



DECONSTRUCTING  
**DEPOPULATION**

RURAL CHARACTERISTICS & POPULATION CHANGE

DALE KNAPP, DIRECTOR

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# Executive Summary

## Deconstructing Depopulation

In a previous report, *Forward Analytics* examined rural population loss and its economic consequences over the past 30 years. With two-thirds of Wisconsin's rural counties losing population between 2010-2018, understanding the sources of the decline is critical for policymakers looking to stem those population losses. This report looks at rural population decline through two lenses: the source of the loss and the county characteristics that are related to population losses and gains.

There are two possible sources of population decline. Natural loss occurs when the number of deaths in a county exceeds the number of births. Net outmigration occurs when the number of residents moving out of a county exceeds those moving in. During 2010-2018, 92% of rural population loss nationally was the result of net outmigration. Wisconsin's experience was different. Less than half of the loss was due to outmigration, while 53% was due to natural decline, or fewer births than deaths.

While a wide range of county characteristics were examined, only six had significant correlations with population loss. A county's population change over the previous decade was the most important. Eighty-eight percent of counties that lost population in 2000-2010 also declined during 2010-2018. Among those that added residents in the 2000s, just over half also grew over the ensuing eight years. A similar pattern emerged for population change in 2000-2010 relative to gains or losses during the 1990s. In other words, it appears that decline begets more decline.

Among the other county characteristics associated with population change, three are out of the control of state and local policymakers: the presence of a medium-sized city, proximity to a metropolitan area, and desirable natural amenities. The first two highlight the overall trend toward urban growth. Having a city between 10,000 and 50,000 residents can help slow rural population loss. Rural counties bordering a metro area have the rural lifestyle some people prefer yet offer access to urban amenities. That access appears to stem decline as well. Natural amenities such as lakes, rivers, forests, and mountains also appear to insulate counties from population loss. Counties with the most natural amenities grew 4.4% during 2010-2018, while those with the fewest declined almost 3%.

Two factors that help slow rural decline can be affected by state and local policymakers: a diverse industry mix and access to high speed internet. Having a dominant industry that is growing can be advantageous for a county. However, it can also leave it vulnerable when an economic shock affects the industry or the major employer in that industry relocates. Access to high speed internet is critical for business and desirable for residents, particularly young adults. Rural counties with greater broadband coverage tended to add residents or show slower population decline.

That so few controllable factors were statistically associated with growth or decline is a bit troubling, but it does not necessarily mean that there is little that state and local officials can do to stem population loss. The factors examined in this study explain a third of the variation in rural population change. There may be actions that have helped lessen, but are not picked up by the measures studied. That will require a deeper look at individual counties that have bucked the trend of rural population loss.

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# Deconstructing Depopulation

## Rural Characteristics & Population Change

Dale Knapp, Director

Rural depopulation is a growing challenge. Two thirds of rural counties in Wisconsin and across the country lost population during 2010-2018. Nationally, that percentage was up from 30% during the 1990s and 47% during 2000-2010. Wisconsin had no rural counties lose population in the 1990s, but the state approached the U.S. average during 2000-2010 with 44% of its rural counties shedding residents.

Depopulation is associated with a variety of economic challenges. As a previous *Forward Analytics* report<sup>1</sup> showed, declining population can lead to a shrinking workforce, fewer jobs and businesses, and slower income growth.

For Wisconsin, the good news is that rates of decline in the 31 counties that lost residents since 2010 were somewhat smaller than in the rest of the country. For example, only Price County was among the 30% of counties nationally with the largest population declines. If Wisconsin had mimicked the nation, Price County would have been joined by 13 of its Wisconsin counterparts in the bottom 30%.

That good news is not a reason for state and local officials to be complacent. While rural depopulation may not have been as severe in Wisconsin as in other states, that could change over the next decade.

This report builds on a prior *Forward Analytics* study by exploring the sources of population loss and the county characteristics associated with growth and decline. In some ways, Wisconsin's

experience differed from the national experience, particularly during 2010-2018. That is especially true in terms of the source of the decline.

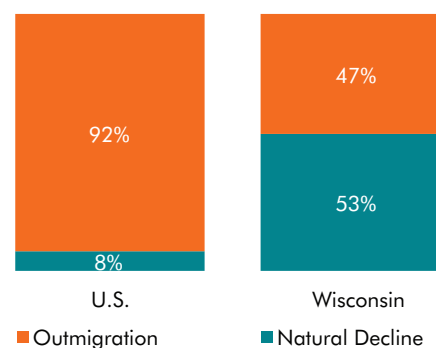
### SOURCES OF CHANGE

At its most basic, population change results from either natural change or migration. A natural decline in population occurs when deaths exceed births. Migration patterns also impact population numbers. A county suffers from net outmigration when the number of residents leaving exceeds the number moving in.

In rural counties that lost population during 2010-2018, the composition of loss in Wisconsin differed from the composition elsewhere in the nation, both in the aggregate and at the individual county level.

Nationally, more than 90% of the decline was due to net outmigration (see Figure 1); just 8%

FIGURE 1: Sources of Population Loss\*  
% of Rural Population Loss Due to Net Outmigration and Natural Decline, 2010-2018



\*Includes only counties with declining population during 2010-2018. Wisconsin had 31 rural counties that lost population and 15 that added residents.

<sup>1</sup> "The Rural Challenge: Depopulation and Its Economic Consequences," *Forward-Analytics.net*.

During 2010-2018, the source of rural population loss in Wisconsin was split almost equally between natural decline and outmigration.

was from the number of births lagging deaths. In Wisconsin, the loss was split fairly evenly between net outmigration (47% of the loss) and natural decline (53%).

#### By County

The aggregate numbers tell only part of the story. Some counties experienced both a natural decline in population and net outmigration of residents, while others dealt with just one of the two.

Among Wisconsin's 31 shrinking rural counties, 13 (42%) faced both sources of decline during 2010-2018 (gray bars in Figure 2). Another 12 (39%) dealt only with natural declines (orange bars), while six (19%) struggled only with outmigration (teal bars). Figure 3 shows how all rural Wisconsin counties, including those that added residents, fared in terms of natural population change and net migration during 2010-2018.

Like the aggregate figures, the county by county numbers show Wisconsin's experience differed from the nation's. Across the country, 53% of

FIGURE 2: Nature of Rural Population Change  
% of Declining Counties by Source of Population Loss,  
2010-2018

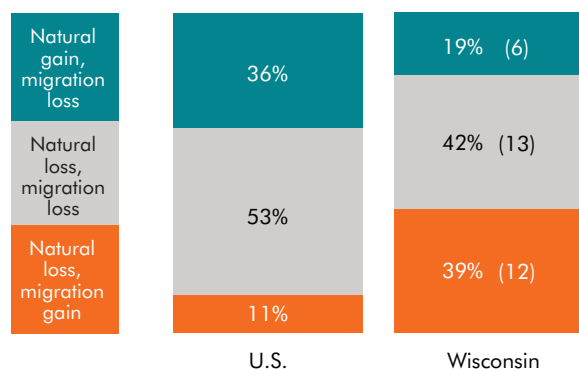
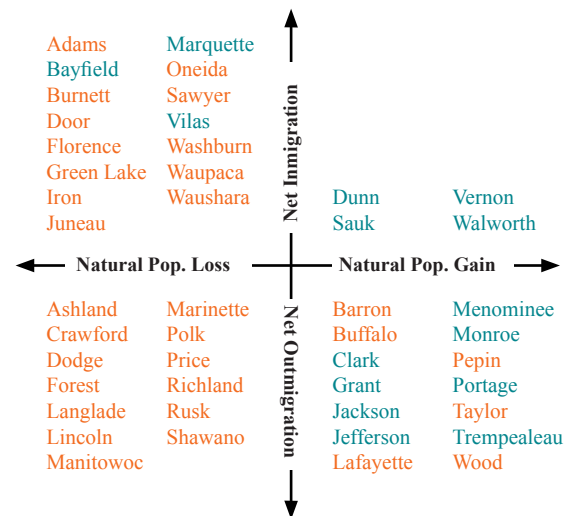


Figure 3: Decomposing Rural Pop. Change  
Natural Change and Net Migration, 2010-2018  
Total Population: Gains, Losses



counties with population losses faced both natural losses and net outmigration, compared to 42% in Wisconsin. The share dealing with only net outmigration was also higher nationally than in Wisconsin (36% vs. 19%).

The teal and gray bars combined reflect the share of counties that dealt with migration losses, either solely or in combination with natural decline. Across the country, 89% of declining counties faced a net outmigration of residents, compared to 61% in Wisconsin.

Rural counties in Wisconsin struggled more with natural declines, with 81% of the 31 counties facing more deaths than births (gray plus orange bars in Figure 2). Nationally among declining rural counties, 64% faced the issue of natural decline.

Among Wisconsin's 15 growing rural counties, 27% (4) were fortunate to have experienced both natural population gains and net immigration. Nationally, 40% were so fortunate. Another 53% (8) in Wisconsin and 30% nationally faced some net outmigration, but natural increases more than compensated for those losses. The remaining 20% (3) in Wisconsin and 30% nationally endured the opposite scenario, net immigration sufficient to overcome natural population declines.

#### Outmigration Leads to Natural Decline?

While natural change and migration are distinct sources of population change, the two can be

related over time as changing migration patterns sometimes lead to natural population declines through the outmigration of young women.

Births are driven largely by the 15 to 44 year old female population and deaths are mostly affected by the senior population. However, young females appear to act more in line with overall migration patterns than do seniors.<sup>2</sup> Thus, a general pattern of outmigration impacts births more than deaths; fewer births eventually can turn natural population gains to natural declines.

One implication of this relationship is significant: depopulation can begin to snowball. A county might experience natural gains in the number of residents, but lose population because outmigration is greater. Eventually, with fewer young women, births begin to fall and natural population growth turns to natural decline, exacerbating the population loss.

This is one mechanism in which depopulation can lead to further depopulation or population growth becomes decline.

#### COUNTY CHARACTERISTICS & GROWTH

Other factors influence, or are at least associated with, population change. Based on a statistical analysis of 2000-2010 and 2010-2018 population changes, six characteristics are identified as being the most influential.

##### *Prior Period Change*

A county's experience with population change in the prior period best explains population change in the current period. If a county lost population during the 1990s, it likely lost additional people during 2000-2010. If it shed residents in 2000-2010, it likely did the same during 2010-2018.

For example, of the rural counties nationally that lost residents during 1990-2000, four of five also lost population during 2000-2010. The reverse was also true, but to a lesser degree. Of those that added residents during the 1990s, two-thirds also added population during 2000-2010.

During the more recent 2010-2018 period, those percentages shifted slightly. Eighty-eight percent

2 The 2010-2018 correlation between migration rates and changes in number of young females was 0.73, but just 0.34 for the senior population. A correlation of "1" indicates a perfect positive relationship; "-1" indicates a perfect negative relationship; and "0" indicates no relationship between overall migration and migration of subpopulations.

The best predictor of a county's population change over a decade is that county's growth or decline in the prior decade.

of counties that declined in 2000-2010 also lost population during 2010-2018. Among those that added residents in the 2000s, just over half grew over the ensuing eight years. In other words, during 2010-2018, population decline became more persistent and growth less persistent.

However, this relationship is far from perfect. A 1% decline in one decade does not necessarily mean a similar drop in the next. Statistical analysis shows that when other factors are accounted for, a 1% population decline during 2000-2010 was associated with a 0.3% decline in 2010-2018. Other factors help explain whether a county performed better or worse than that.

##### *Uncontrollable Factors*

County officials have no control over several factors that are associated with depopulation:

- the "urbanization" of the county;
- the county's proximity to a metro area; and
- the county's natural amenities.

This analysis shows that counties with a medium-sized city generally outperformed other rural counties on population change. Counties adjacent to a metropolitan area also outperformed those that are more remote. Finally, the availability of natural amenities, such as lakes, forests, and warm weather also helped stem population decline.

**Urbanization.** When one hears the word urban, large cities or metropolitan areas often come to mind. In federal government lingo, a metropolitan area is a county or group of counties that are

The presence of a medium-sized city or proximity to a metropolitan county can help limit a county's population decline.

economically integrated, with the largest city in the area having at least 50,000 residents. A metropolitan county may not have a large city, but it must be economically integrated with a county that has one.

The federal government has a similar definition for a micropolitan area. The only difference is the largest city in the area must be between 10,000 and 50,000 people. In this study, rural counties are defined as those not part of a metropolitan area; thus, micropolitan counties are considered rural along with counties that are neither metropolitan nor micropolitan.

Across the nation during 2010-2018, micropolitan counties showed more resistance to depopulation than rural counties with no medium or large cities. The population in micropolitan counties increased 0.3% compared to a 1.7% loss among other rural counties.

Not all micropolitan counties added residents. The median micropolitan county lost 0.6% of its population, but that drop was mild compared to the median 2.7% loss for other rural counties.

Statistical analysis shows that, after accounting for other factors, micropolitan counties outperformed other rural counties by about two percentage points.

Wisconsin has 14 micropolitan counties: Dodge, Dunn, Florence (part of the Iron Mountain micropolitan area), Grant, Jefferson, Lincoln, Manitowoc, Marinette, Menominee (part of the Shawano County micropolitan area), Portage, Sauk, Shawano, Walworth, and Wood. Since 2010, half of these counties lost population compared to 75% of the state's remaining rural counties.

*Proximity To Metro Area.* For rural counties that are not micropolitan, proximity to a metropolitan area can help limit decline. These counties combine the rustic setting that many Americans desire with reasonable access to the cultural and recreational amenities offered in urban areas.

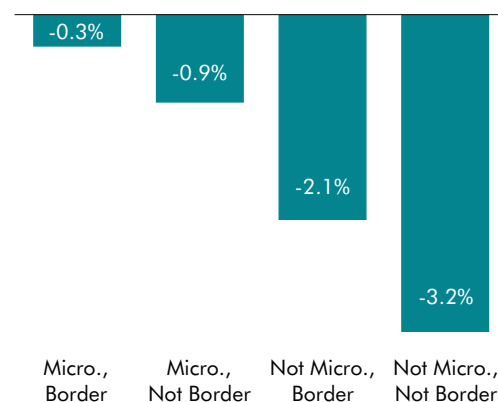
During 2010-2018, the total population in rural counties (including micropolitan counties) bordering a metropolitan area remained essentially unchanged. In those that did not border a metro area, populations declined 1.3%.

Dissecting rural counties into four groups shows the impact of urbanization locally (micropolitan county) and regionally (bordering a metro area).

As previously mentioned, micropolitan counties generally shed fewer residents than other rural counties. However, micropolitan counties that border a metropolitan area (both local and regional urbanization) performed the best, with a median decline of just 0.3% (see Figure 4). More isolated micropolitan counties – locally but not regionally urbanized – experienced a median decline three times larger (0.9%).

The largest population losses were in counties that were neither micropolitan nor bordered a metropolitan area. Median loss was over 3%, or about a percentage point more than isolated counties with a medium sized city.

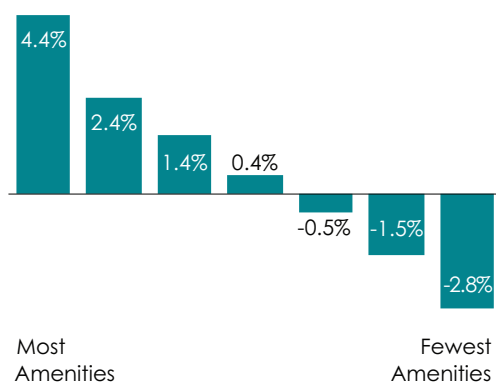
FIGURE 4: Urbanization and Population Change  
Median Change by Whether County is Micropolitan and Whether it Borders a Metropolitan County, 2010-2018



*Natural Amenities.* People remain in or move to rural areas for a variety of reasons. It may be to be near family or for a less hectic lifestyle. For many, it is also the lakes, forests, and mountains that make rural settings attractive.



FIGURE 5: Natural Amenities Limit Decline  
Median Population Change by Amount of Natural Amenities, 2010-2018



While these amenities are hard to measure, the U.S. Department of Agriculture publishes an amenities scale based on weather, topographic variation, and water area. A high score indicates high levels of these amenities; a low score indicates low levels.

Generally, counties with more natural amenities were able to stave off population decline better than those with fewer amenities. Rural counties that lacked natural amenities often saw significant population losses. As Figure 5 shows, rural counties with the most amenities experienced a median population gain of 4.4%. As natural amenities decline (moving to the right in the figure), median population gains fall and then turn to decline. For counties with the fewest amenities, median population loss was 2.8%.

This measure includes a relatively large weather factor. Wisconsin has many forests and lakes that are attractive, but cold and snowy weather in winter tends to negate the positive impact of those natural attractions. Largely because of weather, Wisconsin's rural counties were spread among the three groups with the fewest amenities.

If weather were removed, Wisconsin would have 17 rural counties with topographical and water amenities ranked in the top 30% of counties.

#### Industry Diversification

Natural amenities are an example of a strategic advantage that some counties have. Counties can exploit these amenities by creating a strong tourism industry that may help with job creation and population growth.

The relatively recent oil boom in some counties in North Dakota led to large population gains, job growth, and rising incomes.

These strategic advantages can sometimes turn into disadvantages. Coal mining in West Virginia and other parts of the country was important for those local economies for decades. However, as the nation moved away from coal as an energy source, many of those mines shut down. In 2000, West Virginia had nearly 300 operating coal mines. By 2018, the number was just 155. While not the only reason, the decline of coal was part of the reason West Virginia's rural counties lost 5.8% of their population during 2010-2018, the third greatest decline among the states.

This highlights the reasons a diverse industry base is important. Relying too heavily on one industry can have benefits, but sometimes those benefits can be relatively short-lived.

Industry diversity is measured using the Chmura index, which essentially compares a county's industry mix with the nation's. A low index value

Table 1: Industry Diversity in Wis. Rural Counties  
Ranking Among Rural Counties Nationwide

Top 20%		
Ashland	Jefferson	Sauk
Barron	Manitowoc	Walworth
Dunn	Oneida	Wood
Grant	Portage	
Top 40%		
Crawford	Lincoln	Shawano
Dodge	Marinette	Vernon
Door	Pepin	Vilas
Green Lake	Polk	Washburn
Juneau	Sawyer	Waupaca
Langlade		
Middle 20%		
Bayfield	Marquette	Rusk
Burnett	Monroe	Taylor
Iron	Price	Waushara
Jackson	Richland	
Bottom 40%		
Adams	Clark	Trempealeau
Buffalo	Lafayette	
Bottom 20%		
Florence	Forest	Menominee

indicates more industrial diversity; a higher index value indicates less diversity.

This analysis shows that after accounting for other factors, a diverse industry mix is associated with less population decline. However, its effect on population change has less impact than the factors previously discussed. That said, it is one of the few factors in which policymakers can have some influence.

The Chmura index shows that many of Wisconsin's rural counties are well diversified. Eleven of Wisconsin's 46 rural counties rank among the top 20% of rural counties nationally on this measure (see Table 1 on page 7). Another 16 rank among the top 40%.

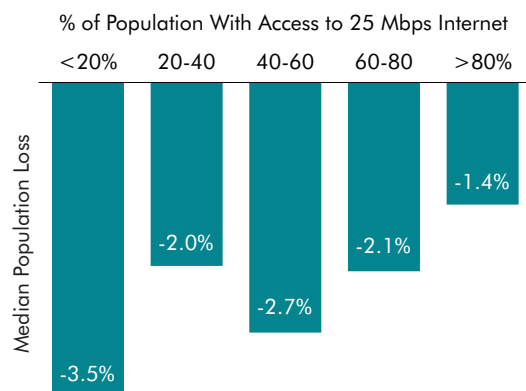
#### High-Speed Internet

Increasingly, businesses in nearly all industries need access to reliable high-speed internet. Individuals depend on broadband for everyday activities. Lack of access to reliable broadband is one reason many young adults are not choosing to live in rural locations.

While consistently available in urban areas, the availability of high-speed internet (at least 25 Mbps) in rural areas varies widely. Broadband access appears to play a role in limiting population loss.

In 737 rural counties across the country, more than 80% of residents can avail themselves of high-speed internet. In these counties, median population loss during 2010-2018 was 1.4%, with just over 40% of those counties adding residents (see Figure 6).

FIGURE 6: High-Speed Internet Slows Pop. Loss  
Median Population Change by Broadband Access,  
2010-2018



In the 220 counties in which less than 20% of residents had access to high speed internet, median population loss was 3.5%, with a quarter of the counties gaining residents.

When other factors are accounted for, this analysis shows that a 10 percentage point decrease in broadband access is associated with population loss of 0.2%. While the impact does not appear to be large, broadband access is one area that state and local officials can influence in an effort to slow rural population loss.

#### FINAL THOUGHTS

When the relationship between population decline and a wide range of county characteristics are examined, only a few are highly correlated. Perhaps the most troubling finding in this report is that prior population decline portends more decline. Since both in Wisconsin and nationally about two-thirds of rural counties lost population during 2010-2018, this finding bodes ill for rural counties over the next decade.

Of the other factors that appear to limit decline, several are unalterable features of some counties: the presence of a medium-sized city; proximity to a metropolitan area; and desirable natural amenities. Two other factors that help slow rural decline can be affected by state and local policymakers: a diverse industry mix and access to high-speed internet.

That other controllable factors did not show significant relationships with growth or decline is a bit troubling. Does this mean that there is little that state and local officials can do to stem declining population? Not necessarily. The characteristics examined in this study explain less than a third of the variation in rural population change. It might be that there are policies that have been enacted or actions that have been taken in individual counties that helped lessen decline or resulted in population growth.

Identifying those policies or actions requires a deeper look at individual counties that have bucked the trend of rural population loss. That will be explored in a future report.

A special thank you to Jack Votava who contributed to this project. A student at the University of Chicago, Mr. Votava interned at Forward Analytics in the summer of 2019 and compiled and analyzed much of the data used in this report. We are grateful for his work.

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22 E. Mifflin St., Ste. 900  
Madison, WI 53703  
608.663.7188  
forward-analytics.net