beyond ‘Interfering Greenies’: The Contested Place of Tenure Review in New Zealand’s High-Country.

Ben Payne

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Over the last decade, highly politicised debate has surrounded issues arising from tenure review in New Zealand’s high-country. This research engages with this debate, beginning by exploring the seemingly polarised positions of agricultural and conservation interests that is frequently evident in media coverage of high country conservation issues. This research aims to question whether conservation and farming are mutually exclusive activities. I suggest that examining the contested understandings embedded within discursive debates may challenge apparently dualistic framings of conservation and agriculture in the South Island high country. In this presentation I outline why this study has investigated exclusively the lived experiences of the ‘farming community’ in the upper Rangitata and Rakaia Rivers. By focusing this presentation on the rich insight and themes that have emerged from recently completed interviews in this region, I explore how I am conceptualising this material currently. I demonstrate that this empirical material links in a nuanced way to the various threads of literature that inform this research, including ideas around the social construction of place, landscape valuation and the notions of identity and representation. I suggest the relational nature of the high country environment; where this ‘nationally significant place’ is apparently imbued with a variety of understandings that are ‘relational’ to broader social, political and economic context. In this way I explore the dynamism of a place that is contested and negotiated by ‘production’ and ‘protection’ interests in a complex but not necessarily ‘poles-apart’ manner.

From policy to action: governance for sustainability transitions in Otago's tertiary education institutions

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In response to a changing moral and legal decision-making environment in New Zealand, institutions are devising and managing strategies that improve environmental sustainability. The transitions represent a complex new challenge, for which there is no singular definition or blueprint.

Taking two tertiary education institutions as case studies, this research aims to identify and investigate key elements associated with the implementation of sustainability measures. Of particular interest is the governance practise of reflexivity, strongly identified in current discourse as a means to achieve the adaptation and to identify the innovation necessary to respond to and manage complex, shifting goals. Actions and achievements to date will suggest current levels of commitment. As the picture for each institution builds and suggests implications for future roles and responsibilities, preliminary findings in each of the above themes from indepth interviews will also be presented.

A Mixed Sand and Gravel Beach Classification Scheme for the Lakeshores of the South Island, New Zealand.

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Mixed sand and gravel (MSG) processes, especially those on lakeshores, have received very little attention in coastal geomorphology literature. As a result, coarse sediment lake shores have yet to be incorporated into an applicable classification scheme like those of the more widely studied oceanic beaches. This research is based on 19 lakes in the South Island of New Zealand, and tests the importance of basic morphologic features on the observed lake beach type (i.e. a pure gravel, MSG or composite beach type). It is intended to supplement and expand on the Jennings-Shulmeister classification scheme, which used linear discriminant analysis to determine that average grain size, Iribarren number, beach width and storm berm height were most influential on oceanic MSG beaches. However, this system cannot yet be said to represent lacustrine environments, which differ through their lack of tides and wave energy. By applying the same methods of Jennings and Shulmeister (2002), it is intended to compare the results of this study with theirs, and to further add in the effect of seasonal changes on the lakeshore profile. The resulting classification scheme and morphodynamic model are intended to add to the current knowledge of lakeshore dynamics, as well as contribute to our broader understanding of MSG coastal processes.

Improving the integration of urban freight activity in transportation and land-use planning

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Freight movement within the Central Business District has generally been a low priority in national and local planning around the world. There is little understanding of the nature of urban freight activity despite the significant impacts it can have on pedestrian safety, other motorists, and consequently the social and economic wellbeing of an area. The frequency and volume of freight needed within the Central Business District is growing and so are its associated problems. Factors such as increasing urbanisation, traffic volumes and the movement of goods are predicted to intensify problems that are already occurring (OECD, 2003).

The aim of this study is to investigate how urban freight can be better integrated into transportation and land-use planning so that benefits can be increased and inconveniences reduced. This research will be carried out using Wellington as a case study. In order to achieve the aim of this research semi-structured interviews have been conducted with professionals within both the planning and freight industry. Preliminary results have generally been consistent with findings from international examples; planners involved within local and regional government generally have a limited understanding of freight vehicle movement within the Wellington CBD and a large proportion of planning around freight movement is targeted at the inter-regional level.

Effective participation for Children and Young People in Council Decision Making

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Children and young people have been repeatedly excluded from decisions that have significant consequences for the way in which they interact with their environment. Those entrusted with the task of obtaining information from children and young people are frequently not in a position to do so, or engage on a highly tokenistic level. Slowly the planning profession is beginning to recognise and act on a growing appreciation for the capacity of children and young people to make valuable contributions to council decision-making.

Although the planning profession is beginning to recognise children and young people as equal citizens, all too often planners miss interpret their responsibility and focus on providing facilities such as play grounds and youth centers. Frequently attempts at gathering information relating to children and young people are flawed through the use of inappropriate methods of participation or by relying on information presented by their caregivers.

The aim of research was to evaluate the inclusion of children and young people in council decision-making and the methods through which participation is carried out. Research involved key informant interviews at three local authorities, which included professionals in various planning roles, youth from associated youth councils and national and regional participation advisors. Preliminary results suggest the exclusion of children and young people in council decision-making continues to be a problem. This exclusion appears to result from the use of inappropriate methods, primarily youth councils, to engage with children and young people.

Evaluation and Monitoring of Crime Prevention through Environmental Design projects in New Zealand

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Crime and the fear of crime are persistent and challenging concerns for planners and city officials alike. To address the concern of crime, and fear of crime, numerous crime prevention strategies have evolved over the last few decades. Crime Prevention through Environmental Design (CPTED) has become one of the most popular crime prevention approaches in the Western world. As a proactive strategy CPTED purports that the built environment can be strategically transformed to render it less facilitative to crime and anti-social behaviour. A number of New Zealand local authorities now promote CPTED through both statutory and non-statutory methods.

Despite the worldwide adoption of CPTED, research into its effectiveness has produced mixed results. Evaluation and monitoring of projects are the best determinant of whether CPTED is achieving what it promotes. However, both evaluation and monitoring are commonly cited as the weakest elements of crime prevention programmes. In New Zealand these criticisms and shortcomings are also evident with studies highlighting the need for evaluation and noting that local authorities struggle in determining the effectiveness of projects.

The aim of this research was to assess local authorities experience with evaluation and monitoring of CPTED projects/initiatives in New Zealand, including barriers and potential solutions to any issues that are evident. The research process has not concluded, however, will involve interviews with two local authorities and professionals from around the country. Preliminary results suggest that evaluation of CPTED projects is either lacking or non-existent. This lack of evaluation appears to be largely caused by limited guidance and knowledge in terms of how to undertake it. Establishing a 'home' for information and an expansion of current guidelines are two potential solutions highlighted by the research thus far.

The Future of Sustainable Waste Management Planning in Rarotonga, Cook Islands

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In Rarotonga local people's lives are affected in a range of different ways by how waste is managed. Despite positive developments in this area of environmental management, the future of waste management in Rarotonga is uncertain. The literature review conducted as part of this thesis identified the lack of extensive research into the sustainability of the waste management planning system of Rarotonga. From a humanistic planning perspective, this thesis aims to critically identify and analyse the achieved progress and remaining deficiencies in sustainable waste management in Rarotonga, with a specific interest in the robustness of long-term strategic planning and evaluation. It investigates planning and waste management policy and practice to address the question: How can waste management in Rarotonga become more sustainable, efficient and future-proof?

Primary data was collected through interviews with stakeholders from government, business and community. Preliminary outcomes of the research indicate that a more integrative, strategic and holistic approach is needed to future-proof and increase the efficacy of Rarotonga's waste management planning framework, consequently ensuring its sustainability. Informed by these results, key recommendations are drafted for Rarotonga's planning and waste management community, which include a number of strategic planning and management principles and concepts, as well as aspects of quality evaluation, that could be considered for implementation.

Community Based Groundwater Management in Andhra Pradesh, India

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Groundwater management is an area of increasing concern throughout South Asia, particularly in those areas where the Green Revolution has led to increased intensity of agriculture and in many cases, the overexploitation of the groundwater resource. Andhra Pradesh is a region in which this has taken place. Community based groundwater management has been identified as a means of addressing these issues. One such initiative is the 'Andhra Pradesh Farmer Managed Groundwater Systems' (APFAMGS) project that aimed to demystify the science of groundwater management and disseminate knowledge to villagers surrounding sustainable agricultural practices in drought prone areas of this Indian State. This research investigated the effectiveness and success of the project and looked at four NGOs that were involved with the project that were spread over three drought prone districts of Andhra Pradesh. This included working with and interviewing NGO representatives as well as interviewing 30-40 farmers that had been associated with each of the NGOs through the project.

Preliminary results suggest that there are a few differences as well as similarities between the three districts. Farmers cited improved water management, crop rotation, fertiliser and pesticide education, and knowledge gained as the main benefits of the project. Sharing of groundwater resources was evident through community bore wells. Equity considerations concerning this sharing were relatively consistent over the three districts as well as the notions people had of selling or giving away water. NGO involvement was cited as important and many stated crucial for the success of such programs. Local leadership was also identified both by the NGOs and farmers as having a significant impact on the uptake and success of the project. Overall conclusions and recommendations for the future direction of such projects are given.

Natural Hazard Planning: The contribution of Cook Island Māori traditional knowledge in the Cook Islands, South Pacific

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Cook Island Māori have an intimate relationship with their environmental landscape. This has contributed to their ability to forecast impending natural hazard events and has arguably aided their survival. The Cook Islands are highly vulnerable to natural hazard events. The Intergovernmental Panel for Climate Change (IPCC) predicts the concentration and intensity of natural hazard events will increase.¹ In this research I identify the opportunity for future Natural Hazard Planning in the Cook Islands to learn from past approaches to managing natural hazard events in the Cook Islands. The aim of this research is to investigate Cook Island Māori traditional knowledge of weather and climate, and past coping methods employed by the Cook Island Māori people in the event of a natural hazard event. Further, the research will identify how this knowledge can support current and future Natural Hazard Planning throughout the Cook Islands. A mixed-method approach for data collection and analysis was adopted for the research. Preliminary results following field work identify, the Cook Islands Government have undertaken critical steps towards addressing the issues of natural hazards. This is illustrated in the “Cook Islands Disaster Risk Management and Climate Change Adaptation National Action Plan 2011-2016”.² Interviews with Key Informant’s found that traditional knowledge of weather and climate is highly

¹ United Nations International Strategy for Disaster Reduction Secretariat (2009) The 2009 Global Assessment Report on Disaster Risk Reduction: Risk and poverty in a changing climate, invest today for a safer tomorrow

² See Cook Islands Disaster Risk Management and Climate Change Adaptation National Action Plan 2011-2016; Goal 2, Strategy 2.

valued and remains an integral part of Cook Island culture and society. This research will assist with the appropriate development of traditional knowledge for natural hazard planning in the Cook Islands.

Planning for the Effective Reuse of Materials in the New Zealand Building Industry

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Modern society generates a growing waste production, associated with natural non-renewable resources depletion. Notably, the building and construction sectors are believed to consume approximately half of the planet's resources and to be responsible for around 30-50% of waste production. Awareness has grown worldwide, particularly within the themes of sustainable construction and the use of green materials. From a demolition project, valuable building materials are salvaged to be reused, or recycled, or ultimately burnt or buried. The aims of this thesis are to evaluate the feasibility of the reuse of materials in the building industry and to present recommendations to promote this practice. This research is focusing on the Dunedin context and also analyses the relevant national legislative framework.

A literature review has been undertaken where six factors influencing the reuse of building materials have been identified: construction and building industry, technical feasibility, waste management, social and cultural value associated with the reuse of building materials, commercial incentives and legislation. In addition, interviews with key informants on the building and waste industries have been conducted in Dunedin and Wellington.

Preliminary results have demonstrated that the Building Code hinders and limits the reuse of materials for structural purposes. However, opportunities for the promotion of the reuse of materials via non-regulatory mechanisms and through the Resource Management Act, the Waste Minimisation Act and the Historic Places Act have been exposed.

Urban Tourism - A Driver for Public Transport Investment?

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Modern society is structured around the automobile for transportation, this has brought with it significant social and environmental consequences. With the impending impact of global warming and climate change, the New Zealand Transport Strategy of 2008 is attempting to achieve “*an affordable, integrated, safe, responsive and sustainable transport system*”. A critical means of creating this desired outcome is through increased investment into public transport. The case study area of Auckland is an inherently car dominated and consequently faces large transportation problems.

Tourism has been one of New Zealand’s fastest growing sectors in recent decades building off our natural scenery and clean green imagery. Auckland is also New Zealand’s main gateway for international tourists. This research attempts to ascertain whether there is a connection between tourism in Auckland and public transport provision and the impacts improvements could have on Auckland’s tourism revenue and visitor satisfaction.

Preliminary results obtained through Key Informant interviews and international case study examples have highlighted a lack of connection between tourism attractions and the public transportation operation in Auckland. By removing some of these barriers and structuring the services to better meet tourist requirements, it was believed that it may entice more people to visit or stay for a longer period of time. Public transport was also perceived to be a lesser investment than roading infrastructure and has consequently struggled to gain much needed governmental revenue. The potential impacts on tourism identified in this study indicate the positive effects public transport can have on both visitors and residents, giving further reasoning to why there should be more public transport investment.

Uplifting small towns in post-apartheid South Africa: The experience of the Amathole Economic Development Agency (ASPIRE)

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Small towns in post-apartheid South Africa are attracting attention for their role in stimulating local economies, improving the livelihoods of their inhabitants, and ameliorating the legacy of social and spatial inequalities created by the apartheid era. A symbiotic relationship exists between small towns and their rural hinterlands such that the economic development of these towns can be crucial to achieving sustainable rural development. Unfortunately, many local municipalities in South Africa are starved of funding and skilled personnel and have achieved little progress in stimulating the local economy.

The Eastern Cape Province of South Africa is one of the country's poorest regions, with a large proportion of the population living in the former 'black homelands' of Ciskei and Transkei. The Amathole Region, one of seven regions in Eastern Cape, in 2005 mandated the Amathole Economic Development Agency (ASPIRE) to 'promote and implement development policies in areas of economic production and investment in the Amathole Region'. ASPIRE has formulated and is now implementing a regional economic development strategy aimed at stimulating the regional economy through the regeneration of small towns within spatial corridors which will hopefully lead to sustainable rural development.

ASPIRE's role is primarily facilitative - establishing and co-ordinating fora for discussion and collaboration between the private and public sectors and local communities, seeking funds and overseeing project implementation with local stakeholders. The agency's approach to regional economic development is innovative, and has gained recognition and support from national government, such that ASPIRE's activities and experience could play a key role in shaping a national small town development policy. The paper will critically examine ASPIRE's approach to regional development and small town regeneration in the context of reconstruction and development in post-apartheid South Africa.

Tourism as a driver for Local Economic Development in Lawrence, New Zealand

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Rural decline associated with government restructuring in New Zealand in the 1980s has reduced the security of the agricultural economic base in many rural communities. These communities must find additional economic drivers to survive, and the appropriateness of possible economic drivers needs to be explored. Lawrence is a small rural town in New Zealand which has developed from a purely rural service centre to an attractive day-trip destination and host for tourism events. In 2011 Lawrence held a one-off anniversary festival. This study focuses on this festival to explore the way in which Lawrence reinvented itself and assess the success of its reinvention. Twenty-one Key Informant interviews were conducted with the local council, businesses and event organisers. Further data were gathered through observation and document analysis. This study showed that event tourism has expanded the economic base in Lawrence. The anniversary festival provided economic benefits and helped build a degree of social cohesion. Heritage tourism is being further explored and there is potential for a rail trail. However, the Lawrence community still faces social tension as different groups fail to work together and feels ignored by the district council. A lack of both communication and cooperation are key barriers to future growth in Lawrence. While these results are limited to this particular case study, they indicate that tourism is a viable secondary activity in rural areas and that there is a need for local governments and organisations to be actively involved in their communities to achieve community cohesion, communication and cooperation.

Retaining the character of bach communities: planning options

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Rapid changes to the coastal property market have resulted in subdivision and gentrification in coastal communities all over New Zealand. This phenomenon is not restricted to New Zealand; 'sea-change' migration has increased demand for property in high amenity locations around the world. The New Zealand bach is particularly vulnerable to coastal development and gentrification; it is rapidly being displaced by large contemporary holiday and permanent housing. This has created a challenging situation for planners as modest bach communities are increasingly beginning to resemble suburbs in the sand, and the special 'character' of these communities is lost.

This thesis investigates the planning approaches which could be used to retain the character of bach communities in New Zealand. Whangarei District and Thames-Coromandel District have been subject to significant coastal development and were therefore used as cases study locations. The objectives for this research involve identifying the characteristics which are valued about New Zealand bach communities, and the changes which have occurred to the character these communities as a result of 'sea-change' processes. In addition to this, the current planning approaches used by local government to promote and protect the character of bach communities will be examined, and recommendations will be formed for future planning approaches to retaining the character of bach communities.

Local Authority Disability Strategies – Do they work?

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Disabled people are generally an excluded group within society. They have for many years been marginalised, segregated and discriminated against. Society has put in place barriers both physical and social which has further limited people with impairments. The perception of the disabled community nevertheless is changing, governments and communities now understand the importance of equality and equal opportunity. New Zealand, like many countries has the aim of becoming an inclusive society. This will not be possible until groups such as the disabled have participation within society that respects their needs and values without the placement of barriers. Accordingly it is important that local authorities responsible for social, environmental, economic and cultural wellbeing of their community as well as maintaining infrastructure, public spaces and infrastructure act in a way to resolve these issues. The role that local governments can play in changing the day to day lives of those with a disability is vast. As a result local authorities throughout New Zealand are developing or have developed local disability strategies. My thesis explores how well disability strategies are related to best practise, and whether they are benefiting the end user. It also explores the avenues of implementation and monitoring with disability strategies.

Medium Density Housing and Outdoor Space Use

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Auckland has made a commitment to urban consolidation in response to the problems of urban sprawl and changing lifestyles. Recently built apartments and medium density housing have led to community concern over design and loss of residential amenity.

This study investigates the issue of housing design and the use of outdoor space on the public side of resident's homes. Research has found that the use of the public side of homes increases community cohesion, informal street surveillance and safety. The aim of the study is to find how medium density housing resident outdoor space activities are influenced by the design of their homes. The local context surrounding this issue was also examined.

Four medium density housing developments were selected in West Auckland as case studies. Surveys were sent to 364 houses that asked residents about the design of their homes, their outdoor space use, and their perceptions of the area. Site visits were undertaken at each of developments to observe design elements of each house and the street. The Waitakere City District Plan was analysed to identify the provisions that relate to outdoor space use design elements in medium density housing. Interviews were carried out with local council planners and private urban designers to understand the effectiveness and relevance of these design elements in recent developments.

Out of all the residents, 40 returned the survey. Residents indicated that natural features encourage outdoor activities. Field observation found that indoor living spaces adjacent to the street encourages informal surveillance.

Planning for New Zealand Towns: the value of Cittaslow in achieving Sustainable Development

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Cittaslow is an Italian turned global network of towns that collectively resist globalisation and mainstream corporate centred development. They adopt an alternative approach to sustainable development based on each town's local, unique and historic resources. Councils and communities work together to build on the economic and cultural strengths of their town to maintain or regain a sense of community and identity. This research investigates the applicability of the Cittaslow network to the New Zealand planning framework, with particular reference to the Resource Management and the Local Government Act. It is found that Cittaslow policies are best applied to the community-driven Annual and Long Term Plans under the Local Government Act, and other non-statutory economic development initiatives. Current planning issues in the New Zealand small towns of Matakana, Raglan and Morrinsville are identified, primarily the environmental concerns depicted in the District Plans. The value of Cittaslow is investigated in its ability to address the identified planning issues in each case study town, its comparison to the current provisions of each case study town, and through the Key Informants perspectives on the relevance of Cittaslow. A comparison of the value of Cittaslow in the three case study towns will provide an analysis of the practicality of Cittaslow in the New Zealand context, and determine whether Cittaslow could be a useful concept to assist planners in their strive to achieve sustainable development for various New Zealand towns.

Decision making for development in flood-prone areas

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Over the past 5 years, Otago has seen large flood events inundate a series of homes on the Taieri flood-plain. The history of Taieri has long recognised the area as having productive fertile soils and as an area susceptible to flooding. Despite this, houses are located in the spillway of the Silver Stream and in other flood-prone areas. The spillway begins at the lowest point of the floodbank where floodwaters will first breach the banks and overflow into the low lying area below. The flood event in 2006 which breached the Silver Stream floodbanks has raised the question of why has development occurred in a known flood-prone area and what awareness of the flood hazard do the homeowners have? This study seeks to examine these questions and evaluate the ways in which residents and councils actively make decisions surrounding development in flood-prone areas. Preliminary results from residents who were considered to be affected by the 2006 floods show that there was little awareness and consideration for a flood prior to the event. New residents who have moved into the area since 2006 have also been interviewed. Results show that although residents are aware of the 2006 flood, the reliance for flood information is often direct from previous owners and there is little successful interaction through the Council. Results have also revealed varying narratives as to what caused the flood in 2006.

Relationship Dynamics within New Zealand Territorial Authorities

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This research aims to analyse the relationship dynamics between elected officials and council staff in both the policy development and implementation of territorial authorities. A key research goal is to evaluate how differences in these relationships affect the degree to which efficiency and legitimacy are integrated into council operations. As part of this, the study looks to utilize established relationship models and analyse their applicability to the New Zealand context. There has been a gradual evolution of relationship models within academic literature, which have focused on different aspects of relationships, including inputs, roles, and power relations.

A significant focus of the research is placed on the structures of territorial authorities. While all New Zealand councils utilise the council-manager form, there are large variations in the roles, responsibilities, and relations between councillors and council management. The structure of relationships and principles within councils are partially determined by legislation, but the inherent nature of relationships creates a need to also consider the informal, contextual, and idiosyncratic factors that shape them. In addition, this study considers current local government trends and their past, present, and future impact on council relationships. These trends include the increased complexity of local government responsibilities, the promotion of pluralist governance, and market-based management.

Heavy metals in urban runoff from the Water of Leith, Dunedin, New Zealand

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Stormwater and river at the Water of Leith catchment in Dunedin, New Zealand were sampled and chemically characterised (iron (Fe), lead (Pb), copper (Cu), zinc (Zn), manganese (Mn) in total and $<0.4\mu\text{m}$ fractions, suspended sediments, particulate organic carbon, major ions, EC and pH) during baseflow, and stormflow from one storm event. Fe, Pb, Cu, Zn and Mn were found to be predominantly in $>0.4\mu\text{m}$ fraction in stormwater and river. First flush effect was apparent for all particulate metals ($>0.4\mu\text{m}$), dissolved Cu, Zn and Mn ($<0.4\mu\text{m}$) and suspended sediments during the storm event. These variables peak before discharge as easily mobilised materials accumulated during antecedent dry period were washed off. All particulate metals are positively correlated with suspended sediments, indicating the importance of sediments in transporting heavy metals. With little influence of pH, sorption sites are mainly provided by hydrous oxides of iron and manganese. Particulate carbon also plays an important role in metal adsorption in river. Major ions (Cl, Ca, Na, Mg) follow EC, decreased initially and increased towards the end of the event as a result of dilution by rainwater. Total Cu in baseflow, Pb, Cu and Zn in stormwater, and Cu and Zn in river exceeded ANZECC guidelines of aquatic ecosystems. Only total Pb in stormwater exceeded ANZECC guidelines of drinking water. Moreover, dissolved Cu and Zn in stormwater and dissolved Zn in river exceeded ANZECC guidelines of aquatic ecosystems, suggesting a possibility of metal toxicity due to their bioavailability and more difficult to remove by stormwater treatment.

Spatial Variation in Rental Housing in Dunedin, New Zealand

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Abstract: This dissertation focuses on identifying the spatial variation of rental housing in Dunedin. By studying factors that affect rental housing such as those related to location of housing and, characteristics of rental housing and tenants, the study compares the importance of these factors and related implications for rents and spatial variation. This dissertation meets the research aims through an analysis of relevant literature by conducting primary research. The latter comprised semi-structured interviews with Real Estate Agents. The objectives of the dissertation include describing the pattern of spatial distribution of rental housing in Dunedin, analysing the spatial variations in rental housing, identifying the social and economic characteristics of tenants, and finding the relationship between spatial, demographic and economic characteristics and rental housing.

Why is it difficult to grow here? Substrate challenges at Wangaloa opencast coal mine.

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Opencast mining degrades the environment. As a consequence restoration efforts are required to restore ecosystem functions and biodiversity. The Wangaloa opencast coalmine ceased operation in 1989. Initially the site was planted with *Pinus radiata*. In 2000 a new rehabilitation plan was implemented, which included the removal of exotic species and extensive planting of natives. Many areas of the mine now support a wide range of species but challenges still remain. Field trials were conducted in 2005 where coal fly ash and limestone were added to a slope suffering from mild acid mine drainage, with the intention of raising pH and improving substrate conditions. The main objective of this study is to investigate the pH, nutrient status and boron levels of the substrates at this site. This should indicate how the substrate is functioning and what factors are limiting plant abundance and growth. Soil analysis, plant counts and foliage analysis were conducted. Preliminary results indicate that the pH is near neutral in the limestone plots, mildly acidic in the fly ash plots and highly acidic in the control plots and in between the plots. Boron levels were highest in the fly ash plots, moderate in the controls and between the plots and low in the limestone plots. Other nutrients were low throughout the study site. The preliminary results indicate that the plants at the site face a number of stresses. Soil amendments appear to have increased the pH, however elevated boron levels in the coal fly may be inhibiting plant growth.

Social and Economic implications of hosting a mega sporting events

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Mega sporting events have long been considered to be the jewel of the sporting calendar. Hosting these large scale sporting events has long provided an opportunity for countries to elevate their worldwide standings to levels previously seen as unattainable to them, public image, possible tourism destination etcetera. However the country that is hosting these mega sporting events can be left with a much greater impact both socially and economically. The relationship between temporary positive economic activity and negative social factors is something which has developed through the literature covered during the research for this paper.

Therefore my overall aim for which this research project is to focus upon is whether a short term positive economic gain for the months leading up to and immediately following the mega sporting event being hosted are worth the potential long term negative social impacts which have often been associated with hosting these events, especially in developing countries. The key focus points are ‘developing’ countries/cities which have hosted mega sporting events including; the Seoul Olympics (1988), the rugby world cup in South Africa (1995) the Beijing Olympics (2008), the Delhi Commonwealth Games (2010) and the soccer world cup in South Africa (2010).

The effects of sedimentation on the growth and mortality of juvenile *Haliotis iris* and their living habitat (crustose coralline algae)

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Coastal sedimentation is one of the most significant land-based sources of degradation of rocky coasts. There are a range of direct and indirect ecological effects that result from both increased turbidity and sediment deposition. Currently, gaps in knowledge make it difficult to predict the effects of sedimentation on individual species and ecological assemblages on rocky coasts. There is a need for further research into the effects of sedimentation on coastal ecological systems and their constituents. The purpose of this experiment is to determine the effects of sedimentation on the growth and mortality of juvenile *Haliotis iris* and their living habitat (crustose coralline algae). The growth and health of *H. iris* will be measured via changes in length, weight and righting time of individuals, and a PAM fluorometer will be used to monitor photosynthetic activity for coralline algae as a response to two levels of sedimentation. It is hypothesised that sedimentation will inhibit growth, decrease health and increase mortality of *H. iris* and decrease the health of crustose coralline algae.

The effects of climate change on discharge for two environmentally distinct catchments, Central Otago, New Zealand

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Climate change linked to anthropogenic emission of greenhouse gases is expected to have substantial effects on Earth's water resources. Changes in the amount and timing of catchment discharge may occur as a result. Catchment discharge regimes are environmentally, socially and economically important. While many studies worldwide focus on the hydrological effects of projected climate change, there have been few such studies in the Otago region, and none specifically focussed on Central Otago. This investigation examines the effects of projected climate change on catchment discharge in Central Otago, New Zealand.

The investigation focuses on two environmentally distinct tributaries of the Clutha River: The Lindis River and the Matukituki River. Discharge in these two catchments was modelled using the distributed hydrological model TopNet. This hydrological model was then subjected to forcing from the projections of 12 different global circulation models for the A1B scenario. From this, projected weekly averaged flows in each catchment were produced for two future time periods: 2030-2049, and 2080-2099.

Annual precipitation was found to increase in both catchments for both future time periods. Catchment discharge was found to greatly increase during winter and spring while remaining relatively unchanged in summer and autumn. These changes in discharge seasonality are consistent with projected increases in winter precipitation as well as a larger proportion of this precipitation falling as rainfall rather than snow due to higher mean temperatures.

Indigenous Afforestation of Marginal Land

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This dissertation examines the factors influencing indigenous afforestation of marginal land on sheep and beef farms in Hawkes Bay. There are climate, soil, and economic benefits to be derived from an increase in indigenous forest at national, regional and individual farm levels. Three forestry schemes promoting forestry through carbon trading are analysed for their potential to provide farmers with viable options for afforesting their marginal land with indigenous species. Interviews conducted with Hawkes Bay farmers are assessed to determine their knowledge of the three schemes, their perspectives on the constraints and benefits of each scheme, and their attitudes towards marginal land use and indigenous afforestation.

Preliminary results indicate that farmers lack knowledge and understanding of the forestry schemes, particularly the Permanent Forest Sink Initiative. Attitudes towards the forestry component of the Emissions Trading Scheme are mixed, on the one hand recognising the potential for forestry to offset agricultural emissions, on the other hand feeling constrained by the eligibility criteria and sceptical about the future of the ETS. The Afforestation Grant Scheme is the most popular among the farmers interviewed, largely due to the initial cash payment and lack of liability after 10 years. While most farmers expressed an initial preference for indigenous forest species, this changed to preference for exotic forest species due to the higher carbon sequestration rate and greater economic return. These results, combined with low national uptake, suggest that the forestry schemes provide insufficient incentives for most farmers to afforest marginal land with indigenous species.

Water Quality Management in the Owhiro Stream

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The Owhiro Stream is a small stream which flows through the eastern side of Mosgiel before joining the Taieri River near Allanton. The catchment supports a variety of land uses, including areas of agriculture, such as dairying, beef cattle, sheep and horses, and residential areas and some light industry. Compared with the other tributaries of the Taieri River, the water quality of the Owhiro stream has been described as extremely poor. Previous surveys have found that the stream was enriched with organic matter, had elevated turbidity levels and *E. coli* counts and nutrient concentrations measured significantly exceeding ANZECC trigger values. Numerous restoration projects have been undertaken along the Owhiro by groups like the Taieri Trust and Fish and Game Otago with a focus on excluding stock and planting strips of riparian vegetation. However the effectiveness of these projects has not been monitored. This research aims to assess, and provide a mitigation strategy for, water quality in the Owhiro Stream by analysing how water quality varies in the catchment temporally, with different land uses and in areas with and without riparian vegetation. This was assessed by taking grab samples at 10 sites along the catchment over the period of three months and by installing a sonde to take continuous data in one of the restored sites. Water temperature, pH, nitrate and phosphate concentrations, suspended solids, turbidity, electrical conductivity, dissolved oxygen and heavy metal concentrations were measured and compared to previous data collected by the Otago Regional Council. From this data options for management to improve water quality standards in the Owhiro Catchment, such as integrated catchment management, are proposed and evaluated.

Alcohol and Society: the relationship between student drinking and Dunedin city

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This project seeks to establish an understanding of student drinking culture and the relationship this culture has with the local city, using the case study of Otago University students and Dunedin city. This project will involve an analysis of the student drinking culture, the various factors involved in this culture and the impact it has on Otago University and Dunedin city. This project will draw on prior research of student alcohol consumption and the place of alcohol in society. As well as obtaining current perceptions surrounding the student drinking culture through key informant interviews with a cross-section of local people and government bodies and a student survey. This input will provide an insight to identify opportunities and challenges surrounding student drinking culture in the city. Key geographical concepts will be used to examine the place of alcohol in student life at Otago University and its relationship with population, economic growth and identity.

Hard vs. Soft Coastal Management – Is there a consensus about how our Coasts should be protected?

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Globally there is mounting concern about the impacts of coastal erosion on people and property. Processes like sea-level rise have meant that over seventy per cent of the world's sandy beaches are experiencing net erosion. The issue becomes worse as marginal areas of the coast are constantly being developed in response to the continuous trend of migration towards coastal property which is seen as more desirable than other land. A common notion for coastal defences is that there are three choices, to protect, accommodate or retreat. Traditionally the choice has been to protect by placing 'hard' coastal structures like seawalls parallel to the coast in an effort to hold the line. It has been asserted by some authors that this leads to the destruction of the beach and has significant erosional impacts on adjacent beaches but was seen as the most effective means of defence. In the late 20th century widespread debate amongst coastal engineers developed about the extent to which hard structures impact the erosion of beaches and whether there are more appropriate solutions to the issue. Since then there has been increasing pressure placed on decision makers to use 'soft' management which includes things like beach nourishment. This report aims to find whether there is agreement about how coasts should be protected by examining the literature on the various coastal protection measures and then aims to use this information to analyse possible solutions to a local erosion problem at St. Clair beach in Dunedin, New Zealand.

Biochar: A Tool for Climate Change Mitigation

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Climate change is now the biggest threat on earth causing food security issues, floods, sea-level rise, droughts and social and political unrest. As the impacts become more evident there is an urgency to find ways to mitigate it and reduce the effects. Biochar is a stable product formed by the pyrolysis of biomass, such as wood, crop, or manure, it is seen as a climate change mitigation tool as it actively sequesters carbon dioxide from the atmosphere. There are numerous co-benefits associated with the production and use of biochar, these are; energy production, soil improvement, and waste management. The option of biochar as a climate change mitigation solution is assessed and it is deemed to be a viable climate change solution. However, there is research lacking on the potential of biochar at the global scale and the implementation of biochar and associated policy will be a future challenge.

Monitoring biodiversity: Use and quality of biodiversity indicators in New Zealand.

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With an increasingly urban and interconnected world, many issues such as climate change, human environment modifications and invasive species negatively affect aspects of biodiversity. Biodiversity has cultural, intrinsic, economic, scientific, and adaptive value and it is important to reduce the on-going rate of biodiversity decline both globally and in New Zealand. Monitoring is a valuable tool in assessing the state of biodiversity. Biodiversity indicator use is an important technique for monitoring the change in biodiversity health. This thesis focusses on assessing the number and range of biodiversity indicators in New Zealand and the efficiency and adequacy of using such indicators. Biodiversity indicators are used at all levels of governance in New Zealand. These indicators have been developed at the national level, with the expectation that they would be utilised by regional and local governing bodies. This thesis will use a literature review method to examine and critique both academic and official government material referring to biodiversity, monitoring and indicators. There will be a description and critique of Froude's proposed biodiversity indicators (1998) and the State of the Environment (2007) report. New Zealand's biodiversity indicator programme will then be compared to that used in Australia. Regional and local biodiversity indicators will also be examined. Overall, some tentative conclusions are, that biodiversity monitoring could benefit from greater co-operation between national, regional and local monitoring schemes and that a reassessment is needed to determine what is actually meant by biodiversity, addressing its subjective nature and examining whether the current indicators are appropriate.

Seismic Influences on Dune Morphology

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Seismic events that occur in the mountainous regions of the world often trigger mass movement processes such as landslides. In regions of high precipitation the material involved in such mass movement can be readily deposited into mountain watersheds. These waterways, if they flow into the ocean can potentially transport a significant pulse of sediment to the littoral zone. This sediment is then integrated into the coastal sedimentary cycle and through coastal processes can be deposited onshore. It is possible that the deposition of seismically derived sediment onshore can leave distinct historic markers of paleoseismic events in the form of prominent dune ridges. In conjunction with these features seismic events that trigger tsunamis can have a significant impact on coastal morphology. Tsunamis leave distinct geomorphological features such as well defined layers of sediment and altered dune features.

This paper reviews the theory and concepts behind seismic influences on coastal dunes including the methods used in analysing such impacts, comprising of a combination of geomorphological maps, thermoluminescence dating and analysis of colonising trees. Current literature on the subject is reviewed and a number of shortcomings in the current understanding of the subject are identified. Shortcomings include theoretical and methodological issues such as the identification of coastal sediments derived from coseismic mass wasting and the matter of the dispersion and transportation characteristics of such sediments in the fluvial system and littoral zone.

Avalanches as a Hazard; putting the puzzle pieces together to establish one's vulnerability

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Skifields are an increasingly popular location for outdoor recreational pursuits. One hazard associated with such pursuits is avalanches. Avalanches may be broadly defined as loose snow or slab, and both types can be wet or dry. In order to operate a skifield safely, management must be able to predict and mitigate avalanche risk. To ascertain whether an avalanche is likely to occur, forecasters use three classes of data. The first class of data involves observations of any observed avalanche activity. The second class of data comprises factors both on and within the snowpack. Snowpits are utilised to obtain data from within the snowpack, including the identification of layers and the characteristics associated with those layers. Furthermore, various tests can be undertaken that indicate slope stability. However, due to the spatial variability of a snowpack, extrapolating the results from class two data to represent an entire slope has proven unsuccessful. Recent scientific studies have focussed on class two data, such as the identification of a weak layer within a snowpack, and the spatial variability of that layer throughout a slope. The third class of data pertains to meteorological factors acting upon the snowpack, which can trigger instabilities at, and below, the snow surface. In order to appreciate the true risk of avalanches, information obtained from forecasts must be combined with detailed and site specific data. These considerations are explored in this research.

The management methods of regional councils for mangrove encroachment within New Zealand

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Mangroves are trees or shrubs found in muddy, intertidal zones in tropical coastal swamps (Harty 2009). Their numerous tangled roots form dense thickets, providing habitats for hundreds of species and protecting the shoreline from long-term erosion (Harty 2009; Nature Conservation Council 1974). *Avicennia resinifera* is the only mangrove species found in New Zealand and is limited by the cold frosts, poor seed dispersal and exposure of the coastline (Harty 2009).

A build up of excess sediment and nutrients in the intertidal zone, can lead to an expansion of the mangrove forests in the estuaries and the harbour ecosystems (Lovelock et al. 2007). Encroachment has become a common issue around the world, as well as New Zealand affecting many of the harbours in the North Island of New Zealand.

At present there are only a handful of management practices in place for encroachment (NIWA Online 2011). There is limited guidance on this matter in the RMA 1991 and the NZCPS, with mangroves only being mentioned in two of the policies (policies 1.1.2(c) and 3.4.3). In 2003, the Mangrove Steering Group developed 'mangrove guidelines' outlining a standard set of scientific methods for monitoring changes in mangrove habitat size (Environment Waikato Online 2010).

Environment Waikato, Bay of Plenty Regional Council, Northland Regional Council and the Auckland Regional Council have all developed general management strategies for encroachment, based on reports conducted by NIWA and other published documents. However, there is not one set method, instead the councils

assess each case individually to determine the best outcome for all the factors involved.