AN ANALYSIS OF ICE HOCKEY PLAYER PRODUCTION AND TEAM LOCATION

By

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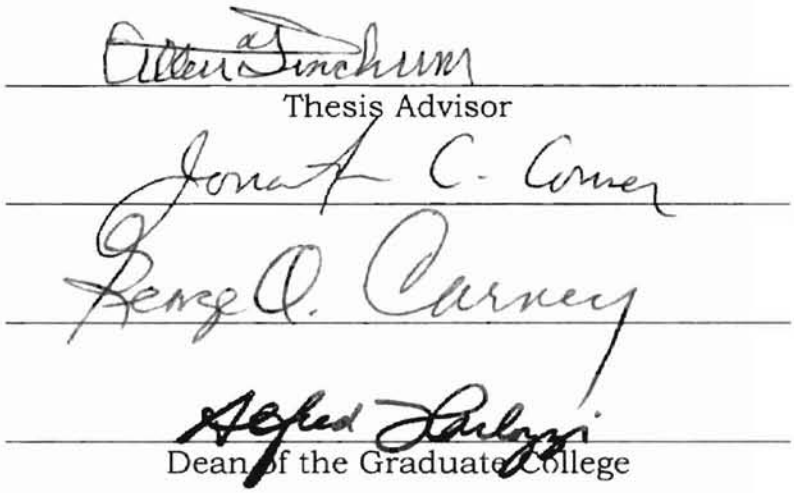

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CHAPTER ONE

INTRODUCTION

Hockey has long been considered a northern sport in the United States. The popular images of the game are more closely associated with places like Northern New England, Minnesota and Ontario, than warm regions of the continent. For many years, the physical necessities of the game limited its location. It was the long winters across the Northern Tier, from Maine to Minnesota and into Canada, that provided the outdoor ice surfaces on which to play. Even after the invention and perfection of man-made ice rinks and interior air conditioning, hockey maintained its regional appeal. In recent decades however, professional hockey leagues have expanded into warm weather markets in response to the growing population of these areas. This expansion stimulated interest in the sport of hockey in many non-traditional areas.

Problem Statement

The sport of hockey has clearly grown in terms of team location in the past several decades. Since 1970, the number of teams in the NHL and the top-level minor leagues has increased. A quick look at a geographical breakdown of where these teams are located reveals an obvious spread to southern areas of the United States, away from the traditional hockey regions. The result has been an increased exposure to

ice hockey in areas not familiar with the sport. Commercial ice rinks, hockey camps and other public programs are extensions of that growth of hockey. Young hockey fans in these areas now have a greater chance of being able to develop the proper skills to play the game, and therefore, a greater chance of playing in minor or professional-level ice hockey.

Shropshire stated (1995) that for a professional sports franchise to survive in an area there must first be a segment of the population actively interested in that sport. Hence some cities that support new professional ice hockey clubs have had strong amateur leagues and have supported hockey on all levels for many years. The bulk of this study attempts to show that new team locations around the country have broadened the base of player production. Because local interest in a sport can often be dependent on what the local community has put into the sport in terms of talent, new player production from these areas can be the key to solid hockey support.

Two hypotheses direct this study. The first revolves around the production in Canada. As the home of the sport of hockey, Canada has led the world in production of players for many years. Hypothesis one states that because of Canada's long dominance in hockey-player production, every part of the country should be able to produce at high levels. Therefore, the ratio of players to population in each province should be nearly equal to the ratio at the national level. The second

portion examines the team locations in the United States and compares local player production in those areas.

Hypothesis two states that the introduction of hockey teams into areas with traditionally low hockey interest will help to increase the production of hockey players in those areas. Expansion has slowly spread south and west throughout the United States, into warm weather area not familiar with hockey. Once teams establish a presence in new cities, the interest will grow and influence the production of new hockey talent.

Much of the growth in professional hockey has occurred in the past several years, and the results of new Sunbelt teams may have yet to be realized within the ranks of hockey. It is a key to the success of hockey that potential fans become not only supporters of a new team, but fans of hockey in general. This in turn can lead to greater development opportunities for players and more chances to play at a professional level. If, when a team locates in a particular market, there is a definite increase in player production, hockey can truly claim a national level of support.

Scope & Limitations

Though past studies of this nature have examined player production for a single year, this study compares four hockey seasons over a 30-year time span. This allows for a more complete analysis of

regional production changes over time. All players who competed on teams in the top professional leagues of North America (the AHL, CHL, ECHL, IHL and NHL) are included in the analysis. Because previous studies covered only one year, they often included college and high school level players in analysis. Since the current study examines four individual years, only professional players are used to keep the amount of data manageable.

A few important limitations must be discussed before any analysis is attempted. As with many studies that use hometown information, it must be noted that some discrepancies may exist. Methods for collecting roster information are not always consistent over time or between different leagues. In some occasions players are listed by birthplace as opposed to hometown and this can produce some irregularities.

Recreational hockey participation numbers were desired to help explain variations in production in this analysis; however, the author could not acquire this information. Though attempts were made to contact USA Hockey, the governing body of organized leagues throughout the country, no response was received and no organized published reports could be located.

Organization of the Study

Previous studies of hockey in 1974 and 1988 created 'snapshots' of hockey production during the time of their respective studies. They

reviewed player production on several levels, from professional leagues to high schools. This study has an increased scope; to show the trends in hockey player production over a span of 30 years. That time interval was chosen based on the recent history of professional hockey in North America, where all but a handful of teams are less than 30 years old. Four seasons, each ten years apart, are analyzed in this study. Inspection of players on many levels would indeed be beneficial; however, the increased amount of data from collecting four seasons as opposed to one would be overwhelming. In this study, only the top professional leagues from North America were analyzed to determine local and regional production.

Data Collection

Player hometown/birthplace data were collected for all named roster players from the five leagues in the study. Several sources were utilized for this information, including the Internet Hockey Database, a privately operated web-site of archived hockey data. This site, though privately run, has been awarded several awards and accolades from general Internet search engines, including Yahoo!; hockey sites on the Internet, such as the A to Z Encyclopedia of Ice Hockey; and print media, including Beckett Hockey Monthly, and newspapers in Toronto and Montréal. The NHL Player Register, in the National Hockey League Official Guide and Record Book, 1999-2000 was used to verify all

Internet information. Data for players in the four minor-professional teams for the 1999-2000 season were obtained through the official Internet site of the appropriate league and team. The 1969-70, 79-80, and 89-90 data were gathered from end-of-year rosters, while 1999-2000 data were gathered from rosters as of March 31, 2000.

Because analysis by individual hometown would be unfeasible, the data were grouped by appropriate county unit. United States counties were used for American players and census divisions (CD's) were used for Canadian players. CD's represent both county and regional municipality designations in Canada, and are directly below the province/territory area in a geographical hierarchy. Because a time span of 30 years was included in the study, changes in boundaries became a critical issue. American counties are not altered on a regular basis, and though some did change boundary lines in the past 30 years, no county that produced a hockey player was among that group. Canadian CD's, however, have changed over the past 30 years, drastically in some cases. Where there were significant changes, new CD's were identified using map archives and historical references, and player data were adjusted accordingly.

Population data were collected from the U.S. Census Bureau and Statistics Canada using official Internet data locations and archived sources. U.S. statistics for the first three years in the study were from the decennial census reports of 1970, 1980, and 1990. Additional U.S. statistics for the 1999-2000 season were determined based on official

2000 population estimates from the Census Bureau. Canadian statistics for the first three years were from 1971, 1981, and 1991 Census Canada reports. Year 2000 estimates from Statistics Canada were used for the final season. All non-North American statistics were collected from the Central Intelligence Agency's World Factbook, Online and the Census Bureau's population estimates for 1970, 1980, 1990, and 2000.

Methodology

To facilitate organization of the data, a database was built. Player first and last name, hometown, county, state or province, and country were entered and each player was assigned a unique ID number. Rosters for each year and each league were completed using the player ID's, allowing for data queries. Total player production amounts were then determined for every country, state, and county during each season. The values for each individual league for each season were also determined.

Once all total production values were found, relative production rates could be determined. Using a Location Quotient (LQ), the player production values were compared to an area's population to determine its relative production value against other places. LQ's were calculated for each country, and for the state/province and county/census division levels in the United States and Canada. A preliminary state quotient was calculated by dividing the number of players produced in a certain state

by the population of that state in the same year. That result is then divided by the quotient obtained by dividing the total number of players produced in the country by the total population of the country during that year. The result is the state LQ.

An example equation for a location quotient of the state of Michigan:

Total Michigan LQ, 2000 =
(Total Number of MI Players, 2000/MI Population, 2000)/
(Total Number of U.S. Players, 2000/U.S. Population, 2000)

Following Henzel, a North American LQ was calculated to facilitate comparison of American and Canadian regions. This was determined using a combined North American value in place of pure national values in all calculations. An example of the North American LQ for Michigan:

Total Michigan N. American LQ, 2000 =
(Total Number of MI Players, 2000/MI Population, 2000)/
(Total Number of N. Amer. Players, 2000/N. Amer. Population, 2000)

A Chi Square analysis was also used to test the production patterns across Canadian provinces. For the test, expected production values for each province were determined by applying the national player-to-population ratio in each year to the individual province populations. This method was used to adjust for the large differences between some of the Canadian provinces. The expected player values were compared to the observed values using a normal Chi Square formula and p-values were calculated to determine the significance of the results.

This analysis attempts to support the assumption that hockey player production has increased in the non hockey-core region in the last

thirty years. Many players are still from the northern United States and Canada; however, several factors have improved the chances of players in other parts of the country. An increased number of teams has created many more roster positions to fill; strong expansion efforts in the Sunbelt and West have brought ice hockey to people who have not traditionally followed the game; and recent marketing campaigns have increased the exposure of hockey in many areas with historically low interest in the sport. Because of the influence of these events, a change should be detected in the trends in player production.

CHAPTER TWO

LITERATURE REVIEW

The study of sports geography has, by-and-large, focused on the major team sports of the United States. Football and baseball dominate many studies, just as they dominate the American sports scene. While ice hockey is not often studied, research does exist on the topic. This chapter outlines the history of hockey, previous studies that look specifically at the origin and diffusion of hockey, and general sports geography studies that have bearing on the sport of hockey. The review should reveal numerous opportunities to expand the research on ice hockey.

The Game of Hockey

Traditionally, hockey is associated with Canada even though its origins are somewhat more complicated. Sources have traced forms of the sport to Native American and European cultures (Henzel, 1990). These variations were adapted by Canadians in the mid-19th century to be played by teams on a surface of ice (Russell, 1974). The location and climate of Canada allowed for the widespread participation of the sport, from large cities to small prairie towns. This enormous interest was the impetus for the formation of numerous amateur leagues from coast to coast, from which the first professional leagues were formed.

National organizations had been formed across Canada in the late-19th century to facilitate competition between amateur teams. The prize trophy of hockey, the Stanley Cup, was donated in 1893 and was awarded to the premiere Canadian amateur team at the end of each season (Pollak, 1998). After the turn of the century, professional hockey organizations began operations, the first of which was the International Hockey League, which began in 1904 with teams in Michigan, Pennsylvania, and Ontario (Pollak, 1998). Though many in Canada resented the idea of professional hockey players competing for the prized Cup, by 1907 the Eastern Canada Hockey Association, a Stanley Cup qualifying league, began allowing professional skaters on its teams. Subsequent leagues followed, including the Ontario Professional Hockey League (the first fully professional league), the Pacific Coast Hockey League and the National Hockey Association (Pollak, 1998).

The geographic extent of these leagues shows the distinct regional aspect of the early game. With the exception of the International and Pacific Coast Hockey Leagues, with teams in Pennsylvania and Michigan, and Washington and Oregon, respectively, the early professional leagues were exclusively Canadian. Decades of amateur play at all levels of Canadian society had created an extraordinary amount of hockey talent for these leagues. Even as teams moved to adjacent areas of the United States, they were largely filled with Canadian born players (Alexander, 1999).

In 1917, the most successful of the professional leagues, the National Hockey League (NHL), had its beginning. While early struggles with the other leagues meant failure for several clubs, by 1926 the NHL had monopolized the professional ranks of hockey. After stabilization in the first few decades, the NHL became a solid league of six teams for over 25 years. Though Canadian players were still the stars of the league, only two Canadian cities hosted franchises, Toronto and Montréal, with Boston, New York, Detroit and Chicago as the four American cities with clubs. The American cities of the urban Northeast had much larger populations from which to draw attendance and were in close proximity to their Canadian counterparts (Riess, 1998). Though the cities were further south than their Canadian counterparts, similar public interest existed for winter sports, including hockey, and this translated into support for a professional team.

The expansion of hockey at the minor league level often preceded the expansion of the professional teams. Developmental leagues to the NHL (International HL, East Coast HL, Central HL, American HL) were key factors in increasing the extent of ice hockey in North America (Henzel, 1990). By the mid-1960's the NHL realized a need for expansion to new markets. In 1967, Philadelphia, Pittsburgh, St. Louis, Minneapolis, Los Angeles and Oakland received teams in the league's first expansion since 1934 (Danielson, 1997). The league had realized two factors that they felt would help new expansion. First, talent levels

were high enough in minor leagues to support more teams. Second, other regions were ready to support the game of hockey.

The NHL lost its monopoly on professional hockey in 1972 with the inception of the World Hockey Association (WHA). During the planning stages of the WHA, the NHL added teams in Buffalo, Washington, D.C, Atlanta and Long Island, in hopes of countering the effects of the new league on what were perceived as marginal hockey markets. The twelve original teams of the WHA helped to bring the sport of hockey to cities never considered by the NHL, such as Phoenix, Houston, Denver and Birmingham. After only six seasons and more than 25 teams, the WHA folded under pressure from the NHL, but not without making a point. The four most successful WHA franchises, Edmonton, Hartford, Quebec and Winnipeg, were allowed entrance to the NHL. With the start of the 1979-1980 season, the NHL again became the only premier professional hockey league in North America.

The increasing number of American teams in a league formed for a 'Canadian' sport did have an impact on where players came from. In the 1967-68 season, when the NHL doubled the number of teams, 96.7 percent of players were Canadian born. By 1980-81, after more than a decade of professional hockey expansion in the WHA and NHL, that number was down to 82.1 percent. The increased exposure of the sport in the United States contributed to a 460 percent growth in American-born players. The much larger opportunity to play - only 6 teams in

1966 to 21 teams in 1980 – gave all non-Canadian skaters an opportunity to succeed in the National Hockey League. This included many European players who had been in smaller leagues across the Atlantic. A 415 percent jump in Europeans from 1967 to 1980 signaled the beginning of a large change to come (Allen, 1999).

Some hockey experts have contended that expansion hurt the talent levels of professional hockey. More teams meant a greater opportunity for non-Canadians to enter the sport, but these players were not as talented as seasoned hockey players from Canada. This contention has been countered by many who say that the expansion has given great players, who never had a chance to play before, the opportunity to compete (Melrose, 2000). Expansion has had a short term effect on talent level on teams, but within a few years, the rise of young players will bring higher skill levels back to professional hockey (Clement, 2000).

The 1980s saw a relative calm in professional hockey with no new NHL clubs formed, though the NHL had expressed its desire to have 24 teams by the end of the decade. Though the league did not expand the number of teams, the sport of hockey was given a boost in the United States in 1988 with the movement of Wayne Gretzky from the Edmonton Oilers to the Los Angeles Kings (Inglis, 1999). Gretzky's star power, and performance on the ice, packed sell-out crowds into the Great Western Forum for the first time and proved that hockey can be supported in

warm-weather cities (ESPN, 1999). Within five years San Jose, Miami, Tampa and Anaheim were added to the NHL and the Minnesota North Stars had relocated to Dallas. The NHL's push into the Sunbelt was in full force.

The flurry of expansion and relocation continued for the remainder of the 1990s. Quebec, Winnipeg and Hartford lost their clubs; Denver, Phoenix, and Raleigh acquired them. Expansion teams were granted to Nashville and Atlanta, which began play in 1998 and 1999 respectively. The true turn of the millenium will have the NHL at 30 teams with the start of hockey operations in Columbus and Minneapolis for the 2000-2001 season. The explosion of hockey at the NHL level mirrored that of minor league levels, where American Sunbelt teams were also emerging. Several minor league circuits that began in the late 1980s and early 1990s were comprised exclusively of southern teams. The Western Professional Hockey League had 19 teams during the 1998-1999 season, 17 of which were in New Mexico, Texas, Louisiana, Mississippi, or Arkansas (Slate, 1999).

The location of these teams will have an affect on the local populations that attend games. Hockey's influence in warm weather areas is evident in the reintroduction of professional roller hockey leagues, such as Major League Roller Hockey and Roller Hockey International. Many of the teams were located in Sunbelt cities and games were played in the summer, to allow winter ice hockey players an

off-season alternative. The acceptance of the sport of hockey, in any incarnation, can only help to develop player skills in all areas of the country, not only the 'traditional' hockey regions.

Sports Geography and Culture

Most geographers agree that the works of John Rooney were groundbreaking publications in sports geography. Beginning in the early 1970's, Rooney's publications on the distribution of sports in the United States served as eye-openers to many in the field of geography. A Geography of American Sport (1974) is one of the first introductions of sport into geographic literature. Rooney focuses on identifying sport as a character of place and local geography. The origin, diffusion, and organization of sport combine to hint at specific sport culture regions within the country. Each sport region produces different cultural landscapes; individual mirrors of the activities that take place in that area. Rooney opened the door on new questions, spatial questions about the future diffusion of sport. Rooney helped enhance the cartographic representation of sport in America with a section on sport in the 1979 work A Social and Cultural Atlas of the United States and in This Remarkable Continent: An Atlas of United States and Canadian Society and Culture (1982). These resulted in the 1992 collaboration with Richard Pillsbury, the Atlas of American Sport. The authors cover nearly

all major and minor sport types that take place in the United States; from baseball to duckpin bowling.

The identity of place with relation to local sport custom was addressed further in John Bale's Sport and Place (1982). Bale notes that:

> the study of regional, sub-national differentiation in sport is still lacking. By using ... the conceptual framework of the geographer, new and hitherto unperceived insights on sports may be obtained and new patterns exhumed, which ... are highly relevant to an understanding of the significance of sport in society (Bale, 1982).

Important intra-national patterns of sport should be identified; a step beyond the sport region as mentioned by Rooney. These variations between regions within a country can do more to explain the sport than variations beyond international borders. Highly recognizable sport 'places' – those areas that seem to be identified with particular sports – can be studied more closely, to determine the validity of the popular conceptions.

Bale continued his emphasis on 'place' in sport in a 1988 Progress in Human Geography article titled "The Place of 'Place' in Cultural Studies of Sport". In this article, Bale emphasizes the idea of topophilia, the love of place, introduced to geography by Yi-Fu Tuan in his 1974 work. The connection of residents to a place can be seen in the representation of their fervor for sport and the support they offer the local clubs. This connection of local culture and its relationship with the

immediate environment, an idea prominent in cultural ecology, can represent an important factor in creating the cultural landscape.

The representation of sport on the landscape is strongly emphasized by Karl Raitz in "Place, Space and Environment in America's Leisure Landscape" (1987). In the article, Raitz looks at "the process of creating and using leisure landscapes [and] ... the meaning that leisure landscapes have for those who use them..." (Raitz, 1987). He further expands the idea of landscape in sport in the introductory chapter of his edited work The Theater of Sport (1995). He supports the connection made by Bale to the Tuan idea of topophilia and the association of sport with a particular environment. In a return to cultural ecology, it is the character of a sport, and the restrictions of the locale it is played in, that affect the cultural landscape.

The Geography of Ice Hockey

There has been far less research on the geography of ice hockey than sport geography in general. Much of the original work stems from the early work of Rooney, and two of the most in-depth spatial analyses of hockey are theses supervised by Rooney at Oklahoma State University. The first was "Hockey and its Regions: A Spatial Analysis" by Michael Russell (1974). He looked at patterns of player production of areas in the United States and Canada, based on collegiate and professional levels of play, to determine the spatial variations in the sport. The expansion of

leagues in North America and the roots of the first professional organizations were also examined. According to the author, the development of these groups has an influence on the landscape and character of an area. With a high amount of professional expansion at the time of publication, an emphasis was given to the importance of keeping geography in mind for future growth. As hockey migrates from its cultural hearth via expansion diffusion, the relevance of the culture in the newer areas becomes more important to the sport.

The second thesis was "Regional Variation in the Importance of Ice Hockey in North America – 1988" by Jerry Henzel (1990). Based on the 1974 work by Russell, Henzel's publication examines the regional production of players by county and census division in the United States and Canada. According to the author, in the 14 years between the two studies, changes took place in the development of quality hockey talent. Though he considers hockey very much a cultural event, one that is much more prevalent in the Northern Tier of states and Canada, its influence has begun to diffuse south. The emergence of several states in the U.S. as important areas of production since the Russell work support the idea that other regions are attracted to ice hockey. Henzel's follow-up in Sport Place, "From Rivers to Rinks: A Geographical Analysis of the Origins of Ice Hockey Players" (1990), is based on his original work. These theses, along with the section on Ice Hockey in the Atlas of American Sport, which used data from Henzel, represent the bulk of

research on the diffusion of hockey based on the production of collegiate and professional players.

Ice Hockey in Non-Geographic Literature

Origins of the sport of hockey are discussed in numerous other non-geographic references; however, this information reflects more historical than geographic realms of study. Sport and Canadian Diplomacy (1994) chronicles the relative importance of hockey in the nation of Canada, a place often considered the cultural core of the modern game. This identity of 'place' association of a sport is supported by the many efforts of the Canadian government to bolster international ties through sporting events. Though production of players is not thoroughly discussed in many other sources, the distribution and movement of players within the sport of hockey has been explored.

One such example is Simon Genest's "Skating on Thin Ice? The International Migration of Canadian Ice Hockey Players", in Bale and Maguire's The Global Sports Arena (1994). Examination of the movement of hockey talent from Canada is analyzed, focusing on the increasing flow of athletes from Canada to Europe. Though evidence still supports the fact that most Canadian hockey 'exports' go to American National Hockey League teams, findings suggest that worldwide increase in quality hockey talent, especially in the United States, has decreased the NHL's need for Canadian players. Less skilled players who only a few

decades ago would have found professional opportunities in Canada and the NHL are now forced to find playing time in smaller European leagues. Genest mentions a lack of expansion in the late 1980's and early 1990's as the major factor in this trend; established players remain in place and newer recruits cannot gain a foothold in the market.

Similar ideas were echoed by Bruce Kidd, dean of the Facility of Physical Education and Health at the University of Toronto, in "Sport, Dependency and the Canadian State," from Hart Cantelon and Richard Gruneau's Sport Culture and the Modern State (1982). He emphasizes the idea of sport as a part of national identity and focuses primarily on 20th century Canada. While he mentions more than just hockey, he acknowledges the understood belief that the sport is indeed the religion of Canada. He explores how vast commercialization of the sport of hockey has reduced the feeling of community between local fans and their favorite clubs. When Canadian teams no longer rely on local talent to fill rosters, fans lose part of what they naturally cheer for.

The role of expansion as a factor of distribution of ice hockey has become much more of an issue in recent publications. Much of the earlier research focused on the identity of culture regions based on the distribution of players; however, franchise expansion and location of teams has become a more prevalent topic of discussion. The idea of cultural diffusion of the sport is still similar, but it instead has been tied to the economics and business of ice hockey organizations. In The

Sports Franchise Game (1995), Kenneth Shropshire, Professor of Legal Studies at the Wharton School, relates the failure of expansion hockey franchises to the expectation of support in areas that obviously have little interest in the game. The diffusion of hockey to non-traditional areas must take place on all levels, professional, amateur, and recreational, for acceptance at any level to take place. For hockey to succeed, other aspects of the culture must become closely tied to the sport.

Recent publications have examined hockey's attempt to become a truly national sport in the United States. As most research has indicated, interest in hockey has always been confined to a core in the northern and eastern areas of the United States. Many sources mentioned the role of league expansion as a cultural diffusion method; a way in which the sport could gain popularity in other parts of the country. In Home Team, Michael Danielson, Professor of Politics at Princeton University, looks at this diffusion and expansion as efforts by the league to expand the traditional base of hockey (1997). He reveals that hockey was the last sport to break from its traditional hearth area. This reluctance to build support in other regions was based on an acceptance of the preconceived regional appeal for the sport and perceived feelings toward hockey and other cold weather sports in non-traditional areas. As other sports migrated to the growing economies of the south and west, hockey remained a northern and eastern game.

Only recently has the movement of teams taken advantage of the new markets. As Danielson writes:

> All of the recent hockey franchise moves [Minneapolis to Dallas, Quebec to Denver, Winnipeg to Phoenix, Hartford to Raleigh] have been acceptable to the NHL, if not encouraged as part of the league's effort to expand its presence in the growing market of the Sunbelt (Danielson, 1997).

Mark Rosentraub, professor of urban policy at Indiana University, discusses the important economic reasons behind league expansion in Major League Losers (1997). He contends that there is actually an undersupply of teams in major sports leagues, including the NHL. The undersupply means that many cities without teams are competing for the next expansion or team relocation. This competition acts to drive up the value of individual teams, increasing the overall value of the league and its financial stability. Gary Bettman, the commissioner of the NHL, admits that the league is not yet as stable as those in other sports; however, with the solid backing of new expansion teams and the overall growth of hockey in the 1990's, the future of NHL hockey is very good (Krupa, 1999).

News Periodicals and Popular Literature

General news periodicals provide most of the recent information on the spread of ice hockey. Just as recent academic works focused on the

business aspect of the expansion, so do many of the news articles. Because the reports of local news sources on hockey can reveal the attitudes toward the sport in the area, these sources are vital. Several of the previously mentioned studies used news articles to support local interest in hockey. The diffusion of the impact of the sport can be seen in the difference in publishing location of some of the articles. In 1990, Henzel used publications from the *Winnipeg Free-Press* and the *St. Paul Pioneer Press Dispatch* for references to hockey. Both papers are located well inside the core areas defined by both Russell and Henzel in their works. In the late 1990's, important articles concerning the spread of hockey were seen in such publications as the national *USA Today* or southern papers such as *The Atlanta Journal/Constitution.* This fact alone shows the diffusion of hockey as a relevant part of culture into many parts of the country.

One such article in the *Journal/Constitution* on December 27, 1998, titled "South afire over hockey," charts the development of hockey at many different levels of society in southern states. As Shropshire mentioned, solid recognition of a sport is contingent on development at all levels. The article shows that, though recent expansion of NHL teams is proof positive of acceptance of hockey in the south, the trend actually began years ago with the start of minor league organizations in small southern cities. The same sentiment is echoed in "With three teams on way, NHL is growth industry," from *The Boston Globe* on June 25, 1999.

Again, the focus is on the economic aspect of the sport; however, it is a mirror to the growing realization that hockey can be supported in many non-hockey areas.

The importance of player origin and regional production has not been lost in the focus on the professional leagues and team movements. *The Los Angeles Times* ran a sports extra on September 30, 1999, "League of nations; As the number of European players continues to grow, the NHL reaches new levels of talent," in which player origins were examined. The development of quality hockey talent from, until recently, untapped European nations has significantly changed the makeup of the league. Though Canada is considered the home of hockey and it has been its national sport since the early 20th century, there is no longer an overwhelming dependence on that country to provide players to professional leagues. Other parts of the world, to which the modern game diffused, have been able to keep pace with the Canadians for production. The resulting numbers, given in "Canadians in NHL at all-time low, 56 percent" in the *USA Today*, show a marked drop in Canada's dominance of the NHL. From 1976-77, when Canadians claimed 90 percent of NHL players, to 1990-91 the Canadian influence dropped nearly 20 percent, to 72.7 percent. At the beginning of the 1999-2000 season the number had dropped to 56 percent. This has been countered by growth in U.S. and European production, 16 percent and 27.7 percent respectively.

All recent publications hint that a very significant change has taken place in the hockey leagues of North America. The most recent publication dedicated to hockey-player production is over ten years old and no study has yet examined production trends over time. There is now a renewed need for geography to step into the analysis. This study fills those gaps by taking a new look at the extent of hockey culture on this continent and examining significant changes of the past three decades.

CHAPTER THREE

RESULTS & INTERPRETATION

This analysis examines trends on several different levels. A brief look at world production rates covers the global aspects of hockey. A more detailed review of Canadian and United States production follows. National production rates are examined at the provincial/state level and census division/county level. Following separate national production analysis, the total North American production rates are reviewed to compare areas of the United States and Canada. Part of the analysis compares the regional production of hockey talent in the United States to the location of professional hockey organizations. A review of franchise locations is necessary to fulfill that analysis.

Team Locations

Over 125 Canadian and American cities have hosted professional hockey teams in the past thirty years, some for the entire time, others for only one season. The geographic distribution of teams has changed dramatically as old leagues expanded and new leagues emerged. In 1969, the majority of teams were in the Great Lakes and Northeast, as shown in Figure 1. The AHL was predominately Northeastern while the IHL was focused in Ohio and Michigan. The CHL dominated the Plains, with teams from Iowa to Texas. The NHL, after expansion in 1967,

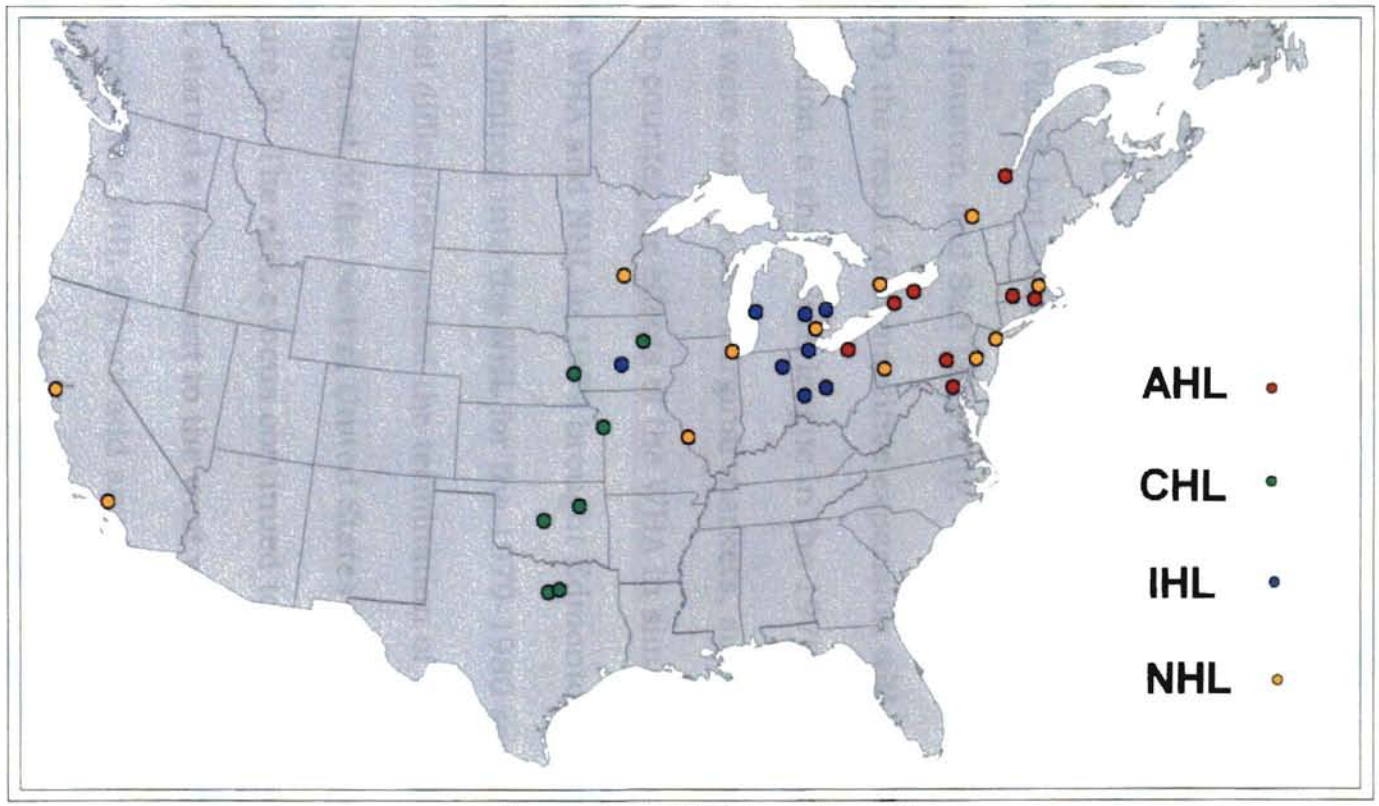

Figure 1 - 1969 Team Locations

stretched from coast to coast; however, the two California teams were the only ones west of Minneapolis.

In 1979, the CHL and NHL had slightly refocused their scope while the AHL and IHL remained centered on the Great Lakes and Northeast (Figure 2). The AHL added two teams in the Canadian Maritimes, expanding its limits slightly; however, the IHL remained clustered between Milwaukee, Dayton, and Detroit. The CHL lost some locations in the Central Plains, but added teams in Indianapolis, Cincinnati, Birmingham, Houston, and Salt Lake City. The NHL added several new teams by 1979, the result of competitive expansion with the World Hockey Association, a short-lived league in the 1970's. Expansion took place in what were considered marginal markets, such as Buffalo and Long Island, to counter the effects of the WHA in similar areas. The merger of the WHA and NHL in 1979 brought Edmonton, Hartford, Québec, and Winnipeg into the NHL for the 1979-1980 season.

Financial difficulties caused the termination of the CHL in the mid 1980's, leaving most of the central United States without a hockey team by 1989 (Figure 3). The AHL's focus continued to be in the Northeast, while the IHL started a movement to the west with teams in Salt Lake City and Phoenix. The NHL did not add any new franchises between 1979 and 1989; however, the Atlanta Flames moved to Calgary, and the Colorado Rockies (Denver) moved to New Jersey (East Rutherford). The introduction of the ECHL brought hockey to several

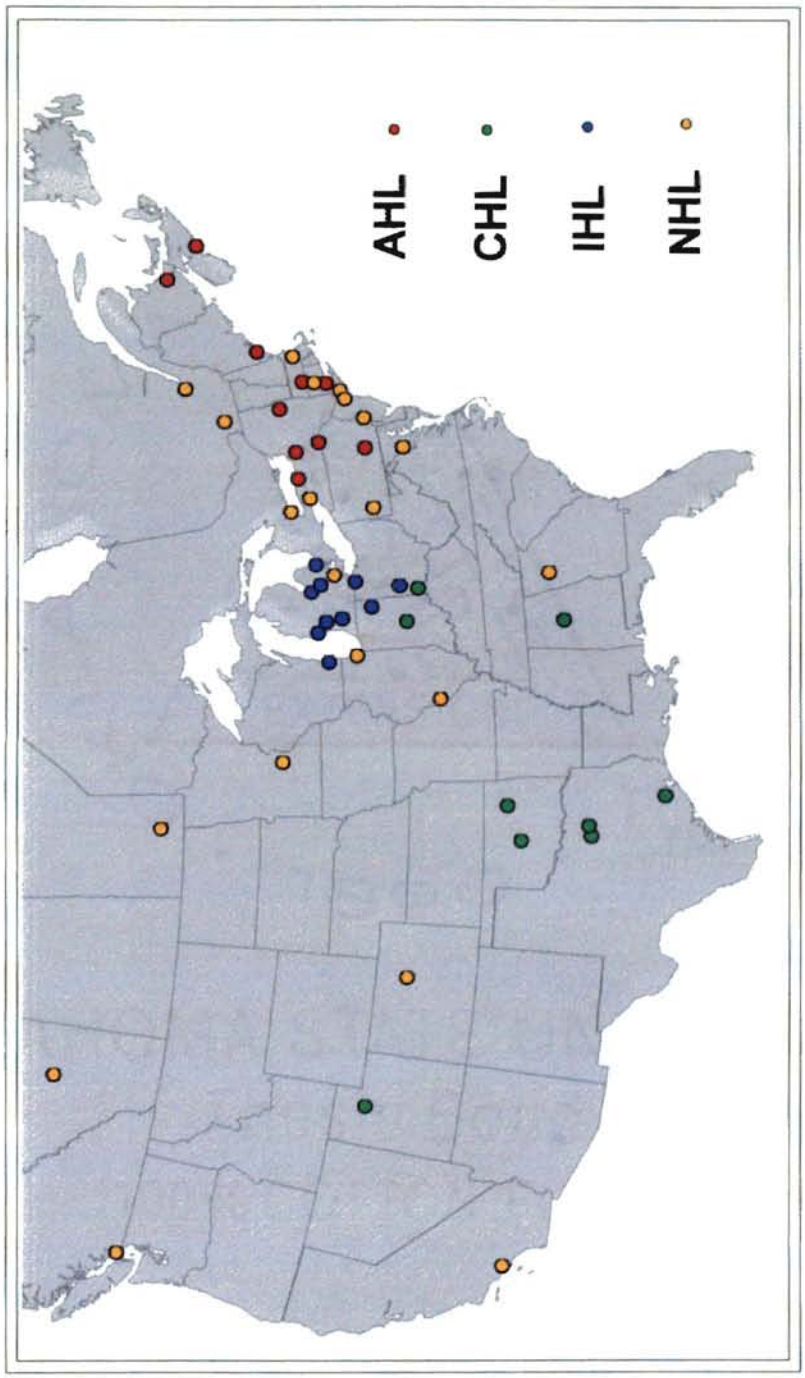

Figure 2 - 1979 Team Locations

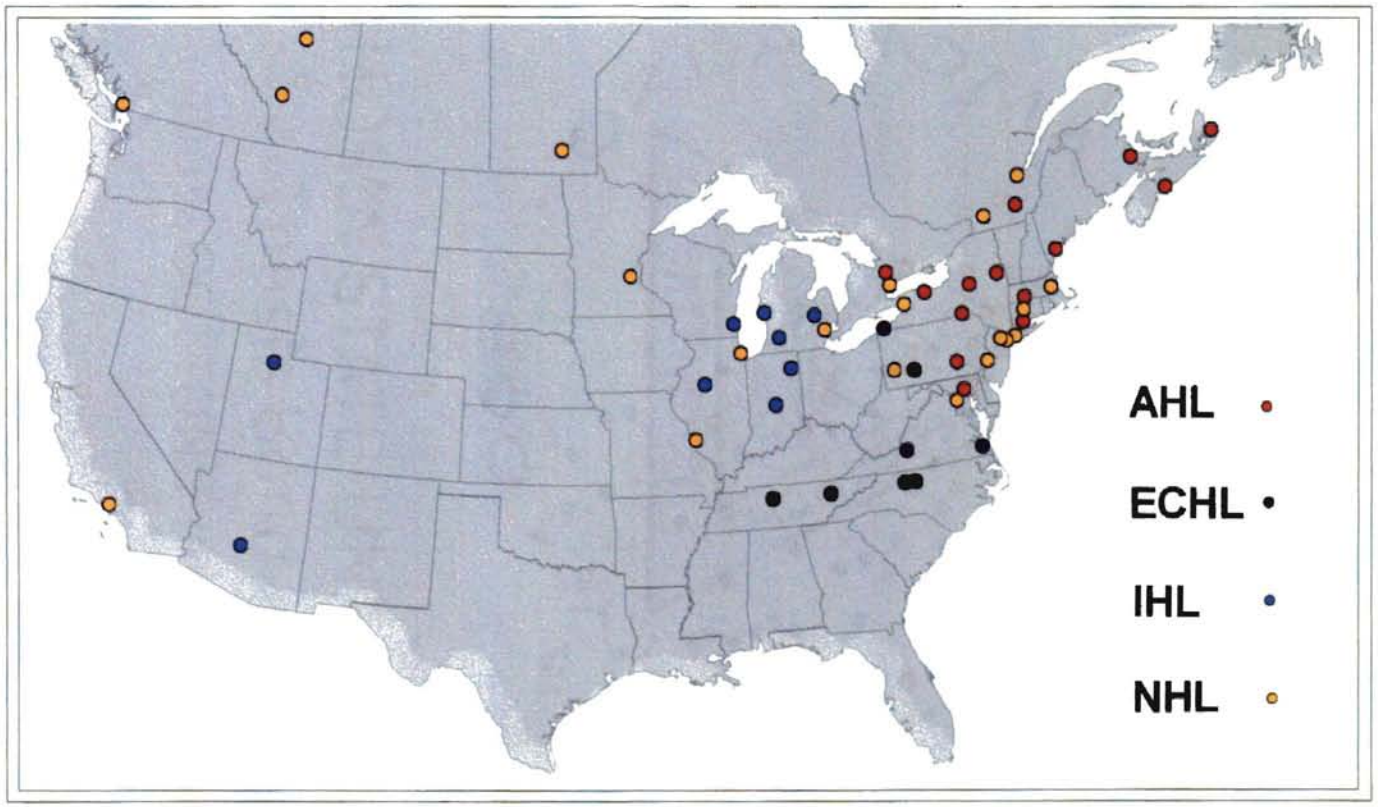

Figure 3 - 1989 Team Locations

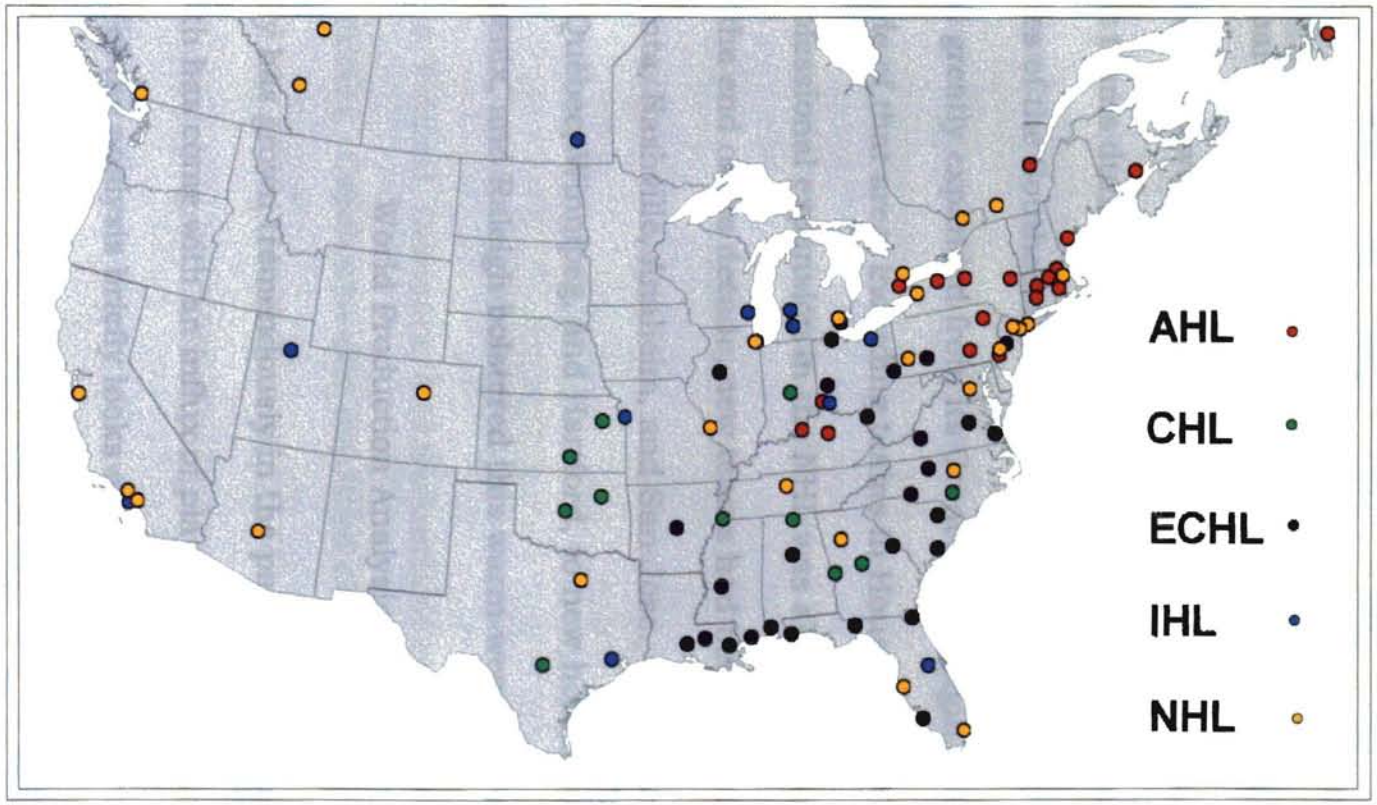

Figure 4 - 1999 Team Locations

small cities in the east, including Norfolk, Virginia, and Greensboro, North Carolina.

The number of teams increased greatly by 1999, as seen in Figure 4. The return of the CHL brought hockey back to the Southern Plains. The AHL expanded in two directions, with new teams in both northern Kentucky and in Newfoundland. The ECHL exploded from eight to twenty-eight teams during the 1990's. Most of the growth was in regional cities of the Southeast, including Mobile, Biloxi, and Pensacola. The IHL had greatly expanded from its Great Lakes origin, with five of ten teams outside of that area, including teams in Houston and Orlando. Top level professional expansion in the NHL was also very strong in the 1990's. By the end of the decade, new teams had been added in Miami, Tampa, Atlanta, Nashville, Anaheim, and San Jose. The movements of Minnesota, Québec, Winnipeg, and Hartford, to new homes in Dallas, Denver, Phoenix, and Raleigh bolstered this warm-weather trend.

World Production Analysis

Hockey has grown tremendously in the past thirty years and much of that growth has come with an influx of players from around the globe. This portion of the analysis briefly looks at the changing status of international players in North American professional leagues, for this change has a direct impact on the scale of North American player participation. Five categories of producing countries were created based

on geographic distributions and cultural traits. These five regions were Eastern Europe, North America, Scandinavia, Western Europe, and Other.

World Production Results

A preliminary view at the list of individual countries shows the overwhelming dominance of Canada as well as a gradual strengthening in international hockey talent (Table 1). In 1969, Canada produced a Location Quotient of 161.47, a value much higher than any other nation. This shows that, relative to population, Canada was the commanding leader in hockey talent production. Lebanon, at 2.28, ranked second, followed by Finland, Denmark, Czechoslovakia, the United States, and the United Kingdom. These nations comprised the primary and secondary producers.

By 1979, Canada topped Sweden by a considerable margin. The United States, Finland, Denmark, and Switzerland completed the top six primary producers. Czechoslovakia remained close to the top group with an LQ of 0.86. In 1989, Canada saw its LQ go up, but its command over other nations shrunk again; Finland jumped to 27.97. Sweden, Czechoslovakia, the United States, Jamaica, and Switzerland completed the highest level producers.

In 1999 Canada again saw a rise in LQ, but its lead was down to second ranked Czechoslovakia. Four non-Canadian nations were now

Location Quotients

Country	*1969*	*1979*	*1989*	*1999*
Austria	0.00	0.00	0.00	3.29
Bahamas	0.00	0.00	0.00	30.22
Brazil	0.00	0.00	0.05	0.00
Canada	161.47	164.48	235.85	395.62
Czechoslovakia	0.76	0.86	7.96	59.70
Denmark	1.10	1.28	0.00	0.00
Finland	1.18	1.37	27.97	50.03
France	0.00	0.00	0.27	0.00
Germany	0.14	0.17	0.20	1.08
Italy	0.10	0.00	0.00	0.00
Jamaica	0.00	0.00	3.14	0.00
Lebanon	2.28	0.00	0.00	0.00
Nigeria	0.00	0.00	0.00	0.07
Poland	0.33	0.00	0.20	0.92
South Africa	0.00	0.00	0.20	0.21
South Korea	0.00	0.00	0.18	0.38
Sweden	0.00	7.86	17.20	52.25
Switzerland	0.00	1.02	1.13	3.68
Taiwan	0.00	0.37	0.38	0.15
United Kingdom	0.49	0.23	0.40	0.75
USA	0.53	2.38	6.42	14.01
USSR	0.00	0.00	0.21	4.23
Venezuela	0.00	0.44	0.00	0.00
Yugoslavia	0.27	0.30	0.00	0.00

Table 1 - Total World Production

producing with LQ's higher than that of 1989's second ranked Finland. A primary group of producers in 1999 included Czechoslovakia, Sweden, and Finland, while the United States, nations of the former Soviet Union, Switzerland, and Austria completed a secondary group.

Comparing production by region can also help visualize the changes (Table 2). In 1969, the United States and Canada combined to give North America an LQ of 15.96, well above the 0.05 of Denmark and Finland in Scandinavia. The nations of Western Europe, the United Kingdom, Germany, and Italy, edged out those of Eastern Europe, Czechoslovakia, Poland, and Yugoslavia. Lebanon was the only nation in the 'Other' category in 1969, giving the group a very low value of 0.02. Every region, except Western Europe, gained in LQ by 1979.

By 1989, Scandinavia, with production from Finland and Sweden, had made significant gains in production. Eastern Europe and Western Europe exchanged places in the rankings. In 1999, where North America, Scandinavia, and Eastern Europe made large jumps in LQ's, leaving the countries of Western Europe, and the rest of the world, behind. This shows in the number of players from the regions. North America, Eastern Europe, and Scandinavia combined for a total of 2149 players in 1999, while the remainder of all nations, including those in Western Europe, produced only 27 total players.

Location Quotients				
Region	***1969***	***1979***	***1989***	***1999***
EasternEurope	0.08	0.05	0.48	5.40
NorthAmerica	15.96	18.18	29.37	52.91
Other	0.02	0.04	0.09	0.11
Scandinavia	0.50	3.48	12.36	29.92
WesternEurope	0.16	0.11	0.21	0.61

Table 2 - Total Regional Production

Canadian Production Analysis

Canada, as the 'home' of hockey continues to lead the world in production of top-quality ice hockey talent. No other nation on earth has as much production or as widespread of production as does Canada. Even with this dominance, however, Canadian production has seen some changes over the past thirty years.

Canadian Production Results

Provincial Results

At the provincial level, Canadian professional player production has stayed fairly constant over the past thirty years. Top production was consistently centered in the central portion of the country, from Ontario into the Prairie Provinces. In 1969, only Saskatchewan, Manitoba, and Ontario produced at rates higher than the national average, with LQ's at 2.77, 2.18, and 1.34, respectively (Table 3; Figure 5). Alberta and Québec produced at similar values, 0.73 and 0.71, though lower than the core provinces. The coastal provinces, the Maritimes in the east and British Columbia in the west, produced much lower than the rest of the nation.

The total production in 1979 shows some slight changes, seen in Table 4 and Figure 6. Saskatchewan and Ontario remained close to their previous LQ's while Manitoba fell somewhat, from 2.18 to 1.76. The three smallest provinces, in terms of population, end up becoming

1969 Location Quotients					
Province	***Total***	***AHL***	***CHL***	***IHL***	***NHL***
Saskatchewan	2.77	2.12	3.18	3.44	2.69
Manitoba	2.18	1.87	1.65	3.58	1.97
Ontario	1.34	1.25	1.40	1.38	1.36
Alberta	0.73	0.71	0.90	0.11	1.00
Quebec	0.71	0.98	0.49	0.53	0.72
Prince Edward Island	0.60	0.00	2.93	0.00	0.00
Nova Scotia	0.47	0.88	0.21	0.67	0.14
New Brunswick	0.32	0.55	0.26	0.28	0.17
British Columbia	0.25	0.11	0.52	0.08	0.30
Newfoundland	0.13	0.00	0.31	0.34	0.00
Northwest Territories	0.00	0.00	0.00	0.00	0.00
Yukon	0.00	0.00	0.00	0.00	0.00

Table 3 - 1969 Province Production

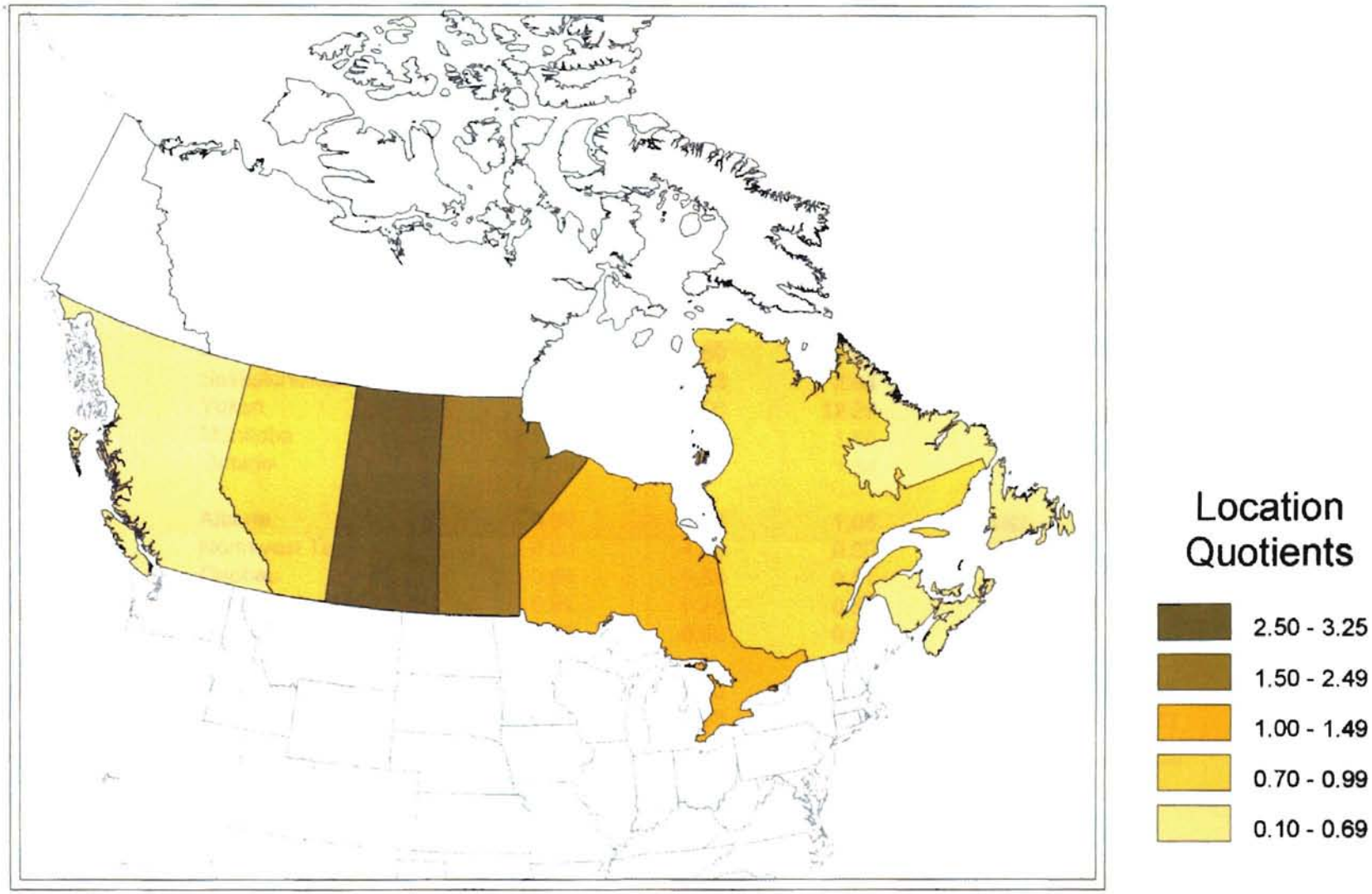

Figure 5 - 1969 Province Location Quotients

1979 Location Quotients					
Province	***Total***	***AHL***	***CHL***	***IHL***	***NHL***
Prince Edward Island	2.61	1.59	4.43	0.00	2.94
Saskatchewan	2.59	1.83	2.84	0.89	3.09
Yukon	1.81	0.00	12.28	0.00	0.00
Manitoba	1.76	1.12	1.56	2.04	2.00
Ontario	1.39	1.48	1.34	1.65	1.32
Alberta	0.99	1.13	1.05	0.62	0.98
Northwest Territories	0.90	4.40	0.00	0.00	0.00
Quebec	0.66	0.58	0.51	0.74	0.71
British Columbia	0.51	0.75	0.63	0.49	0.39
Nova Scotia	0.33	0.92	0.00	0.00	0.26
New Brunswick	0.29	0.00	0.78	0.61	0.21
Newfoundland	0.21	0.00	0.96	0.00	0.13

Table 4 - 1979 Province Production

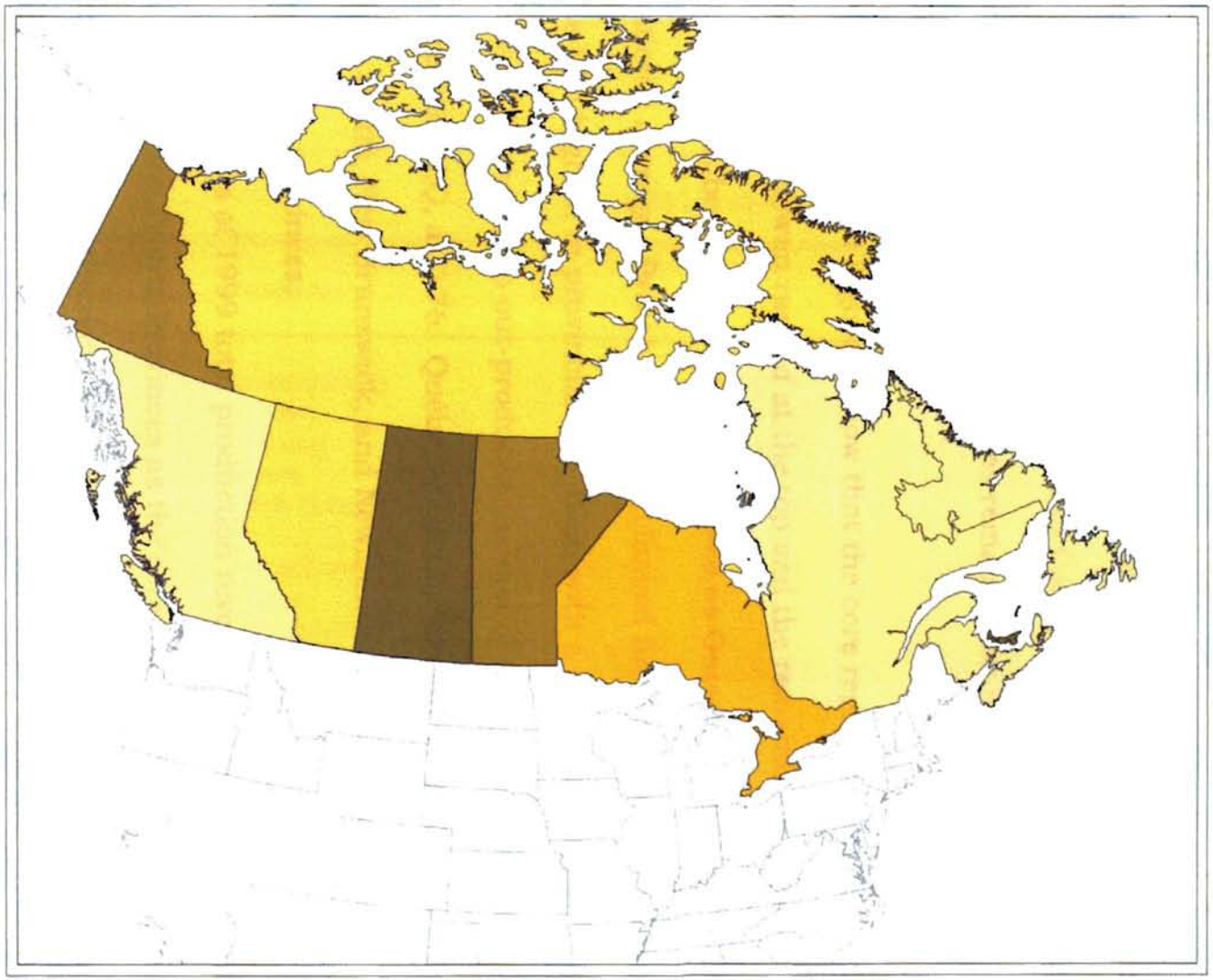

Figure 6 - 1979 Province Location Quotients

statistical anomalies in 1979. Prince Edward Island produced with an LQ of 2.61, slightly higher than Saskatchewan, even though the small island only produced 8 players, compared to 62 from Saskatchewan. The Yukon Territory, at 1.81, and Northwest Territories, at 0.9, also ranked high in the nation, due to the very small populations in the northern reaches of Canada. As with 1969, Alberta remained close to the core region production, up in 1979 to 0.99; however, Québec slipped slightly, to 0.66. Even though British Columbia made a slight rise in production, the eastern Maritimes remained far behind the rest of Canada.

Table 5 and Figure 7 show that the core region remained in 1989, with Saskatchewan ranked at the top and the remaining Prairie Provinces, Alberta and Manitoba, as well as Ontario, stayed above the national average. British Columbia climbed further, to 0.81, to become the fifth highest in provincial LQ. Even with a small population, Prince Edward Island again out-produced the rest of the Maritimes with a respectable LQ, at 0.76. Québec continued its fall, to 0.59, with only Nova Scotia, New Brunswick, and Newfoundland behind it among producing provinces.

Analysis of 1999 total production revealed a strengthening of the position of the Prairie Provinces as the core of Canadian professional hockey-player production (Table 6; Figure 8). Saskatchewan remained the strongest producer with an LQ of 3.05; with a wide margin over

1989 Location Quotients					
Province	***Total***	***AHL***	***ECHL***	***IHL***	***NHL***
Saskatchewan	2.67	2.71	3.15	2.96	2.44
Alberta	1.46	1.55	1.29	1.43	1.43
Manitoba	1.37	1.10	1.82	2.39	1.06
Ontario	1.21	1.12	1.35	1.06	1.30
British Columbia	0.81	1.00	1.13	0.53	0.73
Prince Edward Island	0.75	0.85	0.00	0.00	1.12
Quebec	0.59	0.59	0.23	0.68	0.62
Nova Scotia	0.47	0.61	0.44	0.63	0.32
New Brunswick	0.40	0.45	0.00	1.02	0.20
Newfoundland	0.17	0.38	0.00	0.00	0.13
Yukon	0.00	0.00	0.00	0.00	0.00
Northwest Territories	0.00	0.00	0.00	0.00	0.00

Table 5 - 1989 Province Production

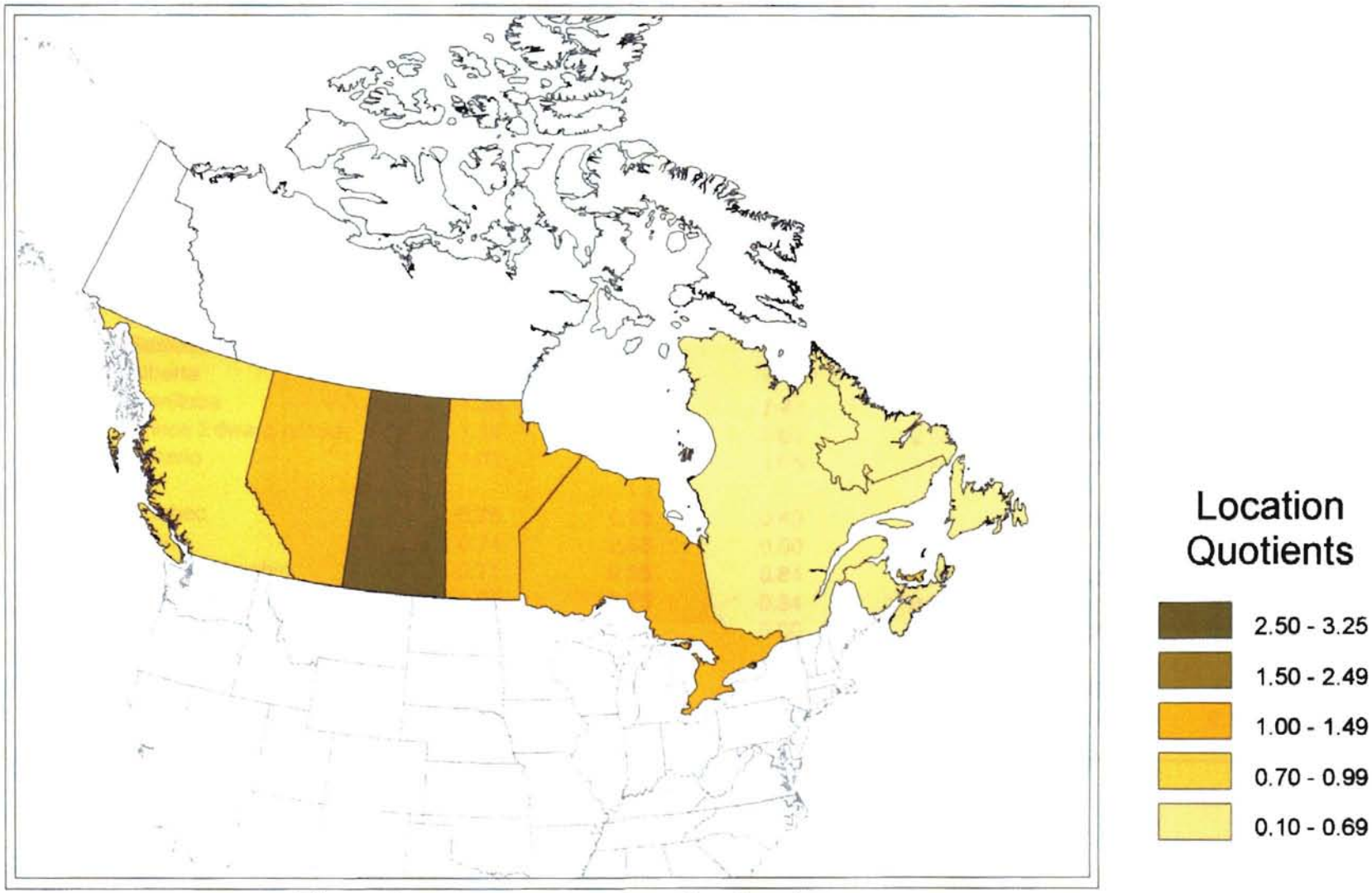

Figure 7 - 1989 Province Location Quotients

1999 Location Quotients						
Province	***Total***	***AHL***	***CHL***	***ECHL***	***IHL***	***NHL***
Saskatchewan	3.05	2.74	3.47	3.11	3.78	2.73
Alberta	1.67	1.66	1.47	1.83	1.55	1.65
Manitoba	1.38	1.62	2.42	1.09	1.08	1.11
Prince Edward Island	1.14	1.28	0.00	2.58	1.28	0.00
Ontario	1.03	0.97	1.05	1.04	0.94	1.11
Quebec	0.75	0.88	0.49	0.65	0.70	0.88
Yukon	0.74	2.88	0.00	0.00	0.00	0.00
British Columbia	0.71	0.66	0.84	0.71	0.92	0.61
Nova Scotia	0.67	0.75	0.84	0.66	1.32	0.19
Northwest Territories	0.66	0.00	0.00	0.00	2.57	1.32
New Brunswick	0.48	0.12	1.05	0.82	0.23	0.36
Newfoundland	0.33	0.65	0.00	0.33	0.33	0.17

Table 6 - 1999 Province Production

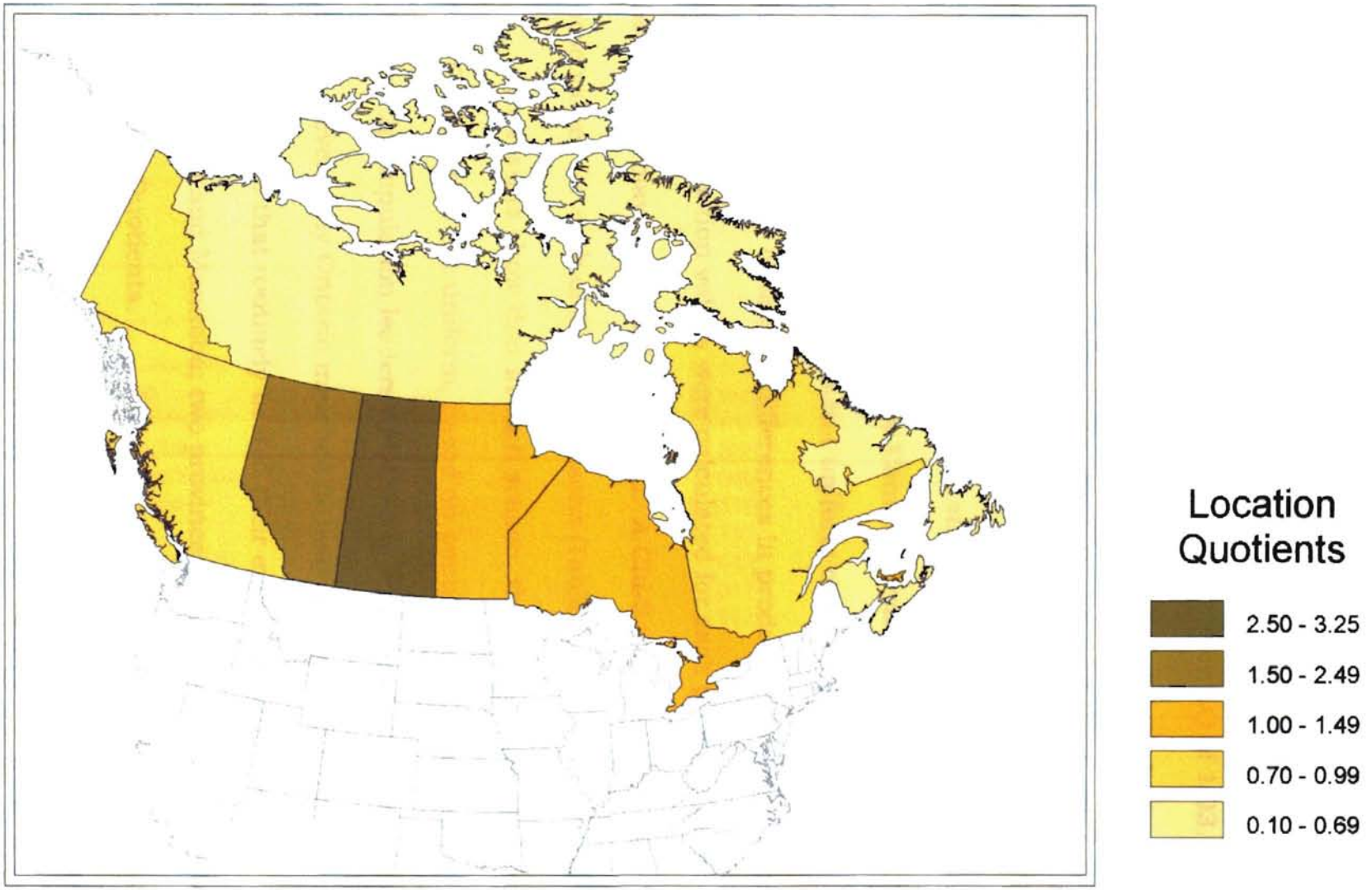

Figure 8 - 1999 Province Location Quotients

number two, Alberta, at 1.67. Manitoba completed the top three for prairie dominance. Prince Edward Island again out-produced the nation as a whole with an LQ of 1.14. Ontario, the population leader of Canada, slid to just above the national average, producing an LQ of 1.03. Québec rebounded slightly, leading a group of provinces with LQ's between 0.65 and 0.75. Yukon, British Columbia, Nova Scotia, and the Northwest Territories round out that group. The remainder of the Maritimes, New Brunswick and Newfoundland, stayed statistically low.

The provincial level data for Canada reveals that, counter to the original premise, production is not uniform over the entire country. To determine whether or not the differences in production were significant, expected production values were calculated for each province based on the national player to population ratio. A Chi-Square test was done on these values for each of the four seasons (Table 7).

The results show that in each season, the distribution of players from Canada was not uniform, based on population. Ontario and Québec, the population leaders of Canada, led in production in every year; however, only Ontario matched or beat its expected value. The other provinces that routinely bested their expected value were Saskatchewan and Manitoba; two provinces that showed some of the best Location Quotients.

Alberta has gone from slightly under its expected value in 1969 to well over its expected value by 1999, showing a trend similar to the LQ's

Chi-Square Values

	1969			1979			1989			1999		
	Exp.	Obs.	Chi-Sq.	Exp.	Obs.	Chi-Sq.	Exp.	Obs.	Chi-Sq.	Exp.	Obs.	Chi-Sq.
Alberta	49	35	3.845	53	51	0.116	77	111	14.605	135	219	52.497
British Columbia	65	16	37.250	67	33	17.601	99	79	4.099	183	127	17.139
Manitoba	29	64	40.150	27	46	13.284	34	46	4.087	52	70	6.217
New Brunswick	19	6	8.874	18	5	9.417	23	9	8.356	34	16	9.797
Newfoundland	16	2	11.870	15	3	9.308	18	3	12.346	25	8	11.210
NorthWest/Yukon	2	0	1.591	2	2	0.046	3	0	2.624	4	3	0.509
Nova Scotia	24	11	6.722	22	7	10.172	28	13	8.049	43	28	5.089
Ontario	230	306	24.836	222	297	25.737	314	374	11.609	524	525	0.003
Prince Edward Is.	3	2	0.537	3	8	7.312	4	3	0.265	6	7	0.083
Quebec	180	127	15.736	165	105	21.917	215	125	37.468	334	245	23.776
Saskatchewan	28	76	84.225	25	62	55.912	31	83	83.556	47	139	182.017
SUM	645	645	235.634	619	619	170.821	846	846	187.065	1387	1387	308.337
p-value			*0.0000*			*0.0000*			*0.0000*			*0.0000*

Table 7 - Province Chi-Square Results

of the province. British Columbia has also seen an increase in LQ value over the past thirty years; however, the actual production of players has never matched what should be expected with uniform production. The same is true with the Maritime Provinces, where the observed production is almost always lower than what is expected. The one exception to this is Prince Edward Island, where production barely exceeded the expected, twice.

Québec's low showings in the LQ rankings were reinforced with the results of the Chi-Square test. In every year of the study, Québec's actual production was at least 50 players below the expected value. There could be one possibility for this result. Historically, many of the developmental leagues in Québec have emphasized the offensive, speed oriented aspects of hockey (Henzel, 1990). Play in the top level of professional hockey has been more defensive in style in the past few decades, in effect creating a barrier that many players from Québec never overcome. There seems to be a slight shift in 1999 but it is impossible at this point to determine if player development in Québec has switched to an offensive style, or if the defensive style of play in the professional leagues has relaxed somewhat.

When comparing the production rates for each league among provinces, very little changes. In 1969, Saskatchewan, Manitoba, and Ontario all ranked among the highest producers in each league. Prince Edward Island's Location Quotient for all professional players, 0.60, was

much lower than its league specific LQ for the CHL, 2.93. This pattern is often evident when a low population province produces a few players for only one league. In 1979, the Yukon showed a similar trend with large jump in the CHL, with a 12.28, much higher than its total production LQ of 1.8. Because of the area's low population, even the one player that came from the province in 1979 could cause that high of a rating. The Northwest Territories exhibited the same condition in the AHL with a production LQ nearly four times higher than its combined total.

Most provinces produced near their combined totals in each league in 1989, with the exception of Québec. Its ECHL production rate was less than half of its total production of the year. As with the combined production rate, Saskatchewan dominated in 1999. The province led in every league except the AHL, where it placed second, 0.15 behind the Yukon Territory. This showed Saskatchewan's dominance in hockey talent production at all levels of professional hockey.

Census Division Results

A closer look can be made at the census divisions (CDs) of Canada. The trend toward prairie dominance seen in the last thirty years is again evident when examining the CDs. The highest producing CD in 1969 was Timiskaming, Ontario, with an LQ of 13.14, slightly higher than the number two ranked Saskatchewan Division-12 (Table 8; Figure 9). A total of 86 CDs produced above the national average in 1969. Forty-one of those were in Ontario or Québec while 35 were in Alberta, Manitoba,

1969 Location Quotients

CD	*Province*	*Total*	*AHL*	*CHL*	*IHL*	*NHL*
Timiskaming	ONT	13.14	19.80	6.98	7.61	13.83
SASK-12	SASK	9.38	4.54	12.82	13.97	8.46
Parry Sound	ONT	7.85	7.61	0.00	5.85	14.17
MAN-19	MAN	7.00	0.00	8.37	27.36	0.00
Abitibi	QUE	6.05	7.18	2.89	4.73	7.64
Cochrane	ONT	6.02	3.60	1.69	9.23	8.94
MAN-16	MAN	5.88	1.66	2.34	2.55	12.38
MAN-14	MAN	5.83	19.78	0.00	0.00	0.00
SASK-7	SASK	5.71	6.46	6.07	9.92	2.00
SASK-13	SASK	5.57	11.33	5.33	5.80	0.00
SASK-15	SASK	4.97	1.41	5.95	6.48	6.54
Sudbury District	ONT	4.80	3.49	5.74	5.36	4.87
SASK-10	SASK	4.73	4.01	5.65	0.00	7.47
Kootenay Boundary	BC	4.32	3.67	10.34	0.00	3.41
Algoma	ONT	3.90	0.94	0.00	10.15	5.27
Shefford	QUE	3.76	3.19	3.00	4.90	3.95
Thunder Bay	ONT	3.73	3.17	6.70	3.65	2.21
SASK-9	SASK	3.66	2.48	7.00	0.00	4.62
SASK-17	SASK	3.52	0.00	5.60	0.00	7.40
Nipissing	ONT	3.44	1.46	4.12	6.73	2.72
MAN-17	MAN	3.31	0.00	15.82	8.62	0.00
Kenora	ONT	3.19	0.00	0.00	9.97	4.03
MAN-11	MAN	3.10	0.00	0.00	0.00	0.00
MAN-13	MAN	3.00	0.00	0.00	0.00	9.47
Victoria	ONT	2.97	5.81	0.00	5.16	3.13

Table 8 - 1969 Census Division Production

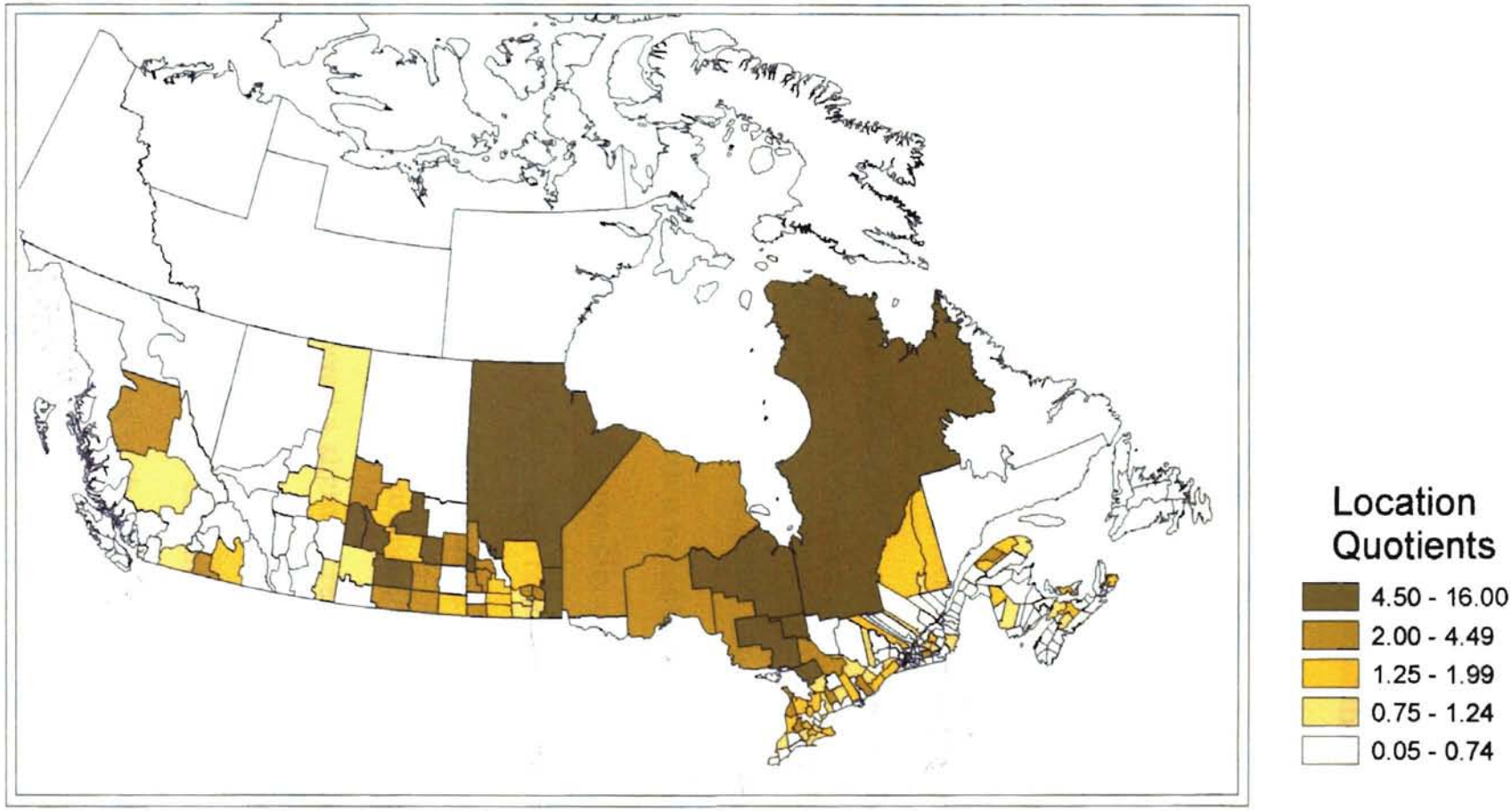

Figure 9 - 1969 Census Division Location Quotients

or Saskatchewan; however, thirteen of the top twenty-five CDs were in Manitoba or Saskatchewan.

Much of the heaviest production in Ontario and Québec was in largely rural areas. Though much of the population of the two provinces are located in the southern portions, along the Great Lakes and St. Lawrence River Valley, higher production rates were found in CDs north and east of Sudbury, including the Timiskaming census division. Manitoba also showed a rural emphasis with several high producing CDs located away from the American border.

Though some Maritime CDs showed production, including several along the northern edge of Québec's Gaspé Peninsula and in the upper reaches of the Bay of Fundy, most were devoid of professional hockey talent. Along the west coast, census divisions in British Columbia fell behind much of the rest of Canada, with a notable exception of the Kootenay Boundary CD, which includes the city of Trail.

The production in Ontario and Québec remained fairly constant through the 1979 data. Much of the distribution is in northern areas, even though several CDs between Toronto and Ottawa in Ontario and Rouyn-Noranda in Québec showed a slight increase (Figure 10). Table 9 shows that by 1979, only seven of the top twenty-five producing CDs were in either Ontario or Québec, while Saskatchewan, Alberta, and Manitoba took fifteen spots, and six of the top seven. Incredibly, five

1979 Location Quotients

CD	*Province*	*Total*	*AHL*	*CHL*	*IHL*	*NHL*
SASK-10	SASK	7.64	0.00	0.00	0.00	13.44
SASK-13	SASK	7.36	7.06	0.00	0.00	10.35
MAN-21	MAN	6.62	0.00	11.14	0.00	8.73
Montmorency #2	QUE	6.62	31.77	0.00	0.00	0.00
SASK-12	SASK	6.36	0.00	0.00	16.96	8.38
SASK-2	SASK	5.89	7.06	0.00	0.00	7.76
MAN-7	MAN	5.78	0.00	4.86	0.00	8.89
Abitibi	QUE	5.74	2.12	8.91	4.71	6.21
Timiskaming	ONT	5.68	9.08	0.00	10.10	4.99
SASK-4	SASK	5.30	12.71	0.00	0.00	4.66
SASK-17	SASK	4.67	0.00	7.86	0.00	6.16
SASK-7	SASK	4.50	0.00	0.00	8.00	6.59
Lambton	ONT	4.20	3.10	8.69	0.00	3.98
Kings	ONT	4.18	10.03	0.00	0.00	3.68
Queens	ONT	3.97	0.00	8.91	0.00	4.66
MAN-6	MAN	3.61	17.33	0.00	0.00	0.00
MAN-18	MAN	3.61	0.00	12.15	0.00	3.18
Kenora	ONT	3.43	9.86	4.61	7.31	0.00
MAN-16	MAN	3.31	0.00	22.28	0.00	0.00
MAN-9	MAN	3.31	0.00	0.00	17.67	2.91
Bulkley-Nechako	BC	3.31	5.30	0.00	0.00	3.88
Lethbridge	ALB	3.31	0.00	0.00	0.00	5.82
Rainy River	ONT	3.18	15.25	0.00	0.00	0.00
Thunder Bay	ONT	3.10	1.24	8.68	5.51	1.81
MAN-15	MAN	3.06	0.00	0.00	0.00	5.37

Table 9 - 1979 Census Division Production

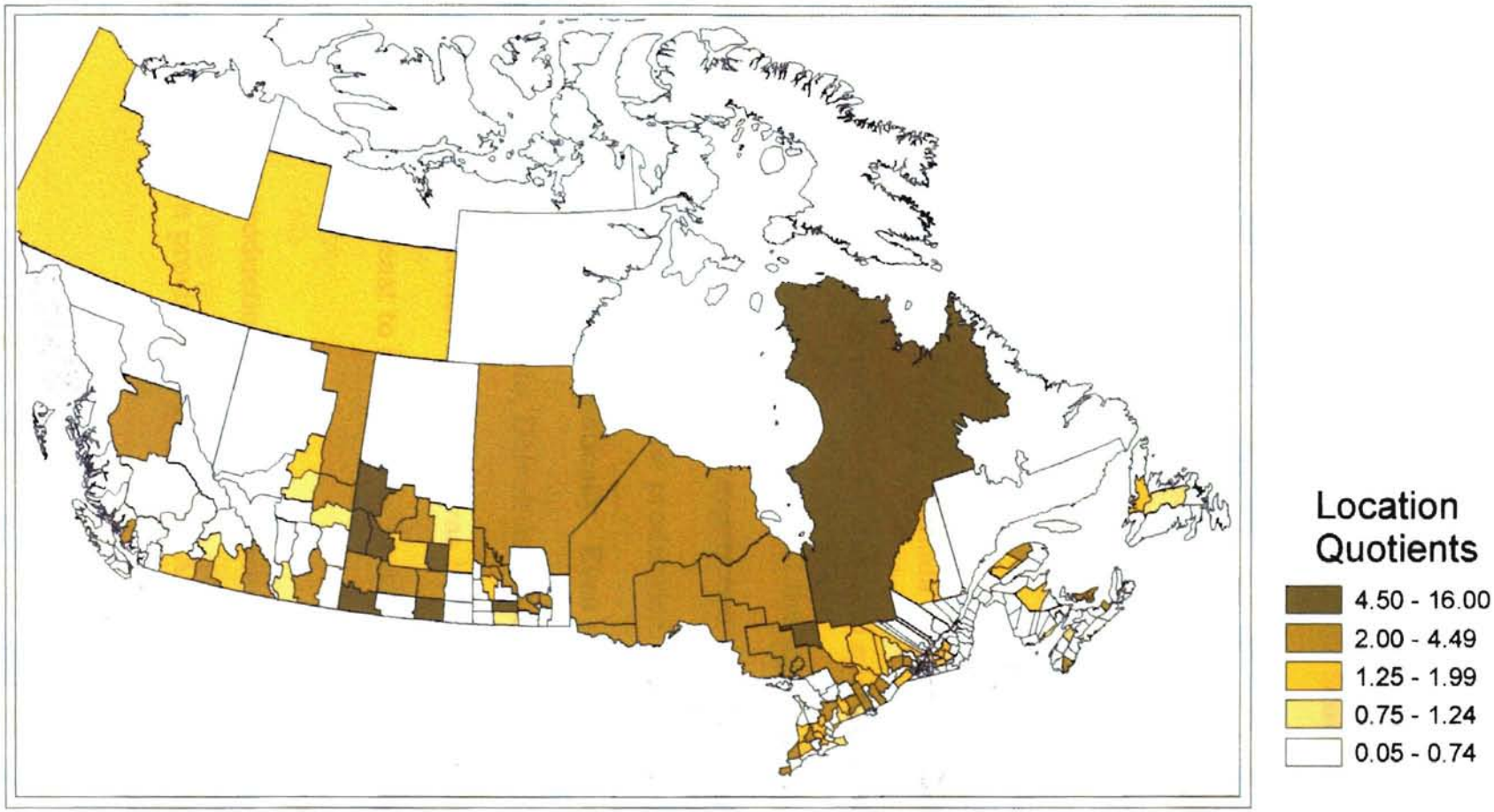

Figure 10 - 1979 Census Division Location Quotients

divisions in Saskatchewan alone produce an LQ over five times the national average.

Two of the three Prince Edward Island divisions jump into the top fifteen, and Shelbourne and Antigonish CDs in Nova Scotia produced at more than double the national average. The north side of the Gaspé Peninsula also remained a strong regional producer. Statistically, however, the Maritimes fell well behind most of Canada. The boundary region of British Columbia again showed a clustering of production around the cities of Trail, Cranbrook, and Penticton.

By 1989, 160 census divisions in Canada produced top-level hockey talent, with 99 producing over the national average (Table 10; Figure 11). Saskatchewan and Manitoba held the top three spots again, with Saskatchewan Divisions 10 and 4 nearly two times as high as all other Canadian divisions. Much of the production in northern areas of Ontario and Québec dropped dramatically. Even several of the urban or semi-urban CDs between Toronto, Detroit and Buffalo dropped in production. Most production in Québec was located in the St. Lawrence Valley, from Montréal, east to Sherbrooke, and north to Trois-Rivières and Québec City.

The regional production in the Maritimes remained sporadic; however, the western provinces, particularly Alberta and British

1989 Location Quotients

CD	*Province*	*Total*	*AHL*	*CHL*	*IHL*	*NHL*
SASK-10	SASK	15.48	18.95	17.24	16.29	12.55
SASK-4	SASK	14.61	24.59	0.00	14.09	10.86
MAN-21	MAN	8.32	9.34	16.98	0.00	9.27
Rouyn-Noranda	QUE	5.47	5.26	0.00	4.52	6.97
SASK-13	SASK	4.83	0.00	0.00	0.00	10.77
L'Ile-d'Orleans	QUE	4.72	0.00	0.00	27.32	0.00
MAN-7	MAN	4.51	1.90	6.90	6.52	5.02
Kootenay Boundary	BC	4.31	7.25	0.00	6.23	2.40
Camrose-Lloydminster	ALB	4.18	2.82	0.00	9.68	3.73
Rainy River	ONT	4.18	4.69	0.00	0.00	6.21
MAN-15	MAN	4.16	9.33	16.96	0.00	0.00
MAN-22	MAN	4.13	3.48	12.66	0.00	4.61
MAN-5	MAN	4.12	0.00	0.00	23.83	0.00
Kitimat-Stikine	BC	3.93	5.30	9.63	4.55	1.75
SASK-12	SASK	3.85	4.32	0.00	14.87	0.00
SASK-9	SASK	3.84	2.59	37.64	0.00	0.00
SASK-7	SASK	3.68	2.07	0.00	7.11	4.11
Papineau	QUE	3.40	0.00	20.79	0.00	3.78
SASK-5	SASK	3.36	5.65	0.00	0.00	3.74
Sudbury Municipality	ONT	3.27	4.82	0.00	0.00	4.10
Sherbrooke	QUE	3.25	0.00	0.00	9.39	3.62
Lambton	ONT	3.24	3.35	3.05	1.44	3.89
Timiskaming	ONT	3.19	2.68	0.00	4.61	3.55
Frontenac	ONT	3.08	2.59	3.15	2.97	3.44
Inverness	NS	2.97	5.01	0.00	0.00	3.32

Table 10 - 1989 Census Division Production

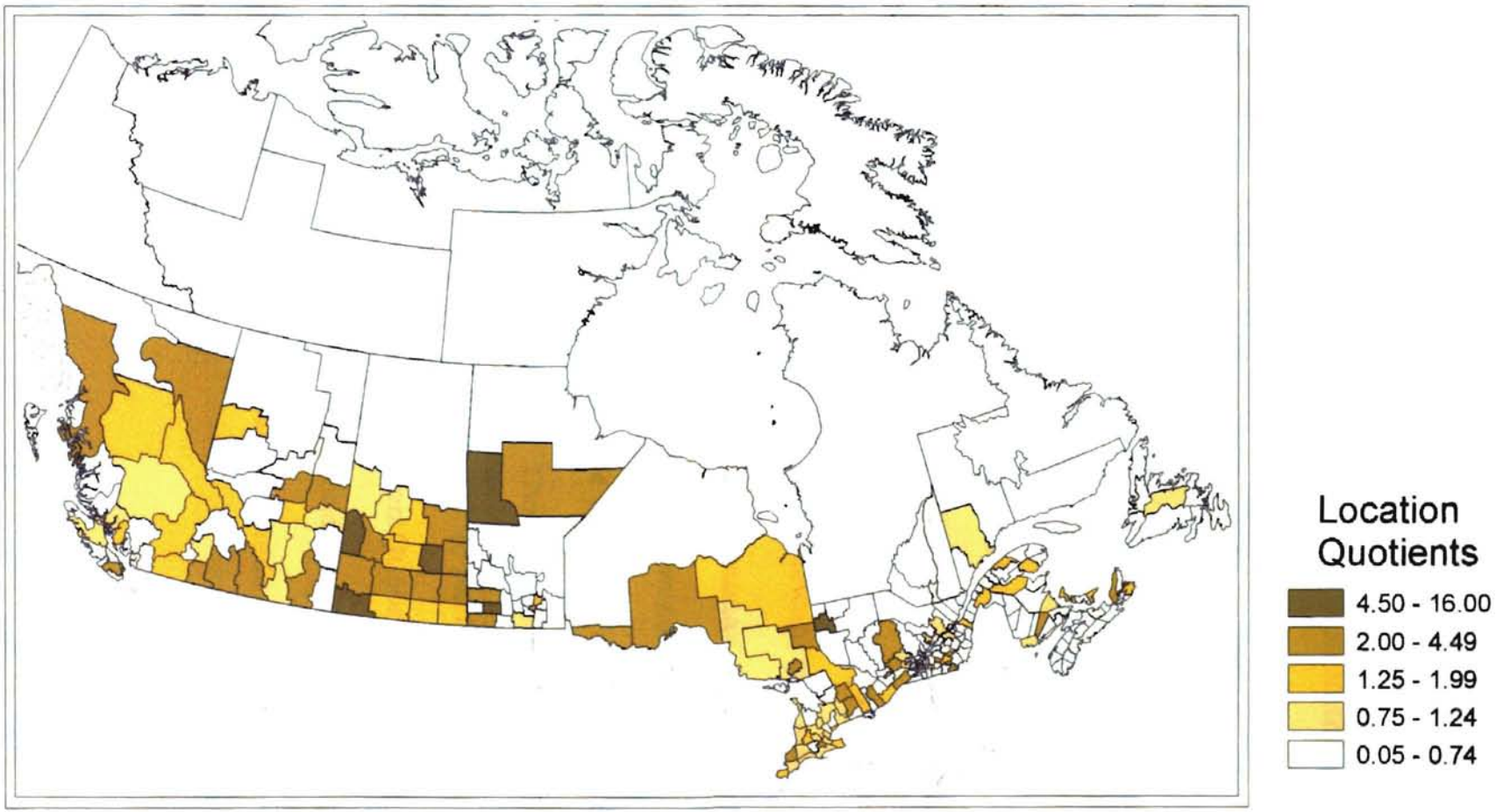

Figure 11 - 1989 Census Division Location Quotients

Columbia showed a significant spread of production. The East Kootenay, Central Kootenay and Kootenay Boundary divisions of British Columbia continued as some of the highest in the province, while several northern CDs began to show signs of production. Production in the southwest portion of Alberta, along the British Columbia border, also increased, as well as the area from Calgary to Edmonton.

Again in 1999, Saskatchewan, Manitoba, and Alberta increased in production in Canada. Table 11 shows that Saskatchewan continued to hold the top two spots and all four western provinces, British Columbia, Alberta, Saskatchewan, and Manitoba, combined to take twenty-one of the top twenty-five producing CDs. The highest LQ production areas are in the south and central portions of Saskatchewan, and adjoining areas of Alberta and Manitoba (Figure 12). The Kootenay region of British Columbia also helped to increase the LQ's in western Canada.

The leading areas of Ontario were again in the northern regions, from Sudbury, west to Thunder Bay. Though these CDs led the province in production, their LQ's have fallen over the past thirty years. The areas north and west of Hull, as well as between Québec City and Sherbrooke, had the highest concentration of production in Québec. The Maritimes, though again much lower than most of Canada, showed a more widespread production in 1999.

1999 Location Quotients

CD	*Province*	*Total*	*AHL*	*CHL*	*ECHL*	*IHL*	*NHL*
SASK-10	SASK	8.61	0.00	0.00	17.00	8.43	8.65
SASK-2	SASK	6.77	0.00	0.00	19.08	7.57	3.88
Antigonish	NS	5.65	8.83	7.86	8.93	8.85	0.00
SASK-12	SASK	5.37	3.50	0.00	7.07	7.01	3.60
MAN-15	MAN	4.96	11.62	0.00	0.00	7.77	3.99
East Kootenay	BC	4.90	5.88	0.57	2.97	5.90	7.56
SASK-15	SASK	4.82	5.23	0.00	4.23	8.39	4.30
Mount Waddington	BC	4.68	12.18	0.00	0.00	0.00	6.27
Kootenay Boundary	BC	4.67	2.61	0.00	5.27	5.23	8.05
SASK-8	SASK	4.19	10.90	0.00	2.76	0.00	2.80
SASK-3	SASK	4.18	5.45	0.00	0.00	10.92	5.60
SASK-5	SASK	3.82	2.49	0.00	2.52	9.98	5.12
MAN-17	MAN	3.78	14.75	0.00	0.00	0.00	0.00
Stettler	ALB	3.68	6.16	0.00	0.00	4.12	4.22
SASK-4	SASK	3.65	0.00	0.00	0.00	0.00	14.65
MAN-12	MAN	3.49	0.00	0.00	9.18	0.00	4.67
Rocky Mountain House	ALB	3.44	0.00	0.00	9.05	0.00	4.60
SASK-1	SASK	3.38	5.28	0.00	0.00	0.00	5.43
Powell River	BC	3.25	4.23	0.00	0.00	8.48	4.35
SASK-17	SASK	3.14	2.04	0.00	2.07	4.10	4.20
Thunder Bay	ONT	3.12	1.66	0.00	5.59	2.22	3.98
Sudbury Municipality	ONT	3.04	3.23	0.00	4.36	0.00	2.22
MAN-22	MAN	2.94	4.59	0.00	4.65	0.00	2.36
SASK-9	SASK	2.92	0.00	0.00	4.62	4.58	2.35
Pontiac	QUE	2.90	0.00	0.00	0.00	0.00	0.00

Table 11 - 1999 Census Division Production

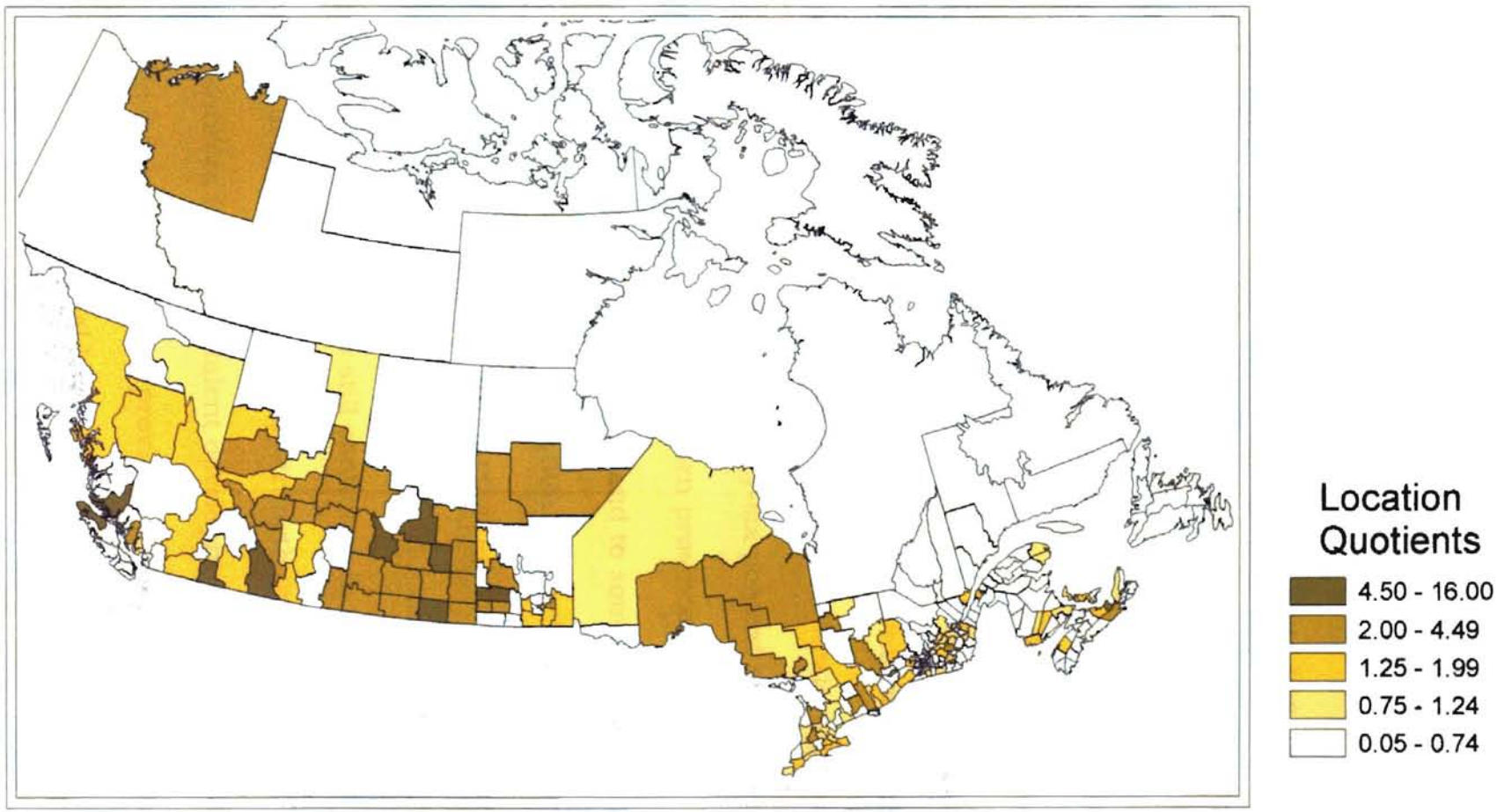

Figure 12 - 1999 Census Division Location Quotients

Canadian Production Interpretation

Throughout the past thirty years, Canada has continued to produce hockey players at very high levels. Nearly every area in the country has had some measure of production. There has, however, been a shift of the core region of production, away from the population centers of Ontario and Québec, to the western provinces of Manitoba, Saskatchewan, Alberta, and British Columbia. Ontario and Québec remain the leading producers, in total number of players; however, that lead has been getting smaller in the last three decades. Sixty-seven percent of all Canadian players came from either Ontario or Québec in 1969, while only thirty percent were from the four western provinces. By 1999, Ontario and Québec produced fifty-six percent of all players, compared to forty percent for the western provinces.

One interesting trend in Québec, and to some extent, Ontario, has been a gradual decrease in the production LQ levels of the more rural or remote areas and an increase in production around urban centers. Historically, rural areas in Canada often produced at higher LQ's than their urban counterparts. This still continues in many parts of Canada; however, the urban areas are gaining strength in production. The available resources for hockey talent development may be substantially higher in the larger urban areas, providing a better way for young players to advance to the professional levels.

American Production Analysis

With dominant Canadian production just across the border, many American players have found it difficult to compete at the professional levels. Expansion of the top hockey leagues in the past three decades has allowed many new American skaters the opportunity play. The new areas of hockey interest in the United States have greatly affected the extent of American production.

American Production Results

State Results

In the last three decades, American production of hockey players has seen some dramatic changes. The traditional core of hockey has slowly expanded into other areas of the country. In 1969, only six states produced any professional hockey talent, and all but one had a boundary with Canada (Table 12; Figure 13). By far, Minnesota was the leading producer. At an LQ of 18.86, it produced at over double the rate of any other state. Following Minnesota, Massachusetts was the closest in production, with an LQ of 7.21. Michigan, Washington, and Ohio completed the top five, all of which produced at more than the national average. New York, the only remaining producer, had an LQ of 0.56.

Table 13 and Figure 14 show that Minnesota and Massachusetts remained the top two states again in 1979, with LQ's at 16.83 and

1969 Location Quotients

State	*Total*	*AHL*	*CHL*	*IHL*	*NHL*
Minnesota	18.86	8.98	13.47	26.94	13.47
Massachusetts	7.21	18.02	3.00	0.00	0.00
Michigan	4.62	3.85	0.00	5.77	11.54
Washington	3.00	10.01	0.00	0.00	0.00
Ohio	2.89	0.00	3.21	4.81	0.00
New York	0.56	0.00	0.00	0.00	2.81

Table 12 - 1969 State Production

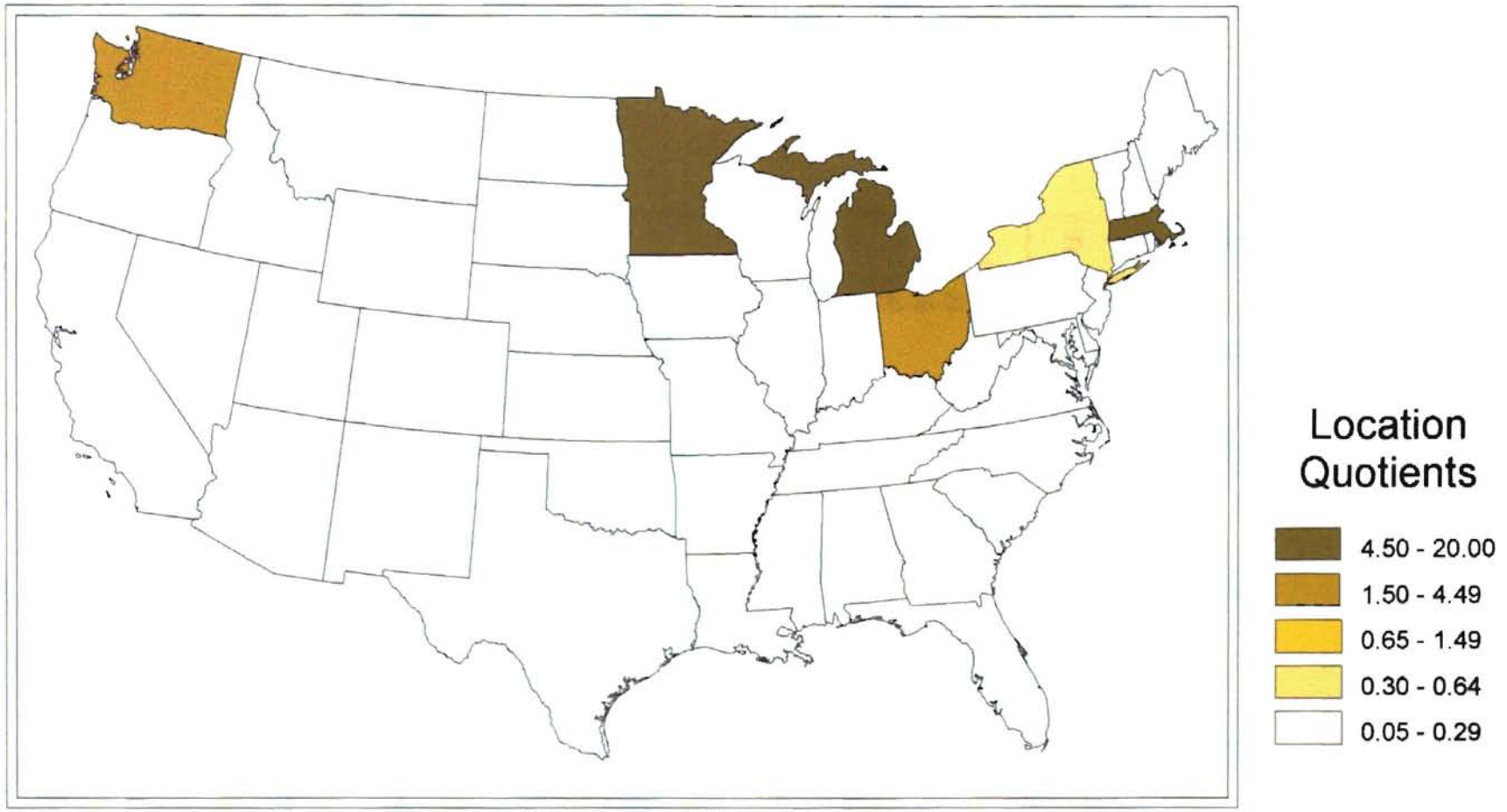

Figure 13 - 1969 State Location Quotients

1979 Location Quotients					
State	***Total***	***AHL***	***CHL***	***IHL***	***NHL***
Minnesota	16.83	18.62	3.72	6.21	22.70
Massachusetts	10.04	15.12	1.76	15.44	4.96
Michigan	3.26	2.34	0.55	5.46	3.07
Rhode Island	2.90	0.00	0.00	13.36	0.00
Maine	2.44	0.00	0.00	0.00	6.33
Wisconsin	1.17	0.00	1.08	2.69	0.00
New York	1.09	0.62	0.58	0.72	1.22
Oregon	1.04	0.00	0.00	0.00	2.70
Illinois	0.96	0.00	0.00	2.21	1.25
Colorado	0.95	0.00	0.00	0.00	2.46
Iowa	0.94	0.00	0.00	0.00	2.44
Maryland	0.65	2.57	0.00	0.00	0.00
Texas	0.58	0.76	0.36	0.00	0.50
Ohio	0.25	0.00	0.00	0.00	0.66
California	0.23	0.00	0.43	0.00	0.00
Pennsylvania	0.23	0.91	0.00	0.00	0.00

Table 13 - 1979 State Production

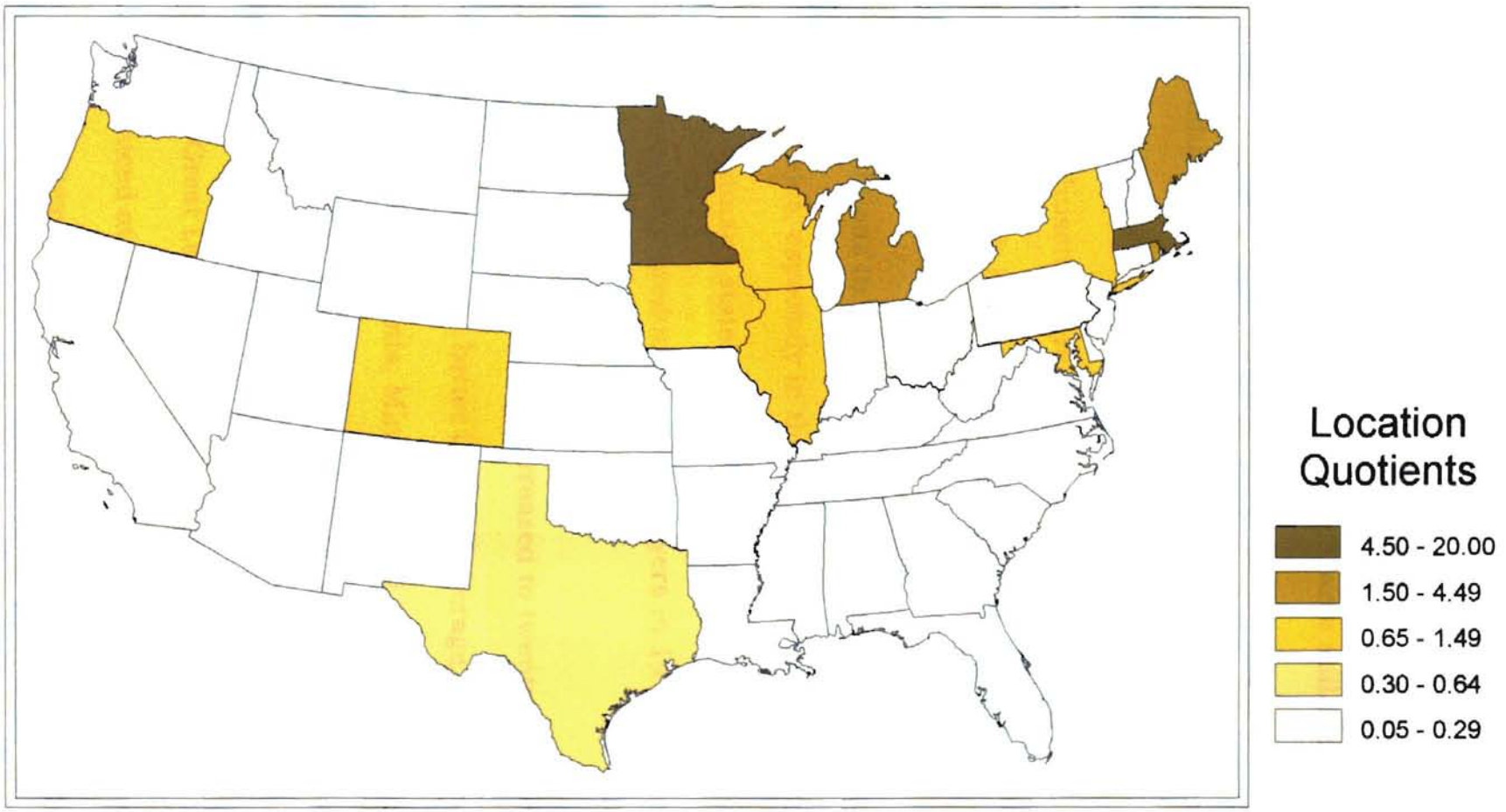

Figure 14 - 1979 State Location Quotients

10.04, respectively. They led a group of fifteen producing states, and eight states with above average production. Michigan, Rhode Island, and Maine rounded out the top five. Wisconsin, New York and Oregon all produced marginally lower than the top five, yet were still above the nation as a whole. States around Minnesota and Massachusetts showed increases in production LQ. Iowa and Illinois, along with Wisconsin, all produced players, while Rhode Island and Maine, New England neighbors of Massachusetts, were both top producers. Maryland, Ohio, and Pennsylvania, though in the northeast, and the core region, produced at very low levels.

Important additions to the ranks of producing states were the several non-core states, especially in the south and west. Both Colorado and Oregon join producing states near the average for the country. Texas and California also produced hockey players in 1979, though at very low LQ values.

The number of producing states increased to twenty-three in 1989, while only nine states produced better than the average, shown in Table 14 and Figure 15. Massachusetts, Minnesota and Rhode Island topped the highest producers with LQ values near 10.0. Michigan and New Hampshire completed the top five at 4.81 and 4.35, respectively. By region, the upper Great Lakes area remained strong. Wisconsin, Illinois and Ohio all produced at respectable levels, though lower than neighbors Minnesota and Michigan. Five of six New England states produced

1989 Location Quotients

State	*Total*	*AHL*	*ECHL*	*IHL*	*NHL*
Massachusetts	10.44	7.63	16.62	7.91	10.77
Minnesota	9.94	12.83	0.00	9.52	12.70
Rhode Island	9.63	15.25	0.00	17.79	6.15
Michigan	4.81	6.59	3.07	3.20	5.31
New Hampshire	4.35	0.00	19.31	0.00	2.78
Alaska	2.20	0.00	12.98	0.00	0.00
Maine	1.97	0.00	5.82	4.85	0.00
Illinois	1.69	0.00	3.12	2.60	1.62
Connecticut	1.47	1.55	2.17	1.81	0.94
Wisconsin	0.99	1.04	0.00	0.00	1.89
New York	0.94	1.70	0.79	0.99	0.51
Ohio	0.67	0.00	0.66	1.10	0.85
Washington	0.50	0.00	2.93	0.00	0.00
Missouri	0.47	0.00	0.00	0.00	1.21
Indiana	0.44	0.92	0.00	1.07	0.00
Pennsylvania	0.41	0.43	0.60	0.00	0.52
Oklahoma	0.38	1.62	0.00	0.00	0.00
Colorado	0.37	0.00	0.00	1.81	0.00
New Jersey	0.31	0.00	0.00	0.00	0.80
California	0.24	0.17	0.00	1.00	0.00
Virginia	0.20	0.82	0.00	0.00	0.00
Florida	0.09	0.39	0.00	0.00	0.00
Texas	0.07	0.00	0.00	0.00	0.18

Table 14 - 1989 State Production

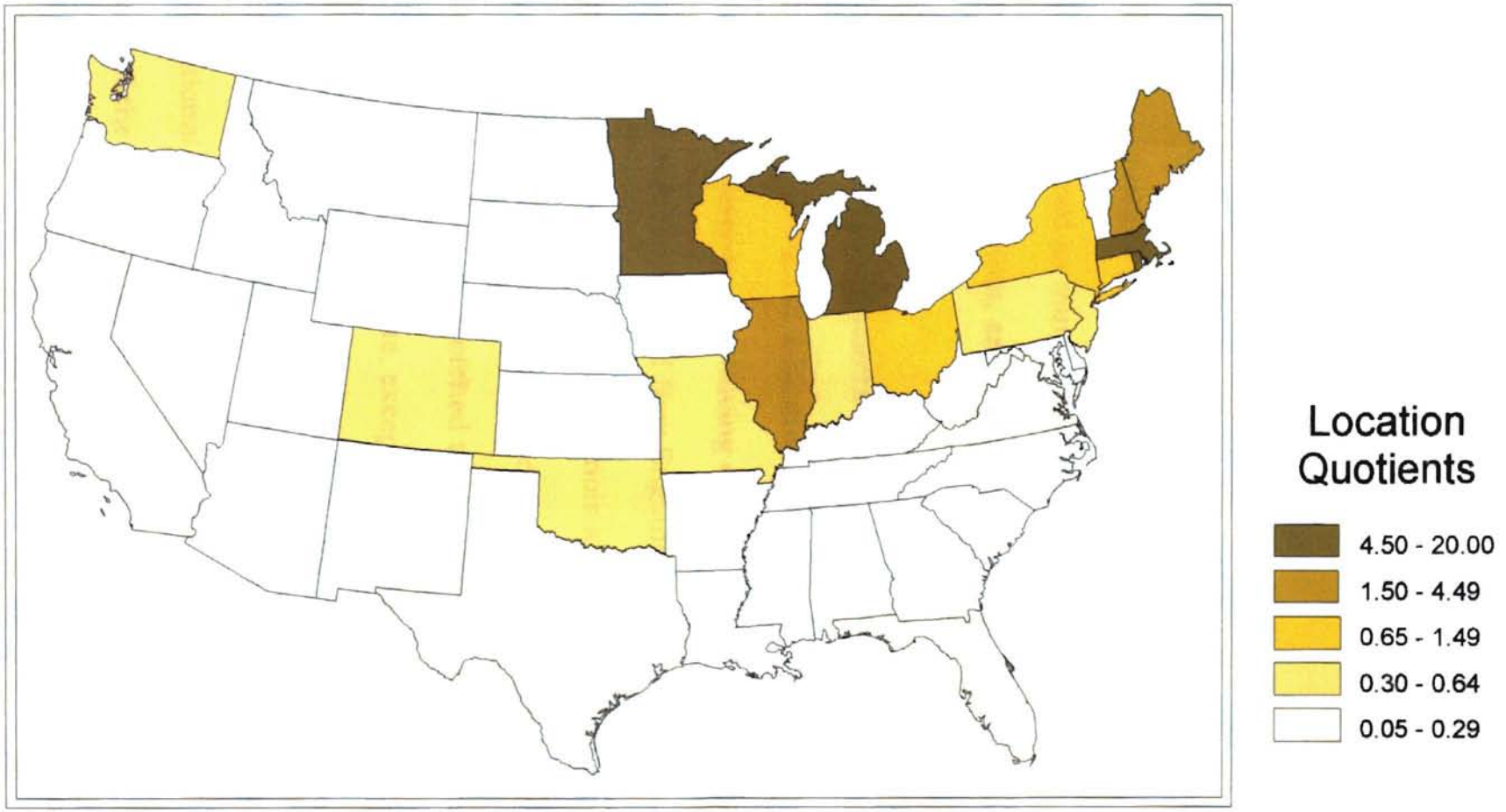

Figure 15 - 1989 State Location Quotients

players at above the national average and nearby New York also produced with a significant LQ. Alaska, far from the major American core, but a promising location for player production, showed a strong LQ of production, at 2.20.

The lower tier of producing states included most of the non-core locations, though Indiana, Pennsylvania, and New Jersey could be considered fringe states of the core area of production. Colorado, Texas, and California remained as minor producers and Washington, Oklahoma, Missouri, Virginia, and Florida all contributed, though at very minimal levels.

Minnesota and Massachusetts remained as the nations top two producers in 1999 with LQ's of 9.22 and 8.42 (Table 15; Figure 16). They led a group of thirty-two producing states. The major producers were again in the Great Lakes and New England regions, and Alaska. Minnesota, Michigan, Wisconsin, and Illinois all ranked in the top twelve among producing states. North Dakota joined with a significant production value of 6.73 and stretched the western edges of the core region. Every New England State, except New Hampshire, ranked in the top nine and produced over twice the national average. Alaska, New York, and the District of Columbia complete the areas with production above the national level.

Many of the near-core states had minor, yet still important, production. Ohio, New Jersey, Delaware, Indiana, and New Hampshire

1999 Location Quotients

State	*Total*	*AHL*	*CHL*	*ECHL*	*IHL*	*NHL*
Minnesota	9.22	8.73	21.19	6.11	11.60	9.33
Massachusetts	8.42	10.98	3.81	9.21	3.77	10.26
North Dakota	6.73	0.00	11.89	14.87	0.00	4.00
Rhode Island	5.10	3.25	0.00	5.92	0.00	10.62
Michigan	5.00	1.00	12.20	5.69	7.24	4.11
Vermont	3.09	0.00	12.76	3.19	0.00	4.29
Alaska	2.92	4.96	0.00	0.00	7.15	4.06
Connecticut	2.13	6.91	0.00	0.60	2.84	0.81
Maine	2.02	2.57	6.25	3.13	0.00	0.00
New York	1.93	2.86	2.17	1.74	1.29	1.90
Wisconsin	1.58	2.47	0.00	1.50	2.67	1.01
Illinois	1.48	0.27	1.31	2.12	2.71	1.10
District of Columbia	1.22	0.00	0.00	0.00	0.00	5.07
Ohio	0.90	0.29	0.00	1.39	1.24	0.94
New Jersey	0.86	1.19	0.00	1.44	0.00	0.65
Delaware	0.83	4.22	0.00	0.00	0.00	0.00
Montana	0.67	0.00	0.00	0.00	0.00	2.79
Missouri	0.57	0.00	2.84	0.00	0.84	0.96
Indiana	0.53	1.07	0.00	0.00	0.77	0.88
New Hampshire	0.52	0.00	0.00	0.00	0.00	2.16
Colorado	0.46	0.78	0.00	0.94	0.00	0.00
Pennsylvania	0.42	0.80	0.65	0.48	0.00	0.22
Nevada	0.34	0.00	4.21	0.00	0.00	0.00
Washington	0.33	0.55	0.00	0.34	0.80	0.00
Utah	0.29	0.00	0.00	0.00	0.00	1.20
Mississippi	0.24	0.00	0.00	0.75	0.00	0.00
Maryland	0.24	0.00	0.00	0.37	0.00	0.50
Virginia	0.18	0.00	0.00	0.00	0.00	0.76
California	0.12	0.40	0.00	0.00	0.29	0.00
Florida	0.08	0.00	0.00	0.00	0.31	0.17
Georgia	0.08	0.41	0.00	0.00	0.00	0.00
Texas	0.06	0.00	0.00	0.10	0.00	0.13

Table 15 - 1999 State Production

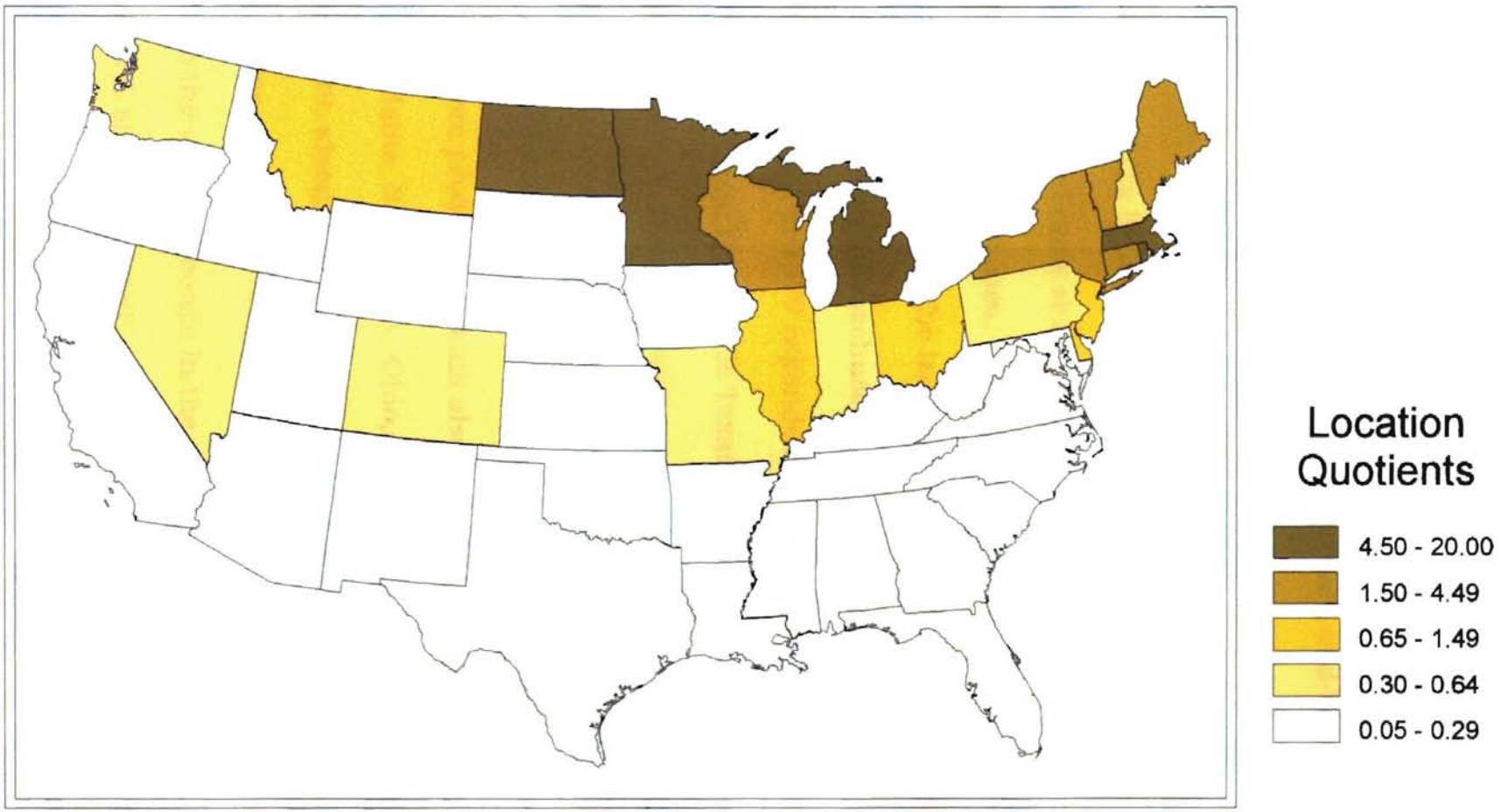

Figure 16 - 1999 State Location Quotients

all ranked among a secondary level of producers. Montana and Missouri also ranked among this group though they were not part of the traditional core. A group of lower level producers included several mountain or western states such as Colorado, Utah, and Washington. Five states produced an LQ of lower than 0.2, all of which were in the south or west.

Production LQ's by league for U.S. states show much of the same growth that combined rates show. The number of producing states goes up in each year, for all leagues. There is, however, a regional difference in production growth among the leagues. In the AHL of 1969, four states produced hockey talent, Massachusetts, Washington, Minnesota, and Michigan. Production in 1979 expanded in the east with Maryland, Pennsylvania, and New York, while Texas produced in the south. The highest producers were again located across the northern core region.

By 1989, production in the north had spread into Rhode Island, Connecticut, New York, Indiana, and Wisconsin. Oklahoma topped a group of non-core producers, which also included California, Virginia, and Florida. Maine, New Jersey, Ohio, and Illinois all produced AHL players in 1999, along with the other northern states. Sporadic production was seen in the rest of the country, from Washington and California in the west to Georgia in the southeast.

The CHL also had growth among the northern states; however, the few fringe and non-core states that showed production were different.

CHL production was quite low in 1969, when only Minnesota, Ohio, and Massachusetts produced any players for the league. By 1979, production was more widespread across the north and California and Texas produced in the south and west. The CHL went bankrupt for a brief period of time in the late 1980's and early 1990's, so 1989 saw no production for the league. By 1999, the new CHL had production from the key northern states; however significant production was also seen in the near-core states of Illinois and Missouri.

The ECHL did not begin operations until 1988, but by the 1989 season, eleven states, primarily in the northeast showed production on some level. The highest producers were from New England, with New Hampshire, Massachusetts, and Maine all in the top four. Notable in its absence was Minnesota. The 1989 ECHL was the only instance in the entire study where players from Minnesota were not included; however, Minnesota did contribute to the ECHL in 1999. The western Great Lakes and northern Plains states of Wisconsin, Minnesota, and North Dakota all entered players during that season. The lone player in the study from the state of Mississippi helped boost the state to a statistical ranking higher than some northern producers, such as Connecticut and Pennsylvania.

The IHL production in 1969 was located solely in the Great Lakes region. By 1979, both New York, Rhode Island and Massachusetts were producing, but Minnesota, Michigan, Wisconsin, and Illinois remained as

important producers. Two more New England states entered production in 1989, as did Indiana among the Great Lake states. The Great Lakes core of the IHL continued to be dominant in 1999, with the addition of Wisconsin among the major producers.

The NHL mirrored total production levels through most of the data. The core region again was the major producer; however, production was seen from Montana to New Hampshire by 1999, a much greater expanse than any of the other leagues. One noticeable difference from the total production was the absence of California. Though not a major producer in any of the years, California did manage to produce several players in some of the other leagues. It is interesting, however, that California, where four of the five teams to play there during the study years have been NHL teams, has never produced an NHL player.

County Results

County level analysis in the United States shows much greater disparity than in Canada. While many Canadian census divisions throughout the entire country produced at various levels, only a very small number of American counties produced players in significant numbers. Table 16 and Figure 17 show that in 1969, only eleven counties, out of nearly 3000, produced hockey talent in the United States. The top producer was Grays Harbor, Washington, with a production rate of 172.16. St. Louis and Ramsey Counties in Minnesota topped the other ten producers. Several urban counties ranked in the

1969 Location Quotients						
County	***State***	***Total***	***AHL***	***CHL***	***IHL***	***NHL***
Grays Harbor	WA	172.16	573.86	0.00	0.00	0.00
St. Louis	MN	92.91	154.85	0.00	0.00	232.28
Ramsey	MN	64.58	0.00	143.52	107.64	0.00
Hennepin	MN	21.36	0.00	35.60	53.39	0.00
Cuyahoga	OH	17.87	0.00	39.72	29.79	0.00
Norfolk	MA	16.95	56.50	0.00	0.00	0.00
Essex	MA	16.07	53.58	0.00	0.00	0.00
Wayne	MI	15.36	12.80	0.00	19.20	38.39
Suffolk	MA	13.95	46.49	0.00	0.00	0.00
Middlesex	MA	7.33	0.00	24.44	0.00	0.00
New York	NY	6.66	0.00	0.00	0.00	33.30

Table 16 - 1969 County Production

Figure 17 - 1969 County Location Quotients

producing counties of the United States. Ramsey and Hennepin Counties, which contain the Twin Cities, Cleveland's Cuyahoga County, Detroit's Wayne County, and four counties in the Boston area, Norfolk, Essex, Suffolk, and Middlesex are all part of the producing counties. New York County, part of the New York City area, was the last of the producing counties.

The number of producing counties increased greatly in 1979, up to thirty-nine. Three northern Minnesota counties topped the list with extremely high LQ's, and seven of the top ten counties were located in either Minnesota or Wisconsin. Table 17 and Figure 18 show that several other areas of concentrated production were evident across the core region of the United States in 1979. Five counties around Detroit, including Wayne and Oakland, showed production, and the Boston area influence spread to include Plymouth County, Massachusetts, and Providence County, Rhode Island.

In 1969, only Grays Harbor, Washington, could have been considered outside of the traditional hockey region; however, in 1979, many more non-core counties showed evidence of production. Top among these counties was Howard County, Texas, just east of Midland, with an LQ of 82.79. Texas also boasted two other producing counties, Tarrant (Fort Worth), and Cameron (Brownsville). Counties around Des Moines, Iowa, Oakland, California, and Cincinnati, Ohio, also contributed players.

1979 Location Quotients

County	*State*	*Total*	*AHL*	*CHL*	*IHL*	*NHL*
Roseau	MN	436.41	0.00	0.00	0.00	1131.93
Koochiching	MN	312.30	617.16	0.00	0.00	405.01
Itasca	MN	127.41	503.57	0.00	0.00	0.00
Howard	TX	82.79	0.00	0.00	0.00	214.73
Barron	WI	70.84	0.00	489.99	0.00	0.00
Mower	MN	67.93	268.49	0.00	0.00	0.00
St. Louis	MN	49.38	0.00	85.39	56.93	64.05
Deschutes	OR	44.15	0.00	0.00	0.00	114.52
Suffolk	MA	33.76	50.04	0.00	38.92	32.84
Dakota	MN	28.24	55.82	0.00	65.12	0.00
Kennebec	ME	24.97	0.00	0.00	0.00	64.76
Washington	MD	24.26	95.89	0.00	0.00	0.00
Hennepin	MN	23.32	11.52	40.32	0.00	37.80
St. Clair	MI	19.77	0.00	0.00	91.15	0.00
Ramsey	MN	17.90	0.00	0.00	0.00	46.43
Middlesex	MA	14.05	31.73	13.88	18.51	0.00
Anoka	MN	14.00	55.33	0.00	0.00	0.00
Norfolk	MA	13.57	0.00	31.29	20.86	11.73
Cameron	TX	13.08	51.71	0.00	0.00	0.00
Dauphin	PA	11.81	46.68	0.00	0.00	0.00
Polk	IA	9.05	0.00	0.00	0.00	23.47
Wayne	MI	8.22	4.64	8.12	16.23	6.09
Richmond	NY	7.79	0.00	0.00	0.00	20.22
Plymouth	MA	6.77	26.75	0.00	0.00	0.00
Hampden	MA	6.19	0.00	0.00	28.56	0.00

Table 17 - 1979 County Production

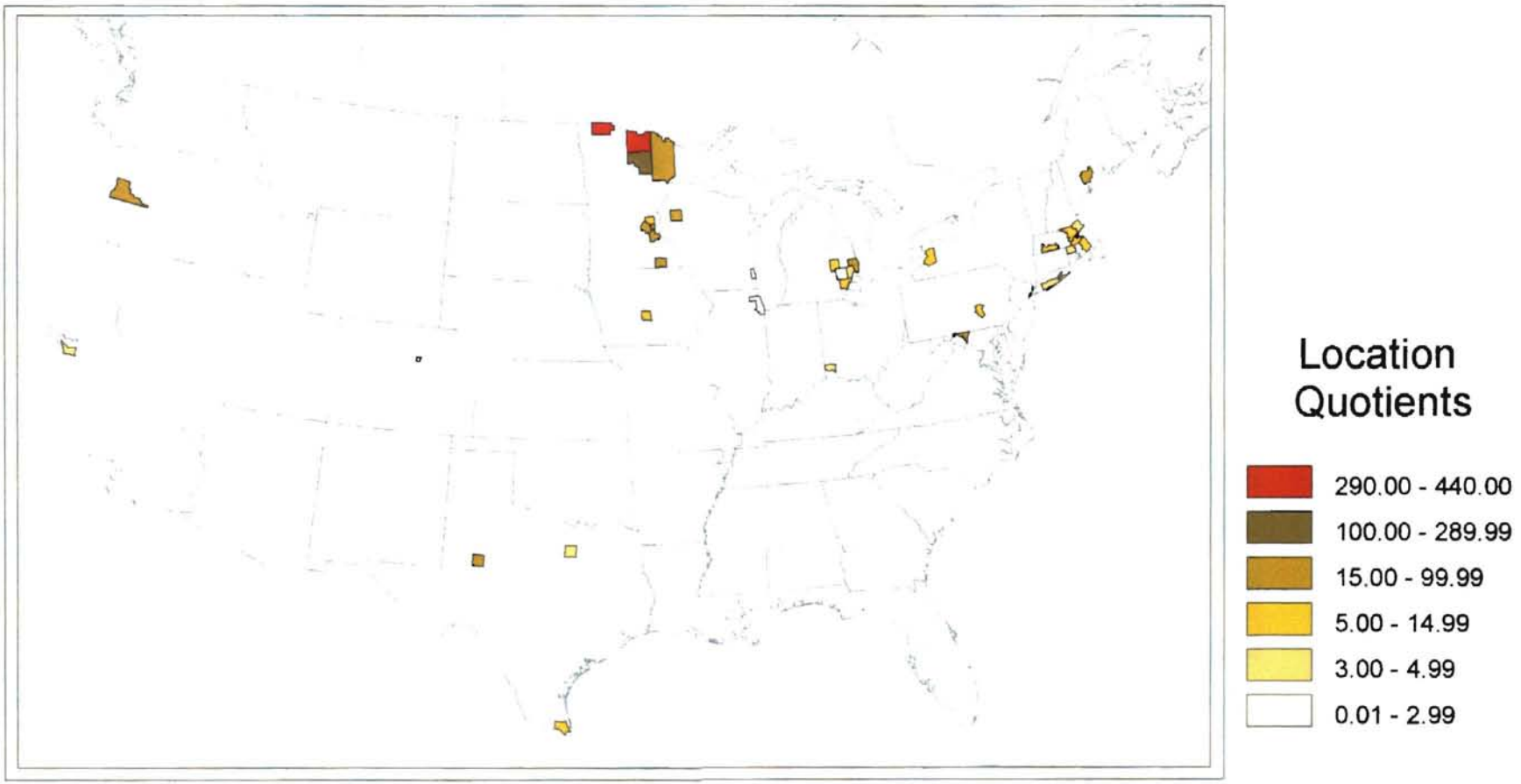

Figure 18 - 1979 County Location Quotients

Minnesota remained the leader among counties in 1989, with eight of the top ten producers from that state (Table 18; Figure 19). Roseau County, in extreme northern Minnesota, along the Manitoba and Ontario borders, had 5 players, ninth out of the seventy-six producing counties, and posted a 401.8 LQ, by far the highest in the country.
The leaders outside of Minnesota were again located across the Great Lakes and New England.

St. Lawrence County, New York, located along the Ontario border, far upstate, ranked third in production with an LQ of 100.84. Oneida, Wisconsin, and Chippewa, Michigan, both located on or near the Upper Peninsula of Michigan, ranked in the top ten counties. The New England production grew from Boston roots across the state of Massachusetts and into neighboring New Hampshire, Rhode Island, Connecticut, and New York. Excluding the islands of Nantucket and Martha's Vineyard, nine of twelve Bay State counties produced players in 1989.

Because of the relatively few number of counties supplying players in the United States, most county production ratios measured higher than the national production ratio, producing LQ's higher than 1. The first year to see some United States counties produce below that level was 1989. These counties were universally urban and centered around major urban centers in all parts of the country. Orange, San Diego, and Los Angeles Counties in Southern California, Queens and Nassau around

1989 Location Quotients

County	*State*	*Total*	*AHL*	*ECHL*	*IHL*	*NHL*
Roseau	MN	401.80	339.48	0.00	0.00	821.45
Stearns	MN	113.55	0.00	0.00	0.00	290.18
St. Lawrence	NY	100.84	0.00	0.00	497.01	0.00
Itasca	MN	88.69	0.00	0.00	145.70	151.10
Carlton	MN	82.54	0.00	0.00	406.79	0.00
Koochiching	MN	74.08	0.00	0.00	0.00	189.32
Oneida	WI	38.12	0.00	0.00	0.00	97.41
Polk	MN	37.05	156.52	0.00	0.00	0.00
Chippewa	MI	34.89	147.41	0.00	0.00	0.00
Crow Wing	MN	27.29	0.00	0.00	134.49	0.00
Winona	MN	25.25	0.00	0.00	124.43	0.00
St. Louis	MN	24.36	51.46	0.00	60.04	0.00
Olmsted	MN	22.68	95.82	0.00	0.00	0.00
Suffolk	MA	21.82	15.37	10.76	44.82	18.59
San Patrico	TX	20.55	0.00	0.00	0.00	52.52
Plymouth	MA	19.42	11.72	65.63	13.67	7.09
Franklin	MA	17.23	72.78	0.00	0.00	0.00
Dodge	WI	15.77	0.00	0.00	0.00	40.31
Middlesex	MA	15.54	10.94	25.53	0.00	22.07
Wayne	MI	14.87	19.32	6.76	8.45	19.00
Newport	RI	13.85	0.00	0.00	68.25	0.00
Chemung	NY	12.68	53.58	0.00	0.00	0.00
Roanoke City	VA	12.51	52.87	0.00	0.00	0.00
Providence	RI	12.15	25.66	0.00	19.96	5.18
Hennepin	MN	11.70	14.82	0.00	0.00	20.92

Table 18 - 1989 County Production

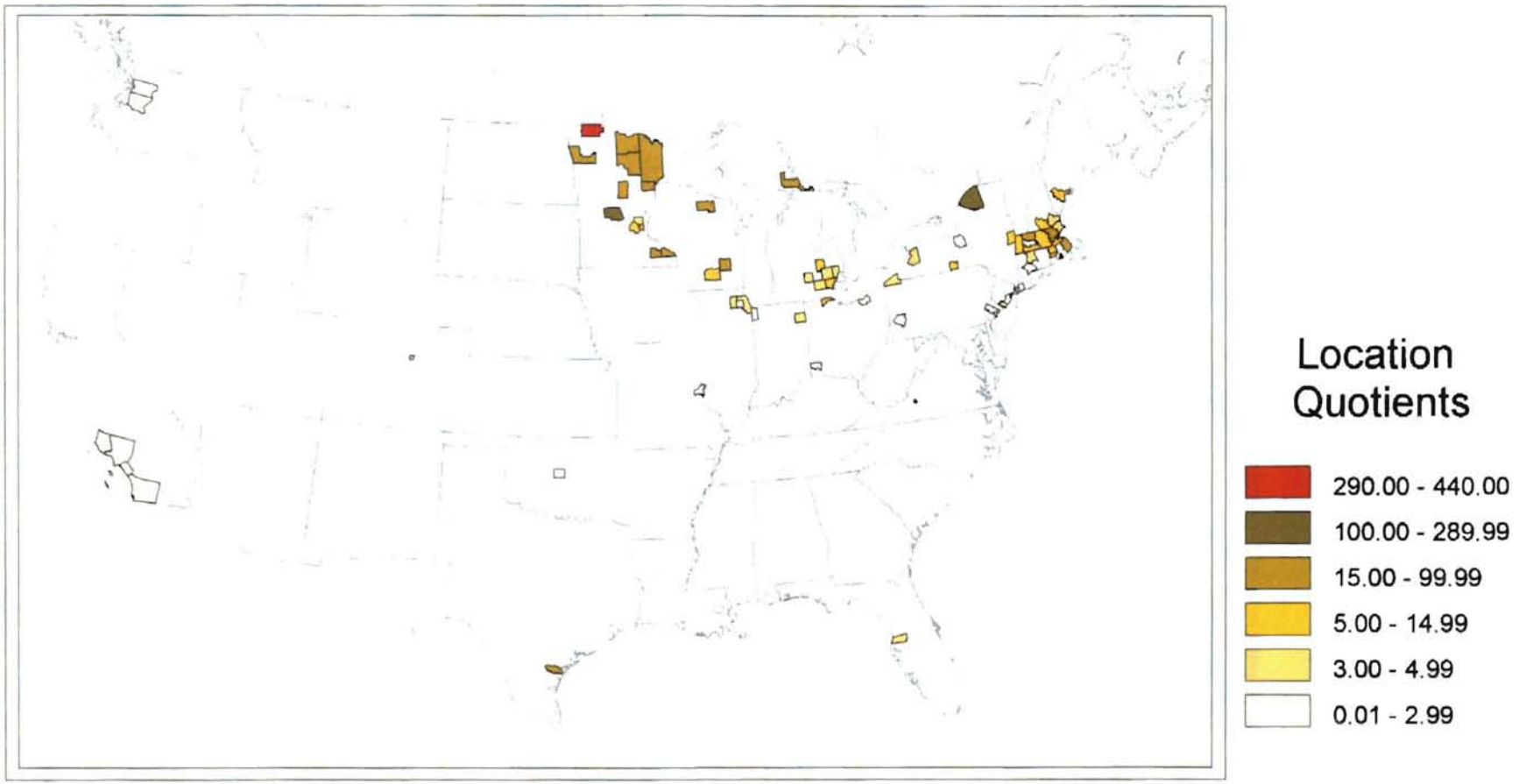

Figure 19 - 1989 County Location Quotients

New York, and Seattle's King County in Washington were all among the lowest producers.

By 1999, 140 counties were producing hockey players, up from only twenty in 1969. Most of that growth, as seen in both 1979 and 1989, was realized in counties of the traditional American hockey core in the Northeast and Great Lakes. That trend continued in 1999. While a Minnesota county was no long ranked first, as was the case in 1979 and 1989, the state did still have seven of the top ten ranked counties, as seen in Table 19. Keweenaw, Michigan, on the northern side of the Upper Peninsula, took the top spot with a production LQ of 293.27.

Figure 20 shows that the spread in New England and the Northeast also continued. By 1999, every mainland county in Massachusetts was producing hockey talent. Production increased throughout most of the region, with nearly contiguous lines of producing counties running from Augusta, Maine, south to Philadelphia, and from Cape Cod, west to Buffalo. Several counties in upstate New York also increased production, along with two upstate Vermont counties, across Lake Champlain.

Concentrations of moderate production grew in the Great Lakes and Upper Plains region as well. Counties around Detroit, Grand Rapids, Kalamazoo, Sault Ste. Marie, and Marquette, Michigan, showed moderate levels of LQ's. Oneida, Dane, and Douglas Counties in Wisconsin all ranked in the top thirty. Four counties in North Dakota

1999 Location Quotients

County	*State*	*Total*	*AHL*	*CHL*	*ECHL*	*IHL*	*NHL*
Keweenaw	MI	293.27	0.00	2821.94	0.00	0.00	0.00
Roseau	MN	191.53	585.39	737.16	0.00	0.00	0.00
Red Lake	MN	147.04	0.00	1414.88	0.00	0.00	0.00
Bottineau	ND	85.53	0.00	0.00	264.52	0.00	0.00
Itasca	MN	71.91	73.26	276.75	0.00	105.54	59.87
Carlton	MN	40.95	0.00	197.00	0.00	0.00	85.24
Koochiching	MN	40.85	0.00	0.00	126.34	0.00	0.00
Chippewa	MI	33.01	0.00	158.82	51.05	0.00	0.00
St. Louis	MN	29.42	33.30	62.91	10.11	47.98	27.22
Blue Earth	MN	23.46	0.00	112.87	0.00	86.09	0.00
St. Lawrence	NY	22.20	28.27	0.00	34.32	0.00	23.10
Marquette	MI	21.52	54.80	0.00	33.27	0.00	0.00
Juneau	AK	20.31	0.00	0.00	0.00	149.07	0.00
Logan	IL	20.21	0.00	0.00	0.00	148.30	0.00
Polk	MN	19.87	0.00	0.00	0.00	0.00	82.72
Kittitas	WA	19.53	0.00	0.00	0.00	143.32	0.00
Burleigh	ND	18.66	0.00	0.00	28.85	0.00	38.84
Adams	MS	18.45	0.00	0.00	57.06	0.00	0.00
Grand Forks	ND	18.34	0.00	0.00	56.73	0.00	0.00
Houghton	MI	17.79	0.00	171.16	0.00	0.00	0.00
Madison	NY	17.62	0.00	0.00	0.00	0.00	73.35
Oneida	WI	17.36	0.00	0.00	0.00	127.38	0.00
Charlottesville City	VA	16.97	0.00	0.00	0.00	0.00	70.64
Beltrami	MN	16.03	0.00	154.28	0.00	0.00	0.00
Suffolk	MA	15.92	35.49	0.00	15.39	0.00	16.57

Table 19 - 1999 County Production

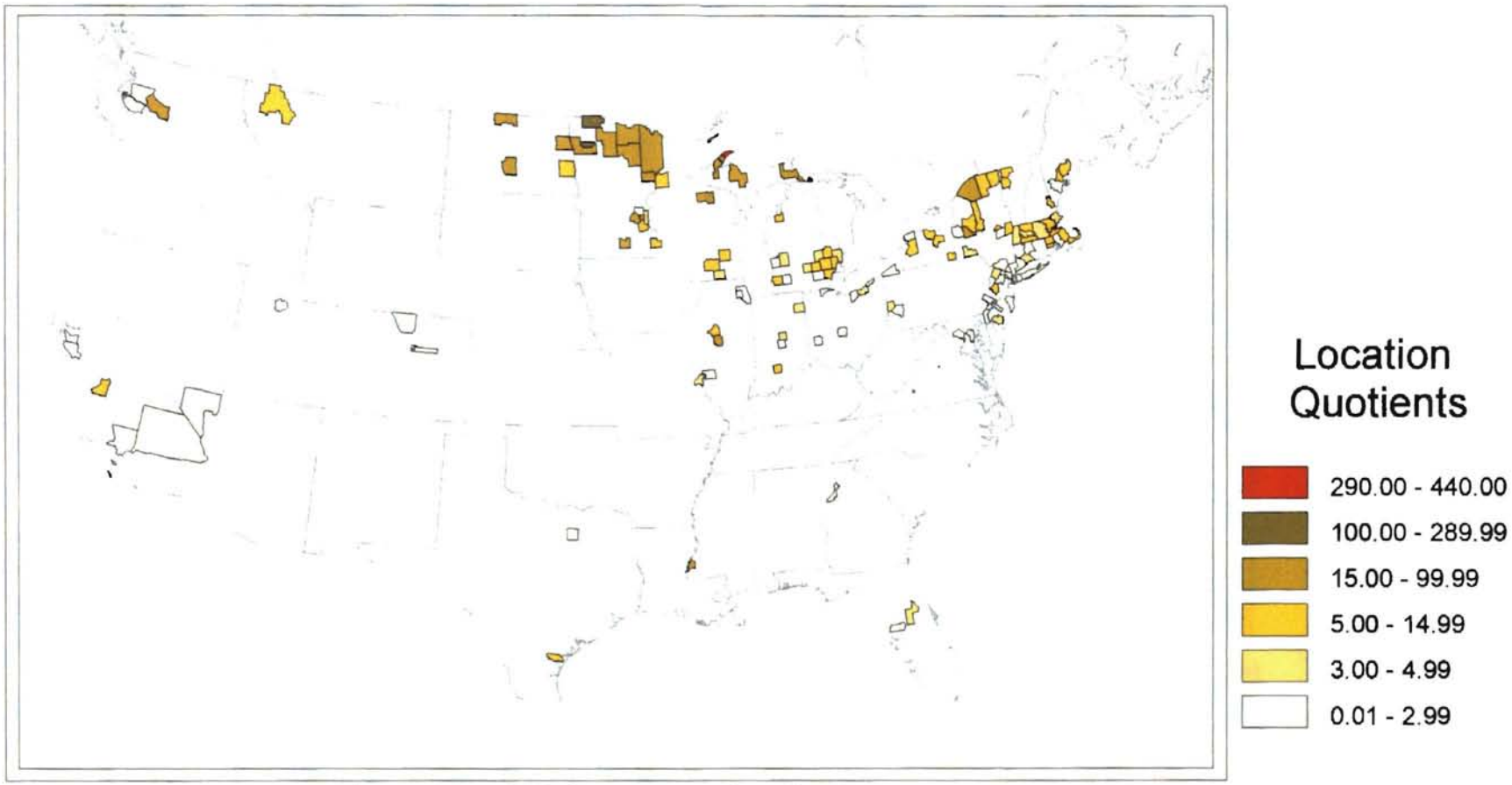

Figure 20 - 1999 County Location Quotients

were ranked in the top forty, including those around Bismarck, Grand Forks, and Fargo.

Some of these counties highlight a trend in much of the producing areas. Sault Ste. Marie, Marquette, Madison (Dane Co.), Grand Forks, and Fargo are all home to top college hockey programs. The five schools from those cities, Lake Superior State, Northern Michigan State, the University of Wisconsin, the University of North Dakota, and North Dakota State, respectively, have been to the NCAA tournament a combined forty times since 1970 and have won thirteen national titles (Benson, 1999).

The number of producing counties outside the core hockey regions increased in 1999. Kittitas, Washington, and Adams, Mississippi, ranked among the top of the non-core counties, with production LQ's near 20. Several concentrations of player production were located in southern or western areas. Pasco and Lake Counties, Florida, Alameda and Santa Clara Counties, California, and King, Pierce, and Kittitas Counties, Washington, were all concentrated around urban centers outside of the major producing centers of the country.

The production at the league level among the counties shows a little more of the regional distribution. In the AHL, the predominant production areas in 1969 and 1979 were in northern Minnesota, around the Twin Cities, near Detroit, and around Boston. These areas remained as primary production areas by 1999; however, the largest clustering of

producing counties was in central and upstate New York. This region was also home to many AHL teams in the past thirty years. In all, eight cities in or near central and upstate New York had teams between 1969 and 1999.

Very few counties produced CHL players during any of the years in the study. Production was seen in only four counties in 1969 and that grew slightly to ten by 1979. This production was primarily located in Wisconsin, Minnesota, and Massachusetts. Northern Minnesota continued its dominance of the CHL in 1999 with a majority of the top producing counties for the league.

Production of players in the ECHL was much more widespread. In 1989, one year after the beginning of the league, production was heavy in southern New England, as well as near large cities on the Great Lakes. By 1999, the number of producing counties nearly tripled and the distribution was much greater. Though the greatest concentrations were found in southern New England and around Detroit, counties around Fargo, Grand Forks, Denver, and St. Louis also contributed players to the league.

The IHL mimicked the AHL in that many of the highest producing counties were in the same region that held many of the league's teams. 1969 and 1979 saw limited production, mainly from Minnesota and Massachusetts. In 1989 and 1999, counties of the Mid West and Great Lakes produced the majority of players. Counties around Madison,

Milwaukee, Chicago, and Detroit all produced players by 1999. Allen County, Indiana, home to a long running hockey franchise, the Fort Wayne Komets, was also among this group.

NHL production saw much less of a distinct regional concentration. Though the number of counties producing players increased over the thirty-year period, a distinct area of predominantly NHL production was not seen. Fifty-five counties produced NHL players in 1999, up from only three in 1969. The area around Boston did show a clustering of production; however, the remaining counties were scattered over most of the northeast quarter of the country. One difference in NHL production, as seen at the state level as well, was the lack of any players from California.

Team Location and Player Production

The amount of American hockey player production has greatly increased in the past thirty years. The distribution is not nearly as great as it is in Canada, but the vast difference between 1969 and 1999 production is significant. This production difference can be viewed in comparison to team locations.

In 1969, very few areas of the country had been exposed to hockey for more than a few years. Areas in the northeast had teams that had been around for many decades; however, the California teams of the NHL had only been around since 1967, and the entire CHL as it was in 1969

did not exist before 1968. Because the small number of teams limited the roster space, only counties from northern areas, where hockey was played more often, produced players.

The production in 1979 had spread slightly, as did the distribution of teams. Again, much of the production was in northern areas of the country, as were most of the teams; however, the western NHL clubs, and the teams of the CHL had now been in operation for over a decade in many locations. One example is the production from Tarrant County, Texas, part of the Dallas Metroplex, where both the Fort Worth Texans and the Dallas Blackhawks had been playing for over ten years. Denver County, home of the Colorado Rockies of the NHL, also showed production in 1979. Both Alameda County, California, and Polk County, Iowa, had production in 1979 and while neither had a team at the time, both had seen professional hockey in the previous ten years.

Increased production was again seen in 1989, especially in the north, but with some production elsewhere. The southern California counties around Los Angeles showed hints of production, after twenty years of hosting the L.A. Kings. Though Denver lost the Rockies to New Jersey in 1982, there was still production around the city. Some interesting growth in the core region was also seen. Counties around St. Louis and Cincinnati produced players in 1989, after each city had been host to a hockey franchise.

By 1999, professional hockey teams were numerous across all of the eastern United States, and most areas of the country, including the south and west, had seen at least some kind of hockey for almost fifteen years. The highest concentrations of production were again in the north, primarily in Minnesota, Michigan, New York, and Massachusetts. In areas of recent NHL expansion there were signs of player production. The Los Angeles and San Jose areas of California showed production in the shadow of two new NHL clubs. The Denver and Dallas metro areas both gained teams from relocation efforts in the 1990's, and both showed some production by 1999.

Two southeastern cities also showed evidence of new player production, Atlanta and Tampa. The Atlanta Thrashers of the NHL played their first season in 1999-2000; however, both the NHL and the IHL had teams in the city over the past twenty-five years. Lake and Pasco Counties, northeast of Tampa, were in the shadow of the NHL's Lightning, which began play in 1992.

Smaller cities within the United States core hockey region also show increased production. The areas around Indianapolis, Kalamazoo, Muskegon, Toledo, Dayton, Cleveland, Columbus, Erie, and Roanoke, all produced players, some for the first time. Every one of these places had a team for most of the 1990's, and all except Columbus and Erie had a team in 1999.

American Production Interpretation

Production on the American level is far different than that in Canada. Nearly all regions of Canada show some production; however, the production is much more regionalized in the United States. Even as production has increased in the past thirty years, much of the growth has been seen only in counties of the Northeast or Great Lakes. When areas outside of the traditional hockey region did produce hockey players, it was almost always around a location that had seen some professional hockey.

The urban location trend also took place in parts of the traditional hockey core as well. Large cities, Detroit or Boston, have shown consistent production through all thirty years. Both cities have long hockey traditions, as members of the "Original Six" of the NHL, and of top-level hockey talent production. But some smaller regional cities have recently shown consistent player production.

The cities near the Mohawk Valley of New York exemplify this trend. In 1979, there was no production anywhere between Buffalo, New York, and Springfield, Massachusetts. By 1999, there were clusters of producing counties around Rochester, Syracuse, Elmira, Binghamton, Utica, and Albany. With the exception of Elmira, every one of these cities had a professional hockey team during the 1990's.

This represents a large difference in the production patterns of the United States and Canada. The game of hockey is vastly popular in

Canada; it has often been referred to as the 'national religion' of Canada (Kidd, 1982). The data show that even the most remote part of Canada produced some professional players. In the United States, professional players most often come from the northeast urban centers. Some areas in far Upstate New York, northern Minnesota, and the Upper Peninsula of Michigan have concentrations of production in rural counties; however, this is unusual in the United States.

North American Production Analysis

Examination of state and county level data at the national level has provided a view of what areas are the primary producers. These areas, however, must be put in the perspective of the entire continent. Though Canada's production has been slipping in recent years, it is still by far the leading producer of hockey talent. In order to gauge the increases in American production, state and county values must be compared to the same levels in Canada. Only after a complete North American analysis can the gains in United States player production be understood.

North American Production Results

State Level Results

In North American production, American states almost never outperform their Canadian counterparts, as seen in Tables 20 through 23 and Figures 21 through 24. In comparison to the national location

1969 Location Quotients					
State	***Total***	***AHL***	***CHL***	***IHL***	***NHL***
Saskatchewan	27.94	21.46	31.71	34.70	27.34
Manitoba	22.05	18.93	16.51	36.14	20.05
Ontario	13.53	12.60	13.98	13.91	13.86
Alberta	7.32	7.18	9.02	1.10	10.14
Quebec	7.17	9.89	4.87	5.33	7.31
Prince Edward Island	6.10	0.00	29.23	0.00	0.00
Nova Scotia	4.75	8.89	2.07	6.79	1.40
New Brunswick	3.22	5.53	2.57	2.81	1.74
British Columbia	2.49	1.07	5.23	0.82	3.02
Newfoundland	1.30	0.00	3.13	3.42	0.00
Minnesota	0.63	0.31	1.29	0.94	0.29
Massachusetts	0.24	0.62	0.29	0.00	0.00
Michigan	0.15	0.13	0.00	0.20	0.25
Washington	0.10	0.34	0.00	0.00	0.00
Ohio	0.10	0.00	0.31	0.17	0.00
New York	0.02	0.00	0.00	0.00	0.06

Table 20 - 1969 State/Province Production

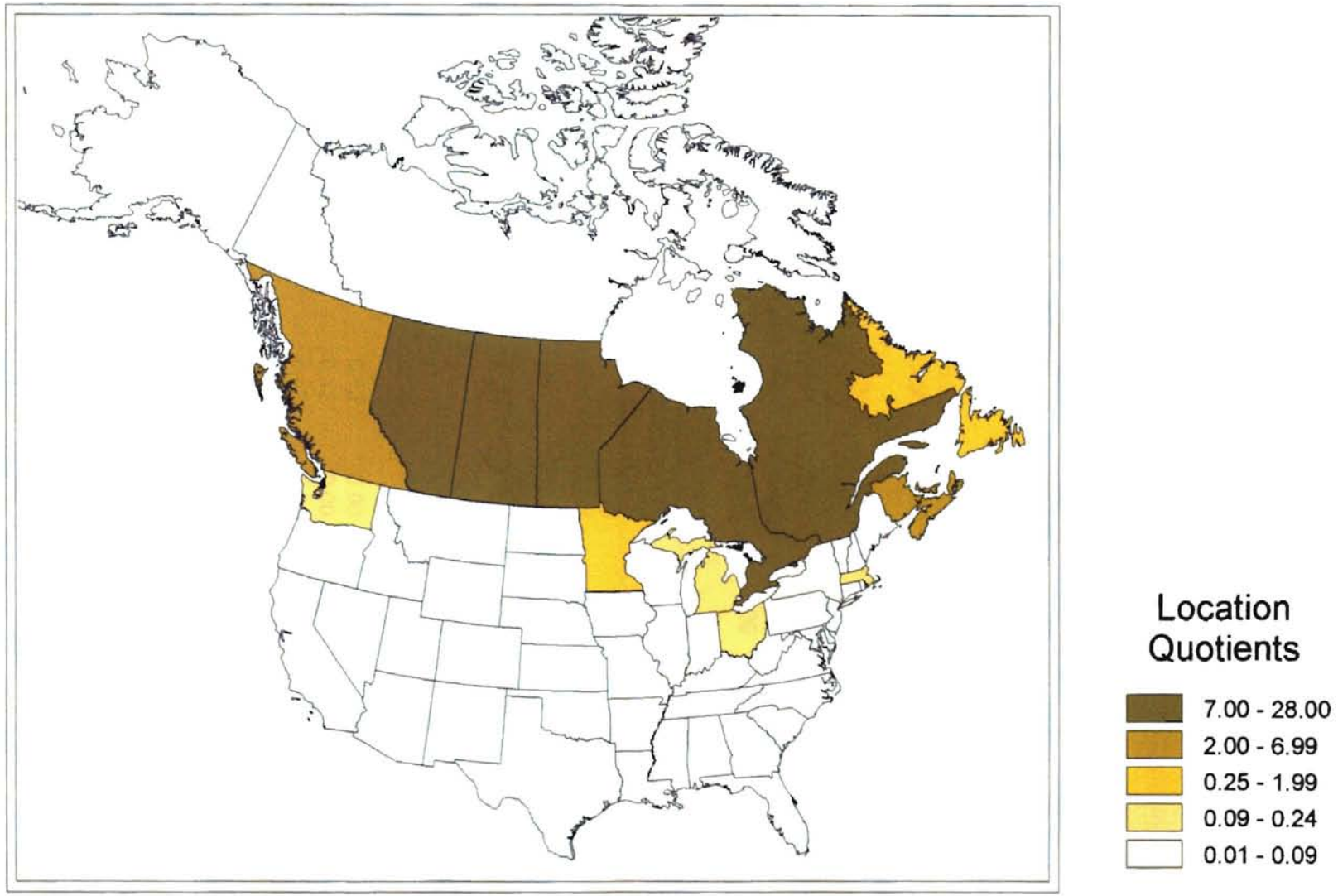

Figure 21 - 1969 State/Province North American Location Quotients

1979 Location Quotients					
State	***Total***	***AHL***	***CHL***	***IHL***	***NHL***
Prince Edward Island	23.57	13.97	40.16	0.00	27.58
Saskatchewan	23.43	16.13	25.76	7.47	29.01
Yukon	16.34	0.00	111.35	0.00	0.00
Manitoba	15.93	9.85	14.16	17.12	18.80
Ontario	12.56	13.04	12.10	13.80	12.43
Alberta	8.93	9.97	9.55	5.19	9.18
Northwest Territories	8.17	38.75	0.00	0.00	0.00
Quebec	5.95	5.11	4.64	6.17	6.69
British Columbia	4.58	6.59	5.68	4.12	3.64
Nova Scotia	2.99	8.10	0.00	0.00	2.40
New Brunswick	2.60	0.00	7.08	5.14	1.94
Minnesota	2.20	2.93	1.80	1.74	2.15
Newfoundland	1.91	0.00	8.69	0.00	1.19
Massachusetts	1.32	2.38	0.85	4.34	0.47
Michigan	0.43	0.37	0.26	1.53	0.29
Rhode Island	0.38	0.00	0.00	3.75	0.00
Maine	0.32	0.00	0.00	0.00	0.60
Wisconsin	0.15	0.00	0.52	0.76	0.00
New York	0.14	0.10	0.28	0.20	0.11
Oregon	0.14	0.00	0.00	0.00	0.26
Illinois	0.13	0.00	0.00	0.62	0.12
Colorado	0.12	0.00	0.00	0.00	0.23
Iowa	0.12	0.00	0.00	0.00	0.23
Maryland	0.09	0.40	0.00	0.00	0.00
Texas	0.08	0.12	0.17	0.00	0.05
Ohio	0.03	0.00	0.00	0.00	0.06

Table 21 - 1979 State/Province Production

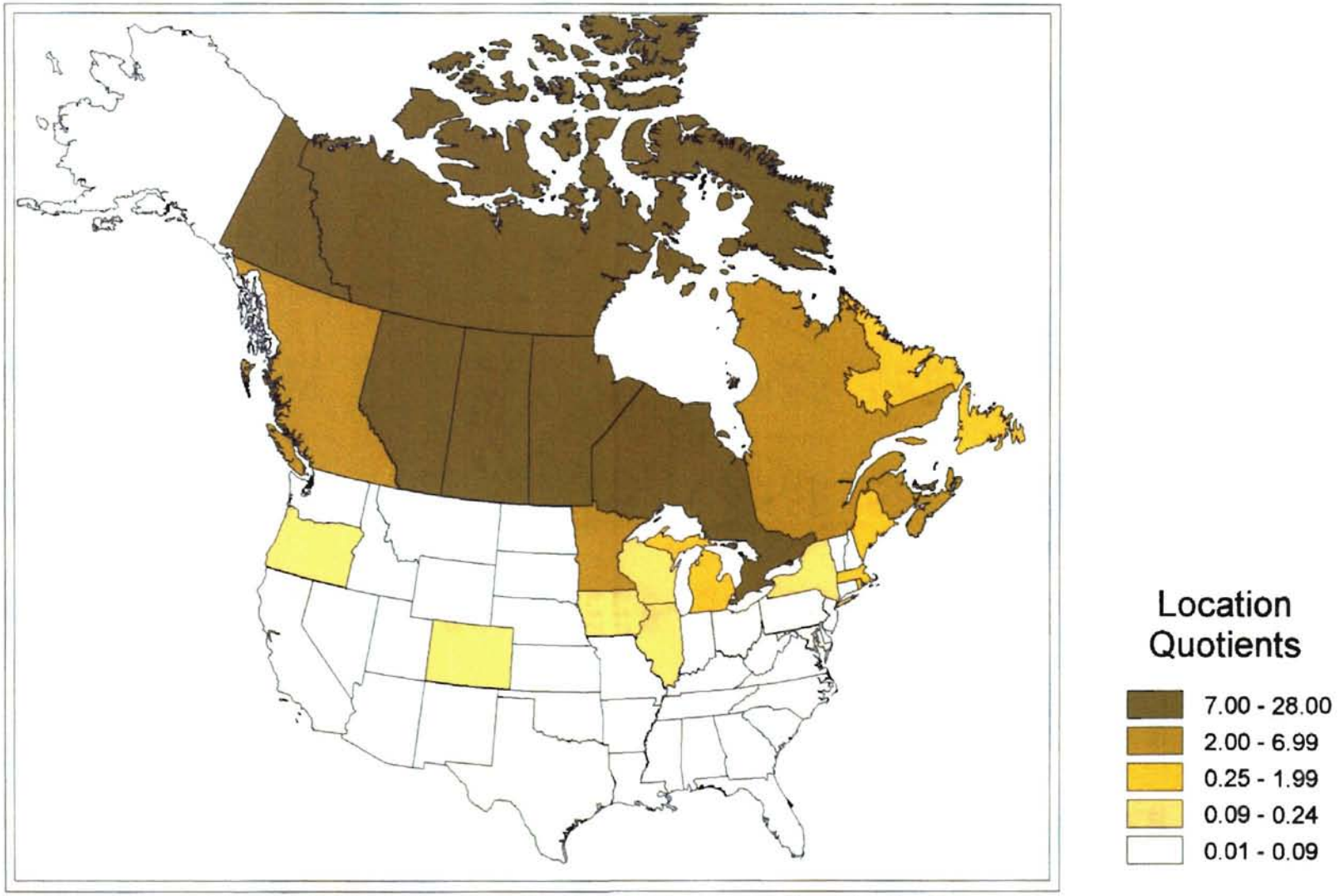

Figure 22 - 1979 State/Province North American Location Quotients

1989 Location Quotients

State	*Total*	*AHL*	*ECHL*	*IHL*	*NHL*
Saskatchewan	21.40	22.63	20.89	22.98	20.07
Alberta	11.69	12.94	8.53	11.15	11.81
Manitoba	10.97	9.21	12.07	18.60	8.73
Ontario	9.72	9.39	8.94	8.25	10.71
British Columbia	6.49	8.37	7.49	4.12	6.02
Prince Edward Island	6.06	7.09	0.00	0.00	9.25
Quebec	4.75	4.93	1.54	5.29	5.13
Nova Scotia	3.78	5.11	2.95	4.86	2.66
New Brunswick	3.22	3.76	0.00	7.96	1.64
Massachusetts	2.28	1.38	6.21	1.95	2.11
Minnesota	2.17	2.33	0.00	2.35	2.48
Rhode Island	2.10	2.77	0.00	4.39	1.20
Newfoundland	1.37	3.21	0.00	0.00	1.05
Michigan	1.05	1.20	1.15	0.79	1.04
New Hampshire	0.95	0.00	7.22	0.00	0.54
Alaska	0.48	0.00	4.86	0.00	0.00
Maine	0.43	0.00	2.17	1.20	0.00
Illinois	0.37	0.00	1.17	0.64	0.32
Connecticut	0.32	0.28	0.81	0.45	0.18
Wisconsin	0.22	0.19	0.00	0.00	0.37
New York	0.21	0.31	0.30	0.25	0.10
Ohio	0.15	0.00	0.25	0.27	0.17
Washington	0.11	0.00	1.10	0.00	0.00
Missouri	0.10	0.00	0.00	0.00	0.24
Indiana	0.10	0.17	0.00	0.27	0.00
Pennsylvania	0.09	0.08	0.22	0.00	0.10
Oklahoma	0.08	0.29	0.00	0.00	0.00
Colorado	0.08	0.00	0.00	0.45	0.00
New Jersey	0.07	0.00	0.00	0.00	0.16
California	0.05	0.03	0.00	0.25	0.00
Virginia	0.04	0.15	0.00	0.00	0.00
Florida	0.02	0.07	0.00	0.00	0.00
Texas	0.02	0.00	0.00	0.00	0.04

Table 22 - 1989 State/Province Production

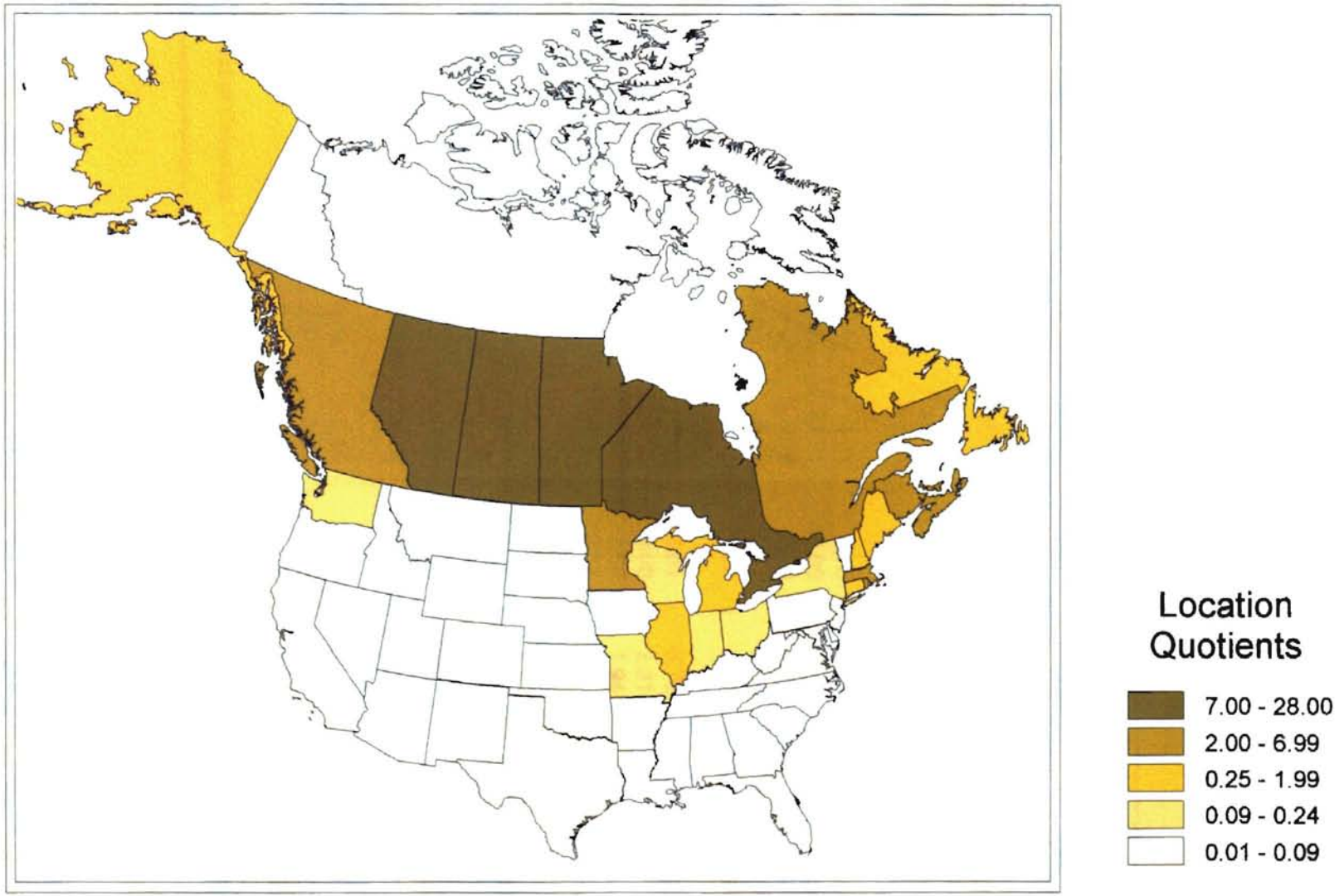

Figure 23 - 1989 State/Province North American Location Quotients

1999 Location Quotients						
State	***Total***	***AHL***	***CHL***	***ECHL***	***IHL***	***NHL***
Saskatchewan	22.79	21.66	26.47	21.84	27.83	20.61
Alberta	12.45	13.14	11.22	12.83	11.40	12.45
Manitoba	10.31	12.78	18.51	7.64	7.96	8.37
Prince Edward Island	8.55	10.09	0.00	18.08	9.42	0.00
Ontario	7.68	7.67	8.01	7.31	6.89	8.37
Quebec	5.62	6.91	3.70	4.58	5.13	6.61
Yukon	5.50	22.71	0.00	0.00	0.00	0.00
British Columbia	5.32	5.19	6.39	4.96	6.79	4.59
Nova Scotia	5.02	5.92	6.43	4.65	9.68	1.45
Northwest Territories	4.91	0.00	0.00	0.00	18.94	9.96
New Brunswick	3.57	0.92	8.01	5.78	1.72	2.72
Newfoundland	2.49	5.14	0.00	2.31	2.40	1.26
Minnesota	2.44	1.87	3.68	1.94	3.23	2.41
Massachusetts	2.23	2.36	0.66	2.92	1.05	2.65
North Dakota	1.78	0.00	2.07	4.71	0.00	1.03
Rhode Island	1.35	0.70	0.00	1.87	0.00	2.74
Michigan	1.32	0.22	2.12	1.80	2.01	1.06
Vermont	0.82	0.00	2.22	1.01	0.00	1.11
Alaska	0.77	1.07	0.00	0.00	1.99	1.05
Connecticut	0.56	1.48	0.00	0.19	0.79	0.21
Maine	0.54	0.55	1.09	0.99	0.00	0.00
New York	0.51	0.61	0.38	0.55	0.36	0.49
Wisconsin	0.42	0.53	0.00	0.48	0.74	0.26
Illinois	0.39	0.06	0.23	0.67	0.76	0.28
District of Columbia	0.32	0.00	0.00	0.00	0.00	1.31

Table 23 - 1999 State/Province Production

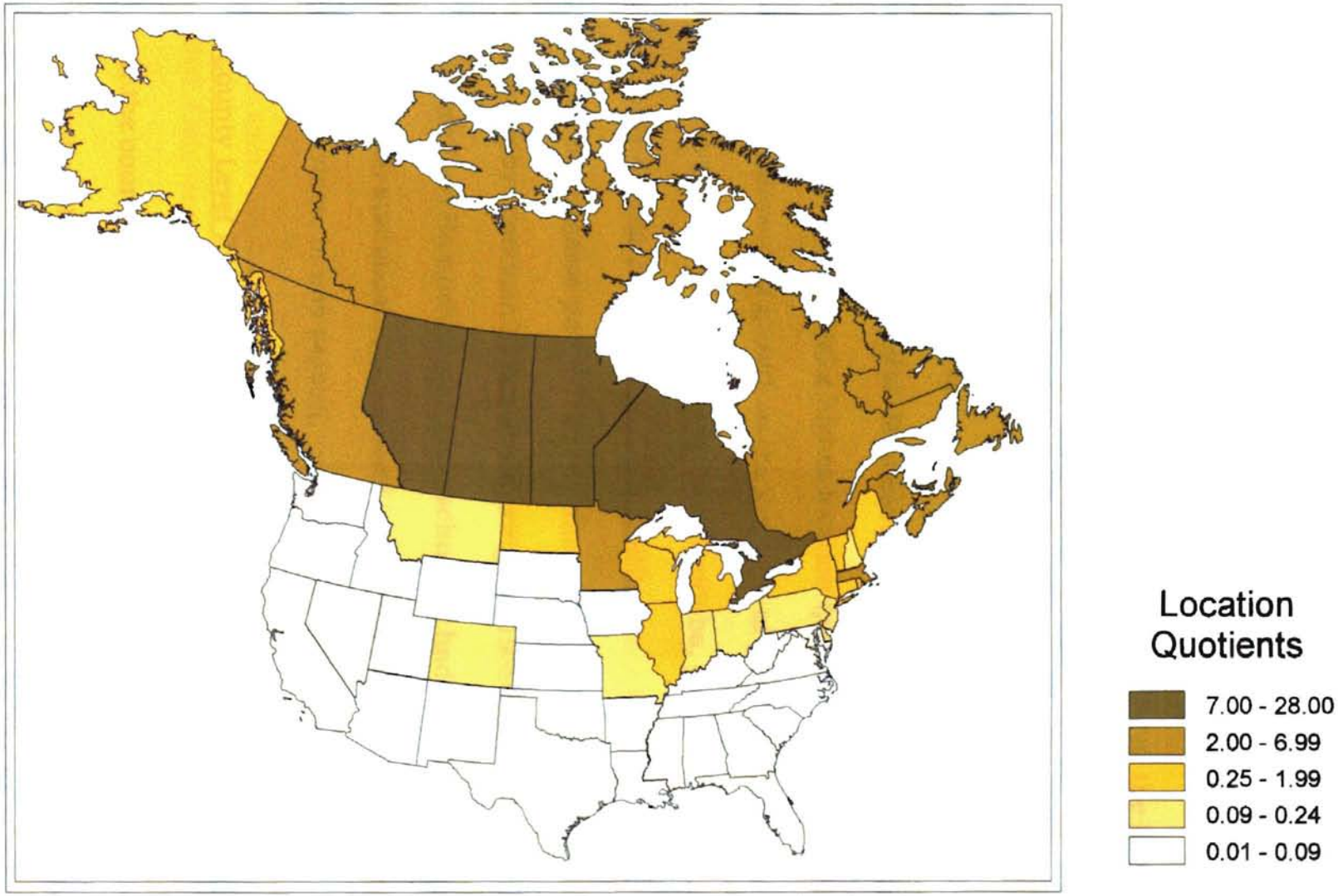

Figure 24 - 1999 State/Province North American Location Quotients

quotients, North American LQ's for the United States decline by approximately 98 percent, while LQ's for Canada increase by close to 90 percent. Only three states, Massachusetts, Minnesota, and Rhode Island, ever outperform any Canadian province in total production LQ. All three did that once, in 1989, beating out Newfoundland, the lowest Canadian province.

The general trend in production, however, is not as down for the United States. Of the top ranked states in 1969, five showed production in every season; Massachusetts, Minnesota, Michigan, Ohio, and New York. Every one of those had a higher location quotient value in 1999 than in 1969, showing a growth in the strength of production. Of the top five provinces from 1969, Saskatchewan, Manitoba, Ontario, Alberta, and Québec, only Alberta had a higher LQ in 1999.

Much of the same pattern is seen among the league values. The best showing by American states was during the 1989 season of the ECHL. Both New Hampshire and Massachusetts had LQ's higher than 6.0, which was, statistically, the closest any states came to the leading Canadian province, in any season.

County Level Results

At the county level, the United States showed greater advances. In total, 250 out of about 350 Canadian census divisions produced at least one player over the time of the study. This compares to production from

only 174 American counties, out of over 3000, in the same period. Inevitably, with that kind of dominance, most of the top North American level producers were Canadian CDs. However, a surge of American counties was evident by 1999.

In total production of 1969, CDs took the top 107 spots in LQ value. The highest American county, Grays Harbor, Washington, at 5.72, was well below the leader, Timskaming, Ontario, at 131.87 (Table 24). Every producing Canadian province had at least one CD ahead of the top American county. By 1979, Roseau County, Minnesota, the top American producer, was ranked behind only five Canadian census divisions (Table 25). In addition, a second county, Koochiching, Minnesota, was in the top fifteen.

Roseau County, the top American county again in 1989, moved up to third in the overall rankings in Table 26, behind only two Saskatchewan divisions. Table 27 shows that by 1999, three American counties were in the top ten, and Keweenaw County, Michigan, was at the top of the rankings. During the 1969 season, the top five county/CD units had an average LQ of 87.15. In 1999, that value had fallen to 57.1.

The same trend was seen among the individual leagues as well. In the 1969 AHL, Grays Harbor the top American county, ranked at forty-seven. Koochiching County moved into the top American spot in 1979, and was ranked sixth overall. Another Minnesota county, Roseau, replaced Koochiching as the top American county in 1989 and 1999. In

1969 Location Quotients

County/CD	*State/Prov.*	*Total*	*AHL*	*CHL*	*IHL*	*NHL*
Timiskaming	Ontario	131.87	201.20	70.20	76.84	142.11
SASK-12	Saskatchewan	94.14	46.17	128.87	141.05	86.96
Parry Sound	Ontario	78.82	77.31	0.00	59.05	145.61
MAN-19	Manitoba	70.25	0.00	84.15	276.32	0.00
Abitibi	Quebec	60.68	72.91	29.07	47.73	78.47
Cochrane	Ontario	60.41	36.60	17.03	93.17	91.91
MAN-16	Manitoba	59.04	16.89	23.57	25.80	127.25
MAN-14	Manitoba	58.53	200.94	0.00	0.00	0.00
SASK-7	Saskatchewan	57.33	65.60	61.04	100.21	20.59
SASK-13	Saskatchewan	55.87	115.09	53.54	58.60	0.00
SASK-15	Saskatchewan	49.91	14.28	59.79	65.44	67.24
Sudbury District	Ontario	48.14	35.41	57.66	54.09	50.02
SASK-10	Saskatchewan	47.46	40.73	56.84	0.00	76.71
Kootenay Boundary	British Columbia	43.39	37.24	103.94	0.00	35.07
Algoma	Ontario	39.10	9.59	0.00	102.52	54.17
St.-Maurice	Quebec	37.71	32.36	30.11	49.44	40.64
Thunder Bay	Ontario	37.48	32.16	67.34	36.85	22.72
SASK-9	Saskatchewan	36.71	25.21	70.37	0.00	47.48
SASK-17	Saskatchewan	35.28	0.00	56.34	0.00	76.04
Nipissing	Ontario	34.54	14.82	41.38	67.93	27.92
MAN-17	Manitoba	33.20	0.00	159.08	87.05	0.00
Kenora	Ontario	31.99	0.00	0.00	100.65	41.37
MAN-11	Manitoba	31.08	0.00	0.00	0.00	0.00
MAN-13	Manitoba	30.11	0.00	0.00	0.00	97.35
Victoria	Ontario	29.84	34.14	0.00	52.15	32.15

Table 24 - 1969 County/CD Production

1979 Location Quotients

County/CD	*State/Prov.*	*Total*	*AHL*	*CHL*	*IHL*	*NHL*
SASK-10	Saskatchewan	69.12	0.00	0.00	0.00	129.39
SASK-13	Saskatchewan	66.56	63.14	0.00	0.00	99.68
MAN-21	Manitoba	59.90	0.00	102.07	0.00	84.11
Montmorency #2	Quebec	59.90	284.14	0.00	0.00	0.00
SASK-12	Saskatchewan	57.51	0.00	0.00	142.15	80.74
Roseau	Minnesota	57.17	0.00	0.00	0.00	107.02
SASK-2	Saskatchewan	53.25	63.14	0.00	0.00	74.76
MAN-7	Manitoba	52.28	0.00	44.54	0.00	85.64
Abitibi	Quebec	51.92	18.94	81.66	39.49	59.81
Timiskaming	Ontario	51.35	81.18	0.00	84.61	48.06
SASK-4	Saskatchewan	47.92	113.66	0.00	0.00	44.86
SASK-17	Saskatchewan	42.29	0.00	72.05	0.00	59.37
Koochiching	Minnesota	40.91	97.03	0.00	0.00	38.29
SASK-7	Saskatchewan	40.69	0.00	0.00	67.05	63.48
Lambton	Ontario	37.99	27.72	79.67	0.00	38.29
Kings	Prince Edward Island	37.83	89.73	0.00	0.00	35.41
Queens	Prince Edward Island	35.94	0.00	81.66	0.00	44.86
MAN-18	Manitoba	32.68	0.00	111.35	0.00	30.58
MAN-6	Manitoba	32.68	154.99	0.00	0.00	0.00
Kenora	Ontario	30.99	88.18	42.24	61.27	0.00
Hanna	Alberta	29.95	0.00	0.00	0.00	56.07
Bulkley-Nechako	British Columbia	29.95	47.36	0.00	0.00	37.38
MAN-16	Manitoba	29.95	0.00	204.14	0.00	0.00
MAN-9	Manitoba	29.95	0.00	0.00	148.07	28.04
Rainy River	Ontario	28.75	136.39	0.00	0.00	0.00

Table 25 - 1979 County/CD Production

1989 Location Quotients

County/CD	*State/Prov.*	*Total*	*AHL*	*ECHL*	*IHL*	*NHL*
SASK-10	Saskatchewan	124.17	158.49	114.29	125.78	103.36
SASK-4	Saskatchewan	117.17	205.64	0.00	108.80	89.41
Roseau	Minnesota	87.77	61.61	0.00	0.00	160.73
MAN-21	Manitoba	66.72	78.07	112.60	0.00	76.37
Rouyn-Noranda	Quebec	43.86	43.98	0.00	34.91	57.37
SASK-13	Saskatchewan	38.76	0.00	0.00	0.00	88.72
L'Ile-d'Orleans	Quebec	37.85	0.00	0.00	210.89	0.00
MAN-7	Manitoba	36.14	15.86	45.74	50.34	41.37
Kootenay Boundary	British Columbia	34.54	60.62	0.00	48.11	19.77
Camrose-Lloydminster	Alberta	33.54	23.54	0.00	74.74	30.71
Rainy River	Ontario	33.49	39.19	0.00	0.00	51.11
MAN-15	Manitoba	33.33	77.98	112.47	0.00	0.00
MAN-22	Manitoba	33.16	29.10	83.93	0.00	37.95
MAN-5	Manitoba	33.02	0.00	0.00	183.97	0.00
Kitimat-Stikine	British Columbia	31.54	44.28	63.87	35.14	14.44
SASK-12	Saskatchewan	30.91	36.16	0.00	114.80	0.00
SASK-9	Saskatchewan	30.82	21.63	249.61	0.00	0.00
SASK-7	Saskatchewan	29.54	17.28	0.00	54.85	33.81
Papineau	Quebec	27.23	0.00	137.85	0.00	31.17
SASK-5	Saskatchewan	26.93	47.27	0.00	0.00	30.83
Sudbury Municipality	Ontario	26.23	40.28	0.00	0.00	33.78
Sept-Rivieres-Caniapiscau	Quebec	26.03	0.00	0.00	72.50	29.79
Lambton	Ontario	25.97	28.05	20.23	11.13	32.01
Timiskaming	Ontario	25.55	22.42	0.00	35.59	29.25
Stearns	Minnesota	24.80	0.00	0.00	0.00	56.78

Table 26 - 1989 County/CD Production

1999 Location Quotients

County/CD	*State/Prov.*	*Total*	*AHL*	*CHL*	*ECHL*	*IHL*	*NHL*
Keweenaw	Michigan	77.65	0.00	696.56	0.00	0.00	0.00
SASK-10	Saskatchewan	64.31	0.00	72.11	119.01	62.03	65.20
Roseau	Minnesota	50.71	125.64	181.96	0.00	0.00	0.00
SASK-2	Saskatchewan	50.52	0.00	0.00	133.55	55.68	29.27
Antigonish	Nova Scotia	42.21	69.72	0.00	62.49	65.14	0.00
SASK-12	Saskatchewan	40.12	27.61	59.98	49.50	51.59	27.12
Red Lake	Minnesota	38.93	0.00	349.24	0.00	0.00	0.00
MAN-15	Manitoba	37.05	91.79	0.00	0.00	57.17	30.05
East Kootenay	British Columbia	36.55	46.44	0.00	20.81	43.39	57.02
SASK-15	Saskatchewan	36.00	41.29	17.94	29.61	61.73	32.44
Mount Waddington	British Columbia	34.95	96.21	0.00	0.00	0.00	47.25
Kootenay Boundary	British Columbia	34.89	20.58	0.00	36.90	38.46	60.65
SASK-8	Saskatchewan	31.26	86.05	0.00	19.28	0.00	21.13
SASK-3	Saskatchewan	31.24	43.01	0.00	0.00	80.36	42.24
SASK-5	Saskatchewan	28.55	19.65	0.00	17.61	73.44	38.60
MAN-17	Manitoba	28.21	116.48	0.00	0.00	0.00	0.00
Stettler	Alberta	27.47	48.62	35.21	0.00	30.29	31.84
SASK-4	Saskatchewan	27.23	0.00	0.00	0.00	0.00	110.43
MAN-12	Manitoba	26.03	0.00	0.00	64.24	0.00	35.20
Rocky Mountain House	Alberta	25.67	0.00	0.00	63.33	0.00	34.70
SASK-1	Saskatchewan	25.24	41.69	45.29	0.00	0.00	40.95
Powell River	British Columbia	24.26	33.39	0.00	0.00	62.39	32.79
SASK-17	Saskatchewan	23.44	16.13	35.05	14.46	30.15	31.69
Thunder Bay	Ontario	23.27	13.11	0.00	39.16	16.33	30.03
Sudbury Municipality	Ontario	22.67	25.53	36.97	30.51	0.00	16.72

Table 27 - 1999 County/CD Production

1999, Roseau edged Manitoba Division-17 for the top rank in North America.

In 1969, the CHL had sixty-three Canadian CDs ranked above Ramsey County, Minnesota, the topped ranked American county. Barron County, Wisconsin, at 63.25, ranked thirteenth among all county level units and first in the United States in 1979. After the CHL returned in 1992, its focus was turned further south and east, away from the major hockey producing regions. By 1999, American counties occupied three of the top four spots. Both Keweenaw, Michigan, and Red Lake, Minnesota, had LQs well over 300 in the top two spots.

Only two years of the ECHL were covered in this study due to its 1988 start. In its second season, 1989, Plymouth County, Massachusetts, ranked as the top American county, coming in behind twenty Canadian CDs. Bottineau, North Dakota, topped the American counties in 1999 with an LQ of 83.82. It ranked behind Division-2 and Division-10 of Saskatchewan.

Both the IHL and the NHL showed slightly different trends. American counties did show improvement from 1969 to 1989 in the IHL, with Ramsey County, Minnesota, ranked fifty-ninth in 1969 and St. Lawrence County, New York, ranked forth in 1989. In 1999, however, the top American county, Juneau, Alaska, was ranked eighteenth. A similar result happened in the NHL. St. Louis, Minnesota, ranked sixty-eighth in North America in 1969, while Roseau jumped to the second

spot by 1979. Roseau climbed again in 1989, to the top spot, with an LQ of 160.73. Carlton, Minnesota, came in as the top ranked American county in 1999; however, it was ranked below forty-two Canadian CDs.

North American Production Interpretation

It is clear that Canada is still the dominant leader in North American player production. Internally, Canada has seen a slight shift in production to the western provinces, and a minor trend towards urban areas in the eastern provinces. The United States has seen an incredible amount of growth, both in terms of the number of American players in professional hockey, and in the number of counties producing those players. Even with the American advances in production, however, Canada is still in control of professional players.

Though some American counties have moved into the leading spots in North American location quotient rankings, the vast majority of top producers are still Canadian census divisions. The only areas in the United States that are able to compete with Canada, in terms of player production, are those areas that are relatively close, geographically.

CHAPTER FOUR

CONCLUSIONS

Summary

It is evident that over the past thirty years, a dramatic change has been seen in the origins of professional hockey players. Changes have been seen most readily in non-Canadian production. International players now have a greater opportunity to play after years of discrimination on the ice. The sentiments within North American hockey have changed so much that in 1998 the All-Star format was switched from the Eastern Conference versus the Western Conference to North America versus the rest of the world (Teaford, 1999).

American influence has also increased in the past three decades. Less than a dozen U.S. counties produced hockey players in 1969, producing less than 3 percent of all professional players. In 1999, nearly 150 counties produced at least one player, and nearly 20 percent of all players were American. But the trends within the United States results are very striking. Hockey-player production has become much more widespread, with counties from Maine to California and Florida to Washington contributing to the American total. The highest concentration of production was consistently located in the upper

reaches of Minnesota and across the Northeast, yet counties near Brownsville, Texas, and Los Angeles, California, also produced players.

Outside of the near-Canadian counties of the northern tier of states, a uniquely American trend was evident. While Canadian production was seen everywhere, from the cities of Toronto and Montréal to the extremely rural sections of the northern prairies, most American production, even the low-level production, was concentrated around urban centers. Even in Michigan, one of the top producing states, most production was around Detroit, Grand Rapids, or Kalamazoo.

Production in nearly every state inside and outside of the traditional hockey core was completely urban. Production around Atlanta, Oklahoma City, Dallas, Salt Lake City, and San Diego highlight this uniquely American trend. These urban centers may often be the only location in a particular region where a hockey development infrastructure is available. Unlike most of Canada, and some parts of the northern United States, this country is completely reliant on artificially constructed ice surfaces. Where hockey interest is low, it may be less profitable to build the proper facilities. Only in larger regional cities is there enough population base to support these investments.

Evaluation of Problem Statement

The first hypothesis, that Canadian production is uniform across the country, was disproved. The location quotients show that the

production in the Prairie Provinces tend to be well above other areas of the country. When actual numerical production was analyzed, the same trend was found. Ontario and Québec produced the most players, but did not always meet expected values. Saskatchewan and Alberta, while not leaders in number of players, proved that they far out-produce what is expected of them, based on their respective populations.

The second hypothesis stated that increased American production would be seen around areas of new hockey growth. The belief was that the influence of a team on the surrounding areas, in increased exposure to the sport and better developmental programs, would help boost production in places where hockey teams locate. The recent increase in teams in every area of the country would help to spread hockey development to all areas.

From the current data, it is difficult to definitively support this original premise. Certainly, many places around the country do exhibit increased production around team locations. The area across Central New York, from Buffalo to Albany, is one of these places. Several professional teams have played in this region and county level production has grown around every team location. However, Tulsa has seen professional hockey for all but eight years of the last thirty-two, yet northeast Oklahoma did not produce one player during that span.

Most of the consistent team location/player production correlation is in the traditional hockey region, in areas of new or recently increased

production. These are the areas that have benefited most from the expansion in the south. The increased amount of roster space, up about 220 percent in the past thirty years, has allowed lesser talent to enter professional hockey. The hockey tradition was always there, evident in the long tenures of many of the local teams; however, the player talent was not as high as areas in Canada, or Minnesota and Massachusetts in the U.S., so players did not get the opportunity to compete professionally until recently.

The large urban markets of the South finally began contributing hockey talent recently, years after seeing professional hockey come to these areas. Again, this production could also be attributed to the increased opportunity to play and not specifically to the new development of talent. Much of the southern growth of hockey, especially in the Southeast, has been seen in very small cities with little or no exposure to any professional sport (Schultz, 1998). Most people had never followed the game of hockey and are only now being educated on the sport. It would have been very difficult for hockey-player development to exist in many of these places more than ten years ago if most people did not know anything about the sport.

This idea highlights what could be the biggest reason for the lack of consistent production around team locations. As Shropshire mentioned, success for any sports franchise is dependent on a strong base of local support. For hockey this is represented by strong local

leagues or high school and college programs. When leagues expanded and moved into smaller cities of the Northeast, this base was already there and player development came quickly. When leagues entered southern cities, however, the new teams were forced to compete where the sport had no roots.

These teams became the standard-bearers for hockey in these areas; employing clever marketing techniques to create not only loyal team fans, but loyal hockey fans as well (Schultz, 1998). When teams finally became part of the community, the local support grew and player development operations could be established. The strength of top-level player development in new hockey areas has not yet reached the same levels as other areas of the country, but given time, they may become just as important.

Direction of Future Research

This study provides a base for several avenues of future research. The temporal changes must be continually reviewed to track the ever-changing face of American hockey. Because the trend of Sunbelt hockey only started in full force a decade ago, much of the impact in player development may not have reached the professional level yet. Even though a direct connection cannot be made to a team location and player production in an area, the ever-increasing opportunities in professional hockey will certainly continue to alter the composition of the leagues.

This study focused solely on professional hockey; its teams and its players. Further research is needed to look at American college hockey and its changes in this age of southern hockey. Even college hockey has seen the expansion into warm weather areas, with schools such as the University of Alabama, Huntsville, hosting competitive teams (Walker, 1999). This direction of research could also examine the role of high schools and youth leagues in development of hockey talent around the country. By Henzel's account, the only place outside the hockey core region with high school hockey programs was the Denver area. In 1999, the scope of youth and high school hockey is much more widespread, with evidence of new teams from Florida to Texas to Arizona (USA Hockey, 1999).

The urban and rural differences in production between the United States and Canada could prove to be another interesting line of future study. It is obvious that urban areas in all parts of the U.S. seem more likely to produce players than corresponding rural areas. In Canada, this is not seen. Urban areas do produce hockey talent, and in terms of number of players, often lead the nation; however, this is not at the expense of rural production, which in most cases leads in the ratio of players to population. This difference between the two nations is intriguing, and could open doors to a deeper understanding of the level of importance of hockey within both societies.

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APPENDICES

APPENDIX A

TEAMS INCLUDED IN STUDY

City	State	Team	League	Years
Albany	NY	Albany River Rats	AHL	1993-2000
Anaheim	CA	Mighty Ducks of Anaheim	NHL	1993-2000
Atlanta	GA	Atlanta Flames	NHL	1972-1980
Atlanta	GA	Atlanta Thrashers	NHL	1999-2000
Augusta	GA	Augusta Lynx	ECHL	1998-2000
Baltimore	MD	Baltimore Clippers	AHL	1962-1976
Baltimore	MD	Baltimore Skipjacks	AHL	1982-1993
Baton Rouge	LA	Baton Rouge Kingfish	ECHL	1996-2000
Biloxi	MS	Mississippi Sea Wolves	ECHL	1996-2000
Binghamton	NY	Binghamton Dusters	AHL	1977-1980
Birmingham	NY	Binghamton Whalers	AHL	1980-1990
Boston	MA	Boston Bruins	NHL	1924-2000
Buffalo	NY	Buffalo Sabres	NHL	1970-2000
Calgary	AB	Calgary Flames	NHL	1980-2000
Charlotte	NC	Charlotte Checkers	ECHL	1993-2000
Chicago	IL	Chicago Blackhawks	NHL	1926-2000
Chicago	IL	Chicago Wolves	IHL	1994-2000
Cincinnati	OH	Cincinnati Stingers	CHL	1979-1980
Cincinnati	OH	Cincinnati Mighty Ducks	AHL	1997-2000
Cincinnati	OH	Cincinnati Cyclones	IHL	1992-2000
Cleveland	OH	Cleveland Lumberjacks	IHL	1992-2000
Columbus	GA	Columbus Cottonmouths	CHL	1996-2000
Columbus	OH	Columbus Checkers	IHL	1966-1970
Dallas	TX	Dallas Black Hawks	CHL	1968-1982
Dallas	TX	Dallas Stars	NHL	1993-2000
Dayton	OH	Dayton Bombers	ECHL	1991-2000
Dayton	OH	Dayton Gems	IHL	1964-1980
Denver	CO	Colorado Avalanche	NHL	1995-2000
Denver	CO	Colorado Rockies	NHL	1976-1982
Des Moines	IA	Des Moines Oak Leafs	IHL	1963-1972
Detroit	MI	Detroit Red Wings	NHL	1933-2000
Detroit	MI	Detroit Vipers	IHL	1994-2000
East Rutherford	NJ	New Jersey Devils	NHL	1982-2000
Edmonton	AB	Edmonton Oilers	NHL	1979-2000
Erie	PA	Erie Panthers	ECHL	1988-1996
Estero	FL	Florida Everblades	ECHL	1998-2000
Fayetteville	NC	Fayettville Force	CHL	1997-2000
Flint	MI	Flint Generals	IHL	1969-1985
Flint	MI	Flint Spirits	IHL	1985-1990
Florence	SC	Pee Dee Pride	ECHL	1997-2000
Fort Wayne	IN	Fort Wayne Komets	IHL	1952-1999
Fort Worth	TX	Fort Worth Fire	CHL	1992-1999
Fort Worth	TX	Fort Worth Texans	CHL	1974-1982
Fort Worth	TX	Fort Worth Wings	CHL	1968-1974
Fredericton	NB	Fredericton Canadiens	AHL	1990-1999
Glens Falls	NY	Adirondack Red Wings	AHL	1979-1999
Grand Rapids	MI	Grand Rapids Griffens	IHL	1996-2000

City	State	Team	League	Years
Grand Rapids	MI	Grand Rapids Owls	IHL	1978-1980
Greensboro	NC	Greensboro Generals	ECHL	1999-2000
Greensboro	NC	Greensboro Monarchs	ECHL	1989-1995
Halifax	NS	Halifax Citadels	AHL	1988-1993
Halifax	NS	Nova Scotia Voyageurs	AHL	1971-1984
Hamilton	ON	Hamilton Bulldogs	AHL	1996-2000
Hartford	CT	Hartford Whalers	NHL	1979-1997
Hartford	CT	Hartford Wolf Pack	AHL	1997-2000
Hershey	PA	Hershey Bears	AHL	1940-2000
Houston	TX	Houston Aeros	IHL	1994-2000
Houston	TX	Houston Apollos	CHL	1968-1981
Huntington	WV	Huntington Blizzard	ECHL	1993-2000
Huntsville	AL	Huntsville Channel Cats	CHL	1996-2000
Indianapolis	IN	Indianapolis Checkers	CHL	1979-1984
Indianapolis	IN	Indianapolis Ice	CHL	1999-2000
Jackson	MS	Jackson Bandits	ECHL	1999-2000
Jacksonville	FL	Jacksonville Lizard Kings	ECHL	1995-2000
Johnstown	PA	Johnstown Chiefs	ECHL	1988-2000
Kalamazoo	MI	Kalamazoo Wings	IHL	1974-1995
Kalamazoo	MI	Michigan K-Wings	IHL	1995-2000
Kansas City	MO	Kansas City Blades	IHL	1990-2000
Kansas City	MO	Kansas City Blues	CHL	1968-1977
Knoxville	KY	Knoxville Cherokees	ECHL	1988-1997
Lafayette	LA	Louisiana Ice Gators	ECHL	1995-2000
Lexington	KY	Kentucky Thoroughblades	AHL	1996-2000
Little Rock	AR	Arkansas RiverBlades	ECHL	1999-2000
Long Beach	CA	Long Beach Ice Dogs	IHL	1996-2000
Los Angeles	CA	Los Angeles Kings	NHL	1967-2000
Louisville	KY	Louisville Panthers	AHL	1999-2000
Lowell	MA	Lowell Lock Monsters	AHL	1998-2000
Macon	GA	Macon Whoopee	CHL	1996-2000
Memphis	TN	Memphis Riverkings	CHL	1992-2000
Miami	FL	Florida Panthers	NHL	1993-2000
Milwaukee	WI	Milwaukee Admirals	IHL	1977-2000
Minneapolis	MN	Minnesota North Stars	NHL	1967-1993
Mobile	AL	Mobile Mysticks	ECHL	1995-2000
Moncton	NB	Moncton Hawks	AHL	1987-1994
Moncton	NB	New Brunswick Hawks	AHL	1978-1982
Montreal	PQ	Montreal Canadiens	NHL	1917-2000
Montreal	PQ	Montreal Voyageurs	AHL	1969-1971
Muskegon	MI	Muskegon Lumberjacks	IHL	1984-1992
Muskegon	MI	Muskegon Mohawks	IHL	1965-1984
Nashville	TN	Nashville Knights	ECHL	1989-1996
Nashville	TN	Nashville Predators	NHL	1998-2000
New Haven	CT	New Haven Nighthawks	AHL	1972-1992
New Orleans	LA	New Orleans Brass	ECHL	1997-2000
New York	NY	New York Rangers	NHL	1926-2000

City	State	Team	League	Years
Newmarket	ON	Newmarket Saints	AHL	1986-1991
Norfolk	VA	Hampton Roads Admirals	ECHL	1989-2000
North Charleston	SC	South Carolina Stingrays	ECHL	1993-2000
Oakland	CA	Oakland Seals	NHL	1967-1970
Oklahoma City	OK	Oklahoma City Blazers	CHL	1968-1977
Oklahoma City	OK	Oklahoma City Blazers	CHL	1992-2000
Oklahoma City	OK	Oklahoma City Stars	CHL	1978-1982
Omaha	NE	Omaha Knights	CHL	1968-1975
Orlando	FL	Orlando Solar Bears	IHL	1995-2000
Ottawa	ON	Ottawa Senators	NHL	1992-2000
Pensacola	FL	Pensacola Ice Pilots	ECHL	1996-2000
Peoria	IL	Peoria Rivermen	ECHL	1996-2000
Peoria	IL	Peoria Rivermen	IHL	1984-1996
Philadelphia	PA	Philadelphia Flyers	NHL	1967-2000
Philadelphia	PA	Philadelphia Phantoms	AHL	1996-2000
Phoenix	AZ	Phoenix Coyotes	NHL	1996-2000
Phoenix	AZ	Phoenix Roadrunners	IHL	1989-1997
Pittsburgh	PA	Pittsburgh Penguins	NHL	1967-2000
Port Huron	MI	Port Huron Flags	IHL	1962-1981
Portland	ME	Maine Mariners	AHL	1977-1992
Portland	ME	Portland Pirates	AHL	1993-2000
Providence	RI	Providence Bruins	AHL	1992-2000
Providence	RI	Providence Reds	AHL	1940-1976
Quebec	PQ	Quebec Aces	AHL	1959-1971
Quebec	PQ	Quebec Citadelles	AHL	1999-2000
Quebec	PQ	Quebec Nordiques	NHL	1979-1995
Raleigh	NC	Carolina Hurricanes	NHL	1997-2000
Richmond	VA	Richmond Renegades	ECHL	1990-2000
Roanoke	VA	Roanoke Express	ECHL	1993-2000
Roanoke	VA	Virinia Lancers	ECHL	1988-2000
Rochester	NY	Rochester Americans	AHL	1956-2000
Saginaw	MI	Saginaw Gears	IHL	1972-1983
Saint John	NB	Saint John Flames	AHL	1993-2000
Salt Lake City	UT	Salt Lake Golden Eagles	IHL	1984-1994
Salt Lake City	UT	Utah Grizzlies	IHL	1995-2000
San Antonio	TX	San Antonio Iguanas	CHL	1994-2000
San Jose	CA	San Jose Sharks	NHL	1991-2000
Sherbrooke	PQ	Sherbrooke Canadiens	AHL	1984-1990
Springfield	MA	Springfield Falcons	AHL	1994-2000
Springfield	MA	Springfield Indians	AHL	1940-1967
Springfield	MA	Springfield Indians	AHL	1974-1994
Springfield	MA	Springfield Kings	AHL	1967-1974
St. John's	NF	St. John's Maple Leafs	AHL	1991-2000
St. Louis	MO	St. Louis Blues	NHL	1967-2000
Sydney	NS	Cape Breton Oilers	AHL	1988-1996
Syracuse	NY	Syracuse Crunch	AHL	1994-2000
Syracuse	NY	Syracuse Firebirds	AHL	1979-1980

City	State	Team	League	Years
Tallahassee	FL	Tallahassee Tiger Sharks	ECHL	1994-2000
Tampa Bay	FL	Tampa Bay Lightning	NHL	1992-2000
Toledo	OH	Toledo Blades	IHL	1963-1970
Toledo	OH	Toledo Goaldiggers	IHL	1974-1986
Toledo	OH	Toledo Storm	ECHL	1991-2000
Topeka	KS	Topeka Scarecrows	CHL	1998-2000
Toronto	ON	Toronto Maple Leafs	NHL	1926-2000
Trenton	NJ	Trenton Titans	ECHL	1999-2000
Tulsa	OK	Tulsa Oilers	CHL	1968-1984
Tulsa	OK	Tulsa Oilers	CHL	1992-2000
Uniondale	NY	New York Islanders	NHL	1972-2000
Utica	NY	Utica Devils	AHL	1987-1993
Vancouver	BC	Vancouver Canucks	NHL	1970-2000
Washington	DC	Washington Capitals	NHL	1974-2000
Waterloo	IA	Iowa Stars	CHL	1969-1970
Wheeling	WV	Wheeling Nailers	ECHL	1996-2000
Wichita	KS	Wichita Thunder	CHL	1992-2000
Wilkes-Barre	PA	Wilkes-Barre/Scranton Penguins	AHL	1999-2000
Winnipeg	MB	Manitoba Moose	IHL	1996-2000
Winnipeg	MB	Winnipeg Jets	NHL	1979-1996
Winston-Salem	NC	Winston-Salem Thunderbirds	ECHL	1989-1992
Worcester	MA	Worcester IceCats	AHL	1994-2000

APPENDIX B

NATIONAL LOCATION QUOTIENTS: CANADA

Census Division	*1969*	*1979*	*1989*	*1999*
Alberta	**0.72501**	**0.98698**	**1.45599**	**1.66582**
Athabasca	0.00000	1.47151	0.58337	1.03581
Banff	0.00000	0.00000	1.26766	2.04111
Calgary	0.53127	0.46664	1.09844	1.12763
Camrose-Lloydminster	1.03557	2.72128	4.18165	2.17567
Drumheller	0.00000	0.00000	0.83536	1.44661
Edmonton	0.90404	1.13516	2.06723	2.09762
Edson	0.00000	0.00000	0.00000	1.53706
Fort MacLeod	0.00000	1.13516	0.89783	1.73119
Fort McMurray	-	-	0.00000	1.09374
Fort McMurray-St. Paul	1.24184	2.61386	-	-
Grand Cache	-	-	0.00000	2.81246
Grand Prairie	-	-	1.77688	1.81993
Hanna	0.00000	3.31089	2.63549	0.00000
Lethbridge	1.17512	0.37839	0.55969	2.00576
Medicine Hat	0.00000	0.77903	1.70056	2.35005
Red Deer	-	-	1.05876	1.18285
Red Deer-Rocky Mountain House	1.58487	1.77369	-	-
Rocky Mountain House	-	-	0.00000	3.43750
Slave Lake	-	-	0.65507	0.37219
Slave Lake-Grand Cache-Prairie	0.35807	0.67916	-	-
St. Paul	-	-	0.69975	2.77891
Stettler	1.77030	0.99327	0.80755	3.67963
British Columbia	**0.24697**	**0.50642**	**0.80865**	**0.71188**
Bulkley-Nechako	2.50001	3.31089	1.70910	1.52491
Capital Region	0.33136	0.33387	0.33373	0.27287
Cariboo	0.86214	0.70948	1.06078	0.63527
Central Kootenay	1.51510	1.58923	2.58408	1.86204
Central Okanagan	0.00000	0.00000	0.64131	0.45401
Comox-Strathcona	0.00000	0.63065	0.79586	0.43850
Cowichan Valley	0.00000	0.00000	2.86060	0.29871
East Kootenay	0.00000	2.38384	2.49305	4.89551
Fraser Valley	0.00000	0.00000	0.28604	0.27979
Fraser-Fort George	0.52718	0.00000	1.78463	1.30388
Greater Vancouver	0.06599	0.49708	0.54127	0.45881
Kitimat-Stikine	0.00000	0.00000	3.93269	1.50709
Kootenay Boundary	4.32301	2.48317	4.30700	4.67326
Mount Waddington	0.00000	0.00000	0.00000	4.68069
Nanaimo	0.00000	0.00000	0.34974	0.17214
North Okanagan	0.00000	0.79461	1.11544	1.18768
Okanagan-Similkameen	0.79368	1.49927	1.54458	1.97690
Peace River	0.00000	0.00000	2.49593	1.13882
Powell River	0.00000	2.09109	1.71678	3.24879
Squamish-Lillooet	0.00000	0.00000	0.00000	0.66470
Sunshine Coast	0.00000	0.00000	0.00000	0.83734
Thompson-Nicola	0.44793	0.41386	1.27612	1.96449
Manitoba	**2.18380**	**1.76071**	**1.36599**	**1.38046**
MAN-1	1 11955	0.00000	0.00000	1.33811
MAN-2	1.02465	0.00000	0.74327	1.77418

Census Division	*1969*	*1979*	*1989*	*1999*
MAN-3	1.78727	1.10363	0.83070	1.60002
MAN-4	2.72038	0.00000	0.00000	0.00000
MAN-5	2.07044	2.20726	4.11721	0.00000
MAN-6	1.12133	3.61188	0.00000	2.11283
MAN-7	1.93838	5.77901	4.50671	2.32220
MAN-9	2.86921	3.31089	0.00000	1.90722
MAN-10	1.91367	0.00000	0.00000	0.00000
MAN-11	3.09649	1.41642	1.00750	1.11103
MAN-12	1.27547	0.00000	0.00000	3.48671
MAN-13	3.00038	0.00000	1.79301	0.53056
MAN-14	5.83213	0.00000	0.00000	0.00000
MAN-15	2.59771	3.05621	4.15536	4.96178
MAN-16	5.88252	3.31089	0.00000	0.00000
MAN-17	3.30811	2.74005	0.00000	3.77804
MAN-18	0.00000	3.61188	0.00000	0.00000
MAN-19	7.00012	0.00000	0.00000	0.00000
MAN-20	1.75855	0.00000	0.00000	1.94394
MAN-21	-	6.62178	8.31983	2.88104
MAN-22	-	2.94301	4.13442	2.94203
New Brunswick	**0.31885**	**0.28707**	**0.40061**	**0.47792**
Charlotte	0.00000	0.00000	1.19256	1.60472
Gloucester	0.00000	0.00000	0.00000	0.25514
Kent	0.00000	0.00000	1.01432	0.68487
Northumberland	0.00000	1.47151	0.59427	0.00000
Queens	0.00000	0.00000	2.59167	1.81466
Restigouche	0.00000	0.00000	1.65334	0.58283
Saint John	0.36817	0.91335	0.39034	0.56916
Sunbury	0.00000	0.00000	0.00000	0.83644
Victoria	1.71405	0.00000	0.00000	0.00000
Westmorland	0.68778	0.37131	0.56658	0.90228
York	1.05827	0.00000	0.00000	0.51237
Newfoundland	**0.12917**	**0.21133**	**0.17067**	**0.33347**
NFLD-1	0.31656	0.00000	0.12934	0.62846
NFLD-5	0.00000	1.69067	0.71529	0.00000
NFLD-6	0.00000	0.94597	0.80492	0.00000
NFLD-8	0.00000	0.00000	0.00000	0.49333
Northwest Territories	**0.00000**	**0.90297**	**0.00000**	**0.65703**
Fort Smith	0.00000	1.58923	0.00000	0.70514
Inuvik	-	-	-	2.35026
Nova Scotia	**0.47015**	**0.33030**	**0.47097**	**0.67188**
Annapolis	0.00000	2.20726	0.00000	1.97958
Antigonish	0.00000	0.00000	0.00000	5.65310
Cape Breton	1.31440	0.62079	1.33130	0.38827
Colchester	1.79840	0.00000	0.00000	0.00000
Cumberland	0.96506	0.00000	0.00000	0.66197
Guysborough	0.00000	0.00000	0.00000	2.12477

Census Division	*1969*	*1979*	*1989*	*1999*
Halifax	0.12978	0.27881	0.40069	0.68083
Hants	1.17267	0.00000	0.00000	0.53590
Inverness	0.00000	0.00000	2.97457	1.07899
Kings	0.00000	0.81083	0.00000	0.00000
Lunenburg	0.00000	0.00000	0.68463	0.46117
Pictou	0.73597	0.00000	0.65118	1.37473
Shelbourne	0.00000	2.33710	0.00000	0.00000
Ontario	**1.33954**	**1.38807**	**1.21029**	**1.02826**
Algoma	3.89577	2.13935	1.21736	2.46203
Brant	1.40260	1.91013	2.57116	1.26162
Bruce	2.86431	0.65132	1.03024	0.67472
Cochrane	6.01896	2.48317	1.68520	2.17064
Dufferin	1.60053	1.28164	0.85868	0.45970
Durham	0.00000	0.86685	1.15707	0.76315
Elgin	0.00000	0.56758	0.86867	1.08118
Essex	0.33223	2.51460	1.37497	1.20185
Frontenac	2.66934	2.18701	3.08279	1.79436
Grey	1.53297	0.00000	0.39631	2.24537
Haldimand-Norfolk	1.17312	0.44641	1.00765	1.86792
Haliburton	0.00000	0.00000	2.40131	0.00000
Halton	0.17815	0.32566	0.94612	0.79532
Hamilton	0.75988	0.67833	1.21440	0.91396
Hastings	1.70693	2.94301	1.68416	2.36382
Huron	1.28161	1.39406	1.10510	1.10335
Kenora	3.18724	3.42506	0.52784	0.99522
Kent	0.33556	0.73575	1.15574	1.40323
Lambton	0.89048	4.19918	3.23797	0.68497
Lanark	0.80294	2.59113	0.60995	0.36070
Leeds-Grenville	1.82404	0.00000	1.83545	0.90767
Lennox-Addington	0.00000	0.00000	0.00000	1.11495
Middlesex	0.48127	1.26531	0.97510	0.88146
Muskoka	1.06241	0.00000	0.70976	0.84747
Niagra	1.27000	0.96642	1.57554	1.28433
Nipissing	3.44188	2.42260	1.55535	1.59800
Northumberland	0.00000	1.20396	0.43440	0.52590
Ontario	0.51868	-	-	-
Ottawa-Carleton	0.79089	0.96004	1.16923	1.41794
Oxford	0.84460	0.00000	0.00000	0.22208
Parry Sound	7.85344	0.00000	0.00000	1.08878
Peel	0.26161	0.26785	0.41430	0.50547
Perth	2.15529	2.37198	1.39454	2.41774
Peterborough	0.77289	2.75361	2.24046	2.28847
Prescott-Russell	0.76909	0.00000	0.50885	0.28936
Rainy River	0.00000	3.17846	4.17629	0.00000
Renfrew	1.12015	1.33924	0.35308	0.44999
Simcoe	1.58342	2.15732	1.05831	0.92534
Stormont-Dundas-Glengarry	1.74474	1.96104	2.08754	1.75848
Sudbury District	4.79646	2.83791	1.23910	0.87206
Sudbury Municipality	-	2.96129	3.27070	3.03613
Thunder Bay	3.73410	3.09590	2.02228	3.11717
Timiskaming	13.13895	5.67581	3.18623	1.81199
Toronto	1.00850	1.40490	1.27164	0.85655

Census Division	*1969*	*1979*	*1989*	*1999*
Victoria	2.97278	1.69067	1.07126	0.62787
Waterloo	0.00000	1.32436	1.22838	0.92664
Wellington	0.00000	1.25136	0.83138	0.84330
York	0.00000	0.00000	0.20549	0.32707
Prince Edward Island	**0.60410**	**2.60529**	**0.75477**	**1.14405**
Kings	0.00000	4.18218	1.65617	0.00000
Prince	0.00000	0.00000	1.47560	1.00417
Queens	1.32713	3.97307	0.00000	1.54130
Quebec	**0.71047**	**0.65810**	**0.59098**	**0.75217**
Abitibi	6.04600	5.73888	0.00000	0.87762
Acton	-	-	2.22669	0.00000
Antoine-Labelle	-	-	2.05770	1.27983
Argenteuil	0.00000	2.48317	1.20157	1.55395
Arthabaska	1.97566	1.39406	0.54189	2.07362
Asbestos	-	-	2.06832	0.00000
Beauce-Sartigan	-	-	0.00000	0.46600
Beauharnois	0.65081	0.74964	-	-
Beauharnois-Salaberry	-	-	0.00000	1.87354
Becancour	-	-	0.00000	1.13317
Bellechasse	0.00000	0.00000	0.00000	1.50438
Bonaventure	0.00000	0.00000	1.60807	0.00000
Brome-Missisquoi	-	-	0.71829	0.95559
Chambly	0.00000	0.13332	-	-
Champlain	0.59976	0.69703	0.52148	0.49271
Charlevoix-est			0.00000	1.32803
Chicoutimi	1.45407	0.00000	-	-
Coaticook	-	-	2.06780	0.00000
Communaute-Urbaine-de-Montreal	-	-	1.18541	1.00530
Communaute-Urbaine-de-Quebec	-	-	0.81854	1.29174
Communaute-Urbaine-L'Outaouais	-	-	0.87037	1.01233
Desjardins	-	-	0.00000	0.42978
Deux-Montagnes	0.00000	0.60198	0.00000	0.00000
Drummond	1.05797	1.75282	0.00000	1.54028
Francheville	-	-	0.47770	0.79217
Frontenac	1.24322	0.00000	-	-
Gaspe-Est	0.81317	0.00000	-	-
Gaspe-Ouest	1.80929	2.09109	-	-
Gatineau	1.21773	1.47151	-	-
Ile-de-Montreal et Ile-Jesus	0.69813	0.76180	-	-
Joliette	0.00000	0.67340	0.69068	0.41314
Labelle	0.00000	1.20396	-	-
La Cote-de-Gaspe	-	-	0.00000	1.10824
La Haute-Yamaska	-	-	0.45975	0.00000
La Riviere-du-Nord	-	-	0.46541	0.50411
La Vallee-de-la-Gatineau	-	-	0.00000	1.06827
Lac-Saint-Jean-Est	0.75036	1.69067	0.61875	0.42318
Lac-Saint-Jean-Ouest	1.78354	1.28164	-	-
L'Amiante	-	-	0.69158	0.50249
L'Assomption	0.00000	0.00000	0.38160	0.00000
Laprairie	0.80264	0.00000	-	-

Census Division	*1969*	*1979*	*1989*	*1999*
Laval	-	-	0.00000	0.91170
Le Bas-Richelieu	-	-	0.00000	0.43335
Le Centre-de-la-Maurice	-	-	0.95806	0.66776
Le Fjord-du-Saguenay	-	-	0.56503	0.12951
Le Haut-Richelieu	-	-	0.00000	0.22194
Le Val-Saint-Francois	-	-	1.54747	0.98914
L'Erable	-	-	0.00000	0.91287
Les Etchemins	-	-	0.00000	1.23163
Les Jardins-de-Napierville	-	-	0.00000	0.96161
Les Laurentides	-	-	1.05968	0.58054
Les Maskoutains	-	-	0.42535	0.28235
Les Moulins	-	-	0.39343	0.20230
Levis	0.54051	0.45149	-	-
L'Ile-d'Orleans	-	-	4.71990	0.00000
Lotbiniere	0.00000	0.00000	1.21399	0.81762
Manicouagan	-	-	0.91166	0.62770
Matane	2.24258	1.32436	1.31348	0.00000
Matapedia	1.26345	1.65545	-	-
Montcalm	1.57483	1.52810	0.00000	0.00000
Montmagny	-	-	1.33367	0.00000
Montmorency #2	0.00000	6.62178	-	-
Nicolet-Yamaska	0.00000	0.00000	0.00000	0.93064
Pabok	-	-	0.00000	1.07264
Papineau	0.00000	2.09109	3.39527	0.00000
Pontiac	0.00000	1.98653	0.00000	2.89620
Portneuf	0.00000	0.00000	0.75718	0.97935
Quebec	0.48111	0.61394	-	-
Richelieu	2.16155	1.52810	-	-
Richmond	0.82671	0.99327	-	-
Rimouski	0.52801	0.00000	-	-
Rimouski-Neigette	-	-	0.63310	0.42412
Riviere-du-Loup	0.00000	0.00000	0.00000	1.38662
Robert-Cliché	-	-	0.00000	1.18370
Roussillon	-	-	0.00000	0.15308
Rouville	0.00000	0.00000	1.06815	0.00000
Rouyn-Noranda	-	-	5.46888	2.60759
Sept-Rivieres-Caniapiscau	-	-	3.24510	2.17373
Shefford	0.54411	1.16855	-	-
Sherbrooke	1.00319	0.70320	0.51368	1.31707
St.-Hyacinthe	1.34397	0.00000	-	-
St.-Maurice	3.75741	1.48526	-	-
Temiscamingue	0.00000	1.52810	0.00000	0.00000
Temiscouata	0.00000	0.00000	1.34954	0.00000
Terrebonne	0.48492	0.00000	-	-
Therese-de Blainville	-	-	0.00000	0.52388
Vallee-de L'Or	-	-	0.00000	0.49912
Vaudreuil	0.00000	0.82772	0.00000	0.00000
Saskatchewan	**2.76687**	**2.59022**	**2.66532**	**3.04985**
SASK-1	1.82589	0.00000	1.97013	3.38075
SASK-2	2.23851	5.88603	1.28380	6.76561
SASK-3	2.84170	0.00000	1.75451	4.18453
SASK-4	0.00000	5.29743	14.61052	3.64663

Census Division	*1969*	*1979*	*1989*	*1999*
SASK-5	0.00000	0.00000	3.35843	3.82386
SASK-6	2.32381	2.22978	2.21634	2.87762
SASK-7	5.71224	4.49781	3.68290	2.25167
SASK-8	0.86315	2.20726	2.83422	4.18634
SASK-9	3.65821	1.72742	3.84245	2.92434
SASK-10	4.72845	7.64052	15.48280	8.61260
SASK-11	1.98690	1.98653	1.58169	2.21334
SASK-12	9.37996	6.35691	3.85395	5.37314
SASK-13	5.56708	7.35754	4.83243	2.65392
SASK-14	0.70258	0.82772	2.88393	2.16804
SASK-15	4.97332	2.01168	1.98947	4.82130
SASK-16	1.67430	2.97980	0.80648	0.57462
SASK-17	3.51511	4.67420	0.87073	3.13956
Yukon	**0.00000**	**1.80594**	**0.00000**	**0.73669**
YUK-1	0.00000	1.80594	0.00000	0.73669

APPENDIX C

NORTH AMERICAN LOCATION QUOTIENTS: CANADA

Census Division	*1969*	*1979*	*1989*	*1999*
Alberta	**7.32183**	**8.92885**	**11.69063**	**12.44710**
Athabasca	0.00000	13.31222	4.67857	7.73403
Banff	0.00000	0.00000	10.16648	15.24025
Calgary	5.33195	4.22149	8.80935	8.41960
Camrose-Lloydminster	10.39320	24.61848	33.53624	16.24500
Drumheller	0.00000	0.00000	6.69950	10.80136
Edmonton	9.07319	10.26942	16.57889	15.66222
Edson	0.00000	0.00000	0.00000	11.47672
Fort MacLeod	0.00000	10.26942	7.20044	12.92617
Fort McMurray	-	-	0.00000	8.16659
Fort McMurray-St. Paul	12.46339	23.64670	-	-
Grand Cache	-	-	0.00000	20.99966
Grand Prairie	-	-	14.25032	13.58881
Hanna	0.00000	29.95249	21.13624	0.00000
Lethbridge	11.79385	3.42314	4.48860	14.97634
Medicine Hat	0.00000	7.04764	13.63825	17.54699
Red Deer	-	-	8.49110	8.83194
Red Deer-Rocky Mountain House	15.90619	16.04598	-	-
Rocky Mountain House	-	-	0.00000	25.66660
Slave Lake	-	-	5.25354	2.77904
Slave Lake-Grand Cache-Prairie	3.59367	6.14410	-	-
St. Paul	-	-	5.61190	20.74915
Stettler	17.76718	8.98575	6.47643	27.47452
British Columbia	**2.49412**	**4.58138**	**6.49290**	**5.31920**
Bulkley-Nechako	25.09070	29.95249	13.70676	11.38599
Capital Region	3.32557	3.02042	2.67643	2.03741
Cariboo	8.65268	6.41839	8.50726	4.74337
Central Kootenay	15.20589	14.37719	20.72397	13.90320
Central Okanagan	0.00000	0.00000	5.14321	3.38994
Comox-Strathcona	0.00000	5.70524	6.38271	3.27416
Cowichan Valley	0.00000	0.00000	22.94156	2.23033
East Kootenay	0.00000	21.56579	19.99387	36.55308
Fraser Valley	0.00000	0.00000	2.29404	2.08907
Fraser-Fort George	5.29090	0.00000	14.31249	9.73564
Greater Vancouver	0.66232	4.49689	4.34089	3.42577
Kitimat-Stikine	0.00000	0.00000	31.53957	11.25292
Kootenay Boundary	43.38687	22.46437	34.54153	34.89361
Mount Waddington	0.00000	0.00000	0.00000	34.94910
Nanaimo	0.00000	0.00000	2.80484	1.28532
North Okanagan	0.00000	7.18860	8.94569	8.86802
Okanagan-Similkameen	7.96556	13.56339	12.38732	14.76083
Peace River	0.00000	0.00000	20.01701	8.50315
Powell River	0.00000	18.91736	13.76829	24.25758
Squamish-Lillooet	0.00000	0.00000	0.00000	4.96307
Sunshine Coast	0.00000	0.00000	0.00000	6.25213
Thompson-Nicola	4.49551	3.74406	10.23433	14.66817
Manitoba	**22.05399**	**15.92849**	**10.96803**	**10.31482**
MAN-1	11.23609	0.00000	0.00000	9.99118
MAN-2	10.28366	0.00000	5.96093	13.24721

Census Division	*1969*	*1979*	*1989*	*1999*
MAN-3	17.93750	9.98416	6.66210	11.94677
MAN-4	27.30246	0.00000	0.00000	0.00000
MAN-5	20.77942	19.96833	33.01942	0.00000
MAN-6	11.25392	32.67544	0.00000	15.77579
MAN-7	19.45407	52.28071	36.14315	17.33909
MAN-9	28.79617	29.95249	0.00000	14.24054
MAN-10	19.20611	0.00000	0.00000	0.00000
MAN-11	31.07716	12.81390	8.08000	8.29566
MAN-12	12.80094	0.00000	0.00000	26.03408
MAN-13	30.11261	0.00000	14.37967	3.96147
MAN-14	58.53275	0.00000	0.00000	0.00000
MAN-15	26.07132	27.64845	33.32537	37.04790
MAN-16	59.03843	29.95249	0.00000	0.00000
MAN-17	33.20108	24.78827	0.00000	28.20931
MAN-18	0.00000	32.67544	0.00000	0.00000
MAN-19	70.25499	0.00000	0.00000	0.00000
MAN-20	17.64925	0.00000	0.00000	14.51471
MAN-21	-	59.90498	66.72379	21.51171
MAN-22	-	26.62443	33.15744	21.96715
New Brunswick	**3.21998**	**2.59704**	**3.21660**	**3.57103**
Charlotte	0.00000	0.00000	9.56411	11.98188
Gloucester	0.00000	0.00000	0.00000	1.90502
Kent	0.00000	0.00000	8.13469	5.11369
Northumberland	0.00000	13.31222	4.76599	0.00000
Queens	0.00000	0.00000	20.78480	13.54947
Restigouche	0.00000	0.00000	13.25956	4.35179
Saint John	3.69505	8.26276	3.13045	4.24972
Sunbury	0.00000	0.00000	0.00000	6.24541
Victoria	17.20264	0.00000	0.00000	0.00000
Westmorland	6.90275	3.35916	4.54389	6.73703
York	10.62107	0.00000	0.00000	3.82566
Newfoundland	**1.30450**	**1.91186**	**1.37036**	**2.49170**
NFLD-1	3.17704	0.00000	1.03729	4.69253
NFLD-5	0.00000	15.29489	5.73651	0.00000
NFLD-6	0.00000	8.55785	6.45535	0.00000
NFLD-8	0.00000	0.00000	0.00000	3.68349
Northwest Territories	**0.00000**	**8.16886**	**0.00000**	**4.90935**
Fort Smith	0.00000	14.37719	0.00000	5.26501
Inuvik	-	-	-	17.54856
Nova Scotia	**4.74800**	**2.98813**	**3.78159**	**5.02030**
Annapolis	0.00000	19.96833	0.00000	14.78081
Antigonish	0.00000	0.00000	0.00000	42.20973
Cape Breton	13.19169	5.61609	10.67687	2.89907
Colchester	18.04921	0.00000	0.00000	0.00000
Cumberland	9.68554	0.00000	0.00000	4.94269
Guysborough	0.00000	0.00000	0.00000	15.86491

Census Division	*1969*	*1979*	*1989*	*1999*
Halifax	1.30246	2.52231	3.21349	5.08351
Hants	11.76926	0.00000	0.00000	4.00136
Inverness	0.00000	0.00000	23.85557	8.05648
Kings	0.00000	7.33530	0.00000	0.00000
Lunenburg	0.00000	0.00000	5.49064	3.44337
Pictou	7.38642	0.00000	5.22233	10.26466
Shelbourne	0.00000	21.14293	0.00000	0.00000
Ontario	**13.52783**	**12.55742**	**9.71785**	**7.68322**
Algoma	39.09896	19.35392	9.76307	18.38315
Brant	14.07685	17.28028	20.62032	9.42009
Bruce	28.74695	5.89229	8.26235	5.03793
Cochrane	60.40778	22.46437	13.51502	16.20741
Dufferin	16.06337	11.59451	6.88648	3.43243
Durham	0.00000	7.84211	9.27952	5.69818
Elgin	0.00000	5.13471	6.96661	0.00000
Essex	3.33431	22.74873	11.02705	0.00000
Frontenac	26.79019	19.78513	24.72356	0.00000
Grey	15.38531	0.00000	3.17832	0.00000
Haldimand-Norfolk	11.77374	4.03854	8.08119	0.00000
Haliburton	0.00000	0.00000	19.25812	0.00000
Halton	1.78792	2.94615	7.58777	5.93839
Hamilton	7.62633	6.13661	9.73934	6.82422
Hastings	17.13116	26.62443	13.50672	17.64980
Huron	12.86259	12.61157	8.86273	8.23833
Kenora	31.98793	30.98533	4.23322	7.43093
Kent	3.36778	6.65611	9.26885	10.47744
Lambton	8.93706	37.98852	25.96802	5.11443
Lanark	8.05849	23.44108	4.89168	2.69322
Leeds-Grenville	18.30658	0.00000	14.72002	6.77726
Lennox-Addington	0.00000	0.00000	0.00000	8.32495
Middlesex	4.83016	11.44681	7.82012	6.58153
Muskoka	10.66264	0.00000	5.69219	6.32773
Niagra	12.74607	8.74289	12.63558	9.58964
Nipissing	34.54358	21.91645	12.47368	11.93169
Northumberland	0.00000	10.89181	3.48385	3.92672
Ontario	5.20558	-	-	-
Ottawa-Carleton	7.93756	8.68511	9.37709	10.58727
Oxford	8.47661	0.00000	0.00000	1.65820
Parry Sound	78.81909	0.00000	0.00000	8.12955
Peel	2.62560	2.42312	3.32264	3.77420
Perth	21.63108	21.45850	11.18398	18.05242
Peterborough	7.75690	24.91098	17.96816	17.08724
Prescott-Russell	7.71875	0.00000	4.08094	2.16055
Rainy River	0.00000	28.75439	33.49323	0.00000
Renfrew	11.24215	12.11561	2.83164	3.35991
Simcoe	15.89162	19.51655	8.48746	6.90917
Stormont-Dundas-Glengarry	17.51065	17.74086	16.74175	13.12997
Sudbury District	48.13846	25.67356	9.93743	6.51137
Sudbury Municipality	-	26.78980	26.23050	22.66976
Thunder Bay	37.47642	28.00752	16.21836	23.27482
Timiskaming	131.86584	51.34712	25.55311	13.52953
Toronto	10.12154	12.70968	10.19840	6.39554

Census Division	*1969*	*1979*	*1989*	*1999*
Victoria	29.83560	15.29489	8.59136	4.68808
Waterloo	16.08633	11.98100	9.85145	6.91888
Wellington	3.13631	11.32063	6.66753	6.29662
York	6.15218	4.81379	1.64803	2.44214
Prince Edward Island	**6.10069**	**23.56917**	**6.06032**	**8.54840**
Kings	0.00000	37.83472	13.28226	0.00000
Prince	0.00000	0.00000	11.83413	7.49778
Queens	13.31939	35.94299	0.00000	11.50839
Quebec	**7.17497**	**5.95364**	**4.74521**	**5.62023**
Abitibi	60.67915	51.91765	0.00000	6.55290
Acton	-	-	17.85776	0.00000
Antoine-Labelle	-	-	16.50248	9.55602
Argenteuil		22.46437	9.63645	11.60277
Arthabaska	19.82825	12.61157	4.34586	15.48298
Asbestos	-	-	16.58758	0.00000
Beauce-Sartigan	-	-	0.00000	3.47949
Beauharnois	6.53171	6.78170	-	-
Beauharnois-Salaberry	-	-	0.00000	13.98908
Becancour	-	-	0.00000	8.46102
Bellechasse	0.00000	0.00000	0.00000	11.23267
Bonaventure	0.00000	0.00000	12.89650	0.00000
Brome-Missisquoi	-	-	5.76057	7.13505
Chambly		1.20614	-	-
Champlain	6.01933	0.00000	4.18222	3.67889
Charlevoix-est	0.00000	0.00000	0.00000	9.91592
Chicoutimi	14.59341	6.30579	-	-
Coaticook	-	-	16.58341	0.00000
Communaute-Urbaine-de-Montreal	-	-	6.56459	9.64497
Communaute-Urbaine-de-Quebec	-	-	6.98021	7.55869
Communaute-Urbaine-L'Outaouais	-	-	9.50684	7.50619
Desjardins	-	-	0.00000	3.20900
Deux-Montagnes	0.00000	5.44591	0.00000	0.00000
Drummond	10.61809	15.85720	0.00000	11.50074
Francheville	-	-	3.83112	5.91486
Frontenac	12.47732	0.00000	-	-
Gaspe-Est	8.16123	0.00000	-	-
Gaspe-Ouest	18.15845	18.91736	-	-
Gatineau	12.22141	13.31222	-	-
Ile-de-Montreal et Ile-Jesus	7.00658	6.89172	-	-
Joliette	0.00000	6.09203	5.53918	3.08475
Labelle	0.00000	10.89181	-	-
La Cote-de-Gaspe	-	-	0.00000	8.27487
La Haute-Yamaska	-	-	3.68713	0.00000
La Riviere-du-Nord	-	-	3.73253	3.76405
La Vallee-de-la-Gatineau	-	-	0.00000	7.97639
Lac-Saint-Jean-Est	7.53082	15.29489	4.96226	3.15971
Lac-Saint-Jean-Ouest	17.90010	11.59451	-	-
L'Amiante	-	-	5.54640	3.75189
L'Assomption	0.00000	0.00000	3.06035	0.00000
Laprairie	0.00000	7.26121	-	-

Census Division	*1969*	*1979*	*1989*	*1999*
Laval	-	-	2.52959	6.80736
Le Bas-Richelieu	-	-	0.00000	3.23568
Le Centre-de-la-Maurice	-	-	7.68350	4.98591
Le Fjord-du-Saguenay	-	-	4.53148	0.96700
Le Haut-Richelieu	-	-	0.00000	1.65717
Le Val-Saint-Francois	-	-	12.41044	7.38555
L'Erable	-	-	0.00000	6.81612
Les Etchemins	-	-	0.00000	9.19616
Les Jardins-de-Napierville	-	-	0.00000	7.18004
Les Laurentides	-	-	8.49849	4.33466
Les Maskoutains	-	-	3.41127	2.10822
Les Moulins	-	-	3.15524	1.51050
Levis	5.42474	4.08443	-	-
L'Ile-d'Orleans	-	-	37.85292	0.00000
Lotbiniere	0.00000	0.00000	9.73604	6.10490
Manicouagan	-	-	7.31141	4.68684
Matane	22.50709	11.98100	10.53393	0.00000
Matapedia	12.68035	14.97624	-	-
Montcalm	15.80542	13.82423	0.00000	0.00000
Montmagny	-	-	10.69583	0.00000
Montmorency #2	0.00000	59.90498	-	-
Nicolet-Yamaska	0.00000	0.00000	0.00000	6.94879
Pabok	-	-	0.00000	8.00900
Papineau	0.00000	18.91736	27.22956	0.00000
Pontiac	0.00000	17.97149	0.00000	21.62490
Portneuf	0.00000	0.00000	6.07250	7.31247
Quebec	4.82856	5.55410	-	-
Richelieu	21.69389	13.82423	-	-
Richmond	8.29704	8.98575	-	-
Rimouski	5.29922	0.00000	-	-
Rimouski-Neigette	-	-	5.07737	3.16678
Riviere-du-Loup	0.00000	0.00000	0.00000	10.35338
Robert-Cliché	-	-	0.00000	8.83825
Roussillon	-	-	0.00000	1.14302
Rouville	0.00000	0.00000	8.56639	0.00000
Rouyn-Noranda	-	-	43.85961	19.47001
Sept-Rivieres-Caniapiscau	-	-	26.02523	16.23052
Shefford	5.46084	10.57147	-	-
Sherbrooke	10.06830	6.36159	4.11963	9.83411
St.-Hyacinthe	13.48847	0.00000	-	-
St.-Maurice	37.71037	13.43663	-	-
Temiscamingue	0.00000	13.82423	0.00000	0.00000
Temiscouata	0.00000	0.00000	10.82311	0.00000
Terrebonne	4.86682	0.00000	-	-
Therese-de Blainville	-	-	0.00000	3.91163
Vallee-de L'Or	-	-	0.00000	3.72675
Vaudreuil	0.00000	7.48812	0.00000	0.00000
Saskatchewan	**27.94227**	**23.43286**	**21.40078**	**22.78861**
SASK-1	18.32505	0.00000	15.80011	25.24288
SASK-2	22.46626	53.24887	10.29585	50.51646
SASK-3	28.52004	0.00000	14.07091	31.24444
SASK-4	0.00000	47.92398	117.17421	27.22812

Census Division	*1969*	*1979*	*1989*	*1999*
SASK-5	0.00000	0.00000	26.93413	28.55147
SASK-6	23.32237	20.17208	17.77473	21.48617
SASK-7	57.32949	40.69017	29.53630	16.81246
SASK-8	8.66280	19.96833	22.73002	31.25796
SASK-9	36.71470	15.62739	30.81587	21.83507
SASK-10	47.45590	69.12113	124.16976	64.30732
SASK-11	19.94100	17.97149	12.68489	16.52628
SASK-12	94.13967	57.50878	30.90807	40.11934
SASK-13	55.87260	66.56109	38.75534	19.81591
SASK-14	7.05132	7.48812	23.12865	16.18803
SASK-15	49.91355	18.19898	15.95523	35.99898
SASK-16	16.80369	26.95724	6.46786	4.29051
SASK-17	35.27852	42.28587	6.98311	23.44202
Yukon	**0.00000**	**16.33772**	**0.00000**	**5.50064**
YUK-1	0.00000	16.33772	0.00000	5.50064

APPENDIX D

NATIONAL LOCATION QUOTIENTS:UNITED STATES

County	*1969*	*1979*	*1989*	*1999*
Alaska	**0.00000**	**0.00000**	**2.19524**	**2.92375**
Anchorage	0.00000	0.00000	5.33484	4.89558
Juneau	0.00000	0.00000	0.00000	20.31226
California	**0.00000**	**0.23185**	**0.24344**	**0.11741**
Alameda	0.00000	4.96426	0.00000	0.45826
Kings	0.00000	0.00000	0.00000	5.37285
Los Angeles	0.00000	0.00000	0.40871	0.06892
Orange	0.00000	0.00000	0.50089	0.00000
San Bernadino	0.00000	0.00000	0.00000	0.77086
San Diego	0.00000	0.00000	0.48337	0.00000
Santa Clara	0.00000	0.00000	0.00000	0.38821
Ventura	0.00000	0.00000	1.80486	0.00000
Colorado	**0.00000**	**0.94939**	**0.36652**	**0.45806**
Arapahoe	0.00000	0.00000	0.00000	1.32598
Denver	0.00000	5.56876	2.58257	1.24661
Larimer	0.00000	0.00000	0.00000	2.69967
Connecticut	**0.00000**	**0.00000**	**1.46935**	**2.13168**
Fairfield	0.00000	0.00000	0.00000	1.52388
Hartford	0.00000	0.00000	4.25276	2.32269
New Haven	0.00000	0.00000	1.50143	4.81775
Delaware	**0.00000**	**0.00000**	**0.00000**	**0.82865**
New Castle	0.00000	0.00000	0.00000	1.31706
District of Columbia	**0.00000**	**0.00000**	**0.00000**	**1.21683**
District of Columbia	0.00000	0.00000	0.00000	1.21941
Florida	**0.00000**	**0.00000**	**0.09333**	**0.08356**
Lake	0.00000	0.00000	0.00000	3.07773
Pasco	0.00000	0.00000	4.29507	1.92732
Georgia	**0.00000**	**0.00000**	**0.00000**	**0.08081**
Fulton	0.00000	0.00000	0.00000	0.86636
Illinois	**0.00000**	**0.96046**	**1.69017**	**1.47866**
Cook	0.00000	2.08899	3.31137	2.87992
DuPage	0.00000	0.00000	1.54470	0.71550
Kane	0.00000	0.00000	3.80343	0.00000
Logan	0.00000	0.00000	0.00000	20.20777
Madison	0.00000	0.00000	0.00000	2.43857
Tazewell	0.00000	0.00000	0.00000	9.80598

County	*1969*	*1979*	*1989*	*1999*
Indiana	**0.00000**	**0.00000**	**0.43559**	**0.52639**
Allen	0.00000	0.00000	4.01374	4.03158
Hamilton	0.00000	0.00000	0.00000	3.84701
Lake	0.00000	0.00000	2.53888	0.00000
Lawrence	0.00000	0.00000	0.00000	13.74373
Marion	0.00000	0.00000	0.00000	0.77789
Iowa	**0.00000**	**0.00000**	**0.94162**	**0.00000**
Polk	0.00000	0.00000	9.05001	0.00000
Maine	**0.00000**	**2.43957**	**1.96669**	**2.02193**
Androscogin	0.00000	0.00000	0.00000	12.68481
Cumberland	0.00000	0.00000	9.93257	2.50566
Kennebec	0.00000	24.96785	0.00000	5.49524
Maryland	**0.00000**	**0.65063**	**0.00000**	**0.24129**
Anne Arundel	0.00000	0.00000	0.00000	1.32192
Montgomery	0.00000	0.00000	0.00000	0.75334
Washington	0.00000	24.26200	0.00000	0.00000
Massachusetts	**7.20850**	**10.04308**	**10.43623**	**8.41831**
Barnstable	0.00000	0.00000	0.00000	9.08767
Berkshire	0.00000	0.00000	8.66494	4.79209
Bristol	0.00000	0.00000	0.00000	2.46996
Essex	16.07275	4.32972	3.60398	4.54969
Franklin	0.00000	0.00000	17.22851	8.93474
Hampden	0.00000	6.19318	7.93853	7.24853
Hampshire	0.00000	0.00000	0.00000	4.22966
Middlesex	7.33168	14.04928	15.54171	12.00831
Norfolk	16.95054	13.56949	9.79957	9.86912
Plymouth	0.00000	6.76725	19.41835	8.08975
Suffolk	13.94551	33.76115	21.82497	15.92342
Worcester	0.00000	0.00000	5.10409	4.31578
Michigan	**4.61734**	**3.25851**	**4.80637**	**4.99707**
Chippewa	0.00000	0.00000	34.89415	33.01019
Genesee	0.00000	6.09102	5.61018	4.37668
Grand Traverse	0.00000	0.00000	0.00000	8.49149
Houghton	0.00000	0.00000	0.00000	17.78806
Ingham	0.00000	0.00000	4.28317	4.50368
Kalamazoo	0.00000	0.00000	0.00000	2.76617
Kent	0.00000	0.00000	0.00000	3.48603
Keweenaw	0.00000	0.00000	0.00000	293.27346
Lapeer	0.00000	0.00000	0.00000	7.11877
Livingston	0.00000	0.00000	0.00000	8.61915
Macomb	0.00000	3.95003	3.36626	6.41628
Marquette	0.00000	0.00000	0.00000	21.51683

County	*1969*	*1979*	*1989*	*1999*
Oakland	0.00000	2.71171	4.45731	6.48427
Ottawa	0.00000	0.00000	0.00000	2.80023
St. Clair	0.00000	19.76695	0.00000	3.97608
Van Buren	0.00000	0.00000	0.00000	8.29666
Washtenaw	0.00000	0.00000	4.26765	2.09727
Wayne	15.35758	8.21520	14.86698	9.90116
Minnesota	**18.85608**	**16.82846**	**9.93559**	**9.22324**
Anoka	0.00000	13.99857	4.95597	2.16293
Beltrami	0.00000	0.00000	0.00000	16.03395
Blue Earth	0.00000	0.00000	0.00000	23.45971
Carlton	0.00000	0.00000	82.53715	40.94601
Crow Wing	0.00000	0.00000	27.28824	0.00000
Dakota	0.00000	28.24487	0.00000	5.49709
Hennepin	21.35780	23.31557	11.69548	15.09403
Itasca	0.00000	127.40915	88.68945	71.90511
Koochiching	0.00000	312.29780	74.08290	40.84746
Mower	0.00000	67.92999	0.00000	0.00000
Olmsted	0.00000	0.00000	22.68202	5.47006
Polk	0.00000	0.00000	37.05168	19.86712
Ramsey	64.58263	17.90205	9.94299	15.71619
Red Lake	0.00000	0.00000	0.00000	147.04330
Roseau	0.00000	436.40724	401.79597	191.52624
St. Louis	92.91278	49.38496	24.36493	29.41908
Stearns	0.00000	0.00000	113.54874	0.00000
Washington	0.00000	0.00000	0.00000	3.16423
Winona	0.00000	0.00000	25.24624	0.00000
Mississippi	**0.00000**	**0.00000**	**0.00000**	**0.24327**
Adams	0.00000	0.00000	0.00000	18.44968
Missouri	**0.00000**	**0.00000**	**0.47194**	**0.57437**
St. Louis	0.00000	0.00000	2.43073	3.16645
Montana	**0.00000**	**0.00000**	**0.00000**	**0.66990**
Flathead	0.00000	0.00000	0.00000	8.45090
Nevada	**0.00000**	**0.00000**	**0.00000**	**0.34014**
Clark	0.00000	0.00000	0.00000	0.52774
New Hampshire	**0.00000**	**0.00000**	**4.35420**	**0.51994**
Hillsborough	0.00000	0.00000	10.78625	0.00000
Rockingham	0.00000	0.00000	4.91154	0.00000
Strafford	0.00000	0.00000	0.00000	5.86158

County	*1969*	*1979*	*1989*	*1999*
New Jersey	**0.00000**	**0.00000**	**0.31241**	**0.85601**
Bergen	0.00000	0.00000	0.00000	2.22970
Camden	0.00000	0.00000	0.00000	1.26353
Cumberland	0.00000	0.00000	0.00000	4.52708
Hunterdon	0.00000	0.00000	0.00000	5.16691
Mercer	0.00000	0.00000	3.70666	0.00000
Middlesex	0.00000	0.00000	1.79761	0.00000
Morris	0.00000	0.00000	0.00000	1.37978
Ocean	0.00000	0.00000	0.00000	1.29580
Passaic	0.00000	0.00000	0.00000	2.61556
Sussex	0.00000	0.00000	0.00000	4.41772
New York	**0.56205**	**1.09385**	**0.93965**	**1.92892**
Albany	0.00000	0.00000	0.00000	2.16624
Broome	0.00000	0.00000	0.00000	3.24863
Chemung	0.00000	0.00000	12.68425	6.85041
Clinton	0.00000	0.00000	0.00000	8.00417
Erie	0.00000	5.40378	3.73993	9.50827
Franklin	0.00000	0.00000	0.00000	12.90958
Herkimer	0.00000	0.00000	0.00000	9.67575
Kings	0.00000	0.00000	0.00000	0.28584
Madison	0.00000	0.00000	0.00000	17.61792
Monroe	0.00000	0.00000	0.00000	7.09815
Nassau	0.00000	0.00000	0.93757	1.46082
New York	6.66085	3.84194	3.24692	0.41023
Niagra	0.00000	0.00000	0.00000	2.88072
Oneida	0.00000	0.00000	0.00000	8.30131
Onondaga	0.00000	0.00000	2.57473	1.39228
Ontario	0.00000	0.00000	0.00000	6.28565
Orange	0.00000	0.00000	0.00000	1.91422
Queens	0.00000	0.00000	0.61871	0.00000
Rensselaer	0.00000	0.00000	7.81898	8.23381
Richmond	0.00000	7.79394	3.18615	0.00000
Schenectady	0.00000	0.00000	0.00000	8.65396
St. Lawrence	0.00000	0.00000	100.84159	22.19580
Suffolk	0.00000	4.27290	0.00000	1.85474
Westchester	0.00000	0.00000	0.00000	0.70578
North Dakota	**0.00000**	**0.00000**	**0.00000**	**6.72934**
Bottineau	0.00000	0.00000	0.00000	85.52660
Burleigh	0.00000	0.00000	0.00000	18.65875
Cass	0.00000	0.00000	0.00000	10.84689
Grand Forks	0.00000	0.00000	0.00000	18.34068
Ohio	**2.88604**	**0.25410**	**0.66791**	**0.89959**
Cuyahoga	17.87376	0.00000	1.71014	4.64491
Franklin	0.00000	0.00000	0.00000	0.62009
Hamilton	0.00000	3.14210	2.78790	0.00000
Lake	0.00000	0.00000	0.00000	2.83889

County	*1969*	*1979*	*1989*	*1999*
Lorain	0.00000	0.00000	0.00000	2.22637
Lucas	0.00000	0.00000	5.22309	2.82097
Montgomery	0.00000	0.00000	0.00000	1.14233
Oklahoma	**0.00000**	**0.00000**	**0.38386**	**0.00000**
Oklahoma	0.00000	0.00000	2.01377	0.00000
Oregon	**0.00000**	**1.04200**	**0.00000**	**0.00000**
Deschutes	0.00000	44.15198	0.00000	0.00000
Pennsylvania	**0.00000**	**0.23126**	**0.40650**	**0.41725**
Allegheny	0.00000	0.00000	0.90350	1.00794
Beaver	0.00000	0.00000	0.00000	3.41480
Dauphin	0.00000	11.81012	0.00000	0.00000
Delaware	0.00000	0.00000	0.00000	1.16820
Erie	0.00000	0.00000	4.38166	2.25983
Montgomery	0.00000	0.00000	1.78043	1.76530
Philadelphia	0.00000	0.00000	0.76154	0.44441
Rhode Island	**0.00000**	**2.89678**	**9.62647**	**5.10143**
Kent	0.00000	0.00000	7.49320	11.79785
Newport	0.00000	0.00000	13.84817	0.00000
Providence	0.00000	4.80213	12.15031	5.56591
Texas	**0.00000**	**0.57846**	**0.07108**	**0.06326**
Cameron	0.00000	13.08221	0.00000	0.00000
Dallas	0.00000	0.00000	0.00000	0.30649
Howard	0.00000	82.78596	0.00000	0.00000
Tarrant	0.00000	3.18708	0.00000	0.00000
San Patrico	0.00000	0.00000	20.55315	8.83170
Utah	**0.00000**	**0.00000**	**0.00000**	**0.28836**
Salt Lake	0.00000	0.00000	0.00000	0.73998
Vermont	**0.00000**	**0.00000**	**0.00000**	**3.09434**
Chittenden	0.00000	0.00000	0.00000	8.83391
Franklin	0.00000	0.00000	0.00000	14.36414
Virginia	**0.00000**	**0.00000**	**0.19515**	**0.18191**
Charlottesville City	0.00000	0.00000	0.00000	16.96714
Roanoke City	0.00000	0.00000	12.51440	6.77652
Washington	**3.00377**	**0.00000**	**0.49622**	**0.32592**
King	0.00000	0.00000	0.80108	0.38111

County	*1969*	*1979*	*1989*	*1999*
Grays Harbor	172.15925	0.00000	0.00000	0.00000
Kittitas	0.00000	0.00000	0.00000	19.52817
Pierce	0.00000	0.00000	0.00000	0.92915
Snohomish	0.00000	0.00000	2.59322	0.00000
Wisconsin	**0.00000**	**1.16610**	**0.98735**	**1.57586**
Barron	0.00000	70.84153	0.00000	0.00000
Dane	0.00000	0.00000	6.57873	14.13636
Dodge	0.00000	0.00000	15.77185	7.54882
Douglas	0.00000	0.00000	0.00000	14.57134
Milwaukee	0.00000	2.84324	0.00000	0.00000
Oneida	0.00000	0.00000	38.11602	17.35677
Rock	0.00000	0.00000	0.00000	4.14884

APPENDIX E

NORTH AMERICAN LOCATION QUOTIENTS: UNITED STATES

County	*1969*	*1979*	*1989*	*1999*
Alaska	**0.00000**	**0.00000**	**0.47952**	**0.77413**
Anchorage	0.00000	0.00000	1.16533	1.29621
Juneau	0.00000	0.00000	0.00000	5.37810
California	**0.00000**	**0.03037**	**0.05318**	**0.03109**
Alameda	0.00000	0.65033	0.00000	0.12134
Kings	0.00000	0.00000	0.00000	1.42258
Los Angeles	0.00000	0.00000	0.08928	0.01825
Orange	0.00000	0.00000	0.10941	0.00000
San Bernadino	0.00000	0.00000	0.00000	0.20410
San Diego	0.00000	0.00000	0.10559	0.00000
Santa Clara	0.00000	0.00000	0.00000	0.10279
Ventura	0.00000	0.00000	0.39425	0.00000
Colorado	**0.00000**	**0.12437**	**0.08006**	**0.12128**
Arapahoe	0.00000	0.00000	0.00000	0.35108
Denver	0.00000	0.72952	0.56413	0.33007
Larimer	0.00000	0.00000	0.00000	0.71479
Connecticut	**0.00000**	**0.00000**	**0.32096**	**0.56441**
Fairfield	0.00000	0.00000	0.00000	0.40348
Hartford	0.00000	0.00000	0.92897	0.61498
New Haven	0.00000	0.00000	0.32797	1.27560
Delaware	**0.00000**	**0.00000**	**0.00000**	**0.21940**
New Castle	0.00000	0.00000	0.00000	0.34872
District of Columbia	**0.00000**	**0.00000**	**0.00000**	**0.32218**
District of Columbia	0.00000	0.00000	0.00000	0.32286
Florida	**0.00000**	**0.00000**	**0.02039**	**0.02212**
Lake	0.00000	0.00000	0.00000	0.81489
Pasco	0.00000	0.00000	0.93821	0.51030
Georgia	**0.00000**	**0.00000**	**0.00000**	**0.02140**
Fulton	0.00000	0.00000	0.00000	0.22939
Illinois	**0.00000**	**0.12582**	**0.36920**	**0.39151**
Cook	0.00000	0.27366	0.72333	0.76252
DuPage	0.00000	0.00000	0.33742	0.18944
Kane	0.00000	0.00000	0.83081	0.00000
Logan	0.00000	0.00000	0.00000	5.35043
Madison	0.00000	0.00000	0.00000	0.64566
Tazewell	0.00000	0.00000	0.00000	2.59634

County	*1969*	*1979*	*1989*	*1999*
Indiana	**0.00000**	**0.00000**	**0.09515**	**0.13937**
Allen	0.00000	0.00000	0.87675	1.06745
Hamilton	0.00000	0.00000	0.00000	1.01858
Lake	0.00000	0.00000	0.55459	0.00000
Lawrence	0.00000	0.00000	0.00000	3.63894
Marion	0.00000	0.00000	0.00000	0.20596
Iowa	**0.00000**	**0.12335**	**0.00000**	**0.00000**
Polk	0.00000	1.18557	0.00000	0.00000
Maine	**0.00000**	**0.31959**	**0.42960**	**0.53535**
Androscogin	0.00000	0.00000	0.00000	3.35857
Cumberland	0.00000	0.00000	2.16965	0.66343
Kennebec	0.00000	3.27084	0.00000	1.45498
Maryland	**0.00000**	**0.08523**	**0.00000**	**0.06389**
Anne Arundel	0.00000	0.00000	0.00000	0.35001
Montgomery	0.00000	0.00000	0.00000	0.19946
Washington	0.00000	3.17838	0.00000	0.00000
Massachusetts	**0.23943**	**1.31567**	**2.27967**	**2.22892**
Barnstable	0.00000	0.00000	0.00000	2.40615
Berkshire	0.00000	0.00000	1.89275	1.26881
Bristol	0.00000	0.00000	0.00000	0.65398
Essex	0.53386	0.56720	0.78725	1.20463
Franklin	0.00000	0.00000	3.76336	2.36566
Hampden	0.00000	0.81132	1.73408	1.91920
Hampshire	0.00000	0.00000	0.00000	1.11989
Middlesex	0.24352	1.84049	3.39490	3.17945
Norfolk	0.56302	1.77763	2.14060	2.61306
Plymouth	0.00000	0.88652	4.24171	2.14193
Suffolk	0.46320	4.42279	4.76741	4.21606
Worcester	0.00000	0.00000	1.11493	1.14269
Michigan	**0.15337**	**0.42687**	**1.04990**	**1.32308**
Chippewa	0.00000	0.00000	7.62222	8.74014
Genesee	0.00000	0.79794	1.22548	1.15882
Grand Traverse	0.00000	0.00000	0.00000	2.24830
Houghton	0.00000	0.00000	0.00000	4.70976
Ingham	0.00000	0.00000	0.93561	1.19244
Kalamazoo	0.00000	0.00000	0.00000	0.73240
Kent	0.00000	0.00000	0.00000	0.92300
Keweenaw	0.00000	0.00000	0.00000	77.65034
Lapeer	0.00000	0.00000	0.00000	1.88484
Livingston	0.00000	0.00000	0.00000	2.28210
Macomb	0.00000	0.51746	0.73532	1.69885
Marquette	0.00000	0.00000	0.00000	5.69704

County	*1969*	*1979*	*1989*	*1999*
Oakland	0.00000	0.35524	0.97365	1.71685
Ottawa	0.00000	0.00000	0.00000	0.74142
St. Clair	0.00000	2.58952	0.00000	1.05275
Van Buren	0.00000	0.00000	0.00000	2.19672
Washtenaw	0.00000	0.00000	0.93222	0.55530
Wayne	0.51011	1.07621	3.24752	2.62154
Minnesota	**0.62631**	**2.20457**	**2.17031**	**2.44205**
Anoka	0.00000	1.83384	1.08257	0.57268
Beltrami	0.00000	0.00000	0.00000	4.24533
Blue Earth	0.00000	0.00000	0.00000	6.21146
Carlton	0.00000	0.00000	18.02927	10.84132
Crow Wing	0.00000	0.00000	5.96079	0.00000
Dakota	0.00000	3.70014	0.00000	1.45547
Hennepin	0.70941	3.05439	2.55474	3.99646
Itasca	0.00000	16.69088	19.37316	19.03840
Koochiching	0.00000	40.91171	16.18254	10.81523
Mower	0.00000	8.89898	0.00000	0.00000
Olmsted	0.00000	0.00000	4.95462	1.44831
Polk	0.00000	0.00000	8.09350	5.26024
Ramsey	2.14513	2.34521	2.17193	4.16119
Red Lake	0.00000	0.00000	0.00000	38.93282
Roseau	0.00000	57.17033	87.76759	50.71062
St. Louis	3.08613	6.46954	5.32223	7.78932
Stearns	0.00000	0.00000	24.80338	0.00000
Washington	0.00000	0.00000	0.00000	0.83780
Winona	0.00000	0.00000	5.51474	0.00000
Mississippi	**0.00000**	**0.00000**	**0.00000**	**0.06441**
Adams	0.00000	0.00000	0.00000	4.88494
Missouri	**0.00000**	**0.00000**	**0.10309**	**0.15208**
St. Louis	0.00000	0.00000	0.53097	0.83838
Montana	**0.00000**	**0.00000**	**0.00000**	**0.17737**
Flathead	0.00000	0.00000	0.00000	2.23755
Nevada	**0.00000**	**0.00000**	**0.00000**	**0.09006**
Clark	0.00000	0.00000	0.00000	0.13973
New Hampshire	**0.00000**	**0.00000**	**0.95112**	**0.13766**
Hillsborough	0.00000	0.00000	2.35613	0.00000
Rockingham	0.00000	0.00000	1.07287	0.00000
Strafford	0.00000	0.00000	0.00000	1.55198

County	*1969*	*1979*	*1989*	*1999*
New Jersey	**0.00000**	**0.00000**	**0.06824**	**0.22665**
Bergen	0.00000	0.00000	0.00000	0.59036
Camden	0.00000	0.00000	0.00000	0.33455
Cumberland	0.00000	0.00000	0.00000	1.19864
Hunterdon	0.00000	0.00000	0.00000	1.36805
Mercer	0.00000	0.00000	0.80968	0.00000
Middlesex	0.00000	0.00000	0.39267	0.00000
Morris	0.00000	0.00000	0.00000	0.36532
Ocean	0.00000	0.00000	0.00000	0.34309
Passaic	0.00000	0.00000	0.00000	0.69253
Sussex	0.00000	0.00000	0.00000	1.16968
New York	**0.01867**	**0.14330**	**0.20525**	**0.51072**
Albany	0.00000	0.00000	0.00000	0.57356
Broome	0.00000	0.00000	0.00000	0.86014
Chemung	0.00000	0.00000	2.77072	1.81379
Clinton	0.00000	0.00000	0.00000	2.11927
Erie	0.00000	0.70791	0.81694	2.51752
Franklin	0.00000	0.00000	0.00000	3.41808
Herkimer	0.00000	0.00000	0.00000	2.56186
Kings	0.00000	0.00000	0.00000	0.07568
Madison	0.00000	0.00000	0.00000	4.66472
Monroe	0.00000	0.00000	0.00000	1.87939
Nassau	0.00000	0.00000	0.20480	0.38678
New York	0.22124	0.50330	0.70925	0.10862
Niagra	0.00000	0.00000	0.00000	0.76273
Oneida	0.00000	0.00000	0.00000	2.19795
Onondaga	0.00000	0.00000	0.56242	0.36864
Ontario	0.00000	0.00000	0.00000	1.66426
Orange	0.00000	0.00000	0.00000	0.50683
Queens	0.00000	0.00000	0.13515	0.00000
Rensselaer	0.00000	0.00000	1.70796	2.18007
Richmond	0.00000	1.02102	0.69598	0.00000
Schenectady	0.00000	0.00000	0.00000	2.29132
St. Lawrence	0.00000	0.00000	22.02766	5.87681
Suffolk	0.00000	0.55976	0.00000	0.49108
Westchester	0.00000	0.00000	0.00000	0.18687
North Dakota	**0.00000**	**0.00000**	**0.00000**	**1.78174**
Bottineau	0.00000	0.00000	0.00000	22.64497
Burleigh	0.00000	0.00000	0.00000	4.94030
Cass	0.00000	0.00000	0.00000	2.87194
Grand Forks	0.00000	0.00000	0.00000	4.85608
Ohio	**0.09586**	**0.03329**	**0.14590**	**0.23819**
Cuyahoga	0.59368	0.00000	0.37356	1.22984
Franklin	0.00000	0.00000	0.00000	0.16418
Hamilton	0.00000	0.41162	0.60898	0.00000
Lake	0.00000	0.00000	0.00000	0.75166

County	*1969*	*1979*	*1989*	*1999*
Lorain	0.00000	0.00000	0.00000	0.58948
Lucas	0.00000	0.00000	1.14092	0.74691
Montgomery	0.00000	0.00000	0.00000	0.30246
Oklahoma	**0.00000**	**0.00000**	**0.08385**	**0.00000**
Oklahoma	0.00000	0.00000	0.43988	0.00000
Oregon	**0.00000**	**0.13650**	**0.00000**	**0.00000**
Deschutes	0.00000	5.78401	0.00000	0.00000
Pennsylvania	**0.00000**	**0.03030**	**0.08880**	**0.11047**
Allegheny	0.00000	0.00000	0.19736	0.26687
Beaver	0.00000	0.00000	0.00000	0.90414
Dauphin	0.00000	1.54715	0.00000	0.00000
Delaware	0.00000	0.00000	0.00000	0.30931
Erie	0.00000	0.00000	0.95712	0.59834
Montgomery	0.00000	0.00000	0.38891	0.46740
Philadelphia	0.00000	0.00000	0.16635	0.11767
Rhode Island	**0.00000**	**0.37948**	**2.10279**	**1.35071**
Kent	0.00000	0.00000	1.63680	3.12373
Newport	0.00000	0.00000	3.02497	0.00000
Providence	0.00000	0.62909	2.65409	1.47369
Texas	**0.00000**	**0.07578**	**0.01553**	**0.01675**
Cameron	0.00000	1.71380	0.00000	0.00000
Dallas	0.00000	0.00000	0.00000	0.08115
Howard	0.00000	10.84515	0.00000	0.00000
Tarrant	0.00000	0.00000	4.48959	2.33838
San Patrico	0.00000	0.41751	0.00000	0.00000
Utah	**0.00000**	**0.00000**	**0.00000**	**0.07635**
Salt Lake	0.00000	0.00000	0.00000	0.19593
Vermont	**0.00000**	**0.00000**	**0.00000**	**0.81929**
Chittenden	0.00000	0.00000	0.00000	2.33896
Franklin	0.00000	0.00000	0.00000	3.80321
Virginia	**0.00000**	**0.00000**	**0.04263**	**0.04816**
Charlottesville City	0.00000	0.00000	0.00000	4.49241
Roanoke City	0.00000	0.00000	2.73362	1.79423
Washington	**0.09977**	**0.00000**	**0.10839**	**0.08629**
King	5.71833	0.00000	0.00000	0.00000

County	*1969*	*1979*	*1989*	*1999*
Grays Harbor	0.00000	0.00000	0.17499	0.10091
Kittitas	0.00000	0.00000	0.00000	5.17049
Pierce	0.00000	0.00000	0.00000	0.24601
Snohomish	0.00000	0.00000	0.56646	0.00000
Wisconsin	**0.00000**	**0.15276**	**0.21568**	**0.41724**
Barron	0.00000	9.28040	0.00000	0.00000
Dane	0.00000	0.00000	1.43705	3.74290
Dodge	0.00000	0.00000	3.44518	1.99871
Douglas	0.00000	0.00000	0.00000	3.85807
Milwaukee	0.00000	0.37247	0.00000	0.00000
Oneida	0.00000	0.00000	8.32599	4.59557
Rock	0.00000	0.00000	0.00000	1.09849

VITA

Stephen M. O'Connell

Candidate for the Degree of

Master of Science

Thesis: AN ANALYSIS OF ICE HOCKEY PLAYER PRODUCTION AND TEAM LOCATION

Major Field: Geography

Biographical:

Personal Data: Born in San Francisco, California, On September, 20, 1976, the son of William and Patricia O'Connell.

Education: Graduated from R.H.A.M. High School, Hebron, Connecticut, in June 1994; received Bachelor of Arts degree in Geography from Mary Washington College, Fredericksburg, Virginia, in May 1998. Completed the requirements for the Master of Science degree with a major in Geography at Oklahoma State University, Stillwater, Oklahoma, in December, 2000.

Experience: Employed by Oklahoma State University, Department of Geography as a graduate teaching assistant, September 1998 to May 2000; employed by Oklahoma State University, Department of Geography as a graduate research assistant, January 2000 to present; employed by Oklahoma State University, Cartography Services, as a cartographic assistant, May 2000 to present.

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