DESIGNLAB IN ACTION: REGIONAL SCALE LANDSCAPE DESIGN

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1 ABSTRACT

In this paper we present two DesignLab projects that provide insight into the practice of design directed research. Te Whenua Hou reimagines a 7600 ha dairy conversion project as a gateway for brand values and also a biodiversity corridor across monocultural agricultural landscapes. The Mackenzie Drylands Conservation Park investigates ways biodiversity values can be fostered through diverse land tenure relationships within a distributed park system. The two projects generate possibilities that challenge default expectations of these landscape types. Their function is to identify novel possibilities that might unsettle aesthetic clichés and normative landscape architecture practice, and instead acting as experiments into innovative expressions of bio-diversity, culture, and sense of place.

1.1 Keywords

Design-directed research, regional scale design, agriculture, conservation

2 INTRODUCTION

In this article two regional scale projects are considered. The first focuses on a currently being implemented farm design that uses a distributed native forest design as the means to open up a regional scale native bird corridor across the highly modified and intensively farmed Canterbury Plains. The second poject presentes speculative options for a distributed conservation park whosde form is generated through the layering of a range of land tenure types, agriculture practices, biodiversity protections and tourism and recreation activities as a means of considering how a multifunctional landscape approach might also protect protected area values.

3 PROJECT ONE: TE WHENUA HOU

Dairy production, alongside a much larger sheep farming industry, has underpinned the New Zealand economy since the early days of European colonisation in the mid-19th century. Dairy farms traditionally had an aesthetic of tidy green pastures surrounded by hedges, but the recent expansion of dairy across more and more land has required mechanised irrigation, resulting in the removal of hedges and other vegetation (Peden, 2008). The Canterbury Plains is one region in which the shift from grain and sheep farming to dairy is significant (Peden, 2008). The 750,000 ha Plains are composed of introduced crops, exotic production forests, and grazing land, with only about 0.06% of cover being indigenous vegetation. This produces a distinctive landscape visually, and one which lacks bio-diversity ecologically, providing few resources for native fauna, and representing only one cultural history (figure 1).

Figure 1: Aerial view of the northern Canterbury Plains. Photo: Andrew Cooper. Reproduced by permission of Andrew Cooper.

Te Whenua Hou is a 7,600 ha dairy conversion being undertaken on the Canterbury Plains by Ngai Tahu property, on behalf of the South Island's largest Maori tribe. Through the use of irrigation it involves the transformation of former forestry lands and dryland pastures into dairy production. In total, 20 standalone

farms are being created in this billion-dollar investment. DesignLab was engaged to consider the opportunities landscape architecture could develop through creating a sense of a gateway and entrance to the project. While the project partner's expectation was that this would focus on entrances to each of the farms, and also to the farm as a whole, our investigations identified deeper opportunities to express this quality of a gateway.

The water for irrigation across the property comes from the nearby Waimakariri River. At its headwaters it is fed by glaciers and snowmelt before emerging from a gorge to weave its way braiding across the Canterbury Plains and down to the ocean. This river is significant to Ngai Tahu. In our studies we identified that there was both value and opportunities to express the life this water brings to native forest plantings across the project.

The Canterbury Plains are heavily modified ecologically. Given this level of modification, very few pockets of pre-settlement shrub lands and forests remain. Nor can these lands be simply returned to their former constitution. Given the current context, if native plants were to be returned today, it would be difficult to do so in such a way that would match their existence within a past ecology. In accepting this, we sought to identify ways native planting could be established and foster biodiversity, while also strengthening the production values of this development. To achieve this a palette of native plants was identified and differentiated according to the functions they could perform within the farm. Together they could deliver benefits at a regional scale. This project is currently being implemented and involves the planting of 750,000 native plants. Their configuration is highly structured, but using a fractal-based organisation allows for a diversity of plant relationships to arise and flourish.

The vision takes advantage of irrigation to support endemic forestry, adding to biodiversity through the increase of invertebrate and avian fauna these native trees will host as well as supporting native birds moving across the Plains. The fusion of dairying and forestry is innovative, inverting negative perceptions of dairying. The pivot irrigator patterns form the basis for planting, allowing the full development to include 5% of its land area for native planting; a significant contribution, even on productive land, to the goal of 17% protected land by 2020 under the Aichi protocol. The planting framework weaves through the site, transforming it from a limited agricultural palette to a vibrant and diverse cultural presence. The planting becomes a provenance story of 'eating pure,' countering the negative view of industrial agriculture. It is a dynamic and flexible approach which allows for change, for a decline in dairying might lead to areas transforming into residential development.

One of the key drivers for the planting design was the use of fractals, which are self-similar patterns that replicate across scales. This mechanism drove the form and content of the planting at the farm scale, extending right down to a fractal ordering of the more than 750,000 plants, covering 350 ha of the 7600 ha development. At the plant scale, species are arranged in a rhythmical sequence , with this patterning expressing the ethos of order and organisation that structures the entire farm operation. Twin colonnades of totara dominate the primary shelterbelt network, supported by other indigenous species (figure 2).

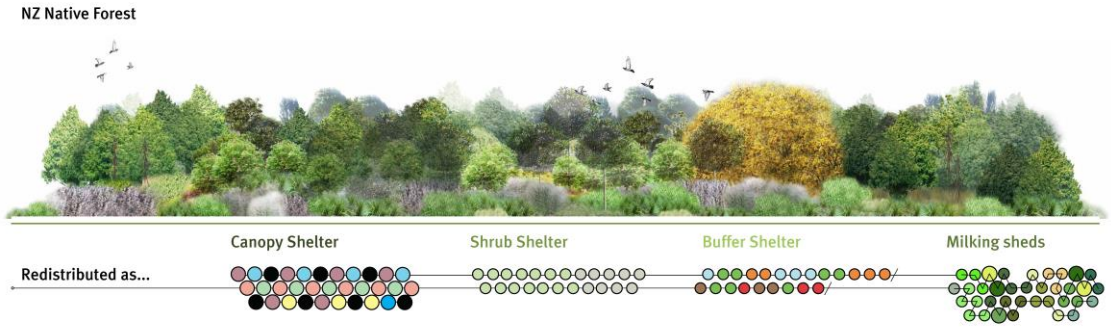

Figure 2. Planting concept and expression that shows the ordered planting structures that combine to generate habitat for native brids and invertebrates. Image by the authors.

At the scale of the pivot irrigators, patterning responds to the dominant winds and sun direction. The native plantings provide shelter for stock, and a native timber resource for future generations. Canterbury's braided river patterns are echoed at the development-scale, and will eventually be seen when flying into Christchurch (figure 3).

Figure 3. Fractal planting as seen from the air. Image by the authors.

This aerial view emphasises how the development scale becomes part of the region, giving a sense of arrival, not just for those driving to the farms, but also for those flying into the South Island's main gateway airport.

It is at the regional scale that this project establishes its greatest potential impact. The Canterbury Plains, with its paucity of native species acts as a barrier to native birds being able to travel across. This has resulted in Banks Peninsula becoming almost an ecological island. Projects such as Te Ara Kakariki have sought to establish connectivity across the plains through the planting of small reserves. Competing uses for land have arguably impeded the level of planting possible, and subsequently, its effectiveness. This project, working at the expansive scale of the landscape,that being 10 kilometers wide and 20 kilometers long creates a potential corridor for native birds to travel from the South Island's back country over the sparsely vegetated plains to Banks Peninsula (figure 4).

Figure 4. The planting provides a 'bridge' for native birds to cross from the Southern Alps to Banks Peninsula – across the 'desert' of the Canterbury Plains. Image by the authors.

It also establishes a possible model in which irrigation becomes a vector, allowing further conductivity to be established as part of the introduction of irrigation across the plains. Here planting design is a potent dimension of landscape architecture practice. Bound up in the practice of tree planting are an inter-generational temporal perspective and a place-sensitive approach to landscape. These factors of long-term vision and local distinctiveness resonate with the values of Māori, making planting a core component for this dairy development owned by Ngai Tahu, one of Aotearoa New Zealand's Māori tribes.

4 PROJECT TWO: MACKENZIE DRYLANDS CONSERVATION PARK

The MacKenzie Basin is an extensive drylands ecosystem that has been used for sheep grazing since the time of European settlement 150 years ago (Wilson, 2015). Its distinctive character is shaped by the action of glaciers, which dumped gravels across the region before retreating. Within the landscape are endemic plants and invertebrates whose unique characteristics have been developed through the processes of adaptation to the shallows and humps formed by the bed of the retreating glaciers. Like many similar regions, the development of irrigation technologies has led to a rapid level of landscape change, as centre pivot irrigation is installed throughout the basin (Macfie, 2016). This has led to much debate, with farming, conservation, and tourism interests having competing expectations with regards to the best way to manage this landscape (Macfie, 2016).

The 2012 Mackenzie Agreement brought together these diverse stakeholders to create an effective mechanism under which to negotiate and structure the way these landscapes are to be used and protected. This led to development and protection targets being set alongside management approaches that emphasise offsetting as mitigation for those protecting. This may be an additional constraint for those whose focus is irrigation based development. While the agreement tabulated respective numbers of hectares for each use, it did not consider how these might play out spatially.

Design lab, in a design-directed research project, sought to identify key drivers that would shape the landscape's spatial form, and then through development of scenarios, how these might play out over time. The research had two distinct phases. In the first, 12 senior landscape architecture students worked with two of the three specific themes identified in the MacKenzie agreement. For two students, conservation

was selected as the dominant theme, with farming production included as a supporting, secondary consideration, while tourism factors were expressly ignored. Another group of two students kept conservation as the dominant theme, but with tourism was this time made a supporting theme, and farming expressly ignored. Table 1 shows how the six student groups were organised so each option was considered.

Table 1. Matrix of Design Drivers as Explored by Student Teams.

Research Matrix	Farming	Conservation	Tourism
Students 1 & 2	Dominant	Secondary	Ignored
Students 3 & 4	Dominant	Ignored	Secondary
Students 5 & 6	Secondary	Ignored	Dominant
Students 7 & 8	Ignored	Secondary	Dominant
Students 9 & 10	Secondary	Dominant	Ignored
Students 11 & 12	Ignored	Dominant	Secondary

During the research studio each student developed a spatial master plan at the regional scale, and also more detailed indicative site-based planning and program development. Following this, DesignLab researchers extracted the project's common components that were integral to tourism, conservation, and/or farming production. Figure 5 shows part of this process. This involved a further process of refined design, as we sought to schematically model these components at both a regional and local scale.

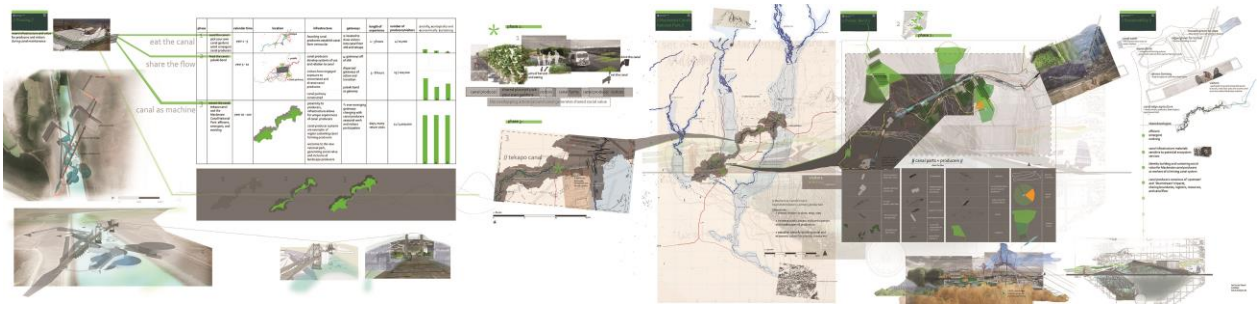

Figure 5 Mackenzie Drylands Concept development. Student work by Ian Tucker Peach.

Through this approach the following seven key drivers were identified that could shape a regional scale 'Drylands Park': protecting and connecting along the rivers and lakes; creating a path across the basin; developing a distributed park with distributed ownership; restoring selected ecosystems from current impacts; seeking opportunities for tourism activity; canal water farming; and targeted land irrigation. The second phase used a speculative approach to consider how these different drivers might play out both across the region over time. Rather than articulate a demarcation into respective zones, a more layered approach was taken, in which opportunities to combine tourism with farming, farming with conservation, conservation with tourism, and also across all three factors was considered across the different land classifications.

This research found, that at a regional scale, it is possible to tease out a more complex and multifunctional expression of a conservation park. While default norms might suggest such parks should be standalone and continuous, this work developed scenarios that allow a more distributed conservation park to be considered. The park can link a range of protections, some of which maybe publicly accessible, while others remain in private stewardship, managed according to a more diverse range of conditions. Such management can be more attuned to the biodiversity outcomes being sought at each site, rather than forcing a simplistic binary choice of full protection or full development. Instead, a spectrum becomes possible that expresses conservation as being many shades of green.

5 CONCLUSION

The two projects, one on the Canterbury Plains and the other in the MacKenzie Basin, illustrate how landscapes of change are settings for landscape architectural innovation. DesignLab's research is

collaborative, involving students and staff, including a range of colleagues from different disciplines. This research setting provides the context for responding to changes to agriculture and technology in ways which envisage new landscape forms. In this landscape architecture can be a generator of subsequent discussions in which new scenarios add to a simultaneous focus on agriculture, ecology, culture, hydrology and technology. In this design can be considered as an interdisciplinary, innovative and collaborative endeavour. New scenarios add to the richness of possibilities in our everyday landscapes.

Landscape architecture can be multi-scalar, capable of bringing both design and ecological values to projects at the most intimate of scales – for example pocket parks, pocket gardens, and rooftop interventions – and also at the regional and national scale. This research seeks to investigate the creative opportunity opened up by the significant levels of landscape change brought about through increased intensive farming. This work results in opportunities to express changing relationships with the environment, and also to identify potential options for increasing ecological and biodiversity benefits. In this we do not want to ameliorate or mitigate. Rather, we seek to suggest potential ways landscape change can directly increase ecological outcomes.

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