

# **Migration and the Place Community<sup>1</sup>**

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## 1. Introduction

As a result of rising economies of agglomeration and the associated growth of metropolitan centres, small settlements everywhere are being repositioned within the preference sets of individuals, households and firms. As the competition from larger centres intensifies, many small communities struggle to grow their populations and secure a sustainable growth path of their own. While most firms and most young, well educated members of the labour force find large centres increasingly attractive, those less competitive in the labour market and those with certain lifestyle preferences continue to settle in secondary and smaller towns throughout the country. Dependency ratios tend to rise as a result and many small towns find their populations exhibiting greater dependence on the State.

The aim of this paper is to place population turnover and migration as it relates to small towns in the context of a national competition between settlements for residents. Far from being random, the way migrants connect small communities to the rest of the country is quite systematic, for each small community is embedded in its own unique circuit of mobility that connects its population to other settlements throughout the country. Empirically I show that flows associated with these circuits are **reciprocal, restricted, resistant, reactive, regulated** and **redistributive**, a collective set of properties refer to as the six Rs.<sup>2</sup>

Across settlements of all sizes in-flows of internal migrants reflect out-flows in a *reciprocal* manner, in part because they are *restricted* in terms of the distances moved. Partly as a result these flow paths are also *resistant* to change and therefore persist over time. Residents *react* to connections built up at the place origin, including employment, and this acts as a constraint on the distance moved. Another reason for the symmetry and persistence of migration flows between places is that both the origins and destinations connecting flows share a similar stock of natural and man-made amenities.<sup>3</sup> Populations usually move between places with similar amenity levels but when flows deviate from such paths migration becomes *redistributive*, channelling people between communities with different levels of amenity and hence socio-economic position.

The argument is presented in the following sections. Section two motivates the enquiry and raises a number of conceptual issues to do with mobility and how it is measured. Section three introduces the case study of Kawerau and traces its interactions with the rest of New Zealand between 1991 and 2001. Section four considers three other small communities as comparisons. Section five draws the arguments together and considers their implications for the delivery of social services. Appendix 1 tabulates the raw counts of migrants and Appendix 2 outlines the 1996 New Zealand Deprivation Index (NZDep96).

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<sup>2</sup> Several of these properties are common to all migrations and were identified almost 125 years ago in the classic paper by Ravenstein (1885:167–235). The particular concern of this paper is what these properties mean for the growth and functioning of small communities.

<sup>3</sup> Greenwood and Hunt (1989), Chen and Rosenthal (2008), Mueser and Graves (1995).

## 2. Motivation, Concepts and Measurement

The motivation for the funding of this research was a belief that, in certain communities, population mobility can disrupt relationships with state support agencies (and those they contract) and contribute to diminished educational, health and economic outcomes. Large numbers of people moving into or out of a community over a short time can destabilise relationships within the community, disrupt educational sequences and reduce the efficient delivery of local services.<sup>4</sup> At the same time, a certain level of population turnover and replacement is necessary to sustain the population size and demographic balance of a community. From a policy perspective, therefore, the aim is to optimise the benefits of residential mobility while mitigating its potentially negative impacts on individuals and families, employers and firms and the community institutions they support.

Internationally we know a great deal about internal migration.<sup>5</sup> In New Zealand the characteristics of such patterns are continually being documented and updated.<sup>6</sup> In policy terms internal migration patterns are most often explored for their role in labour adjustment.<sup>7</sup>

This collective knowledge of migration within New Zealand has been generated primarily through studies of flows between geographic areas in the country (e.g. regions, territorial local authorities, and area units), the data being drawn almost exclusively from the census of population and dwellings.<sup>8</sup> Migration flows are typically analysed by constructing an origin by destination migration matrix, with each cell carrying counts of people moving from origin  $i$  to destination  $j$ ,  $m_{ij}$ . Place based communities enter simultaneously as both origins and destinations, with size and proximity in particular being used as arguments in explaining the pattern of flows.<sup>9</sup>

While *migration* studies focus on flows, studies of the *community* focus primarily on the way places are affected by these flows. In this study I adopt the second approach, focussing on connections between migration and the small community. The place based approach allows the connectivity of specific communities to be analysed in some depth focussing on both the relevant row of the origin by destination matrix (the migration field) and the relevant column (the migration catchment). The field refers to the set of destinations while the catchment refers to the collectivity of areas from which a community draws migrants.<sup>10</sup>

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<sup>4</sup> See for example Sampson and Groves (1989), Carpiano (2006).

<sup>5</sup> See for example Bell et al. (2002) and Greenwood (1997).

<sup>6</sup> Didham, 2003, Goodwin and Bedford, 1997, Kerr et al., 2004.

<sup>7</sup> See for example Maré and Timmins (2003), Morrison et al. (2008), Maré and Timmins (2000).

<sup>8</sup> The exception is the recently released Statistics New Zealand Survey of Dynamics of Motivation and Migration (Didham (2007), Morrison et al. (2008), Nissen and Voon (2007).

<sup>9</sup> Places appear in such models either as fixed effects or as attributes of origins and/or destinations such as size, or condition (e.g. the proportion unemployed). In the gravity model for example, flows of people between the origins and destinations (the flow dyads) are modelled on the basis of population size of the origin and destination and the distance between them (Cadwallader (1992).

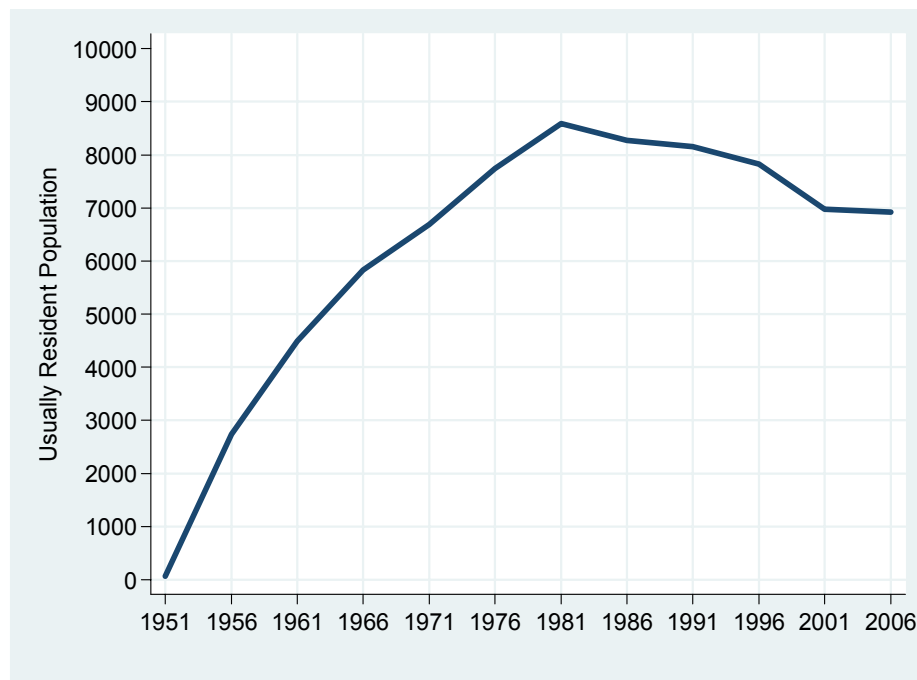
<sup>10</sup> Our reliance on the census precludes the inclusion of those moving overseas. Correspondingly we have also omitted those arriving directly from overseas origins for we know that, with the exception of Auckland, in-migrants from overseas make up a fairly small and relatively constant share of all in-migrants across New Zealand (Newell, 2002).

Migration catchments and fields are not new concepts; they were central to the work of Agnew and Cox<sup>11</sup> and Vance,<sup>12</sup> for example, and their relevance in understanding the demography of places was foreshadowed by Hagerstrand a few years earlier.<sup>13</sup> Despite their veneration, Agnew and Cox's observations of 25 years ago, that "little research has been conducted into how urban in-migration fields evolve over time", still holds true today.<sup>14</sup> In the New Zealand context comparatively little attention has been paid to migration fields (or catchments) of urban areas including small towns, and until recently similar observations could be made about the associated *labour* catchments (sheds) and *labour* fields to which I refer to below. I introduce these concepts through the experience of Kawerau, a small purpose-built settlement in the Bay of Plenty.

### 3. The Kawerau Case

The contemporary demography of any community reflects its economic history. This is particularly true of the purpose-built settlement of Kawerau. After the construction of the pulp and paper processing mill in 1951 the population of Kawerau grew rapidly. It reached its peak of about 8,500 residents in 1981 after three decades of growth after which its population has continued to decline, by approximately 200 people per annum (see Figure 1).

**Figure 1: Population growth and decline in Kawerau, 1951–2006**



Source: Statistics New Zealand, Census of Population and Dwellings, 1951 to 2006

<sup>11</sup> Agnew and Cox (1980).

<sup>12</sup> Vance (1960).

<sup>13</sup> Hagerstrand (1957).

<sup>14</sup> Agnew and Cox (1980:69).

There were three primary reasons for this population history: the built-in ageing process of a newly formed settlement, the reduction in the workforce of the Mill<sup>15</sup> in the early 1980s, and the changing relative attractiveness of Kawerau as a place to live. In communities with stable populations *gross* in- and out-migration flows are similar by definition.<sup>16</sup> In the Kawerau case, out-migration exceeded in-migration in the two intercensal periods I focus on here, 1991–1996 and 1996–2001. Table 1 shows that between 1991 and 1996 the 936 in-migrants from Territorial Local Authorities (TLAs) outside Kawerau made up 15 percent of the end of period population, compared to 2,022 who were lost as out-migrants. The result a net loss of 1,086 migrants or nearly 15 percent of the base population in the first period and 930 in the next.<sup>17</sup>

**Table 1: Migration to and from Kawerau 1991–1996 and 1996–2001**

	1991–1996	Percentage of population at the end of the period	1996–2001	Percentage of population at the end of the period
<b>Migrants to Kawerau</b>	936	15	1,011	18
<b>Non-migrants</b>	5,166		4,479	
<b>Population at the end of the period</b>	6,102	100	5,490	100
<b>Migrants from Kawerau</b>	2,022	28	1,941	30
<b>Population at the end of the period</b>	7,188	100	6,420	100
<b>Net loss</b>	1,086		930	

Source: Census of Population and Dwellings, 1996 and 2001

Through the case study of Kawerau’s recent history we will see how small town migration is restricted, reciprocal, resistant, reactive, regulated and redistributive respectively.

<sup>15</sup> Almost half (47 percent) of all the 3,362 jobs (full-time and part-time) in mid 2003 were being offered by the four companies that made up the ‘Mill’: Norske Skog Tasman Ltd., Carter Holt Harvey Tasman, Carter Holt Harvey Tissue and Fletcher Challenge Forest, with the latter including over 50 dedicated contractors. Further details may be found in Morrison (2004).

<sup>16</sup> If numbers migrating into the area approximate the numbers migrating out then migration is deemed *efficient* (Shryock and Siegel (1973)). Several theories have been developed to account for the typically high correlation between inflows and outflows, including repeat mover theory and place effects theory (DaVanzo and Morrison (1978), Miller (1967), Stone (1971)). Arguments for the counter stream are also discussed by Lee (1966). Most empirical evidence supporting such inferences focuses on flows between metropolitan centres rather than small towns.

<sup>17</sup> That reciprocity also holds when cities were losing population and was also noted by Miller (1967:1428).

### **Restrictions**

Small town migration is **restrictive** in terms of ties to other places as well as in the distribution of flows across those places. While Kawerau, the country's smallest Territorial Local Authority (TLA) interacted with 64 of the 74 TLAs in New Zealand, either as a recipient or sender of migrants, most of these interactions involved very few people – as the tabulation in Appendix 1 shows.

The 'intensity' or size of Kawerau's migration connections with other TLAs was positive skewed. The vast bulk of migrants go to very few proximate locations – to Tauranga (156), Rotorua (207) and Whakatane (681) Districts. The majority of changes of usual address between 1991–1996 (5,166 of the 7,188) involved even closer locations *within* Kawerau District itself. By contrast, under one quarter of all TLAs received only three out-migrants during the first inter-censal period, and half received only nine, the base three reflecting Statistics New Zealand's random rounding. Three quarters of the interacting TLAs hosted less than 25 out-migrants and 90 percent were under 50.

Not only does Kawerau interact very selectively with other parts of New Zealand but there is also a very high correlation between the places its residents migrate *to* and the places it receives migrants *from*. This is the second attribute of small town migration flows: reciprocity.

### **Reciprocity**

Of the 64 separate migration flows between Kawerau and the other Territorial Local Authorities (TLAs) between 1991 and 1996 only four involved an inflow with no corresponding outflow and 16 carried outflows with no corresponding inflows; most of the 64 TLAs therefore involved some *reciprocal* migration relationship with Kawerau (see Appendix 1).

Table 2 tabulates the inflows and outflows to and from Kawerau and the other TLAs over the two periods of 1991–1996 and 1996–2001. The overwhelming majority of interactions were with TLAs in the North Island. The 14 South Island TLAs received a total of only 99 and 51 migrants and received in return a total of only 33 and 39 over the two periods respectively. Well over half of all connections made as a result of outflows were reciprocated by inflows in the first period (37/64) while in the second period (43/64) inflows were more likely to be reciprocated than outflows – as one might expect from a town losing population. Corresponding proportions in the second period were only slightly higher at 0.93 (43/46) and 0.78 (43/55). Therefore, if we count reciprocity simply as the joint presence of outflows and inflows then reciprocity has indeed been a dominant characteristic of the Kawerau experience.

**Table 2: Connections Between Inflows and Outflows to and from Kawerau over the Two Intercensal Periods, 1991–1996 and 1996–2001**

		In-migration		
Out-migration	1991–1996	Absent	Present	TOTAL
	Absent	7	4	11
	Present	16	37	53
	Total	23	41	64
	1996–2001	Absent	Present	TOTAL
	Absent	3	3	9
	Present	12	43	55
	Total	18	46	64

Reciprocity is not limited to counting connections however; it is a property which also extends to the size of the flows. To illustrate, panels a and b of Figure 2 are scatter plots of the number of reciprocated migrations by their respective volume for the two inter-censal periods 1991–1996 and 1996–2001.<sup>18</sup> Outmigration was higher than in-migration as indicated by the positive intercept of the fitted line. In both periods the *slope* of the line is less than unity meaning that TLAs receiving a larger flow of migrants from Kawerau were reciprocated by relatively fewer migrants than those receiving smaller flows.

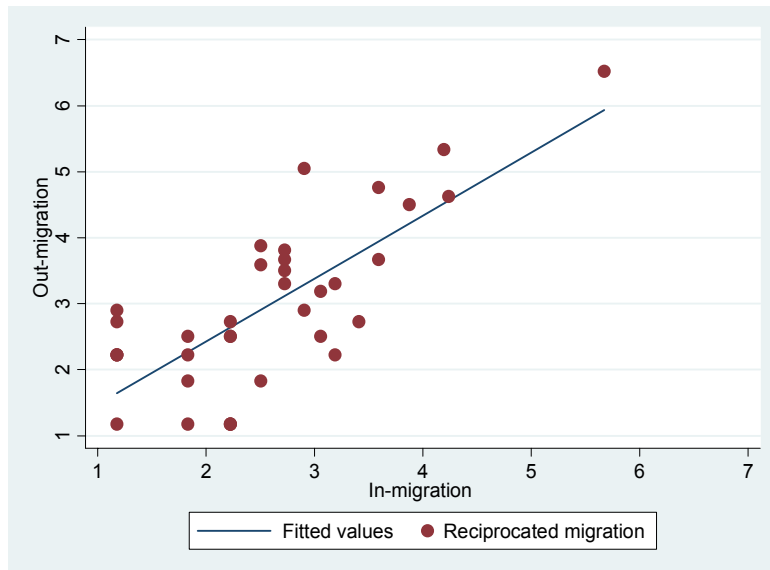
While the slope of the fitted line relating migration from Kawerau to and from other TLAs was slightly higher in the second intercensal period, the intercept was lower suggesting that, while movement within the large streams may have stabilised, Kawerau was losing relatively more migrants to those TLAs to which it sent relatively few people. At the same time, more flows (points on the graph) were involved between 1996 and 2001 and the numbers leaving.

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<sup>18</sup> Since there can be more than one flow with a similar number of migrants the plotted numbers in Figure 2 can be less than the actual number of flows, 31<36 in the first period for example. The scale is in natural logs and have to be exponentiated by the numbers on the Y and X axes in order to realise their actual distances, e.g.  $e^5 = 148.4$  kilometres.

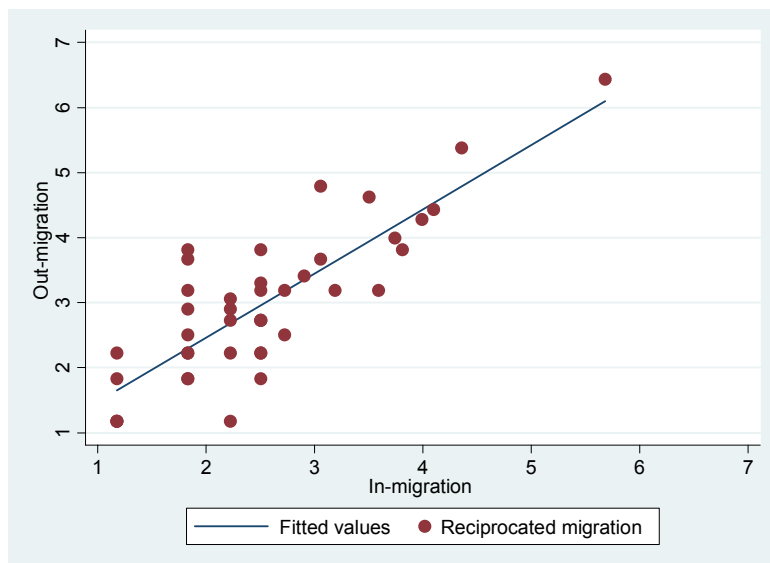
**Figure 2: The Numbers Migrating in and out of Kawerau from and to Other Territorial Local Authorities (natural log scale)**

**a. 1991–1996**



**Out-migration = 0.519 (1.3) + 0.954 (6.72) In-migration; R<sup>2</sup> = 0.58, N=36[31]**

**b. 1996–2001**



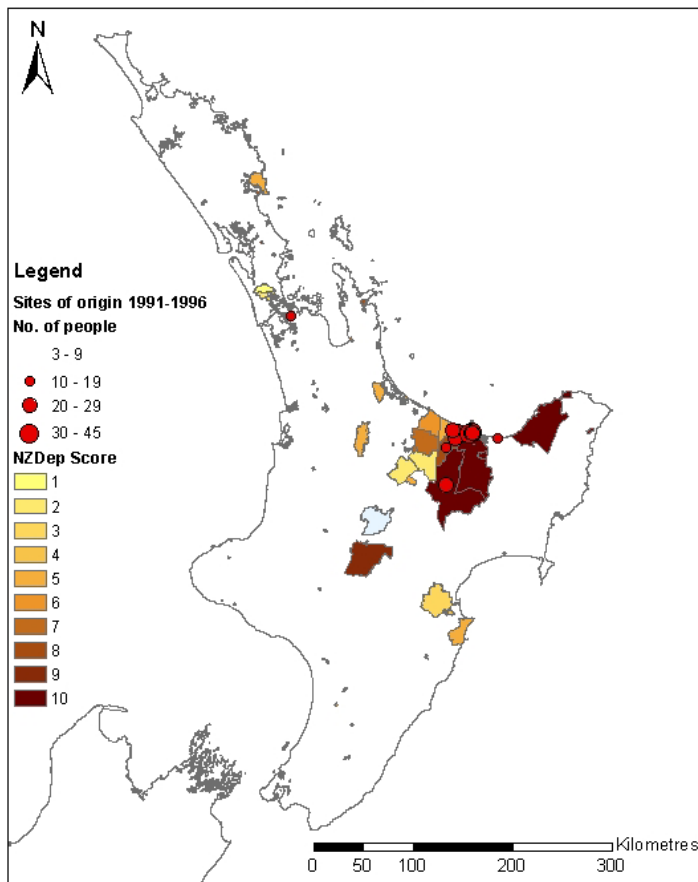
**Out-migration = 0.486 (1.7) + 0.986 (9.32) In-migration; R<sup>2</sup> = 0.68, N=43 [35]**

In summary, the first two properties of Kawerau's experience are the restriction of its in and out migrants to certain parts of New Zealand, particularly areas neighbouring Kawerau, and the reciprocal nature of the flows themselves. Underlying both characteristics are the geographic properties of Kawerau's migration catchment and migration fields.



The catchment that formed in the first half of the 1990s for example is depicted in Figure 3. There are three separate pieces of information presented here: 1) the area units involved in sending and receiving people from Kawerau, 2) the number of migrants (the diameter of the red solid circle symbol), and 3) the decile assigned to the area unit by the NZ Deprivation Index, 1996. The darker the shading of the decile, the higher the deprivation index for that area unit: an NZDep96 score of 1 denotes the least deprived area, while a score of 10 denotes the most deprived area.<sup>19</sup>

**Figure 3: Kawerau's Migrant Catchment 1991–1996. Sites of Origin of People Shifting to Kawerau (at census area unit level)**



Source: Statistics New Zealand

<sup>19</sup> Crampton et al. (2004), Crampton et al. (2000), White et al. (2008). Care has to be taken in drawing inferences from maps based on the NZDep96. The NZDep96 used here is a weighted sum of 11 variables outlined in Appendix 2 created using a principal components analysis (Crampton et al. (2000)). In the maps produced in the text not all people in so called 'deprived areas' are deprived in the above sense. NZDep96 is more accurately referred to as areas containing top 10 scores on the index rather than as the most deprived (ibid).

The relative importance of area units very close to Kawerau is quite apparent in Figure 3, as is the way proximity influences the relative size of the migration stream (the size of the red circles). The area units involved share very similar socio-economic characteristics to Kawerau itself. There is a considerable similarity in the geography of the first and second half of the 1990s and we therefore only illustrate the first period.<sup>20</sup>

Whereas the migration *catchment* refers to the area units from which Kawerau draws its migrants, the migration *field* traces the areas within New Zealand that those leaving Kawerau move to. A larger number of area units were receiving migrants *from* Kawerau than were sending migrants *to* Kawerau with flows *to* the field carrying more migrants than flows *from* the catchment. Whereas 29 percent of those migrating *to* Kawerau carried at least three other people per area, well over one third of those leaving Kawerau carried more than three people (36 percent and 34 percent in the two periods).

Among the differences between the catchment and the field is the more extensive and expansive nature of the field. At the same time these outward movements are more sensitive to the distance from Kawerau, a property I now discuss as ‘reaction’.

### **Reaction**

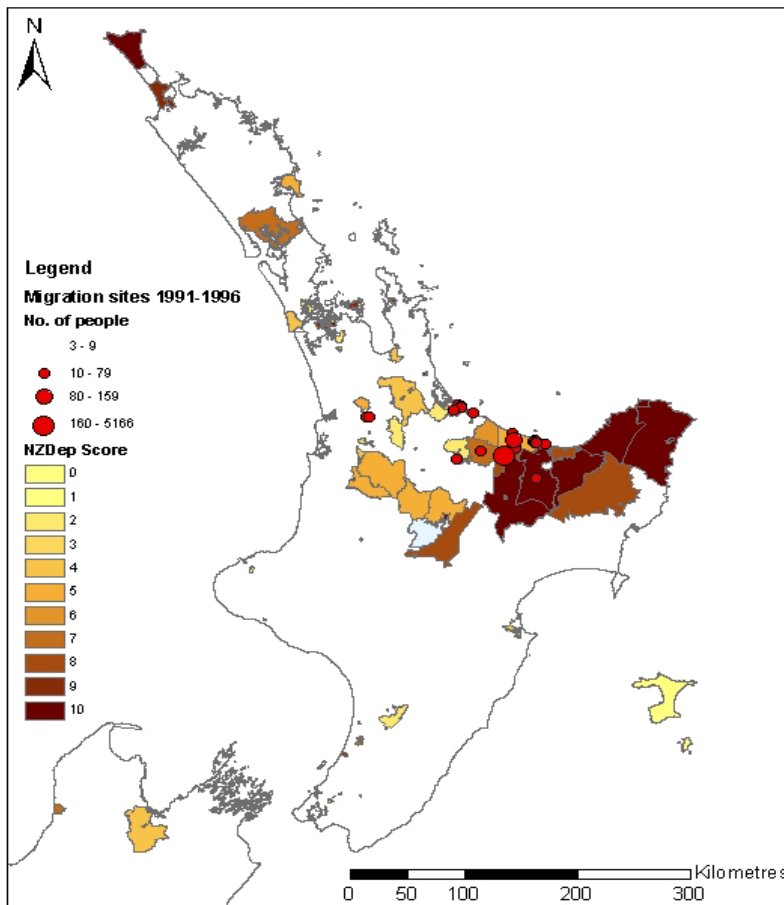
Most of those *leaving* Kawerau did not move very far in either period as shown in Kawerau’s migration field, Figure 4: under half, 44 percent, moved to areas units within 50 kilometres of Kawerau and half migrated to areas within 100 kilometres. By comparison, those moving *to* Kawerau did so from further away. The elasticity of *out*-migration from Kawerau with respect to distance (controlling for population size of the connecting area unit) was noticeably higher in both periods than the elasticities of *in*-migration.<sup>21</sup> In other words, those moving away from Kawerau appeared *more* sensitive to distance from the origin than those moving to Kawerau a feature characteristic of New Zealand flows in general.

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<sup>20</sup> Maps from the second period 1996–2001 are available on request.

<sup>21</sup> The term elasticity comes from the fitted parameter  $b_1$  from the equation,  $(\log)m_{ij} = a + b_1 (\log) D_{ij} + b_2 P_{ij}$  where  $D$  is distance and  $P$  refers to the population of  $i$  or  $j$  depending on whether the elasticity of in- or out-migration to or from Kawerau is being estimated. Results for all four communities over the two periods is given in Table 6 below. The average elasticity of migration with respect to distance *from* the place community is -0.34, so that for every 10 percent increase in distance from the community, migration falls by 3.4 percent.

**Figure 4: Kawerau's Migration Field 1991–1996. Destination Sites of People Shifting From Kawerau (at census area unit level)**



Source: Statistics New Zealand

There are two reasons why those leaving Kawerau might move shorter distances than those arriving. Firstly many apparent ‘migrants’ are moving *within* rather than between labour catchments. As such they are (probably) not changing their job but simply adjusting their housing by responding to opportunities for larger lots and/or more scenic locations or amenities while still retaining their employment connection with Kawerau. A separate analysis of addresses from payrolls from the major Mill employers in Kawerau showed an association between outward movement and salary (controlling for age); commuting distances increased 2.3 kilometres for every \$1,000 increase in gross salary. The probability of living outside Kawerau declined with age after an initial rise among those in their early 20s, partly as a reflection of the encouragement given to home ownership during the early years through the Mill’s provision of some assistance such as interest free loans.

A second reason why those moving *out* of Kawerau were more sensitive to distance may have been their very residence in Kawerau. A number may have avoided moving too far so they could keep in regular touch with friends and family, particularly given that older workers are more likely to live in town. As I show elsewhere on the basis of a

national sample of residents across New Zealand, family and friends are a primary source of attachment to place of residence and one of the major constraints on movement.<sup>22</sup> What I am inferring from the Kawerau case is that internal migration tends to be *reactive*; migrants react to where they just lived and this leads to an asymmetry between outward and inward migration.<sup>23</sup> It is tempting to speculate that the fall in the Kawerau population over the 1990s was accompanied by a loosening of such ties as evidenced by the fall in the elasticity of migration with distance in the second half of the nineties; whereas the number of people leaving Kawerau in the first period fell by 28 for every one percent increase in distance from Kawerau, this had dropped to 21 percent in the second period.<sup>24</sup>

If we switch attention from the *migrant* catchment to the *labour* catchment and the *migrant* field to the *employment* field we gain a fuller appreciation of the reactive nature of small town migration. Under the conventional definition a migrant (of working age) is someone who changes *both* employment *and* usual residence in the course of crossing some designated boundary. In their geographical overlap, however, there exists a zone in which *either* migration or mobility can take place. This is where migration fields and labour catchments overlap and hence where commuting can substitute for migration (and vice versa).<sup>25</sup> I label this area of overlap as the zone of extension.

An inspection of Figure 5 shows that Kawerau's labour shed is geographically extensive, many times the size of Kawerau District, and how it overlaps the area covered by the most dense part of the migration catchment. A change of usual residence for employment and non-employment reasons cannot be distinguished from census data, but the dominance of the latter apparent from the more recent survey would help explain the marked distance decay characteristics of migration to and from Kawerau.<sup>26</sup>

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<sup>22</sup> Morrison and Schroder (2010).

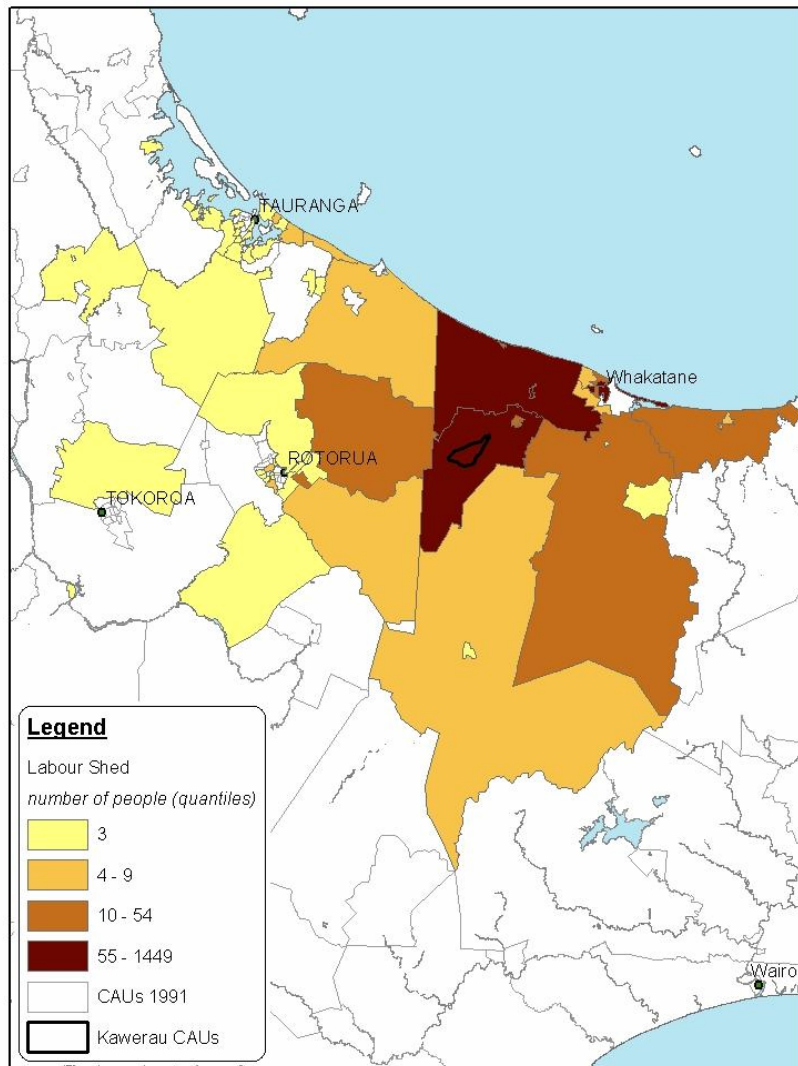
<sup>23</sup> It may be no coincidence that the weakest support for this thesis comes from Amuri which is characterised by an annual movement of its share milkers and farm workers.

<sup>24</sup> These results are reported for all four communities in Table 4. The intercept falls in the second period and the slope capturing the role of distance is more shallow. As a more definite test of the shift in the parameters over the nineties I also introduced a distance x time period interaction effect into the pooled data set. The results *confirm* my rejection of the null hypotheses of no change in the volume of out-migration and no change in the effect of distance (albeit at the 0.10 significance level).

<sup>25</sup> When and where extended commutes become substitutes for migration is receiving widespread attention in the international literature (Eliasson et al. (2003), Green et al. (1999), Romání et al. (2003)). Two early explorations of this link include Holmes (1972) and Yapa et al. (1971). Empirically however there is no way of telling the difference between a change of address that is accompanied by a change of employment location simply from census data because the prior place of work of in-migrants is not collected.

<sup>26</sup> For a discussion of the results from the Dynamics of Motivation and Migration Survey which asks people why they move, see Morrison et al. (2008).

**Figure 5: Kawerau's Labour Shed, 1991**



Source: Statistics New Zealand. Census of Population and Dwellings 1991

In summary, migration out of small towns tends to be *reactive*, as migrants respond to their own history in the place of origin. The presence of friends and relatives and of course employment can constrain the distance people subsequently move, and likely affects the decision to commute further rather than to migrate. The result is a broad zone within and beyond the town where the labour shed and the migration field overlap where a longer commute and out-migration become substitutes. This 'zone of extension' can stretch a long way in the case of small towns given their broad hinterlands of potentially available sections and relative quick and uncongested commutes.

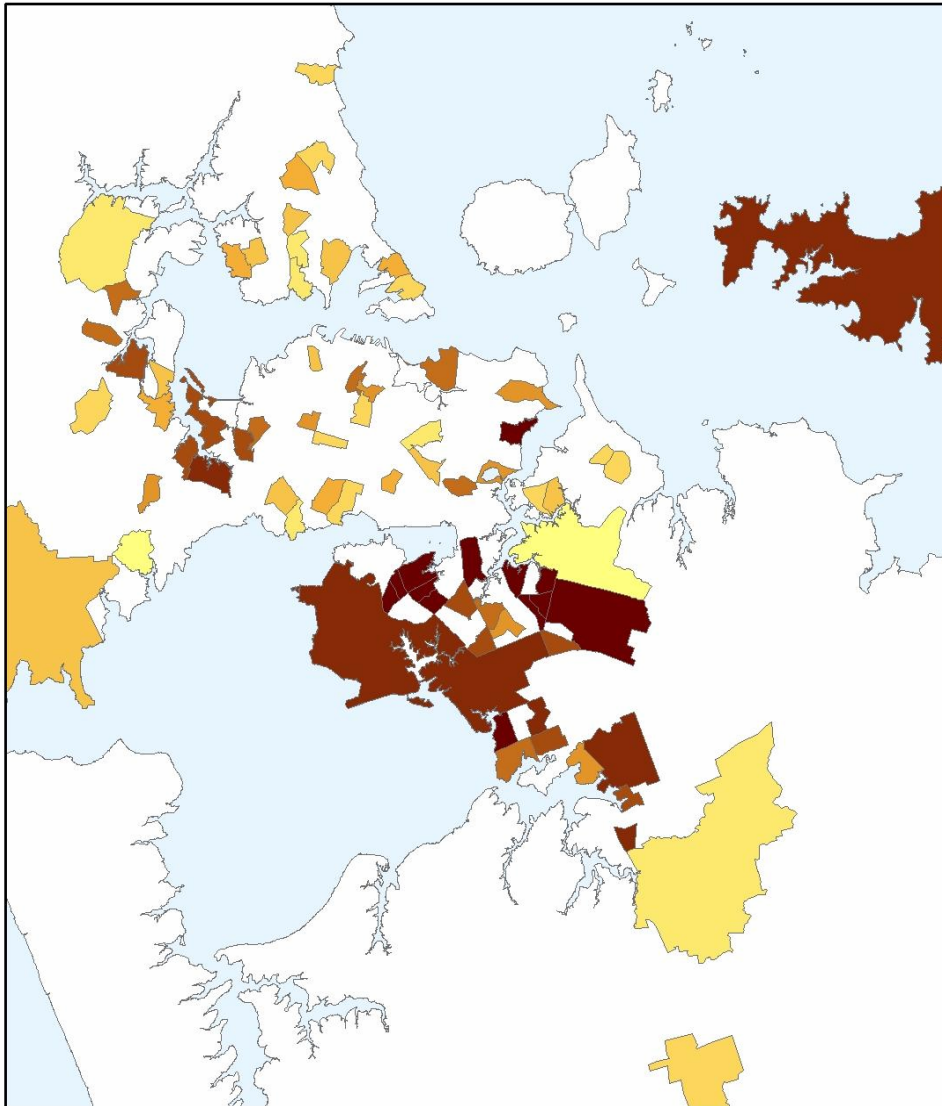
A fourth feature characteristic of small town migration is the way in which individual migration streams persist over time, the feature I am calling *resistance*. Resistance refers to the propensity of existing patterns of flows to repeat themselves or replicate over successive time periods.

### **Resistance**

A comparison of Kawerau's migration catchments five years apart suggests only minor changes between the first and second half of the 1990s. The same generalisation applies to the migration field. In each case the core areas that form extensions of Kawerau's extra-territorial 'community', remain the suite of towns and small cities that lie well within a few hours' drive of Kawerau itself. The other area is, of course, Auckland.

As the migration literature has long observed, metropolitan centres pull migrants from considerable distances. This is apparent when we map the Auckland locations in which Kawerau migrants settle. While Figure 6 shows a dispersion of Kawerau migrants across metropolitan Auckland, their concentration in South Auckland is apparent, tied as many are to families dependent on the centre's manufacturing based labour markets.

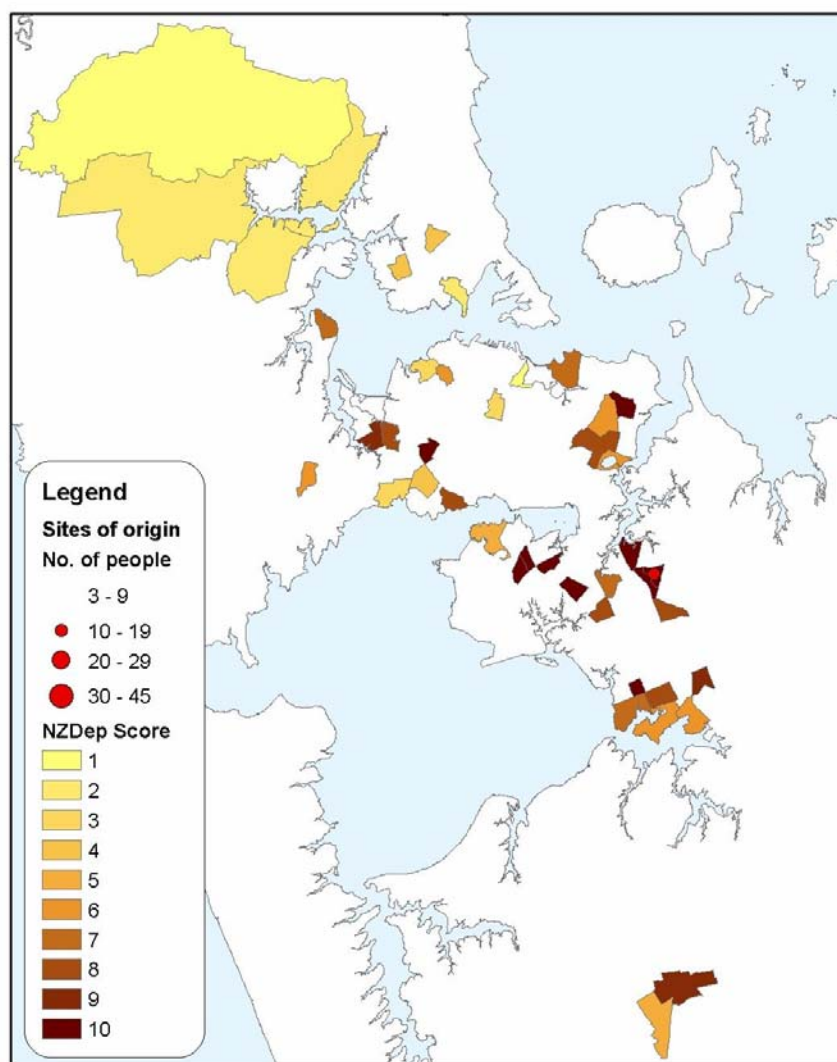
**Figure 6: Destination Sites of Migrants from Kawerau to Auckland 1991–1996**



Source: Statistics New Zealand. Census of Population and Dwellings 1996

The places migrants from Kawerau settle in Auckland contrast with those places in Auckland from which migrants come to Kawerau. The latter exhibit a noticeably more dispersed pattern in both locational and socio-economic terms as Figure 7 shows. Instead of originating in the south of Auckland, those leaving Auckland for Kawerau appear to come from a range of more northern and less deprived locations within the Auckland region.<sup>27</sup> Within Auckland, therefore, the pattern of reciprocity in both numerical and socio-economic terms we observed at the TLA level shows signs of breaking down at the area unit level.

**Figure 7: Sites of Origin of Migrants Moving to Kawerau from Auckland 1991–1996**



Source: Statistics New Zealand. Census of Population and Dwellings 1996

<sup>27</sup> It would be instructive to be able to tie these locational shifts to characteristics of the migrants themselves but small numbers prevent such an extension with any degree of reliability.



In summary, in addition to being restricted, reciprocal and reactive, migration patterns to and from Kawerau are also quite resistant to change, with the spatial linkages apparent in one census period being replicated with only subtle changes in the next. While most evident when addressing New Zealand (mainly the North Island) as a whole, these properties also apply to linkages between particular parts of Auckland and Kawerau District. Like many small towns whose size they resemble, certain suburbs in Auckland are connected Kawerau through regular migration streams. As well as family connections, itinerant linkages with Auckland's southern labour market may well be used to supplement employment opportunities in Kawerau's small town labour market, either on a seasonal or periodic basis. While not a commute in the conventional sense, circular migration to known host communities within metropolitan centres for specific periods is a feature likely to raise levels of turnover and transience within smaller towns. Such a connection in turn raises questions about the role of regulation and redistribution in the migration patterns of the small town to which I now turn.

The fifth and sixth characteristics of migration between place based communities have to do with the socio-economic similarities of the places people move to and from.<sup>28</sup> A standard step in migration analysis is to compare migration flows of different demographic and socio-economic groups but, when only small places are involved, there is limited scope to identify the characteristics of individuals. Therefore, in this paper I have adopted an ecological approach and analyse flows according to the socio-economic characteristics of the *areas* as opposed to the characteristics of individual migrants. Drawing on the New Zealand Deprivation Index (NZDep96), each area unit is assigned a rank from the least deprived, 1, to the most deprived, 10; deprivation being the degree to which the population of the area unit meets certain labour status and material possessions criteria as listed in Appendix 2.<sup>29</sup>

In reality most people move to areas that are only slightly different in socio-economic terms from the one they leave. This feature of migration reflects the fact that the spatial (and social) adjustments made by most individuals tend to be small and incremental. In the case of Kawerau most migration is to and from other area units of the same NZDep96 decile. The extent to which a proportion of migrants adjust more radically (by moving out of decile 10) is an indication of the potential way in which Kawerau might foster or retard social mobility.<sup>30</sup>

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<sup>28</sup> It would be valuable to establish the degree to which the characteristics of individual migrants entering each community are *actually* the same as those who have left (as well as those who have stayed, i.e. non-migrants). Of special interest in such comparisons would be differences in age distribution. Fieldwork suggests that migration streams are made up of three broad age groups, those in the working age, young single mothers and children on the benefit, and older migrants selecting Kawerau for retirement. We fully expect that these age streams to be quite sensitive to origin and for different migration equations to apply (see Millington (2000)). However, access to the unit records of the census (via the SNZ Data Lab which guards confidentiality) would be required to address such questions. Meanwhile much can now be learned from the Dynamics of Migration sample survey results as the suite of tabulations now on the Statistics New Zealand website illustrates: [http://www.stats.govt.nz/methods\\_and\\_services/information-releases/survey-of-dynamics-and-motivations-for-migration-in-nz.aspx](http://www.stats.govt.nz/methods_and_services/information-releases/survey-of-dynamics-and-motivations-for-migration-in-nz.aspx)

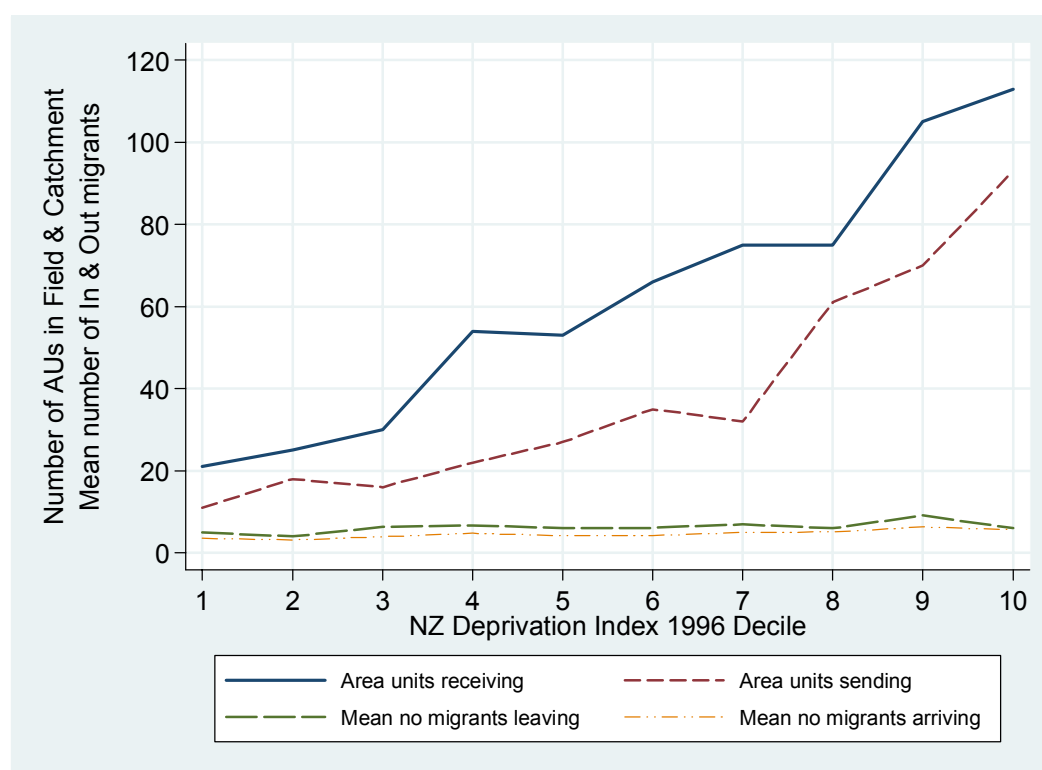
<sup>29</sup> Crampton et al. (2000).

<sup>30</sup> The roles internal migration can play as instruments of social mobility are captured in the concept of the escalator coined by Fielding as originally identified through the study of migration in the south east of England (Fielding (1992)).



In tracing changes in amenity levels of areas – as reflected in their NZDep96 Index – I make a distinction between the presence of a migration connection between Kawerau and another area unit and the actual *number* migrating. Figure 8 plots the number of *area units* that are connected by a migration flow (the top two lines) and the *mean* number of migrants *per flow* (the bottom two lines). The continuous lines refer to *out*-migration and the dashed lines to *in*-migration. Both are plotted against successively higher levels of deprivation from least to most deprived, i.e., from level 1 to level 10 of the NZ Deprivation Index. The data for the two periods are pooled to reduce temporal variation and therefore cover the decade 1991–2001.

**Figure 8: The Mean Number of Migrants and Number of Area Units Involved in Migrants Entering and Leaving Kawerau by the NZ Deprivation Index96 category, 1991–2001**

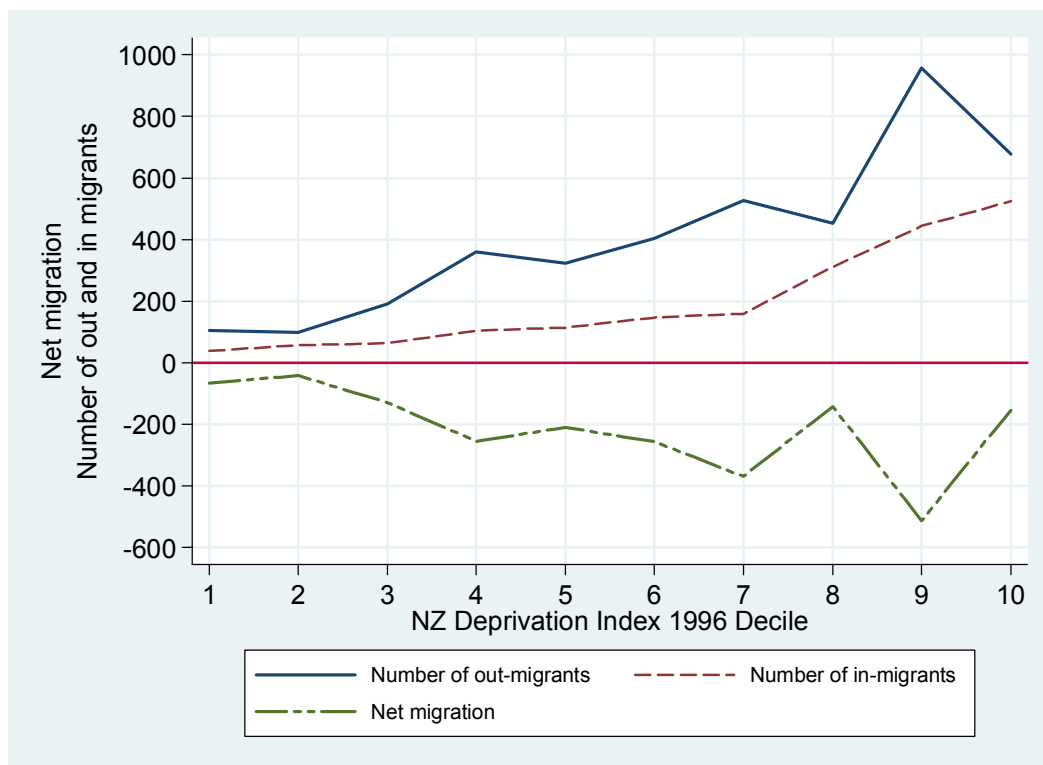


Source: Statistics New Zealand. Census of Population and Dwellings 1996

What is quite clear from the top two lines in Figure 8 is that the number of area units linked to Kawerau via a migration increases with their level of deprivation. By contrast, the average *number* in each migration stream, the bottom two lines, show very little change from one NZDep96 category to the next. This means that differences in the number of migrants moving in and out of Kawerau over the range of NZDep96 deciles are due primarily to the addition of area units to the catchment or field rather than to increases in the average number of migrants sent to or received from each area.

By extension, Figure 9 plots the *product* of the number of area units and the mean number of migrants at each decile over the NZDep96 domain and shows in turn how the number of migrants entering and leaving Kawerau rises with the decile rating of their origins and destinations. The difference between the continuous line of in-migrants and dashed line of out-migrants is negative and this difference is plotted as the line below 0 on the Y axis. What Figure 9 also tells us is that those *leaving* Kawerau were more likely to end up in areas with a higher NZDep96 rating than those *entering* Kawerau. In this sense, then, Kawerau was playing a distributive role within the migration system, receiving from low NZDep96 areas (as we noticed in Auckland) and otherwise redistributing people to areas with deprivation scores more similar to Kawerau.

**Figure 9: The Number of Migrants Entering and Leaving Kawerau and the Net Change by NZ Deprivation Index96 Category, 1991–96 and 1996–2001**



Source: Statistics New Zealand. Census of Population and Dwellings 1996

To summarise, when a community like Kawerau attracts additional migrants, it does so by pulling migrants from new areas with similar decile ratings and often less deprived areas, rather than by drawing more migrants from areas which are already part of its pre-existing catchment.

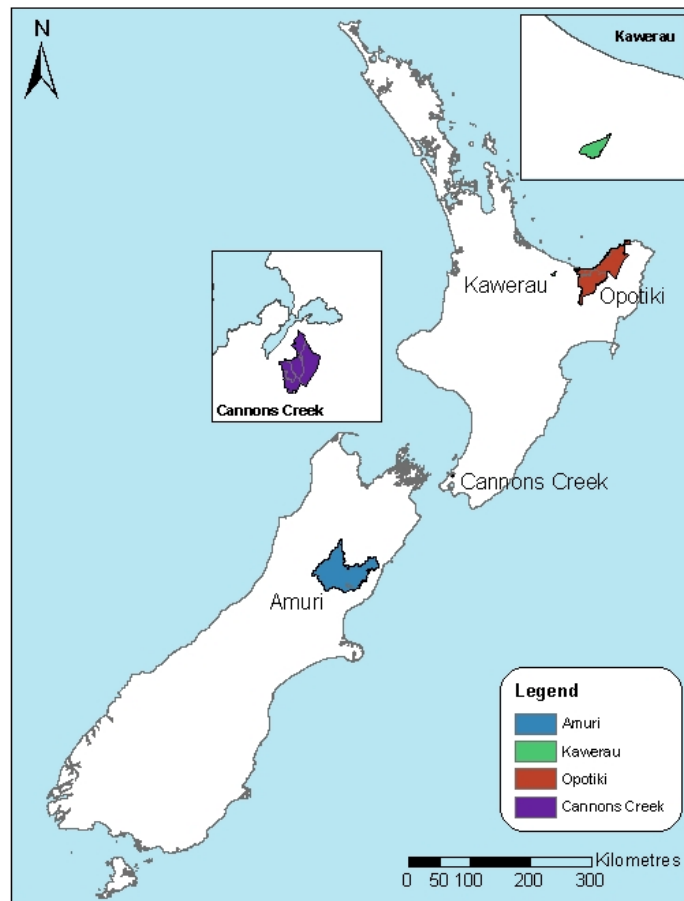
With these observations from the Kawerau experience I turn now to the migration pattern characteristics of the three other communities.

#### 4. Opotiki, Cannons Creek/Waitangirua and Amuri Case Studies

The four separate settlements in this study differ in the size of their population, economic base and location. In terms of their migration experience however they exhibit very similar characteristics to those identified in the Kawerau case: their migration flows are restricted to relatively few migration streams, as well as being reciprocal, reactive, resistant, regulated and redistributive. The main point of difference is in the magnitudes, that is, the numbers of migrants involved.

The four community locations are mapped in Figure 10, and the salient characteristics of the four settlements are summarised in Table 3.<sup>31</sup> The populations range from only 2,000 or so who make up the small dairying settlement of Amuri (2,010 people in 2001), through the two Bay of Plenty settlements of Kawerau (7,278) and Opotiki (9,201) to Cannons Creek/Waitangirua with its relatively large suburban population of 15,700.

**Figure 10: The Location of the Four Project Communities in New Zealand**



<sup>31</sup> I retain the 2001 figures in order to connect with the migration period used in the original analysis, even though a subsequent census provides more recent figures for 2006.

**Table 3: A Statistical Profile of the Four Communities, 2001**

	Kawerau	Opoitiki	Amuri	Cannons Creek/ Waitangirua	New Zealand
<b>Total population 2001</b>	7,278	9,201	2,013	15,699	3,727,277
<b>Total area (km)</b>	21.9	3,086.8	4,200.0	8.2	268,294.0
<b>Brief description</b>	Forestry industry – timber and pulp and paper mills	Farming and service centre and small coastal port	Pastoral area – has converted to dairying	Predominantly Pacific population. Industries and factories – source of work	
<b>Percent under 24 (%)</b>	43.1	39.6	37.2	50.4	
<b>Percent over 65 (%)</b>	9.0	12.4	8.9	4.7	12.0
<b>Percent Māori (%)</b>	55.9	54.3	6.6	24.3	14.1
<b>Percent moved in last year (%)</b>	18.0	19.3	21.0	22.6	23.0
<b>Percent living at current address for 5 years + (%)</b>	48.3	47.4	46.9	44.9	42.5
<b>Number of households</b>	2,412	3,156	762	4,023	
<b>Largest family type</b>	Couples without children – 31%	Couples without children – 34%	Couples without children – 43%	Couples with dependent children only – 30%	Couples without children – 39%. Couples with dependent children only – 39%
<b>Median annual personal income</b>	13,602	12,899	19,332	14,223	18,545
<b>Median annual family income</b>	32,586	28,130	42,425	29,736	46,087
<b>Median annual household income</b>	31,048	26,095	34,226	32,766	39,588
<b>Labour force participation rate (%)</b>	61.5	58.0	76.7	61.5	66.7
<b>Three largest industrial sectors</b>	Manufacturing – 36.7%	Agriculture, forestry and fishing – 31.8%	Agriculture, forestry and fishing – 59.9%	Manufacturing – 16.5%	
	Retail trade – 11.7%	Retail trade – 14.2%	Accommodation, cafes & restaurants – 6.1%	Retail trade – 13.1%	
	Education – 10.1%	Education – 13.4%	Education – 6.1%	Property and business services – 12.3%	
<b>Contributing school decile ratings 2002<sup>32</sup></b>	Mainly 1s	Mainly 1s and 2s	Two decile 9 and one decile 7	Mainly 1s	
<b>Contributing school decile ratings 2003</b>	Mainly 1s	Mainly 1s and 2s	Two decile 8 and one decile 6	Mainly 1s	
<b>Percentage leaving school with School Cert or higher qualification (%)</b>	47.0	66.3	81.3	67.7	83.0
<b>Home ownership rate (%)</b>	70.8	67.0	66.3	36.4	68.0

Source: Statistics New Zealand

<sup>32</sup> A school's decile indicates the extent to which it draws its students from low socio-economic communities. Decile 1 schools are the 10 percent of schools with the highest proportion of students from low socio-economic communities. A school provides its student addresses and these are used to determine which areas its students come from and census data are used to determine socio-economic status. In intervening years, schools can apply for a review of their decile on the basis of perceived changes in the socio-economic status of the school's catchment. Decile 10 schools are the 10 percent of schools with the lowest proportion of these students. A major reassessment of all school deciles is undertaken following each five yearly Census of Population and Dwellings. For further information see:  
<http://www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/SchoolOperations/Resourcing/OperationalFunding/Deciles/HowTheDecileIsCalculated.aspx>

Table 3 shows how each community relies on quite a different economic base: forestry processing (Kawerau), horticulture (Opotiki), sheep and dairying (Amuri) and urban manufacturing and services (Cannons Creek/Waitangirua) as well as how the communities differ demographically. The highly mobile, young predominately Pacific Island population of Cannons Creek/Waitangirua contrast with the more stable European (Pakeha) population of Amuri and the slightly older and predominantly Māori population in Kawerau and Opotiki (notwithstanding the presence of many young Māori in both these two settlements). The four areas also differ in socio-economic terms. The relatively affluent South Island settlement of Amuri stands in contrast to the much lower income families in the North Island who experience relatively high levels of unemployment, lower labour force participation rates, high levels of benefit dependency and low school decile ratings.

The settlement most closely related geographically to Kawerau is the Bay of Plenty district of Opotiki. Unlike Kawerau, the number of residents of Opotiki District was relatively stable in the 1990s and this is reflected in the more similar numbers moving in and out (see Table 4). Amuri's population also remained relatively constant but Cannons Creek/Waitangirua lost a substantial population over both the two intercensal periods.

Table 4 presents a variety of comparative statistics on the migration flows into and out of each settlement. In terms of magnitudes, most migration flows from the communities carried under 12 people and most carry under six (Statistics New Zealand random rounding to base 3 being applied in both cases). The mean migration flow varied from the 9.3 coming into Cannons Creek/Waitangirua in the early nineties through to 3.4 leaving Amuri in the late 1990s. In each community the migration numbers are highly positively skewed. I therefore show the four highest flows as the last four lines in each quadrant of Table 4. This highlights the case of Opotiki, which was characterised by unusually high flows into and out of only a few areas. The least skewed in terms of their origin were the flows into the farming community of Amuri, which draws on a wider range of mainly rural areas for replacement labour. The numbers of migrants entering and leaving each community over the two periods and the net change is summarised in Table 5. Only Opotiki in the first half of the nineties and Amuri in the second half of that decade recorded a gain.

**Table 4: The Characteristics of Migration Flows Into and Out of the Four Communities, 1991–1996 and 1996–2001**

	KAWERAU				OPOTIKI			
	Out of Migration Field		Into Migration Catchment		Out of Migration Field		Into Migration Catchment	
	1991–1996	1996–2001	1991–1996	1996–2001	1991–1996	1996–2001	1991–1996	1996–2001
<b>No of flows</b>	306	311	185	200	306	381	373	365
<b>Mean</b>	6.73	6.37	5.11	5.57	5.32	5.42	4.97	5.19
<b>Standard</b>	13.49	11.18	5.77	5.57	13.8	14.8	12.53	15
<b>Skewness</b>	7.63	6.53	4.5	4.03	14.18	15	15.75	15.07
<b>25%</b>	3	3	3	3	3	3	3	3
<b>50%</b>	3	3	3	3	3	3	3	3
<b>75%</b>	6	6	6	6	6	3	3	3
<b>90%</b>	9	9	9	7.5	6	9	6	6
<b>95%</b>	18	18	12	15	9	12	9	9
<b>99%</b>	57	57	42	31.5	21	30	18	30
<b>4<sup>th</sup> largest</b>	57	57	24	27	21	30	18	30
<b>3<sup>rd</sup> largest</b>	78	75	30	30	36	42	36	42
<b>2<sup>nd</sup> largest</b>	123	102	42	33	78	108	78	108
<b>Largest</b>	156	114	45	42	228	264	228	264

	CANNONS CREEK/WAITANGIRUA				AMURI			
	Out of Migration Field		Into Migration Catchment		Out of Migration Field		Into Migration Catchment	
	1991–1996	1996–2001	1991–1996	1996–2001	1991–1996	1996–2001	1991–1996	1996–2001
<b>No of flows</b>	777	590	368	468	131	137	114	141
<b>Mean</b>	7.43	8.19	9.27	8.2	3.87	3.4	4.2	4.08
<b>Standard</b>	17.03	18.52	23.36	20.16	2.28	3.4	2.82	3.29
<b>Skewness</b>	7.58	6.49	5.82	6.26	3.16	4.72	2.93	4.62
<b>25%</b>	3	3	3	3	3	3	3	3
<b>50%</b>	3	3	3	3	3	3	3	3
<b>75%</b>	6	6	6	6	3	3	6	3
<b>90%</b>	9	12	12	12	6	6	6	6
<b>95%</b>	24	27	39	27	9	9	12	6
<b>99%</b>	93	123	135	129	15	24	15	21
<b>4<sup>th</sup> largest</b>	135	153	135	153	12	9	15	18
<b>3<sup>rd</sup> largest</b>	168	168	168	168	12	21	15	18
<b>2<sup>nd</sup> largest</b>	201	183	201	183	15	24	15	21
<b>Largest</b>	213	183	213	183	15	27	18	27

Source: Statistics New Zealand

**Table 5: Migration Into and Out of the Four Communities 1991–1996 and 1996–2001**

Community	1991–1996			1996–2001		
	Into	Out of	Difference	Into	Out of	Difference
<b>Kawerau</b>	945	2,061	-1,116	1,020	1,980	-960
<b>Opotiki</b>	1,854	1,629	225	1,893	2,067	-174
<b>Cannons Creek/Waitangirua</b>	3,411	5,772	-2,361	3,840	4,830	-990
<b>Amuri</b>	486	507	-21	576	573	3

Source: Statistics New Zealand

Unlike the Kawerau case, Opotiki drew its migrants from approximately the same number of areas as it sent them and distance appeared to be less of a constraint than it was in Kawerau, a feature which weakened noticeably in the second half of the nineties as it did in Kawerau (see Table 6 which reproduces the parameters of the migration model given in Footnote 20).<sup>33</sup>

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<sup>33</sup> The table showing the results of applying the migration model at area unit level to both out- and in-migration to each of the four communities for the two periods includes the fitted constant and parameters on the two arguments, the log of distance and the population of the area unit together with the adjusted  $R^2$  measure of fit. The last three columns give the number of cases where the migration flow is greater than the randomly rounded base of 3 compared to the total number of flows present in each 16 regressions. As the last column shows, the proportion of very small flows (anywhere between 1 and 3 persons) varies from 17 percent in the case of migration out of Amuri in the 1991–1996 period to the much more dispersed flows out of Kawerau over the same period where 36 percent of all flows involved only between one and three people.

**Table 6: The Influence of Distance on the Propensity to Migrate Into and Out of the Four Communities, 1991–1996 and 1996–2001 (t statistics in italics)**

Community	Migration	Period	Constant	log(Dist)	Population, P1	Adj R2	N>3	N	N>3 as % all flows
Kawerau	Out of	1991–1996	1.8	-0.45	0.000032	0.36	109	306	36%
			15.7	-7.91	1.82				
		1996–2001	1.8	-0.49	0.000049	0.41	106	311	34%
			16.5	-8.70	2.87				
	Into	1991–1996	1.5	-0.31	0.000017	0.35	53	185	29%
			12.5	-5.42	0.17				
		1996–2001	1.6	-0.40	0.00004	0.44	58	200	29%
			15.1	-6.59	1.7				
Opotiki	Out of	1991–1996	1.4	-0.27	0.0000109	0.24	77	302	25%
			13.3	-5.00	0.6				
		1996–2001	1.2	-0.30	0.000018	0.27	91	378	24%
			4.5	-5.94	1.04				
	Into	1991–1996	1.2	-0.22	0.0000104	0.27	87	369	24%
			17.2	-5.76	1.6				
		1996–2001	1.2	-0.18	0.0000143	0.21	79	361	22%
			14.1	-4.63	1.22				
Cannons Creek/ Waitangirua	Out of	1991–1996	1.2	-0.27	0.0000474	0.46	257	777	33%
			27.5	-14.61	3.46				
		1996–2001	1.3	-0.27	-0.0000388	0.46	198	590	34%
			26.5	-13.18	2.62				
	Into	1991–1996	1.2	-0.33	-0.0000819	0.49	108	368	29%
			13.0	10.00	2.84				
		1996–2001	1.3	-0.31	-0.0000198	0.46	140	468	30%
			19.6	-11.01	2.3				
Amuri	Out of	1991–1996	1.0	-0.08	0.00002387	0.01	22	130	17%
			7.9	-0.35	0.918				
		1996–2001	1.2	-0.14	0.000022	0.17	28	136	21%
			8.9	-1.88	1.06				
	In to	1991–1996	-1.5	-0.26	-0.0000466	0.52	28	113	25%
			12.1	-3.94	-2.52				
		1996–2001	1.7	-0.40	0.000000443	0.51	26	140	19%
			10.9	-4.95	0.983				

Source: Statistics New Zealand

Cannons Creek/Waitangirua is a very different settlement from the two Bay of Plenty locations, being several times the size of both and anchored firmly within the metropolitan settlement of Wellington. With a much larger population, it is not surprising to find that Cannons Creek/Waitangirua drawing on a much wider catchment



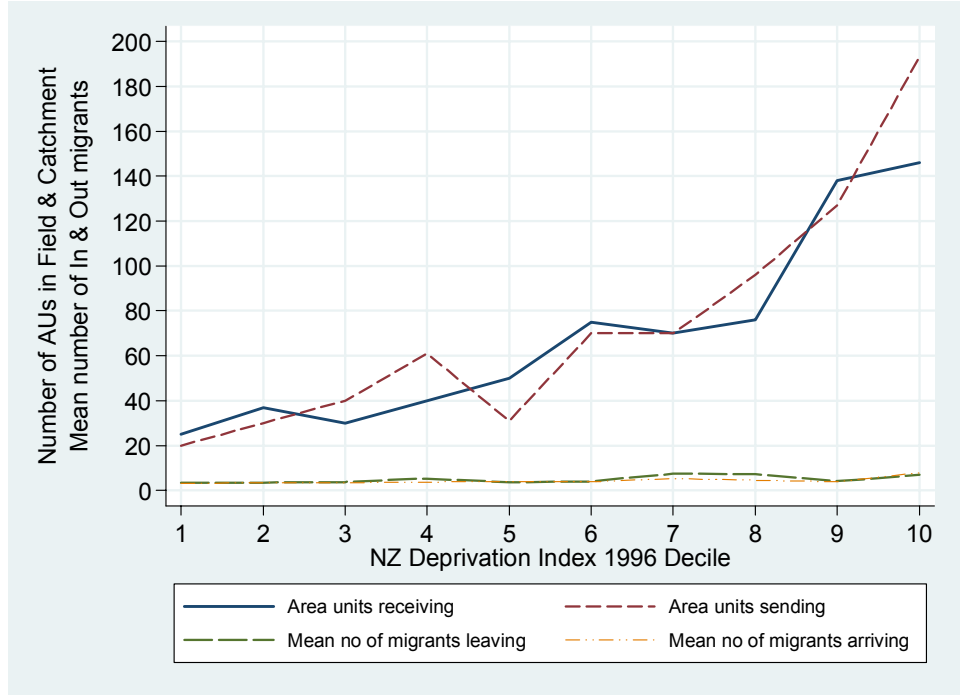
(368 and 468 area units in the two periods) and sending migrants over an even more extensive field (777 and 590 area units). Despite its very different geographical setting the effect of distance on migration in the Cannons Creek/Waitangirua area remains very similar to the estimates from migration to and from small towns – yielding elasticities of between 2.7 and 3.2 percent (recall Table 6). Unlike the Kawerau and Opotiki cases, however, where distance constrains out-migration more than in-migration, in the Cannons Creek/Waitangirua case it is the *in*-migrants who appear more sensitive to distance. This is probably because this suburban area's catchment is more narrowly defined than its field, a feature that reflects the larger set of suburbs around Cannons Creek/Waitangirua and the preponderance of residential mobility rather than migration.

Finally we turn to Amuri. Much smaller and more physically isolated than the other settlements, this rural South Island area interacts with correspondingly fewer other areas. The limited term contract nature of much employment means fewer social ties are likely to develop and therefore out-migration ends up being less constrained by distance than in-migration.

#### ***The redistributive experience of other communities***

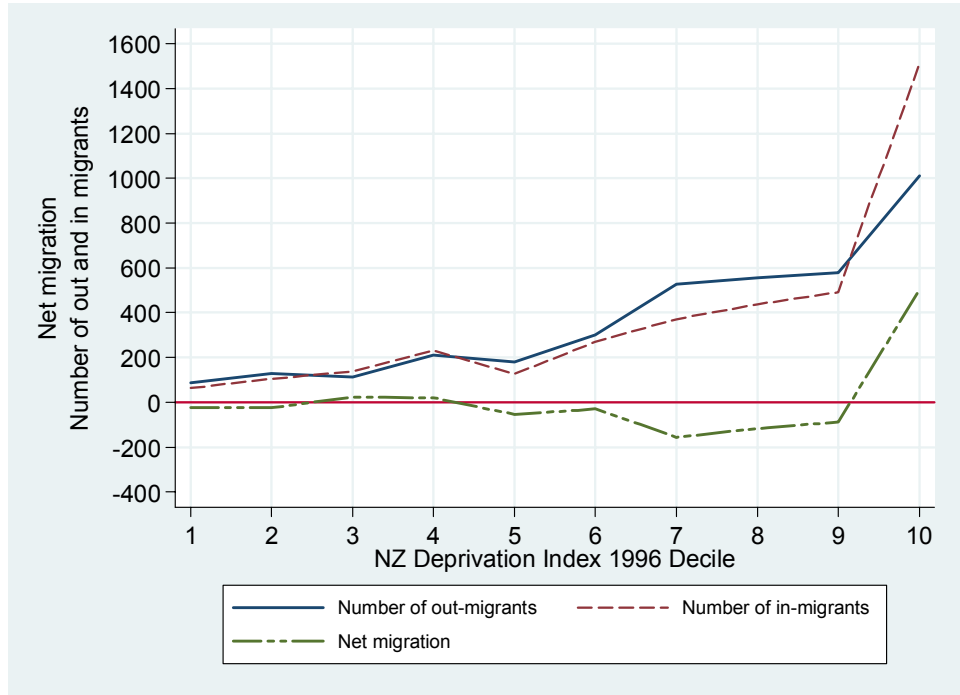
Opotiki, like Kawerau, is also a decile 10 area and appears to behave similarly with respect to its regulatory and redistributive role. Migration into and out of Opotiki increases the higher the level of deprivation of both origins and destinations, as shown in Figure 11. In the Opotiki case, however, the number of in-migrants from the more deprived communities exceeds the number of out-migrants, as evidenced by the dashed line sitting above the continuous line in deciles 8 and 10 of Figure 11. As in the Kawerau case, the numbers of migrants rise with the NZDep96 rating of areas in both its catchment and field, as Figure 12 shows. This is also almost solely due to the addition of area units as opposed to an increase in the number of migrants per area

**Figure 11: The Number of Area Units and Mean Number of Migrants Entering and Leaving Opotiki by New Zealand Deprivation Index96 Category, 1991–2001**



Source: Statistics New Zealand. Census of Population and Dwellings 1996

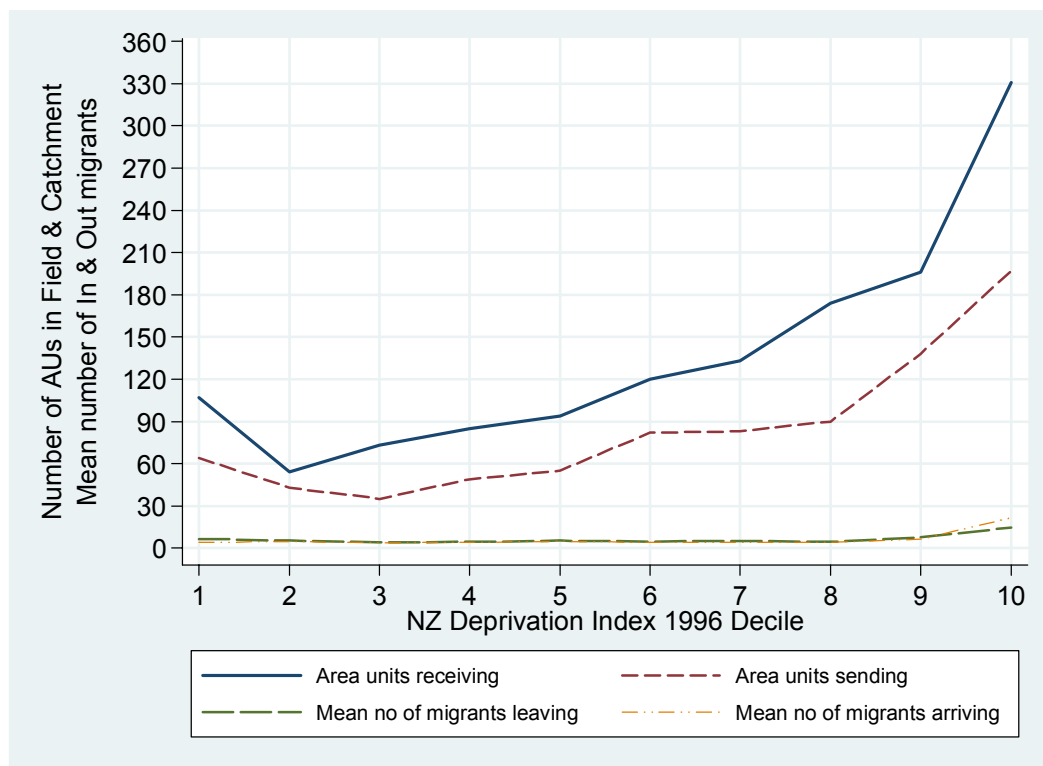
**Figure 12: The Number of Migrants Entering and Leaving Opotiki and the Net Change by New Zealand Deprivation Index96 Category, 1991–2001**



Source: Statistics New Zealand. Census of Population and Dwellings 1996

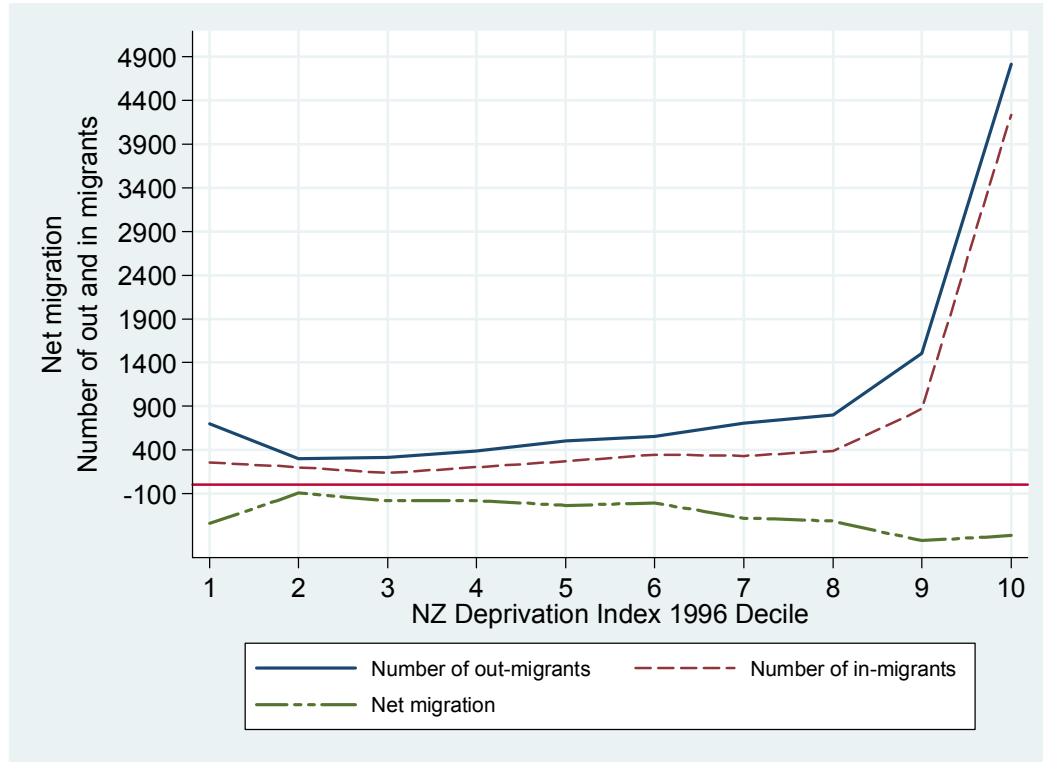
The Cannons Creek/Waitangirua experience graphed in Figure 13, replicates the Opotiki pattern but shows a much heavier interaction with other decile 10 areas, both by volume and by average size of flow. This may be partly because Cannons Creek/Waitangirua is situated within a set of high deprivation suburbs with which it interacts intensively. However, the migration maps of Cannons Creek/Waitangirua catchment and field (available on request) show that this interaction is by no means confined to proximate areas. The tendency to draw on successively large numbers of migrants from decile 10 areas *and* send an increasing number of migrants to such areas marks Cannons Creek/Waitangirua as one of the major connection points for inhabitants of high NZDep96 areas throughout New Zealand and one of the major nodes redistributing people among lower socio-economic areas within the country.

**Figure 13: The Number of Area Units and Mean Number of Migrants Entering and Leaving Cannons Creek/Waitangirua by New Zealand Deprivation Index96 Category, 1991–2001**



Source: Statistics New Zealand. Census of Population and Dwellings 1996

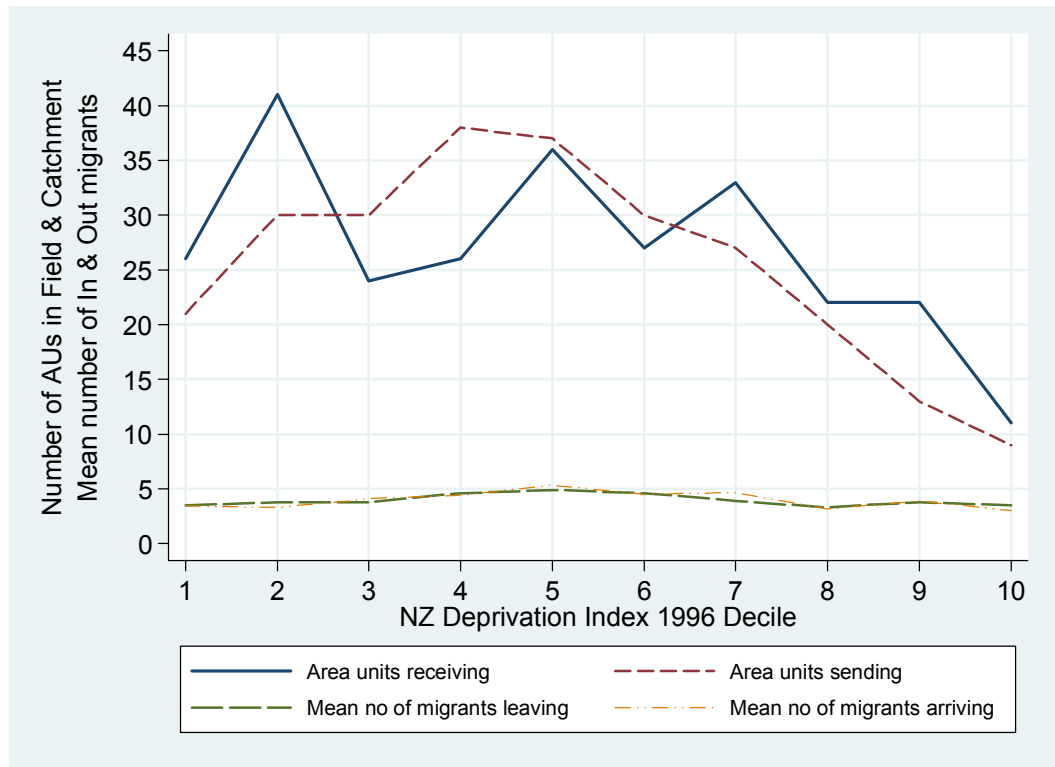
**Figure 14: The Number of Migrants Entering and Leaving Cannons Creek/Waitangirua and the Net Change by New Zealand Deprivation Index96 Category, 1991–2001**



Source: Statistics New Zealand. Census of Population and Dwellings 1996

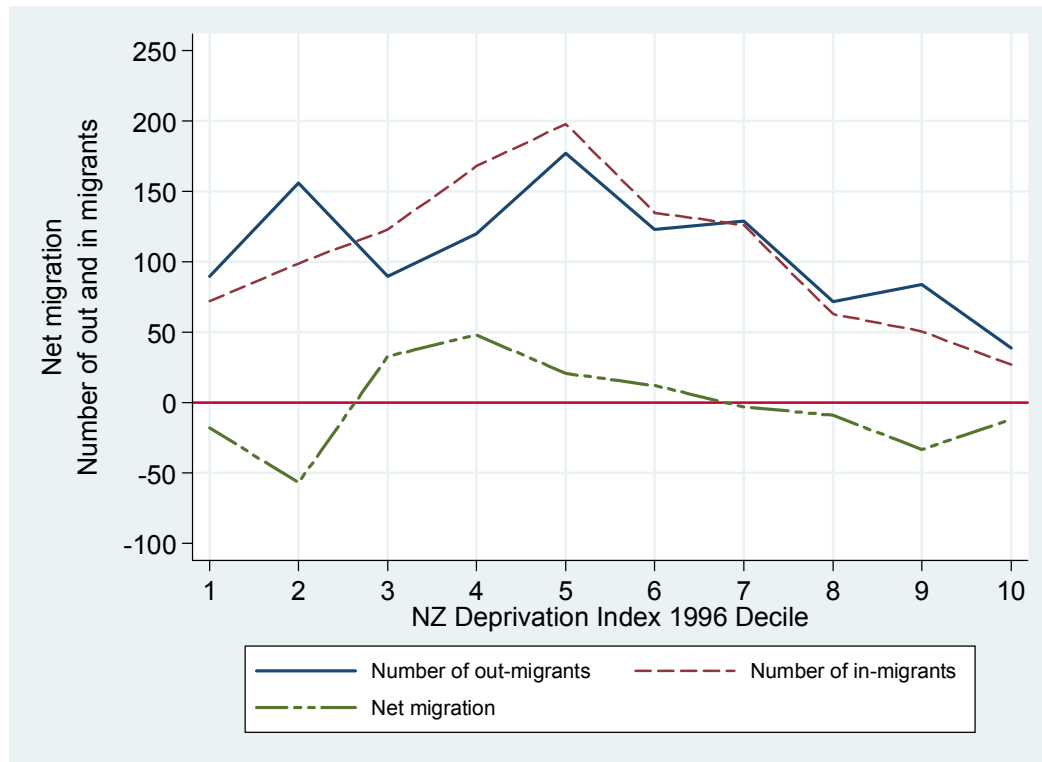
Finally, and in marked contrast to the three other areas, Amuri is a NZDep96 decile 5 area and again we find migrants moving in and out primarily within the same decile. And again, the primary reason migrants in one decile group exceed another is the number of area units in each category (see Figure 15). Having said this however, it is clear from Figure 16 that changes in the average flow of migrants play a much stronger role in altering the overall number of migrants in the Amuri case than is the case in the other three communities. Amuri's catchments and fields are much narrower and carry larger flows on average implying a greater dependence by this town on a few key sources of migrants. Again this is consistent with the flow of skilled agricultural labour and their families responsible for most of the migration.

**Figure 15: The Number of Area Units Mean Number of Migrants Entering and Leaving Amuri by New Zealand Deprivation Index96 Category, 1991–2001**



Source: Statistics New Zealand. Census of Population and Dwellings 1996

**Figure 16: The Number of Migrants Entering and Leaving Amuri and the Net Change by New Zealand Deprivation Index Category, 1991–2001**



Source: Statistics New Zealand. Census of Population and Dwellings 1996

In summary, regardless of its decile rating, each community draws on and sends migrants to *all* types of areas but interacts most strongly with areas like itself in NZDep96 terms. This is because people make only minor adjustments in socio-economic terms when they move. All types of areas gain population primarily by drawing people from new, rather than long standing areas of supply (Amuri being the exception), so that an increase in the population of small towns is associated with the physical extension of their catchment rather than its intensification. Similarly, a growing out-migration enlarges the geographic area covered by the migration field, increasing the number and range of contacts a place has with the rest of New Zealand. By the same argument as the geographic extent of the catchment shrinks, as it does when an area's population declines, contacts around New Zealand diminish and interactions become concentrated within narrower streams, a feature which can render a declining community more vulnerable to further decline.

## 5. Conclusions

Small communities, either as separate locations or discrete areas within metropolitan areas, have a large proportion of any change in their population determined by the interaction their residents have with the rest of the country. Understanding the relationship between an area's population and its migration flows becomes particularly salient when place-based communities are experiencing population decline.

This paper has employed the concepts of *migration catchment* and *migration field* in order to present a place-based interpretation of internal migration and the way it varies across place-based communities. Six characteristics of migration have been identified, beginning with the fact that a community's growth is highly **restricted** in terms of the particular areas it exchanges migrants with.

The second characteristic is its **reciprocity**, the fact that migration involves an *exchange* of people between places such that their outflows tend to approximate their inflows over any intercensal period. The smaller the spatial unit of analysis and the longer the time period the streams can take to equalise, the lower the degree of numerical reciprocity.

Migration flows appear **resistant** to change, persisting over several inter-censal periods. In each of the cases documented here, both the volume and the geography of flows are highly correlated from one inter-censal quinquennium to the next. The fact that migration patterns are resistant to change reflects a path dependency in which previous flows and the information gathered there from channels future migration.

Fourthly, migration is **reactive**. Out migration tends to reflect the fact that small communities offer many opportunities for making housing adjustments within commuting range, allowing residents to maintain employment connections with the town while also making extensive housing adjustments. Longer commutes are more easily substituted for migration. Out-migration, where jobs as well as housing are changed may also be reactive because of the social attachment generated by an accumulation of relatives and friends at the place of origin.<sup>34</sup>

Fifthly, migration is not only reciprocal numerically and geographically, it is also reciprocal in socio-economic terms. The areas connected to a community via migration tend to be very similar to those of the community itself as measured by the New Zealand Deprivation Index. Communities with high levels of deprivation are much more likely to send their migrants to areas with similar index scores. They are also more likely to receive in-migrants from such areas. In this sense migration is heavily **regulated** by the range and quality of natural and constructed amenities at both the origin and destination. Migration patterns involving deprived communities can therefore involve a substantial 'circulation of the poor'<sup>35</sup> many of whom are young and are travelling well worn migration paths.

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<sup>34</sup> Dawkins (2006).

<sup>35</sup> Nord (1998).

Finally, migration can also be **redistributive** in nature. Each community draws migrants from *all* types of areas and from all categories on the 10 point NZDep96 scale. They also send migrants to all such areas. Although, the majority of migrants remain well within their NZDep96 category, particularly those entering or leaving decile 10 areas, some do move to area units of different decile levels mainly adjacent categories and as such are involved in the socio-economic redistribution of their inhabitants.

In conclusion, what this study of migration and the place community has suggested is that for much of the population, especially the younger population, settlements are merely temporary resting places in a matrix of relatively stable flows of people which connect it to the outside world. Better understanding of the characteristics of these migration networks may challenge those conventional approaches to the delivery of health, education and social services still based on a static concept of place.



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## Appendix 1: Migration between Kawerau and other Territorial Local Authorities in New Zealand

TLA_96	Shifting away from Kawerau		Shifting to Kawerau	
	1991-1996	1996-2001	1991-1996	1996-2001
	Out-mig K 91-96	Out-mig K 96-01	In-mig K 91-96	In-mig K 96-01
Area Outside TA	9	3	0	0
Auckland City	90	84	48	60
Buller District	9	3	0	0
Carterton District	0	3	0	0
Central Hawkes Bay District	0	6	0	0
Central Otago District	3	0	3	0
Chatham Islands District	3	0	0	0
Christchurch City	36	24	12	24
Clutha District	3	0	0	0
Dunedin City	9	9	6	9
Far North District	18	39	0	6
Franklin District	3	0	9	9
Gisborne District	39	30	36	18
Gore District	0	3	0	0
Hamilton City	117	102	36	33
Hastings District	33	45	15	6
Hauraki District	15	15	0	12
Horowhenua District	15	9	3	12
Invercargill City	9	0	0	0
Kaipara District	3	0	6	6
Kapiti Coast District	6	3	0	9
Lower Hutt City	18	18	18	9
Manawatu District	0	6	0	6
Manukau City	102	72	69	54
Marlborough District	3	0	0	3
Masterton District	0	6	9	3
Matamata-Piako District	12	6	0	12
Napier City	12	15	21	12
Nelson City	9	0	3	0
New Plymouth District	12	9	9	6
North Shore City	39	45	15	12
Opotiki District	27	54	15	42
Otorohanga District	12	9	0	3
Palmerston North City	12	24	6	15
Papakura District	18	12	3	6
Porirua City	9	9	24	12
Rodney District	6	15	12	12
Rotorua District	207	216	66	78
Ruapehu District	6	18	6	6
Selwyn District	0	3	0	0
South Taranaki District	3	3	9	3
South Waikato District	9	21	3	9
South Wairarapa District	3	6	0	0
Southland District	6	3	0	3
Taranua District	0	6	3	6
Tasman District	9	3	3	0
Taupo District	45	24	15	36
Tauranga District	156	120	18	21
Thames-Coromandel District	15	24	9	12
Timaru District	0	3	6	0
Upper Hutt City	15	9	0	6
Waikato District	3	27	9	12
Waimakariri District	3	0	0	0
Waipa District	24	6	0	0
Wairoa District	0	6	3	0
Waitakere City	48	45	12	45
Waitaki District	0	3	0	0
Waitomo District	12	3	9	3
Wanganui District	0	15	0	9
Wellington City	24	12	21	15
Western Bay of Plenty District	15	39	30	21
Whakatane District	681	624	291	294
Whangarei District	27	24	24	6
Kawerau District	5166	4479	5166	4799
To/from elsewhere in NZ (outside Kaw. District)	2022	1941	915	996

## **Appendix 2: The New Zealand Deprivation Index**

The index is developed from 11 variables from the 1996 census. The NZDep96 provides a measure of deprivation by allocating a score based on the following variables for every 'meshblock' in New Zealand (with an average of 90 people in each). These are the smallest geographical units specified by Statistics New Zealand. According to the proportion of people within each meshblock who fulfil these characteristics, the meshblock is assigned a certain deprivation score. These scores can in turn be aggregated and applied to the next level of spatial aggregation, the area unit. Scores range from the least deprived, 1 to the most deprived, 10. The variables used are the following:

1. Household income in the lowest 15% of households
2. Receiving a means tested benefit, and aged 18–59
3. Without access to a car
4. With more than one 'equivalent' occupant per bedroom (couples counting as one equivalent occupant)
5. Not living in a household which owns the dwelling
6. Unemployed and aged 18–59
7. Without qualifications and aged 18–59
8. In a single parent household
9. Separated or divorced, aged 18–59
10. Separated or divorced, aged 60 years and over
11. People with no access to a telephone.