



Growth Pressures on Sensitive Natural Areas

IN DNR'S CENTRAL REGION

A REPORT BY AMEREGIS AND THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES | 2006



AMEREGIS is a research and geographic information systems (GIS) firm which documents evolving development patterns in U.S. metropolitan regions, and the growing social and economic disparities within them. Founded by Myron Orfield, Ameregis is dedicated to integrating GIS mapping and traditional research methods to inform decision-making. With its partner, Metropolitan Area Research Corporation, Ameregis assists individuals and groups in fashioning local remedies that address these concerns.

MINNESOTA DEPARTMENT OF NATURAL RESOURCES (DNR) is a state agency with a tri-part mission to work with citizens to conserve and manage the state's natural resources, to provide outdoor recreation opportunities, and to provide commercial uses of natural resources. The agency's Conservation Agenda (2005) identifies ten top natural resource conservation priorities, including continued habitat loss, fragmentation, and degradation due to ongoing land use decisions that do not adequately integrate natural resources into planning, budgeting, and development.

Acknowledgments

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EXECUTIVE SUMMARY

This assessment of DNR's 17-county Central Region was conducted by Ameregis and the Minnesota Department of Natural Resources with a grant provided by the Bush Foundation. The purpose of the research and analysis was to place the region's remaining sensitive natural areas into the context of future regional growth and development so that more informed approaches to development and conservation are possible.



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The methods used in the assessment included preparation of two natural resource maps based on existing data; analysis of a variety of social and fiscal factors, using cities and townships as the units of analysis; application of cluster analysis to group similar communities together based on social, fiscal, and physical attributes; and creation of alternative regional growth scenarios to examine how projected growth could affect the region's remaining sensitive natural areas.

Historically, natural resources have been an important source of growth in Central Region's economy. Although today's economy relies much less on raw materials for growth, resource-related natural amenities make very significant contributions to the area's quality of life. Lakes, rivers, streams, wooded areas and the wildlife they support are magnets for residential development both in the metropolitan area and beyond. Undeveloped natural areas also fill many other important, and often free, functions, including water and air purification, flood and stormwater control, wildlife habitat, and outdoor recreation.

Fortunately, Central Region still retains a diversity of natural resource areas. GIS mapping suggests that about 40 percent of the region's total area remains in forests, grasslands, lakes, rivers, streams, and wetlands classified by this work as sensitive. Yet while Central Region still retains natural habitats, some with very high ecological integrity, only 14 percent of the region's sensitive natural areas is publicly protected. In the 11-county metropolitan area, for example, 12 percent of the sensitive area is classified as urbanized, and 16 percent is protected from development. This means that nearly three-fourths of the remaining sensitive natural areas in the metropolitan area are potentially threatened by development.

This threat is real. Of greatest concern are those sensitive, undeveloped, and unprotected natural habitats at the fringe of the 7-county core region and in the neighboring "collar" counties. During the 16 years between 1986 and 2002, the amount of land classified as urban in the 7-county core region grew significantly more quickly (one and one-half times) than did population and population growth is expected to continue. Nearly 900,000 more people (or 460,000 new households) are expected in the 7 core counties by 2030 and another 100,000 people are projected for the four collar counties.

The context for this growth is a highly fragmented metropolitan area with hundreds of municipalities exhibiting a wide range of fiscal and social characteristics. The suburbs, often portrayed as uniformly prosperous, are in fact a very diverse group of communities. Based on the community classification developed for this work, just under half of the metropolitan area's households live in places showing various signs of fiscal stress, while only a fifth live in places with robust tax bases and few social stresses. The remainder (or about a third of households) lives in relatively low-density, middle-class communities with modest fiscal resources.

According to current projections, it is in this last group of middle-class communities where the majority of new growth is likely to occur. These communities also contain the lion's share of the region's remaining sensitive natural areas. Home to just 33 percent of the 7-county area's households in 2003, these communities are projected to receive 67 percent of regional growth between 2003 and 2030 and they contain 85 percent of the sensitive areas in the region that remain undeveloped and unprotected. In addition, a number of these communities, especially those on the edges of the region, face the possibility of water supply constraints, due to the changing nature of the region's aquifers and the availability and predictability of potable water sources needed to meet new demands resulting from growth. Beyond the core region, water-bearing bedrock aquifers disappear and groundwater supply needed to meet new demands resulting from growth becomes less predictable and reliable.

Pressures on sensitive natural areas in the non-metropolitan counties differ, but are directly related to growth and demographic changes in the metropolitan area. Continued income growth coupled with the onslaught of the baby boomer generation is expected to continue to drive demand for retirement homes near natural amenities.

Not surprisingly, many growing communities in DNR's Central Region will face hard choices between accepting development and conserving sensitive natural areas. If projected future growth in the region occurs at housing densities like those in the recent past, then a significant portion of remaining sensitive natural areas will be at risk. Protecting sensitive natural areas is costly. Much of the cost is borne locally in the form of lost tax base. The benefits of protection, on the other hand, are spread much more widely across the broader region and the state.

From the point of view of a single community in the process of making local land-use planning decisions, the benefits of conserving sensitive natural areas will, therefore, rarely exceed the potential fiscal benefits of development. Because the benefits of conservation are shared on a regional scale, so the costs must also be shared.

To ensure conservation for the future in such a diverse region will require a concerted effort to:

- *Plan collaboratively across jurisdictions and disciplines for natural resource conservation;*
- *Share in the costs of conservation by expanding existing programs such as the Fiscal Disparities Program or by augmenting and pooling relevant funding streams to strategically protect sensitive resource areas;*
- *Encourage and provide incentives for municipalities to plan for development in ways that consume as little undeveloped sensitive land as possible; and*
- *Support research and monitoring to update and extend knowledge on the interaction between sensitive natural resources and development.*

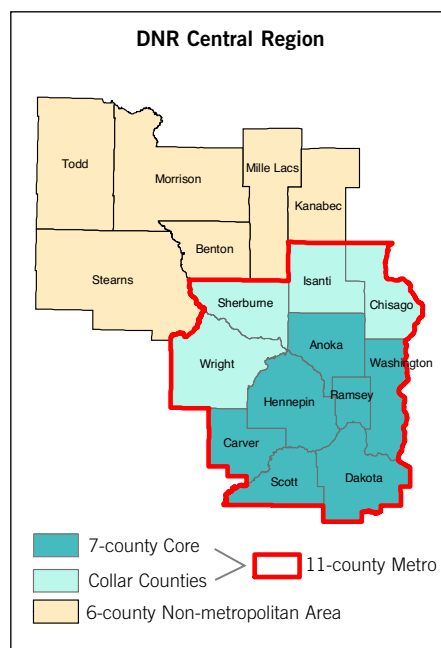


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INTRODUCTION

The purpose of this research was to determine through GIS mapping where sensitive natural areas still remained in the Minnesota Department of Natural Resources (DNR) Central Region and to assess how expected growth patterns in the region might affect these areas. Specifically, the intent was to identify areas where natural resources might be most at risk from projected growth and development in order to assist local, regional and state decision-makers in understanding the impending tradeoffs between regional growth and natural resource conservation.

DNR's Central Region contains a variety of different types of communities, with very different sorts of pressures on sensitive natural areas. To better understand some of these differences, the region was broken down into smaller areas for independent analysis. Five “regions” are discussed in this report: (1) the full 17-county DNR Central Region; (2) the 11-county Twin Cities metropolitan area; (3) the 7-county core of the metropolitan area; (4) the four “collar” counties adjacent to the 7-county core; and (5) the 6-county non-metropolitan area.



GROWTH PATTERNS IN DNR'S 17-COUNTY CENTRAL REGION

The 17-county study area is home to 3.2 million people, nearly two-thirds of the state's population, and contains the state's primary growth engine: the Twin Cities metropolitan area economy. The 11-county metropolitan area is projected to grow significantly by 2030, with the seven core metropolitan counties continuing to receive the majority of the state's new residents and jobs.

Like most metropolitan areas in the U.S., the Twin Cities metropolitan area has seen significant decentralization of population and jobs during recent decades. This pattern has not been as pronounced as in many large metropolitan areas due at least, in part, to the existence of relatively strong (compared to other metropolitan areas) regional institutions like the Metropolitan Council and the Twin Cities Fiscal Disparities Program. ¹

However, the region has been growing more rapidly than any other metropolitan area in the upper Midwest and current projections show the metropolitan area adding more than one million people in the first three decades of the 21st century.

The non-metropolitan portion of the 17-county region has grown much less rapidly than the Twin Cities metropolitan area. Like rural areas across the country, many parts of the 6-county non-metropolitan region have endured significant population declines.

The attraction of natural amenities, however, has drawn retirement and resort-driven growth to the 6-county non-metropolitan area, putting increasing pressures on sensitive natural areas. Continued income growth in the metropolitan area, and the increasing share of the retirement-aged population, will likely fuel continuing demand for land and housing in the non-metropolitan part of Central Region.

Population Growth

The 7-county metropolitan core: The metropolitan area's core is the most densely settled area in the state. In 1990, 86 percent of the population of the 17-county study area lived in the core counties and 78 percent of the growth in the 1990's occurred in this area.

While both of the core cities of Minneapolis and Saint Paul gained population overall between 1990 and 2000, the two cities grew at a substantially slower rate than the 7-county region as a whole—3.9 percent for Minneapolis and 5.4 percent for Saint Paul, compared with a 7-county growth rate of 15.4 percent.

The region's inner-ring suburbs also saw either very modest growth or decline. Growth was strongest in outer ring suburban communities, such as Woodbury and Lakeville, extending to the outer edges of the 7-county core area (Map 1).

More recent population estimates show strong, continuing growth at the perimeter of the 7-county area. According to estimates by the Metropolitan Council, the 7-county region grew by 30,045 people between 2003 and 2004 and almost all of this growth occurred in developing suburbs (25,241 new residents) and exurban areas (4,747 new residents).² Between 2000 and 2004, the 10 cities adding the most population were all middle-ring and outer suburbs—Shakopee, Maple Grove, Blaine, Lakeville, Eden Prairie, Prior Lake, Plymouth, Farmington, Chaska and Woodbury. These 10 cities alone added a total of 54,303 new residents over the four-year time period.

Growth patterns can be seen very clearly in Maps 2 and 3, which show housing subdivisions built between 1998 and 2005 in the 11-county metropolitan area. Map 2 shows the location and size of individual developments and Map 3 sums the numbers of new housing units to the municipal level.

Collar and non-metropolitan counties: All of the metropolitan collar counties—Chisago, Isanti, Sherburne and Wright—grew very quickly during the 1990's. Although not as densely settled as the 7-county metropolitan core, these counties continue to grow. In 1990, the collar counties were home to just six percent of the population in the 11-county metropolitan area; during the 1990's they captured 15 percent of the entire region's growth. Most of Sherburne County, for instance, grew by more than three percent per year during the 10-year period.

Moving beyond the metropolitan area into the non-metropolitan area, rapid growth occurred in northern Mille Lacs County and northwestern Kanabec County. Mille Lacs County was unique in the study area in that all census tracts in that county experienced positive population growth in the 1990's.

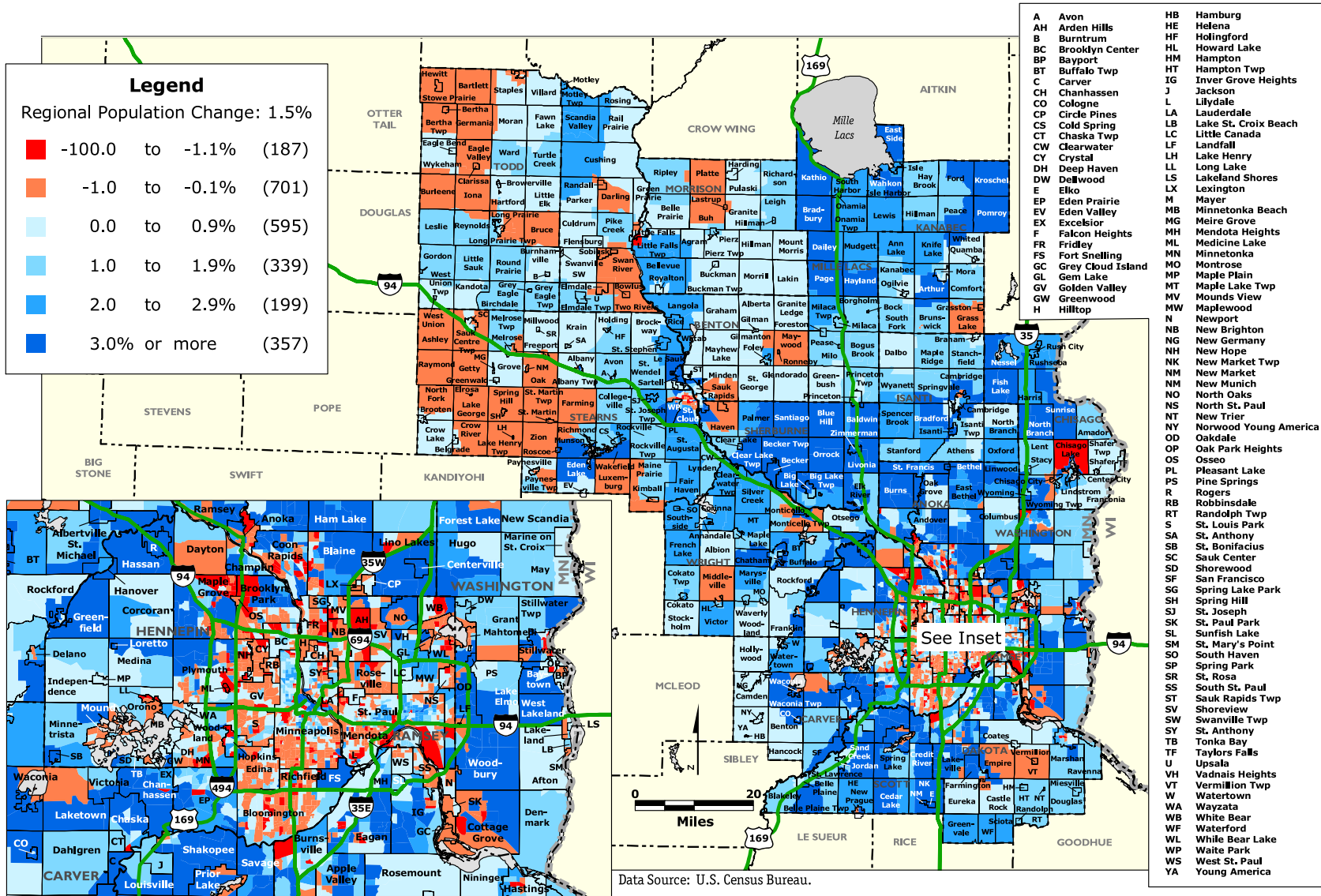
Much of the rest of the 6-county non-metropolitan region experienced population losses, especially large portions of Todd, Morrison and Stearns counties. However, just northwest of the metropolitan area, St. Cloud acted as a locus of growth, with immediately adjacent tracts in Benton, Sherburne and Stearns counties showing relatively strong growth (Map 1).



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POPULATION GROWTH

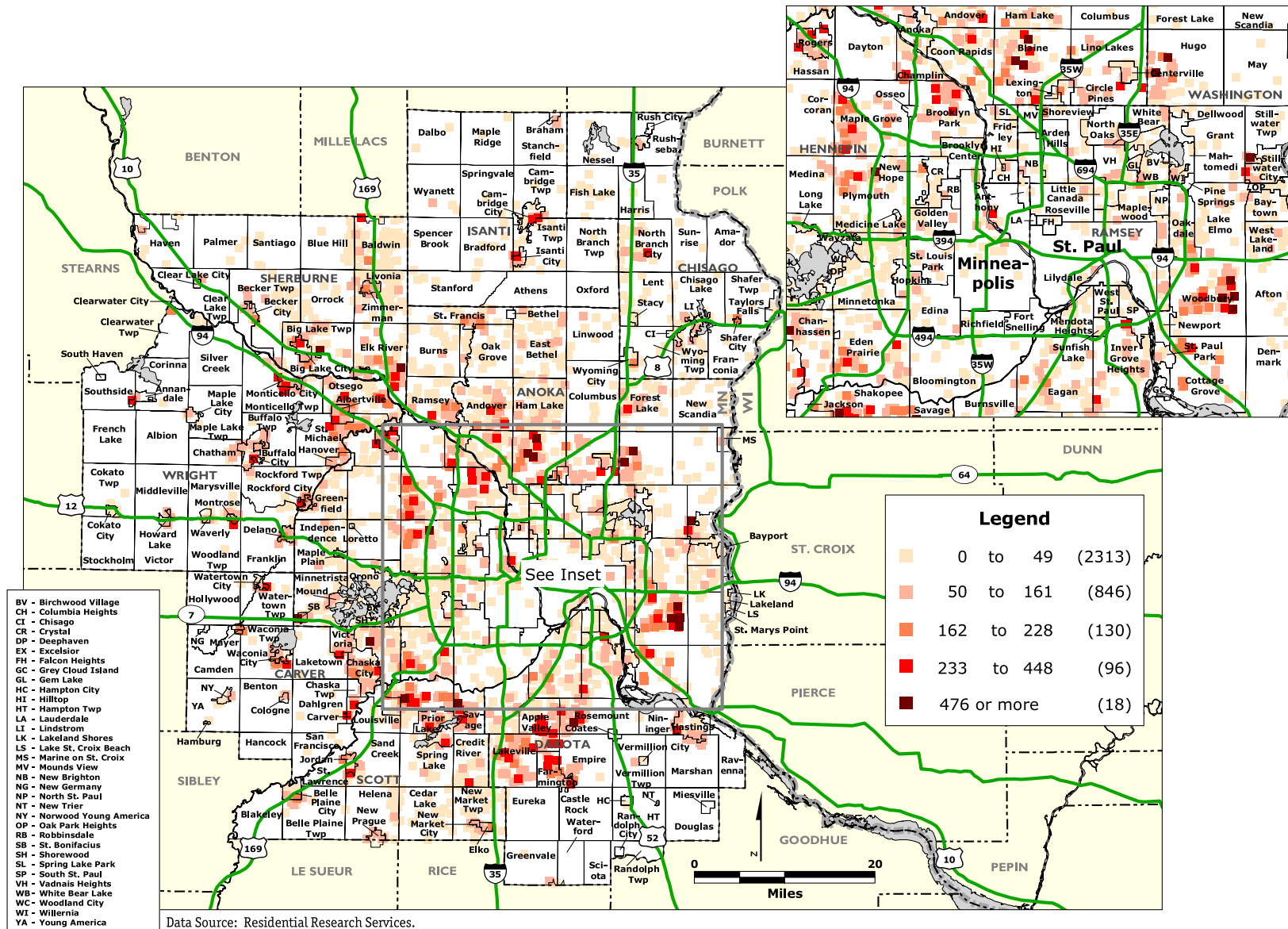
MAP 1. MINNESOTA DNR CENTRAL REGION: PERCENTAGE CHANGE PER YEAR IN POPULATION BY BLOCK GROUP, 1990 – 2000



Changes in population help to identify the communities that are burdened with the costs of rapid growth, and those that are struggling with the costs of decline. Minneapolis and St. Paul gained population overall between 1990 and 2000, but grew at a substantially slower rate than the metropolitan area as a whole. Throughout the region, growth was strongest in the metropolitan area's middle and outer suburbs, along Highway 169 from the core region north to Mille Lacs, and northwest along I-94 between the core and St. Cloud.

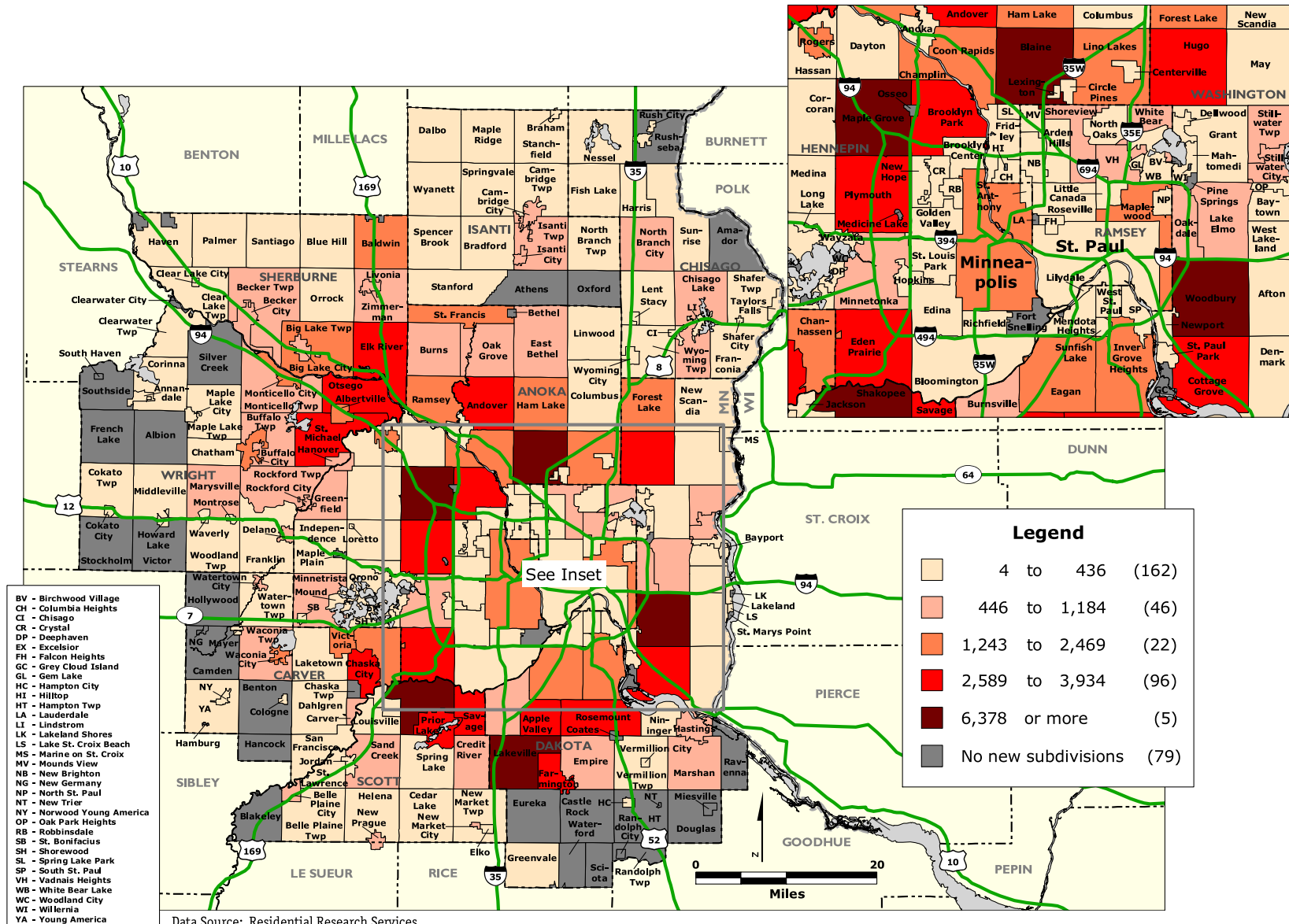
NEW SUBDIVISIONS

MAP 2. TWIN CITIES 11-COUNTY METROPOLITAN AREA: TOTAL NUMBER OF LOTS BY NEW SUBDIVISIONS, 1998-2005



Recent growth patterns show continuing strong growth at the perimeter of the 7-county metropolitan area and into the adjacent collar counties. The Metropolitan Council estimated that in 2003 and 2004 the 7-county metropolitan area gained about 30,000 people and nearly all of the growth occurred in developing suburbs. These patterns are shown clearly in the location and size of individual developments in new housing subdivisions.

MAP 3. TWIN CITIES 11-COUNTY METROPOLITAN AREA: TOTAL NUMBER OF LOTS IN NEW SUBDIVISIONS BY MUNICIPALITY, 1998–2005



Between 2000 and 2004, the 10 cities adding the most population were all middle-ring and outer suburbs—Shakopee, Maple Grove, Blaine, Lakeville, Eden Prairie, Prior Lake, Plymouth, Farmington, Chaska and Woodbury. These 10 cities alone added a total of 54,303 residents during these four years. Again, this pattern appears clearly when looking at total number of lots in new subdivisions at the municipality level.

Urbanization

While the spatial pattern of population growth is an important way to track growth, it does not capture all of what is important in growth patterns. Remote sensing from satellite imagery and aerial photography provide a means for visualizing the direct effect of growth and development on the landscape.

Map 4 shows one major aspect of land use change—urbanization—in the 7-county core region over the period 1986 to 2002.³ Urbanization in this report is defined as land which is in the following uses—residential, commercial, industrial, transportation or communications. Based on satellite imagery analyzed by the Department of Forestry, University of Minnesota, the map shows how growth in population and employment consumed previously undeveloped land during the period.⁴

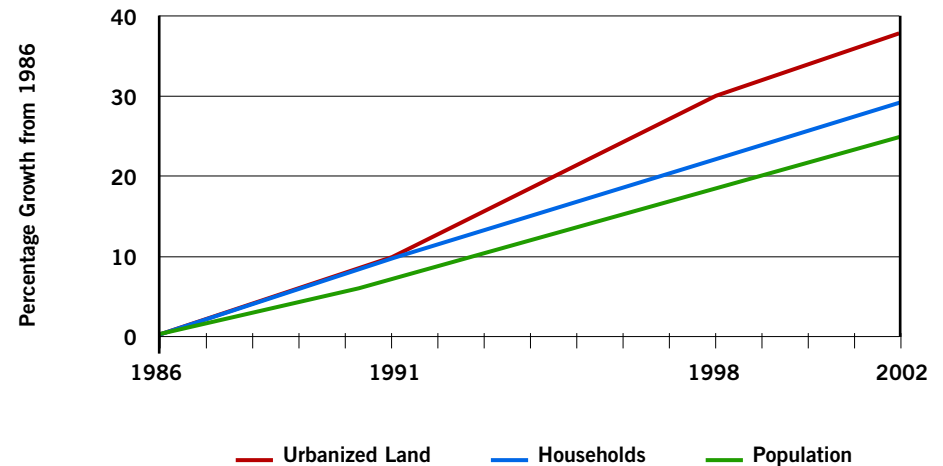
Very rapid urbanization occurred in areas immediately adjacent to previously urbanized areas (in inner and middle suburbs) as well as in locations along major roads and highways. The data show a pattern seen in most American metropolitan areas—as it has grown, the metropolitan area has become less dense, consuming (or urbanizing) land at a rate greater than population has grown.

BETWEEN 1986 AND 2002, THE GROWTH RATE IN URBANIZED LAND WAS 53 PERCENT GREATER THAN THE POPULATION GROWTH RATE.

This is true even in the most densely-settled parts of the region. Between 1986 and 2002, the amount of urbanized land in the seven-county metropolitan core grew from 450,000 to 625,000 acres, or by 38 percent. During the same period, population grew by just 29 percent—the growth rate in urbanized land was 53 percent greater than the population growth rate (Figure 1).

Current population projections show the 7-county region growing by 33 percent between 2003 and 2030. If this growth urbanizes land at the same rate as the recent past then the amount of urbanized land in the 7-county region will grow by another 50 percent during that period, consuming hundreds of thousands of acres of previously undeveloped land.

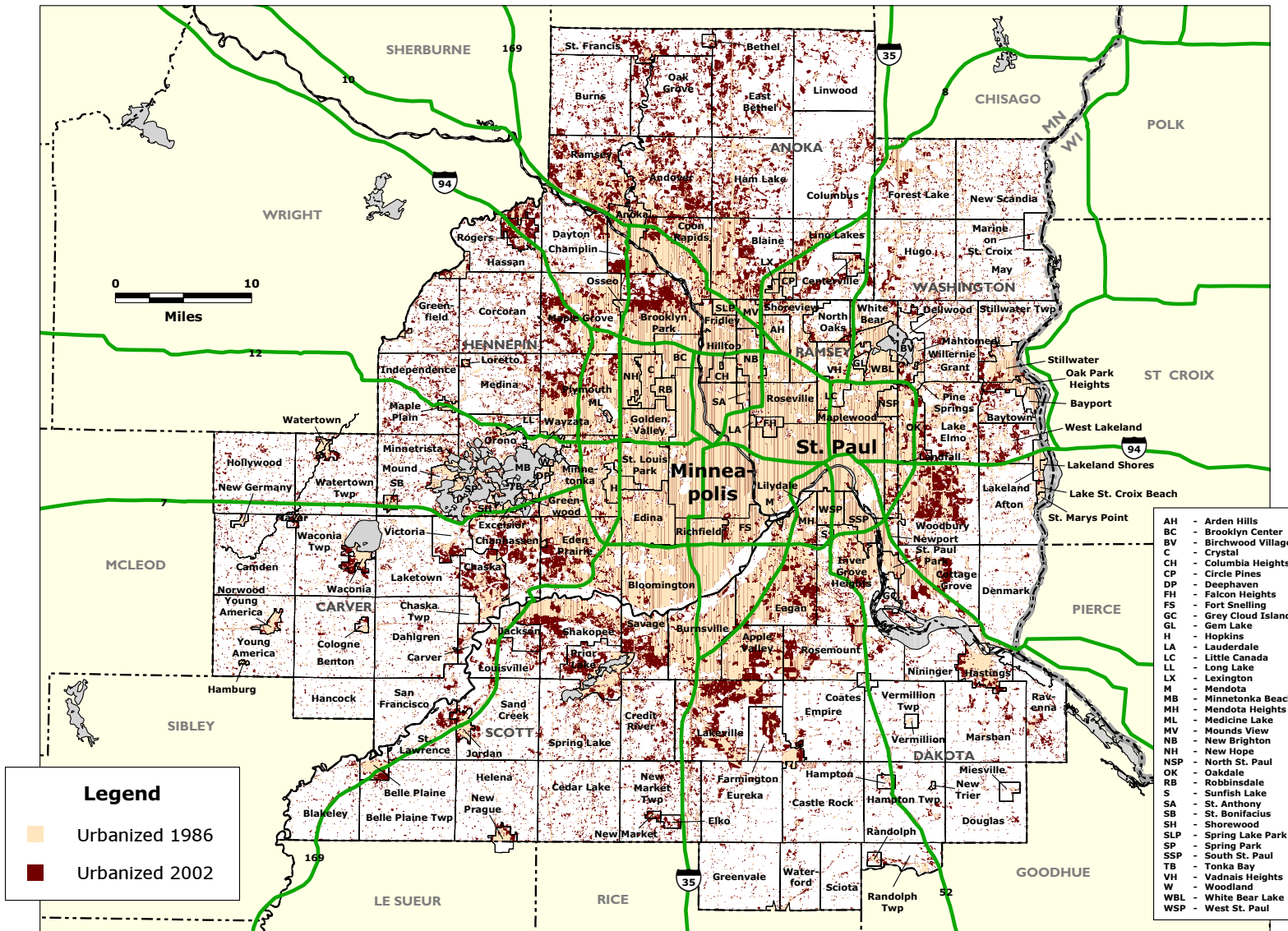
**Figure 1: Growth in Urbanized Land, Population, and Households
7-county Core Area: 1986-2002**



Sources: Remote Sensing and Geospatial Analysis Laboratory, University of Minnesota, U.S. Census Bureau.

URBANIZATION

MAP 4. 7-COUNTY CORE AREA: URBANIZED LAND, 1986 AND 2002



Data Source: Remote Sensing and Geospatial Analysis Laboratory University of Minnesota.

Urbanized land in the 7-county metro area grew by 53 percent more than population between 1986 and 2002. Urbanization—land used for residential, commercial, industrial, transportation or communication purposes – shows how population and employment growth consumed previously undeveloped land from 1986 to 2002 in the 7-county area. Very rapid urbanization occurred in areas immediately adjacent to already urbanized areas as well as along major roads and highways. There has also been a great deal of scattered, non-contiguous development in the outer areas of the 7-county region.

Jobs

Historically, jobs have tended to follow people to the suburbs. As areas became suburbanized, firms followed to be nearer their workforces and customers. In addition, many of the same factors that draw households to the suburbs directly affect businesses as well—such as cheaper land and improving access as a result of substantial transportation investments like roads and highways.

However, not only do jobs follow people, but people follow jobs. The spread of significant numbers of jobs to middle and outer suburbs enables many workers to live further and further from the core of the region while still remaining within reasonable commutes from their jobs. In addition, for a select group of workers, technological advances in communications, such as the internet and wireless communications, have made telecommuting possible.

All of these factors have made living at the edges of the metropolitan area much more practical. In many cases these are areas that still retain natural habitats with significant ecological value and little of the physical infrastructure (such as sewers and waste water treatment facilities) needed to support low-impact development.

A trend toward decentralization is clearly evident in the job and job change data for the 17-county region. Like population, jobs still tend to cluster in the core of the metropolitan area and in a few towns in the non-metropolitan portion of the study area, most notably St. Cloud (Map 5).

Job growth in the 7-county metropolitan area, however, has been significantly greater in middle and outer suburbs (Map 6). Growth was negative or below the regional average in the core of the metropolitan area, including both central cities of Minneapolis and Saint Paul and most of the older, inner-ring suburbs. High percentage gains in jobs between 1993 and 2003 were concentrated in growing suburban communities just inside or at the boundaries of the 7-county metropolitan area where much of the urbanization in recent years occurred.

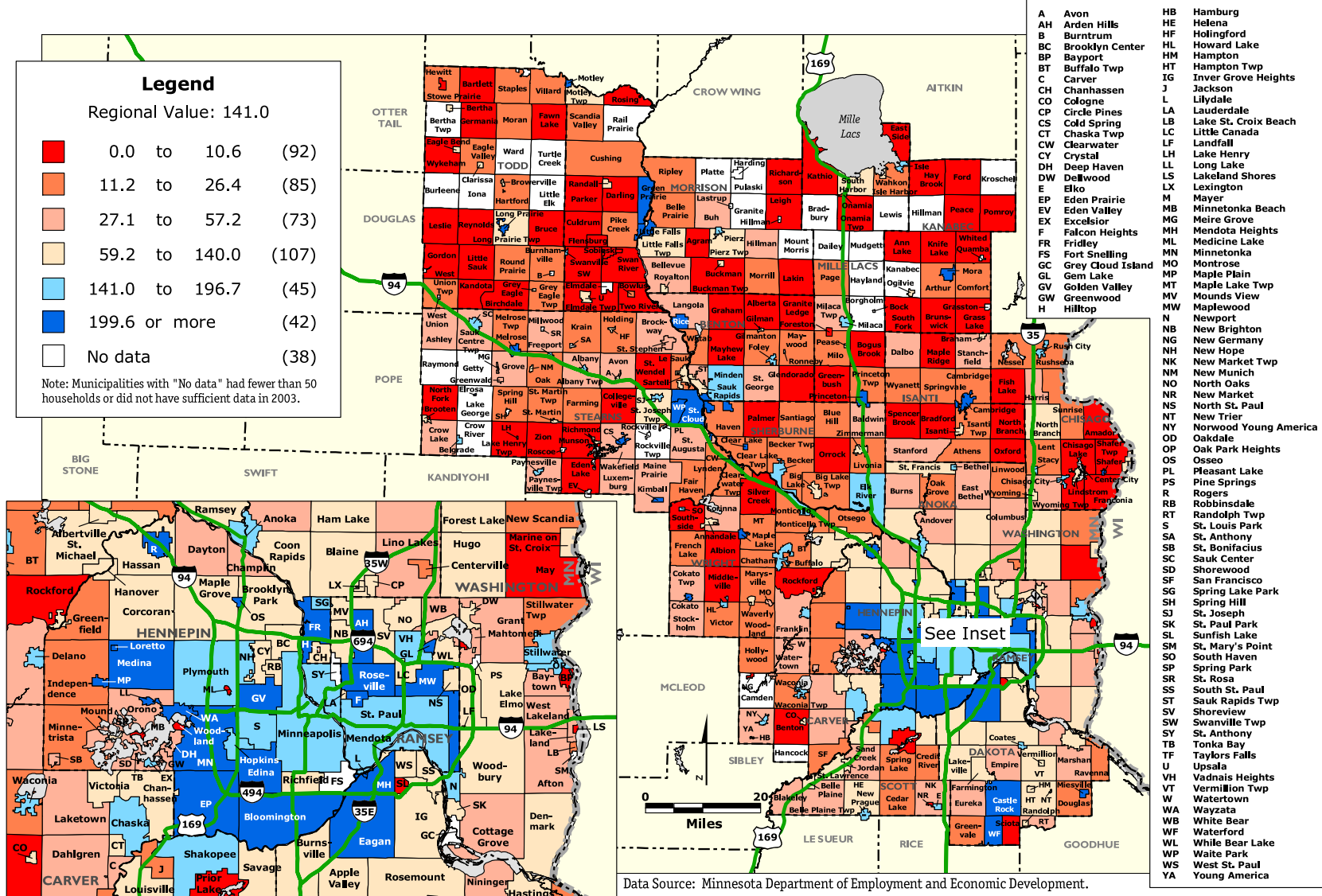
Beyond the 7-county metropolitan area, job densities tend to be much lower. Many of these largely rural areas show significant job growth but it is from such small numbers that it represents relatively few jobs in absolute numbers. Between 1993 and 2003, 90 percent of the job growth in the 17-county area occurred in the 11-county metropolitan area and most of that was in the core seven counties.

The jobs data reinforce the conclusions from prior sections. The metropolitan area is the primary locus of growth in the 17-county region and the fastest growing areas are in its middle and outer suburbs, especially on the outskirts of the 7-county core region.



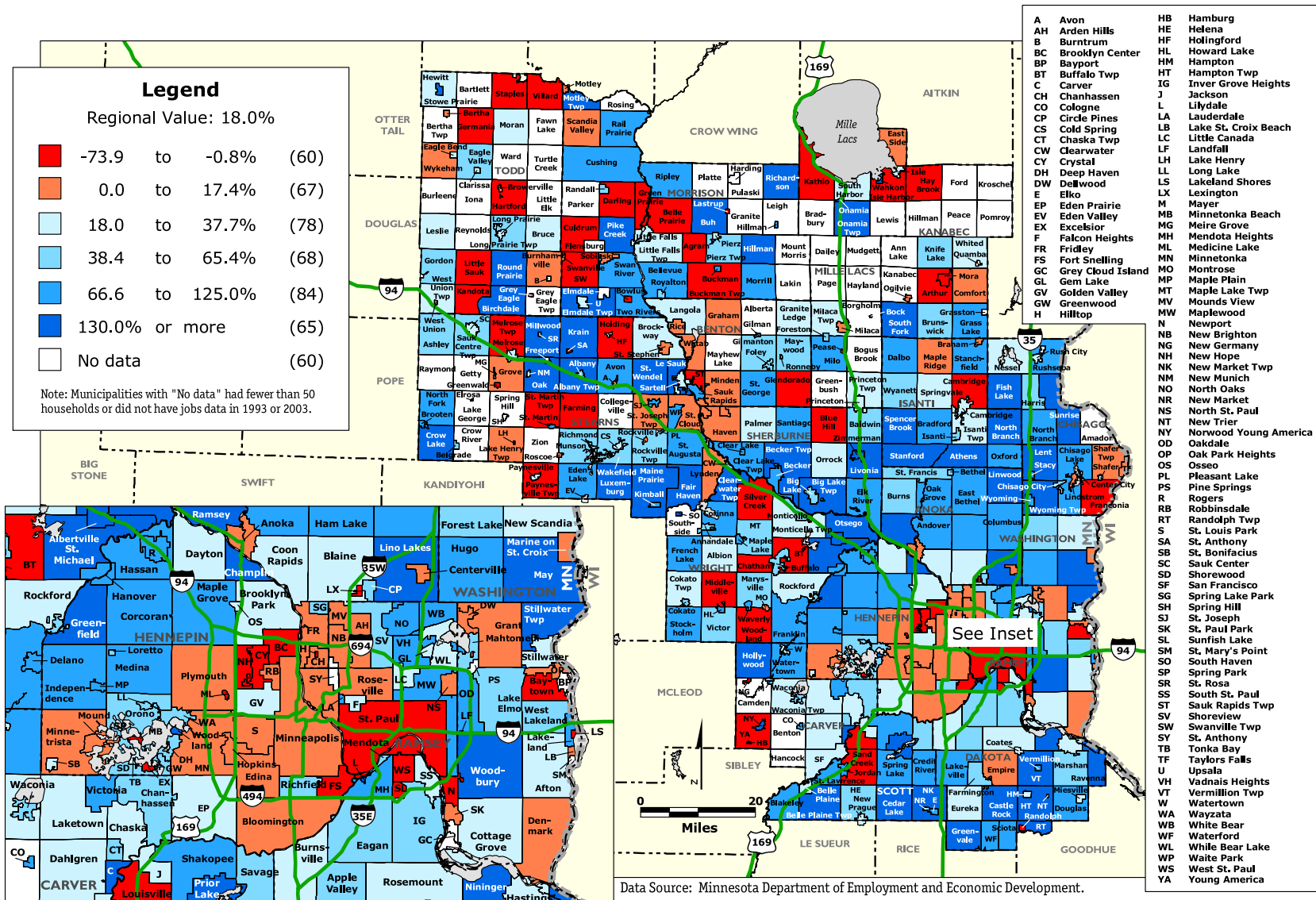
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MAP 5. MINNESOTA DNR CENTRAL REGION: JOBS PER 100 HOUSEHOLDS BY MUNICIPALITY, 2003



The metropolitan area's largest job centers are in the core of the region and provide above the regional average of 141 jobs per 100 households. However, inner and middle suburbs, especially along I-494 in the south and west, are now commuting centers as well. Several suburbs, including Edina, Bloomington, Eden Prairie, Minnetonka and Golden Valley actually have more jobs per resident household than the central cities. The spread of jobs to the suburbs allows workers to live further away from the regional core while still maintaining a reasonable commute to their jobs. In the non-metropolitan portion of the Central Region, jobs still tend to cluster in traditional job centers like St. Cloud, Sauk Centre, Long Prairie and Milaca.

MAP 6. MINNESOTA DNR CENTRAL REGION: PERCENTAGE CHANGE IN JOBS BY MUNICIPALITY, 1993-2003



Job growth has been significantly greater in the middle and outer suburbs of the 11-county metropolitan area than in the 7-county core. Job growth in Minneapolis and St. Paul, as well as in the older inner-ring suburbs, was negative or below the regional average. Outside the core metropolitan area, many areas show significant job growth, but it is from small bases and represents relatively few jobs in absolute numbers.

The Increasing Reach of the Twin Cities Metropolitan Area

The prior sections show very clearly the importance of the 11-county metropolitan area in any discussion of growth pressures in central Minnesota. The metropolitan economy is the strongest growth engine in the larger region. Given that the dominant trends in the metropolitan economy involve the decentralization of jobs and people, this suggests that the influence of the core metropolitan area is spreading further out into the region.

The places where this can be seen most clearly are in the four collar counties of Chisago, Isanti, Sherburne and Wright that are adjacent to the core region. These counties, which were not added to the Census-designated “metropolitan area” in the 1970’s and 1980’s, are the fastest growing counties outside of the 7-county core and this growth is clearly being driven by the metropolitan economy.

Table 1 shows one measure—increases in the number of workers commuting from residences in the collar counties to jobs in the 7-county core—of how much more connected to the core metropolitan area the collar counties have become. The total number of workers residing in these four counties almost quadrupled between 1970 and 2000, from about 31,500 to 118,225. However, during the same time period, the number of workers living in the collar counties and working in the core seven counties increased by *more than six times*, from just 8,900 to more than 56,000. By 2000, 48 percent of the workers living in these counties commuted to jobs in the 7-county core, compared to just 28 percent in 1970.

How did this kind of change occur? Transportation improvements made a significant contribution, but another important factor was the growth of jobs in the middle and outer sections of the core seven counties. Map 6 shows this job growth in one way. Another way to see this expanding reach is by examining commuting data into job centers in Twin Cities suburbs.

Map 7 shows the distribution of job centers, which were derived using data describing commuting patterns in the metropolitan area in 1990 and 2000.⁵ Job centers were defined as areas with jobs per square mile higher than the regional average and with more than 2,500 jobs in 2000. Large clusters like those in the centers of Minneapolis and St. Paul were divided into more than one center by examining the job densities and the types of jobs.

The data indicate that there are 40 significant job clusters located near major transportation arteries within the core region. This group of job centers has remained fairly stable for a number of years. The same job clusters result if the analysis is performed on 1990 data.

Table 2 shows job and job growth data for the job centers grouped by their locations in the metropolitan core area. The groups include the central business districts, other job centers within the two central cities, inner suburban job centers, middle suburban job centers, and outer suburban job centers.⁶ Also shown are the totals for all non-clustered jobs, or jobs not in a job center.

Table 1: Integration of the Collar Counties into the Twin Cities Metropolitan Area, 1970 — 2000

County	Total Resident Workers			Resident Workers Commuting to the Core 7 Counties			Percentage of Resident Workers Commuting to the Core 7 Counties		Percentage of Resident Workers Commuting in County of Residence	
	1970	2000	% Change	1970	2000	% Change	1970	2000	1970	2000
Chisago	5,935	20,772	250	1,732	11,754	579	29	57	42	34
Isanti	5,597	16,085	187	1,611	7,319	354	29	46	56	40
Sherburne	6,037	34,084	465	1,643	14,265	768	27	42	38	32
Wright	13,921	47,284	240	3,945	22,960	482	28	49	63	43
Total	31,490	118,225	275	8,931	56,298	530	28	48	53	38

Source: U.S. Bureau of the Census.

The job center data show a pattern consistent with the decentralization evident in prior sections. Large numbers of job centers and jobs are now in the suburbs, including the vast majority of the non-clustered jobs. Job growth rates increase, on average, with distance from the core. In addition, the number of jobs not in job clusters increased much more rapidly than those in job centers—so not only are jobs decentralizing but they are also becoming less concentrated.

The rapid growth in job centers on the fringes of the 7-county metropolitan area and in non-clustered jobs opens up opportunities for individuals to live in parts of the region well beyond the current urbanized area. While it might not be practical for someone living in western Wright County to commute to the Minneapolis central business district, it might be very practical for that same person to commute to Maple Grove. Growth of job centers at the fringes of the core region allows individuals previously residing within the urbanized area to take advantage of cheaper land and housing outside of the metropolitan core without giving up employment opportunities.

Commuting data for 1990 and 2000 show how accessible residences on the fringes have become. Maps 8 and 9 show a representative suburban job center—the Fridley/Coon Rapids center—and various commute times to that job center in 1990 and 2000 (i.e., 0-20 minutes, 20-30 minutes, and 30-40 minutes). These commuter-sheds were derived using data about where commuters to the job center live and how long their commutes take.⁷ The Fridley/Coon Rapids job center had 14,500 jobs in 1990 and grew by 45 percent, to 21,000 jobs in 2000.

Map 8 shows that, in 1990, workers in this job center could live relatively far out at the edges of the metropolitan area and still have reasonable commuting times to their jobs. At that time, much of Isanti and Sherburne counties, and significant parts of Chisago and Wright counties, were within a 40 minute commute of the Fridley/Coon Rapids job center.

However, rapid population and job growth in this part of the region during the 1990's led to increasing traffic congestion, making these commutes more and more difficult. By 2000, although the commuter-shed still reached into Chisago, Isanti and Sherburne counties, the area within a 40 minute drive of the job center had shrunk considerably (Map 9).

Increasing congestion in the periphery of the region could have different effects. On one hand, slower commutes make the farthest locations less desirable to potential residents/commuters. On the other hand, firms locating or relocating to this part of the region have incentives to move even further away from the core to remain within a “reasonable” distance of the area’s growing number of workers and customers.

Overall, it is clear that the collar counties are rapidly transforming from largely self-contained rural environments to more suburban communities with strong links to the metropolitan economy. As long as that economy continues to grow, this part of the region can expect to see growing demand drive development of currently undeveloped land, including sensitive natural areas.

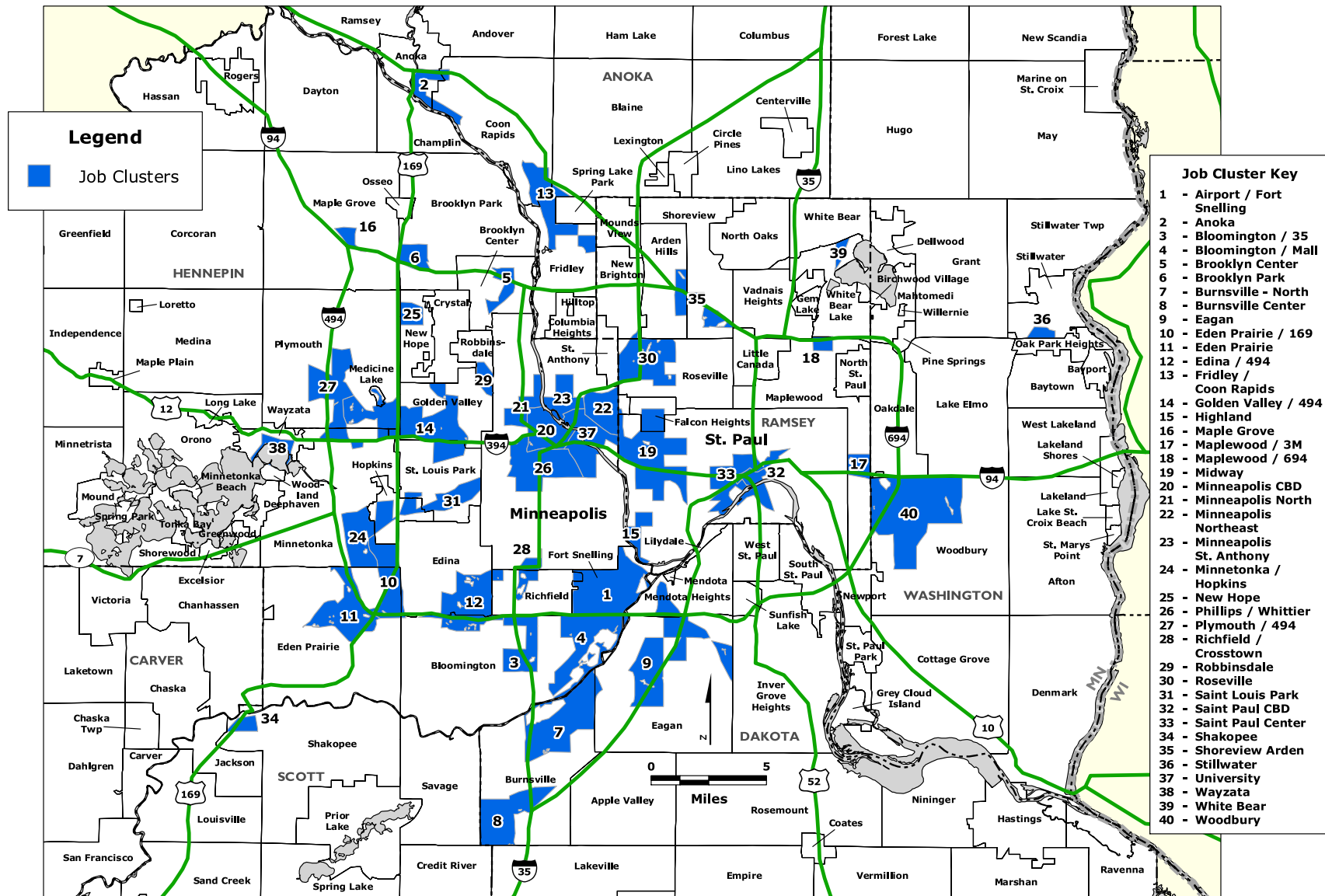
Table 2: Job Growth by Type of Employment Center Percentage

Job Center Type	Number	Total Jobs		% Growth 1990-2000	Jobs per Sq. Mile	Percentage of Regional Jobs	
		1990	2000			1990	2000
Central Business District	2	168,673	179,070	6	58,847	13	11
Other Central City	8	197,409	206,060	4	7,497	15	13
Inner Suburb	10	163,622	194,565	19	6,596	12	12
Middle Suburb	13	176,100	214,275	22	4,626	13	13
Outer Suburb	7	37,419	51,105	37	2,452	3	3
Total – Employment Ctrs.	40	743,223	845,075	14	7,958	55	52
Non-clustered Employment		596,045	783,405	31		45	48
Total – Metropolitan Area		1,339,268	1,628,480	22		100	100

Central Business Districts: Minneapolis CBD and St. Paul CBD
Other Central City: Highland, Minneapolis - North, Minneapolis - Northeast, Minneapolis - Phillips/Whittier, Minneapolis - University of MN, St. Anthony, St. Paul - Midway, St. Paul Center
Inner Suburb Job Centers: Airport/Fort Snelling, Brooklyn Center, Edina, Golden Valley - I-394, Maplewood - 3M, Maplewood - I-694, Richfield-Crosstown, Robbinsdale, Roseville, St. Louis Park
Middle Suburb Job Centers: Bloomington, I-35W, Bloomington - Mall of America, Brooklyn Park, Eagan, Eden Prairie - Hwy 169, Eden Prairie Center, Fridley/Coon Rapids, Minnetonka/Hopkins, New Hope, Plymouth - I-494, Shoreview/Arden Hills, White Bear Lake, Woodbury
Outer Suburb Job Centers: Anoka, Burnsville-Hwy 13, Burnsville Center, Maple Grove, Shakopee, Stillwater-Hwy 36, Wayzata

Source: U.S. Census Transportation Planning Package

MAP 7. TWIN CITIES 11-COUNTY METROPOLITAN AREA: JOB CLUSTERS, 2000



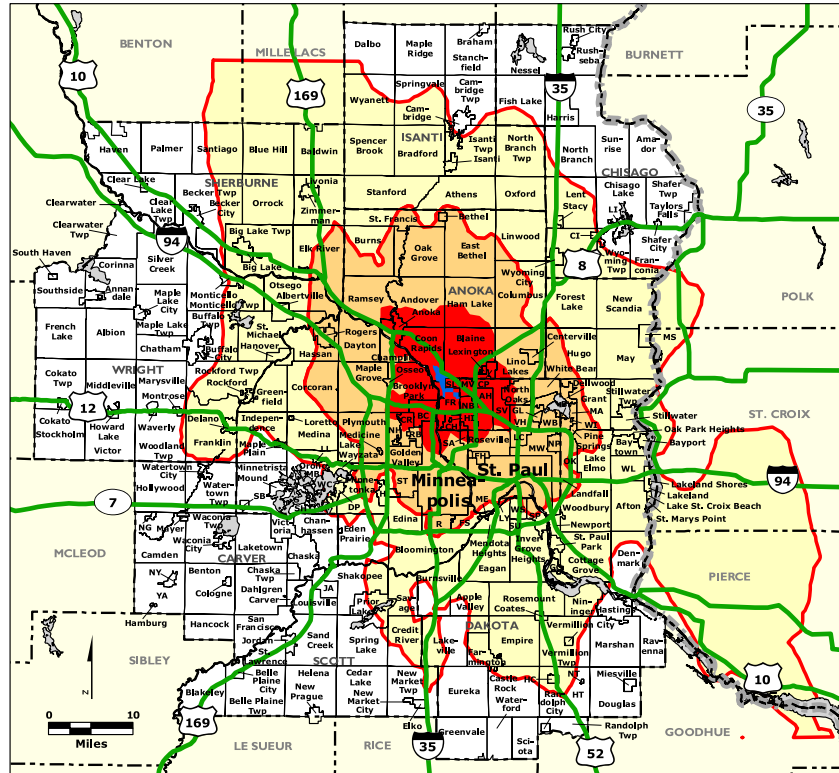
Data Source: U.S. Census Transportation Planning Package.

Job centers are defined as areas with job densities greater than the regional average and more than 2,500 jobs in 2000. The job centers are scattered across the seven-county core of the metropolitan area near major transportation arteries. The data show a pattern consistent with the overall decentralization of the region – large numbers of job centers are now in the suburbs.

COMMUTE TIMES

MAPS 8 AND 9. TWIN CITIES 11-COUNTY METROPOLITAN AREA: COMMUTER-SHED FOR FRIDLEY JOB CLUSTER

1990

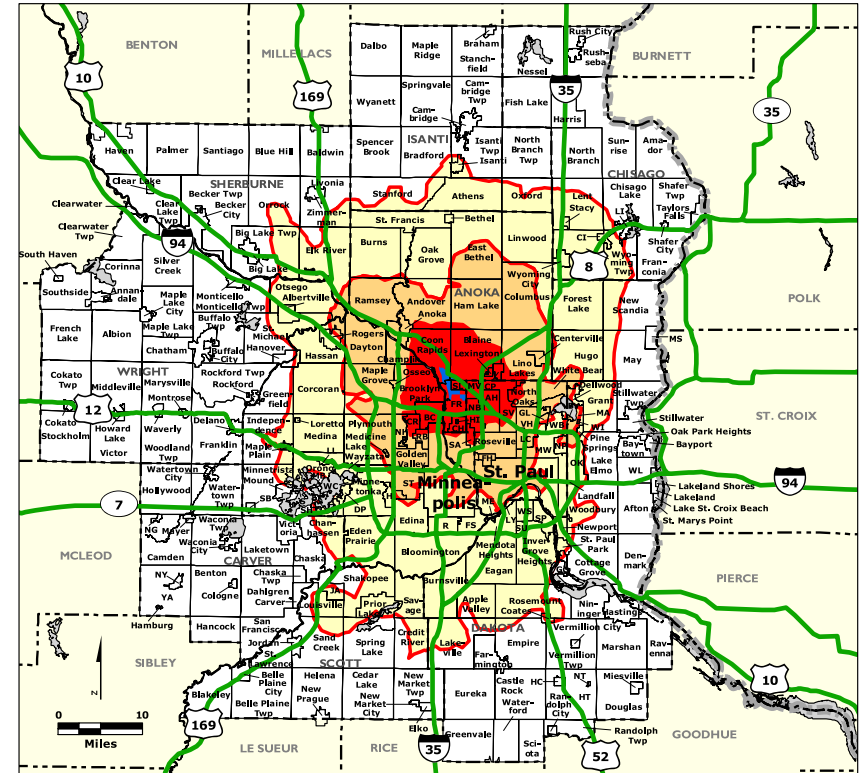


Data Source: U.S. Census Transportation Planning Package.

AH - Arden Hills	LI - Lindstrom	SH - Shorewood
BC - Brooklyn Center	LL - Long Lake	SL - Spring Lake Park
BV - Birchwood Village	MA - Mahtomedi	SP - South St. Paul
CH - Columbia Heights	MB - Minnetonka Beach	ST - St. Louis Park
CI - Chicago	ME - Mendota	SU - Sunfish Lake
CP - Circle Pines	MS - Marine on St. Croix	SV - Shoreview
CR - Crystal	MV - Mounds View	VH - Vadnais Heights
DP - Deephaven	MW - Maplewood	WB - White Bear Lake
EX - Excelsior	NB - New Brighton	WC - Woodland City
FH - Falcon Heights	NG - New Germany	WI - Willernia
FR - Fridley	NH - New Hope	WL - West Lakeland
FS - Fort Snelling	NP - North St. Paul	WS - West St. Paul
GC - Grey Cloud Island	NT - New Trier	YA - Young America
GL - Gem Lake	NY - Norwood Young America	
H - Hopkins	OK - Oakdale	
HC - Hampton City	R - Richfield	
HI - Hilltop	RB - Robbinsdale	
HT - Hampton Twp	S - Spring Park	
JA - Jackson	SA - St. Anthony	
LA - Lauderdale	SB - St. Bonifacius	
LC - Little Canada		



2000



Growth of job centers in the suburbs allows individuals previously residing within the urbanized area to take advantage of cheaper land and housing outside of the metropolitan core without giving up employment opportunities. In 1990, workers in the Fridley-Coon Rapids job center could live relatively far out and still have a reasonable commute. However, rapid population and job growth in this part of the region led to increasing traffic congestion, making these commutes more and more difficult.

Growth in the 6-County Non-metropolitan Area

The power of the metropolitan economy and job decentralization have driven population shifts in much of DNR's Central Region, but other factors have also been at work, particularly outside the metropolitan area. The 6-county non-metropolitan part of the study area is beyond the reach of the metropolitan labor market for the most part. Although growth was very modest, on average, in this part of the region, there were pockets of significant growth during the 1990's.

The highest growth rates occurred in the Highway 169 corridor through Mille Lacs County, across much of Kanabec County and in parts of Todd County (Map 1). The most likely impetus for past growth in these areas was natural amenities. Comparing the distributions of seasonal housing (a proxy for amenity-driven resort or cabin development) and population growth illustrates this relationship.

In 2000, there were two major clusters of seasonal housing in the 6-county region: from southern Todd County stretching northeast to the Camp Ripley area in Morrison County; and in northern Kanabec and Mille Lacs counties and northeastern Morrison County around the southern end of Lake Mille Lac (Map 10). The areas showing the strongest population growth during the 1990's (Map 1) are nearly identical.

Demand for year-round housing from increasing numbers of retirees moving to the area also contributes to growth in the 6-county non-metropolitan part of Central Region. Throughout Minnesota, seasonal properties are commonly converted to year round residences by retiring owners. Where this process has just begun, you would expect to see high, but declining seasonal housing rates. High initial seasonal housing rates reflect the resort and cabin economy and declining rates reflect new year-round housing and conversions from seasonal to year-round housing.

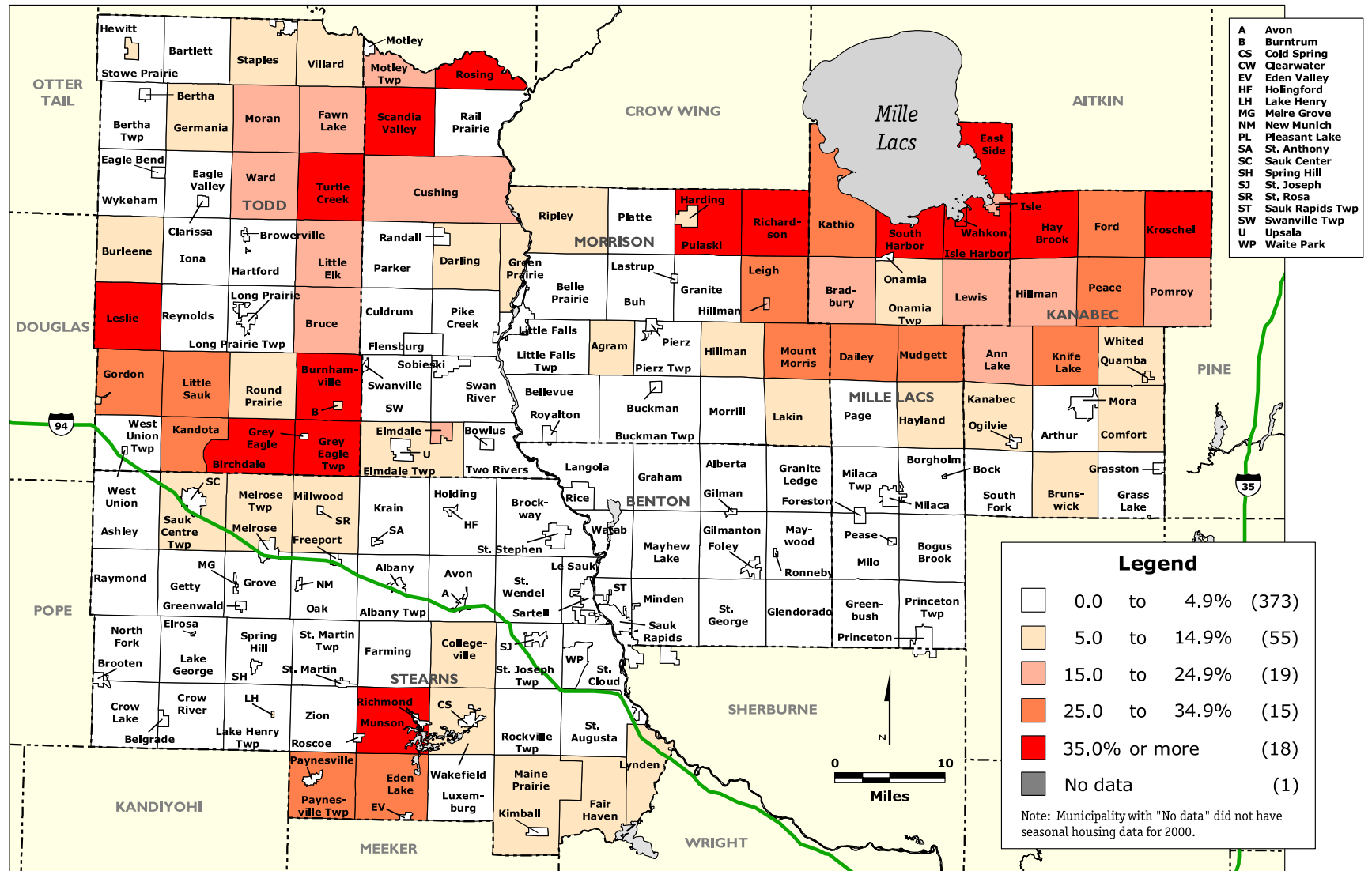
Maps 10 and 11 show precisely this pattern in the fastest growing parts of the 6-county, non-metropolitan area. The fastest growing areas with high seasonal housing rates highlighted above—near Lake Mille Lacs and in the Camp Ripley area—also show declining seasonal housing rates. The seasonal housing declines were the result of both increases in the overall number of housing units (from growth) and decreases in the number of seasonal units (from replacement or conversions to year-round units). This pattern is likely to intensify as more and more baby-boomers retire.



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SEASONAL HOUSING

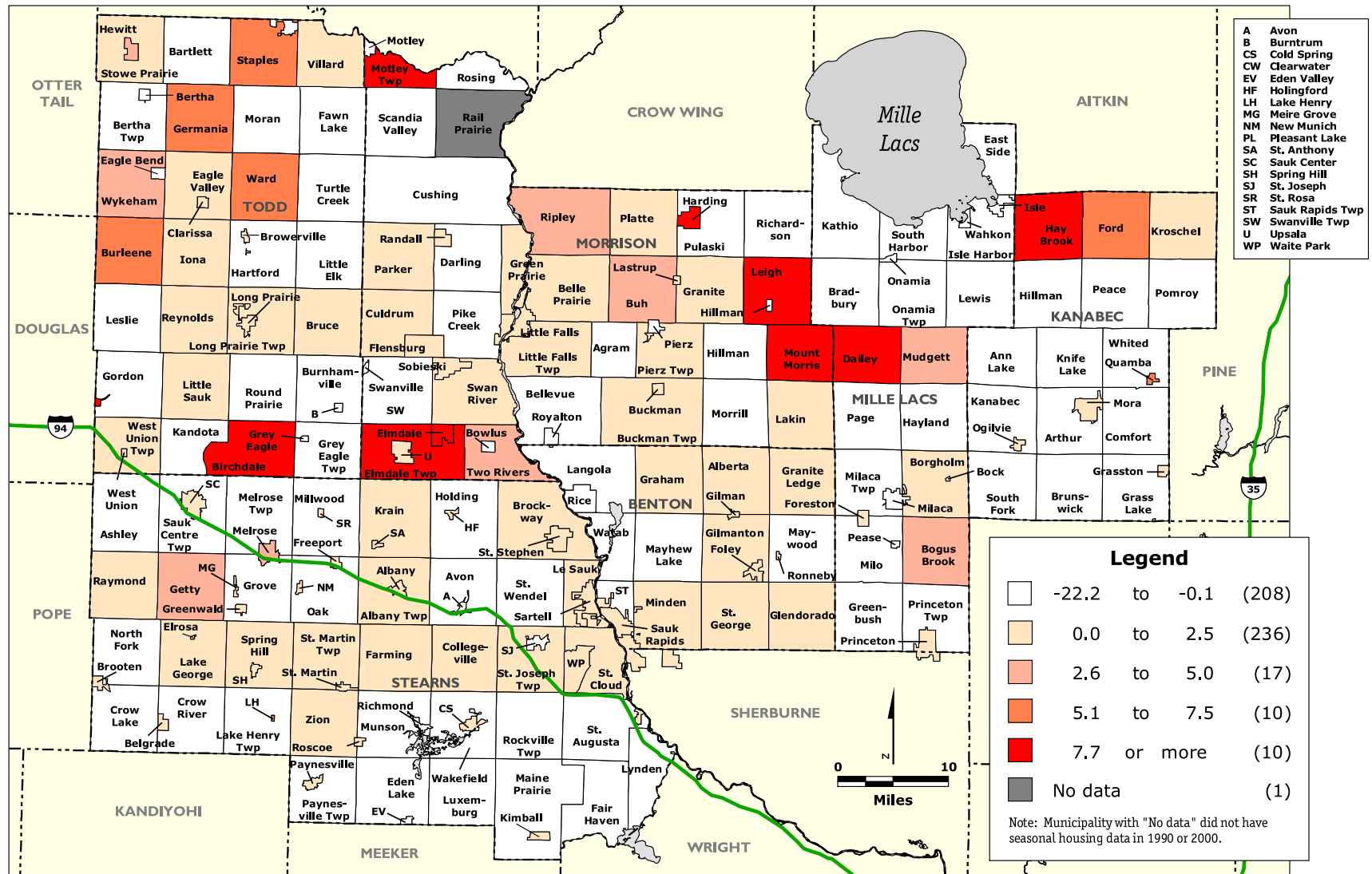
MAP 10. MINNESOTA 6-COUNTY NON-METROPOLITAN AREA: PERCENTAGE OF SEASONAL HOUSING BY NON-METRO MUNICIPALITY, 2000



Data Source: U.S. Census Bureau.

The distribution of seasonal housing is used as a proxy for resort or cabin development. High percentages of seasonal housing near Lake Mille Lacs and in Todd and Morrison counties correspond with areas showing the highest population growth rates in the 6-county non-metropolitan portion of Central Region.

MAP 11. MINNESOTA 6-COUNTY NON-METROPOLITAN AREA: PERCENTAGE POINT CHANGE IN SEASONAL HOUSING BY MUNICIPALITY, 1990-2000



Data Source: U.S. Census Bureau.

As job decentralization in the metropolitan area makes the non-metropolitan area more viable for residential development, higher rates of standard residential development and conversion of seasonal housing to year-round can be expected. The first signs of this transformation occurred in the 1990s, when the share of seasonal housing declined in much of the 6-county non-metropolitan area. These declines were due to both overall increases in the number of housing units and decreases in the number of seasonal units.

Projected Future Growth in DNR's 17-County Central Region

Past population and job growth trends can help us to understand the forces at work in defining the demographic and economic face of a region. However, past patterns do not always foretell the future, so it is worthwhile to examine projections that account for a variety of factors. Population projections are available for the entire Central Region. Such projections are subject to error, of course, but they provide the best available basis for evaluating future pressures on sensitive resources.

Map 12 shows projected population growth to 2030 as estimated by the Office of the Minnesota State Demographer and the Twin Cities Metropolitan Council.⁹ The 17-county study area is projected to add 1,073,532 residents between 2003 and 2030. The vast majority of this growth—93 percent or about 1 million people—is expected to fall in the 11-county metropolitan area. Roughly 900,000 new residents are expected within the 7-county metropolitan core alone.

The greatest projected growth rates in the 7-county metro area are found in the second and third ring suburbs (Map 12). These high growth areas lie almost uniformly adjacent to land that made up the urbanized core of the region in 2002 (Map 3), implying that a large share of future growth will most likely consume currently undeveloped land.

Overall, growth within the seven-county metro area is expected to be strongest in the western half, with nearly all remaining non-urbanized areas of Hennepin, Carver, and Scott Counties seeing high population growth rates.

Many of the municipalities in the four collar counties show similarly high projected growth rates. The highest rates occur in western Chisago County, all but the western most tip of Sherburne County, and extreme northeastern Wright County. Notably, the growth in the collar counties falls almost exclusively in areas directly adjacent to or one municipality removed from major transportation corridors: Interstate 94 (and U.S. Highway 10) through Sherburne and northeastern Wright Counties, U.S. Highway 169 through eastern Sherburne County, and Interstate 35 through western Chisago County.

Although this growth is from relatively small numbers compared to the high-growth areas of the 7-county core metro, the 100,000 people expected to settle in these areas represent very significant growth—46 percent for the four counties as a whole. Further, since much of the land in these counties is currently non-urban, this growth is also likely to represent significant consumption of currently undeveloped land.

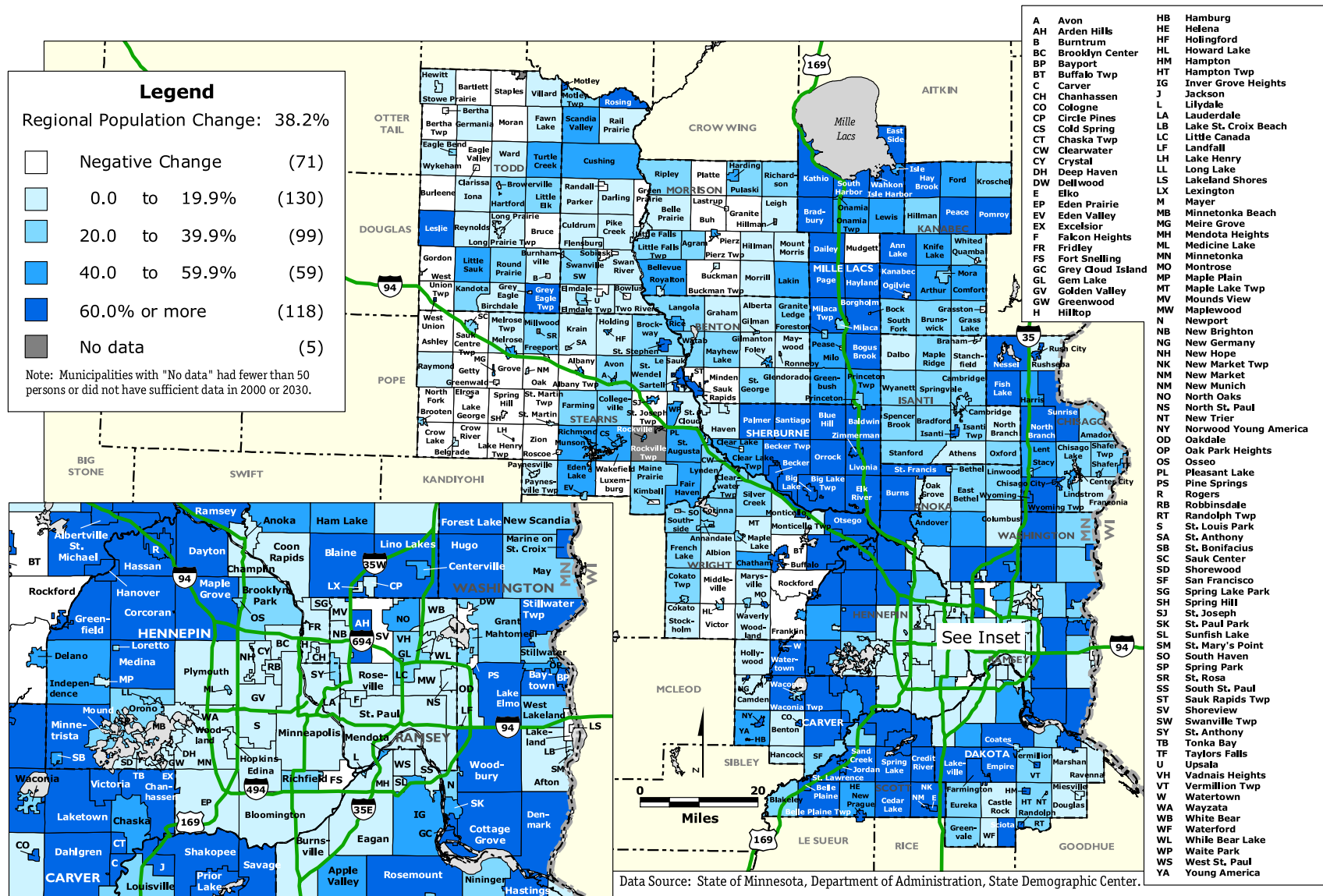
Significant growth rates are also predicted for parts of the 6-county non-metropolitan portion of the study area. Much of this growth is expected in the same areas highlighted in the discussion of non-metropolitan growth in the 1990's. The Highway 169 corridor through Mille Lacs County shows the greatest projected growth, illustrating again the power of major infrastructure investments to shape growth.

In general, if the rate of land consumed continues to outstrip the rate of population growth in the metropolitan area, as it has in the past, the growth projections shown in Map 12 are almost certain to result in the loss of sensitive natural areas, valuable agricultural land, and other types of open spaces. To document these threats, the next section examines the location of sensitive natural areas in the 17-county region and the variation in water sources to meet water demands from growth.

THE VAST MAJORITY OF POPULATION GROWTH IS EXPECTED TO FALL IN THE 11-COUNTY METROPOLITAN AREA, PARTICULARLY IN THE 7-COUNTY CORE REGION. THE FOUR COLLAR COUNTIES ARE EXPECTED TO GROW BY 46% BY 2030.

PROJECTED POPULATION GROWTH

MAP 12. MINNESOTA DNR CENTRAL REGION: PROJECTED POPULATION GROWTH RATE BY MUNICIPALITY, 2003-2030



Population projections are subject to error but they provide the best available basis for evaluating future pressures on sensitive resources. The greatest growth rates in the 7-county metropolitan area are expected in the second and third ring suburbs. In the region, projected growth follows the major transportation corridors, especially I-94, I-35, and Highway 169.

SENSITIVE NATURAL AREAS IN DNR'S CENTRAL REGION (2005)

DNR's Central Region lies at the nexus of coniferous and deciduous forests and grasslands, and abounds with wetlands, rivers, streams, and lakes. Bifurcating Central Region from northwest to southeast is the mighty Mississippi River and its outwash plains, hills, and moraines left from the last glaciation. The region's glaciated past created a wide variety of different landforms throughout the region and an abundance of different plant and animal communities. DNR's Central Region includes 9 different ecological subsections: the Mille Lacs Uplands, the Pine Moraines and Outwash Plains, the Anoka Sand Plain, the Hardwood Hills, Big Woods, Oak Savanna, St. Paul Baldwin Plains and Moraines, the St. Croix Moraine, and the Blufflands.



© Karen Schik, Friends of the Mississippi River

Regional growth and development since European settlement have converted over 60 percent of the region's 6.5 million total acres to other types of land uses. In 2005, roughly 40 percent of the region, or about 2.7 million acres, can be characterized as sensitive natural areas. These remaining acres of sensitive aquatic and terrestrial resources, as defined by the data sets used in the mapping (see text box), are allocated almost equally between the 11-county metro area (1.3 million acres) and the 6-county non-metropolitan area (1.4 million acres). With the exception of the four natural resource clusters discussed below, remaining resources exist in the regional landscape as smaller, isolated habitat fragments that are readily affected by a wide variety of incompatible, adjacent land uses.

The Sensitive Natural Areas map for Central Region (Map 13) shows three categories of sensitive natural resources that were compiled using existing natural resource data sets of varying ages. Because some of the existing data sets are less accurate than others due to the rate of development in the region, this GIS map undoubtedly overestimates the presence of remaining sensitive natural areas. It is, however, a useful, region-wide compilation of existing data and provides guidance at the regional scale to help focus efforts on land and water conservation in fast growth areas of the region.

Habitats with the highest sensitivity to external pressures (based on Minnesota County Biological Survey data and Regionally Significant Ecological Areas, modeling by the DNR) shown in dark blue on Map 13, constitute an estimated 36 percent of the Region's remaining sensitive natural areas. These high quality habitat areas are the remnants of the region's former glorious natural heritage and deserve protection for future generations. Lower quality habitats, that still provide many important benefits, make up the remaining 64 percent of the region's sensitive natural resource base. In the "land of 10,000 lakes", it is not surprising that Sensitive Aquatic Areas, like lakes, trout streams, floodplains, and permanent wetland types, make up 22 percent of remaining sensitive areas. Sensitive Land Areas, including upland buffer zones directly adjacent to many types of sensitive water resources, steep slopes, and ephemeral wetlands, make up an estimated 42 percent of all remaining sensitive natural areas in Central Region.

ROUGHLY 40 PERCENT OF THE REGION CAN BE
CHARACTERIZED AS SENSITIVE NATURAL AREAS. ONLY
14 PERCENT OF THIS AREA IS PUBLICLY MANAGED.

Relative to other growing metropolitan regions, Central Region still retains a fair percentage of important natural habitats that provide many unseen and unacknowledged environmental, economic, and social benefits. Unfortunately, these natural habitats do attract development, which often creates detrimental external pressures such as removal of native vegetation, restrictions on natural processes like fire, or the introduction of exotic species. Only 14 percent, or about 400,000 acres (see hatched areas of Map 13), of the Region's sensitive natural areas are publicly managed by federal, state, or regional government. This means that roughly 6 percent of the total surface area of Central Region is currently available to future generations.

While sensitive resources are scattered throughout the 17-county region, DNR's mapping suggests that there are four major clusters of sensitive natural areas when measured as a percentage of a municipality's total area (Map 14). In the northern portion of DNR's Central Region lies Minnesota's second largest lake, Mille Lacs, at over 132,000 acres. Despite a long history of resort and seasonal housing development near this famous walleye fishery, this portion of the Mille Lacs Uplands area of the region still retains high quality natural resources, especially wetlands and deciduous forest patches. Whereas Mille Lacs Kathio State Park, Mille Lacs Wildlife Management Area, and the Rum River State Forest offer public protection to some of the sensitive resources in this area, there remain sensitive areas that are not in public ownership. This part of the region has seen significant population growth since 1990 (Map 1), and is projected to experience substantial growth in the next 25 years (Map 12). Unprotected sensitive natural resource areas appear to be in the path of future growth and development, largely in the form of resort development and housing development for retirement.

A second cluster of sensitive natural areas is found in the northwestern portion of the 17-county region. Located in the Hardwood Hills ecoregion, just to the west of the Mississippi River valley, Todd and Morrison counties are characterized by sandy outwash plains, river bluffs, hardwood forests, and numerous small wetlands. Although much of this portion of the Hardwood Hills ecoregion is cultivated or in pasture, Camp Ripley is located within this resource cluster.

At 53,000 acres, Camp Ripley is, according to DNR's Minnesota County Biological Survey, one of the most important wooded habitats in Central Minnesota. Over 200 bird species, 50 mammal species, 40 fish species, 24 amphibian and reptile species, and 8 mussel species are found within its borders. Growth has been increasing around Camp Ripley, especially in the townships of Turtle Creek, Cushing, Scandia Valley, and Rosing and positive growth is anticipated through 2030. Residential development threatens the area's uplands and very sensitive water bodies because of their poor buffering capacity and unique hydrological characteristics. Current partnership efforts to buffer Camp Ripley beyond its current borders through the purchase of conservation easements from willing sellers have the potential to protect additional sensitive resources in this part of the Region.

Moving south into the Anoka Sand Plain subsection of DNR's Central Region, the map shows a broad stretch of sensitive natural areas that extends from the Mississippi River in central Sherburne County eastward to Anoka County, southern Isanti County, southwestern Chisago County, and northern Washington County. This entire area is part of a 3,000 square mile fine sand glacial outwash plain characterized by shallow lakes, wetland depressions, rare dune habitats, oak savanna, and dry prairie. Within this cluster are multiple large protected areas: the 31,000 acre Sherburne National Wildlife Refuge, the surrounding Sand Dunes State Forest, the Uncas Dunes Scientific and Natural Area, and the 23,000 acre Carlos Avery Wildlife Management Area located in Anoka and Chisago counties. Despite the fact that much of the sand plain is not easily developed because of the abundance of wetlands, growth is occurring rapidly in this area. In Anoka County alone, urbanized area increased 81 percent from 1986 (53,000 acres) to 2002 (96,000 acres). Significant population growth is projected for all of Sherburne County and areas adjacent to Interstate 35 that transects north-south through the Anoka Sand Plain.

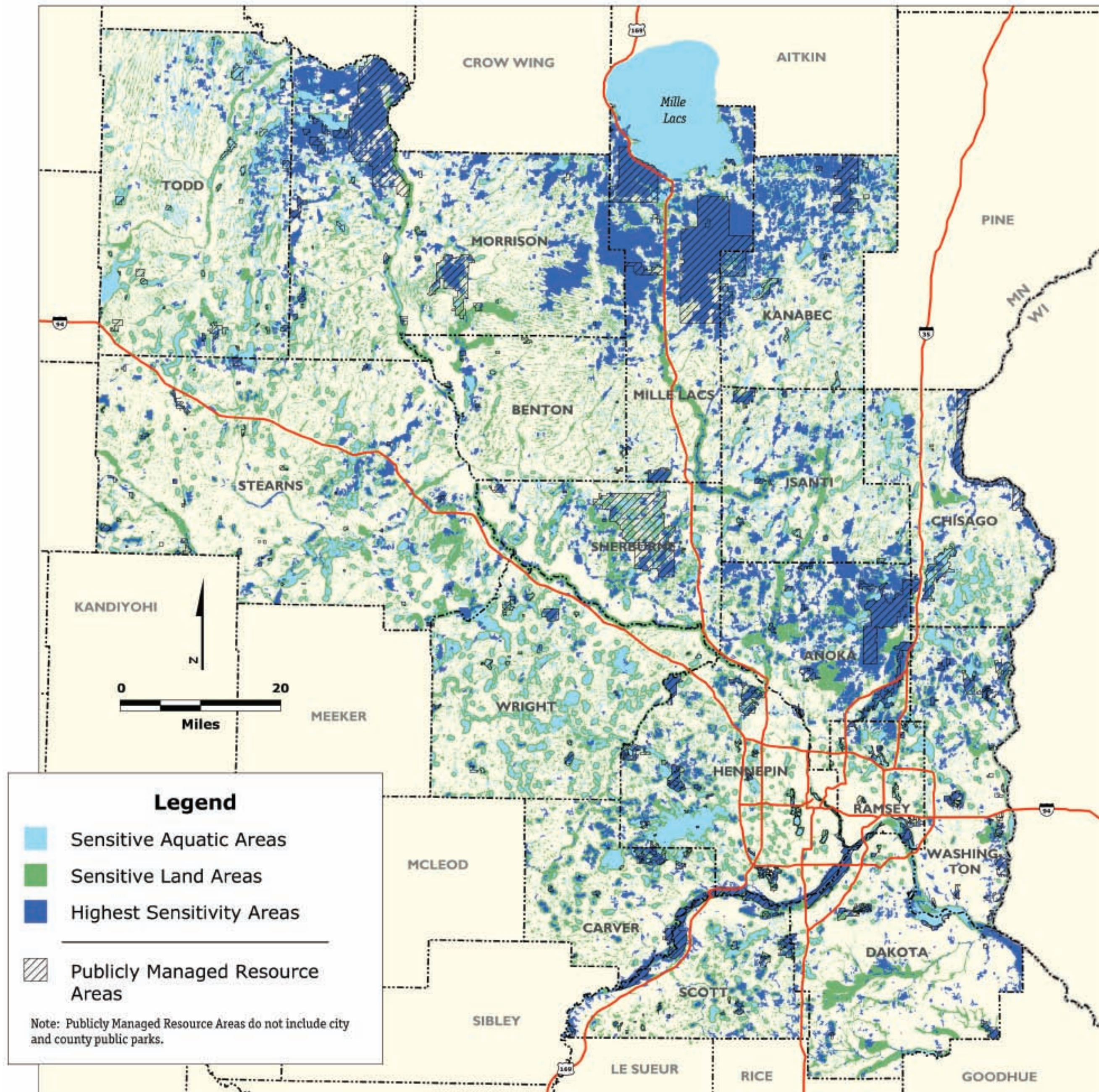


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The fourth, less obvious cluster of sensitive natural areas is located in the vicinity of the 14,000-acre Lake Minnetonka and includes portions of Hennepin, Carver and Scott counties. As the ninth largest lake in the state (excluding border lakes), Lake Minnetonka was once the location of summer cottages for wealthy Minnesotans. Today, ringed by year-round homes, the watershed is largely urbanized. With the lake as a major recreational amenity, much of this development is high-end residential. Significant population growth is expected in nearby municipalities such as Minnetrista and Laketown townships, in part, due to the natural amenities of the area's smaller lakes, wetlands and wooded areas. This implies more fragmentation and conversion of existing sensitive natural areas that have made this portion of the region so attractive.

It is important not to dismiss portions of the region where sensitive natural areas are small, scattered, and isolated. The data underlying Map 13 show that there are nearly 500,000 acres of unprotected sensitive areas remaining in the densely populated 7-county metropolitan region and an ecological assessment, concluded in 2003 by the DNR in partnership with the Metropolitan Council, indicated that there are approximately 120,000 acres of high quality wetland and terrestrial habitats in the core region alone.⁹

As shown in Map 14 sensitive resources remaining in the 7-county core are primarily located at the fringe of the region, with many townships showing 25-50 percent of their total area covered with fragments of sensitive natural areas.



Legend

- Sensitive Aquatic Areas
- Sensitive Land Areas
- Highest Sensitivity Areas
- Publicly Managed Resource Areas

Note: Publicly Managed Resource Areas do not include city and county public parks.

CREATION OF THE SENSITIVE NATURAL AREAS MAP

The creation of this 17-county GIS map by DNR's Central Region staff combines 19 different, existing data layers of varying ages. While some data sets are relatively current, others like the National Wetlands Inventory date back to 1979-1988. As a result, this map represents a "still shot in time" and the best approximation of remaining regional natural resources in 2005. Undoubtedly, this map overestimates the remaining sensitive natural areas in the region because land cover changes occur rapidly on a daily basis throughout much of DNR's Central Region. Conversely, the map underestimates land in public protection, since county and city parks and privately owned lands such as corporate and academic land holdings are not included in the Publicly Managed Resource Lands overlay.

An essential step in the overall analysis was the creation of a region-wide Sensitive Natural Areas (SNA) map. Initially, three separate natural resource layers were developed using different databases: Highest Sensitivity Areas, Sensitive Aquatic Areas, and Sensitive Land Areas. These three layers were then combined to create the final SNA map. Although natural resources are not constrained by jurisdictional boundaries, municipal boundaries were overlain on the resource map for purposes of analysis by cities and townships. By aggregating the three categories of sensitive natural areas and calculating percentages by municipality (Map 14), remaining sensitive natural areas could be compared directly with demographic, fiscal and economic data used in analysis by Ameregis.

The data sets used in the creation of the three separate natural resource layers included:

Highest Sensitivity Areas:
Minnesota County Biological Survey (MCBS) Native Plant Communities (varies, 1986-present; excludes MCBS surveys for some counties); MCBS Sites of Biodiversity Significance (varies, 1980-present); Regionally Significant Ecological Areas (2000); Forest Core Patches (1991-1993).

Sensitive Aquatic Areas:
Shallow Lakes (2004); Natural Environment Lakes (2004); Scientific and Natural Area (SNA) Lakes (2004); Outstanding Resource Value Water (ORVW) Streams (2004); Trout Streams (2002); Calcareous Fens (2004); Public Water Basins (2004); Wetlands (1979-1988; from the National Wetlands Inventory, Cowardin classes 4 through 8).

Sensitive Land Areas:
Shoreland Management Zone—Natural Environment Lakes (2004); Shoreland Management Zone—Shallow Lakes (2004); Trout Stream Protection Zone (2004); Calcareous Fen Protection Zone (2004); SNA Lake Protection Zone (2004); Shoreland Management Zone—All Other Public Water Lakes (2004); Steep Slopes (1997); Wetlands (1979-1988; from the National Wetlands Inventory, Cowardin classes 1 through 3).

As a final caveat, this regional mapping of natural resources is not of sufficient resolution to detect remaining natural resources at the local level. Ground truthing is required to verify the presence and distribution of resources at this scale.



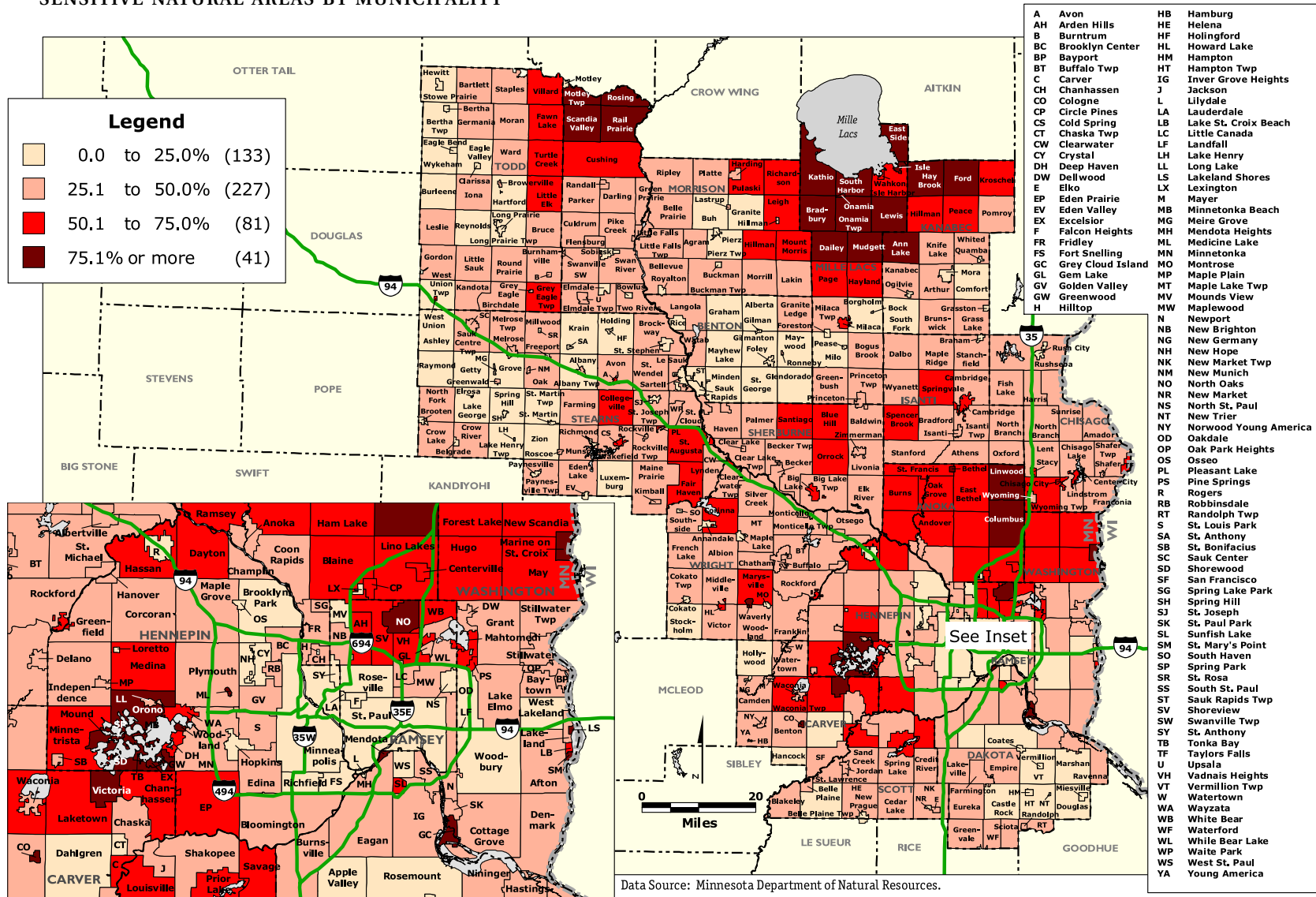
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SENSITIVE NATURAL AREAS

MAP 14. MINNESOTA DNR CENTRAL REGION: PERCENTAGE OF TOTAL AREA DESIGNATED AS SENSITIVE NATURAL AREAS BY MUNICIPALITY



The mapping of sensitive natural resources used data from several sources to classify sensitive land and water areas (Map 13 for more detail). Roughly 40 percent of the area in DNR's 17-county Central Region falls into one of three sensitive categories. Although there are large tracts of publicly owned lands protected from development in the region, most of the sensitive resources are scattered and unprotected. Only 14 percent of sensitive areas, or six percent of total surface area, is protected in the Central Region.

VARYING REGIONAL WATER SOURCES

DNR's Central Region has relatively large supplies of ground water for residential, commercial and industrial uses. About 1.83 million residents in the 7-county metropolitan area obtain their water from bedrock aquifers that underlie much of the Twin Cities metropolitan area. These groundwater sources include the Prairie Du Chien-Jordan (PDC-Jordan), Franconia-Ironton-Galesville (FIG), and Mt. Simon-Hinckley (Mt. Simon) aquifers. Treated drinking water for an additional 870,000 people comes from the Mississippi River. In the 7-county core region and in the inner portions of the adjacent "collar" counties (Wright, Sherburne, Isanti, Chisago), both bedrock aquifers and the Mississippi River supply significant amounts of water. Although there have been reported incidences of interference with surface water features, such as fens and wetlands, in the core area of the region, DNR's Waters Division believes that, if managed carefully, these combined ground and surface water sources can supply enough water to meet future growth and development in the southern portion of DNR's 17-county Central Region (Purple, orange, and blue areas of Map 15).

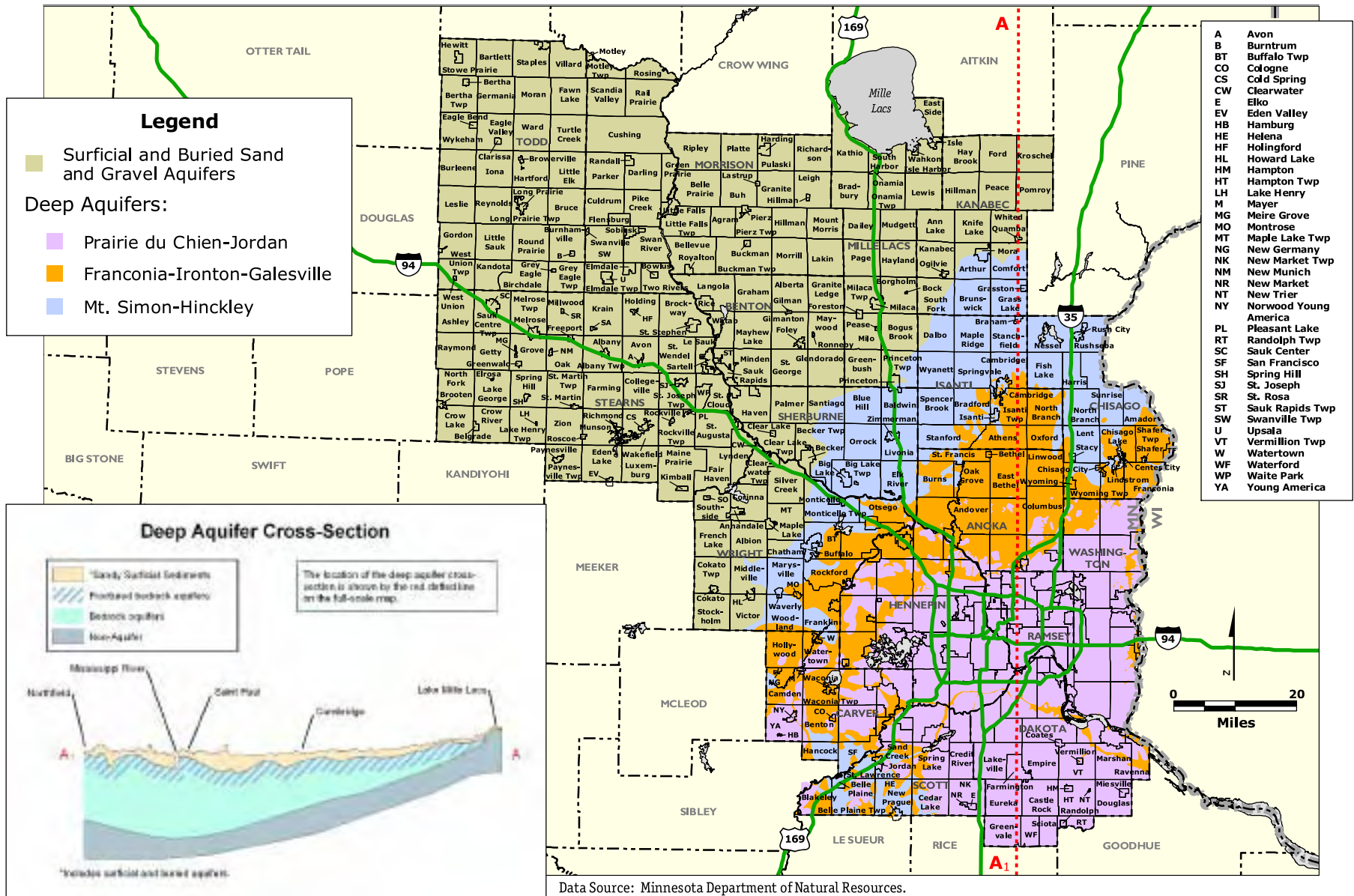
The water supply situation clearly changes in the northern half of DNR's Central Region. As can be seen in the insert of Map 15, the water-bearing bedrock aquifers gradually disappear in the vicinity of the northern collar counties and groundwater sources are restricted to unconsolidated sand and gravel deposits that can be at or near the land surface. These water-bearing deposits vary in thickness and in some areas in Central Region can be virtually non-existent. They are also spatially scattered and the locations of the buried sources are poorly known. Although these water sources are primarily used for low-volume domestic supplies and seasonal irrigation, it is uncertain whether these surficial and buried aquifers will be able to sustain increased withdrawals to meet the expected demand of 100,000 new residents in this portion of DNR's Central Region. Moreover, these shallow sand and gravel aquifers allow rapid infiltration of surface water, making these aquifers highly susceptible to contamination. In the future, the Mississippi River might prove to be the more reliable source of water supply for future development, although river water dependence will bear costs associated with water treatment and piping to location.

As growth occurs in DNR's Central Region, it will be important to balance the needs of water-dependent natural habitats with the water needs for homes, businesses, energy, and agriculture. To conserve the region's remaining sensitive natural resources, water managers will need to take into account the impacts of groundwater withdrawal on sensitive natural areas such as groundwater-fed lakes, trout streams, springs, fens, and seepage swamps (photo). Even if groundwater does not directly feed a lake, wetland, or river, groundwater depletion can result in a lowered water table that negatively affects sensitive aquatic plant communities adapted to specific hydrologic conditions.



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MAP 15. MINNESOTA DNR CENTRAL REGION: GROUNDWATER AQUIFERS



Data Source: Minnesota Department of Natural Resources.

The Central Region's deep aquifers, the most reliable sources of water, are available to most of the Twin Cities eleven-county metropolitan area. However, the aquifers become much shallower and less reliable near the boundary of the metropolitan area where much of the region's future growth is expected to occur. The northern portion of the 17-county region depends on groundwater in scattered unconsolidated sand and gravel deposits that are not well-located, less reliable in supply, and highly susceptible to contamination.

LOCAL TAX CAPACITY

The public actors most often associated in the public's mind with natural resources conservation activities include several federal agencies, state government agencies in all 50 states, and thousands of special districts and counties. However, the role of local governments, with their powers to regulate land use is underestimated. Municipal governments often have the first and last word on whether specific parcels of land can or will be developed.

In many cases, local governments are not particularly well-suited to regulate or protect sensitive natural areas. The full benefits of conserving natural resources are rarely concentrated in a single community. But, at the same time, the costs of conservation can be highly localized. In this situation, local governments do not face the proper incentives to conserve sensitive natural resources. If the benefits of protection are under-valued because many of the benefits accrue to other areas, while the costs are fully borne locally, then local governments can be expected to do too little to protect sensitive natural areas.

This happens not because residents or public officials value the resources any less than others or behave irrationally. Natural assets clearly have value at the local level. Recent initiatives in Woodbury, Eden Prairie, Minnetonka, and St. Cloud to raise local taxes to preserve open space illustrate this.¹⁰ However, local residents often receive only a small portion of the benefits of protection, biasing decisions away from conservation when made solely at the local level.

IN DNR'S CENTRAL REGION, THERE IS A GREAT DEAL OF VARIATION IN THE ABILITY OF MUNICIPALITIES TO FINANCE PUBLIC SERVICES FROM LOCAL TAXES AND LOCAL GOVERNMENTS DO NOT FACE THE PROPER INCENTIVES TO CONSERVE.

Local governments also face a variety of incentives which push them to favor development over natural resource conservation. Local tax policy and land-use regulations are closely related. Local taxes must finance municipal services like police and fire protection and public schools. The amount of revenue a local government can generate on its own depends largely on the value and types of land within its boundaries. If the property tax is the primary local tax, as it is in Minnesota, then local governments have a direct incentive to develop land-use plans that maximize the value of property. Conservation areas rarely meet this standard, at least in the short run.

Different types of development often imply different obligations on the expenditure side of local budgets as well. Commercial-industrial development might enhance the tax base without increasing the demand for school services, for instance. In the end, it is the balance of costs (expenditure needs caused by the development) and benefits (the revenues generated) that local officials care about. Since protected resources rarely generate revenues directly, they often fare poorly in local fiscal decision-making.

One very important characteristic to consider when comparing local government capacity is the ability to raise revenues locally. In Minnesota, the primary local tax instrument is the property tax. State law sets the rate structure for different types of property—the rate per dollar of assessed value is greater for commercial-industrial property than for owner-occupied residential property, for instance. A particular locality's mix of property types then determines how productive its tax base is in terms of revenue generated per dollar of property values. This is the locality's "tax capacity". Local governments then determine their overall tax rate by varying the percentage of tax capacity that they assess.

Tax capacity per household—the revenue that the property tax would generate if the locality taxed its capacity at 100 percent—is therefore the proper measure of local ability to raise tax revenue. Maps 16 and 17 show this measure in 2004 and the percentage change during the prior 11 years for each municipality in DNR's Central Region.

Maps 16 and 17 show a high degree of diversity in the capacity of local governments to absorb the potential costs of natural resource conservation. Tax capacities per household in 2004 varied from as low as \$214 per household in the City of Osakis in Todd County to as high as \$12,866 in the City of Becker in Sherburne County. The distribution increases relatively smoothly between these extremes and 90 percent of municipalities fall in the range between \$865 per household and \$4,109 per household.

Tax capacities are, in general, significantly greater in the Twin Cities metropolitan area—average capacity in the 11-county metropolitan area is \$2,429 per household compared to \$1,546 per household in the 6-county non-metropolitan portion of the region. This reflects the much greater economic vitality in the metropolitan area as well as the higher cost of living.

However, there is significant variation within each of the two parts of the 17-county region. Municipalities in the core and at the fringes of the metropolitan area share lower than average capacities for the most part, while second and third ring suburbs are largely above average. The highest capacities are in the cities located in the western and southwestern suburbs and along the St. Croix River valley.

Municipalities in the 6-county non-metropolitan portion of the region are more uniformly below the 17-county average of \$2,355. The most striking patterns here are the clusters of much-lower than average capacities in northwest Todd County and in large portions of Mille Lacs and Kanabec Counties.

The situation is not entirely negative in the non-metropolitan counties, however. Tax capacities are increasing more rapidly there, in general than in the metropolitan area—38 percent compared to just 9 percent on average in the metropolitan area—and growth rates were above average in nearly every part of the area.

Tax capacities in virtually the entire core of the metropolitan area grew more slowly than in the rest of the metropolitan area and the 17-county region. Part of the explanation for this is the changes in state law that decreased tax rates on commercial-industrial property compared to residential property. This led to decreased values of tax bases in places rich in commercial-industrial property

(like the core area) when compared to places with less commercial-industrial property (like the non-metropolitan portion of the region and many suburbs in the metropolitan area).

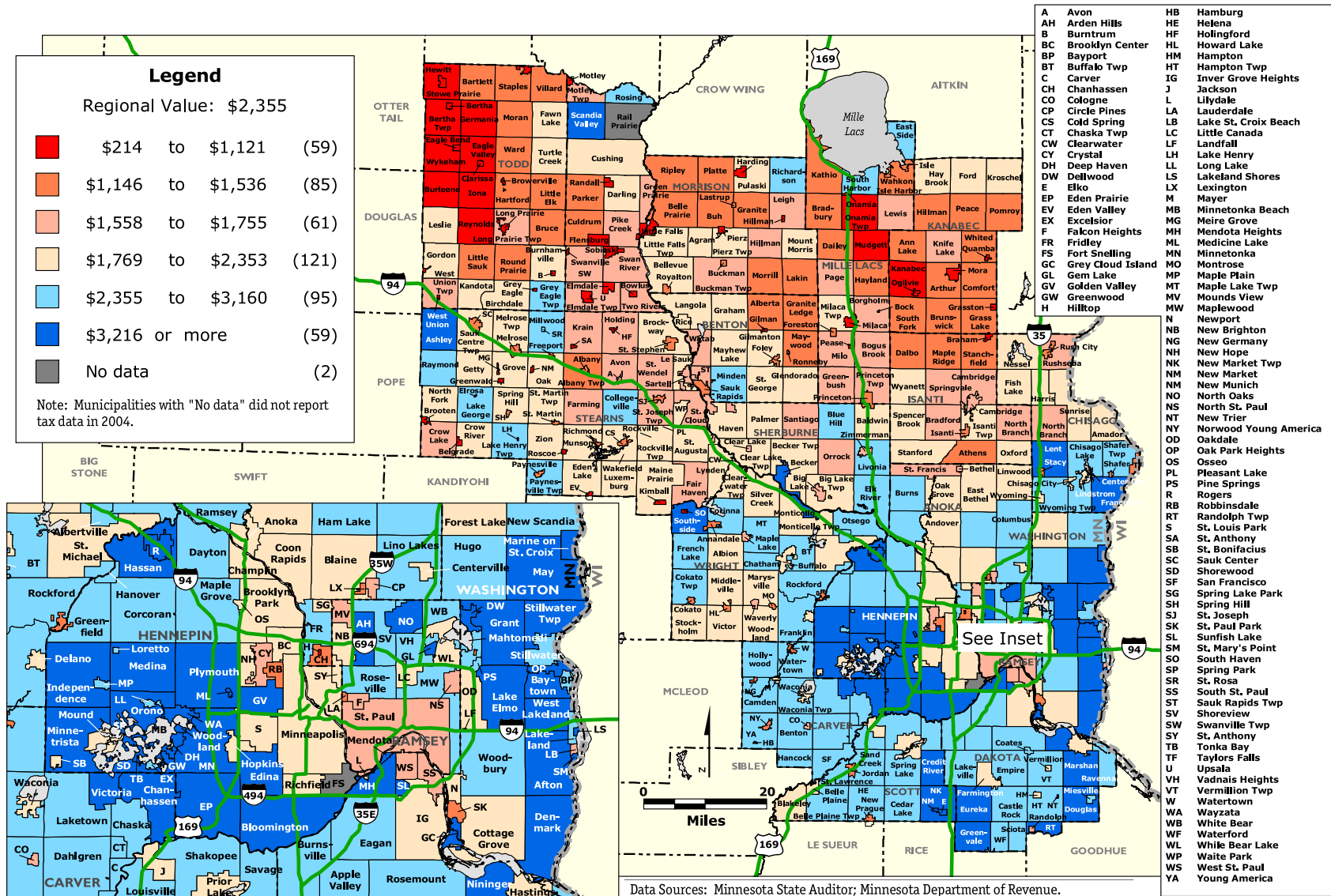
In sum, there is a great deal of variation in the ability of municipalities to finance public services from local taxes. If primary responsibility for conserving sensitive natural areas is left to local governments—through local planning and zoning decisions—the results would be a patchwork quilt of conservation efforts. An analogy would be each community independently planning and paying for its streets and highways with no knowledge of the timing, type, or location of roads being developed in adjacent communities or regionally. The resulting regional system would be inefficient and ineffective.



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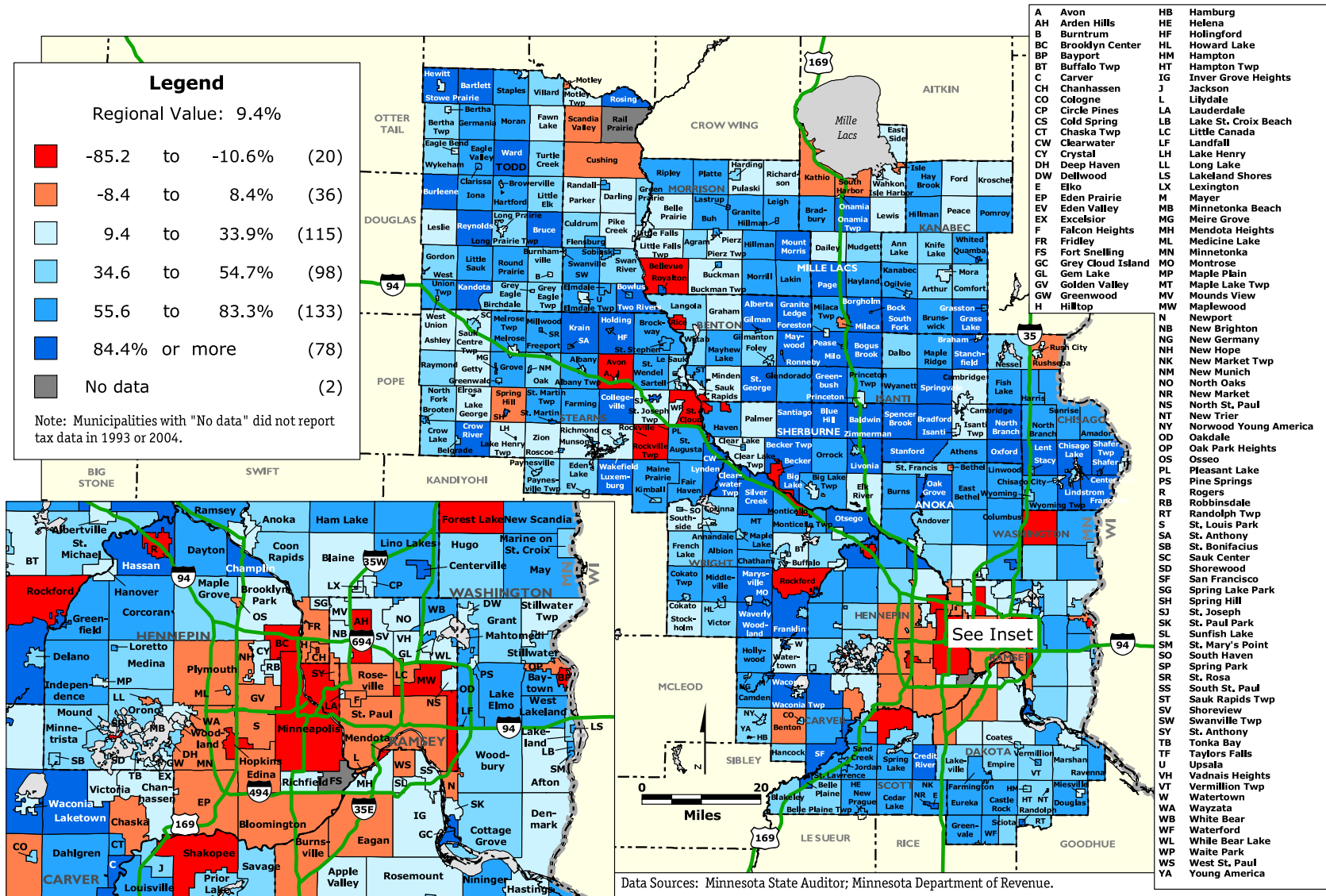
TAX CAPACITY

MAP 16. MINNESOTA DNR CENTRAL REGION: TAX CAPACITY PER HOUSEHOLD BY MUNICIPALITY, 2004



Local tax policy and land-use regulations are closely related. Local governments face a variety of incentives that push them to favor development over natural resource conservation. The property tax is the primary local tax, which pushes local governments to develop land-use plans that maximize the value of property. These pressures are greatest where local resources are low. Tax capacity per household—the revenue the property tax can generate given the local mix of commercial-industrial, residential and other types of property—varies dramatically across the Central Region. Tax capacities are highest in the southwest suburbs of the metropolitan area and along the St. Croix valley and lowest on the periphery of the metropolitan area and in the northern half of Central Region.

MAP 17. MINNESOTA DNR CENTRAL REGION: PERCENTAGE CHANGE IN TAX CAPACITY PER HOUSEHOLD BY MUNICIPALITY, 1993-2004



Modest growth and changes in state laws governing the property tax have led to lower than average growth in tax capacity in the central cities and inner suburbs of the metropolitan area. Outer suburbs in the metropolitan area and areas along the two major transportation arteries (I-94 and Highway 169) in the six non-metropolitan counties show the greatest growth rates.

COMMUNITY CLASSIFICATION

Tax capacity is not the only important dimension to consider when evaluating local conditions relating to conservation of natural resources. Local fiscal stress or health also depends on factors affecting the demand side of local budgets (see text box on page 38). These factors must also be considered for a more complete picture of conservation potential.

Metropolitan areas are often viewed as if they are composed of troubled central cities and prosperous suburbs. However, in its studies of numerous metropolitan areas, Ameregis has documented the very wide diversity of communities within metropolitan areas, especially suburban areas. In most metropolitan areas, many fully developed, relatively densely settled suburban areas show signs of stress much like those seen in central cities. In addition, another group of suburbs usually exhibits modest, roughly average, tax bases and high rates of population or job growth—a combination that can also produce stress because of the costs associated with growth.

No single dimension, such as tax base, income or poverty is adequate to describe the diversity of communities in the metropolitan landscape. For this work, cluster analysis was used to group municipalities based on similarities and differences across several dimensions, including both sides of local budgets—the capacity to raise revenues and the need for or costs of providing services.

The analysis was performed separately for the 11-county metropolitan area and 6-county non-metropolitan portions of Central Region. The underlying economy, growth dynamics, tax bases and service costs are dramatically different in the two parts of the region, making a single analysis of the full 17-county area impractical.



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The Twin Cities Metropolitan Area

Map 18 shows the results of the analysis for the metropolitan portion of the region. The analysis divided the 269 municipalities in the 11-county region into six groups—central cities, stressed municipalities, developing job centers, bedroom developing communities, developed job centers, and affluent residential areas.

Table 3 (page 37) shows how the groups vary across the characteristics used in the clustering—tax capacity per household, jobs per household, poverty rate, household growth from 1993 to 2003, household density, and median housing age.

Two groups—central cities (2) and stressed municipalities (53)—are home to 47 percent of metropolitan households. These two community types, found largely in the core of the region, show a combination of capacities and costs that imply significant fiscal stress. In these places, lower than average tax capacities are combined with higher than average cost factors. Notable cost factors include: significant job concentrations that increase demand for services by non-residents; higher poverty rates that increase needs; much greater than average household densities that can create congestion costs; and greater than average housing ages which generally indicate older infrastructure that is more expensive to maintain or upgrade.

Another group of 58 developing job centers, representing 25 percent of households, shows roughly average tax capacity and some higher than average cost characteristics. In particular, these places are likely to be stressed by growth—they show the highest growth rates for both households and jobs among the six clusters. Developing job centers lie in two arcs of second ring suburbs in the southern and northern parts of the metro and along the I-94 corridor to the northwest.

The bedroom developing group consists of 112 municipalities at the perimeter of the metropolitan area and represents 8 percent of households. It is similar to the developing job centers except that these places do not show job concentrations like those in the job centers. They also show roughly average tax resources coupled with rapid population growth.

DNR'S CENTRAL REGION SHOWS A WIDE VARIETY OF COMMUNITY TYPES ESPECIALLY IN THE SUBURBS. SOCIAL AND FISCAL STRAINS ARE NOT LIMITED TO OLDER URBAN AREAS.

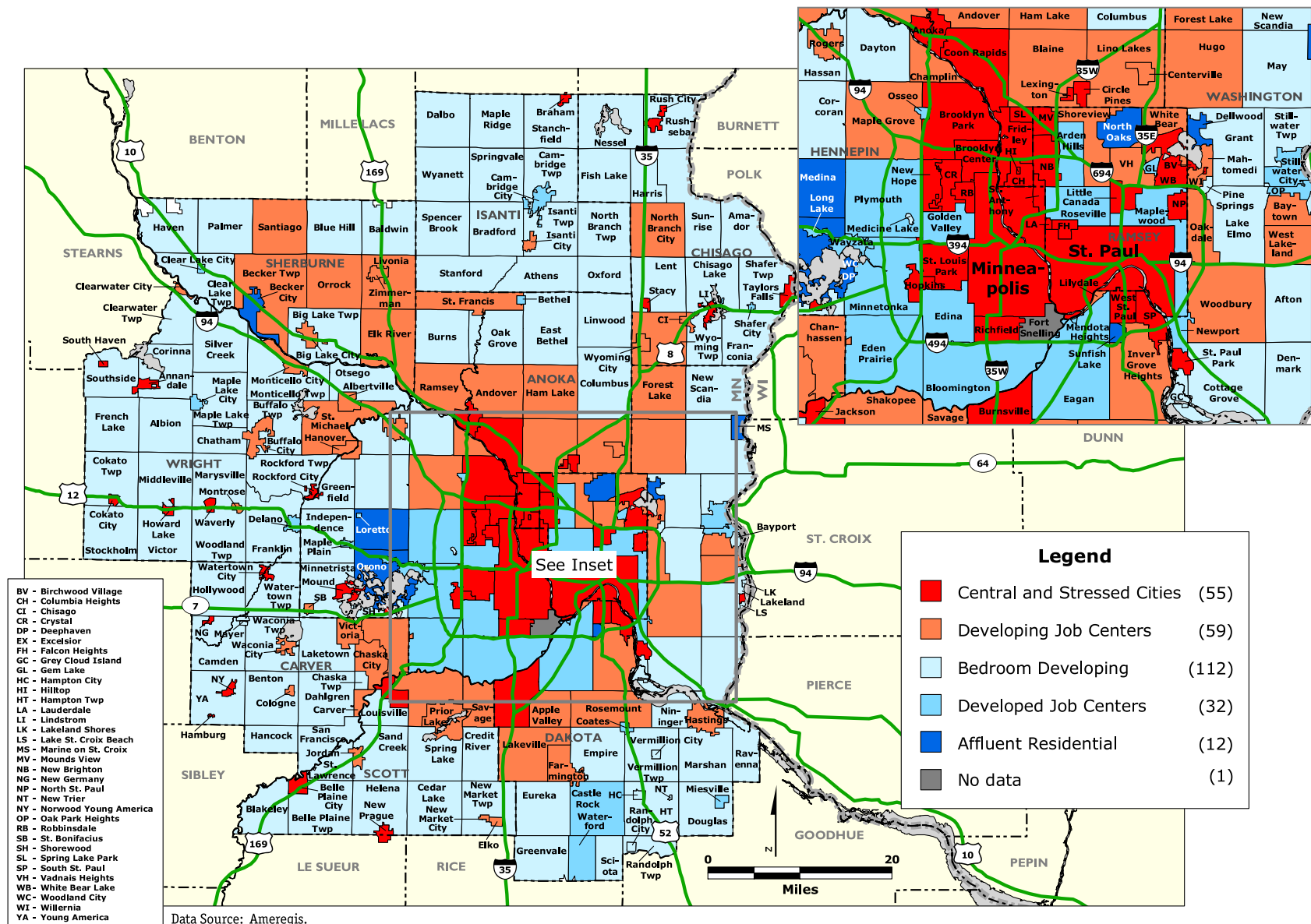
The final two community types—32 developed job centers and 12 affluent residential areas—are largely second ring suburbs across the south and west of the region and in the area around Lake Minnetonka. They show few signs of stress. Representing just 20 percent of regional households, these places enjoy relatively rich tax bases with few cost factors.

In sum, like most metropolitan areas, the Twin Cities region shows a great deal of diversity in community types, especially in the suburbs. Just under half of the region's households live in places showing clear signs of stress and another third live in communities that must plan carefully to manage the costs of growth with only average local resources.



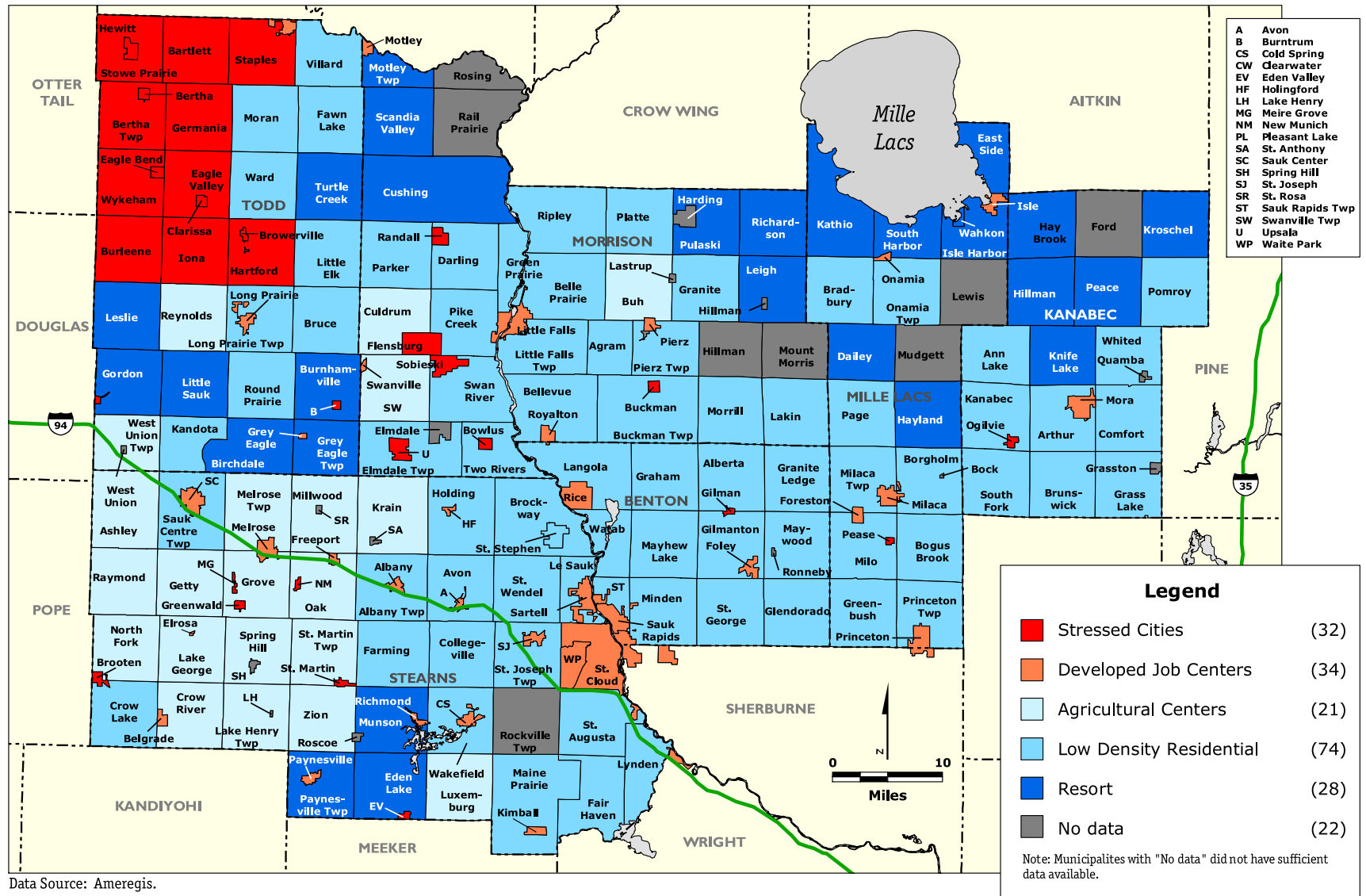
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MAP 18. TWIN CITIES 11-COUNTY METROPOLITAN AREA: COMMUNITY CLASSIFICATION



Classifying municipalities helps demonstrate the combined effects of a local government's fiscal capacity and the costs it faces in providing services. In the metropolitan area, the two central cities and a group of more than 50 suburban communities show a combination of lower than average fiscal capacity and greater than average cost factors that implies significant fiscal stress. Nearly half of the region's households reside in these places. Two other groups, containing another third of households are coping with the greatest growth rates with average tax capacities. Only one in five households lives in areas with a combination of high tax capacities and low costs.

MAP 19. MINNESOTA 6-COUNTY NON-METROPOLITAN AREA: COMMUNITY CLASSIFICATION



Data Source: Ameregis.

Two groups of municipalities in the six non-metropolitan counties—Stressed and Developed Job Centers—show clear signs of fiscal stress. Developed Job Centers are the area’s traditional economic centers and are home to nearly 60 percent of households in the six counties. Only about a third of the area’s households live in municipalities with a combination of higher than average tax resources and lower than average cost factors.

The 6-County Nonmetropolitan Region

Map 19 and Table 4 show the results of the analysis for the 6-county non-metropolitan portion of the region. The analysis separated the 189 municipalities in this part of the region into five groups—stressed municipalities, developed job centers, agricultural centers, low density residential areas, and resorts.

The table shows how the groups vary across the characteristics used in the clustering. The clustering variables are the same as those used in the 11-county metropolitan area with the addition of two variables—the percentage of residents employed in agriculture and the percentage of housing that is seasonal.

Both the stressed municipalities and the developed job centers show significant signs of fiscal stress. The 66 municipalities in these groups represent 63 percent of households in the 6-county non-metropolitan region. Both groups show lower than average tax capacities. Tax capacities are especially low in the stressed group. These places are in the farthest reaches of the region, for the most part, in northwestern Todd County.



© Peggy Booth, MnDNR

The developed job centers represent the traditional regional centers like Onamia, Long Prairie and Sauk Center and one larger city—St. Cloud. Tax capacities in this group are just below average and stagnant, showing essentially no growth between 1993 and 2004. The cost factors facing them relate primarily to their function as central places in their local economies—the costs of providing services to non-resident workers and others who use local public and commercial facilities—but they are also growing faster than average.

The second largest group—74 low-density residential areas representing 27 percent of total regional households—is spread across the southern and eastern parts of the six county area. They are relatively stable places with tax capacities a bit higher than average and the lowest average poverty rate of the six groups.

A relatively small group of agricultural centers—21 municipalities with 3 percent of households—shows slightly higher tax capacity coupled with very slow growth and very low densities.

Finally, the resorts—28 places with 8 percent of the region's households—show the highest tax capacities per household and the greatest household growth rates. These places are clustered around Mille Lacs, in northeastern and southwestern Todd County and in southern Stearns County.

Just as in the Twin Cities metropolitan area, the 6-county non-metropolitan portion of the region shows very significant diversity. Roughly two-thirds of the area's households reside in communities with significant signs of stress—places that could shoulder the burden of conserving sensitive natural areas only with great difficulty.

Table 3: Characteristics of the Community Types — Twin Cities Metropolitan Area | Variables Included in the Cluster Analysis

Community Type	Number	Percentage of Regional Households	Tax Capacity per Household 2003	Jobs per Household 2003	Poverty Rate 2000	Percentage Growth in Households 1993-2003	Households per Sq. Mile 2003	Median Housing Age 2000
Central Cities	2	24	1,821	1.7	16	1	2,972	58
Stressed	53	23	1,943	1.2	6	7	1,371	32
Developing Job Centers	58	25	2,503	1.0	3	56	364	14
Bedroom Developing	112	8	2,639	0.3	3	24	36	29
Developed Job Centers	32	19	3,375	2.3	3	15	793	30
Affluent Residential	12	1	7,047	0.9	2	19	173	3
Total	269	100	2,429	1.4	7	18	287	27

Table 4: Characteristics of the Community Types — 6-County Non-metropolitan Area | Variables Included in the Cluster Analysis

Community Type	Number	Percentage of Regional Households	Tax Capacity per Household 2003	Jobs per Household 2003	Poverty Rate 2000	Percentage Growth in Households 1993-2003	Households per Sq. Mile 2003	Median Housing Age 2000	Percentage of Housing Seasonal 2000	Percentage of Work Force in Agriculture
Stressed	32	6	785	0.5	12	5	17	46	4	9
Developed Job Centers	34	57	1,442	1.9	11	31	638	31	1	1
Low Density Residential	74	27	1,710	0.3	6	19	13	28	5	7
Agricultural Centers	21	3	1,949	0.2	10	9	5	41	3	33
Resort	28	8	2,115	0.2	11	43	10	28	40	8
Total	189	100	1,546	1.2	10	26	26	33	7	5

Sources: U.S. Bureau of the Census, Minnesota State Auditor.

CLUSTER ANALYSIS: HOW IT WORKS

Because there are more than 450 jurisdictions included in the study area, it is impossible to individually measure each one against the others. Instead this assessment relies on a statistical procedure called cluster analysis to assign municipalities to groups that are as internally homogeneous and as distinct from one another as possible, based on specified social, fiscal and physical characteristics.¹¹ Because the forces driving the economic and social growth are so different for the two parts of the overall study area, the analysis was performed separately for the municipalities in the 11 Minnesota counties of the Twin Cities metropolitan area and the remaining six non-metropolitan counties.

The characteristics used to group the municipalities were property tax base per household (2003), poverty rate (2000), household growth (1993 to 2003), and household density (2003), median age of the housing stock (2000) and jobs per household (2003).¹² The percentage of the housing stock that is seasonal (2000) and the percentage of the work force in agriculture (2000) were added to the analysis of the non-metropolitan portion of the study area because development related to tourism/resorts and agriculture are so important in that part of the region.

These demographic and fiscal variables provide a snapshot of a community in two dimensions—its ability to raise revenues from its local tax base and the costs associated with its social and physical needs. Fiscal capabilities are measured by tax base and jobs per household in the Twin Cities and by those variables plus the seasonal share of housing in the rest of the study area.

Measures of need capture a range of local characteristics that affect the cost of providing public services. High poverty is a well-documented contributor to

public service costs. It both generates greater needs for services and increases the cost of reaching a given level of service. Both population declines and large increases tend to increase the per-person costs of long-lived assets like sewers, streets or buildings. When population declines, the costs of these assets must be spread across fewer taxpayers. When population is growing rapidly, the costs for new infrastructure tend to fall disproportionately on current residents (compared to future residents) because of the difficulty of spreading the costs over the full lifetime of the assets. Density is another important predictor of cost. Very low densities can increase per-person costs for public services involving transportation (like schools, police and fire protection) and for infrastructure (roads and sewers). Moderate to high densities, on the other hand, can help limit per-person costs. Housing age is used as a proxy for the age of the community's infrastructure—older infrastructure is more expensive to maintain.

These variables also capture a cross-section of the socioeconomic characteristics that define a community's character. Demographics, population growth, and density are among the factors people examine when deciding if a community is “their kind of place.” Because of their unique history and characteristics, the Twin Cities central cities—Minneapolis and St. Paul,—were place in their own group before clustering.

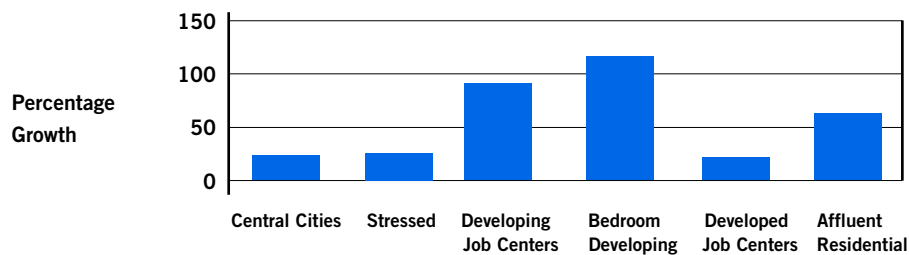
SENSITIVE NATURAL AREAS AND GROWTH

The final step in the analysis was to examine the relationships among projected growth patterns, the community classification, and the sensitive natural areas mapping in order to explore questions such as:

- *What types of communities are projected to grow more or less quickly than the region as a whole? Do these communities contain sensitive natural areas?*
- *If new growth proceeds in the future at densities like the recent past, will there be enough available land – land that is not sensitive, protected or already urbanized – in fast growth communities to accommodate future growth while also conserving sensitive natural areas for their many benefits?*

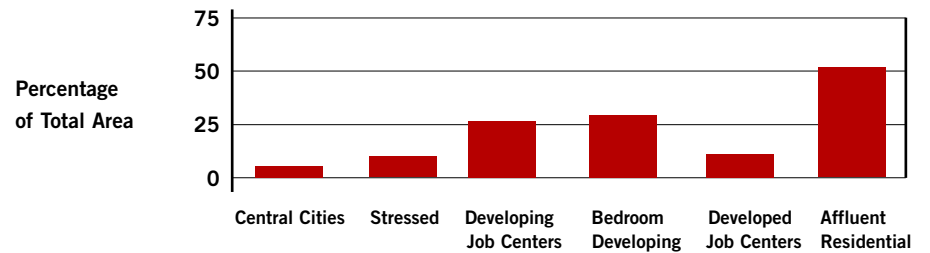
Much of the region's future growth is expected to occur in the 7-county core area. Of the projected 1,073,000 new residents in the 17-county Central Region, nearly 900,000 are expected in the core region with another 100,000 expected in the four adjacent collar counties. Figure 2 shows which types of communities in the 7 core counties are expected to show the greatest increases in households between 2003 and 2030. The greatest expected growth rates are found in communities classified as Developing Job Centers and Bedroom Developing. Although these two groups represented just 33 percent of households in the 7 counties in 2003, they are projected to receive 67 percent of growth in the coming decades. In short, much of the region's future growth is expected in relatively low-density, middle class communities at the fringe of the metropolitan area.

**Figure 2: Projected Growth in Households 2003 – 2030 by Community Type
Seven County Core Metropolitan Area**



Source: See Map 3.

**Figure 3: Percentage of Total Area: Non-urban, unprotected and sensitive
by Community Type, 7 County Core Metropolitan Area**



Source: See Map 4.

Figure 3 shows the distribution of unprotected, undeveloped sensitive natural areas across community types for the 7-county region. The Affluent Residential category shows the highest percentage of total land classified as non-urban, unprotected, and sensitive (53 percent) while the Bedroom Developing and Developing Job Center categories are second and third (29 and 27 percent). However, because the latter two classes represent so much more total land area, Bedroom Developing and Developing Job Centers contain fully 85 percent of the 7-county region's non-urban, unprotected, and sensitive areas.

In sum, two of the five community types—Developing Job Centers and Bedroom Developing—contain 85 percent of the area's non-urban, unprotected and sensitive natural areas and are expected to receive 67 percent of the 7-county area's future growth.

Growth produces tax base but it also creates demand for infrastructure, schools and public services. Given that they possess just average fiscal resources, Developing Job Centers and Bedroom Developing Communities are unlikely to be able to protect these sensitive resources alone. The costs of accommodating the bulk of the region's future growth will make it very difficult to also expend scarce local fiscal resources on natural resources conservation.

Tradeoffs that jeopardize important, sensitive natural resource areas can be ameliorated based on how communities grow. This is illustrated by looking at how much currently undeveloped land will be needed if future growth occurs at densities like those of the past.

Table 5 compares the amount of currently available land that will be needed to accommodate new households in each of the community types if each new household consumes as much land as current households.¹³ "Available" is defined as non-urban, unprotected, non-sensitive land. The results show that, although the 7-county area as a whole has enough land to accommodate projected growth, there are shortfalls in available land for three of the six community classes. The most glaring shortfall is in those communities classified as Developing Job Centers—the classification expected to receive the most growth. If growth in these communities occurs at current densities, it would consume 98,000 more acres than is currently available, an area equivalent to the total areas of Minneapolis, St. Paul, and Bloomington combined (97,800 acres).

TRADEOFFS THAT JEOPARDIZE IMPORTANT, SENSITIVE
NATURAL RESOURCE AREAS CAN BE AMELIORATED
BASED ON HOW COMMUNITIES GROW.

Developing Job Centers contain about 118,000 acres of unprotected, non-urban, sensitive land. This means that, if these communities grow in the same manner they have grown in the past, one of two things must happen. Either, new growth will consume most or all of the remaining sensitive natural areas or new growth will be pushed further out into the fringes of the region. Developing job centers form a nearly complete ring around the region's core (Map 18). If they cannot accommodate all of the growth they are expected to receive, the most likely place for it to go is outward into the fringes of the 7-county region and the collar counties. It will be difficult for growth to be pushed inward since the communities inside the ring of Developing Job Centers—central cities, stressed suburbs and developed job centers—already are expected to grow at rates that will consume all, or nearly all available land there. Each of these community types shows either a shortfall or very small surplus of available land for development when sensitive natural areas are removed from development consideration (Table 5).



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Another way to view the potential tradeoffs facing the region is to look at the growth projections in the context of the Metropolitan Council's Metropolitan Urban Services Area (MUSA). The MUSA is perhaps the most important tool that the Council uses to guide development in the region. It defines the area within which the council provides important regional infrastructure like wastewater conveyance and treatment. The primary objective of the MUSA is to ensure orderly, contiguous development as the region moves outward.

The current MUSA line forms a rough circle around the core of the region, passing through Andover, Blaine and Lino Lakes in the north, Woodbury and Lake Elmo in the east, Lakeville and Savage in the south, and around the western end of Lake Minnetonka and through Plymouth and Maple Grove in the west. Sixty-three municipalities lie completely within the current MUSA and another 38 are partly inside it.¹⁴ Eighty-nine communities in the core region lie beyond the MUSA.

The bottom panel of Table 5 places projected population and calculations of available land in the context of the MUSA line. If the MUSA boundary were expanded out to include all of the area in the 38 municipalities currently split by the MUSA, this would add about 280,000 acres of new area inside the MUSA.¹⁵ If each new household projected for this part of the region by 2030 consumes land at rates like the recent past, then there will be a shortfall of more than 115,000 acres of available land inside the expanded MUSA to accommodate future growth. This is true even though the 280,000-acre increase assumed for the purposes of this assessment is substantially more than the Metropolitan Council currently plans for future growth.

The shortfall of 115,000 acres represents about 65 percent of the non-urban, unprotected, sensitive land in these communities. This reinforces the conclusions from the calculations based on the community classification: if the region grows the way it has in the past, future growth will either have to occur beyond the areas targeted for development by the Metropolitan Council—primarily within the current MUSA and in areas immediately adjacent to it—or it will consume much of the region's remaining unprotected, sensitive natural areas.



© Julie Westerlund, Minnehaha Creek Watershed District

The overriding conclusion from each of the simulations is that we must find new ways to grow if we want to both conserve the region's remaining sensitive natural areas and avoid inefficient expansion into the far reaches of the metropolitan area. To do this while accommodating the amount of growth that is currently projected to 2030, new development on currently underdeveloped land must occur at greater densities than in the past or as "infill" development on already developed land. Further, even if new development occurs in ways that consume less land than in the past, it still must be directed to non-sensitive areas as much as possible—natural resource planning must play a significant role in local and regional land-use planning.

Table 5: Land Consumption from Projected Household Growth, 2003 – 2030, by Community Type, 7-County Region

Community Type	Projected Household Growth 2003-2030	Average Households per Acre of Urbanized Land 2002	Land Consumption 2003-2020 at 2002 Densities	Available Land* 2002	Surplus/Shortfall
Central Cities	52,480	4.2	12,698	1,424	(11,274)
Stressed	58,311	2.3	29,521	9,248	(20,273)
Developing Job Centers	228,551	1.3	201,867	103,868	(97,999)
Bedroom Developing	69,304	0.5	138,107	489,204	351,097
Developed Job Centers	43,997	1.8	31,202	35,932	4,730
Affluent Residential	5,820	0.9	9,533	7,770	(1,763)
Total	458,463	1.7	422,928	647,446	224,517

Land Consumption from Projected Household Growth, 2003 – 2030, Relative to the MUSA Line

	Projected Household Growth 2003-2030	Average Households per Acre of Urbanized Land 2002	Land Consumption 2003-2020 at 2002 Densities	Available Land* 2002	Surplus/Shortfall
Inside the Expanded MUSA	366,083	2.0	257,380	138,656	(118,733)
Outside the Expanded MUSA	92,380	2.3	165,539	508,789	343,250
Total	458,463	1.7	422,928	647,446	224,517

* Available lands defined as land that is not urbanized, protected, or sensitive.

Sources: Computed from data from the Twin Cities Metropolitan Council, U.S. Bureau of the Census, University of Minnesota Remote Sensing and Geospatial Laboratory, and Minnesota DNR.

In the 6-county non-metropolitan region, the distributions of projected future growth and sensitive natural areas across community types are different from the metropolitan area in significant ways. Developed Job Centers and Resort areas are expected to grow the fastest (Figure 4). However, because current populations in Developed Job Centers are so much greater than in Resort areas, the bulk of this growth is expected in the Developed Job Centers—61 percent of projected growth is in these communities.

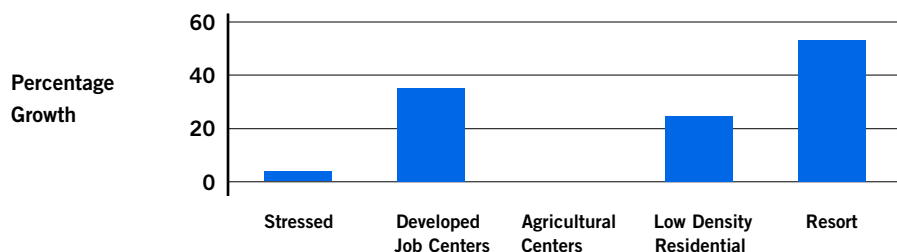
The greatest concentrations of unprotected, sensitive areas, on the other hand are in the Resort and Low Density Residential categories (Figure 5). Between them, these groups contain 83 percent of unprotected sensitive areas.

Thus, the greatest increases in population are expected in areas (Developed Job Centers) with lower than average concentrations of sensitive natural areas. However, the Resorts category both contains sensitive resources and is expected

to expand significantly in the future. Resort communities are among the least-densely settled parts of the 6-county non-metropolitan region. Such high concentrations of sensitive resources imply that careful planning and appropriate private management for sensitive natural resources are very important. The high amenity value of these places clearly creates the potential for growth beyond current projections leading to negative natural resources impacts, such as triple tier lake development. With local tax capacities only moderately above average for the 6-county non-metropolitan region and below the average for the Twin Cities metropolitan area, resort communities might also struggle if left to conserve sensitive areas on their own.

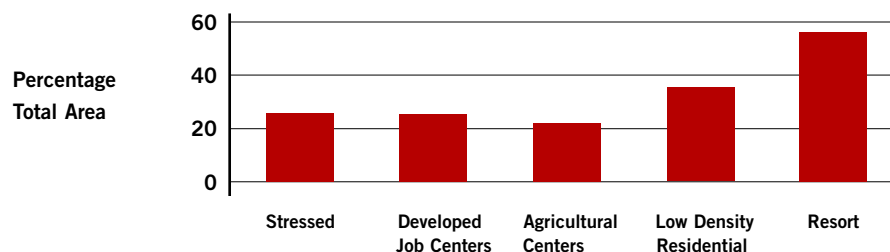
As in the metropolitan area, this assessment clearly suggests that if natural resources are to sustain the region's economy and communities into the future, serious consideration and efforts must be made at all levels to better plan and budget for the conservation of sensitive natural areas.

**Figure 4: Projected Growth, 2003 – 2030 by Community Type
6 Non-metropolitan Counties**



Source: See Map 12.

**Figure 5: Percentage of Total Area Unprotected and Sensitive by Community Type
6 Non-metropolitan Counties**



Source: See Map 4.

FINDINGS AND CONSERVATION OPTIONS FOR THE FUTURE

Central Minnesota's wealth of natural resources has been a driving force in the region's vitality since the times of European settlement. Formerly providing raw materials to support the region's growth, natural habitats today provide the foundation for the region's high quality of life. Increasingly, however, growth is threatening these very resources. The fact that natural resources both attract growth, and are often consumed by that growth, poses important and unaddressed conservation challenges.

Key Findings

Finding 1: DNR's Central Region retains a diversity of important natural habitats scattered throughout its region that provide conservation opportunities for the future. Although about 40 percent of Central Region's total surface area is considered as having sensitive natural resources, an estimated 14 percent of the entire region is covered with remnant land and water habitats of highest sensitivity that merit serious conservation consideration.

Finding 2: Water availability is an invisible and often forgotten resource constraint to growth and development, especially beyond the reach of the core region's deep aquifers. As development in the Twin Cities metropolitan area moves outward, it becomes increasingly reliant on shallow and poorly identified buried and surficial sand aquifers rather than deep aquifers. While surface water sources are available beyond the core region, there are increased costs and uncertainty associated with these water supplies.

Finding 3: Current patterns of low-density development are consuming land at a much greater rate than population is growing. In the core 7-county region, previously undeveloped land was converted to urban uses at a rate one and a half times the population growth rate between 1984 and 2002.

Finding 4: Continued low-density development potentially threatens sensitive natural areas throughout DNR's Central Region. In both the metropolitan and non-metropolitan portions of the region, water, woods, and open views are highly valued and sought after for the value they add to properties and quality of life. The increasing trend of dispersed, small job centers and home-based employment enables spread out, low-density living

that often jeopardizes sensitive natural habitats and scenic open spaces. If projected development in the metropolitan area, in particular, continues at densities like the recent past, the region faces a no-win situation resulting in inefficient expansion of the urbanized area, loss of much of the region's remaining, non-publicly-owned, sensitive natural areas, or a combination of the two.

Finding 5: The fiscal resources available to local governments vary widely across the region; many of the areas directly in the path of growth lack resources needed to protect sensitive natural areas on their own. Current forecasts project that 67 percent of growth in the 7-county core region during the next three decades will occur in middle class communities with modest fiscal capacities. These municipalities also contain 85 percent of the unprotected sensitive natural areas in the region.



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Conserving Sensitive Natural Areas in a Growing Region: Options for the Future

The intent of this assessment was to gain greater understanding of the implications of growth and development on remaining sensitive natural resource areas in DNR Central Region and to identify reasonable, proactive approaches that might be tried by the DNR and others in the region to conserve vital resources.

Reconciling the requirements of a growing metropolitan region with the need to conserve sensitive natural areas constitutes a complex challenge because:

- *Regional planning is fragmented in the Central Region, with only municipalities in the 7 core counties guided in their growth by the Metropolitan Council, with its staged provision of infrastructure – wastewater treatment facilities, sewers, roads, airports, regional parks and park reserves.*
- *The forces driving growth, development, and loss of sensitive resources differ between the 11-county metropolitan areas and the six non-metropolitan counties.*
- *The region retains a wide diversity of sensitive land and water habitat patches that both attract development, and increase land prices, making conservation measures very expensive.*

Many of the social and economic pressures on natural resources examined by this joint research effort span governmental boundaries, policy boundaries, and disciplinary boundaries. Potential solutions must do the same. Above all, it is imperative that there be increased cooperation among the many public and private actors in order to plan and budget for the conservation of sensitive natural habitats that contribute to a healthier, more secure regional future.

Working Across Boundaries

An important element of natural resources conservation in today's fragmented landscapes is recreating connections, whether it is to facilitate the movement of water, organisms, or air. Just as roadways and sewer systems work best when planned for at a regional scale, so to do natural habitats. Working across boundaries can produce better outcomes.

The primary planning issue in the 11-county metropolitan area is how to accommodate large numbers of new households without excessive expansion into sensitive areas that remain just beyond the already urbanized part of the region. In the near term, much of this growth is expected within the 7 counties, where the Metropolitan Council provides a regional voice in the planning process. However, the four collar counties are also expected to experience rapid growth. Coordinating growth planning in the collar counties with Metropolitan Council policies will become more and more important as the region expands. Bringing the collar counties into the Metropolitan Council's planning process is one way to do this. Short of that, greater cooperation among the collar counties to facilitate closer coordination with the Metropolitan Council, and the Mn DNR, is an alternative to achieve a balance between growth and conservation.

Closer collaboration between DNR's Central Region and the Metropolitan Council in the identification and acquisition of natural areas that are beyond the interest or financial wherewithal of local governments could markedly enhance regional conservation efforts. The DNR's 7-county regional ecological assessment (2003), funded in part by the Metropolitan Council, provides a sound foundation on which to base regional conservation collaboration within the metropolitan area.

Internally, DNR's Central Region needs to expand its identification and prioritization of natural resource areas deserving of protection and restoration to its entire 17-county region. By working with its various agency disciplines and local communities, sensitive resources in the path of rapid growth can be prioritized for attention.

In addition to regional templates for conservation action, the DNR, Metropolitan Council, and other conservation-oriented organizations need to encourage natural resource-based comprehensive planning at the local level

to support regional plans. Strong encouragement needs to be provided to every municipality to apply natural resources information in order to identify sensitive natural areas for conservation, to direct development to less sensitive areas, and to incorporate natural resources into plans, budgets, and designs for physical infrastructure like roads and utility corridors. In this way, communities will become more aware of the need to consider conserved natural areas as “must haves”, not just “nice things to have”.

In the more rural counties, well beyond the influence of the Metropolitan Council, development impacts due to low density development and redevelopment associated with recreational and retirement homes will continue to affect sensitive natural areas like lakeshores. In the non-metropolitan counties, where natural resources play a very important role, conservation will benefit from natural resource-based planning and more and better cooperation among DNR staff, private landowners, and county, municipal, and other local planning authorities.

Sharing the Costs of Conservation

In the context of rapid growth and increasing disparities in DNR’s Central Region, which were illuminated by this assessment, reducing the negative fiscal impacts of natural resources conservation becomes an important goal. While the many, important benefits derived from natural habitats, like flood and storm water control, water purification, and outdoors recreation are often regional in scope, many of the costs associated with conservation are borne locally. As a result, reliance primarily on local governments for natural resources conservation is likely to result in too little conservation from the point of view of the region (or state) as a whole.

Regional and statewide policies that regulate the behavior of local governments are unpopular among local officials because they usually involve costs to local governments, for which they are seldom compensated. More stringent regulations by regional or state agencies to conserve sensitive natural areas, especially at the edges of the core region where natural habitats still exist, almost certainly impose costs on local areas. Development in or near sensitive natural habitats is highly desirable, and limiting local prerogatives to develop sensitive areas imposes costs in the form of lost local tax base.

This suggests that responsibility for natural resource conservation and the associated costs need to be shared by many, including local units of government, regional institutions like the Twin Cities Metropolitan Council, state government, nongovernmental organizations, and the private sector.

The 7-county core of the metropolitan area already has a unique institution, which, if expanded, could meet at least some of the equity concerns raised by regional or state limitations on the development of sensitive lands by municipalities. The region’s Fiscal Disparities Program since 1971 has combined 40 percent of the increase in commercial-industrial tax base in each municipality into a regional pool. The pooled tax base is then redistributed to municipalities according to their population and total market value of property. The lower a place’s market value per capita, the more tax base it receives from the pool. This means that municipalities that forego development of sensitive lands (and the market value increases associated with that development) are compensated to some extent for that decision. Tax-base sharing effectively encourages sensible land use planning, especially when governance is as fragmented as it is in the Central Region.¹⁶

Coupling more regional guidance of local land use decisions with expansion of the Fiscal Disparities Program would reduce the potential costs of conserving sensitive natural areas in places rich in resources. For instance, the current Fiscal Disparities Program clearly helps the developing suburbs that are most likely to face difficult trade-offs between development and resource conservation in the coming years. Of the 102 municipalities in the 7-county core region in the Developing Job Center and Bedroom Developing classifications, 88 (or 86 percent) currently receive more tax base from the pool than they contribute.

Similarly, expanding Fiscal Disparities to include the next ring of counties likely to face these tradeoffs—Chisago, Isanti, Sherburne and Wright—would benefit the vast majority of places in those counties as well. If they had been part of the program from its inception, 78 out of the 88 municipalities would now be receiving more tax base from the pool than they contributed and a typical municipality would receive enough to increase its tax capacity by 11 percent. These communities now contain 80 percent of the population in the collar counties.¹⁷

In addition to the Fiscal Disparities Program, a variety of other fiscal incentives are also available to ease local costs associated with natural resource conservation in the Region. These include:

- *Revising the formula for the Local Government Aid system to compensate communities most affected by conservation efforts;*
- *Encouraging the Metropolitan Council to broaden its Regional Parks and Open Space mission to include acquisition of sensitive natural areas for purposes other than parks and park reserves, such as education and passive recreational opportunities.*
- *Encouraging the Minnesota Legislature to increase funding to the Minnesota Department of Natural Resources, Metropolitan Council's Parks and Open Space System, and to local units of government to accelerate land and water conservation in high growth areas of the region.*
- *Provision of monetary incentives to local units of government to conduct natural resource/land cover inventories to be used as the basis for natural resource-based local comprehensive planning;*
- *Participation in Minnesota DNR's Metro Greenways Program, the Metro Conservation Corridors Partnership, and Minnesota Habitat Corridor Partnership;*
- *Providing various kinds of tax incentives to private landowners to conserve land and water.*



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Bridging the Gaps

Conserving sensitive resources as the region grows into the future requires more than collaborative planning and financing for land conservation. It also requires new information, analyses of changing conditions, provision of assistance, and creative and innovative changes to enhance desired outcomes. While there are many gaps to address, some key issues to be considered, as suggested by this study, include:

- *Support for accelerated groundwater mapping and monitoring in selected fast-growth communities where water supply is constrained in order to avoid inefficient growth;*
- *Seed funds to support local land cover inventories for purposes of land use planning;*
- *Community outreach to fast growth communities in DNR's Central Region in order to generate greater public awareness of the importance of public and private conservation efforts to overall community health;*
- *Development of local examples that economically justify low impact development and conservation design, especially to fiscally strapped communities; and*
- *Changes to regulations, ordinances, codes, and environmental review that enable a shift from conventional planning and design in support of more creative low impact design and conservation development. Adjustments to the environmental review process could also make the review process more proactive, less burdensome, and more effective at conserving habitat by addressing area-wide rather than site-by-site development impacts.*

Endnotes

- ¹ Orfield, Myron, *American Metropolitcs: The New Suburban Reality*, Brookings Institution, Washington D.C. 2002.
- ² Metropolitan Council, news release, July 19, 2005.
- ³ Consistent urbanization data were not available over the full time period for the 17-county region.
- ⁴ See Yuan, Fei, Kali E. Sawaya, Brian C. Loeffelholz and Marvin E. Bauer, “Land Cover Classification and Change Analysis of the Twin Cities (Minnesota) Metropolitan Area by Multitemporal Landsat Remote Sensing,” *Remote Sensing and the Environment* 98 (2005), 317-328 for a complete description of the methods used to classify land uses.
- ⁵ The Census Transportation Planning Package was used to find the job centers and analyze commuting patterns.
- ⁶ Inner suburbs are defined as municipalities bordering one of the central cities. Middle suburbs are municipalities bordering an inner suburb. Outer suburbs are the remainder.
- ⁷ The commuter-sheds were generated from Census Transportation Planning Package journey to work data shown by Traffic Analysis Zones (TAZ). TAZ’s are usually slightly smaller than census tracts. The commuter-sheds were derived by finding the circumference of TAZ’s around the job center with the relevant median travel time and smoothing the contour using Inverse Distance Weighting (IDW) interpolation. IDW estimates values for areas by averaging from surrounding values of point samples, giving greater weight to nearby points. The commuter-shed boundaries were interpolated from TAZ commuting times, using the TAZ centroids as the point samples. IDW was used with the Geostatistical Analyst extension to ESRI’s ArcMap.
- ⁸ Minnesota Department of Administration, Office of the State Demographer; “Projected Population to 2030 for Cities and Townships Outside the Twin Cities Area”; <http://server.admin.state.mn.us/resource.html?Id=7376>
- ⁹ See <http://www.dnr.state.mn.us/rsea/map.html>.
- ¹⁰ See “Voters being asked to raise taxes for parks,” Star Tribune, November 2, 2005, p. B1.
- ¹¹ Grouping was accomplished using the K-means clustering procedure in SPSS. For more on cluster analysis in general, and K-means clustering in particular, see *StatSoft, Inc. Electronic Statistics Textbook* (Tulsa, OK: StatSoft, 2002) at www.statsoft.com/textbook/stathome.html.
- ¹² All variables were standardized—expressed as the number of standard deviations from the mean—to minimize scale effects.
- ¹³ Densities and land consumption were calculated separately for each municipality. Density was estimated as 2002 households divided by 2002 land classified as urbanized. Land consumption was estimated by this density times the number of projected new households for the municipality. Total land consumption for a community type is the sum of estimated land consumption for each of the municipalities in the group.
- ¹⁴ Municipalities with 97 percent or more of their land inside the MUSA were treated as completely within the MUSA for these calculations.
- ¹⁵ The Metropolitan Council currently plans to expand the MUSA by significantly less—by 121,637 acres in 2020 or about 21 percent of current area inside the MUSA. (This was calculated with GIS data from the Metropolitan Council at <http://www.datafinder.org>.) However, since the planned MUSA expansion does not follow municipality boundaries while the population projections do, it is not possible to match population changes and MUSA changes acre by acre.
- ¹⁶ See Burchell, Robert W., Anthony Downs and Sahan Mukherji, *Sprawl Costs: Economic Impacts of Unchecked Development*, Island Press, Washington D.C. 2005 and Orfield, Myron, *American Metropolitcs: The New Suburban Reality*, Brookings Institution, Washington D.C. 2002.
- ¹⁷ The findings for the current program and the expansion to the collar counties were calculated from work performed by Steve Hinze of the Research Department of the Minnesota House of Representatives.



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