Memo

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CC	
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Changes in lifestyle properties within Waimakariri CWMS zone

Introduction

Lifestyle blocks are a significant land use component in the Waimakariri Canterbury Water Management Strategy (CWMS) Zone. There is a lack of data on the existing extent, distribution, and trend in lifestyle properties in the zone. The information could be of use for informing the current land use map and in giving some scope for the hypothetical land use change scenarios. The fragmentation of the rural landscape by lifestyle properties is generally a cascade of irreversible change (Andrew & Dymond, 2013).

Methodology

There is no existing dataset documenting land use change in Canterbury. I examined two approaches for estimating changes in lifestyle properties through time. One relies on a spatial analysis of the existing and historical land parcel polygon dataset, the cadastres, to identify land fragmentation that has occurred between two snapshots in time. The other approach, relies on the land title data, available freely from Land Information New Zealand. The dataset contains the issue dates of titles, which can be used to date the inception of the properties. Both methods are applied to the current cadastre, from March 2016, after it has been processed to identify the existing lifestyle properties with the land use data from Environment Canterbury's regional valuation roll.

Identifying land use

We used Environment Canterbury's regional valuation roll as a source of land use information. The roll records a primary land use for each property, which includes a set of codes for lifestyle uses. The most frequently used of these codes distinguish between the occupied and unoccupied lifestyle properties, recording a presence, or otherwise, of a dwelling. The regional roll database is non-spatial, but it records a number of attributes that can be used to link its records with the cadastre polygons (legal description, title, and street address). Unfortunately, a unique join between the two does not exist, and an automatic join process fails to find the valuation data for a proportion of land parcels. I carried out a manual exercise to improve the match for a number of polygons, targeting unmatched polygons in the 0.06 and 50 ha size range.

Identifying changes based on land parcel fragmentation

The oldest version of the cadastre layer archived on our council's databases is from circa 1997, giving us an analysis window separated by approximately 20 years. By examining the spatial relationships between polygons in the historical and the current cadastres, we can identify those land parcels that have been involved in fragmentation processes.

I summarised the relationship between the centroid points¹ of the 2016 land parcels and the polygon shapes of the 1997 land parcels, counting how many of 2016 centroid points fall within each 1997 polygon parcel. The number of 2016 centroid points located within the extent of each 1997 parcel tells us if that particular parcel, present in 1997, is now represented by more than one parcel. I used a spatial join operation, in ArcGIS Map software suit, to calculate this count statistic. In creating the spatial dataset of the 2016 centroids, we constrained the location of centroids to within its polygon's boundaries.

If the count of 2016 centroids within any 1997 parcel exceeded one, we treated the associated 2016 land parcels as products of fragmentation. The method may not work effectively in instances where the geometries of sibling parcels sit uncomfortably within the geometry of the parent parcels, for instance, if a set of narrow parcels is merged, and then split into smaller, but wider, blocks through subdivision.

Tracking changes based on the NZ Title data

Land Information New Zealand freely distributes a layer providing information about the property titles associated with the primary parcels. The layer is called NZ Property Titles, and it includes the date of the title issue as an attribute. This date represents the date when the title is created, usually through subdivision, giving us an accurate and precise understanding on the timing of land fragmentation.

Results

The lifestyle properties in Waimakariri CWMS zone have more than doubled in the last 20 years, in both number and area. The sum of both unoccupied and occupied lifestyle properties in the study area now reaches close to 6,500, covering slightly over 30,000 ha.

Table 1 shows the breakdown of the lifestyle, and residential, properties using the archived cadastre from c.1997 as a reference point. Figures 1 and 2 show the annual, cumulative growth in the number and the area of lifestyle properties through time, estimated using the data from their associated titles. I also append a map displaying the changes, a small version of which is shown in Figure 3. All these results break-up the data by the district zoning. The two methods for examining land use change are generally consistent, although the title issue data suggests that a fewer parcels had been issued by 1997 than recorded by our archived cadastre, implying that the layer may be of a later providence.

¹ Centroids are points that approximate the central mass of polygon features.

Since late 1980s, on average, we are seeing approximately 10,000 ha of land become lifestyle properties every 10 years. There was a significant exponential phase in their growth during mid-2000s. From c.1997 onwards, we are also seeing a reduction in the average size of the lifestyle blocks. This shift to smaller parcel sizes is also evident in the residential properties (Table 1).

Due to the nature of the methodology, the analysis is unable to distinguish the subdivision of existing lifestyle blocks to smaller lifestyle blocks as a special case, which technically is fragmentation, but not land use change. In addition, I have assumed that all the land parcels in existence in c.1997 and identified as lifestyle within the roll as of 2016 were occupied. Because we do not have a copy of the valuation roll from c.1997, we cannot discriminate between the occupied and the vacant present at that point of time, or the fragmentation of larger lifestyle blocks.

Table 1. Number and area under lifestyle and residential properties in Waimakariri CWMS zone, identifying separately the properties present in c. 1997. Lifestyle properties are separated according the presence or absence of a dwelling, and the district plan zoning.

			Count of	Sum of area
Land use code	Source date	District zoning	properties	(ha)
Lifestyle (occupied)	Present in c.1997	Rural Zone	1,987	11,882
Lifestyle (occupied)	Present in c.1997	All Other Zones	439	470
Lifestyle (occupied)	New since c. 1997	Rural	2,403	11,077
Lifestyle (occupied)	New since c. 1997	All Other Zones	372	270
Lifestyle (unoccupied)	Present in c.1997	Rural	411	3,215
Lifestyle (unoccupied)	Present in c.1997	All Other Zones	14	13
Lifestyle (unoccupied)	New since c. 1997	Rural	769	3,872
Lifestyle (unoccupied)	New since c. 1997	All Other Zones	71	54
Residential (occupied)	Present in c.1997	Rural	219	87
Residential (occupied)	Present in c.1997	All Other Zones	7,409	820
Residential (occupied)	New since c. 1997	Rural	403	176
Residential (occupied)	New since c. 1997	All Other Zones	4,254	641



Figure 1. The cumulative change in the number of lifestyle properties in Waimakariri CWMS zone according to the respective year of title issue. Colours identify different district planning zones.



Figure 2. The cumulative change in the area (ha) of lifestyle properties in Waimakariri CWMS zone according to the respective year of title issue. Colours identify different district planning zones.

Attachments:

Map – Estimate of Lifestyle block fragmentation between c.1997 and 2016.

File reference:

ECan SharePoint

References

Andrew, R., & Dymond, J. R. (2013). Expansion of lifestyle blocks and urban areas onto high-class land: an update for planning and policy. *Journal of the Royal Society of New Zealand*, *43*(3), 128-140.





Figure 3. Estimated spatial distribution of lifestyle and residential land use fragmentation in the Waimakariri CWMS Zone, showing differences between c. 1997 and 2016.