

THE UNIVERSITY OF MANITOBA

MEASURING THE SPATIAL EFFECTIVENESS OF PUBLIC
ADMINISTRATIVE SYSTEMS: AN EVALUATION
OF THE MANITOBA DEPARTMENT OF HEALTH AND
SOCIAL DEVELOPMENT'S DELIVERY OF INCOME
SECURITY SERVICES THROUGH THE WINNIPEG
REGIONAL OFFICE SYSTEM

by

JOHN KENNETH WILKINS

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A dissertation submitted to the Faculty of Graduate Studies of
the University of Manitoba in partial fulfillment of the requirements
of the degree of

MASTER OF ARTS

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ABSTRACT

Geography can be a useful component in the government planning process. However, a more meaningful and comprehensive approach to planning the geography of public administration is required. In particular, concepts and measures of spatial effectiveness, a geographical quality indicating how adequately an administrative system fulfills the spatial attributes of public goals, should be defined and applied.

The intention here is to examine the mechanism for measuring the spatial effectiveness of a public administrative system. This is attempted in a case study of the Manitoba Department of Health and Social Development's delivery of Income Security Services through the Winnipeg Regional Office System.

The research reveals that more comprehensive measures of spatial effectiveness, embracing elements of accessibility and the population in need of services, should be devised. It is also concluded that these measures should only be preferred as initial indicators for planning purposes due to inherent assumptions and limitations.

In the case study, it is recommended that the Manitoba Department of Health and Social Development pursue data reform, comparative evaluation and more rigorous geographical planning. This research is only suggested as a starting point for further geographical studies and government planning.

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CHAPTER 1 INTRODUCTION

Geography can contribute to the planned development of public administration in two ways. First, geographers formulate and test hypotheses about the spatial organization of administrative systems. Second, geographers assist government decision-makers by applying geographical theory to resolve real-world organizational problems. The latter involves the evaluation and planning of administrative regions, boundaries, facilities and networks. The aim is to improve the effectiveness and efficiency of these systems.

Effectiveness and efficiency are optimal standards established by the full array of decision-makers in government and society. Effectiveness is a quality indicating how adequately an administrative system fulfills public goals. Governments promote effectiveness to enhance the relationship of administrative systems to the public. The intention is to fulfill public goals by offering a suitable level and quality of service delivery wherever there is a demand for services.

Efficiency is itself a public goal and therefore, is part of the broader concept of effectiveness. It is a quality indicating how adequately an administrative system carries out the work processes necessary to fulfill other public goals. Governments promote efficiency to minimize the cost of operating

administrative systems. The intention is to protect the public's fiscal interests by economizing expenditures.

Society demands that public administration be both effective and efficient at the same time. In practice, governments attempt to strike an acceptable balance between these dual objectives. Government must reconcile what is suitable to public needs with what is feasible in the realm of administrative capabilities. Without the constraint of economic efficiency, the price of fulfilling many of society's goals would probably be prohibitive for the public treasury. Similarly, without the effective fulfillment of society's goals, public discontent or alienation would probably overshadow the economic endowments of efficiency.

Consumer advocate Ralph Nader has recently called for a re-assessment of current government planning priorities. He observes that, "Although consumers are able to obtain performance information on cars, toasters and restaurants, they seldom have access to data that tells them if an organization helps them achieve personal goals." (Dennison, 1974:10). Nader contends that governments should be more accountable and responsive to society's needs and interests. He recommends ongoing or periodic evaluation of government administrative systems as a means to monitor and control the effectiveness with which public goals are fulfilled.

It is to this end that this research seeks to

evaluate the spatial effectiveness of a public administrative system. Spatial effectiveness is a quality indicating an administrative system's ability to fulfill spatial goals. Spatial goals are fulfilled when the spatial attributes of public goals are optimized in an objective function. In this way, the current spatial structure of an administrative system is compared against an optimal structure based on the system's spatial objectives. The degree to which a predetermined set of spatial goals is realized demonstrates the system's spatial effectiveness.

Objective

This research has two primary objectives. The first objective is to evaluate the spatial effectiveness of a public administrative system using a case study. The intention is to identify the system's spatial goals and to measure the effectiveness with which these goals are administered. The second objective is to examine the mechanism for measuring the spatial effectiveness of this administrative system. The intention is to investigate the analytical problems and deficiencies associated with this form of evaluation. There is no attempt to develop planning decisions around the system's geographical problems or to propose new methods for measuring spatial effectiveness. Instead, the research seeks to understand some of the applications and

limitations of utilizing measures of spatial effectiveness.

The administrative system used for the case study is the Winnipeg Regional Office System (W.R.O.S.). This system is one of seven regional service administrations established by the Manitoba Department of Health and Social Development (H. & S.D.). It is responsible for delivering a comprehensive range of health and social services to the Winnipeg Region, including financial benefits called Income Security Services provided under the Social Allowances Act. The Winnipeg Region is comprised of the metropolitan area of the City of Winnipeg, plus the Rural Municipalities of East St. Paul and West St. Paul.

Over the past few years, H. & S.D. has established a specific set of spatial goals for regional service delivery. Through a process of re-organization, the Department has attempted to maximize the accessibility of services to the demand population, while meeting the service needs of that population, wherever needs occur. In order to fulfill this objective, service facilities delivering the total complement of the Department's community services have been located at central points in each service area. As a result, there has been a progressive decentralization of facility locations to the community level.

To date, this service objective has not been fully

realized in any of the Department's seven administrative regions. However, only the Winnipeg Region has strayed significantly from the original re-organizational concept. Instead of establishing an integrated set of total-service, community-based facilities, three distinct spatial systems have evolved. Disjoint sets of facility locations and intersecting service areas partition the delivery of Income Security Services from other service programs in the Winnipeg Region.

The fulfillment of the Department's service objective is particularly important for W.R.O.S. First, more than half the Province's million population and a greater proportion of its affluence are concentrated in the Winnipeg Region. However, amid this apparent abundance is a corresponding concentration of health and social welfare problems sustained by the urban environment. As a result, more than half of H. & S.D.'s clientele is concentrated in the Winnipeg Region. This concentration, plus the special service needs associated with Winnipeg as an urban area have necessitated the development of a service delivery system distinct from those systems operating in other administrative regions.

Second, the location of service facilities at points central to the population in need of services is important because of the high incidence of walk-in trade in the Winnipeg Region. In rural and northern

areas, most client contacts are completed in the field, usually at the client's residence. The initial application for services and the evaluation of service needs are completed at this time. However, because of its relatively compact setting and because of various urban transportation factors, the predominant form of client contact in the Winnipeg Region is at the office site. Clients initiate contact in most cases by approaching an office and requesting services. Once the initial application for services has been completed at the office, service needs are evaluated by means of a field worker's visit to the client's residence. If health or counselling services are required, professional staff and clients arrange to meet at the office or at the client's residence.

Therefore, service delivery in the Winnipeg Region is a two-way link involving travel by field staff and clients between service facilities and clients' residences. It is important for service facilities to be both identifiable and accessible to the population in need of services in order to facilitate trips by prospective clients to an office to initiate contact. Similarly, it is important for service facilities to be located at points central to the population in need of services in order to facilitate trips by field staff to clients' residences.

The objective function implied by the spatial

interaction of field staff and clients in the Winnipeg Region involves maximizing the accessibility of service facilities to the population in need of services. This function falls into the broad class of techniques called the location-allocation problem. Holmes and Webster (1973:7), with reference to Scott (1970:95), define location-allocation problems as follows:

"Location-allocation problems involve the simultaneous determination of locations for central facilities and the allocation of demand points to the central facilities such that the costs of flows between demand points and facilities is minimised. Scott (1970 p. 95) states the problem succinctly: '...suppose that there are given (a) a set of n demand points distributed in the plane (b) a numerical weight to be attached to each point and (c) a set of m indivisible centroids without predetermined locations; then, the location-allocation problem, in its most general form, is to find locations for the m centroids and an allocation of each point, or fraction of a point, to some centroid so as to optimise an objective function'."

Accessibility can be maximized by allocating demand locations to the nearest facility or by locating facilities at points which minimize aggregate distances to demand locations. The latter is applied in this research. In each case, solutions are a function of distance and population.

The second part of the functional relationship is concerned with supplying the level of services required to fulfill the service needs of the demand population in each service area. It is a part of the larger objective to maximize accessibility. Need is a relative concept

and, as such, is difficult to measure. It is comprised of an applied demand, plus an uncontacted residual. Services are rarely, if ever, extended to the level of need due to numerous eligibility, production and distribution constraints. Harvey (1972:92) explains need as follows:

"Needs are not constant for they are categories of human consciousness and as society is transformed so the consciousness of need is transformed. The problem is to define exactly what it is that need is relative to and to obtain an understanding of how needs arise.

Needs can be defined with respect to a number of different categories of activity... Within each of these categories we can set about defining those minimum quantities and qualities which we would equate with needs. This minimum will vary according to the social norms accepted at a given time. There will also be a variety of ways of fulfilling such needs."

In an article on "Social Justice and Spatial Systems", Harvey (1972:90-96) suggests that the main components of territorial social justice are need, contribution to the common good and merit. He considers need to be the most significant component to the development of a just distribution of public services. Harvey discusses four approaches to measure need. These are market demand, latent demand measured via relative deprivation, potential demand based on inherent factors and consultation with experts.

The third approach, potential demand, is a surrogate of need. Harvey believes that potential demand, along with consultation with experts, is the most indicative measure of need. It is calculated by applying the

eligibility criteria for supplying a service to the associated demand characteristics of the regional population. Using an example of the need for health care, Harvey (1972:93) comments on potential demand:

"Population totals obviously provide an initial indicator of potential need. But the characteristics of that population are also important. Health problems can be related to age, life-cycle, amount of migration, and so on. In addition there are special problems which may relate to occupational characteristics (such as mining), to sociological and cultural circumstances, as well as to income levels. Health problems can also be related to local environmental conditions (density of population, local ecological conditions, air and water quality, and so on). If we knew enough about all of these relationships we should be able to predict the volume and incidence of health care problems across a set of territories, from demographic and environmental information. This requires a far more sophisticated understanding of relationships than we currently have, but various attempts have been made to carry through this method. The attraction of it, of course, is that it does provide a reasonably objective method for measuring potential demand for health care. Unfortunately, we are still left with the problem of converting this potential demand into a measure of need. A measure of need in this case requires that we determine what are needed as opposed to non-essential responses to these statistically determined potential demands."

It remains, then, to determine whether or not W.R.O.S. is fulfilling the Department's service delivery objective. If the set of facilities is effectively maximizing the accessibility of services to the demand population and is meeting that population's service needs, no relocation of facilities or subsequent re-alignment of service areas may be required. However, if the effectiveness with

which this goal is being fulfilled is unacceptable, other alternatives for spatial planning in the Winnipeg Region should be considered. Whichever conclusion is reached, this is only intended as a preliminary enquiry from which more intensive spatial analysis and large-scale evaluation and planning can emanate.

Methodology

The research only concerns the development of W.R.O.S. during the last five years. This period encompasses the development of W.R.O.S. from its introduction as a new concept of service delivery in 1970 to current proposals for alternative administration in the Winnipeg Region. The data and background information for this period were collected from various media, including: interviews with H. & S.D. officials; Departmental and Statistics Canada computer print-outs; H. & S.D. statistical bulletins, reports, correspondence and administrative files; and local newspapers.

The research is comprised of five chapters. In Chapter 1, the topic is introduced and the objective and methodology are outlined.

In Chapter 2, the geographical background and development of W.R.O.S. over the past five years are summarized. First, H. & S.D.'s departmental structure, services, external relations and regional administration are presented. Then, the spatial and operational

components of W.R.O.S. and the spatial implications of service delivery are specified. The chapter concludes with a discussion of the past and current development of W.R.O.S.'s spatial goals and a definitive statement of these goals.

In Chapter 3, there is an attempt to measure W.R.O.S.'s spatial effectiveness by evaluating the system's fulfillment of the spatial goals defined in Chapter 2. First, the method and its data requirements are stated. The method is referred to as the Index of Effectiveness (E-index). The E-index is based on a distance-minimization technique proposed by Massam (1972:4-6) and on a potential demand measure recommended by Harvey (1972:93). These measures are incorporated together to evaluate the accessibility of the set of facility locations to the population in need of services. This index is applied to W.R.O.S. to calculate the effectiveness of present Income Security facility locations and to formulate evaluation conclusions.

In Chapter 4, some of the limitations of the evaluation are examined. The analytical problems and deficiencies associated with this form of analysis, plus some of the practical shortcomings of the data set and the application of the E-index technique to this particular system are investigated.

In Chapter 5, a summary and explanation of research findings and suggestions for future geographical and government research are given.

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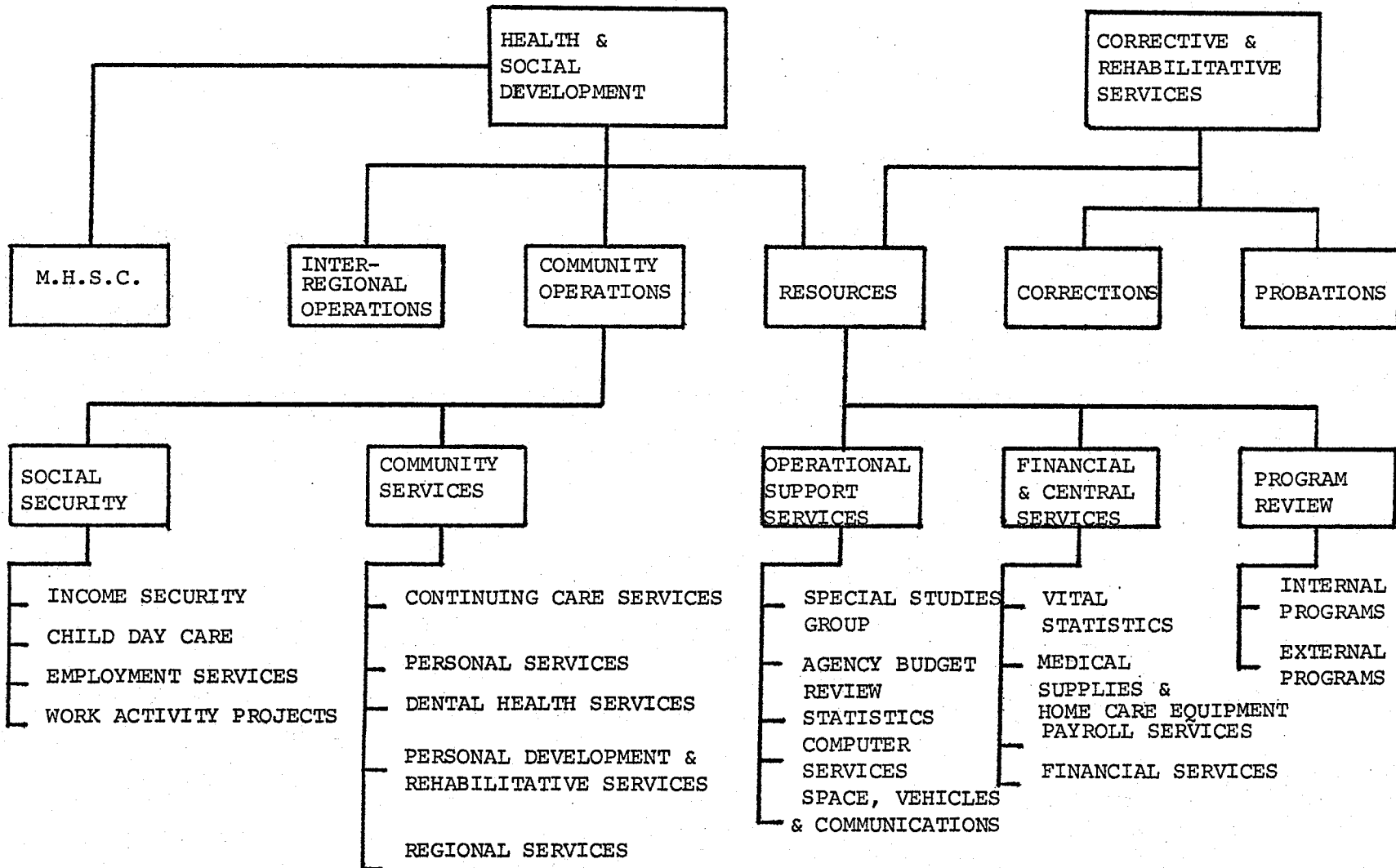
CHAPTER 2 BACKGROUND

The Manitoba Department of Health and Social Development

The Manitoba Department of Health and Social Development (H. & S.D.) is one of twenty ministries and departments in the Provincial Government of Manitoba. It operates by legislative authority through thirty-three statutes and twenty boards, commissions and committees. The Department is organized in three divisions, identified in Diagram #1 as Resources, Community Operations and Inter-Regional Operations. Corrective and Rehabilitative Services is a separate ministry attached to H. & S.D. The divisions deliver programs and services through regional offices, health units, mental health centres, correctional institutions, laboratories and related facilities. Services to the public include health care, social assistance, rehabilitation, corrections, social counselling and health and social services education. The work is carried out by a Departmental staff of close to 5,000 at a projected cost of \$308,559,400 (Krueger, 1975:1). These figures represent 44% of the 12,000 Provincial civil servants and 30% of the 1975/76 spending estimates of \$1,009,257,300.

The primary goal of H. & S.D. is to promote and maintain the health, social and economic fulfillment of the individual. In order to meet this goal, the Department co-operates on a cost-sharing, program and

DIAGRAM #1 - THE MANITOBA DEPARTMENT OF HEALTH AND SOCIAL DEVELOPMENT
 ORGANIZATIONAL STRUCTURE - MAY, 1975



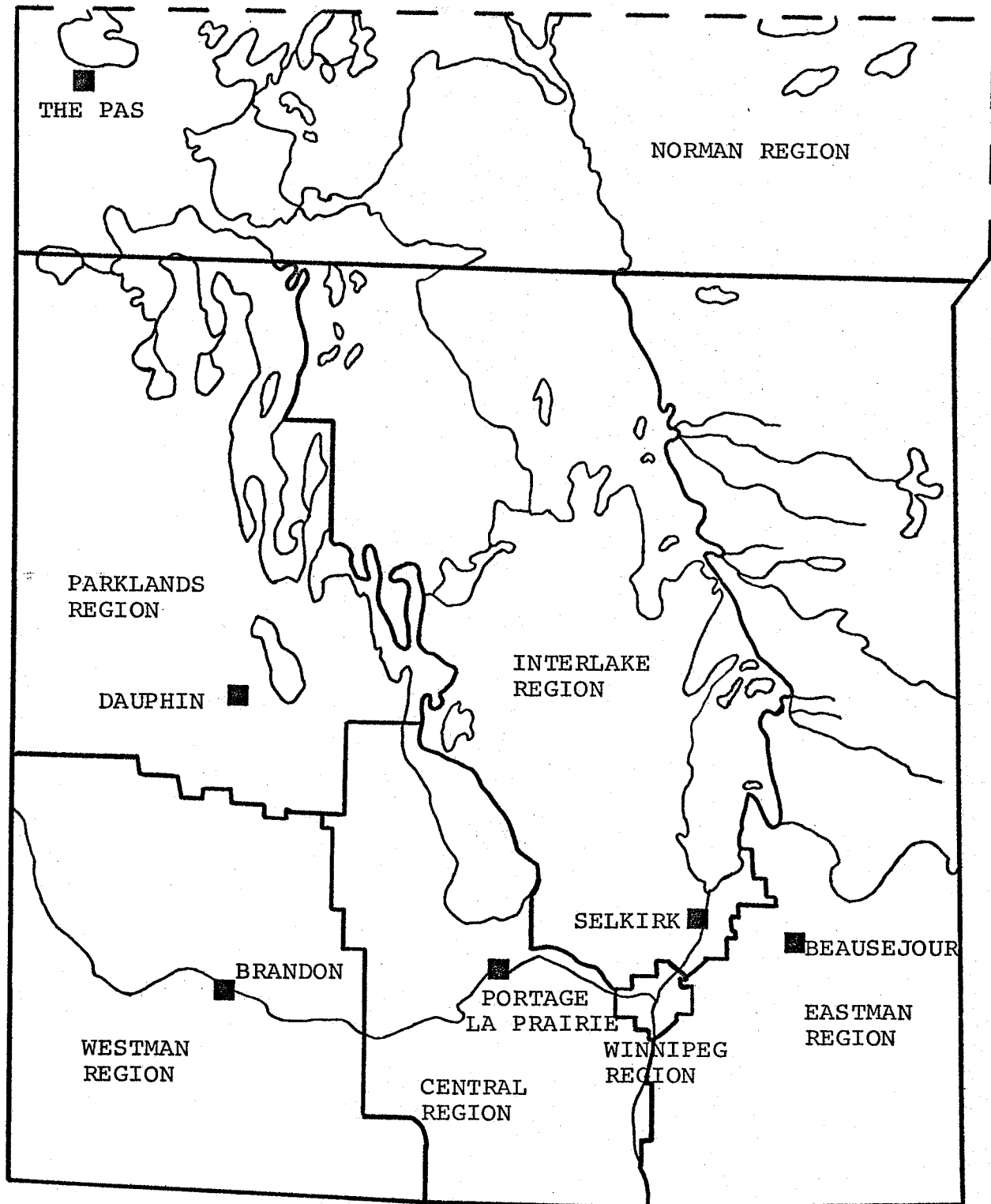
planning basis with the Federal Government, city and metropolitan governments, rural municipalities, local government districts and private social welfare agencies. Health and Welfare Canada is the corresponding department at the federal level. Health and Welfare is accountable for the development and administration of universal social welfare and health programs, like Family Allowances and Unemployment Insurance. It also serves in a consultative capacity to the Provinces and administers grants to provincial bodies through special programs, like the Canada Assistance Plan. In addition, Health and Welfare is responsible for the National Welfare Council which is an advisory committee set up to help co-ordinate the activities of various levels of government and private agencies.

In Manitoba, H. & S.D. shares the responsibility for health and social services with local governments and private agencies. These provincial bodies carry out programs at the community and neighbourhood levels. The programs are highly sensitive to local needs and are often more specialized than Provincial services. In most cases, H. & S.D. attempts to co-ordinate its services with local services. For example, the City of Winnipeg Public Welfare Department has jurisdiction for the first ninety days of social assistance cases and is reimbursed by the Province at 50% of the assistance payments. After ninety days, cases are transferred to H. & S.D.'s Social Allowances

files, at which time the Federal Government contributes 50% of the cost through the Canada Assistance Plan. In contrast, private agencies are subsidized by direct government and private grants. The value of grants varies considerably among agencies.

H. & S.D.'s Community Operations Division is responsible for delivering community-based health and social services throughout Manitoba. The Department has defined seven administrative regions for the purpose of consistent and effective delivery of community services. The seven regions, each headed by a Regional Director, are named Winnipeg Region, Interlake Region, Eastman Region, Central Region, Westman Region, Parklands Region and Norman Region and are illustrated in Map #1. Each region administers the entire array of H. & S.D.'s community services through a basic unit of administration called the Regional Office. Facilities have also been extended to the sub-regional level as a result of the increasing number of service teams in the field and in response to public demands for better access to services. This has resulted in a hierarchy of Regional Offices, District Offices and Sub-Station. The intention is for each region to operate, in terms of people and services, as the vital point of contact between the citizen in need and the Department.

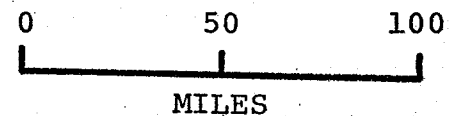
MAP #1 - THE MANITOBA DEPARTMENT OF HEALTH AND SOCIAL DEVELOPMENT REGIONAL BOUNDARIES - MAY, 1972



LEGEND:

- REGIONAL OFFICE
- REGIONAL BOUNDARY

SCALE: 1: 3,000,000

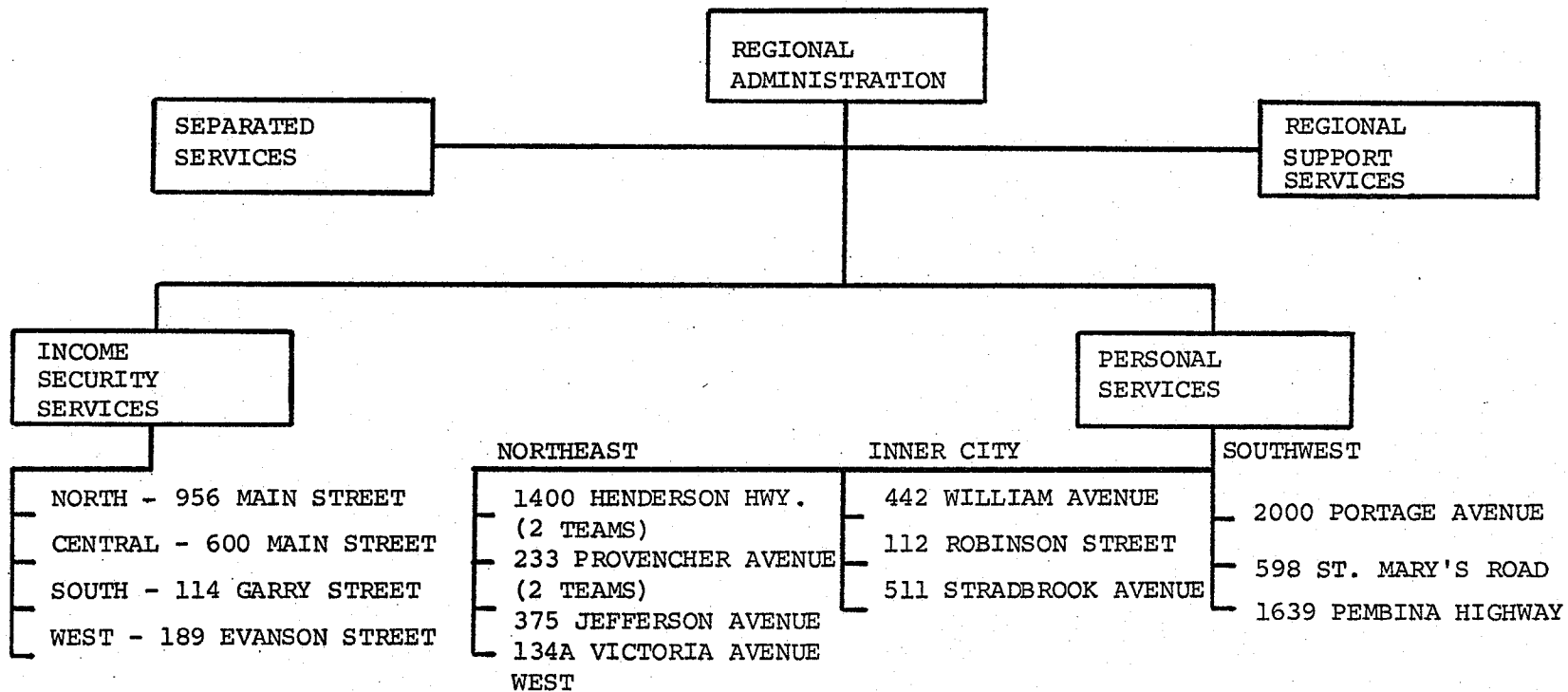


The Winnipeg Regional Office System

The service delivery system operating under the direction of the Community Operations Division in Winnipeg is called the Winnipeg Regional Office System (W.R.O.S.). The system's organizational structure is depicted in Diagram #2 and its spatial components are shown in Maps #2, 3 and 4. The operational components of W.R.O.S. are identified as Administration, Income Security Services, Personal Services, Separated Services and Regional Support Services. They are often physically isolated in regional operations and only interact on a referral basis.

The Administration component is responsible for the total administrative function of the region. The Regional Office, located in the Winnipeg West District Office, acts as the headquarters from which the Regional Management Team, headed by the Regional Director, co-ordinates regional operations. The Management Team has ultimate responsibility for regional budgets, vehicles, space, purchasing, supplies and other administrative concerns. It also supervises the allocation of support services, such as reception, case opening and closing, statistics, data processing, filing and clerical services, for the Income Security and Personal Services programs. In addition, the Management Team provides a necessary liaison with Central Office (Community Operations Division) at Fort Osborne Barracks and with other H. & S.D. regions.

**DIAGRAM #2 - THE WINNIPEG REGIONAL OFFICE SYSTEM ORGANIZATIONAL STRUCTURE -
DECEMBER, 1974**



INCOME SECURITY TEAM:

- TEAM CO-ORDINATOR
- INTAKE WORKERS
- EVALUATORS
- SERVICE CLERKS
- CLERICAL SUPPORT

PERSONAL SERVICES TEAM:

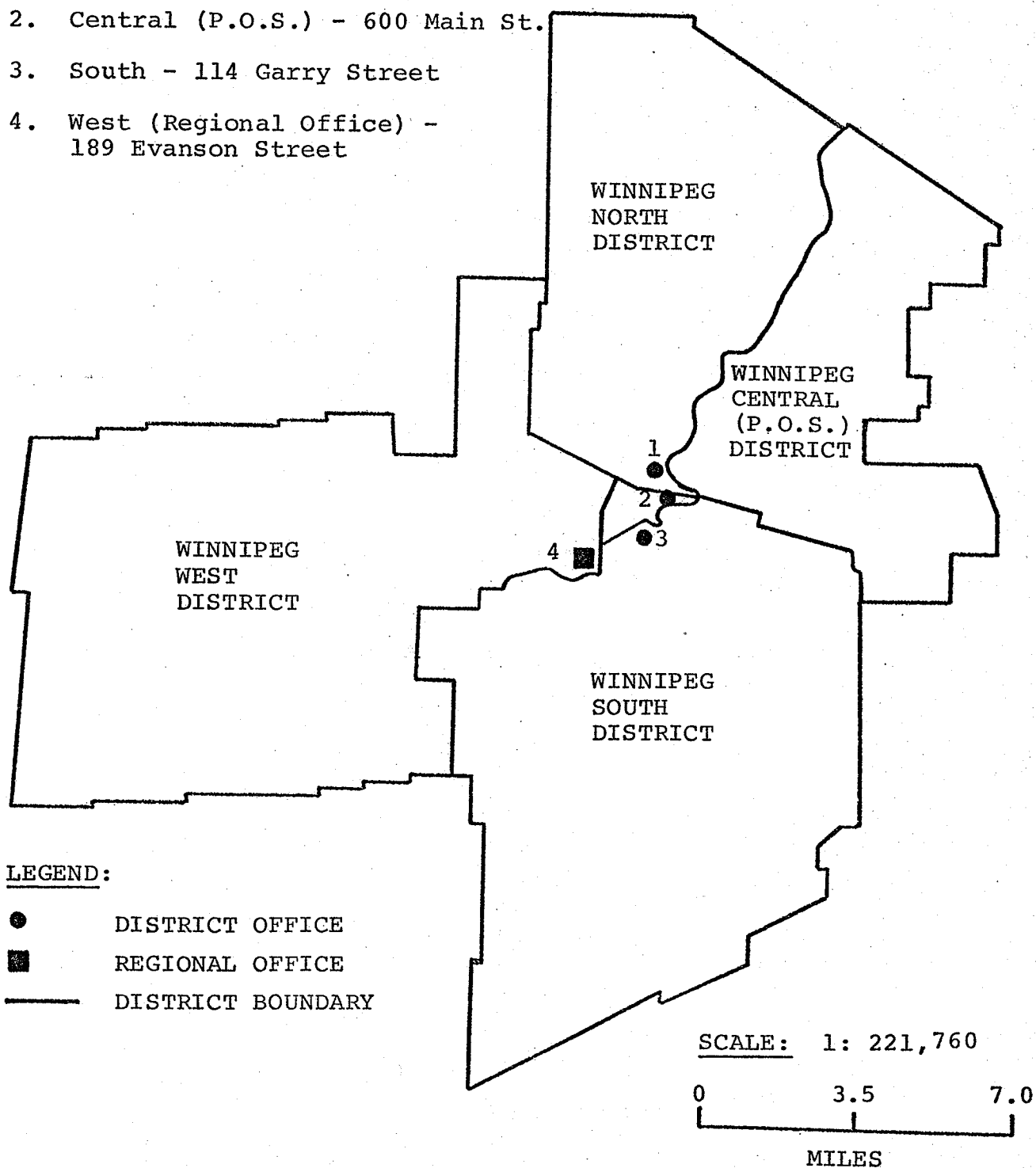
- TEAM CO-ORDINATOR
- FAMILY COUNSELLORS
- PUBLIC HEALTH NURSES
- VOCATIONAL REHABILITATION COUNSELLORS
- HOME ECONOMISTS

REGIONAL MANAGEMENT TEAM:

- REGIONAL DIRECTOR
- CO-ORDINATOR OF PROGRAMS
- DISTRICT DIRECTORS
- AREA DIRECTORS
- ADMINISTRATOR

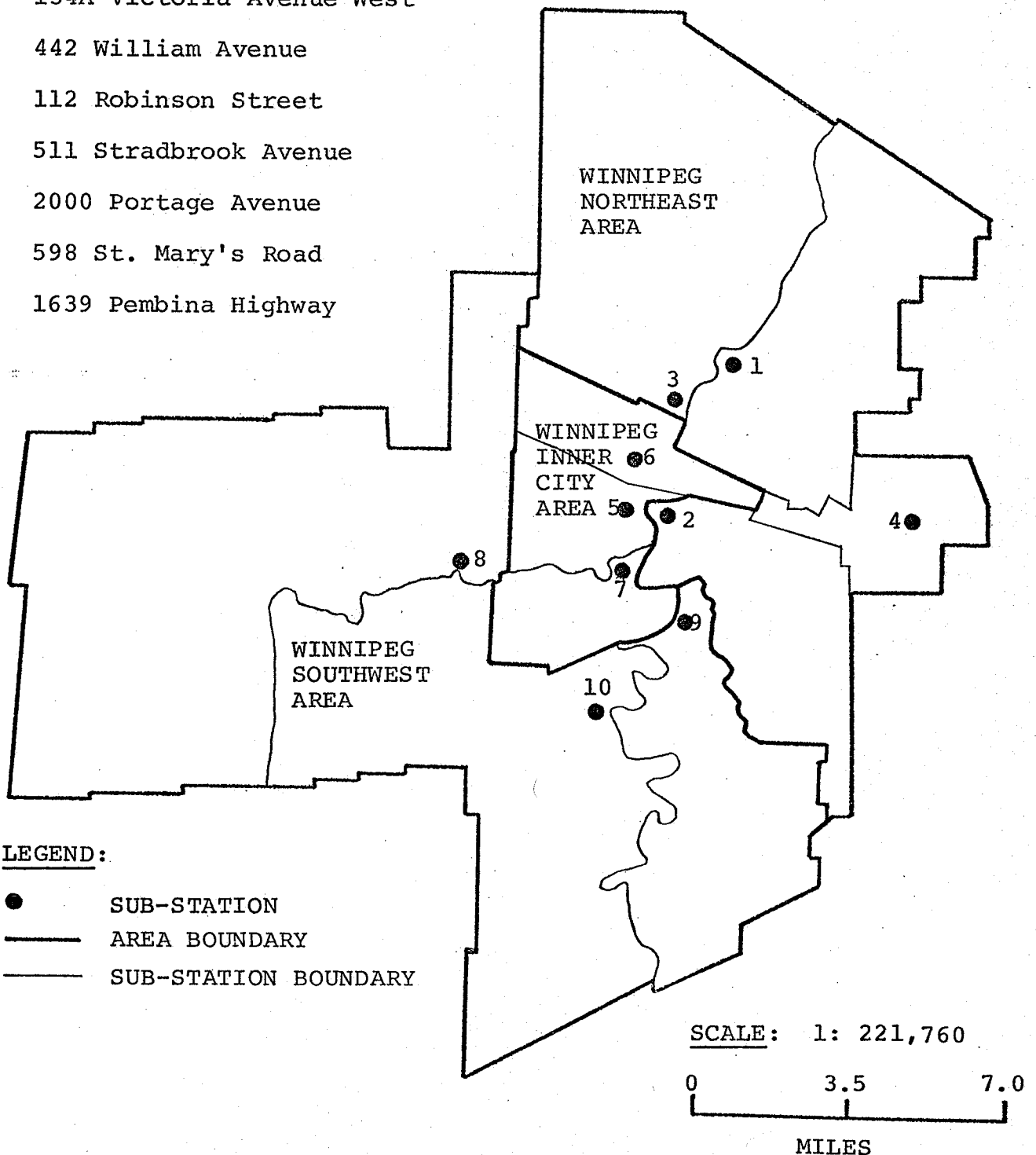
MAP #2 - THE WINNIPEG REGION: PRESENT INCOME SECURITY
DISTRICT OFFICES AND SERVICE DISTRICTS - DECEMBER, 1974

1. North - 956 Main Street
2. Central (P.O.S.) - 600 Main St.
3. South - 114 Garry Street
4. West (Regional Office) -
189 Evanson Street



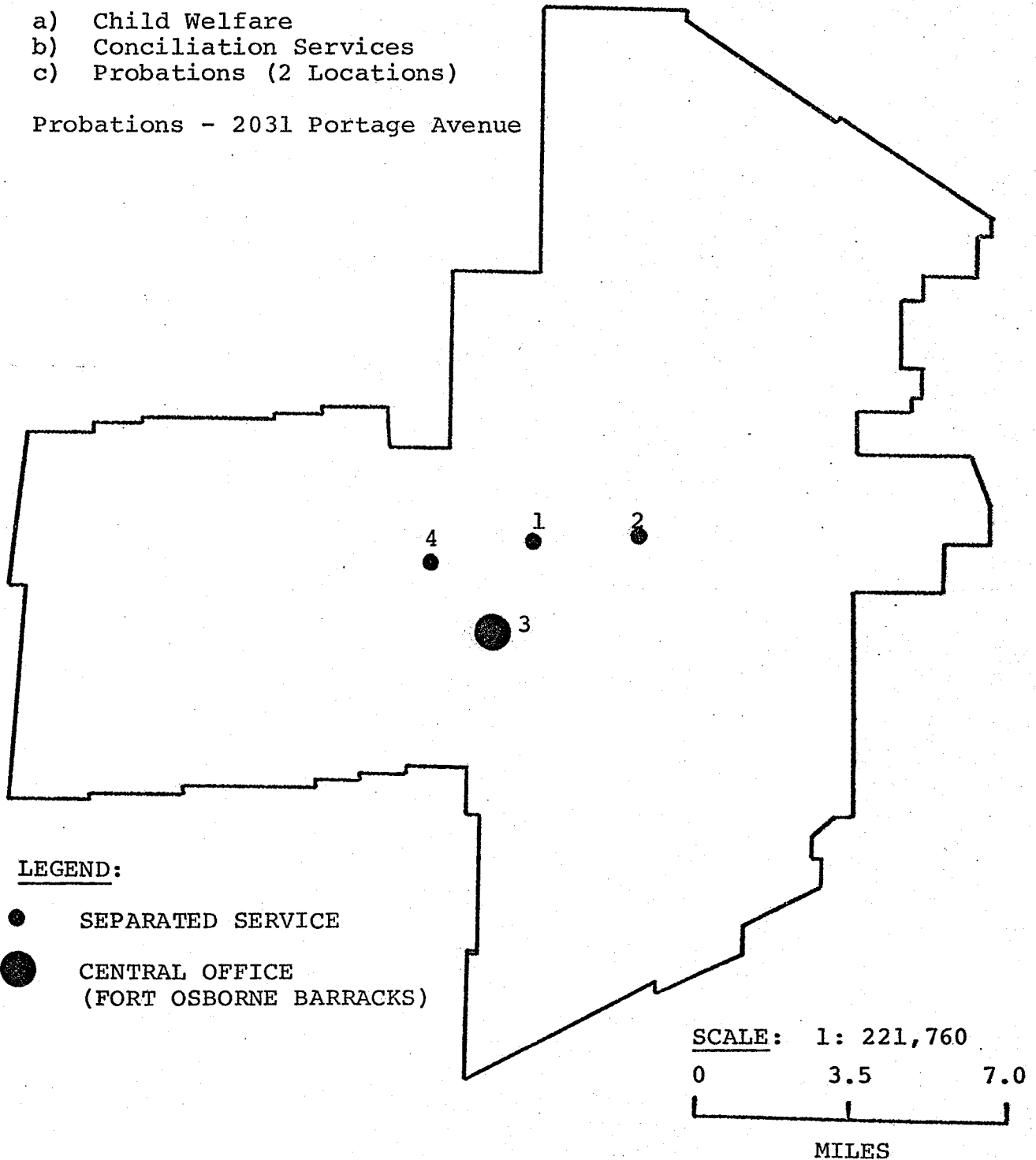
MAP #3 - THE WINNIPEG REGION: PRESENT PERSONAL SERVICES
SUB-STATIONS AND SERVICE AREAS - DECEMBER, 1974

1. 1400 Henderson Highway (2 Teams)
2. 233 Provencher Avenue (2 Teams)
3. 375 Jefferson Avenue
4. 134A Victoria Avenue West
5. 442 William Avenue
6. 112 Robinson Street
7. 511 Stradbrook Avenue
8. 2000 Portage Avenue
9. 598 St. Mary's Road
10. 1639 Pembina Highway



MAP #4 - THE WINNIPEG REGION: PRESENT SEPARATED SERVICES
FACILITY LOCATIONS - DECEMBER, 1974

1. Student Aid - 1181 Portage Avenue
2. Care Services - 114 Garry Street
3. Central Office (Community Operations Division) - 139 Tuxedo Boulevard
 - a) Child Welfare
 - b) Conciliation Services
 - c) Probations (2 Locations)
4. Probations - 2031 Portage Avenue



The Income Security component is responsible for handling cases with financial input. The service categories and eligibility criteria for financial assistance are defined in the Social Allowances Act. The case categories include Mothers' Allowances, Aged Social Allowances, Special Dependent Care, Long-term and Temporary Disability Allowances, General Assistance and Special Cases. Intake Workers take the initial application for services at the Income Security District Office. The client's eligibility and service needs are determined and if counselling is required, the client is referred to Personal Services. An Evaluator is assigned to complete the case documentation by making a home visit to evaluate the client's financial eligibility and counselling needs. A Service Clerk is then assigned to process the necessary assistance papers and to administer the case on an ongoing basis. A District Director of Income Security acts as the program supervisor and co-ordinates team activities in each of the four Income Security District Offices.

The Personal Services component is responsible for handling cases with treatment and counselling input. Medical Officers of Health and Public Health Nurses provide a comprehensive range of public health services. These include pre-natal and post-natal care, communicable disease control, home care, school health programs, family planning services and public health education

services. Personal Services Workers (social workers) provide a host of social services, including vocational rehabilitation and family and financial counselling. A Director of Personal Services acts as the program supervisor and co-ordinates the activities of several teams in each of the Personal Services Areas. The three Personal Services Areas are broken down into twelve teams allocated to ten Sub-Stations. Sub-Stations #1 and #2 in the Winnipeg Northeast Area each have two teams assigned. Each team is supervised by a Team Co-ordinator who reports to the Area Director.

The Separated Services component concerns the delivery of community services outside the regular framework of W.R.O.S. Unlike other H. & S.D. regions, the Winnipeg Region has removed some services from the District Offices and Sub-Stations and placed them in separate locations. H. & S.D. has centralized Student Aid, Care Services, Child Welfare and Conciliation Services and has developed three separate locations for Probations. The separation of these services from the regular framework was precipitated by the need for autonomous office locations for more personalized administration of these specialty services.

The Regional Support Services component concerns the utilization of existing private and public resources by Winnipeg Region program workers. These support services are highly specialized and include dental, health

education, mental health, community development, job placement and medical services. The personnel associated with these services act as consultants for H. & S.D. workers or provide a direct service on behalf of the Region. Support services personnel are assigned to District Offices or Sub-Stations, depending on the affiliation of the support service to office functions.

The community services delivered by W.R.O.S. involve both the movement of clients to facilities and the movement of facility workers to clients. However, the direction and frequency of staff and client movements vary from case to case and from region to region. Although both functional states exist in all regions, there are marked preferences for passive service delivery in the Winnipeg Region and active service delivery in rural and remote H. & S.D. regions. In the Winnipeg Region, because of the high degree of walk-in trade, Intake is set up as a separate section in Income Security Offices operating with a full-time staff. In rural and remote regions, where walk-in trade is less prevalent and Intake is done in the field, it is part of the Intake/Evaluator function. In all cases, clients are geographically assigned to specific facilities without choice.

Spatial Goals

Toward the end of 1970, a gradual process of re-organization was begun by H. & S.D. A Departmental report

recommending a new organizational concept was introduced by the Special Studies Group, the office responsible for planning H. & S.D.'s organization. The concept was called the Single Unit Delivery System (S.U.D.S.). Many of the report's recommendations have yet to be implemented or fully realized because of revised plans, interim development strategies and technical problems. However, the major themes remain intact for present-day planning of regional field operations.

S.U.D.S. was developed to dispell public dissatisfaction with the efficiency and responsiveness of community service delivery. The Department came to the conclusion that the individual citizen had been undervalued as the focus of government attention. The public was confused and alienated by the bureaucratic maze of Municipal, Provincial and Federal departments, agencies, statutes, regulations, programs, services, procedures and forms. This fragmentation resulted in duplication of effort and gaps in Departmental service delivery. Therefore, H. & S.D. (1970:6) resolved that,

"Programs and services must be restructured so as to achieve that singular perspective of the individual or family who needs help. We need an operating structure, a process, that will allow the citizen to approach a single point of contact for assistance. A basic statement of need at that vital point of contact should be the trigger that brings together all our resources and skills as a single unit, and thus serve the total individual. Only in this way can we clear the maze and restore that sense of participation and acceptance on the

part of the citizens of Manitoba. We must organize our efforts and activities less by internal standards and more by external demands."

H. & S.D.'s present course involves continued efforts to develop a wide range of community-based services. This objective is balanced by a stated desire to obtain the best possible return on the investment of human and financial resources through the effective organization and co-ordination of service delivery systems. Particular attention is also being accorded the preservation of local community interests and involvement by people in Departmental services. A trend toward the decentralization and humanization of the existing system is being pursued.

H. & S.D. is not working in isolation. Other Provincial departments are also taking a critical look at the delivery of their services. There are definite trends toward identifiable points of contact for service recipients, toward single units of delivery wherever possible and toward citizen participation. The present course of re-organization is leading to the formation of regional governments in Manitoba. The intention is for the people of Manitoba to identify more closely with the political-administrative process underlying service delivery. This objective is a principal goal envisaged by the present Provincial Government.

The spatial expression of these public goals involves properties of accessibility and need. Accessibility concerns the minimization of interaction distances between

the set of facilities and the demand population. The Department's intention is to develop a more intimate service delivery by bringing services to the people. In the Winnipeg Region, H. & S.D. has attempted to locate facilities at points which are visible, identifiable and accessible to as many people as possible. In practice, the Department has located facilities on or near major thoroughfares, close to public transit routes and in proximity to other government buildings. Otherwise, the availability of suitable office sites and adequate floor space is currently the most important variable in location decisions. The selection criteria for this variable are founded on the economics of the physical plant in terms of land rent, construction and/or renovation costs and other capital outlays. Present facility locations are both visible and identifiable, but the question remains whether or not they are also accessible.

Need concerns the fulfillment of potential demand in the regional population. The Department's intention is to promote and maintain the health, social and economic well-being of Manitobans. In the Winnipeg Region, H. & S.D. has attempted to meet the service needs of all eligible individuals. Because some demand for services is ineligible and because other levels of government and private agencies deliver complementary services, the Department does not expect to fulfill all the potential demand in any given region. However, by identifying

service areas which have a discernable need for services, special planning can be applied to alleviate regional disparities in service delivery.

Therefore, the spatial goals of W.R.O.S. are related to the accessibility of and the need for services. Together, these variables constitute a comprehensive spatial goal for W.R.O.S. The objective function is,

'To maximize the accessibility of services to the demand population, while meeting the service needs of that population, wherever needs occur.'

The spatial attributes of this function are measured by minimizing the aggregate distances between facility locations and the locations of the regional population demonstrating a potential demand for facility services. For the purposes of this research, the objective function is restricted to the Winnipeg Region and the present Income Security District boundaries defined in W.R.O.S.

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CHAPTER 3 EVALUATION

The E-Index Technique

The Index of Effectiveness (E) is based on a technique proposed by Massam (1972:4-6) in a resource paper on "The Spatial Structure of Administrative Systems". Massam defines an accessibility measure of the location of a facility with respect to the distribution of demand population in a service area. Accessibility is defined in terms of the Moment of Inertia of a service area and includes a distance-decay element. Unlike the proximal solution which assigns demand points to the nearest facility, this technique attempts to minimize accessibility distances by finding the Centre of Demand for the distribution of demand points. The distance-decay element biases accessibility by multiplying the weight of a point by the square of the distance, thereby weighting very heavily those points furthest from the centre.

The technique also incorporates a measure of need for services as the population element of the objective function. A potential demand technique is used as a surrogate measure of need. The purpose is to minimize the aggregate distances between facility locations and the population in need of services by locating facilities at the Centres of Demand in service areas. The E-index

is calculated by comparing the aggregate accessibility for present District Office locations against the aggregate accessibility for facility locations located at the Centres of Demand in Income Security Districts. This should give an initial indication of how adequately W.R.O.S. maximizes the accessibility of District Offices to the population in need of Income Security Services.

In order to determine the E-index, a four-step procedure is followed. First, the aggregate accessibility distances for present Income Security District Offices are calculated in the formula,

$$A_j = \sum_{i=1}^n d_{ij}^2 p_i$$

where an Income Security District is made up of n demand points, j is the District Office, d_{ij}^2 is the square of the distance between each demand point and the District Office and p_i is the potential demand for Income Security Services at each demand point.

Second, the co-ordinates of the Centre of Demand are calculated. The demand points are located within a co-ordinate system and the interpoint distances are measured. The X co-ordinate of the Centre of Demand is given by,

$$X_{CD} = \frac{\sum_{i=1}^n x_i p_i}{\sum_{i=1}^n p_i}$$

and the Y co-ordinate of the Centre of Demand is given by,

$$Y_{CD} = \frac{\sum_{i=1}^n y_i P_i}{\sum_{i=1}^n P_i}$$

where x_i and y_i are the co-ordinates of a demand point. In this way, the Centre of Demand method calculates the means of the X and Y co-ordinates for a distribution of weighted points. The resulting co-ordinates (X_{CD}, Y_{CD}) give the location of one possible point in the distribution which minimizes aggregate weighted distances.

Third, the aggregate accessibility distances for Centre of Demand locations are calculated in the formula,

$$A_{CD} = \sum_{i=1}^n d_{iCD}^2 P_i$$

where CD is the Centre of Demand and d_{iCD}^2 is the square of the distance between each demand point and the Centre of Demand.

Fourth, the Index of Effectiveness (E) is defined as,

$$E_j = \frac{A_{CD}}{A_j} = \frac{\sum_{i=1}^n d_{iCD}^2 P_i}{\sum_{i=1}^n d_{ij}^2 P_i}$$

If the quotient is equal to 1.0, the District Office is located at the Centre of Demand. As the value decreases below 1.0, the distance between the District Office and the Centre of Demand increases. Therefore, the closer

the index number approaches 1.0, the more effective should be the flow of services to the demand population in need of Income Security Services.

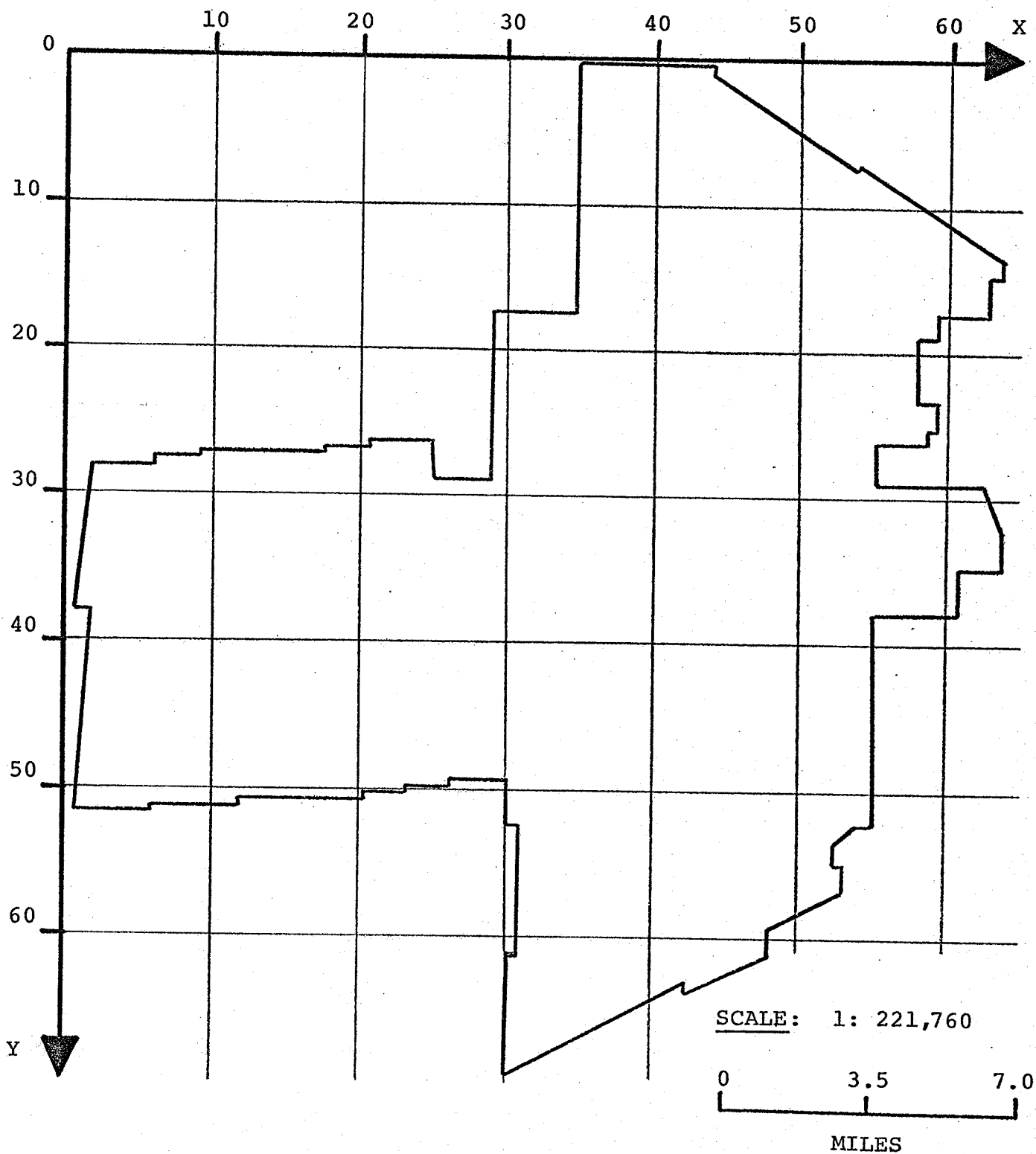
Data Requirements

The data requirements for the E-index technique are in three parts. First, the given data involves the plotting of supply and demand points as two-2 figure Cartesian co-ordinates. Map #5 shows the grid overlay for the co-ordinate system. Supply points are located at District Office facility locations, while demand points are located at the approximate centres of the demand areas contained within each office's service area. Demand areas are designated as the Statistics Canada census tracts of the Winnipeg Region. The Appendix gives a list of the census tracts aligned with each Income Security District. The co-ordinates of District Office locations and the approximate centre of each census tract are also given. This listing is referenced against Map #6 which depicts the census tracts of the Winnipeg Region.

Second, distance data is computed as straight-line distance between facilities and demand points. Pythagoras' Theorem is used to calculate these interpoint distances. The general formula for the distance calculation is,

$$d_{ij}^2 = (x_j - x_i)^2 + (y_j - y_i)^2$$

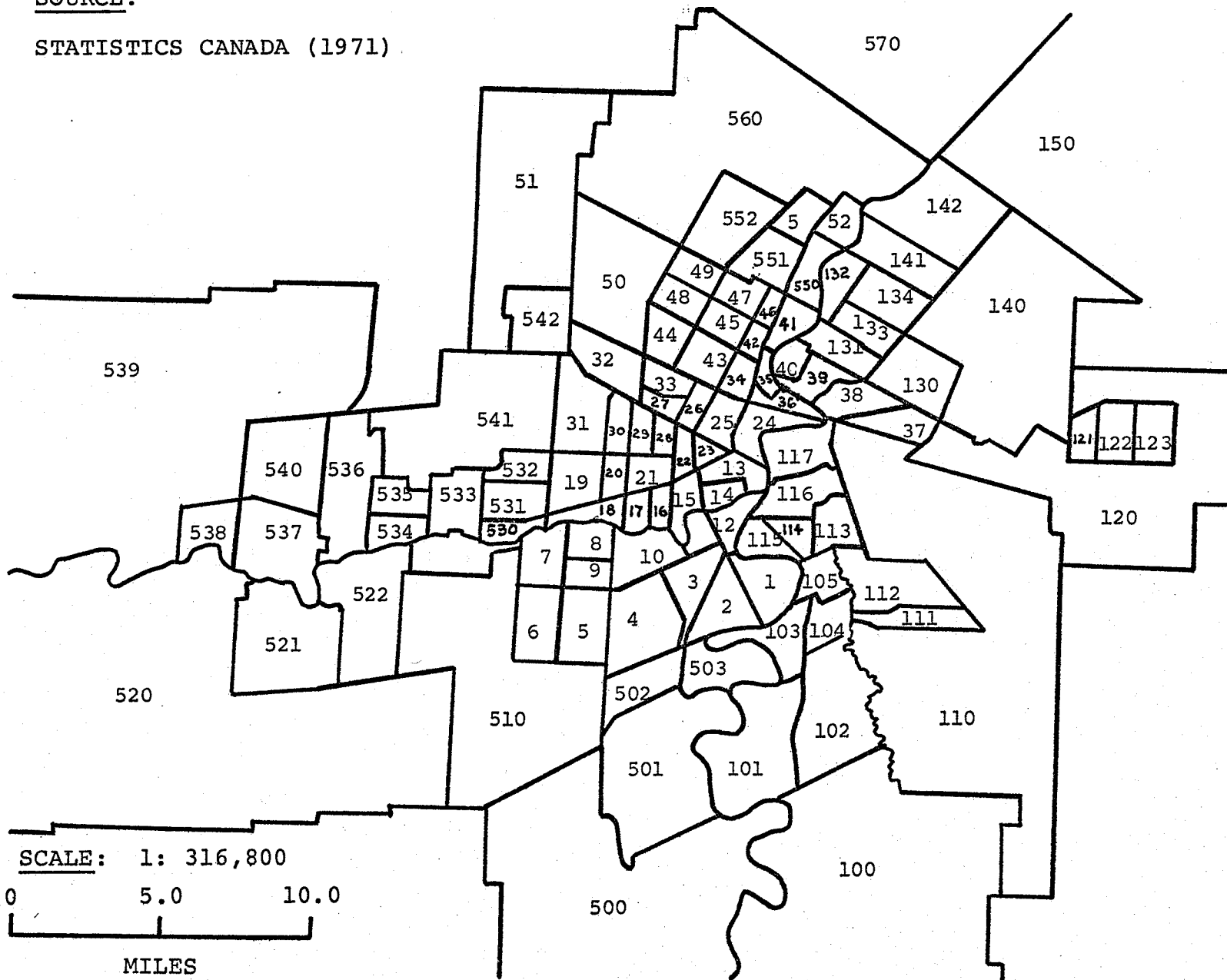
MAP #5 - THE WINNIPEG REGION: GRID
CO-ORDINATE SYSTEM



SOURCE:

STATISTICS CANADA (1971)

MAP #6 - THE WINNIPEG REGION:
1971 CENSUS TRACTS



where d_{ij}^2 is the distance-decay element, x_j and y_j are the co-ordinates of the District Office and x_i and y_i are the co-ordinates of a demand point. The distance data for present and distance-minimizing facility locations are listed in the Appendix.

Third, demand points are assigned weightings, expressed as the population in need of Income Security Services at each demand point. The measure of need adopted here is based on Harvey's (1972:93) concept of potential demand mentioned in Chapter 1. Because of other social services jurisdictions (Federal Government, City of Winnipeg, private agencies) in the Winnipeg Region which complement H. & S.D. services and because of numerous eligibility, production and distribution constraints, supply is not expected to fulfill public needs. Rather, areal variations in the accessibility and servicing of the population in need of Income Security Services are meant to identify District Offices which fail to achieve standards of service delivery acceptable to the Department. These results can then be combined with other location criteria to form the basis for more informed spatial planning in the Winnipeg Region.

The first step in deriving levels of potential demand involves determining the eligibility criteria for supplying Income Security Services. These criteria are catalogued by case category in the Social Allowances Act and in H. & S.D.'s "Social Allowances Administrative Manual".

The criteria are applied by District Office staff in many diverse ways, depending on the economic and household situation of the client. Need is the only demonstrated common criterion for service eligibility. If clients meet needs tests, they receive Social Allowances. If not, their applications are rejected and, if necessary, they are referred to other agencies or levels of government.

The diversity of service cases means that eligibility criteria can be applied in many different ways. Therefore, in order to overcome computational problems associated with the application of eligibility criteria to cover every type of case situation handled by W.R.O.S., a reliable yardstick is proposed as a surrogate of need for Income Security Services. The surrogate suggested here is poverty.

Poverty is a very complicated concept with many interpretations. For example, the Economic Council of Canada (1968:104-105) defines poverty as "...insufficient access to certain goods, services, and conditions of life which are available to everyone else and have come to be accepted as basic to a decent, minimum standard of living." Statistics Canada is more specific in its designation of poverty:

"A basic assumption for the main set of estimates was that any family or individual spending more than 70 per cent of total income on food, clothing, and shelter was in a low-income situation and likely to be suffering from poverty." (Croll, 1970:1357).

Poverty also involves other social, psychological and economic variables. Many of these variables are associated with disadvantaged people who are in need of social services, like Social Allowances.

Although poverty appears analogous to the need for Social Allowances, it remains to convert the concept to a meaningful quantitative surrogate. The Special Senate Committee on Poverty (1971:5) accepts poverty lines as a measurable surrogate and explains this choice as follows:

"In the simplest terms, a "poverty line" represents the level of income which divides the family of a particular size, place, and time into the poor and the non-poor. A poverty line is both conceptual and statistical. It is conceptual in that it permits us to define the scope of poverty in a society; it is statistical in that it provides us with a means of counting the number of poor. Once we know the size of the problem, we can begin to estimate the cost of solving it, the feasibility of proposed programs. A poverty line provides an operational definition of poverty."

There are several ways to devise poverty lines.

Statistics Canada/Economic Council of Canada (1968:108-109) lines are based on subsistence levels as minimum poverty lines. Adams, Cameron, Hill and Penz (1971:15) use relative levels to define maximum poverty lines. The Special Senate Committee on Poverty (1971:6) compromises these approaches and offers the following derivation of poverty lines:

"Given these various alternatives, it seemed reasonable to the Committee that in establishing a poverty line, we should take account both of the minimum subsistence-level budget estimates of Statistics Canada, cost-

of-living adjustments, adjustments for family size, and of relative income-deprivation. The Committee poverty line, therefore, represents a compromise solution which takes the budgetary needs as a starting point and adjusts the resulting line to take account of the yearly increase in average income. Because all these approaches share a number of characteristics, they do not produce markedly divergent results."

The Senate lines and comparable poverty lines for 1970 are listed in Table #1. If potential demand is to be calculated from 1971 Canada Census data using Senate poverty lines, these lines require updating. The extrapolated Senate poverty lines for Canada for 1971 are described in Table #2. The lines are based on a 1971 household income of \$2500 for one individual. This base is expanded according to household unit size using Family Size Equalizer Points (Special Senate Committee on Poverty, 1971:208-216). Household unit size and household income are used instead of the family unit size and family income variables found in other poverty line derivations. This is to accommodate the presumption that one Social Allowances case equals one household. The poverty lines are rounded to the next lowest multiple of 500 to comply with 1971 Census income intervals.

Potential demand for Social Allowances is drawn from a Statistics Canada computer print-out. The computer analysis involved cross-referencing household unit size and household poverty lines for each census tract in the Winnipeg Region. The number of households with incomes

TABLE #1 - POVERTY LINE COMPARISONS FOR CANADA 1970

Family Size	Poverty Line (\$)	Senate Committee ¹	Statistics Canada/ECC ²	Relative ³	Opinion Poll ⁴
1		2310	1900	2100	3200
2		3860	3200	3400	4900
3		4630	3900	4100	5700
4		5400	4500	4800	6500
5		6170	5200	5500	7400
6 - 9		6940(6) 7710(7)	5200	6200	8200
10		10020	5200	8900	11500

1. Special Senate Committee on Poverty (1971:216)
2. Economic Council of Canada (1968:108-109)
3. Adams, Cameron, Hill and Penz (1971:15)
4. Adams, Cameron, Hill and Penz (1971:15)

TABLE #2 - EXTRAPOLATED SENATE POVERTY LINES FOR CANADA 1971

Household Unit Size	Family Size Equalizer Points	Poverty Lines(\$)	Household Income Intervals (\$)
1	3	2500	2500
2	5	4165	4000
3	6	5000	5000
4	7	5831	5500
5	8	6664	6500
6	9	7500	7500
7	10	8330	8000
8+	12	10000	10000

below 1971 poverty lines is listed by census tract and aggregated by Income Security District in the Appendix. There were 106 census tracts containing 166,620 total household units considered in which 34,410 households were below the poverty lines. This means that approximately 21% of all the households in the Winnipeg Region were below the poverty level. The distribution of potential demand is shown on Map #7.

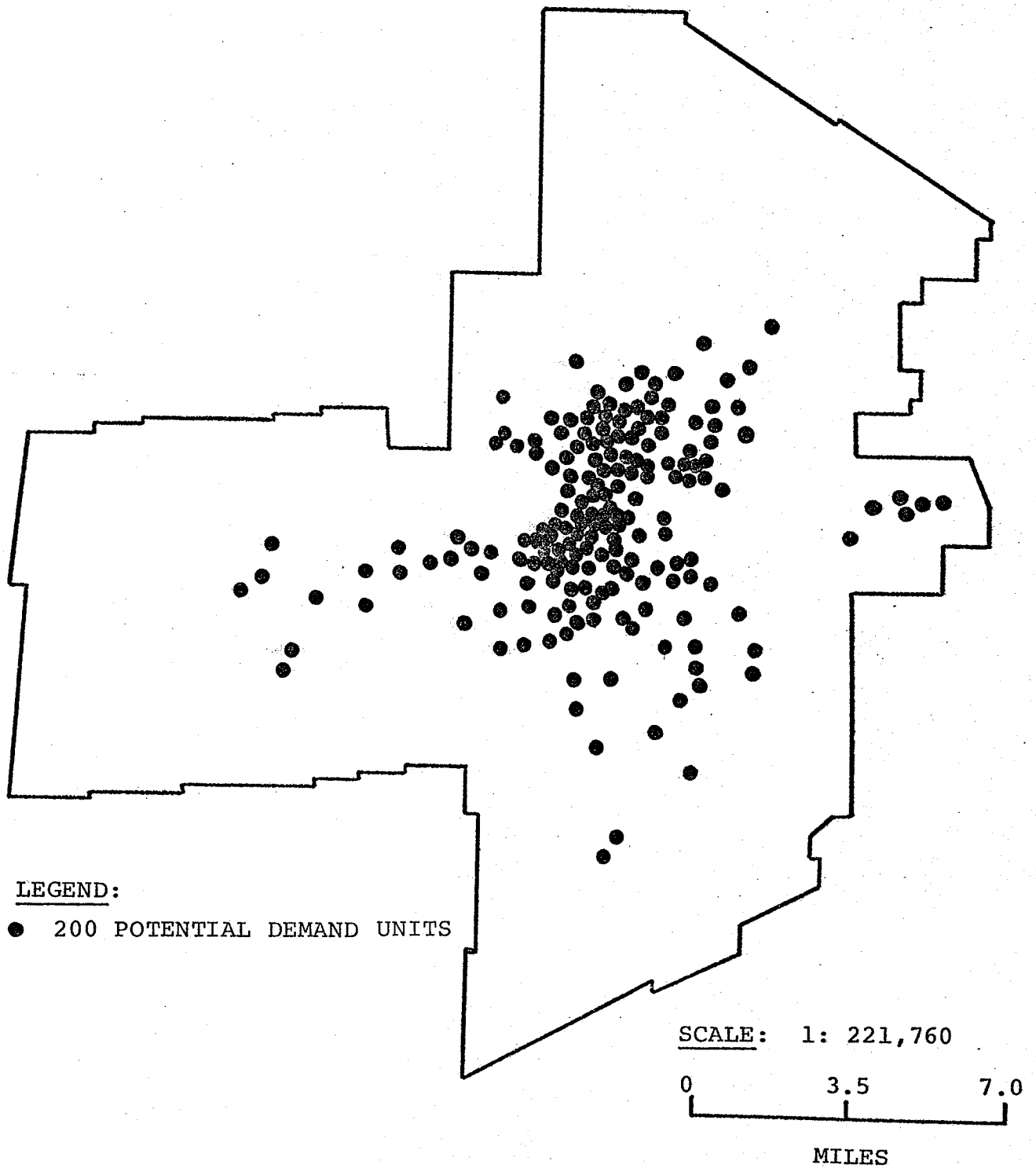
Evaluation Conclusions

Measures of A_j , X_{CD} , Y_{CD} and A_{CD} for each Income Security District are given in the Appendix, while the Centres of Demand have been placed on Map #8. The E-index values derived for the four Income Security District Offices are:

Winnipeg North District Office	.535
Winnipeg Central District Office	.788
Winnipeg South District Office	.678
Winnipeg West District Office	.627

The mean E-index for Income Security facilities is .675. Only Winnipeg Central District Office has an E-index value significantly above the mean. The only Income Security location which appears excessively ineffective is Winnipeg North District Office. The other locations appear slightly more effective. However, it is apparent that North, South and West offices require special geographical planning to correct disparities in the

MAP #7 - THE WINNIPEG REGION: DISTRIBUTION OF
POTENTIAL DEMAND - 1971



MAP #8 - THE WINNIPEG REGION: CENTRES OF DEMAND
FOR PRESENT INCOME SECURITY DISTRICTS

E-INDEX VALUES:

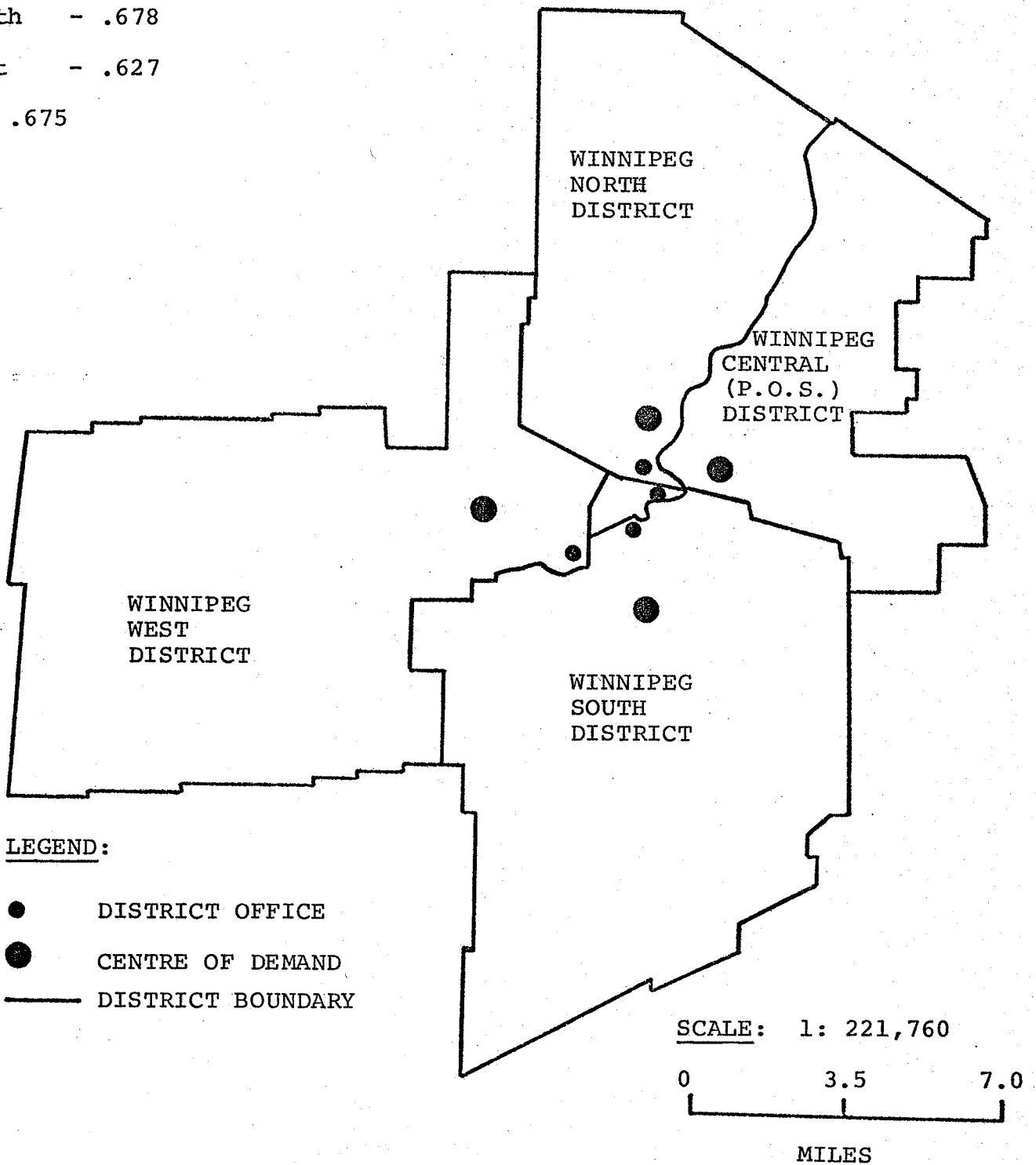
North - .535

Central - .788

South - .678

West - .627

$\bar{E} = .675$



accessibility of facilities to the population in need of services.

Although this technique provides only an initial indication of spatial effectiveness, the Centres of Demand developed here can be used as a basis for relocating facilities to points which are more accessible to the population in need of services. These statistically-derived locations explain most of the variation between present and optimal facility positions. However, the final location decision should also be modified by other location criteria, such as the availability of economic office locations and adequate floor space, the proximity to transportation routes, the visibility and identifiability of office buildings and the direction and influence of future population growth. This is to accommodate the real-world constraints which govern facility location decisions.

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CHAPTER 4 LIMITATIONS

Analytical Limitations

Measures of spatial effectiveness, such as the technique applied here, are constrained by some important assumptions, generalizations and manipulations. In most cases, constraints are accepted to facilitate the measurement of the many complex features of public administrative systems. However, these constraints also pose serious analytical limitations which inhibit objective planning. As a result of planning weaknesses, measures of spatial effectiveness are only proposed as initial indicators for evaluation purposes. They provide a general starting point from which more specific spatial analysis can be applied to public administrative systems.

Most of the problems associated with spatial effectiveness techniques are related to normative assumptions. It is generally assumed that the behaviour of the demand population is rational and normative. It is presumed public interests are equivalent to aggregated individual interests. As such, all members of the demand population are decision-makers and their aggregate needs and demands are divisible on an individual and equal basis. In reality, these conditions do not exist. However, in practice, the assumption is made expedient by the multiple and complex behaviour of the demand population and by the wide acceptance of this assumption by that population.

Several geographers have commented on the assumption of normative conditions for this form of analysis. For instance, Scott (1971:2) observes that for location-allocation problems "...the model is a purely normative mechanism. That is, the model seeks not so much to describe real systems, as to represent an optimized ideal state to which real systems (whether centralized or decentralized) aspire." Similarly, Symons (1971:58) states that "...location decisions made with the location-allocation model of efficiency will, to the extent that they reflect assumptions that conflict with reality, fail to achieve the desired goal of minimizing the total social disutility inherent in the provision of a good or service." ReVelle, Marks and Liebman (1970:692) complete the appraisal of these techniques by insisting that,

"These methods of analysis are no panacea for pouring out "optimal" solutions, since the real world with its immense complexity tends to defy exact analogs. The results of analyzing these models may be optimal and exact in reference to the models, but they are not necessarily the optimal results for the real world. Rather, the results are regarded as an aid to the analyst's intuition and not as a replacement for it. Indeed, the greatest aid the models provide is a better understanding of the sensitivity of solutions to changes in parameters, constraints or criteria. It remains for the analyst to select from among the "good" solutions those which he feels meet the needs and demands of his region most closely."

The techniques are further limited by the adoption of Euclidean space. Massam (1972:3) criticizes the assumption of Euclidean space and joins in the view that,

"...earth-space is made of a surface of varying friction, and that the separation of points and the effort in moving from one to another is related to the frictional force of the intervening space. Points may be joined by a fast super-highway or a dirt track, and the straight-line distance does not reflect truly the time, effort or cost of moving between places. Rectangular road patterns, traffic congestion, mode of transportation all serve to produce earth-space of varying degrees of accessibility."

Distance data is often computed as straight-line distance between points of supply and demand. If the point distribution is placed within a Cartesian co-ordinate system, distance calculations are subject to Pythagoras' Theorem. Physical distance (road mileage, travel time), economic distance (transport costs) or social distance (intervening opportunities) are more accurate distance measures because they account for physical and socio-economic barriers to movement. However, they are also more difficult and expensive to derive.

Many location-allocation studies have chosen measures of distance-decay to approximate interaction distances. For instance, Gould and Leinbach (1966:205) arbitrarily assign a distance weighting for unpaved versus paved roads by multiplying unpaved road mileages by two. Symons (1971:63) also includes a distance-decay parameter k in the calculation of accessibility at a point in space. Others, like Massam (1972:4-6), have squared the distance. The square of the distance is required in order to make the derivation of the Centre of Gravity (Second Areal Moment) analytically accurate. Massam (1972:6) comments

on the use of the Centre of Gravity (called the Centre of Demand in this research) as follows:

"It should be noted that when we calculate M_B or M_G we multiply the weight of the point by the square of the distance; therefore points which are twice as far from the center carry a weight of four times, and those three times as far carry a weight of nine times. We are biasing our measure by weighting very heavily those points which are furthest from the center. Recently a method has been found to calculate the point within the set of points which minimizes the linear distance to all points. This is the point of minimum aggregate travel (M.A.T.). The technique for determining this point is complex and until now most studies have used the location which minimizes the square of the distance (this is the center of gravity). This is easy to calculate and provides a unique answer; the point of M.A.T. is found on a trial and error basis and there need not be a unique position for it."

However, it is not necessarily accurate to assume that the square of the distance or other functional distance relationships represent empirical distance-decay or accessibility.

A final note concerns the development of more comprehensive measures of spatial effectiveness. Many measures of geographic accessibility fail to incorporate more meaningful socio-economic, attitudinal or functional measures of the population element. The designation of a serviced population instead of a demand population in location-allocation solutions results in deficiencies for practical problem solving and is often inadequate for planning purposes. These solutions have been pre-occupied with the economic efficiency of distributing

facilities and services rather than with the identification and measurement of other public goals. These other public goals enlist social values, like equity, equality, justice and need.

Although social values are often difficult to measure, some geographers recognize the need to incorporate them with more traditional efficiency algorithms. Recent geographical literature has suggested instilling a social awareness in location-allocation solutions. For instance, Peet (1972:6) advocates the development of a more humane human geography for understanding the environment of socio-economic problems. He argues that location models should be based upon a new premise of efficient locations derived from social and economic needs. A more comprehensive index which integrates accessibility distances with some spatial measure of social values is required. In this way, the population requiring services rather than the population served is identified and solutions to maximize accessibility are made more responsive to public interests.

When these analytical limitations are recognized and the techniques are used in conjunction with related spatial measures of effectiveness, they can be useful to the evaluation and planning of public administrative systems. Unfortunately, location-allocation models have not been modified and applied as appropriately as possible to practical problems. Holmes and Webster

(1973:1) note that, "In instances where models have been applied to problem situations the latter generally have been used simply as examples to demonstrate the potential uses to which the model, the main focus of interest in the study, could be applied...." There has also been a prevalent trend to define spatial goals around techniques rather than to formulate comprehensive measures which approximate the real identity of these goals. Consequently, most measures of spatial effectiveness fail to take into full account the comprehensive range of spatial goals in government today.

Practical Limitations

In addition to the above analytical problems, the techniques used in this evaluation are characterized by several practical limitations. These limitations are a function of the method and data set used. Problems are associated with the choice of a grid overlay, the constitution of areal units, potential demand data and the comparability of results.

The choice of a grid overlay as a co-ordinate system is based on an accepted scale for detail and computational time and costs. The base-map scale and the corresponding grid scale selected affect the accuracy of pinpointing co-ordinate locations for the system's spatial components. In general, the larger the map scale and the finer the grid overlay, the more accurate are the co-ordinates derived.

In this case, a small-scale map and a medium-scale grid were used, thus creating some room for error in pin-pointing co-ordinate locations. In particular, the placement of demand points at the centres of demand areas (census tracts) is difficult and inaccurate, regardless of scale. As a result of the imprecise designation of co-ordinates, there is a built-in error factor in E-index calculations. If the index is employed only as an initial indicator for facility relocation, the error factor should not pose a serious detriment to the technique.

The constitution of areal units for population data also limits the evaluation. Arbitrary decisions on the number, size (level of aggregation), extent and shape of demand areas bias index results. In general, the greater the number, the lower the level of aggregation, the smaller the extent and the more uniform the shape of demand areas, the more accurate are location-allocation solutions. In this case, there are 106 census tracts considered. The census tracts have a high level of aggregation and irregular extents and shapes. These conditions distort the relevance of index calculations to the real-world situation. But again, the error factor is acceptable, given the intended use of the techniques as initial indicators, not planning solutions.

Inherent shortcomings in the computation and quality of the potential demand data set also detract from the accuracy of techniques. For instance,

information on the number of households per census tract below the poverty lines is hampered by Statistics Canada's data collection methods. The three to four year time-lag between the collection and tabulation of 1971 Census information means that the population data inscribed in E-index solutions is obsolete for up-to-date planning. In turn, restrictions imposed by the Federal Government's sampling of only one-third of Canadian households for household size and income variables mean that Census totals are derived from projected estimates. Census totals are also rounded off to the nearest multiple of 5 to protect confidentiality limits. These Census restrictions create some inaccuracy for calculating potential demands.

The type of surrogate measure used to derive potential demand also influences the nature and quality of E-index results. In this case, potential demand data are a function of the technique and poverty lines chosen to measure the need for Income Security Services. The extrapolated Senate lines selected here ignore significant household characteristics and geographical location in favour of a simple operational definition. There are other factors affecting households, such as social and psychological problems, which play a large role in determining Income Security needs. In addition, poverty lines vary from place to place according to local economic circumstances, like the cost of living. Therefore, the

proposed lines are not strictly representative of actual Income Security needs in the Winnipeg Region.

Poverty lines are also not equivalent to benefits paid out under the Social Allowances Act. In all cases, poverty lines are slightly higher than Social Allowances. This is attributable to the inclusion of a work incentive factor in eligibility criteria which encourages recipients to supplement benefits with earned income. As recipients acquire additional income, their Social Allowances benefits are diminished at an increasing rate, until the benefits are nil. In most cases, discrepancies between poverty lines and corresponding Social Allowances payments are marginal.

A further complication involves the assumption that one Social Allowances case equals one household. It is true that for most Social Allowances cases only one individual from a single household is served. This applies most prevalently to Mothers' Allowances, Long-term and Temporary Disability Allowances and Student Aid cases. But in other cases, particularly those involving Aged Social Allowances and Special Dependent Care, more than one individual may be served in the same household. There are also several dual cases in which more than one service is supplied to a single recipient. Therefore, aggregate levels of serviced demand and potential demand are not strictly comparable because Social Allowances cases are not always supplied on a one to one basis to

households.

Poverty lines also fail to explain the void left between service levels and the potential demand for Income Security Services. There were 13,301 service recipients in the Winnipeg Region out of a total Provincial caseload of 23,619 as of December 31, 1974 (Manitoba Department of Health and Social Development; 1974a:2). But there were 34,410 households in the Winnipeg Region below the poverty lines. Therefore, only 27% of the potential demand was fulfilled by W.R.O.S.'s service delivery. The remaining 73% was split between other social welfare concerns, plus an unserved residual. As of December 31, 1974, the City of Winnipeg covered 7,656 of the financial assistance recipients not served by W.R.O.S., while private agencies specializing in Special Dependent Care augmented W.R.O.S.'s services by handling 446 cases and 1,141 recipients (Manitoba Department of Health and Social Development, 1974b:19,25). The remainder were served by the universal programs of the Federal Government and by other social services concerns. Again, individuals may receive various combinations of these services from different jurisdictions. However, an uncontacted or unserved residual can remain due to the effects of numerous eligibility, production and distribution constraints on service delivery.

A final note concerns the comparability of spatial

effectiveness between different administrative systems. At present, it is inadvisable to compare index results with those developed in other studies, unless identical analytical techniques and scales of measurement apply and similar services are measured. For instance, the E-index values derived by Massam and Burghardt (1968) in a study of eight Provincial Departments in Southern Ontario can not be compared to the index values derived here. Variations in the techniques, grid overlays, areal units and services studied do not permit meaningful comparisons. More studies based on similar methodologies are required before a basis for index comparisons is available.

With these practical limitations in mind, it is possible to gain an improved perception of some of the spatial problems facing W.R.O.S. This only represents the initial phase of analysis. Other detailed evaluation and planning are required before W.R.O.S can approach the fulfillment of its spatial goals. In particular, the development of an even more comprehensive measure of spatial effectiveness and improvements in available data sets are required. Then, it may be possible for W.R.O.S to initiate more informed planning leading to improvements in the spatial effectiveness of service delivery.

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CHAPTER 5 CONCLUSIONS

In the previous chapters, an administrative system was evaluated and some of the limitations for measuring spatial effectiveness were examined. The aim was to gain an improved understanding of the mechanism required to measure the fulfillment of spatial goals in public administrative systems. However, this only represents a preliminary investigation. Other studies, whether theoretical or applied, general or specific, are required to fully explore the relevant concepts and methods. Some of the concerns requiring the particular attention of geographers and government researchers are discussed below.

Suggested Research

Geography can make a significant contribution to the planned development of public administration. Massam (1972:37) notes that,

"...the study of administrative patterns is a fascinating field which allows the geographer to formulate and test hypotheses about man's organization of space, and also to assist in a very practical way by applying his knowledge to real-world problems. The geographer cannot stand alone in this field; he must cooperate with workers in other disciplines such as economics, operations research and business management. Also he must be prepared to use the tools of these subjects and so enrich his own discipline."

Whether this contribution is theoretical, practical or both, a more meaningful and comprehensive approach to

planning the geography of public administration is required. In particular, there should be a greater emphasis on promoting the fulfillment of public goals by means of ongoing, objective evaluation. Holmes and Webster (1973:3) comment on the need for this type of rigorous planning:

"In the public sector re-evaluation is usually instigated by mounting public dissatisfaction with the effectiveness of the existing system. The continued use of an out-dated and inefficient public facility system over extended periods of time both reduces its contribution to the common good and threatens the administrative control of the system. Therefore, it is advantageous to both the public administrator and the consumer population to have periodic re-evaluation of the efficiency of such delivery systems."

In addition to the economic requisites currently stressed in most administrative development, there should be a concomitant acknowledgement of social values which reflect public interests. It is important to know how adequately government fulfills public goals, as well as how economically government functions in carrying out these goals. Since the effectiveness and efficiency of public administration systems are interrelated, discrepancies in service delivery and/or administrative diseconomies can result from a failure to consider both objectives in planning solutions.

Current measures of spatial effectiveness are only applicable as initial indicators for evaluating public

administrative systems. They would be more incisive to resolving the geographical problems of these systems if the underlying concepts and methods were more accurately and relevantly defined. The restrictions imposed by the normative assumptions and limitations mentioned in Chapter 4 must be reconciled before spatial effectiveness can be more aptly defined and operationalized as a formative planning solution. Most notably, evaluations should be a function of the spatial goals measured, not of available techniques and data sets. The elements of the functional relationship should be defined precisely in accordance with the spatial goals studied so that the appropriate variation of the location-allocation problem (or other functional relationship) is applied.

Future research in this area should also stress the development of more comprehensive measures which reflect the contemporary concerns of government and society. For instance, there is an ongoing objective in Geography to develop more accurate distance measures. Most distance measures are weighted to allow for various spatial elasticity effects. However, in the case of government service delivery, it is more relevant to consider the perceived accessibility of the population applying for services. Perceptual variations in the demand population's access to facilities are not accounted for in current location solutions. If the demand population

is free to choose any one among several locations in a set of facilities from which to receive services, the nearest facility (with modifications from other social preferences) is most commonly selected. However, when the administrative system assigns the demand population to facilities without choice, the locations the system selects as the most accessible for the total demand population may not always be the locations individual consumers perceive as the most accessible to their residences, whether accessibility is measured in real or perceptual terms.

A more comprehensive definition of the population element is also required. It is becoming more important in government today to delimit the population in need of public services so that more informed planning can be initiated in anticipation of probable service demands. However, measures of need are not always readily developed. Surrogates applied in lieu of the eligibility criteria for supplying services are notably deficient for deriving meaningful levels of need. Statistically-derived potential demand fails to distinguish between essential and non-essential service responses.

Although it provides a rough approximation of need, potential demand does not account for needs fulfilled by other service jurisdictions and for uncontacted needs. The latter often results from the administrative system's

failure to educate the demand population about service opportunities. A more precise portrayal of need could be obtained if only one service jurisdiction existed or if all jurisdictions for a particular service category observed the same eligibility criteria. In these cases, a complex procedure for operationalizing the eligibility criteria as a measure applied across the relevant characteristics of the regional population could be designed. However, these would only be temporary measures of need because of the changing nature of the demand population.

Measures of spatial effectiveness can not be proffered as prescriptive or up-to-date planning solutions. However, the more comprehensively these measures are defined, the more useful they can be to geographical planning. They offer a formative basis for other specialized studies which formally aim to resolve geographical deficiencies. By contemporizing these measures and by applying them widely in many practical studies, a comparative base can be developed in which the spatial goals of government today are evaluated for a broad range of public services. The responsiveness to public interests and the analytical comparisons emanating from this approach could be useful to the development of improved planning practices in government.

Planning Applications

With a few exceptions, geography has played only a minor role in the past development of H. & S.D. The Department requires more rigorous geographical planning to identify problem areas and to initiate more informed development decisions. The location-allocation solution applied in this research provides a starting point for determining optimal facility locations and for resolving other spatial problems. However, the solutions are not absolute. They are constrained by various assumptions and limitations and should be modified further by other real-world location criteria. In turn, the Department requires ongoing, objective geographical evaluation to optimize service delivery to the public and to reduce operating costs. The intention would be to increase the co-ordination and consistency of service delivery, to improve policies and practices governing administrative matters and to co-ordinate health and social services jurisdictions to eliminate service duplication.

Before any of these objectives can be attained, H. & S.D. must develop more useful research data. The Department should compile more complete service data, including the automation of all case characteristics. The present Social Allowances computer file only entails a 70% sample and the case characteristics are inadequate for planning purposes. The absence of any automated

data for Personal Services and other H. & S.D. services also restricts the geographical planning of these services. Furthermore, the use of postal code areas instead of census units for the areal coding of Departmental data detracts from the quality of possible research. H. & S.D. employed census coding for the Social Allowances file prior to September, 1973, but has since adopted postal area coding for convenience. However, the use of postal code areas gives the mailing address of clientele and not the desired residential (household) location. Information comparisons with the Canada Census data file would be facilitated if the Department coded service data by census units. A special report prepared by Statistics Canada (1972) outlines some of the statistical, administrative and planning benefits which could result from such coding and data referencing.

With these improvements to Departmental data, it would be possible to implement a number of more informed planning innovations. In particular, the implementation of an alternative administrative plan for Winnipeg Region service delivery would be facilitated. A more thorough evaluation, starting with a study of W.R.O.S.'s spatial effectiveness, would aid in the understanding of the kinds of spatial development required. If necessary, wholesale re-organization of the present system could then be initiated to reduce operating costs and make service

delivery more responsive to public needs and demands.

The design of an alternative administrative plan would be contingent on the geographical shortcomings of W.R.O.S. The main problem appears to concern the Department's development of three distinct spatial systems in the Winnipeg Region. Disjoint sets of facility locations and intersecting service areas partition Income Security, Personal Services and Separated Services functions. These systems adhere to the Department's policy of locating facilities in the areas they serve, but fail to fully observe the policy of centralizing Income Security in the region and decentralizing Personal Services to the community level.

In addition, geographical factors are insufficiently weighted in delimiting service areas. Some service areas are conveniently delineated by former city and municipal boundaries and somewhat less by more significant physical features, such as the Red and Assiniboine River axes. The areal pattern is also deficient in service areas defined by common service needs, community identity and equal population and caseload levels. The lack of conformity of Winnipeg Region service boundaries to more familiar City of Winnipeg Community Committee Areas also hinders ready public identification with H. & S.D. service jurisdiction. Consequently, Departmental clientele are confused by overcomplicated spatial systems. Streamlined

and consistent spatial planning to meet community needs is essential before the same can be realized for W.R.O.S.'s internal administration.

A number of alternative administrative plans can be suggested to resolve these problems and to improve the spatial effectiveness of W.R.O.S. The geographical alternatives for service delivery range from total centralization to total decentralization. In the former case, H. & S.D. clientele would travel to a single central location in the Winnipeg Region for the complete array of community services. This would be the most economic method for the Department, but would not correspond to public interests for accessibility to services. In the latter case, H. & S.D. clientele would travel to geographically-assigned, community-based locations where each facility would distribute the complete array of community services. This would be the most responsive method for the public, but would not correspond to the Province's interest in economizing service delivery costs.

A consistent, people-oriented spatial plan is required to meet accessibility and need requisites. Such a plan is currently being considered by H. & S.D. The plan represents a compromise between total centralization and total decentralization and is in keeping with W.R.O.S.'s spatial goals. Furthermore, it lends itself readily to community needs, offers legislative and economic

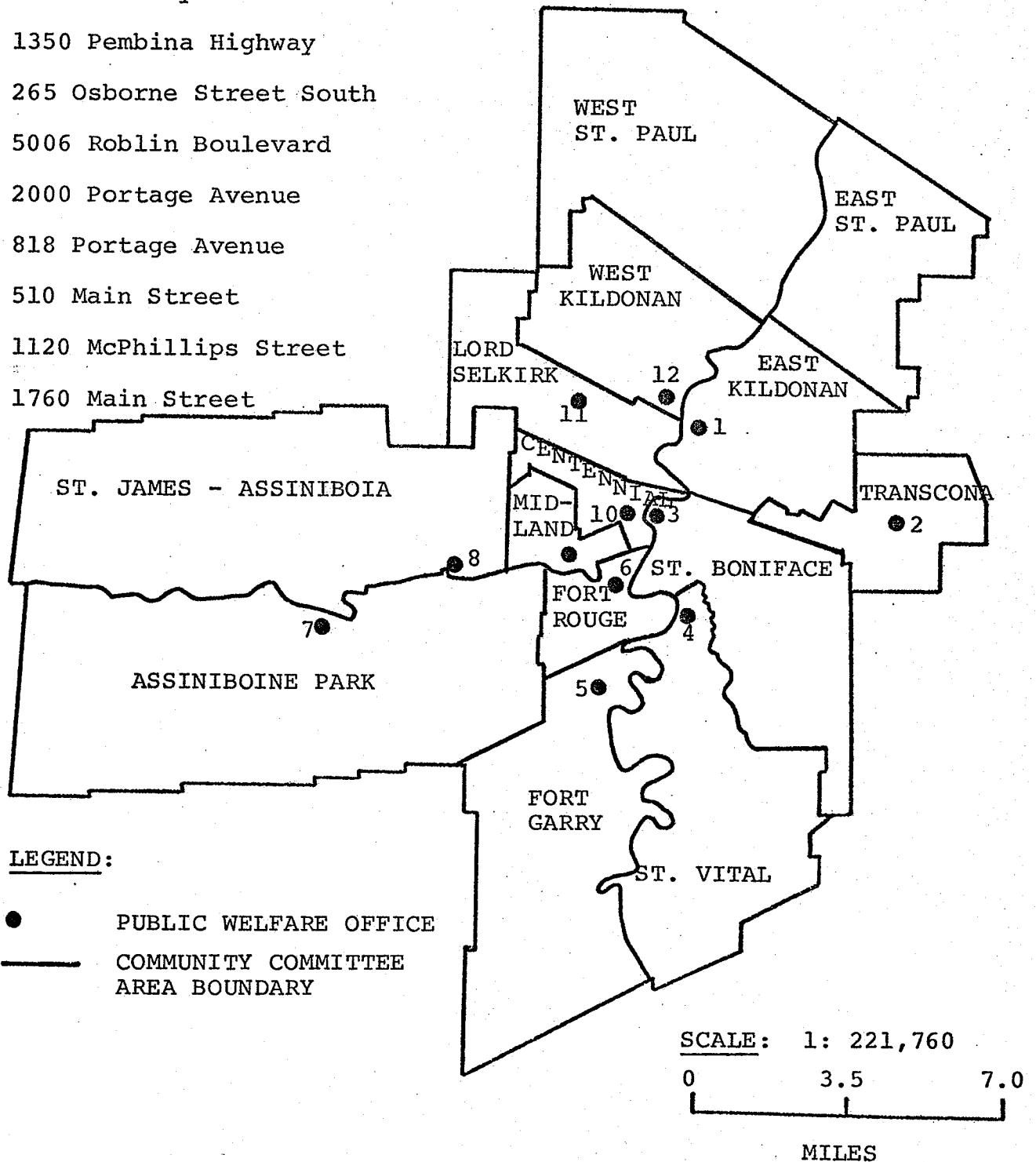
feasibility and would minimize the disruption of Departmental clientele and staff during the implementation process.

The alternative involves two significant departures from the current system. First, the Administration component and Income Security administrative and paper processing (Service Clerks) would be centralized at one location in the Winnipeg Region. Neither clientele nor staff would travel to and from the location, since personal contacts would not be required to fulfill this facility's functions. Rather, the aim would be to provide an efficient and effective processing method and control of the financial program. All activities related to service delivery would be on a referral basis with other regional facilities and jurisdictions.

Second, Personal Services and the Income Security Intake and Evaluator functions would be decentralized and located more exactly at the community level. Both clientele and staff would travel to and from community locations to carry out service delivery. Facilities would deliver the complete array of community services and would be assigned to the twelve Community Committee Areas of the City of Winnipeg depicted in Map #9. The Rural Municipalities of East and West St. Paul would also be included in the sphere of the Winnipeg Region for cohesive health and social services planning. They would

MAP #9 - THE WINNIPEG REGION: CITY OF WINNIPEG
PUBLIC WELFARE OFFICE LOCATIONS AND
COMMUNITY COMMITTEE AREAS - DECEMBER, 1974

1. 755 Henderson Highway
2. 141 Regent Avenue West
3. 219 Provencher Avenue
4. 604 St. Mary's Road
5. 1350 Pembina Highway
6. 265 Osborne Street South
7. 5006 Roblin Boulevard
8. 2000 Portage Avenue
9. 818 Portage Avenue
10. 510 Main Street
11. 1120 McPhillips Street
12. 1760 Main Street



be allocated to the Communities of East and West Kildonan respectively.

This scheme represents a marked remodelling of W.R.O.S. on the lines of the City of Winnipeg Public Health and Public Welfare spatial systems. The future possibility of Provincial and City health and social services becoming housed under one roof, with or without separate legal jurisdictions, could be crucial to locating Winnipeg Region facilities. It might be feasible to locate some offices at present City sites, given adequate floor space conditions. The City of Winnipeg Public Welfare community office locations are marked on Map #9. The City's Public Health offices already coincide with W.R.O.S.'s health unit (Personal Services) locations.

Community Committee Areas were selected as the areal units for service delivery because of their relevance to community administration in the Winnipeg Region. These areas are delineated by such geographical factors as the Red and Assiniboine River axes, community identity, previous city and municipal boundaries and wards of equal population. This neighbourhood or community-based approach to the delivery of health and social services has met with success in other large metropolitan centres in Canada.

The alternative administrative plan would span a two to three year implementation period. The actual time

would depend on such factors as the acquisition of suitable facility locations and floor space, the establishment of an efficient inter-facility communications network and the development of a standard method of processing cases. If and when the alternative plan is accepted in principle, this research and other geographical evaluation could become informative to the location of facilities and to the design of associated systems and procedures.

Geography can also play a significant part in developing other geographical aspects of H. & S.D. For instance, measures of spatial effectiveness could be applied in the other six administrative regions to promote geographical evaluation and planning and to develop a comparative analytical base. In this way, styles of service delivery could be compared between regions and an overall service philosophy could be developed. Studies involving prioritized office location criteria, field staff functions (Intake Workers, Evaluators, Personal Services Workers) and the modes of transportation used in service delivery could also be reviewed in conjunction with these regional comparisons.

Future spatial developments in H. & S.D. will depend on administrative changes in other health and social services jurisdictions. At present, there is a jurisdictional overlap between the Province, the Federal Government, local governments and private agencies. As

a result, many services are duplicated, spatial systems intersect and the general public is confused. Since health and social services are primarily a Provincial responsibility according to Section 92 of the B.N.A. Act, the Department should attempt to combine service delivery with other levels of government and private agencies.

Wherever possible, H. & S.D. should pursue a course of co-ordinated planning and service delivery, particularly with local governments and private agencies. In the case of the Federal Government, there are ongoing talks on the replacement of present Provincial welfare systems with a Guaranteed Annual Income program. This program would be operated by the Provinces across Canada, but would be supervised and controlled by Ottawa.

These considerations should be incorporated in a long-term strategy of spatial development for H. & S.D. Moreover, if the Department and Manitobans are to realize the benefits of effective and efficient service delivery, H. & S.D. must undertake objective geographical planning on an ongoing or periodic basis. Otherwise, ad hoc reform will continue to be the method prescribed for alleviating public dissatisfaction created by administrative problems. This situation is untenable for a Department that relies heavily on its rapport with clients and on the acceptance of its policies from the broader public.

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WINNIPEG NORTH DISTRICT OFFICE - 956 Main Street (42,30)

CT	x_i	y_i	d_{ij}^2	p_i	$d_{ij}^2 p_i$	$p_i x_i$	$p_i y_i$	d_{iCD}^2	$d_{iCD}^2 p_i$
34	41	30	1	695	695	28495	20850	9	6255
35	42	30	0	355	0	14910	10650	10	3550
36	43	29	2	195	390	8385	5655	8	1560
41	43	27	10	420	4200	18060	11340	4	1680
42	42	28	4	475	1900	19950	13300	2	950
43	39	28	5	1050	5250	40950	29400	5	5250
44	37	28	29	365	10585	13505	10220	17	6205
45	41	27	10	930	9300	38130	25110	0	0
46	44	27	13	365	4745	16060	9855	9	3105
47	41	26	17	425	7225	17425	11050	1	425
48	38	27	25	550	13750	20900	14850	9	4950
49	38	26	32	135	4320	5130	3510	10	1350
50	35	25	74	530	39220	18550	13250	40	21200
52	45	23	58	0	0	0	0	32	0
550	44	25	29	210	6090	9240	5250	13	2730
551	41	24	37	465	17205	19065	11160	9	4005
552	40	23	53	210	11130	8400	4830	17	3570
553	43	22	65	290	18850	12470	6380	29	8410
560	38	22	80	110	8800	4180	2420	34	3740
570	49	14	305	125	38125	6125	1750	233	29125
n=	20		849	7900	201780	319930	210830	491	108060

APPENDIX

WINNIPEG CENTRAL (P.O.S.) DISTRICT OFFICE - 600 Main Street (42,32)

CT	x_i	y_i	d_{ij}^2	P_i	$d_{ij}^2 P_i$	$P_i x_i$	$P_i y_i$	d_{iCD}^2	$d_{iCD}^2 P_i$
22	38	33	17	1085	18445	41230	35805	58	62930
23	39	32	9	675	6075	26325	21600	40	27000
24	42	32	0	80	0	3360	2560	13	1040
25	40	31	5	615	3075	24600	19065	26	15990
26	39	31	10	440	4400	17160	13640	37	16280
37	47	32	25	200	5000	9400	6400	8	1600
38	45	30	13	595	7735	26775	17850	0	0
39	44	29	13	465	6045	20460	13485	2	930
40	43	29	10	200	2000	8600	5800	5	1000
120	58	35	265	195	51675	11310	6825	184	35880
121	57	32	225	75	16875	4275	2400	148	11100
122	58	32	256	350	89600	20300	11200	173	60550
123	59	32	289	320	92480	18880	10240	200	64000
130	49	29	58	275	15950	13475	7975	17	4675
131	46	28	32	430	13760	19780	12040	5	2150
132	45	26	45	85	3825	3825	2210	16	1360
133	47	27	50	190	9500	8930	5130	13	2470
134	47	26	61	300	18300	14100	7800	20	6000
140	52	26	136	50	6800	2600	1300	65	3250
141	47	24	89	470	41830	22090	11280	40	18800
142	48	22	136	150	20400	7200	3300	73	10950
150	57	18	421	135	56835	7695	2430	288	38880
n= 22			2165	7380	490605	332370	220335	1391	386835

WINNIPEG SOUTH DISTRICT OFFICE - 114 Garry Street (41,34)

CT	x_y	y_i	d_{ij}^2	p_i	$d_{ij}^2 p_i$	$p_i x_i$	$p_i y_i$	d_{iCD}^2	$d_{iCD}^2 p_i$
1	43	39	29	290	8410	12470	11310	4	1160
2	41	39	25	435	10875	17835	16965	0	0
3	39	38	18	600	10800	23400	22800	5	3000
4	37	39	41	565	23165	20905	22035	16	9040
5	36	39	50	100	5000	3600	3900	25	2500
6	34	39	74	135	9990	4590	5265	49	6615
7	33	37	73	185	13505	6105	6845	68	12580
8	34	37	58	90	5220	3060	3330	53	4770
9	34	38	65	90	5850	3060	3420	50	4500
10	38	37	18	405	7290	15390	14985	13	5265
11	40	36	5	550	2750	22000	19800	10	5500
12	41	36	4	630	2520	25830	22680	9	5670
13	41	33	1	205	205	8405	6765	36	7380
14	41	34	0	610	0	25010	20740	25	15250
15	39	35	5	1175	5875	45825	41125	20	23500
100	42	57	300	120	36000	5040	6840	325	39000
101	42	46	145	200	29000	8400	9200	50	10000
102	46	44	125	635	79375	29210	27940	50	31750
103	44	41	58	155	8990	6820	6355	13	2015
104	45	40	52	240	12480	10800	9600	17	4080
105	45	43	97	230	22310	10350	9890	32	7360
110	49	42	128	170	21760	8330	7140	73	12410
111	49	39	89	125	11125	6125	4875	64	8000
112	48	37	58	205	11890	9840	7585	53	10865
113	46	36	29	275	7975	12650	9900	34	9350
114	44	37	18	505	9090	22220	18685	13	6565
115	43	37	13	170	2210	7310	6290	8	1360
116	44	35	10	515	5150	22660	18025	25	12875
117	44	34	9	340	3060	14960	11560	34	11560
500	39	53	365	300	109500	11700	15900	200	60000
501	39	48	200	325	65000	12675	15600	85	27625
502	39	43	85	100	8500	3900	4300	20	20000
503	41	42	64	175	11200	7175	7350	9	1575
510	30	40	157	45	7065	1350	1800	122	5490

n= 34 2468 10895 573135 449000 420800 1620 388610

WINNIPEG WEST DISTRICT OFFICE - 189 Evanson Street (37,35)

CT	x_i	y_i	d_{ij}^2	p_i	$d_{ij}^2 p_i$	$p_i x_i$	$p_i y_i$	d_{iCD}^2	$d_{iCD}^2 p_i$
16	37	35	0	430	0	15910	15050	29	12470
17	36	35	1	510	510	18360	17850	20	10200
18	35	35	4	285	1120	9975	9975	13	3705
19	34	34	10	240	2400	8160	8160	5	1200
20	35	34	5	205	1025	7175	6970	10	2050
21	37	33	4	875	2700	32375	28875	25	21875
27	37	31	16	245	3920	9065	7595	29	7105
28	37	32	9	655	5895	24235	20960	26	17030
29	36	32	10	520	5200	18720	16640	17	8840
30	35	32	13	255	3315	8925	8160	10	2550
31	34	31	25	125	3125	4250	3875	8	1000
32	34	28	58	605	35090	20570	16940	29	17545
33	36	29	37	220	8140	7920	6380	32	7040
51	32	23	169	45	7605	1440	1035	100	4500
520	19	40	349	95	33145	1805	3800	218	20710
521	22	41	261	165	43065	3630	6765	164	27060
522	24	39	183	200	36600	4800	7800	100	20000
530	31	36	37	145	5365	4495	5220	10	1450
531	31	35	36	560	20160	17360	19600	5	2800
532	31	34	37	80	2960	2480	2720	2	160
533	30	36	50	210	10500	6300	7560	13	2730
534	27	36	101	235	23735	6345	8460	34	7990
535	27	35	100	240	24000	6480	8400	29	6960
536	24	34	170	165	28050	3960	5610	65	10725
537	22	37	229	180	41220	3960	6660	116	20880
538	19	37	328	35	11480	665	1295	185	6475
539	7	37	904	165	149160	1155	6105	541	89265
540	22	34	226	250	56500	5500	8500	101	25250
541	32	32	34	5	170	160	160	1	5
542	33	28	65	290	18850	9570	8120	26	7540
n= 30			3471	8235	585005	265745	275240	1963	367110

WINNIPEG REGION TOTALS

106 8935 34410 1850525 1367045 1127205 5465 1250615

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