

Chapter 2

Current Conditions and Projected Development

This chapter discusses the current water quality conditions in Northeast Ohio. It also addresses population and employment changes that have occurred since 1970, changes which have markedly affected water quality in the region. The last section of the chapter discusses the impacts that may be expected to occur given continuation of existing trends in population and employment over the next two decades.

I. Current Water Quality Conditions in Northeast Ohio

Background

The definitive source of information concerning current water quality conditions in Northeast Ohio is the 305(b) report prepared by the Ohio EPA on a biennial basis. This report is a requirement of Section 305(b) of the federal Clean Water Act which calls for states to submit to U.S. EPA a biennial report summarizing the status and trends in water quality of both surface and ground waters. The intent is for the 305(b) report to be a routine check on the progress that states are making toward achieving the goals of the Clean Water Act. The 305(b) report also acts to provide a baseline of water quality data to gauge changes in response to best management practices. Readers are encouraged to consult the full 305(b) report for details, a copy of which can be found on Ohio EPA's web page at www.epa.state.oh.us.

The bases for the 305(b) report are the periodic surveys of water quality and aquatic life (biosurveys) that Ohio EPA conducts on each major river system throughout Ohio. State priorities and resource availability to perform the survey work dictate the frequency with which watersheds are assessed. Northeast Ohio's major rivers are surveyed on an approximate five-year rotation.

The Ohio EPA's water quality survey goals are to assess the attainment status of water quality standards, to assess whether assigned use designations are appropriate, and to determine if changes in water quality have taken place since previous surveys, and if the changes can be attributed to point and/or nonpoint source controls.

The findings and conclusions of the water quality surveys are published as Water Quality Permit Support Documents (WQPSDs). They may reflect in regulatory actions taken by Ohio EPA e.g. NPDES permits, Director's Orders, the Ohio Water Quality Standards (WQS), and are eventually incorporated into the Ohio Water Quality Management Plan, the Ohio Nonpoint Source Assessment, and the Ohio Water Resource Inventory (305(b) Report).

Historical surveys conducted by the Ohio EPA in the Cuyahoga River basin include basin-wide chemical and biological surveys in 1984, 1991, 1996 and 2000. The 1991 and 1996 surveys are documented in the reports titled "Biological and Water Quality Study of the Cuyahoga River and Selected Tributaries Geauga, Portage, Summit, and Cuyahoga Counties (Ohio) dated August 19, 1994 and August 15, 1999" respectively. Mainstem biological surveys between Akron and Lake Erie were conducted in 1985, 1986, 1987, and 1988, and intensive chemical and biological surveys of the Little Cuyahoga River subbasin in 1986 and 1996. The 1996 Little Cuyahoga River survey is reported in the April 14 1998 "Biological and Water Quality Study of the Little Cuyahoga River and Tributaries (Portage and Summit Counties)". In addition, water quality data has been collected monthly from the Cuyahoga River National Ambient Water Quality Monitoring Network (NAWQMN) stations at Independence (RM 13.18), Lower Harvard Ave (RM 7.10) and West Third Ave (RM 3.26) over the past 20 to 26 years. A new monthly station was added in 1994 at Shalersville (RM 64.3) in Portage County to monitor expected changes in water quality due to anticipated land development as a result of changes in the transportation network in the upper section of the watershed. Biological sampling has also been routinely conducted at the NAWQMN stations over the same period.

Water Quality Standards Applicable to Northeast Ohio

Protecting the safety of the public is accomplished through the Ohio Water Quality Standards. As articulated in the Ohio Water Quality Standards:

It is the purpose of these water quality standards, Chapter 3745-1 of the Administrative Code, to establish minimum water quality requirements for all surface waters of the state, thereby protecting public health and welfare; and to enhance, improve and maintain water quality as provided under the laws of the state of Ohio, section 6111.041 of the Revised Code, the federal Clean Water Act, 33 U.S.C. section 1251 et seq., and rules adopted thereunder (Ohio EPA, 1997).

The analyses of biological criteria in a stream recognizes the assimilative ability of a stream and subsequent response by flora and fauna to levels of pollution. In general the more degraded the biological community the greater the threat of a disease-causing condition that could deleteriously affect human health.

Water quality standards consist of numerical standards geared to attainment of designated stream uses. Use designations consist of two broad groups, aquatic life and non-aquatic life uses. There are five different aquatic life uses currently defined in the Ohio WQS that apply to Northeast Ohio streams. These include: Warmwater Habitat (WWH), Exceptional Warmwater Habitat (EWH), Coldwater Habitat (CWH), Modified Warmwater Habitat (MWH), and Limited Resource Water (LRW).¹

The vast majority of segments in Northeast Ohio are designated Warmwater Habitat. There are some notable exceptions. The Cuyahoga River basin has numerous streams that are classified as Modified Warm Water Habitat or as Limited Resource Waters. Streams that are

¹**Warmwater Habitat** (WWH) - this use designation defines the “typical” warmwater assemblage of aquatic organisms for Ohio rivers and streams; this use represents the principal restoration target for the majority of water resource management efforts in Ohio. **Exceptional Warmwater Habitat** (EWH) - this use designation is reserved for waters which support “unusual and exceptional” assemblages of aquatic organisms which are characterized by a high diversity of species, particularly those which are highly intolerant and/or rare, threatened, endangered, or special status (i.e., declining species); this designation represents a protection goal for water resource management efforts dealing with Ohio’s best water resources. **Coldwater Habitat** (CWH) - this use is intended for waters which support assemblages of cold water organisms and/or those which are stocked with salmonids with the intent of providing a put-and-take fishery on a year round basis which is further sanctioned by the Ohio DNR, Division of Wildlife; this use should not be confused with the Seasonal Salmonid Habitat (SSH) use which applies to the Lake Erie tributaries that support periodic “runs” of salmonids during the spring, summer, and/or fall. **Modified Warmwater Habitat** (MWH) - this use applies to streams and rivers which have been subjected to extensive, maintained, and essentially permanent hydro modifications such that the biocriteria for the WWH use are not attainable and where the activities have been sanctioned and permitted by state and federal law; the representative aquatic assemblages are generally composed of species which are tolerant to low dissolved oxygen, silt, nutrient, enrichment, and poor quality habitat. **Limited Resource Water** (LRW) - this use applies to small streams (usually less than a three square mile drainage area) and other water courses which have been irretrievably altered to the extent that no appreciable assemblage of aquatic life can be supported; such waterways generally include small streams in extensively urbanized areas, those which lie in watersheds with extensive drainage modifications, those which completely lack water on a recurring annual basis (i.e. true ephemeral streams), or other irretrievably altered waterways.

in the modified category include portions of the Ohio Canal, Fish Creek, Congress Lake Outlet, and Wahoo Ditch. Limited waters include part of Wahoo Ditch, Kingsbury Run, Morgana Run, the Burke Branch, the Ford Branch of Big Creek, Wood Creek, and Pond Brook.

The Ohio EPA employs biological criteria that have been codified in the Ohio Water Quality Standards (WQS) to ascertain the attainment status of aquatic life uses in streams.² It uses three different indices to measure fish and macroinvertebrate community characteristics and to determine if aquatic life uses are in FULL, PARTIAL or NON-ATTAINMENT status. Attainment of aquatic life use is in FULL ATTAINMENT if all three indices meet the applicable criteria, PARTIAL ATTAINMENT if at least one of the indices does not attain and biological community performance is at least fair, and NON-ATTAINMENT if all indices fail to attain, or any index indicates poor or very poor performance. PARTIAL ATTAINMENT or NON-ATTAINMENT indicates that the receiving water is impaired and does not meet the designated use criteria specified by the Ohio WQS.

Figure 2-1 compares the biological integrity of Northeast Ohio's streams to 106 Ohio Rivers statewide. It is based on a tool developed by Ohio EPA, Biological Integrity Equivalents (BIE), that integrates the three Ohio EPA biological indices into a single value on a scale of 0-100. The BIE includes measures of the fish and macroinvertebrate community structure and health of rivers and stream segment. The ranking reflects the degree to which biological integrity is achieved or the degree of impairment. The system is older and no longer used. It does serve a purpose to gage the relative health of the stream in the region in 1991. For additional details the reader is referred to the Ohio EPA 2000 305(b) report.

The aquatic life use designations, the attainment status evaluation, and the BIE all serve to document existing conditions and trends within the rivers and streams of Ohio. The following discussion summarizes conditions in the streams of Northeast Ohio based on these tools.

Water Quality Trends in Northeast Ohio

The Ohio EPA has identified that major changes have occurred, which have contributed to the improvements in current statewide water quality conditions. The Ohio EPA notes that most of these water quality improvements can be attributed to improvements in point source control and that future threats to water quality will come from nonpoint sources of pollution. Their assessment is applicable to Northeast Ohio as well. The Ohio EPA states:

“the impacts from nonpoint sources of pollution, such as combined sewer overflows, urban storm water, siltation of substrates, and habitat degradation, agricultural and storm water run-off, etc., are becoming increasingly evident as historically more pronounced impacts from point sources e.g. municipal WWTPs, some industrial effluents, are reduced. Since 1988, there has been a 48% decline in point sources as a major source of impairment in reassessed streams in Ohio...Nonpoint sources have emerged as a major source of impairment in streams and rivers during this period...River and stream attainments will not

²Ohio Administrative Code {OAC} 3745-1-07, Table 8-14.

be achieved by the restoration of point source related impairments alone. Even if point source associated impairment is virtually eliminated (and assuming no new nonpoint source impacts are revealed) the result would be over 70% of streams and rivers fully attaining aquatic life criteria. Given these facts, “new” successes in controlling, abating, and preventing nonpoint and other sources of impairment will be needed.”

“While successes resulting from the abatement of point sources have been documented, there are other indications that impact from nonpoint source runoff, habitat degradation, and watershed disturbances may be worsening. Siltation of substrates i.e. stream bed, stream channel, stream bottom, etc. and habitat degradation are now the second and third leading causes of aquatic life impairment in Ohio streams and rivers, surpassing ammonia and heavy metals. These impairments are principally the result of agricultural land use, intensive urbanization, and suburban development, the latter of which is emerging as one of the most

Figure 2-1

Statewide Rating of the Biological Integrity of N.E. Ohio River and Stream	Narrative Rating	Cultural/Watershed Influences & Characteristics
<p style="text-align: center;"><u>Ranking</u></p> <p>21. Grand River (1995)</p> <p>27. Upper Cuyahoga R. (1991)</p> <p>36. Chagrin River (1995)</p> <p>50. W. Br. Rocky River (1992)</p> <p>51. E. Br. Rocky River (1992)</p> <p>61. E. Br. Black River (1992)</p> <p>73. W. Br. Black River (1992)</p> <p>80. Black River (1992)</p> <p>84. Rocky River (1992)</p> <p>88. Lower Cuyahoga R. (1991)</p> <p>96. Lower Cuyahoga R. (1990/91)</p>	Exceptional	Highest quality Ohio stream and riverine resources with exceptional quality biological assemblages, significant populations of imperiled species, high quality instream and riparian habitat (effects of nonpoint sources are mitigated by these characteristics); point source impacts are generally minimal to nonexistent; significant recovery has occurred in some due to WWTP upgrades.
	Very Good	High quality Ohio streams and rivers, most with intact instream and riparian habitat; significant recovery has occurred in some due to WWTP upgrades.
	Good	Typifies characteristics common to most Ohio stream and riverine resources; quality of instream and riparian habitat is generally good at most locations; effects of point and/or nonpoint sources are more evident significant recovery has occurred in some areas due to WWTP upgrades.
	Marginally Good	Increase non-attainment of WWH evident; marginal attainment of WWH at many locations; effects of point and/or nonpoint sources are increasingly evident; riparian and instream habitat degradation, siltation, and nutrient enrichment are increasingly important factors; recovery from point source impacts is incomplete and may be inhibited by these factors.
	Fair	Few sites attain WWH, non-attainment at most sites due to watershed-wide riparian and instream habitat degradation, agricultural and suburban nonpoint sources, industrial and municipal WWTP impacts and/or non-acidic mine drainage; recovery from point source impacts is incomplete and may be inhibited by other factors.
	Fair-Poor	Very few or no sites attain WWH; non-attainment due to extensive riparian and instream habitat degradation, agricultural and urban nonpoint source, CSOs, urban/industrial impacters, and/or sediment contamination; recovery from point source impacts is negligible or masked by other factors.
	Poor	Extensive WWH non-attainment with poor biological assemblages; significant urban/industrial impacts; little or no recovery is evident.
	Very Poor	Extreme degradation due to residual problems; very low recovery potential.

Source: 1996 Ohio Water Resources Inventory 305(b) Report by Ohio EPA

significant threats to watersheds...Increasingly, water pollution problems are associated with nonpoint sources such as, construction sites, farm land, abandoned mines, landfills, pits and lagoons, oil and gas wells, domestic sewage systems, manure and treatment processing residuals.”³

The following discussion summarizes water quality conditions within the Cuyahoga watershed in Portage and Summit Counties. Each watershed is discussed in terms of its water quality standards attainment status, of gains or losses in overall water quality since the development of the original 208 CWP, and the outlook for the future.

Cuyahoga River Watershed: Figure 2-2 summarizes current water quality conditions in the Cuyahoga River watershed. In the upper Cuyahoga River (in Geauga and Portage Counties) the river has been identified as being in Full Attainment except in a few segments. The East Branch is most heavily impacted stretch with one segment in non-attainment and the balance in Partial Attainment. From the confluence of the East Branch and the West Branch to the Portage County line, the river is in partial attainment of the standard. A twenty-five mile portion of the Cuyahoga River, through this stretch, from the Troy/Burton Township line in Geauga County to River Mile 60.76 (Route 14) in Portage County, has been designated a State Scenic River.

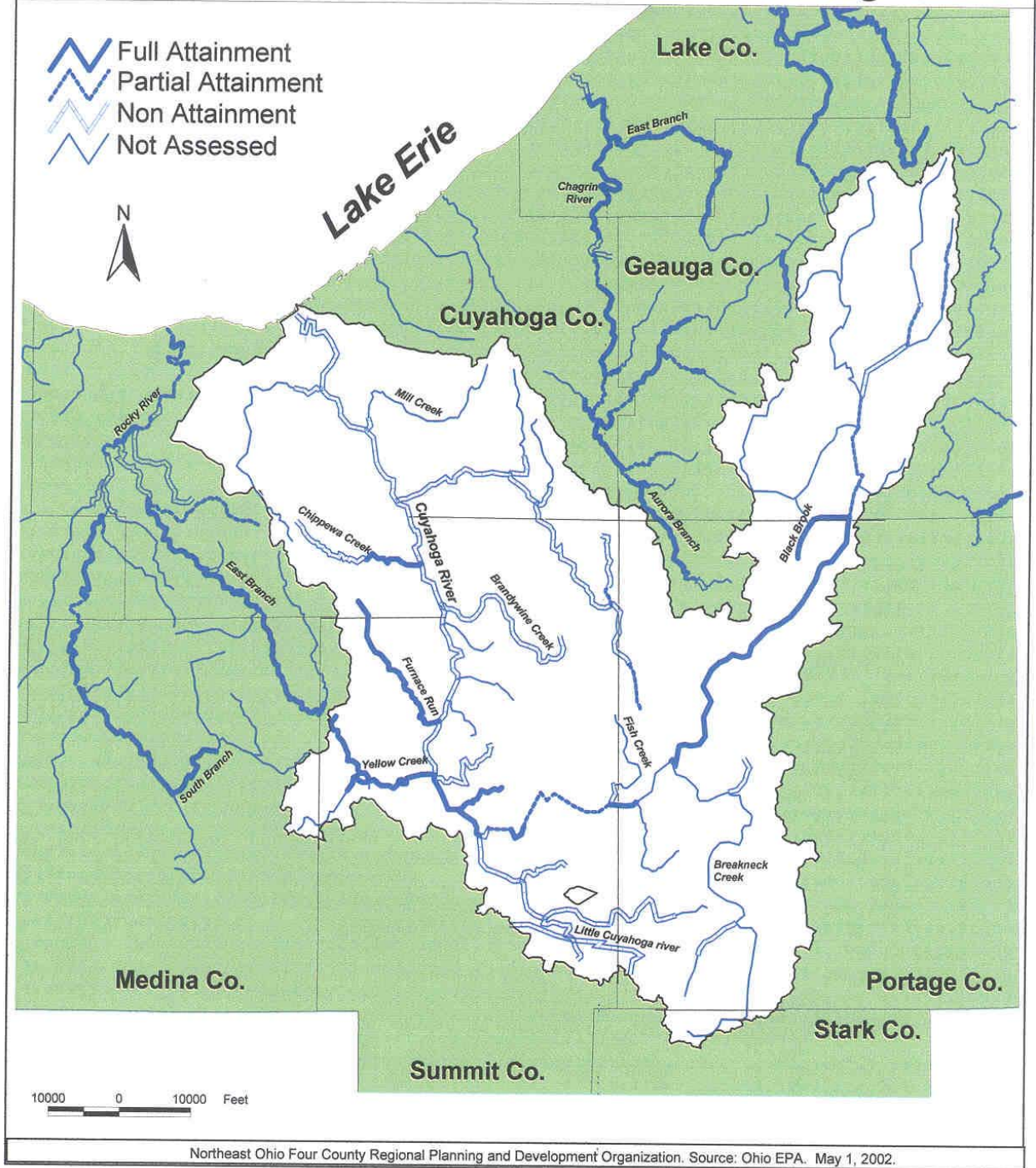
Much of the middle Cuyahoga River which lies in Portage and Summit Counties upstream of the confluence with the Little Cuyahoga River is in full and partial attainment of the standards. The lower 45 miles of the river, from the Ohio Edison Dam upstream of the confluence of the Little Cuyahoga is an Area of Concern subject to Remedial Action Plan requirements of the Great Lakes Water Quality Agreement.⁴

The Cuyahoga River has greatly improved since 1984. Most improvements were due to municipal and industrial wastewater treatment plant upgrades, sanitary and combined sewer overflow remediations, and pretreatment programs at industrial facilities. The Cuyahoga’s habitat status in the navigation channel limits biological recovery. Habitat above the navigation channel has improved in many locales but is threatened in rapidly urbanizing areas of the watershed.

³Ohio Water Resources Inventory: Executive Summary (Ohio EPA, 1996), pp. 11-13.

⁴Cuyahoga River Remedial Action Plan Stage One Report (Cuyahoga River RAP Coordinating Committee, 1992; 1995).

Figure 2-2
Water Quality Standards Use Attainment
of Lake Erie Tributaries in the NEFCO Region



The Upper Cuyahoga River is ranked second in Northeast Ohio and 27th statewide by the BIE index. It received a ranking of “good”. In “good” streams and rivers the quality of the in-stream and riparian habitat is good at most locations, while the effects of point and nonpoint source pollution are not evident.

The Lower Cuyahoga River was evaluated twice, once with 1991 data, and once with 1986 and 1991 data combined. Both times the river fell within a “fair to poor” classification. With 1991 data alone, the lower Cuyahoga ranked 88th in Ohio. The fair to poor classification indicates that very few if any sites attain warmwater standards and there is very extensive riparian and in-stream habitat degradation due to urban development and non-point problems, combined sewers overflow (CSOs), sanitary sewer overflows (SSOs), industrial impactors and sediment contamination. Tinkers Creek is ranked right below the lower Cuyahoga and is also in the fair to poor category.

II. Regional Population & Employment Developments Since 1979

A significant factor influencing water quality in Northeast Ohio is the continuing dispersal of people and jobs. This dispersal is an ongoing phenomenon, affecting people, businesses and communities in complex ways.

Population Trends

The region’s devastating loss of manufacturing industries in the late 1970s and early 1980s precipitated widespread population declines in many communities. This declining trend, however, was reversing in the early 1990s. The 2000 Census figures reveal further evidence that the area is recovering. Both Summit and Portage Counties experienced positive percentage changes in population from previous decades that surpassed those of the state of Ohio. Summit County experienced a 5.4 percent population increase over the last decade, and Portage County saw a 6.6 percent growth in numbers between 1990 and 2000. Table 2.1 depicts these population trends.

Table 2.1 Population Change 1980-2000					
				Percent Change	
	1980	1990	2000	'80-'90	'90-'00
Portage	135,856	142,585	152,061	5.0%	6.6%
Summit	524,472	514,990	542,899	-1.8	5.4
NEFCO	1,136,559	1,126,621	1,184,622	-0.9	5.1
Ohio	10,797,604	10,847,115	11,353,140	0.5	4.7

Source: U.S. Bureau of Census, 2000; Ohio County Profiles, State of Ohio, Office of Strategic Research, 2001

Comparing Ohio's 88 counties in population percentage change between 1990 and 2000, both Portage and Summit Counties moved up in rank. Portage and Summit Counties' population percentage changes for the same period ranked them 37th and 44th in the state, placing them at or above the median among all counties.

Although the NEFCO region as a whole saw population losses between 1980 and 1990, the turnaround and resulting population growth of over 5 percent is evidence of a stable region that has made many efforts to preserve economic gains and to provide a good quality of life for its residents. As in many other locations, Portage and Summit Counties have communities which exhibit high population growth and the resulting increased need for services. Other communities within these counties face the challenges of failed septic systems or old systems in need of repair. Meeting the current infrastructure needs and planning for future expansion in stable and high-growth areas will be necessary.

Employment Trends

Just as population patterns may potentially affect the area's water quality, so do employment trends. In Summit County, the past two decades were marked initially by severe economic disappointments as many of the rubber industries moved south, followed by an economic turnaround as economic diversification and the rise of the polymer industry redefined the area.

Table 2.2 describes the annual averages of the civilian labor force, employment, unemployment and unemployment rates for Portage and Summit Counties and the state of Ohio in 2000. Unemployment rates in these counties remained low and echoed state and national trends. The annual average percentage for 2000 for these counties mirrored the state and national rates. The low rates are similar to those from previous years; however, some of the area's larger cities exhibit unemployment rates similar to or exceeding national trends.

The national economic situation is certain to have an effect locally; however, it is still too early to determine the specific economic impacts following September 11, 2001.

Table 2.2 Civilian Labor Force Estimates Annual Averages – 2000				
Area name	Civilian Labor Force	Employment	Unemployment	Unemployment Rate
Portage	83,700	80,300	3,400	4.1
Summit	282,900	270,700	12,200	4.3
Ohio (seasonally adjusted)	5,857,000	5,606,000	251,000	4.3

Source: Ohio Department of Job and Family Services, Labor Market Information website, March 2002

Overall, Ohio's economy has been healthy, with officials reporting a large number of business expansions over the past few years. Table 2.3 denoting net business formations between 1995 and 2000 shows net losses in the numbers of businesses largely occurring in 1997. Portage County also reported a net loss in 2000; however, the loss amounted to four businesses.

Table 2.3 Net Business Starts 1995-2000						
Area	1995	1996	1997	1998	1999	2000
Portage	89	55	-8	48	not available	-4
Stark	191	164	-48	27	not available	64
Summit	362	373	88	162	not available	72
Wayne	13	70	11	42	not available	32
NEFCO	655	662	43	279	not available	164
Ohio	4,648	5,762	-1,105	1,081	not available	849

Source: Ohio County Indicators, 2001.

Over the past years, the manufacturing sector declined in Summit County. Overall, however, the region has a healthy balance of economic sectors, with manufacturing industries largely concentrated in the older, urban areas. As in many other places, trade and services are a significant part of the local economies in Portage and Summit Counties (Table 2.4).

Table 2.4 2000 Employment by Industry*				
	Portage	Summit	NEFCO	Ohio
2000 Total Employment	52,770	265,069	541,271	5,460,117
Agriculture/Forestry/Fishing	790	1,972	4,534	46,330
Manufacturing	14,112	49,740	123,269	1,062,145
Construction	2,403	11,498	24,908	247,533
Transportation/Utilities	1,101	13,740	20,582	241,105
Trade	11,999	70,649	137,462	1,366,254
F.I.R.E.**	1,021	13,085	22,376	298,934
Services***	9,909	76,258	142,958	1,507,591
Mining	300	280	1,406	12,678
Government	11,150	27,850	63,796	657,744

Source: Ohio Department of Development, Office of Strategic Research, Ohio County Profiles, 2000.

- * Some of the figures do not include the industries that reported a range of employees; other figures show a range of jobs as reported.
- ** F.I.R.E. - Finance, Insurance, Real Estate
- *** Services include: Professional, scientific, technical services; Management of companies; educational services; health care; arts/recreation; accommodation and food services; and other services (except public administration).

A key factor in ensuring the health of the area's manufacturing base while maintaining water quality has been the development and use of regulations allowing brownfield redevelopment. Planners in the area's larger cities, Akron and Barberton, have made exceptional use of former brownfields. Other cities such as Kent are also exploring redevelopment of brownfields to increase their tax base and curb urban sprawl.

Future Changes in Regional Population and Employment

Current trends are expected to continue, with economic diversification and population growth or stabilization characterizing Portage and Summit Counties. As noted above, the local economic effects of the economic downturn in the fall of 2001 are yet to be determined. However, it is apparent from the area's ability to weather economic disasters that the region has critical measures in place and is not new to responding to events that threaten the health of the economy. Northeast Ohio has a diverse industrial base that is likely to sustain the Summit-Portage population, even with the loss of key industries. The continued development of the polymer and liquid crystal industries will be factors in both attracting complementary industries and retaining and creating jobs for the region's labor force. Continued upgrading of the transportation

network, as well as the future possibility of a commuter rail system should serve to maintain and increase population and employment in the region.

Conclusion

The most recent concern to water quality today is occurring in the rapidly developing areas of the region on the periphery of the existing urban areas. This threat comes from a variety of potential sources, including nonpoint source discharges from residential and commercial developments, but most significantly from the combined effects of land disturbances to construct these new developments. This transformation is threatening regionally important water resources once thought relatively secure from water pollution threats (upland drinking water reservoirs, headwaters areas, and high quality streams once far removed from urbanization). Thus, while the perceived water pollution problems of the 1970s have largely been addressed, there remains a whole new set of water pollution challenges at the turn of the century to be confronted. Land uses will change from a predominantly rural character to urbanizing uses, and this will affect whether water runs off the land surface or seeps into the ground. This trend will have an impact on water quality.