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The Community Well-being Index (CWB): Well-being in First Nations Communities, Present, Past, and Future1

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The Community Well-being Index (CWB): Well-being in First Nations Communities, Present, Past, and Future[1]

Erin O'Sullivan and Mindy McHardy

Introduction

The Community Well-being Index (CWB) was developed as a complement to the Registered Indian Human Development Index (HDI). While the HDI measures the well-being of Registered Indians at the national and regional levels, the CWB measures well-being at the community level. The CWB combines indicators of educational attainment, income, housing conditions, and labour force activity from the Census of Canada to produce well-being "scores" for individual communities. These scores permit the assessment of variations in well-being among First Nations communities, differences in well-being between First Nations and other Canadian communities, and changes in well-being patterns over time.

The Community Well-being Index (CWB)

The CWB index combines several indicators of well-being into a single number, or CWB score. A score is generated for each community in Canada,[2] allowing an "at-a-glance" look at the relative well-being of those communities. CWB scores may fall anywhere between 0 and 100 (with 100 being the highest).[3]

The CWB index consists of four equally weighted components:[4]

1) Education

This component is comprised of two indicators: functional literacy and "high school plus." The former is afforded a weight of 2/3 of the education component, and is operationalized as the percentage of a community's population, 15 years and over, that has completed at least a grade 9 education. The latter is defined as the percentage of the population, 20 years and over, that has obtained at least a secondary school education.

2) Labour Force

This component is also comprised of two indicators: labour force participation and employment rate. The former is operationalized as the percentage of the

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population, 20 years and over, that is involved in the labour force. Employment rate refers to the employed labour force expressed as a percentage of the total labour force, aged 15 and over.

3) Income

This component is defined as *income per capita*—a community's total income divided by its total population. To make them amenable to inclusion in the CWB index, per capita income values had to be converted into income scores running from 1 to 100. The following formula was used to this end:

$$\left(\frac{\text{Log (income per capita)} - \text{Log (2,000)}}{\text{Log (40,000)} - \text{Log (2,000)}} \right) \times 100$$

The theoretical minimum and maximum ($2,000 and $40,000, respectively), were derived from the actual range of income per capita across Canadian communities. The log function was incorporated into the income component to account for the *diminishing marginal utility of income*. According to this principle, those who occupy lower income strata benefit more from additional income than those at higher income levels.

4) Housing

This component is comprised of indicators of both housing quantity and quality. The former is operationalized as the percentage of the population living in dwellings that contain no more than one person per room. The latter is defined as the percentage of the population living in dwellings that are not in need of major repairs.

Limitations of the CWB Index

As an adaptation of the HDI, the CWB reflects an attempt to capture non-monetary aspects of well-being. Nevertheless, owing to the limited scope of the Census data on which it is based, the CWB does emphasize economic aspects of well-being. This emphasis is always problematic, as things such as physical and psychological health are equally important to well-being. Many would argue, however, that it is an even greater problem when one is considering First Nations. For example, some suggest that Aboriginal culture puts less emphasis on the accumulation of material wealth and that identifying First Nations communities as "good" or "bad" on the basis of modern economic indicators has assimilatory undertones. Relatedly, some contend that programs aimed at developing First Nations communities economically can have negative social effects that economic analyses alone cannot detect.

In addition to affording excessive importance to economics, indicators such as income and labour force activity do not capture fully the reality of the economic situation among Aboriginal people. Many First Nations are involved in traditional

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economic pursuits, which, although contributing to their material well-being, are not manifested in monetary income or paid employment.

While a useful tool, then, the CWB is not a comprehensive model of well-being. Its components were chosen based on the widespread acceptance of their importance and their availability across Census years, and do not preclude the importance of other aspects of well-being. The CWB must be regarded as only a first step, albeit an important one, towards understanding well-being in First Nations communities. See Chapter 2 for a rigorous discussion of these issues.

First Nations Community Well-being: The Present (2001)

The Data

The most recent CWB was constructed using data drawn from the 2001 census of Canada.[5,6,7] Readers should be aware that any references to the "current" state of well-being in Canada's First Nations communities are actually references to that state of well-being as of 2001.

As indicated above, the CWB is calculated at the community level. Communities are defined in terms of Census subdivisions (CSDs). CSD is the term applied to municipalities (as determined by provincial legislation) or their equivalent (i.e. Indian reserves, Indian settlements, and unorganized territories) (Statistics Canada, 2002: 224).

In this study, CSDs are categorized as either First Nations or other Canadian communities. The distinction is based on a listing of First Nations communities that was developed by Indian and Northern Affairs Canada (INAC, 2001) and employed by Statistics Canada to produce on-reserve population counts from the 2001 census.

INAC's complete list of First Nations communities includes:

- Land reserved under the *Indian Act*;
- Land set aside for the use and benefit of Indian people;
- Areas where activities on the land are paid for or administered by INAC or;
- Areas listed in the Indian Lands Registry System held by Lands and Trust Services at INAC.

The list includes all CSDs of the following types: Reserves (R), Indian Government Districts (IGD), Indian Settlements (S-E), Terre Reservées (TR), Nisga'a Lands (NL), Nisga'a Villages (NVL), and Teslin Lands (TL). A selection of the following CSD types are also classified as First Nations: Chartered Community (CC), Hamlet (HAM), Northern Hamlet (NH), Northern Village (NV), Settlement (SET), Town (T), and Village (VL).

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Figure 6.1: First Nations and Other Canadian Communities Average CWB Scores, 2001

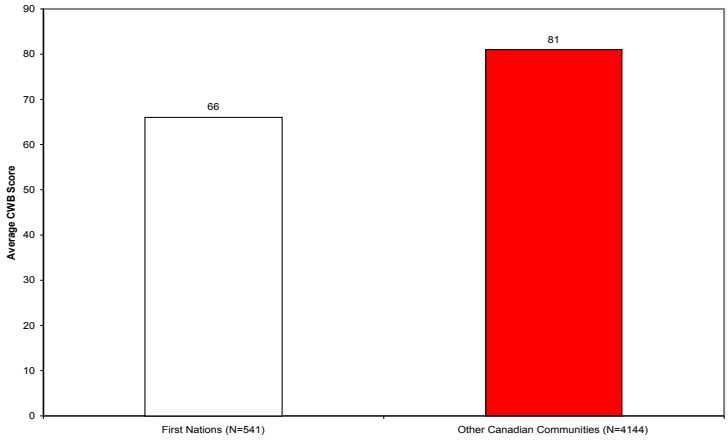
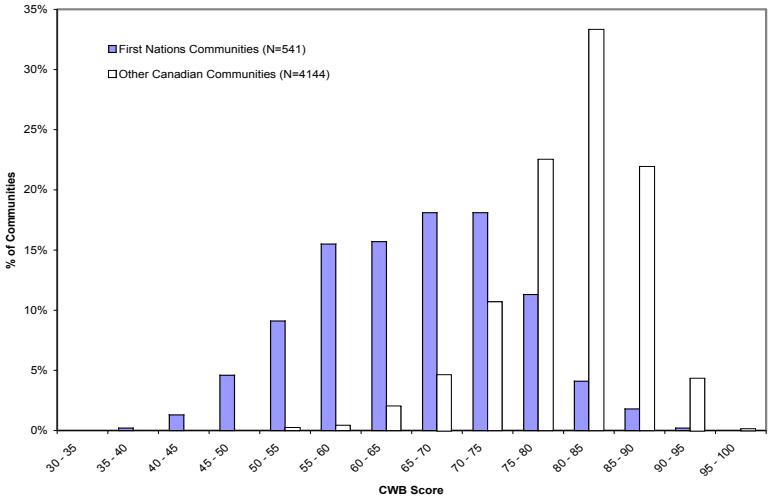


Figure 6.2: CWB Distributions, First Nations and Other Canadian Communities, 2001



These analyses are based on 541 First Nations and 4,144 other Canadian communities. They represent all CSDs with populations of at least 65, that were free of data quality issues, and that participated in the 2001 Census. Readers should be aware that 30 First Nations communities, with a combined estimated Registered Indian population of 30,000 to 35,000, chose not to participate in the 2001 Census.

Note that other types of Aboriginal communities such as Inuit and Metis communities are categorized, in this study, as "other Canadian communities." A separate study of Inuit communities, which compares them to First Nations and non-First Nations communities is provided in Chapter 7.

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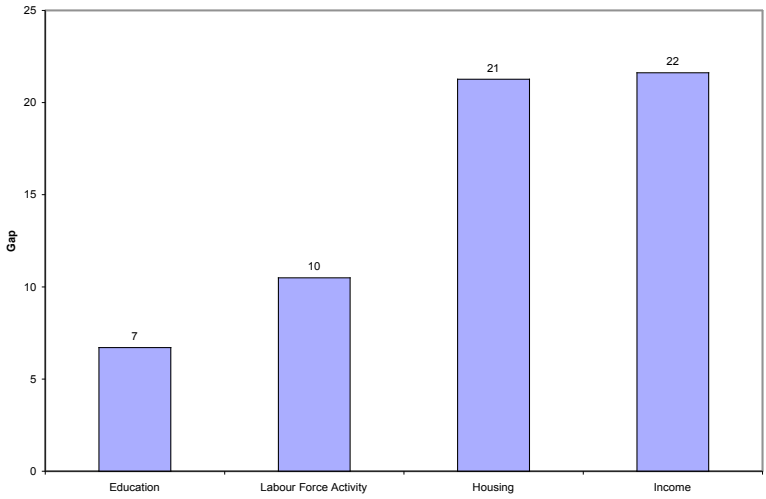
Table 6.1: Number of Communities by Type and Region, 2001

Region	First Nations Communities	Other Canadian Communities	Total
Maritimes	29	795	842
Quebec	35	1,306	1,341
Ontario	59	425	484
Manitoba	65	211	276
Saskatchewan	91	715	806
Alberta	57	334	391
British Columbia	170	316	486
North	35	42	77
Total	541	4,144	4,703

Figure 6.3: Gaps in Community Well-being, by CWB Components, 2001



Results—First Nations Community Well-being, a National Overview, 2001

As indicated earlier, interpretation of the CWB is very straightforward. The scale runs from 0–100, with zero being the lowest score and 100 being the highest. As is illustrated in **Figure 6.1**, the average CWB score for First Nations is 66 while the average score for other Canadian communities is 81—a difference of 15 points on the 100-point CWB scale.

Figure 6.2 illustrates the distribution of First Nations and other Canadian communities. The disparity between First Nations and other Canadian communities is quite clear, with the latter concentrated at the high end of the CWB range, and the former at the middle and lower end. Nearly 50% of First Nations communities

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Figure 6.4: Average CWB Scores for First Nations and Other Canadian Communities by Region, 2001

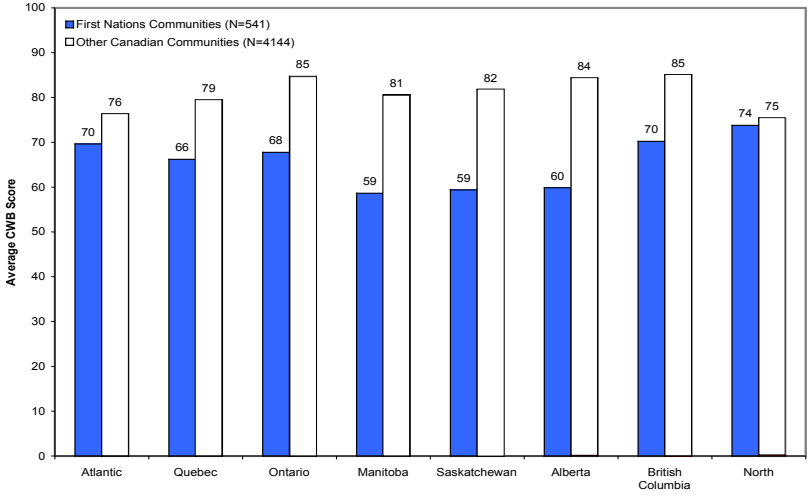
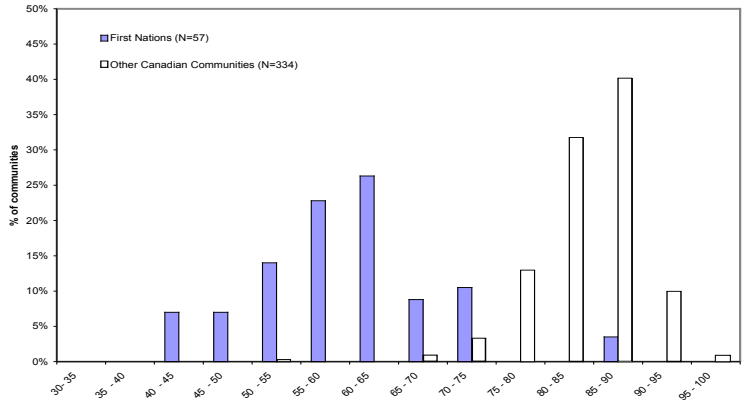


Figure 6.5: CWB Distributions of First Nations and Other Canadian Communities in Alberta, 2001



occupy the lower half of the index range (between 35 and 65). Conversely, less than 3% of other Canadian communities fall within this range. While about 94% of First Nations have CWB scores lower than the average score for other Canadian communities (81), only about 3% of other Canadian communities have CWB scores lower than the average score for First Nations (66). Perhaps most strikingly, only 1 of the top 100 Canadian communities is a First Nation while 92 of the lowest-scoring communities are First Nations.[8]

Figure 6.3 (page 115) illustrates the differences between First Nations and other Canadian communities on the four components of the CWB Index. The housing and income components exhibit the greatest differences. These two components

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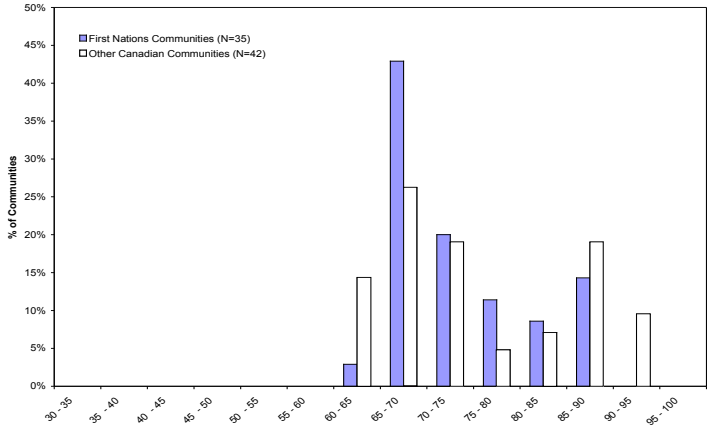
Figure 6.6: CWB Distributions of First Nations and Other Canadian Communities in the North, 2001



account for more than two-thirds of the current disparity in well-being between First Nations and other Canadian communities.[9]

For reference, **Table 6.1** provides the number of First Nations and other Canadian communities in each region.

As illustrated in **Figure 6.4**, average CWB scores vary from region to region, as does the well-being gap between First Nations and other Canadian communities. The widest disparity between First Nations and other Canadian community CWB scores exists in Alberta, while the smallest disparity exists in the North. CWB distributions in these two regions are illustrated in **Figures 6.5** and **6.6**, respectively.

Map 1 (page 144) groups First Nations communities into three strata. These strata are based on the mean and standard deviation of the average CWB for score for all 541 First Nations. The "Average" stratum includes all communities whose scores fall within one standard deviation (9.925) above or below the average First Nations CWB score (66). First Nations whose scores fall above and below the limits of this stratum are categorized as "Above Average" and "Below Average," respectively. The ranges[10] of the three strata are as follows: 0–55 = Below Average, 55–75 = Average, and 75–100 = Above Average.

The map demonstrates that communities with higher well-being are concentrated around the outer edge of Canada, and emphasizes the prevalence in the Prairie provinces of lower-scoring First Nations.

The Data

To assess well-being trends in First Nations and other Canadian communities across time, we constructed CWB indices for 1981, 1991, 1996, and 2001.[11] Owing to differences in the ways key variables were measured in the 1986 Census, and

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Table 6.2: Census Database Details 1981–2001

Census Year	CSDs for which CWB Score was Calculated[1]	Incompletely Enumerated Reserves	CSDs Excluded Owing to Data Quality	CSDs with Population 65 and Over		CSDs included in 1981–2001 Time Series Analyses	
				First Nations[2]	Other Canadian Communities	First Nations	Other Canadian Communities
1981	5,509	8[3]	0	458	4,731	318	3,171
1991	5,693	78	51	485	4,697		
1996	5,585	77	49	541	4,579		
2001	5,188	30	98	541	4,144		

Notes:

1. Includes all CSDs present on the 2B micro-databases.

2. As indicated above, for the purposes of the time series analyses, CSDs were divided into First Nations and other Canadian communities based on INAC's 2001 geography hierarchy. For the purposes of this table, however, the 1996 INAC hierarchy was used to identify the number of First Nations in 1996. As the 1996 hierarchy is the earliest one that exists, it was also used to identify the number of First Nations in 1991. Six CSDs in the 1991 database, which did not exist in 1996 but which were INAC legal reserve CSD 'types' (five 'R' and one 'S-E') have also been counted as First Nations for the purposes of this table.

3. Counts are available for these CSDs (which include Kahnawake 4, Webequie, Wunnumin 2, Kingfisher 1, Peigan 147, Cowicha 1, Theik 2, and Cowicahn 9), but the numbers were actually imputed. Since the "donor cases" were chosen from outside the reserves in question, data for these CSDs do not reflect their conditions accurately. Beginning in 1986, missing data were replaced by values from donor cases within the same reserve, improving the veracity of on-reserve data.

Table 6.3: Average CWB Scores for First Nations and Other Canadian Communities in Canada, 1981–2001 (Numbers are rounded)

Census Year	Average CWB Score		Difference
	First Nations (N=318)	Other Canadian Communities (N=3,171)	
1981	52	73	21
1986	NO DATA		
1991	57	77	19
1996	62	77	16
2001	64	80	15

Note: Numbers Presented in table are rounded

to the large number of First Nations communities that did not participate in that Census, 1986 CWB scores are not available.

In most respects, the methods used to create this 1981–2001 series of CWB indices are identical to those used to create the single-year (or cross-sectional) CWB index described in the previous section. The time series indices differ, however, in two ways. Both of these differences were implemented to make the indices comparable across time.

First, to account for inflation, the income components of the indices were adjusted using the Consumer Price Index (CPI) (Statistics Canada, 2004). These adjustments, which are described in detail below, permit the comparison of income values from the 1981, 1991, 1996, and 2001 censuses.

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Where 1992=100, the CPI value for 1980 is 52.4, for 1990 is 93.3, and for 2000 is 113.5.[12] These values were transformed to make 1995=100, establishing income values from the 1996 census as a "baseline." To render them comparable to this baseline, 1981, 1991, and 2001 income data were multiplied by 1.989, 1.117, and 0.918, respectively.

The second adjustment to the 1981–2001 series of CWB indices involved the exclusion of communities deemed "inconsistent" across time. CSDs themselves can change over time. For example, a CSD may gain a large portion of land and its associated population. In other cases, a block of population belonging to one CSD may be reassigned to another. In order to legitimately compare a community across time, one must be sure that one is assessing the same entity. To illustrate, consider the result if a very wealthy community was absorbed by a less affluent one between Census years: the overall well-being of the latter will appear to have improved even though the population of which it was originally comprised may not have improved at all—it may have even declined.

As such, analyses of CWB trends between 1981 and 2001 are based upon only those 318 First Nations and 3,171 other Canadian communities deemed as "consistent entities" from 1981 through 2001.[13] The criteria we used to designate a CSD as consistent are as follows:

1) The CSD existed in each Census year.[14]
2) The CSD did not gain or lose, owing to boundary changes, more than 5% of its population.[15]
3) The CSD had a CWB score in each Census year.
4) The CSD had a population of at least 65 in each Census year.

Summaries of each of the Census data sets and comparability analyses are provided in **Table 6.2**.

It is important to recognize that, as our analyses are based on a subset of CSDs, one must not assume that our results are representative of all First Nations and other Canadian communities.

It is perhaps also prudent to emphasize that the 2001 CWB data included in this series are necessarily different from those presented in the previous section, which looked at 2001 alone. Specifically, the cross-sectional 2001 data included raw income scores rather than scores adjusted to account for inflation. Additionally, the cross-sectional 2001 data included communities deemed inconsistent across time.

Results—First Nations Community Well-being, a National Overview, 1981–2001

As demonstrated in **Table 6.3** (page 118) and **Figure 6.7**, the average CWB score for both First Nations and other Canadian communities increased between each Census and the well-being "gap" between the two community types decreased.

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Figure 6.7: Average CWB Scores for First Nations and Other Canadian Communities, 1981–2001

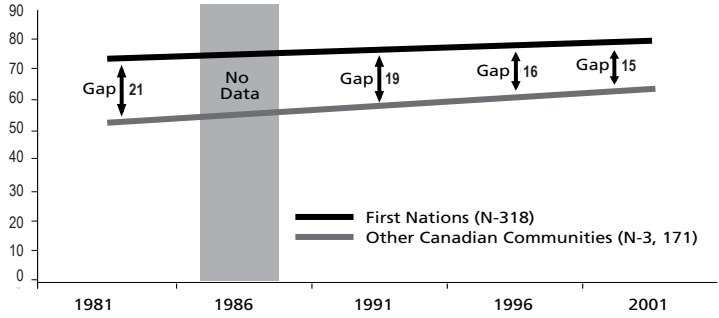


Figure 6.8: First Nations' CWB Distributions 1981–2001

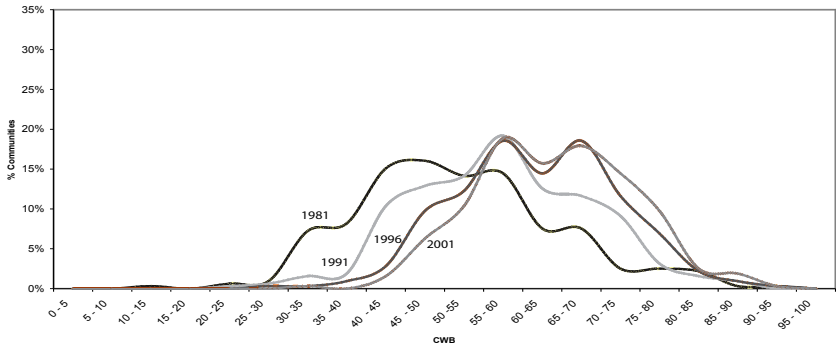
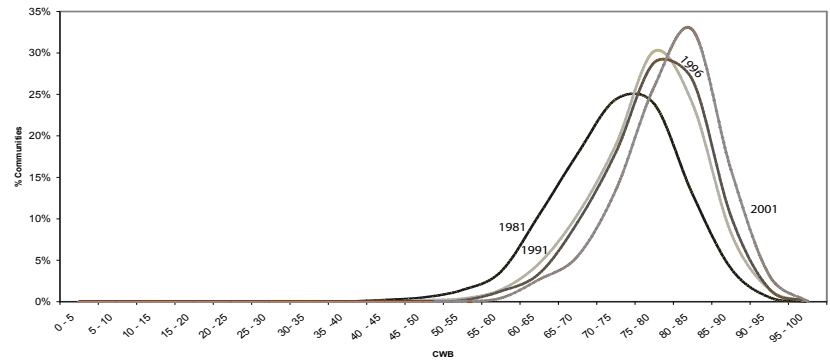


Figure 6.9: Other Canadian Communities' CWB Distributions 1981–2001



Notably, most of the absolute and relative gains experienced by First Nations appear to have occurred between 1991 and 1996. The gap decreased by less than a point between each of the 1996–2001, 1981–1986, and 1986–1991 intercensal periods (as we do not have CWB scores for 1986, we must assume that the gap decreased equally in each of the two latter periods).

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Figure 6.10: Changes in CWB Scores for First Nations and Other Canadian Communities, 1981–2001

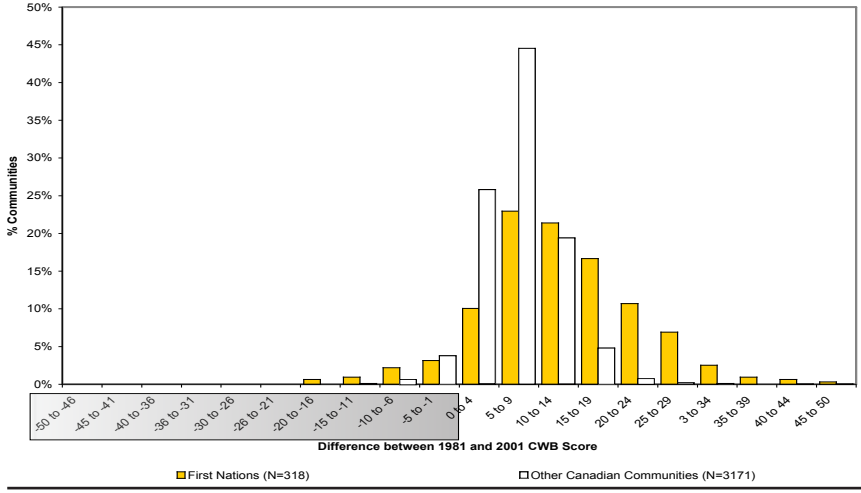

Figure 6.8 shows the distributions of First Nations' CWB scores for 1981, 1991, 1996, and 2001. **Figure 6.9** shows these distributions for other Canadian communities. The graphs demonstrate several things. First, CWB scores in both First Nations and other Canadian communities increased steadily over time. Second, the relatively consistent shapes[16] of the distributions and their wholesale shifts to the right of the graph suggests that scores have increased "across the board" for both community types. It was not the case, for example, that the mean CWB of First Nations was drawn upwards by the removal of a few communities to the extreme high end of the CWB continuum. Third, CWB scores were consistently lower for First Nations communities. Finally, scores for both types of communities spanned a wide range of the CWB continuum in each Census year, with a greater amount of variation being found in First Nations communities.

In addition to changes in the averages and distributions of the CWB, it is important to examine the changes in individual communities' scores across time. This permits us to distinguish between a scenario wherein all communities experience a "slow but steady" increase in well-being over time and a scenario wherein communities experience erratic periods of "boom and bust."[17]

Figure 6.10 demonstrates changes in CWB scores for individual communities between 1981 and 2001. The x-axis represents the change in a community's CWB score between the two Census years (literally, its 2001 CWB score minus its 1981 CWB score). Where the number is positive, the community's CWB score has increased. Where the number is negative, the community's score has decreased. For ease of interpretation, the area of the graph containing negative numbers has the numbers on the x-axis shaded in grey. The graph demonstrates that most Canadian communities, both First Nations and otherwise, improved between 1981 and 2001. Only 22 (7%)[18] First Nations and 141 (4%) other Canadian communities had a lower CWB score in 2001 than in 1981.

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Figure 6.10 also reveals that the pattern of change for First Nations differed from that of other Canadian communities. The bulk of the curve for First Nations is slightly farther to the right than that for other Canadian communities, suggesting that First Nations communities, on the whole, improved more. Congruously, the mean change was 12 for First Nations but only 7 for other Canadian communities. As importantly, however, the First Nations curve is much "flatter,"[19] indicating that the amount of change varied more across First Nations than across other Canadian communities.

Another means of analysing changes in individual communities is illustrated in **Table 6.4**. The table contains one "change matrix" for First Nations and another for other Canadian communities. CWB scores in both 1981 and 2001 are collapsed into 5 levels: 0–20, 20–40, 40–60, 60–80, and 80–100. The CWB 1981 levels lie on the vertical axes, while the 2001 levels lie on the horizontal axes. Each cell represents the proportion of communities which moved from its corresponding CWB stratum in 1981 to its corresponding stratum in 2001. To illustrate, the cell in **Table 6.4** that is located at the point where "20–40" on the vertical axis (in the First Nations segment of the table) and "40–60" on the horizontal axis interact, represents the percentage (11%) of First Nations whose CWB score moved from between 20 and 40 in 1981 to between 40 and 60 in 2001.

One benefit of this type of analysis is that it provides a good "at a glance" representation of how well-being in First Nations and other Canadian communities has changed over time. The diagonal lines of shaded cells include those CSDs which occupied the same CWB stratum in both Census years. The cells above the diagonals include CSDs whose CWB scores have moved to a higher stratum between the Census years in question. The cells below the diagonals include CSDs whose CWB scores have moved to a lower stratum.

Like **Figure 6.10**, this table indicates that a decline in well-being, both in First Nations and other Canadian communities, was the exception rather than the rule, and that improvement between 1981 and 2001 was more common among First Nations communities. On the one hand, 55% of First Nations occupied a higher CWB stratum in 2001 than in 1981, compared to 41% of other Canadian communities. On the other hand, 43% of First Nations and 58% of other Canadian communities occupied the same CWB stratum in both Census years. A slightly larger percentage of First Nations declined (2% vs. 1% of other Canadian communities), but the difference is negligible. Overall, these numbers indicate that well-being improved gradually in Canadian communities between 1981 and 2001, and at a faster rate among First Nations.

Components of the CWB, Canada, 1981–2001

Between 1981 and 2001, First Nations scores increased across all components of the CWB index, both in absolute terms and relative to other Canadian communities. The greatest gains were seen in the education component. The education score for

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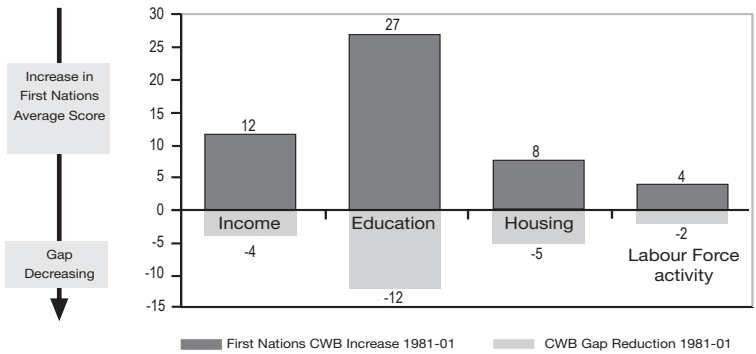
Table 6.4: CWB Change Matrices for First Nations and Other Canadian Communities, 1981–2001

			CWB 2001				
			0–20	20–40	40–60	60–80	80–100
First Nations (N=318)	CWB 1981	0–20			1 (0.3%)		
		20–40		1 (0.3%)	35 (11%)	18 (5.7%)	
		40–60			77 (24.2%)	112 (35.2%)	1 (0.3%)
		60–80			5 (1.6%)	52 (16.4%)	7 (2.2%)
		80–100				2 (0.6%)	7 (2.2%)
Other Canadian Communities (N=3,171)	CWB 1981	0–20			1 (0.0%)		
		20–40				3 (0.1%)	
		40–60			12 (0.4%)	167 (5.3%)	5 (0.2%)
		60–80			3 (0.1%)	1,313 (41.4%)	1,113 (35.1%)
		80–100				27 (0.9%)	527 (16.6%)

Figure 6.11: First Nations' Gains and Gap Reduction in the Components of the CWB, 1981–2001



First Nations increased by 27 points. This gain is more than that seen in the other three CWB components combined. The gap between the education score for First Nations and that calculated for other communities decreased by 12 points between 1981 and 2001. This reduction is greater than that seen in the other three CWB components combined.[20] As is illustrated in **Figure 6.11** (page 123), the second largest absolute gains were seen in income (12 points), followed by housing (8 points), and labour force activity (4 points). The second largest gap reduction

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Figure 6.12: CWB Component "Gaps" 1981–2001

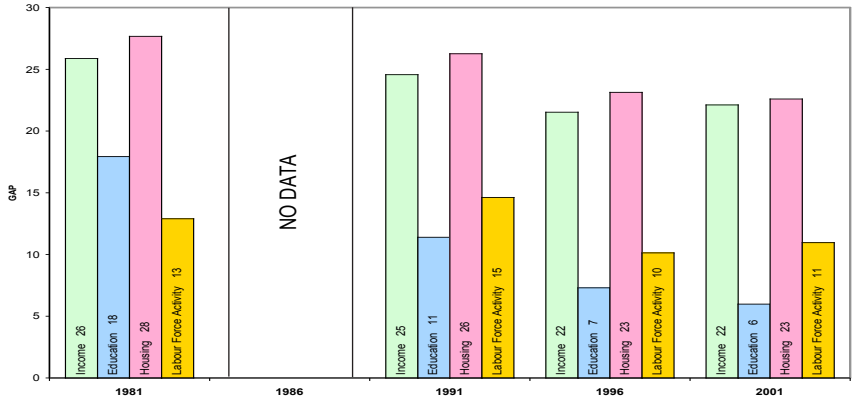
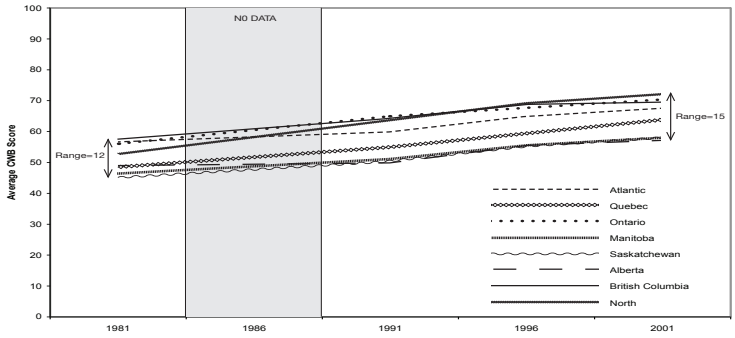
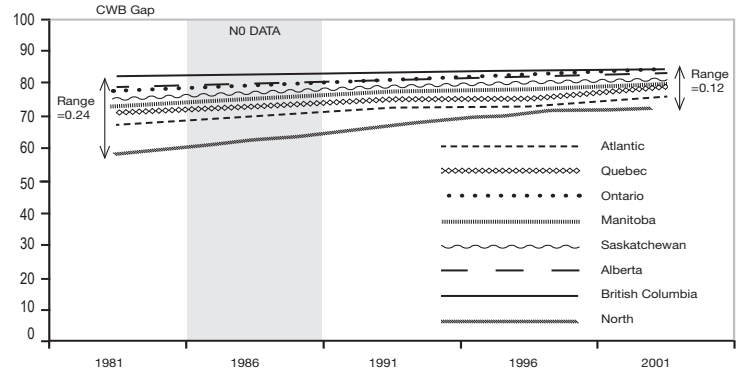


Figure 6.13: First Nations' CWB Scores by Region, 1981–2001



Source: Derived from Appendix Table 1

Figure 6.14: Other Canadian Communities' CWB Scores by Region, 1981–2001



Source: Derived from Appendix Table 2

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occurred in housing (5 points), followed by income (4 points), and labour force activity (2 points).

The large gains in education are evident in **Figure 6.12**, which shows the gaps between First Nations and other Canadian communities in the CWB components for 1981, 1991, 1996, and 2001. In each Census year, the largest gaps existed in the housing component, closely followed by the income component. The gap in the labour force activity component was consistently about half as large. However, the education gap, which was about two-thirds the size of the housing and income gaps in 1981, had shrunk to less than one third their size by 2001.

First Nations Community Well-being, a Regional Breakdown, 1981–2001[21]

Readers should interpret regional CWB statistics with caution. As we discussed in an earlier section of this report, our analyses are based on the subset of communities that existed in a relatively consistent manner between 1981 and 2001. Excluding communities which did not meet this criterion may have introduced bias. Given that the number of communities per region is much smaller than the aggregate analysis, such bias may be exacerbated. Moreover, regional boundaries are somewhat arbitrary. Cross-sectional analyses of 2001 CWB scores, presented earlier, indicate that First Nations' well-being follows certain geographic patterns, but that these patterns do not conform closely to regional borders. Essentially, while regional analyses provide a good general indication of the dispersion of well-being across the country, data limitations must be remembered and regional differences should not be overemphasized.

Figures 6.13 and **6.14** plot changes in regional CWB averages for First Nations and other Canadian communities, respectively. These graphs demonstrate that the average CWB scores for both types of communities increased across regions each Census year.

These figures also demonstrate that, while regional scores for other communities converged between 1981 and 2001, regional scores for First Nations diverged slightly. In other words, the disparity in well-being between First Nations across regions of Canada increased between 1981 and 2001.

Figure 6.13 also demonstrates that the well-being of First Nations varied from region to region in a fairly consistent manner between 1981 and 2001. Consistently, average CWB scores were highest in British Columbia, Ontario and the Atlantic region, and lowest in the Prairies. First Nations in the North, whose average score was middling in 1981, rose to be the highest in 2001. Quebec First Nations, whose score was comparable to those of the Prairie provinces in 1981, had become more middling by 2001.

The largest increase in First Nations' CWB score occurred in the North (19 points), while the smallest occurred in Alberta (almost 8 points). Increases in First Nations' CWB scores in the other regions were as follows: Quebec (15), Ontario

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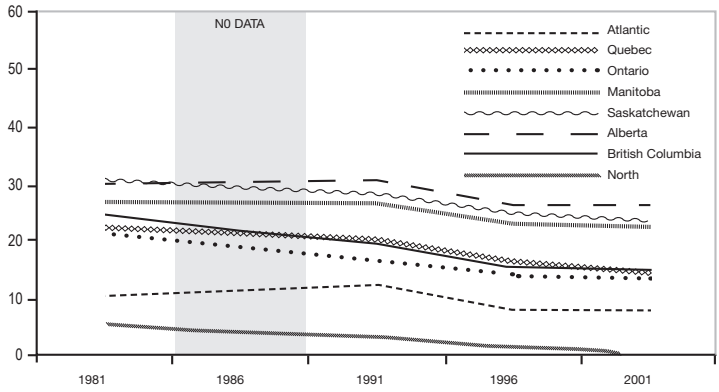
Figure 6.15: CWB Gaps by Region, 1981–2001



Source: Derived from Appendix Table 3

(14), Saskatchewan (13), British Columbia (12), Manitoba (11), the Atlantic region (11).

Figure 6.15 illustrates changes in the gaps between First Nations and other communities, by region, between 1981 and 2001. This graph demonstrates that, with the exception of Alberta and the Atlantic region, the regional gaps between First Nations and other communities decreased with each Census year (the gap increased very slightly in Alberta and somewhat more in the Atlantic region between 1981 and 1991, though gaps in both regions decreased in the overall 1981–2001 period).

Regional differences in the disparity between First Nations and other communities were also quite consistent across time. The smallest gaps were found in the North and the Atlantic region, to a certain extent owing to the lower CWB scores of non-First Nations communities in those regions. Middling gaps were found in Ontario, British Columbia, and Quebec. The largest disparities between First Nations and other communities were found in the Prairie provinces.

As mentioned above, the disparities between First Nations and other Canadian communities decreased in all regions between 1981 and 2001. The largest reduction occurred in British Columbia (almost 10 points), while the smallest occurred in the Atlantic region (about 3 points). Gap reductions in the other regions were as follows: Ontario (8), Quebec (8), Saskatchewan (7), the North (5), Manitoba (4), Alberta (4).

Overall it may be said that while there were clear regional patterns in First Nations' CWB scores and gaps in 1981, 1991, 1996, and 2001, regional patterns of changes in scores and gaps between Census years were less pronounced.[22]

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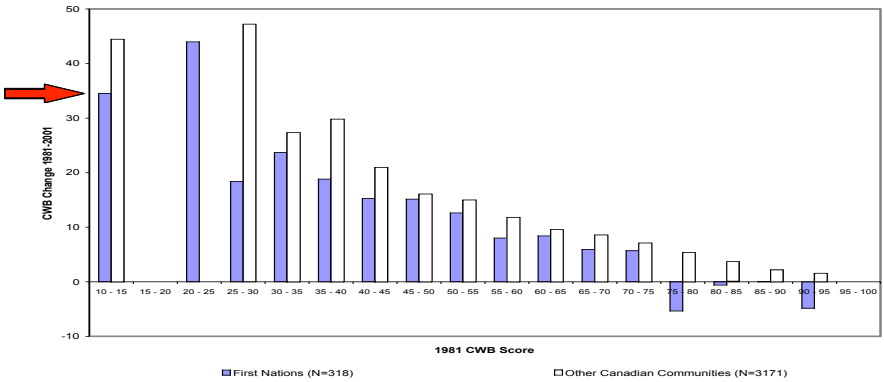
Figure 6.16: CWB Score Change 1981–2001 by 1981 CWB Score Strata



The Importance of "Initial Scores"

Analyses of 1981–2001 CWB data revealed two interesting patterns. These patterns provide insight into both past and future CWB trends. Consequently, we decided to highlight the patterns in this separate section.

The patterns, in brief, are as follows:

a) As communities' CWB scores at the outset of an intercensal period (i.e. their "initial scores") increased, the amount of improvement they experienced during the intercensal period decreased.

b) Within categories of "initial scores," First Nations improved less than other Canadian communities.

These patterns were evident almost uniformly across intercensal periods.[23] The patterns were also evident across all components of the CWB index[24] except for education. While improvement in education decreased as initial education scores increased, First Nations and other communities with similar initial scores generally improved at a similar rate.

Using the 1981–2001 inter-censal period as an example, **Figure 6.16** illustrates these patterns in the CWB scores of First Nations and other Canadian communities. The 1981 CWB scores, divided into 20 equidistant groups, fall on the x-axis. On the y-axis is the average change in CWB score that communities within each 1981 CWB stratum experienced between 1981 and 2001. For example (as indicated by the arrow), the average amount of change experienced by First Nations whose 1981 CWB score fell between 10 and 15 was about 35 points on the 100-point CWB scale.

The decline in bar heights from left to right demonstrates that improvement between 1981 and 2001 decreased as 1981 scores increased: communities with lower scores in 1981 improved more between 1981 and 2001 than did communi-

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Table 6.5: Regression Analysis: Examining Determinants of Change in CWB Scores Between 1981 and 2001

Predictors of CWB Score Change 1981–2001	R	R^2		B (slope)
1981 CWB Score only (Model 1)	0.630	0.397		-0.342
First Nations status only (Model 2)	0.287	0.082		0.057
1981 CWB Score with First Nations status added (Model 3)	0.637	0.406	1981 CWB Score	-0.379
			First Nations status	-0.023

ties with higher scores in 1981. Each 1981 CWB score stratum contains a pair of bars. In each stratum, the grey bar representing the average change between 1981 and 2001 for First Nations is shorter than the white bar which represents the average change between 1981 and 2001 for other Canadian communities. This indicates that, within categories of "initial scores," First Nations improved less than other Canadian communities.

What Do These Patterns Say About CWB Trends in the Past?

Almost uniformly, our analyses of the CWB index indicate that First Nations well-being increased between 1981 and 2001 and that the gap between First Nations and other communities narrowed. What those analyses did not determine, however, was why First Nations improved more than other communities.

An attractive explanation is that something was "going on" in First Nations communities that allowed them to progress faster than other communities. That is, we could assume that the correlation between First Nationhood and CWB improvement (i.e. First Nations improved more) was actually a causal link (i.e. First Nations improved more because they were First Nations).

The patterns revealed in **Figure 6.16** (page 127), however, negate this supposition. First, the graph demonstrates that in both First Nations and other communities, improvement in well-being scores decreased as initial scores increased. Since CWB scores were generally lower among First Nations communities, their average score would necessarily have increased more than that of other Canadian communities. In other words, the relationship between "First Nationhood" and improvement in well-being is largely spurious.

The relationship is not entirely spurious; but what impact First Nationhood had on improvement in well-being was not favourable. Within the strata of 1981 CWB scores, First Nations improved less than other communities, indicating that First Nationhood had a negative impact on CWB improvement.

The regression analyses presented in **Table 6.5** will help clarify these claims. As indicated by the R-Square values of the three different "models," 1981 CWB scores

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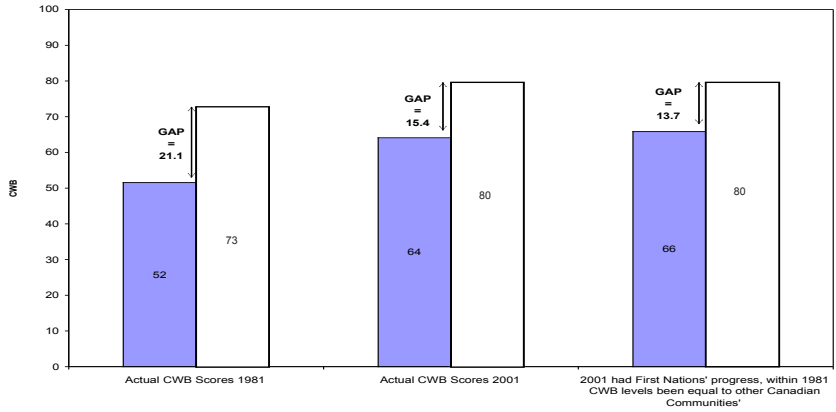
Figure 6.17: Comparing Actual Changes in First Nations Well-being Between 1981 and 2001 with those that "Would Have Occurred" had First Nations Progress Within 1981 CWB Levels Been Equal to That of Other Canadian Communities



alone accounted for about 40% of the variation in CWB change between 1981 and 2001. Alone, First Nations status accounted for only about 8%. Adding the latter to the first model improved its ability to account for variation in 1981–2001 CWB change only minutely. These results suggest that little of the difference between communities' 1981 and 2001 CWB scores was related to whether or not they were First Nations.

The B values, or "slopes," demonstrate that what influence First Nationhood had on CWB improvement between 1981 and 2001 was negative. When examined in isolation (Model 2), First Nationhood appears to have a weak but positive relationship with the amount of improvement communities experienced between 1981 and 2001. When one "controls" for communities' initial scores by introducing 1981 CWB scores into the model (Model 3), however, that relationship is reversed: First Nations improved slightly less than other Canadian communities.

Essentially, despite the increase in First Nations well-being between 1981 and 2001 and the fact that the disparity between First Nations and other Canadian communities decreased, we cannot claim that First Nations progressed faster, or even as fast, as other communities. Put another way, had First Nations' progress really been equal to that of other communities, their average score would have increased more, and the gap would have narrowed more appreciably.

Figure 6.17 is illustrative. The first two sets of bars represent the actual average CWB scores for First Nations and other Canadian communities in 1981 and 2001, respectively. In the final set of bars, the First Nations score for 2001 has been adjusted to represent what the First Nations score "would have been" had First Nations progressed at the same rate as other communities within their respective 1981 CWB score strata.[25] Had that been the case, the CWB gap would have decreased by about 7.4 points on the 100-point CWB scale, slightly more than the actual decrease of about 5.7 points.

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Table 6.6: Summary of Regression Equations Used to Generate Projections

Period	Indicator	Regression Equation *where* x = change between year A and year B, and y = score year A	
		First Nations (N = 318)	**Other Canadian Communities (N = 3,171)**
1981–2001	**CWB**	x = 38.0 + -0.494 (y)	x = 32.3 + -0.350 (y)
	Income	x + 30.4 + -0.529 (y)	x = 36.5 + -0.466 (y)
	Education	x = 47.2 + -0.479 (y)	x = 38.4 + -0.388 (y)
	Housing	x = 51.9 + -0.706 (y)	x = 66.3 + -0.705 (y)
	Labour Force Activity	x = 58.7 + -0.832 (y)	x = 15.2 + -0.167 (y)
		First Nations (N = 399)	**Other Canadian Communities (N = 3,454)**
1991–2001	**CWB**	x = 20.9 + -0.247 (y)	x = 20.4 + -0.228 (y)
	Income	x = 14.0 + -0.187 (y)	x = 22.6 + -0.288 (y)
	Education	x = 27.8 + -0.280 (y)	x = 27.3 + -0.299 (y)
	Housing	x = 30.9 + -0.397 (y)	x = 48.4 + -0.519 (y)
	Labour Force Activity	x = 33.9 + -0.455 (y)	x = 18.0 + -0.217 (y)
		First Nations (N = 470)	**Other Canadian Communities (N = 3,643)**
1996–2001	**CWB**	x = 12.1 + -0.160 (y)	x = 15.6 + -0.174 (y)
	Income	x = 9.3 + -0.139 (y)	x = 19.8 + -0.248 (y)
	Education	x = 14.5 + -0.157 (y)	x = 20.6 + -0.241 (y)
	Housing	x = 22.8 + -0.315 (y)	x = 42.2 + -0.455 (y)
	Labour Force Activity	x = 28.0 + -0.395 (y)	x =19.1 + -0.221 (y)

What Do These Patterns Say About CWB Trends in the Future?

As the implications of the patterns we have described are borne out in our projections, little needs to be said about them here. In brief, the fact that improvement declines as initial scores increase suggests that well-being will eventually "plateau." The fact that within the strata of initial scores, First Nations improved less than other communities, suggests that First Nations will plateau at a lower level of well-being than other Canadian communities.

First Nations Community Well-being: the Future (2001–2041)—Projection Methodology

We cannot know for certain how well-being among First Nations will develop. Innumerable unexpected factors may emerge to alter the course of First Nations history. We can, however, ascertain what implications previous CWB patterns

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have for the future progress of First Nations well-being. In simple terms, what is the future of First Nations well-being, if things continue on their present course?

Without any clear indication of which intercensal period best represents how First Nations will fare in the future,[26] it is prudent to produce several projections based on different intercensal periods. We used the 1981–2001 period, the 1991–2001 period, and the 1996–2001 periods,[27,28] to produce projections for the CWB and its components through 2041. Producing multiple projections also allows us to minimize the impact of any random variation that may appear in any individual intercensal period.

In the previous section, we discussed the impact of communities' initial scores on how much their scores are likely to change. To account for this impact in our projections, we employed regression equations. These equations summarize the relationship between communities' scores at the beginning of a period and how much they changed by the end of the period. They allowed us to estimate how much communities' scores would be expected to increase in the future, given their scores in 2001.

Our methodology is described in detail below, using projections of the CWB index based on the 1981–2001 period as an example.

The following regression equation describes the relationship between First Nations communities' 1981 CWB scores and the amount of change those communities incurred between 1981 and 2001.

*Change 1981 to 2001 = 38 + (-.494 * 1981 CWB Score)*[29]

The corresponding regression equation for other communities is:

*Change 1981 to 2001 = 32.3 + (-.350 * 1981 CWB Score)*

To calculate 2021[30] CWB scores for First Nations, we added to their 2001 CWB scores 38 minus 0.494 multiplied by their 2001 CWB scores. To calculate First Nations 2041 CWB scores, we repeated the process, this time multiplying the 0.494 by communities' 2021 CWB scores.

To calculate 2021 CWB scores for other Canadian communities, we added to their 2001 CWB scores 32.3 minus 0.350 multiplied by their 2001 CWB scores. To calculate other Canadian communities' 2041 CWB scores, we repeated the process, this time multiplying the .350 by communities' 2021 CWB scores.

In all, we completed 15 projections. They are detailed in **Table 6.6**.

A Word of Caution

A simple and popular method of projecting trends into the future is to extrapolate changes in group averages. That is, since First Nations' average CWB score increased by 13 between 1981 and 2001, we could assume that it would increase by the same 13 between 2001 and 2021 and in every subsequent 20-year period.

In the case of the CWB, this method would implicitly assume that some inherent quality in First Nations allowed them to improve at a faster rate than

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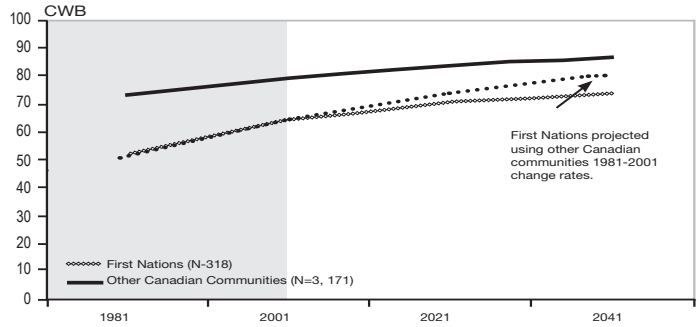
Figure 6.18: 2001–2041 CWB Projections Based on Trends Observed in the 1981–2001 Intercensal Period



Source: Derived from Appendix Table 4

other communities. Such an assumption is unwarranted, however, given the relationship we uncovered earlier between initial scores, changes in scores, and First Nations community status. Consequently, we utilized a more complex projection method which accounted for that relationship.

This more complex projection method, however, contains its own assumptions. Specifically, our method assumes that the aforementioned negative relationship between initial scores and improvement and between First Nationhood and improvement are "real" and not by-products of factors unknown.

For example, as the positive one was revealed to be, the negative relationship we discovered between First Nationhood and well-being improvement may be spurious. Perhaps communities within the strata of initial scores tended to improve more if they were closer to highways. First Nations might appear to improve less simply because they tended to be located farther from highways, even though First Nations near highways improved just as much as other Canadian communities near highways and other Canadian communities removed from highways improved just as little as their First Nations neighbours.

The possibility of such an effect might prompt readers to wonder why we didn't investigate the matter, and, if such an effect existed, account for it in our projection model. The answer is simple: research is an iterative, cumulative, long-term process. The factors that one might examine for influence on the trajectory of First Nations well-being are innumerable, and investigation is bounded only by researchers' imaginations (and, of course, data availability!).

No matter what method was used, we could not claim to have the definitive "answer" to what affects First Nations well-being, or how it will progress in the future. Our projection method accounts for the patterns we have discovered in the CWB data thus far. As additional patterns are discovered, better methods of projection may be developed. At this point in time, however, we may state confidently that our method of projecting well-being into the future reflects our current level of understanding of how First Nations well-being evolved in the past.

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Projection Results, 2001–2041[31]

The results of our projection models are reported in absolute terms. That is, we often refer to what will happen. This mode of expression was chosen for its clarity and brevity. Our projections are merely "educated guesses," however, and should not be interpreted as concrete claims.

The CWB Index, Canada, 2001–2041

Figure 6.18 illustrates our projection of the CWB index based on the 1981–2001 intercensal period. Past CWB scores have been shaded in grey to distinguish them from projected scores.

The graph indicates that by 2041, the average CWB score for First Nations communities will be about six points below the level seen in other Canadian communities in 2001. Moreover, the amount of improvement in the First Nations average decreases steadily between 2001 and 2041, implying that improvement will "level off" when First Nations have achieved only a moderate level of well-being.

In addition, the gap between First Nations and other Canadian communities, while slightly narrower in 2041 than in 2001, is still very much in evidence. The CWB gap narrows by only about 3 points over the 40-year projected period and remains 13 points wide in 2041.

As indicated earlier, within categories of initial conditions, First Nations improved less, on average, than other Canadian communities. The effect of this disparity is demonstrated in the dashed grey line of **Figure 6.18**. The line represents what the projection for First Nations would have looked like had First Nations changed at the same rate as other Canadian communities within initial conditions strata between 1981 and 2001.[32] Had this been the case, First Nations would have achieved a substantially higher level of well-being by 2041.

As also noted earlier, we simply do not know which of the intercensal periods best represents what we will see in the future. **Figures 6.19** and **6.20** (both on page 134) are based on the rates of change observed between 1991 and 2001, and 1996 and 2001, respectively.

Projections of the CWB index based on the 1991–2001 period (**Figure 6.19**) yield the largest absolute and relative increases for First Nations. While the well-being gap is expected to be about eight points wide in 2041, this projected gap is approximately half the size of the current one. Moreover, the projected 2041 CWB score for First Nations will still not have achieved the level observed in other Canadian communities in 2001.

Figure 6.19 also demonstrates the similarity between the actual First Nations projection and the hypothetical projection based on the regression line for other Canadian communities. This similarity demonstrates that, within the strata

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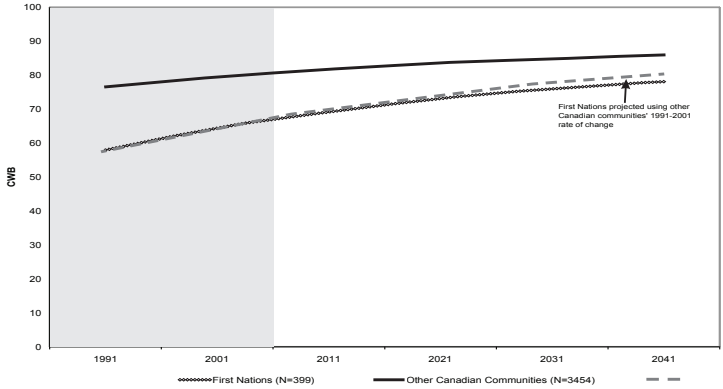
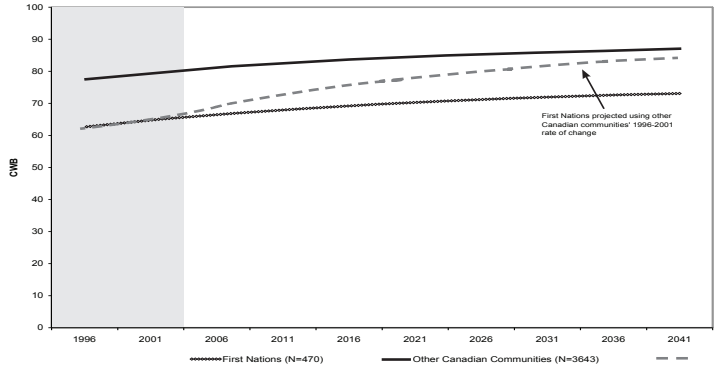
Figure 6.19: 2001–2041 CWB Projections Based on Trends Observed in the 1991–2001 Intercensal Period



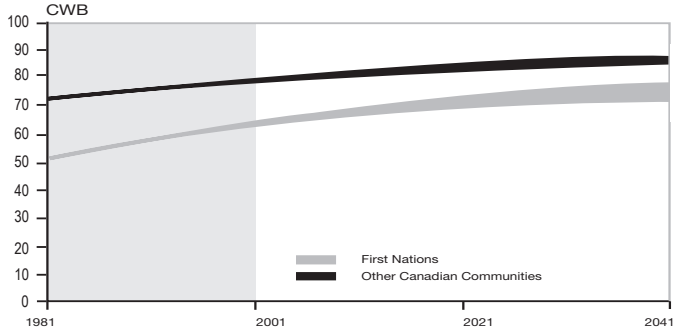
Source: Derived from Appendix Table 5

Figure 6.20: 2001–2041 CWB Projections Based on Trends Observed in the 1996–2001 Intercensal Period



Source: Derived from Appendix Table 6

Figure 6.21: Projecting Well-being in First Nations and Other Canadian Communities: A Summary



Source: Derived from Appendix Table 7

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of 1991 scores, First Nations improved only slightly less than other communities between 1991 and 2001.

Projections based on the 1996–2001 period (**Figure 6.20**) are very similar to the ones based on the 1981–2001 period. Progress in First Nations' well-being quickly plateaus and the CWB gap remains virtually unchanged by 2041. Again, the dashed grey line represents a hypothetical projection of First Nations well-being. The line depicts how we would have projected First Nations well-being had their 1996–2001 rate of change been identical to that of other Canadian communities. Had this been the case, the well-being gap projected for 2041 would have been about 80% smaller.

The following graph is a summary of the previous three projections. We have included it for a very important reason: it highlights the variability in those projections. We cannot foresee the future of First Nations well-being. We can only extrapolate previous data trends, and can only guess at which trends best approximate what we will see in the future.

As **Figure 6.21** demonstrates, there is a gap of about 5 points between our highest and lowest estimates of First Nations 2041 CWB scores. The gap between our highest and lowest estimates for other Canadian communities is only about 1.5 points wide. Uniformly, however, our projections indicate that progress in First Nations will begin to level off, and that a gap between the average CWB score for First Nations and that of other Canadian communities will remain in 2041.

Components of the CWB, Canada, 2001–2041

In the interest of brevity, we have summarized our projections of the CWB components. As in **Figure 6.21**, the projections based on the 1981–2001, the 1991–2001, and the 1996–2001 periods have been combined to form ranges of possible futures for First Nations and other Canadian communities.

Income

The projections for the income component of the CWB are illustrated in **Figure 6.22** (page 136). It indicates that the First Nations income score will increase between 8 and 15 points between 2001 and 2041. The income gap in 2041 is expected to be anywhere from 13 to 24 points wide. This range is not directly comparable to the 1981 income gap of 26, given that some of the communities used to produce our projections from the 1991–2001 and 1996–2001 time periods were not included in our 1981–2001 analyses. Still, we can claim in general terms that the income gap may be reduced by as much as 50% or almost not at all by 2041. Whatever the case, our projections indicate that the income disparity between First Nations and other communities will persist through 2041. The fact that First Nations' income improvement has begun to plateau by that time suggests that the gap will persist for some time after.

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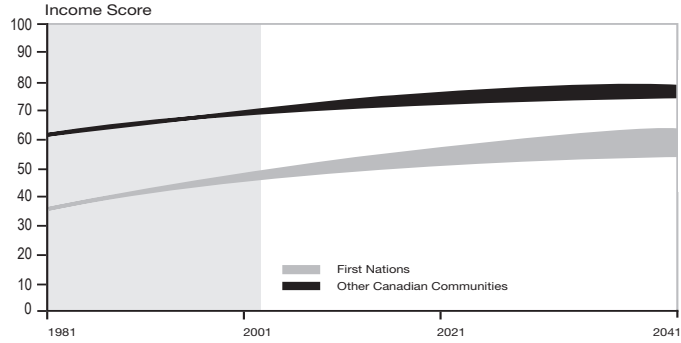
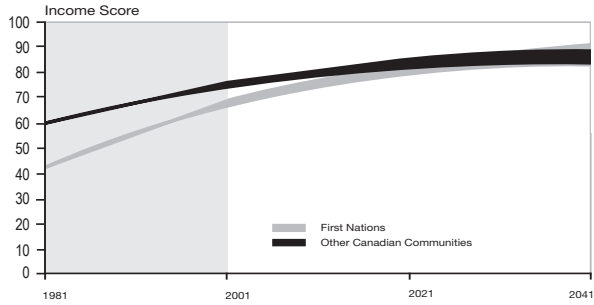
Figure 6.22: Income Projections for First Nations and Other Canadian Communities 2001–2041: A Summary



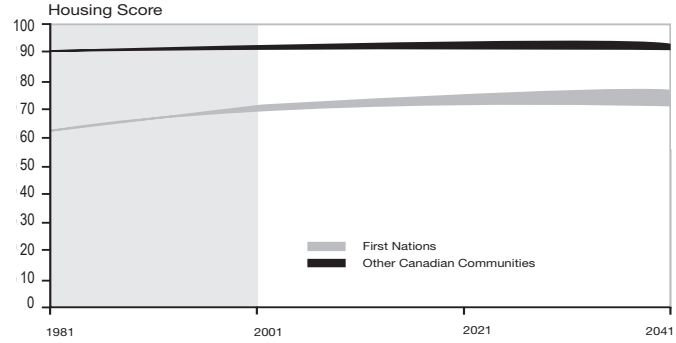
Source: Derived from Appendix Table 8

Figure 6.23: Education Projections for First Nations and Other Canadian Communities 2001–20041: A Summary



Source: Derived from Appendix Table 9

Figure 6.24: Housing Projections for First Nations and Other Canadian Communities 2001–2041: A Summary



Source: Derived from Appendix Table 10

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Education

The projections for the education component of the CWB are illustrated in **Figure 6.23**. Between 2001 and 2041, the First Nations average education score is expected to increase between 17 and 22 points. All of our projections indicate that, by 2041, the education gap between First Nations and other Communities will effectively be closed. Some of our estimates actually predict that First Nations' education scores will surpass that of other Canadian communities. Again, it is important to remember that the education indicator emphasizes achievement at the lower end of the education continuum. Differences in educational attainment between First Nations and other Canadian communities in the higher echelons of education are not captured.

The projections for the housing component of the CWB index are illustrated in **Figure 6.24**. The First Nations average housing score is expected to increase between 1 and 6 points by 2041. The gap between First Nations and other communities is expected to remain between 16 and 22 points wide. The plateau of First Nations progress is very evident in the housing component. All of our projections indicated that little improvement will occur between 2021 and 2041 (never much more than a single point). This suggests that the 2041 housing gap, even the smallest one predicted by our projections, will not reduce much further in the years beyond 2041.

Labour Force Activity

Projections for the labour force activity component of the CWB index are illustrated in **Figure 6.25** (page 138). The labour force activity gap in 2041 is expected to be between 8 and 15 points wide. The "plateau effect" for First Nations was evident in all our projections of labour force activity. This suggests that the labour force activity gap, whatever it may be in 2041, will reduce little in the years that follow.

It should be noted that projections using the 1991–2001 intercensal period yielded higher estimates for First Nations well-being, in terms of both the CWB and its components, than projections based on the 1981–2001 and 1996–2001 periods. Labour force activity was an exception. The largest absolute increase in the First Nations labour force activity score was generated by the projections based on the 1991–2001 period, but the projections based on the 1996–2001 period indicated a greater gap reduction between First Nations and other communities.

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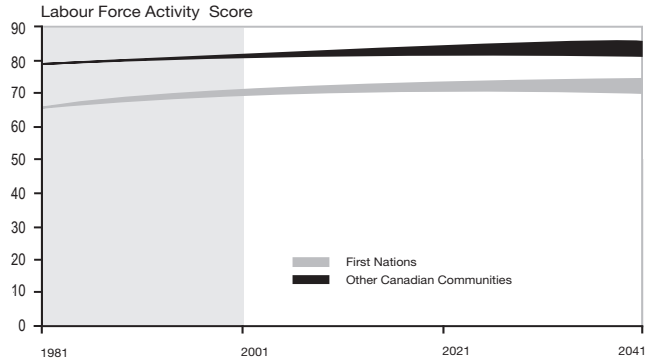
Figure 6.25: Labour Force Activity Projections for First Nations and Other Canadian Communities, 2001–2041: A Summary



Source: Derived from Appendix Table 11

Summary of Results

First Nations Community Well-being: The Present (2001)

As of 2001, First Nations communities have, on average, substantially lower CWB scores than other Canadian communities. CWB scores vary considerably across First Nations communities. First Nations' average CWB scores vary across regions of Canada, as do disparities in average CWB scores between First Nations and other Canadian communities. The largest disparities between First Nations and other communities exist in the income and housing components of the CWB.

First Nations Community Well-being: The Past (1981–2001)

Average CWB scores for both First Nations and other Canadian communities have increased since 1981 and the well-being gap between the two types of communities has narrowed. The largest disparities between First Nations and other Canadian communities were found consistently in the housing and income components of the CWB. First Nations scores, both absolutely and relative to those of other communities, increased in all four components of the CWB index since 1981. First Nations experienced their greatest gains, by far, in education.

Regional disparities in First Nations' CWB scores were fairly consistent between 1981 and 2001. Scores in Ontario, British Columbia, the North, and the Atlantic region were fairly similar, while scores in the Prairies were noticeably lower. Gaps between First Nations and other Canadian communities were smallest in the North and the Atlantic region, mid-range in Quebec, Ontario, and British Columbia, and largest in the Prairies. First Nations well-being improved across

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regions between 1981 and 2001. Degree of improvement varied across regions, but not in a markedly systematic way.

On average, the higher a community's score at the outset of a given intercensal period, the less it improved during that period. On average, First Nations improved less during each inter-censal period than did other Canadian communities whose scores at the outset of the period were comparable. These patterns indicate that the reduction in the CWB gap between First Nations and other Canadian communities between 1981 and 2001 was driven by the large proportion of First Nations whose very low CWB scores predisposed them to a large amount of improvement. The patterns also suggest that improvement in First Nations well-being will slow down in the future and that First Nations' average CWB score will plateau at a level below that of other Canadian communities.

These patterns were consistent across inter-censal periods, almost uniformly across regions, and were evident in all components of the CWB except for education.

First Nations Community Well-being: The Future (2001–2041)

Overall, our projections of the CWB suggest that increases in First Nations' average CWB score will slow down and that a significant gap will remain between First Nations and other communities in 2041. Significant gaps are also predicted to remain in all components of the CWB except for education.

Projections of the CWB varied with the intercensal period upon which they were based. Generally, projections using the 1991–2001 intercensal period yielded higher estimates for First Nations well-being, both in terms of the CWB and its components, than projections based on the 1981–2001 and 1996–2001 periods.

Conclusion

That well-being in First Nations communities improved between 1981 and 2001 and First Nations achievements, particularly in the area of education, should not be down-played. Despite these successes, however, a significant well-being gap between First Nations and other Canadian communities remains.

Moreover, First Nations' continued progress cannot be taken for granted. According to the evidence in hand, maintenance of the status quo in First Nations communities means that, to at least some extent, the well-being gap is here to stay.

That being said, the evidence in hand is, as always, contestable. The CWB is an important first step in understanding the disparity in well-being between First Nations and other communities, but it does not represent "the final word" on First Nations community well-being. Future research into the determinants of First Nations well-being is necessary. Such research will not only provide insight into the factors that impact well-being, but will demonstrate what factors might

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be included in a more comprehensive model of First Nations well-being.[33] Additional research will also allow us to predict the future trajectory of First Nations well-being with greater accuracy. Incorporating the effects of "initial scores" into our projection model likely produced more accurate predictions than a simplistic extrapolation of mean changes would have. Still, much more must be learned about the dynamics of First Nations well-being before definitive forecasts of future trends will be possible.

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Endnotes

1 This chapter is an amalgam of the following articles: McHardy, M., and O'Sullivan, E., 2004. "First Nations Community Well-being in Canada: The Community Well-being Index (CWB), 2001." INAC. Catalogue no. R2-334/2001E; O'Sullivan, E. and McHardy, M. 2004. "The Community Well-being (CWB) Index: Disparity in Well-being Between First Nations and Other Canadian Communities Over Time." INAC, Catalogue no. R2-349/2004E; O'Sullivan, E. and McHardy, M. 2004. "The Community Well-being (CWB) Index: Well-being in First Nations Communities, 1981–2001 and into the Future." INAC, Catalogue no. R2-441/2006E. These articles were published individually by the Strategic Research and Analysis Directorate of Indian and Northern Affairs Canada and are available online at <**www.ainc-inac.gc.ca/pr/ra/pub4_e.html**>.

2 Excluding communities that did not participate in the Census, had data quality issues, or had populations of less than 65.

3 In previous publications, the CWB scale ran from 0 through 1. It has been re-scaled here for ease of interpretation. This re-scaling has no substantive impact on analyses of the CWB. Effectively, CWB and component scores were multiplied by 100. For example, a CWB score of 0.85 was multiplied by 100, producing a re-scaled score of 85. Other articles in this volume do not multiple by 100 and list CWB as a value between 0 and 1.

4 Unless otherwise noted, the indicators comprising each component of the CWB are equally weighted.

5 Census data on Indian reserves and in remote areas were collected from 100% of households. In other areas, data collected from a random 20% sample of households were weighted to make them representative of the total population in those areas.

6 Missing information on individual records was imputed during processing of the Census data. Each missing value was replaced by the corresponding entry for a "similar" record.

7 The original data source for the CWB was a selection of un-rounded, unsuppressed individual-level data which was accessed through a memorandum of understanding between INAC and Statistics Canada.

8 To put these values in context, note that First Nations communities make up approximately 13% of all Canadian communities.

9 While numerous factors may contribute to CWB disparities between First Nations and other communities, it is especially important to point out the likely impact of the Aboriginal age structure on income in First Nations communities. The Aboriginal population is significantly younger than the population of other Canadians. Consequently, a greater proportion of Aboriginal people are in the beginning phases of their careers in employed work. Since salary tends to increase with seniority, the lower incomes seen in First Nations communities are at least partly attributable to the youthfulness of the Aboriginal population.

10 These ranges are approximations that have been rounded in the interest of brevity.

11 In 1991, 1996, and 2001, Census data on Indian reserves and in remote areas were collected from 100% of households. In other areas, data collected from a random 20% sample of households were weighted to make them representative of the total population in those areas (Statistics Canada, 2002:279; Statistics Canada, 1999:356; Statistics Canada, 1992:32). In 1981, while data were generally collected from 100% of households in remote areas, reserves were not singled out for 100% sampling (Statistics Canada, 1984:18).

12 As income represents one's total income in the full year prior to the Census year, income values are adjusted using inflation rates from the years preceding any given census year.

13 Note, however, that CWB scores for "inconsistent" CSDs have still been calculated, and may be useful for specific types of analyses.

14 Typically, a CSD was identified across time by its CSD code. In a small number of cases, a CSD code changed without affecting the population associated with that name and number. In these cases, the "old" and "new" CSDs are regarded as a single entity.

15 Population changes resulting from births, deaths, and migration are not bases for the exclusion of communities from our analyses.

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16 The distributions for First Nations are considerably less "smooth" than those for other Canadian communities. This is attributable to the much smaller number of First Nations being analysed. No clear evidence of a bimodal distribution, for example, was found.

17 For example, imagine we are measuring well-being in only two communities: Community A and Community B. In 1981, Community A had a score of 0 and Community B had a score of 1. The average score for these two communities in 1981 was, therefore, 0.5. In 2001, the average score for these 2 communities was still 0.5, suggesting that well-being remained stable for these communities between 1981 and 2001. When we look at the individual communities' scores, however, we see that, in 2001, Community A had a score of 1 while Community B's score had dropped to zero. The extreme "boom and bust" pattern of these communities was masked by the consistency of their average score across time.

18 Notably, however, a few First Nations seem to have declined substantially. It is possible that these declines are illusory. The method of imputing missing data in 1981 did not require that missing data for reserve residents be replaced by the values from a "donor case" in the same reserve. Consequently, missing data in reserves may have been replaced with data from residents of non-reserve communities. Given the lower well-being among First Nations, it is possible that this sort of imputation inflated the 1981 scores of some First Nations communities. If so, when more accurate scores were computed in later Census years, these communities will have appeared to have declined. There is, unfortunately, no documentation available that can either confirm or deny this speculation. We do, however, wish to acknowledge the possibility and to suggest that readers consider steeply declining First Nations with caution.

19 The standard deviation of the change in CWB scores between 1981 and 2001 was .10293 for First Nations and .04826 for other Canadian communities.

20 When considering the improvements in First Nations education, it is important to keep in mind how education is defined in this study. The education indicator emphasizes achievement at the lower end of the education continuum (literacy and high school "plus"). Differences in educational attainment between First Nations and other Canadian communities in the higher echelons of education are not captured.

21 Data tables related to this section are provided in Appendix 1.

22 The fact that Manitoba and Alberta seem to have been doubly disadvantaged by lower CWB scores and less improvement is worthy of consideration, however.

23 As will be detailed later, we examined the 1981–2001, 1991–2001, and 1996–2001 periods.

24 The strength of the relationships varied.

25 To produce this estimate, we recalculated the average 2001 CWB score for First Nations using the regression equation that defines the relationship between 1981 CWB score and change in CWB score between 1981 and 2001 for other Canadian communities. The complete adjustment equation is as follows: First Nations CWB 2001 = First Nations CWB 1981 + (0.323 + (-0.35 * First Nations CWB 1981)).

26 For example, if the evolution of well-being follows a long-term trajectory, patterns of change since 1981 may be the most appropriate bases for our well-being projections. Alternately, the deceleration of First Nations progress following 1996 may have marked the beginning of a new trend in First Nations development.

27 Projections based on 1981–2001 CWB changes are based on 318 First Nations and 3,171 other communities that were deemed comparable between 1981 and 2001. Projections based on 1991–2001 CWB changes are based on 399 First Nations and 3,454 other communities that were deemed comparable between 1991 and 2001. Projections based on 1996–2001 CWB changes are based on 470 First Nations and 3,643 other communities that were deemed comparable between 1996 and 2001.

28 Projections based on these time periods assume that well-being progresses in 20-, 10-, and 5-year cycles, respectively.

29 In simple terms, this equation means that each community had a base increase of 0.380 between 1981 and 2001. 0.494 multiplied by the community's 1981 CWB score is the amount that is subtracted from the base amount of 0.380. We can see that the higher a First Nations' CWB score was in 1981, the less it would have improved by 2001.

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30 Since this projection is based on the 20-year period between 1981 and 2001, CWB scores are projected in 20-year intervals. Correspondingly, for projections based on the 1991–2001 and 1996–2001 periods, CWB scores were projected in 10- and 5-year intervals, respectively.

31 Data tables related to this section are provided in Appendix 1.

32 Literally, we replaced the regression equation that described the relationship between First Nations 1981 CWB scores and changed in those scores with the equation that describes the relationship between other Canadian communities' 1981 CWB, and changes in those scores.

33 Fortunately, the CWB index is itself a powerful research tool that can be used to this end. It may be employed as a dependent and even an independent variable in a myriad of research projects, providing an efficient means of identifying determinants of well-being.

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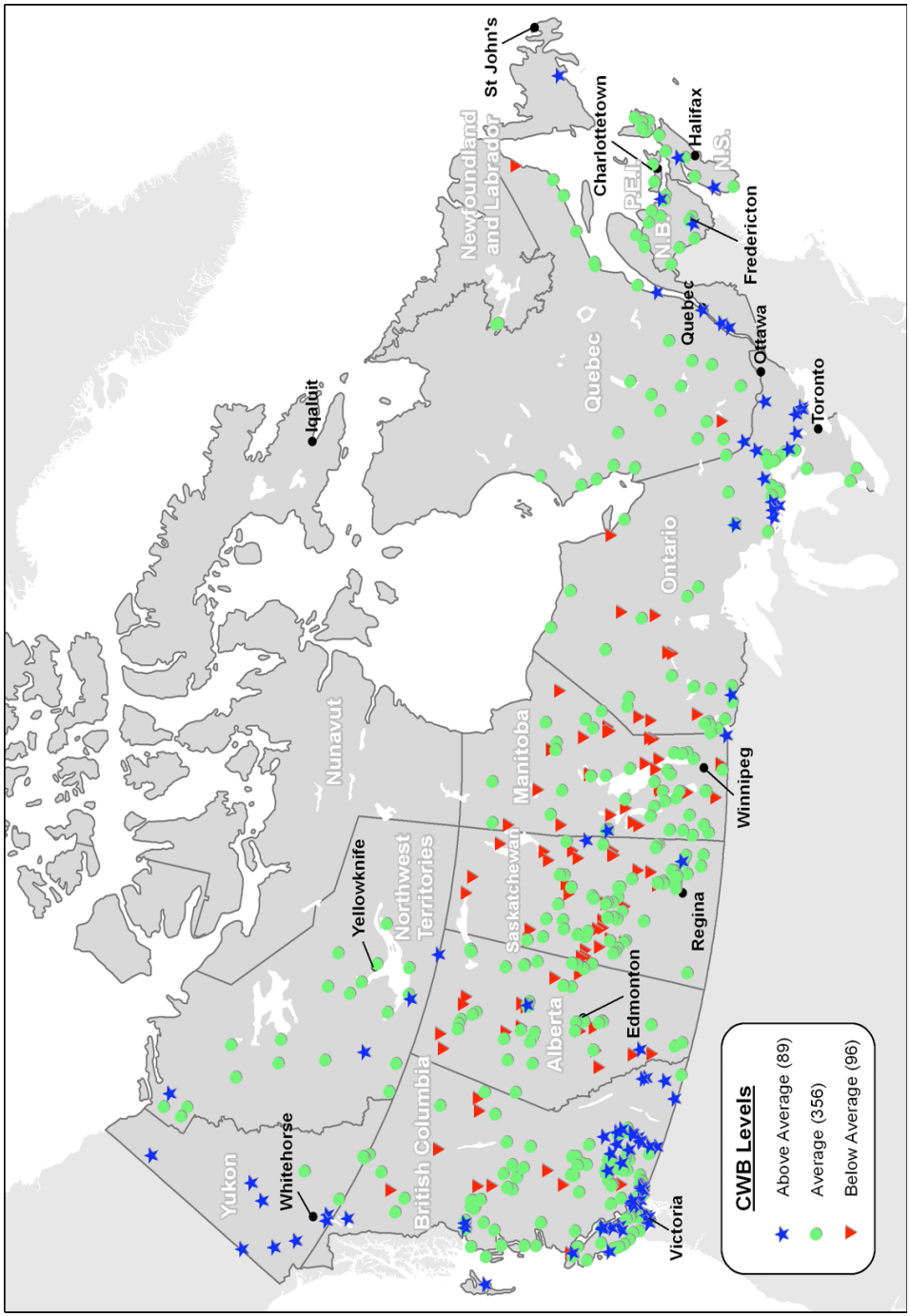
Appendix—Map



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Appendix—Data Tables Related to Selected Figures

Appendix Table 1: First Nations' CWB Scores by Region, 1981–2001

	1981	1986	1991	1996	2001
Atlantic (N=15)	57	58	60	65	68
Quebec (N=21)	49	52	55	59	64
Ontario (N=23)	56	60	65	67	70
Manitoba (N=40)	46	49	51	55	58
Saskatchewan (N=73)	45	48	50	55	58
Alberta (N=27)	49	49	50	55	57
British Columbia (N=97)	58	61	64	69	70
North (N=22)	53	58	64	69	72

Appendix Table 2: Other Canadian Communities' CWB Scores by Region, 1981–2001

	1981	1986	1991	1996	2001
Atlantic (N=654)	67	70	72	73	75
Quebec (N=1,030)	71	73	75	76	79
Ontario (N=220)	78	80	82	82	84
Manitoba (N=194)	73	75	78	78	80
Saskatchewan (N=744)	76	77	78	80	81
Alberta (N=272)	79	80	80	82	83
British Columbia (N=122)	82	83	84	84	85
North (N=35)	58	62	67	71	73

Appendix Table 3: CWB Gaps by Region: 1981–2001 (See Figure 6.15)

	1981	1986	1991	1996	2001
Atlantic	10	11	12	8	8
Quebec	22	21	20	16	15
Ontario	21	19	17	14	14
Manitoba	27	27	26	23	22
Saskatchewan	30	29	28	25	23
Alberta	30	30	30	26	26
British Columbia	25	22	19	16	15
North	5	4	3	2	0

Appendix Table 4: 2001–2041 CWB Projections Based on Trends Observed in the 1981–2001 Intercensal Period (See Figure 6.18)

	1981	2001	2021	2041
First Nations (N=318)	52	64	70	74
Other Canadian Communities (N=3,171)	73	80	84	87
First Nations projected using other communities' 1981–2001 rate of change	52	64	74	80

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Appendix Table 5: 2001–2041 Projections Based on Trends Observed in the 1991–2001 Intercensal Period (See Figure 6.19)

	1991	2001	2011	2021	2031	2041
First Nations (N=399)	58	64	69	73	76	78
Other Canadian Communities (N=3,454)	77	79	82	84	85	86
First Nations projected using other communities' 1991–2001 rate of change	58	64	70	75	78	81

Appendix Table 6: 2001–2041 CWB Projections Based on Trends Observed in the 1996–2001 Intercensal Period (See Figure 6.20)

	1996	2001	2006	2011	2016	2021	2026	2031	2036	2041
First Nations (N=470)	63	65	66	68	69	70	71	72	72	73
Other Canadian Communities (N=3,643)	77	80	81	83	84	85	85	86	87	87
First Nations projected using other communities' 1996–2001 rate of change	63	65	69	73	76	78	80	82	83	84

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Appendix Table 7: Projecting Well-being in First Nations and Other Communities: A Summary (See Figure 6.21)

	1981	1991	1996	2001	2006	2011	2016	2021	2026	2031	2036	2041
First Nations 1981–2001 (N=318)	52			64				70				74
First Nations 1991–2001 (N=399)		58		64		69		73		76		78
First Nations 1996–2001 (N=470)			63	65	66	68	69	70	71	72	72	73
Other Canadian Communities 1981–2001 (N=3,171)	73			80				84				87
Other Canadian Communities 1991–2001 (N=3,454)		77		79		82		84		85		86
Other Canadian Communities 1996–2001 (N=3,643)			77	80	81	83	84	85	86	86	87	87

Appendix Table 8: Income Projections for First Nations and Other Canadian Communities, 2001–2041: A Summary (See Figure 6.22)

	1981	1991	1996	2001	2006	2011	2016	2021	2026	2031	2036	2041
First Nations 1981–2001 (N=318)	36			47				53				55
First Nations 1991–2001 (N=399)		42		48		53		57		60		63
First Nations 1996–2001 (N=470)			45	48	51	53	55	57	58	59	60	61
Other Canadian Communities 1981–2001 (N=3,171)	61			69				74				76
Other Canadian Communities 1991–2001 (N=3,454)		66		69		72		74		75		76
Other Canadian Communities 1996–2001 (N=3,643)			66	69	72	74	75	77	77	78	78	79

Appendix Table 9: Education Projections for First Nations and Other Canadian Communities, 2001–2041: A Summary (See Figure 6.23)

	1981	1991	1996	2001	2006	2011	2016	2021	2026	2031	2036	2041
First Nations 1981–2001 (N=318)	42			69				83				91
First Nations 1991–2001 (N=399)		57		69		77		83		88		91
First Nations 1996–2001 (N=470)			65	69	73	76	78	81	82	84	85	86
Other Canadian Communities 1981–2001 (N=3,171)	60			75				84				90
Other Canadian Communities 1991–2001 (N=3,454)		68		75		80		83		86		87
Other Canadian Communities 1996–2001 (N=3,643)			72	75	78	80	81	82	83	84	84	84

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Appendix Table 10: Housing Projections for First Nations and Other Canadian Communities, 2001–2041: A Summary (See Figure 6.24)

	1981	1991	1996	2001	2006	2011	2016	2021	2026	2031	2036	2041
First Nations 1981–2001 (N=318)	63			70				73				73
First Nations 1991–2001 (N=399)		67		71		74		75		76		77
First Nations 1996–2001 (N=470)			70	71	71	72	72	72	72	72	72	72
Other Canadian Communities 1981–2001 (N=3,171)	90			93				94				94
Other Canadian Communities 1991–2001 (N=3,454)		92		93		93		93		93		93
Other Canadian Communities 1996–2001 (N=3,643)			93	93	93	93	93	93	93	93	93	93

Appendix Table 11: Labour Force Activity Projections for First Nations and Other Canadian Communities, 2001–2041: A Summary (See Figure 6.25)

	1981	1991	1996	2001	2006	2011	2016	2021	2026	2031	2036	2041
First Nations 1981–2001 (N=318)	66			70				70				71
First Nations 1991–2001 (N=399)		66		70		72		73		74		74
First Nations 1996–2001 (N=470)			70	70	71	71	71	71	71	71	71	71
Other Canadian Communities 1981–2001 (N=3,171)	79			81				82				84
Other Canadian Communities 1991–2001 (N=3,454)		80		81		81		82		82		82
Other Canadian Communities 1996–2001 (N=3,643)			79	81	82	83	84	84	85	85	85	86

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