

MUNICIPALITIES AND WATER MANAGEMENT
IN
THE SAINT JOHN RIVER BASIN

A Report
prepared for
THE SAINT JOHN RIVER BASIN BOARD

by
John M. Henderson
Planning Consultant
Fredericton, N.B.

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FOREWORD

This study is one of a series commissioned by the Saint John River Basin Board as part of its program for preparing a water management plan for the Basin. A draft has been reviewed by members of the Board, its Advisory and Liaison Committee and Planning Office. The reviewers are satisfied that the work was conducted conscientiously by highly qualified people and that they have fulfilled their terms of reference. Although the report has been checked carefully for errors, inconsistencies and omissions, a few almost certainly remain. The Planning Office would appreciate hearing of them.

This is a report made to the Board, and the recommendations put forward in it are the author's own. Each recommendation will be carefully considered during the process of developing the comprehensive plan for the River Basin. However, some recommendations made with the aim of improving conditions for one water use may not be compatible with the needs of other uses. As the objective of the plan is to seek an optimum balance among all uses of the water resource, it is quite possible that the Board will not include in its final plan all the recommendations contained in this report. They are presented here, nevertheless, for public information and debate.

The Saint John River Basin Board
Fredericton, New Brunswick
February 1976

AUTHOR'S NOTE

This report is based upon a much more comprehensive report prepared for the Saint John River Basin Board by Peter McLoughlin Associates Limited and delivered in January 1974. The Board and members of the Planning Office felt that the PMA report was too far ranging and that it should be shortened and focussed more upon the central topic - municipalities and water management.

Since that time a good deal of work, including further research, has been carried out by several people, including Cecil W. Freeman, Anthony R. Sebastian and S. Thorpe Walker.

In putting my own name down as author of this report I have no desire to take credit for the excellent research and analysis conducted by my predecessors. On the other hand, I do accept responsibility for a fair amount of re-analysis, re-working of the data and editing. If this has resulted in changes in emphasis or viewpoint, if certain insights have been lost or distorted, the fault is mine.

John M. Henderson

TABLE OF CONTENTS

	List of Tables	ii
	List of Figures	iv
INTRODUCTION		v
CHAPTER 1	SETTLEMENT PATTERNS AND WATER USE	1
	Regional Settlement Characteristics	1
	Region 1, Edmundston - Grand Falls	1
	Region 2, The Middle Basin	1
	Region 3, Fredericton	8
	Region 4, Grand Lake and Kennebecasis	8
	Region 5, Saint John	8
	Water Use Implications	16
	Water Supply	16
	Waste Disposal	18
CHAPTER 2	POPULATION TRENDS	29
	Region 1, Edmundston - Grand Falls	29
	Region 2, Middle Basin	31
	Region 3, Fredericton	34
	Region 4, Grand Lake to Kennebecasis	39
	Region 5, The Greater Saint John Region	41
CHAPTER 3	ECONOMIC TRENDS	45
CHAPTER 4	FINANCING WATER, SEWERAGE AND TREATMENT SYSTEMS	51
	Tax Base	52
	Tax Rates	52
	Municipal Debt	56
	Capital Requirements for Water-Related Services	56
	Water Supply	59
	Water Distribution System	59
	Sewerage Systems	59
	Waste Collection and Treatment Investment	59
CHAPTER 5	MUNICIPAL PLANNING	67
	Planning in New Brunswick	67
	The <u>Community Planning Act</u> and Water Management	68
	Status of Municipal Plans	69
	Conclusion	70
CHAPTER 6	CONCLUSIONS	75
	The Municipal Population	75
	A Central Water Supply	75
	Groundwater Sources	75
	Liquid Waste Disposal	75
	Growing Municipal Population	75
	Financing Water-Related Services	75
	Municipal Planning	76

LIST OF TABLES

<u>Number</u>	<u>Title</u>	
1.1	Saint John River Basin Status of New Brunswick Municipalities - 1973	2
1.2	Size Frequency Distribution of Basin Municipalities - 1973	3
1.3	Saint John River Basin - Planning Region 1 Detailed Status of Municipalities	6
1.4	Saint John River Basin - Planning Region 2 Detailed Status of Municipalities	9
1.5	Saint John River Basin - Planning Region 3 Detailed Status of Municipalities	11
1.6	Saint John River Basin - Planning Region 4 Detailed Status of Municipalities	13
1.7	Saint John River Basin - Planning Region 5 Detailed Status of Municipalities	15
1.8	Status of Water Supply and Waste Disposal Services - Saint John River Basin Municipalities - 1973	17
1.9	Waste Treatment Plants in the Saint John River Basin - Municipal	19
1.10	Waste Treatment Plants in the Saint John River Basin - Provincial	20
1.11	Waste Treatment Plants in the Saint John River Basin - Federal	21
1.12	Waste Treatment Plants in the Saint John River Basin - Private	22
1.13	Incidences of Sewer and Treatment Systems - Saint John River Basin Municipalities - May 1973	23
1.14	Requirements for Municipal Sewerage and Sewage Treatment - by Regions	27
2.1	Municipal Population Projections - Region 1	30
2.2	Total Population and Age-Group Distribution, 1971 and 1991, Region 1 - Selected Municipalities	32
2.3	Municipal Population Projections - Region 2	33
2.4	Total Population and Age-Group Distribution, 1971 and 1991, Region 2 - Selected Municipalities	35
2.5	Municipal Population Projections - Region 3	36
2.6	Total Population and Age-Group Distribution, 1971 and 1991, Region 3 - Selected Municipalities	38

<u>Number</u>	<u>Title</u>	
2.7	Municipal Population Projections - Region 4	40
2.8	Total Population and Age-Group Distribution, 1971 and 1991, Region 4 - Selected Municipalities	42
2.9	Municipal Population Projections - Region 5	43
2.10	Total Population and Age-Group Distribution, 1971 and 1991, Region 5	44
3.1	Aggregate Employment by Regions and Selected Municipalities	46
3.2	Top Ten Employment SIC Codes in each Region and Basin with Per Cent of Total Employment Accounted For - 1971	49
4.1	Total Tax Base of Basin Municipalities - By Region - 1967-1973	53
4.2	Average Tax Rate and Rate of Increase - 1967-1973 - Basin Municipalities	54
4.3	Percentage Distribution of Expenditures - Basin Municipalities - 1972 - and Average Annual Growth 1967-1972	55
4.4	Debt Position of Basin Municipalities - 1972	57
4.5	Per Capita Expenditure Patterns of Basin Municipalities - Estimated - 1973	58
4.6	Summary of Investment Costs of Water-Related Services - 1974 Prices	60
4.7	Estimated Capital Requirements for Water-Related Services - Saint John River Basin - 1971 to 1991	62
4.8	Comparative Financing of Water-Related Services in Four Hypothetical Villages of 750 Population	65
5.1	Status of Municipal and Regional Plans in the Saint John River Basin	71

LIST OF FIGURES

<u>Number</u>	<u>Title</u>	
1.1	Boundaries of Planning Regions in the Saint John River Basin	4
1.2	Saint John River Basin - Planning Region 1	5
1.3	Saint John River Basin - Planning Region 2	7
1.4	Saint John River Basin - Planning Region 3	10
1.5	Saint John River Basin - Planning Region 4	12
1.6	Saint John River Basin - Planning Region 5	14

INTRODUCTION

This study was commissioned as one of the three undertaken by Peter McLoughlin Associates Ltd. in the capacity of economic advisors to the Saint John River Basin Board. The other two studies relate to secondary manufacturing industry and to population and economic trends within the Basin, and the connection between the three is that, in one sense or another, they represent the major "people-related" aspects of water management. The population of the Basin is quite dominantly concentrated in settlements and the water-related management problems are those associated with the manner in which people presently congregate to work and live and how the present situation may alter in space and time.

The present study concerns itself with the economic and organizational health of the Basin's cities, towns and villages - its incorporated areas, its municipalities. It attempts to quantify the problems associated with the need to provide secure and wholesome water supplies for such communities, as well as the implications of ensuring urban waste disposal arrangements that afford a satisfactory degree of protection for the water resource itself. In doing this, it deals not with the scientific and technological aspects of the water supply/waste disposal problem, but rather with the economic, administrative and fiscal framework within which the problem has to be solved in organized urban areas.

In the course of the study, a very large volume of data was brought together from many different sources. However, as the original data collection exercises were in no way designed to fit the needs of the study - the information having been gathered in the first instance by many different agencies, each for its own particular purpose - there are many deficient areas. This was, and is, one of the accepted constraints of the study, but the analyses presented remain valid within reasonable limits. On the other hand, much of the information has been collated and juxtaposed virtually for the first time, and in view of its potential interest and usefulness outside the strict requirements of the study itself, it has been produced in extenso in a series of appendices, bound separately from the analytical part of the report.

CHAPTER 1 SETTLEMENT PATTERNS AND WATER USE

Of the 300,000 or so people living in the New Brunswick part of the Saint John River Basin in 1973, some 220,000 reside within municipal boundaries (Table 1.1). This represents more than 70% of the total, and, although they are spread relatively thinly over 51 different municipalities, some notable concentrations exist nonetheless. In fact, the three cities of Saint John, Fredericton and Edmundston account for almost half the total Basin* population among them. In terms of the organizational units themselves, villages dominate in numbers, accounting for 41 of the total number of municipalities (80%), although only for some 15% of the Basin population.

In terms of size, half the municipalities have populations less than 1000 (Table 1.2), about 70% less than 2000, and nearly 90% less than 5000. Only six in all have populations in excess of 5000 people - Edmundston, Grand Falls, Woodstock, Fredericton, Oromocto and Saint John - while, at the other end of the spectrum, as many as 21 of the 41 villages harbour less than 750 souls.

Regional Settlement Characteristics

Viewed regionally, the picture is far from being one of complete homogeneity. In fact, of the five Basin Planning Regions (Figure 1.1), only one comes close to the Basin average in terms of the urban/rural population ratio (see again Table 1.1). The boundaries of regions themselves have, in fact, been determined on the basis of both demographic and hydrologic criteria, but define, nevertheless, geographic entities which are meaningful in human terms.

Region 1, Edmundston - Grand Falls This region is separated from the rest of the Basin by the hydrologically significant break point at Grand Falls but in fact includes the bulk of the French-speaking population of the Basin and is a very well defined cultural entity. About two-thirds of its people reside within municipal boundaries and two-thirds of these in either the city of Edmundston or the town of Grand Falls. Figure 1.2 shows the location of the municipalities of the Region, and Table 1.3 sets out some important statistics, among which will be noted the heavy concentration of settlements on the main stem of the Saint John River, which, in this area, forms a particularly well defined communications corridor.

Region 2, The Middle Basin This region occupies that part of the Basin which lies between Grand Falls and the next hydrologically significant break point at Mactaquac, which location has geological and physiographic as well as hydrologic relevance, marking as it does the change from the relatively rugged topography of the New Brunswick Highlands to the more gentle slopes of the Lowlands area (Figure 1.3). The region is dominantly rural with only one-third of

*Throughout the text "the Basin" will be used as a synonym for the "New Brunswick part of the Basin".

TABLE 1.1

Saint John River Basin
Status of New Brunswick Municipalities - 1973

	Planning Regions					Basin
	1	2	3	4	5	
Total Population	46 600	45 800	80 500	47 500	96 800	317 200
Municipal Population	30 800	15 200	57 800	26 300	91 200	221 400
Municipal Population as a Percentage of Total	66	33	72	55	94	70
City Population	13 200	-	44 300	-	87 800	145 300
Town Population	7 700	6 100	11 500	5 500	-	30 800
Village Population	9 900	9 200	2 100	20 800	3 400	45 300
Number of Cities	1	0	1	0	1	3
Number of Towns	2	2	1	2	0	7
Number of Villages	11	11	4	13	2	41
Number of Municipalities	14	13	6	15	3	51

Note: Municipal population data for 1973 obtained from Municipal Journal, New Brunswick Department of Municipal Affairs, Vol. 30, April-August 1974. Municipal/total population ratios obtained from 1971 census data. Total population data for 1973 estimated by applying 1971 municipal/total ratio to 1973 municipal population data. This almost certainly produces an overestimate since any population movement from rural areas to municipalities between 1971 and 1973 will have been counted twice. All population data rounded to nearest 100. Lines and columns do not necessarily add correctly.

TABLE 1.2

Size Frequency Distribution of Basin Municipalities - 1973

<u>Population Range</u>	<u>Number of Municipalities</u>		
	<u>In Range</u>	<u>Larger Than Range</u>	<u>Smaller Than Range</u>
0 - 250	2	49	-
251 - 500	7	42	2
501 - 750	12	30	9
751 - 1,000	4	26	21
1,001 - 1,250	5	21	25
1,251 - 1,500	4	17	30
1,501 - 1,750	2	15	34
1,751 - 2,000	0	15	36
2,001 - 2,500	4	11	36
2,501 - 5,000	5	6	40
5,001 - 10,000	2	4	45
10,001 - 15,000	2	2	47
15,001 - 20,000	0	2	49
20,001 - 50,300	1	1	49
50,000 - +	1	-	50

FIG. 1.1

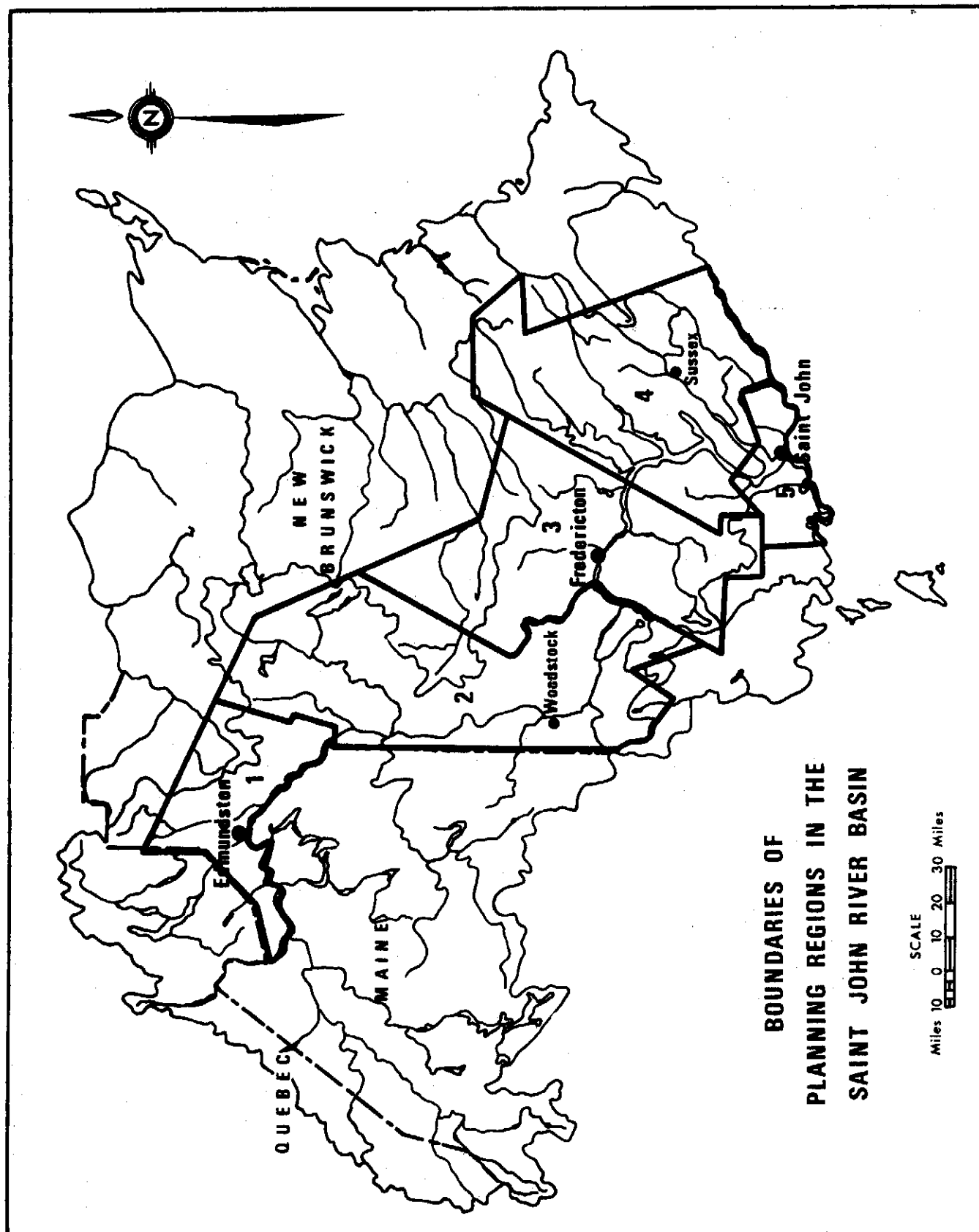


FIG. 1.2

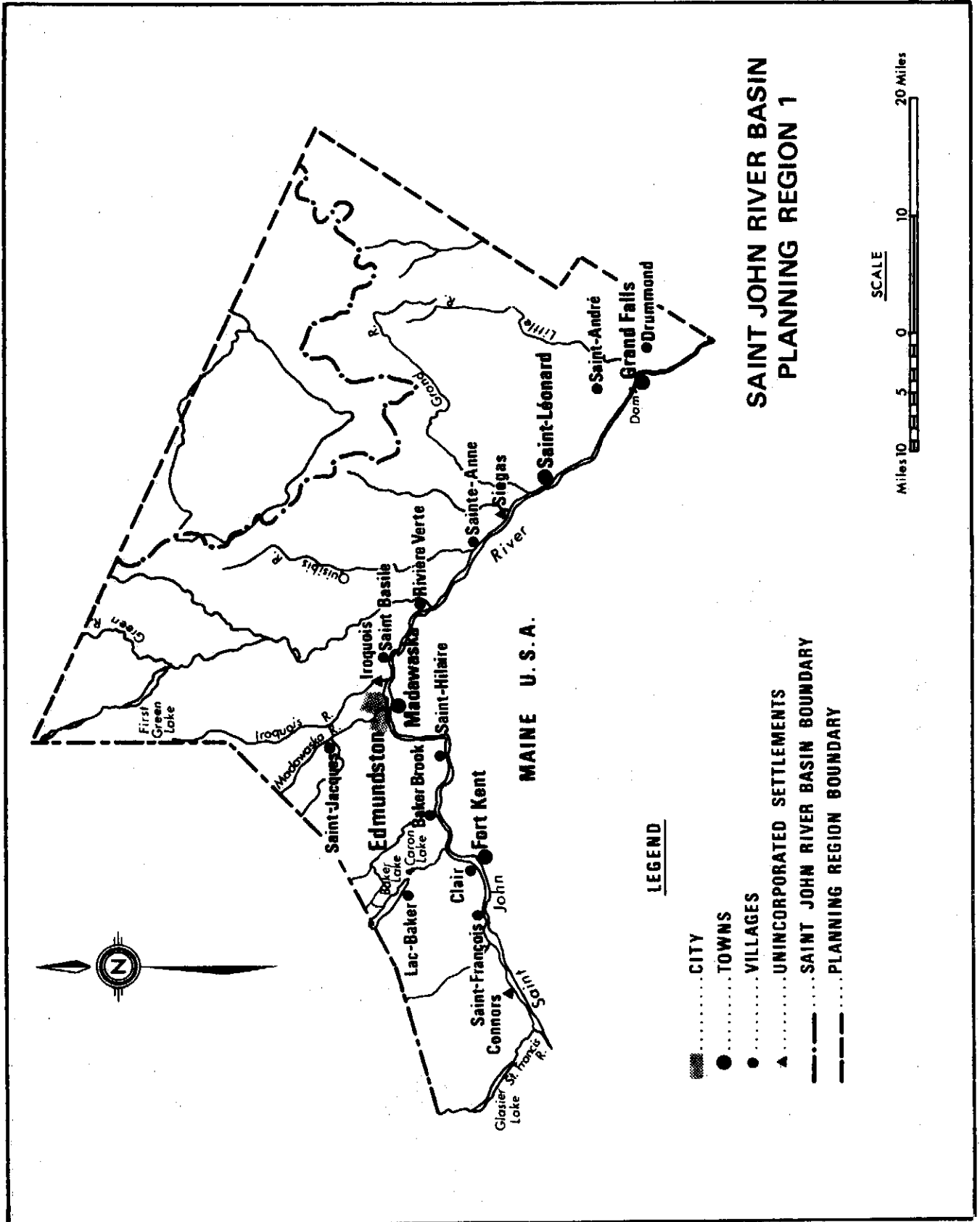


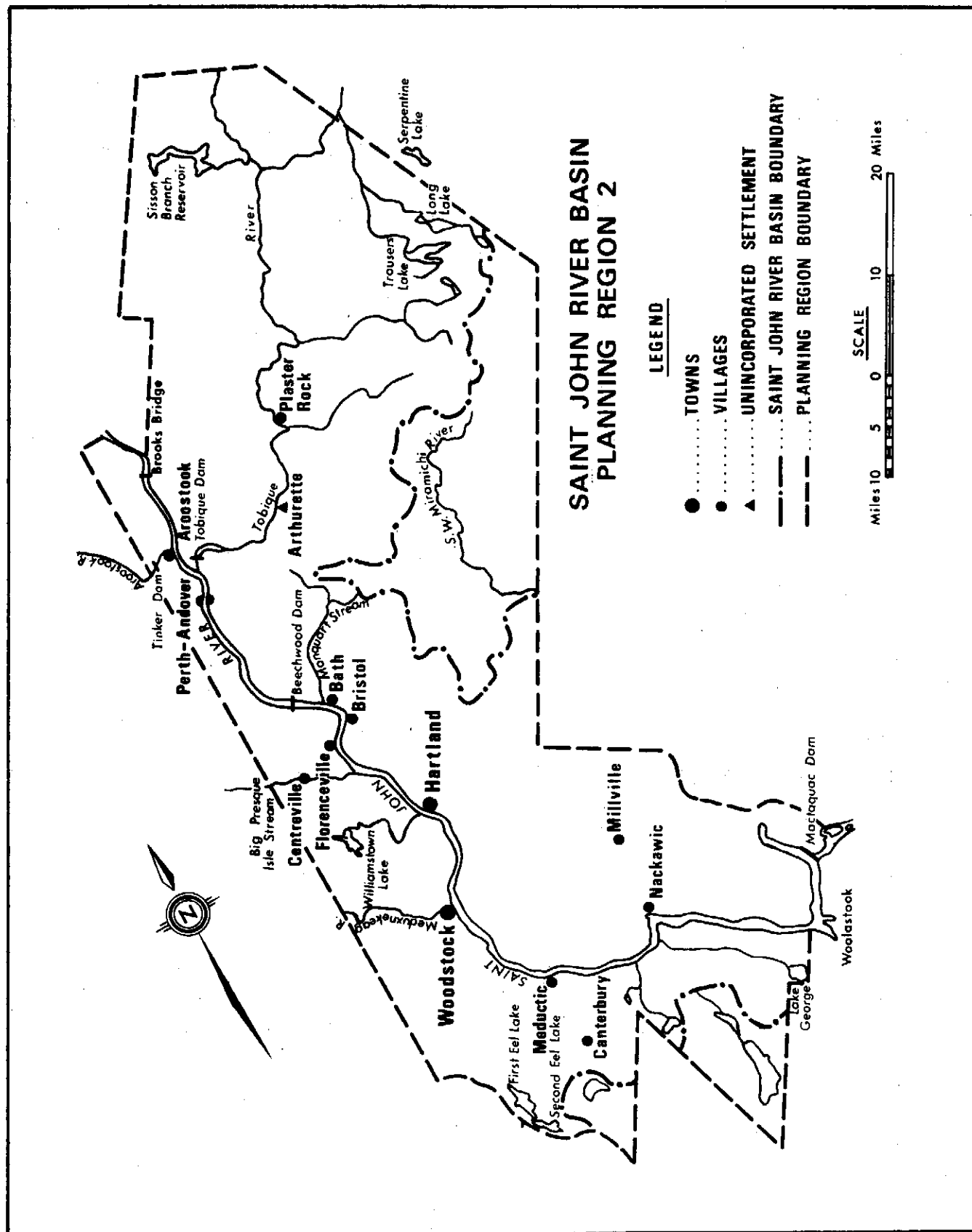
TABLE 1.3

Saint John River Basin - Planning Region 1
Detailed Status of Municipalities

Municipality and Status	Date Incorporated	Population (1973)	Total Employment (1971)	Spending Per Capita (1973) (dollars)	Status of Services			Location of Community
					Sewage Disposal		Water Supply	
					Collection	Treatment		
Edmundston (C)	1952	13 243	5 426	134.74	Yes	No	Ground	Main Stem
Grand Falls (T)	1890	6 195	1 252	98.14	Yes	Secondary	Ground	Main Stem
St. Leonard (T)	1920	1 531	155	93.54	Yes	Secondary	Ground	Main Stem
St. Basile (V)	1966	2 887	283	16.36	Yes	Secondary	Surface	Main Stem
Ste. Anne (V)	1966	1 323	111	20.68	Yes	Secondary	Ground	Main Stem
St. Jacques (V)	1966	1 146	93	24.84	Yes	Secondary	Surface	Nadawaska
Riviere Verte (V)	1966	1 069	75	26.71	Yes	Secondary	Ground	Main Stem
Clair (V)	1966	776	95	35.42	Yes	Secondary	Surface	Main Stem
Drummond (V)	1967	705	0	36.14	Yes	Secondary	Ground	N.O.M.R.
St. Francois (V)	1966	559	210	42.38	Yes	Secondary	Surface	Main Stem
Baker Brook (V)	1967	541	45	20.56	No	No	No	Main Stem
Lac Baker (V)	1967	351	25	20.66	No	No	No	Lac Baker
St. Andre (V)	1967	294	21	44.77	No	No	No	N.O.M.R.
St. Hilaire (V)	1967	202	4	12.71	No	No	No	Main Stem

Note: C = City; T = Town; V = Village; and N.O.M.R. = Not on major river.

FIG. 1.3



its population in organized areas. Woodstock is the only settlement of any size (Table 1.4) although Hartland and Perth-Andover are locally important service areas and Plaster Rock and Nackawic exist to serve forest-based industries of sizeable proportions. Florenceville is also an important employment centre, but is commuter-dependent, since its workforce is considerably greater than its total population. Surface communication with the rest of New Brunswick is virtually limited to the valley route followed by the Trans-Canada Highway, but there are important connections with neighbouring areas of Maine which are both culturally and physically part of the same geographic region.

Region 3, Fredericton This region is dominated by the provincial capital, Fredericton, which itself accounts for some 55% of the total regional population. Just over 70% in fact live within the Region's six municipalities (Figure 1.4) with Oromocto, the next largest settlement, accounting for 13% of the total. The latter town acts as a residential and service centre for the Canadian Armed Forces Base at nearby Gagetown, while Fredericton itself, in addition to supporting a substantial civil service population, is an important educational centre. The four villages (Table 1.5) are all very small and service mainly local forestry work and some Fredericton commuters, although Fredericton Junction is also a small railway centre.

Region 4, Grand Lake and Kennebecasis This region encompasses most of the Saint John Estuary and its lowland tributaries as shown on Figure 1.5. There is a fairly even mix of incorporated and unincorporated population, with two towns and some sizeable villages providing a reasonable scattering of moderately-sized settlements. The largest of these is Sussex, (Table 1.6) a rural service centre with some agriculture-based industry, located about midway between Saint John and Moncton - New Brunswick's two largest cities - astride the main connecting road and rail routes, and adjacent to the Trans-Canada Highway. The next largest municipality, the Village of Minto, is a coal-mining centre of modest note near the head of Grand Lake, while neighbouring Chipman supports considerable saw-milling activity. Most of the remaining settlements of size - Rothesay, Fairvale, Hampton, Quispamsis, Renforth, for example - are dormitory areas for Saint John in Region 5.

Region 5, Saint John This region is by far the smallest in area, and consists almost entirely of the City of Saint John and its immediate hinterland. This is illustrated on Figure 1.6. Its population is not only overwhelmingly urban (94%) but is also the largest of the five regions, one effect of which is to distort quite significantly the Basin average (70% urban including Saint John, 59% urban excluding Saint John). The city itself is a substantial port and industrial centre, the two neighbouring villages of Grand Bay and Westfield (Table 1.7) mainly dormitories.

TABLE 1.4

Saint John River Basin - Planning Region 2
Detailed Status of Municipalities

Municipality and Status	Date Incorporated	Population (1973)	Total Employment (1971)	Spending Per Capita (1973) (dollars)	Status of Services			Location of Community
					Sewage Disposal		Water Supply	
					Collection	Treatment		
Woodstock (T)	1856	5 058	1 719	94.81	Yes	Secondary	Ground	Main Stem
Hartland (T)	1918	1 011	858	112.26	Yes	No	Ground	Main Stem
Perth/Andover (V)	1966	2 005	1 105	38.95	Part	No	Surface	Main Stem
Plaster Rock (V)	1966	1 381	459	19.72	Yes	Secondary	Surface	Tobique
Nackawic (V)	1970	1 237	949	99.29	Yes	Secondary	Ground	Main Stem
Bath (V)	1966	928	191	16.75	No	No	Ground	Main Stem
Florenceville (V)	1966	748	1 436	68.22	No	No	No	Main Stem
Bristol (V)	1966	712	149	37.74	No	No	No	Main Stem
Centreville (V)	1966	609	135	20.71	No	No	No	Presquile
Aroostook (V)	1966	527	19	11.77	No	No	Ground	Main Stem
Canterbury (V)	1966	527	79	18.34	No	No	No	N.O.M.R.
Millville (V)	1966	324	93	12.92	No	No	No	Nackawic
Meductic (V)	1966	181	43	18.91	No	No	No	Main Stem

Note: T = Town; V = Village; and N.O.M.R. = Not on major river.

FIG. 1.4

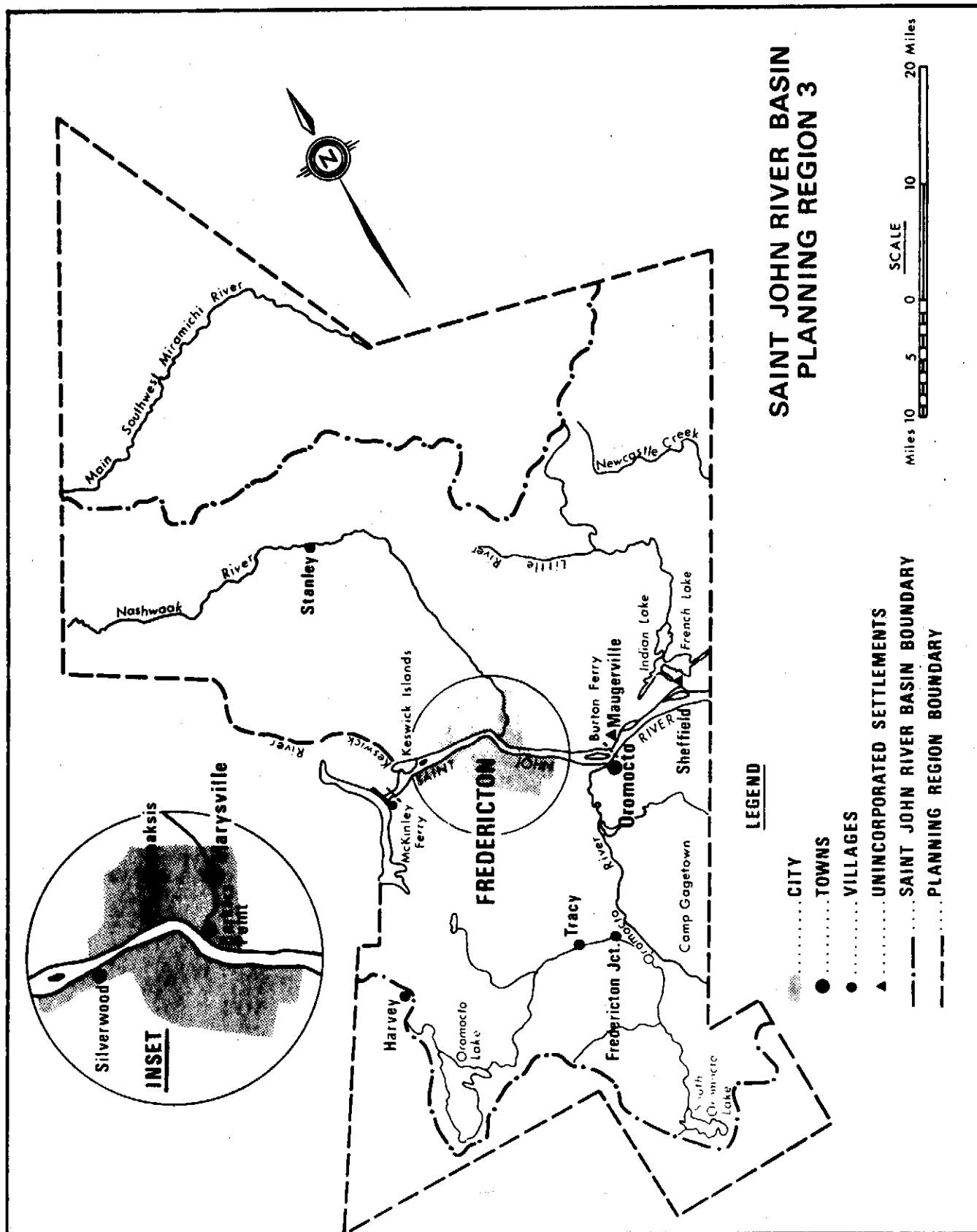


TABLE 1.5

Saint John River Basin - Planning Region 3
Detailed Status of Municipalities

Municipality and Status	Date Incorporated	Population (1973)	Total Employment (1971)	Spending Per Capita (1973) (dollars)	Status of Services			Location of Community
					Sewage Disposal		Water Supply	
					Collection	Treatment		
Fredericton* (C)	1848	44 311	16 971	91.04	Yes*	Secondary*	Ground	Main Stem
Marysville* (T)	1886	-	-	-	Yes*	Secondary*	Ground	Nashwaak
Nashwaaksis* (V)	1966	-	-	-	Yes*	Secondary*	Ground	Main Stem
Barkers Point* (V)	1966	-	-	-	Yes*	Secondary*	Ground	Main Stem
Silverwood* (V)	1968	-	-	-	Yes*	Secondary*	Ground	Main Stem
Oromocto (T)	1956	11 462	752	112.11	Yes	Secondary	Surface	Main Stem
Fredericton Junction (V)	1966	648	8	19.14	No	No	Surface	Oromocto
Tracy (V)	1966	622	34	8.59	No	No	No	Oromocto
Stanley (V)	1966	417	76	21.55	No	No	No	Nashwaak
Harvey (V)	1966	386	152	14.51	No	No	No	N.O.M.R.

Note: C = City; T = Town; V = Village; and N.O.M.R. = Not on major river.

* Amalgamated July 1973; Population, employment and spending data relate to amalgamated area; just over 37,000 people are served by municipal sewage disposal services.

FIG. 1.5

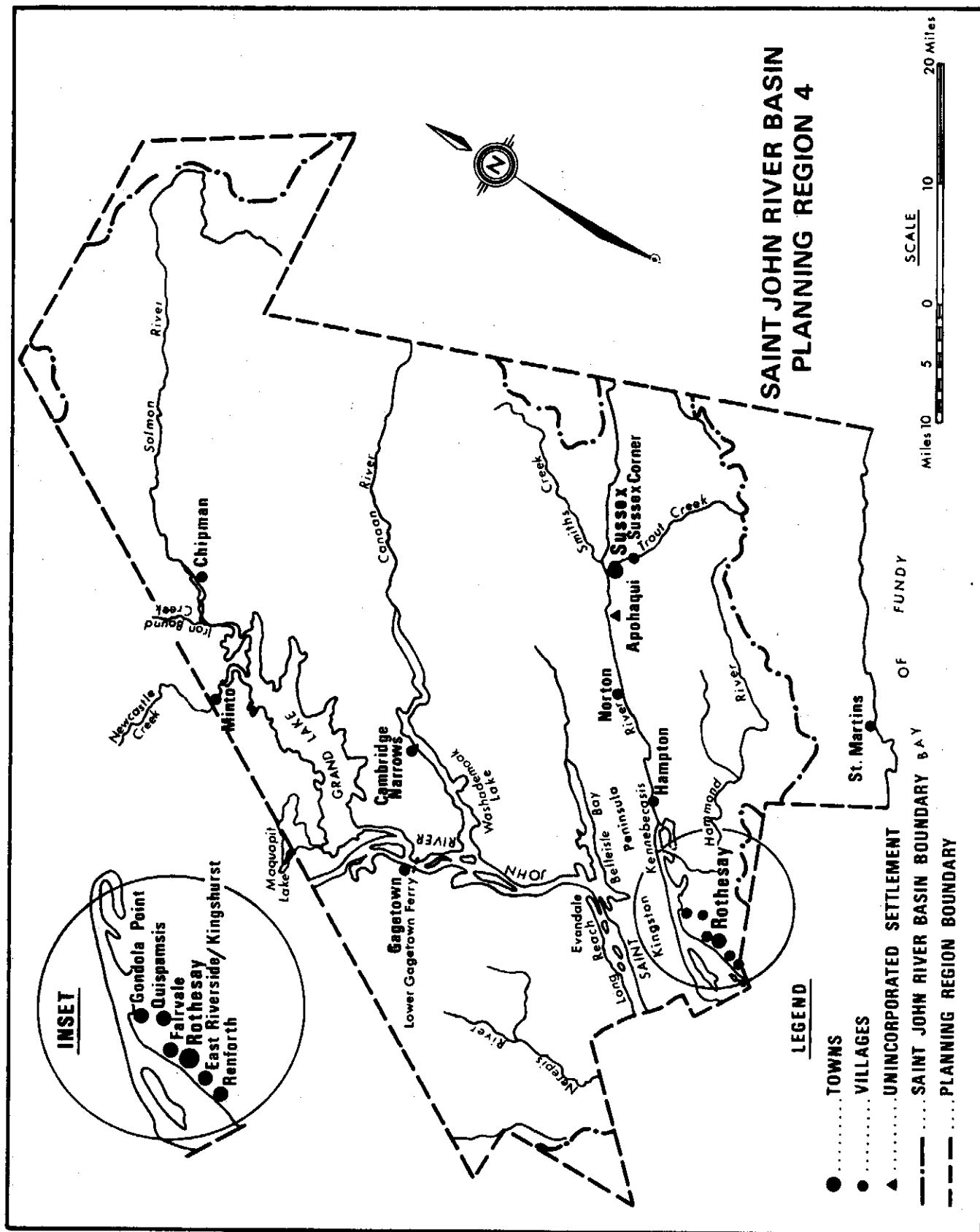


TABLE 1.6

Saint John River Basin - Planning Region 4
Detailed Status of Municipalities

Municipality and Status	Date Incorporated	Population (1973)	Total Employment (1971)	Spending Per Capita (1973) (dollars)	Status of Services			Location of Community
					Sewage Disposal		Water Supply	
					Collection	Treatment		
Sussex (T)	1904	4 018	1 790	113.54	Yes	Secondary	Ground	Kennebecasis
Rothsay (T)	1956	1 483	178	124.38	Yes	Primary	Ground	Kennebecasis
Minto (V)	1966	4 001	627	20.20	Yes	Secondary	Ground	Grand Lake
Quispamsis (V)	1966	3 227	-	12.70	Under Construction		No	Kennebecasis
Fairvale (V)	1966	2 252	-	13.59	Yes	Secondary	No	Kennebecasis
Hampton (V)	1966	2 136	326	13.19	Yes	Secondary	No	Kennebecasis
Chipman (V)	1966	2 021	284	31.16	Yes	Secondary	Ground	Grand Lake
Renforth (V)	1966	1 637	-	28.66	Yes	Secondary	No	Kennebecasis
Norton (V)	1966	1 296	86	7.04	No	No	No	Kennebecasis
Gondola Point (V)	1966	1 196	-	5.83	No	No	No	Kennebecasis
East Riverside/ Kingshurst (V)	1966	821	-	58.31	Yes	Secondary	No	Kennebecasis
Sussex Corner (V)	1966	681	38	8.82	Yes	Secondary	No	Kennebecasis
Gagetown (V)	1966	660	24	12.85	No	No	No	Main Stem
St. Martins (V)	1966	497	-	19.94	No	No	No	Coast
Cambridge Narrows (V)	1966	394	2	13.65	No	No	No	Washademoak

Note: T = Town; and V = Village.

FIG. 1.6

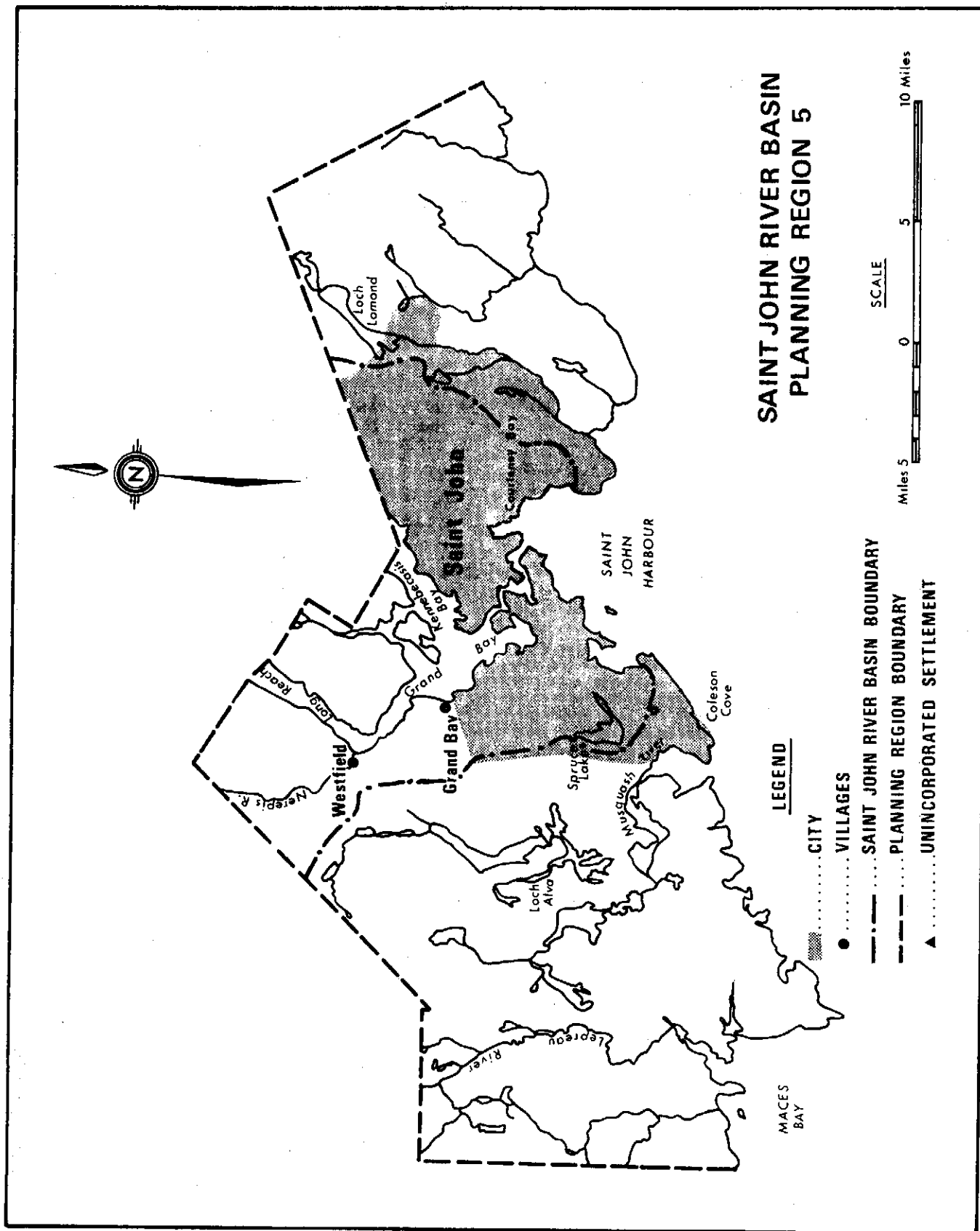


TABLE 1.7

Saint John River Basin - Planning Region 5
Detailed Status of Municipalities

Municipality and Status	Date Incorporated	Population (1973)	Total Employment (1971)	Spending Per Capita (1973) (dollars)	Status of Services			Location of Community			
					Sewage Disposal	Water Supply					
									Collection	Treatment	
Saint John (C)	1785	87 783	28 167	179.01	Yes*	Secondary*	Surface	Main Stem			
Grand Bay (V)	1966	2 581	50	7.67	No	No	No	Main Stem			
Westfield (V)	1966	845	25	12.35	No	No	No	Main Stem			

Note: C = City; and V = Village.

* Some 70,000 people are served by municipal sewers and some 20,000 by treatment.

Water Use Implications

The implications of the settlement patterns described for the development, management and use of the Basin's water resources are very clear. People are, in effect, very widely scattered; clustered, with two major exceptions, in medium-sized to very small towns and villages, but separated by large expanses of very thinly populated territory. Equally important is the fact that most of the settlements are very small indeed. This means that the tax base upon which water-related services must be supported is also small and, with distances between centres inhibitive to the achievement of economics of scale by joint servicing, the per capita cost is often prohibitive.

The difficulties described are particularly pronounced in Regions 2 and 4, which are the most truly rural in the Basin, with a combined total of 24 villages, 13 of them with population under 1000. Add to this the fact that the two regions have only one-third and one-half respectively of their population residing within municipalities, and the problem of providing adequate services for everyone can be seen to be quite formidable.

Water Supply Of the 51 municipalities in the Basin, 28 lack any sort of organized water supply (Table 1.8), meaning that individual households have the responsibility of providing for their own water needs. That this total should include 19 villages with populations under 1000 is less surprising than the fact that it includes six settlements with populations over 2000, and two of over 3000 (refer to Tables 1.3 through 1.7). Just over 24,000 people in the Basin are not served by public water supplies.

Also of interest, and potentially of concern, is the fact that Region 4, with only some 12% of the Basin municipal population, contains over 60% of the unserved municipal population. This figure expands to 75% if the two unserved villages in adjacent Region 5 are included, and further examination reveals that the Kennebecasis valley alone - the major commuting area for Saint John City - contains some 55% of the total unserved municipal population in the Basin.

Among the communities that do provide water supply services there is modest bias in favor of groundwater as opposed to surface sources - 13 out of 23, with one community, Bath, using both types of sources. More important, however, is the very substantial lack of sound data on the actual capacity of many of these sources. This is particularly of concern in the case of groundwater sources. In the case of a surface water source there is usually some reasonably sound theoretical basis for calculating the likely yield. This is rarely the case with a groundwater source and there is no adequate substitute for proper well evaluation at the time of construction. So far as can be ascertained this has, in the past, been a most uncommon practice, with the result that little is known of the capability of existing groundwater sources to support expanding demand.

TABLE 1.8

Status of Water Supply and Waste Disposal Services
Saint John River Basin Municipalities - 1973

	<u>Planning Regions</u>					<u>Basin</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	
Number of Municipalities	14	13	6	15	3	51
Municipal Water Services						
Ground	6	4	1	2	-	13
Surface	4	2	2	-	1	9
Both	-	1	-	-	-	1
None	4	6	3	13	2	28
Location of Municipalities						
Saint John Main Stem	10	9	2	1	3	25
Major Tributaries	2	3	3	13	-	21
Not on Major River	2	1	1	1	-	5
Municipalities with Sewage Treatment						
Treatment	8	3	2	8	1	22

Note: The numbers in the Table relate to whether or not any given municipality has organized water supply or waste disposal services, not to the number of individual sources of treatment plants that it may operate.

Waste Disposal Research has revealed a picture of some confusion with regard to the present status of liquid waste disposal systems within the Basin. A variety of lists was discovered, compiled by various public agencies and individuals, of the kinds of sewerage and sewage treatment systems in existence. None was found to be complete, and there is no particular reason to suppose that the consolidated lists presented here (Tables 1.9 through 1.12) are themselves complete.

One hundred and eleven systems have been identified, 24 of which are municipally operated. Of the remainder, 19 are the responsibility of the Province (schools, hospitals, parks, etc.), six belong to federal agencies (airports, Indian Reserves, Base Galetown, for example), while the remaining 62 are privately owned. Among the cities of the Basin, only Fredericton has anything approaching a complete collection and treatment system. Saint John treats only part of its sewage at two different plants, while Edmundston treats none of its municipal wastes at all. The Basin's towns perform better, with only one of the seven, Hartland, not having any treatment. Among the villages, only 16 out of 41 have sewerage systems, and of these, 14 provide treatment prior to disposal.

Some details of the waste treatment facilities operated by the Basin's municipalities are set out in Table 1.13, and it is of interest to comment briefly on the types of treatment employed. Of the plants operational in the Basin at the time of writing, only one (Rothesay) is classed as "primary". The remainder are considered by the Pollution Control Branch of the New Brunswick Department of the Environment to be of "secondary" type. These terms relate not to the specific process used but to the degree of removal of Biochemical Oxygen Demand (BOD), Suspended Solids (SS) and Coliforms achieved. Primary treatment normally involves only sedimentation and is capable of removing only up to 50% of BOD and SS and, often, a much smaller percentage of coliforms. Secondary treatment involves some form of biological oxidation and re-aeration and is capable of 80% or better reduction in all three parameters.

An additional aspect of relevance to waste management is the operating efficiency of the existing systems. Data here is far from complete, but one recent survey* examined 54 of the treatment plants in the Basin. This study revealed many plants operating significantly below design efficiency, and a small number seriously below. It suggested that one of the main reasons for less than optimum efficiency was a serious shortage of skilled operators. This, coupled with maintenance problems which were also significant in a few instances, reflects the very fundamental organizational problems associated with thinly-spread human resources.

*Domestic Waste Treatment: Plant Efficiency Study, 1971. New Brunswick Department of Fisheries and Environment, 1972.

TABLE 1.9

Waste Treatment Plants in the Saint John River Basin - Municipal

<u>Location</u>	<u>Type of Treatment</u>
Clair	Lagoon
Drummond	Lagoon (2)
East Riverside/Kingshurst	Oxidation Ditch
Fairvale	Lagoon
Fredericton Area	High Rate Complex Mix
Grand Falls	Oxidation Ditch*
Hampton	Lagoon (2)
Minto	Contact Stabilization
Oromocto	Activated Sludge *
Nackawic	Extended Aeration
Plaster Rock	Lagoon (2)
Renforth	Lagoon
Rothsay	Clarigester (primary)
Ste. Anne de Madawaska	Lagoon
St. Basile	Lagoon (2)
St. François	Lagoon
St. Jacques	Lagoon
Saint John	
Marsh Creek	High Rate Complex Mix
Lancaster	Primary Aeration & Lagoon
St. Leonard	Lagoon
Silverwood	Lagoon & Aeration Cell
Sussex	Oxidation Ditch & Lagoon
Sussex Corner	Lagoon
Woodstock	Oxidation Ditch

*Updated to February 1976 by Pollution Control Branch

Grand Falls	Activated Sludge (2)
Oromocto	Contact stabilization added

TABLE 1.10

Waste Treatment Plants in the Saint John River Basin - Provincial

<u>Location</u>	<u>Type of Treatment</u>
Bath School	Extended Aeration
Central Carleton School, Hartland	Trickling Filter
Central Reformatory, Kingsclear	Extended Aeration
Chipman School	Trickling Filter
East Florenceville School	Trickling Filter
Florenceville High School	MFM Extended Aeration
F'ton Junction Hospital	Trickling Filter
Geary School	Lagoon
Harvey Community Hospital	Trickling Filter
Kings Landing, Prince Wm.	Trickling Filter (2)
Lower Lincoln School	Trickling Filter
Mactaquac Park	Lagoon (Surface Aeration)
Quispamsis School	Extended Aeration
Rothsay High School	Trickling Filter *
St. Leonard Prov. Park	Trickling Filter
Saint John Institute of Technology	Trickling Filter *
Vocational School	Extended Aeration *
Upper Carleton Hospital, Bath	Trickling Filter
York Park	Extended Aeration

*Updated to February 1976 by Pollution Control Branch

Rothsay High School	Connected to Municipal System
Saint John Institute of Technology	Connected to Municipal System
Vocational School	Connected to Municipal System

TABLE 1.11

Waste Treatment Plants in the Saint John River Basin - Federal

<u>Location</u>	<u>Type of Treatment</u>
Base Gagetown (Oromocto)	Activated Sludge
Blue Mountain Correctional Institute	Extended Aeration
Fredericton Airport	Trickling Filter
Kingsclear Indian Reserve	Trickling Filter
Saint John Airport	Trickling Filter
Woodstock Indian Reserve	Trickling Filter

TABLE 1.12

Waste Treatment Plants in the Saint John River Basin - Private

<u>Location</u>	<u>Type of Treatment</u>
Ben's Restaurant, Baker Lake	Acadia Extended Aeration
Bethel Home, Inc.	Lagoon
Booker MHP, Fredericton	Lagoon
Brookside Terrace MHP, Sussex Corner	Lagoon
Caledonia Development, Fairvale	Acadia Extended Aeration (2)*
Carleton Mall, Woodstock	Extended Aeration
Centennial Heights Subdivision, F'ton	Lagoon
Charters Subdivision, Fredericton	Lagoon
Condor Motel, Fredericton	Acadia Extended Aeration
Corey's MHP, Pinder Road	Acadia Extended Aeration
Corey's Mobile Home Park, Pokiok	Acadia Extended Aeration
Daniels Subdivision, New Maryland	Lagoon
Donald Reckle, Geary	Acadia Extended Aeration
Glasier Road MHP, Fredericton	Lagoon
Grassland MHP, Lake George	Lagoon
Green Acres Campground, Jemseg	Lagoon
Green Wood Subdivision, Saint John	Trickling Filter
Gulf Oil Service Station, Fredericton	Lagoon
Hanson Apartments, Fredericton	Trickling Filter
Highland Acres, Fredericton	Lagoon
Hillcrest MHP, Quispamsis	Lagoon
Irving Service Station, Woodstock Rd., Fredericton	MFM Extended Aeration
Jonah MHP, Sussex Corner	Lagoon
Kelly's Mobile Home Court, Fredericton	Lagoon *
Keirstead Mobile Home Court, Burton	Lagoon
Kileen's Overnight TP, Lincoln	Trickling Filter
Kingshomes MHP, Lincoln	Lagoon
Knight's General Store, Gagetown	Acadia Extended Aeration
L & A Machine Works, Lincoln	Acadia Extended Aeration
Levine MHP, Fredericton	Trickling Filter *
MacDonald Apartments, Quispamsis	Acadia Extended Aeration
Maclean Subdivision, Westfield	Trickling Filter
Maritime Trailer Sales, Lincoln	Lagoon
McCoy MHP, Lincoln	Lagoon
McFarlane MHP, Nackawic	Acadia Extended Aeration
McNamara MHP, Quispamsis	Lagoon
Morna Heights Subdivision, Saint John	Trickling Filter
N.S. Bank, Bath	Acadia Extended Aeration

TABLE 1.12 (continued)

Nethervue MHP, Fredericton	Trickling Filter
Newcastle Creek, N.B. Power	Extended Aeration
New Maryland MHP	Lagoon
Northrup MHP, Lincoln	Contact Stabilization
Panorama MHP, Woodstock	Trickling Filter
Pleasant View High Subdivision, F'ton	Trickling Filter
Rainsford Park, Fredericton	Septic Tanks *
Rioux Building, Fredericton	Lagoon
Roblin Village, Lincoln	Lagoon
Sherwood Park, Gondola Point	Extended Aeration
Silver Falls Subdivision, Saint John	Lagoon
Sunrise Subdivision, New Maryland	Lagoon (2)
Texaco Service Station, Woodstock	Extended Aeration
Texaco Service Station, Sussex	Extended Aeration
Thomas Equipment Ltd., Centreville	Trickling Filter
Thorne MHP, Hampton	Lagoon
True's Esso, Fredericton	Extended Aeration
Wandlyn Motel, Edmundston	Lagoon
Wandlyn Motel, Woodstock	Lagoon
Williston MHP, Quispamsis	Lagoon *
Willow Park MHP, Fredericton	Trickling Filter
Woodlawn Park Subdivision, Saint John East	Lagoon
Westfield Golf & Country Club	Extended Aeration

*Updated to February 1976 by Pollution Control Branch

Caledonia Development	Connected to Municipal System
Kelly's Mobile Home Court	Trickling Filter Added
Levine's MHP, Fredericton	Aeration Lagoon Added
Rainsford Lane Park	No Sewer System
Williston MHP	Extended Aeration

TABLE 1.13

Incidence of Sewer and Treatment Systems
Saint John River Basin Municipalities - May 1973

Planning Region		Population 1971	Served by Sewers	Treated	Date of completion of treatment facility	Type of treatment system
1	Edmundston	12,365	12,365	-	Design Stage	
3	Fredericton	44,311	37,107	37,107	Mar 71	HRCM
5	Saint John	89,039	70,000	20,000	Oct 69	HRCM, PA lagoon
1	Grand Falls	4,516	4,516	4,516	-	OD*
1	St. Leonard	1,478	1,478	1,478	-	lagoon
2	Woodstock	4,846	4,846	4,846	Dec 64	OD
2	Hartland	1,009	1,009	-	-	
3	Oromocto	11,518	11,518	11,518	-	AS
4	Sussex	3,942	3,942	3,942	Mar 71	OD, lagoon
4	Rothsay	1,038	1,038	1,038	Sept 65	C
1	St. Basile	3,085	2,000	2,000	Dec 64	lagoon
1	Riviere Verte	1,660	1,660	-	-	
1	Ste. Anne de Madawaska	1,253	1,253	1,200	Mar 68	lagoon
1	St. Jacques	1,072	1,072	1,072	Mar 65	lagoon
1	Clair	704	704	704	Jan 66	lagoon
1	Drummond	637	637	637	Nov 70	lagoon
1	Baker Brook	561	-	-	-	
1	St. François de Madawaska	511	511	511	Jan 66	lagoon
1	Lac Baker	360	-	-	-	
1	St. Andre	315	-	-	-	
1	St. Hilaire	199	-	-	-	
2	Perth-Andover	2,108	1,500	-	-	
2	Plaster Rock	1,331	1,331	1,331	-	lagoon
2	Nackawic	1,324	1,324	1,324	-	EA
2	Bath	920	-	-	-	
2	Bristol	771	-	-	-	
2	Florenceville	584	-	-	-	
2	Centreville	566	-	-	-	
2	Aroostook	550	-	-	-	
2	Canterbury	528	-	-	-	
2	Millville	352	-	-	-	
2	Meductic	172	-	-	-	
3	Fredericton Junction	615	-	-	-	
3	Tracy	610	-	-	-	

TABLE 1.13 (continued)

3	Stanley	388	-	-	-	
3	Harvey	383	-	-	-	
4	Minto	3,880	3,000	3,000	-	CS
4	Quispamsis	2,215	-	-	-	*
4	Fairvale	2,050	2,050	2,050	-	lagoon
4	Chipman	1,977	-	-	-	*
4	Hampton	1,748	1,748	1,748	Mar 71	lagoon
4	Renforth	1,606	1,606	1,606	Jan 63	lagoon
4	Norton	1,149	-	-	-	
4	East Riverside/ Kingshurst	852	852	852	Apr 66	OD
4	Gondola Point	850	-	-	-	
4	Sussex Corner	700	700	700	-	lagoon
4	Gagetown	609	-	-	-	
4	St. Martins	484	-	-	-	
4	Cambridge Narrows	416	-	-	-	
5	Westfield	461	-	-	-	
5	Grand Bay	420				*

HRCM = High Rate Complex Mix

PA = Primary Action

OD = Oxidation Ditch

AS = Activated Sludge

C = Clarigester

CS = Contact Stabilization

EA = Extended Aeration

Source: Pollution Control Branch, New Brunswick Department of Fisheries and Environment

and

Municipal Journal, Department of Municipal Affairs,
July - September, 1973

*Updated, February 1976, by Pollution Control Branch

Grand Falls

Activated Sludge (2)

Quispamsis

Aeration Lagoon

Chipman

Oxidation Ditch

Grand Bay

Bio-disc under Construction

In Table 1.14 the data shown in Table 1.13 are summarized and an estimate of the numbers of people currently requiring sewers and sewage treatment is presented. It is only an estimate because it is based upon municipal statistics rather than actual survey. Thus, although it can be argued that many of the smaller villages are adequately served by septic tanks, it is quite certain that there are numbers of people living in fairly dense settlements outside municipal boundaries, and who, although not included in the municipal statistics, do need sewers and sewage treatment. In addition, the statistics are a mixed bag, showing the municipal population for 1971, yet including new servicing that was not completed until 1973. All in all, the need is pictured on the modest side, and, as the public health hazards of septic tanks become better defined, the tendency will be to include a lot more people among those needing public servicing. On a Basin-wide basis, therefore, it is reasonable to accept the figures shown in Table 1.14. Approximately 45,000 people need sewers and, of course, sewage treatment, and an additional 66,500 people need treatment services only.

Among the regions and segments of the Basin municipal population, the figures show up some interesting variations. Not all of these are significant, but certain characteristics stand out. The towns, for example, are all fully serviced except for Hartland, although Rothesay has only primary treatment. In fairness to Hartland, it should be pointed out that several unserved villages are more than twice its size and growing rapidly, whereas Hartland is static. The worst problems in the Basin are clearly in the Cities of Saint John and Edmundston. Even Fredericton has over 7000 people needing services since amalgamation. And, although the greater number of villages present no great immediate problem, those that are satellites of Saint John - along the Kennebecasis and Grand Bay and Westfield - present a situation which is entirely unacceptable and potentially dangerous, with almost 10,000 people living in a relatively confined strip without services or treatment.

TABLE 1.14

Requirements for Municipal Sewerage and Sewage Treatment - by Regions

<u>Region</u>	<u>Municipal Population</u>	<u>With Sewers</u>	<u>With Treatment</u>	<u>Unsewered</u>	<u>Sewered, Untreated</u>
1					
City	12,365	12,365	-	-	12,365
Towns	5,994	5,994	5,994	-	-
Villages	10,357	7,837	6,124	2,520	1,713
	28,716	26,196	12,118	2,520	14,078
2					
City	-	-	-	-	-
Towns	5,855	5,855	4,846	-	1,009
Villages	9,206	4,155	2,655	5,051	1,500
	15,061	10,010	7,501	5,051	2,509
3					
City	44,311	37,107	37,107	7,204	-
Town	11,518	11,518	11,518	-	-
Villages	1,996	-	-	1,996	-
	57,825	48,625	48,625	9,200	-
4					
City	-	-	-	-	-
Towns	4,980	4,980	4,980	-	-
Villages	18,536	9,956	9,956	8,580	-
	23,516	14,936	14,936	8,580	-
5					
City	89,039	70,000	20,000	19,039	50,000
Towns	-	-	-	-	-
Villages	881	-	-	881	-
	89,920	70,000	20,000	19,920	50,000
Total Basin	215,038	169,767	103,180	45,271	66,587

CHAPTER 2 POPULATION TRENDS

The 1971 census recorded some 299,000 people living in the Basin, approximately 42% of whom resided in the three cities of Saint John, Fredericton and Edmundston. A further 28% lived in other municipalities, leaving 30% as residents of unincorporated areas. It is of vital importance to water management to have an appreciation of how this situation is likely to alter in the future.

Accordingly, some population projections have been attempted, based not only upon analysis of past trends, but also upon detailed examination of the age structure of the population and of survival rates from one age group to the next. Detailed results of this study are reported elsewhere,* but selected statistics have been used as input to this present study. In particular, some projections have been prepared relating to the Board's five planning regions and to a selection of the individual municipalities. These projections, it should be borne in mind, are not intended to be firm predictions of what will happen in the future. Rather, they should be regarded as guidelines to the likely direction and magnitude of population changes. Also, the more specific they are, the greater is the likely margin of error; which is to say that the Basin forecasts are likely to be less in error than those for the regions, which, in turn, should be more accurate than those for individual municipalities.

At the municipal level in particular, some discrepancies can already be observed between the 1973 population estimates included in the previous chapter (Tables 1.3 through 1.7) and the population projections to be discussed below, which relate to "full" census years (1971, 1981 and 1991) and to "intermediate" census years (1966, 1976 and 1986) only, and which do not make use of the updated 1973 data obtained directly from the municipalities themselves. Neither set of six estimates can be said to be "right" in any absolute sense. Even census data have a built-in error, and at the small community level, the opening of a new factory or closing of an old one can bring about significant changes in the population structure within a very short space of time. The projections are vital to the planning process nonetheless, since without them, the task of allocating scarce financial resources to maximum effect becomes very difficult indeed.

Region 1, Edmundston - Grand Falls

Table 2.1 sets out population projections to 1991 for nine of the region's 14 municipalities. The omissions are all communities which incorporated after 1966 - the last intermediate census year - allowing no statistical

*Population & Economic Trends in the Saint John River Basin, by Peter McLoughlin Associates Ltd., Report No. 1, Saint John River Basin Board. (Published only in Summary)

TABLE 2.1

Municipal Population Projections - Region 1

<u>Municipality</u>	<u>Year</u>					
	<u>1966</u>	<u>1971</u>	<u>1976</u>	<u>1981</u>	<u>1986</u>	<u>1991</u>
Edmundston	12,517	12,360	12,313	12,253	12,030	11,522
Grand Falls	4,158	4,510	5,090	5,802	6,496	7,017
St. Basile	3,296	3,080	2,863	2,667	2,479	2,255
Riviere Verte	1,760	1,660	1,599	1,540	1,462	1,400
St. Leonard	1,635	1,480	1,488	1,457	1,416	1,333
Ste. Anne	1,258	1,255	1,243	1,223	1,215	1,202
St. Jacques	944	1,080	1,296	1,588	1,858	2,135
Clair	799	700	610	528	458	392
St. François	570	505	447	395	360	316
Baker Brook*	-	-	-	-	-	-
Drummond*	-	-	-	-	-	-
Lac Baker*	-	-	-	-	-	-
St. Andre	-	-	-	-	-	-
St. Hilaire	-	-	-	-	-	-
Total	26,937	26,630	26,949	27,453	27,774	27,572

*No data available with which to make forward projections. Estimated 1973 population figures in Table 1.3.

basis on which to make rational projections. For the region as a whole, only a very modest increase is expected in the municipal population by 1991, attributable almost entirely to in-migration from surrounding rural areas.

Looking at the data in detail, Edmundston is projected to decline in population by some 7.5%, but this forecast is already placed in some doubt by the 1973 population estimate (see again Table 1.3) which indicates at least a short-term increase. It is likely, in fact, that the forecast decline will not take place, since the key 1966-1971 period, by which the projections are heavily influenced, saw the town's staple industry - pulp manufacture - in considerable difficulty - conditions which later changed into something approaching a boom. In fact, region-wide, the status of the municipal population in 1973 is estimated to be somewhat healthier than the projections would suggest, and it is possible that some of the very significant reductions in population forecast for smaller communities, such as Clair and St. François, may not take place.

One thing which is apparent, however, is the likelihood of significant change in the population age structure (Table 2.2). Relative to the rest of the Basin (refer to Tables 2.4, 2.6, 2.8 and 2.10), the population of the Region 1 municipalities at present is young, with 31.2% less than 15 and 74.1% less than 45 years of age. By 1991, these values are expected to decline to 28.9% and 70.1% respectively, while the 45 to 64 years age group is expected to increase by a substantial 21.3% relative to its 1971 level.

There are implications of this situation which are of relevance to the provision of water and waste disposal services. Although only a modest decline in the 15-44 years age group relative to the total population is forecast, a significant proportionate increase is expected in the 45 years-and-over group. It is the former group which may be expected to form the bulk of the active workforce, as well as to be more mobile than the latter group which will, in turn, include both the retired fraction of the population and the older part of the workforce. In other words, the proportion of the population on fixed or declining incomes is growing relative to the proportion having the greatest ability to support service charges or taxes.

Region 2, Middle Basin

Population projections to 1991 are set out for nine of the region's 13 municipalities in Table 2.3, the four omitted all having been incorporated since 1966. An appreciable increase is projected in the total population of the included municipalities over the period 1971 to 1991, almost 85% of the increase being accounted for by a very substantial expansion in the population of the Town of Woodstock. This town is already far and away the most important in the region and seems to be destined to consolidate its position. If the projections hold true, by 1991 it will be more than seven times as big as the next largest municipality in the region.

TABLE 2.2

Total Population and Age-Group Distribution,
1971 and 1991
Region 1 - Selected Municipalities

<u>Municipality</u>	<u>Year</u>	<u>Percentage in Each Age Group</u>				<u>Total Population</u>
		<u><15</u>	<u>15-44</u>	<u>45-64</u>	<u>> 64</u>	
Edmundston	71	28.3	45.0	19.1	7.6	12,360
	91	25.5	42.7	23.6	8.2	11,522
Grand Falls	71	31.4	41.4	18.7	8.5	4,510
	91	30.1	41.0	20.7	8.2	7,017
St. Basile	71	32.2	42.3	16.9	8.6	3,080
	91	28.2	39.0	21.8	11.0	2,255
Riviere Verte	71	39.0	41.2	13.5	6.3	1,660
	91	36.2	39.3	17.8	6.7	1,400
St. Leonard	71	32.0	38.6	17.2	12.2	1,480
	91	28.9	35.5	23.7	11.9	1,333
Ste. Anne	71	41.3	38.7	14.4	5.6	1,255
	91	39.3	40.5	14.4	5.8	1,202
St. Jacques	71	33.3	44.6	13.4	8.7	1,080
	91	33.2	42.3	19.2	5.3	2,135
Clair	71	33.6	40.6	17.9	7.9	700
	91	28.0	40.8	19.8	11.4	392
St. François	71	33.6	37.7	16.8	11.9	505
	91	28.3	34.7	23.8	13.2	316
All selected municipalities	71	31.2	42.9	17.8	8.1	26,630
	91	28.9	41.2	21.6	8.3	27,572
Percentage change relative to 1971		-7.4	-4.0	+21.3	+2.5	+3.5

TABLE 2.3

Municipal Population Projections - Region 2

<u>Municipality</u>	<u>Year</u>					
	<u>1966</u>	<u>1971</u>	<u>1976</u>	<u>1981</u>	<u>1986</u>	<u>1991</u>
Woodstock	4,442	4,840	5,970	7,490	9,095	10,913
Plaster Rock	1,430	1,335	1,267	1,235	1,211	1,139
Hartland	1,034	995	985	1,024	1,030	990
Bristol	671	770	930	1,097	1,298	1,451
Florenceville	586	585	625	654	699	695
Canterbury	558	525	537	540	546	544
Centreville	518	560	623	768	940	1,069
Millville	329	345	346	367	376	369
Meductic	166	165	153	139	126	115
Aroostook*	-	-	-	-	-	-
Bath*	-	-	-	-	-	-
Nackawic*	-	-	-	-	-	-
Perth-Andover*	-	-	-	-	-	-
Total	9,734	10,120	11,436	13,314	15,321	17,285

*No data available with which to make forward projections. Estimated 1973 population figures in Table 1.4.

In 1971 the town had an employed workforce in excess of 1700 (see again Table 1.4) and had experienced a regular increase in every year since 1967. Partial data for 1972 and 1973 (see Appendices - Community Profiles) show further significant additions to employment in some new areas of government services.

In common with the Basin as a whole a significant shift of population from rural to urban areas is foreseen, although it is expected to be much less marked in Region 2 than elsewhere. This is hardly surprising, since the general character of the region as a whole is rural. Perhaps more illuminating of the manner in which the population is expected to change is that, of the 7400 increase forecast for the region as a whole between 1971 and 1991 (Table 2.3), nearly 7200 (97%) is attributable to the nine municipalities listed in Table 2.4, and just over 6000 (82%) to Woodstock alone. In other words, what may be expected is not so much a flight from the countryside to the towns as an expansion of one large (Woodstock) and two small (Bristol and Centreville) urban communities, with population in the rest of the region, both urban and non-urban, remaining fairly static.

The urban population of the region is at present (1971 data) quite young, with some 26% under 15 years of age and with only about 35% aged 45 or older. By 1991 these relative proportions are expected to change somewhat to 24% and 38% respectively, indicating a general aging of the population. A surprising 29% increase is forecast in the relative importance of the 45 to 64 years age group over the period, offset to some extent by an expected 17% decline in the proportion of the population aged 65 and over. This phenomenon is common to all the municipalities examined with the single exception of Meductic which has, in any case, a total population of under two hundred, and which is presently characterized by an exceptionally young element.

As with Region 1, the implications of the present and likely future population age structure are important to water management. Throughout the region the proportion of the population in age groups likely to be most affected by fixed or declining income is expected to increase substantially by 1991. At the same time, and compounding the difficulty, actual population totals are forecast to remain virtually static, or even to decline, in all but three communities.

Region 3, Fredericton

Table 2.5 sets out the population projections to 1991 for three of the five separate municipalities in Region 3, as well as for four of the five communities amalgamated in 1973 to form the enlarged City of Fredericton. The latter city, of course, dominates the region, accounting for 75% of the total municipal population in 1971 and forecast to account for some 86% by 1991. Fredericton, in fact, included over half (52%) of the entire regional population in 1971 and, if the forecasts hold true, may have increased this share to more than 70% by 1991.

TABLE 2.4

Total Population and Age-Group Distribution,
1971 and 1991
Region 2 - Selected* Municipalities

<u>Municipality</u>	<u>Year</u>	<u>Percentage in Each Age Group</u>				<u>Total Population</u>
		<u><15</u>	<u>15-44</u>	<u>45-64</u>	<u>>64</u>	
Woodstock	71	24.6	40.0	19.6	15.8	4,840
	91	23.4	37.6	26.8	12.2	10,913
Plaster Rock	71	27.7	40.0	22.9	9.4	1,335
	91	26.3	36.0	28.6	9.1	1,139
Hartland	71	24.6	37.2	23.7	14.5	995
	91	27.4	34.4	27.8	10.4	990
Bristol	71	27.9	38.3	22.1	11.7	770
	91	22.9	34.5	29.3	13.3	1,451
Florenceville	71	30.8	42.7	17.1	9.4	585
	91	27.3	43.1	22.3	7.3	695
Canterbury	71	27.6	35.3	21.9	15.2	525
	91	24.0	37.6	27.8	10.6	544
Centreville	71	27.7	36.6	20.5	15.2	560
	91	27.7	37.5	27.0	7.8	1,069
Millville	71	27.5	37.7	20.3	14.5	345
	91	26.5	34.0	24.6	14.9	369
Meductic	71	36.3	30.3	24.3	9.1	165
	91	36.3	37.4	14.3	12.0	115
All selected municipalities	71	26.2	39.1	20.8	13.9	10,120
	91	24.4	37.2	26.9	11.5	17,285
Percentage change relative to 1971		-6.9	-4.9	+29.3	-17.3	+70.8

*See Table 2.3

TABLE 2.5

Municipal Population Projections - Region 3

<u>Municipality</u>	<u>Year</u>					
	<u>1966</u>	<u>1971</u>	<u>1976</u>	<u>1981</u>	<u>1986</u>	<u>1991</u>
Fredericton*	22,460	24,255	27,007	30,303	33,710	36,365
Nashwaaksis*	5,473	7,355	10,113	13,856	19,092	25,371
Marysville*	3,472	3,880	4,606	5,424	6,193	6,903
Barkers Point*	1,777	1,890	2,072	2,180	2,243	2,258
Greater Fredericton	33,282	37,380	43,798	51,763	61,238	70,897
Oromocto	14,112	11,430	10,590	10,118	10,191	9,745
Fredericton Junction	549	615	715	842	998	1,192
Harvey	384	380	463	475	425	385
Silverwood*	-	-	-	-	-	-
Stanley**	-	-	-	-	-	-
Tracy**	-	-	-	-	-	-
Total	48,327	49,805	55,566	63,198	72,852	82,219

*In 1973 the villages of Nashwaaksis, Marysville, Barkers Point and Silverwood were amalgamated with the City of Fredericton.

**No data available upon which to make forward projections. Estimated 1973 population figures in Table 1.5.

The city in its new form sits astride the Saint John River with about two-thirds of its 1971 population located on the south (right) bank in the "old" city, and the remainder in the former villages of Nashwaaksis, Marysville and Barkers Point on the north (left) bank. Most of the projected growth seems likely to take place on the north bank, where over 60% of the forecast population increase of 33,500 or so (1971 to 1991) may be expected.

Besides Fredericton, the only other population centre of note is the town of Oromocto. This owes its existence, in its present size and form, to the establishment in the late fifties of the nearby Canadian Forces Base at Camp Gagetown, and, as a result, has a population structure quite atypical of the Basin norm (see Table 2.6 below). Its population contracted markedly (by nearly 20%) over the period 1966-1971, and is forecast to decline by a further 15% (relative to 1971) by the end of the forecast period. This is attributable to the rather artificial character of the community which contains no significantly growing element, but it must be recognized that, equally on account of its artificial nature, developments in connection with the nearby forces base could easily reverse (or accelerate) this trend.

Of the remaining communities detailed in the table, Fredericton Junction, although some 25 miles distant from the City, already holds sufficient attraction to act as a dormitory for a significant number of Fredericton and Oromocto workers, and is expected to expand this function quite significantly in the future. The village of Harvey, on the other hand, is remote from any major population centre and exists as an agriculture/forest-based community with little apparent prospect of significant future growth.

It is perhaps worth noting at this point that the City of Fredericton is surrounded by an outer ring of development of substantial magnitude, the population of which chooses to reside outside the municipality itself but looks firmly to the City for employment and services. In fact, this development is not at all ring-like, but instead follows very closely the relatively limited number of communication arteries which radiate from the City. Most of the communities concerned remain unincorporated, although they may be designated as Local Service Districts, but some are of quite considerable extent and probably harbour populations in excess of many of the smaller incorporated villages. Such communities present their own peculiar servicing difficulties, and may be expected to expand both in population and extent in the future. As building land is already becoming scarce in the southern part of Fredericton City, it is entirely likely that a substantial portion of the population increase forecast for the City will, in fact, be diverted to the surrounding unincorporated communities.

As regards age structure (Table 2.6) the two larger communities - Fredericton and Oromocto - are relatively young - the latter overwhelmingly so, with only a very modest representation of the 65 years-and-over group. The two villages of Fredericton Junction and Harvey house much older

TABLE 2.6

Total Population and Age-Group Distribution,
1971 and 1991
Region 3 - Selected* Municipalities

<u>Municipality</u>	<u>Year</u>	<u>Percentage in Each Age Group</u>				<u>Total Population</u>
		<u><15</u>	<u>15-44</u>	<u>45-64</u>	<u>>64</u>	
Fredericton	71	27.6	46.1	18.5	7.8	37,380
	91	26.9	46.7	19.5	6.9	70,897
Oromocto	71	41.5	51.2	6.4	0.9	11,430
	91	36.4	56.1	5.7	1.8	9,745
Fredericton Junction	71	26.9	39.0	19.5	14.6	615
	91	23.6	46.2	19.5	10.7	1,192
Harvey	71	22.4	39.4	19.7	18.5	380
	91	21.3	32.3	26.8	19.6	385
All selected municipalities	71	30.7	47.2	15.7	6.4	49,800
	91	27.9	47.7	17.9	6.5	82,215
Percentage change relative to 1971		-9.1	+1.1	+14.0	+1.6	+65.1

*See Table 2.5

populations, with very significant elements in the 65-and-over group, and Harvey in particular having the smallest representation of under fifteens in the Basin.

Looking to the future, although a general aging of the population is to be expected, this seems likely to be of more modest dimensions than are forecast for either Region 1 or Region 2, with a modest percentage increase in the relatively numerous 15 to 44 years group to set against a greater percentage increase in the numerically much smaller 45 to 64 years group.

Although possibly facing a declining population, Oromocto is forecast to improve the strength of its "young workforce" group and to maintain its exceedingly low incidence of residents over 44 years of age. Fredericton, too, is expected to maintain a favourable balance of workforce relative to the very young and the aged, while Fredericton Junction seems destined to improve substantially its young-to-old ratio, with a considerable increase in the 15 to 44 years age group reinforced by a modest decline in both the under-15 and over-64 representation. Harvey, on the other hand, is forecast to undergo a decline in the under-45 element and a balancing increase in the over-44 element of its virtually static population - to the probable disadvantage of its ability to finance services.

Region 4, Grand Lake to Kennebecasis

Dominantly agricultural and forestry oriented, this region, like Region 2, is characterized by a large number of small municipalities. As can be seen in Table 2.7 the growth rates of these communities vary enormously, from a slight decline in the case of Norton and Cambridge Narrows to quite incredibly high rates in Sussex Corner, Gondola Point and Quispamsis. These extremes are good examples of why a warning was given earlier about the reliability of projections for small units.

The range of growth rates, however, illustrates the nature of the region, and this can be better understood by reference to the map, Figure 1.5. The municipalities fall into three groups, the futures of which are heavily influenced by their location and their economic base.

Sussex and Sussex Corner should be considered as a single unit. This is the focal point and service centre of the agricultural heartland of the Kennebecasis Valley. Located nearly mid-way between Saint John and Moncton, it is also a centre of light industry. Norton and perhaps Hampton are related, to some degree, to Sussex. These make up the first group, which, as a whole, is projected to enjoy steady but unspectacular population growth.

The second group consists of widely scattered small municipalities with only moderate economic opportunities and generally non-strategic locations. This includes Minto and Chipman, Gagetown, Cambridge Narrows and St. Martins. It will be noted that Gagetown and Cambridge Narrows, the only two for which projections have been carried out, are characterized by a slowly declining population.

TABLE 2.7

Municipal Population Projections - Region 4

<u>Municipality</u>	<u>Year</u>					
	<u>1966</u>	<u>1971</u>	<u>1976</u>	<u>1981</u>	<u>1986</u>	<u>1991</u>
Sussex	3,607	3,940	4,176	4,499	4,812	4,946
Fairvale	1,615	2,050	2,744	3,727	4,875	6,229
Hampton	1,605	1,740	2,068	2,596	3,162	3,610
Quispamsis ⁺	1,556	2,205	3,349	5,221	7,748	10,947
Renforth	1,373	1,625	1,980	2,571	3,458	4,404
Norton	1,206	1,160	1,181	1,195	1,147	1,051
Rothesay	893	1,025	1,082	1,148	1,219	1,277
E.Riverside/Kingshurst	750	835	967	1,171	1,456	1,795
Gagetown	631	605	709	708	620	590
Gondola Point ⁺	479	865	1,730	3,458	6,561	11,887
Sussex Corner	461	710	1,108	1,818	2,999	4,839
Cambridge Narrows	418	410	372	352	332	302
Chipman*	-	-	-	-	-	-
Minto	-	-	-	-	-	-
St. Martins*	-	-	-	-	-	-
Total	14,594	17,170	21,466	28,464	38,389	51,877

*No data available upon which to make forward projections. Estimated 1973 population figures in Table 1.6.

⁺The more distant projections should be viewed with extreme caution since they pre-suppose the continuation of quite extreme recent trends over a very long period.

The third group is unique in the Basin, because it consists of a linear strip of bedroom communities which are satellites of Saint John. Included in this exceptionally rapidly growing zone are, from the City boundary outwards, Renforth, East Riverside/Kingshurst, Rothesay, Fairvale, Quispamsis and Gondola Point, as can be seen on the map, Figure 1.5. The extreme growth rates, which, it will be noted, are at the remote end of the strip, probably reflect the availability of less expensive land, and may be expected to slow down, well within the forecast period, as population density approaches urban levels.

Unfortunately, this phenomenon may not be an unmixed blessing, because the tendency in the Basin is for the prevailing high prices of serviced land to drive people out of the municipalities and into the unincorporated areas. Thus the growth pressures that are now rapidly filling up Quispamsis and Gondola Point could themselves be diverted into the surrounding areas, or farther along Route 1, as the costs of land and services, together with property taxes, rise in these municipalities.

Table 2.8, which shows the present and projected age structure of the sample municipalities, also reflects the difference between the two groups of communities whose base is essentially rural, on the one hand, and the Saint John suburbs on the other. The former have a significantly higher proportion of older people and a lower proportion of young people than the latter.

Region 5, The Greater Saint John Region

Table 2.9 displays the population projections derived for the three municipalities contained in this, essentially big-city, region. Saint John itself demonstrates a healthy growth rate with a 57 per cent increase in population in 20 years, resulting from an annual growth rate of just over two per cent. The villages of Westfield and Grand Bay (see Figure 1.6) like their suburban counterparts in Region 4, are expected to grow explosively, their population increasing to more than 12 times its present size by 1991, that is at an average annual rate of about 14%.

As might be expected, the regional municipal population already shows the age structure indicative of a growing industrial area, (Table 2.10) with a relatively large workforce, a large group in the formative years and comparatively few of retirement age. This trend is expected to continue. Such a population should be well able to afford needed water and sewerage services.

TABLE 2.8

Total Population and Age-Group Distribution,
1971 and 1991,
Region 4 - Selected* Municipalities

<u>Municipality</u>	<u>Year</u>	<u>Percentage in Each Age Group</u>				<u>Total Population</u>
		<u><15</u>	<u>15-44</u>	<u>45-64</u>	<u>> 64</u>	
Sussex	71	24.9	38.4	21.5	15.2	3,940
	91	26.0	38.5	24.6	10.9	4,946
Fairvale	71	32.0	45.3	16.6	6.1	2,050
	91	31.7	43.7	20.4	4.2	6,229
Hampton	71	29.3	39.1	18.9	12.7	1,740
	91	28.5	36.2	28.6	6.7	3,610
Quispamsis	71	37.4	43.1	14.7	4.8	2,205
	91	36.2	40.4	19.8	3.6	10,947
Renforth	71	32.9	41.9	19.4	5.8	1,625
	91	26.7	47.2	19.8	6.3	4,404
Norton	71	26.3	36.6	21.6	15.5	1,160
	91	19.5	29.3	29.4	21.8	1,051
Rothesay	71	25.4	37.5	22.4	14.7	1,025
	91	27.0	38.9	22.1	12.0	1,277
E. Riverside/Kingshurst	71	27.0	41.2	24.0	7.8	835
	91	28.5	44.5	23.1	3.9	1,795
Gagetown	71	27.2	34.8	23.1	14.9	605
	91	22.9	30.2	19.2	27.7	590
Gondola Point	71	33.5	43.4	16.8	6.3	865
	91	29.7	39.9	23.0	7.4	11,887
Sussex Corner	71	31.1	36.5	16.9	15.5	710
	91	32.4	40.5	19.9	7.2	4,839
Cambridge Narrows	71	26.8	31.7	24.3	17.1	410
	91	24.5	33.0	22.7	19.9	302
All selected municipalities	71	29.4	40.4	19.3	10.9	17,170
	91	30.4	40.5	22.1	7.0	51,877
Percentage change relative to 1971		+2.7	+0.2	+13.9	-35.8	+202

*See Table 2.7

TABLE 2.9

Municipal Population Projections - Region 5

<u>Municipality</u>	<u>Year</u>					
	<u>1966</u>	<u>1971</u>	<u>1976</u>	<u>1981</u>	<u>1986</u>	<u>1991</u>
Saint John	70,764	89,050	98,035	111,569	126,284	139,838
Westfield	331	465	662	1,037	1,602	2,337
Grand Bay	233	420	806	1,610	2,834	4,923
Total	71,328	89,935	99,503	114,216	130,720	147,098

TABLE 2.10

Total Population and Age-Group Distribution
1971 and 1991
Region 5

<u>Municipality</u>	<u>Year</u>	<u>Percentage in Each Age Group</u>				<u>Total Population</u>
		<u><15</u>	<u>15-44</u>	<u>45-64</u>	<u>>64</u>	
Saint John	71	29.2	41.1	20.1	9.6	89,050
	91	28.7	43.6	20.7	7.0	139,838
Westfield	71	28.0	37.6	21.5	12.9	465
	91	29.2	41.1	20.6	9.1	4,923
Grand Bay	71	35.7	44.1	16.6	3.6	420
	91	37.2	38.9	17.0	6.9	2,337
All municipalities	71	29.1	41.2	20.1	9.6	89,935
	91	28.9	43.4	20.6	7.1	147,098
Percentage change relative to 1971		-0.7	+5.3	+2.5	-26.0	+63.6

CHAPTER 3 ECONOMIC TRENDS

Municipalities in the Basin provide services to small industries as well as to their resident populations. In general, large industries, or industries that are major water users, are required, by convenience or regulation, to provide their own water supplies and waste disposal services. The municipalities, however, need to make provision for servicing those smaller industries whose requirements are not sufficiently large to render independent systems economical. As these industries create a significant servicing requirement in some municipalities, a brief study was directed towards ascertaining whether any significant trends are apparent in the type and location of small industrial developments in the Basin. The situation was examined from three angles: the developing job market, employment trends in the individual municipalities and employment trends on an industry basis.

The first approach was conducted by analysis of census data. The results are consistent with those of the Basin-wide population forecasts together with which they are reported in detail.* In brief, an increase is foreseen in the employed labour force of the Basin from about 97,000 in 1971, to approximately 116,000 in 1991. Of these 19,000 or so new workers, about 20 per cent, or 4,000 more or less, are expected to be engaged in manufacturing. This is the segment which is of most concern to the municipalities, and the chief questions it poses are - where will the people work? and what will they do?

To shed some light on these questions a detailed computer analysis of New Brunswick Workmen's Compensation Board (W.C.B.) data was undertaken and combined with surveys carried out by Peter McLoughlin Associates Limited. The W.C.B. data are of particular value in this analysis because they exclude the service sector, whose needs are covered adequately in the general per capita servicing provisions, while providing details of employment in activities of concern - manufacturing and processing, construction and the primary extraction industries. The aggregate employment from 1967 to 1971, as reported by the W.C.B., is shown, by region and selected municipalities, in Table 3.1.

Two very interesting and possibly significant observations may be made from the Table. Firstly, each region with the possible exception of Region 2, has a dominant employment centre. In Region 1 it is Edmundston; in Region 2, Woodstock, by a narrow margin; in Region 3, Fredericton; in Region 4, Sussex, and in Region 5, of course, Saint John. Secondly, certain municipalities show marked growth in employment over the years whereas others demonstrate no trends. (The marked decline in employment in Edmundston in 1970 and '71 does not represent a trend but the disastrous market cycle experienced by the pulp and paper industry in those years.) Growth appears to be of two types, either steady or sudden, the latter being due usually to the location of a single

*Population and Economic Trends in the Saint John River Basin, op cit.

TABLE 3.1

Aggregate Employment by Regions and Selected Municipalities

<u>Region 1</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
<u>Madawaska County</u>					
Saint-François	134	173	194	187	210
Clair	163	187	119	96	95
Edmundston	7026	7295	7404	6680	5426
Saint-Leonard	152	144	120	138	155
Rest of Madawaska County	548	599	546	564	665
<u>Victoria County</u> (Drummond Parish)					
Grand Falls	1087	1149	1088	1081	1238
Rest of Drummond Parish	3	5	0	0	0
Total Region 1	9113	9552	9471	8746	7789
 <u>Region 2</u>					
<u>Victoria County</u> (excluding Drummond Parish)					
Plaster Rock	315	372	400	424	459
Perth-Andover	926	858	805	841	1105
Rest of Victoria County	208	189	163	170	178
<u>Carleton County</u>					
Florenceville	871	1135	1174	1283	1436
Hartland	717	869	762	827	858
Woodstock	1372	1546	1616	1660	1719
Rest of Carleton County	816	874	869	891	891
<u>York County</u>					
Nackawic	34	141	260	920	949
Rest of York County	426	392	450	357	341
Total Region 2	5685	6376	6499	7373	7936

TABLE 3.1 (continued)

Region 3

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
<u>York County</u>					
Fredericton	13,907	14,351	14,689	15,527	16,956
Rest of York County	529	549	510	637	557
<u>Sunbury County</u>					
Fredericton Junction	24	20	12	10	8
Oromocto	546	545	586	698	752
Rest of Sunbury County	286	271	246	253	209
Total Region 3	15,292	15,736	16,043	17,125	18,482

Region 4

<u>Queens County</u>					
Minto	259	240	235	371	403
Chipman	418	448	319	322	282
Rest of Queens County	299	288	627	588	483
<u>Kings County</u>					
Norton	57	74	92	115	83
Rothsday	145	165	169	165	178
Sussex	1,514	1,555	1,496	1,606	1,749
Rest of Kings County	709	730	712	794	747
Total Region 4	3,401	3,500	3,650	3,961	3,925

Region 5

Kings County	63	73	83	90	79
Saint John	27,934	27,000	27,446	27,480	28,187
Total Region 5	27,997	27,073	27,529	27,570	28,266
Total Basin	61,488	62,237	63,192	64,775	66,398

Source: Peter McLoughlin Associates Ltd., based mainly on W.C.B. files plus Peter McLoughlin Associates Ltd. surveys.

major industry. Nackawic presents an example of this type. By eliminating the one-big-industry towns from the list of steady growers a list is obtained that gives a reasonably good indication of where the small manufacturers that need municipal services are most likely to settle. These are the locations:

Edmundston
Grand Falls
Woodstock
Fredericton
Oromocto
Sussex
Saint John

Interestingly enough, each of these municipalities is either a city or a town, each offers a reasonable level of services - or is currently in the process of upgrading that level - and each has a locational advantage.

Having identified the municipalities most likely to be called upon to provide services for the growing manufacturing sector, a further analysis of the W.C.B. data was undertaken to obtain some insight into the type of industries to anticipate. In this case, the data were sorted by SIC* codes and the top ten classifications identified for each region. The results are presented in Table 3.2. Some of these enterprises, such as #243 - Men's clothing industries, #324 - Truck body and trailer manufacture, #327 - Shipbuilding and repair and #421 - Special trade contractors may create a demand for serviced industrial land. These will combine with certain general manufacturing industries, which do not appear among the top ten employers, by SIC code, to constitute the market for industrial parks. Unfortunately, for a reason that will soon be apparent, this potentially valuable line of analysis could provide no quantitative clues, at this time, about this requirement.

Here, however, is a problem that would justify a good deal of careful study because, whereas no municipality wants to lose a potential employer for lack of serviced industrial land, no municipality can afford to pay for servicing industrial land that is never used.

Certain other activities tend to create special loads on water-related services that would not normally be allowed for if the systems were designed using per capita formulae. Such classifications include #642 - General merchandise stores, #656 - Motor vehicle dealers, #806 - Universities and colleges, #821 - Hospitals and #881 - Hotels and motels. These "industries" all cater to numbers of people from outside their community who, like tourists, inflate the population requiring services.

The studies of the W.C.B. data resulted in the recognition of a most interesting situation which, while not directly related to municipal water use, does make it difficult for the municipalities to predict industrial

*Standard Industrial Classification

TABLE 3.2

Top Ten Employment SIC Codes in each Region and Basin
With Per Cent of Total Employment Accounted For - 1971

<u>Rank</u>	<u>Region 1</u>	<u>Region 2</u>	<u>Region 3</u>	<u>Region 4</u>	<u>Region 5</u>	<u>Basin</u>
1	271	103	572	031	821	821
2	821	031	404	951	404	404
3	031	404	806	881	421	881
4	503	821	881	061	642	421
5	251	271	421	802	881	031
6	881	251	931	821	931	931
7	404	881	821	404	544	271
8	951	802	406	324	271	642
9	243	951	031	642	327	951
10	802	507	656	108	951	572
<u>%</u>	<u>64.87</u>	<u>63.28</u>	<u>54.94</u>	<u>52.95</u>	<u>45.53</u>	<u>43.12</u>

Source: Peter McLoughlin Associates Ltd., based on W.C.B. data.

Code Key

<u>Code</u>	<u>Activity</u>	<u>Code</u>	<u>Activity</u>
031	Logging	503	Railway transport
061	Coal mines	507	Other truck transport
103	Fruit and vegetable processing	544	Telephone systems
108	Miscellaneous food industries	572	Electric power
243	Men's clothing industries	642	General merchandise stores
251	Sawmills, planing mills and shingle mills	656	Motor vehicle dealers
271	Pulp and paper mills	802	Elementary and secondary schools
324	Truck body and trailer manufacture	806	Universities and colleges
327	Shipbuilding and repair	821	Hospitals
404	Building construction	881	Hotels and motels
406	Highway, bridge and street construction	931	Provincial administration
421	Special trade contractors	951	Local administration

requirements for services. It was observed from a detailed study of the W.C.B. data that there has been an extraordinarily high turnover of industries in the Basin. This conclusion was reached by giving every firm an SIC code, next recording its employment at the start of each year from 1967 to 1971, then adding up the net gains or losses of jobs for all firms in each SIC code. This procedure does not record normal employee turnover but only the increases and decreases in the number of jobs from year to year, in each type of industry. In manufacturing, over the period referred to, 6,196 new jobs were created in the Basin but 6,175 were lost. This demonstrates an extremely unstable situation in the manufacturing sector, and one which, clearly, must impose serious burdens on the municipalities, especially on the departments responsible for water and waste disposal services.

In summary, recent economic trends indicate that general manufacturing is growing and can be expected to generate a demand for services in industrial parks. Also growing are those miscellaneous industries which, while located in a centre, provide services to people from a wide area, and therefore generate a need for a somewhat larger level of services in town than the population would indicate. The actual quantities of land to be serviced for industry and the target population to be served in each centre should be the subject of careful, case by case, analysis.

CHAPTER 4 FINANCING WATER, SEWERAGE AND TREATMENT SYSTEMS

There is considerable public literature on the subject of municipal finance, including the report of the Royal Commission of 1965, (The Byrne Report), and the report in 1972 of the Task Force on Municipal Structure and Financing. Most of the recommendations of this latter have been accepted by Government and went into effect January 1, 1974. Villages now assume much of the same responsibilities as towns, responsibilities which were heretofore carried out by the Province. The formula for calculating municipal grants has also been changed. Details of these financing systems have been well distributed by the Department of Municipal Affairs and the Pollution Control Branch of the Department of the Environment, and have been documented as well in a series of manuals.*

Some of the recommendations of the Task Force on Municipal Structure and Financing - now accepted - relate to water planning and management. They include the following:

- the Province is responsible for everything to do with highways in urban areas
- the service responsibilities of incorporated villages have been enlarged to embrace the same functions as cities and towns
- regulations under the Community Planning Act are being revised so that the approval of small lot sizes in subdivisions is conditional upon the existence of water and sewerage services
- water and sewerage systems for public use require the approval of the Departments of the Environment, Health, Transportation and Municipal Affairs
- if a proposed water or sewerage system is in unincorporated territory, it may be included in an existing system after a feasibility study
- the Provincial Government provides a basic shelter exemption of \$6,000 of taxable assessment for each dwelling unit in a municipality provided that it is a principal place of residence
- the Province makes grants as percentages of municipal spending based on new formulae which tend to equalize

*See Municipal Organization in New Brunswick (1974), Fredericton: Department of Municipal Affairs, 1974.

the tax base among municipalities.*

In the original report of Peter McLoughlin Associates to the Board, data on municipal financial affairs for the period 1969-1971 were presented in considerable detail. The main data sources were the Municipal Journal and Municipal Statistics, both published by the Department of Municipal Affairs. In particular, tax rates and the tax base were reported in detail, together with revenue and expenditure by type and per capita, real assets, debt, and the general debt position. While these matters are summarized here, details are available in the main report. In any case, as far as water-related services at the municipal level are concerned, what really counts is the ability of each community to pay its own share of the costs - that portion which is not provided under grant.

The tax base, first of all, seems to be moving ahead roughly in accord with the economy as a whole, though perhaps a bit more slowly. Table 4.1 shows the changes that have taken place, for cities, towns and villages, in each region between 1967 and 1973. The figures reflect changes in the status of some municipalities and their boundaries as well as in re-assessment, rising real estate values and growth. Therefore, they must be interpreted with caution. Nevertheless, it is clear that for all municipalities in the Basin, the tax base has been rising at close to eight per cent per annum. A second important general point is that the base has been expanding three times as fast in the towns and villages as it has been in the cities. In these, the annual increases have been 4.5% - 5.5%, whereas, in the towns they have been 11.0% - 17.6%, and in the villages, 13.9% - 17.8%.

Tax rates are also significant to the capability of the municipalities to provide services. These changing rates are shown in Table 4.2 which makes it clear that the villages have been experiencing the most rapid rate of increase in their tax rates over recent years. This must be combined with the earlier observation that the tax base has been increasing more rapidly in the villages too. In spite of this, the rates of property tax are still lower in the Basin's villages than in the towns and cities. The explanation for this differential appears to be that the financial requirements of villages, and to some extent towns, have been rising at an increasing rate in recent years.

The real strain on municipalities is a result of the fact that the costs of providing municipal services have been rising more rapidly than the real property tax base. Table 4.3 reports the percentage distribution by type of expenditure and the annual average growth over the 1969-1972 period. Cities and towns reflect virtually the same pattern both in the distribution and the overall growth of expenditures. Villages spent far larger portions of the total on general government, protection and recreation and community services. As well, village spending has been growing twice as rapidly as city and town spending. Even when the formation of new villages is discounted the difference remains striking. Municipal

*The details of these formulae were not available at the time of writing.

TABLE 4.1

Total Tax Base of Basin Municipalities - By Region - 1967-1973

		Region 1	Region 2	Region 3	Region 4	Region 5	Basin
<u>Cities</u>	1967	\$ 52,023,779	\$ -	\$181,927,152	\$ -	\$408,535,767	\$ 642,486,698
	1972	74,053,560	-	242,772,790	-	532,385,425	849,211,775
	1973	79,745,830	-	257,706,290	-	549,718,135	887,170,255
Annual % change	67-73	7.4	-	6.0	-	5.0	5.5
% change	72-73	7.7	-	6.2	-	3.2	4.5
<u>Towns</u>	1967	18,712,980	21,403,020	9,487,208	22,254,137	-	71,866,345
	1972	25,686,290	31,695,530	82,390,220	31,106,330	-	170,978,370
	1973	36,194,230	33,187,370	85,566,490	34,938,570	-	189,886,660
Annual % change	67-73	11.6	7.6	-	7.8	-	17.6
% change	72-73	40.9	4.7	3.8	12.3	-	11.0
<u>Villages</u>	1967	13,613,523	20,743,947	26,021,071	33,229,574	2,770,088	96,377,202
	1972	22,926,910	51,757,720	43,456,147	56,223,597	3,958,040	178,322,414
	1973	24,328,760	54,543,480	54,459,790	64,981,453	11,795,841	210,109,324
Annual % change	67-73	10.2	14.8	13.1	11.8	-	13.9
% change	72-73	6.1	5.4	25.3	15.6	-	17.8
<u>TOTAL</u>	1967	84,350,282	42,146,967	217,435,420	55,483,711	411,305,855	810,730,245
	1972	122,666,760	83,453,250	368,619,150	87,329,927	536,343,465	1,198,512,559
	1973	140,268,820	87,730,850	397,732,570	99,920,023	561,513,976	1,287,166,239
Annual % change	67-73	8.8	13.0	10.6	10.3	5.3	8.0
% change	72-73	14.3	5.1	7.9	14.4	4.7	7.4

Source: Developed by Peter McLoughlin Associates Ltd. from Municipal Statistics

TABLE 4.2

Average Tax Rate and Rate of Increase - 1967-1973
Basin Municipalities

	<u>Rates*</u>		<u>% Increase 1967 - 1973</u>	<u>Average Annual Rate of Increase</u>
	<u>1967</u>	<u>1973</u>		
Cities	0.9075	1.0985	21.0	3.2%
Towns	0.7241	0.9111	25.8	3.9
Villages	0.1780	0.3735	109.8	13.1
Basin	0.3059	0.4912	60.6	8.2%

*Only the highest rate was used in the average where a municipality had a dual or multi-rate system.

TABLE 4.3

Percentage Distribution of Expenditures - Basin Municipalities - 1972
and Average Annual Growth 1967-72

	<u>Type of Municipality</u>			<u>Total</u>
	<u>Cities</u>	<u>Towns</u>	<u>Villages</u>	
General government	10.2	11.4	17.0	10.8
Protection	35.3	33.3	41.2	35.4
Public works	18.9	23.4	1.4	18.5
Sanitation and waste disposal	7.7	3.6	4.6	7.0
Grants	0.6	0.3	0.6	0.6
Recreation and com- munity services	9.0	8.9	16.5	9.4
Debt charges	11.7	16.2	11.1	12.3
Machinery and equip- ment trust fund	-	0.5	0.1	0.1
Transferred to capital account	2.7	1.1	3.4	2.5
Joint expenditures	-	0.3	2.0	0.2
Miscellaneous	3.9	1.0	1.9	3.4
Total	\$19,765,294	\$3,204,303	\$1,374,342	\$24,338,686
Annual Average Growth - 1969-72	11.0	11.0	22.6	11.6

Source: Developed by Peter McLoughlin Associates Ltd. from Municipal Statistics

spending has been expanding faster than the total economy over this period. This will probably continue to be the case for some time in the future.

Municipal debt is under the supervision of the Province and is governed by The Municipalities Act, Section 90 and The Municipal Capital Borrowing Act. The Municipal Capital Borrowing Board must approve each issue of municipal bonds. Municipal bonds are marketed by the Provincial Coordinator, who is Secretary to the Board. The Province does not guarantee municipal bonds. There is, however, a "de facto" guarantee in that the Province pays to the municipalities all property taxes levied, and the grants as well, regardless of tax collections. The Province in effect guarantees municipal income and is therefore guaranteeing that municipalities will be able to meet their debt obligations.

Municipalities are limited in their indebtedness to eight per cent of their real property tax base. New borrowing may not exceed two per cent of the tax base in a single year except by plebiscite and, of course, Provincial approval. In addition, municipalities may borrow up to four per cent of their budget for current spending purposes. These limits apply to general funds only. Utilities (water, sewerage, and electric) are treated separately because of their user-charge feature. There is, in fact, no limit to borrowing for utilities, although Provincial approval is still necessary.

The debt position of all Basin municipalities indicates their potential capacity to finance new works. These are summarized in Table 4.4. Overall, general fund debt was only 25% of the maximum allowable in 1972. It had decreased from 30% in 1969, indicating that the tax base had expanded faster than debt over that time period. Even if debt for utilities were treated under the same rules as general fund debt, only one or two municipalities would exceed the limit.

Expressed on a per capita basis, expenditure patterns yield further insight into the relative progress of Basin municipalities in financing water-related services. Table 4.5 summarizes the per capita total budgeted expenditure and the amounts estimated to be allocated to sanitation and waste disposal. As this budget head includes solid waste disposal, it is clear that much more is needed for water supplies, sewerage and sewage treatment. The huge spread in per capita total expenditures of villages is most noteworthy. The towns can be seen to be much closer together and the low figure of \$91 for Fredericton is an anomaly due to amalgamation. Some of the villages, it appears, simply budget differently and do not bother with the "sanitation and waste disposal" heading. See Tables 1.3 to 1.7 for per capita budgets of all municipalities.

Capital Requirements for Water-Related Services

Although they do illustrate the current situation, records of past spending on water, sewerage and treatment systems are not helpful in estimating the financial requirements for upgrading the present level of services, where it is inadequate, and providing for future growth. This is due to the very wide variation that presently exists in both type and effectiveness of service provided and the differing cost functions that prevailed at the times when municipal services were constructed.

TABLE 4.4

Debt Position of Basin Municipalities - 1972

	Tax Base	Total Debt	Total debt*		Maximum allow- able debt	General Fund Debt as per cent of maximum
			Less Utilities			
			<u>Million Dollars</u>			
Cities	849	39	19.5	68	29	
Towns	171	4.2	3.7	13.7	27	
Villages	178	5.2	1.0	14.3	6.8	
All Municipalities	1,199	49	24	96	25	

*General Fund Debt

Source: Developed from Peter McLoughlin Associate's analysis of data from Municipal Statistics

TABLE 4.5

Per Capita Expenditure Patterns of Basin Municipalities
 - Estimated - 1973

	<u>Cities</u>	<u>Towns</u>	<u>Villages</u>
	\$	\$	\$
<u>Total Budget</u>			
Highest	179	125	100
Lowest	91	94	6
Median	135	112	20
 <u>Sanitation & Waste*</u>			
<u>Disposal Budget</u>			
Highest	14.45	10.00	5.00
Lowest	3.15	.43	-
Median	5.15	4.10	-

*Estimated by expressing the actual 1972 expenditure as a percentage of total and applying this figure to the 1973 budget.

Source: Developed from Peter McLoughlin Associate's analysis of data from Municipal Statistics

On the other hand, typical 1974 costs of modern systems of water supply, sewerage and sewage treatment works, do provide a reasonable global estimate of the total foreseeable financial requirements in 1974 dollars.

Water supply - as with other investments, the actual costs will differ from community to community depending upon the specific circumstances in each place. To create a new supply for a settlement of 1000 persons, and to add to an existing system to supply 1000 more people by developing groundwater (well) supplies, the well and well development costs will normally run, 1974 prices, about \$50,000. This assumes that there are no particular drilling or other problems. To obtain needed pressure in the system, a reservoir (of about 100,000 gallons capacity) will need to be built, or a hydro-pneumatic pressure system will be needed. In either case this will cost about \$100,000. Thus, a new system for 1000 people would cost about \$150,000 or \$150 per person. Surface water development - typically a dam, or a brook with some elevation and a long pipe to the community, will normally cost \$150-\$200 per person. Both of these estimates exclude the costs of any water treatments if needed (chlorine, etc.).

To provide a water distribution system in the municipality itself generally costs, including fire protection, some \$15 per linear foot; this can go to \$25 per foot if blasting is involved. In the typical subdivision or village, the costs work out to some \$450 per person, assuming a four-person family. It then costs an average \$200 from the street to the house, or \$50 per person. Thus, a total water supply system costs \$450-\$700 per person on the basis of 1000 persons. This could come down to \$300-\$500 per person where existing well or reservoir capacity is being expanded, and where the new units are multi-dwelling units.

The establishment of sewerage systems costs approximately the same as water systems. Costs in the Upper Basin are running \$12-\$14 per linear foot, and \$14-\$16 per foot in the Lower Basin, once again assuming no additional costs for blasting. Storm sewer costs can run up to \$50 per foot. On the average, it is costing some \$350-\$400 per person for sewers in the Basin. To this must be added some \$175-\$200 per household for the street-to-house connection, or up to \$50 per person. This gives a total of some \$400-\$500 per capita for the sewer system.

Waste collection and treatment investment costs have also been rising. Over the late 1960s and early 1970s, the per capita investment costs were averaging some \$120 per capita in the Province as a whole. By 1973, however, the average had risen to some \$150 per capita, and for 1974 and 1975, the Pollution Control Branch is estimating \$175 per person as the average investment cost. It costs somewhat less per capita, though not much, if the investment is for an expansion of an existing collection and treatment system, and somewhat more if it is for an original facility. These investment costs, on a per capita basis, and in terms of current (1974) prices are summarized in Table 4.6.

TABLE 4.6

Summary of Investment Costs
of Water-Related Services
- 1974 Prices

	<u>Per capita cost</u>
Water supply	\$ 150 - \$ 200
Water distribution system	300 - 500
Street collector sewers	400 - 450
Trunk sewer and treatment plant	150 - 200
Total	<u>\$1,000 - \$1,350</u>

These general investment costs can be applied to the present and forecast population needing services in order to provide an estimate of the capital that is likely to be required for water supplies, sewerage and sewage treatment over the plan period. Before doing this, a cautionary examination of the population forecasts is called for.

The rates of growth selected for the five planning regions resulted in an average growth rate of one per cent per year for the Basin population. This results in an increase of 60,000 persons by the target year, 1991. There is no indication in this forecast, however, how this new population will be divided between urban and rural inhabitants. Two major shifts in population have been taking place in recent years, and they both have a significant effect on the need for services. There is the general shift of rural population into urban centres, and, in addition, there is a perhaps more gradual shift from certain municipalities to others. To take these population movements into account, the projections of populations of selected municipalities, reported in Chapter 2, were prepared.

Reference to Tables 2.1, 2.3, 2.5, 2.7 and 2.9, shows that the total projected population increase in the selected municipalities between 1971 and 1991 is approximately 132,000. Further examination of the same tables shows that the total increase in population forecast for the municipalities that grow at all, is slightly over 137,000. The latter figure represents the total of: the municipalities' share of Basin population increase, the rural-urban shift, the shift from declining to growing municipalities, and the results of amalgamations. The actual number of people needing services probably lies somewhere between the two figures because some people will leave already serviced municipalities to go to newly developing areas whereas others can be expected to move out of unserved municipalities. In other words, some people will be serviced twice and others only once, at their new residence.

It is evident that the Basin-wide population forecast (one per cent) is not quite high enough to account for the projected growth in selected municipalities. The projected Basin population for 1991 is only 358,000, a figure which, combined with the municipal forecast, indicates that the ratio of urban to rural dwellers is expected to increase from 70:30 to 90:10 in the plan period. This seems a bit unlikely, although it is not impossible. The 1973 municipal population figures included in Tables 1.3 to 1.7 show, on the whole, even more rapid growth and larger shifts than forecast, therefore it seems advisable to conclude that the total population is probably growing a little faster than the one per cent rate that was assumed, and to accept the municipal population forecasts for calculating capital requirements for water-related services.

Table 4.7 summarizes the results of this broad estimate of capital requirements. At something between 180 million and 240 million dollars, at 1974 prices, they can be seen to be formidable. Of course the municipalities do not have to raise all this money themselves.

TABLE 4.7

Estimated Capital Requirements for Water-Related Services
Saint John River Basin - 1971 to 1991*

<u>To upgrade services to a reasonably high level in all municipalities:</u>		Million \$
Water supplies for 24,000 people @ \$450 - \$700:		<u>10.8 - 16.8</u>
Sewage treatment for 66,500 people @ \$150 - \$200:		10.0 - 13.3
Sewers and treatment for 45,000 people @ \$550 - \$650:		<u>24.7 - 29.2</u>
	Sub totals	<u>45.5 - 59.3</u>
<u>To provide new services in areas of growth:</u>		
Complete services for 135,000 people @ \$1,000 - \$1,350:		<u>135.0 - 182.2</u>
	Totals	<u>180.5 - 241.5</u>

*At 1974 prices

In the first place, the costs of street collector sewers and the water distribution system for new subdivisions is borne by the subdivider and, quite naturally, is passed on to the purchaser where it is reflected in the amount he pays for his lot. The resultant high price of serviced lots is one major factor that, as was previously observed, is literally driving people out of the modern municipalities into "bedroom" communities in surrounding unserviced areas, whether "organized" or not.

Thus the rapidly growing cities and towns have the immediate financing problem only of providing the water supply and the trunk sewer and treatment services, and for the waste handling aspects they are eligible for considerable financial assistance as will be seen. But how do the smaller, older municipalities without services fare? A brief review of the financial assistance now offered by the senior levels of government to all municipalities sheds some light on this problem.

Very considerable assistance is available for capital financing. Both the Federal and Provincial governments are involved. The formulae for capital assistance are complex and, being subject to periodic revision, will not be described in detail here. The three programs that are, or may be, applicable are operated by the Central Mortgage and Housing Corporation, the Department of Regional Economic Expansion and the New Brunswick Department of Municipal Affairs.

CMHC makes loans available for two-thirds of the eligible costs of sewer and sewage treatment systems. Eligibility depends in part on the size of the municipality, and may in future be extended to include water supply systems. Twenty-five per cent of the loan is forgiven when the project has been completed. The advantages of the CMHC program are, in general: a saving of the cost of bond raising, a small margin on interest rates and the forgiveness portion of the loan.

DREE, under a program designed to facilitate economic growth in Saint John, has committed - to mid-1975 - approximately \$9,100,000 in contributions and loans for water supply and distribution plus a further \$4,300,000 for sewerage and sewage treatment. Although the Special Areas Agreement, under which this aid was provided, has now been concluded, limited further funds are still available. In addition some DREE aid might be forthcoming for infrastructure necessary in connection with industrial developments which DREE might support in the Basin in future under the current General Development Agreement.

Under the Stimulation Grants program of the N.B. Department of Municipal Affairs, capital grants can be made to municipalities in order to bring the annual user charges for water and sewerage systems down to \$110 for one service (water supply or waste disposal) or \$190 for both.

In addition to the capital assistance programs outlined above the New Brunswick Department of the Environment offers very significant aid in covering annual costs. This Department pays the interest on the CMHC

loan and on the portion of the bond issue covering the "eligible" capital costs not covered by CMHC grant or loan.

The net results of these financial assistance programs to small municipalities in need of services are generalized in Table 4.8. The cases presented are purely hypothetical, and the actual figures would probably not be found to be applicable in any real village. The comparative effects of the aid programs as they presently exist are real enough, however, and so the table does illustrate the real problems. For the purposes of this example four villages of 750 people have been assumed. The costs of construction used were the averages of those given in Table 4.6.

Village A already has sewers and a municipal water supply, but is being pressed to desist from dumping raw sewage into the river by providing trunk collection and treatment. The capital cost is estimated at \$131,250, 100 per cent of which is eligible for the CMHC and N.B. Department of the Environment programs. Because CMHC pays according to a schedule and upon presentation of receipted invoices, interim financing is needed, the cost of which is also eligible and is therefore included, bringing the total eligible capital cost up to \$144,375. This amount is provided, as shown on the next three lines on the table, approximately \$96,000 from CMHC, only \$72,188 of which has to be repaid, and \$48,125 from an issue of municipal bonds. The annual cost of this borrowing - including capital recovery - is approximately \$16,598 of which a whopping \$13,053 is paid each year by Environment, leaving only \$3,545, or \$4.72 per capita to be paid by the citizens of the municipality directly.

Trunk sewers and treatment plants are bargains!

Village B has a water supply system but needs street collectors as well as a trunk sewer and treatment plant. In this case 100 per cent of the cost of the treatment plant, but only 50 per cent of the cost of the whole sewer system are eligible for CMHC financing. However, because the per capita cost exceeds \$250 there is a CMHC grant as well. The results are startling. Although the total cost is only three times that of Village A, the per capita cost to the inhabitants of Village B is ten times as much as Village A residents had to pay. At this point, the Department of Municipal Affairs comes to the rescue with a stimulation grant which brings the cost per connection down to \$110 annually.

In Village C, sewerage and treatment are already provided and only water supply is needed. In this case the entire system must be financed by bonds. The repayment on these bonds must be covered, in the first year, entirely by the municipality. In the second year the Provincial unconditional grant covers half what it does in the third and subsequent years. The net cost to the municipality, after the stimulation grant, is an annual cost of about \$9.75 per capita that must be covered from taxes plus a cost of \$80 per connection, which is paid directly by the users.

TABLE 4.8

Comparative Financing of Water-Related Services
in Four Hypothetical Villages of 750 Population

	Village A needs trunk sewer and treatment plant	Village B needs collectors trunk sewer and treatment plant	Village C needs water supply	Village D needs water supply collectors trunk sewer and treatment plant
Estimated capital cost	131,250	450,000	431,250	881,250
Capital provision with Interim Financing	144,375	477,500		908,750
CMHC - grant		7,084		7,084
- forgivable loan	24,062	52,188		52,188
- repayable loan	72,188	156,563		156,563
Bonds - open market	48,125	261,665	431,250	692,215
Annual cost of financing	16,598	57,878	59,987	117,865
N.B. Dept. of the Environment - annual aid	13,053	21,323		21,323
Annual financing cost to municipality	3,545	36,555	59,987	96,542
Provincial unconditional grant			31,673*	31,673
Covered by municipal taxes			7,319	7,319
Charged to users			20,995	20,995
Annual cost per capita	4.72	48.74	27.99	76.73
Annual cost per connection (3.6 persons)	17.00	175.50	100.78	276.28
After N.B. Department of Municipal Affairs Stimulation Grant		110.00	80.00	190.00
Estimated amount of Stimulation Grant		164,750	88,900	253,650

*In the third and subsequent years of operation (see text)

Note: assumed: 15 year term for bonds and loans - bond interest 11% - CMHC 10.75%

Village D needs all three services, and their costs are the same as those of Villages B and C combined.

The great difference in the impact of Provincial assistance to municipalities for trunk sewers and treatment facilities, on the one hand, and to street collector sewers and water supplies, on the other, is evident from the table. And, related to the difference in impact is the capability of the small municipality to finance and operate such costly services. Nevertheless, the Provincial involvement is exceedingly large. The capital equivalent of the Department of the Environment grants is \$95,000 to Village A and \$155,000 to Village B, and these values could be added to the stimulation grant to give an indication of the Province's contribution to capital costs. In addition, the unconditional grant represents, in large part, a Provincial contribution. It appears, in fact, as if the Province is bearing the major portion of the burden of providing water-related services in the smaller, and older, municipalities.

CHAPTER 5 MUNICIPAL PLANNING

Planning in New Brunswick

Community planning has been written into Provincial legislation as the responsibility of local government. The relevant privilege of each municipality is to prepare a planning document which provides direction for future development within its boundaries, and to promulgate regulations in order to assure the desired result. Thus, there is provision for planning the location, level and types of public investment to be made in roads, water supplies, sewers and sewerage treatment as well as other services. Plans are intended to improve the welfare of the community and to reflect the concerns of ordinary citizens as well as of elected councillors.

The Provincial planning framework has been broadened by the addition of regional planning* under the new Community Planning Act. The responsibility for approaching regional problems rests with the Department of Municipal Affairs, while control of development remains with each municipal unit. The procedures to ensure that Provincial policies are enforced has not yet come into effect, although all municipal plans are required to conform to the broader regional plans.

The recognized reason for planning legislation, such as the Community Planning Act, is to establish a legal basis upon which communities can plan and regulate their development and land use within their borders. In addition, the legislation provides a guideline for municipal planning and a framework for the integration of local, community, regional and Provincial planning efforts.

The proclamation of the new Community Planning Act in January 1973 signalled the Government's recognition of the need for Provincial leadership in planning in New Brunswick. The relationship between the Province and the municipalities in this regard is reflected in the permissiveness of the legislation - the number of "mays" versus the number of "shalls". The Community Planning Act, while enabling a broad range of planning activity, is not authoritative in the way it is being implemented throughout the Province, probably because planning is still felt to be a local matter. Legal and regulatory mechanisms are established under the Act for implementing plans covering a wide range of land uses, but a strong mechanism is still required for coordinating the approaches of the various Provincial departments and municipalities involved, especially in the broader regional planning process.

*According to the Department of Municipal Affairs (Municipal Organization in New Brunswick (1974) p. 59), "A regional plan is basically a statement of Provincial policies translated into land use terms after consultation with municipalities. Its purpose is to provide for the general development of the region, and to provide a framework within which municipalities may plan their own future development."

The result so far is that community planning efforts are mainly concerned with land use conflicts and controls, with major emphasis on zoning, subdivision practices, building standards, provision of infrastructure, public land acquisition, and industrial park development and promotion. Partly in consequence, the Department of Municipal Affairs has concerned itself with the planning of settlements and not with primarily rural - agricultural or recreational - areas.

Water use and water resource development are subjects that communities have tended to react to, rather than plan for, probably because water has not been regarded as a scarce commodity in New Brunswick. Community plans generally consider only the area within municipal boundaries although the solutions to water needs and pollution problems may lie beyond them. Under the legislation, District Planning Commissions and regional plans are to be established to solve planning problems, such as these, that do not conform to man-made boundaries. Until these mechanisms are in place each community plan will tend to relate to internal problems and cannot be expected to encompass the wider aspects of water resource management.

Nevertheless, the Community Planning Act is very good enabling legislation which does empower municipal governments to plan* and also to control their physical development, while the Province remains responsible for planning in unincorporated areas and for regional and Provincial planning.

The Community Planning Act and Water Management

Many municipalities do plan for water supply and treatment but only with regard to their own jurisdictions and the obligations placed upon them by the Province. The Community Planning Act requires municipal plans to contain statements of policy concerning "the control and abatement of all forms of pollution of the natural environment" and the "provision of municipal services"*** and these include sewage collection, treatment and disposal, as well as water supply and distribution. Capital expenditures and operating costs for water-related services are estimated and scheduled in the plans, but the communities' needs have to be met within their financial capabilities, and, in many cases, water supply and waste treatment are given lower priority than desirable because their costs are prohibitive in towns and villages of small size and tax-base - a situation that frequently prevails in the Saint John River Basin, as has been seen.

* The proposals contained within a plan are binding on the municipality, the public and the Province.

** Province of New Brunswick, Community Planning Act (Consolidated to 1973), Fredericton: Queen's Printer, 1972, Section 23 (5), p. 19.

Regional resource use concerns are provided for under the section of the Act dealing with Regional Plans. This section states that a regional plan shall contain "a statement of planning policies for the orderly economic, social and physical development of the region including policies with respect to ... management of water resources".*

To summarize, the Community Planning Act, in combination with other Acts, particularly the Clean Environment Act, enables the municipalities effectively to provide water-related services through a number of initiatives, including the following:

- 1) ensuring that waste disposal arrangements in all new developments are such that the potential impact upon water resources is minimized
- 2) prohibiting the discharge of untreated sewage
- 3) ensuring that all pre-existing and newly installed waste treatment facilities are maintained in good working order
- 4) ensuring that all the information necessary to achieve adequate protection of the water resource becomes input to the municipal planning process
- 5) controlling land use through purchase, zoning and other regulatory measures
- 6) controlling all land uses within municipal boundaries
- 7) planning ahead for the water supply and waste disposal services needed to sustain forecast economic development.

Status of Municipal Plans

Under the Community Planning Act, the Basin contains three regions, three cities, seven towns and 41 villages all of which require planning. The Act does not itself, however, assure that the plans will be prepared. In fact, the Act states only that municipalities "may" prepare a municipal development plan, unless they are "required to do so by a regional plan or order of the Minister" (of Municipal Affairs). Since no regional plans have been completed and the Minister has not yet "ordered" a plan to be prepared, it is up to the individual communities to decide if and when to commission a plan.*** This, in turn, may well depend on the development pressures within each community.

*Ibid, Section 12(4)(a), p. 14.

**Ibid, Section 23(1)(a) & (b), p. 18.

***The major reason for this lack of Provincial prodding is the shortage of qualified planners in the Province.

As yet, no District Planning Commissions have been established, although the Department of Municipal Affairs would like to see a number in the Basin, particularly in the vicinity of the cities of Saint John and Edmundston. The Community Planning Branch considers this as one way of solving the problem of regulating development in unincorporated areas close to large urbanizations.

In a few cases, Local Service Districts, such as Keswick and New Maryland, have asked the Province for planning assistance. These unincorporated areas wish to control rapid haphazard growth through introduction of a zoning by-law, until plans are prepared for their region - in this case, until the Capital Area Comprehensive Plan has been adopted.

The status of municipal plans in the Saint John River Basin is outlined in Table 5.1. As of February 1975, 11 plans have been adopted, 16 are under preparation (plus the Capital Area Comprehensive Plan and the Saint John Regional Plan), one plan has been requested, and 23 municipalities have made no move towards preparing a plan.

The overview of the situation reveals that 55% of all municipal units are involved in planning under the Community Planning Act. This effort has been spatially scattered with a greater involvement in the vicinity of the cities, particularly Saint John, because of rapid and random growth. The lowest proportion of active communities is found in the agricultural areas where populations are less concentrated and growth is either static or of no real consequence. Planning for future development in these areas is, therefore, not of major concern to the majority of the citizens.

The only regional plan* under preparation in the Basin is for the Saint John region.** Thus, the plans presently under preparation will not be guided by the regional framework plan as the Act appears to intend they should. It seems quite likely, in fact, that all the municipal plans for the Saint John region will be completed and adopted before the Province finalizes the regional plan.

Conclusion

If proper management of the Basin's water resources is to be achieved, certain restraints on the indiscriminate use of the resources of water are essential. Water supply, waste disposal, flood protection and erosion control, for example, must be considered as important elements in all planning processes. Therefore, at the very least, draft community plans should

*The Capital Area Comprehensive Plan is not a regional plan but a plan for the municipality and its surrounding unincorporated area.

**This plan has been under preparation for quite some time while the Urban Region Plan was submitted to the Steering Committee on the Saint John Urban Region Impact Study in February of 1971.

TABLE 5.1

Status of Municipal and Regional Plans in the Saint John River Basin

Saint John River Basin Board Planning Regions	Department of Muni- cipal Affairs Planning Regions	Community Plans Adopted	Community Plans in Preparation	Community Plans Requested	No Plans
Region 1	Edmundston	Grand Falls Clair	Edmundston c St. François de Madawaska v St. Jacques v St. Basile v	St. Leonard v	St.-Andre v Drummond v Ste.-Anne de Madawaska v Riviere-Verte v Lac Baker v Baker Brook v St.-Hilaire v
Region 2	Fredericton	Woodstock	Perth-Andover v Plaster Rock v	-	Hartland t Aroostook v Nackawic v Bath v Bristol v Florenceville v Canterbury v Millville v Centreville v Meductic v
Region 3	Fredericton	Oromocto	Fredericton c Capital Area Comprehensive Plan	-	Harvey v Tracy v Fredericton Junction v Stanley v

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Status of Municipal and Regional Plans in the Saint John River Basin (cont.)

<u>Saint John River Basin Board Planning Regions</u>	<u>Department of Muni- cipal Affairs Planning Regions</u>	<u>Community Plans Adopted</u>	<u>Community Plans in Preparation</u>	<u>Community Plans Requested</u>	<u>No Plans</u>
Region 4	Fredericton	Minto	Sussex Corner v	-	Cambridge-
		Chipman	Norton v		Narrows v
	Saint John	Sussex	Rothsay v		Gagetown v
		Hampton	Fairvale v		
Region 5	Saint John	Gondola Point v	E. Riverside/		
		Quispamsis v	Kingshurst v		
			Renforth v		
			St. Martins v		
			Westfield v	-	
			Grand Bay v		
			Saint John Regional Plan		

The letters refer to: c = city, t = town, v = village

Source: Department of Municipal Affairs, Community Planning Branch, February 1975

be formally submitted to the water management and pollution control agencies for approvals; better still, these agencies should participate in the preparation of the plans.

One of the main factors inhibiting effective municipal planning and water management is the lack of local level rural representation in New Brunswick. As matters presently stand, the unincorporated areas surrounding the municipalities of the Basin have no political entity and no mechanism to undertake planning unless they become designated as Local Service Districts.* Even then, since local service districts do not have elected Councils, the Community Planning Branch can assist them only if a request is made for planning assistance and if the Minister approves. Tremendous residential pressures have been put on the lands near the cities and the prime recreational areas. The resulting servicing problems are becoming serious and at some point in the future can be expected to become burdens to the core municipalities despite their own best planning efforts.

This problem may become aggravated over the next few years as the Provincial tax is phased out on owner-occupied residential property. In the incorporated areas, municipal governments are expected to take up the slack by increasing their property tax rates as the Province withdraws from the field, but in the unincorporated area there could be zero property tax for resident owners in 1978 and beyond. This creates an added incentive to the urban dweller and worker to move to the country while still working in town. The resulting servicing problems may become monumental.

*A Local Service District is usually established to provide specified services such as fire protection, ambulance service, etc.

CHAPTER 6 CONCLUSIONS

The Municipal Population of the Saint John River Basin in 1973 was about 220,000, just over 70% of the total. Although over half resided in the three cities, the remainder were distributed among 48 towns and villages. This characteristic dispersion of population renders the provision of water supply and sewerage services difficult and expensive.

A Central Water Supply is lacking in 28 villages, including six with populations over 2000 and two with populations over 3000. Altogether some 24,000 people living in Basin municipalities are not served by a municipal water supply. The Kennebecasis valley alone contains more than half of these people.

Groundwater sources provide most of the water used by the municipalities of the Basin, yet very little is known as yet about the sustainable yields of the aquifers which will have to supply the needs of growth.

Liquid Waste Disposal There are many sewage treatment plants in the Basin - about 24 municipal, 19 Provincial, six federal and 62 private. It is almost impossible to supervise the operation of so many systems and it is known that a majority perform well below their design efficiency.

In spite of the large number of treatment plants there are approximately 45,000 people in Basin municipalities who are not served by sewers and a further 65,000 who have sewers but no sewage treatment. The main problem area is the satellite community strip outside Saint John, although it must be pointed out that Edmundston's planned treatment facility is not yet constructed, that Perth-Andover and Hartland have made no move towards installing treatment, that since amalgamation Fredericton has a new population of about 7000 people needing services, and that Saint John contains some 50,000 people needing sewage treatment facilities.

The Growing Municipal Population will create a need for greatly expanded water-related services. By 1991, it is estimated, population growth, population shifts and municipal amalgamations will result in some 130,000 to 135,000 additional persons needing full services.

In addition, some of the municipalities are likely to continue to attract small industry, as they have in the past, and thus to need serviced industrial land. The principal candidates appear to be Edmundston, Grand Falls, Woodstock, Fredericton, Oromocto, Sussex and Saint John.

Financing Water-Related Services

The financial status of the municipalities does not appear to preclude the provision of services. However the wide variation in technical know-how and financial stature, combined with high per capita costs, seem to militate against it.

The total capital cost required to bring water, sewerage and sewage treatment up to desirable levels of service by 1991 is estimated at between 180 and 240 million dollars at 1974 prices.

This burden does not by any means all fall on the municipalities, although they will be involved, sooner or later, in practically all of it. In new subdivisions, if they are built in municipalities, water lines and sewers will be installed by the developer and paid for by the home buyer in the price of his lot. Unfortunately the resulting high land costs are driving new home-owners out to the unorganized areas, where they soon get together to demand municipal services.

Financial assistance from senior levels of government is very substantial, but is biased very heavily in favour of trunk collector sewers and sewage treatment plants. Provincial aid is particularly dynamic, the Province, indeed, taking on rapidly increasing financial liabilities, year by year, on behalf of the municipalities. While the Province shoulders a very large proportion of financial responsibility, it does not play, it seems, an equivalent role in decision-making or in operation and maintenance.

Municipal Planning The Community Planning Act of 1972 has considerable promise as a mechanism for rectification of the problems referred to, but the shortage of qualified town planners in the Province, together with both a lack of understanding of the problems and a lack of representation at the local level tend to slow progress in this field. Meanwhile, rising prices for serviced land in municipalities and the phase-out of the Provincial tax on owner-occupied residential property are combining to drive new home-owners to unorganized areas, a shift which is likely to lead to more severe problems in the future.

An opportunity exists for a carefully worked out Provincial initiative. The provision of good supplies of pure water and good sewerage and sewage treatment has a profound effect upon health and upon the capacity to sustain orderly economic growth. Provincial leadership is called for, on an inter-departmental basis, in order to achieve these objectives efficiently, economically and equitably.