

ON THE USE AND USERS OF DEMOGRAPHIC PROJECTIONS IN CANADA

Paper submitted by Statistics Canada¹

Introduction

1. Population projections are an essential element for planning and policy making at all levels of government and private enterprises. Since population forms the base for socio-economic planning, projections are also heavily used for quantitative evaluation of the anticipated impact of programs and policies. Further, the increasing attention to the links between demographic and socio-economic changes create growing demands for projections of populations by sex, age, and other characteristics, at the national, regional, and other subnational levels. Population projections by age and sex are also used for developing specialized demographic projections or 'derived projections' such as those covering the labour force, household and families, the population by marital status categories, the school-age population and school enrolments, the rural-urban population, etc. In addition, projections are used for demographic analysis and other related impact studies. As demands for population projections grow, so does their production by statistical agencies.

2. As the main center for carrying on various types of demographic projections, Population Projections Section of Demography Division, Statistics Canada produces the following types of projections: (1) population projections for Canada, provinces and territories by age and sex; (2) household and family projections for Canada, provinces and territories by type and size of households and families; (3) short-term annual updates of population projections; (4) census metropolitan area population projections; (5) special/customized projections.

3. Of these, the first two types have been produced and published on a regular basis from the 1970s. Hence, methodologically and numerically consistent national, provincial and territorial projections have been available at regular intervals for over twenty-five years.

4. In Canada there is no legal requirement for preparing population, and household and family projections. However, the projections program is carried out under Statistics Canada's current mandate to produce national and provincial population, and family projections.

5. This paper will describe first, the above-mentioned five types of projections by Statistics Canada in terms of their users and uses based on the information gathered from users, and other indirect sources such as the demand for future-oriented reports and analytical studies. The information provided here can, therefore, be considered only partial, since there is no direct mechanism to know how and by whom

¹ Prepared by M.V. George, Demography Division.

the projections reports and data contained therein are used. Hence, what is reported here is mainly based on data compiled from requests for projection data that are not readily available to the user. Because users of projections contact Demography Division directly or indirectly through Statistics Canada's Regional Offices in order to obtain a special projection series, customized projections, or to obtain methodological advice, records have been kept of these users and the types of uses to which the projections have been put. Direct information about other users of projections products are not available. Next, the accuracy of projections and its impact on demand will be briefly discussed. The conclusion focuses on the potential demand and use for projections, paying particular attention to customized special projections.

Population Projections for Canada, Provinces and Territories by Age and Sex

6. Statistics Canada started preparing official demographic projections on a continuing basis from 1969 (Dominion Bureau of Statistics, 1970). The 1969-based projections were prepared using a cohort component method but limited to the national level only.

7. Three groups of users required official projections: (1) those who only needed the national projections; (2) those who required both the national projections and their breakdown by regions/provinces; and (3) those who wanted a specific region/province only.

8. The 1969 projection series only served the needs of the first group. The second group included all the federal departments requiring population projections. To meet the demand of this group, the 1969 projection were disaggregated on the basis of a cohort ratio method.

9. The ratio method fails to take explicit and detailed account of the differentials and trends in each variable affecting population growth at the regional/provincial level. Hence, the ratio projections were not satisfactory for the third group. An alternative would have been to use projections for individual regions or provinces prepared by various provincial governments or other agencies. However, the provincially prepared projections had many disadvantages. First, the sum of the individual provincial projections did not tally with the official projections for Canada prepared by Statistics Canada. Secondly, they generally related to different base years and did not follow a uniform methodology. Projection inputs often present theoretical inconsistencies unless the projections are prepared by the same agency. For example, it is unlikely that the assumptions on net interprovincial migration will add up to zero where an attempt is made to use projections from different sources and combine them as a series.

10. In view of the above problems and difficulties, Statistics Canada adopted a regional cohort component approach to prepare projections for Canada and the provinces by age and sex. According to the new approach, the component parameters were applied to the base populations of the provinces and the resulting projections were then aggregated to arrive at the projections for Canada (for details of the method, see Statistics Canada, 1994). The consideration of provincial differences in the components of growth has greatly improved the projection results.

11. Since the 1969-based national population projections, five generations or sets of projections have been developed and published by Statistics Canada (**1974**: 1972-2001; **1979**: 1976-2001; **1985**: 1984-2006; **1990**: 1989-2011; **1994**: 1993-2016). These five generations of projections for Canada, provinces and territories (Table 1) have been produced and published by single years of age and sex with a horizon of 25 years for provinces and territories, and 50 years for Canada⁽¹⁾. Further, following the release of the 1974 set of population projections, a technical report on population projections, putting together under cover all the background studies on each component and projection model, was

published. Since the projections have been developed for each single years of age, the results are available for each year of the projection.

12. Depending upon the number of component assumptions, each of the aforesaid sets of projections yield several projection scenarios with the combination of the underlying component assumptions. However, following Statistics Canada's policy of not attempting to make predictions about the future size of population, more than one series of population projections (four or more) have always been selected and published without recommending a "preferred series". The users, however, often require a single series of most likely projections. Thus, the 1974 set provided four series (A, B, C, D); 1979: four series (1, 2, 3, 4); 1985: five series (1, 2, 3, 4, 5); 1990: four series (1, 2, 3, 4); and 1994: four series (1, 2, 3, 4). Although the practice has been only to publish the selected projection series in detail, unpublished projection series based on other combinations of components of growth have been made available to the users on a cost recovery basis.

Demand for Projections

13. Because of the vital need for population projections for planning purposes, the demand for projections has been great from the inception of the program. This can be seen from the number of copies sold and the requests for customized projections. Population projection reports have always been among Statistics Canada's best-sellers. However, the number of copies sold is only a partial indication of the real demand and use of these projections. It is well known that the volume of sales of any product depends on the price. Thus, the earlier publications with substantially lower prices had larger sales than those published more recently with higher prices (see Table 1 on publication sales). The release of the projections reports with a wide press coverage accompanied by a promotion program with fliers mailed to potential clients, have also contributed to raise the demand for projections. The projections are also made available through computer print media, magnetic tape or diskette, and a computerized data bank and its supporting software called the Canadian Socio-Economic Information Management System (CANSIM).

14. The sixth generation of population projections, 1998-2026, which is about to be completed, is expected to be released by the Spring of 1999.

General Use of Population Projections

15. Statistics Canada's population projections reports and their accompanying detailed projections are the most comprehensive and consistent reference source available on the future population growth of Canada and its provinces and territories. They contain a range of population projections, describe the methodology and assumptions involved, and provide a succinct analysis of results. Life expectancy, fertility rates, the age structure, international migration levels, population size and growth and interprovincial migration, etc. are all examined, and are complemented by a series of population projections (generally four). The 1974 technical report, containing detailed information on technical and analytical aspects of the projections, served as a manual to prepare and use population projections. In addition, the numerous projection-related studies, articles and papers by Statistics Canada's staff and other scholars in the field have provided supplementary material on the development and use of various types of demographic projections.

16. Whether the user is an analyst, a researcher, a planner, a decision maker, or just interested in the recent and future evolution of the Canadian population, the population projections publications provide the basic demographic data on the size, structure, components, and distribution of population. They are useful for many types of statistical calculations relevant to social and economic planning, and are

needed for a variety of uses by governments at various levels, and non-government agencies, as well as business people and academicians. A general discussion of the users and the uses made of projections for countries is given in a publication by the United Nations (1965).

Table 1. Sales of Reports of Population Projections and Household and Family Projections

Title of publication	Year of release	Price in Canada	No. of copies printed/sold
<u>Population Projections</u>			
1. Population Projections for Canada and the Provinces, 1972-2001 (Cat. 91-514, Bilingual)	1974	\$2.80	4,225 (initial + 2 reprints)
2. Technical Report on Population Projections for Canada and the Provinces, 1972-2001 (Cat. 91-516, Bilingual)	1975	\$2.10	2,000
3. Population Projections for Canada and the Provinces, 1976-2001 (Cat. 91-520, Bilingual)	1979	\$7.50	2,500 (initial + 2 reprints)
4. Population Projections for Canada, Provinces and Territories, 1984-2006 (Cat. 91-520, Bilingual)	1985	\$40.00	2,500 (initial + 2 reprints)
5. Population Projections for Canada, Provinces and Territories, 1989-2011 (Cat. 91-520, Bilingual)	1990	\$40.00	2,070 (initial + 3 reprints)
6. Population Projections for Canada, Provinces and Territories, 1993-2016 (Cat, 91-520, Bilingual)	1994	\$50.00	1,600
<u>Household and Family Projections</u>			
1. Household and Family Projections, Canada and the Provinces to 2001 (Cat. 91-517, Bilingual)	1975	\$2.80	1,500
2. Household and Family Projections, Canada and the Provinces and Territories, 1976-2001 (Cat. 91-522, Bilingual)	1981	\$8.00	2,300
3. Interim Household and Family Projections for Canada, Provinces and Territories to 2006 (non-catalogued publication by Demography Division)	1987	\$14.00	565
4. Projections of Households and Families for Canada, Provinces and Territories, 1989-2011 (Cat. 91-522, Bilingual)	1990	\$30.00	1,750 (initial + 2 reprints)
5. Projections of Households and Families for Canada, Provinces and Territories, 1994-2016 (Cat. 91-522, Bilingual)	1995	\$45.00	1,280

Source: Population Projections Section, Demography Division, Statistics Canada

17. A Government of Canada Memorandum (1973) to the Cabinet on Demographic Objectives based on the 1974 Statistics Canada's population projections, stated that "for planning purposes, all departments and agencies should use the data produced by Statistics Canada and the assumptions contained in this document". This statement gives official status to Statistics Canada's projections. It has also defined such demographic factors as population growth, size, composition (age structure, labor force, ethnic composition) and location (distribution). The same document also states the following four

future-oriented demographic objectives: (i) to obtain an indication of Ministers' preferences for future demographic conditions; (ii) to anticipate and influence future demographic conditions and the changes resulting from them; (iii) to establish a common demographic framework for consistent mid- and long-range policies for energy, land, industry, transportation, urbanization, housing, culture, and other characteristics of the size and kind of Canada desired, and (iv) to provide a framework which will enable the integration of national development and demographic objectives with the international demographic, ecological and economic situation.

18. A few sectors were identified to examine the stated demographic objectives. They were: energy; environment; agricultural and recreational land; mineral resources; GNP/per Capita; urban form; cultural unity and diversity; social expenditures; regional development; and international relations.

Selected Users and Uses of Statistics Canada's Population Projections

Federal Government Users and Uses

19. Because of the official status of Statistics Canada's population projections as the only source that provides consistent national and provincial projections, they are widely used by federal government departments and agencies for research and planning. The chief federal government users of population projections are: Citizenship and Immigration Canada (formerly Employment and Immigration Canada (EIC)), Human Resources Development Canada, Department of Finance, Health Canada (formerly Health and Welfare Canada), the Treasury Board, Elections Canada, the Secretary of State (now called Canadian Heritage), Transport Canada, Indian and Northern Affairs Canada, Central Mortgage and Housing (CMHC), Revenue Canada, Statistics Canada, the Privy Council of Canada, the National Energy Board, the defunct Economic Council of Canada, the Royal Commission on Aboriginal Populations, and Environment Canada. These federal users have requested Statistics Canada to prepare special projections, or to provide tailor made projection results for their particular needs. The major special projections prepared for the federal users are discussed separately under Special/Customized Projections.

20. Some examples of important uses made of projections by the above-mentioned federal government departments are as follows:

21. Population Projections have been used by Employment and Immigration Canada (EIC) as background information in setting the annual immigration targets. Further, special sets of population projections for Canada and the provinces were prepared for EIC in 1983, 1987, and 1995 for their use as inputs to the Canadian Occupational Projection System (COPS). Several special series of population projections and simulations under various levels of fertility, immigration, and emigration have also been used for determining optimal immigration levels and demographic objectives for Canada. Also, the various projection series formed a major input for the preparation of the Green Paper on Immigration (several studies commissioned under Canadian Immigration and Population Study by EIC in 1974).

22. The report, **Population Projections for Canada and the Provinces, 1984-2006**, released in 1985, served as a catalyst for discussions on population related issues and inputs for establishing immigration targets by Employment and Immigration Canada. The **Three-year Review of Demography and Its Implications for Economic Policy** established by the federal government in May 1986 and carried out by Health and Welfare Canada, was in line with the conclusions of the 1985 projections report, "the evolving new demographic trend – the drastic slowdown in population growth and the changing age structure – will have major implications for a wide range of social and economic

policy fields” (Statistics Canada, 1985, p. 59). The terms of reference of the Review of Demography were the following: (i) to review and assess population projections for Canada for the next 40 years (1985-2025) and examine the prospect of population decline nationally and regionally within this time horizon; (ii) to examine the impact that Canada’s changing age structure will have during the next 40 years on federal policies and programs; (iii) to review and assess the relationship between Canada’s projected population growth and economic growth, including the longer-term benefits and costs of immigration to and emigration from Canada; (iv) to examine the impact of immigration to Canada on internal patterns, urban/suburban/ rural growth and the Canadian labour market; (v) to examine the relationship between changes in fertility rates and changes in the family; and (vi) to examine the policy and program response of other countries to changes in the size, structure, and distribution of their populations and evaluate these response to the Canadian situation.

23. The Department of Finance has been using projections for their short-term forecasting in their economic model, and for negotiations with the provinces concerning the future sharing of health and post-secondary education costs.

24. The Health and Welfare has used population, and household and family projections, for the forecasting and planning of future expenditures on Old Age Security, the Guaranteed Income Supplement, and Family Expenditure Plans. The 1986-based projections were used as input to the process of negotiating seven-year cost-sharing agreements with the provinces. The provincial projections of under 15 population were used to determine the transfer of payments for each of the seven years of the program between 1988 and 1994.

25. The Treasury Board requires population projections for evaluating the impact of the changing population on the Government age-specific expenditures in the future. Among the federal programs evaluated by the Treasury Board are the following: Established Programs Financing (EPF for Hospital Insurance, Medical Care, Post-Secondary Education), Family Allowance payments (PA), Guaranteed Income Supplement (GIS), Old Age Security (OAS), Spouse’s Allowance (SA), Unemployment Insurance Commission payments (UIC). Evaluation of expenditures also included programs for Veterans Affairs, the Solicitor General and the Canada Pension Plan (CPP). Various Provincial Expenditures Programs in health care, social welfare, and education, as well as municipal programs, are also evaluated by the Treasury Board using population projections.

26. The Privy Council Office (PCO) has used population projections to evaluate the expected distribution of seats in the House of Commons. The draft-interim report, **Growth, Human Development, Social Cohesion, 1996** by the Policy Research Committee of the PCO also used population projections extensively, especially in the analysis of “Demographic Trends”.

27. Among other users, Elections Canada has used population projections to evaluate the expected number of voters across Canada in future elections, while the Secretary of State has used population as the demographic base for the Established Programs Financing (EPF) arrangements between the federal government and the provinces. The Economic Council of Canada has used population projections to evaluate the impact of alternative mortality patterns on government expenditures under the medical care and hospital insurance programs, while the National Energy Board has used them to prepare forecasts of energy requirements for the residential and commercial sectors. Transport Canada’s Statistics Branch of the Canadian Air Transportation Administration has used them for the preparation of forecasts of aircraft, cargo, mail, etc; and CMHC has used them as inputs for the household and housing model. Special population projections for taxation districts were used by Revenue Canada for their model to project the number of tax filers.

28. As a data user, Statistics Canada uses population projections and the components of growth for estimating the cost of census taking, and certification of census data by age and other characteristics. The projections also complement postcensal population estimates and form the base (denominator) for calculation of various future-oriented demographic and socio-economic rates and ratios. The projections have also been used for school enrolment projections, modeling purposes, analytical studies, and presentations to data users.

29. The importance and accountability of the above-mentioned departments, which are the main users, give some indication of the key role played by Statistics Canada's projections for federal/provincial economic planning and programs.

Use by Provincial Governments

30. The use of Statistics Canada population projections by provincial governments depend upon whether the province concerned has its own projections program or not. A brief survey by Perreault (1995) reported that the following provinces had a full-fledged projections program: Nova Scotia, Quebec, Ontario, Manitoba, and British Columbia. Those who do not have their own projections program use Statistics Canada's projections as base data for planning purposes. These include projections of the number of schools, classrooms, teachers, students, medical personnel, hospital beds, etc. and provincial cost estimation for various other socio-economic programs. Provinces which have their own projections program, mainly use Statistics Canada's projections for comparison and as a guide in preparing provincial and subprovincial population projections. Only Statistics Canada's projections meet the criteria of being numerically and methodologically consistent and comparable at the national and provincial levels.

31. The following are some of the specific users/uses: British Columbia (B.C) Hydro and Power Authority has used population projections to plan the anticipated demand for electricity. The B.C. Ministry of Industry and Small Business Development has used projections for planning and policy purposes. The Commission on Declining School Enrolments in Ontario (CODE) used several series of projections to study the declining school enrolment and demand for classrooms. Also, the Ontario Manpower Commission has used projections to forecast possible shortages of skilled labour. Other principal provincial government users recorded were: Newfoundland Central Bureau of Statistics, Saskatchewan Bureau of Statistics, the British Columbia Energy Commission, the Ontario Ministry of Education, Manitoba Bureau of Statistics, and the Northwest Territories Housing Corporation. In addition, the provincial and territorial statistical focal points use Statistics Canada's population projections. They use these projections for comparing the projections produced by them, and for estimating future provincial share concerning the federal-provincial cost-sharing programs.

Non-Government Users

32. As a consequence of the profound demographic changes in Canada since the 1970s, many private agencies and companies have needed to change their production, and marketing strategies, and business plans. This has been especially true for businesses producing goods for a specific population target. For example, the fall in births has led companies producing goods for children to change their business strategies radically, and sometimes to aim towards other segments of the population. Thus, the decline in fertility, the aging of the population, the increase in life expectancy, and the changes in family structure have necessitated adjustments on the part of many businesses. Population projections showing different growth patterns in different parts of the country, and market studies based on these trends provide vital information for the starting and monitoring of various type of businesses.

33. Some of the non-governmental users of population projections who have contacted Statistics Canada for population projections are: Bell Canada; Shell Canada; The Hudsons' Bay Company; Imperial Oil; the Bank of Montreal, General Foods Ltd.; the Bank of Commerce; the Conference Board of Canada; and the Institute for Policy Analysis of the University of Toronto. Examples of specific uses of projections by these companies are: to estimate the demand for residential telephone services; to evaluate the future demand for oil; to forecast the demand in the petroleum industry; and as input in developing an economic model, etc. The academics use projections for teaching, public lecturing, research, modelling, and consulting.

Population Projections form the Base for Several Derived Projections

34. Age/sex projections are also used as a basis for the following projections: projections of households and families, the labour force, disabled persons, the school age population and school attendance, rural and urban populations, the ethnic population, etc. Of these, only household and family projections have been produced by Statistics Canada on a regular basis. Some of the other derived projections have been developed as special projections on a cost-recovery basis.

35. Like the population projections, five generations/sets of household and family projections have been produced and published by Statistics Canada, based on data from the censuses of 1971, 1976, 1981, 1986 and 1991 (see Table 1 for details). A headship rate/maintainer rate model is used for household and family projections by type of households and families for Canada, provinces and territories for a 25-year horizon. As in the case of projecting the population of Canada and the provinces, a 'bottom up' regional component approach is used for household and family projections (George and Perreault, 1993). The regional approach enables the model to take into account the regional differentials related to the components of household and family changes.

36. Like the population projections, more than one series of projections (three or four) have been selected and published (see Table 1 for titles of the reports). Unpublished projections series have also been made available to the users on a cost-recovery basis.

Demand for Household and Family Projections

37. Population projections by age and sex provide only the basic demographic variables for socio-economic planning purposes. For a variety of goods and services, both in the public and private sectors, households and families are more relevant units of demand than individuals, since they are the basic units of consumption into which people are organized. The obvious example is the future planning of housing needs, which depends on the number and structure of households and families. Also, for housing policy to be successful, it must be based on trends in the number and structure of households and on their geographical distribution.

38. Again, the demand for consumer durables such as appliances and furniture, the development of public utilities such as gas and electricity, and the construction of roads and transportation networks are also determined by anticipated changes in the number of households, while the costs of many government programs are directly influenced by the number of households and families. Because of these potential applications, there is a growing demand for projections of households and families in terms of their size and structure.

39. Evidence of the demand for Statistics Canada's household and family projections can be seen from the number of copies of the published reports sold (see Table 1) and the requests for customized

projections. Like the population projections reports, these projections reports have been among Statistics Canada's best sellers.

Selected Users and Uses of Statistics Canada Household and Family Projections

40. Once again, the users of household and family projections are widely ranging from federal government departments, provincial and municipal government departments, to non-government users, especially businesses.

41. Some of the main users and uses of household and family projections which have been recorded are the following: the Treasury Board has used these projections for evaluating family allowance payments; the Department of Finance for forecasting investments in residential construction (Long Range Planning Branch); Health Canada for forecasting and planning the Family Allowance Program; the RCMP to estimate and plan for the anticipated demand for police protection services to elderly households; Census Division, Statistics Canada for census planning; Structural Analysis Division, Statistics Canada, to simulate the demand for various goods and services through its economic model; Ontario Hydro to evaluate the future demand for energy; and Imperial Oil Ltd. for evaluating the future demand for oil.

Short-term Annual Update of Population Projections

42. A substantial number of users of population projections have been requesting annual updates of short-term projections. In order to meet this demand, Statistics Canada started publishing population projections for Canada, Provinces and Territories annually for a five-year horizon from 1995 on. These projections by age and sex are published in the **Annual Demographic Statistics** reports (see Statistics Canada, 1998).

43. These short-term updates are produced by using the latest annual population estimates as the base and the medium assumptions updated, if required, of the long-term population projections. The general method used is the same as that of the long-term projections, namely, the regional cohort component approach. Thus, only the medium long-term projection is annually updated for a five-year horizon.

44. The users of these projections are by and large, the same as those for the long-term projections. They are mainly used for short-term five-year socio-economic forecasting and planning purposes which demand high accuracy in projected population.

Census Metropolitan Area (CMA) Population Projections

45. A market-study on population estimates and projections by Statistics Canada's Demography Division (Despatis Inc. 1994) indicated an enormous unmet demand for subprovincial population projections, including Census Metropolitan Areas (CMAs). In order to meet this demand, Statistics Canada started producing CMA population projections from 1996 on. CMAs are urban areas having a population of at least 100,000 (based on the previous census). There are 25 CMAs in Canada according to the 1996 Census, comprising 62 % of the total population (see Statistics Canada, 1998).

46. The projected total population of each CMA for a time horizon of 5 years is published in **Annual Demographic Statistics** (see Statistics Canada, 1998). Detailed CMA projection series by age and sex for a longer time period based on the 1996 Census data will be made available in 1999.

47. These are the only set of consistent and comparable projections for all CMAs. The demand for CMA projections comes from a variety of users: federal government departments, provincial and municipal governments, and private companies, such as banks and private companies. A few of the clients who have requested CMA projections are: Revenue Canada, Central Mortgage and Housing Corporation; Transport Canada; Human Resources Canada; the City of Metro Toronto; Alberta Treasury and Economics; the City of Moncton; the Bank of Nova Scotia, Hydro Quebec, Clayton Research; and Price Waterhouse.

48. Planning activities tend to focus on smaller geographic areas, and in fact this is the chief use to which CMA projections are put. Users who initially requested for them included government departments at all levels and private companies and agencies.

Special/Customized Projections

49. Since 1978, Demography Division has been providing customized demographic projections to users on a cost-recovery basis. This is a unique venture by a statistical agency. There are mainly two types of requests. The first, requires the generation of alternative projections under a different combination of existing projection assumptions. The second requires the development of “special purpose” projections either for subprovincial area(s) or for a particular component or group of the population. Examples of the latter type, are population projections for Revenue Canada taxation districts; Population Projections of Registered Indians for the Department of Indian and Northern Affairs Canada (DIAND).

Users and Uses of Special Projections

50. As in the case of projections of population, households and families for Canada and provinces, the requests for special projections come from a wide spectrum of users – federal departments, provincial governments, private businesses, universities, municipalities, foreign agencies, etc.

**Table 2. Special Projections Requests and Services Provided by Statistics Canada
1982-1983, 1983-1984, 1991-1992, 1992-1993, 1993-1994, 1994-1995, 1995-1996, 1996-1997**

		Federal Requests	Provincial Requests	Private Requests(1)	Total
1982-1983	Number	190	60	159	409
	%	46	15	39	100
1983-1984	Number	197	63	165	425
	%	46	15	39	100
1991-1992	Number	102	9	157	268
	%	38	3	59	100
1992-1993	Number	105	17	175	297
	%	35	6	59	100
1993-1994	Number	98	15	138	251
	%	39	6	55	100
1994-1995	Number	191	30	158	397
	%	50	8	42	100
1995-1996	Number	140	34	117	291
	%	48	12	40	100
1996-1997	Number	189	17	106	312
	%	61	5	34	100

(1) Including municipalities.

Source: Population Projections Section, Demography Division, Statistics Canada.

51. The user services, including undertaking requests for projections, are different from those for routine data series. This is because of the technical complexity involved in answering requests on the choice of projection series, the rationale for the series and the underlying assumptions. The Division has received several hundreds of requests over the years (Table 2) averaging roughly 400 per year in 1982 and 1983. In the recent years, the number of requests has been around 300 per year (excluding the users out of computerized data bank). The reduction in the number of requests in recent years may be attributed to the availability of projections through electronic media. The requests are made by telephone, by letter, by FAX, by e-mail, and/or a visit to the Division. These have varied from requests for published and unpublished results of the projections, to explaining concepts, methodology, and the preparation of new series of population projections under alternative assumptions on the components of growth. Several of the requests were for "tailor made" projections for subprovincial areas and population groups (e.g., Registered Indians, and the Employment Equity Groups: women, aboriginal population groups; visible minorities; the disabled persons at work).

52. By far the most important users of this service have been the federal government departments (varying between 35% to 61%), followed by private businesses (including municipalities), and provincial government departments (see Table 2). There has been a notable increase in the number and percentage of requests from federal departments and agencies between 1995-1996 and 1996-1997.

53. Projections have been developed for the following users on a contract basis involving five thousand dollars or more for each contract: the Department of Indian Affairs and Northern Development (DIAND); Employment and Immigration Canada (EIC); the Secretary of State; the Employment Equity Data Program; Central Mortgage and Housing Corporation (CMHC); Revenue Canada; the Children's Hospital of Eastern Ontario; and Queensway Carleton Hospital.

54. The preparation of cost-recovery special projections has not only provided the required projection data to users for their planning programs, but has also generated about \$1.4 million revenue during the period 1982-1983 to 1996-1997 (see Table 3). The major projects were carried out during the 12 years between 1985 and 1997. The average annual revenue for this period came to \$116, 000, which amounted to one-fifth of the total 1997-1998 cost for the projections program. In addition to its fair contribution to the total projections program, the revenue generated is an indication of the high demand for projections and a reflection of the value added service provided .

55. Federal departments, especially DIAND, contributed to the bulk of the large revenue generating contract projects. Four generations of special projections of the Registered Indian population (**1985**: 1982-1996; **1990**: 1986-2011; **1993**: 1991-2015 and **1998**: 1996-2021), and households and families (**1988**: 1982-1996; **1990**: 1986-2011; **1993**: 1991-2015; and **1998**: 1996-2021), based on the Indian Register data were developed under a series of contracts. These projections and the published reports formed the demographic base for DIAND's departmental budgeting, planning, and policy decisions involving millions of dollars.

56. Projections of Canada's Aboriginal Population, 1986-2011 (Cat. S2-232/2011), prepared for the Native Citizen's Secretary, Directorate of Secretary of State of Canada based on 1986 Census data served as a pilot study for the Aboriginal population using census data. For the Employment Equity Data Program, projections were prepared for three groups: The Aboriginal Population (Statistics Canada, 1995, Cat. 91-539-XP); Visible Minorities (Statistics Canada, 1996, Cat. 91-541-XP); and Persons with Disabilities at Work (Statistics Canada, 1996, Cat. 91-538). These projections were intended to assist employers in planning and implementing employment equity programs with the objective of achieving equality in the workplace. CMHC used selected parameters developed for Statistics Canada population projections (mortality and interprovincial migration) as inputs to their model in developing potential housing demand projections for Canada and the provinces. The special projections for Revenue Canada taxation districts were used to project the number of tax filers. Similarly, the population projections for the Children's Hospital of Eastern Ontario and Queensway Carleton Hospital for the identified "catchment-areas" were used as inputs for the hospital planning.

Table 3. Revenue from Statistics Canada Cost-Recoverable Special Projections and Services, 1982-1983 - 1996-1997

Client	Project	Year completed	Amount in \$
DIAND	Projections of Population, Households and Families of Registered Indians, Canada, Regions and Bands	1985	
DIAND	Projections of Population, Households and Families of Registered Indians, Canada and Regions, 1986-2011	1990	
DIAND	Projections of Population, Households and Families of Registered Indians, Canada and Regions, 1991-2015	1993	
DIAND	Projections of Population, Households and Families, Canada, Regions and First Nations, 1996-2021	1998 ⁽¹⁾	
RCAP	Projections of the Population with Aboriginal Identity, Canada and Regions, 1991-2016	1995	
EEDP	Employment Equity Groups Projections: Projections of Female Population, Canada and Provinces, 1991-2016; Projections of Canada's Population with Aboriginal Identity (Canada and Regions), 1991-2016; Population Projections of Visible Minority Groups, Canada and Regions, 1991-2016; Projections of Persons with Disabilities at Work, Canada and Provinces, 1991-2016	1993	
EEDP	Revision of Employment Groups Projections: Projections of Population with Aboriginal Ancestry, Canada and Regions, 1991-2016; Projections of Visible Minority Population Projections, Canada and Regions, 1991-2016; Projections of Persons with Disabilities (Limited at Work/Perception), Canada and Provinces, 1993-2016	1996	
		Sub-total	1,086,634 ⁽³⁾
	Smaller projects and services with less than \$20,000 revenues(2)	1982-1983 to 1996-1997	304,221
		TOTAL	1,390,855

(1) Most of the work completed by 1997.

(2) Some of the notable clients of the smaller projects were:

Employment Immigration Canada; Human Resources Development Canada; The Children's Hospital of Eastern Ontario; Queensway Carleton Hospital; Revenue Canada; and Central Mortgage and Housing Corporation.

DIAND: Department of Indian Affairs and Northern Development.

RCAP: Royal Commission on Aboriginal Peoples.

EEDP: Employment Equity Data Program.

(3) The individual amount of each project is available from Demography Division.

Source: Population Projections Section, Demography Division, Statistics Canada.

57. An additional benefit derived from answering requests for special purpose projections has been the information we have been able to obtain about users' needs, and valuable inputs for projections we have received through direct contact with the clients. This information is useful in three respects: (i) it helps us to know before-hand the type of projections and details required by the chief users for planning and policy purposes; (ii) the inputs obtained serve to the finalization of projection assumptions based on local information and developments; and (iii) the projection products utilizing this information, tend to

become more acceptable to users and thus help to improve the image of the Bureau's work and its products.

Quality vs. Use of Projections

58. Although for some users "any figures are better than none", the use of projections may be evaluated against their quality. Two basic approaches can be considered in assigning the quality of a set of projections: (i) the credibility of the process in developing the projections; and (ii) the accuracy of the projection results.

59. The credibility of the process may be evaluated in terms of the following criteria: (1) the methodology used; (2) the quality and comprehensiveness of the data used; (3) the credibility of the underlying assumptions; (4) the determination of the projection series and time horizon; (5) accounting of limitations; and (6) experience and expertise in projection work. The projections developed by Statistics Canada may be evaluated using these six criteria.

60. Statistics Canada's experience suggests that for producing population projections by age and sex and for each year, a cohort component approach is the best method. The projection model used is very efficient and flexible. It produces scientifically verifiable consistent national and subnational projections by age and sex for each year under several combinations of component assumptions using appropriate demographic parameters. The agency is the custodian of the comprehensive historical, and up-to-date demographic data sources (stock and flow data). The assumptions for components are generally developed based on the extensive analysis of trends and the consideration of relevant socio-economic developments within the country and elsewhere. They are presented with their rationale, and the inputs generated are scientifically verifiable. The time horizon for the past population projections have been 25 years for the provinces and 50 years for Canada, 25 years for household and family projections, and five years for the annual updates of population projections. A span of 25 years is ordinarily sufficient to meet the requirements of socio-economic planning of population projections. In the case of special projections, the time span is specified by the user concerned. The projections are presented with three or more alternative series with "high" and "low" variants designed to delimit a plausible range of variation, and to provide flexibility to the users. A judicious selection of the series is made after a careful examination of the possible combinations of assumptions. The limitations of the projections are always clearly stated. The projections and the related methodological and analytical research are carried out by a professional and technical team with considerable experience and expertise in demographic analysis and research. Also, since the projection work is a continuing activity, the team has the added advantage of continuously monitoring the demographic trends. The consultation process with the main federal and provincial government users in developing the projections helps to obtain valuable inputs for the finalization of component assumptions. Furthermore, the increasing demand for customized cost-recoverable projections from government and private businesses is a recognition of the quality of the products produced. The continuing contact with the users also helps in determining the type of projections and details required for planning and policy making purposes.

61. The second approach in quality assesment involves the assessment of projections accuracy. An evaluation of the first three projections: 1972-2001, 1976-2001; and 1984-2006 has shown that they have been quite accurate in projecting the population at the national level by age and sex (Statistics Canada, 1994). An assesment of the accuracy of subnational projections (provinces and other geographic areas) has not been done. However, evaluation studies of small area projections show that accuracy tends to decrease with the size of the geographic areas (Tayman and Swanson, 1996). This aspect has been dealt with in the section on the limitations in the projections reports. Further, the high standards and quality of the projections program and its products have been attested by the periodic,

auditing and evaluation of the program by external consultants appointed by Chief Statistician of Canada, including Statistics Canada's Advisory Committee on Demographic Statistics and Studies.

Conclusion

62. Statistics Canada's population projections, and household and family projections for Canada and the provinces, provide the basic data for social and economic planning at regular intervals, and serve a wide clientele of federal departments, provincial governments, businesses, academic institutions and the general public. These projections also form the base for developing other specialized projections. They are widely used for estimating the cost of various federal programs. Depending on the uses for which projections are required, the demand varies with regard to details by age, sex, and other characteristics, unpublished scenarios, and period to be covered by the projections. The principal users are the federal departments. They attach great importance to the quality of the population projections since they are used for formulating national/provincial socio-economic programs and policies involving millions of dollars. These indicate the high political sensitivity associated with the projections produced.

63. Requests for customized projections, both for policy decisions and program development, have increased considerably. Also, noteworthy is the diversification of the clientele and the extension of the demand for custom-made, cost-recoverable projections, especially for smaller sub-provincial geographic areas. In addition, demand for specialized projections covering elderly population, ethnic and language groups is increasing.

REFERENCES

- Abrami, Valerioterra and Leo Van Wissen (1994). "The User's Side in Subnational Population Projections". ECE/Eurostat Joint Session on Demographic Projections, June 1994, Luxembourg, Statistical Commission and Economic Commission for Europe.
- Despatis Inc. (1994). Report on a Market Study Regarding Population Estimates and Projections. Demography Division, Statistics Canada. Ottawa. (unpublished)
- Dominion Bureau of Statistics (1970). The Population Projections for Canada, 1969-1984. Analytical and Technical Memorandum, No. 4, Ottawa.
- George, M.V. and J. Perreault (1993). Projecting Households and Families in Canada by the Headship Rate Method", in *Methodology for Population Studies and Development* (ed. Kuttan Mahadevan), Sage Publications, New Delhi.
- Government of Canada (1973). "Memorandum to the Cabinet on Demographic Objectives", Cabinet Document, Doc. 616/73, June 19, 1973. (unpublished)
- Perreault, J. (1995). "Subnational Projections: Who Does What?: Brief Survey of Activities by Statistical Bureaus", Population Projections Section, Demography Division, Statistics Canada (unpublished document), Ottawa.
- Privy Council Office Canada (1996). Growth, Human Development, Social Cohesion. Policy Research Committee Draft Interim Report, October 1996, Ottawa.
- Statistics Canada (1985). Population Projections for Canada, Provinces and Territories, 1984-2006 (Catalogue No. 91-520). Demography Division, Ottawa.
- Statistics Canada (1994). Population Projections for Canada, Provinces and Territories, 1993-2016 (Catalogue 91-520. Demography Division, Statistics Canada, Ottawa.
- Statistics Canada (1998). Annual Demographic Statistics, 1997. Catalogue No. 91-513-XPB), Demography Division, Ottawa.
- Tayman, Jeff and David A. Swanson (1996). "On the Utility of Population Forecasts", Demography, 33(4), 1996.
- United Nations (1965). National Principles for National Programmes of Population Projections as Aids to Development Planning. Population Studies No. 38, Department of Economic and Social Affairs, New York.

Acknowledgements:

The author wishes to thank Jeannine Perreault, Ravi Verma and Shirley Loh for their review and comments, and to Lawrence Wise for technical assistance and editorial comments on the paper.