1981 CENSUS OF NATIVE PEOPLE IN CANADA

ANALYSIS AND RECOMMENDATIONS RE: METHODOLOGY AND RESULTS

Prepared By:

J. Phillip Nicholson
B.A. (Carleton)
M.A. (Oxford)
M.C.P. Candidate (MIT)

and

Bonaventure Bowa
B.A. (Zambia)
M.A. (Carleton)
M.P.A. Candidate (Carleton)

J. Phillip Nicholson
Policy and Management Consultants Inc.

For:

The Native Council of Canada
Ottawa, Canada

PURPOSE AND USE OF THIS REPORT

This report was commissioned by the Native Council of Canada. The opinions and observations herein do not necessarily reflect the views of the Council.

The purpose of this report is to provide the Native Council of Canada with a description and analysis of the methodologies used by Statistics Canada in carrying out the 1981 Census of Native Peoples as part of the national census. The report is designed to assist the Native Council in working with Statistics Canada to undertake the following:

- develop a better understanding and appreciation of the accuracy, reliability and implications of the results of of the 1981 census of Native peoples

- identify possible improvements to the methodologies utilized in the census of Native peoples in the future

The report was commissioned because the Native Council of Canada felt it was important that the census of Native peoples be not only as accurate as possible, but as reliable and acceptable as possible. This means that the estimates should not only be accurate but that they should be seen to be derived from the most reliable methods available,in order that they may enjoy the trust and confidence of the users of data concerning Native peoples.

To the authors' knowledge, this report is the first published description and analysis of the specific methodologies used in the Canadian census of Native peoples. It is recognized that there may be certain errors and omissions. Since this is a working document designed to contribute to the collaborative process involving the Native Council, Statistics Canada and others, it is hoped that any such errors or oversights will be brought to the attention of the Council.

The report was prepared on the basis of a step-by-step review of the methodologies used by Statistics Canada. The authors enjoyed the close cooperation of the staff of Statistics Canada, who made available all non-classified documentation concerning the census process, and who spent several days providing a detailed and candid description of the process, including observations on its strengths and limitations.

In addition to consulting with Statistics Canada, and reviewing methodological materials, the authors undertook the following supplementary research and consultation:

- informal and unofficial consultations with demographers and socio-economic analysts from the Office of the Secretary of State, the Department of Indian Affairs and Northern Development, and the Canada Employment and Immigration Commission

- review of selected bibliographic sources on general census methodologies

- review of past reports and estimates dealing with population estimates of Native peoples in Canada

- in-house analysis of the methodologies and results of the 1981 census

Although this report is designed to be used as the basis of a submission and follow-up consultations with Statistics Canada on plans for the 1986 census, it is the sole decision of the Native Council of Canada as to which recommendations, if any, it wishes to endorse as part of the process of preparation for the next census.

BACKGROUND

The 1981 Census is the first census in Canadian history which attempted to estimate the population size of all "categories" of Native peoples: Inuit; Status Indian; Non-Status Indian; Métis. Although there is some basis for comparing the results of the 1981 census with previous census estimates, the 1981 census marks the first of what is intended to be a permanent enumeration of all categories of Natives in Canada. In this sense, it is perhaps the most significant estimate from the point of view of planning for the delivery of government programs and services, and from the point of view of the rights, concerns and interests of the varying groups.

Although the authors have not undertaken a formal survey of the reactions of either Native groups or of government departments to the results and findings of the 1981 census, it appears that the general consensus is as follows:

. the 1981 estimates tend to under-estimate the total size of Native population in Canada

. the magnitude of the under-estimation may be very significant

. although Statistics Canada's methodologies and general reputation enjoy relatively high esteem, there may be a number of significant shortcomings in respect of the census of Native peoples which result in both inaccuracies and in a general low level of confidence in the results

. notwithstanding the above concerns with the methodologies and results of the 1981 census, Native groups and government departments alike feel that the census results will and should be used as the basis for policy and program planning in respect of such issues as Native claims, housing, economic development, social services and Native rights.

The Native Council of Canada as well as several federal departmental officials actively involved in Native affairs appear to be concerned that the 1981 results may be too-rigidly adhered to for official government planning purposes. In general, their concerns are that the government should maintain a healthy appreciation of the potential and likely limitations of the 1981 census estimates, and should put the results in the context of other population estimates which suggest a broader range and generally higher population level for Native peoples in Canada. The general hope and intent of those most concerned is that considerable attention should be focused on improving the methodologies for the 1986 and 1991 census estimates. If appropriate improvements are made, then the future estimates might prove to be more accurate, reliable and credible.

The 1981 Census resulted in an estimate of the Native populations in Canada as follows:

Total Native People:	491,460	
Inuit ("Eskimo")	25,390	
Native Indian:	367,810	
Status:		292,700
Non-Status:		75,110
Métis (Mixed Native and Non-Native Ancestry):	98,260	

Over the past number of years there have been a variety of estimates of Native peoples in Canada. Although these vary greatly in terms of their reliability and their results, they generally tend to provide higher estimates of the total Native population in Canada. In particular, they tend to suggest that the Non-Status Indian and the Métis populations are very considerably higher than the 1981 census results show.

For instance estimates for the total native population appearing between 1971 and 1982 have ranged from a low of 491,460 (Statistics Canada 1981) to a high of 3,500,000 (Employment and Immigration 1978). Estimates by other departments and agencies are shown in the table below.

	YEAR	INUIT	STATUS INDIANS	NON-STATUS INDIANS	METIS	TOTAL NATIVE
Secretary of State	1982	- 0 -	- 0 -	-	-	614,800 (1)
	1977	27,170	295,898	447,144		745,483
Employment and Immigration	1978	17,877	282,762	300,000		600,639
CMHC	1971/ 1972		257,609	271,700		529,319 3,000,000
DIAND	1971		263,499			
	1982		324,376			
DREE	1976		282,762	305,000		587,762
				426,060		708,822
Statistics Canada	1971	17,550	295,215	N/A	N/A	312,765
Census	1981	25,390	292,700	75,110	98,260	491,460

(1) Includes only Métis and non-status Indians

(2) Figure represents a countof both Métis and non-status Indians

It is not the intent of this report to attempt to reconcile the various estimates and projections outlined above. Nor is it the intent to suggest any specific adjustments to the 1981 census results. Instead, the authors wish to emphasize the importance of appreciating that such significant discrepancies exist, and that different methodologies employed at different times with different objectives in mind will produce different results. The important question is: what is the most appropriate methodology for the specific needs and circumstances of Native peoples?

The analysis which follows attempts to combine the theoretical with the practical. Each major aspect of the census methodology was examined from the point of view of identifying the margin for error (whether over-estimate or under-estimate). In some cases, it was relatively clear that the methodology had natural biases which may have affected the accuracy or reliability of the Native estimates. This does not necessarily imply sloppiness or incompetence on the part of Statistics Canada. In fact, the general impression of the authors is that Statistics Canada performed admirably well in trying to minimize the room for error and uncertainty - keeping in mind that the Native component was but one part of a very large and comprehensive, multi-purpose census.

In other cases, the authors have identified aspects of the methodology where theoretically there may have been room for error. There is no evidence available to either confirm or refute any postulations that such potential errors were in fact experienced. Nonetheless, it is the view of the authors that a number of these methodological flaws might be rectified so as to increase the general level of confidence in the census results.

ANALYSIS OF THE 1981 CENSUS OF NATIVE PEOPLES IN CANADA

Introduction

As with any census, there are four basic areas where errors or uncertainty may be introduced:

- The specific objectives of the census itself, and the nature and format of the question or questions used to elicit the desired information

- The methods and procedures used for data gathering and collection

- The methods and procedures used for the processing and statistical manipulation of the data which is gathered

- The description, presentation and or interpretation of the data and results of the census

The analysis which follows provides a highlight of a number of known as well as theoretically possible areas where the 1981 census of native peoples in Canada could have been subject to either error or uncertainty. In carrying out the background research necessary to identify such possibilities for error and uncertainty, the authors were impressed by the general level of care taken by Statistics Canada to minimize such opportunities and to provide statistical measures to adjust for such possible under or over estimation. At the same time, however, the authors identified a number of areas where it appears that the census could be improved and strengthened with a result of providing not only a more accurate estimate of the native peoples in Canada, but one which would likely enjoy a greater and wider degree of acceptability among native peoples and among users of population data on native peoples in Canada.

In reviewing the following analysis and recommendations, it should be generally appreciated that the 1981 census is a complex, comprehensive and multi-purpose instrument designed to meet a wide range of statistical needs. The portion dealing with native peoples is one small segment of the census while some improvements can be expected to be achieved within the existing scope and budget allocated for the native peoples component, other improvements would only be possible if greater attention and priority was attached to the questions dealing with demographic characteristics of native peoples in Canada. In view of the important social, economic, cultural, legal and constitutional implications of native demography, it appears that greater attention might be warranted.

Purpose of the Census of Native Peoples

The first, and perhaps most serious room for error and misunderstanding arising from the 1981 census of native peoples relates to the very purpose and objectives of the census itself, as reflected by the format and structure of question number 26 of form 2B of the census survey (see annex 4 detailed description).

The question is phrased as follows:

> "To which ethnic or cultural group did you or your ancestors belong on first coming to the continent?"

The guide provides further instructions to respondents indicating that:

- ethnic or cultural groups refer to the "roots" of the population, and should not be confused with the citizenship or nationality
- a guide to one's ethnic origin may be the language which the respondent or his/her ancestors used on "first coming to this continent"
- Métis are defined as "descendents of people of mixed Indian and European ancestry who formed a distinct socio-cultural entity in the 19th century" and who "have gone on to absorb the mixed offspring of Native Indian people and groups from all over the world"

Specific problems associated with the manner in which the question is presented and the instructions provided are dealt with in the next section dealing with the data gathering methods. Of greater importance in the first instance, however, are the problems associated with the nature of the question itself.

The question focuses on the identification of the ethnic or cultural characteristics of the respondent's ancestors. In the case of

native peoples this concept may not be as fully relevant as for other ethnic and cultural groups. Some of the problems associated with the purpose and nature of the question are:

- status or registered Indians are a legally-defined group of peoples identified by their status under the law, rather than exclusively or specifically their ethnic or cultural background

- the other categories of native peoples (Inuit, non-status Indians and Métis) have been subject to varying and inconsistent definitions based upon a variety of characteristics (including ethnicity, cultural background, language, legal and political status, marital association and other demographic attributes). It is therefore doubtful whether the identification of native peoples from solely an ethnic or cultural perspective is the most relevant. This is particularly true if the objectives of the census were more clearly identified for such purposes as eligibility for native-oriented programs and services, constitutional and rights implications, and other related purposes. Although the census provides an opportunity for cross-listing or double counting under the various categories identified in the potential responses to question 26, the focus on the ancestry of the respondents may lead to certain ambiguity. Although the census no longer provides for a rigid matrilineal or patrolineal definition of ancestry, the absence of any clear definition renders the results ambiguous and suspect. In this regard, it does not appear that the question was pre or post tested to measure the patterns of responses, and the rationale of the respondents in answering the question.

While it is impossible to identify whether or not the nature and purpose of the question would tend to result in either an under estimation or an over estimation of the number of native peoples in Canada (as defined for practical purposes of program planning, constitutional issues, etc.) it would appear that the net result would be to <u>under</u> estimate the native population. The focus on ethnic and

cultural attributes alone, compounded by the focus on the (undefined) ancestry of the respondents, might tend to discourage a number of respondents from identifying themselves as satisfying the explicit or implicit definitions of native peoples as depicted in the census question. This may be particularly true of the Métis population, which has suffered from the greatest inconsistency in definitions from either ethnic, cultural, political or legal perspectives, and who might be most predisposed to also associate themselves clearly (and exclusively?) with other ethnic or cultural ancestry.

Data Gathering and Collection

The second major area where error and uncertainty may be introduced to the census of native peoples relates to the methods and procedures employed by Statistics Canada in gathering and collecting the census information. A detailed description of this process is attached as appendix II.

In a number of cases the kinds of errors introduced would normally be seen to offset each other (i.e. errors of under estimation would be counter balanced by errors of over estimation). However, there are a number of specific aspects unique to the census of native peoples which tend to suggest that the net effect would be an under estimation of native peoples. The recent support for this suspected consistent under estimation are outlined below.

Some of the more serious problems associated with the data gathering methods and procedures relate to the form, presentation and treatment of the question itself. In general, the wording of the question number 26 on form 2B (which was the principle source of information used to determine the native population) was considered ambiguous and in some cases offensive to certain native persons. Moreover, the supporting definitions and explanatory notes also tend to be ambiguous, unsubstantiated and potentially offensive. Some of the key problems which may have contributed to error and under estimation are:

- The question deals with ethnic and cultural attributes, which are not exactly and directly synonomous with "native-ness" although the census provided for respondents to check off more than one response, it is suspected that the general impression would have been for respondents to focus on pure ethnicity or cultural affiliation which may have encouraged native peoples of mixed ancestry to focus primarily on responses 25 through 36 rather than the boxes devoted exclusively to native peoples. To the extent that this was true, then the respondents who may

have otherwise been deemed to be native would have been identified only by their indicated ethnic or cultural affiliation (e.g. French, English, Italian, etc.). This may have been particularly true of Métis who would naturally have a mixed ethnic and cultural ancestry as well as some aspect of native status. It is also true of status Indians who have gained status through marriage or other legal processes. The inclusion of the question on native peoples within the same box and question as ethnic and cultural ancestry, compounded by the absence of clear instructions indicating the allowable multiple-response, is likely to have resulted in a significant under estimation of the native population in Canada - in particular among the Métis group.

- There may have been an additional general tendency on the part of native persons to be reluctant to indicate their native roots, for a variety of reasons ranging from a misunderstanding of the purpose and objectives of the question to a basic mistrust of government inquiries and surveys. The extent and magnitude of such reluctance to respond accurately has not been tested and measured.

- In addition to any general mistrust and reluctance on the part of native persons to participate in the census, and to answer the questions fully and accurately, there is a general feeling that the wording of the question may have been offensive to certain native persons and would have had the net result of discouraging them from responding accurately and fully to question 26. Notwithstanding the disclaimour in the explanatory notes, the inclusion of reference to the ancestors of respondents "first coming to this continent" would be seen to deny the basic assertion of many native persons that they are in fact indigenous peoples who ancestors have been on this continent since time immemorial. The inclusion of the disclaimour in the guide appears to have been generally inadequate in dispelling the general impressions created by the phrasing of the question.

In addition to problems directly associated with the structure of the question and possible responses, additional error and uncertainty may have been introduced as a result of what is referred to as interviewer bias. As outlined in the attached appendix 2, the census process involved a combination of "drop off/mail back" and "drop off/pick up" procedures for the distribution and subsequent collection of the census forms. In all cases where there were incomplete forms or inconsistencies in the responses, Statistics Canada interviewers would contact the respondents to ensure proper and full completion of the forms. In areas where the drop off/pick up method was used (i.e. collective dwellings such as highrises, hospitals and other institutions except correctional institutions, rural and remote areas, etc.) the interviewer would play a more significant role in assisting the respondents in completing their forms. Although Statistics Canada appears to have taken great pains to provide adequate briefing, training, orientation and direction to their interviewer staff (approximately 30,000 interviewers across the country employed for a period of one to two months) it is entirely possible and likely that a certain amount of interviewer bias would be introduced in the process. Some of the problems and possible consequences are as follows:

- recruitment and training was carried out at five levels (the Regional Census Officer trained and supervised for Senior Regional Census Representatives. In turn, each of these representatives trained and supervised anywhere from eight to ten Regional Office Representatives who then trained and supervised between ten and twenty Census Commissioners. Finally, the census commissioners trained and supervised Census Representatives who were in actual face-to-face contact with respondents.). Depending upon the training and general attitudes of the enumerators (i.e. the census representatives) there may have been the tendency to either over estimate or under estimate certain census responses. Such errors do not necessarily cancel out, since there may be a general propencity for the majority of enumerators to introduce a bias in one direction or another.

- Any bias introduced by the interviewers in the 1981 census has not yet been measured, although the results of the 1971 census indicate an average level of response bias of about 6% of each estimate. This figure was deemed low for certain sensitive and difficult-to-measure demographic characteristics such as specific occupations, ethnicity, income, education, etc. Thus, it would appear that if the 1981 census compared favourably with the 1971 census the tendency for response bias dealing with highly specialized and sensitive questions such as the native population would be at least 6%.

- Some of the ways by which response bias may be introduced in the census process include:

    - through their general attitude and relationship with the respondents, shape and influence the attitude of the respondents toward participating or not participating in the census

    - being able to converse in the working language of the respondent

    - introducing cultural biases, e.g. with respect to interpreting the meaning of questions and the possible and actual responses to those questions

    - providing inadequate, accurate and helpful interpretation and assistance in the proper and full completion of the census forms

    - diligence and care toward obtaining a high return rate on the forms

As indicated above, the general response bias of the 1981 census has not been calculated. Nor has the specific response bias associated with the questions dealing with native populations been estimated or assessed. However, the non-response rates associated with question 26 for certain Indian and Inuit communities ranged from 5 to 20%, compared to national

average of approximately 2.3%. This raises another problem associated with the census of native persons in Canada. The non-response rate appears to be higher among the native population than the rest of Canada in general. This may be attributed to a variety of reasons, including an inability to read and or write in either of the official languages (in which the census was conducted), a general reluctance to participate in the census as a result of mistrust or uncertainty about the end results of the census and its importance and relevance to the daily affairs of the native population, and other factors which have not been fully assessed or identified.

Apart from response error and bias, factors such as incorrect exclusion of dwellings from the sampled enumeration areas, incorrect identification of enumeration area boundaries, use of outdated enumeration area maps and visitation record (vr) listings, missed dwellings within enumeration areas, and failure to list all members of the household can contribute to under enumeration. The potential magnitude of such under enumeration has not been assessed or calculated by Statistics Canada, and no follow up activities have been undertaken to spot-check such potential under estimation.

A general characteristic of census processes is that such under or over enumeration tends to get larger the smaller and more specific population being investigated. For instance, Statistics Canada determined that a certain age group of males (15 to 25 years) were under estimated at a rate of more than 10% in the 1961, 1971 and 1976 censuses. Similarly it was estimated that congested downtown areas and people in the lower levels of socio-economic strata tended to be under enumerated by substantially more than the national average. In the case of native populations it would generally appear that the tendency would be for a more or less consistent under enumeration as a result of their great dispersion in rural and remote areas and their concentration in small, isolated social enclaves in larger urban centers.

In the 1981 census of native populations, there were several broad categories of native populations which would clearly have been either eliminated altogether, or seriously under estimated as a result of the general guidelines relating to the sampling and survey procedures:

- resident populations of all federal and provincial correctional institutions (i.e. penitentiaries and detention centers) were explicitly excluded from the census, and their total populations were deemed to demonstrate the same profile of demographic characteristics as the national average (i.e. the native population was deemed to be about 2% of the total person population, based upon the figures obtained from the non-person population). In actual fact, the total population in federal and provincial correctional institutions was estimated to be approximately 450,000, of which approximately 8 to 33% have been identified as native in other independent surveys.

- At the time of writing this report, it was unclear as to whether or not all children in care (ranging from group and foster homes to correctional institutions) were included in the 1981 census. In any case, it appears that the responsibility for defining the ethnic, cultural and native characteristics of the children in care was left to the authorities of each institution. In general, it may be surmised that there will be a general tendency to under estimate the number of native children in care. This is borne out by the fact that the 1981 census reveals approximately 10,000 Métis and non-status Indian children in care, which compares with other estimates of approximately 20,000 such Métis and non-status Indian children in care.

Although the census does not specifically exclude temporary domiciles such as hotels, motels and rooming houses, it is suspected that there may be a general tendency to experience and accept relatively low levels of response from such accomodations. To the extent that the native populations demonstrate a higher propensity to be transient, than there will be an additional tendency to under estimate the native population. This comes

about since the general procedure for calculating the total population of each group is based on their relative distribution in the returns. There appears to be no special weighting or adjustments to take account of the propensity for native persons to reside in situations which traditionally may experience lower levels of response.

Another series of potential errors and uncertainty arise from the self-enumerating aspects of the census itself. Although some assistance and guidance is provided by the census officials in completing forms, the onus is left to one individual per dwelling unit to undertake responsibility for the full and proper completion of the census form. This person, designated as "person 1" completes the form from his or her own perspective, including providing information on all other members of the household. Furthermore, in canvassed areas where there is no one home at the time of enumeration, any person above the age of 15 years may be designated as person 1. Some of the problems associated with this approach include the following:

- in the case of "mixed" marriages (where only one of the partners is deemed native), there may be a tendency to classify the whole family as either native or non native. It is generally believed that the error tends to be on the side of under enumeration of native persons, on the assumption that most respondents will tend to associate themselves with what is perceived as the dominant ethnic, cultural or other demographic group. This is felt to be particularly true where the male partner is non native, and the tendency is for the female partner and any children to be categorized as per the male parent's status. In the 1981 census, approximately 28,000 children who had one parent identified as a native were themselves excluded from any of the native categories.

- although the 1981 census was careful to avoid providing a precise definition of status Indians (therefore leaving the respondents to assess and identify the appropriate response on their own), there may have been a tendency for status Indian women married to non-natives to feel that (as per existing law they no longer should or could identify themselves as status Indians or indeed

as natives of any kind. There is a serious discrepancy between the 1981 census results which show approximately 292,700 status Indians and the department of Indian Affairs and Northern Development's own estimates which suggest that the number of status Indians in Canada is approximately 325,000.

In general, there appear to be a number of areas where the census approach appears to inadvertently introduce a bias toward the under estimation of the numbers of native persons in Canada. It is recognized in a few cases the error may be in favour of an over estimation, but in general the theories and explanations which appear most plausible would suggest that there is a general bias toward exclusion and under estimation of native peoples in Canada - especially Métis and non-status Indians. Furthermore, although great care appears to have been taken in designing techniques to overcome many of the typical problems associated with data gathering and collection, there does not appear to have been particularly sophisticated tests and follow up evaluations regarding the known or suspected error rates for the native populations in particular.

Data Processing

At each of the several processing stages for the transmittal, manipulation and summarization of the data and information from the census forms, there are chances of error that might affect the quality and reliability of the final output. In a number of cases, these errors are universally applicable to all census responses and to all questions on the forms. However, the general impact of any error for small groups may tend to be disproportionately large. Moreover, there may be a general proclivity for certain typical errors to be associated with the native populations and the particular questions addressed to the native populations as a result of such factors as:

- the necessity to provide additional explanatory notes in the "other" columns in questions relating to mother tongue, ethnic origin, other cultural characteristics, marital status, etc.

- a higher tendency for native persons to provide incomplete answers (thereby necessitating the use of cross referencing to responses to

related questions such as mother tongue and place of residence) The imputation stage, wherein the results are reconciled and double checked to ensure consistent and complete answers to the maximum extent possible, is also subject to error and uncertainty. Statistics Canada appears to have taken every reasonable precaution to ensure that it makes the best possible use of all available information to overcome any inadequacies arising from incomplete census forms. For example, the imputation stage involves drawing upon information such as residents on reserves and native languages as mother tongue to infer nativeness in cases where question 26 is incompletely or inconsistently responded to. In general, the bias of Statistics Canada is in fact to ensure the maximum possible identification of native persons in Canada, and to, for instance, to designate a respondent as a native person if they have indicated their mother tongue as native even though they may not have identified themselves as native in response to question 26. There are several other instances where the imputation stage plays a critical role in determining the final count of each category type of native population. Statistics Canada observed that the final tabulated count of Métis and non-status Indians, for example, was in fact larger after the imputation stage was carried out than would otherwise have been tabulated had the responses (including multiple answers, ambiguous answers, and no responses) been taken at face value.

Notwithstanding the precautions taken by Statistics Canada to overcome the inadequacies of confusing, ambiguous and incomplete responses, there are still some limitations and biases introduced by the imputation process. The precise impact of these biases has not been calculated. In some cases, assumptions had to be made about the nature of the distribution of the various native groups in each reporting area on the basis of the larger population. To the extent that the larger population demonstrated lower proportions of each or any category of native persons, then similar proportions would imputed for the resonses in each region which were otherwise incomplete or ambiguous. The actual distribution, in fact, may have been quite different. It is not known whether the net effect of this would be to under or over estimate the native populations in Canada.

Interpretation of Data and Results

Bearing in mind the general limitations regarding the structure and content of question 26 and the various possibilities of errors in data gathering and processing, estimates of native populations in Canada must be interpreted with great care. In particular, it is important to appreciate that the census is first and foremost a self-enumerating instrument. This means that the responses are not necessarily true or factual. They are merely the actual responses submitted by the respondents for whatever reason and with whatever understanding of their accuracy and relevance may be the case from individual to individual. Therefore, the 1981 census, as with any such census or opinion poll or equivalent, should never be directly taken at face value.

A prime example which illustrates the importance of careful descriptions, analysis and interpretation of the results can be taken from an anecdote related to Abraham Lincoln:

> Apparently one of Abraham Lincoln's favourite jokes was to ask a person "if you call a tail a leg, how many legs does a dog have?". When the respondent naturally answered "five". Abraham Lincoln would laugh and say "wrong. Calling a tail a leg doesn't make it a leg."

The same is equally true of the results of the 1981 census. Strictly speaking, any published materials describing the results of the census should not state that the total native population, for example, in Canada in 491,460. Instead, it should state that as a result of the survey of a number of thousand dwellings in Canada involving interviews and surveys of selected occupants therein a number of persons in Canada felt that they and others within their household were native and that this figure, taking into account the various adjustments employed by Statistics Canada, resulted in an estimate of 491,460. Without belabouring the point, therefore, the results of the 1981 census should be seen as a report and estimate of the number of people reporting themselves and others as native. Unless and until a more precise understanding of their motivations toward answering in such a fashion, their understanding of the question and of their responses, and a variety of other factors relating to the limitations of the gathering and data processing procedures are better understood, then

the results should be generally regarded with caution.

The element of caution in interpreting and utilizing the data is particularly significant in cases where the results may be used for important, political, program and other purposes such as determining eligibility for government programs and services, assessing the implications of land claims and aboriginal writes, establishing positions on the constitution of Canada and related socio-economic planning.

In this regard, the census of Canada may be deemed to be one of the more statistically reliable estimates of native populations in Canada, bearing in mind its general nature and level of application. It should, not, however, be seen to displace certain other estimates which have been designed for more specific purposes and uses relating directly to native needs, interests and concerns. Thus, the 1981 census results should ideally be viewed as one of the more acceptable but nontheless error prone and uncertain estimates of the native populations in Canada. In the opinion of the authors, the 1981 census results of the native population should be used only in conjunction with other estimates and projections - many of which are cited in the attached appendices.

APPENDIX 1

1981 CENSUS OF NATIVE PEOPLES IN CANADA

Comparison of Census Results With Other Estimates & Projections

Prepared By: J. Phillip Nicholson
Policy & Management Consultants, Inc.

For: Native Council of Canada
170 Laurier Avenue West
Ottawa, Canada

Native Population Estimates: A Comparison

Past population estimates of Inuit and Status Indians by various departments and agencies have generally been consistent. In the 1981 census, 292,700 Inuit and registered Indians were recorded representing 91.7% of DIAND's estimates of 319,235 for that year. The census figure for these two groups also represents 94% of Taylor's 1977 estimate of 311,000. However the case of Métis and non-status Indians (MNSI's), population counts has always been contentious. There is an extremely high variance in the population counts of MNSI's by different departments and agencies. The 1981 census captured only about 40% of Taylor's estimated population of MNSI's as table (1) shows. The table gives a comparison of 1981 census count of MNSI's to Taylor's 1977 estimates and Secretary of States 1982 estimates. Only in Alberta, B.C. and Newfoundland is the census count more than 50% of Taylor's estimates. In Saskatchewan, New Brunswick and the Yukon, the census count is less than 30%.

In terms of Secretary of State's estimates for 1982, the census figure represents only about 28%. Only in Alberta and the Northwest Territories is the census count over 50% of that of Secretary of State's i.e. 71.5% for Alberta and 63% for the NWT.

Table (1)

MNSI - POPULATION ESTIMATES: 1977, 1981 & 1982

Province	Estimates 1977 Taylor	Estimates 1982 Sec. of State	1981 Census	% Census of Taylors Estimates
NFLD.	2,200		1,565	71.1
P.E.I.	575	1,300	199	33.9
N.S.	5,000	4,500	1,760	35.2
N.B.	5,000	5,000-7,000	1,270	25.5
QUE.	31,000	37,000	13,120	42.3
ONT.	94,200	200,000	38,765	41.2
MAN.	84,700	100,000-130,000	26,340	31.1
SASK.	82,200	80,000	21,590	26.3
ALB.	61,500	50,000	35,730	58.1
B.C.	54,000	120,000	28,040	51.9
YUK.	400	5800-6000	1,180	29.5
NWT	11,000	6,000	3,800	34.5
TOTAL	435,375	614,800	173,360	39.8%

Source: Cenus Data 1981

One reason for this divergence is clearly the use of different population estimation methodologies. While Stats Can's figures are based on full and partial census data, population estimates of the other groups, such as DIAND, are based on a compilation of various administrative records statistics. Stats Can. has defended its methodology stating that "there do not appear to be problems with the purely technical aspects of data collection and processing". Instead they have explained this divergence as having been caused by the following factors:

(a) overestimation of MNSI population by DIAND

(b) undercoverage of MNSI population by the census

(c) MNSI population self-identification

Overestimation:

According to Statistics Canada, when census data is broken down between urban and rural areas, the 1981 counts for MNSI's are within 10% of DREE's estimates of between 99,750-121,250 for urban areas (see table VI). The census figure was 108,950. For the rural areas however, a higher discrepancy is noted. While the 1981 census counted 64,420, DREE's estimates were between 192,250-287,590. Statistics Canada argues that this discrepancy is due to overestimation by DREE records. However, this cannot be the only reason. As noted above, all rural areas were enumerated by direct canvassing, a procedure which is known to introduce the highest degree of under-coverage or under-enumeration. Thus any conclusive statement can only be made in relation to the calculated rate of under-enumeration for the rural areas.

Undercoverage and Non-Response Rates:

Both the 1971 and 1976 Census coverage reports prepared by Statistics Canada indicated that the coverage rate of rural areas is much lower than that for urban areas. Specifically, the coverage and response rates, depending on the question asked, were in the order of 2-3% for coverage and up to 10% for response on certain questions e.g. vocational schooling in 1976. For the 1981 Census non-response rates of about 20% have been recorded among the status Indians and Inuits in Quebec and the NWT. Table II below gives the distribution of non-response rates relating to question 26 on ethnic origin.

Table II

Ethnic Origin Non-Response Rates

	(% census)	On-Reserve	Off-Reserve
NFLD	2.7	-	2.7
PEI	1.4	-	1.5
NS	2.4	2.2	2.2
NB	2.2	0.8	1.9
QUE	1.9	19.9	1.6
ONT	2.4	4.6	2.3
MAN	1.9	2.0	1.9
SASK	2.1	2.3	2.0
ALTA	2.4	2.0	2.4
BC	3.5	5.9	3.4
YUKON	8.3	-	8.3
NWT	2.4	-	2.4
CANADA	2.3	5.3	2.2

Source: Unpublished Stats Canada figures

It should also be noted that very high non-response rates were recorded among respondents who indicated Inuktitut as their mother tongue. These rates were nearly 20% in Quebec and about 18% in the Atlantic Provinces. Note also that these rates represent only the non-response to the ethnic origin question as a percentage of the "unweighted" number of respondents recorded on 2B questionnaires. Thus if in addition one considered an average response bias of over 6% for question 26 and if all these rates were maintained in the 1981 census, the total effect on the total count of native peoples can be quite considerable. Finally, the discrepancy between rural counts by the 1981 census and other estimates is so large that only the correspondingly large under-coverage and non-response rates can account for it.

While it was not possible to determine the ethnic origin of a household where all family members had a non-response, in the case of partial response i.e. one or more family members had a response, the imputation procedure described above assigned that response to the rest of the family members. Statistics Canada argues, however, that due to a relatively low non-response rate of 2.3%, only a small number can be added to the MSNI population. This position is not entirely accurate, for the 2.3% non-response rate is a national average. Until a separate rate for the MSNI's is calculated it is not possible to ascertain under-enumeration of this segment of the population. However, one would suspect that such rates are higher for the MSNI's than they are for Canada as a whole. Again table (II) is a case in point. In addition, note from table (III), that about 2,290 children with MNSI parents were counted as having no response.

Table III

Count of Children with Non-Response

Who have MNSI-Parents

NFLD	10
PEI	20
NS	10
NB	60
QUE	270
ONT	470
MAN	250
SASK	250
ALTA	400
BC	510
YUKON	10
NWT	30
Total	2,290

Source: unpublished Statistics Canada data

Similar data is given in table 4 which compares the reported ethnic origin of children to that of their parents. Note that over 28000 children of families where one or both parents were Métis or non-status Indian, were themselves not reported as native. Thus the 1981 Census excluded 28,160 potential MNSI, a figure that represents 16.2% of the total reported MNSI population. This percentage is 3.5 times as high as the corresponding percentage for status Indian children. In effect, were this figure to be included in the MNSI count, that number would exceed 200,000. A similar

TABLE IV

MNSI Parents With Non-MNSI Children

Province	one or both parents MNSI's	one parent MNSI & other parent non-native	Total MNSI	Status Indian parent	non-native male parent/ status Indian female parent
NFLD.	30	320	345	170	70
P.E.I.	10	40	50	30	5
N.S.	130	340	370	160	150
N.B.	35	340	375	85	115
QUE.	630	4,280	4,910	1,135	185
ONT.	1,040	6,710	7,750	2,875	2,430
MAN.	495	2,145	2,640	440	435
SASK.	415	1,695	2,105	395	905
ALTA.	830	3,920	4,750	700	1,705
B.C.	3,690	4,415	1,820	55	725
YUKON	95	105	15	60	10
N.W.T.	180	195	40		15
TOTAL	23,765	28,160	8,115	7,445	4,395

Source: unpublished Statistics Canada data

figure of non-status Indian children with status Indian parents is given in table V. This figure (14,025) is only about 50% of that of MNSI children (28,160).

Table V

Non-Status Indian Children with Status Indian Parents (one or both)

	Ethnic Non-Native	MNSI	Total*
NFLD	175	195	195
PEI	310	10	40
NS	160	25	180
NB	85	80	60
QUE	1380	310	1685
ONT	2875	1435	4310
MAN	435	1005	1445
SASK	395	710	1110
ALTA	700	1110	1815
BC	1825	945	2770
YUKON	15	70	85
NWT	40	185	220
Total	8115	5910	14025

* Numbers do not add up due to rounding procedures employed

Source: unpublished Statistics Canada figures

There is no explanation of the noticeably high discrepancy rate between MNSI parents to their children and that of status Indian parents to their children. Although Statistics Canada concluded that it was a deliberate decision by parents to classify these children as non-native, it would be noted that a number of these children are in care institutions or in foster homes. It is only in this context that such a high number of native children could have been excluded from the total count of native people.

Population Self-Identification:

This is probably the major reason according to Stats. Can. for the huge discrepancy between Census Counts and other estimates of MNSI's. Both Taylor (1979) and Rhyne et al (1980), have alluded to it. Stats. Can. have quoted Richmond and Rhyne at length who argue that the MNSI's self-perception is in a constant flux with considerable movement in and out of the group. Their affiliation to their native background appears to be fairly fluid and rests largely with the individual to assert or downplay his ethnic origins which tend to be European. John Kralt, one of the two authors of this Stats. Can. document also reported a conversation with Secretary of State personnel staff which indicated that many MNSI's do not so identify themselves for official government purposes but choose instead to emphasize their European origins.

Thus, in their conclusion, Rhyne et al state "even when final 1981 census counts are avialable, they may still underestimate the actual number of people with some Indian ancestry. Some people of ultimately Indian ancestry may prefer to report their origin as French, British or some other ethnic group."

This view, according to Statistics Canada seems to be supported by the examination of family ethnic origins presented in Table IV. It is noted that a total of 28,260 children have been listed as non-native but have Métis and/or non-status Indian parents. A large percentage of these children i.e. 84.4% have one parent hwo is non-native but the other is Métis or non-status Indian. This, according to them lends weight to the observation that through progressive marriage to non-natives, affiliation and contact with the native community becomes weakened, causing individuals to identify more with the larger Canadian community than with the MNSI's.

Impact of the Concept of Métis:

Another factor mentioned by Stats. Can. is the fact that the 1981 census is the first since 1941 which to allow Métis as an answer category. "Experience with other ethnic origins and language groups in the past censuses would suggest that the inclusion of Métis in the 1986 census should lead to a significantly higher count especially if there's controversy and publicity regarding the adequacy of the 1981 Métis count."

TABLE IV: Comparison of Edited 1981 Census of MNSI's Population with 1975 DREE Estimates

		CENSUS 1981 MNSI POPULATION	1975 MNSI-DREE POPULATION
NFLD	Urban	545	300-420
	Rural	1020	700-980
	Total	1570	1,000-1,400
PEI	Urban	25	250-350
	Rural	165	350-490
	Total	195	600-840
NS	Urban	885	100-1,400
	Rural	870	1,500-2,100
	Total	1760	2,500-3,500,
NB	Urban	550	1,500-2,100
	Rural	730	1,000-1,400
	Total	1275	2,500-3,500
QUE	Urban	9665	6,000-8,400
	Rural	3460	8,000-11,200
	Total	13125	20,000-28,000
ONT	Urban	29610	14,000-19,600
	Rural	9155	36,000-50,400
	Total	38770	50,000-70,000
MAN	Urban	13025	26,000-30,400
	Rural	13310	36,000-56,400
	Total	26340	62,000-86,800
SASK	Urban	10365	26,000-27,000
	Rural	11225	38,400-63,200
	Total	21590	64,400-90,200
ALTA	Urban	22390	10,000-11,000
	Rural	13340	35,000-52,000
	Total	35730	45,000-63,000
BC	Urban	19045	15,000-21,000
	Rural	9000	30,000-42,000
	Total	28045	45,000-63,000
YT	Urban	610	
	Rural	575	2,500-3,500
	Total	1180	2,500-3,500
NWT	Urban	2235	
	Rural	1565	9,500-13,300
	Total	3800	9,500-13,300
TOTAL	Urban		99,750-121,250
	Rural	64420	192,250-287,590
	Total	173370	292,000-408,840

Source: unpublished Statistics Canada data

APPENDIX II

1981 CENSUS OF NATIVE PEOPLES IN CANADA:

A Detailed Description of Methods and Procedures

Prepared By: J. Phillip Nicholson

Policy & Management Consultants, Inc.

In Consultation With: Statistics Canada

Government of Canada

For: The Native Council of Canada

170 Laurier Avenue West

Ottawa, Ontario

METHODOLOGICAL REVIEW OF THE 1981 CENSUS OF THE NATIVE POPULATION IN CANADA

In order to determine basic demographic and cultural characteristics of the native ponulation, the 1981 Census asked a range of questions including those dealing with mother tongue, current home language and place of birth. However, the only and most direct question used to identify ethnic origin and to estimate the total count of native peoples was question #26 of the 2B questionnaire. This question was structured and posed as follows:

26. To which ethnic or cultural group did you or your ancestors belong on first coming to this continent?

(See Guide for further information.)

25 ☐ French
26 ☐ English
27 ☐ Irish
28 ☐ Scottish
29 ☐ German
30 ☐ Italian
31 ☐ Ukrainian
32 ☐ Dutch (Netherlands)
33 ☐ Polish
34 ☐ Jewish
35 ☐ Chinese
36 ☐ Other (specify)

Native Peoples
37 ☐ Inuit
38 ☐ Status or registered Indian
39 ☐ Non-status Indian
40 ☐ Métis

The guide mentioned in the above question defined ethnic or cultural group as "the roots of the population" such as English, French, Irish, Scottish, etc. which was not to be confused with citizenship or nationality. An indicator of such "roots" or ethnic origin was the language which an individual or his/her ancestors "used on first coming to this continent". At the bottom of the nage, the guide then advised native peoples to ignore the phrase "on first coming to this continent".

Question 26 was distributed to 20% of households throughout Canada containing approximately 1.7 million people. The methodology as well as the basic procedures used to conduct the 1981 census consisted of three main stages:

demographic data gathering, data processing and the interpretation of the processed output.

DATA COLLECTION

The aim of this initial stage was to gather information on the social, cultural and economic characteristics of Canadian residents including such basic demographic variables as age, sex, marital status, mother tongue and relationship to a specified family reference person described as person-1. To obtain this information, respondents were required to answer questions on one or more of the following questionnaire forms, depending on the area of their residency in Canada.

a) Form 2A: This form consisted of twelve questions requiring basic personal information such as name, date of birth, marital status and a description of the relationship of members of the household to the reference person. Respondents were also asked to name the language they first learned in childhood and which they still understood. The response set consisted of five languages: English, French, German, Italian, Ukranian and "other" which was to be specified. The second part of this question also appeared as question 28 on form 2B. It asked respondents to name the language currently spoken at home and gave the same choice of answers as above. Other questions on 2A dealt with a description of other people who might be living in that same dwelling as well as a thorough description of the dwelling itself.

Form 3 This was an individual census questionnaire containing the first nine questions of Form 2A. It was used to enumerate all temporary residents as well as residents who could not be contacted personally or who wished to be enumerated in privace (e.g. roomers, lodgers, boarders, etc.). It was also used to enumerate usual and temporary residents of collective dwellings such as hotels, school residences, religious institutions, hospitals, orphanages, rooming houses, nursing homes, work camps, military camps, jails and tourist homes. By the 1981 Census definition, any dwelling of a commercial, institutional or communal nature was regarded as a collective dwelling. Thus Form 3 was used to enumerate people in both private households and collective type dwellings.

Form 2B This form contained all the twelve questions from Form 2A plus an additional 34, including question 26 which specifically dealt with the ethnic backgrounds of respondents. It had an additional ten questions on housing, sixteen on social characteristics, (e.g. ethnicity, citizenship, immigration, etc.) and eight on

economic characteristics such as employment and income. Form 2B was used to enumerate every fifth private household in "self-enumeration areas" and every household in canvassed areas" as explained below.

Form 9B This was a user guide included in every "drop-off" package which further explained each question in forms 2A and 2B. Although Form 3, 2A and 2B were the basic documents used for the 1981 population and housing census, there were other forms used either for control purposes or for enumerating the farming (agricultural) communities. These were: Form 4A, "a missing questionnaire card" used to identify those households or operators of agricultural holdings who:

(a) were not at home for the duration of the census period, and from whom no questionnaire was received by the census representative.

(b) moved on or after census day and no questionnaire was received.

(c) refused to complete their questionnaire (2A, 2B or 6).

Form 4B: An "Incomplete questionnaire card" used to identify those households or operators of agricultural holdings who:

(a) were not at home during the duration of the census period but from whom a questionnaire which failed "Edit" was received

(b) moved on or after census day and from whom a questionnaire which failed "Edit" was received

(c) could not answer questions on an individual of the household who was not at home for the duration of the census

Forms 6, 6A, 6C, 6F and 6D were, respectively, an agriculture questionnaire used to identify and enumerate operators of all agricultural holdings and their associated lands; a specified form card used for identifying and enumerating particular agricultural holdings which had been designated by the census headquarters; a listing of all agricultural operators and their holdings in "mail-back" areas; a listing of agricultural holdings based on the 1976 census and; an agricultural land referral form used to identify holdings in one enumeration area (EA), operated by an operator, who lives in a different EA or in an area unknown to the (CR).

Form 5E: A double "drop-off" envelope for bilingual areas which contained drop-off packages in both official languages and was left at a dwelling, in bilingual areas, when no one was at home during drop-off.

DATA COLLECTION PROCEDURES

The 1981 Census of Canada was conducted through two basic approaches: self-enumeration and direct canvassing.

(a) Self-enumeration is a do-it-yourself census technique which requires an adult member of a given household to respond to census questions about him or herself and about other members of that household. Self-enumeration was conducted through a procedure known as "drop-off/mail-back" whereby a census respresentative (CR), visited every dwelling in his EA to leave applicable questionnaire items (Form 3, 9B and 2A or 2B or 6). The drop-off, conducted one week before census day, had two main purposes.

(i) to list every dwelling, agricultural holding and agricultural operator in each EA in the CR's visitation record (VR), which was to be used later in ensuring complete enumeration.

(ii) to ensure that each household had the opportunity to complete the required questionnaire by self-enumeration. This was done by asking respondents their preferred official language and by letting them know about the telephone assistance service (TAS) should they have problems in completing the questionnaire.

Once the questionnaire was delivered, an adult member of the household, designated as person 1, answered the questionnaire giving information on every occupant of the household including their relationship to him or herself. The complete form was then mailed back directly to a regional processing centre at no cost to the respondent.

Through self-enumeration 4 out of every 5 households or 80% were asked to complete Form 2A. In addition, one in every five households or 20% were asked to complete a longer form, 2B, which contained those additional sections on social and economic dimensions of households which were missing Form 2A. This form was also distributed, on a 100% basis, in all collective type dwellings. Thus the basic demographic characteristics as well as the total census count for Canada were based on an 80% sample of all Canadian households. Specific population characteristics, such as ethnicity, were derieved only from the 20% sample of all households and adjusted for by appropriate weights.

Actually the determination of ethnicity was based on a Surrogate variable, mother tongue. (see the section on the weighting procedure below).

(b) Direct Canvassing

- was used in certain types of areas and households where Statistics Canada (Stats. Can.) decided to collect detailed census data on a 100% basis. These were, all rural areas, small urban centres, all collective type dwellings and Canadian households abroad. That is, no sampling was used in all areas that were referred to as "drop-off/pick-up" or "canvassed" areas.

Instead, a census representative (CR), visited all households in his EA and dropped off the census questionnaire material between May 25-30. For collective dwellings, this was done two days before Censu day (ie. June 1-2) and the CR either waited while the questionnaire was answered or came to pick them up later. In either case, he/she was instructed to check the accuracy of the anseres and made corrections while in face to face contact with respondents. In other canvassed areas, pick-up and edit was done between June 4-26.

Enumeration Personnel

To keep track of all the questionnaires and related details of conducting the census, over 33,000 individuals were employed on a local basis. The majority of these people were CR's whose selection and training was carried out locally by census commissioners (CC's). Once they were selected they were given a three week training program to familiarize them with all procedures involved in field operations.

Each CR was then assigned a given group of households or farm holdings making up his EA. Enumeration areas varied in size depending on population density and ranged from a low of 125 persons per square kilometre in farming communities to a high of 375 persons in mail-back areas. To ensure that all households in their EA were enumerated, CR'S maintained a visitation record (VR), in which they recorded characteristics of households and

dwellings e.g. whether dwellings were occupied, unoccupied or collective. Included on a CR was such information as Civic addresses, names of person - 1, official language preference of households, number of usual and temporary residents, visitation dates and, during editing, whether a field or telephone follow-up would be necessary due to incomplete or missing information.

All CRs reported directly to their respective CC's. Each CC was responsible for an enumeration district containing several EA's. Census commissioner districts (CCD's), were sub-sets of Federal Electoral Districts (FED's), i.e. federal ridings. Apart from the general supervision of CR's in his district, a CC had to check maps and boundaries in order to avoid omission or duplication of census areas. He also investigated problems of entry into dwellings particularly the tightly controlled apartment buildings.

Enumeration Procedures - A Summary

Between May 25-30, CR's dropped off Census questionnaire material in both mail-back and pick-up areas. This included the listing of all dwellings in the VR and all agricultural operators and their holdings. All other forms such as the Form 6 series were also completed where applicable. Prior to all this, a mapping procedure of the EA or the township had been undertaken. This map was used for establishing a route to be followed systematically in all the enumeration movements of the CR. After all the drop off procedures were completed, the CR had to complete his "drop-off report" containing dwelling and household totals for an EA.

Between June 1-2, CR's visited all collective dwellings, made the drop-off and carried out enumeration or arranged to return later for the pick-up. Pick-up was done between June 4-26 in all pick up areas. In these areas, pick-up and editing went hand-in-hand. A pick-up was the return visit made by the CR to each private dwelling in an EA to pick-up and edit all questionnaires dropped off earlier and to check any dwellings that were listed as unoccupied during drop-off to establish their current status. Editing, on the other hand, was a review made by a CR of all questions on each questionnaire to see if all questions had been answered fully or partially.

Where the CR was unable to get the questionnaire back either due to the absence of occupans or due to their refusal to be enumerated, the CR was to record this information in either Form 4A or 4B, the missing and incomplete questionnaire cards respectively. In cases of partially answered questions, the CR was to complete by interview all the incomplete questionnaires. After checking all dwellings and making the required VR entries, the CR then completed a "status report". This was a summary of the information recorded on the VR.

In "mail-back" areas, edit, telephone and field follow-ups were done between June 5-26. By prior arrangement with the CC, a CR either picked up all the mailed-back questionnaires at a designated place or had them delivered to his or her home. Questionnaires were then sorted into numerical order by household number and edited. A questionnaire was designated " a failed-edit questionnaire" if some of its questions or

parts of questions were left unanswered. All such questionnaires were marked for telephone follow-up. The CR called the households with failed edit questionnaires to obtain needed information to complete enumeration. The procedure was to make four call attempts at different times on different days. Where no contact was made, the questionnaire was marked for "field follow-up". Otherwise, it was completed by telephone interview. Field follow-ups were made on June 8 with the aim of completing the failed edit questionnaires which could not be completed by telephone and to enumerate non-response households by interview. In addition, there were houses which were classified as unoccupied on drop-off but which were occupied on census day. These were to be enumerated. The reverse was also true and the CR therefore needed to adjust his record accordingly. Once all questionnnaires were edited and collected at different field collection units, they were shipped to regional office processing centres. After initial processing at regional centres, they were submitted to the headquarters in Ottawa, for final processing and tabulation.

Regional Office Questionnaire Processing

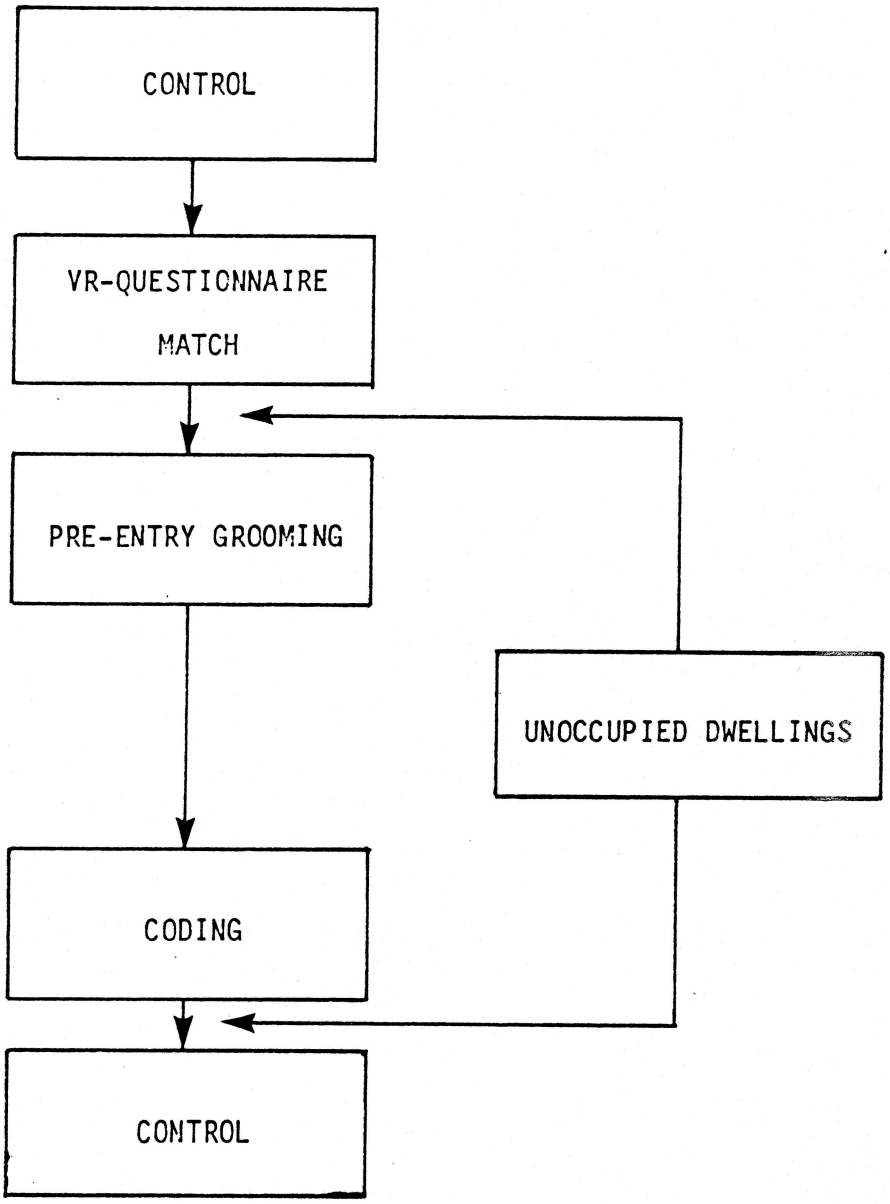
There were four designated regional processing centres where a series of operations were performed between June and December of 1981. These centres were St. John's, Surray,Shawinigan and Winnipeg. The first series of operations concerned the preparation of questionnaire records for computer data entry. These steps are summarized by the following flow chart. The main functions of these initial operations were to ensure:

1. that the information recorded on the census questionnaire is consistent with the information recorded in the visitation record (VR);
2. that the information given by respondents is recorded properly on the Census questionnaires so that it can be easily key-entered by the direct data entry operators.

The documents at the disposal of processing clerks at this stage were the VR, Form 2A, 2B and 3; and the collective dwelling record.

Control:

Completed questionnaires from ech EA were forwarded from a field collection unit to a regional processing centre where invoices for each EA were verified and a master control log established. The data recorded on missing and incomplete questionnaire cards (Form 4A and 4B) was transferred to either Form 2A or 2B and the EA boxes were then submitted for a reverse record check. The purpose of this step was to "estimate the degree of undercoverage": A sample


CONTROL
VR-QUESTIONNAIRE MATCH
PRE-ENTRY GROOMING
UNOCCUPIED DWELLINGS
CODING
CONTROL

(I) Control:

of persons had been selected from the 1976 Census records and a search was done among the 1981 documents to locate these same persons. Only a sample of EA's were used in the 1981 check when these persons were located, their 1981 characteristics were noted and the 1976 files were returned to Ottawa. If not, a further tracing operation was initiated to determine if these persons had been counted in another EA. The percentage of such persons traced will then indicate the degrees of coverage.

VR-Questionnaire Match

As noted above, this step was performed to ensure that the information recorded in the VR for a particular dwelling matched the information recorded on census questionnaires for that same dwelling. It was the entries recorded in both the VR and the questionnaire which were used to produce tabulations on population counts. To complete the matching, the clerk verified that:

(a) for each dwelling listed in the VR, one or more Forms 2A or 2B with the same household number and the same address have been completed;

(b) the counts of usual residents recorded in the VR accurately reflected the information provided on the Forms 2A, 2B, 3 and 1A, (collective dwellings record).

In performing these operations, clerks were to follow pre-established processing procedures. Forms from an EA were sorted into piles and were then processed, one dwelling at a time, beginning with private occupied dwellings, then private unoccupied dwellings, and lastly collective dwellings. The reconciliation between the basic population and household counts on VR's and

those found on questionnaires was subjected to "a quality check procedure". If discrepancies from the VR/questionnaires additions exceeded "a pre-established tolerance", the whole EA box was rejected and returned to be corrected. Rejected EA's could not be corrected by the clerk who orignally processed them. Reasons for rejection of an EA box was mainly due to errors in one or more of the basic procedures ie. Vr-questionnaire match, pre-entry grooming and the coding of write-ins. Corrections therefore involved the repeating of these procedures on each rejected EA box of documents. The reconciliation condition/action table for usual residents count is reproduced in the appendix.

Pre-Entry Grooming:

The objective of this step is to prepare questionnaires for direct data entry by editing "unacceptable multiple responses", ensuring the legibility of answers and marking the questionnaires with special symbols. This is done to improve keying procedures and applies only to items and questions on Forms 2A and 2B that do not require coding. Questions requiring coding are groomed and coded at the same time.

A multiple response occurred whenever a respondent provided more than one answer to a question where only one was needed. Although such responses were acceptable for certain questions, for others, they had to be resolved at this stage. The appendix provides a list of specific situations relative to the 2A and 2B questions and the action(s) the processing clerk was instructed to undertaken in each case.

Coding

This consisted of a series of steps through which information appearing in the "write-in" sections of the questionnaire were given specified number codes. These codes and the symbols created from the questionnaire grooming stage were the only inputs used by the direct data entry operator to produce the final census tabulations. Thus, mis-coding or failure to code at all, would lead to a permanent loss of questionnaire information. The following cultural questions needed coding: Ethnic Group, mother tongue, place of birth, religion and current home language. The primary document used in coding these questions was the population code book (PCB). It contained the classifications and code numbers to be applied to each cultural characteristic question. Again the condition/action table in the appendix was used in this stage. For instance, if a respondent had marked " a coding box" for mother tongue and had also provided " a write-in" response in the box - "other specify" - ie. two different mother tongues, they were both allowed.

Other Situations

Damaged Questionnaires

Documents that were ripped, torn, multilated or creased were acceptable as long as they could be repaired without affecting the respondents answer. Where questions were obscure they were transferred to a new questionnaire form, usually of the same kind except where a CR had issued a 2A when a 2B was required and vice-versa. Where the respondent had given an answer that was partially legible, the clerk crossed out this entry and entered in another more legible entry. Where the response was illegible, the whole entry was

crossed out. Other unclearly marked responses were corrected either by the condition/action table or by other specific instructions. Example, where check marks extended into other answer boxes, the clerk was to choose the box where the central point or the greatest proportion of the checkmark lay.

Missed Code Boxes

This happened when all the questions for a dwelling were left blank except for question 1, which might or might not have been completed. The processing clerk was required to determine the possible number of residents in that dwelling from VR records. If that number was greater than zero, the clerk was to check or provide names to question 1 and enter the total number of persons in the dwelling on the form. If the number of usual residents was not known, the questionnnaire was counted as having zero persons in that dwelling.

Cancellation of Persons

A person was cancelled from the questionnaire record under anyone of the following circumstances:

(1) if a person had been listed twice on the same questionnaire one of the two names was cancelled. The cancelled name was to be the one with the least information under it.

(2) if a temporary or foreign resident had completed some or all of questions 2 to 6 of the questionnaire, such information was cancelled. Foreign residents were only supposed to indicate their status on top of Form 2A or 2B while temporary residents were enumerated on Form 3.

Direct Data Entry Procedures:

Forms 2A and 2B were divided into batches of 50 and 25 respectively and the relevant codes from the questionnaires were keyed directly into the computer depending on whether each document sampled from each batch was determined to be error free according to established quality control standards. If the sample document was not accepted, then all non-sample documents were sent back for correction and re-keying. Once documents from a given EA were deemed error-free, regional office operators keyed in the data to be stored on a disk at the computer centre in Ottawa, ie. the four regional centres outside of Ottawa were linked directly to the central computer system at revenue Canada taxation. After direct data entry, all source documents (questionnaires and related forms) were shipped to the head office (HQ) in Ottawa.

Head Office Processing:

Once the documents arrived at HQ - VR's, questionnaires and data tapes for each EA - were registered via a computer terminal, recording each step in the data processing chain on "a control master file" to ensure that no stage of processing was overlooked. After registration, all VR's were sent to the census mapping services (CMS), where they were checked to ensure that that boundaries of each EA had been respected. If errors were found during registration of the Data Tape, corrections were made to the relevant documents. If not, a copy of the data tape was made and a listing of all EA's on each tape was produced so comparison could be made with the original.

Data Manipulation

The Edit and Imputation Procedure

This process involved the detection (edit) and correction (imputation) of errors from the data files. Data was screened for illogical and/or irregular entries e.g. omissions by respondents, wrong codes being assigned to responses by census personnel, etc. The method used in this stage was referred to as the Automated Edit and Imputation approach whose aim was to assign approximate answers to missing, incorrect or conflicting entries on questionnaires in such a way that the answer chosen was "the next best approximate answer" to that question. For variable responses in the 2A file, except age, sex and marital status conflicts, a decision logic table was used.

This table consisted of a series of "if-then" statements which were the programmed route to be followed by computer search. First, "a source (hot) deck" was created containing 2000 file documents which was regarded as the "clean file". Each batch containing between 30,000-90,000 questionnaires files had one such reference batch. In editing and inputing the whole batch, the computer would search all questions until it found conflicting response . It would then select, at random, a response from the "hot-deck" and assign it to the conflicting response. In the case of age, sex and marital status, a similar system as the decision table was used except it was referred to as the "Generalized Edit and Imputation System using Hot-Deck Approach" (GEISHA). Once the data were "cleaned" through the Edit and Imputation operation they were ready to be accessed for tabulation.

However, because sampling was widely used in the 1981 census, the exact counts for the entire population, including its social, cultural and economic characteristics, collected on Form 2B were not available. Some method of producing estimates of the total counts, based on these sample data, was therefore, required. The method chosen was to inflate the sample counts to the level of the total population by means of weights assigned to each person and household in the sample.

In the case of areas which received the 2B questionnaire on a 100% basis i.e. collective dwellings, overseas households and areas enumerated by canvassers, the sample counts were equivalent to the total population counts. Thus a weight of 1 was applied to all members of these populations. For the remaining cases i.e. all occupied private dwellings and their residents in self-enumeration areas of Canada, weights had to be computed.

Weighting Procedure:

There were four basic stages in this procedure: formation of weighting areas, creation of cross-classification matrices, collapsing of some matrices and the calculation of weights.

Formation of Weighting Areas

Canada was divided into small geographic regions called "weighting areas" (WA) within which the procedure of calculating weights was performed. The WA was defined a the smallest geographic area over which exact agreement could be ensured for given total and sample counts. Thus it was to be composed of continuous or connected EA's, with a population of between 3000 and 7000

people living in occupied private dwellings of self-enumerated areas only. In addtion each WA had to fall within a given census division (CD) whose size was equivalent to that of a municipality. For the 1981 census, Canada was divided into approximately 5000 WA's with an average population of about 4500 persons in occupied private dwellings of self enumeration areas. (See Appendix for the distribution of WA sizes throughout Canada).

The input to the system consisted of a count for each EA of all persons in occupied private dwellings of self-EA's. All non-sampled EA's were assigned a population of zero. From tapes already in storage, the computer then produced a listing of the number of the WA to which each EA was to be assigned.

Cross-Classification Matrices:

Two types of cross-classification matrices were used: A personal and a household cross-classification matrix. Within a WA, each person from an occupied private dwelling of a self-EA was assigned to a cell of the personal cross-classification matrix depending on the demographic characteristics he/she displayed so that each cell contained individuals with homogeneous demographic characteristics. Two counts for each cell of the matrix were made: A total population count obtained by summing up, for a given cell, persons from the entire population of interest in a WA as recorded on both 2A and 2B forms. And a sample count for that cell, which included only those persons who had been enumerated on a 2B questionnaire. Thus two different population counts were prepared for each cell, as shown below:

Population Counts		Sample Counts	
Cell A=30	B=50	A=5	B=8
C=70	D=70	C=20	D=12

Demographic and Household Characteristics:

As noted above, one had to display certain demographic characteristics in order to be assigned to a particular cell. These characteristics were age, sex, marital status, census family status and mother tongue i.e. the language a person first learned in childhood and which was still understood. A census family was described as a husband and wife or persons living common law (with or without children who had never married, regardless of age) or alone parent, regardless of marital status, with one or more children (who had never married regardless of age) living in the same dwelling (see Appendix for the definition of matrices by rows and columns).

Similarly, households were assigned to a cell of the household cross-classification matrix by the variables, age and sex of household maintainer, number of census families in a household, and number of persons in a household. The household maintainer was any person in the household responsible for payments of rent, mortgage, taxes or electricity for the dwelling. If no person in the household made such payments, person-1 was selected as the maintainer.

In addition, two population counts - a total and a sample - were also prepared for each cell of the household classification matrix. The end result of these procedures was that each cell of each of the two matrices had a total and a sample population count.

Collapsing of Matrices:

Where certain criteria for population and sample counts were not satisified by all rows and columns, the matrices had to be "collapsed". This simply meant combining cells which could not stand alone for computational purposes. The criteria to be satisfied by each matrix were:

(a) cell total population count was to be greater than a specified minimum i.e. about 30, while its sample count was to be greater than zero.

(b) the ratio $\frac{\text{Total Population Count}}{\text{Sample Count}}$ was to lie within a specified range i.e. 2.9 to 20. This ratio established the reference range with which ratios to be calculated were to be compared and finally determined. Thus if the above criteria were not satisfied, cell counts were combined with another or other sub-groups" taking care to preserve the homogeneity of populations within cells as far as possible."

Calculation of Weights

The 1981 census used a method called the Raking Ratio Estimation procedure (RREP). The method consists of a repetition of similar calculations whose objective is to produce a weight which approximates the one determined earlier by the ratio, $\frac{\text{Total Population Count}}{\text{Sample Count}}$.

The whole procedure consisted of five steps as follows:

1. Calculation of initial weights from the total and sample population counts in each cell:

Cell Population Counts		Cell Sample Counts	
A=30	B=50	A=5	B=8
C=70	D=70	C=20	D=12

$$A=\frac{70+30}{20+5}=\frac{100}{25}=4 \qquad B=\frac{70+50}{12+8}=\frac{120}{20}=6$$

$$C=\frac{100}{25}=4 \qquad D=\frac{120}{20}=6$$

2. Row population totals were estimated by using the initial weights calculated in Step (1)

Row 1 (A,B) = 4x5+6x8 = 68

Row 2 (C,D) = 4x20+6x12 = 152

3. The weight for each cell calculated in Step 2 was then adjusted by a new ratio based on the row totals of Step (2) i.e.:

$$\frac{\text{Row Population Total}}{\text{Estimate of Row Total}}$$

$A = \frac{30+50}{68} = \frac{80}{68} \times 4 = 4.7058$ $\quad B = \frac{80}{68} \times 6 = 7.0588$

$D = \frac{140}{152} \times 4 = 3.6842$ $\quad D = \frac{140}{152} \times 6 = 5.5263$

4. Estimation of column totals: the current weights, calculated in step (3) were used to estimate the population total for each column of the matrix, i.e.:

Column (1) (A,C) = (4.7058) x 5 + (3.6842) x 20 = 97.2136

Column (2) (B,D) = (7.0588) x 8 + (5.5263) x 12 = 122.786

5. Adjustment for column totals: the weight for each cell, calculated in Step (3), was adjusted by the ratio $\frac{\text{Column Population Total}}{\text{Estimate of Column}}$

$A = \frac{100}{97.2136} \times 4.7058 = 4.8407$ $\quad B = \frac{120}{122.786} \times 7.0588 = 6.8986$

$C = \frac{100}{97.2136} \times 3.6842 = 3.8634$ $\quad D = \frac{120}{122.780} \times 5.5263 = 5.4008$

After Step 5, the process returned to Step 2 and repeated each step. After Step 3 on each subsequent iteration, the following criteria were tested to determine whether or not further adjustments to the weights were required. These were: (a) whether the estimates produced converged i.e. the difference between the weights produced at adjacent stages was less than a certain limit or (b) the maximum of 80 iterations had been performed whereby the process ended.

Interpreation of Census Data

In interpreting the processed data to produce the final tabulations for the 1981 Census, two systems were used: the decision logic tables and weights calculated through the RREP procedure. As already indicated, the end result of the 1982 weighting system was the production of a weight for each person and household enumerated on a 2B questionnaire. The calculation of these weights was based only on that segment of the population belonging to occupied private dwellings of self-EA's. Those from non-sampled areas on dwellings were automatically assigned a weight of 1.

Person level weights were used to estimate counts of persons for the total population. For instance, to estimate the number of persons in Quebec holding a Masters degree, each member of a 2B household of Quebec displaying that characteristic would be associated with a given weight, calculated in that person's WA of residence. person level weights of each such member would then be summed up across WA's in Quebec to give the required total. Similarly, in calculating the total number of a given

ethnic group, such as Métis, each person identifying himself as Métis on the 2B questionnaire would be given the weight of his WA and all weights across WA's would then be summed up to yield the total count.

Counts of families were estimated by summing up the person level weights of reference individuals in each family of interest i.e. person-1. In a similar manner, household level weights of 2B households displaying certain characteristics of interest were summed up to provide estimates of the counts of the entire population. The table below gives the percentage distribution of person weights for sampled Métis and non-status Indian populations for the 1981 Census.

% DISTRIBUTION OF PERS WT FOR SAMPLED MNSI's

WT	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7+	% Total	Total Number
EAST.	-	1.6	0.2	8.9	43.0	35.6	7.3	3.4	100	910
ONT.	-	1.7	1.1	10.9	40.2	29.7	9.9	6.5	100	2410
QUE.	-	2.6	0.8	9.5	40.3	32.2	9.5	5.1	100	6920
	-	3.0	1.2	10.3	37.9	32.1	10.1	5.4	100	17,600
TOTAL		2.8	1.1	10.1	38.8	32.1	9.8	5.3	100	27,850

Source: Unpublished Stats. Canada Calculations