

## Demographic Aftermath of the 1997 Red River Valley Floods

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In the spring of 1997, massive flooding in the Red River Valley affected communities in northwestern Minnesota, northeastern North Dakota and the Canadian Province of Manitoba. News coverage featured dramatic pictures of flames and water as buildings in the flooded streets of downtown Grand Forks, North Dakota, caught fire and burned. More than two years later, memories of the flood remain vivid, especially for residents of the area.

It was difficult to read about the widespread flood destruction without imagining that many people would simply leave the area. Yet population figures from both the Minnesota State Demographic Center and the U.S. Bureau of the Census show surprisingly little flood effect. Grand Forks County, North Dakota and Polk County, Minnesota appear to be partial exceptions to this statement. Estimates for these two counties show an abrupt drop in population that is almost certainly attributable to the flood. School enrollment and employment data concur in showing a substantial flood effect in Polk County.

Census Bureau and State Demographic Center figures diverge, however, in their assessment of where the Polk County losses have occurred. The Demographic Center estimates show most of the losses occurring in areas directly affected by the flood, while

the Census Bureau estimates show the declines more evenly dispersed throughout the county. In this report, we attempt to weigh the likely accuracy of these two sets of estimates by discussing the methodologies that underlie them. We conclude that the Demography estimates are better suited to pick up population change occurring in flood-affected areas. On balance, it seems likely that most of the population decline in Polk County took place in the city of East Grand Forks.

In recent years many other areas in the Red River Valley besides Polk County have lost population, but these declines appear to be part of a long-term trend with only a tangential relationship to the flood.

### **Areas covered in this report**

The focus in this report is on the seven Minnesota counties (Clay, Kittson, Norman, Marshall, Polk, Traverse and Wilkin) affected by the Red River flood. The Land Management Information Center at Minnesota Planning provided a list of the cities and townships in the flood area. We do not have similar information for North Dakota. In North Dakota, we simply report estimates for the counties bordering the Red River.

### **County population trends**

Census Bureau estimates show population declines in all seven Minnesota flood counties in recent years. With the exception of Polk County, however, there was no sudden single-year decline that might be attributed to the flood. In Polk County, where the city of East Grand Forks is located, the census numbers show a rather large decline, from

## Red River Flood Area

Listed below is a list of flood-affected communities identified by the Minnesota Land Management Information Center at Minnesota Planning in April, 1997. This area was determined by taking all of the townships and cities along the Red River, and adding other communities identified through media sources as being affected. This list was never revised or updated. The area included comprises over one million acres (1,009,286) and 70 cities and townships with a total estimated population of 65,538.

### Clay County

Georgetown Twp.  
Georgetown City  
Kragnes Twp.  
Oakport Twp.  
Moorhead City  
Moorhead Twp.  
Dilworth City  
Kurtz Twp.  
Holy Cross Twp.  
Comstock City

### Kittson County

St. Vincent Twp.  
St. Vincent City  
Hill Twp.  
North Red River Twp.  
South Red River Twp.  
Teien Twp.  
Hallock City  
Hallock Twp.  
Thompson Twp.  
Humboldt City

### Marshall County

Eagle Point Twp.  
Fork Twp.

### Marshall, cont.

Big Woods Twp.  
Oak Park Twp.  
Oslo City

### Norman County

Shelly Twp.  
Shelly City  
Halstad Twp.  
Halstad City  
Hendrum Twp.  
Hendrum City  
Lee Twp.  
Perley City  
Ada City  
Hegne Twp.  
McDonaldsville Twp.  
Anthony Twp.

### Polk County

Roome Twp.  
Vineland Twp.  
Bygland Twp.  
Tynsid Twp.  
Climax City  
Hubbard Twp.  
Neilsville Twp.  
Higdem Twp.  
Esther Twp.

### Polk, cont.

East Grand Forks City  
Grand Forks Twp.  
Rinehardt Twp.  
Sullivan Twp.  
Sandsville Twp.  
Huntsville Twp.

### Traverse County

Taylor Twp.  
Monson Twp.  
Wheaton City  
Lake Valley Twp.

### Wilkin County

Breckenridge City  
Breckenridge Twp.  
Connelly Twp.  
McCauleyville Twp.  
Kent City  
Roberts Twp.  
Wolverton Twp.  
Wolverton City  
Nordick Twp.  
Brandrup Twp.  
Campbell Twp.  
Campbell City  
Doran City  
Tenney City

32,464 in 1996 to 30,594 in 1998. From 1995 to 1996 there was a decline of only 9, followed by declines of 491 and then 1,019 in the next two years. This abrupt and substantial drop is consistent with a flood effect.

Polk County also stands out for flood effect in the Minnesota State Demographic Center estimates. The total population loss is not as large as in the Census Bureau estimates and is concentrated in a one year period, 1997 to 1998, rather than occurring over two years. The Demography estimates have Polk County at 32,904 in 1995, 32,885 in 1996, 32,808 in 1997 and then dropping to 31,765 in 1998.

Outside Polk County, the State Demographic Center estimates show declining population in all the flood region counties except in Clay County (Moorhead), where there was a small increase. Population loss has increased somewhat in Norman and Marshall counties, but this could be a broad trend rather than a flood effect. Given the small population base, it is hard to tell.

For North Dakota, only Census Bureau estimates are available. These show a large population drop in Grand Forks County, where the city of Grand Forks is located. The county population fell from 70,900 in 1996 to 66,869 in 1998, a decline of more than 4,000 or almost 6 percent.

Outside Grand Forks County, North Dakota did not show much flood effect. Cass County (Fargo) continued to show strong growth, as it has throughout the decade.

**Comparison of Census and State Demographic Center Estimates  
 in Flood-affected Counties (Revised State Demographic Center Estimates)**

County	1995	1996	1997	1998	Change 1995-96	1996-97	1997-98
<b>CLAY</b>							
Census Bureau total	51,814	51,682	51,742	51,599	(132)	60	(143)
Flood affected	39,221	39,144	39,182	39,017	(77)	38	(165)
Unaffected	12,593	12,538	12,560	12,582	(55)	22	22
Demography total	52,540	52,895	52,994	53,183	355	99	189
Flood affected	39,799	40,028	40,133	40,243	229	105	110
Unaffected	12,741	12,867	12,861	12,940	126	(6)	79
<b>KITTSOON</b>							
Census Bureau total	5,454	5,413	5,363	5,322	(41)	(50)	(41)
Flood affected	2,020	2,005	1,986	1,968	(15)	(19)	(18)
Unaffected	3,434	3,408	3,377	3,354	(26)	(31)	(23)
Demography total	5,572	5,535	5,510	5,455	(37)	(25)	(55)
Flood affected	2,064	2,048	2,037	1,995	(16)	(11)	(42)
Unaffected	3,508	3,487	3,473	3,460	(21)	(14)	(13)
<b>MARSHALL</b>							
Census Bureau total	10,558	10,628	10,510	10,313	70	(118)	(197)
Flood affected	754	758	750	735	4	(8)	(15)
Unaffected	9,804	9,870	9,760	9,578	66	(110)	(182)
Demography total	10,733	10,716	10,676	10,465	(17)	(40)	(211)
Flood affected	769	764	762	695	(5)	(2)	(67)
Unaffected	9,964	9,952	9,914	9,770	(12)	(38)	(144)
<b>NORMAN</b>							
Census Bureau total	7,703	7,761	7,653	7,535	58	(108)	(118)
Flood affected	3,941	3,965	3,909	3,852	24	(56)	(57)
Unaffected	3,762	3,796	3,744	3,683	34	(52)	(61)
Demography total	7,885	7,876	7,832	7,636	(9)	(44)	(196)
Flood affected	4,052	4,047	4,028	3,903	(5)	(19)	(125)
Unaffected	3,833	3,829	3,804	3,733	(4)	(25)	(71)
<b>POLK</b>							
Census Bureau total	32,473	32,464	31,973	30,954	(9)	(491)	(1,019)
Flood affected	11,373	11,401	11,254	11,017	28	(147)	(237)
Unaffected	21,100	21,063	20,719	19,937	(37)	(344)	(782)
Demography total	32,904	32,885	32,808	31,765	(19)	(77)	(1,043)
Flood affected	11,575	11,576	11,603	10,593	1	27	(1,010)
Unaffected	21,329	21,309	21,205	21,172	(20)	(104)	(33)
<b>TRAVERSE</b>							
Census Bureau total	4,284	4,284	4,265	4,248	0	(19)	(17)
Flood affected	2,153	2,157	2,149	2,146	4	(8)	(3)
Unaffected	2,131	2,127	2,116	2,102	(4)	(11)	(14)
Demography total	4,374	4,374	4,331	4,250	0	(43)	(81)
Flood affected	2,236	2,241	2,242	2,216	5	1	(26)
Unaffected	2,138	2,133	2,089	2,034	(5)	(44)	(55)
<b>WILKIN</b>							
Census Bureau total	7,340	7,374	7,383	7,312	34	9	(71)
Flood affected	5,215	5,237	5,242	5,214	22	5	(28)
Unaffected	2,125	2,137	2,141	2,098	12	4	(43)
Demography total	7,399	7,387	7,376	7,316	(12)	(11)	(60)
Flood affected	5,304	5,312	5,309	5,266	8	(3)	(43)
Unaffected	2,095	2,075	2,067	2,050	(20)	(8)	(17)

**Population estimates inside and outside Red River Valley counties in North Dakota  
U.S. Census Bureau population estimates**

	1990 Census					Population change:				
	1990	1995	1996	1997	1998	1995-1996	1996-1997	1997-1998		
<b>North Dakota</b>	638,800	641,374	642,805	640,965	638,244	1,431	(1,840)	(2,721)		
<b>Red River Valley counties:</b>										
Cass County	102,874	111,802	113,238	114,997	116,832	1,436	1,759	1,835		
Grand Forks County	70,683	71,382	70,900	69,325	66,869	(482)	(1,575)	(2,456)		
Pembina County	9,238	8,776	8,747	8,635	8,485	(29)	(112)	(150)		
Richland County	18,148	18,193	18,248	18,175	18,272	55	(73)	97		
Trail County	8,752	8,664	8,653	8,628	8,544	(11)	(25)	(84)		
Walsh County	13,840	13,860	13,762	13,698	13,532	(98)	(64)	(166)		
<b>Red River Valley total</b>	223,535	232,677	233,548	233,458	232,534	871	(90)	(924)		
<b>Outside Red River Valley</b>	415,265	408,697	409,257	407,507	405,710	560	(1,750)	(1,797)		

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### **Population trends in affected and unaffected areas within counties**

The Census Bureau numbers show the majority of the decline in Polk County occurring outside the flood-affected areas. The State Demographic Center estimates, by contrast shows almost all the population decline, 1,010 of 1,043, taking place in flood-affected areas.

In the other counties that are losing population, Demographic Center numbers do not show the clear-cut difference between flood-affected and unaffected areas that was seen in Polk County. This supports the idea that their population losses are not primarily flood-related, though the flood may have had a modest effect.

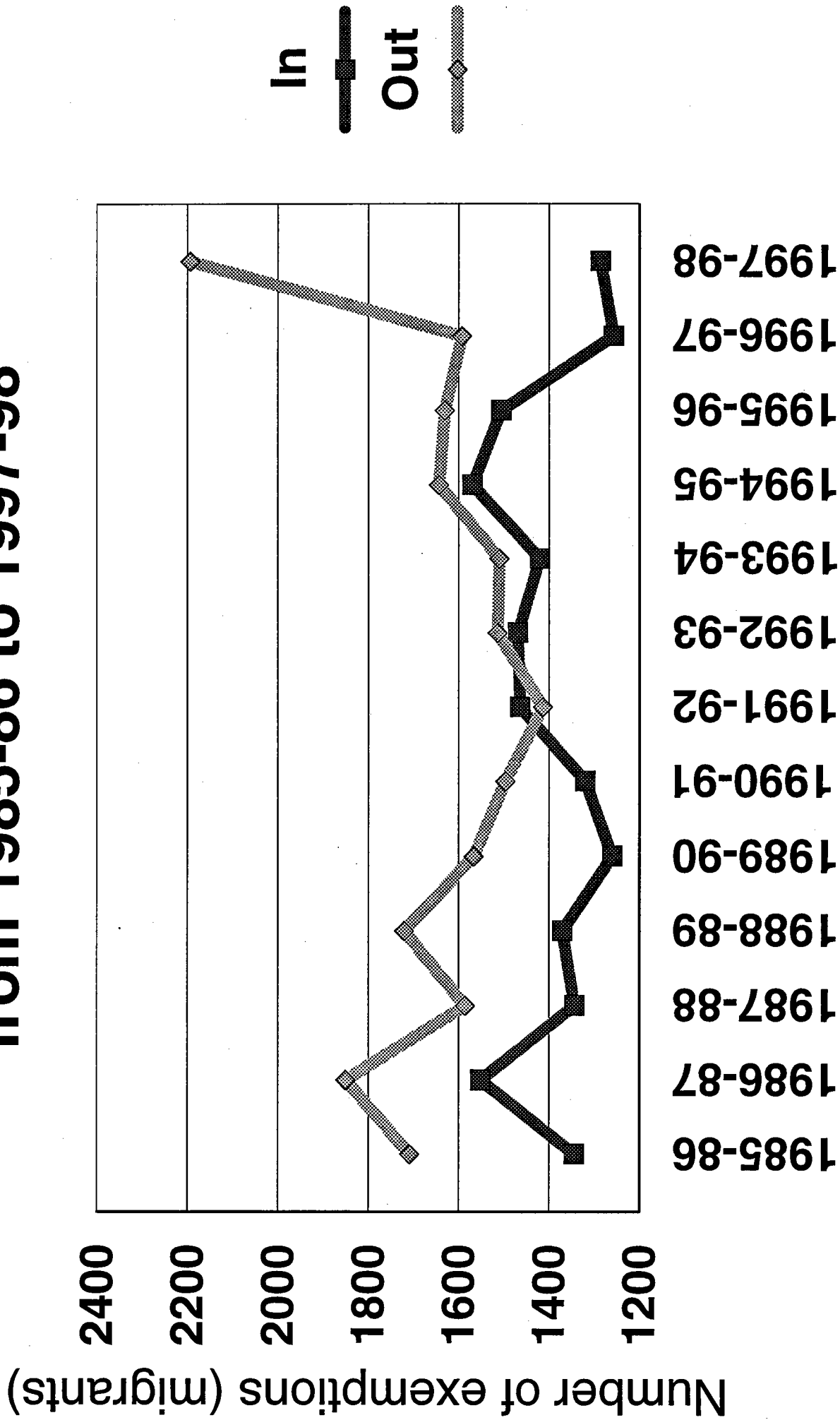
### **Internal Revenue Service Migration Data**

County-to-county migration data from the Internal Revenue Service, based on matched federal income tax returns, support the view that Polk County was the most affected Minnesota county. Data suggest that declining in-migration played a role in both 1996-1997 and 1997-1998, while out-migration increased between 1997 and 1998. Thus the higher levels of net migration loss do not just reflect more people leaving, but a big drop in the number of people moving into the area.

The migration losses in Polk County are shown as having occurred over a two-year period, along with the population losses. Since Internal Revenue Service migration



# In- and out-migration in Polk County from 1985-86 to 1997-98



Source: IRS data  
Migrants are exemptions at time 2.

**SUMMARY OF IRS MIGRATION**

	1994 to 1995			1995 to 1996			Net
	In	Out	Net	Non-mover	In	Out	
Clay	2578	2523	55	35,443	2,504	2,737	-233
Kittson	215	208	7	4,565	178	185	-7
Marshall	441	483	-42	9,066	444	399	45
Norman	318	321	-3	6,265	355	305	50
Polk	1571	1644	-73	24,967	1,507	1,631	-124
Traverse	209	219	-10	3,777	197	165	32
Wilkin	334	387	-53	6,191	368	357	11
7-county total	5,666	5,785	-119	90,274	5,553	5,779	-226

	1996 to 1997			1997 to 1998			Net
	In	Out	Net	Non-mover	In	Out	
Clay	2,588	2,805	-217	35,414	2,303	2,697	-394
Kittson	156	188	-32	4,384	172	205	-33
Marshall	391	501	-110	9,327	399	605	-206
Norman	274	347	-73	6,217	262	350	-88
Polk	1,257	1,594	-337	24,106	1,286	2,194	-908
Traverse	158	173	-15	3,432	187	190	-3
Wilkin	448	430	18	6,146	348	417	-69
7-county total	5,272	6,038	-766	89,026	4,957	6,658	-1701

drives the Census Bureau population estimates, this is not a coincidence. The migration data shown by the tax return method may be in part an artifact of the disaster rather than a reflection of actual moves, however. Migration is estimated by comparing addresses on tax returns in successive years. By the time the flood occurred in the spring of 1997, many residents had probably already filed 1996 tax returns at their pre-flood addresses. If they were permanently displaced by the flood, they would not show up as migrants until 1998 when they filed 1997 tax returns from their new addresses. Residents who were displaced in Spring, 1997 and had not yet filed returns may have used their pre-flood address, expecting mail to be forwarded. Others may have received a filing extension because of the emergency. It is not clear what effect all these factors had on the measure of migration. But clearly, the migration data was probably not measuring things the same way during the flood as during more normal periods.

Other than in Polk County, the Internal Revenue Service data do not show major flood effects in the Red River Valley counties of Minnesota. There was slightly more net out-migration in Marshall, Norman and Clay counties in 1996-1997 and 1997-1998 than in immediately preceding years. There was little shift in migration numbers in Wilkin, Traverse and Kittson counties. The lack of clear migration pattern in these six counties is consistent with the absence of a clear population effect.

### **School enrollment-based estimates of migration**

Grade progression ratios based on school enrollment data provide an alternative method for assessing migration trends. The grade progression ratio expresses the relationship

between the number of students in any given grade and the number who are enrolled in the following grade during the next school year. While grade progression ratios normally fluctuate somewhat, ratios consistently above 1.00 indicate that the school district is experiencing net in-migration of families with school-age children, while ratios that are consistently below 1.00 suggest out-migration.

Unfortunately, in Minnesota's Red River Valley counties, the small enrollment numbers in many districts and a rush to school district consolidation during this decade limit the utility of the grade progression ratio. Many communities have small and declining enrollments and these declines probably would be occurring without the flood. In other communities, district consolidation, sometimes across county lines, makes it difficult to track trends.

Given these limitations, East Grand Forks again stands out as a clear example of flood effect. This district is large enough that the numbers are probably reliable, and the grade progression ratios support the notion that the community experienced significant population decline and out-migration as a result of the flood. After hovering around 1.000 during most of the decade, the average grade progression ratio for grades 1 through 8 combined fell to .857 between the 1996-1997 and 1997-1998 school years and to .935 between the fall of the 1997-1998 and 1998-1999 enrollments.

Some local observers have stated that much of the decline in East Grand Forks enrollment could be attributed to out-migration of Hispanics. The enrollment data

suggest that this is not the case and that declines occurred across ethnic groups. Total K-12 enrollment fell from 2,280 in the 1996-1997 school year to 1,928 in the 1998-1999 school year, a drop of 15 percent. Hispanic enrollment fell from 203 to 179, or 12 percent, about the same rate of decline as for all students.

### **Labor Force Trends**

Labor force trends show no clear-cut flood effects, again with the exception of the East Grand Forks area. Unemployment rates have not changed dramatically, either. In Polk County, average annual employment in the ES-202 series from the Minnesota Department of Economic Security was 12,015 in 1996, falling to 11,603 in 1997, the year of the flood. Third quarter employment in 1997 was only 10,899, and then employment rebounded in the final quarter. Other than in Polk County, employment changes do not seem sudden enough or large enough to be attributed to the flood. Overall, from 1995 to 1998, employment declined slightly in Wilkin and Norman counties, rose slightly in Clay and Marshall counties, and did not change much in Kittson and Traverse counties.

In Polk County, Department of Economic Security data suggests that services and retail employment were most affected by the flood. This is similar to what occurred in the Grand Forks, North Dakota area, according to a report on employment in that community. The North Dakota authors suggest that retail and service workers were lured away by higher wages in cleanup industries. Also, many employees in these industries were college students who went home early when classes were canceled. In addition, many retail stores were located in the devastated downtown area.

Anecdotal evidence and news stories indicated that large numbers of construction workers and electricians from outside the area came to work on clean-up and repair projects, but these individuals do not show up in the local employment statistics. They are probably counted in the work force data for their home county.

### **U.S. Census Bureau vs. State Demographic Center county-level population estimates**

Though the population data show few dramatic flood effects, an examination of the figures raises as many questions as it answers. Population estimates are not based on an actual count of the population, but on indicators from various types of government records. These indicators vary, but can include building and demolition permits, births and deaths, school enrollments, income tax returns and assessor records. The quality of these data sources varies widely across space and time, and in addition they are likely to be affected in different ways by a flood or other disaster. Thus in evaluating the effects of the flood, we must consider not just the population numbers, but also the administrative records and the methodologies that underlie these estimates.

This report uses two sets of independently derived population estimates from the Minnesota State Demographic Center and from the Census Bureau to assess the flood's effect. These two sets of numbers differ because they are based on different methodologies.

The State Demographic Center method can be summarized as a bottom-up, housing-unit based procedure. Population for cities and townships is estimated using a housing unit method. The county population is then derived by adding up city and township populations.

The Census Bureau method, in contrast, is top-down. The Bureau first uses a demographic-based method to estimate county population. The county population is then allocated to subcounty areas using a housing-unit method. At the county level, the Census Bureau estimates the 65 and older and under-65 household population separately and then adds in the under-65 group quarters population. The 65 and older population is estimated directly using Medicare enrollment data. Changes in the household population under age 65 are estimated by looking at births, deaths to people under 65 and migration of people under 65. Migration estimates for people under 65 are derived from matched Federal income tax returns. Group quarters population under age 65 is estimated separately and then added to the household population. Undocumented foreign immigration is estimated using a method for apportioning total undocumented by county based on 1990 census migration data. Legal immigrants are allocated using intended county of destination filed with the Immigration and Naturalization Service.

### **Building and demolition permits**

Building permits and estimates of demolitions are key sources for both Census Bureau and Minnesota State Demographic Center methodologies, and differences in how these

data are collected and treated have a major impact on the estimates. A basic difference is that the Census Bureau method relies more on formulas and imputation in areas that do not issue building permits, while the State Demographic Center is often able to acquire small-area data from the counties.

Building permit data is collected by the Construction Statistics Division of the U.S. Department of Commerce. The same building permit file is used by both the Census Bureau and the State Demographic Center. In Minnesota, more than 800 governmental units issue building permits, including cities, counties and a few townships. The building permit file contains information for all the governmental units which require building permits and provide the data requested.

Most, but not all, counties in Minnesota require building permits. Of the seven flood counties, five require permits and two (Marshall and Traverse) do not. In the counties that require building permits, county governments usually are responsible for issuing permits for townships and cities that do not have their own permitting systems.

Areas that do not issue building permits are called non-permit areas. A major difference between Census Bureau and State Demographic Center methodologies lies in how they treat new construction in these non-permit areas. The Bureau method uses imputation. Data on the total amount of construction in non-permit areas is obtained from the county. New construction is then allocated to non-permitting cities and townships based on the size of the 1990 housing stock.



## Building permits in flood area cities and counties

County issues permits for unincorporated areas?		Cities that Issue Permits	County issues permits for unincorporated areas?		Cities that Issue Permits
<b>Track building permits:</b>			<b>Do not track building permits:</b>		
Clay	Yes	Barnesville Dilworth Felton Georgetown Glyndon Hawley Moorhead Sabin Ulen	Traverse	No	Browns Valley Dumont Lake Valley Twp. Tintah Wheaton
Kittson	Yes	Hallock Halma Karlstad Kennedy Lake Bronson Lancaster St. Vincent	Marshall	No	Alvarado Argyle Grand Plain Twp. Grygla Middle River Newfolden Stephen Warren
Norman	Yes	Ada Halstad Hendrum Perley Shelley Twin Valley			
Polk	Yes	Beltrami Crookston East Grand Forks Erskine Fertile Fisher Fosston McIntosh Mentor Nielsville			
Wilkin	Yes	Breckenridge Kent Rothsay			

The Minnesota State Demographic Center attempts to obtain direct information on the location of housing in non-permit areas, rather than using a formula. Many Minnesota counties keep records on the minor civil division where new housing is built, even if these areas do not issue building permits. The State Demographic Center collects this data from the counties and incorporates the information into its estimates.

Mobile homes constitute another element of the housing stock. The Census Bureau receives a file containing information on new mobile home placements by states. These new mobile homes are allocated according to the county's share of the state's mobile homes in 1990. The State Demographic Center does not receive this file on mobile homes. However, some counties report new mobile home placements when they send in the other information about construction, and this data is incorporated into the State Demographic Center estimates. Mobile homes make up a relatively small portion of the housing stock in Minnesota, so if new ones are missed it probably has less effect than it would in some other states.

### **Demolitions**

Building permit data gives indications of increases in the housing stock. Demolition data provides the other side of the picture. Unfortunately, data on demolitions has always been of dubious quality and is becoming more and more difficult to obtain. Demolition data is no longer collected by any federal government agency. Without actual data, both the Census Bureau and the State Demographic Center must estimate demolitions. The

Demographic Center estimates demolitions by using the annual average for the years earlier in the 1990s when demolition data was still collected. The file used by the Census Bureau estimates demolitions by a formula based on age and condition of the existing housing. Neither approach would pick up the demolitions occurring in the aftermath of a flood or other disaster.

A basic problem with the Census Bureau method is that it would pick up the new construction in East Grand Forks, but not the large number of demolitions that made this new construction necessary. The East Grand Forks consultant's report estimated a loss of more than 700 housing units in the city. The Census assumption on demolitions, based on age of housing stock and similar factors, would show little change in the imputed number of demolitions from year to year. Looking only at the construction permits, East Grand Forks looks like a growth center in the census method; after all, this is where most of the new building is taking place. Thus much of the countywide population loss was assigned to Crookston and other communities that were not directly affected by the flood.

Although the Minnesota State Demographic Center does not normally collect annual data on demolitions, an exception was made in the flood counties in the years following the flood, when the Center collected information directly from the affected communities. Ironically, data on post-flood demolitions may be of considerably higher quality than is customary. Federal flood relief programs generally require proper documentation of demolitions before money is paid out. This helps ensure good quality reporting.

### **State Demographic Center subcounty estimates**

The State Demographic Center methodology uses building permits to estimate changes in the housing stock in each Minor Civil Division. Once change in the housing stock is estimated, the Demographic Center method assumes the same occupancy rate as in 1990 and applies a persons per household number that is benchmarked to 1990 but is slightly lower. This gives an estimate of the household population. The total population is the sum of the household population and the group quarters population. The group quarters population comes from state records or from an annual survey conducted by the State Demographic Center.

If a county does not issue building permits, the State Demographic Center method estimates change in housing units by looking at changes in the number of homesteads. A homestead is a housing unit that is occupied by the owner at least half the year.

Minnesota homesteads are taxed at a lower rate than other types of real estate, so there is a strong incentive to list property as a homestead. The count of homesteads is probably complete; if anything it may be an overestimate because some part-year residents may claim to be homesteading. When the homestead data is used, it is assumed that the proportion of owner-occupied and rental-occupied housing does not change much over time. Also, in some cases the State Demographic Center method uses a ratio of homesteads to households rather than the homestead change itself. This is because in some areas there were more homesteads in 1990 than there were households. These areas

typically have large numbers of seasonal homes. This adjustment is not necessary in northwestern Minnesota, where there are relatively few seasonal homes.

### **Comparison of the two subcounty estimates methods**

In non-permit areas, the State Demographic Center method may do a better job of allocating population within counties than the Census Bureau method. In non-permit areas, the Bureau method allocates new building and demolitions following formulas, while the Demography method uses actual permit data obtained from the county. Data on homesteads by city and township are also current and actual. If there is a shift during the decade in areas of growth or loss, the State Demographic Center method should pick this up better than the Census Bureau method.

Based on this comparison of the two methodologies, we believe that the Demography estimates are more accurately reflecting the post-flood trends at the city and township level. Our tentative conclusion is that the flood's major population impact occurred in the Grand Forks-East Grand Forks area. Flood-related population change elsewhere in the Red River Valley appears to have been relatively slight.

### **Why the flood had only a modest impact on population**

It might seem surprising at first that the massive floods of 1997 appear to have had only modest impact on population, yet this result is in accord with most research on disasters. Most studies show that modern-day disasters, at least in the United States, have minimal long-term population impact. Usually residents choose to stay as close to their previous

homes as possible. It is simpler to pick up the pieces of one's existing life than to start over in a new community. Jobs, family and other ties keep people in the area.

Government-sponsored disaster assistance offers another incentive to remain. Most of this money is in the form of temporary assistance and low-interest loans, rather than grants, but it is extremely valuable to residents and businesses in disaster areas. If government did not offer this assistance, or offered incentives to relocate to other regions, the population impact might be different.

A consultant's report suggests that in East Grand Forks, many flooded-out households chose to purchase an existing undamaged home rather than to rebuild in East Grand Forks. Many of these existing homes were outside the city limits, and this preference for buying existing homes may have contributed to population loss in East Grand Forks itself. The city offered programs to encourage residents to move up to more expensive housing, but these programs were not as popular as officials had hoped. The cost of new construction remains too high for many local residents in an area where housing values are rather modest. Buying an existing home in a nearby community seemed less intimidating and often less expensive than rebuilding. The demand for existing homes apparently spurred other households to sell, setting off a series of musical chairs.

Anecdotes suggest that the people who left the flood area permanently were either those with few ties, typically younger adults, or adults nearing retirement. Young people with few family or social connections would have less reason to remain in the community, especially in a full-employment economy where jobs are easy to find in other areas.

Older adults may have decided to move up their retirement plans a few years rather than go through the hassle of rebuilding. These suggestions are reasonable, but hard data on characteristics of leavers is unavailable.

Even as the Red River Valley tries to recover from the flood, its future is threatened by an emerging farm crisis. Low commodity prices and crop diseases are undermining the valley's agricultural economy. In the long run, this could affect population more than the 1997 flood.

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**Demographic Aftermath of the 1997 Red River Valley Floods**

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In the spring of 1997, massive flooding in the Red River Valley affected communities in northwestern Minnesota, northeastern North Dakota and the Canadian Province of Manitoba. News coverage featured dramatic pictures of flames and water as buildings in the flooded streets of downtown Grand Forks, North Dakota, caught fire and burned. More than two years later, memories of the flood remain vivid, especially for residents of the area.

It was difficult to read about the widespread flood destruction without imagining that many people would simply leave the area. Yet population figures from both the Minnesota State Demographic Center and the U.S. Bureau of the Census show surprisingly little flood effect. Grand Forks County, North Dakota and Polk County, Minnesota appear to be partial exceptions to this statement. Estimates for these two counties show an abrupt drop in population that is almost certainly attributable to the flood. School enrollment and employment data concur in showing a substantial flood effect in Polk County.

Census Bureau and State Demographic Center figures diverge, however, in their assessment of where the Polk County losses have occurred. The Demographic Center estimates show most of the losses occurring in areas directly affected by the flood, while