Appendix I

Terrestrial Ecozones and the Urban/Rural Distribution of Canada's Population

One might argue, with a great deal of justification, that the standard geographical units employed by Statistics Canada are "artificial". Alternative means of subdividing Canada into more "natural" geographical units would be to use major watersheds (not used in this report) or the ecologically-defined terrestrial zones of the country *(Rural Canada: A Profile*; Statistics Canada, 1991 and more recent publications dealing with *Human Activity and the Environment*). If one associates "rural" with the "physical environment" and deals with, for example, air, water or soil pollutants, this approach might offer advantages over the administrative boundaries of the previous two approaches.

Currently, Canada is subdivided into 15 ecozones. These are illustrated in Figure I.1 using digital boundary files courtesy of the Canadian Soil Information System (CanSIS), Agriculture Canada. Those ecozones are further subdivided into 217 ecoregions and then again subdivided into a total of 1,029 ecodistricts. The definitions of these ecological areas are provided below (Wiken, 1986; Ecological Stratification Working Group, 1995):

Ecozone: an area of the earth's surface representative of large and very generalized ecological units characterized by interactive and adjusting abiotic and biotic factors.

Ecoregion: a part of an ecozone characterized by distinctive regional ecological factors, including climatic, physiography, vegetation, soil, water, fauna, and land use.

Ecodistrict: a part of an ecoregion characterized by distinctive assemblages of relief, geology, landforms and soils, vegetation, water, fauna, and land use.

As with the questions posed in Chapter 2, we can now ask: "How many people live in rural areas in Canada grouped by these terrestrial ecozones?" To answer this question we undertook an estimation process that is a classic function of geographical information systems (GIS) known as "point-in-polygon" analysis. That is, we assigned the centroids (centre points) of the 1996 EAs to regions (the ecozone polygons) and then cross-tabulated the populations of the assigned EAs by ecozones. The results are illustrated in Table I.1.

Table I.1

1996 Proportions of Canadians by Ecozone and Statistics Canada Urban/Rural Codes

Ecozone	Urban/Rural Classes					Population Totals
	1	2	3	4	5	
Arctic Cordillera	0	0	0	0	100	1,197
Northern Arctic	0	0	0	27.3	72.7	18,892
Southern Arctic	0	0	0	17.5	82.5	11,754
Taiga Plain	0	0	0	44	56	24,003
Taiga Shield	38	0	8.8	0	53.2	36,938
Boreal Shield	42.9	1.9	8.9	15.2	31.1	2,895,553
Atlantic Maritime	35.7	2.8	13.5	12	36	2,549,321
Mixed Wood Plain	80.6	1.7	5.9	3.8	8	14,840,915
Boreal Plain	18.4	1	8.3	22.1	50.1	745,380
Prairie	72.5	1.3	4.4	7.5	14.4	3,979,747
Taiga Cordillera	0	0	0	0	100	360
Boreal Cordillera	52.2	0	14	3.8	30	32,918
Pacific Maritime	82.4	3.6	6.9	2.6	4.5	2,848,566
Montane Cordillera	39.1	1.9	14.8	20.5	23.7	851,815
Hudson Plain	0	0	0	54.1	45.9	11,839
Canada	68.8	1.9	7.1	7.1	15.1	28,849,198

(Source: authors and 1996 Census Canada)

Because we are using the same EA-level data that were employed in the first approach outlined in Chapter 2, the overall result for Canada is the same, i.e. 22.2% of Canadians living in rural and small towns. Of necessity, however, the spatial configurations of rural Canadians will be more in tune to the physical characteristics of the country and be much more amenable to the exploration of environment-health relationships referred to earlier in Section 2.2.2.2.

This approach would also be a much more logical one when examining the health characteristics of specific sub-populations in rural Canada. For example, if we were examining the health of farmers in eastern Ontario and along the Quebec City-Montreal axis we would be able to avoid use of those relatively long, narrow CDs that run approximately north-south from the shores of Lake Ontario and from the St. Lawrence River. These are wholly artifacts of surveyors' work of the past century or earlier that have little or nothing to do with the physical environment of the area. These CDs straddle the boundary between the Boreal Plain and the Mixed Wood Plain. A third or more of those CDs are therefore within the Precambrian Shield, not farming areas at all!! Similar arguments could be made for the examination of other rural populations, such as fishing or forestry communities, especially when the more detailed ecoregion and ecodistrict units are

employed. Without leaping into the arguments of environmental determinism, the ecozone-derived regions would offer far more opportunities to construct and evaluate health and health care delivery hypotheses that are environment-related than the almost totally artifical administrative boundaries that appear to be the norm.

As well, because we have linked the terrestrial ecozones with the Statistics Canada urban/rural codes through association with EAs, it would be possible to link them with the community and region definitions of Statistics Canada and the OECD rural classification schemes (see Appendix II). The boundaries will now not match perfectly but the fundamental population characteristics derived from Census of Canada databases and health-related databases can be associated with the ecozones, ecoregions and ecodistricts.

As an example of this approach, the Total Dependency Ratio (see Section 4.6) has also been computed for the ecodistricts for one ecozone, the Boreal Shield (Figure I.2). When compared with the results from Section 4.6, these smaller geographical units show greater spatial variation than is found when using census divisions, but again shows a concentration of high ratios in the Prairie provinces.

Figure I-1

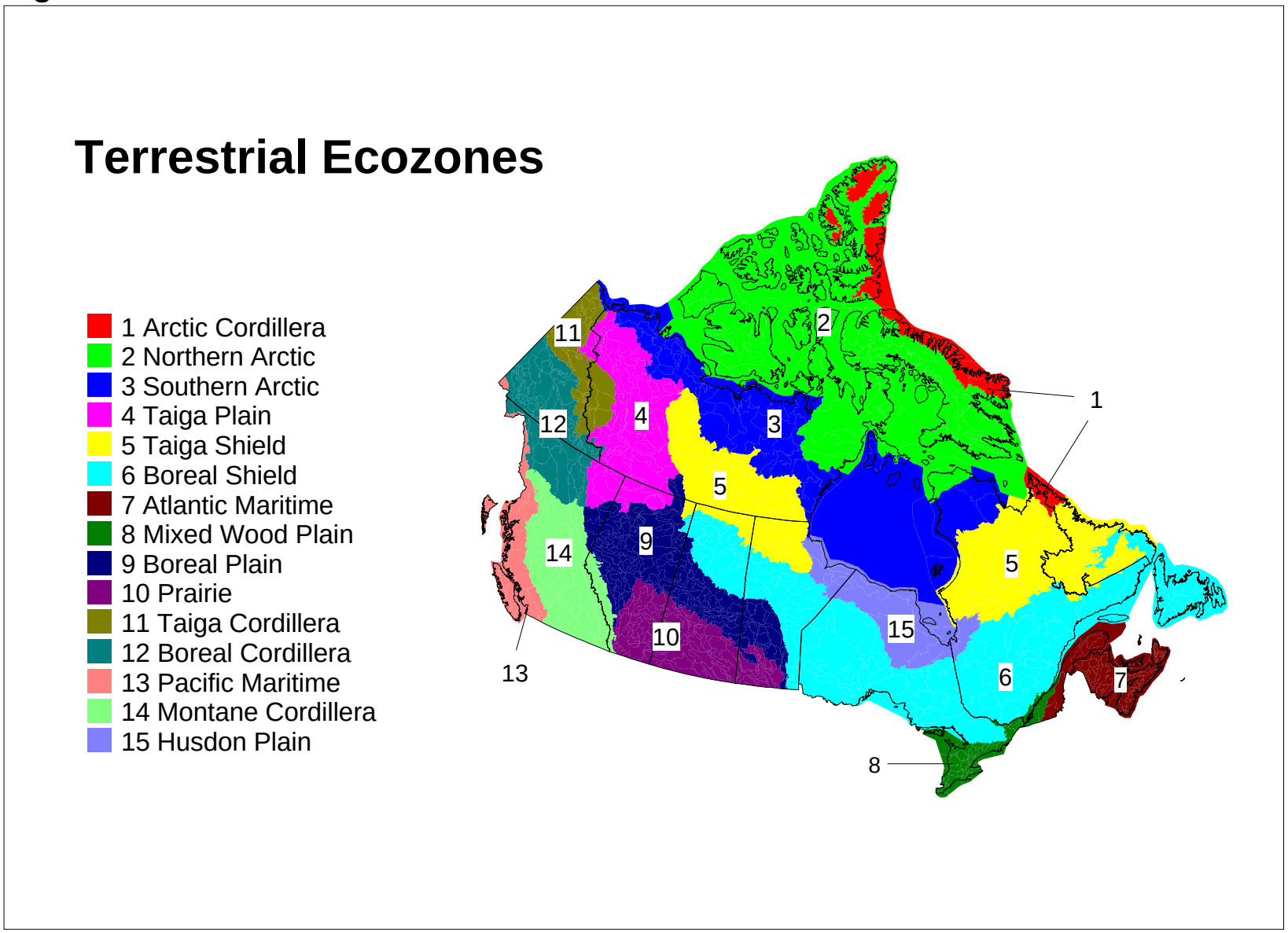
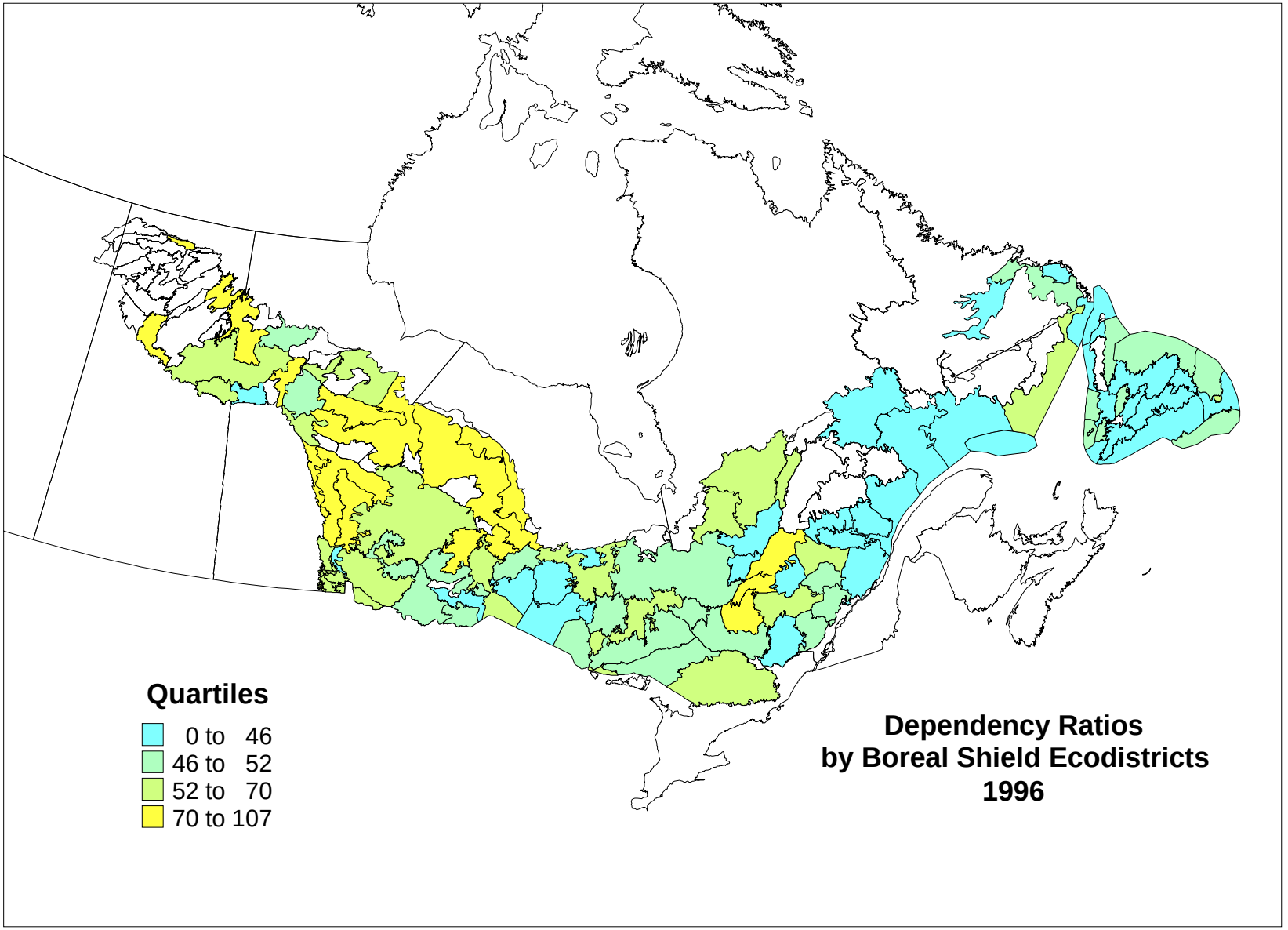

Terrestrial Ecozones
1 Arctic Cordillera
2 Northern Arctic
3 Southern Arctic
4 Taiga Plain
5 Taiga Shield
6 Boreal Shield
7 Atlantic Maritime
8 Mixed Wood Plain
9 Boreal Plain
10 Prairie
11 Taiga Cordillera
12 Boreal Cordillera
13 Pacific Maritime
14 Montane Cordillera
15 Husdon Plain
1
2
3
4
5
5
6
7
8
9
10
11
12
13
14
15

Figure I-2


Quartiles
0 to 46
46 to 52
52 to 70
70 to 107
Dependency Ratios
by Boreal Shield Ecodistricts
1996