I. EXECUTIVE SUMMARY

A. Introduction

The Monongahela River has played an unparalleled role in American history. It served as a major transportation route for westward settlement during colonial times and later propelled the industries along its shores to worldwide importance and unequaled production.

Along with its changing roles, the Monongahela itself has changed. It has been transformed from a wide and shallow river to a slow-moving, deeply pooled body of water. It has gone, as well, from a pristine waterway to an industrial sewer that could not sustain aquatic life, and back to a viable fishery again.

Although many of the factories along its banks are now rusted hulks reminding river users of the past, riverfront land is also being freed from the constraints of industry and opportunities that have not existed for more than a century are now arising. It is in this context that the analysis of data was conducted for the Monongahela River Conservation Plan. The recommended management options have been developed to take advantage of the opportunities presented while addressing ongoing concerns.

B. Project Background

In the fall of 1997, Mackin Engineering Company was contracted by the Steel Industry Heritage Corporation (SIHC) to prepare a River Conservation Plan for the Monongahela River from the Mason-Dixon to the Glenwood Bridge in the City of Pittsburgh. The preparation of the plan, through a program established by the Pennsylvania Department of Conservation and Natural Resources (DCNR), was an extension of SIHC's Management Action Plan which was developed through the Pennsylvania Heritage Parks Program.

The DCNR Rivers Conservation Program provides a fifty percent funding source for implementation of management options in approved plans. The approval process consists of DCNR's review of the plan and its subsequent inclusion on the Pennsylvania Rivers Registry.

The Monongahela River Conservation Plan was produced as a mechanism to further implement the state and federally designated Rivers of Steel Heritage Area, for which SIHC is the developing entity. The goals of Rivers of Steel are to conserve, interpret, promote, and manage the historic, cultural, natural, and recreational resources in southwestern Pennsylvania, especially as they

relate to steel and related industries, and to develop uses for these resources so that they may contribute to the economic revitalization of the region. Since SIHC's Management Action Plan defines the rivers as the connecting thread of the heritage area, the Monongahela River Conservation Plan is a logical method to achieve these goals.

C. *Project Area Characteristics*

The Monongahela River Basin extends north from western Maryland and West Virginia into southwestern Pennsylvania and ends at the river's confluence with the Allegheny, which forms the Ohio River at Pittsburgh. From its origin at the confluence of the West Fork and Tygart Rivers in West Virginia, the Monongahela flows for approximately 128 miles and drains approximately 7,390 square miles.

The study corridor for the Monongahela River Conservation Plan covers only the portion of the river from the West Virginia/Pennsylvania border (Mason-Dixon Line)near Point Marion, Pennsylvania (river mile 90) to the Glenwood Bridge in the City of Pittsburgh (river mile 6). The width of the study corridor is approximately one mile on either side of the river, or to the top of the nearest slope. It includes approximately 84 river miles, sections of 58 tributaries, and portions of 65 municipalities in five counties (Greene, Fayette, Westmoreland, Washington, and Allegheny).

In general, the land use within the study corridor tends to range from undeveloped in the southern areas to urban and industrial uses in the northern communities. There are some smaller communities, particularly to the south, which have residential uses along the river.

According to 1990 census data, the population of study corridor communities totaled 668,440 people, over 30 percent of the total population of the five counties along the river. As a whole, the study corridor municipalities had fewer residents under the age of 18 and more over the age of 64 than the rest of the region. Study corridor communities tended to be older when compared to state and national averages as well. Census data from 1990 indicated that study corridor communities also tended to have higher unemployment rates than the surrounding municipalities.

D. *Resource Data Analysis and Conclusions*

A detailed analysis of available resource data revealed numerous issues, concerns, constraints, and opportunities related to the study corridor. Primary among these were commercial use of the river, the emergence of recreational

opportunities, water quality, the lack of coordinated land use planning along the river, the presence of numerous industrial sites and brownfields, and planned projects which will have a major impact upon the character and use of the river.

There is no question that commercial shipping is the major use for the Monongahela River. The five locks located within the study corridor handled up to 19 million tons of cargo in 1997, hauled by more than 7,500 vessels. This places the Monongahela among the top inland waterways in the U.S. in terms of commercial shipping. One issue that has emerged in recent years is the potential for conflict between the large number of commercial vessels and the increasing number of recreational users on the river. Recreational use on the river has increased dramatically in recent years as water quality has improved and the closing of manufacturing plants has opened riverfront access. A total of more than 120 recreational facilities, such as parks, marinas, golf courses, and trails are located within the study corridor, which creates numerous opportunities for recreation and, occasionally, conflicts with commercial shipping as well.

As mentioned above, recent decades have seen an improvement in water quality in the Monongahela River, due to the declining number of industries along its banks and increasingly stringent environmental regulations. However, serious threats to water quality still exist within the study corridor, with abandoned mine drainage being foremost among those. One issue which makes an analysis of water quality particularly difficult is that, while numerous water quality studies have been undertaken on the Monongahela, they vary significantly in the parameters and types of sampling conducted. As a result, researchers attempting to review this voluminous data are often left with a mix that cannot be easily compared.

Land use regulation is another field in which a coordinated effort is lacking. At least 15 municipalities within the study corridor had no land use regulations at all, and more than half of the 50 remaining municipalities had zoning only at the county level. Particularly in the southern portion of the study corridor, this has created a situation where riverfront development, including residential, industrial, and recreational, has been impeded by conflicting land uses.

The primary opportunity for development along the river comes in the form of reusing abandoned industrial sites, known as brownfields. The shores of the river contain dozens

of brownfields, most of which are abandoned mines and dumps, former coal tipples, and vacant industrial plants. There are currently plans to redevelop several of these sites, such as the former U.S.X. Duquesne Works and the former National Tube Works in McKeesport, but many other major brownfields remain empty.

While the redevelopment plans for the Duquesne Works and other brownfields certainly qualify as major undertakings, there are three other major planned projects that will also have direct impacts on the river and access to it. The first of these is the Mon/Fayette Expressway, a planned toll road that, when completed, would connect I-68, I-70, and I-376. Portions of this project are currently under construction and other sections are currently in the Environmental Impact Statement phase. The Mon/Fayette Expressway will directly affect the Monongahela River with at least two major river bridges, but, it will also create new access to study corridor communities and tie them more closely to the interstate transportation system. It is anticipated that this improved access will help spur redevelopment efforts at many of the brownfield sites and it may increase recreational usage of the river as well.

The second major planned project also deals with infrastructure improvement. As outlined by the U.S. Army Corps of Engineers, the "Lower Mon Project" will consist of the removal of Locks and Dam No. 3 and the renovation of Locks and Dams 2 and 4. In the short term, the project is expected to result in the loss of approximately 400 jobs. However, due to projected increases in shipping once the project is completed, 8,000 new jobs and $402 million in economic benefits are expected.

The third project discussed here is the creation of a series of boat tours and landing sites as the focal point of the Rivers of Steel Heritage Area. This project, as defined in SIHC's Management Action Plan, will help to inform visitors of the historic, cultural, and natural resources of the river. In order to further the development of these tours, Mackin and SIHC have coordinated to identify the communities in which the primary landing sites should be located. This Determination was based on criteria such as concentrations of historic resources, availability of riverfront property, and existing river-based facilities. The locations selected for primary landing sites included Greensboro, Rices Landing, Brownsville, Belle Vernon, Charleroi, Monessen, Donora, Monongahela, McKeesport, and Homestead.

E. Project Timeline

As noted previously, this document summarizes the Final Report for the Monongahela River Conservation Plan. This is the last of three drafts and will be submitted to DCNR for listing on the Rivers Registry.

II. INTRODUCTION

A. Introduction

The Monongahela River has played an unparalleled role in the history of America. It has served a transportation function for both its native residents and for settling colonials. It provided a means to access the Ohio River and to expand and explore westward. It also became the mechanism which propelled the industries on it shores to worldwide importance and unequaled strength.

Through its changing role, the Monongahela River itself has changed. It has been transformed from a fast-running, wide and shallow river to a slow moving, deeply pooled body of water. It has gone from a pristine, natural waterway to one that could not sustain the simplest of life forms.

Today, the Monongahela is in the midst of change once again. The many factories, mines, and mills which have historically claimed its banks are receding, as is their effect upon the river. Although it still remains primarily a commercial waterway, other uses are coming to light. New riverfront land is being freed from past industrial constraints, and opportunities that have not been seen in over a century are now arising.

It is in this context that the Monongahela River Conservation Plan was initiated, and through this context that the recommendations and management options were developed, and must be considered.

B. Project Background

The development of the Monongahela River Conservation Plan stemmed from the opportunity posed by DCNR, and SIHC's Management Action Plan (MAP), as generated through the Pennsylvania Heritage Parks Program.

The Rivers Conservation Program provided a funding source for developing the plan, and as important, allocated a fifty-fifty matching incentive to implement the recommendations produced through the planning process. Therefore, this planning procedure had an active component to it, affording the opportunity to carry out the intentions of the plan itself, and preventing a lifeless plan.

SIHC is the developing entity for the state and federal Rivers of Steel Heritage Area. SIHC's MAP provided a framework for carrying out its mission: to conserve, interpret, promote, and manage the historic, cultural, natural, and recreational resources of the steel and related industries in southwestern Pennsylvania, and to develop uses for these resources so they

may contribute to the economic revitalization of the region.

Within the MAP, the rivers are the central theme, providing a framework on which to develop the heritage area. Therefore, the creation of a plan to identify, evaluate, and produce recommendations for the resources of the Monongahela River was a natural extension of SIHC's mission, and the conjunction of two Commonwealth initiatives.

III. PROJECT AREA CHARACTERISTICS

A. Location

The Monongahela River basin is situated within the southwestern Pennsylvania region of the Appalachian Plateau. The basin extends eastward through central Westmoreland and Somerset Counties, south into western Maryland and West Virginia, west through central Greene and Washington Counties, and north to its confluence with the Allegheny River at Pittsburgh, which forms the Ohio River. From its origins at the confluence of the Tygart and West Fork Rivers in Fairmont, West Virginia, the Monongahela flows northward for approximately 128 river miles (r.m.) before ending at Pittsburgh, Pennsylvania.

B. Size

The Monongahela River basin drains approximately 2820 square miles in southwestern Pennsylvania, 4150 square miles in West Virginia, and 416 square miles in Maryland (Pennsylvania Department of Environmental Protection [PADEP], 1989). The study corridor for the Monongahela River Conservation Plan covers only the portion of the river located between the West Virginia/Pennsylvania border near Point Marion, PA (r.m. 90) and the Glenwood Bridge located near the Pittsburgh city limits (r.m. 6). The width of the corridor extends approximately one mile to either side of the river or to the ridge of the nearest steep slope (Figure 1). The boundary of the study area was determined through the coordinated efforts between SIHC and Mackin Engineering Company. This plan covers approximately 84 r.m., sections of 58 tributary waters (Figure 2), and portions of 65 municipalities in five counties.

C. Topography

The study area is located in the Kanawha section of the Appalachian Plateau physiographic province. This particular section is deeply bisected by the Monongahela River and characterized by deep, narrow valleys with steep slopes and a meandering floodplain. The relief, or slope height, in this area was typically 250 to 300 feet along smaller tributaries and 400 to 500 feet along major streams. The width of the valley floor varied from 0.4 to 0.6 miles. The river elevation is approximately 778 feet above sea level (at the state line), while the river elevation located at the northern edge of the study corridor was approximately 710 feet above sea level.

Much of the development along the river is governed by the floodplain patterns and steep topography of the river valley. As a result, development tends to concentrate along tributaries.

Undeveloped land along the river.

D. Corridor Characteristics

1. Land Use

Land use information was collected during a field survey conducted by Mackin in February, 1998. Land use data is broken into eight categories: Residential, Commercial, Industrial, Institutional, Agricultural, Open Space, Public/Open Space, and Public/Restricted (Table 1). The field survey determined that a rather large percentage of developed land along the river is active or abandoned industrial land or limited for development by steep slopes. In Greene and Allegheny Counties, industrial land is the most prevalent land use. The industrial land use classification includes active and abandoned coal mines, steel mills, slag piles, and mine tipples. The most prevalent land uses within the corridor are residential and open space totaling over 63 percent of land (Figure 3).

Open space lines the river in Fayette County. Mixed among the open space are pockets of residential and industrial land. Large areas of residential land occur in Point Marion, Masontown, and Brownsville, three of the larger communities in Fayette County. These communities also include commercial downtown areas which are surrounded by residential properties.

Throughout the river corridor in Washington County, industrial, residential and open space land uses are distributed evenly. Industrial land occurs at several locations, most of which is surrounded by residential communities that once provided the workforce for large industrial operations. Other areas of Washington County within the corridor are used as open space and contain steep slopes.

Table 1
Land Use

Land Use Type	Percent of Total
Agricultural	0.13
Commercial	11.53
Industrial	18.95
Institutional	0.07
Open Space	32.75
Public/Open Space	4.30
Public/Restricted	0.30
Residential	31.97
Total	**100.00**

Source: Mackin Engineering Company, 1998.

Westmoreland County includes three large tracts of industrial land adjacent to the river. In fact, each municipality located on the river has a large tract of industrial land along the river. Large residential areas are located within the corridor in the City of Monessen and the community of North Belle Vernon. Both municipalities also contain small commercial districts.

In Allegheny County, the majority of the land along the river is industrial. This includes both active and abandoned industrial sites, as well as redevelopment projects which are now underway. Commercial areas near the river are municipal commercial districts located along throughways. Almost all residential land occurs away from the river due to the intense industrial development which limits access to the river.

2. Zoning

The corridor includes portions of 65 municipalities, of which 50 have zoning ordinances. Municipalities that do not have zoning are located in less populated areas of Greene and Washington Counties. Only one municipality in Greene County, Cumberland Township, has zoning. Ten municipalities in Washington County do not have any form of land use control. Municipalities along the river in Fayette County are covered by a countywide zoning ordinance enforced by county appointed zoning officers. The remaining 37 municipalities have municipal zoning ordinances which are enforced by appointed municipal zoning officers.

In the municipalities having zoning ordinances, a large percent of land along the river is zoned industrial which typically limits public river access. The nature of these sites

Table 2
1990 Population Distribution

	Percent <18 yrs. old	Percent 18-64 yrs. old	Percent 64+ yrs. old
Greene County	25.6	42.0	16.4
River Municipalities Greene	*25.6*	*55.7*	*18.7*
Fayette County	24.1	58.0	17.9
River Municipalities Fayette	*23.1*	*56.4*	*20.5*
Washington County	22.4	60.4	17.4
River Municipalities Washington	*19.8*	*58.9*	*21.6*
Westmoreland County	22.4	60.5	17.1
River Municipalities Westmoreland	*19.8*	*59.2*	*23.0*
Allegheny County	21.1	61.5	17.4
River Municipalities Allegheny	*20.3*	*60.7*	*19.0*
Pennsylvania	**23.5**	**61.1**	**15.4**
United States	**25.9**	**61.4**	**12.7**

Source: 1990 U.S. Census.

also deter non-industrial development adjacent to industrial property. Less than 10 municipalities have zoning for specific river-related development, which generally provides for a mixed use classification and allows light industry, commercial, and recreational development.

E. Socio-Economic Profile

In 1990, the population within the Monongahela River study corridor municipalities totals 668,440 people and consists of 32 percent of the total population of the five counties along the river. Over 36 percent of Greene, 23 percent of Fayette, 26 percent of Washington, 6 percent of Westmoreland, and 40 percent of Allegheny Counties (City of Pittsburgh included) respective populations are located in municipalities along the river. Demographic information on age shows that 20.4 percent of the Monongahela Valley's population is below the age of 18, while 19.4 percent are over the age of 64. These figures reveal that river municipalities, excluding those of Fayette County, had smaller percentages of population under the age of 18, and larger populations of residents 64 and older. These figures also reveal that, in each county, the population in the Monongahela Valley tends to be older than the population of the rest of the county. Also, when compared to age data from Pennsylvania and the United States, community populations located along the Monongahela River are significantly older (Table 2).

The river municipalities are characterized by a common economic identity when compared to similar county, state and national statistics. For example, 76.9 percent of the municipalities along the river had higher 1990 unemployment rates than their respective county rate. Donora Borough had the highest 1990 unemployment rate at 25.2 percent

while the Borough of Greensboro had the lowest at 4.1 percent. The Mon Valley Workforce Survey, (Yamatani & Cunningham, 1994), conducted on 35 municipalities within four counties along the Mid Monongahela River, determined that the Mid Monongahela unemployment rate was 11.3 in 1993. A complete listing of 1990 unemployment rates can be found in Appendix B.

The 1997 county unemployment rates show that unemployment levels have improved dramatically since 1990 (Table 3). Current municipal unemployment estimates were not available at the time of this study, but 1990 census data demonstrates the region's dependence upon coal, steel, electrical machinery and other manufacturing industries which were nearly extinct (Yamatani & Cunningham, 1993).

1. Population Centers

Population centers along the river were identified as municipalities with resident populations over 1,000 with the majority of the municipal population being within the study corridor. According to the 1990 census, (excluding the City of Pittsburgh), Mackin estimated that 190,244 people lived within two miles of the river (Chart 1). Of these only 4,968 lived outside the population centers (Appendix C).

The southern section of this study area has only three population centers within the corridor, all of which are in Fayette County. These population centers are Point Marion Borough (pop.1,344), Masontown Borough (pop. 3,759), and Belle Vernon Borough (pop. 1,202). Many river communities in Greene and Fayette counties are unincorporated villages and coal patch towns located in larger townships. These patch towns resulted from the prior coal mining industry that dominated the landscape from the mid 1800s to the 1970s. Many villages developed close to mine entrances in the valleys of tributaries of the Monongahela River.

These villages are small rural communities that function as their own neighborhoods. Many of the villages contain the same housing type and only have one access route.

From 1980 to 1990, municipalities that border the river in Fayette County lost significant populations.

The greatest losses were in Point Marion Borough (-18.4 percent), Masontown Borough (-23.4 percent), Brownsville Borough (-21.7 percent), Newell Borough (-17.6 percent) and Belle Vernon Borough (-18.5 percent).

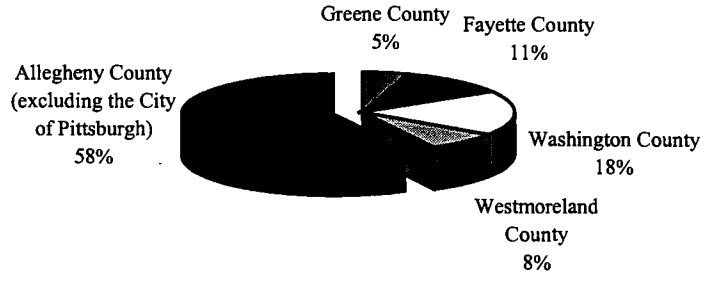
Table 3
1990 Unemployment Comparison

1990 Unemployment Rates	
Greene County	12.2
River Municipalities Greene	*11.6*
Fayette County	13.3
River Municipalities Fayette	*[illegible]*
Washington County	7.6
River Municipalities Washington	*[illegible]*
Westmoreland County	7.1
River Municipalities Westmoreland	*[illegible]*
Allegheny County	6.3
River Municipalities Allegheny	*[illegible]*
Pennsylvania	11.1
United States	6.2

Source: 1990 U.S. Census.

In Washington County, there are eight population centers containing a total of 26,576 people. These municipalities include East Bethlehem Township (pop. 2,747), West Brownsville Borough (pop. 1,170), California Borough (pop. 5,802), Charleroi Borough (pop. 5,014), North Charleroi Borough (pop. 1,562), Donora Borough (pop. 5,928), the City of Monongahela (pop. 4,928), and New Eagle Borough (pop. 2,172). Mackin identified commercial

Chart 1
Population Distribution By County
(Municipalities Bordering Monongahela River)



Source: Mackin Engineering Company, 1998.

districts in these municipalities which meet daily needs of residents.

Between the years of 1980 and 1990, Monongahela Valley river municipalities in Washington County lost 11.3 percent of their populations while the county-wide population decreased by only 5.3 percent. Eight municipalities along the river lost over 15 percent of their population during this period (Table 4). However, the Southwestern Pennsylvania Regional Planning Commission (SPRPC) predicts that the populations of river communities in Washington County will increase by the year 2015 (SPRPC, 1994).

The Monongahela River population centers in Westmoreland County consist of the City of Monessen, North Belle Vernon Borough, and Rostraver Township. Only the City of Monessen (pop. 9,901) and North Belle Vernon (pop. 2,112) have the majority of their populations within the corridor. Both of these communities developed around the steel and glass industries that once existed along the river. Mackin observed that both North Belle Vernon and Monessen maintained commercial districts capable of providing goods and services to meet the daily needs of residents. From 1980 to 1990, both municipalities lost significant population. North Belle Vernon decreased by 12.9 percent and

Table 4
Population Percentage Change 1980-2015

Change in Monongahela River Municipalities		
	1980- 1990	1990- 2015
Greene County	-5.3	N/A
Fayette County	-12.4	5.0
Washington County	-11.3	5.9
Westmoreland County	-9.8	11.2
Allegheny County	-12.4	9.4
Total Five County Region	-12.3	9.0
Change Countywide		
	1980- 1990	1990- 2015
Greene County	-2.3	N/A
Fayette County	-8.8	8.9
Washington County	-5.8	10.4
Westmoreland County	-5.5	10.8
Allegheny County	-7.8	16.0
Total Five County Region	-7.3	14.1

Source: 1990 U.S. Census.

Monessen lost 16.9 percent. As indicated in Chart 1, Allegheny County (excluding the City of Pittsburgh) accounts for 58 percent of the total population along the Monongahela River in 1990. Allegheny County's industrial river communities developed during the Industrial Revolution near the steel and coke factories which blanketed the river banks. Allegheny County has 18 population centers along the river, which account for 128,227 residents. In fact, all of the county's municipalities along the river except Elizabeth Borough have populations greater than 1,000.

2. Transportation Facilities

a) *Roads*

Road access within the corridor ranges from interstate highways to one lane municipal roads. Interstate 70 (I-70), a limited access east/west highway, was the only interstate located within the corridor. It connects two major north-south highways, the Pennsylvania Turnpike (I-76) and Interstate 79, and also provides access to PA Rt. 51. I-70 has exits at Speers and Belle Vernon within the study corridor. In 1993, the average daily traffic on the I-70 bridge which crosses the river at Speers and Belle Vernon was over 39,000 vehicles (Pennsylvania Department of Transportation [PennDOT], District 12-0, personal communication, July,1997).

State Routes 51, 88, 119, 148, 166, 201, 837, and 906 are the primary state roads which travel north/south within the corridor (Figure 3). State Routes 88 and 837 combine to extend along the western side of the river weaving in and out of the study corridor. Both Rt. 88 and Rt. 837 are part of business districts in Washington and Allegheny Counties. The remaining five state routes traverse the eastern side of the river from Point Marion to McKeesport. These roadways provide access to the river communities in Fayette, Westmoreland, and Washington Counties.

Similarly state roads on the western side of the river were part of the business districts along the eastern bank. Three east/west state routes cross the river within the study corridor, Rt. 21, Rt. 40 and Rt. 51. Route 21 crosses the river at r.m. 79.4, and connects Cumberland Township, Greene County and Masontown Borough, Fayette County. PennDOT District 12-0 stated that the 1997 average daily traffic on this bridge is over 9,000 vehicles per day. The Rt. 21 bridge is the only automobile bridge along the 24 mile stretch of river between Point Marion and Brownsville. Rt. 40 crosses the river connecting Washington and Fayette Counties at West Brownsville and Brownsville. Here the river is traversed by two bridges, the newer Rt. 40 Bridge which is known as the Lane Bane Bridge, and the old Rt. 40, Inter-County Bridge. PennDOT District

12-0 determined the 1997 average daily vehicle count on these bridges was 8,966 and 3,430, respectively. Finally, the Rt. 51 bridge is located entirely within Allegheny County, crossing the river at Elizabeth Borough and West Elizabeth Borough. Table 5 provides a comprehensive listing of automobile bridges within the study corridor.

An important transportation project was being studied and constructed during the preparation of this river conservation plan. The Mon-Fayette Expressway, as proposed by the Pennsylvania Turnpike Commission (PTC), would connect I-68 in West Virginia, I-70, and I-

Table 5
Automobile Bridges

River Mile	Automobile Bridge	Municipality, County		Roadway/ Roadway Link
90+	Rt. 88	Point Marion, Fayette	Dunkard, Greene	Rt. 88 to Rt. 119
Cheat	Rt. 119 (Cheat River)	Point Marion, Fayette	Dunkard, Greene	Rt. 119
79+	Rt. 21	Masontown, Fayette	Cumberland, Greene	Rt. 21
55+	Old Rt. 40	W. Brownsville, Washington	Brownsville, Fayette	Rt. 88 to Brownsville's High St.
55+	Rt. 40	W. Brownsville, Washington	Brownsville, Fayette	Rt. 40
43+	I 70	Speers, Washington	Rostraver, Westmoreland	I 70
41+	N. Charleroi/ Monessen	N. Charleroi, Washington	Monessen, Westmoreland	Rt. 88 to Rt. 906
38+	Donora/ Monessen	Donora, Washington	Rostraver, Westmoreland	Rt. 88/ Rt. 837 to Rt. 201/ I 70
37+	Donora/ Webster	Donora, Washington	Rostraver, Westmoreland	Rt. 837 to Rt. 906/ Rt 51
32+	Monongahela City	Monongahela, Washington	Forward, Allegheny	Rt. 88 to Rt. 136
22+	Rt. 51	Jefferson, Allegheny	Elizabeth, Allegheny	Rt. 51
19+	Clairton/ Glassport	Clairton, Allegheny	Glassport, Allegheny	Rt. 837 to Glassport/ Elizabeth Rd.
16+	Mansfield	Dravosburg, Allegheny	McKeesport, Allegheny	Rt. 148
Yough	Rt. 148	McKeesport, Allegheny	McKeesport, Allegheny	Rt. 148
14+	McKeesport, Duquesne	Duquesne, Allegheny	McKeesport, Allegheny	Rt. 837 to Rt. 148
9+	Rankin	Whitaker, Allegheny	Rankin, Allegheny	Rt. 837 to Braddock Ave.
7+	Homestead Highlevel	Homestead, Allegheny	City of Pittsburgh, Allegheny	Rt. 837 to Browns Hill Rd.
5+	Glenwood	City of Pittsburgh, Allegheny	City of Pittsburgh, Allegheny	Rt. 885

Source: Mackin Engineering, 1998.

376 in the City of Pittsburgh. There are five sections to this project with only two that could potentially affect the study corridor. These two sections are the Uniontown to Brownsville and Route 51 to Pittsburgh sections. Both of these sections are currently in the Environmental Impact Statement (EIS) preparation stage. No preferred alternative will be approved before the year 2000.

Within the corridor, this limited access toll road is proposed to cross the river near Brownsville, Fayette County and again near Duquesne, Allegheny County. The highway is also proposed to travel along the northern bank of the river from Rankin Borough to the City of Pittsburgh. The new highway was proposed to increase transportation efficiency within the Monongahela Valley. It is anticipated to have broad reaching economic and social effects through the region. Because the Mon-Fayette Expressway is the largest highway project proposed in the region, it has the potential to impact natural, cultural, and socioeconomic resources of the study corridor communities. These impacts may be either direct or indirect, and may be either positive or negative. The scope of this project presents an opportunity for increased community planning throughout the Monongahela River Valley. The manner in which each community addresses this opportunity will help determine the overall effects of the highway project.

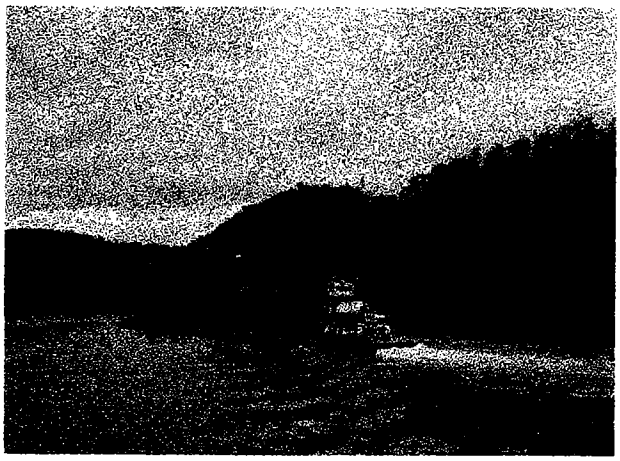
b) *River*

River transportation occurs both commercially and recreationally along the river. Mackin estimated that an average of seven different barge companies operate on the river each day. Commercial barges chiefly transport coal, petroleum products, scrap metal, and limestone along the river. Recreational boating also occurs on the river and creates additional traffic volumes during summer months. Mackin analyzed the 1997 lockage and tonnage statistics for the locks and dams along the river to determine the amount river traffic traveling between pools (Table 6). A lockage is calculated each time a lock chamber equalizes the water levels between pools.

Table 6
1997 River Lockages

River Lock	River Mile	Vessels	Tonnage	Lockages
Lock 2	11.2	7,553	19,310,000	6,120
Lock 3	23.8	10,081	15,401,000	9,158
Lock 4	41.5	6,955	10,856,000	6,295
Maxwell	61.2	6,497	10,577,000	5,425
Grays Landing	82.0	2,681	5,451,000	3,017

Source: U.S. Army Engineering District, Pittsburgh, Lock Performance Monitoring System Summary, 1997.



Over 19 million tons of cargo were shipped on the Monongahela River in 1997.

The major river project influencing river transportation is the "Lower Mon Project" consisting of the removal of Locks and Dam No. 3 and the renovation of Locks and Dams 2 and 4 by the U.S. Army Corps of Engineers (ACOE). The projected economic impacts determined in the Potential Economic Impacts of the Replacement of Locks and Dams 2, 3, and 4 on the Lower Mon, prepared for The Port of Pittsburgh Commission by Martin Associates in June of 1996, stated the dam replacement project will put 400 direct, induced, and indirect jobs at risk at a local economic value of about $15.4 million annually. This negative impact is due to renovations required by the change of water elevation at existing terminals. In contrast, tonnage is expected to increase by 24 percent due to the larger lock chambers and fewer lockages. The twenty year Lower Mon Project means the creation of 8,800 new jobs, 402 million in economic benefits, a 24 percent increase in traffic capacity, and a 60 cents-a-ton savings in transportation costs.

To decrease the negative impacts associated with the renovation of river terminals, the Port of Pittsburgh Commission has begun to coordinate with local financial industry to establish a special economic development fund available for river terminals, specifically associated with the impact of the changing water levels.

c) *Rail*

In addition to roadway and river travel, the railroad industry represents a strong transportation element in the study corridor. CSX Corporation and Conrail operate and maintain railroads on both sides of the river in every county except Greene. These lines carry coal and steel from the coal mines, preparation plants and steel mills located along the river (Table 7).

Active and inactive rail lines follow both banks of the Monongahela River.

d) Public Transportation

Public transportation is available in the study corridor municipalities within Washington, Westmoreland, and Allegheny Counties. In Washington and Westmoreland, two public bus companies provide service to the Mid-Monongahela Valley communities. These companies are the Mid-Monongahela Valley Transit Authority (MMVTA) and 88 Transit Lines, both of which provide service between Monongahela Valley communities and the City of Pittsburgh. The MMVTA provides transportation solely to communities along the river, and bus routes extend as far south as California Borough and as far north as New Eagle Borough.

The Port Authority of Allegheny County provides bus transportation to all communities within Allegheny County. Stops are located throughout the study corridor in Allegheny County, and riders are transported to other municipalities and the City of Pittsburgh.

3. Major Sources of Employment

a) *Major Employers*

A field survey, along with the 1994-1996 edition of the Greater Pittsburgh Chamber of Commerce Industrial PinPointer, were used by Mackin to determine major employers within the study corridor. Since the 1970s, the

Table 7
Monongahela River Terminals With Rail Access

River Mile	Active Industrial Sites	Municipality, County	Railroad Access
58.8	CONSOL	Luzerne, Fayette	CONSOL
58.5	The New Marcus Paulson	Luzerne, Fayette	CONSOL
45.1	Westmot Coal Company	Belle Vernon, Fayette	N/A
43.6	Mon-River Towing	Belle Vernon, Fayette	Conrail
43.2	Matt Canestrale Contracting	Belle Vernon, Fayette	CSX, Conrail
34.3	American Carbon & Metals	Donora, Washington	Conrail
24.8	Lock 3 Coal Company	Monongahela, Washington	N/A
24.1	Dillner Transfer & Storage	West Elizabeth, Allegheny	Conrail
23.6	Clairton Slag Co.	Dravosburg, Allegheny	N/A
19.5	Glassport Transportation	Glassport, Allegheny	CSX, Conrail
18.5	Commercial Steele Corp.	Glassport, Allegheny	CSX
17.2	St. Clair Supply Company	Glassport, Allegheny	CSX
12.1	Union Railroad	Duquesne, Allegheny	CSX, Conrail
10.2	Rochez Brothers	Braddock, Allegheny	CSX
10.1	JOSH Steele Co.	Braddock, Allegheny	CSX
09.9	S. H. Bell	Braddock, Allegheny	CSX

Source: The Southwestern PA Freight Transportation Guidebook, 1995.

economic vitality of the area has suffered from the decline of the mining, glass and steel industries. Nevertheless, the Monongahela Valley is not absent of industry.

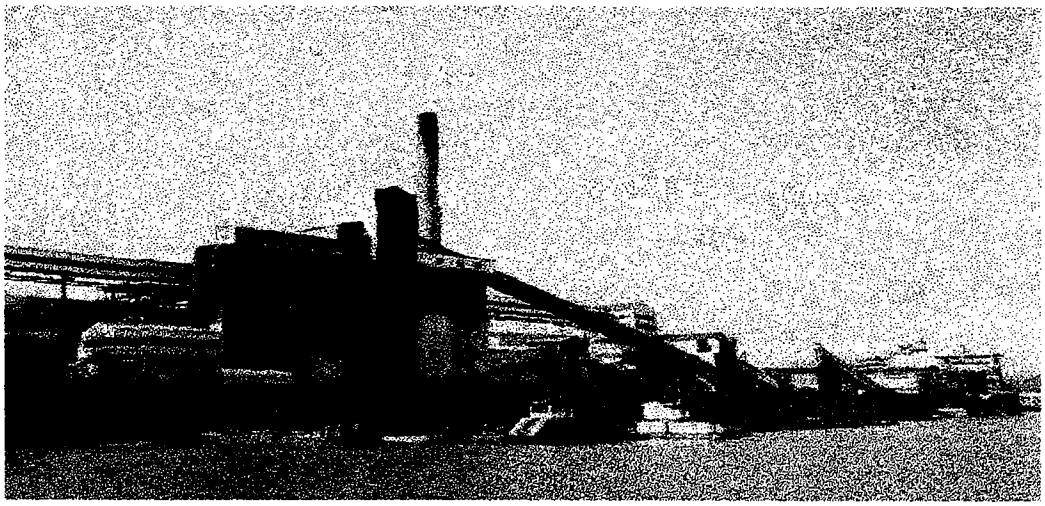
Major employers within the study corridor are businesses who employ over 50 people. The Industrial PinPointer identified industrial employers in all counties of the study corridor, except Greene County for which field data was used to located major employers. The Industrial PinPointer identified 42 major industrial employers within the study corridor (The Industrial Pinpointer excluded mining operations and Power Plants). Three major employers are located in Fayette County, 11 in Washington County, 2 in Westmoreland County, and 26 and three power stations which have over 50 employees (Figure 3).

The field survey conducted by Mackin identified several non-industrial major employers within the study corridor, including 17 public school systems, four regional hospitals, and one university.

b) *Industrial Parks*

Five active industrial parks are located along the river in Washington, Westmoreland, and Allegheny counties. These include:

- The Greater Charleroi Industrial Park, located in Speers Borough, adjacent to I-70 and a 1/2 mile from the river. Mackin identified 10 active businesses at this site, as



U.S.X. Clairton Coke Works is one of 42 industrial employers along the river.

within Allegheny County, together they employed 6,935 people at the time of the survey. Mackin also identified three mining operations well as a career and technology center.

Former U.S. Steel Duquesne Works, site of the new Duquesne City Center redevelopment project.

- The Monessen Riverfront Industrial Park, located along Rt. 906 in the City of Monessen, is a major brownfield redevelopment project in its initial phase. This phase encompasses 26 acres and 250,000 square feet of industrial space. The industrial park is home to one tenant who occupies 36,000 square feet.

- The Donora Industrial Park is the largest of all the industrial parks within the corridor. It is located between the borough's commercial district and the Monongahela River, adjacent to Rt. 837. The industrial park is home to 22 businesses and the Washington and Greene County Job Training Center. In November 1997, construction began on a new access road which will allow industrial park traffic to bypass the downtown area and significantly improve access to I-70 (Mon Valley Progress Council, 1998.)

- The Glassport Industrial Park, located along the Monongahela River, is home to 12 industrial employers. This redevelopment project is located to allow for rail, river, and truck access. A large area in the northern section of the site remains undeveloped.

- The Regional Industrial Development Corporation (RIDC), a quasi-public development agency, operates a redevelopment project known as the Duquesne City Center industrial park at the former U.S.X. Duquesne Works.

  The site is located along the Monongahela River adjacent to Rt. 837. At the time of the survey, this

major brownfield
redevelopment housed two
small companies.

IV. LAND RESOURCES

A. Soil Characteristics

Soil characteristic information was collected from the soil surveys of Fayette, Washington, Greene, Westmoreland, and Allegheny Counties, by the U.S. Department of Agriculture (USDA) in conjunction with the Pennsylvania State University. The primary factors determining soil variations along the Monongahela River are vegetation, relief, and the influence of man. These factors have created soil associations which, within the study corridor, consist of one to three major soils and a combination of several minor soils (Table 8).

1. Greene and Washington Counties

The soil profiles in Greene and Washington Counties are nearly identical along the river. In both counties, Dormont-Culleoka is the dominant soil association countywide and is prevalent in the Monongahela River basin. It exists uninterrupted along the river from the West Virginia border to the Washington/Allegheny County line. This association commonly displays hills with many benches and ridges. Most of the hills have long slopes drained by small streams which have formed drainage ways between the hillsides. Slopes common to this association can reach up to 50 percent along the river valley. Much of this association is wooded or is reverting to a woodland mix of native hardwoods. Large wooded lots unsuitable for development exist on steep slopes along the river valley. Less sloped areas are suited for farming with limitations that include a relatively high water table and moderate bedrock depth.

In the streambeds of Ten Mile Run and Pigeon Creek in Washington County, the Dormont-Culleoka-Newark association is common. Within the corridor, most of the unit is wooded or reverting back to its wooded state, except for cleared areas along ridges commonly used as pastures. The less sloping areas of the association are suitable for farming which was common on level ground in the flood plain. Slope, erosion, occasional flooding, and a seasonal high water table, are the major limitations for most uses. The bedrock depth can be an additional limitation with uses not associated with farming.

Along Dunkard Creek in Greene County, the Glenford-Dormont-Library association is present. This soil association consists of terraces, hills, ridges and benches with slopes up to 20 percent. The common use in the corridor for this association is residential and open space.

2. Fayette County

Along the river, the Guernsey-Westmoreland-Clarksburg soil is located in every municipality of Fayette County. It consists of soils influenced by limestone and soils underlain by the Pittsburgh coal vein. The landscape consists of rounded hilltops and a series of benches located along the slopes. The soils of this association readily accept fertilizer and have good surface drainage, making them among the best soils for farming in the county. Commercial, industrial, and residential development, although present in some areas, is limited due to the soil's permeability and the fine textured subsoil.

The Monongahela-Philo-Atkins association is located in the municipalities of Belle Vernon Borough, Washington Township, Jefferson Township, Brownsville Borough, Luzerne Township, Masontown Borough, Springhill Township, and Point Marion Borough. Soils of this association have formed deep alluvial deposits and are commonly found along the Monongahela River, separated from the Guernsey-Westmoreland-Clarksburg association by steep escarpments. This association has severe limitations for nearly every use due to its seasonal high water table and frequent flooding.

3. Westmoreland County

The Philo-Monongahela-Atkins association is located along the river in North Belle Vernon Borough, Rostraver Township, and the City of Monessen. This association was commonly located along the larger streams of the county and it contains a hardened layer of soil (fragipan) near the water table. The association can be productive for farm and pastureland, but it is not used commercially in this capacity within the study corridor. The primary uses consisted of industrial, commercial, and residential, all which are limited by frequent flooding and a seasonal high water table.

The Weikert association is also located along the river in Rostraver Township. This association occurs as steep escarpments cut by the river, with often exposed geologic formations. Commonly wooded along the river, this association contains slopes too steep for any type of farming or development. The shallowness and rockiness of this soil also limit its uses.

4. Allegheny County

In Allegheny County, the Urban Land-Philo-Rainsboro association is found consistently along both sides of the Monongahela River. The Urban Land soil consists of land so altered by earth moving or so obscured by buildings or

structures that the original soil type can not be identified. It is commonly found on somewhat level land adjacent to the Monongahela River where past development has been intense for industrial, residential, and commercial uses.

In areas just outside of the river basin in Clairton, Duquesne, and Munhall, the Urban Land-Dormont-Culleoka association is present. Like other urban soils, it has been so altered by development that the original soil types could not be identified. Most of the association in Clairton and Duquesne has a gentle slope which accommodates the intense urban development. The Gilpin-Upshur-Atkins association is located just outside the Urban Land-Philo-Rainsboro association along length of the river. This association is located on the steep hillsides of river valley. In some areas, seepage springs are common due to recent landslides. Being very steep, this association is mostly wooded and has severe limitations for uses other than open space.

Table 8
Soil Associations

Soil Association	Characteristics	County
Dormont-Culleoka	Moderately well to well-drained, deep to moderately deep, gently sloping to very steep soils; on hilltops, ridges, benches, and hillsides.	Greene, Washington
Glenford-Dormont-Library	Moderately well to poorly-drained, deep, nearly level to sloping soils, on terraces and surrounding uplands.	Greene
Dormont-Culleoka-Newark	Well to somewhat poorly drained, deep to moderately deep, nearly level to very steep soils; on hilltops, ridges, benches, hillsides, and floodplains.	Greene, Washington
Guernsey-Westmoreland-Clarksburg	Deep to moderately deep, well-drained to poorly drained, medium textured, nearly level to sloping soils on stream terraces and floodplains.	Fayette
Monongahela-Philo-Atkins	Deep, moderately well to poorly drained soils and poorly drained medium textured nearly level soils, on hilltops, ridges, benches and hillsides.	Fayette
Philo-Monongahela-Atkins	Deep, moderately well-drained soils and poorly drained medium textured nearly level soils, on hilltops, ridges, benches and hillsides.	Westmoreland
Weikert	Shallow, well drained rocky soils on escarpments along streams.	Westmoreland
Urban Land-Philo-Rainsboro	Deep, moderately well-drained soils and Urban land on floodplains and terraces.	Allegheny
Urban Land-Dormont-Culloeka	Moderately deep to deep, moderately well to well drained soils and urban land underlain by shale and limestone uplands.	Allegheny
Gilpin-Upshur-Atkins	Moderately deep, well-drained to moderately well-drained soils and Urban land underlain by red and gray shale on uplands, having deep poorly drained soils on floodplains.	Allegheny

Source: Soil Surveys of Greene and Washington, Westmoreland, Fayette, and Allegheny Counties.

B. Prime Agricultural Soils

Prime agricultural soils are designated by SPRPC, these soils have a mixture of soil and landscape attributes which are best suited for agricultural purposes. Prime agricultural soils are deep, with good internal drainage, and level or nearly level. The elements which make these soil types ideal for agriculture also make them an excellent soil type for development.

Within the corridor, the majority of prime agricultural soil has been developed leaving only a few pockets of undeveloped prime agricultural acres (Table 9). These undeveloped prime agricultural soil pockets are located in Dunkard Township, Greensboro, Rices Landing, Springhill Township, Brownsville Township, and Forward Township. Figure 4 displays the location of the prime agricultural land within the study corridor as indicated by SPRPC (1998).

C. Ownership

Most of the land within the study corridor is privately owned by industrial companies or individuals. Both large and small companies own land related to industrial uses such as rail corridors, mining operations, steel mills, coke plants, scrap yards, electrical plants, storage facilities, and barge facilities.

Scrap yard at Monongahela.

The publicly-owned areas along the river include parks, river access sites, institutional buildings, and open space.

Table 9
Prime Agricultural Soils Within Corridor

Greene County	976.4 Acres
Fayette County	1021.7 Acres
Washington County	1603.7 Acres
Westmoreland County	405.8 Acres
Allegheny County	221.1 Acres
Total	**4228.7 Acres**

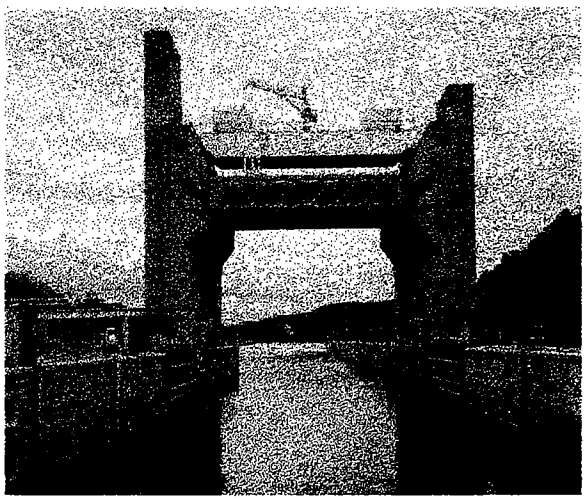
Source: Southwestern Pennsylvania Regional Planning Commission, 1998.

designations was not conducted, Brian Bradley of the Bureau of Abandoned Mine Reclamation indicated that all of the sites identified probably "contained an environmental degradation component" (personal communication, February 12, 1998).

V. WATER RESOURCES

A. *Historical Perspective*

The Monongahela River has been subjected to severe modifications over the past 150 years. As early as 1792, navigational improvements such as the removal of large rocks and the construction of stone dams were taking place on the Monongahela (Miko & Lorson, 1994), but the Monongahela Navigation Company, chartered by the state of Pennsylvania in 1837, was responsible for the most significant modifications. ACOE obtained control of the Pennsylvania section of the river in 1897 and between 1840 and 1903 the construction of a navigational system of locks and dams, extending from Fairmont, West Virginia to Pittsburgh permanently transformed this free-flowing river into a series of canals and uniform pools.



Inside of Maxwell Lock, near Maxwell and East Bethlehem.

With the improved navigational system, the Monongahela Valley was primed for interstate commerce and industrial development. Between the early 1800s and 1960s the Monongahela River was exposed to the most intense industrialization in the eastern United States. At one point, barges on the Monongahela hauled 30-40 million tons of interstate commerce annually, more than either the Allegheny or Ohio Rivers (Miko & Lorson, 1994). The principle commodity shipped on the Monongahela River was and remains bituminous coal (M. Koryak, ACOE, personal communication, June, 1998). Intense coal mining activities throughout the basin resulted in gross abandoned mine drainage (AMD). As a result, by the early 1900s, the 113.1 mile reach of the Monongahela upstream of the Youghiogheny River was essentially a sterile system, supporting only the most pollution tolerant species (ACOE, 1991).

In order to fully understand the condition of the river it is important to understand the evolution of the nation's water pollution control program. Initially, human waste disposal via watercourses made water pollution control a paramount concern, but despite the requests of individual states for the federal government to oversee sewage disposal, pollution control remained a local responsibility.

In 1899 Congress enacted the Rivers and Harbors Act which prohibited discharges of refuse into navigable waterways. The act's true purpose, however, was to prevent interference with interstate commerce on navigable waterways. Despite the growing severity of pollution problems, often remedied only by minor regulatory actions, regulation of water quality remained under the jurisdiction of state and local authorities until the mid 1940s.

Following World War II, water pollution in the Monongahela increased by several orders of magnitude as steelmaking and industrial influences reigned supreme throughout the Monongahela Valley. The Water Pollution Control Acts of 1948 and 1956 were attempts at combating the problem by providing federal grants for research and the implementation of state water pollution programs. In addition, the Water Pollution Control Acts authorized the federal government to act directly in matters of interstate water pollution. Unfortunately, the process was complicated and lacked effective mechanisms to regulate individual dischargers.

Not until 1972, when the Federal Water Pollution Control Act (now known as the Clean Water Act) was initiated, did the state of water pollution throughout the country and within the Monongahela basin begin an upward trend. The following quote by Oliver Houck, a noted authority on the Clean Water Act, (cited in Percival, Miller, Schroeder, & Leape, 1996) provides some insight into the revolutionary nature of the act and its extraordinary impact on the regulation of water quality.

> Warts and all, the Clean Water Act's NPDES program is *America's most successful pollution control program* to date...for a mix of reasons that include its (impossible) goals, its reliance on action-forcing technological standards, and its watch-dogging and enforcement by citizen organizations.

Unfortunately, by the early 1960s the majority of the damage had already occurred in the Monongahela. Not until the late 1970s had water quality in the river begun to recover. These improvements were a result of steel industry downsizing between 1970 and 1980, advances in wastewater treatment systems, limits on industrial effluents, and AMD abatement technologies. As Michael Koryak from ACOE points out, the Pennsylvania Clean Streams Law of 1965 and the passage of the Federal Surface Mining Control Act (SMCRA) of 1977 were important milestones in the restoration of water quality in the Monongahela River.

Despite the downsizing of the steel industry, the Monongahela

remains primarily a commercial navigation. In fact, estimates place commercial traffic increases at 1.4% annually by the year 2050 (ACOE, 1991; Miko & Lorson, 1994). It is for this reason that sustained improvements in water quality will remain at odds with river commerce.

B. Major Tributaries

The Monongahela River receives its greatest hydrological influence from four major tributaries: the Tygart, West Fork, Cheat and Youghiogheny Rivers. The Tygart and West Fork are located in West Virginia and their confluence at Fairmont, West Virginia forms the Monongahela. Within the study corridor, two systems, the Cheat and Youghiogheny Rivers, account for 72% of the total drainage area entering the Monongahela (Table 10, Figure 2). The Youghiogheny originates in Maryland and the Cheat in West Virginia, but the majority of the Youghiogheny's drainage lies within Pennsylvania, while only the mouth of the Cheat falls within Pennsylvania.

By far the largest contributor to the Monongahela drainage in Pennsylvania, the Youghiogheny basin historically represented some of the worst water quality conditions in the state. Intense resource extraction, industrial land uses, and coking facilities combined to severely degrade water quality and the existing biological communities (Pennsylvania Department of Environmental Resources [PADER], 1971; Frey, 1994). With the collapse of the steel industry in western Pennsylvania, the Youghiogheny basin has slowly recovered, but the myriad of abandoned mines, coal fine piles, and slag dumps continue to release acidic discharges into the basin (Frey, 1994).

Despite water pollution concerns on the Youghiogheny, its inflows benefit water quality on the Monongahela (ACOE, 1991). Low flow augmentation from the Youghiogheny River Lake provides cooler water, thus lowering temperature in both the Youghiogheny and the Monongahela. ACOE (1991) also indicated that inflows from the low flow augmentation provided by Tygart River Lake and Stonewall Jackson Lake on the West Fork significantly influence hydrology and benefit the water quality of the Monongahela.

Water from the Cheat River basin, which has been severely degraded by AMD, appears to negatively affect the Monongahela's water quality. Acidic inflows from the Cheat River frequently produce acidic conditions near its confluence with the Monongahela and according to ACOE (1991), periods of low flows in Pool 7

result in increased acidic conditions.

C. *Wetlands*

Wetlands can be defined as transitional areas between terrestrial and aquatic environments where the water table often exists at or near the surface, or the land is inundated by water (Cowardin, Carter, Golet, LaRoe, 1979). As such,

TABLE 10
Major Tributaries* to the Monongahela River Study Corridor

Tributary	Drainage Area (mi^2)	PADEP Water Use**	Monongahela River Mile
Cheat River	1423.00	WWF	89.68
Dunkard Creek	235.00	WWF	87.18
Georges Creek	64.80	WWF	84.81
Jacobs Creek	7.50	WWF	83.16
Whiteley Creek	54.40	WWF	80.24
Little Whiteley Creek	9.03	WWF	78.44
Browns Run	17.90	WWF	77.16
Muddy Creek	31.70	WWF	72.92
Tenmile Creek	338.00	WWF	65.62
Dunlap Creek	41.60	WWF	56.16
Redstone Creek	109.00	WWF	54.90
Pike Run	28.60	TSF	51.36
Little Redstone Hollow	12.70	WWF	46.70
Downers Run	6.22	WWF	46.02
Speers Run	6.63	WWF	43.30
Maple Creek	10.20	WWF	42.60
Pigeon Creek	59.20	WWF	32.34
Mingo Creek	22.20	WWF	29.80
Peters Creek	51.50	TSF	19.67
Youghiogheny River	1764.00	WWF	15.53
Turtle Creek	148.00	WWF, ***delete*** PWS	11.52
Nine Mile Run	6.07	TSF, ***delete*** PWS	7.60
Streets Run	10.00	WWF, ***delete*** PWS	6.00

* (Contributory drainage > 6 square miles)
** PADEP Chapter 93 Water Quality Standards abbreviations are: WWF = Warm Water Fisheries, TSF = Trout Stocked Fisheries, PWS = Potable Water Supply

Source: Pennsylvania Gazateer of Streams by Pennsylvania Department of Environmental Protection in cooperation with the United States Department of the Interior Geological Survey, 1989, Harrisburg: Pennsylvania Department of Environmental Protection.

wetlands frequently exhibit a combination of physical and biological characteristics of each system. Three factors are recognized as criteria for wetland classification: the presence of hydric soils (soils characteristic of a reducing environment due to lack of oxygen); inundation or saturated conditions during part of the growing season; and a dominance of hydrophytic (water-loving) vegetation (Environmental Laboratory, 1987). Within this general framework, many different wetland ecosystems and classifications exist.

Decades of urban development and growth along the Monongahela floodplain has significantly reduced the number of wetlands within the study corridor. As a result, wetlands occurring within the study corridor are generally small and found primarily along shorelines and tributary mouths.

Wetlands occupying the study corridor were identified through a review of National Wetlands Inventory (NWI) and SPRPC mapping. Figure 4 illustrates the locations of these systems within the study corridor.

Within the study corridor, the Monongahela River is classified as a riverine wetland on NWI mapping. Riverine wetlands occur in floodplains and riparian corridors that are closely associated with waterways. Hydrology is provided by overbank flows during flood conditions and through subsurface hydraulic connections to the stream itself. Periods of inundation or saturation, combined with a reducing environment, stimulate the growth of hydrophytic vegetation. If conditions permit, the resulting wetland systems are generally classified as emergent, scrub/shrub, or forested wetlands.

Several of the tributary waters to the Monongahela are also classified as riverine systems. Located between the Conrail freight yard and the Monongahela River in Blainsburg, the Blainsburg Floodplain Biological Diversity Area provides exceptional wetland habitat for native vegetation and wildlife. This region is best characterized as a recovering floodplain forest and scrub/shrub wetland community.

Riverine or floodplain wetlands perform several functions within the Monongahela basin. Two of the most important include the retention and gradual release of floodwaters and bank stabilization. Wetlands retard floods by slowing the movement of water through the wetland, increasing retention time, and allowing water to infiltrate the soil. When floodwaters recede, these wetlands function to gradually release stored water back to the river. Along with forested and scrub/shrub riparian

corridors, the root systems associated with herbaceous and scrub/shrub wetland vegetation anchor the otherwise unstable sand and alluvial soils of the riverbank.

Expansive areas of other wetland types do not occur within the study corridor due to the steep slopes and topographic relief surrounding the river valley. The existence of smaller systems (less than 10 acres) within the study corridor is highly probable however. These systems would most likely be of two types, slope and depressional wetlands.

Slope wetlands occur in areas of groundwater discharge. These discharges often occur when the downward flow of groundwater meets an impermeable layer of rock material. The flow of groundwater is then diverted horizontally until it reaches the soil surface along a hillside. Spring seeps and sphagnum moss wetlands are common examples.

Depressional wetlands may also occur within the study corridor in topographical basins. The accumulation of surface water into depressions with constricted or nonexistent outlets is one of the defining characteristics. These depressional systems are often overlooked, ranging in size from a few square yards to several acres.

D. Submerged Aquatic Vegetation

Despite the industrialized nature of the Monongahela, it is interesting to note that an ACOE (1991) study indicated that the Monongahela River supports almost all of the aquatic beds of submerged aquatic plants within the navigable waters of the Pittsburgh District (this includes the Allegheny and Ohio Rivers). These beds are significantly concentrated in the upper Monongahela throughout West Virginia and in Pool 3 in Pennsylvania; and establish the Monongahela as a unique ecological resource within the Ohio River navigation system.

The rarity of submerged aquatic vegetation within the three rivers alone establishes this habitat type as a unique resource. Submerged aquatic vegetation also provides valuable spawning and cover habitat for many forage feeder fish.

E. Floodplains

The one-hundred and five-hundred year floodplains are generally narrow and restricted by the steep slopes that border much of the Monongahela River within the study corridor. Still, there are areas at risk for flooding at locations like Point Marion, Greensboro, East Bethlehem, West Brownsville, Brownsville, California, Coal Center, and McKeesport (Figure 4). As evidenced by historical flood events on the Monongahela

River, these low-lying areas often sustain significant property damage.

Flood management and insurance rates are coordinated through the National Flood Insurance Program. This program, which was established by the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973, was an effort to reduce the damage and hazards associated with flood events. To accomplish these goals, the Federal Emergency Management Agency (FEMA), conducts routine flood insurance studies which investigate the severity and existence of flood hazards throughout the country. The results of these studies are then used to develop risk data that can then be applied during land use planning and floodplain development.

In addition to the flood hazard data provided by FEMA, the National Weather Service (NWS) operates river forecast points at several locations along the Monongahela River. River stage information is available through recorded messages, the NWS internet site (www.nws.noaa.gov\er\pitt), and National Oceanic and Atmospheric Administration (NOAA) weather radio. ACOE also maintains copies of FEMA studies and related flood hazard investigations. This information as well as other flood hazard assistance is available through the ACOE, Pittsburgh District office.

F. Water Quality

1. Prevailing Concerns

While much is known about individual pollutant species and sources in the Monongahela River, an overall understanding of the impact of water pollution is significantly limited.

According to Smith, Alexander, & Lanfear, (1994) comprehensive, valid, and reliable water quality data at the watershed level is currently on the frontier of academic and governmental agency reporting. For this reason compiling a useful description of water quality conditions within the Monongahela River study corridor is complicated by numerous limitations because reliable, regional data does not exist for many aspects of water quality. In addition, comprehensive networks of sampling locations, which are necessary for analyzing trends and correlations are often absent.

The primary reason for the lack of comprehensiveness is that water quality monitoring and research is technically demanding, labor intensive, and expensive (Smith et al., 1994). Another difficulty associated with water quality monitoring is the requirement of a continued research effort. Collection of

data at a discrete point in time offers little information regarding the trends and dynamics of water quality parameters. Several years of data are needed in order to more completely evaluate the effects of environmental factors, and to discriminate between short and long term sources of variability.

Further complicating the difficulties associated with monitoring programs is the determination of which water quality indicators are appropriate. Describing the different aspects of water quality is generally achieved through a myriad of indicators, ranging from algal species to aquatic invertebrate population dynamics to studies of chemical species composition. According to Smith et al. (1994), indicators range from those that are specific and narrowly focused, like individual chemical or bacterial concentrations, to those that are integrative and broadly focused, such as an index of biological health for an entire community ecosystem. Ideally, a watershed-based analysis of water quality for the Monongahela River study corridor would include a combination of indicators selected from all points along this spectrum.

Unfortunately, this ideal range of indicators does not exist for the Monongahela River because federal, state, and local databases are often compromised. In fact, the EPA has said that the state of current water quality data is so poor that no objective, overall answer can be provided to the question of whether water quality within the major basins [including the Monongahela] is trending upward or downward (cited in Percival, 1996). The available data includes chemical samples from a regionally diverse area, permitted effluent discharges and water uses, toxic trace metal and organic species concentrations in vertebrate tissue, and macroinvertebrate and fish community compositions. Data for these indicators is often random, both temporally and geographically, and analysis is difficult at best due to inconsistencies between individual sampling protocols.

2. Existing Indicators and Data

a) *Chemical Standards and Assessment*

Section 303 of the Clean Water Act of 1972 requires that states adopt specific water quality standards that include uses designated for their waterbodies (Percival et al., 1996). These standards specify maximum ambient levels of pollutants that will ensure that waters can be used for their designated purposes. Water uses and levels of specific chemical parameters are to be protected and maintained with the goal of eliminating and preventing water pollution. A synopsis of

Pennsylvania's designated water uses includes fish and aquatic life; public, industrial, livestock, wildlife, and irrigational water supply; and boating, fishing, water contact sports, aesthetics, and recreational uses (Frey, 1996).

In accordance with section 303, the major goal of Pennsylvania's Water Quality Assessment Program is to evaluate whether these water quality standards are being met. Data from the program is compiled and presented to Congress and the public in accordance with section 305(b) of the Clean Water Act (1972) which requires states to conduct biennial water quality assessments on the condition of their waterways and report on these findings.

In the 1994 and 1996 Water Quality Assessment Reports (Frey, 1994, 1996), approximately 1200 r.m.'s within the Monongahela River subbasin were evaluated. For 1994 and 1996, respectively, 745 and 780 r.m. were fully supporting (i.e. currently supporting the existing designated water uses), 207 and 200 r.m. were partially supporting (i.e. only partial attainment was achieved due to an observed impairment in fish and aquatic life), and 216 and 223 r.m. were identified as not supporting (i.e. data, direct observation, and professional judgment indicated that the water body did not support current uses).

Throughout the United States, nonpoint sources are the greatest source of water quality degradation (Conservation Foundation cited in Percival et al., 1996) and the Monongahela basin is no exception. Nonpoint source pollution is an expansive source that is perhaps the most difficult to measure and highly variable due to climatic variances. Nonpoint sources are those that cannot be traced to a specific point of discharge or origin. Of the 1200 r.m. assessed in the 1994 Water Quality Assessment Report, over 400 were indicated as being degraded and the overwhelming source of this degradation was nonpoint source impacts, accounting for over 350 r.m.

Historically, the number one nonpoint source impact throughout the Monongahela basin has been from resource extraction in the form of AMD. In fact, PADEP reported that AMD was responsible for the degradation of close to 300 r.m. (70.6%) within the Monongahela drainage (Frey, 1994).

AMD involves a complex set of chemical reactions but begins by exposing sulfides to oxygen during the mining process. Sulfides almost invariably occur within bituminous coal seams, in rocks and clays surrounding the seams, and within roof shales.

Typically in the mineral form pyrite or marcasite (FeS_2), exposure to oxygen oxidizes the pyrite and liberates sulfate ions (SO_4^{2-}), hydrogen ions (H^+), and ferrous iron (Fe^{2+}). The sulfate and hydrogen ions constitute the components of the familiar compound sulfuric acid (H_2SO_4).

Further oxidation of the ferrous iron is often facilitated by iron bacterium such as *Thiobacillus ferrooxidans*, *Metallogenium spp.*, *Thiobacillus thiooxidans*, and *Bacillus ferrooxidans* (Manahan, 1994). The additional oxidation has two consequences. First, the conversion of Fe^{2+} to Fe^{3+} causes the pyrite to further dissolve, thus perpetuating the cycle. Second, the ferric acid ($Fe(H_2O)_6^{3+}$) remains in solution only at a very low pH (<3). When diluted by receiving waters, the pH rises, $Fe(OH)_3$ precipitates, and the familiar yellow-orange sediment found in so many Pennsylvania waterways is formed.

The sediments produced by AMD can cause aesthetic damage, clog the gills of aquatic organisms, and increase toxic levels of metals. However, the most damaging component of AMD is the production of sulfuric acid which is acutely toxic to all aquatic organisms (Manahan, 1994).

Although individual sites were not identified, data from PADEP's Water Quality Assessment Reports indicated a random distribution of mine discharges throughout the Monongahela's watershed including: 110.0 r.m. of the Youghiogheny basin, 26 r.m. in the Redstone Creek basin, 22 r.m. in the Peters Creek basin, 22 r.m. on Turtle Creek, 20 r.m. in the Georges Creek basin, 13 r.m. on the Big Sandy Creek, 12 r.m. on Whiteley and Little Whiteley Creeks, and 10 r.m. on Dunkard

Abandoned mine discharges, like this one, are one of the major pollution sources along the Monongahela.

Creek (Frey, 1994, 1996).

The remaining significant sources of degradation were identified by PADEP as municipal point sources (28 r.m.), natural chemical and physical changes (27 r.m.), miscellaneous nonpoint sources (20 r.m.), septic systems (16 r.m.), industrial point sources (10 r.m.), storm sewers (6 r.m.), atmospheric deposition (5 r.m.), combined sewer overflows (4 r.m.), and agriculture (1.5 r.m.).

As a result of the overwhelming influence of AMD, the Monongahela River watershed has been listed as a High Priority Watershed on the Nonpoint Source (NPS) Priority Degraded Watershed List (DWL) under the PADEP's Nonpoint Source Control Program (Frey, 1994, 1996). The NPS DWL identifies streams or stream segments that are impacted by nonpoint sources of pollution. PADEP uses information about the amount of degradation in conjunction with interest from the public and local groups in order to assess watersheds that are most likely to benefit from remediation projects.

In addition to water quality assessment reports, PADEP maintains hundreds of fixed Water Quality Network (WQN) stations throughout the state. WQN stations are located on the Monongahela River at Braddock (WQN 701), Charleroi (WQN 702), and Point Marion (WQN 725). WQN stations are also located on the Monongahela's two largest tributaries, the Cheat River near its confluence (WQN 727) and the Youghiogheny River at Sutersville (WQN 706). Water quality data from these stations is contained in Appendix E. Information obtained at each location is used in assessing the quality of surface water, identifying trends, and evaluating the effectiveness of the Water Quality Management Program (Shertzer & Schreffler, 1996). Results between 1984 and 1992 indicated several positive trends as illustrated in Table 11.

Trends for alkalinity are perhaps the most encouraging. As discussed, the primary source of degradation within the Monongahela basin is AMD. Alkalinity serves to buffer the input of acidic solutions, so increases are generally indicative of improving water quality. Concentrations of manganese were decreasing at WQN's 702 and 725, but were increasing at WQN 706. Manganese, although sparsely studied, is a toxic metal at high concentrations and AMD constituent. The reported toxicity of manganese in most freshwater aquatic life varies widely between 0.3-2700 mg/l. Iron displayed an upward trend only at WQN 706 on the Youghiogheny River. Increases in total iron often indicate the influence of AMD, so increases are of concern. Similarly,

increases in aluminum, a toxic metal, indicate the effects of acidic inputs. Therefore the aluminum increase at WQN 727, the Cheat River, are also of concern.

Similar to the PADEP WQN, the United States Geological Survey (USGS) operates the National Water Quality Assessment Program (NAWQA) which began in 1991. This program was designed to collect consistent water quality data, report on the status and trends of water resources, and identify factors that affect water quality throughout the United States. To meet these objectives, the USGS established approximately 60 study units, or major watersheds, throughout the country. Information is then collected regarding the physical, chemical, and biological condition of the watershed.

In 1994, studies began within the Allegheny-Monongahela River Basin. NAWQA maintains only one water chemistry sample station on the Monongahela River at Braddock, PA. Although still in the preliminary stages of data collection, early results indicate AMD as the most significant source of water quality degradation (USGS, 1997a; D. Williams, USGS, personal communication, December 10, 1997). Due to the sample station's downstream orientation within the watershed, data collected at this site provides only a summary of cumulative effects throughout the entire river system. Furthermore, because only one sample location exists, it is difficult to make further conclusions from this limited data set. Appendix E contains the water chemistry data for 1996 and 1997 at the Braddock site.

As part of a study examining the Monongahela's navigational system from Locks and Dams No. 2 to 4, ACOE (1991) investigated existing water quality between r.m. 4.5 and 56.2. Several specific water quality parameters were measured between 1975 and 1990. Results indicated elevated temperatures, reduced dissolved oxygen, elevated iron and sulfate concentrations, high levels of turbidity and dissolved solids as the main issues affecting existing water quality in the lower Monongahela.

According to ACOE (1991) the construction of the locks and dams resulted in isolated pools that have become more sensitive to tributary flows and industrial effluents. For instance, the Monongahela exhibits a warming trend from upstream to downstream. Two large fossil fuel generators, Duquesne Light's Elrama Plant and West Penn Power's Mitchell Plant, are responsible for massive volumes of heated thermal discharges totaling 273 and 146 million gallons per day, respectively (R.

TABLE 11
Monongahela River Water Quality Network:
Summary of Selected Water Quality Chemical Parameters
(1984-1992)

WQN#	Alkalinity (mg/l)	Ammonia (mg/l)	Nitrate (mg/l)	Manganese (ug/l)	Iron (ug/l)	Aluminum (mg/l)
701	0.80	-0.010	-	-	-	-
702	0.50	-	-	-12.0	-	-
725	0.93	-	0.01	-16.3	-	-
727	-	-	-	-	-	96.7
706	1.00	-	0.02	8.0	96.0	
PADEP Standards	min. 20	-	max. 10	max. 1000	max. 1500	max. 1000
Figures are the estimated yearly change in concentration. *Positive numbers indicate increasing trends while negative numbers indicate decreasing trends.						

Source: Commonwealth of Pennsylvania 1994 Water Quality Assessment (Section 305(b), Federal Clean Water Act) by R. F. Frey, 1994, Harrisburg: Pennsylvania Department of Environmental Protection.

Ludlow, USGS, personal communication, December 1, 1997). In fact, increased electrical demands during a drought in 1988, combined with low flow conditions, resulted in recorded water temperatures as high as 100^0F within Pool 3 (r.m. 23.8) (ACOE, 1991).

Combined, these power plants extract and discharge approximately 7 times the amount of water used by all public water suppliers within the study corridor.

Because water temperature is negatively correlated with levels of dissolved oxygen these regions of elevated water temperature correspond with lower levels of dissolved oxygen. The combination of increased water temperature and wastewater inputs between r.m. 30.0 and r.m. 16.7 resulted in a significant 1.6 mg/l decrease in dissolved oxygen concentration (ACOE, 1991). This type of dissolved oxygen decrease can place significant stress on fish populations, resulting in

increases in mortality and decreases in fecundity rates.

Studies of algal abundance on the Lower Monongahela between 1975 and 1988 indicated higher phytoplankton concentrations at downstream locations (ACOE, 1991). Algal concentrations are closely tied to nutrient concentrations and water temperature. This finding correlates with the observed temperature increases in the lower reaches of the Monongahela, as well as an increase in wastewater discharge.

Very little data existed regarding volatile organic compounds (VOC's) in the Monongahela. ACOE (1991) did indicate that through reaeration, the locks and dams network provided substantial stripping of VOC's between the water-air interface. Exactly how this process functioned was unclear and researchers pointed out that the data sets were too limited to make sound conclusions.

b) *Biological Indicators and Assessment*

As cited, descriptive data regarding the biological integrity of the Monongahela River ecosystem is highly inadequate for a number of different reasons. Comprehensive data sets regarding macroinvertebrate composition for the study corridor are scarce. There are several factors that contribute to the lack of available information but two in particular, associated costs and labor intensity, prohibit, comprehensive macroinvertebrate studies. In addition, the size and depth of the Monongahela River introduces a series of logistical difficulties related to the sampling procedure itself.

The most recent and comprehensive macroinvertebrate study identified was conducted in 1989 by Finni (cited in U.S. Fish and Wildlife Service [USFWS], 1991) on the lower 42 miles of the Monongahela. Results of this investigation indicated a "diverse invertebrate community" represented by 139 distinct taxa including 72 species of insects and crustaceans and 54 taxa of segmented worms and leeches. Due to the ratio of taxa collected which are considered intolerant of organic pollutants and low pH levels, and the observed species richness, Finni concluded that evidence of substantial improvement within the benthic community existed. Although these results are encouraging and represent marked improvements in this aspect of water quality, the robustness of these conclusions is somewhat compromised by the lack of an established biological reference condition and non-reliance on an accepted bioassessment protocol.

Assessments of fish populations in the Monongahela River have

revealed encouraging trends over the past 40 years. In fact, a management report from the Pennsylvania Fish and Boat Commission (PFBC) described the changes in species composition since 1957 as "miraculous" (Miko & Lorson, 1994). This report cites the collection of only two fish from the Monongahela in a 1957 population study. By 1994, gamefish such as walleye, smallmouth bass, and sauger (once considered rare throughout the Monongahela) exhibited increased fecundity rates and represented a viable sportfishery. Increases in gamefish populations have been complemented by the appearance of five Pennsylvania candidate or "near endangered status" species. Table 12 lists species composition results from PFBC sampling efforts conducted between 1988 and 1991.

As cited by ACOE (1991) additional fish studies have been conducted by the Ohio River Valley Water Sanitation Commission (ORSANCO) (1967-1988), Ecological Analysts, Inc. (1977-1978), NUS Corporation (1981-1982), and USFWS (1984-1988). These investigations have indicated similar species composition and abundance results with the upper reaches showing less improvement than the lower Monongahela, most likely the result of AMD influence.

As was the case with other water quality indicators for the Monongahela, Miko and Lorson (1994) pointed out that more consistent, rigorous sampling protocols need to be implemented to provide a greater understanding of fish population dynamics.

Due to the industrialized character of the Monongahela, sediment contamination is a recurring water quality concern. Much attention has been given to the phenomenon of bioaccumulation and biomagnification of toxins within fish and crustacean species. Toxic compounds include heavy metals such as cadmium and chromium; organohalide pesticides including aldrin, dieldrin and chlordane; polychlorinated biphenyls (PCB) like askarel; polycyclic aromatic hydrocarbons (PAC) such as benzene; and volatile solid material. Many of these compounds are insoluble in water and subsequently concentrate in bottom sediments and animal tissue. However, comprehensive monitoring networks are costly and limited in scope.

In response to human health concerns and the obvious ecological implications associated with contaminants, PADEP began the Water Quality Toxics Management Strategy. Monitoring was started in 1976 and includes routine sampling of fish tissues for a variety of

toxins. The most recent reports contain consumption advisories for several fish species in the Monongahela and Cheat Rivers (Table 13). Due to chemical concentrations found in the fillets of these species, these advisories were designated as "do not eat" by PADEP.

TABLE 12
Fish Species Composition for the Monongahela River
Sections 04-06 (Lock & Dam No. 3 to The Point)

Common Name	Scientific Name
Largemouth bass	*Micropterus salmoides*
Smallmouth bass	*Micropterus dolomieui*
Spotted bass	*Micopterus punctulatus*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Walleye	*Stizostedion vitreum v.*
Sauger	*Stizostedion canadense*
Bluegill	*Lepomis macrochirus*
Pumpkinseed	*Lepomis gibbosus*
Green sunfish	*Lepomis cyanellus*
Rock bass	*Ambloplites rupestris*
Tiger muskellunge	*Esox masquinongy*
Flathead catfish	*Pylodictis olivaris*
Channel catfish	*Ictalurus punctatus*
White bass	*Morone chrysops*
Yellow perch	*Perca flavescens*
White x striped bass	*M. chrysops x M. saxatilis*
Longnose gar	***Lepisosteus osseus***
Gizzard shad	*Dorosoma copedianum*
Emerald shiner	*Notropis atherinoides*
Mooneye	***Hiodon tergisus***
Quillback	*Carpoides cyprinus*
Common carp	*Cyprinus carpio*
Northern hog sucker	*Hypentelium nigricans*
Silver redhorse	*Moxostoma anisurum*
River redhorse	***Moxostoma carinatum***
Golden redhorse	*Moxostoma erythrurum*
Shorthead redhorse	*Moxostoma macrolepidotum*
Logperch	*Percina caprodes*
Skipjack herring	***Pomolobus chrysochloris***
Freshwater drum	*Aplodinotus grunniens*
Brook trout	*Salvelinus fontinalis*
Warmouth*	***Lepomis gulosus***
Species in bold represent Pennsylvania candidate species *not sampled in Sections 04-06 but is known to occur in other sections	

Source: Monongahela River (819 A&C) Management Report, Sections 04-06 by D. A. Miko and R. D. Lorson, 1994, Bellefonte: PA: Pennsylvania Fish and Boat Commission.

TABLE 13
Fish Consumption Advisories within the Monongahela River Basin

Waterbody	Location	Species	Toxin
Monongahela	r.m. 90.8	White Bass, Carp	Chlordane, PCB
Monongahela	r.m. 61.2	Channel Catfish, Carp, Smallmouth Bass	Chlordane, PCB
Monongahela	r.m. 11.2	Smallmouth Bass, Spotted Bass, Walleye, Freshwater Drum, Carp, Channel Catfish	PCB
Cheat River	Confluence	White Bass	Chlordane

Sources: Commonwealth of Pennsylvania 1996 Water Quality Assessment (Section 305(b), Federal Clean Water Act) by R. F. Frey, 1996, Harrisburg: Pennsylvania Department of Environmental Protection. 1998 Pennsylvania Summary of Fishing Regulations and Laws by Pennsylvania Fish and Boat Commission, 1998a, Bellefonte, PA: Pennsylvania Fish and Boat Commission.

In 1990, ACOE conducted an analysis of bottom sediments for priority pollutants within the navigational channel between r.m. 23.8 and 41.4. Sample locations were selected which presumably represented "worst-case" areas and analyzed for a variety of contaminants. Results indicated that bottom sediments from the Pool 3 navigation channel are "remarkably clean" of EPA priority pollutants (ACOE, 1990). In addition, ACOE pointed out that there were no indications that the sediments at Locks and Dam No. 2 and 4 would yield significant levels of contamination. Near shore fine sediments were not addressed in this 1990 study.

The combination of elevated temperatures and increased nutrient levels can have serious health implications for recreational water use on the river. Two species of potentially dangerous thermophilic (heat-loving) organisms are known to occur within Pool 3. These organisms are especially abundant in warm waters with increased bacterial concentrations (K. Talaro & A. Talaro, 1993). *Schizothrix calcicola*, a species of algae, was found to occur in high densities by ACOE (1991). This blue-green algae produces an exotoxin similar to those produced by the agents of botulism, diphtheria, and tetanus and has been blamed for isolated water supply epidemics (ACOE, 1991).

According to Talaro et al. (1993) the protozoa *Naegleria fowleri*, is known to infect swimmers, boaters, and water skiers worldwide through direct water-mucous membrane contact. Although infections are rare, recreational water users are at risk for contracting primary acute meningoencephalitis, an invariably lethal condition resulting from the massive destruction of brain tissue.

One result of increased temperatures and sewage nutrient concentrations are 'blooms', or explosions in growth rates of blue-green algae and certain protozoans. The productivity associated with these blooms has significant impacts on the river ecosystem. During daylight hours algae produce energy via photosynthesis. At night however, algal metabolism requires the input of oxygen from the surrounding waters. Aquatic systems with high concentrations of algae may become depleted of oxygen which is essential to fish and other aquatic life. If the cycle persists, the demand for dissolved oxygen may become so great that anaerobic conditions (i. e. in the absence of free oxygen) will result.

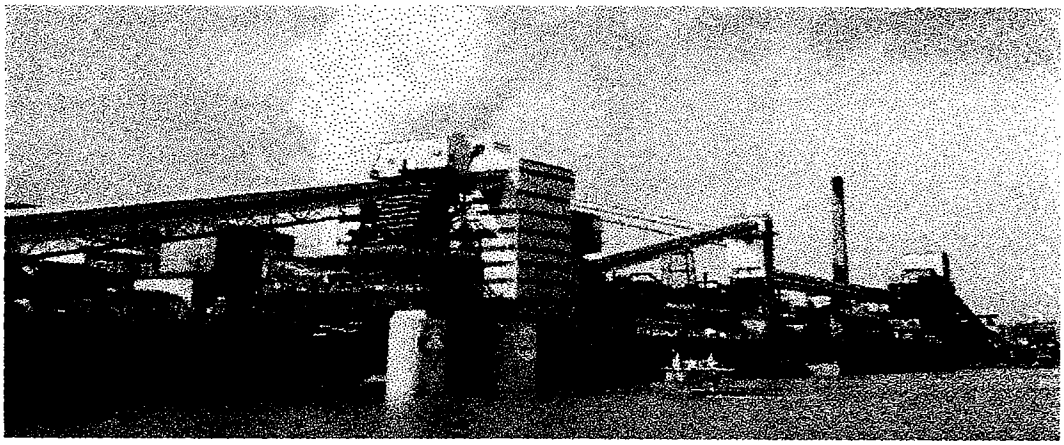
During the summer months, certain species associated with algal blooms can become so abundant that offensive odors and tastes have often occurred within the river and at municipal water authorities. Although the majority of these odors can be removed with proper water treatment, this condition seriously detracts from the aesthetic appeal of the river. Decreases in transparency and concurrent increases in turbidity between r.m. 56.2 and 0.8 have also been blamed on the observed increases in algal colonies, suspended materials, and prop wash from commercial navigation in the lower Monongahela (ACOE, 1991).

3. Effluent Discharge

Section 402 of the Clean Water Act of 1972 establishes a national permit program, the National Pollution Discharge Elimination System (NPDES), that may be administered by the EPA or by individual states as delegated by the EPA. Essentially, the NPDES permit program translates general effluent limitations into specific obligations of a discharger. Thus, "...the discharge of any pollutant by any person shall be unlawful" except as specifically permitted by the regulatory agency (Percival et al., 1996).

Effluent dischargers in the study corridor were identified through a review of PADEP and USGS NPDES databases (USGS, 1997b; K. Halloran, PADEP, personal communication, November 24, 1997). A total of 215 active permits were identified for the study corridor (Appendix E). Although the

majority of these permits are owned by industrial and municipal/sewage treatment facilities, several were issued to private individuals and retail businesses. PADEP (1998) indicated that of the 215 active permits, 23 effluent violations had occurred during 1997 (Table 14).



The U.S.X. Clairton Works is one of the many industrial dischargers to the Monongahela.

Public wastewater or sanitary treatment facilities within the study corridor were identified from NPDES databases, and sewer service area mapping for the study corridor was obtained from the SPRPC. As depicted in Figure 5, the more industrialized, heavily populated regions of the lower Monongahela tend to have greater service coverage. With the exception of portions of Forward Township, the majority of the riverfront in Allegheny County is covered by municipal treatment service.

Approximately 50 percent of Westmoreland County's riverfront is serviced, but Rostraver Township, which accounts for the remaining 50 percent, is un-sewered. All of the riverfront in Washington County except West Brownsville, Centerville, and Elco Boroughs, is covered by municipal service.

Less populated, and more rural in nature, Fayette and Greene Counties are significantly lacking in service coverage. As shown by Figure 5, approximately 90 percent of the riverfront in these counties is not covered by municipal treatment service.

In addition to permitted discharges, one of the most significant pollutant sources in terms of human health risks is the unauthorized discharge of untreated sewage. Despite the strict regulations against unpermitted pollutant discharges under the Clean Water Act and

Pennsylvania's Sewage Facilities Act (PA Act 537), many communities within the study corridor remain out of compliance. Concentrated primarily in the less industrialized areas of Fayette and Greene Counties, on-lot septic systems or direct 'wildcat' lines, are frequently observed. These allow untreated sewage and septic system leachate to enter directly into the river. Possible outcomes of these discharges include increased nutrient levels (nitrates and phosphates), higher turbidity, sedimentation, decreases in dissolved oxygen levels and increases in pathogenic bacteria.

According to PADEP there are numerous municipalities and unincorporated towns that relied solely upon on-lot septic systems or direct 'wildcat' lines to the river (B. Santmeyer, PADEP, personal communication, July

TABLE 14
Effluent Violations for Major Dischargers to the Monongahela River (1/97-12/97)

Facility	Municipality	County	Parameter
Hercules, Inc.	Jefferson	Allegheny	pH
Wheeling-Pgh Steel	Allenport	Washington	Oil/Grease
Wheeling-Pgh Steel	Allenport	Washington	Total Suspended Solids
Duquesne Light-Elrama	Elrama	Washington	pH
West Penn Power-Mitchell	Monongahela	Washington	Total Suspended Solids, Oil/Grease, pH
West Penn Power-Mitchell	Monongahela	Washington	Total Boron
West Penn Power-Mitchell	Monongahela	Washington	Total Suspended Solids
U.S.X. Corporation	Clairton	Allegheny	Total Suspended Solids
U.S.X. Corporation	Clairton	Allegheny	pH
U.S.X. Corporation	Clairton	Allegheny	Napthalene
LTV Steel Company	Pittsburgh	Allegheny	Temperature
California Borough	California	Washington	Flow
Elizabeth Sanitary Authority	Buena Vista	Allegheny	Total Suspended Solids
Monongahela Municipal Authority	Monongahela	Washington	Total Suspended Solids
Mon Valley Sewer Authority	Donora	Washington	Flow
West Mifflin Municipal	West Mifflin	Allegheny	Fecal Coliform
West Mifflin Municipal	West Mifflin	Allegheny	Fecal Coliform
Charleroi Municipal	Charleroi	Washington	Total Suspended Solids
Duquesne City	Duquesne	Allegheny	Fecal Coliform
Elizabeth Boro Municipal	Elizabeth	Allegheny	Total Suspended Solids
U.S.X. Corporation	North Braddock	Allegheny	Zinc
U.S.X. Corporation	North Braddock	Allegheny	Oil/Grease
U.S.X. Corporation	North Braddock	Allegheny	Oil/Grease

Source: [NPDES Limits and Effluent Violations], Unpublished data by Pennsylvania Department of Environmental Protection, 1998.

17, 1997). Many of these areas have attempted to receive grants to construct treatment plants or link with existing sewer lines in the area under Pennsylvania's Sewage Facilities Act, but have been unsuccessful.

4. Navigational Demands

It has been emphasized that in spite of enormous changes in water quality legislation and public attitude, the Monongahela River remains first and foremost, a commercial navigation river. The sheer magnitude of annual river commerce on the Monongahela illustrates this point (Table 15).

With an expected increase in river commerce of approximately 60% by the year 2050 and the condition of antiquated navigational structures on the Monongahela River, ACOE (1991) conducted a feasibility analysis for the rehabilitation and/or replacement of Locks and Dams No's. 2 through 4. Although not discussed in detail here, ACOE stated that the most significant impacts to aquatic habitat would result from the removal of Locks and Dam No. 3., as a result of the loss of oxygen exchange processes due to reaeration of water flowing over the dam. As suggested, this would decrease dissolved oxygen concentrations below Locks and Dam No. 3 and create an uninterrupted pool zone between r.m. 11.3 and 41.5. In addition, the tailwater zone associated with Locks and Dam No. 3, which accounts for approximately 45 acres of exceptional value habitat, has been identified by USFWS as a "Resource Category 2" (ACOE, 1991). Resources of this type represent systems which perform vital functions at the population, community, or ecosystem levels.

Scrap hauling is among the many types of commercial navigation on the Monongahela.

TABLE 15
River Commerce on the Monongahela River (1951-1989)

Year	Millions of Tons
1951	32.0
1955	37.6
1960	29.5
1965	38.8
1970	42.3
1975	37.3
1980	34.3
1981	32.1
1982	28.8
1983	26.5
1984	34.5
1985	28.8
1986	32.4
1987	32.9
1989	38.4
2000	**48.1**
2010	**52.9**
2020	**55.7**
2030	**64.6**
2040	**71.1**
2050	**78.7**
Figures in bold are forecasts from the ORD Navigational Planning Center	

Source: Lower Monongahela River Navigation System Feasibility Study Final Main Report by ACOE, 1991, Pittsburgh: U.S. Army Engineer District, Corps of Engineers.

Along with direct loss of aquatic habitat, impacts from the project may include:

- loss of fishing opportunity and access
- damage to upland wildlife habitat at disposal sites
- destruction of macroinvertebrate communities and fish spawning areas during dredging
- contamination from hazardous and toxic wastes during dredging
- indirect loss of wetland systems

ACOE, in conjunction with state and federal agencies, has developed mitigation strategies to compensate for unavoidable adverse impacts.

5. Summary

Over the past 50 years many notable improvements in water pollution control have been realized on the Monongahela River, but the Monongahela will never be restored to its pristine state. Nevertheless, the Monongahela River is far from achieving its highest attainable state of ecosystem functioning. In fact, Miko and Lorson (1994) have described the Monongahela as "in a state of transition".

Despite enormous expenditures on water pollution controls, the overall record of water quality improvement within the Monongahela River is mixed. According to Percival et al. (1996) "the Federal Clean Water Act has kept levels of many water pollutants substantially below what they would otherwise be". Nonetheless, water pollution problems remain throughout the Monongahela River, primarily as a result of nonpoint source pollution, navigational demands, combined sewer overflows, industry, and discharges from 'wildcat' sewers.

G. Water Supply

There are fourteen public water intakes within the study corridor which withdraw surface water from the Monongahela River (Table 16). Cumulatively, these facilities extract approximately 58 million gallons per day and supplied over 1.6 million homes (G. Wobert, PADEP, personal communication, December 17, 1997). This amount of daily extraction appears significant but when viewed in terms of the total river volume (at Braddock) it becomes a relatively small amount. For example, according to the USGS (1988) riverflow volume at Braddock averages approximately 12,430 cubic feet per second (cfs). This translates into almost 335 million gallons per hour (mgh) which is more than sufficient to meet the needs of public water suppliers. As ACOE points out, volumes upstream are significantly less. At Charleroi, for example, river volume decreases to 650 cfs, translating to 17.5 mgh (C. Weiser, ACOE, personal communication, June, 1998).

Water service area mapping for the study region was obtained from SPRPC and is contained in Figure 5. Service areas on Figure 5 represent existing water supply lines with a 'buffered' region of coverage of approximately 350 feet. Water service was determined by comparing the buffered coverage areas with communities and residences as indicated on USGS 7.5 minute series quadrangles.

TABLE 16
Public Water Suppliers with Intakes on the Monongahela River

Facility	Population Served	Withdrawal (gal/day)	Intake Location (River Mile)
Point Marion Borough Water Service	1,400	117,000	90.0
East Dunkard Water Association	3,400	400,000	88.1
Dunkard Valley Joint Municipal	1,400	100,000	85.5
Masontown Boro Waterworks	3,900	500,000	79.0
Carmichaels Municipal Water Authority	3,900	300,000	75.0
Southwestern PA Water Authority	34,000	4,000,000	71.2
Tri-County Joint Municipal Authority	7,400	1,000,000	64.5
PA American Water-Brownsville	15,000	1,500,000	57.1
Newell Municipal Authority	700	350,000	50.6
Washington Twp. Municipal	8,200	1,322,000	46.0
Belle Vernon Municipal Water Authority	5,000	500,000	44.1
Charleroi Boro Authority	30,000	6,000,000	42.7
PA American Water-Elrama	800,000	6,000,000	42.7
PA American Water-Hays Mine	700,000	36,000,000	4.5
Total	**1,614,300**	**58,089,000**	

Source: G. Wobert, PADEP, personal communication, December 17, 1997.

A total of 26 public water suppliers service the study corridor population, however, as Table 16 indicates, only 14 of these withdraw water directly from the Monongahela. The remaining facilities obtain their water from other facilities, through groundwater supplies, or through purchase from other facilities.

With the exception of isolated residences in Forward Township, all of the riverfront communities in Allegheny County are within public water supply coverage. Similarly, all of the riverfront communities within Westmoreland, Washington, Greene, and Fayette Counties, are within water service coverages. Although not identified as residences, there are isolated buildings indicated on USGS mapping that are outside of water service coverage areas in all five study corridor counties.

Table 17 lists non-public water withdrawal from the Monongahela River within the study corridor. Cumulatively, these eight facilities withdraw approximately 9 times as much surface water from the river as public suppliers. On a daily basis these extractions are marginally within the hydrologic means of the river but as cited under the Water Quality section, the return of heated waters from the Elrama and Mitchell plants

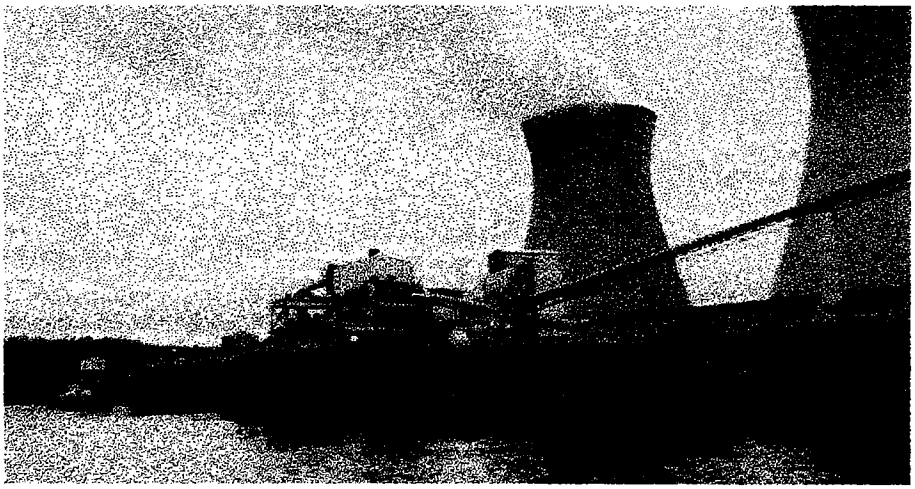
TABLE 17
Non-Public Water Withdrawal from the Monongahela River

Facility	Municipality	Withdrawal and Return Discharge (gal/day)
Commercial		
Riverview Golf Course	Forward	200,000
Fossil Fuel Generating Units		
Allegheny PSI - Hatfields Ferry	Cumberland	27,700,000
Duquesne Light Co. - Elrama Plant	Union	273,000,000
Allegheny PSI - Mitchell Plant	Union	146,000,000
Industrial Facilities		
Aristech Chemical Corp.	Clairton	2,870,000
Wheeling-Pittsburgh Steel	Monessen	65,300,000
Wheeling-Pittsburgh Steel	Allenport	11,300,000
LTV Steel-Pittsburgh Works	Pittsburgh	788,000
Total		**527,158,000**

Source: R. Ludlow, USGS, personal communication, December 1, 1997.

has severe deleterious effects on the aquatic ecosystem.

Discharge rates within the Monongahela River basin are regulated by five major reservoirs including, Stonewall Jackson Lake on the West Fork,



The Allegheny P.S.I. power plant at Hatfields Ferry withdraws over 27 million gallons of water from the river each day.

Tygart Lake on the Tygart River, Youghiogheny River Lake and Deep Creek Lake on the Youghiogheny River, and Lake Lynn on the Cheat River (ACOE, 1991). The first three reservoirs are maintained and operated by ACOE. Designed uses of these reservoirs included recreation, fishing, flood control, and low-flow augmentation to enhance water quality and navigational capabilities during drought conditions. Deep Creek Lake and Lake Lynn are both privately owned by power generating facilities and do not perform any low flow regulation.

VI. BIOLOGICAL RESOURCES

A. Vegetation

When the first settlers entered the Monongahela Valley and the surrounding region, the most prominent feature was the immense acreage of virgin forest. This seemingly endless tract of forest was then known as "The Great Forest" or the "Black Forest of America". It has been determined that the Great Forest contained more species of trees than any where else in North America (Bissell, 1952). A few stands of isolated softwood or evergreen trees were present, although it was predominantly a hardwood forest. Oak trees (*Quercus spp.*) were the most abundant species and grew to enormous size. Other tree species of this diverse woodland were hickory (*Carya spp.*), yellow poplar (*Liriodendron tulipifera*), walnut (*Juglans spp.*), ash (*Fraxinus spp.*) and elm (*Ulmus spp.*). Evergreen species such as the white pine (*Pinus strobus*), eastern hemlock (*Tsuga canadensis*), pitch pine (*Pinus rigida*), eastern red cedar (*Juniperus virginiana*), and short leaf pine (*Pinus echinata*) were also located within the forest.

By 1952 less than five percent of this original forest remained (Bissell, 1952). Many species were timbered for charcoal-making, ship-building, timbering, mining, and rail-building. More recently, large tracts of forest land have been altered to make way for homes, businesses, highways and other developments.

The Monongahela Valley is classified as a part of the North American Deciduous Hardwood Forest Type. The entire area consists primarily of second and third growth mature deciduous forest. The upland areas located along the hillsides and ridges of the valley contain white and northern red oak (*Quercus alba; Quercus rubra*), maple (*Acer spp.*), birch (*Betula sp.*) hickory (*Carya spp.)*, beech (*Fagus grandifolia*) and yellow poplar (*Liriodendron tulipifera).* Dominant herbaceous vegetation consisted of Japanese knotweed (*Polygonum cuspidatum*), garlic mustard (*Alliaria officinalis*), wild grape (*Vitis sp.*), beggar-tick (*Bidens sp.*), touch-me-nots (*Impatiens sp.*), and goldenrods (*Solidago sp.*). Within the riparian zone, silver maple (*Acer saccarinum*), black willow (*Salix nigra*), and box elder (*Acer negundo*) were dominant. Wetland ecosystems along the river were dominated by dogwood species (*Cornus sp.*), ninebark (*Physocarpus opulifolious*), cattails (*Typha sp.*), burreed (*Sparganium sp.*), panic grass (*Panicum sp.*), needle rush (*Eleocharis acicularis*), and soft rush (*Juncus effusus*).

B. Wildlife

1. Terrestrial

As the borders of the Great Forest shrank and the number of hunters and trappers increased and the industrial age began to take hold, the wildlife populations of the region suffered. Wild cats (*Felis spp.*), wolves (*Canis spp.*), black bear (*Ursus americanus*), Eastern elk *(Cervus canadensis*), white-tailed deer *(Odocoileus virginianus)*, and other large mammals, which were quite abundant in the 1750s, were virtually eliminated from the Monongahela Valley (Bissell, 1952).

Around the early 19th century, hunting and trapping laws were instituted to minimize the loss of wildlife populations. Many conservation efforts were undertaken by hunters, trappers, and other sportsmen to reintroduce and stabilize populations. White-tailed deer were reintroduced into the area and have since become a management problem. Habitat improvement projects were undertaken to attract the black bear back to the region.

Forested areas along the river now support wildlife that is tolerant of human actions, including squirrels (*Sciurus spp.)*, raccoons (*Procyon lotor*), opossums (*Didelphis virginiana*), Eastern cottontails (*Sylvilagus floridanus*), and white-tailed deer (*Odocoileus virginianus*). According to the Pennsylvania Game Commission (PGC), the populations of beaver *(Castor canadensis)* and great blue heron *(Ardea herodias)* are on the rise in 1998 (PGC, 1997; J. Lucas, PGC, personal communication, December,1997).

Avian species in the study corridor, such as the red-tailed hawk (*Buteo jamaicensis*), the Eastern wild turkey (*Meleagris gallopavo*), the ring-necked pheasant (*Phasianus colchicus*), the ruffed grouse (*Bonasa umbellus*), and other gamebirds and songbirds inhabit the wooded slopes of the river valley. Several duck species also use the Monongahela River for nesting and migration. In addition, the Audubon Society indicated that in 1997 over 200 bird species occurred in or near the study corridor. According to the Breeding Bird Atlas from 1983 to 1989 prepared by the PGC, the Monongahela River was also used by several migratory bird species.

2. Aquatic

Additional discussions on biological indicators and assessments of fish and macroinvertebrate species are presented in the *Water Resources* section of this report.

During the industrial era, the aquatic community within the Monongahela River was severely

reduced and nearly eliminated. In 1957, a fish population study conducted by ORSANCO collected only 2 specimens from the Monongahela River (Miko & Lorson, 1994). The loss of the entire mussel community occurred nearly a century ago (Ortmann, 1909). Since the 1960's, more stringent federal and state regulations on industry and increased community involvement contributed to a significant improvement in water quality and as a result, fish populations rose to sustainable, naturally reproducing levels. The recolonization of unionid mussels followed the significant recovery of the fish and macroinvertebrate community (Anderson, 1997).

One recent introduction into the Monongahela River is the zebra mussel (*Dreissena polymorpha*). The zebra mussel is a dime-sized, black and white striped mussel that entered Pennsylvania in the ballast of a ship en route from Europe to Lake Erie (PADEP, 1997b). The mussels initially invaded the Great Lakes, the Hudson River in New York, and the Mississippi Delta in Louisiana, and eventually were introduced throughout the Allegheny and the Ohio Rivers.

In 1997, zebra mussels were identified in Lock and Dam No. 3 in Elizabeth. Although there were only 14 mussels collected at this lock, the potential exists for migration by the free-swimming veligers or larvae into the remaining portions of the river (PADEP, 1997b). Problems result when zebra mussels block pipe intakes at public water systems or power plants, as well as when the filter-feeding mussels reduce nutrient levels in water bodies and native species that rely on these nutrients can not sustain themselves.

Another nuisance mussel that has been introduced into the Monongahela River is the Asiatic clam (*Corbicula fluminea*). This species occurs in large numbers throughout the river and has the potential to create the same problems as the zebra mussel. It is a small freshwater bivalve mollusk that is comprised of two yellowish-gold thick, hinged shells, characterized by a series of concentric ridges. This species rarely grows larger than a nickel.

It was introduced into the west coast around 1924 and was discovered along the east coast in the 1970s. Asiatic clams can reach densities of 10,000 to 20,000 per square meter, potentially releasing several million juveniles daily into the same area. Once released, the juveniles are weak-swimmers usually found near the bottom of the water column. This is one of the reasons they can cause water intake pipe problems, because the intake pipes are generally places at the bottom of the water column also.

Some suggested methods of control of this species include using screens, traps or small concentrations of chlorine or bromine to kill the juveniles.

Another interesting mussel located in the Monongahela River is *Toxolasma parva*. This species was collected near r.m. 5 in July, 1996 by NAWQA for the first time ever (Anderson, 1997). This identification supports the fact that the river ecosystem is improving since the majority of fresh water mussels are intolerant of pollution.

The ACOE (1991) sectioned the aquatic habitat within the Monongahela River into 5 zones related to substrate type, overlying water column, and fish spawning success. This resulted in the following segments: the main channel, the main channel border, the shoreline-debris zone, the tailwater zone, and the creek mouths and flooded channel zone. The main channel, which included areas within the designated navigational channel and areas containing a water depth greater than 9 feet, consisted primarily of a sandy substrate. Although, silt, gravel, rubble, and bedrock were present. These areas were determined to be of little value in regards to fish spawning. The main channel border was designated as a transitional area between the main channel and the shoreline-debris zones containing a sand or silt substrate with the potential for occasional deposits of gravel or rubble. This zone is often associated with spawning by freshwater drum (*Aplodinotus grunniens*), emerald shiner (*Notropis atherinoides*) and gizzard shad (*Dorosoma cepedianum*).

The shoreline debris zone, also referred to as shallow water habitat, is located from the shoreline inward to the river up to 150 feet and is usually associated with water depths from 0 to 5 feet. Within this zone, organic debris and rooted aquatic vegetation can occasionally be present. Although, the substrate generally ranges from a hard rocky bottom to coarse gravel and sand to a silty substrate. This zone is extremely significant in successful fish reproduction when a suitable substrate is available.

The tailwater zone, another significant habitat for fish spawning, occurs below each lock and dam and is created by the turbulence and currents associated with the locks. This provides for a clean substrate and oxygen rich water which attracts walleye (*Stizostedion vitreum*) and sauger (*Stizostedion canadense*), in particularly. The final segment, the creek mouths and flooded channel zone, can become critical to nesting species such as the smallmouth bass (*Micropterus dolomieui*) and sunfishes (*Lepomis sp.*). It was

determined by ACOE (1991) that this habitat is lacking in Pools 2 and 3.

C. *PNDI Species*

Threatened or endangered species are an ever-increasing topic of discussion in the 1990's. The Pennsylvania Natural Diversity Inventory (PNDI) is a compilation of all the threatened, endangered, or species of special concern within Pennsylvania. This list is gathered from the three agencies responsible for the management of these species: Department of Natural Resources (DCNR), PFBC, and PGC. DCNR holds jurisdiction over the endangered plants of the state, while PFBC is responsible for fish, reptiles, amphibians and aquatic organisms and PGC is accountable for the birds and mammals of the state.

According to the PFBC, there are 28 candidate species and one endangered species located within the corridor (Appendix F). Kirtland's snake, the only endangered species on the list, is also the only reptile listed. Of the 28 candidate species, there are three macroinvertebrates, six fish, and 19 mussel species.

DCNR indicated that 54 species of special concern were located in the vicinity of the Monongahela River (Appendix F). Of these 54 species, 29 are plant species, 16 are mussel species, 3 are insect species, 4 are fish species, and 2 are geological formations.

No response from the PGC has been received at this time.

D. *Important Habitats*

1. Riparian Forest Buffers

A riparian forest buffer is defined as an area of trees, usually accompanied by a scrub/shrub component and other vegetation, that is adjacent to a body of water (Siesholtz, 1997). This buffer maintains the integrity of stream channels and shorelines; reduces the impact of upland sources of pollution by trapping, filtering, and converting sediments, nutrients, and other chemicals; and supplies food, cover, and thermal protection to fish and other wildlife (Siesholtz, 1997). Riparian forest buffers are extremely beneficial in river conservation. Riparian buffers once protected most rivers and streams in North America, but due to deforestation and development, most of these buffers are gone. The removal of riparian buffers results in adverse effects on water quality, wildlife and aquatic habitat, stream bank stabilization, and aesthetics of the waterway. Over 32 percent of the corridor is classified as open space and nearly 28 percent of this space is forested.

2. Natural Heritage Inventory Areas

Western Pennsylvania Conservancy (WPC), in cooperation with interested counties, is responsible for conducting county-wide Natural Heritage Inventories. These reports are compilations of unique or significant habitats, geological finds, or biological diversity areas. According to the Allegheny County Natural Heritage Inventory, biological diversity areas include "natural or human-influenced habitats that harbor one or more occurrences of plants or animals recognized as state or national species of concern, or possess a high diversity of species of plants or animals native to the county, or support a rare or exemplary natural community, including the highest quality and least disturbed examples of relatively common community types." (WPC, 1994a).

There are only two counties located within the corridor that participated in the Natural Heritage Inventory program; Allegheny and Washington. Westmoreland and Fayette Counties have begun the process to complete an Inventory, while Greene County has no plans to conduct a study (L. Smith, WPC, personal communication, December, 1997). Within the counties that participated in this program, three natural heritage inventory areas are located: Black Dog Hollow Slopes, Blainsburg Floodplain, and California Overlook (WPC, 1994b) (Figure 4).

Black Dog Hollow Slopes is located along Ten Mile Creek, Washington County. The steep slopes contain a Dry Mesic Calcareous Central Forest Community dominated by sugar maple *(Acer saccharum)*, white oak *(Quercus alba)*, chinkapin oak *(Quercus muehlenbergii)*, and beech *(Fagus grandifolia)*. This area is recognized as a High Diversity Area and contains impressive cliffs and outcrops made from a conglomeration of sandstone, siltstone, and limestone layers.

The Blainsburg Floodplain is located along the Monongahela River in Blainsburg, Washington County. This area is a recovering forested floodplain community containing several small inland pools. The herbaceous vegetation consists of sedges (*Carex spp.*), soft rush (*Juncus effusus*), wool grass (*Scirpus cyperinus*), swamp milkweed (*Asclepias incarnata*), blue vervain (*Verbena hastata*) and various other species. Scrub/shrub sections of the floodplain are composed of young black willow (*Salix nigra*), cottonwood (*Populus deltoides*), and eastern sycamore (*Platanus occidentalis*). Native butterfly and dragonfly populations also thrive in the area.

California Overlook, the third natural heritage inventory is situated just north of Coal Center, on a steep sloped bank of the Monongahela River. This area was documented as an outstanding geological site.

3. State Game Lands

State game lands (SGL) are managed primarily for outdoor recreation in the form of sport hunting. Protecting and perpetuating non-game wildlife species is increasingly becoming a management issue. Hiking, bird watching, and nature study are also popular pursuits at the SGL (PGC, 1989).

SGL 238 is the only SGL located within the corridor. It is located in German Township, Fayette County and contains 662 hilly, partially wooded acres. This SGL is managed primarily for hunting small game and maintaining several grassland areas (PGC, 1975).

VII. CULTURAL RESOURCES

A. Recreation

From the time when the European frontiersmen began to settle into the Monongahela Valley in the mid 1700s, recreation along the river presented an interesting and controversial story. Although the Monongahela River was primarily used for commercial trade and transport, as early as the 1760's, it was also used for recreation. Hugh Henry Brackenridge, one of the first politicians in Allegheny County, used the following statement in the 1780s to portray the Pittsburgh waterfront:

> You will see on a spring evening the banks of the rivers lined with men fishing at intervals, from one another. This, with the streams gently gliding, the woods, at a distance green, and the shadows lengthening towards the town, forms a delightful scene... (Muller, 1989).

As populations in the valley increased and towns cropped up along the river, it became a social meeting place. Social walks, community events, and other related activities were held at the river banks, which were also the center of commercial trade, warehousing, and tavern development.

With the advent of the steamboat in the 1810s, hundreds of showboats, river cruises, and celebrations were held on the river (Baldwin, 1938). Riverfront properties were plentiful and boathouses and small retreats were beginning to appear. During the 1850s and 1860s, commerce and industry grew at unbelievable rates and from then on the Monongahela was recognized as a "commercial" river. The public attitude toward the river and recreation began a decline and the use of the river for recreation would be a controversial topic of discussion up to the 1990s.

Conflicts between commerce and recreation have arisen along the Monongahela River.

Despite the enormous growth of commercial and industrial wharfs, manufacturing facilities, and barge traffic on the river, recreation on the Monongahela has managed to sustain. Rowing was a popular past time in the 1870s and boat races attracted thousands of spectators (Muller, 1989). Swimming and fishing

were also recreational favorites until the industrial and commercial uses of the river began to take their toll. Water quality decreased, riverfront properties were quickly occupied by manufacturing facilities, wildlife populations declined, and the scenic appearance of the river was forever altered. This trend continued until the 1960s, when water quality improved, manufacturing decreased and people became concerned with the environmental condition of the river.

Although one hundred years of commercial and industrial activity greatly impacted the river, there has been an attempt by federal, state and local governments and conservation organizations to revive the river and reclaim the river banks. With the slow improvement in water quality, fish populations have increased and recreation has begun to reappear on the river. In 1979, there were 137,800 boating activity days (a designation by the ACOE indicating one person's participation in one recreation activity at any time during the calendar day without regard to how many times that person participates) on the Monongahela River. Swimming increased 60 percent between 1975 and 1979 and water-skiing and fishing nearly doubled (SIHC, 1995).

In the latter decades of the twentieth century, recreation managed to reemerge and cooperation between the industrial and the recreational players on the river took on a new attitude. In fact, the Pennsylvania Scenic Rivers Act of 1972, listed the Monongahela River from Point Marion, PA to Pittsburgh, PA as a proposed Recreational River. This classification was adjusted in 1982 to a proposed Modified Recreational River. This designation described the ability of the river to provide and maintain recreational uses while balancing residential, commercial and industrial uses. The criteria stated that this classification of river may contain calm water that can be, or is being, restored to support appropriate water-based recreation, aquatic and fish life.

1. Use

Many of the recreational uses of the past were still prevalent in and along the river in the 1990s. Fishing, boating, hiking, biking, river cruises, and swimming all occurred on or near the Monongahela in 1998.

Fishing is one of the more popular pastimes within the corridor. According to the PFBC (1997), the Monongahela River contains species such as walleye, sauger, largemouth and smallmouth bass, and muskellunge. The ACOE concluded that fishing on the Monongahela River for walleye is good; populations of

smallmouth bass, muskellunge, and panfish are fair; largemouth bass, yellow perch, and crappie are occasional species and trout and northern pike are rare (ACOE, 1997).

Hunting, while not directly related to the river, is also a popular activity within the study corridor. Most of the hunting focuses on State Game Lands 238, located in German Township, Fayette County. A listing of sportsmen clubs and fishing associations located within the corridor is located in Appendix G.

Motor boating is an increasingly popular form of outdoor recreation on the Monongahela River. The number of boats registered in the entire state has grown 32 percent in the last decade and contributes more than $1.7 billion each year to the Commonwealth's economy (PFBC, 1997).

Personal watercraft (PWC) are the fastest growing segment of recreational boating. PWC are defined by PFBC (1998b) as small, powerful and highly maneuverable motorboats and which are better known by such brand names as Jet Ski®, SeaDoo®, Bomber® or Wave Runner®. In 1997, PWC comprised approximately 6 percent of the total boater registration in the state with 21,466 registered in the state. It is projected that by the year 2000, there will be over 23,000 (PFBC, 1998b).

Hiking, biking, and walking for pleasure and fitness experienced an enormous increase in the last decade. In the mid 1990s, over one quarter of the region's population jogged, one half walked, and one out of five people engaged in day hikes.

2. Facilities

According to field and background review studies conducted by Mackin, there are 122 recreational facilities located along the Monongahela River. The breakdown by river pool is shown in Table 18.

Existing recreational facilities are located on Figure 6 and a listing of the facilities and their amenities is located in Appendix G.

a) *Public Parks*

Fifty-five public parks are located within the corridor (Figure 6). Of these 55 parks, 9 provided river access. Some of the more notable facilities along the Monongahela include Mon View Park, Friendship Hill, Ten Mile Community Park, Sunnyside/Gallatin Park, Monongahela Aquatorium, McKee's Point Park, and Frick Park.

Table 18
Existing Recreational Facilities by Pool

	Pool 6	Pool 5	Pool 4	Pool 3	Pool 2	Pool 1
Public Parks	2	10	11	19	9	4
Marinas	2	10	8	11	5	0
Ramps	2	4	6	7	2	1
Ferries	0	1	0	0	0	0
Trails	1	1	0	0	2	0
Amusement Parks	0	0	0	0	0	2
Golf Courses	0	0	0	2	0	0
TOTAL	7	26	25	39	18	7

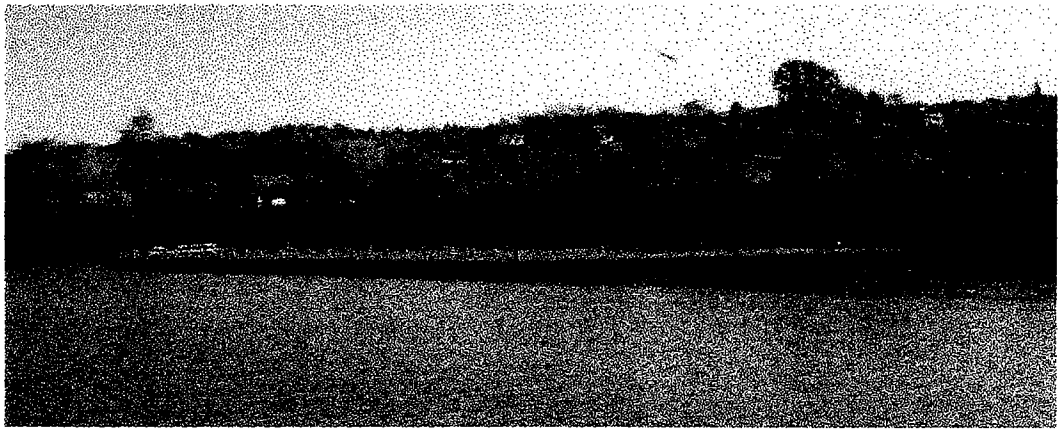
Mon View Park is located in the southern end of the corridor in Greensboro. It is a borough park containing a skating rink, swimming pool, playground equipment, athletic fields, and a walking trail.

Friendship Hill, a National Historic Site, is also located within this section of the corridor. The park consists of the estate of Albert Gallatin, a Swiss immigrant who is best remembered for his 13 year tenure as U.S. Secretary of Treasury under Thomas Jefferson and James Madison. Friendship Hill details Gallatin's accomplishments and contributions to late 18th and early 19th century U.S. history. It contains a visitor center, exhibits, ten miles of nature trails and guided tours of the site.

Tenmile Community Park is located along Tenmile Creek in Washington County. It is a joint municipal and county park consisting of picnic areas, river access, playground equipment and athletic fields.

Sunnyside/Gallatin Park was originated by the 1984 Twin Rivers Council Riverfront Recreation Plan. The park was completed in the early 1990s and contains river access, athletic fields, and playground equipment. This park also contains an old Indian burial site which was disturbed during the construction of the park and was replaced with an interpretive gravestone on it.

The Monongahela Aquatorium, located in Monongahela, is a unique feature on the river, consisting of a concrete set of bleachers, a large docking area and a floating stage. The Aquatorium is used by the Pittsburgh Wind Symphony and other performance groups for summer events.



The Monongahela Aquatorium is an example of recreational opportunities along the river.

McKee's Point Park is a multipurpose recreational and entertainment complex under development at the confluence of the Youghiogheny and Monongahela Rivers in McKeesport. While portions of this project are completed, there are numerous proposals for other amenities. The intent of this project is to have landing sites, a marina, restaurants, specialty shops, offices, lodging, boat sales and storage, and a riverwalk all within the same complex. The proposed Steel Heritage Trail and the Youghiogheny River Trail are also planned to intersect within the park.

Frick Park was created in 1919 by Henry Frick. It encompasses 476 acres within Pittsburgh's city limits and contains the largest nature center of the Pittsburgh city parks. It also includes a nature reserve, several athletic fields, tennis courts, a bowling green and numerous play areas.

There are also four parks proposed for development within the study corridor. Brownsville's wharf project includes the creation of a walking area with interpretive signs, boat docks for tour boats, and a boat ramp. They have already started to receive funding and anticipate this project will be successfully completed.

Charleroi's Monongahela River Front Promenade and Tower proposal (1997) recommends the creation of a boardwalk for residents and visitors to enjoy walking, fishing, or viewing the river and surrounding areas. At the northern end of the promenade, an observation tower is proposed to be constructed for viewing Lock No. 4.

The City of Donora is proposing a small municipal park. This park is to include a fishing area with an access ramp.

The City of McKeesport and Versailles Borough applied for funding from DCNR in 1997 to develop a Master Site Plan for a Youghiogheny Linear Park, extending along the Youghiogheny River from McKee's Point Park to an approximately 16 acre riverfront parcel located in Versailles Borough. The intent of this plan was to connect public lands located along the river, unite public entities existing along the river, discourage fragmented and inappropriate development and usage, and rehabilitate abandoned industrial areas to a natural condition. The plan included recommendations for the placement of ballfields, forest buffers, a kayak club, a trail, lighting, and parking facilities along the riverfront. At the time of this study, the City was creating a steering committee to oversee the project.

b) *Marinas*

There are 36 existing private marinas located within the study corridor (Figure 6). The majority of the marinas also include activities or amenities such as camping, playground equipment, picnic areas, restaurants, fueling capabilities and supplies.

Several marinas worth noting due to their size and amenities are the Two Rivers Marina, the Denbo Marina, the Green Cove Yacht Club, the Beach Club Marina, and the marina at McKee's Point Park. The Two Rivers Marina is located in Dilliner, Greene County. It includes boat sales, camping and RV areas, a restaurant, storage, swimming, entertainment, and fishing.

The Denbo Marina is located in Washington County and contains 75 docks, private boat ramps, a restaurant, groceries, and fuel and supplies. A permit was granted by the ACOE in late 1997 and is currently being used to upgrade the Denbo facilities by the addition of several more docks.

The Green Cove Yacht Club is located along Tenmile Creek, Fayette County. This marina has 250 boat docks, camping and RV areas, a restaurant, athletic fields, playground equipment, and fuel and supplies. The largest marina on the Monongahela River is the Beach Club Marina located in New Eagle. It consists of 300 boat docks, a floating convenience store, boat and watercraft rentals, and a service department.

Four new marinas were proposed within the study corridor. One proposed marina in Forward Township received an ACOE permit in September of 1997 and is expected to be constructed near East Monongahela. A second plan proposed the construction of a new marina in Fredericktown, which is expected to include 1,960 feet of docking space.

The third proposed marina is intended for Brownsville, Fayette County. This facility is expected to include an exclusive 25 dock marina containing a restaurant and other related amenities. Kennywood Park has also expressed interest in a possible marina with a restaurant to be located just east of their existing Sandcastle Park. While this type of facility could be used in the area, Kennywood Park is searching for an operator to run the facility.

There are 36 commercial marinas within the study corridor.

c) *Boat Ramps*

Twenty-two public boat ramps are located within the corridor (Figure 6). Seven of these are PFBC ramps, while the remaining 15 are municipal. There are numerous privately-owned docks along the Monongahela River but these are not individually located for this project.

There are 3 proposals related to ramp access located within the study corridor. One proposal was prepared by Luzerne Township to expand an existed PFBC ramp to include 10 permanent boat docks. The intent of this project is to increase the river access for fishing, boating, and handicapped individuals.

Kennywood Park, the owners and operators of Sandcastle, proposed a public boat ramp adjacent to Sandcastle. This ramp would be open to the public and was expected to include boat trailer parking facilities. Also proposed within the study corridor is a PFBC ramp in Monessen.

d) *Ferries*

Another form of river access located along the Monongahela were the old ferry crossings. Ferries were historically used to compensate for the lack of bridges across the river. Only one operational ferry is located in the study corridor. It is located at r.m. 64 and crosses from Fredericktown in Washington County to East Fredericktown in Fayette County. This ferry is the last cable-driven ferry in the eastern United States. The cost is 15 cents for passengers and 75 cents for cars.

The Fredricktown Ferry is the last of its kind in the eastern U.S.

During the course of this study, a total of 19 abandoned ferry locations were located within the study corridor (Figure 6). According to History of Greene County Pennsylvania (Smith, 1996), there were 12 ferries crossing the river connecting Greene and Fayette County in 1876. Three other abandoned ferry crossings were located during data collection in Brownsville, Coal Center, and Fayette City.

Table 19 shows the locations of all the abandoned ferries located along the Monongahela River. Indications of four other ferry crossings were noted in Dutch Hill, Belle Vernon, Monessen, and Monongahela but could not be verified or located.

Table 19
Abandoned Ferry Locations

Name	Location
Dilliner Upper Ferry	Near the mouth of the Cheat River
Dilliner Ferry	Dunkard Creek
Greensboro Ferry	Greensboro
A.J. Neil Ferry	Near Greensboro
Grays Ferry	Monongahela Township
Ross Ferry	At the mouth of Big Whitely Creek
Hatfields Ferry	Monongahela River
McCanns Ferry	Near the mouth of Little Whitely Creek
Browns Ferry	Cumberland Township
Flennikens Ferry	Near the mouth of Muddy Creek
Davidsons Ferry	Near Rice's Landing
Hughes Ferry	Rice's Landing
Maxwell Ferry	Dutch Hill
Brownsville Ferry	Brownsville
Simpson Ferry	Coal Center
Fayette City Ferry	Fayette City
Belle Vernon Ferry	Belle Vernon
Monessen Ferry	Monessen
Parkinsons Ferry	Monongahela

e) *Trails*

According to the Department of City Planning, Pittsburgh and its surrounding communities were fast becoming a national hub in a growing greenway system (Pittsburgh Department of City Planning, 1997). Greenways and trails have the potential to link parks and natural areas by non-motorized access routes. They were intended to link communities, theme parks, municipal parks, industrial parks, natural features, shopping districts, historical landmarks and to showcase cultural and industrial heritage, reclaim the environment, provide river access, preserve natural resources, promote business and tourism, invite people into communities, and rekindle social interaction. There were 4 existing trails located within the study corridor (Figure 6).

The 68 mile Warrior Trail, which was used for 5,000 years by Native American Indians, was re-established as an interpretive hiking trail. Biking, horseback riding and other activities are restricted on the Warrior Trail, which runs from Greensboro to Flint, Ohio (Carnein, 1988).

The Catawba Trail is another interpretive trail that begins in Rice's Landing and ends in Maryland. Its history began as a portion of the Cherokee Trail, which spanned the eastern United States from Florida to Canada and was the main route from New England to the Carolinas. It was said to make warriors out of young men of each tribe (Greene County Conservation District, 1997).

The Youghiogheny River Trail is a multi use recreational trail, which allows hikers, bikers, cross-country skiers, fishermen and horseback riders. During 1996 the YRT drew just over 200,000 people, and in 1997 more than 300,000 users are expected (Regional Trail Corporation [RTC], personal communication, August, 1997). In 1997, 28 miles of trail were completed between Connellsville and Boston, with the remaining 15 miles expected to be complete by the fall of 1998.

The Montour Trail is proposed to extend from Clairton to Route 51 in Coraopolis. When completed, it will extend 55 miles and circumvent Pittsburgh's southern border. It is located along the former Montour railroad which runs adjacent to Montour Run in Findlay, Moon, North Fayette and Robinson Townships in Allegheny County and also in Peters and Cecil Townships in Washington County. There are trailheads located at Enlow, Groveton, and Montour Run. Twenty miles of this trail are completed (DCNR, 1998; RTC, 1997). While the majority of this trail project was outside the corridor, when completed it will provide added access to Clairton.

There are 6 proposed trails projects located within the corridor (Figure 6). Greene County has one proposed trail located within the county. The Greensboro Riverwalk will develop a walkway along the river, starting at the borough lockhouse and ending at Mon View Park. This trail is intended to connect the Greensboro historic district with the park, which receives 1,500 visitors a weekend (Hrin, 1998). It is to extend a total of 3.7 miles and tie in with a proposed riverfront recreation area and a proposed river museum at the borough lockhouse.

In Fayette County, the Sheepskin Trail is proposed as a multi-use recreational trail. It would extend 32 miles from Point Marion to Dunbar, connecting to the Youghiogheny River Trail. There is also a proposal for a bike trail to be located along side of the National Road.

Three trails were proposed within Allegheny County. The proposed Steel Heritage Trail will extend 15 miles from the Glenwood Bridge to Clairton. It will connect the Youghiogheny River Trail, the Three Rivers Heritage Trail, and the Montour Trail. The intent of the Steel Heritage Trail is to display the story of the former heavily industrialized Steel Valley. By passing landmarks that reflect the valley's diverse ethnic origins and manufacturing past, the trail would remind visitors of the major role local communities played in developing the U.S. and the world during the industrial era (SIHC, 1996).

The proposed Nine Mile Trail is currently under investigation. It was expected to extend from the mouth of Nine Mile Run to Frick Park.

The Three Rivers Heritage Trail will begin at Washington's Landing in Pittsburgh along the Allegheny River, travels south along the Allegheny to the Ohio River, then crosses the Ohio and proceeds up the Monongahela River past Station Square and Southside Riverfront Park to the Glenwood Bridge. This trail is slated to be the starting point of a network of trails connecting Pittsburgh to Washington, DC. It allowed only hikers and bikers on the trail. Three sections of the trail are completed, totaling 4.4 miles. The total length of this trail will be 10-12 miles when completed (DCNR, 1998; RTC, 1997).

f) *Golf Courses*

There are two golf courses located within the corridor: the Riverview Golf Course and the Monongahela Country Club (Figure 6). The Riverview Golf Course is a public facility located in Bunola, Allegheny County. It consists of an 18 hole golf course, a restaurant and a pro

shop. The Monongahela Country Club is a private 9 hole golf course situated in Monongahela, Washington County.

g) *Amusement Parks*

Two amusement parks are located within the study corridor: Kennywood Park and Sandcastle Park. Both of these parks are located in Pool 1, Allegheny County (Figure 6).

Kennywood Park, a national registered historic site, is located in West Mifflin and is celebrating its 100th birthday in 1998. The park contains numerous amusement park rides, refreshments and games. It receives 1.3 million visitors during its 125 day season. It has been estimated that 80% of theses visitors are within a 90 mile radius of park.

Sandcastle, owned and operated by Kennywood Park, is a water park near the Glenwood Bridge containing water slides, a wave pool, swimming pools, approximately 55 slips at the dock, and a restaurant/bar. It is open for 90 days of the year and receives 250-350 thousand visitors during that time. This facility also holds the monthly Riverplex Miller Lite Concert Series and a weekly volleyball league.

B. Archaeological and Historical

The history of the Monongahela Valley covered numerous events and people. A complete timeline depicting the main events from each era can be found in Appendix H and Figure 7 illustrates the location of significant historic sites within the study corridor (Appendix I).

1. Prehistory

Archaeologists have traced human settlement in the Monongahela Valley back approximately 10,000 years. The Mound Builders, early dwellers who constructed their settlements out of a series of mounds, occupied many areas of western Pennsylvania, including several sites along the Monongahela River (Monongahela Culture, 1998). Many of these mounds remain and have been documented by the Pennsylvania Historical and Museum Commission (PHMC).
As much as one thousand years

Table 20
Historical Eras of the Monongahela Valley

>1500 1600	1650 - 1750	1770 - 1810	1820 - 1850	1860 - 1950	1960 - 1990
Prehistory	**Early European Settlers**	**Early Manufacturing**	**Commercial Development**	**Industrial Revolution**	**Post Industrial**

ago, the river valley was the domain of Native American Indians. The Monongahela Indians, who lived in the basin between 900 and 1600 AD, disappeared inexplicably before white settlers entered the area. The "Monongahela people" as they are referred to by archaeologists are known to have lived in stockaded villages located on hilltops.

The area surrounding the Monongahela River was occupied at the time of European arrival by various tribes of the Iroquois Nation, also known as the Iroquois Confederacy. The original Indian nations included in the Iroquois Confederacy were the Oneidas, Onondogas, Mohawks, Cayugas, and Senecas. Later, the Tuscaroras were admitted as well (History of Allegheny County, Pennsylvania (Vol. 1), 1889).

In western Pennsylvania, the Iroquois Nation was closely associated with the Shawnee and Delaware Indian tribes which inhabited the area as well. This association was made through both geographic familiarity and because the Iroquois exercised a historic claim to having conquered the Delawares. Because the Shawnees were related to the Delawares by language and customs, and were relatively few in number in western Pennsylvania, they also were treated as inferiors by the Iroquois. The association of these tribes continued until the defeat of the Indians in the Pontiac War of 1763 (History of Allegheny County, Pennsylvania (Vol. 1), 1889).

The area immediately along the Monongahela River was used primarily as a hunting area by the local Indian tribes. While there are some records of Indian encampments along the river, such as Seneca Queen Aliquippa's settlement at the mouth of the Youghiogheny River, nearly all of the major Indian villages in the region were located along either the Allegheny or Ohio Rivers.

Villages established by Native American Indians were referred to as "old forts". These were usually located on high, rich soils with a particular pattern and building style (Veech, 1971). Many were later taken over by white settlers as convenient locations to settle or to set-up trading posts. Brownsville, which was formerly called "Redstone Old Fort" and Belle Vernon, built near an old fort at the mouth of Speers Run, are two examples of this (Veech, 1971).

Indian trails were the earliest travel routes in the Monongahela Valley, and were adopted by a succession of people over the years. They were used by white traders, particularly French-Canadian fur trappers, who traded with Native American Indians as early as the late 1600s

(Monongahela Culture, 1998). They were also used by militiamen during the French and Indian War. Anecdotal evidence indicates that some of the local Indian trails that crossed the Mason-Dixon Line may have been efficient routes by which slaves were transported from south to north. Most recently, Indian trails have been modified for recreational purposes as hiking trails.

One of the oldest trails, the Catawba or Cherokee Trail, spanned the eastern United States from Florida to Canada. It traversed western Pennsylvania, and a portion of this historic route, from Rices Landing south through West Virginia, has been preserved for recreational hiking. Another Indian route that predated European settlers was the Warrior Trail, which was the main trail of the Iroquois nation and was used heavily in their 18th century wars against southern Indian tribes such as the Catawba (Western Pennsylvania Historical Survey, 1938). The Warrior Trail runs east-west about 5 miles north of the Mason Dixon Line with its eastern terminus on the Monongahela River (Warrior Trail Association, 1998). The Warrior Trail Association of Greene County currently maintains this route as a hiking trail.

Nemacolin's Trail was the most prominent path in the Monongahela Valley region. The trail crossed the Monongahela River at Brownsville in its southeast to northwest direction route. It earned its name from Nemacolin, a well-known Delaware Indian, who was recruited by white traders to mark a pathway in the early 1750s. Nemacolin's trail was later improved and used by George Washington and General Edward Braddock for military purposes because it was an efficient route through the area. Portions of the rebuilt trail were renamed Braddock's Road, until they became part of the National Road in the early 1800's. Most recently, the section of the National Road through the Brownsville area has been upgraded and renamed again, thereby concluding its evolution from Nemacolin's Trail to the to U.S. Route 40.

2. Early European Settlers (1650s-1760s)

The French were the first Europeans to explore the region. La Salle staked broad claims to the entire Ohio River basin for the French in 1682, but the Lancaster Treaty, struck between the British and the Iroquois Indians in 1744, disputed France's claim of the land west of the Allegheny Mountains. The regional conflicts came to a crest in 1754 with the onset of the French and Indian War.

Many famous military men crossed the Monongahela River

during this period, most notably George Washington and General Edward Braddock. George Washington was sent into the area with the Virginia Militia at age 21 to deliver a message from Governor Dinwiddie of Virginia to the French at Fort LeBoeuf (Palmer, 1984). He returned a number of times on military missions. General Braddock, commander of all British forces in America, also crossed the river during his French and Indian War campaign.

Braddock planned to defeat the French along the frontier by inspiring colonists to join him and resist French encroachment. The most pivotal part of his strategy was capturing Fort Duquesne from the French, and then heading north to Niagara (Western Pennsylvania Genealogical Society, 1977). Braddock led his army toward Fort Duquesne along the Nemacolin Trail, which he improved in 1755 for the purpose of carrying infantry and supply wagons (from that point forward it took on the name Braddock's Road). General Braddock's military effort was unsuccessful, however, and his army was defeated by the French and Indians after a surprise attack along the Monongahela River at the current location of Braddock Borough. Braddock himself was mortally wounded in the battle and died during the trip back to Cumberland, Maryland. The effect of Braddock's defeat was catastrophic to the colonies of Pennsylvania and Virginia because fear of attack spread through the frontier settlers (Western Pennsylvania Genealogical Society, 1977).

The close of the French and Indian War in 1763, the American Revolution in 1783, and the victory of General "Mad" Anthony Wayne over British and Indian troops at the Battle of Fallen Timbers in 1794, finally ended more than a half-century of fighting in western Pennsylvania (Riley, 1996).

3. Early Trade and Manufacturing (1770-1810)

After the French and Indian War, the region began to see an influx of immigrants from the east. From 1790-1815, a shift from subsistence agriculture to a market-based economy occurred. Although the Monongahela Valley was still sparsely populated in the 1790s, it was starting to lose its frontier character. Immigration was on the rise and frontier life was slowly giving way to small towns. The first estates were cropping up at this time, most notably Friendship Hill, built by Albert Gallatin in 1788 on 640 acres of land near New Geneva. Gallatin, a Swiss immigrant, became a successful businessman and later an important U.S. politician and diplomat. His elegant Friendship Hill estate was used as a resort by political

leaders during Thomas Jefferson's presidency (Baldwin, 1939).

During the late 1700s, the importance of roads and trails was heightening. The Conestoga wagon first appeared in the east between 1750 and 1760, and it revolutionized road travel. As wheeled vehicles were employed more extensively to carry people and freight in the west, the population realized the problems they faced in road building. Petitions were sent from western Pennsylvania to the legislature in support of road construction, but the area was seen as too vast and uninhabited to warrant such an expenditure.

As the population increased, the demand for necessities spurred the growth of cottage industries. Mills, tanneries, and distilleries were high growth industries in the late 1700s. Crops which could be used in distilling took a front row position in agriculture, and the mercantile trade established hubs in Brownsville and Pittsburgh.

Glassmaking and ceramics were industries that grew rapidly from 1800-1810. The stoneware pottery industry in the Monongahela Valley was estimated at nearly fifty individual firms, at which 150 potters and skilled craftsmen were employed (Schaltenbrand, 1996). Greensboro eventually became home to the largest and best known stoneware factories west of the Allegheny Mountains (Schaltenbrand, 1996). Stoneware was also made in Fredericktown, and New Geneva.

River transport was the most important means of moving products to Pittsburgh and other markets, and in 1782 the Monongahela River was declared a navigable public highway by the federal government (ACOE, 1991). Its role in trade increased after the Commonwealth of Pennsylvania undertook the first improvements by removing rocks and constructing low, stone dams in 1792.

Boats were in demand because they were an essential part of moving settlers and goods. Boats at this time were mostly single-trip vessels that were dismantled at their destination point. The exception to this were keelboats which moved in both directions. Keelboats were pushed upstream by men setting poles into the mud and shoving the boat along. Pittsburgh, Belle Vernon, Allenport, and Brownsville became boat-building centers specializing mainly in flatboats and keelboats. Other boats in production were pirogues, skiffs, bateaux, arks, barges, and packet boats (Bissel, 1952).

Whiskey Rebellion (1794)

The Whiskey Rebellion was a social uprising over the issue of whiskey and taxation in the United States. It was an event

that challenged the U.S. Constitution for the first time, pitting rural pioneers against the urban political elite. The rebellion focused national attention on urban-rural conflicts and what were interpreted as gross injustices imposed on the people of the frontier through the taxing of one of their most valued commodities, whiskey. Southwestern Pennsylvania played a major role in the rebellion, particularly the counties of Greene, Westmoreland, and Fayette.

Whiskey and furs were two of the most important commodities during the Early Trade and Manufacturing Era. Both could readily be traded or sold by merchants and were easier and cheaper to transport across the mountains than bulky, heavy, or perishable items (Baldwin, 1939). Whiskey rose to a position as one of the most valuable market commodities at the time because of its ubiquitous use in society.

Aside from its economic value, whiskey was the pride of frontier culture as the following quote illustrates:

> The Americans got no help from heaven or the saints but they knew what to do with corn. In the heroic age our forefathers invented self-government, the Constitution, and bourbon, and on the way to them they invented rye. And that shows our proper place in the international order: no other nation ever gave mankind two kinds of whiskeys. Like our political institutions, which would be inconceivable without them, both express our national characteristics; both are distilled not only from our native grains but from our native vigor, suavity, generosity, peacefulness, and love of accord (Bissel, 1952).

Southwestern Pennsylvania had an advantage in distilling whiskey because quality rye was easily grown here. It was estimated that in the 1790s, twenty-five percent of all stills in the United States were located in Pennsylvania. Although local farmers were not getting rich from distilling whiskey, its presence in the market economy helped to leverage economic stability. Consequently, western Pennsylvanians were aggravated by the tax placed on whiskey, which they viewed as wrongful and oppressive.

Pennsylvania had at least nineteen laws or supplementing acts imposing taxes on liquor from the time the colony was founded to 1791 (Baldwin, 1939), but before the end of the American Revolution there seemed to have been no regular collection in the west. In response to the enforced collection of the excise tax on whiskey, local meetings were held by so-called "whiskey rebels" in back rooms of homes, taverns, and inns to discuss their

opposition tactics. The grassroots insurgency peaked in the summer of 1794 when farmers, distillers, and artisans openly protested the excise tax through armed demonstrations and brutal attacks on tax collectors, some of whom were tarred and feathered.

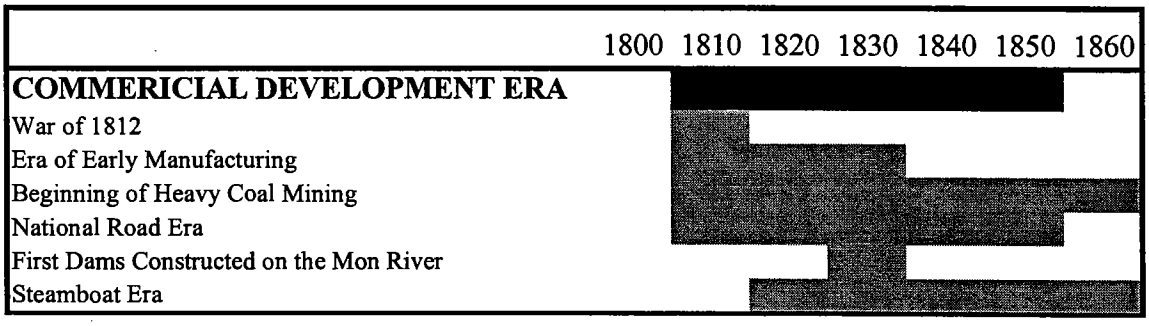
The legacy of the Whiskey Rebellion, which lasted only eight weeks, was significant to American history. Trials of the arrested insurgents were held in 1795 with many being arraigned for treason, but most of the trials ended in acquittals for lack of evidence (Baldwin, 1939). Feeling the political pressure of the rebellion, President George Washington issued a proclamation pardoning all those who were not under indictment or sentence.

4. Commercial Development (1810-1850s)

Rampant commercial development in the Monongahela Valley was attributed to a combination of factors. First and foremost was its location and wealth of natural resources. Bituminous coal, in particular, was an important resource in commercial growth. The coal industry expanded steadily from 1760 when local blacksmiths, mill operators and residents were a growing market, up to the 1860s when glass factories, iron furnaces, salt works and woolen mills voraciously used coal for production (National Park Service, 1992). The Monongahela River was already becoming a valuable resource for transportation and the riverbanks were soon lined with for wharves. These became crowded, active places surrounded by blocks of warehouses, inns, taverns, and assorted commercial businesses.

Other factors aided to the development of the region, particularly innovations in transportation. Commercial development in Pittsburgh grew with the completion of the Pennsylvania Main Line Canal, construction of the National

Table 21
Timeline of the Commercial Development Era



Road, and the invention of the steamboat. Hundreds of steamboats were traveling the Monongahela River annually by the1830s (Muller, 1989). During this period of commercial development, rail, road, and water routes opened trade as far west as St. Louis and as far south as New Orleans. Bridges, which were necessary in overcoming weather-induced delays in freight and passenger transport, were erected over the Monongahela in the 1830s and 1840s (Day, 1996). A covered bridge at West Brownsville was considered one of the most picturesque sites on the National Road until it was demolished in 1910 (Day, 1996).

a) *Transportation Innovations*

In 1806 Congress passed into law, "[a]n Act to regulate the laying out and making a Road from Cumberland, in the State of Maryland, to the State of Ohio" (Day, 1996). It became the first roadway to link the eastern United States with the west, and was duly named the National Road. Its 600 miles of roadway went from Cumberland, Maryland to Vandalia, Illinois and was heralded as the first route to overcome the impassable mountains and open the west for settlement.

The National Road was a significant project in our nation's history because it challenged the political, economic, and engineering limits of the time. Before the National Road was introduced, commerce, land value and socialization were limited. After the road was completed and opened to the public in 1818, it flourished as the premiere route of transport carrying freight, mail and passenger travel from east to west. As early as 1818, stage lines ran three times a week, inns and taverns prospered, and cattle, horses, hogs and sheep were regularly driven to eastern markets by way of the National Road (Day, 1996).

From 1818 to the 1850s, the National Road was the lifeline of social and commercial development, and the main competitor to river traffic. The construction of the National Road incorporated many unique bridges and highway markers, some of which remain today. There are three remaining toll houses along the length of the National Road, as well as taverns and mile markers. It remains one of the few active traces of America's movement westward, and is conserved as the National Road Heritage Park in Pennsylvania (Rhodeside & Harwell, Inc., 1994).

While the National Road was the premiere surface route of transportation, steamboats were becoming the primary mode of river transit. Steamboats were first introduced to western rivers with the sailing of the *New Orleans* in 1811. The *New*

Orleans made a safe trip from Pittsburgh to New Orleans in that year, demonstrating that steam power could be used in river navigation. The second steamboat in history, *The Comet*, was built in Brownsville in 1813. A river town which continued to operate a successful boat-building industry for more than a century, Brownsville was the first and most important center for steamboat building on the Monongahela.

From 1811 to 1816, nine steamboats were built and although the technology improved, the cost and unfamiliarity of steamboats retarded general use until 1817 when the *Washington* traveled from New Orleans to Louisville in 25 days (Reiser, 1951). With this much-publicized event, riverboat towns were officially on the rise. They were not only economic focal points in the Monongahela Valley, they were cultural hubs of the boat-building craft and home to craftsmen recognized for their skill as far away as New Orleans. Some of the most notable boat-building centers were Pittsburgh, Brownsville, Elizabeth, Belle Vernon, McKeesport, West Elizabeth, Port Perry, Monongahela City, Fayette City, and West Brownsville Shipyards on the Monongahela grew to a scale of production that exceeded both the Ohio and Allegheny shipyards. The use of the steamboat increased progressively and by the 1830s, it was the undisputed leader in river trade.

The early development of the Monongahela Valley was inhibited by the precarious nature of navigation. Water levels and ice jams halted trade at times, a condition which was unacceptable to local merchants who faced increasing demands for goods and intense competition with merchants along the Ohio and Allegheny Rivers.

To resolve this difficulty and create dependable slackwater conditions, locks and dams were first introduced to the Monongahela River in the late 1830s. Construction on Lock and Dam Nos. 1 & 2 began in 1838 and they opened in 1841 under the Monongahela Navigation Company, a state-held company organized in 1837. Other locks and dams followed in the 1840s and 1850s which made the Monongahela more competitive for river trade and transport (ACOE, 1991).

Transportation improvements introduced during the era of Commercial Development continued to fuel the population explosion into the Monongahela Valley. Foreign immigrants were entering the area in large numbers attracted by the available employment opportunities in towns along the river. The movement of people

migrating south and west brought a steady flow of transients through the Monongahela Valley. Residents viewed the river and its banks as inexhaustible resources, claiming as much as possible for municipal and private consumption (Muller, 1989).

Another positive contributor to the economic growth in the Monongahela Valley was war. It was said that "for a time it appeared that the primary circulation medium of exchange in Pittsburgh was to be army certificates..." (Reiser, 1951). The Revolutionary War had been responsible for the growth spurt of all branches of industry and the War of 1812 had similar economic impacts. Because much of the War of 1812 was a dispute over control of the Great Lakes region, the northwest army was provisioned by Pittsburgh merchants. Consequently, from 1810-1816 manufacturers in Pittsburgh grew to the point of over-expansion. A depression followed the war, but it was short-lived and manufacturing and commerce picked up again in the 1820s.

It was coal mining, however, that emerged as the most important player in river trade. In western Pennsylvania, the coal industry expanded steadily from the 1760s to 1860s with the development of manufacturing. The Pittsburgh seam of bituminous coal proved to be of exceptionally high quality, which benefited the Monongahela Valley by generating close ties between mining and other industries. Fayette and Westmoreland Counties were the top two producers of coal in western Pennsylvania giving rise to company-owned coal towns and more immigration (National Park Service, 1992). Unfortunately, the smoky-burning character of bituminous coal had serious effects on air quality in the Monongahela Valley. Pittsburgh represented the extreme case of this, earning the reputation of "The Smoking City" which it retained for a century (National Park Service, 1992).

5. Industrial Revolution (1860-1950)

Although the course of America's second Industrial Revolution began in the years prior to the Civil War, it is doubtful that it would have accelerated without the influence of the war itself. The enormous consumption of materials dictated that existing plants run to their full capacity, and that new ones be constructed. There was heavy investment in iron and steel, which were the dominant material used in war industries and railroading (Hacker, 1968).

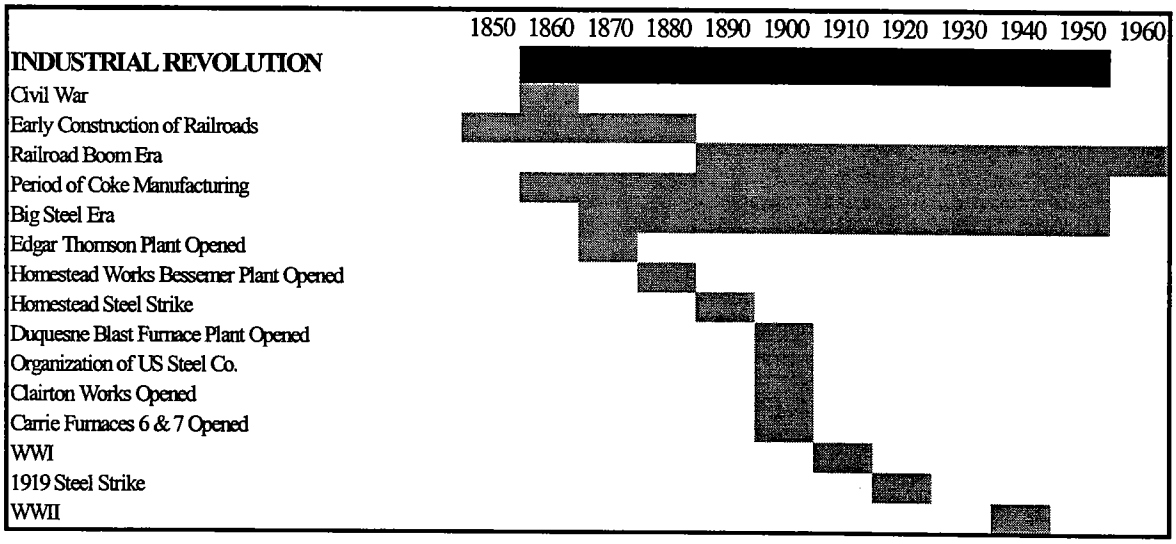
The process of making coke was one of the first technological innovations of this era. Ironworkers preferred charcoal for smelting in the 1840s and

1850s, but it consumed an enormous amount of wood which became expensive as the local supplies dwindled. The search for new fuel sources was a result of the stiff competition from European exporters, who were undercutting prices (National Park Service, 1992). By the 1840s, it was recognized that the coal extracted in southwestern Pennsylvania was particularly good for coking and thus, as early as the 1860s, the industry was in bloom. Beehive coke ovens, bank ovens, block ovens, and rectangular ovens peppered the landscape along hills, valleys and steep riverbanks.

When steel manufacturing entered the local scene, the demand for coke grew exponentially. In 1856, Henry Bessemer discovered a way to make steel out of pig iron and proclaimed a new "Age of Steel" which would take over the preceding "Age of Iron". His proclamation was premature, however, because litigation and glitches in the Bessemer process hampered the use of this method for almost a decade. American iron manufacturers at the close of the Civil War had no alternative but to use the traditional method of making wrought iron products, rather than Bessemer steel (Wall, 1970).

After the obstacles blocking the development of the Bessemer process were removed in 1866, the era of Big Steel began. Andrew Carnegie was among the first entrepreneurs to concentrate on the manufacturing of steel, erecting his first blast furnace in 1870. By 1872 Carnegie, along with his Carnegie Group, planned his second blast furnace,

Table 22
Timeline of the Industrial Revolution



the Edgar Thomson Works, which would become a major producer of Bessemer steel on the banks of the Monongahela in Braddock.

Meanwhile, his competitors were developing the Pittsburgh Bessemer Steel Company on Homestead's riverfront (Muller, 1989). The new mill at Homestead turned out its first rail in August 1881 and immediately crowded Carnegie's domain (Wall, 1970). Other independent steel producers at the time included the Jones and Laughlin mills which occupied both banks of the Monongahela in the City of Pittsburgh. In addition to iron furnaces, other integrated steel mills and specialty works captured miles of riverfront. The river provided water for the numerous industrial processes and a disposal system for industrial waste. It also supported the dumping of slag, sludge, and debris on its banks.

Regional development took on a whole new force with large-scale steel production. Locally-produced steel was transformed into bridge beams, building frames, and rails to be transported to locations around the country for new, sophisticated structural designs like the Golden Gate Bridge, Brooklyn Bridge, St. Louis Bridge, and Empire State Building. These projects were not only structurally innovative, but Carnegie also worked out bond packages in Europe and the United States that changed the way large infrastructure projects were approached.

The advent of Big Steel was paramount to changes in the national landscape. It changed railroad development, which in turn changed the social, economic and physical orientation of the Monongahela Valley by edging out the National Road, fueling industrial development, and sparking another wave of immigration. As coal and coke operations flourished in the Monongahela Valley, railroad lines expanded to serve them with connector lines. The expansion of railway lines increased substantially with the opening of the Pennsylvania Railroad in 1852.

It was the successful completion of the Pennsylvania and B&O Railroads that had the most local repercussions. Aside from the basic movement of goods and resources, the expansion of railroad lines following the Civil War created job opportunities, which in turn attracted large numbers of southern blacks, and eastern and southern Europeans to the area. Railroads also made it possible for outlying residents to travel by train into the city, and for the more affluent urban dwellers to move into newly developing neighborhoods.

Industrial Boomtowns

The industrial age was the impetus behind the founding of many towns in the Monongahela Valley. The introduction of large corporations and investors into the region was a definitive aspect of the economic transition from commerce to industry. Coal mines were bought by corporations and their investors soon established headquarters in large cities like Pittsburgh, Philadelphia and New York (National Park Service, 1992).

The landscape of the Monongahela Valley gave way to industrial centers which sprang up almost overnight. Boomtowns such as Charleroi, Monesson, Donora, and Glassport, were the instant creations of bankers, steelmasters, mining magnates and railroad barons (Magda, 1985). Charleroi developed so quickly that it earned the name "Magic City". River boomtowns followed similar patterns of rapid urbanization.

Instantaneous economic success was not the only reputation that industrial boomtowns retained. The cost of industrialization was severe pollution. The most notorious example of deadly pollution along the Monongahela River was the "killer smog of 1948" in Donora. In this case, sulfur from burning coal at the local steel mill mixed with dampness in the air to produce sulfuric acid that affected 43 percent of the 12,000 residents, and resulted in death for 22 people.

Social Unrest

In 1892 the Carnegie Steel Company was the largest steel company in the world (Wall, 1970). Carnegie had acquired the rival Homestead plant, which was a modern and efficient facility. However, with the purchase of the Homestead plant came six highly-organized labor lodges of the Amalgamated Association of Iron and Steel Workers, a powerful union of the most highly-skilled workers in the industry (Wall, 1970).

Steelworkers, who were upset by reductions in wages, unfavorable labor agreements, and threats to their unions, wanted better union contracts and were prepared to take on the Carnegie empire. The famous Homestead Steel Strike erupted in 1892 when steelworkers were refused a contract by Carnegie manager Henry Clay Frick. The result was a bitter and violent clash between the Carnegie Steel Company and workers at the Homestead mill.

Frick took drastic measures by commissioning Pinkerton Guards to enter Homestead and suppress the strike by armed force. Although the casualties were surprisingly low, the battle received world-wide attention. This was partially due to the high drama of the incident in which

men, women and children hurried to the banks of the Monongahela after dark with everything from guns to household items to fight off the Pinkerton Guard, who had floated in on a barge during the night. Frick himself was shot and stabbed, but recovered. The union organizers were dismissed, and the workers went back to their 12-hour shifts after nearly five months.

The Homestead Strike was just the beginning of labor unrest in the United States. The larger picture was of union dissatisfaction around the country that culminated in the Steel Strike of 1919, when four million workers in the United States were either on strike or locked out of their mills (Trager, 1994).

The Monongahela River Valley typified the state of miners and steelworkers in America and their fight for fairer contracts and better working conditions. U.S. Steel finally reduced its 12-hour work day to 8 hours in 1923, following the lead set by American Rolling Mill in 1916 (Trager, 1994).

6. Post-Industrial Era (1960-Present)

After World War II, industrial development and the era of Big Steel began to decline. The Post-Industrial Era brought the realization that the domestic market would not sustain a long-term demand for steel production at WW II levels, and that the region's economy would have to undergo intense change. It was also a time to evaluate the degree of degradation that the Monongahela River and its riverbanks had received. New goals were set to rekindle the economy.

Not only did local residents realize the damage done to the environment, but the nation as a whole was reevaluating the quality of its water, air, and soil after years of industrial development. The federal government initiated a barrage of environmental protection legislation in the Post-Industrial Era: the Clean Air Act (1963), National Environmental Policy Act (1970), Clean Water Act (1972), Safe Drinking Water Act (1974), SMCRA (1977), and CERCLA (1980). These federal acts reflected the change in political climate toward environmental concerns.

In sync with national attitudes, western Pennsylvania politicians were focused on their own renaissance based on reclaiming the riverfronts and urban renewal. The rivers were paramount to Pittsburgh's Renaissance I movement because high profile projects such as Point State Park encouraged new uses of the riverbanks (Muller, 1989). Projects undertaken during Renaissance I and II were concentrated in the Golden

Triangle of the City of Pittsburgh and included the construction of Three Rivers Stadium and the redevelopment of Station Square.

Although the riverfront redevelopment projects first initiated by Renaissance I and II were focused on Pittsburgh, ideas for reuse are continuing with more variety and scope in the 1990s. Lifestyle changes and increases in leisure time have influenced the public's perception of the river and riverfront property throughout the Monongahela Valley. Examples of riverfront reuse can be seen in McKeesport with McKee's Point Park proposal, in Greensboro with the proposed "riverwalk", in Monongahela with the Aquatorium, and in West Homestead with the Sandcastle complex.

The Three Rivers Regatta and Gateway Clipper fleet are entertainment endeavors which reflect attitudinal changes towards the local rivers, and river rowing clubs have made a comeback with a new facility on Washington's Landing, formerly an industrial pig slaughtering site known as Herr's Island. It has been documented that the Three Rivers Regatta has induced a $59 million impact on the City's business volume and a $36 million impact on the Allegheny County business volume (Tripp, Umbach, & Associates, 1995). The Pittsburgh Technology Center, developed on a brownfield site, shows enormous promise for the city's research and development niche. These and other riverfront reuse projects along the Monongahela River are contributors to a regional trend which values riverfront property and encourages a new relationship between communities, their rivers, economic development, recreation, and history.

VIII. LANDING SITES

As part of their river-based heritage tourism initiative the SIHC Management Action Plan calls for the development of river landing sites as the gateway into study corridor communities. These landings also present the opportunity for commuter transit. This is particularly important since the Monongahela River could serve as a link between the county-operated transit systems, where it is currently seen as a barrier to these connections.

Mackin evaluated sites throughout the study corridor as potential landing locations. This evaluation addressed only existing conditions. The evaluation method was developed to allow reassessment by SIHC, based on the same objective criteria on an as-needed basis. Reassessment on a differing set of conditions may change the order in which the potential landing sites were ranked.

Through intensive field investigation and data collection, a list of potential landing sites was developed for review (Table 23). This list identifies what Mackin considered to be all potential landing sites. It must be noted that for each potential landing site location, the entire community was analyzed, not specific locations within the community.

Objective criteria were developed to rate each of these potential landing sites and identify which had the greatest potential for development at the time of this study. The criteria included a combination of variables such as amenities, nearby historical and cultural attributes, infrastructure

The Greensboro riverfront provides ideal landing site access.

characteristics, and potential funding availability (evaluation criteria are contained in Appendix J). Application of the review criteria to the 33 potential landing sites resulted in ten sites being recommended as locations for primary landings (Table 24).

The recommended landing sites represent all geographic areas of the Monongahela Valley with at least one primary landing in each pool. All of the recommended landings are related to the SIHC journey areas and can be tied to activities planned within the journey areas.

In addition to the recommended landings there were six additional potential landings being considered outside the study corridor. Contact with the Pittsburgh City Planning Department indicated that landing sites are being considered at the South Side LTV Works (27th Street), Station Square, Nine Mile Run, Mon Wharf (at Smithfield St. Bridge), Point State Park, and Pittsburgh Technology Center in the City of Pittsburgh. These sites would provide access for Rivers of Steel tours, as well as an opportunity for commuter transit to the employment centers in Pittsburgh.

Table 25 was developed in order to better plan for potential landings by identifying distances between locations along the corridor.

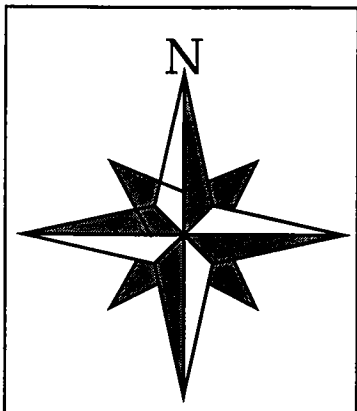
Table 23
Primary and Secondary Landing Sites

Location	Approximate River Mile	Dam Location	Pool #
Point Marion	90		6
Dunkard Creek	87		6
Friendship Hill	85		6
New Geneva	85		6
Greensboro	84.5		6
Lock and Dam #6	*82*	*Grays Landing*	
Masontown at Grays Landing	81		5
Masontown at Hatfield	79		5
Nemacolin Mines	76.5		5
Isabella	72		5
Crucible	70		5
Rices Landing	68		5
Fredericktown/Ten Mile	65		5
Lock and Dam #5	*61.2*	*Maxwell*	
Brownsville	56		4
California/Coal Center	52		4
Allenport	47		4
Fayette City	46		4
Lower Speers	43.5		4
Belle Vernon	43.5		4
Charleroi	42 or 41		4
Lock and Dam #4	*41.5*	*Charleroi*	
Monessen	40.5		3
Donora	37		3
Monongahela	32		3
New Eagle	30		3
Lock and Dam #3	*23.8*	*Elizabeth*	
Elizabeth	23		2
Clairton	20		2
Glassport	19		2
McKeesport	15		2
Duquesne	13		2
Port Perry/Braddock	11.5		2
Lock and Dam #2	*11.2*	*Braddock*	
Kennywood	11		1
Carrie Furnace/Rankin	9		1
Nine Mile Run	8		1
Homestead	7.5		1
Sandcastle	6		1

Table 24
Primary Landing Sites

Location	Approximate River Mile	Dam Location	Pool #
Greensboro	84.5		6
Lock and Dam #6	*82*	*Grays Landing*	
Rices Landing	68		5
Lock and Dam #5	*61.2*	*Maxwell*	
Brownsville	56		4
Belle Vernon	43.5		4
Charleroi	42		4
Lock and Dam #4	*41.5*	*Charleroi*	
Monessen	40.5		3
Donora	37		3
Monongahela	32		3
Lock and Dam #3	*23.8*	*Elizabeth*	
McKeesport	15		2
Lock and Dam #2	*11.2*	*Braddock*	
Homestead	7.5		1

Table 25
Mileage Chart



	Greensboro	Rices Landing	Brownsville	Charleroi	Monessen	Monongahela	McKeesport	Homestead	Nine Mile Run	South Side - LTV	Pgh. Technology Center	Station Square	Mon Wharf - Smithfield St.	Point State Park
Greensboro	-	17	29	43	45	53	70	77	77	82	83	84	84	85
Rices Landing	17	-	12	26	28	36	53	61	61	65	66	67	67	68
Brownsville	29	12	-	14	16	24	41	49	49	53	54	55	55	56
Charleroi	43	26	14	-	2	10	27	35	35	39	40	41	41	42
Monessen	45	28	16	2	-	8	25	33	33	37	38	39	39	40
Monongahela	53	36	24	10	8	-	17	25	25	29	30	31	31	32
McKeesport	70	53	41	27	25	17	-	8	8	12	13	14	14	15
Homestead	77	61	49	35	33	25	8	-	0	4	5	6	6	8
Nine Mile Run	77	61	49	35	33	25	8	0	-	4	4	7	7	7
South Side - LTV	82	65	53	39	37	29	12	4	4	-	1	2	2	3
Pgh. Technology Center	83	66	54	40	38	30	13	5	5	1	-	2	2	3
Station Square	84	67	55	41	39	31	14	6	7	2	2	-	0	1
Mon Wharf - Smithfield St.	84	67	55	41	39	31	14	6	7	2	2	0	-	1
Point State Park	85	68	56	42	40	32	15	7	8	3	3	1	1	-

Mileage in River Miles.

IX. ISSUES, CONCERNS, CONSTRAINTS, AND OPPORTUNITIES

A. Project Area Characteristics

The municipalities along the Monongahela River have experienced a population decline due to the closing of the mills and mines. The 1990 U.S. Census indicates that between 1980 and 1990 California Borough was the only study corridor municipality to witness a growth in population. Other municipalities have lost as much as 27 percent of their population, and 39 of 65 municipalities lost over 10 percent of their respective populations during that decade.

Sudden population loss has left vacant housing, commercial buildings, and industrial structures which have contributed to the lack of private investment within the river municipalities. According to SPRPC, skilled workers in these towns have found themselves in an employment gap, left unqualified for high paying jobs and overqualified for unskilled jobs. Faced with this problem, many skilled workers have chosen to leave the region in search of new employment.

Since 1990 riverfront use has been rethought, and plans are developing to claim areas for public use. Conflicts have arisen over public recreation and private uses for the abandoned riverfront sites (SPRPC, 1994b). New multi-use zoning within brownfields along the river provides an opportunity to bridge this gap by allowing these uses to coexist. New companies would provide municipal tax revenue while the recreation amenities would attract additional people to the municipality and improve the overall quality of life, making the community an attractive place to live, work, and invest.

B. Land Resources

Hazardous and toxic waste production has been a long-standing problem within the Monongahela Valley. According to Percival et al. (1996) "the volumes and toxicity of industrial and municipal waste streams increased dramatically after World War II". For decades, industrial wastes were disposed in the least expensive, most convenient fashion possible with little or no concern given to the environment, the community, or its residents.

Despite stricter controls governing the management of hazardous wastes, cleanup of past materials may take decades. Numerous hazardous and toxic waste sites were identified within the study corridor including three CERCLA sites, 22 miscellaneous sites identified by ACOE, and one active residual waste landfill. Although varying levels of contamination may exist at these

sites they were all regulated or at various stages of reclamation by PADEP.

Brownfields located within the study corridor represented · resources for future economic and recreational development. Due to their proximity to the river, many of these brownfields were equipped with moorings, river terminals, docks, etc. In some instances, these features may provide the necessary infrastructure where river access is part of a redevelopment plan. In addition, PA Act 2 establishes standard procedures for remediation, release of liability, and financial assistance for interested parties to conduct voluntary cleanups.

As hazardous areas, abandoned mine sites within the study corridor also represented potential redevelopment areas. Reclaiming these sites can improve hazardous conditions, while utilizing their redevelopment potential. There are multiple abandoned mine reclamation efforts that incorporate techniques like refilling, regrading, and revegetation. In addition, a variety of volunteer special interest, federal and state government, and university research programs are ongoing to provide technical assistance and funding for reclamation.

In 1967, the $500 million Land and Water Conservation and Reclamation Fund (Operation Scarlift) was initiated for the treatment, reclamation, regrading and revegetating, and sealing of abandoned mines. Approximately $120 million of this fund was earmarked for the prevention, control, and elimination of AMD. In 1996 PADEP reported that approximately $78 million has been contracted (Frey, 1996).

Additionally, Pennsylvania receives approximately $19 million per year from the Federal Office of Surface Mining (OSM) through the Surface Mining Control and Reclamation Act of 1977 (SMCRA). These funds are direct proceeds from active mining operations and are allocated to states with active Abandoned Mine Land (AML) programs, such as Pennsylvania. However, monies are appropriated on a priority basis, and even then, only to Priority 1, 2, and 3 sites as defined by OSM.

In an interview with the Port of Pittsburgh they identified the lack of a comprehensive inventory of development sites as a problem when interested groups begin looking in the area. The Port of Pittsburgh indicated that a comprehensive inventory should be prepared identifying all attributes of a sites such as available docking facilities, water depth, acreage, etc.

There were numerous abandoned barges along the river which are

both visible along shore and sunk on the river bottoms. These barges present a variety of problems including obstructions to development, general hazards, and visual blight of the shoreline. The Port of Pittsburgh had begun a process to identify the abandon barges and establish a process by which to remove them. At the time of this study the Port of Pittsburgh was in the process of setting up a private foundation to acquire funds for the removal of the barges. The process of removing the barges will be costly and lengthy, additional funding sources available, outside of private contributions, will expedite the removal and improve the overall river quality.

Although many riverfront municipalities had established zoning ordinances, 15 municipalities did not have any form of land use control. The 15 municipalities were located in Washington and Greene counties and comprised of nearly 40 miles of riverfront along the western bank. These unzoned lands represented approximately 25 percent of all the riverfront property within the project area. Many municipalities had outdated zoning ordinances that did not reflect current conditions. There is a particular concern in municipalities which contain brownfield sites that had not adapted their zoning regulations to encourage reuse of these developments. This lack of zoning or outdated zoning is also of particular concern in municipalities that may experience growth projected with the Mon-Fayette Expressway. These communities may be ill-prepared for the results and impacts of this transportation project if they do not take steps to ensure proper planning.

These land use and zoning conflicts should be addressed as they limit development opportunities. Additionally, land use on adjacent properties are limited because of the incompatibility of industrial uses. Finally, several communities' zoning ordinances did not make the best use of existing environmental conditions. Many communities have left abandoned riverfront industrial sites zoned industrial in hopes that they will be reactivated. These communities should evaluate the potential for other river based redevelopment opportunities beyond industrial, as it may open access to the river.

C. Water Resources

Although the one-hundred and five-hundred year floodplains were confined between narrow regions of the river valley, existing developments did occur within the floodplains at locations like Point Marion, Greensboro, East Bethlehem, West Brownsville, Brownsville, California, Coal Center, and McKeesport. As evidenced by historical flood events on the

Monongahela River, these low-lying areas often sustain significant property damage.

Residential developments along the Monongahela's floodplain.

Future development and land use plans should be coordinated with the FEMA and the National Flood Insurance Program to determine floodplain and special flood hazard areas within the corridor.

Existing development could use emergency flood response resources. The NWS operates river forecast points at several locations along the Monongahela River. This information is available through recorded messages, the NWS internet site (www.nws.noaa.gov.er.pitt), and NOAA weather radio.

The navigational improvements on the Monongahela are expected to have an impact on existing water elevations in Pools No. 2 and 3. ACOE indicated that changes in elevation will be negligible however, and will not affect the existing floodplains. Furthermore, ACOE stressed that the lock and dam system was never designed or intended to manage floodwaters and that the modifications will neither benefit nor harm flood control (W. Loehline, ACOE, personal communication, February, 1998).

It has been emphasized that the state of water quality monitoring data for the Monongahela River basin suffered from numerous inadequacies. Several sources of chemical, physical, and biological data were available for the study corridor; however, the collection of data throughout the basin was a highly decentralized process. As a direct result of this decentralization, data quality and consistency was often compromised.

Agencies like PADEP and PFBC, and programs like NAWQA did maintain water quality stations along the Monongahela with the goal of detecting trends, assessing general water quality, and reporting on the effectiveness of water quality programs. In addition, federal, state, and private entities have conducted a variety of isolated water quality studies with specific goals in mind. As summarized in this plan, these studies focused on indicators such as fish and macroinvertebrate communities, contamination of sediments by heavy metals and organic compounds, and standard water

chemistry parameters. However, Miko & Lorson indicated that, "given the numerous anthropogenic influences upon the aquatic resources of the Monongahela River, describing (or forecasting)...may require a more complex array of hydrologic, water chemistry and forage fish data to yield reasonable descriptions...indeed greater quantification of biological data and more in-depth examination of flow and water quality data will be necessary".

When examined on a case-by-case basis each of these studies used a specific research protocol designed to evaluate a predetermined object and answer questions related to the specific goals of the study. Difficulties arose when attempting to compile a survey of water quality for the study corridor due to the incompatibility of methods used to collect and analyze data. With the possible exception of the PADEP, PFBC, and NAWQA programs, the majority of research presented was not intended to provide an *overall* picture of the Monongahela's waters. In 1997 the Intergovernmental Task Force on Monitoring Water Quality (ITFM) pointed out that:

> ...agreement is widespread that *existing data programs cannot be added together* to provide all the information needed to answer the more recent complex questions about national or regional water quality. [There is also] wide recognition of the need to improve water-quality monitoring to accomplish clearly defined objectives and to obtain better ambient compliance information...

The ITFM's message was clear: combining data from all of the various studies and agency monitoring programs represents a statistical challenge due to the myriad of protocols employed by researchers, and also presents a question of validity. Although the American Chemical Society Committee on Environmental Improvement (cited in Barcelona, 1988) indicated that there was no generally acceptable strategy for developing water quality protocols, the following minimum requirements were recommended:

- a proper statistical design which accounts for the goals of the study
- specific instructions for collecting, labeling, and preserving samples
- training of personnel in research design and analysis
- detailed written protocols

A watershed-based approach to water quality monitoring for the Monongahela must begin with goal-oriented monitoring and indicators that can address water pollution from a more global orientation. This type of approach may help to validate claims and implement strategies

directed at changing the image of the Monongahela as a polluted, industrial river.

Many mine abatement projects and investigations have been conducted throughout the Monongahela basin. Water quality monitoring conducted by PADEP and NAWQA indicated that mine discharges were randomly distributed throughout the watershed. In fact, PADEP has identified approximately 1000 "problem areas" throughout the basin (P. Milavec, personal communication, February 11, 1998).

The magnitude of AMD, especially in the upper Monongahela, has decreased considerably due to a greater understanding of the interrelated processes producing AMD and advancements in abatement technologies, (Miko & Lorson, 1994; ACOE, 1991; USGS, 1997a; D. Williams, USGS, personal communication, December 10, 1997). Despite these gains, AMD represented the single-most significant source of water pollution within the Monongahela River basin (Frey, 1994).

In 1991, ACOE completed the Lower Monongahela River Navigation System Feasibility Study. This proposal has since received congressional approval and will involve the upgrade of Locks and Dams No. 2 and 4, and the removal of Locks and Dam No. 3. When implemented, the project will have major effects on water quality and the hydrology of the river. The most visible change resulting from ACOE's recommended plan will be changes in pool elevations. According to ACOE estimates, Pool No. 2 was expected to rise an average of 2 feet over its entire length and Pool No. 3 was expected to lower an average of 5 feet due to the removal of Locks and Dam No. 3. The shifting of these pool levels was expected to require the relocation or adjustment of a variety of facilities and structures including railroads, municipal water intakes, storm sewers, commercial facilities, and recreational facilities.

Environmental consequences associated with the plan included the loss of beneficial tailwater habitat below Dam No. 3, the degradation of upland habitats used as disposal areas, temporary increases in turbidity and the possible liberation of contaminated sediments during dredging operations, reduced levels of dissolved oxygen resulting from the removal of Locks and Dam No. 3, loss of submerged riverine and riparian wetland habitat, and the loss of recreational access points.

ACOE in conjunction with EPA, PADEP, PFBC, and USFWS has outlined a series of mitigation strategies; nevertheless, due to the project's magnitude and

scope, the potential for long-term, negative environmental impacts existed. As Miko & Lorson (1994) describe: "...commercial navigation impacts supersede environmental impacts [on the Monongahela]".

Percival et al. (1996) described the "shift to waterborne methods" of waste disposal as a "major concern" throughout the United States. Both treated and untreated sewage effluent represented a water quality problem within the Monongahela. Throughout much of the study corridor communities were served by municipal wastewater treatment facilities. Nonetheless, even treated wastewaters often contain high levels of heavy metals, nutrients, and sediment material. Combined with the increased temperatures found throughout the lower Monongahela, nutrients found in wastewater often placed further demands on dissolved oxygen concentrations.

Several isolated areas throughout the study corridor lacked municipal treatment service. As a result, on-lot septic systems and direct "wildcat" lines introduced pollutants into the river. Although reports of illness due to pathogens in the river were rare, in untreated sewage they pose potential human and ecological health risks.

D. Biological Resources

The continuing invasion of the riparian zone by aggressive foreign plants, such as Japanese knotweed (*Polygonum cuspidatum*) and garlic mustard (*Alliaria officinalis*), has significantly degraded the diversity and habitat quality of the associated understory. Japanese knotweed is native to eastern Asia (Seiger, 1997). First introduced to North America in the late 19th century, this species became a serious problem in the eastern U.S. Once established, it forms large stands which displace all native vegetation. Stands of Japanese knotweed have been virtually impossible to eradicate. The presence of this noxious, invasive plant may result in increased erosion problems. Due to shallow rooting and poor bank stabilization, It replaces native herbaceous vegetation on many banks, which can leave an exposed bank which could be eroded during storm events.

Zebra mussels (*Dreissena polymorpha*) have been identified in Lock and Dam No. 3 in Elizabeth. Although there were only 14 mussels collected at this lock, the potential exists for migration by the free-swimming veligers or larvae into the remaining portions of the river (PADEP, 1997b). Problems result when zebra mussels block pipe intakes at public water systems or power plants, as well

as when the filter-feeding mussels reduce nutrient levels in water bodies and native species that rely on these nutrients can not sustain themselves. The Asian clam can create the same complications as the zebra mussel.

The ACOE Lock and Dam project could significantly alter the aquatic habitat of the Monongahela River by dredging, excavating, eliminating tailwater habitat, and changing pool levels. The loss of the tailwater habitat could create a significantly negative impact on the improving fish community. ACOE , in coordination with the USFWS, has plans to compensate for this loss of tailwater habitat by increasing the amount of shoreline-debris zone or shallow water habitat and enhancing the fishery by placement of fish reefs and rubble beds.

Forested buffers, which exist along much of the study corridor, help improve water quality, but proper maintenance, management, and integration with other river conservation techniques is also required. Riparian forest buffers alone can not solve water quality problems. There must be an integrated ecosystem approach including sediment and erosion plans, AMD abatement projects and proper land management techniques.

There are several government agencies that can be contacted for further information on maintaining a riparian forest buffer such as the USDA, the USFWS, the Natural Resource Conservation Service, and DCNR. It is critical to the maintenance and protection of riparian forested buffers that private landowners along the riverside are provided with knowledge and assistance regarding the benefits and effects of these systems.

Of the five counties located within the study corridor, only two participated in a Natural Heritage Inventory; Allegheny and Washington. Westmoreland and Fayette Counties began the process to complete an inventory, while Greene County has no plans to conduct the study. The purpose of the inventory is to identify and present areas with unique natural resources. In turn, WPC is hoping that this designation, although it holds no legal protection, will deter developers from building in these areas.

E. Cultural Resources

1. Recreational Resources

With the reintroduction of the river-based recreation industry, numerous issues were raised such as recreational safety, degradation of the river, limited access to the river areas, and new recreational opportunities.

Abandoned coal conveyors, tipples and barge tie-offs represent safety concerns for both the shipping industry and the recreation industry. Towboats, pushing an average of six barges, have difficulty in seeing and reacting to the recreational users of the river. Both the commercial shipping industry and the recreation industry are concerned with safety and future changes to the shipping industry.

Other concerns are related to the acquisition of operator licenses, the attendance of boater safety courses, and the use of alcohol while boating. While these simple measures to ensure the safety of the recreational users of the river are required, it has been suggested that they are rarely enforced.

The introduction of personal watercrafts (PWC) has also added to safety concerns on the Monongahela River. In 1997, 27 percent of all boating accidents involved at least one PWC and 43 percent of all reported collisions between boats involved at least one PWC (PFBC, 1998). The PFBC has already adopted regulations for an age restriction for persons under 15 years of age and are considering even stricter regulations aimed at requiring a PWC safety class for any one intending to operate these watercraft.

Obstacles to recreational use exist both in and out of the river. Railroad tracks and steep slopes generally restrict public access to the river throughout the corridor. There are a number of private household docks and points of river access, but public access by swimmers, boaters and fishermen is limited within the study corridor. Limited public access to the river is due to land ownership, industrial use, pollution, railroads, highways, and steep slopes.

Recreational facilities also present challenges to development opportunities along the river and redevelopment at brownfield sites. Conflicts between pedestrian/bikers and industrial loading operations and the liability resulting from these conflicts are of paramount concern. An interview with Port of Pittsburgh indicated that trails established at the rivers edge on potential redevelopment sites such as the Duquesne City Center and McKeesport, will strongly impact the ability of industries reliant on river based transportation to develop, narrowing opportunities for development.

The abandoned ferry locations, located mostly in the southern half of the study corridor, could provide additional, unmaintained access to the river. Although these abandoned ferry landings are not readily noticeable, they

represent a time in history when the shores and communities along the Monongahela were connected by a simpler form of transportation.

As Table 18 indicates, the distribution of recreational facilities along the Monongahela River corridor appears to be concentrated in Pools 3, 4 and 5. In analyzing population, it is apparent that certain areas of the river, particularly Pools 1, 2, and 5 are under served for public boat launches. The first four pools of the river, which are also the most populated, could use at least two new ramps each, while Pool 5 needs at least one new ramp. Pool 6 appears to contain enough public access for the number of people located nearby.

The PFBC Water Trails Initiative may provide an excellent opportunity to join with agency personnel in creating any type of boat tours. Promotion, funding, conservation and other positive benefits of this program could be put to use on the Monongahela River. This program includes the designation of a statewide network of water trails to enhance the recreational experiences of the region while attracting traveling and tourism dollars. Under this initiative, specific information about designated water trails, including camping, interesting sites, trail heads, and other pertinent information would be collected and complied into a brochure for tourism and promotion. In 1998, this initiative was still undergoing a preliminary trial on the Susquehanna River.

There are numerous proposals for ramps, marinas and riverfront parks as discussed in the *Recreation* section of this report. These proposals are indications that the communities in the region are interested in improving public access and use of the river (Table 26).

In discussions with Mackin and SIHC, Kennywood Park, which operates the Sandcastle water park, expressed a willingness to provide space for a public boat launch adjacent to the parking area at Sandcastle. In a past overture to the City of Pittsburgh, where the property is located, Kennywood indicated that they would help pay for the construction of the launch area and provide maintenance and security while the park was in operation. Although the City was unwilling to entertain Kennywood's offer at that time, this launch would provide public access, parking for boat trailers within the Pittsburgh pool and would relieve pressures on other ramps within the area, which is greatly underserved for boat access at this time.

The ACOE Lock and Dam project requires the adaptation of several private facilities including the Mon-Valley

Table 26
Recreation Proposals

Fredericktown	Marina
Luzerne Township	Boat Ramp
Brownsville	Wharf
Brownsville	Marina
Charleroi	Promenade and Tower Park
Monessen	PFBC Ramp
Forward Township	Marina
Donora	Municipal Park & Ramp
McKeesport	McKee's Point Park
McKeesport	Youghiogheny Linear Park
Kennywood Park	Boat ramp
Kennywood Park	Marina

Speedboat Club, Elizabeth Boat Club, Pine Run Outboard Club, Evan Ford Development, Molnar Marina, Beach Club Marina, Monongahela Mariners Boat Club, Marina One Corp., and Frank & Fey Irey Marina. Under Section 10 of the River and Harbor Act of 1899, private facilities are not entitled to compensation for modifications resulting from a federal project. Therefore, remedying these adjustments is the responsibility of the private facilities. Due to the impacts to several commercial docks, the Port of Pittsburgh Commission has set up a revolving low interest loan fund to assist the private commercial interests affected by this project. Although, these measures may never be undertaken due to the cost associated with them.

Also impacted by this project will be five public ramps located in New Eagle, Monongahela, Black Diamond, Forward Township, and Webster. Although, the ACOE is responsible for mitigation and financial funding of these public facilities, it is important to keep updated on the progress of the mitigation efforts.

With the advent of railways and the industrial age, the Monongahela River became inundated with railroads. As the coal and steel industries declined, many of the railroads were left abandoned. This provides an opportunity to create new recreational trails. The abandoned railroads are already cleared spaces that had relatively little to no grade associated with them. Due to the numerous railroad companies in the area and conflicting ownership and

usage information, the length and locations of abandoned railroads were unable to be determined.

2. Historical & Cultural

Historical resource conservation is based on three issues: preservation, official recognition, and interpretation. Preservation includes the physical rehabilitation of structures, districts and sites. Recognition is done through the formal process of placing sites and structures on lists of historical resources. These lists are kept and managed by groups at different political levels, local (historical societies), state (PHMC), and federal (National Register of Historic Places). Interpretation of historical resources means explaining past usage thereby placing value in it, and increasing overall awareness of its historical significance. Interpretation can take the form of reusing a structure for modern purposes while maintaining the architectural integrity of its past.

Preservation, recognition, and interpretation are all occurring to different degrees within the river communities. Preservation efforts are generally commensurate with the amount of financial resources available. Because the cost of rehabilitation varies greatly, the desire to physically preserve many structures is restricted. The limited availability of funds for historic preservation is a concern in the Monongahela Valley, where so many worthwhile structures exist.

Official recognition can be deceiving. For example, a municipality may have sites listed on the National Register, but they may have been placed there as a result of surveys done by government agencies for infrastructure projects such as roadways. Therefore, sites which are listed may not actually be recognized or valued as a historical resource on the local level. By contrast, official recognition through a community-based effort takes a certain amount of political will. Communities wishing to have a site listed on the National Register must justify its relevance and follow the formal nomination process. This can be a much more time consuming effort than achieving recognition through a local historical society. Most importantly, official recognition of historic resources does not ensure that they will be physically restored or protected.

Interpretation can be complicated, as well. A site may be valued by the community based on an event which occurred there, such as an uprising during the Whiskey Rebellion or a military battle. Interpretation of a structure may involve preserving its outward appearance and style while using it for a new purpose, or preserving its historical use while

changing the physical appearance.

Preservation, recognition and interpretation can be wasted efforts if they are not done in combination with one another. The Flatiron Building in Brownsville is an example of how successfully combining preservation, recognition and interpretation can yield a structure that serves public interests and contributes to economic growth. On the other hand, a site such as the Pinkerton Landing Site in Homestead is officially recognized and has been outwardly rehabilitated, but there is limited interpretation of its importance in history and it is easily overlooked by Homestead visitors, residents, and river users. A final example of the importance of combining the three aspects of historical conservation is the Old Main building on the campus of California University of Pennsylvania. This historical building, listed on the National Register, was restored and upgraded to maintain its use by the university. The university's master plan (2003-2009) intends to further highlight the historical significance of Old Main by further renovating it. The University also intends to build an addition to Old Main, and create a new university entryway that would direct traffic to Old Main (McLachlan, Cornelium, & Filoni, 1996). This will serve to highlight the building in the university setting.

Cultural Conservation

The river communities of the Monongahela share a commercial and industrial past which attracted immigrants and others, and bonded people through their experiences in mills, warehouses, factories, and mines. This formed an identity for residents of the Monongahela Valley, despite the ethnic and religious diversity. This identity still retains its significance today.

The culture of this region has taken on a special meaning within the larger context of southwestern Pennsylvania that is summed up simply by the term "Mon Valley". It is this recognition that sets Monongahela Valley residents and communities apart from those of other southwestern Pennsylvania river valleys with industrial pasts.

It is difficult to conceptualize *culture* as something to preserve. SIHC has taken the lead in attempting to do this through local initiatives and a regional strategy. Many important aspects of Monongahela Valley culture will not be appreciated by depending on historical conservation alone, which is why taking stock in cultural attributes is important. For example, coal patch communities are not something unique in the Monongahela Valley, and there

may not be efforts to identify, preserve, recognize or interpret their individual histories because they seem a common entity. However, the importance of coal patch towns is that they represent a niche of culture that is significant to the Monongahela Valley. This and other nuances of the valley are something to consider, preserve, and capitalize on.

F. Other Resource Opportunities

1. River Conservation Plans

Within the last year and a half, several other river conservation plans have been conducted within the vicinity of the Monongahela River. This offers the opportunity of coordinating management options and funding sources to accomplish a common goal. There were five other conservation plans completed or being conducted at the time of this report. They are the Dunkard Creek Plan, the Monongahela River Plan at Brownsville, the Youghiogheny River Plan, the Nine Mile Run Plan, and the Three Rivers Plan.

The Dunkard Creek Plan was conducted by the Greene County Conservation District and is in the Final Draft phase. It is anticipated that this report will be completed by the end of 1998. This plan focuses on the following seven top issues of concern within the watershed: abandoned mine drainage, trash dumps, erosion and sedimentation, stream awareness, raw sewage, water quality, and promotion of heritage and recreation.

The Monongahela River Plan at Brownsville was conducted by seven municipalities within the watershed that joined together to investigated a 26 mile stretch of the river. This plan was completed in November 1997 and was the first plan to be included on the Rivers Registry. Some of the main issues in this plan were sewage, river access, historical recognition, and river safety. This plan has also started to implement some of their management options. They are pursuing a wharf/landing site and have formed a river rescue team.

The Youghiogheny River Conservation Plan investigated a 46 mile stretch of the river and included 27 municipalities. This plan was completed in February, 1998. The focus of this plan was economic development, river access, water quality, and recreation. The Regional Trial Corporation was responsible for this plan and they have begun to implement some of their management options as well.

The Draft Phase of the Nine Mile River Conservation Plan was under development as of April of 1998. The study corridor includes both the upper and lower reaches and extends from Braddock Avenue in Frick Park

to the confluence with the Monongahela River. Some issues of concern identified in the plan include: the extensively degraded water quality and stream habitat, excessive erosion and scouring from storm water run-off throughout the basin, failing sewage lines and unauthorized discharges, and potential toxic contamination from an adjacent 20 million ton slag pile.

The Nine Mile Run Plan addresses these and other issues and concerns with a series detailed management options directed at "protecting, restoring, and enhancing the biotic, abiotic, cultural, and scenic values of a post-industrial urban watershed, and to promote public understanding, appreciation, and enjoyment of this heritage within a sustainable greenway program" (City of Pittsburgh Department of City Planning, STUDIO for Creative Inquiry, & Carnegie Museum of Natural History, 1998).

The Three Rivers Plan is currently being conducted on portions of the Allegheny, Ohio and Monongahela Rivers by the City of Pittsburgh and is anticipated to be complete in the summer 1999. The focus of this plan includes an in depth flora and fauna assessment, a historical review, and recreational utilization of the riverfronts.

2. Economic Development Proposals

The City of Pittsburgh has complied the Riverfront Development Plan, which encompasses a portion of the Monongahela River within the City limits. Within this report, several districts have been designated, the Central district, Community districts, industry districts, and green districts. Each district provides for various goals and standards that the City of Pittsburgh wants to establish. In particular, with the Monongahela River, the Community district in Nine Mile Run, the Industry region in Hays, and the Green District in the Upper Monongahela River are of interest.

As part of a larger initiative directed towards the revitalization of the Mid-Mon Valley, various studies were identified which focused on economic development and market potential within the study corridor. Two of these studies, *Leading Mid-Mon Valley Venture Development Opportunities* (Delta Development Group & GAI Consultants, [DDG & GAI], 1993) and *Development Potential of River-Based Properties: Market Assessment* (ZHA, 1988), investigated several potential opportunities throughout the valley and identified four of the more attractive sites for proposals.

The most viable initiatives and their development perspectives were as follows:

- Pine Oaks Site - A former mine and slag dump area totaling 400 acres, this site is located northwest of Donora, adjacent PA Route 837. The proposal includes a mixed use health care business and service park with amenities including a golf course, spa, tennis courts, residential developments, and restaurants.

- Gibsonton Site - Described as a premier location for a riverfront development due to its proximity to I-70 and high visibility, this 75 acre site was selected for hotel and franchise restaurant development. Included in the proposal are small office and residential compliments, a 50 slip marina, park facilities, and a future rail excursion coordinated with the Steel Valley Heritage Project, which would link the site to cultural and historic sites within the region.

- Charleroi Trustees Park Site - The 6 acre park is located on the Monongahela River southeast of downtown Charleroi. Already a functioning community playground facility, plans for a festival market place for local merchants, vendors, and retailers are the highlight of this proposal. This open-air market would also be complimented by local fairs, exhibits, arts and crafts, and carnivals. A deck hockey facility, marina, and ball park

- Monongahela Aquatorium Site - Bordering the eastern side the existing Aquatorium in the City of Monongahela, this site proposal was recommended due to its proximity to the Aquatorium, exceptional river access, and the neighboring downtown area. Recommendations include a riverfront "white tablecloth" restaurant tailored specifically toward boaters and an 80 slip marina with boat rental.

X. MANAGEMENT OPTIONS

The following Management Options are contained within a Matrix located in Appendix L. This matrix provides for potential partners, potential funding sources and recommended beginning dates.

A. Cultural and Historical

Facilitate regional coordination between historical groups and municipalities through PHMC and SIHC.

Coordination between local historical societies, river communities, SIHC, and PHMC in necessary to create a successful strategy for regional development. The Rivers of Steel journey area organizations can serve as main players in regional coordination efforts.

SIHC through their journey areas would act as a clearinghouse for information and a regional organizing body. Through its system of consultants and contacts, SIHC would also offer technical advice on how to properly rehabilitate or refurbish historic structures, where to go for potential grant money to engage in historic preservation at the community level; how determine if a structure is historic, and how to nominate it for recognition by PHMC. As the state commission overseeing historical sites and structures, PHMC should play an active role in facilitating coordination and communication among historical organizations in the Monongahela River Valley.

Create a Steamboat Museum at Brownsville.

This facility would be located at Brownsville, the cradle of the American steamboat-building industry. The museum would have the potential to be both land and river-based, focusing not only on the steamboats themselves, but also on the boat-building process.

The museum would be dedicated to presenting this colorful and important part of our nation's heritage, and relating the story of how steamboat building developed in the Monongahela Valley, along with how it affected the course of American history. There would be numerous opportunities for exhibits on boat building and steamboat travel, including displays on the history of boat building on the Mon; replicas of the Enterprise, one of the first steamboats to travel the length of the Ohio River system to the Gulf of Mexico and the first steamboat to travel from Brownsville to New Orleans and return on its own power; exhibits and festivals on Dixieland and other forms of music associated with steamboat travel; and an annual regatta exclusively featuring steamboats and paddlewheelers from around the country.

In addition to historic interpretation, the museum could become active in the restoration of steamboats and the construction of replica boats if a market for this service exists. As part of this process, museum staff could begin to locate and restore early steamboats from around the nation. If this was proven to be a viable market, it could be a method

of generating revenue for the museum, as well as offering an opportunity for visitors to learn firsthand about the steamboat-building process.

Investigate partnerships with ACOE for the development of a Lock and Dam Museum.
This facility, which could be located at any of several Rivers of Steel landing sites would provide interpretation of the history of the locks and dams along the river. This museum would relate the importance of the lock and dam systems to all rivers in western Pennsylvania.

It could address early efforts to dam the rivers and the economic forces that drove these efforts, the engineering required to design the dams, a discussion of how the locks work, different types of locks and dams used along the rivers (i.e. wicket dams, modern style, etc.), and how the slackwater system has changed the character of the rivers. This museum would also provide an opportunity to discuss the canal system which historically existed along the rivers and the importance of the commercial shipping industry to western PA, both in the past and today.

Coordinate an exchange of historical literature between communities in order to market a regional experience among travelers to the river communities.
Transferring community literature on historical resources is important as a strategy to inspire tourism on a larger scale. SIHC's proposed landing site kiosks are the most obvious place to keep a stock of regional historical and cultural information. Other localities would be the offices of local and regional historical societies and the Bost Building. Because SIHC is already developing a tourism and marketing plan for Rivers of Steel, they are the most appropriate entity to manage this information.

Those communities without a local history book or pamphlet (such as a centennial tribute) should partner with those that have completed such a project (e.g. Monessen, Charleroi) for technical assistance.
This would help document history from a local perspective and would spark interest within the community. It may also uncover items of historical importance that have been previously overlooked. In addition for those communities which have not initiated any historic archives or documentation, contacting local newspapers is one place to begin assembling information in preparation for a pamphlet or book.

Display public artwork.
It is recommended that areas be set aside within the river communities, particularly at landing sites, for displaying public art. Public art is a process that involves local residents and when completed can display the culture, ideals, and history of a community. Public art can be produced by children, the elderly, artists and non-artists alike. The public open space that will be

created at landing sites, as well as along trails and in new public parks, provides an ideal opportunity for permanent or revolving displays by local artists.

Communities should selectively focus conservation efforts by identifying their historical resources, including those which are listed on the National Register of Historic Places and those which they would like to see listed.
Identifying structures remaining from former industrial sites, commercial, residential areas is a primary task for communities interested in historical and cultural preservation. However, selectively focusing the community's preservation efforts on significant structures is a better long-term strategy than either ignoring all structures or spreading resources too thinly over many structures. Selective preservation should be done in a coordinated manner with SIHC, PHMC, and local groups.

Take a regional approach to signs so that all of the historical structures or districts within the river corridor communities use similar marking techniques to identify their historical and cultural resources.
Signs are one way to unify the theme of history and culture in the Monongahela River communities. Signs of a similar style or color scheme can be used to mark structures, trails, or historic districts. Signs can also be functional listings of the choices of attractions within each community. It is recommended that the signs take on a Rivers of Steel marking that will unify the corridor resources.

Signs can also be used in a flag or tapestry fashion to add character to a commercial district, such as that used on Eighth Avenue in Homestead. In the case of Homestead, the street flags depict scenes from the community's industrial past. The designs for flags and tapestries could be developed through community art projects or contests.

Research local history to attempt to identify sites of exceptional interest for interpretive sites.
An example of this is the former Parkinson's Ferry site in Monongahela. Because the former Parkinson's Ferry is celebrated as a rendezvous site of the Whiskey Rebels, it should be researched by the community and submitted to the PHMC for listing. Through SIHC or the municipality, Parkinson's Ferry could developed into an interpretive site for attracting and informing tourists on the significance of the Whiskey Rebellion to regional and national history. This is just one example of many significant historic sites within the study corridor which could be developed into interpretive areas.

Preserve local churches as cultural and ethnic symbols of the Monongahela Valley.
Churches are a significant part of the landscape in the Monongahela Valley because they represent the ethnic and religious variety of previous generations who lived,

worked, and worshipped in the valley. Today however, churches throughout southwestern Pennsylvania are in danger of being forgotten as congregational numbers decline and churches close. This trend is not expected to change, which means that more church structures will be put on the resale market as congregations merge. The threat of indiscriminate resale ranges from buyers who remove valuable stained glass often the churches to those that demolish the structures, or allow them to remain unprotected from vandals.

It is important to protect these ethnic and cultural symbols when appropriate. Local municipalities should take the lead in monitoring the resale and reuse of churches and communicate to prospective buyers and developers their concern for churches as ethnic and cultural artifacts. This can help assure that reuse is done with historical and cultural sensitivity. Community development corporations can also play a part in this by including suitable churches in their redevelopment plans.

Resale and reuse can be a positive and lucrative venture, such as the Church Brew Works in Lawrenceville and the Priory Bed and Breakfast on the City of Pittsburgh's North Side. Both of these redevelopment projects were done in the spirit of the original church structure.

Design regional history exhibits that can be displayed outside the Monongahela Valley.
Once the regional historical resources are identified and researched, and the information is managed by the PHMC or SIHC, the next step would be to design exhibits based on the Monongahela River's history for traveling displays. There are currently enough artifacts, photographs, and historical data in SIHC's possession to do this. Displaying exhibits in Ohio, West Virginia and eastern Pennsylvania, would spur interest in tourism in southwestern Pennsylvania and the Monongahela River valley. Accomplishing this would require approaching organizations such as the Senator John Heinz Regional History Center, which are in a position to develop and circulate such an exhibit.

Address regulatory problems which discourage reuse of historical sites.
The main regulatory deterrents are floodplains, local zoning ordinances and building code ordinances. Other issues are Americans with Disabilities Act (ADA), and Occupational Safety Health Administration (OSHA) standards for elevators. Some of the problems of former mill sites and industrial river towns are unrealistic to overcome, notably frequently flooded areas. However, local zoning, ADA, and OSHA can often be resolved through innovative planning and cooperation between agencies.

Highlight the stoneware industry of southwestern Pennsylvania.
The salt-glazed stoneware industry once flourished in the Monongahela Valley. Salt kilns were fired as early as the 1830s and at the time stoneware items from southwestern Pennsylvania were a prized commodity. A study should be done to locate and explore extant stoneware and pottery factory buildings or kilns. Stoneware production was prevalent in New Geneva and Greensboro, as well as in towns along the Youghiogheny River.

Develop the Steel Heritage Interpretive Center at Carrie Furnace.
This attraction is already planned by SIHC, but there are several suggestions for details of the design which could be incorporated. One suggestion for the Steel Heritage Interpretive Center at Carrie Furnace is the incorporation of an ethnic food gallery. Each facility would highlight food from the ethnic groups which formed the basis of the strong neighborhoods in the Pittsburgh area, such as African, Czech, German, Hungarian, Irish, Italian, Polish, Russian, and Ukrainian. Each ethnic group would then serve authentic foods which would have been eaten by the immigrants who worked in the valley's mills, prepared by the descendants of those immigrants. For example, a restaurant representing the African ethnic group would be run and staffed by people of African descent and could serve soul food, which was a part of the culture of the many blacks who migrated from the post-Civil War South to work in Pittsburgh's factories. The ethnicity of the food gallery facilities could also be reinforced by selling authentic, handmade crafts or clothing at each.

If a food court approach is taken, the individual units be as representative booths of ethnic restaurants which already exist throughout the region. This would encourage visitors to sample the various types of food available at the Steel Heritage Interpretive Center at Carrie Furnace, then travel to the actual location of the restaurant for a larger meal later. This approach would fulfill one of SIHC's goals of moving visitors into existing communities rather than centralizing facilities. The concept would provide another opportunity to improve awareness of the region's heritage. At the same time, it might also serve to attract more local visitors, who are simply looking for an evening dining experience, to the Steel Heritage Interpretive Center at Carrie Furnace.

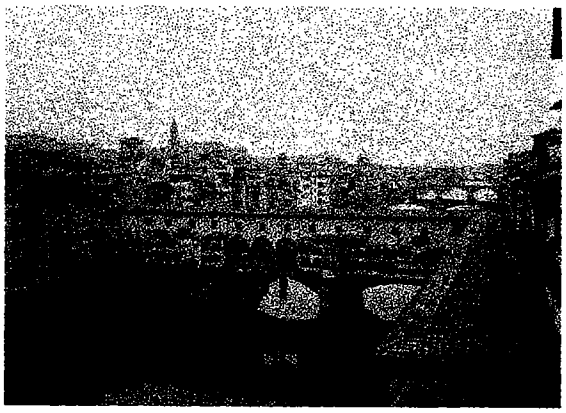
If, as planned, a hard-hat tour of the U.S.X. Edgar Thomson Steel Works is developed as part of the Steel Heritage Interpretive Center at Carrie Furnace, another opportunity for creative interpretation could arise. Since a travel link will be needed to cover the approximately 1.5 miles between the two facilities, a replica streetcar could be built to shuttle visitors. This would recreate a nostalgic part of the region's past and remind visitors of the method of

commuting frequently used by millworkers. The rubber-tire streetcar, which would use existing streets, could provide additional prospects for cultural interpretation as well. It could be routed through the National Register-eligible Braddock Historic District (which encompasses many industrial era buildings and mill housing) or past significant historic structures such as the National Register-listed Braddock Library or the approximate location of Braddock's Field, the location of the 1755 French and Indian War battle. Streetcar riders could each be given an information kit related to these sites contained in a lunchbox, to further heighten the impression of factory workers commuting to the job. Overall, the streetcar would solve the logistical difficulty of moving visitors between the two sites while providing many methods of enhancing the interpretation of the area's heritage.

Investigate and create a trail under the Dunlap Creek Bridge in Brownsville.
Aside from its recreational use, this trail could be utilized as an interpretative site to explain the construction, design, and purpose of the Dunlap Bridge, the first cast iron bridge in America.

Redevelop an existing bridge to hold small shops.
There are many bridges over the Monongahela River which link towns and people. Aside from reusing extant bridges for pedestrian and bike paths, bridges should be explored for their commercial potential. Example of this exists in other areas such as in Florence, Italy. This could be explored on the Monongahela using an inactive railroad bridge or a roadway bridge that has been taken out of service.

Although other bridges may have the future potential for combined commercial reuse, the abandoned railroad bridge across the Monongahela at Clairton is one immediate possibility. The bridge could support tourism and industrial history-related shops.


Bridge reused for shops and walkway in Florence, Italy.

Another possibility is the Carrie Furnace Hot Metal bridge. This bridge has been targeted as part of the Steel Heritage Trail, but incorporating small shops along the bridge may add more attraction to the route.

B. Economic Development

Develop a series of landings for riverboat tours.
As outlined in the Landing Sites section of this document, Mackin has identified those areas which represent potential landing sites for

the Rivers of Steel Heritage Area based upon existing conditions. The first step in implementing this would involve a more intensive evaluation of these sites by SIHC including: existing infrastructure, amenities, landing site design, engineering feasibility, potential funding sources, and partnership opportunities.

PFBC has a grant that provides for 75% matching funds to create and construct docking facilities for non-trailerable boats. This money could be utilized for Rivers of Steel landing sites and tourboats.

Complete an inventory of brownfields and prioritize their redevelopment potential under PA Act 2 and Act 4.
Pennsylvania land recycling legislation provides valuable incentives to parties interested in adaptive reuse and/or redevelopment of brownfields. Study corridor municipalities may be eligible for grant funding to assess the environmental condition of brownfields under PA Act 4 (Industrial Sites Environmental Assessment Act) and to redevelop sites under PA Act 2 (Land Recycling and Environmental Remediation Standards Act).

Once a complete inventory of brownfield sites is completed for the study corridor (this River Conservation Plan includes only a cursory inventory), they should be prioritized based on their redevelopment potential, including road and utility access, and size. Once this prioritization is complete, the individual municipalities or other interested parties may apply to the state for funding to assess the sites' environmental condition, and in some cases to begin cleanup work.

This inventory should be prepared in conjunction with agencies involved with economic development opportunities such as Southwestern Pennsylvania Regional Planning Commission (SPRPC), Penn Southwest, or the Port of Pittsburgh.

Create a Business Directory and map that highlights the commercial districts and other amenities near river landings.
A directory which includes shops, eateries, transportation resources, parks and other points of interest could be developed and placed at the SIHC landing sites. The directory and map would be a valuable resource in locating nearby businesses within local commercial districts. The directory could also be updated seasonally to highlight municipal or regional events such as parades, festivals and cultural events. Funding could be provided through advertising space within the directory.

Complete and maintain the Steel Heritage Trail, Montour Trail, Sheepskin Trail, and Greensboro Riverwalk.
By completing these trails, not only will a portion of the Washington, DC to Pittsburgh trail be completed but it will allow for visitors and recreational users of the trail to view the towns and communities surrounding the area. Bikers, hikers,

and walkers using the trail network will bring in more tourism and new economic opportunities. The people within the study corridor will also benefit from completing these trails by an increase in recreational opportunities and an increase in tourism revenues.

Monitor the success and impact of economic development projects along the river.
Publishing an annual report of completed or ongoing projects, documenting their economic impact and hold an annual symposium for those involved in projects or interested in the river.

Promote fishing, hiking, and biking through events.
Promoting the natural beauty and recreation opportunities of the Monongahela Valley will help to bring new visitors to the river corridor. This will, in turn, help to spur new business development in the service sector and foster an appreciation for the valley's resources and their potential economic effect.

Fishing tournaments have been proven to provide for increased tourism and economic profit. PFBC provides for applications to hold these events. The BASS federation has expressed an interest in promoting such an event.

Evaluate, and where appropriate acquire and rebuild abandoned ferry sites to be used as future ferry launch sites, public boat launches, and interpretive areas.
With many constraints to river access (topography, railroads, and industrial use) the ferries represent access points that at one time were operable. Even though most of the ferry sites are overgrown and the access is usually not maintained, these areas still present a feasible way to access the river. In addition, interpretive sites and an alternative to bridges for river crossing would be made available. According to the Port of Pittsburgh funding for the reuse and establishment of old ferry sites is available through the Inter-Modal Surface Transportation Efficiency Act (ISTEA) and the newer TEA21. The Port of Pittsburgh has indicated a willingness to assist in acquiring these funds for use at ferry sites.

Link Greensboro and New Geneva by ferry.
This would actually again institute ferry service which historically existed between the two towns. The purpose of the ferry would be to link the two towns as one Rivers of Steel landing site. The main landing would be at Greensboro and the ferry would tie this landing to New Geneva. This would address several concerns and opportunities. The first of these is the opportunity to access the Friendship Hill National Historic Site, located adjacent to New Geneva. This will encourage people who visit Albert Gallatin's estate at Friendship Hill to experience both New Geneva, a town founded by

Gallatin, and Greensboro, which has a historic character of its own.

In addition, by landing at Greensboro and ferrying to New Geneva, a logistical problem can be solved. While Greensboro has excellent river access through both an existing landing and an abandoned lock, New Geneva will be difficult to access for large tour boats due to railroad tracks and the shallow bottom at Georges Creek. A smaller ferry boat will be able to navigate in this area and deliver visitors to a convenient landing point.

Build historically accurate replica ferries to connect the river communities and for historic interpretation.
As noted in the land use portion of this document, there are few bridges located along the Monongahela River to connect river communities. By reestablishing the ferries, an interesting and historically significant way of connecting communities could be accomplished.

Promote a Farmers' Market in Mid-Monongahela Valley.
This would be of lesser scale than the market house described above and would only sell locally-farmed produce. The selection of the Mid-Monongahela Valley for the site serves two purposes. The first is to locate the market in a densely populated area in order to attract a maximum number of consumers. The second is to serve the large number of agricultural operations which operate in Greene, Fayette, Washington, and Westmoreland Counties and to provide a large, central outlet for these goods.

Develop a Market House at McKeesport.
Because the Monongahela Valley is lacking a single facility or district for marketing goods, such as the Strip District in Pittsburgh, the Reading Terminal Market in Philadelphia, or Tamarack in West Virginia, a market house could be developed in McKeesport in conjunction with a Rivers of Steel landing site. The market house could include food items (both prepared and unprepared) and other hard goods. Some possibilities include furniture, clothing, toys, quilts and crafts, wines, and microbrewed beers. A particular focus should be maintained on selling either locally-made goods or non-mass produced goods, or both. This will add to the overall attraction of the market house to consumers and help to avoid a 'flea market' atmosphere.

McKeesport is suggested as the market house site for two reasons. The first is accessibility to a large population area. This is an important element to get products to the site and to attract a maximum number of customers. The second reason to locate in McKeesport is that the market house will require a very large building or buildings, which already exist along McKeesport's waterfront.

Coordinate any planned development projects that have the possibility of being impacted by the Mon-Fayette Expressway with the Pennsylvania Turnpike Commission (PTC).
By coordinating with PTC, they can see that new projects will be considered during the highway design process.

C. Education

Inform the public of the value of the resources of the Monongahela River Valley.
Publish a monthly newsletter discussing projects related to water quality monitoring, AMD reclamation projects, recreational activities, cultural activities, and areas of historical interest.

Initiate educational programs on floods and floodplain development which include "flood emergency response" educational materials and flood awareness seminars for residents and recreational river users.
Flood awareness and prevention seminars should be presented in different formats to local residents, land owners, and municipal figures.

The National Weather Service provides free flood awareness seminars for communities located along rivers and streams in western Pennsylvania. Arranging these seminars will help make people in flood-prone communities such as Point Marion, Greensboro, East Bethlehem, West Brownsville, Brownsville, California, Coal Center, and McKeesport more aware of this problem and alert them of proper procedures in flood emergencies. Other education initiatives and information sessions may be provided by FEMA, NOAA, and ACOE.

Promote an essay and/or photo contest throughout school districts within the Monongahela River corridor.
An essay or photo contest would focus on stewardship of the river. Contests could be for elementary and high school age students. Themes such as "My view of the river" and "How the river has affected my life" would be considered focusing attention on river conservation and stewardship. Prizes for elementary age students might include family passes to regional attractions such as river tours, history centers or science centers. Awards for high school students might include scholarships for continuing education.

Educate land owners and municipalities on the importance of riparian buffers.
Riparian buffers are vital to the natural process of filtering run-off and pollution and maintaining a healthy waterway. Therefore, educational courses, workshops, and literature should be distributed to local land owners and municipalities. Riparian buffers are more likely to be valued and encouraged once their crucial role in the ecosystem is understood.

Create and distribute an educational pamphlet describing the potential threat and actions to maintain, the zebra mussel and the Asian clam.

With the potential threat of the zebra mussels and Asian clam, public awareness need to be raised. An informational pamphlet discussing this species and the concerns surrounding it could possibly be distributed through PFBC in their fishing and boating handbooks. This would reach a great deal of the river based recreational users and provide them with the knowledge to properly remove the animals from the ballast of their boats so as not to accidentally aid in the distribution of the species, as well as other pertinent information.

Promote water quality improvements with an emphasis on economic benefits.

While a direct causal relationship between water quality and economic benefit cannot be accurately quantified, data relating to the economic importance of fishing and boating in Pennsylvania does demonstrate a connection. In 1996, direct trip and equipment revenues from fishing and boating activities totaled over $2 billion statewide (Frey, 1996). Economic benefits are complemented by improved water quality, increased water recreation, improved aesthetics, and more viable fish, bird, and mammal populations. Though costly, continued improvements in water quality directly and indirectly support the betterment of river resources, the recreational experience, and the economy.

Create a Monongahela River summer camp program.

There are more and more summer camps that relate to themes, such as space camps or science camps. This program would be geared toward elementary school children and would focus on the river and its environment. Students could stay on house boats for three days to a week, with each day focusing on different aspects of the Monongahela River. Educational activities would include environmental issues such as abandoned mines, aquatic life and forested riparian buffers; historic events such as the Whiskey Rebellion, Industrial Revolution, and the Battle of Homestead; navigation on the river; and the lock and dam systems.

Develop a River Environment Center to educate the public about the past and present conditions of the regions rivers.

This facility could be located at any of the Rivers of Steel landing sites and would focus on interpreting the natural environment of western Pennsylvania's rivers and the changes brought about in that environment by human actions. Topics for display could include abandoned mine drainage and its effects on aquatic systems; the historic impacts of industrial effluent on the rivers; flooding and its effects, including how flooding patterns can change when fill is placed within floodplains and how flood control dams have helped to regulate one of

the most severe flood risk areas in the United States; riparian forest buffers and how they function to protect water quality; subaquatic vegetation and its importance to the river ecosystem; the fish and other aquatic animals that inhabit the river; threatened and endangered species that occur in and along area waterways; and the impact of zebra mussels and other non-native species on the ecology of the river. It is possible that many of these items could be displayed through the use of a large aquarium that would recreate a river bottom habitat and use native fish and plant species. This would allow visitors to enjoy a glimpse of what occurs below the surface of the waterways on which they will be traveling.

Another possible method for accomplishing this would be to create an underwater riverwalk as part of the River Environment Center. Visitors could descend steps to enter a Plexiglas-walled, underwater room from which the river could be viewed. This would eliminate the need to recreate the river environment on land by placing visitors directly in the river. The underwater riverwalk also offers the advantage of being an all-season attraction since it would be completely enclosed and buffered from temperature extremes by the river itself.

D. Natural Resources

Develop a watershed database to coordinate conservation activities among governmental agencies, private organizations, and the general public.

As local and regional governments and communities become increasingly cognizant of the condition of their surface waters, the centralization of information and resources will become an effective vehicle for coordinating restoration and preservation efforts, pooling technical resources, conducting educational programs, and providing resource contacts and solutions for various problems related to watershed conservation.

SIHC would function as a resource center and or clearing-house for the archiving and distribution of water quality data and information. This option could be modeled after groups such as Pennsylvania Environmental Council's Allegheny Watershed Network which deals with issues such as public involvement, watershed economics, government roles, water quality, and aquatic ecosystems.

Establish a relationship with the Appalachian Clean Streams Initiative.

In cooperation with the EPA's Mine Drainage Program, the U.S. OSM signed an agreement in 1995 "for future cooperative efforts" to address AMD. The result was the Appalachian Clean Streams Initiative which specifically targets clean up efforts on streams affected by AMD.

By fostering coordination between all parties interested in correcting the problems associated with mine drainage, the initiative raises public awareness, targets streams and watersheds affected by AMD, educates about the application of the best available technology, supports efforts to mine and reclaim abandoned sites, and evaluates the status of ongoing efforts.

Initiate and complete Natural Heritage Inventories for Westmoreland, Fayette, and Greene Counties through Western Pennsylvania Conservancy.
By completing these inventories, all of the counties surrounding the Monongahela River will have an inventory of the unique and high diversity areas. This will help to define areas open for development without impacting these natural environments. It will also foster knowledge and appreciation of the existing resources. These inventories may also identify interesting areas to be used as educational classrooms.

Implement a volunteer trash removal or land stewardship program to clean and preserve the river corridor.
Unauthorized dumping and litter was observed throughout the study corridor. Although not a significant source of water pollution, it did represent a severe visual degradation. A simple, cost effective solution is to implement a program like the Youghiogheny River Sweep which is an annual, volunteer event to remove discarded debris. Another solution is to institute a river corridor steward program whereby property owners and interested conservation groups could adopt a river section, with the goal of managing cleanup efforts and conservation. Local municipalities and groups such as the Boy and Girl Scouts of America, or Rotary and Lions Clubs could be approached for their assistance.

Coordinate with PADEP's Bureau of Abandoned Mine Reclamation to identify "Problem Area" abandoned mine sites within the study corridor for reclamation and funding prioritization.
This option is needed to identify the location of priority sites within the study corridor and to accurately establish a reclamation hierarchy based upon the level of hazard at each site.

Investigate the potential for utilizing abandoned tipples and other structures as public fishing piers.
There are numerous abandoned industrial structures along Monongahela River that could be utilized as fishing piers. This would require investigating ownership, safety, and feasibility issues.

Develop fishing access at public parks.
This could be accomplished through utilizing existing structures or providing fishing piers and docking space. Fishing groups and municipalities could provide for potential partenerships.

Encourage citizen monitoring and reporting of industrial and residential effluent violations.
As described throughout this plan, water pollution (specifically effluent discharge) is managed by a complicated network of environmental agencies and regulations. Cumulatively, this framework attempts to provide protection from further degradation and continued improvements in water quality. Nonetheless, it is impossible for regulatory bodies to oversee every individual resident and industry within the study corridor. Citizen monitoring and policing is one of the most efficient, cost effective means of identifying environmental violations. In fact, a substantial amount of environmental legislation (including the Clean Water Act) contains provisions authorizing citizen suits against individual violators, as well as the DEP and EPA "for failure to perform a nondiscretionary duty" (Percival et al., 1996).

If implemented, this option could have a two pronged effect. First, residents within the study corridor would be assisting regulatory bodies in the identification of suspected violations. This heightened public awareness towards effluent violations would serve to deter future illegal discharges. Second, by taking an active role in the regulation of water pollution within their respective communities, citizens would be in a better position to lobby regulatory agencies to take a harder line towards violations.

Identify and remove abandoned barges along the river.
Identify organizations and potential funding sources, both public and private, that will remove abandon barges along the river. This program would eliminate visual blight, provide areas for additional development opportunities and provide for the opportunity of adaptive reuse of the barges.

Encourage existing water quality monitoring programs and regulatory agencies to implement monitoring strategies that use the recommendations and outline proposed by the ITFM.
Water quality monitoring on the Monongahela River has suffered from numerous problems as identified in the Water Resources section of this plan. These inadequacies are not unique to the Monongahela basin however. Numerous government agencies, researchers, and private organizations have become increasingly cognizant of the status and current trends in water quality monitoring throughout the U.S. The EPA itself has criticized the lack of goal directed monitoring and comparability of data.

This recommendation is derived from the ITFM's six year long review and evaluation of water quality monitoring activities nationwide. Many of the fundamental changes recommended by the ITFM were applicable to situations on the Monongahela. A complete copy of the ITFM's report is contained in Appendix K. A

summary of the recommendations include:

- Develop goal-oriented monitoring strategies and indicators
- Evaluate existing information gaps and establish priorities
- Establish flexible and comprehensive monitoring protocols
- Establish collaborative partnerships with government and private monitoring programs at all levels
- Appoint an advisory group to integrate water quality monitoring programs and effectively allocate resources
- Improve data comparability
- Facilitate the accessibility, validity, and usefulness of research data
- Improve assessment standards, interpretation, and analysis of data
- Routinely evaluate monitoring activities through QA/QC methods.

Encourage the preservation of the ecological and visual quality of the river corridor by planting a vegetative barrier along the river's edge where feasible.
Although riparian buffers generally require 100 feet of wooded area to work effectively, they provide aesthetic value as well. Therefore, the areas that already have a riparian buffer should be maintained and protected. New developments along the river should consider the addition of a smaller scale vegetative buffer to give the appearance that the river is still completely forested. Mitigation requirements for developments along waterways should include riparian buffers as a basic course of action. In addition, trails or small openings in these corridors can be made to permit river access without reducing the buffers' function.

Identify or create a regional land trust to preserve and protect sensitive ecological habitats or historical properties.
A land trust is a non-profit organization whose primary purpose is the conservation and preservation of open space, park lands or natural areas for public benefit. Although industrial land use occupies significant portions of the study corridor, undeveloped areas do exist, especially along the upper Monongahela. Land trusts within the Monongahela River corridor, such as the Allegheny Land Trust, provide a vehicle for acquiring undeveloped land with the goal of maintaining forested viewsheds and conserving riparian zones along the river. A regional land trust would also afford the opportunity to preserve sensitive historic features and reuse them as interpretive areas.

There is a Land Trust Grant Program through DCNR's Keystone Recreation, Park and Conservation Fund that allows for 50% matching funds for the acquisition and management of land trust projects. In order to receive this grant, a land trust organization must be prequalified through DCNR. To

prequalify for Keystone Funding, a land trust must fill out a prequalification form; be tax exempt under section 501(c)(3) of the Internal Revenue Code of 1986; be registered with Bureau of Charitable Organizations, PA Department of State; and be in existence for at least 5 consecutive years.

Coordinate with local officials and private industry to enforce stormwater management regulations and erosion control methods.
Due to the urban character of the study corridor, water pollution via overland flows is a significant concern. Sparsely vegetated, impervious lands adjacent to the river prohibit effective filtering of runoff pollutants.

One effective solution is the conservation or reestablishment of riparian buffer zones. The benefits of riparian buffers as filters for surface runoff pollutants and streambank stabilization is widely accepted. In addition, riparian buffers enhance in-stream habitat by providing cooler, shaded river margins and introducing detrital material as a source of organic nutrients.

Enforce deficient municipalities to establish compliance with existing sewage treatment regulations by preparing and updating formal Act 537 sewage facilities plans and prioritizing construction of sewage treatment facilities and/or sewer line extensions in unserviced areas.
Untreated and undertreated sewage effluent was a growing concern throughout the southern regions of the study corridor. Many small communities in these rural areas simply cannot afford the development and implementation of these plans. However, the development of a treatment plan is the first step towards regulatory compliance.

Funding is available through grants and reimbursements from PADEP. In addition, municipalities with official plans, as well as private landowners, may be eligible for funds through programs such as the Pennsylvania Infrastructure Investment Authority (PIIA) established by ACT 16. PIIA provides funding for community construction of new or upgraded water and sewer systems.

E. Planning and Zoning

Coordinate with other River Conservation Plans within the vicinity.
Coordination between river conservation plans can lead to increased support, funding sources, and public awareness. Joining efforts with existing plans at Dunkard Creek, Brownsville, Youghiogheny River, Nine Mile

Run, and the City of Pittsburgh can lead to more successful, common goals. Any groups that complete River Conservation Plans along the study corridor in the future should also be included.

Work with municipalities to promote more aggressive enforcement of zoning.
Only with a well-administered zoning enforcement program can a zoning ordinance perform efficiently. Strong enforcement procedures will obtain an optimum in compliance, the true objective of the ordinance, while minimizing money spent on law suits, or pursuing violators (Pennsylvania Department of Community and Economic Development, 1995).

With the proper enforcement of a well-prepared zoning ordinance, steep slopes, wetlands and floodplains can be protected as green space, commercial and residential developments can be accommodated, and abandoned or underused industrial sites can be revitalized.

Use zoning regulations to restrict building in floodplains.
Zoning regulations are a tool by which municipalities along the river can control the improper development of floodplains. Although development may take place in floodplains, it is important to set guidelines in harmony with FEMA and the ACOE for sensible development.

Reconnect zoning and planning.
Due to the economic status of many corridor communities, zoning and planning often do not work in concert as they should. Zoning ordinances are frequently changed to accommodate developers and businesses which conflict with published future land use plans. This pattern has left many municipalities with zoning ordinances which do not consider future regional plans or trends. Zoning and planning are closely related topics and should be developed and amended in conjunction. New developments within the study corridor should adhere to a municipality's future land use plan, or to the future land use plan of the appropriate county.

Have municipalities that do not adopt zoning develop an Official Map.
For communities that do not wish to implement zoning, an official map can be used as a basis to designate land for future public use, but with less enforceable power than a zoning ordinance. Municipalities wishing to adopt an official map should follow the guidelines prescribed in Article IV of the Pennsylvania Municipalities Planning Code. Developing an official map as a land use technique can enhance planning by aiding local municipalities in highlighting development opportunities, planning for the overall use of the riverfront, planning for the land acquisitions, and identifying significant cultural and environmental resources for enhancements. Due to the intent of the riverfront overlay district, there

would be little liability and enforcement issues normally associated with typical zoning.

Develop Multi-Municipal Comprehensive Plans for river communities.
Comprehensive plans provide an information base that can be used as a tool for guiding future development and land use. Relevant issues such as housing, land use, economic development, community facilities and services, transportation and recreational amenities are typically reviewed to formulate future plans. Multi-municipal comprehensive plans lay the groundwork for regional development strategies. In recent years, the Pennsylvania Department of Community and Economic Development has actively supported regional comprehensive plans which combine multi-municipal resources.

Create a Special Overlay District for municipalities along the river.
Municipalities with zoning ordinances should consider creating a river front recreation overlay district to rethink land use along the river. Several municipalities lack recreational access to the river as well as zoning that would permit this type of land use. The overlay district's intent should be to encourage economic development and the conservation and preservation of historic, natural, and recreational resources. An overlay district would allow river-related economic development to occur on land that has the physical features that can support development, avoiding steep slopes, prime agricultural soils, floodplains, slide prone areas, and watercourses. The overlay district concept should be applied to the standards of the primary zoning district of the municipality. Communities that do not have zoning may wish to consider adopting the special overlay district standards as part of an Official Map.

F. Recreation

Develop a cooperative process with the Port of Pittsburgh to address potential conflicts and safety issues between commercial shipping and recreation interests.
Establish a cooperative process detailing how conflicts will be addressed between recreational and commercial development interests. Acknowledging the importance of both recreational and commercial development interests and resolving conflicts that arise is necessary in order to take full advantage of opportunities along the river. SIHC and the Port of Pittsburgh should jointly establish procedures to address these issues.

For example, the Port of Pittsburgh should be involved early in the Rivers of Steel landing site planning process to help identify and resolve potential issues.

Other examples related to river safety may include the addition of no wake zones or speed limit restrictions for both recreational and commercial users of the river.

Foster partnerships and agreements with private marinas to provide Rivers of Steel tour boat access.
Public access ramps do not provide a docking area for large tour boats. The majority of the facilities able to house a tour boat along the Monongahela River are private marinas. McKee's Point Park, Greene Cove Yacht Club, the Beach Club Marina and the Two Rivers Marina along with several others could provide such a service.

Develop and maintain proposed recreational facilities along the river.
Numerous proposals exist for new recreational facilities along the river, including the Charleroi Promenade and Tower, the new Pechins marina in Fredericktown, McKee's Point Park, McKeesport Master Site Plan for a Linear Park, Luzerne Township boat dock, Donora riverfront park & boat ramp, Monessen boat ramp, Nine Mile Run Project, Brownsville Marina, Brownsville wharf, and Sandcastle boat ramp. Completing and maintaining these projects will greatly enhance public access to the river and its shoreline.

Renovate and maintain the Glassport Community Park.
This park was built and completed in 1986 with the cooperation of the Twin Rivers Council of Government. Shortly after, the area was severely vandalized and is no long open to the public. Renovating this property for its intended use would also allow for the Steel Industry Heritage Trail to use the park as a resting area, picnic area, or interpretive stop.

Ensure the continued operation of the Fredericktown Ferry by improving the operation, maintenance and equipment.
This is the last cable drawn operating ferry in the eastern United States. Its place in history as a unique form of transportation could be added into the Rivers of Steel tours by utilizing it as an interpretive stop or by landing at the proposed Luzerne Township Boat Ramp and ferrying the tourists to the Fredericktown side of the river. According to the Port of Pittsburgh, funding for the reuse and establishment of old ferry sites is available through the Inter-Modal Surface Transportation Efficiency Act (ISTEA). The Port of Pittsburgh indicated a willingness to assist in acquiring these funds for use at ferry sites.

Foster the relationship between Rivers of Steel Heritage Area and the National Road Heritage Park at Brownsville.
This would link two heritage area initiatives and encourage crossover travel between visitors to each. Possibilities here might include covered wagon tours of the former National Road route or tours of the historic bridges along the National Road. It may even be possible to connect the two heritage areas as they were historically traveled by pioneers. This could be accomplished by a tour of the National Road route ending in Brownsville (known as Redstone Old Fort during the period of

construction of the National Road), then boarding a boat designed to resemble an early 1800s craft for a tour down the Monongahela River. A trip of this sort would allow visitors to see one of the main routes of western migration in the early United States and, in some cases, to retrace the steps of their ancestors who traveled this route.

Partner with the PFBC Water Trails Initiative. This program includes creating a state wide network of water trails to enhance the recreational experiences of the region while attracting tourism. The Rivers of Steel Tours will be eligible for additional funding, while inviting tourism into the area through state wide promotion of the program. The Water Trails Initiative can provide funding for signage, mapping and other associated tasks. This is a new program which will allow for the adaptation of the program to fit the needs of the grantee.

Participate in the nomination of the Monongahela River as a Modified Recreational River on the Pennsylvania Scenic Rivers Inventory.
This designation provides for the protection and conservation of river resources, as well as potential funding for projects. The proposed designation of the Monongahela River as a Modified Recreational River on the Pennsylvania Scenic Rivers Inventory requires a non-profit organization to nominate the river for this designation after the Rivers Conservation Plan is completed and approved by DCNR. The criteria for this designation are currently being reevaluated by DCNR and at the time of contact the department will present the new criteria.

Develop and maintain new public boat ramps in West Homestead, Clairton, Masontown, and Greensboro that comply with safety and accessibility standards.
Too few boat launches are currently available within the study corridor. By building additional accesses, more boaters will have the opportunity to use the river, and have shorter drive times to those accesses. These communities were chosen based upon location along the river, proximity to an existing ramp, and population numbers. The PFBC provide for a grant specifically focused on boat ramps. This grant provides for the investigation, creation, and construction of the ramps. Most ramps are then turned over to the municipalities for service and maintenance.

Emphasize water quality improvements consistent with sportfishing programs such as the PFBC's "Pittsburgh Pool" Hybrid Striped Bass Management Program.
Efforts toward improving water quality have helped the Monongahela's sport fishery rebound. In addition to managing naturally reproducing populations of warm water fishes, PFBC manages stocking plans for walleye, tiger muskellunge, and hybrid striped bass throughout the river. As a key interest river conservation, SIHC is

in a position to solicit continued participation in water quality improvements and support for such programs. This will attract more recreational use of the river and additional revenues from resident and out-of-state anglers.

Directional and interpretive signs should be included along the entire trail system.
This would consist of three types of signs, one set directing trail users to important locations within the local communities and another identifying the landing sites and other major attractions of the Rivers of Steel Heritage Area. For example, a biker on the Steel Heritage trail, upon entering Glassport from the south, would see one information display showing locations within Glassport which might be of interest and are bike/pedestrian accessible (i.e. parks, historic sites, churches, restaurants, or bike shops). A second information display would show the distance to the Rivers of Steel landing at McKeesport and the facilities (i.e. boat launch, marina, park, and market house) contained there. The second information display would also show the rest of the Rivers of Steel landings and the highlights of the facilities contained at each. The third category, interpretive signs would indicate significant sites, such as the approximate location where Braddock's troops crossed the Monongahela River enroute to their battle with the French or the importance of the Blainsburg Floodplain as an ecological resource, identifying plant and animal species which occur there.

By using this approach to informational signing, SIHC will enhance the trail experience for users and enable them to maximize their enjoyment during a given trip. In addition, this approach will allow trail users to venture off of the main trail and travel into the communities along it, enjoying what these towns have to offer and contributing to their local economy. It will also encourage trail users to plan future trips to the Rivers of Steel Heritage Area by making them aware of the resources which lie along the trail and the river.

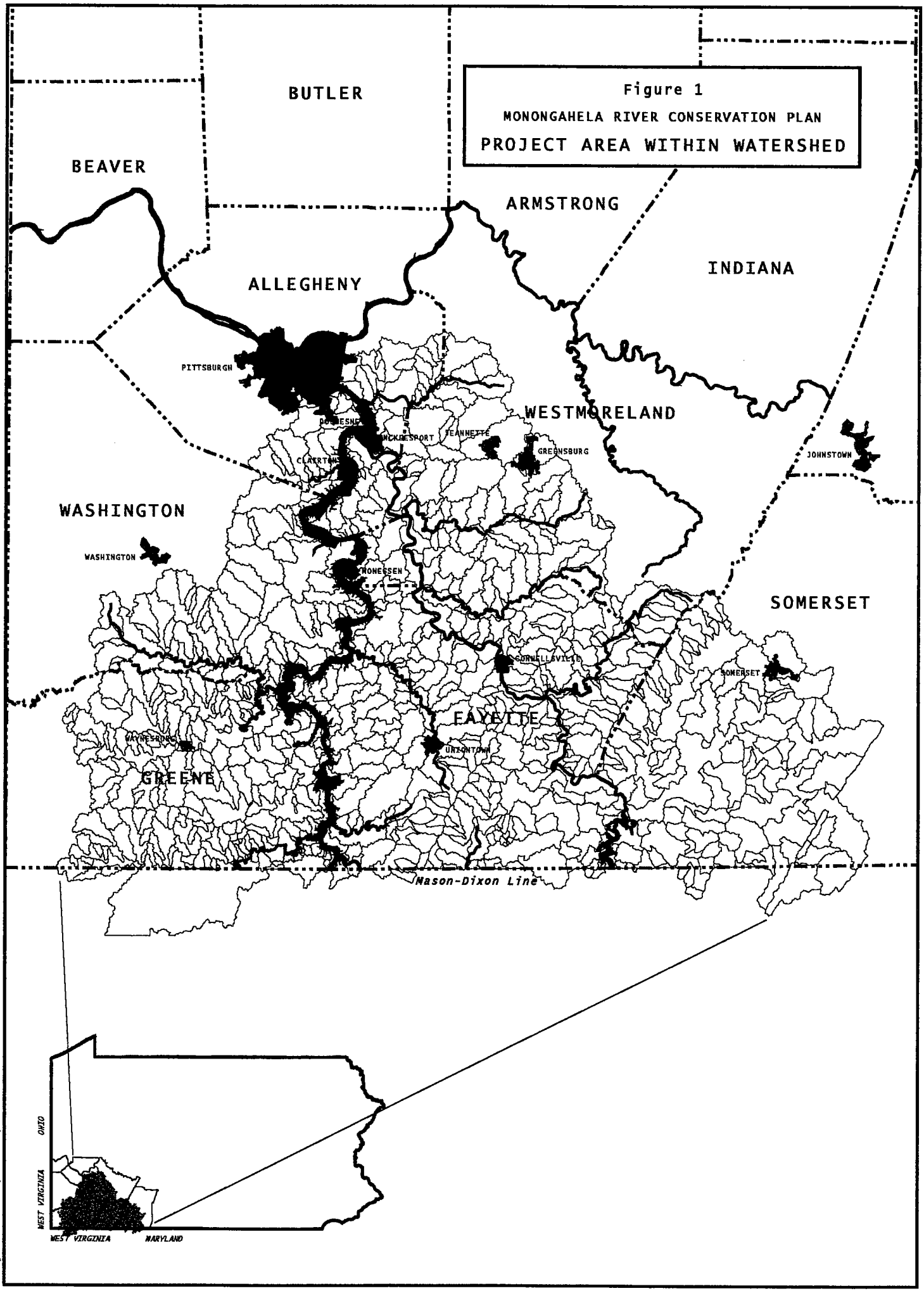
Investigate and acquire abandoned railroad right-of-ways for new recreational trails and connections between existing or proposed trails, and investigate the possibility of rail-with-trail connections.
This would allow for the connection of the Monongahela Valley with other regions of the state such as the Youghiogheny River Valley and would provide for additional access into the valley for visitors. This allows for the reuse of abandoned rail lines, the potential for new economic development, the attraction of visitors and tourists into the area, and an increase in the quality of life for people living along; and using, the trails. By connecting to the Youghiogheny River Trail, the potential exists for the 200,000 people a year that use the Youghiogheny River Trail to continue into the Monongahela

Valley, bringing increased revenue and tourism.

Investigate the possibility of creating trails through industrial settings as a unique experience for visitors.
Creating trails through industrial settings will provide users with an opportunity to look at industrial operations. This type of trail would provide an alternative to the typical environment of recreational trails and present the riverfront from a different perspective. It may also provide opportunities or solutions for conflicts that arise between commercial development opportunities and recreational use.

Develop and maintain a Mon River Trail. Conduct an alignment study and construction need assessment for the Mon River Trail to determine an exact alignment (or identify alternatives) and determine the cost of developing the trail.
By completing a Mon River Trail, the study corridor communities and the Rivers of Steel area would have increased accessibility to a variety of recreational users. It would also allow for people from Pittsburgh and other major population centers along the river to travel the trail and visit other study corridor communities, bringing in new development and new revenue.

FIGURES



Project Area (1 of 1)

MONONGAHELA RIVER CONSERVATION PLAN

Allegheny, Fayette, Greene, Washington and Westmoreland Counties, Pennsylvania

Prepared for the

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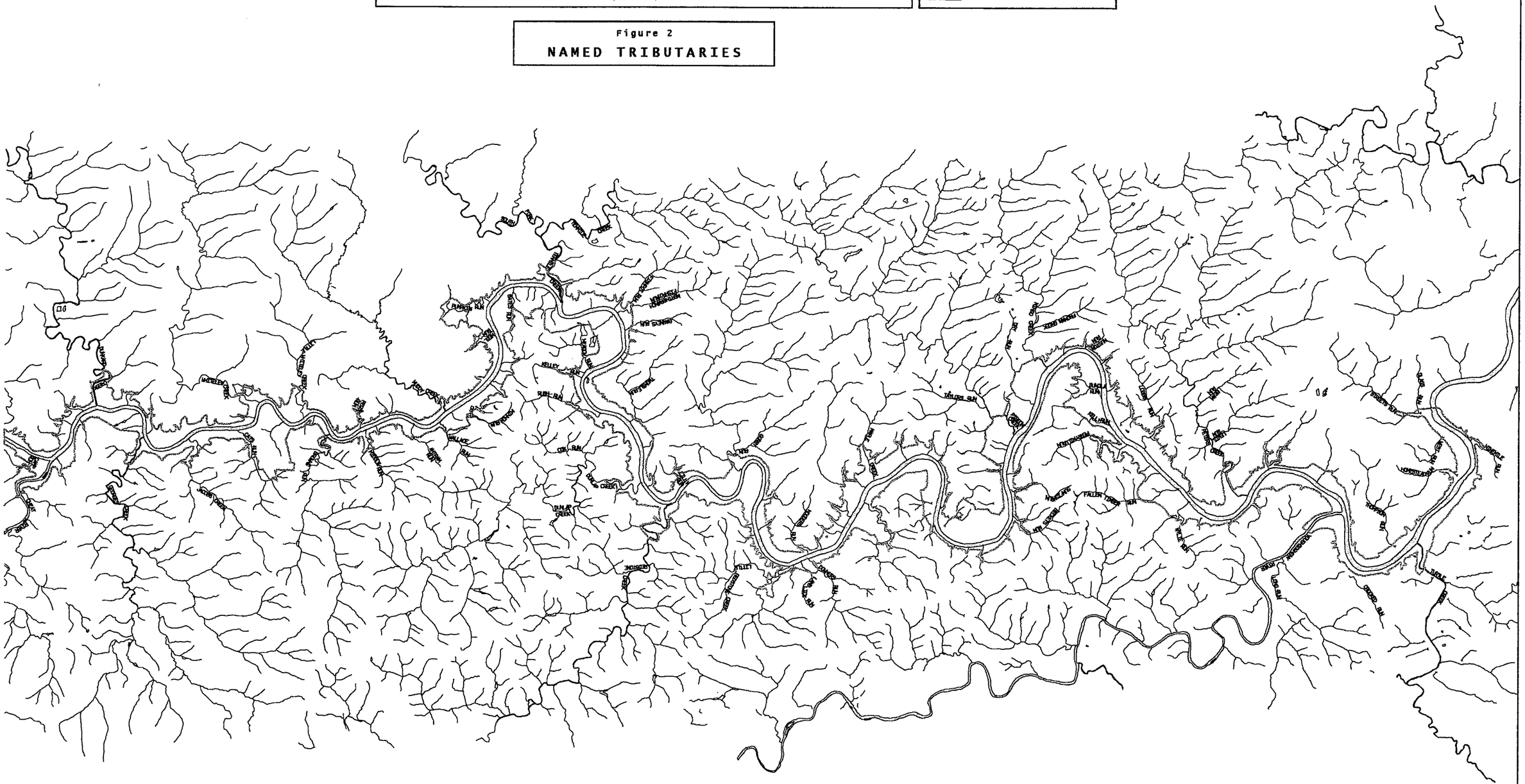
RESOURCE FEATURES MAPPING

September, 1998

Mackin

Figure 2

NAMED TRIBUTARIES



Named Tributaries (1 of 1)

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RESOURCE FEATURES MAPPING

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Figure 3

EXISTING LAND USE

- Residential
- Commercial
- Industrial
- Institutional
- Agricultural
- Open Space
- Public/Open Space
- Public/Restricted
- River Terminal
- Major Employer
- Major Road
- Local Road
- Railroad
- Municipal Boundary
- County Boundary
- Study Corridor

1 .5 0 1 2 3

Scale in Miles

Mackin

DUNKARD

JEFFERSON

JEFFERSON

CLARKSVILLE

CUMBERLAND

CARMICHAELS

MONONGAHELA

NICHOLSON

SPRINGHILL

GERMAN

LUZERNE

REDSTONE

MASONTOWN

Existing Land Use (1 of 3)

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1 .5 0 1 2 3

Scale in Miles

Mackin

CLAIRSVILLE
DEEMSTON
EAST BETHLEHEM
CENTERVILLE
LUZERNE
CALIFORNIA
BENTLEYVILLE
FALLOWFIELD
CARROLL
UNION
FORWARD
BROWNSVILLE
LONG BRANCH
TWILIGHT
ALLENPORT
JEFFERSON
WASHINGTON
REDSTONE
ROSTRAVER
SUTTERSVILLE

Existing Land Use (2 of 3)

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1 .5 0 1 2 3

Scale in Miles

Mackin

FINLEYVILLE
SOUTH PARK
UNION
JEFFERSON
FORWARD
WEST MIFFLIN
BRENTWOOD
MT OLIVER
PITTSBURGH
RESERVE
MILLVALE
SHALER
ETNA
SHARPSBURG
O'HARA
ASPINWALL
FOX CHAPEL
WILKINSBURG
EDGEWOOD
EDGEWOOD
BRADDOCK HILLS
FOREST HILLS
CHURCHILL
PENN HILLS
WILKINS
TURTLE CREEK
WILMERDING
EAST MCKEESPORT
MONROEVILLE
WALL
BLAWNOX
NORTH BRADDOCK
WEST MIFFLIN
EGLOWN
GLASSPORT
LIBERTY
LINCOLN
ELIZABETH
VERSAILLES
NORTH VERSAILLES
WHITE OAK
SOUTH VERSAILLES
SUTERSVILLE

Existing Land Use (3 of 3)

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Figure 4

LAND RESOURCES

- Prime Agricultural Soil
- 100-Year Floodplain
- Wetland
- Important Habitat
- ACOE Disposal Site
- Hazardous Waste Site
- Pennsylvania Act 2 Site
- Major Road
- Local Road
- Railroad
- Municipal Boundary
- County Boundary
- Study Corridor
- River Mile Marker

1 .5 0 1 2 3

Scale in Miles

Mackin

DUNKARD

JEFFERSON

JEFFERSON

CLARKSVILLE

EAST

CUMBERLAND

CARMICHAELS

MONONGAHELA

MONTOWN

LUZERNE

NICHOLSON

GERMAN

SPRINGHILL

REDSTONE

Land Resources (1 of 3)

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ALLENPORT
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WEST HOMESTEAD
HOMESTEAD
MUNHALL
DUQUESNE
GLASSPORT
FORWARD
ELIZABETH
LIBERTY
LINCOLN
VERSAILLES
NORTH VERSAILLES
EAST McKEESPORT
WILMERDING
WHITE OAK
SOUTH VERSAILLES
SUTTERSVILLE
WALL
MONROEVILLE
TURTLE CREEK
WILKINS
EAST PITTSBURGH
WALFANT
CHURCHILL
FOREST HILLS
NORTH BRADDOCK
BRADDOCK HILLS
WILKINSBURG
PENN HILLS
SHARPSBURG
O'HARA
ASPINWALL
FOX CHAPEL
BLAWNOX

Land Resources (3 of 3)

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RESOURCE FEATURES MAPPING

September, 1998

Figure 5

WATER & SEWER SERVICE

- Water Service Area
- Sewer Service Area
- Water Intake
- Major Road
- Railroad
- Municipal Boundary
- County Boundary
- Study Corridor
- River Mile Marker

1 .5 0 1 2 3

Scale in Miles

Mackin

DUNKARD

MONONGAHELA

CUMBERLAND

JEFFERSON

JEFFERSON

CLARKSVILLE

EAST

RICES LANDING

CARMICHAELS

NICHOLSON

SPRINGHILL

GERMAN

LUZERNE

REDSTONE

Water & Sewer Service (1 of 2)

MONONGAHELA RIVER CONSERVATION PLAN

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Scale in Miles

Mackin

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BROWNSVILLE
LONG BRANCH
TWILIGHT
MONESSEN
DUNLEVY
ALLENPORT
FAYETTE CITY
SPEERS
DONORA
FORWARD
REDSTONE
JEFFERSON
WASHINGTON
ROSTRAVER
SPERSVILLE

Water & Sewer Service (2 of 3)

MONONGAHELA RIVER CONSERVATION PLAN

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- County Boundary
- Study Corridor
- River Mile Marker

1 .5 0 1 2 3

Scale in Miles

Mackin

FINLEYVILLE
SOUTH PARK
UNION
JEFFERSON
FORWARD
WEST MIFFLIN
BRENTWOOD
MT OLIVER
PITTSBURGH
BALDWIN
WEST OVERTON
HOMESTEAD
MUNHALL
WHITAKER
SWISSVALE
EDGEWOOD
WILKINSBURG
RESERVE
MILLVALE
SHALER
ETNA
SHARPSBURG
O'HARA
ASPINWALL
FOX CHAPEL
WEST ELIZABETH
ELIZABETH
CLAIRTON
GLASSPORT
PORT VUE
LIBERTY
LINCOLN
DRAVOSBURG
DUQUESNE
NORTH BRADDOCK
BRADDOCK
BRADDOCK HILLS
FOREST HILLS
CHURCHILL
CHALFANT
WILKINS
PENN HILLS
MCKEESPORT
VERSAILLES
NORTH VERSAILLES
TURTLE CREEK
WILMERDING
EAST MCKEESPORT
MONROEVILLE
WALL
WHITE OAK
SOUTH VERSAILLES
SUTERSVILLE
BLAWNOX

Water & Sewer Service (3 of 3)

MONONGAHELA RIVER CONSERVATION PLAN

Allegheny, Fayette, Greene, Washington and Westmoreland Counties, Pennsylvania

Prepared for the

STEEL INDUSTRY HERITAGE CORPORATION

RESOURCE FEATURES MAPPING

September, 1998

Figure 6

RECREATIONAL RESOURCES

- State Gameland
- Park
- Golf Course
- Boat Ramp
- Marina
- Existing Trails
- Proposed Trails
- Major Road
- Local Road
- Railroad
- Municipal Boundary
- County Boundary
- Study Corridor
- River Mile Marker

1 .5 0 1 2 3

Scale in Miles

Mackin

DUNKARD

CUMBERLAND

JEFFERSON

JEFFERSON

CLARKSVILLE

EAST

CARMICHAELS

MONONGAHELA

MASONTOWN

LUZERNE

NICHOLSON

GERMAN

SPRINGHILL

REDSTONE

Warrior Trail

Catawba Trail

Greensboro Rivertalk

Sheepskin Trail

Recreational Resources (1 of 3)

MONONGAHELA RIVER CONSERVATION PLAN

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- River Mile Marker

1 .5 0 1 2 3

Scale in Miles

Mackin

CLARKSVILLE
DEEMSTON
EAST BETHLEHEM
CENTERVILLE
LUZERNE
BENTLEYVILLE
FALLOWFIELD
CARROLL
NEW EAGLE
UNION
FI
FORWARD
CALIFORNIA
BROWNSVILLE
LONG BRANCH
TWILIGHT
MONESSEN
DUNLEVY
ALLENPORT
STOCKDALE
JEFFERSON
REDSTONE
WASHINGTON
ROSTRAVER
PETERSVILLE

Yaughiogheny River Trail (North)

Recreational Resources (2 of 3)

MONONGAHELA RIVER CONSERVATION PLAN

Allegheny, Fayette, Greene, Washington and Westmoreland Counties, Pennsylvania

Prepared for the

STEEL INDUSTRY HERITAGE CORPORATION

RESOURCE FEATURES MAPPING

September, 1998

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- River Mile Marker

1 .5 0 1 2 3

Scale in Miles

Mackin

FINLEYVILLE
SOUTH PARK
Montour Trail
UNION
JEFFERSON
MT OLIVER
BRENTWOOD
Three Rivers Heritage Trail
PITTSBURGH
RESERVE
MILLVALE
SHALER
ETNA
SHARPSBURG
O'HARA
ASPINWALL
FOX CHAPEL
WILKINSBURG
BLAWNOX
FORWARD
WEST ELIZABETH
GLASSPORT
PORT VUE
LIBERTY
LINCOLN
ELIZABETH
VERSAILLES
NORTH VERSAILLES
WEST MIFFLIN
BALDWIN
WEST HOMESTEAD
HOMESTEAD
MUNHALL
WHITAKER
RANKIN
BRADDOCK
BRADDOCK HILLS
NORTH BRADDOCK
FOREST HILLS
CHURCHILL
WILKINS
PENN HILLS
TURTLE CREEK
WILMERDING
EAST MCKEESPORT
MONROEVILLE
WALL
WHITE OAK
SOUTH VERSAILLES
GOLDSVILLE
Youghiogheny River Trail (North)

Recreational Resources (3 of 3)

MONONGAHELA RIVER CONSERVATION PLAN

Allegheny, Fayette, Greene, Washington and Westmoreland Counties, Pennsylvania

Prepared for the

STEEL INDUSTRY HERITAGE CORPORATION

RESOURCE FEATURES MAPPING

September, 1998

Figure 7

CULTURAL RESOURCES

- Historic Site
- Attraction
- Active Ferry Location
- Former Ferry Location
- National Road
- Major Road
- Local Road
- Railroad
- Municipal Boundary
- County Boundary
- Study Corridor
- River Mile Marker

1 .5 0 1 2 3

Scale in Miles

Mackin

DUNKARD

CUMBERLAND

JEFFERSON

JEFFERSON

CLARKSVILLE

RICES LANDING

CARMICHAELS

MONONGAHELA

MASONTOWN

NICHOLSON

SPRINGHILL

GERMAN

LUZERNE

REDSTONE

Cultural Resources (1 of 3)

MONONGAHELA RIVER CONSERVATION PLAN

Allegheny, Fayette, Greene, Washington and Westmoreland Counties, Pennsylvania

Prepared for the

STEEL INDUSTRY HERITAGE CORPORATION

RESOURCE FEATURES MAPPING

September, 1998

Figure 7

CULTURAL RESOURCES

- Historic Site
- Attraction
- Active Ferry Location
- Former Ferry Location
- National Road
- Major Road
- Local Road
- Railroad
- Municipal Boundary
- County Boundary
- Study Corridor
- River Mile Marker

1 .5 0 1 2 3

Scale in Miles

Mackin

CLARKSVILLE
DEEMSTON
EAST BETHLEHEM
CENTERVILLE
LUZERNE
BENTLEYVILLE
FALLOWFIELD
CARROLL
NEW EAGLE
UNION
FORWARD
CALIFORNIA
COAL CENTER
NEWELL
LONG BRANCH
TWILIGHT
NORTH CHARLEROI
CHARLEROI
MONESSEN
BROWNSVILLE
STOCKDALE
ALLENPORT
DUNKEVY
FAYETTE CITY
JEFFERSON
REDSTONE
WASHINGTON
ROSTRAVER
PERRYOPOLIS

Cultural Resources (2 of 3)

MONONGAHELA RIVER CONSERVATION PLAN

Allegheny, Fayette, Greene, Washington and Westmoreland Counties, Pennsylvania

Prepared for the

STEEL INDUSTRY HERITAGE CORPORATION

RESOURCE FEATURES MAPPING

September, 1998

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Scale in Miles

Mackin

FINLEYVILLE
SOUTH PARK
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MONROEVILLE
TURTLE CREEK
WILKINS
PENN HILLS
WEST MIFFLIN
GLASSPORT
LIBERTY
DUQUESNE
WEST HOMESTEAD
HOMESTEAD
MUNHALL
WEST MIFFLIN
WEST ELIZABETH
CLAIRTON
BRENTWOOD
MT OLIVER
PITTSBURGH
BALDWIN
WHITEHALL
CARNEGIE
RANKIN
BRADDOCK
BRADDOCK HILLS
NORTH BRADDOCK
WILKINSBURG
FOREST HILLS
CHURCHILL
EDGEWOOD
RESERVE
MILLVALE
SHALER
ETNA
SHARPSBURG
O'HARA
ASPINWALL
FOX CHAPEL
BLAWNOX

Cultural Resources (3 of 3)

APPENDIX A: List of Acronyms

ACOE	United States Army Corps of Engineers
AMD	Abandoned Mine Drainage
ARC	Allegheny Recovery Corporation
ATA	Allegheny Trail Alliance
CDC	Community Development Corporation
CERCLA	Comprehensive Environmental Response, Cleanup, and Liability Act of 1980
CMU	Carnegie Mellon University
COG	Council of Governments
CWS	Cold Water Fishery
DCED	Pennsylvania Department of Community and Economic Development
DCNR	Pennsylvania Department of Conservation and Natural Resources
DWL	Degraded Watershed List
EPA	United States Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FPMS	Floodplain Management Services
HEArt	Human Equity through Art
HQ-CWF	High Quality Cold Water Fishery
HPP	Heritage Park Program
ISRP	Industrial Site Reuse Program
ITFM	Intergovernmental Task Force on Monitoring Water Quality
LYRC	Lower Youghiogheny River Council
NAWQA	National Water Quality Assessment
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	Nonpoint Pollution Source
NWI	National Wetlands Inventory
NWS	National Weather Service
ORSANCO	Ohio River Valley Water Sanitation Commission
OSM	United States Office of Surface Mining
PAC	Polycyclic Aromatic Hydrocarbon
PADEP	Pennsylvania Department of Environmental Protection
PADER	Pennsylvania Department of Environmental Resources
PCB	Polychlorinated Biphenyl
PCS	Permit Compliance System
PEDFA	Pennsylvania Economic Development Financing Authority
PennDOT	Pennsylvania Department of Transportation
PFBC	Pennsylvania Fish and Boat Commission
PGC	Pennsylvania Game Commission
PHMC	Pennsylvania Historic and Museum Commission
PIDA	Pennsylvania Industrial Development Authority
PITA	Planning, Implementation, and Technical Assistance
PNDI	Pennsylvania Natural Diversity Index
PTC	Pennsylvania Turnpike Commission

PWC	Personal Watercraft
PWS	Potable Water Supply
RCRA	Resource Conservation and Recovery Act
RIDC	Regional Industrial Development Corporation
SARA	Superfund Amendments and Reauthorization Act of 1986
SCPAP	Small Communities Planning Assistance Program
SEIS	Supplemental Environmental Impact Statement
SIHC	Steel Industry Heritage Corporation
SMCRA	Pennsylvania Surface Mining, Conservation and Reclamation Act
SPAG	Small Planning Assistance Grant
SPRPC	Southwestern Pennsylvania Regional Planning Commission
SGL	State Game Lands
TEA21	Transportation Equality Act for the 21st Century
TMDL	Total Maximum Daily Loadings
TRI	Toxic Release Inventory
TSF	Trout Stocked Fishery
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USNPS	United States National Park Service
VOC	Volatile Organic Compound
WPC	Western Pennsylvania Conservancy
WPCAMR	Western Pennsylvania Coalition for Abandoned Mine Reclamation
WQN	Water Quality Network
WWF	Warm Water Fishery

APPENDIX B: Population and Economic Characteristics

Appendix B
Population and Economic Characteristics

1990 POPULATION AND ECONOMIC CHARACTERISTICS

	POPULATION DISTRIBUTION				ECONOMIC STATISTICS		
	Total Population	Percent of Population <18	Percent of Population 18 - 64	Percent of Population 64 +	Median Household Income	Percent of Population Below Poverty Level	Percent of Population Unemployed
Westmoreland County	*370,321*	*22.4*	*60.5*	*17.1*	*25,736*	*11.1*	*7.1*
North Belle Vernon Borough	2,084	18.6	53.3	28.1	19,957	7.9	13.4
Rostraver Township	11,224	22.5	61.5	15.8	25,615	10.8	11.8
Monessen City of	9,806	17.1	53.1	29.8	18,131	18.3	17.5
AVERAGE OF RIVER COMMUNITIES	**23,114**	**19.8**	**57.2**	**23.0**	**N/A**	**13.7**	**14.0**

	Total Population	Percent of Population <18	Percent of Population 18 - 64	Percent of Population 64 +	Median Household Income	Percent of Population Below Poverty Level	Percent of Population Unemployed
Allegheny County	*1,336,449*	*21.1*	*61.5*	*17.4*	28,136	11.5	6.3
Forward Township	3,871	20.0	62.6	17.4	29,115	10.7	5.7
Elizabeth Borough	1,595	19.3	55.7	25.0	21,888	13.7	5.7
Elizabeth Township	14,694	22.0	61.3	16.6	30,542	8.1	7.2
West Elizabeth Borough	649	22.6	59.5	18.0	24,375	15.7	10.6
Clairton City of	9,656	21.3	55.7	23.0	17,396	22.3	12.1
Lincoln Borough	1,187	20.9	61.7	17.4	26,950	9.0	8.8
West Mifflin Borough	23,644	20.0	60.1	19.9	26,867	10.0	7.4
Glassport Borough	5,582	20.2	57.6	22.2	20,146	15.9	10.3
Jefferson Borough	9,533	22.8	63.0	14.4	34,548	5.5	4.8
Dravosburg Borough	2,377	18.6	60.4	23.0	22,886	7.9	7.6
McKeesport City of	26,016	22.4	54.4	23.2	16,427	24.2	13.7
Port View Borough	4,641	20.0	59.0	21.0	24,976	9.5	11.0
Duquesne City of	8,525	24.5	52.7	22.8	15,801	25.5	14.7
North Versailles Township	12,308	20.3	61.3	18.5	25,130	9.1	7.1
East Pittsburgh Borough	2,160	21.0	56.6	22.4	16,150	21.8	11.7
Braddock Borough	4,682	22.9	55.4	21.7	17,340	20.6	12.1
North Braddock Borough	7,036	22.2	57.6	20.2	18,550	21.3	9.9
Rankin Borough	2,503	29.0	50.4	20.6	10,872	40.7	14.6
Whitaker Borough	1,416	19.8	58.5	21.6	32,571	10.4	7.2
Munhall Borough	13,158	19.3	56.2	24.4	32,883	6.4	5.7
Homestead Borough	4,179	21.1	55.5	23.4	11,390	31.6	11.3
Swissvale Borough	10,637	18.1	61.7	20.6	23,773	12.5	6.6
West Homestead	2,493	16.4	62.7	20.9	22,298	16.8	8.0
Pittsburgh City of	369,879	19.8	62.2	17.9	20,747	21.4	9.1
AVERAGE OF RIVER COMMUNITIES	**542,421**	**20.3**	**60.7**	**19.0**	**N/A**	**18.7**	**9.6**

Source: 1990 US Census

Appendix B
Population and Economic Characteristics

1990 POPULATION AND ECONOMIC CHARACTERISTICS

	POPULATION DISTRIBUTION				ECONOMIC STATISTICS		
	Total Population	Percent of Population <18	Percent of Population 18 - 64	Percent of Population 64 +	Median Household Income	Percent of Population Below Poverty Level	Percent of Population Unemployed
Washington County	*204,584*	*22.4*	*60.4*	*17.4*	*25,469*	*12.8*	*7.6*
East Bethlehem Township	2,747	25.7	53.1	21.2	18,819	22.8	18.1
Centerville Borough	3,842	22.5	55.5	22.0	20,403	16.6	13.9
West Brownsville Borough	1,170	20.5	60.3	19.2	17,750	16.7	19.4
California Borough	5,802	12.3	73.8	13.9	16,811	22.6	8.5
Coal Center Borough	181	25.4	55.2	19.4	15,250	13.3	2.9
Elco Borough	376	22.8	56.9	20.3	21,346	13.2	0.9
Roscoe Borough	872	15.4	59.5	25.1	21,417	12.3	7.6
Allenport Borough	617	17.7	55.9	26.4	20,132	16.3	12.7
Stockdale Borough	613	20.0	61.8	18.2	20,667	18.5	13.9
Dunlevy Borough	423	19.9	60.9	19.2	25,577	12.0	9.6
Speers Borough	1,284	17.9	58.9	23.2	30,107	4.5	7.8
Charleroi Borough	5,014	17.9	53.6	28.5	15,789	21.8	14.6
North Charleroi Borough	1,562	18.1	56.2	25.7	18,311	19.3	11.6
Fallowfield Township	4,970	20.0	60.8	19.2	29,287	7.3	10.1
Carrol Township	6,208	20.1	59.3	20.6	29,765	6.9	7.2
Donora Borough	5,928	20.3	51.2	28.5	16,620	23.8	25.2
Monongahela City of	4,928	17.9	56.3	25.8	18,849	14.1	12.9
New Eagle Borough	2,172	19.4	60.1	20.5	22,188	8.4	9.5
Union Township	6,324	23.4	61.9	14.7	29,140	7.6	5.0
AVERAGE OF RIVER COMMUNITIES	**55,033**	**19.5**	**58.9**	**21.6**	N/A	**14.8**	**11.0**

Source: 1990 US Census

Appendix B
Population and Economic Characteristics

1990 POPULATION AND ECONOMIC CHARACTERISTICS

	POPULATION DISTRIBUTION				ECONOMIC STATISTICS		
	Total Population	Percent of Population <18	Percent of Population 18 - 64	Percent of Population 64 +	Median Household Income	Percent of Population Below Poverty Level	Percent of Population Unemployed
Greene County	*39,550*	*25.6*	*42.0*	*16.4*	*19,903*	*21.4*	*12.2*
Dunkard Township	2,386	24.9	51.9	17.2	17,547	20.8	14.7
Monongahela Township	1,858	26.9	56.0	17.2	20,931	16.5	11.8
Greensboro Borough	332	24.1	47.9	28.0	21,625	13.8	4.1
Cumberland Township	6,742	23.6	54.9	18.9	18,102	12.5	12.5
Rices Landing Borough	464	23.0	54.3	22.7	14,524	29.7	11.8
Jefferson Township	2,536	24.1	57.4	18.5	23,575	12.0	7.4
AVERAGE OF RIVER COMMUNITIES	**14,318**	**25.6**	**55.7**	**18.7**	**N/A**	**20.7**	**11.6**

	Total Population	Percent of Population <18	Percent of Population 18 - 64	Percent of Population 64 +	Median Household Income	Percent of Population Below Poverty Level	Percent of Population Unemployed
Fayette County	*145,351*	*24.1*	*58.0*	*17.9*	*19,195*	*20.9*	*13.3*
Springhill Township	2,800	26.3	59.1	14.6	19,969	20.6	19.6
Point Marion Borough	1,344	23.6	56.6	19.8	17,670	21.6	15.1
Nicholson Township	1,995	27.7	58.7	13.6	18,687	23.5	14.7
German Township	5,596	23.6	55.7	20.7	18,516	22.2	16.1
Masontown Borough	3,759	22.8	52.9	24.3	18,470	23.6	16.1
Luzerne Township	4,937	24.2	55.8	20.0	18,354	18.3	12.3
Borwnsville Borough	3,164	22.2	54.8	23.0	11,791	33.0	22.8
Borwnsville Township	851	19.8	59.1	21.1	17,917	22.5	18.7
Jefferson Township	2,055	25.6	58.2	16.2	23,419	11.8	10.5
Newell Borough	513	22.8	58.9	18.3	22,857	16.5	16.5
Washington Township	4,613	19.0	59.3	21.7	23,547	12.0	14.2
Fayette City Borough	724	19.8	55.6	24.6	16,845	21.5	14.1
Belle Vernon Borough	1,202	19.0	50.3	30.7	13,696	22.2	14.5
AVERAGE OF RIVER COMMUNITIES	**33,553**	**23.1**	**56.4**	**20.5**	**N/A**	**20.5**	**15.6**

Source: 1990 US Census

APPENDIX C: Municipal Population 1980-2015

MUNICIPAL POPULATION 1980-2015

	1980	1990	2015
Greene County	*40,476*	*39,550*	*N/A*
Dunkard Township	2,647	2,386	*N/A*
Monongahela Township	1,920	1,858	*N/A*
Greensboro Borough	377	332	*N/A*
Cumberland Township	7,053	6,742	*N/A*
Rices Landing Borough	516	464	*N/A*
Jefferson Township	2,671	2,536	*N/A*
Total of River Communities	**15,184**	**14,318**	*N/A*

	1980	1990	2015
Fayette County	*159,417*	*145,351*	*159,559*
Springhill Township	2,906	2,800	2,834
Point Marion Borough	1,642	1,344	1,453
Nicholson Township	2,143	1,995	2,110
German Township	5,900	5,596	5,909
Masontown Borough	4,909	3,759	4,020
Luzerne Township	5,549	4,904	4,666
Borwnsville Borough	4,043	3,164	3,385
Borwnsville Township	936	847	823
Jefferson Township	2,265	2,047	1,968
Newell Borough	629	518	496
Washington Township	5,069	4,613	5,523
Fayette City Borough	788	713	784
Belle Vernon Borough	1,489	1,213	1,307
Total of River Communities	**38,268**	**33,513**	**35,278**

	1980	1990	2015
Washington County	*217,074*	*204,584*	*228,837*
East Bethlehem Township	3,353	2,799	2,712
Centerville Borough	4,207	3,842	3,695
West Brownsville Borough	1,433	1,170	1,139
California Borough	5,703	5,748	6,129
Coal Center Borough	255	184	182
Elco Borough	417	373	365
Roscoe Borough	1,123	872	821
Allenport Borough	735	595	595
Stockdale Borough	641	630	627
Dunlevy Borough	463	417	421
Speers Borough	1,425	1,284	1,346
Charleroi Borough	5,717	5,014	5,327
North Charleroi Borough	1,760	1,562	1,669
Fallowfield Township	5,439	4,972	5,249
Carrol Township	6,590	6,210	6,913
Donora Borough	7,524	5,928	5,744
Monongahela City of	5,950	4,928	4,792
New Eagle Borough	2,617	2,172	2,283
Union Township	6,692	6,322	8,511
Total of River Communities	**62,044**	**55,022**	**58,520**

	1980	1990	2015
Westmoreland County	*392,184*	*370,321*	*414,955*
North Belle Vernon Borough	2,425	2,112	2,061
Rostraver Township	11,430	11,224	14,144
Monessen City of	11,928	9,901	9,965
Total of River Communities	**25,783**	**23,237**	**26,170**

	1980	1990	2015
Allegheny County	*1,450,174*	*1,336,449*	*1,592,341*
Forward Township	4,335	3,871	4,383
Elizabeth Borough	1,892	1,595	1,572
Elizabeth Township	16,269	14,694	16,538
West Elizabeth Borough	808	649	635
Clairton City of	12,188	9,656	9,690
Lincoln Borough	1,428	1,187	1,278
West Mifflin Borough	26,322	23,644	26,623
Glassport Borough	6,242	5,582	5,592
Jefferson Borough	8,643	9,533	16,172
Dravosburg Borough	2,511	2,377	2,918
McKeesport City of	31,012	26,016	28,640
Port View Borough	5,316	4,641	5,215
Duquesne City of	10,094	8,525	8,563
North Versailles Township	13,294	12,308	14,773
East Pittsburgh Borough	2,493	2,160	2,170
Braddock Borough	5,634	4,682	4,680
North Braddock Borough	8,711	7,036	7,043
Rankin Borough	2,892	2,503	2,518
Whitaker Borough	1,615	1,416	1,436
Munhall Borough	14,535	13,158	13,691
Homestead Borough	5,092	4,179	4,181
Swissvale Borough	11,345	10,637	12,162
West Homestead	3,128	2,493	2,679
Pittsburgh City of	423,938	369,879	405,689
Total of River Communities	**619,737**	**542,421**	**598,841**

Source: 1990 U.S. Census

APPENDIX D: Hazardous and Toxic Waste Site Data

SUMMARY OF FEDERAL LEGISLATION
(Adapted from Percival, 1996)

Comprehensive Environmental Response, Cleanup, and Liability Act of 1980 (CERCLA),
42 U.S.C. §§9601-9657
CERCLA establishes a strict liability system for releases of hazardous substances and creates a "Superfund" to finance actions to cleanup such releases. Amended by the Superfund Amendments and Reauthorization Act of 1996, which increases the size of Superfund, imposes numerical goals and deadlines for cleanup of Superfund sites, and specifies standards and procedures to be followed in determining the level and scope of cleanup actions.

Resource Conservation and Recovery Act of 1976 (RCRA) 42 U.S.C. §§6901-6987
RCRA directs the EPA to establish regulations ensuring the safe management of hazardous waste from cradle to grave. Reauthorized and substantially amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA), which impose new technology-based standards on landfills handling hazardous wastes, require phaseout of land disposal for certain untreated hazardous wastes, and increase federal authority over disposal of nonhazardous solid wastes.

Toxic Substances Control Act of 1976 (TSCA), 15 U.S.C. §§2601-2629
TSCA provides the EPA with comprehensive authority to regulate or prohibit the manufacture, distribution, or use of chemical substances that pose unreasonable risks; requires premanufacture notification of EPA for new chemicals or significant new uses of existing chemicals.

ENVIRONMENTAL PROTECTION AGENCY'S GEOGRAPHIC INFORMATION QUERY RESULTS

EPA GEOGRAPHIC INFORMATION QUERY SYSTEM (Version 97.1.8) January 14, 1998
==========

Title : LOWER MONONGAHELA
Sub-Title: HUC 05020005

Basin Map for HUC: 05020005

Map Scale: 1:150000

Notes:

Read Notes on accuracy and extent of all GIS database coverages!!!

Note Version Id on top line as we are continuously upgrading data layers, quality, and calculation methods for this report and associated graphics.

Disclaimer:

This computer representation has been compiled by the Environmental Protection Agency (EPA) from sources which have supplied data or information that has not been verified by the EPA. This data is offered here as a general representation only, and is not to be used for commercial purposes without verification by an independant professional qualified to verify such data or information. The EPA does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any loss or injury resulting from reliance upon the information shown.

*** End of Notes ***

****
** Human Health Factors/Concerns **
****

Population Factors Using 1990 Census Data
==========

Approximate Population and Demographic Analysis

Notes:

1) Based on summing Census Tract/Block centroids within selected map area. A portion of actual block may extend beyond distance (overcount), or portions of some blocks may be within distance but centroid is outside (undercount). This technique is simple and achieves good agreement with other methods for all basins and centroid radii at or beyond 2 miles in non-rural areas. Additional tests are planned for method accuracy comparisons.
2) The Hispanic Origin category is defined as an ethnic category, not as a race in the official Census definitions. Hispanic Origin may include counts from any of the Census race categories including White. PL171 Census data included a cross tabulation of origin versus race (Fields P004_0001 to 0006). We used these tabulations for our summaries below. Our definition for Total People of Color is Total Population minus the White Non-Hispanic Origin as tabulated in the PL171 data. These fields are similar to the STF1A P009 class of fields.

Population within Basin (HUC): 05020005

Reading population data from an existing statistics file in the support library...
Stats sucessfully read from file created 97-10-08.02:10:02.Wed
Includes data from State Libraries: PA42 WV54

Will now process statistics for 18340 Census Block Centroids...

Total Population = 829321
Household Units = 363748

Population By Origin:	Total	Summary Stats	National Comparison 50 States/D.C.	
White	= 725436	87.5%	75.6%	
Black	= 88294	10.6%	11.8%	
AmInd/Esk/Ale	= 847	0.1%	0.7%	
Asian/PacIsnd	= 8341	1.0%	2.8%	
Other	= 809	0.1%	0.1%	
Hispanic	= 5594	0.7%	9.0%	
Total People of Color	= 103885	12.5%	24.4%	See note 2.

Community Water Supplies (EPA National Database)
==========

System Notes:
05/22/97 -- Found severe database problems. Many records had attributes switched with wrong plotting points! We re-constructed plotting points 5/22/97 at 3:00am EDT using the lat/long values stored in the attributes for each record until the originator provides us with a updated database.

Important Notes:

This data layer has been created from the EPA SDWIS Drinking Water database. It is still under construction and is LIMITED at this time to supplies with latitude and longitude locations stored in the database. Many supplies ARE NOT ON THIS REPORT due to lack of latitude and longitude locations but may have been located to the watershed level by USGS Hydrologic Unit Code (HUC). Please refer to the Surf Your Watershed WWW pages (http://www.epa.gov/surf/) for a more complete listing of supplies by watershed.

If you are interested in a particular 8 digit HUC basin code of interest, you can go directly to the Surf Your Watershed pages for that HUC by linking to (using HUC 03030007 for example):
http://www.epa.gov/surf/HUCS/hucinfo/03030007/

Drinking Water Database: 90 records selected within this search request...

SDWIS Id:PA5020020 Name: CENTURY TOWNHOMES ASSN Persons Served: 1410
Addr:KIM M JENKINS, PROP, 1179 WOODLAND AVE City/Zip: CLAIRTON, 15025
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38399 Lat: 40.286389 Lng: 79.895833
Record Id: 38400 Lat: 40.286389 Lng: 79.895833
Record Id: 38401 Lat: 40.286389 Lng: 79.895833
Record Id: 38402 Lat: 40.286389 Lng: 79.895833

SDWIS Id:PA5020039 Name: PA-AMERICAN WATER CO-PITTSBURG Persons Served: 615543

Addr:-, 380 BECKS RUN RD City/Zip: PITTSBURGH, 15227
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38411 Lat: 40.410833 Lng: 79.953889
Record Id: 38412 Lat: 40.420556 Lng: 79.993611
Record Id: 38413 Lat: 40.249444 Lng: 79.919722

SDWIS Id:PA5260004 Name: BELLE VERNON BORO MUNIC AUTH Persons Served: 6000
Addr:-, ROUTE 906 City/Zip: BELLE VERNON, 15012
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38553 Lat: 40.121667 Lng: 79.861667
Record Id: 38554 Lat: 40.121667 Lng: 79.861667

SDWIS Id:PA5260005 Name: PA-AMERICAN WATER-BROWNSVILLE Persons Served: 11890
Addr:-, WATER ST City/Zip: BROWNSVILLE, 15417
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38555 Lat: 40.021389 Lng: 79.907222

SDWIS Id:PA5260007 Name: FAIRCHANCE BOROUGH WATER DEPT Persons Served: 3200
Addr:-, 125 WEST CHURCH STRE City/Zip: FAIRCHANCE, 15436
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38558 Lat: 39.813889 Lng: 79.730833
Record Id: 38559 Lat: 39.805000 Lng: 79.721389
Record Id: 38560 Lat: 39.821667 Lng: 79.764167

SDWIS Id:PA5260009 Name: WASHINGTON TWP MUNIC AUTHORITY Persons Served: 9000
Addr:RONALD E DEITCH, MAN, 1390 FAYETTE AVE City/Zip: BELLE VERNON, 15012
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38561 Lat: 40.101111 Lng: 79.842222

SDWIS Id:PA5260013 Name: MASONTOWN MUN WATER WORKS Persons Served: 3759
Addr:-, 2 COURT ST City/Zip: MASONTOWN, 15461
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38562 Lat: 39.844167 Lng: 79.928333
Record Id: 38563 Lat: 39.844167 Lng: 79.928333

SDWIS Id:PA5260014 Name: NEWELL MUNICIPAL AUTHORITY Persons Served: 530
Addr:STEVE SABOL, CHAIRMA, P.O. BOX 92 City/Zip: BROWNSVILLE, 15417
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38564 Lat: 40.076389 Lng: 79.900833
Record Id: 38565 Lat: 40.076389 Lng: 79.900833
Record Id: 38566 Lat: 40.076389 Lng: 79.900833
Record Id: 38567 Lat: 40.076389 Lng: 79.900833

SDWIS Id:PA5260020 Name: PA-AMERICAN WATER- UNIONTOWN Persons Served: 32000
Addr:-, 72 COOLSPRING STREET City/Zip: UNIONTOWN, 15401
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38576 Lat: 39.933889 Lng: 79.656111
Record Id: 38577 Lat: 39.933889 Lng: 79.656111
Record Id: 38578 Lat: 39.933889 Lng: 79.656111

SDWIS Id:PA5260023 Name: REDSTONE WATER CO SMOCK PLANT Persons Served: 2415
Addr:J. TERRY YABLONSKI,, 3 MAIN STREET City/Zip: DAISYTOWN, 15427
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38579 Lat: 40.003056 Lng: 79.761111
Record Id: 38580 Lat: 40.003056 Lng: 79.761111

SDWIS Id:PA5260026 Name: REDSTONE WATER CO ROYAL SYSTEM Persons Served: 321
Addr:-, 3 MAIN STREET City/Zip: CHESTNUT RIDGE, 15422
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38581 Lat: 39.978889 Lng: 79.815556

SDWIS Id:PA5260027 Name: ALBERT GALLATIN MUN AUTHORITY Persons Served: 2100
Addr:BONNIE BURCHINAL, MA, P.O. BOX 178 City/Zip: POINT MARION, 15474
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005

Record Id: 38582 Lat: 39.799444 Lng: 79.902500
Record Id: 38583 Lat: 39.799444 Lng: 79.902500
Record Id: 38584 Lat: 39.799444 Lng: 79.902500

SDWIS Id:PA5260032 Name: MOUNTAIN WATER ASSOCIATION Persons Served: 2680
Addr:JOHN S. TRUMP, MANAG, P.O. BOX 297 City/Zip: FAIRCHANCE, 15436
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38586 Lat: 39.803333 Lng: 79.771667
Record Id: 38587 Lat: 39.803333 Lng: 79.771667
Record Id: 38588 Lat: 39.803333 Lng: 79.771667

SDWIS Id:PA5300004 Name: BRAVE WATER AUTHORITY Persons Served: 400
Addr:-, P.O. BOX 159 City/Zip: BRAVE, 15316
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38593 Lat: 39.745833 Lng: 80.244444
Record Id: 38594 Lat: 39.745833 Lng: 80.244444
Record Id: 38595 Lat: 39.745833 Lng: 80.244444

SDWIS Id:PA5300005 Name: CARMICHAELS MUN WATER AUTH Persons Served: 4700
Addr:-, 104 N PINE ST PO BOX City/Zip: CARMICHAELS, 15320
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38596 Lat: 39.990556 Lng: 79.948056
Record Id: 38597 Lat: 39.990556 Lng: 79.948056

SDWIS Id:PA5300007 Name: DUNKARD VALLEY JOINT MUN AUTH Persons Served: 2200
Addr:-, MINOR STREET, BOX 19 City/Zip: GREENSBORO, 15338
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38598 Lat: 39.806944 Lng: 79.919444
Record Id: 38599 Lat: 39.806944 Lng: 79.919444
Record Id: 38600 Lat: 39.806944 Lng: 79.919444
Record Id: 38601 Lat: 39.806944 Lng: 79.919444

SDWIS Id:PA5300012 Name: EAST DUNKARD WATER ASSOCIATION Persons Served: 3962
Addr:ISAAC N LEWIS, MANAG, P.O. BOX 241, ROUTE City/Zip: DILLINER, 15327
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38602 Lat: 39.746111 Lng: 79.928333
Record Id: 38603 Lat: 39.746111 Lng: 79.928333
Record Id: 38604 Lat: 39.746111 Lng: 79.928333

SDWIS Id:PA5300015 Name: MT MORRIS WATER & SEWAGE AUTH Persons Served: 1500
Addr:-, PO BOX 340 City/Zip: MT MORRIS, 15349
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38605 Lat: 39.721111 Lng: 80.063889

SDWIS Id:PA5300017 Name: SOUTHWESTERN PA WATER AUTH Persons Served: 37000
Addr:JOSEPH J. SIMATIC, M, GREENE AND WASHINGTO City/Zip: JEFFERSON, 15344
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38606 Lat: 39.930000 Lng: 79.951667

SDWIS Id:PA5630003 Name: ROSEWOOD FARM MANOR Persons Served: 130
Addr:-, 855 SOUTH BRIDGE RD City/Zip: PROSPERITY, 15329
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38684 Lat: 40.070833 Lng: 80.286111
Record Id: 38685 Lat: 40.070833 Lng: 80.286111
Record Id: 38686 Lat: 40.070833 Lng: 80.286111
Record Id: 38687 Lat: 40.070833 Lng: 80.286111

SDWIS Id:PA5630028 Name: WEST BETH TWP MUN WATER WORKS Persons Served: 430
Addr:-, JEFFERSON AVE, BOX 3 City/Zip: MARIANNA, 15345
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38695 Lat: 40.018333 Lng: 80.096111
Record Id: 38696 Lat: 40.018333 Lng: 80.096111
Record Id: 38697 Lat: 40.018333 Lng: 80.096111

SDWIS Id:PA5630030 Name: BENTLEYVILLE MUNIC AUTHORITY Persons Served: 2600
Addr:CONSTANCE A GREENLEE, 508 MAIN STREET City/Zip: BENTLEYVILLE, 15314
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38698 Lat: 40.127222 Lng: 79.994444
Record Id: 38699 Lat: 40.127222 Lng: 79.994444
Record Id: 38700 Lat: 40.127222 Lng: 79.994444
Record Id: 38701 Lat: 40.127222 Lng: 79.994444

SDWIS Id:PA5630036 Name: REDSTONE WATER-CRESCENT HEIGHT Persons Served: 846
Addr:-, 3 MAIN ST City/Zip: DAISYTOWN, 15427
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38702 Lat: 40.057778 Lng: 79.937778

SDWIS Id:PA5630039 Name: CHARLEROI MUNICIPAL AUTHORITY Persons Served: 28326
Addr:-, 325 MCKEAN AVE, PO B City/Zip: CHARLEROI, 15022
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38706 Lat: 40.131944 Lng: 79.890000

SDWIS Id:PA5630041 Name: COKEBURG BORO WATER DEPT Persons Served: 820
Addr:-, 3 GARFIELD ST City/Zip: COKEBURG, 15324
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38707 Lat: 40.096389 Lng: 80.070833
Record Id: 38708 Lat: 40.096389 Lng: 80.070833
Record Id: 38709 Lat: 40.096389 Lng: 80.070833
Record Id: 38710 Lat: 40.096389 Lng: 80.070833

SDWIS Id:PA5630044 Name: ELLSWORTH BOROUGH WATER DEPT Persons Served: 1250
Addr:-, 26 SOUTH MAIN STREET City/Zip: ELLSWORTH, 15331
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38711 Lat: 40.096389 Lng: 80.070833
Record Id: 38712 Lat: 40.096389 Lng: 80.070833

SDWIS Id:PA5630045 Name: TRI COUNTY JOINT MUN AUTHORITY Persons Served: 9200
Addr:FRANK HOAK, MANAGER, BOX 758 City/Zip: FREDERICKTOWN, 15333
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38713 Lat: 39.991111 Lng: 79.991389
Record Id: 38714 Lat: 39.991111 Lng: 79.991389

SDWIS Id:PA5630046 Name: MC CORMICK WATER CO. GIBSON Persons Served: 92
Addr:WILLIAM J MCCORMICK,, 998 MAIN ST City/Zip: BENTLEYVILLE, 15314
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38715 Lat: 40.131111 Lng: 79.991389
Record Id: 38716 Lat: 40.131111 Lng: 79.991389
Record Id: 38717 Lat: 40.131111 Lng: 79.991389
Record Id: 38718 Lat: 40.131111 Lng: 79.991389
Record Id: 38719 Lat: 40.131111 Lng: 79.991389
Record Id: 38720 Lat: 40.131111 Lng: 79.991389

SDWIS Id:PA5630050 Name: MARIANNA MUNICIPAL WATER WORKS Persons Served: 620
Addr:EDWIN L. STEPP, SUPT, P.O. BOX 368 City/Zip: MARIANNA, 15345
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38722 Lat: 40.018333 Lng: 80.095556
Record Id: 38723 Lat: 40.018333 Lng: 80.095556

SDWIS Id:PA5630053 Name: VAN VOORHIS WATER CO Persons Served: 175
Addr:-, BOX 52 City/Zip: VAN VOORHIS, 15366
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005
Record Id: 38724 Lat: 40.163611 Lng: 79.968056
Record Id: 38725 Lat: 40.163611 Lng: 79.968056
Record Id: 38726 Lat: 40.163611 Lng: 79.968056

SDWIS Id:PA5630061 Name: SOMERSET WATER COMPANY Persons Served: 89
Addr:WILLIAM J MCCORMICK,, 998 MAIN ST City/Zip: BENTLEYVILLE, 15314
SDWIS CatUnit: N/A Assgnd CatUnit: 05020005

```
     Record Id: 38732  Lat: 40.109444  Lng: 80.028611
     Record Id: 38733  Lat: 40.109444  Lng: 80.028611
     Record Id: 38734  Lat: 40.109444  Lng: 80.028611
     Record Id: 38735  Lat: 40.109444  Lng: 80.028611
     Record Id: 38736  Lat: 40.109444  Lng: 80.028611
     Record Id: 38737  Lat: 40.109444  Lng: 80.028611
     Record Id: 38738  Lat: 40.109444  Lng: 80.028611

SDWIS Id:PA5630074  Name: AMWELL TWP MUNICIPAL AUTHORITY Persons Served: 510
     Addr:DICK BISHOP, R.D. #4, ROUTE 19  City/Zip: WASHINGTON, 15301
     SDWIS CatUnit: N/A  Assgnd CatUnit: 05020005
     Record Id: 38741  Lat: 40.134722  Lng: 80.230556
     Record Id: 38742  Lat: 40.134722  Lng: 80.230556
     Record Id: 38743  Lat: 40.134722  Lng: 80.230556

SDWIS Id:WV3304902  Name: BUCKHANNON WATER BOARD         Persons Served: 7638
     Addr:-, MAIN STREET  City/Zip: BUCKHANNON, 26201
     SDWIS CatUnit: N/A  Assgnd CatUnit: 05020005
     Record Id: 45715  Lat: 39.978889  Lng: 80.219722
     Record Id: 45716  Lat: 39.978889  Lng: 80.219722

Drinking Water Report completed...



**********************************
**  Regulated Facility Report    **
**********************************

EPA Envirofacts Facility Databases Information
==============================================

Note: 04/10/97 - Using National Envirofacts .EF Data Layer

  Envirofacts:  1506 facility record instances within this search request...
        Of these, we are interested in the following Program Facilities:
                801 RCRIS instances (All - "General" and "Major")
                    (  119 of these are "major" TSD or LQG facilities)
                155 PCS instances
                445 AFS/AIRS instances
                  4 CERCLIS instances
                 61 TRIS instances


 Important Notes:

   1. For information about the various EPA Facility Program databases
      and their environmental/regulatory aspects, see the Envirofacts
      WWW home page at http://www.epa.gov/enviro/html/ef_home.html
   2. We have excluded FINDS database record instances from this listing.
   3. The latitude/longitude is from the 1st program instance record only.
      It may not be the best location!
   4. Locational accuracy currently varies greatly for this database as
      EPA is in the process of improving it. Some facilities may still
      be located at zip code centroids or even have wrong lat/longs
      putting a facility in a wrong state!

 Your Specific Requested Options:
   RCRIS Facilities: Selected
      You have specified to include ONLY the treatment/storage/disposal (TSD)
      and large quantity generator (LQG) facilities and not the miscellaneous
      small quantity and other handler facilities!
   PCS (NPDES) Facilities: Selected
   AIRS/AFS Facilities: Selected
```

CERCLA Facilities: Selected
TRI Facilities: Selected

Letter in column indicates record instance for:
r . . . . . RCRIS Program System database ("General" Facility)
R . . . . . RCRIS Program System database ("Major" - TSD or LQG Facility)
. P . . . . PCS Program System database
. . A . . . AIRS/AFS Program System database
. . . C . . CERCLIC (Superfund) Program System database
. . . . T . TRI (Toxics Release Inventory) Program System database
. . . . . O Other Program Database

Finds ID	Facility Name Facility Address	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
(Not Avail) . P	? (EnvFacts EF-ID:438896 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:439182 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:440418 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:440447 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:440465 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:440477 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:440565 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441024 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441061 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441065 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441072 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441284 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441306 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441314 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441338 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441343 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441352 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441353 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441354 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441365 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441373 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441381 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441399 - No More Info) ?, ?, ?. ?		
(Not Avail) . P	? (EnvFacts EF-ID:441411 - No More Info) ?, ?, ?. ?		

```
(Not Avail)   ? (EnvFacts EF-ID:441415 - No More Info)
 . P . . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:441416 - No More Info)
 . P . . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:441421 - No More Info)
 . P . . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:441431 - No More Info)
 . P . . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:441436 - No More Info)
 . P . . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:450630 - No More Info)
 . P . . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:571313 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585067 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585071 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585072 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585075 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585076 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585077 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585078 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585080 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585082 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585084 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585085 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585086 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585090 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585091 - No More Info)
 . . A . . .     ?, ?, ?. ?
(Not Avail)   ? (EnvFacts EF-ID:585092 - No More Info)
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NCD991278284   CAROLINA P & L CO HARRIS NUCLEAR          39.669326  -80.397069
 R . . . . .     SECONDARY RD 1134, NEW HILL, NC. 27562
NJD986591352   STANDARD MACH/EQUIP                      39.802516  -79.726668
 . . A . . .     P O DRAWER 1187, UNIONTOWN,PA., NJ. 15401
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NV0000706499  QUALITY SAND AND GRAVEL                    39.866030  -79.908580
 . . A . . .    BLM PIT - LONE MTN RD, LAS VEGAS, NV. 15476
OH0001650134  MAPLE CREEK MINING INC                      0.000000    0.000000
 . P . . . .    29525 CHAGRIN BLVD, PEPPER PIKE, OH. 44122
OH0001922525  MASTERCLEAN INC                           40.425632  -79.673373
 . . A . . .    4556 WILLIAM PENN HWY # 540, MURRYSVILLE, OH. 15668-2002
OHD986997831  SME WRECKING                             39.802516  -79.726668
 . . A . . .    P O BOX 1187, UNIONTOWN, OH. 15401
PA0000045963  TYPECRAFT PRESS INC                       40.429506  -79.972678
 R . A . . .    45 S 23RD ST PO BOX 4295, PITTSBURGH, PA. 15203-2120
PA0000064956  GRD STEEL CORP                           40.200473  -79.923299
 R . A . . .    RD #3 RTE 136 PO BOX 111, MONONGAHELA, PA. 15063
PA0000111898  POLYCOM HUNTSMAN INC                       0.000000    0.000000
 r . . . T .    790 GALIFFA ST, DONORA, PA. 15033
PA0000118273  COCHRAN PONTIAC INC                       40.438709  -79.764397
 r . A . . .    4200 WILLIAM PENN HWY, MONROEVILLE, PA. 15146-2746
PA0000136358  UNION CARBIDE CORP                        40.433392  -79.601858
 . . A . . .    RD #4 MELLON RD, EXPORT, PA. 15632
PA0000140103  GOLDEN EAGLE CONST CO INC                 40.178110  -80.059314
 . . A . . .    RT 136, NORTH STRABANE, PA. 15330
PA0000140178  RECON A T PARTS CORP                      40.459164  -79.913335
 r . A . . .    6545 HAMILTON AVE, PITTSBURGH, PA. 15206
PA0000143818  UNITED DEFENSE LP                        39.927763  -79.647073
 R . . . . .    300 UNIVERSITY DR, LEMONT FURNACE, PA. 15456
PA0000286609  EQUITABLE RESOURCES                      40.437831  -79.999684
 . . A . . .    420 BLVD OF THE ALLIES, PITTSBURGH, PA. 15219
PA0000296095  CONSUMERS WOOD PRESERVING CO             40.268510  -79.895300
 . . A . T .    SECOND ST, WEST ELIZABETH, PA. 15088
PA0000445056  HOFFMAN K AUTO BODY                      40.321640  -80.042568
 R . . . . .    5430 PROGRESS BLVD, BETHEL PARK, PA. 15102
PA0000516575  CARLTON MOTEL RESTAURANT                 40.148889  -80.030278
 . P . . . .    R.D. #1, BOX 94 R.D. 1, BOX 94, BENTLEYVILLE, PA. 15314
PA0000517185  BERYL ACRES                              40.106944  -80.093889
 . P . . . .    428 FOURTH ST, CHARLEROI, PA. 15022
PA0000517672  SUSKI, DAVID                            40.193333  -79.870833
 . P . . . .    182 PLACE PLAN, DONORA, PA. 15503
PA0000517870  STROTMAN, CINDY                         40.219167  -79.860556
 . P . . . .    RD 3  TORRANCE RD, ELIZABETH, PA. 15037
PA0000518423  PA TURNPIKE COMMISSION                   40.109722  -79.913889
 . P . . . .    PO BOX 8531, HARRISBURG, PA. 17105-8531
PA0000519322  CBF, INC                                39.896111  -79.835833
 . P A . . .    R. D. #1, BOX 266, MCCLELLANDTOWN, PA. 15458
PA0000520007  ALBERT GALLATIN MUNICIPAL AUTH           39.851944  -79.720556
 . P . . . .    R.D. #1, BOX 178, POINT MARION, PA. 15474
PA0000520965  CHICO, KELLY                             39.941389  -79.800278
 . P . . . .    RD 6  BOX 304, UNIONTOWN, PA. 15401
PA0000521187  REESMAN MHP                              39.928333  -80.094444
 . P . . . .    BOX 99B, WAYNESBURG, PA. 15370
PA0000521195  RETARDED CITIZEN ASSOC.                  39.958889  -80.175833
 . P . . . .    PO BOX 431, WAYNESBURG, PA. 15370
PA0000521203  FRANKLIN TOWNSHIP WASTEWATER T          39.903056  -80.150000
 . P . . . .    R.D #2, WAYNESBURG, PA. 15370
PA0000550194  CHARLEROI WTP                            0.000000    0.000000
 . P . . . .    325-327 MCKEAN AVE, CHARLEROI, PA. 15022
PA0000560631  PERMA COTE PLASTICS INC                  39.946020  -79.678080
 R . . . . .    RTE 119 GREATER UNIONTOWN INDUS PK, MOUNT BRADDOCK, PA. 15465
PA0000561464  ELLIOTT TURBOMACHINERY INC              40.337500  -79.612500
 . P . . . .    FOURTH ST AND RT 130, JEANETTE, PA. 15644
PA0000562868  MATTHEWS INTL CORP                      40.456167  -79.915220
 R . A . . .    6515 PENN AVE, PITTSBURGH, PA. 15206
PA0000893370  FULMER CO INC                           40.403862  -79.623295
 . . . . T .    3004 VENTURE CT, EXPORT, PA. 15632
PA0000987842  NEW EAGLE CHEM FIRE                     40.210314  -79.957592
 . . . C . .    25 S UNION ST, NEW EAGLE, PA. 15067
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PA0001115054	WEST PIKE RUN TWP.	0.000000	0.000000
. P	RD 1, DAISYTOWN, PA. 15427		
PA0001206226	DIE QUIP CORP	40.320943	-80.044689
. . A . . .	5360 ENTERPRISE BLVD, BETHEL PARK, PA. 15102		
PA0001209402	PERMA CAST INC	40.403862	-79.623295
. . A . T .	9002 CORPORATE CIR, EXPORT, PA. 15632		
PA0001463090	AMOCO OIL CO FAC 3538	40.381679	-79.905374
. . A . . .	MAIN ST & CENTRE AVE, MUNHALL, PA. 15120		
PA0001463256	GULF RETAIL FAC CUMBERLAND FARMS	40.449536	-79.950714
. . A . . .	195 N CRAIG ST, PITTSBURGH, PA. 00000-0000		
PA0001463694	BEKAVAC FUNERAL HOME	40.293375	-79.885463
. . A . . .	555 5TH ST, CLAIRTON, PA. 15025		
PA0001463710	MON VALLEY SCH	40.301216	-79.924376
. . A . . .	555 LEWIS RUN RD, CLAIRTON, PA. 15025		
PA0001463728	AFFTREX LTD	40.290543	-79.875622
. . A . . .	600 STATE ST STE 201, CLAIRTON, PA. 15025-1800		
PA0001463744	ELLIS SCH	40.453442	-79.919240
. . A . . .	6425 FIFTH AVE, PITTSBURGH, PA. 15206		
PA0001463769	PVS TECHNOLOGIES INC	40.351203	-79.890024
. . A . . .	C/O USX IRVIN WORKS BOX 68, DRAVOSBURG, PA. 15034		
PA0001463777	ST ROBERT BELLARMINE CHURCH	40.351841	-79.851989
. . A . . .	1313 FIFTH AVE, MC KEESPORT, PA. 15130		
PA0001463785	PEOPLES NATURAL GAS CO WALL	40.258706	-79.852444
. . A . . .	RD 3, ELIZABETH, PA. 15037		
PA0001463793	ELIZABETH FORWARD SD SENIOR HIGH SCH	40.256087	-79.856043
. . A . . .	1000 WEIGLES HILL RD, ELIZABETH, PA. 15037		
PA0001463850	SOUTH ALLEGHENY SD GLASSPORT CENTRAL	40.332292	-79.891055
. . A . . .	2ND & OHIO AVE, GLASSPORT, PA. 15045		
PA0001463868	TUBE CITY IRON & METAL CO	40.327067	-79.887619
. . A . . .	516 DELAWARE RD, WEST MIFFLIN, PA. 15045		
PA0001463876	GLASSPORT TRANSP CTR INC	40.324800	-79.894372
. . A . . .	#3 ALLEGHENY CT, GLASSPORT, PA. 15045		
PA0001464296	BETHEL PARK SD NEIL ARMSTRONG ELEMENTARY	40.305384	-80.022790
. . A . . .	5800 MURRAY AVE, BETHEL PARK, PA. 15102		
PA0001464304	BETHEL PARK SD BENJAMIN FRANKLIN ELEMENT	40.324130	-80.030914
. . A . . .	5400 FLORIDA AVE, BETHEL PARK, PA. 15102		
PA0001464320	BETHEL PARK SD GEORGE WASHINGTON ELEMENT	40.311510	-80.063633
. . A . . .	515 CLIFTON RD, BETHEL PARK, PA. 15102		
PA0001464338	BETHEL PARK SD WILLIAM PENN ELEMENTARY	40.298853	-80.044793
. . A . . .	110 WOODLET LANE, BETHEL PARK, PA. 15102		
PA0001464361	ST GERMAINE SCH	40.341527	-80.016358
. . A . . .	7003 BAPTIST RD, PITTSBURGH, PA. 15102		
PA0001464379	ST VALENTINE SCH	40.330887	-80.031281
. . A . . .	2709 MESTA ST, BETHEL PARK, PA. 15102		
PA0001464395	ROCHEZ BROS BUILDERS SUPPLY	40.403566	-79.862248
. . A . . .	7TH ST, BRADDOCK, PA. 15104		
PA0001464403	ACHA GENERAL BRADDOCK TOWERS	40.405063	-79.864941
. . A . . .	620 SIXTH ST N, BRADDOCK, PA. 15104		
PA0001464411	ACHA MAPLEVIEW TERRACE	40.403566	-79.862248
. . A . . .	FRAZIER ST, BRADDOCK, PA. 15104		
PA0001464734	ACHA COCHRANDALE HOUSING	40.373035	-79.850738
. . A . . .	WYLIE AVE, DUQUESNE, PA. 15110		
PA0001464742	DUQUESNE CITY SCH DISTRICT	40.373035	-79.850738
. . A . . .	28 3RD ST, DUQUESNE, PA. 15110		
PA0001464759	DUQUESNE SD DUQUESNE MIDDLE SCH	40.373035	-79.850738
. . A . . .	S SIXTH, DUQUESNE, PA. 15110		
PA0001464775	DUQUESNE COAL BLENDING	40.373035	-79.850738
. . A . . .	RT 837, DUQUESNE, PA. 15110		
PA0001464833	ACHA HOMESTEAD APARTMENTS	40.396055	-79.906851
. . A . . .	EIGHTH AVE, HOMESTEAD, PA. 15120		
PA0001464882	PARK VIEW TOWERS	40.396055	-79.906851
. . A . . .	CAROLINE AVE, MUNHALL, PA. 15120		
PA0001464957	STEEL VALLEY SD PARK ELEMENTARY SCH	40.381405	-79.906416
. . A . . .	MAIN & CAMBRIA STS, MUNHALL, PA. 15120		

PA0001464965	STEEL VALLEY SD WOODLAWN MIDDLE SCH	40.396055	-79.906851
. . A . . .	WOODLAWN AVE, MUNHALL, PA. 15120		
PA0001464973	ST RITA CHURCH	40.400104	-79.893183
. . A . . .	218 W SCHWAB AVE, MUNHALL, PA. 15120		
PA0001464999	HOMESTEAD HEALTH CTR	40.399751	-79.905335
. . A . . .	1800 WEST ST, HOMESTEAD, PA. 15120		
PA0001465004	FENTON HEAT TREATING INC	40.363909	-79.871057
. . A . . .	3605 HOMESTEAD DUQUESNE RD, WEST MIFFLIN, PA. 15122		
PA0001465020	STANDARD LAFARGE BROWN RESERVE FAC	40.340927	-79.954893
. . A . . .	935 MOUNTAIN VIEW DR, WEST MIFFLIN, PA. 15122		
PA0001465079	WEST MIFFLIN AREA SD CLARA BARTON SCH	40.342874	-79.920523
. . A . . .	764 BEVERLY DR, WEST MIFFLIN, PA. 15122-3299		
PA0001465095	WEST MIFFLIN AREA SD EMERSON ELEMENTARY	40.361833	-79.865225
. . A . . .	1922 PENNSYLVANIA AVE, WEST MIFFLIN, PA. 15122-3994		
PA0001465103	WEST MIFFLIN AREA SD OLD EMERSON SCH	40.361848	-79.863287
. . A . . .	1850 PENNSYLVANIA AVE, WEST MIFFLIN, PA. 15122		
PA0001465111	WEST MIFFLIN AREA SD HOMEVILLE ELEMENTAR	40.388681	-79.875644
. . A . . .	4315 ELIZA ST, WEST MIFFLIN, PA. 15122-2097		
PA0001465137	WEST MIFFLIN AREA SD MIDDLE SCH	40.346746	-79.926401
. . A . . .	371 CAMP HOLLOW RD, WEST MIFFLIN, PA. 15122-2698		
PA0001465145	WEST MIFFLIN AREA SD NEW ENGLAND ELEMENT	40.335869	-79.936934
. . A . . .	2000 CLAIRTON RD, WEST MIFFLIN, PA. 15122-3006		
PA0001465152	WEST MIFFLIN AREA SD HIGH SCH	40.382788	-79.877238
. . A . . .	91 COMMONWEALTH AVE, WEST MIFFLIN, PA. 15122-2396		
PA0001465178	JAMES LAVELLE MEMORIAL SCH	40.393517	-79.881463
. . A . . .	1 MAJKA DR, WEST MIFFLIN, PA. 15122		
PA0001465194	COMMUNITY COLLEGE OF ALLEGHENY COUNTY	40.358278	-79.905992
. . A . . .	S CAMPUS 1750 CLAIRTON RD, WEST MIFFLIN, PA. 15122		
PA0001465228	WALNUT GROVE ASSEMBLY OF GOD CHURCH	40.357483	-79.908550
. . A . . .	44 ADAMS AVE, WEST MIFFLIN, PA. 15122		
PA0001465327	SOUTH PARK SD LIBRARY ELEMENTARY SCH	40.293209	-79.994183
. . A . . .	PLEASANT ST, LIBRARY, PA. 15129		
PA0001465335	SOUTH PARK SD HIGH SCH	40.305851	-79.989075
. . A . . .	2178 RIDGE RD, LIBRARY, PA. 15129		
PA0001465392	CITY MCKEESPORT HA CRAWFORD VILLAGE 64	40.351035	-79.863709
. . A . . .	332 FIFTH AVE STE 214, MC KEESPORT, PA. 15132		
PA0001465434	MC KEESPORT AREA SD CENTENNIAL SCH	40.342032	-79.856257
. . A . . .	1601 BEAVER AVE, MC KEESPORT, PA. 15132		
PA0001465491	MC KEESPORT AREA SD SENIOR HIGH SCH	40.343733	-79.829821
. . A . . .	1960 EDEN PARK BLVD, MC KEESPORT, PA. 15132		
PA0001465798	ST MARY CZESTOCHOWA CHURCH	40.345484	-79.847542
. . A . . .	2515 VERSAILLES AVE, MC KEESPORT, PA. 15132		
PA0001465863	SOUTH ALLEGHENY SD JUNIOR & SENIOR HIGH	40.322321	-79.872055
. . A . . .	2743 WASHINGTON BOULEVARDE, LIBERTY, PA. 16930		
PA0001466051	NORTH ALLEGHENY SD INGOMAR MIDDLE SCH	40.376799	-79.812196
. . A . . .	INGOMAR HEIGHTS RD, PITTSBURGH, PA. 15137		
PA0001466309	WOODLAND HILLS SD EAST JUNIOR HIGH	40.404866	-79.825178
. . A . . .	126 MONROEVILLE AVE, TURTLE CREEK, PA. 15145		
PA0001466325	LAUREL MOUNTAIN WHIRLPOOL INC	40.402878	-79.822581
. . A . T .	1210 AIRBRAKE AVE, TURTLE CREEK, PA. 15145		
PA0001469576	K MART	40.426116	-79.760551
. . A . . .	RT 22 MONROEVILLE MALL, MONROEVILLE, PA. 15146		
PA0001469600	SUNRISE SCH	40.445232	-79.726635
. . A . . .	550 AURA DR, MONROEVILLE, PA. 15146		
PA0001469683	NORTH AMERICAN MARTYRS CHURCH	40.424835	-79.750294
. . A . . .	2526 HAYMAKER RD, MONROEVILLE, PA. 15146		
PA0001469774	PITTSBURGH SD GLADSTONE MIDDLE SCH	40.412188	-79.940826
. . A . . .	327 HAZELWOOD AVE, PITTSBURGH, PA. 15200		
PA0001469790	IRON CITY INDUSTRIAL CLEANING CORP	40.459566	-79.910396
R . A . . .	6640 FRANKSTOWN AVE, PITTSBURGH, PA. 15200		
PA0001470111	EXXON RETAIL FAC R S22387	40.394855	-79.986735
. . A . . .	2001 BROWNSVILLE RD, PITTSBURGH, PA. 15201		
PA0001472893	PITTSBURGH SD PHILLIPS SCH	40.427845	-79.978966
. . A . . .	1901 SARAH ST, PITTSBURGH, PA. 15203		

PA0001472919	PITTSBURGH SD SOUTH HIGH SCH	40.428916	-79.988382
. . A . . .	S 10TH & E CARSON, PITTSBURGH, PA. 15203		
PA0001472927	PITTSBURGH SD CENTRAL FOOD KITCHEN	40.431330	-79.985236
. . A . . .	8 S 13TH ST, PITTSBURGH, PA. 15203		
PA0001472935	ST PAULS MONASTERY	40.422868	-79.984368
. . A . . .	148 MONASTERY AVE, PITTSBURGH, PA. 15203		
PA0001472943	ARROW CONCRETE CO	40.430912	-79.993479
. . A . . .	3 S 6TH ST, PITTSBURGH, PA. 15203		
PA0001473107	CLAYBOURNE CORP	40.455024	-79.937541
. . A . . .	5435 CLAYBOURNE ST, PITTSBURGH, PA. 15206		
PA0001473123	EAST MALL APARTMENTS	40.460987	-79.922628
. . A . . .	6231 PENN AVE, PITTSBURGH, PA. 15206		
PA0001473230	PITTSBURGH SD REIZENSTEIN MIDDLE SCH	40.458020	-79.918461
. . A . . .	129 DENNISTON AVE, PITTSBURGH, PA. 15206		
PA0001473305	CALVARY EPISCOPAL CHURCH	40.458027	-79.922561
. . A . . .	315 SHADY AVE, PITTSBURGH, PA. 15206		
PA0001473313	EAST LIBERTY PRESBYTERIAN CHURCH	40.461571	-79.925370
. . A . . .	116 S HIGHLAND MALL, PITTSBURGH, PA. 15206		
PA0001473321	PODIATRY HOSPITAL OF PITTSBURGH	40.461640	-79.932134
. . A . . .	215 S NEGLEY AVE, PITTSBURGH, PA. 15206		
PA0001473347	FORBES NURSING CTR	40.458954	-79.908417
. . A . . .	WASHINGTON BLVD & FRANKSTOWN, PITTSBURGH, PA. 15206		
PA0001473396	PITTSBURGH SD BURGWIN SCH	40.410662	-79.940734
. . A . . .	5401 GLENWOOD AVE, PITTSBURGH, PA. 15207		
PA0001473412	PITTSBURGH SD GREENFIELD SCH	40.426067	-79.943334
. . A . . .	1 ALGER, PITTSBURGH, PA. 15207		
PA0001473420	JOHN J KANE REGIONAL CTR	40.407322	-79.929093
. . A . . .	955 RIVERMONT DR, PITTSBURGH, PA. 15207		
PA0001473438	CREATIVE PRODUCTIONS	40.449793	-79.896437
. . A . . .	7500 THOMAS BLVD, PITTSBURGH, PA. 15208		
PA0001473446	PITTSBURGH SD HOMEWOOD MONTESSORI	40.455362	-79.899835
. . A . . .	7100 HAMILTON, PITTSBURGH, PA. 15208		
PA0001473453	PITTSBURGH SD LINDEN SCH	40.445264	-79.917293
. . A . . .	725 S LINDEN AVE, PITTSBURGH, PA. 15208		
PA0001473461	PITTSBURGH SD STERRETT CLASSICAL ACADEMY	40.447373	-79.905726
. . A . . .	7100 REYNOLDS ST, PITTSBURGH, PA. 15208		
PA0001473479	PITTSBURGH SD WESTINGHOUSE HIGH SCH	40.460689	-79.900678
. . A . . .	1101 N MURTLAND, PITTSBURGH, PA. 15208		
PA0001473487	PITTSBURGH SD PITTSBURGH CAPA	40.455735	-79.888479
. . A . . .	925 BRUSHTON AVE, PITTSBURGH, PA. 15208		
PA0001473560	PITTSBURGH SD CONCORD SCH	40.387458	-79.984272
. . A . . .	2350 BROWNSVILLE RD, PITTSBURGH, PA. 15210		
PA0001473578	PITTSBURGH SD ARLINGTON SCH	40.415730	-79.972032
. . A . . .	2500 JONQUIL WAY, PITTSBURGH, PA. 15210		
PA0001473594	PITTSBURGH SD KNOXVILLE MIDDLE SCH	40.416485	-79.993393
. . A . . .	300 CHARLES ST, PITTSBURGH, PA. 15210		
PA0001473602	PITTSBURGH SD MURRAY SCH	40.409356	-79.979746
. . A . . .	600 RECTENWALD ST, PITTSBURGH, PA. 15210		
PA0001473610	ST GEORGE CHURCH	40.420419	-79.993769
. . A . . .	225 ALLEN AVE, PITTSBURGH, PA. 15210		
PA0001473644	PITTSBURGH SD WHITTIER SCH	40.436969	-80.018097
. . A . . .	150 MERIDAN, PITTSBURGH, PA. 15211		
PA0001473826	WQED 13	40.447198	-79.945522
. . A . . .	4802 FIFTH AVE, PITTSBURGH, PA. 15212		
PA0001473917	PRESBYTERIAN UNIVERSITY HOSPITAL	40.441265	-79.961342
. . A . . .	212 DARRAGH ST, PITTSBURGH, PA. 15213		
PA0001473925	CATHEDRAL MANSIONS APARTMENTS	40.448218	-79.947744
. . A . . .	4716 ELLSWORTH AVE, PITTSBURGH, PA. 15213		
PA0001473941	PARK MANSION APARTMENTS	40.440268	-79.941526
. . A . . .	5023 FRAW ST, PITTSBURGH, PA. 15213		
PA0001473958	UNIVERSITY SQUARE 1 APARTMENTS	40.446994	-79.948633
. . A . . .	4625 FIFTH AVE, PITTSBURGH, PA. 15213		
PA0001473974	UNIVERSITY SQUARE 2 APARTMENTS	40.446969	-79.948980
. . A . . .	4601 FIFTH AVE, PITTSBURGH, PA. 15213		

PA0001473982	WEBSTER HALL	40.447023	-79.950625
. . A . . .	101 N DITHRIDGE ST, PITTSBURGH, PA. 15213		
PA0001474014	PITTSBURGH SD SCHENLEY TEACHERS CTR	40.443251	-79.955052
. . A . . .	BIGELOW BLVD AND CENTER AVE, PITTSBURGH, PA. 15213		
PA0001474048	FIRST BAPTIST CHURCH OF PITTSBURGH	40.447687	-79.952409
. . A . . .	159 N BELLEFIELD AVE, PITTSBURGH, PA. 15213		
PA0001474055	FIRST TRINITY LUTHERAN CHURCH	40.449815	-79.948341
. . A . . .	535 N NEVILLE ST, PITTSBURGH, PA. 15213		
PA0001474063	SYNOD HALL	40.447788	-79.949653
. . A . . .	125 N CRAIG ST, PITTSBURGH, PA. 15213		
PA0001474402	MAXON TOWER APARTMENTS	40.438019	-79.918144
. . A . . .	6315 FORBES AVE, PITTSBURGH, PA. 15217		
PA0001474410	RIVERVIEW APARTMENTS	40.416318	-79.914678
. . A . . .	52 GARETTA ST, PITTSBURGH, PA. 15217		
PA0001474428	PITTSBURGH SD ALLERDICE HIGH SCH	40.429927	-79.920364
. . A . . .	2409 SHADY AVE, PITTSBURGH, PA. 15217		
PA0001474436	PITTSBURGH SD COLFAX SCH	40.433204	-79.914503
. . A . . .	2332 BEECHWOOD BOULEVARDE, PITTSBURGH, PA. 15217		
PA0001474444	PITTSBURGH SD MINADEO SCH	40.423268	-79.922273
. . A . . .	6502 LILAC ST, PITTSBURGH, PA. 15217		
PA0001474451	BETH SHALOM CONGREGATION	40.434300	-79.926485
. . A . . .	5915 BEACON ST, PITTSBURGH, PA. 15217		
PA0001474469	JEWISH HOME FOR THE AGED	40.415876	-79.925408
. . A . . .	4724 BROWNS HILL RD, PITTSBURGH, PA. 15217		
PA0001474477	WESTERN PENNSYLVANIA SCH FOR THE DEAF	0.000000	0.000000
r . A . . .	300 E SWISSVALE AVE, PITTSBURGH, PA. 15218		
PA0001474485	WOODLAND HILLS SD WEST JUNIOR HIGH	40.422087	-79.876524
. . A . . .	7600 EVANS ST, PITTSBURGH, PA. 15218		
PA0001474493	PITTSBURGH SD REGENT SQUARE SCH	40.435550	-79.897089
. . A . . .	HENRIETTA AND MILTON STREETS, PITTSBURGH, PA. 15218		
PA0001474501	WOODLAND HILLS SD DICKSON INTERMEDIATE	40.423694	-79.890545
. . A . . .	SCHOYER AVE, PITTSBURGH, PA. 15218		
PA0001474519	ST ANSELM SCH	40.423363	-79.889686
. . A . . .	7446 MCCLURE AVE, PITTSBURGH, PA. 15218		
PA0001474535	ALLEGHENY COUNTY JAIL	40.443237	-79.981808
. . A . . .	SECOND AVE, PITTSBURGH, PA. 15219		
PA0001474683	CTY PGH HA NORTHVIEW HEIGHTS BUILDING 1	40.436697	-79.997082
. . A . . .	200 ROSS ST, PITTSBURGH, PA. 15219		
PA0001474709	PITTSBURGH SD MILLIONES MIDDLE SCH	40.443237	-79.981808
. . A . . .	CENTRE AVE & AVALON, PITTSBURGH, PA. 15219		
PA0001474733	PITTSBURGH SD MILLER SCH	40.440673	-79.982426
. . A . . .	61 REED ST, PITTSBURGH, PA. 15219		
PA0001474741	PITTSBURGH SD VANN SCH	40.449843	-79.970958
. . A . . .	631 WATT, PITTSBURGH, PA. 15219		
PA0001474758	PITTSBURGH SD WEIL SCH	40.445304	-79.974499
. . A . . .	2250 CENTRE AVE, PITTSBURGH, PA. 15219		
PA0001474766	ALLEGHENY UNION BAPTIST ASSOCIATION	40.447191	-79.967532
. . A . . .	2700 CENTRE AVE, PITTSBURGH, PA. 15219		
PA0001474774	AAA ENGRAVING	40.431388	-80.000456
. . A . . .	3 STATION SQUARE DR E, PITTSBURGH, PA. 15219		
PA0001474881	SCHENLEY HOUSE APARTMENTS	40.444350	-79.864075
. . A . . .	1823 PENN AVE, PITTSBURGH, PA. 15221		
PA0001474899	WOODLAND HILLS SD EDGEWOOD PRIMARY	40.434402	-79.865305
. . A . . .	241 MAPLE AVE, PITTSBURGH, PA. 15221-3666		
PA0001474907	PITTSBURGH SD EAST HILLS SCH	40.451912	-79.874028
. . A . . .	2150 E HILLS DR, PITTSBURGH, PA. 15221		
PA0001474915	WILKINSBURG SD HIGH SCH	40.443906	-79.882499
. . A . . .	747 WALLACE AVE, PITTSBURGH, PA. 15221		
PA0001474923	WILKINSBURG SD JOHNSTON ELEMENTARY	40.438163	-79.875242
. . A . . .	1256 FRANKLIN AVE, PITTSBURGH, PA. 15221		
PA0001474931	WILKINSBURG SD TURNER ELEMENTARY SCH	40.449306	-79.865354
. . A . . .	1833 LAKETON RD, PITTSBURGH, PA. 15221		
PA0001474949	ST MAURICE CHURCH	40.421941	-79.854247
. . A . . .	2001 ARDMORE, PITTSBURGH, PA. 15221		

PA0001474964	ALLEGHENY COUNTY HOUSING AUTH	40.439410	-80.000439
. . A . . .	341 4TH AVENUUE, PITTSBURGH, PA. 15222		
PA0001475136	BRENTWOOD PUBLIC SCHOOLS HIGH SCH	40.377575	-79.974607
. . A . . .	BROWNSVILLE RD, BRENTWOOD, PA. 15227		
PA0001475151	BRENTWOOD PUBLIC SCHOOLS ELROY ELEMENTAR	40.378691	-79.973853
. . A . . .	ELROY AND FRANCIS, BRENTWOOD, PA. 15227		
PA0001475169	BRENTWOOD PUBLIC SCHOOLS MOORE ELEMENTAR	40.377575	-79.974607
. . A . . .	DALWOOD, BRENTWOOD, PA. 15227		
PA0001475961	MT LEBANON SD MELLON JUNIOR HIGH SCH	40.370213	-79.928128
. . A . . .	601 LEBANON AVE, PITTSBURGH, PA. 15228		
PA0001476076	PARKLANE	40.455343	-79.938545
. . A . . .	515 S AIKEN AVE, PITTSBURGH, PA. 15232		
PA0001476084	PITTSBURGH SD LIBERTY SCH	40.453779	-79.934568
. . A . . .	601 FILBERT ST, PITTSBURGH, PA. 15232		
PA0001476241	WOODLAND HILLS SD WILKINS PRIMARY SCH	40.428684	-79.827281
. . A . . .	362 CHURCH HILL RD, PITTSBURGH, PA. 15235		
PA0001476266	PENN HILLS SD PENN HEBRON ELEMENTARY	40.462177	-79.827965
. . A . . .	102 DUFF RD, PENN HILLS, PA. 15235		
PA0001476282	PENN HILLS SD PENN HILLS SENIOR HIGH	40.468002	-79.817904
. . A . . .	12200 GARLAND DR, PENN HILLS, PA. 15235		
PA0001476290	PENN HILLS SD WASHINGTON ELEMENTARY SCH	40.470799	-79.788970
. . A . . .	2501 MAIN, PENN HILLS, PA. 15235		
PA0001476308	PENN HILLS SD ADMINISTRATIVE CTR	40.464984	-79.810887
. . A . . .	309 COLLINS DR, PENN HILLS, PA. 15235		
PA0001476332	CARNEGIE NATURAL GAS CO	40.345925	-79.953353
. . A . . .	800 REGIS AVE, PITTSBURGH, PA. 15236		
PA0001476340	SOUTH PARK SD BROUGHTON ELEMENTARY	40.324475	-79.987603
. . A . . .	935 SCHANG RD, PITTSBURGH, PA. 15236		
PA0001476357	WEST JEFFERSON HILLS SD MCCLELLAN ELEMEN	40.337098	-79.969243
. . A . . .	360 SCHOOL LANE, PITTSBURGH, PA. 15236		
PA0001476365	NATIVITY CHURCH	40.328562	-79.987988
. . A . . .	5802 CURRY RD, PITTSBURGH, PA. 15236		
PA0001476373	MC ARNONI CO	40.319444	-79.980932
. . A . . .	1169 COCHRAN MILL RD, PITTSBURGH, PA. 15236		
PA0001477629	'PLUM BOROUGH SD AE O''BLOCK JUNIOR HIGH	40.463272	-79.707034
. . A . . .	440 PRESQUE ISLE DR, PITTSBURGH, PA. 15239		
PA0001477884	ONE MELLON BANK CTR	40.443251	-79.955052
. . A . . .	ONE MELLON BANK CENTER, PITTSBURGH, PA. 15258		
PA0001477892	UNIVERSITY OF PITTSBURGH	40.443958	-79.955452
. . A . . .	B-80 BENEDUM HALL, PITTSBURGH, PA. 15261		
PA0001483957	BP OIL CO 07178	40.445556	-79.714722
. P A . . .	1793 GOLDEN MILE HWY, MONROEVILLE, PA. 15140		
PA0001519446	MATT CANESTRALE CONTRACTING INC	40.152736	-79.814443
. . A . . .	RT 906 AND RT 70, BELLE VERNON, PA. 15012		
PA0001519511	BEARING SVC CO	40.174835	-79.866102
. . A . . .	379 WASHINGTON ST, DONORA, PA. 15033		
PA0001519776	GATEWAY SD GATEWAY JUNIOR HIGH SCH	40.445137	-79.762200
. . A . . .	4450 OLD WILLIAM PENN HWY, MONROEVILLE, PA. 15146		
PA0001519792	COMMUNITY COLLEGE OF ALLEGHENY COUNTY	40.426116	-79.760551
. . A . . .	BOYCE CAMPUS 595 BEATTY RD, MONROEVILLE, PA. 15146		
PA0001520014	PITTSBURGH PRESS	40.440200	-80.007440
. . A . . .	34 BLVD OF THE ALLIES, PITTSBURGH, PA. 15230		
PA0001520097	CARMICHAELS ELEMENTARY CTR	39.898084	-79.979231
. . A . . .	225 N VINE ST, CARMICHAELS, PA. 15320		
PA0001520113	KYOWA AMERICA CORP	39.860956	-80.170920
. . A . . .	RT 21, WAYNESBURG, PA. 15370		
PA0001520121	PA DEPT OF CORRECTIONS	39.916446	-80.165849
. . A . . .	630 JEFFERSON RD, WAYNESBURG, PA. 15370-9801		
PA0001520147	JESMAR ENERGY INC	39.860956	-80.170920
. . A . . .	MOUNTS RD 1 GAS WELL, WASHINGTON, PA. 15370		
PA0001520162	ROYAL RECLAMATION INC	39.909279	-79.757348
. . A . . .	390 NEW SALEM RD, UNIONTOWN, PA. 15401		
PA0001520170	ASSAD IRON & METAL INC	40.029472	-79.945719
. . A . . .	ALBANY RD, BROWNSVILLE, PA. 15417		

PA0001520279	WEST PENN POWER CO	40.220833	-79.968889
. P	800 CABIN HILL DR, GREENSBURG, PA. 15601		
PA0001574722	MON 70 TRANSLOADING	40.128179	-79.871980
. . A . . .	212 STATE ST, BELLE VERNON, PA. 15012		
PA0001618628	3R DEVELOPMENT	40.141667	-79.839444
. P	364 MAY ST, BELLE VERNON, PA. 15012		
PA0001619410	ELIZABETH BORO MUN AUTH	40.279167	-79.883333
. P	200 SECOND ST, ELIZABETH, PA. 15037		
PA0001619519	FORWARD MANOR MHP	40.259444	-79.878333
. P	22 MANOR DR, ELIZABETH, PA. 15037		
PA0001619865	PENNZOIL CO	40.208333	-79.938333
. P	200 DRY RUN RD, MONONGAHELA, PA. 15063		
PA0001621242	COLLEEN & EDWARD JACKSON	40.231667	-79.904167
. P	409 32ND ST, MCKEESPORT, PA. 15132		
PA0001621267	ERNST, ELMOR	40.284722	-79.852222
. P	2717 VERSAILLES AVE, MCKEESPORT, PA. 15132		
PA0001622240	REGIONAL INDUSTRIAL DEV CORP	40.394722	-79.835278
. P	700 BRADDOCK AVE, PITTSBURGH, PA. 15222-3805		
PA0001622455	SOUTHERN DENNIS	40.296111	-79.850556
. P	247 WILLOW HAVEN RD, BRENTWOOD, PA. 15227		
PA0001622950	NEMACOLIN MINES CORP	39.880833	-79.916667
. P	1600 W CARSON ST, PITTSBURGH, PA. 15263		
PA0001623131	WASHINGTON COUNTY HOUSING AUTH	40.002778	-80.000833
. P	100 CRUMRINE TOWER, WASHINGTON, PA. 15301		
PA0001623362	LABELLE PROCESSING CO	40.009722	-79.989722
. P	3025 WASHINGTON RD, MCMURRAY, PA. 15317		
PA0001624592	MAY DAY INC	39.878056	-79.816944
. P	RD 1 BOX 54, VANDERBILT, PA. 15486		
PA0001626480	MERMIGOS, JAMES	40.377778	-79.591667
. P	33 SAXONY DR, HARRISON CITY, PA. 15636		
PA0001758358	FRANKLIN TOWNSHIP STP	40.412222	-79.725000
. P	PO BOX 86, MURRYSVILLE, PA. 15668		
PA0001764356	DUQUESNE LIGHT PHILLIPS POWER	40.252222	-79.917778
. P	1 OXFORD CENTER, PITTSBURGH, PA. 15279		
PA0001888197	AMETEK INC	40.178110	-80.059314
. . A . . .	RR 519, EIGHTY FOUR, PA. 15330		
PA0001889252	RANBAR ELETRICAL MATERIALS INC	40.334306	-79.650972
. . . . T .	RT 993, MANOR, PA. 15665		
PA0001907781	AKZO CHEMICALS INC	40.200473	-79.923299
. . A . . .	RT 481, MONONGAHELA, PA. 15063		
PA0001909639	USS MON VALLEY WORKS	40.383333	-79.834444
. . . . T .	CAMP HOLLOW RD, WEST MIFFLIN, PA. 15122		
PA0001995729	EIGHTY FOUR MINING CO	40.178110	-80.059314
. . A . . .	RT 519, EIGHTY FOUR, PA. 15330		
PA0001998582	DUQUESNE LIGHT	40.437754	-79.997936
. . A . . .	411 PITTSBURGH ST, CHESWICK, PA. 15024		
PA0002004158	STANDARD MACH & EQUIP	39.900961	-79.727816
. . A . . .	50 W MAIN ST, UNIONTOWN, PA. 15401		
PA0002005684	ARISTECH CHEMICAL CORP	40.432777	-79.781896
. . A . . .	1 TECH CENTER DR, PITTSBURGH, PA. 15146		
PA0002173185	ELIZABETH BORO MUN AUTH STP	40.277044	-79.883260
R	1 LOCUST ST, ELIZABETH, PA. 15037		
PA0002174803	AMERICAN IRON OXIDE CO	40.091987	-79.857014
R	2 WHEELING PITTSBURGH STEEL DR, ALLENPORT, PA. 15412		
PA0002200202	NATL RECOVERY SYSTEMS	40.403566	-79.862248
. . A . . .	USX-EDGAR THOMSON PLANT, BRADDOCK, PA. 15104		
PA0002205540	B & M COAL CO	39.756153	-79.993924
. . A . . .	RT 341 PO BOX 37, DUNKARD TWP, PA. 15327		
PA0890090004	US DOE BETTIS ATOMIC POWER LAB	40.355525	-79.897891
R . A . . .	814 PITTSBURGH MCKEESPORT BLVD, WEST MIFFLIN, PA. 15122		
PA1141506807	US DEPT OF INT BUR OF MINES	40.304324	-79.974667
. . . C . .	626 COCHRANS MILL, BRUCETON, PA. 15236		
PA8890031869	US DEPT OF ENERGY - PETC	40.444608	-79.945417
r P	4800 FORBES AVE, PITTSBURGH, PA. 15236		

PAD000414110	CARMICHAELS CUMBERLAND JOINT S	39.901903	-79.966488
r P	103 MUNICIPAL RD, CARMICHAELS, PA. 15320		
PAD000505164	WESTERN WESTMORELAND STP	40.340000	-79.721667
. P	12441 RT 993, NORTH HUNTINGTON, PA. 15642		
PAD000606285	HERCULES INC	40.265833	-79.903611
. P A . T .	RT 837, WEST ELIZABETH, PA. 15088-0567		
PAD000619668	WESTINGHOUSE ELECTRIC CORP	40.418662	-79.819045
R	LARIMER AVE, TURTLE CREEK, PA. 15145		
PAD000619775	WESTINGHOUSE ELECTRIC CORP AES	40.288893	-79.912188
r . A . . .	ROUTE 51, LARGE, PA. 15025		
PAD000619783	WESTINGHOUSE ELEC CORP	40.391937	-79.840465
R P . . T .	700 BRADDOCK AVE, EAST PITTSBURGH, PA. 15112		
PAD000620427	PRESTIGE STATIONS INC 1 ARCO	40.339191	-79.995453
R	310 CEDAR ST, PITTSBURGH, PA. 15212		
PAD000652016	UNIV OF PITTSBURGH	40.443958	-79.955452
R	B 90 BENEDUM HALL, PITTSBURGH, PA. 15261		
PAD000731505	USX CORP-NATIONAL PLT	40.352406	-79.862750
R . . C . .	415 4TH AVE, MCKEESPORT, PA. 15132		
PAD000737379	PRATT & LAMBERT INC	40.430697	-79.979832
R	1823 WHARTON ST, PITTSBURGH, PA. 15203		
PAD000755579	CAM-2 TUNE-UP CTR SUNOCO	40.352065	-79.855488
R	910 LYSLE BLVD, MCKEESPORT, PA. 15132		
PAD000755595	TUNE UP CTR SUNOCO	40.437258	-79.778665
R	3911 NEW WM PENN HWY, MONROEVILLE, PA. 15146		
PAD000779884	BETHLEHEM MINES CORPORATION	40.107251	-80.021540
. . A . . .	MINE #51 ELLSWORTH BORO, ELLSWORTH, PA. 15331		
PAD000797514	ARMOLOY OF WESTERN PA INC	40.427911	-79.815394
r . A . . .	1231 RODI RD, TURTLE CREEK, PA. 15145		
PAD000797555	ASHLAND PETROLEUM CO	0.000000	0.000000
R . A . . .	RTE 837 & WALTON RD, FLOREFFE, PA. 15025		
PAD000800490	GM PITTSBURGH	40.340912	-79.901554
R P	1451 LEBANON SCHOOL RD, WEST MIFFLIN, PA. 15122		
PAD000862862	DUQUESNE CITY OF	40.378333	-79.850278
. P	C/O CITY HALL, DUQUESNE, PA. 15110		
PAD000863050	JEANNETTE CITY MUN AUTH	40.327500	-79.648056
. P	PO BOX 168, JEANNETTE, PA. 15644		
PAD000863159	MCKEESPORT MUN AUTH	40.353333	-79.872778
. P	100 ATLANTIC AVE, MCKEESPORT, PA. 15132		
PAD000863233	MONONGAHELA STP	40.207500	-79.938056
. P	1235 W RAILROAD ST, MONONGAHELA, PA. 15063		
PAD000863241	MONONGEHELIA VALLEY SEWER AUTH	40.179062	-79.862997
R P	MIDA INDUSTRIAL PARK, DONORA, PA. 15033		
PAD000863696	UNIONTOWN CITY	39.915556	-79.718889
. P	BUREAU OF SEWAGE, UNIONTOWN, PA. 15401		
PAD001698786	GENERAL ELECTRIC CO	40.357079	-79.910337
R . A . . .	4930 BUTTERMILK HOLLOW RD, WEST MIFFLIN, PA. 15122		
PAD002898526	GENUINE MOTOR PARTS	40.454787	-79.946393
R	4925 BAUM BLVD, PITTSBURGH, PA. 15213		
PAD003935426	WESTINGHOUSE ELECTRIC R AND D	40.441447	-79.845743
R	1310 BEULAH ROAD, PITTSBURGH, PA. 15235		
PAD004318788	BRASS & BRONZE CASTING CO.INC	40.333333	-79.666667
. . . . T .	SANDY HILL RD.BOX 387BRD#6, IRWIN, PA. 15642		
PAD004318879	MARSOLINO CONST CO INC	39.924100	-79.726844
r . A . . .	480 PITTSBURGH RD, UNIONTOWN, PA. 15401		
PAD004320313	H B C BARGE INC	40.016861	-79.901472
. . . . T .	ALICIA MARINE WAYS, BROWNSVILLE, PA. 15417		
PAD004320933	ALLEGHENY FOUNDRY CO	40.428182	-79.807691
. . A . . .	1100 PENN CTR BLVD, PITTSBURGH, PA. 15235		
PAD004321519	FISHER SCIENTIFIC CO	40.438330	-79.993000
r . A . . .	711 FORBES AVE, PITTSBURGH, PA. 15219		
PAD004323317	COPPERWELD CORP	40.321084	-79.893877
R	100 9TH ST, GLASSPORT, PA. 15045		
PAD004324919	H & H FOUNDRY MACHINE CO INC	40.340215	-79.674116
. . A . . .	1570 RT 993, MANOR, PA. 15665		

PAD004325692	FLEXSYS AMERICA LP	0.000000	0.000000
. P . . T .	RTE 481, MONONGAHELA, PA. 15063		
PAD004326542	CORNING VITRO CORP	40.141459	-79.901175
R P A . T .	100 8TH ST, CHARLEROI, PA. 15022		
PAD004327433	KOPP GLASS INC	40.418682	-79.886707
r . A . T .	2108 PALMER ST, SWISSVALE, PA. 15218		
PAD004328258	BLOOM ENGINEERING CO INC	40.337055	-79.991610
r . A . T .	HORNING & CURRY RDS, PITTSBURGH, PA. 15236		
PAD004329090	LONG MILE RUBBER CO	40.417056	-79.600528
. . . . T .	2 BORELAND RD WHITE VALLEY INDUSTRIAL PARK, EXPORT, PA. 15632		
PAD004334827	MOTOR COILS MANUFACTURING CO	40.405197	-79.875583
R . A . T .	100 TALBOT AVENUE, BRADDOCK, PA. 15104		
PAD004335485	SENSUS TECH	39.802516	-79.726668
. . A . T .	BAILEY & GALLATIN AVENUES, UNIONTOWN, PA. 15401		
PAD004336145	WHEELING PITTSBURGH STEEL CORP	40.088611	-79.843056
. P . . T .	RTE 88, ALLENPORT, PA. 15412		
PAD004336517	PG PUBLISHING CO	40.440200	-80.007440
R	34 BLVD OF THE ALLIES, PITTSBURGH, PA. 15222		
PAD004337903	BRAEBURN ALLOY STEEL	40.460585	-79.674066
. . A . . .	101 BRAEBURN RD, LOWER BURRELL, PA. 15068		
PAD004338000	GENCORP POLYMER PRODUCTS	40.323889	-79.616667
. P . . T .	100 CHAMBERS AVE, JEANNETTE, PA. 15644		
PAD004338646	FRUEHAUF TRAILER CORP	39.802516	-79.726668
. . A . . .	RTE #119 N, UNIONTOWN, PA. 15401		
PAD004341269	WESTINGHOUSE AIR BRAKE DIVISIO	40.389619	-79.788834
. . A . T .	1000 AIRBRAKE AVE, WILMERDING, PA. 15148		
PAD004346300	RITTER ENGINEERING CO	40.352625	-79.954885
R	540 DELWAR RD, PITTSBURGH, PA. 15236		
PAD004373981	DURABOND PROTECTIVE COATING CO INC	40.413683	-79.615402
r . . . T .	2658 JEFFERSON ST, EXPORT, PA. 15632		
PAD004383782	MON CO PRODUCTS INC	40.194335	-79.911477
. . A . . .	731 E MAIN ST, MONONGAHELA, PA. 15063		
PAD004393484	STERLING BOX CO	40.328039	-79.610211
r . A . . .	THOMAS & LAFFERTY STREETS, JEANNETTE, PA. 15644		
PAD004393492	JEANNETTE SHADE & NOVELTY CO	40.328129	-79.615354
. . A . T .	N 4TH ST, JEANNETTE, PA. 15644		
PAD004393500	HOCKENSMITH CORP	40.329778	-79.641473
. . A . . .	901 S RAILROAD ST, PENN, PA. 15675		
PAD004394276	NABISCO INC	40.457589	-79.917274
r . A . T .	6425 PENN AVE, PITTSBURGH, PA. 15206		
PAD004397410	LTV STEEL CO. INC	40.419167	-79.950278
. P A . T .	4650 SECOND AVE, PITTSBURGH, PA. 15207		
PAD004498010	USX CORP	40.294673	-79.874761
R P A . T .	400 STATE ST, CLAIRTON, PA. 15025		
PAD004501193	DUQUESNE UNIVERSITY	40.438370	-79.994247
r . A . . .	600 FORBES AVE, PITTSBURGH, PA. 15282		
PAD004513081	HALL INDUSTRIES INC	40.430216	-79.998594
r . A . . .	201 EAST CARSON ST, PITTSBURGH, PA. 15219		
PAD004810222	KELLY RUN SANITATION INC	40.258706	-79.852444
. . A . . .	RTE 51, ELIZABETH, PA. 15037		
PAD004814893	STANDARD SVC INC	40.428913	-79.990698
R	811 E CARSON ST, PITTSBURGH, PA. 15203		
PAD004991378	GRANT AVE CLEANERS	40.373305	-79.846077
R	109 W GRANT AVE, DUQUESNE, PA. 15110		
PAD005028089	ERIEZ MFG CO	40.067278	-80.183583
. . . . T .	ASBURY RD & AIRPORT, ERIE, PA. 16512		
PAD007915523	CONSOL COAL	40.010278	-79.929444
. P A . . .	1800 WASHINGTON RD, PITTSBURGH, PA. 15241		
PAD007915606	DUQUESNE LIGHT COMPANY CHESWIC	40.437754	-79.997936
. . A . . .	2841 NEW BEAVER AVE, PITTSBURGH, PA. 15233		
PAD008417792	FORBES FORD EAST AVTS	40.452011	-79.752601
r . A . . .	BEATTY & COOPER RDS, MONROEVILLE, PA. 15146		
PAD010448363	GPS INVESTORS CO	39.901004	-79.727013
. . A . . .	MAIN AND PITTSBURG STS, UNIONTOWN, PA. 15401		

PAD010468445	GLADDEN, DOROTHY CLEANERS	40.458610	-79.903550
R	6913 FRANKSTOWN RD, PITTSBURGH, PA. 15208		
PAD014373286	MC KEAN CADILLAC	40.435387	-79.788174
R	3772 WILLIAM PENN HWY, MONROEVILLE, PA. 15146		
PAD014933402	BEST OIL INC	40.376746	-79.986210
. . A . . .	2939 SAW MILL RUN BLVD, PITTSBURGH, PA. 15227		
PAD014936074	BRANDI CLEANERS	40.430421	-79.954803
R	3636-40 FRAZIER ST, PITTSBURGH, PA. 15213		
PAD014943906	CONSTANTIN PONTIAC INC	40.460202	-79.929798
R	5835 BAUM & FRIENDSHIP, PITTSBURGH, PA. 15206		
PAD014948954	DICKSON BROS CLEANERS	40.442458	-79.983238
R	1800 CENTRE AVE, PITTSBURGH, PA. 15219		
PAD021602552	MARSH ASPHALT INC	40.351688	-79.883991
r . A . . .	530 WASHINGTON, DRAVOSBURG, PA. 15034		
PAD022198402	A 1 AUTOMOTIVE ELECTRIC INC	40.414840	-79.823231
R	735 CHURCH ST EXT, TURTLE CREEK, PA. 15145		
PAD037238011	BECK/ARNLEY CORP	40.455825	-79.905176
r . A . T .	6905 SUSQUEHANNA ST, PITTSBURGH, PA. 15208		
PAD039609920	CARNEGIE - MELLON UNIV - MELLO	40.446643	-79.951762
R	4400 FIFTH AVE, PITTSBURGH, PA. 15213		
PAD041255142	INDUSTRIAL DIAMOND POWDERS	40.459366	-79.823477
. . A . . .	200 SANDY CREEK RD, VERONA, PA. 15147		
PAD041259045	ARBO IND INC	40.433392	-79.601858
. . A . . .	BORLAND RD, EXPORT, PA. 15632		
PAD041723883	MON RIVER TOWING INC	40.123333	-79.872500
. P	200 SPEERS RD, BELLE VERNON, PA. 15012		
PAD041736315	WESTERN ELECTRIC CO INC	40.455562	-79.914346
R	6585 PENN AVE, PITTSBURGH, PA. 15206		
PAD044984631	GLASSPORT BOROUGH	40.336944	-79.892222
. P	HARRISON ST, GLASSPORT, PA. 15045		
PAD045301348	COMPUNETICS INC	40.447188	-79.757690
R . . . T .	2000 ELDO RD, MONROEVILLE, PA. 15146		
PAD046799714	ADVANCED METALLURGY INC	40.459290	-79.705726
R	825 PLUM INDUSTRIAL CRT, PITTSBURGH, PA. 15239		
PAD046928081	CALIFORNIA BOROUGH	40.073056	-79.895278
. P	2ND ST, CALIFORNIA, PA. 15419		
PAD055531222	SAFETY KLEEN CORP 4-145-02	40.333393	-79.975140
R	368 OLD CURRY HOLLOW RD, PITTSBURGH, PA. 15236		
PAD055997548	ECONO-WASH & DRY CLEANING	40.458609	-79.925518
R	248-250 S HIGHLAND AVE, PITTSBURGH, PA. 15206		
PAD056641327	CLEVELAND PRICE INC	40.368010	-79.747675
. . . . T .	14000 RT 993, TRAFFORD, PA. 15085		
PAD056883762	CAMETCO INC	40.365639	-79.842315
r . A . . .	600 DUQUESNE BLVD, DUQUESNE, PA. 15110		
PAD059300152	MON VALLEY LINCOLN MERCURY	40.202784	-79.925624
R	446 W MAIN ST, MONONGAHELA, PA. 15063		
PAD060682606	USX CORP	40.397109	-79.859925
R . A . T .	13TH ST & BRADDOCK AVE, BRADDOCK, PA. 15104		
PAD063751465	FOSECO INC	39.933528	-79.650639
. . . . T .	GREATER UNIONTOWN RTE 119, MOUNT BRADDOCK, PA. 15465-0014		
PAD063766828	HERCULES INC	40.303449	-79.880197
R	120 STATE ST, CLAIRTON, PA. 15025		
PAD064041619	GRAPHICS CONTROLS CORP	40.401186	-79.817285
R . A . T .	212 FIFTH ST, WILMERDING, PA. 15148		
PAD065633745	PITTSBURGH CRANKSHAFT SERVICE	40.459612	-79.914574
R	6505 HAMILTON AVE, PITTSBURGH, PA. 15206		
PAD066839598	TRUXELL FOUNDRY CO	40.328129	-79.615354
. . A . . .	BOX 554, JEANNETTE, PA. 15644		
PAD066856212	VOCATIONAL REHABILITATION CTR	40.438025	-79.987751
R	1323 FORBES AVE, PITTSBURGH, PA. 15219		
PAD068728773	MONONGAHELA VALLEY HOSPITAL IN	40.200473	-79.923299
. . A . . .	COUNTRY CLUB ROAD ROUTE 88, MONONGAHELA, PA. 15063		
PAD068734466	UNIONTOWN HOSPITAL THE	39.901087	-79.736705
r . A . . .	500 W BERKELEY ST, UNIONTOWN, PA. 15401		

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PAD068741586  PAGE ALUMINIZED STEEL CORP                  40.158898  -79.870327
 R . A . T .     100 MONONGAHELA ST, MONESSEN, PA. 15062
PAD068751478  WOODLAND HILLS SCHL DISTRICT                40.441260  -79.856921
 r . A . . .     2430 GREENSBURG PIKE, PITTSBURGH, PA. 15221
PAD068759463  MERCY HOSPITAL OF PITTSBURGH               40.437046  -79.986360
 r . A . . .     1400 LOCUST ST, PITTSBURGH, PA. 15219
PAD072149909  BRADDOCK GENERAL HOSPITAL                  40.405637  -79.870650
 r . A . . .     400 HOLLAND AVE, BRADDOCK, PA. 15104
PAD072159460  MAGEE WOMENS HOSPITAL                      40.438472  -79.961269
 r . A . . .     300 HALKET STS, PITTSBURGH, PA. 15213
PAD072173735  USX CORP-NATIONAL DUQUESNE PLT            40.371763  -79.843934
 R . . . . .     1 LIBRARY PLACE, DUQUESNE, PA. 15110
PAD074954488  VALLEY WELDING CORP LINDE DIV             40.363004  -79.900980
 r . A . . .     903 THOMPSON RUN RD, WEST MIFFLIN, PA. 15122
PAD074978131  EMERALD MINES CORPORATION                 39.860956  -80.170920
 . . A . . .     ROUTE 218 SOUTH, WAYNESBURG, PA. 15370
PAD074997545  MONTEFIORE HOSPITAL THE                   40.440332  -79.960557
 r . A . . .     3459 FIFTH AVE, PITTSBURGH, PA. 15213
PAD077486017  CLAIRTON MUN AUTH STP                     40.304167  -79.883611
 . P . . . .     ONE STATE ST NO, CLAIRTON, PA. 15025
PAD080639222  BALDWIN WHITE HALL SCH DIST              40.351995  -79.993290
 . . A . . .     4900 CURRY RD, PITTSBURGH, PA. 15236
PAD082245754  PPG IND INC                              40.446350  -79.733431
 R P A . . .     440 COLLEGE PARK DR, MONROEVILLE, PA. 15146
PAD084591072  CONOCO INC                               40.311880  -79.996876
 r . A . . .     4000 BROWNSVILLE RD, LIBRARY, PA. 15129
PAD085522381  PLEASANT HILLS AUTH-WWTP                 40.316667  -79.966667
 . P . . . .     1222 COCHRAN MILL RD, PITTSBURGH, PA. 15236
PAD086673175  MINE SAFETY APPLIANCES INC               40.426244  -79.698688
 R . A . T .     3880 MEADOWBROOK RD, MURRYSVILLE, PA. 15668
PAD086678257  POLYCOM HUNTSMAN INC                     40.166111  -79.860556
 . P A . T .     WASHINGTON ST, DONORA, PA. 15033
PAD087567798  PIGEON CREEK SAN AUTH                    40.138611  -79.988056
 . P . . . .     513 MAIN ST, BENTLEYVILLE, PA. 15314
PAD088916309  WESTINGHOUSE ELECTRIC CORPORAT          40.318928  -79.890963
 . . A . . .     1000 OHIO AVENUE, GLASSPORT, PA. 15045
PAD089673560  DUQUESNE SLAG PRODUCTS - WEST           40.358228  -79.908798
 R . A . . .     4810 BUTTERMILK HOLLOW RD, WEST MIFFLIN, PA. 15122
PAD091551408  LIBERTY POLYGLAS INC                     40.338493  -79.898523
 r . A . T .     1575 LEBANON SCHOOL RD, WEST MIFFLIN, PA. 15122
PAD095317475  AGWAY INC                               39.860956  -80.170920
 . . A . . .     1ST ST, WAYNESBURG, PA. 15370
PAD096340328  ALLEGHENY ASPHALT & PAVING CO*          40.435524  -79.977452
 . . A . . .     2340 SECOND AVE, PITTSBURGH, PA. 15219
PAD098439375  JEANETTE SHEET GLASS                    40.329239  -79.622058
 r . A . . .     9TH & CLAY AVE.BOX 450, JEANNETTE, PA. 15644
PAD099522583  COASTAL LUMBER HOPWOOD MILL             39.867500  -79.700833
 . . . . T .     SUMMIT ST, HOPWOOD, PA. 15445
PAD100489368  GALLATIN AREA SCHOOL DISTRICT           39.884444  -79.860556
 . P . . . .     RD 5 BOX 175, UNIONTOWN, PA. 15401
PAD100490671  THOMAS JEFFERSON HIGH SCHOOL           40.312228  -79.951249
 r . A . . .     310 OLD CLAIRTON RD, CLAIRTON, PA. 15025
PAD106313851  ELLIOTT TURBO MACHINERY CO INC         40.337190  -79.608142
 . . A . T .     N 4TH ST PO BOX 800, JEANNETTE, PA. 15644
PAD108904616  S.G. KEYWELL CO                         40.360523  -79.928807
 r . A . T .     890 NOBLE DR, WEST MIFFLIN, PA. 15122
PAD113428726  GUARDIAN IND INC                        40.255917  -79.916317
 R P . . T .     300 GLASSHOUSE RD, FLOREFFE, PA. 15025-0300
PAD123224297  ALLEGHENY CO GARAGE                     40.430595  -79.998197
 R . . . . .     215 MCKEAN ST, PITTSBURGH, PA. 15219
PAD131190050  DYNO NOBEL INC                         40.187707  -79.857340
 . . . . T .     1320 GALIFFA DR, DONORA, PA. 15033
PAD157623711  SUN IMAGES                             40.429209  -79.995823
 R . . . . .     439 E CARSON ST, PITTSBURGH, PA. 15203
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PAD159317486	MCKEESPORT AREA VOTECH SCH	40.346925	-79.834242
. . A . . .	3600 ONEIL BLVD, MCKEESPORT, PA. 15130		
PAD980198626	BOSWELL OIL CO, THE	40.354795	-79.879017
r P A . . .	702 WASHINGTON AVE, DRAVOSBURG, PA. 15034		
PAD980229785	GREENE CO MEMORIAL HOSP	39.900093	-80.173929
. . A . . .	7TH & BONAR AVE, WAYNESBURG, PA. 15370		
PAD980229876	GUTTMAN OIL CO	40.152736	-79.814443
. . A . . .	RIVER RD, BELLE VERNON, PA. 15012		
PAD980231252	M BERKOWITZ CO INC	39.802516	-79.726668
. . A . . .	VIRGINIA AVENUE, UNIONTOWN, PA. 15401		
PAD980252167	RINGGOLD SCHOOL DIST	40.206434	-79.953333
. . A . . .	MAIN ST, NEW EAGLE, PA. 15067		
PAD980253090	UNIONTOWN SCHOOL DISTRICT	39.900243	-79.724462
. . A . . .	23 EAST CHURCH ST, UNIONTOWN, PA. 15401		
PAD980538516	GASCOLA SLAG	40.453693	-79.794384
. . A . . .	475 THOMPSON RUN RD, PITTSBURGH, PA. 15235		
PAD980550354	UNION CARBIDE CORPORATION	40.401249	-79.607884
R	6702 MELLON RD, EXPORT, PA. 15632		
PAD980713176	BETHEL,BORO OF MUN AUTH	40.286389	-79.992500
. P	3100 PINEY FORK RD, LIBRARY, PA. 15129		
PAD980713523	W MIFFLIN BORO THOMPSON RUN ST	40.373889	-79.872778
. P	LOWER BULL RUN RD, WEST MIFFLIN, PA. 15122		
PAD980713648	W MIFFLIN BORO NEW ENGLAND STP	40.332222	-79.921944
. P	NEW ENGLAND RD, WEST MIFFLIN, PA. 15122		
PAD980713671	BROWNSVILLE MUNICIPAL AUTH-MAI	40.019444	-79.882778
. P	SHADY AVE, BROWNSVILLE, PA. 15417		
PAD980714109	CHARLEROI BORO AUTH STP	40.145833	-79.903333
. P	13TH & MONONGAHELA RIVER, CHARLEROI, PA. 15022		
PAD980715346	MATSCO/GENERAL ELECTRIC CO	40.328152	-79.987114
R	626 COCHRAN MILL RD, BRUCETON, PA. 15236		
PAD980715767	LEYBOLD HERAEUS VACUUM PRODUCT	40.395292	-79.622137
R	5700 MELLON RD, EXPORT, PA. 15632		
PAD980827372	MINE SAFETY APPLIANCES CO	40.448258	-79.894831
R	201 N BRADDOCK AVE, PITTSBURGH, PA. 15208		
PAD981035447	US STEEL MINING - MAPLE CREEK	40.206434	-79.953333
. . A . . .	RTE 88, NEW EAGLE, PA. 15067		
PAD981035546	CARNEGIE - MELLON UNIV - WEAN	40.441086	-79.948066
R	4811 FREW ST, PITTSBURGH, PA. 15213		
PAD981038011	METALTECH	40.435564	-79.977011
r P A . . .	2400 2ND AVE, PITTSBURGH, PA. 15219		
PAD981045602	IT CORP	40.421876	-79.658434
R	5103 OLD WILLIAM PENN HWY, EXPORT, PA. 15632		
PAD981102452	E ALLEGHENY HIGH SCH	40.376799	-79.812196
. . A . . .	1150 JACKS RUN RD, NORTH VERSAILLES, PA. 15137		
PAD981103237	NATL POLYMERS INC	40.325949	-80.041457
R	2994 INDUSTRIAL BLVD, BETHEL PARK, PA. 15102		
PAD981104110	ST GEORGES CRYSTAL LTD	40.328129	-79.615354
R	BROWN AVE PO BOX 709, JEANNETTE, PA. 15644		
PAD981105968	PORT AUTH OF ALLEGHENY COUNTY	40.343001	-79.915759
R . A . . .	1000 VILLAGE DR, PITTSBURGH, PA. 15241		
PAD981106438	PORT AUTHORITY OF ALLEGHENY CT	40.455977	-79.911038
R . A . . .	6831 5TH ST, PITTSBURGH, PA. 15208		
PAD981106495	PORT AUTHORITY OF ALLEGHENY CT	40.360754	-79.933123
R . A . . .	1011 LEBANON RD, WEST MIFFLIN, PA. 15122		
PAD981730138	CLASSIC AUTO BODY	40.377169	-79.807618
R	1120 THIRD ST, NORTH VERSAILLES, PA. 15137		
PAD981730187	DUTCH GIRL CLEANERS	40.376955	-79.986560
R	2851 SAW MILL RUN BLVD, PITTSBURGH, PA. 15227		
PAD981730211	MCKEAN OLDSMOBILE	40.459443	-79.945090
r . A . . .	5001 LIBERTY AVE, PITTSBURGH, PA. 15206		
PAD981732274	JOHNNY ON THE SPOT DRY CLEANERS	40.441729	-79.766955
R	224 CENTER RD, MONROEVILLE, PA. 15146		
PAD981732340	NU LIFE CLEANERS	40.399489	-79.864028
R	916 BRADDOCK AVE, BRADDOCK, PA. 15104		

PAD981732746	NEW WEIGH DRY CLEANERS	40.437884	-79.919336
R	1711 SHADY AVE, PITTSBURGH, PA. 15217		
PAD981734403	AAMCO TRANSMISSIONS	40.408746	-79.905063
R	530 E 8TH AVE, MUNHALL, PA. 15120		
PAD981738172	PACIFIC AUTO BODY INC	40.405391	-79.872618
R	301 BRADDOCK AVE, BRADDOCK, PA. 15104		
PAD981738297	CLAIRTON AUTO BODY	40.296107	-79.884831
R	504 WILSON AVE, CLAIRTON, PA. 15025		
PAD981739600	JEFFERON HOSPITAL	40.344246	-79.975827
. . A . . .	COAL VALLEY RD, PITTSBURGH, PA. 15263		
PAD981740731	ARISTECH CHEM CORP	40.306793	-79.886470
R P A . T .	300 N STATE ST, CLAIRTON, PA. 15025		
PAD981740798	ARISTECH RESEARCH LABORATORY	40.432857	-79.782108
R . A . . .	1000 TECH CENTER DR, MONROEVILLE, PA. 15146		
PAD981935307	MONONGAHELA CONNECTING RAILROAD CO THE	40.420278	-79.952500
. P	4166 SECOND AVE, PITTSBURGH, PA. 15207		
PAD981944689	FISCHL & DEDO AUTOMOTIVE	40.322629	-80.043513
R	1010 TRANSIT BLVD, BETHEL PARK, PA. 15102		
PAD981945264	WESTINGHOUSE ELECTRIC CORP SOFC-FAC	40.432223	-79.782033
R	2000 TECH CENTER DRIVE, MONROEVILLE, PA. 15146		
PAD982568743	MAGNETEK, PEI	40.409025	-79.899726
r . A . T .	800 MARTHA ST, MUNHALL, PA. 15120		
PAD982568792	AIR PRODUCTS & CHEMICALS	40.294673	-79.874761
r . . C . .	400 STATE ST, CLAIRTON, PA. 15025		
PAD982576043	THERM O ROCK INC	40.206434	-79.953333
. . A . T .	PINE ST, NEW EAGLE, PA. 15067		
PAD982577082	KOPPERS IND INC	40.161087	-79.882840
R . A . T .	345 DONNER AVE, MONESSEN, PA. 15062		
PAD982578866	CALIFORNIA UNIVERSITY OF PA	40.069902	-79.914181
. . A . . .	3RD ST, CALIFORNIA, PA. 15419		
PAD982579609	BRYAN FRANK INC	40.430314	-79.997501
r . A . . .	3RD & MCKEAN, PITTSBURGH, PA. 15203		
PAD982662140	RUBYS CLEANERS & UNIFORM RENTAL	40.435351	-79.769914
r . A . . .	4026 MONROEVILLE BLVD, MONROEVILLE, PA. 15146		
PAD982662967	BOARD OF EDUCATION SVC CTR	40.430206	-79.985191
r . A . . .	13TH & MURIEL ST, PITTSBURGH, PA. 15203		
PAD982674731	NATIONAL POLYMERS INC	40.119764	-79.885202
r . . . T .	9 GUTTMAN AVE, CHARLEROI, PA. 15022		
PAD987266665	TECH MET INC	40.324136	-79.894372
R . A . . .	15 ALLEGHENY SQ, GLASSPORT, PA. 15045		
PAD987269214	ST. GEORGE CRYSTAL	40.328129	-79.615354
. . A . . .	BROWN AVENUE, WESTMORELAND, PA. 15692		
PAD987270279	ADVANCED METALLURGY INC	40.400028	-79.600444
. . . . T .	RT 22, DELMONT, PA. 15626		
PAD987270378	DENINO, CHUCK V CONST INC	40.435676	-79.964553
R	238 OPHELIA ST, PITTSBURGH, PA. 15213		
PAD987270477	XEROX CORP WEST MIFFLIN	40.359694	-79.933856
R	1200 LEBANON RD, WEST MIFFLIN, PA. 15122		
PAD987271046	USX CORP	0.000000	0.000000
. P A . . .	600 GRANT ST, PITTSBURGH, PA. 15219		
PAD987271293	PRECISE PLASTIC PRODUCTS	40.376491	-79.776804
R	501 MOSSIDE BLVD PO BOX 200, NORTH VERSAILLES, PA. 15137		
PAD987276805	DME CO	40.316806	-79.567778
. . . . T .	HILLIS ST, YOUNGWOOD, PA. 15697		
PAD987277241	GENUINE TOOL DIV	40.332796	-79.721236
R	1 QUALITY WAY, IRWIN, PA. 15642		
PAD987278181	JIFFY LUBE #1055	40.370032	-79.785363
R	1716 LINCOLN HWY, NORTH VERSAILLES, PA. 15137		
PAD987284957	WAYNESBURG COMPRESSOR STATION	39.860956	-80.170920
R	HIGHWAY 188, WAYNESBURG, PA. 15370		
PAD987285004	MERCURY PRINTING INC	40.442182	-79.885649
r . A . . .	801 WOOD ST, WILKINSBURG, PA. 15221		
PAD987285327	CHATHAM COLLEGE	40.452760	-79.932772
. . A . . .	WOODLAND ROAD, PITTSBURGH, PA. 15232		

PAD987286820	ADMOR PRESS	40.430620	-79.996673
. . A . . .	52 TERMINAL WAY, PITTSBURGH, PA. 15219		
PAD987286838	ALBA PRESS	40.428280	-79.983204
. . A . . .	95 S 15TH ST, PITTSBURGH, PA. 15203		
PAD987286895	ACME WINDOW SHADE &	40.458139	-79.910492
. . A . . .	6629 HAMILTON AVE, PITTSBURGH, PA. 15206		
PAD987287570	IDL INC	40.457996	-79.749258
. . A . T .	535 OLD FRANKSTOWN, PITTSBURGH, PA. 15239		
PAD987287968	TYGART INDUSTRIES	40.341453	-79.843679
. . A . . .	1 DOUGLAS AV BOX 276, MCKEESPORT, PA. 15134		
PAD987289048	ABC PRESS INC	40.407622	-79.761377
. . A . . .	2252 MOSS SIDE BLVD, MONROEVILLE, PA. 15146		
PAD987289444	CEN. MED. CTR & HOSP	40.440825	-79.989408
. . A . . .	1200 CENTRE AVENUE, PITTSBURGH, PA. 15219		
PAD987289543	MCKEESPORT HOSPITAL	40.352101	-79.849942
. . A . . .	1500 FIFTH AVENUE, MCKEESPORT, PA. 15132		
PAD987289642	SHADYSIDE HOSPITAL	40.455276	-79.940833
R . A . . .	5230 CENTRE AVENUE, PITTSBURGH, PA. 15232		
PAD987289659	SOUTH SIDE HOSPITAL	40.425918	-79.977617
. . A . . .	2000 MARY STREET, PITTSBURGH, PA. 15203		
PAD987298361	PERMA COTE PLASTICS INC	39.893813	-79.716532
R . A . . .	42 FEATHERS AVE, UNIONTOWN, PA. 15401		
PAD987298437	WELLAND CHEMICAL INC	40.074870	-79.889260
r . A . T .	MILL ST, NEWELL, PA. 15466		
PAD987298510	COPYCAT PRINTING	39.900689	-79.730756
R	237 W MAIN ST, UNIONTOWN, PA. 15401		
PAD987298528	BROWNSVILLE GENERAL HOSP	0.000000	0.000000
. P A . . .	125 SIMPSON RD, BROWNSVILLE, PA. 15417		
PAD987298841	GREENE CTY. MEM. HOS	39.860956	-80.170920
. . A . . .	BONAR AVENUE, WAYNESBURG, PA. 15370		
PAD987315595	COMPOSITE METAL PROD	40.178110	-80.059314
. . A . . .	RT 519, EIGHTY-FOUR, PA. 15330		
PAD987315835	AUSTIN INDL COATINGS	40.178110	-80.059314
. . A . . .	RT 519 & 136 RD 2, EIGHTY FOUR, PA. 15330		
PAD987316007	MONONGEHELA VALY.HOS	40.200473	-79.923299
. . A . . .	CARROLL TOWNSHIP, MONONGAHELA, PA. 15063		
PAD987316015	GAUTAM PAEL M D	40.138466	-79.901039
. . A . . .	625 LINCOLN AVE, N CHARLEROI, PA. 15022		
PAD987316668	PBM INC	40.350417	-79.667694
. . . . T .	RD 6 BOX 387A, IRWIN, PA. 15642		
PAD987316916	EARTH SCIENCES CONS.	40.418353	-79.647132
. . A . . .	ONE TRIANGLE DRIVE, EXPORT, PA. 15632		
PAD987316932	JEANNETTE DIST MEM HOSP	40.319710	-79.612121
. . A . . .	600 JEFFERSON AVENUE, JEANNETTE, PA. 15644		
PAD987317849	DONEGAL CRYSTAL USA INC	40.322391	-79.605052
R	KERR & SEVENTH ST, GRAPEVILLE, PA. 15637		
PAD987320751	NEXTECH	40.403089	-79.831158
R . A . . .	300 BRADDOCK AVE, TURTLE CREEK, PA. 15145		
PAD987321395	AMERICAN REFINING GROUP INC	40.354795	-79.879017
R	702 WASHINGTON AVE, DRAVOSBURG, PA. 15238		
PAD987321544	USX CORP	40.333333	-79.902222
. P	CAMP HOLLOW RD, DRAVOSBURG, PA. 15034		
PAD987322443	GRAPHIC ARTS TECHNICAL FOUND	40.444523	-79.948232
r . A . . .	4615 FORBES AVE, PITTSBURGH, PA. 15213-3796		
PAD987322476	ACCO IND INC	40.151560	-79.882877
. . A . . .	DONNER AVE, MONESSEN, PA. 15062		
PAD987324936	DONEGAL CRYSTAL U.S.A., INC	40.328461	-79.618902
r . A . . .	109 SOUTH SIXTH STREET, JEANNETTE, PA. 15644		
PAD987326097	PESTCO INC.	40.400254	-79.867814
. . . . T .	215 8TH ST., BRADDOCK, PA. 15104		
PAD987326279	BINGHAM CO	40.427580	-79.985151
. . A . T .	88 SOUTH 13TH STREET, PITTSBURGH, PA. 15203		
PAD987326659	TYK REFRACTORIES	40.288486	-79.918234
. . A . T .	301 BRICKYARD RD, LARGE, PA. 15025		

PAD987330644	ATLANTIC SVC STA	40.419828	-79.889243
. . A . . .	7403 WASHINGTON ST-TANKS, SWISSVALE, PA. 15218		
PAD987330693	ATLANTIC SVC STA	40.345659	-79.878882
. . A . . .	600 LYSLE BLVD-TANKS, MCKEESPORT, PA. 15132		
PAD987335908	CNG TRANSMISSION CORP	40.343847	-79.592210
R	170 SUTHERLAND RD, JEANNETTE, PA. 15644-9785		
PAD987336021	CNG TRANSMISSION BENEZETTE	40.328129	-79.615354
. . A . . .	SR 2004 6 MI FROM MEDIX, MEDIX, PA. 15868		
PAD987339215	ATLANTIC SVC STA	40.439194	-79.879048
r . A . . .	709 SWISSVALE ST, WILKINSBURG, PA. 15221		
PAD987340189	URBAN REDEVEL AUTH PITTSBURG	40.443237	-79.981808
R	MILLER ST SITE CRAWFORD ROB C, PITTSBURGH, PA. 15219		
PAD987342151	COASTAL OIL CHARLEROI	40.148636	-79.903977
R	104 WATER ST, NORTH CHARLEROI, PA. 15022		
PAD987345170	EXXON CO USA #20607	40.341266	-79.984864
. . A . . .	5300 BROWNSVILLE RD, PITTSBURGH, PA. 15236		
PAD987346103	FRANK IREY JR INC	40.200473	-79.923299
R	#2 PARK AVE EXTENSION, MONONGAHELA, PA. 15063		
PAD987349651	TETCO- M & R 037 & 039 MP748.98 LN15	39.860956	-80.170920
R	HWY 188, WAYNESBURG, PA. 15370		
PAD987349883	QUALITY ROLLS INC	40.430264	-79.987292
r . . . T .	1101 MURIEL STREET, PITTSBURGH, PA. 15203		
PAD987356326	VIVIANO MACARONI CO	40.433667	-80.000000
. . . . T .	NOBLESTOWN RD W, CARNEGIE, PA. 15106		
PAD987356797	ACCURATE MARKING PRODUCTS INC	40.430174	-79.972173
R	2315 WHARTON ST, PITTSBURGH, PA. 15203-2124		
PAD987357126	TETCO-E YOUGHIOGHENY MP 1181.48	39.970478	-79.666176
R	STATE GAME LANDS RD 51 LN 2, DUNBAR, PA. 15431		
PAD987357167	TETCO-MONONGAHELA LN15MP759.90	39.864121	-80.003598
R	LR 30097 RD, CARMICHAELS, PA. 15320		
PAD987360047	ADVANCED METALLURGY INC	40.403862	-79.623295
R . . . T .	1003 CORPORATE DRIVE, EXPORT, PA. 15632		
PAD987361722	CAVALLO, JOHN	39.912546	-79.728410
. P	153 WALTER ST, FRANKLIN TWP, PA. 15050		
PAD987361953	CLINE DENNIS	40.057778	-80.041111
. P	3175 RTE 2011, SCENERY HILL, PA. 15360		
PAD987362019	EMERALD MINES CORP	39.861111	-80.211944
. P	145 ELM DR, WAYNESBURG, PA. 15370		
PAD987362050	FAIRCHANCE MUNICIPAL S.A	39.808056	-79.768333
. P	AUTHORITY 125 W CHURCH STREET, GEORGES TWP, PA. 18940		
PAD987362100	FAYETTE COUNTY HOUSING AUTHORITY	39.938334	-79.731228
. P	624 PITTSBURGH ROAD, SPRING HILL TWP, PA. 16156		
PAD987362175	FULTON, RICHARD & FRANCIS	40.275000	-80.041111
. P	437 TURKEYFOOT ROAD, FINLEYVILLE, PA. 16679		
PAD987362225	CRAMER CALVIN GLEN MEADOW MHP	40.124722	-80.230556
. P	305 OBENDICK DR, MCKEESPORT, PA. 15135		
PAD987362472	LAUREL LAND DEVELOPMENT	39.888056	-79.684444
. P	HOPWOOD VILLAGE MOBILE HOMES P.O. BOX 25, HOPWOOD, PA. 15445		
PAD987363736	BOTTI, WILLIAM & BARBARA	40.460827	-79.727672
. P	312 KNOLLVIEW DRIVE, PITTSBUGH, PA. 15201		
PAD987363876	SVILAR, GEORGE JR & KATHRYN M	40.421667	-79.701389
. P	227 KENMAR DRIVE, MONROEVILLE, PA. 15146		
PAD987364676	CARNEGIE THE	40.444308	-79.949444
r . A . . .	4400 FORBES AVE, PITTSBURGH, PA. 15213		
PAD987370897	DUQUESNE LIGHT CO	40.437754	-79.997936
. . A . . .	301 GRANT ST, PITTSBURGH, PA. 15279		
PAD987372539	BENTWORTH SR HIGH SCHOOL	40.117762	-80.004642
. . A . . .	LINCOLN AVENUE EXT, BENTLEYVILLE, PA. 15314		
PAD987372547	BETHLEHEM MINES CORP	40.117762	-80.004642
. . A . . .	MINE #60 SOMERSET TWP, BENTLEYVILLE, PA. 15314		
PAD987372745	'BLACKMON''S CONSULTING SERVICE'	40.014783	-79.894746
. . A . . .	525 PEARL STREET, BROWNSVILLE, PA. 15417		
PAD987372893	CHARLEROI FOODLAND	40.134243	-79.893221
. . A . . .	FIRST ST & MC KEAN AVE, CHARLEROI, PA. 15022		

PAD987373404	DANRI CORP	39.756153	-79.993924
. . A . . .	RD #1 ROUTE 88, DILLINER, PA. 15327		
PAD987373420	PIAD PRECISION CASTING CORP	40.384594	-79.807254
. . A . . .	WESTMORELAND INDL PARK, EAST MC KEESPORT, PA. 15035-2405		
PAD987373479	NITROUS OXIDE COPRORATION	40.179062	-79.862997
r . A . . .	CARROLL TWP, DONORA, PA. 15033		
PAD987373560	ICI AMERICAS INC SPECIALITY	40.178110	-80.059314
. . A . . .	RD #3 BOX 212, EIGHTY FOUR, PA. 15330		
PAD987373578	FOUR M MFG GROUP	40.178110	-80.059314
. . A . . .	10 WILSON RD, EIGHTY FOUR, PA. 15330-9803		
PAD987373743	CAC ENGERY INC	40.433392	-79.601858
. . A . . .	FRANKLIN TWP, EXPORT, PA. 15632		
PAD987373750	FRANK IREY JR INC	39.824976	-79.754259
. . A . . .	GEORGES TWP, FAIRCHANCE, PA. 15436		
PAD987373909	BETHLEHEM AREA ELEM SCHOOL	40.027035	-80.033659
. . A . . .	RD #1, FREDERICKTOWN, PA. 15333		
PAD987374147	TEXAS EASTERN GAS PIPELINE	39.844217	-80.341992
. . A . . .	HOLBROOK STATION, HOLBROOK, PA. 15341		
PAD987374386	ISABELLA COAL COMPANY	39.948120	-79.927150
. . A . . .	LUZERNE TWP, ISABELLA, PA. 15447		
PAD987374402	JEANETTE MIDDLE SCHOOL	40.328129	-79.615354
. . A . . .	4TH STREET BOX 18, JEANETTE, PA. 15644		
PAD987374410	JEFFERSON-MORGAN JR/SR HIGH SCHOOL	39.918539	-80.056816
. . A . . .	RT 188 GREEN STREET, JEFFERSON, PA. 15344		
PAD987374428	JEFFERSON-MORGAN ELEMENTARY SCHOOL	39.918539	-80.056816
. . A . . .	RT 188 GREEN STREET, JEFFERSON, PA. 15344		
PAD987374972	COAL SERVICES INTERNATIONAL	40.377531	-79.676666
. . A . . .	EXPORT ROAD PENN TWP, MC CULLOUGH, PA. 15636		
PAD987375045	PATTERSON SUPPLY CO	0.000000	0.000000
. P A . . .	RAILROAD ST & 10TH ST, MONONGAHELA, PA. 15063		
PAD987375144	AMPCO PITTSBURGH CORP	40.443237	-79.981808
. . A . . .	700 PORTER BUILDING, MONACA BORO, PA. 15219		
PAD987376209	AUSTRALIAN RECOVERY TECHNOLOGIES	39.802516	-79.726668
. . A . . .	RT 166 GERMAN TWP, RALPH, PA. 15401		
PAD987376662	LAFAYETTE MANOR INC	39.802516	-79.726668
. . A . . .	120 OLD NEW SALEM RD, UNIONTOWN, PA. 15401-8933		
PAD987376670	MOSS SUPER MARKET	39.913654	-79.749654
. . A . . .	655 W MAIN ST, UNIONTOWN, PA. 15401-2646		
PAD987376746	SILBAUGH VAULT & BURIAL SVC	39.885132	-79.736754
. . A . . .	542 MORGANTOWN ST, UNIONTOWN, PA. 15401-5412		
PAD987376787	US STEEL CORP	39.898634	-80.148665
. . A . . .	145 ELM DR, WAYNESBURG, PA. 15370-3295		
PAD987376803	TRINITY AREA SCHOOL DIST	40.109167	-80.208333
. P	PARK AVENUE, WASHINGTON, PA. 15301-9201		
PAD987376811	RAYMONT CONSTRUCTION	39.860956	-80.170920
. . A . . .	1464 E HIGH ST, WAYNESBURG, PA. 15370-9558		
PAD987376837	TIMBER PRODUCTS INC	39.802516	-79.726668
. . A . . .	RT 40 NORTH UNION TWP, UNIONTOWN, PA. 15401		
PAD987376902	ATLANTIC REFINING	39.860956	-80.170920
. . A . . .	10 GREENE STREET, WAYNESBURG, PA. 15370		
PAD987377850	TETCO-CONNGELSVILLE STA 21	39.927763	-79.647073
R	RT 1, LAMONT FURNACE, PA. 15456		
PAD987379138	WESTMORELAND SANITARY LDFL	40.151560	-79.882877
. . A . . .	TYROL RD, MONESSEN, PA. 15062		
PAD987380920	EAST EXIT MOTEL	40.426116	-79.760551
. . A . . .	ROUTE 22, EAST MONROEVILLE, PA. 15146		
PAD987380953	HALOMET INC	39.814738	-79.874403
. . A . . .	PO BOX 726 MONGAHELEA TWP, MASONTOWN, PA. 15461		
PAD987380979	WILKINSBRG-PENN JINT WTR AUTH	40.456343	-79.864229
. . A . . .	2200 ROBINSON BLVD, PITTSBURGH, PA. 15221-1193		
PAD987381365	CARBON FUEL RESOURCES INC	39.964640	-79.715300
. . A . . .	DUNBAR TWP, WEST LEISENRING, PA. 15489		
PAD987382686	COMMUNITY BANK.OF GREENE COUNTY	39.880000	-80.275000
. P	100 N MARKET ST, CARMICHAELS, PA. 15320-1224		

PAD987382934	WILLNER, ALLYN J JR	40.427736	-79.977250
. P	211 SEIK RD, WASHINGTON, PA. 15301		
PAD987383312	RUBISH, PAUL	39.952778	-79.735556
. P	RD #1 BOX 267, DUNBAR, PA. 15431		
PAD987383486	WOODHOUSE RUDOLPH P	40.178110	-80.059314
. P	RT 519 & I 70, EIGHTYFOUR, PA. 15330		
PAD987383502	ELRAMA ASH DISPOSAL SITE	40.249722	-79.950000
. P	ONE OXFORD CENTRE 301 GRANT STREET, ELRAMA, PA. 15038		
PAD987383577	FAIRCHANCE BORO WATER TREATMENT	39.820702	-79.759565
. P	125 W CHURCH ST, FAIRCHANCE, PA. 15436		
PAD987383684	DEBEVEC, WILLIAM J	40.208333	-79.916667
. P	RD 3 BOX 705, MONONGAHELA, PA. 15063		
PAD987383742	BETHLEHEM CENTER SCHOOL DISTRICT	40.017222	-80.026389
. P	RD 1 BOX 28C, FREDERICKTOWN, PA. 15333		
PAD987385283	NUMIS CORPORATION	40.398611	-79.691667
. P	RD #1.BOX 295A, TRAFFORD, PA. 15085-9801		
PAD987385390	UNIVERSAL RESEARCH CENTER	40.459167	-79.794444
. P	ONE TECH CENTER DRIVE, PENN HILLS TWP, PA. 15235		
PAD987385556	PLUM BOROUGH	40.449722	-79.713611
. P	4575 NEW TEXAS RD, PITTSBURGH, PA. 15239-1136		
PAD987385697	BOYLE, JAMES JR & LUANNE	40.417015	-79.881315
. P	2414 WOODSTOCK AVE, RICHLAND TWP, PA. 15024		
PAD987386000	JARRETT BROTHERS MHP	39.795278	-79.815000
. P	PARK, SMITHFIELD, PA. 15478		
PAD987386083	GUTTMAN OIL COMPANY	40.120212	-79.879621
r P	200 SPEERS ROAD, SPEERS, PA. 15012		
PAD987386109	ALBERT GALLATIN AREA SCH DISTRICT	39.780000	-79.921667
. P	10 W CHURCH ST, MASONTOWN, PA. 15461		
PAD987386356	BARNES, GARY	39.916667	-79.766667
. P	345 DUCK HOLLOW ROAD, UNIONTOWN CITY, PA. 15401		
PAD987386372	BOWMAN, ELLA ESTATE OF	40.443251	-79.955052
. P	ONE MELLON BANK CENTER, UPPER BURRELL, PA. 15689		
PAD987387263	COMPUNETICS INC	40.446986	-79.756700
R	700 SECO RD, MONROEVILLE, PA. 15146		
PAD987389830	GEROME MFG INC	39.802516	-79.726668
r . . . T .	UNIONTOWN OLIVER ROAD, UNIONTOWN, PA. 15401		
PAD987390085	SHANE FELTER IND	39.802516	-79.726668
R	RT 51 N, UNIONTOWN, PA. 15401		
PAD987391653	COMMERCIAL STEEL CORPORATION	40.324400	-79.893617
r . A . . .	7TH & ALLEGHENY AVE, GLASSPORT, PA. 15045-1660		
PAD987392248	CHILDRENS HOSPITAL OF PITTSBURGH	40.440328	-79.960510
r . A . . .	3460 FIFTH AVE, PITTSBURGH, PA. 15213		
PAD987392560	MAYFLOWER CONTRACT SERVICES	40.343289	-80.026831
r . A . . .	4780 LIBRARY RD, BETHEL PARK, PA. 15102-2918		
PAD987392974	W PENN WIRE	39.860956	-80.170920
R . . . T .	RT 21 E, WAYNESBURG, PA. 15370		
PAD987395522	PITTSBURGH HOUSING AUTH CITY OF	40.409062	-79.973074
R	920 CRESSWELL ST, PITTSBURGH, PA. 15210-3026		
PAD987396512	SUPERAMERICA NUMBER 5261	39.899402	-79.728999
R	104 W FAYETTE ST, UNIONTOWN, PA. 15401		
PAD987400884	SPECIALTY LINING INC	40.450053	-79.913169
. . A . . .	401 LINDEN ST, MCKEES ROCKS, PA. 15136		
PAD987401221	BESTOFLEX INC	40.400389	-79.601472
. . . . T .	6015 ENTERPRISE DR, EXPORT, PA. 15632		
PAD990754913	WESTINGHOUSE ELECTRIC CORP	40.381614	-79.764563
R . A . . .	1 STEWART STATION DR, TRAFFORD, PA. 15085-1826		
PAD991297284	CAM II TUNE UP CTR-CLAIRTON BLVD PITTS	40.356550	-79.980401
R	4625 CLAIRTON BLVD, PITTSBURGH, PA. 15224		
PAD991297409	CAM II TUNE UP CTR-LIBERTY AVE PITTS	40.460024	-79.946227
R	4900 LIBERTY AVE, PITTSBURGH, PA. 15224		
PAD991298118	SUNOCO SVC STATION-B HOLLOW RD PITTS	40.363709	-79.908125
r . A . . .	6021 BUTTERMILK HOLLOW RD, PITTSBURGH, PA. 15207		
WV0000531004	BLACKSVILLE, TOWN OF	39.723611	-80.201111
. P	P. O. BOX 55, BLACKSVILLE, WV. 26521		

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 WVD988767034  CONSOL BATHOUSE NO 1 MINE                    0.000000    0.000000
  . P A . . .     1MI E OF BLACKSVILLE, BLACKSVILLE, WV. 26521

Envfacts Facility Report completed...


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***  End of Report  ***
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HAZARDOUS AND TOXIC WASTE SITE INVENTORY

Army Corps of Engineers
Lower Monongahela River Navigation Feasibility Study
Final Main Report
(1991)
U.S. Army Engineer District

Facility	Location (River Mile)	Site Description
Westinghouse Electric Corp. PAD987270907	11.5	Bulk liquid storage area. Leakage. Hazardous waste generator. Potential ground/surface water, soil contamination. Incative. Waste tanks removed.
Westinghouse Air Brake Division PAD004341269	12	Small hazardous waste generator. Drums, tanks. Closure activities ongoing. Leakage in soil/groundwater. Caustic waters. Xylene, waste paints, coolants.
USX Taylor Landfill PAD000739672	12.5	Inactive landfill disposal area. Hazardous waste present: benzene, phenols, etc.
West Mifflin Sanitary Authority PAD980693147	12.5	No information.
USX Corp. National Works PAD000731505	15	Inactive. Drums, tanks, bins. solid waste, transformers, PCB's, lead, asbestos, etc. Remedial cleanup.
USX Corp. Irvin Works PAD004379061	18.5	Slag. Active site. Drums, diked areas, tanks, spent pickle liquors.
Carnegie Natural Gas-Pipeline 11	18.8	Coke oven residue burial. Active. Unlined pits, trenches. Chromium, lead, mercury. Potential for direct contact exists.
USX Corp. Clairton Works PAD004498010	20.5	Sludge/decanter from coking operations. Not hazardous now.
Kutsenkow Landfill PAD980830939	20.5	Dump site. Pikcling acids, aromatic solvents, polyaromatic hydrocarbons.
Peters Creek Lagoon PAD981034788	21	Inactive. PADEP medium priority. Acids, organics, phenols. Monitoring wells installed.
Ben Construction Company PAD008938474	21	No hazardous waste. Roadway fill material. Tree stumps.
Hercules-Picco	23.6	Manufacturing operation. Landfill resins, sludge, hazardous waste.
Ashland Oil	24	Storage area. Groundwater collection and treatment system
Elrama School PAD9810344994	25.5	Inactive hazardous waste site. Potential for ground/surface water and soil contamination. Acid clays, solvents.
Elrama Works Town Gas PAD980706915	25.5	Inactive. Covered by development. No wastes existing since 1935. Coal gasification products
Grief Brothers Cooperage Corp. PAD063770200	30.3	No potential hazard or on-site disposal since 1971. PADEP low priority. Pickle liquor acid wastes.

Source: Lower Monongahela River Navigation System Feasibility Study Final Main Report by ACOE, 1991, Pittsburgh: U.S. Army Engineer District, Corps of Engineers.

Putnaks Packing PAD063770200	31.5	Active non-hazardous waste site. Meat processing.
Stauffer Chemical Company PAD004325692	31.5	Inactive site. PADEP low priority site. Hazardous waste generator. Solid, liquids. 3acre site. Potential for ground/surface water and soil contamination.
Burrell Construction and Supply PAD004347894	34.6	Asphalt paving material, slag, small hazardous material usage (100gal/yr)
Canastrales Landfill PAD98050847	38.9	No information.
Welch's Landfill Disposal	41.5	Active waste site. Collection pond. Pigments, alum mud, waste dyes. 95 acres.
Corning Glass Works Charleroi PAD004326542	41.6	Hazardous waste generator. Liquid wastes (1000gal/yr), soild waste (200tons/yr). Stored in containers.

Source: Lower Monongahela River Navigation System Feasibility Study Final Main Report by ACOE, 1991, Pittsburgh: U.S. Army Engineer District, Corps of Engineers.

APPENDIX E: Water Quality Data

NPDES PERMITTED FACILITIES

NPDES Permitted Dischargers to the Monongahela River

FACILITY/OWNER	PERMIT NO.	COUNTY	MUNICIPALITY
Water Authorities			
Southwestern PA Water Authority WTP	PA0205600	Greene	Cumberland Township
Western Penn Water Co.	PA0000205	Washington	
East Dunkard Water Association	PA0021971	Greene	Dilliner
Southwestern PA Water Auth.	PA0205800	Greene	Jefferson
Industrial/Commercial Facilities			
Monessen Works	PA0001554	Westmoreland	Monessen
Aldrich Plant - Pittsburgh Division	PA0000272	Washington	Union Township
Hercules, Inc. - Jefferson Plant	PA0000507	Allegheny	Jefferson Borough
Air Products & Chemical,Inc.Pitts	PA0001261	Allegheny	Pittsburgh
Beth Mines Corp-Ellsworth Div.	PA0001350	Washington	Ellsworth
Bethlehem Mine Corp.	PA0001368	Washington	
Allenport Works	PA0001562	Washington	Allenport Borough
Elrama Station	PA0001571	Washington	Union Township
Duquesne Light Co. Coal Dept.	PA0001635	Greene	Greensboro
Elliott Co. Div. Carrier Corp.	PA0001694	Westmoreland	Jeannette
General Tire & Rubber - Jeannette	PA0001759	Westmoreland	Jeannette
Mitchell Power Station	PA0002895	Washington	Union Township
Hatfield Power Station	PA0002941	Greene	Monongahela Township
Newell Works	PA0003042	Fayette	Newell Borough
Amoco Oil - East Carson Street Ext. Terminal	PA0003450	Allegheny	Pittsburgh
Monongahela Connecting RR	PA0003719	Allegheny	Pittsburgh
Rockwell Mfg. Co.	PA0003786	Fayette	Uniontown
US Steel-Frick Dist. Mines	PA0003913	Greene	Pittsburgh
Irvin Plant - USS	PA0004073	Allegheny	West Mifflin Borough
Page Aluminized Steel Corporation	PA0004120	Westmoreland	Monessen
Standard LaFarge	PA0004278	Canfield	Allegheny
National Works	PA0004464	Allegheny	McKeesport
Clairton Works - USS	PA0004472	Allegheny	Clairton Borough
Homestead Works	PA0004481	Allegheny	Homestead Borough
Westinghouse Electric Corp. E.Pgh	PA0005401	Allegheny	East Pittsburgh
Works-Charleroi	PA0005746	Washington	Charleroi
Gateway Coal Co.	PA0005771	Greene	California
National Mine Corp.	PA0005916	Fayette	Isabella
Vesta Shannopin Coal Div. Shan	PA0006084	Greene	Pittsburgh
Vesta Shannopin Coal #5 Mine	PA0006092	Washington	Pittsburgh
LTV Steel Company - Pgh. Works (J&L)	PA0006131	Allegheny	Pittsburgh
Vesta Shannopin Coal-Prep Plt	PA0006149	Fayette	Pittsburgh
Pittsburgh Flexicore Co., Inc.	PA0006637	Washington	Monongahela

Source: [Dischargers to the Monongahela River], 1996, by USGS, Unpublished data. K. Halloran, PADEP, personal communication, November 24, 1997.

NPDES Permitted Dischargers to the Monongahela River

FACILITY/OWNER	PERMIT NO.	COUNTY	MUNICIPALITY
Patterson Supply Co.	PA0006645	Washington	Monongahela
Consol Carpenter Shaft #2 Mine	PA0013790	Greene	Pittsburgh
Consol Bowers Portal Disch. HU	PA0013803	Greene	Pittsburgh
Republic Steel Clyde Mine	PA0014320	Washington	Cleveland
Flexsys America LP	PA0022004	Washington	Monongahela
US Steel Corp-Dilworth Mine	PA0022594	Greene	Uniontown
Mathies Coal Company	PA0023337	Washington	Pittsburgh
Consol Coal Christopher Div.	PA0025216	Greene	Pittsburgh
Ashland Petroleum-Floreffe Terminal	PA0025852	Allegheny	Jefferson Borough
Hays Mine Station/Becks Run complex	PA0028126	Allegheny	Pittsburgh
General Motors Corp.	PA0030392	Allegheny	West Mifflin
Cumberland Mines-US Steel Corp.	PA0033511	Greene	Waynesburg
Lynn Road Treatment Plant-Lynn	PA0034584	Fayette	Brownsville
Trumbull Corporation	PA0035181	Allegheny	Pittsburgh
Pitsburgh X-Ray Chemical Service	PA0038750	Allegheny	Pittsburgh
Gateway Diesel	PA0038857	Allegheny	Pittsburgh
Rehaboth Valley Industrial Dis.	PA0039721	Westmoreland	Belle Vernon
Brownsville NTP - Southwestern Division	PA0040177	Fayette	Brownsville Borough
Westinghouse Electric Corp.	PA0042102	Westmoreland	Manor
American Dish Services of West	PA0042536	Westmoreland	Export
B & M Coal Co. Mine #1	PA0042757	Greene	Dilliner
Consol No. 1 Mine-Blacksburg O	PA0043559	Greene	McMurray
Fern Valley Industries	PA0090271	Allegheny	Jefferson Borough
Green Valley Packing, Inc.	PA0090328	Washington	Claysville
Maple Creek Mining Inc.	PA0090689	Westmoreland	Pepper Pike
Target Industries, Inc.	PA0090735	Greene	Bunkard Twp.
Nemacolin Mines Corp.	PA0090794	Greene	Nemacolin
Middle States Steel Construction	PA0090930	Washington	Eighty Four
Leeland Development Co.	PA0091324	Greene	Dilliner
Polycom Huntsman - Donora	PA0091391	Washington	Donora Borough
Leybold-Heraeus Vacuum Product	PA0091871	Allegheny	Export
Edgar Thomson Works - USS	PA0094510	Allegheny	North Braddock Borough
Cavallo, John	PA0096407	Fayette	Uniontown
Cyprus Emerald Resources Corp.	PA0096466	Greene	Waynesburg
Numis Corporation	PA0096628	Westmoreland	Trafford
Metaltech	PA0096792	Allegheny	Pittsburgh
R&M Manufacturing Sales & Ser.	PA0096911	Greene	Waynesburg
Paisley Industrial Park	PA0097128	Greene	Waynesburg
Laurel Land Development	PA0097136	Fayette	Hopwood

Source: [Dischargers to the Monongahela River], 1996, by USGS, Unpublished data. K. Halloran, PADEP, personal communication, November 24, 1997.

NPDES Permitted Dischargers to the Monongahela River

FACILITY/OWNER	PERMIT NO.	COUNTY	MUNICIPALITY
Universal Research Center	PA0097357	Allegheny	Monroeville
Aristech Chemical Corporation	PA0098001	Allegheny	Clairton
May Day Inc.	PA0098272	Fayette	Vanderbilt
Community Bank of Greene Cty	PA0098469	Greene	Carmichaels
Bevevino & Briceland Partnership	PA0098990	Beaver	Beaver
Guttman Oil Company - Bulk Storage	PA0204145	Washington	Speers Borough
Reesman MHP	PA0204285	Greene	Waynesburg
Polycom Huntsman - Donora Plant No. 2	PA0204293	Washington	Donora Borough
Carlton Motel & Restaurant	PA0204510	Somerset	Bentleyville
Guardian Industries - Floreffe Plant	PA0204862	Allegheny	Jefferson Borough
Grays Landing Lock & Dam-Concrete Batch Plant	PA0205052	Fayette	Nicholson Township
Mon Valley Cogeneration Facility	PA0205150	Greene	Monongahela township
The Boswell Oil Co. - Dravosburg	PA0205656	Allegheny	Dravosburg Borough
J.G. Foodmart-James Gnagey	PA0215848	Fayette	Uniontown
3R Development	PA0215996	Westmoreland	Belle Vernon
Alicia Dock Coal Transfer Facility	PA0216038	Fayette	Luzerne Township
Chemply, Div. of E. & E. Inc.	PA0216071	Allegheny	Pittsburgh
Eighty Four Mining Co.	PA0216160	Washington	Eighty Four
RJM Real Estate Co.	PA0216275	Washington	Monongahela
Matt Canestrale Contracting	PA0216356	Fayette	Belle Vernon
Consolidated Coal Company	PA0216470	Greene	Morgantown
Pennzoil Company	PA0216771	Washington	Monongahela
Mon-View Mining Corp.	PA0216836	Washington	New Eagle
Maxwell Locks and Dam	PA0217000	Fayette	Luzerne Township
Monessen Coke Plant	PA0217034	Westmoreland	Monessen
Mon River Towing-Belle Vernon Facility	PA0217298	Washington	Speers Borough
BOC Gases - Braddock Facility	PA0217387	Allegheny	Braddock Borough
Therm-O-Rock, Inc.	PAS216103	Washington	New Eagle Borough
Italian Maid Bakery-W. Brownsville	PA0003662	Washington	Pittsburgh
Elrama Ash Disposal	PA0098124	Washington	Union Township
Dyna Nobel (Ireco) - Donora Plant	PAS236101	Washington	Donora Borough
Individual			
Urick, Joseph	PA0091456	Allegheny	Monroeville
Lewis, Richard L.	PA0092096	Westmoreland	Trafford
Odorisio, Ernest C.	PA0092100	Allegheny	Pittsburgh
Barnes, Gary	PA0097616	Fayette	Uniontown
Rubish, Paul	PA0097942	Fayette	Dunbar
Churilla, Matthew D.	PA0098019	Allegheny	Pittsburgh
Lutz, Charles W. Jr.	PA0098221	Allegheny	Pittsburgh

Source: [Dischargers to the Monongahela River], 1996, by USGS, Unpublished data. K. Halloran, PADEP, personal communication, November 24, 1997.

NPDES Permitted Dischargers to the Monongahela River

FACILITY/OWNER	PERMIT NO.	COUNTY	MUNICIPALITY
Willner, Jr. Allyn J.	PA0098256	Washington	Washington
Cramer, Calvin-Glen Meadow M.	PA0098523	Allegheny	McKeesport
Daniel G. Shuss	PA0098591	Allegheny	Pittsburgh
Woodhouse, Rudolph P.	PA0098663	Washington	Eighty Four
Bowman, Ella, Estate of	PA0203769	Westmoreland	Pittsburgh
Debevec, William J.	PA0203793	Allegheny	Monongahela
Fulton, Richard & Francis	PA0204129	Washington	Finleyville
Cline, Dennis	PA0204242	Washington	Scenery Hill
Svilar, George Jr. & Kathryn M.	PA0204641	Allegheny	Monroeville
Southern, Dennis	PA0206008	Allegheny	Brentwood
Chico, Kelly	PA0215988	Fayette	Uniontown
Suski, David	PA0216020	Washington	Donora
Strotman, Cindy	PA0216313	Allegheny	Elizabeth
Colleen & Edward Jackson	PA0216828	Allegheny	McKeesport
Municipal Facilities			
Spedd, Inc. Sewage Treatment Plant	PA0001473	Allegheny	Forward Township
Waynesburg Boro	PA0020613	Greene	Waynesburg
Newell Municipal Authority	PA0020656	Fayette	Newell Borough
Fayette City Borough Municipal Authority WWTP	PA0020702	Fayette	Fayette City Borough
Glassport Boro	PA0021113	Allegheny	Glassport Borough
Point Marion WWTP	PA0021407	Fayette	Point Marion Borough
California Borough	PA0022241	Washington	California Borough
Brownsville Mun. Auth/Shady Ave	PA0022306	Fayette	Brownsville
West Elizabeth WWTP	PA0022331	Allegheny	West Elizabeth Borough
Masontown Municpal Authority	PA0023892	Fayette	Boro of Masontown
Masontown Municipal Authority	PA0023906	Fayette	Boro of Masontown
Vestaburg-New Hill Jnt. Auth.	PA0024465	Washington	Vestaburg
Mid Mon Valley Water Pollution Control	PA0024686	Washington	Allenport Borough
West Brownsville Borough Counc.	PA0024830	Washington	West Brownsville
Barkeyville Sewerage Co.	PA0025607	Venango	Warren
Franklin Twp Sewage Treat	PA0025674	Westmoreland	Murrysville
Centerville Borough San. Auth	PA0025798	Washington	Denbo
Monongahela STP	PA0025950	Washington	Monongahela Township
Monongahela Valley WWTP	PA0026158	Washington	Carroll Township
West Mifflin San Sew Mun Auth	PA0026506	Allegheny	West Mifflin
Kenmore Manor STP	PA0026514	Allegheny	West Mifflin Borough
West Mifflin San Sew Mun Auth	PA0026522	Allegheny	West Mifflin
Clairton Mun Auth STP	PA0026824	Allegheny	Clairton
Charleroi Borough STP	PA0026891	Washington	Charleroi borough

Source: [Dischargers to the Monongahela River], 1996, by USGS, Unpublished data. K. Halloran, PADEP, personal communication, November 24, 1997.

NPDES Permitted Dischargers to the Monongahela River

FACILITY/OWNER	PERMIT NO.	COUNTY	MUNICIPALITY
McKeesport STP	PA0026913	Allegheny	McKeesport
Duquesne STP	PA0026981	Allegheny	Duquesne
Greater Union Joint Sew Pl.	PA0027219	Fayette	Uniontown
Jeannette City Mun Auth.	PA0027430	Westmoreland	Jeannette
Pleasant Hills Auth.	PA0027464	Allegheny	Pittsburgh
Charleroi Borough Auth WTP	PA0027502	Washington	Charleroi
Western Westmoreland STP	PA0027570	Westmoreland	N. Huntingdon
Bethel Park STP	PA0027618	Allegheny	Library
Dravosburg Borough STP	PA0028401	Allegheny	Dravosburg Borough
Elizabeth Borough Municipal Authority STP	PA0028436	Allegheny	Elizabeth Borough
Dunkard-Bobtown Mun. Auth.	PA0028452	Greene	Bobtown
Indian Lake Sewage Treatment	PA0028541	Westmoreland	Irwin
Teagarden Homes Authority	PA0028932	Greene	Clarksville
Rose Acres, Penn Twp. Pleasant	PA0029262	Westmoreland	Irwin
Penn Twp Comm. Plant	PA0029271	Westmoreland	Harrison City
Hemlock STP - Plant A	PA0029696	Washington	New Eagle Borough
Monroe STP - Plant B	PA0029700	Washington	New Eagle Borough
Plum Boro Mun. Auth.	PA0035360	Allegheny	Pittsburgh
Mark Haven Sewage Treatment Pl.	PA0035441	Allegheny	Pittsburgh
Rostraver Twp. Sew. Auth-Sween	PA0038237	Westmoreland	West Newton
Village of Searights, Limited	PA0038504	Fayette	Uniontown
Redstone Twp Sewage Treatment	PA0038725	Fayette	Grindstone
Pigeon Creek Sanitary Authority	PA0044679	Washington	Bentlyville
Franklin Twp Sewage Authority	PA0046426	Greene	Waynesburg
Municipal and Industrial Dispo	PA0046663	Allegheny	Clairton
North Union Twp. Mun. Services	PA0090247	Fayette	Uniontown
Hempfield Twp Mun Park-Wood KN	PA0090786	Westmoreland	Greensburg
West Pike Run Twp.	PA0090832	Washington	Daisytown
German Township	PA0090981	Fayette	Hibbs
Hempfield Twp Mun Auth. Briarwo	PA0091626	Westmoreland	Greensburg
Rennsselaerville Institute STP	PA0091634	Fayette	Uniontown
Uniontown Racketball Club STP	PA0091707	Fayette	Uniontown
Brave Water and Sewer Authority	PA0092266	Greene	Brave
Belle Vernon Municipal Authority	PA0092355	Fayette	Belle Vernon Borough
Crucible Water Pollution Control Facility	PA0093408	Greene	Cumberland Township
Evan Ford Development STP	PA0095150	Allegheny	Forward Township
Nemacolin, Inc. Sewage Treatment Plant	PA0096130	Greene	Cumberland Township
Fairchance Municipal S.A.	PA0096342	Fayette	Fairchance
Fairchance Boro Water Treatment	PA0097276	Fayette	Fairchange

Source: [Dischargers to the Monongahela River], 1996, by USGS, Unpublished data. K. Halloran, PADEP, personal communication, November 24, 1997.

NPDES Permitted Dischargers to the Monongahela River

FACILITY/OWNER	PERMIT NO.	COUNTY	MUNICIPALITY
West Pike Run Twp.	PA0203688	Washington	Daisytown
Greensboro-Monongahela Twp. STP	PA0205257	Greene	Greensboro Borough
Fredericktown Sewage Treatment Plant	PA0205753	Washington	East Bethlehem Township
Menallen Twp Sew Auth	PA0205931	Fayette	New Salem
Dilworth Mine-Rices Landing STP	PA0216461	Greene	Rices Landing Borough
Stocks SR STP	PAG046110	Washington	Union Township
Miscellaneous			
Charleroi Junior Senior High	PA0030881	Washington	Fallowfield Township
North Hempfield Fire Depart.	PA0043869	Westmoreland	Greensburg
Carmichaels - Cumberland USA	PA0046230	Greene	Carmichaels
Beryl Acres	PA0090131	Washington	Scenery Hill
Hog Heaven Association	PA0090921	Washington	Washington
Fayette County Housing Auth	PA0092363	Fayette	Uniontown
Fayette County Housing Auth	PA0092371	Fayette	Uniontown
Washington County Housing Auth.	PA0095672	Washington	Washington
Bethlehem Center School District	PA0096571	Washington	Fredericktown
Jarrett Brothers Mobile Home Park	PA0097578	Fayette	Smithfield
Albert Gallatin Area School Dist.	PA0098400	Fayette	Masontown
Penn Dept. of Transportation	PA0098434	Greene	Uniontown
Fayette County Housing Auth	PA0098957	Fayette	Uniontown
Forward Manor MHP	PA0204706	Allegheny	Elizabeth
PA Turnpike Commission	PA0206067	Washington	Harrisburg
Trinity Area School Dist.	PA0215945	Washington	Washington
Retarded Citizen Association	PA0216186	Greene	Waynesburg
Carmichaels WIP	PA0216291	Greene	Cumberland Township

Source: [Dischargers to the Monongahela River], 1996, by USGS, Unpublished data. K. Halloran, PADEP, personal communication, November 24, 1997.

WATER CHEMISTRY DATA

National Water Quality Assessment Program
(1997)
United States Department of the Interior-Geological Survey

DISTRICT	42	UNIT	ED STATI	DEPARTM	ENT OF I	ERIOR - G	EOLOGIC	L SURVE	PROCE	SS DATE	1/20/97
		3	85000	#NAME?	ONONGA	RIVER AT	BRADDO	K, PA.			
				WA	TER-QUA	Y DATA					
		DIS-		PH		BARO-					
		CHARGE,	SPE-	WATER		METRIC		HARD-		MAGNE-	
		INST.	CIFIC	WHOLE		PRES-		NESS	CALCIUM	SIUM,	SODIUM,
		CUBIC	CON-	FIELD	TEMPER-	SURE	OXYGEN	TOTAL	DIS-	DIS-	DIS-
		FEET	DUCT-	(STAND-	ATURE	(MM	DIS-	(MG/L	SOLVED	SOLVED	SOLVED
DATE	TIME	PER	ANCE	ARD	WATER	OF	SOLVED	AS	(MG/L	(MG/L	(MG/L
		SECOND	(US/CM)	UNITS)	(DEG C)	HG)	(MG/L)	CACO3)	AS CA)	AS MG)	AS NA)
		-61	-95	-400	-10	-25	-300	-900	-915	-925	-930
Apr-96											
22...	0830 1	5700	307	7.1	14	740	10.5	110	31	8.1	15
MAY											
28...	0900 2	1400	249	7.6	15.5	734	9.2	82	23	6	11
JUN											
11...	930	6940	357	7.4	23	738	10	120	33	8.3	20
JUL											
18...	1000	3900	490	7.6	26.5	739	6.8	160	43	12	30
AUG											
13...	0915 1	8200	245	7.6	23	738	9.8	76	22	5.2	13
SEP											
12...	0900 1	2100	200	7.5	23.5	734	9.1	66	19	4.5	9.5
19...	1100	--	--	--	--	--	--	--	--	--	--
19...	1110	--	--	--	--	--	--	--	--	--	--

OCT											
04...	1200	--	--	--	--	--	--	--	--	--	--
04...	1210	--	--	--	--	--	--	--	--	--	--
17...	945	4140	392	7.8	16.5	736	10.6	120	33	8.5	26
NOV											
05...	945	8740	270	7.3	10.5	745	10.3	91	26	6.3	14
DEC											
18...	0945 1	4600	247	7.4	6	735	12.6	80	22	6	12
Jan-97											
31...	0900 2	400	294	7.3	4	733	13.9	88	25	6.3	16
FEB											
11...	0930 1	1400	295	7.3	3	740	12.6	86	24	6.3	18
MAR											
04...	1130 7	3000	199	7.2	8	739	11.2	71	21	4.6	7.7
APR											
23...	1000	5780	392	7.6	13	727	10.3	130	35	9.6	23
MAY											
22...	0800 2	2100	235	7.6	15.5	744	9.3	76	22	5.3	12
JUN											
17...	1000	7140	395	8	22	733	8	120	35	8.8	24
JUL											
24...	1000	2800	461	7.9	27	741	7.6	140	40	10	32
AUG											
19...	0850 1	3700	467	7.6	25.5	741	7.3	140	37	10	35
SEP											
08...	930	2070	418	7.9	23	736	8.2	120	33	8.9	29
OCT											
06...	845	--	443	7.6	21.5	741	8.4	140	38	10	30
		AVG	334.5263	7.542105	16.89474	737.5789	9.773684	106.1053	29.57895	7.615789	19.85263
		MIN	199	7.1	3	727	6.8	66	19	4.5	7.7

		MAX	490	8	27	745	13.9	160	43	12	35
DISTRICT	42	UNIT	ED STATI	DEPARTN	ENT OF I	ERIOR - C	EOLOGIC	L SURVE	PROCE	SS DATE	1/20/97
		3	85000	#NAME?	ONONGA	RIVER AT	BRADDO	K, PA.			
				WA	TER-QUA	Y DATA					
		ALKA-					SOLIDS,	NITRO-	NITRO-	NITRO-	NITRO-
	POTAS-	LINITY		CHLO-	FLUO-	SILICA,	RESIDUE	GEN,	GEN,	GEN,	GEN,AM-
	SIUM,	WAT DIS	SULFATE	RIDE,	RIDE,	DIS-	AT 180	NITRITE	NO2+NO3	AMMONI	MONIA +
	DIS-	TOT IT	DIS-	DIS-	DIS-	SOLVED	DEG. C	DIS-	DIS-	DIS-	ORGANIC
	SOLVED	FIELD	SOLVED	SOLVED	SOLVED	(MG/L	DIS-	SOLVED	SOLVED	SOLVED	TOTAL
DATE	(MG/L	MG/L AS	(MG/L	(MG/L	(MG/L	AS	SOLVED	(MG/L	(MG/L	(MG/L	(MG/L
	AS K)	CACO3	AS SO4)	AS CL)	AS F)	SIO2)	(MG/L)	AS N)	AS N)	AS N)	AS N)
	-935	-39086	-945	-940	-950	-955	-70300	-613	-631	-608	-625
Apr-96											
22...	1.1	27	92	12	0.1	4.6	175	0.02	0.66	0.13	0.2
MAY											
28...	1.4	--	68	8.1	0.1	5	158	0.01	0.52	0.09	0.3
JUN											
11...	1.7	36	95	16	0.2	5.3	212	0.03	0.69	0.11	0.3
JUL											
18...	2.3	57	140	20	0.2	4.5	297	0.02	0.8	0.07	0.3
AUG											
13...	1.6	29	62	7.7	<0.10	4.7	146	0.02	0.54	0.05	0.3

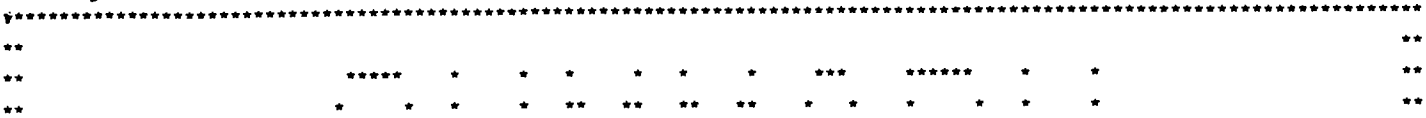
SEP											
12...	1.3	38	55	7.1	<0.10	4.2	117	0.02	0.59	0.11	0.3
19...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
OCT											
04...	--	--	--	--	--	--	--	--	--	--	--
04...	--	--	--	--	--	--	--	--	--	--	--
17...	2.1	54	110	16	0.1	4.4	238	0.02	0.84	0.08	0.2
NOV											
05...	1.6	40	71	9.9	0.1	5.2	160	0.02	0.75	0.09	<0.20
DEC											
18...	1.1	40	62	10	0.1	5.1	142	0.01	0.74	0.09	<0.20
Jan-97											
31...	1.4	37	74	17	0.1	4.7	173	0.02	0.76	0.18	0.4
FEB											
11...	1.3	--	67	18	0.1	4.9	174	0.02	0.89	0.1	<0.20
MAR											
04...	1.5	28	44	9.5	<0.10	4.9	116	<0.010	0.93	0.09	1.4
APR											
23...	1.6	39	120	15	<0.10	4.7	243	0.015	0.766	0.104	0.38
MAY											
22...	1.2	28	59	9.5	0.11	4.6	152	0.012	0.576	0.059	0.66
JUN											
17...	2.2	48	100	19	0.16	5.2	241	<0.010	0.074	0.325	0.26
JUL											
24...	2.4	40	130	25	0.17	2.8	287	0.026	1.02	<0.015	0.37
AUG											
19...	2.3	42	140	13	0.16	3.6	298	0.016	0.803	0.042	0.37
SEP											
08...	2.2	42	110	19	0.13	1.9	248	0.012	0.908	0.015	0.33

OCT											
06...	2.4	41	140	18	0.18	3.3	278	0.01	0.889	0.047	0.37
AVG	1.721053	39.176471	91.52632	14.2	0.134	4.4	202.8947	0.017706	0.723474	0.099	0.4025
MIN	1.1	27	44	7.1	0.1	1.9	116	0.01	0.074	0.015	0.2
MAX	2.4	57	140	25	0.2	5.3	298	0.03	1.02	0.325	1.4
		NITRO-GEN,AM-MONIA + ORGANIC DIS.	PHOS-PHORUS TOTAL	PHOS-PHORUS DIS-SOLVED	PHOS-PHORUS ORTHO, DIS-SOLVED	IRON, DIS-SOLVED	MANGA-NESE, DIS-SOLVED	CARBON, ORGANIC DIS-SOLVED	CARBON, ORGANIC SUS-PENDED	SEDI-MENT, SUS-PENDED	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
	DATE	(MG/L AS N)	(MG/L AS P)	(MG/L AS P)	(MG/L AS P)	(UG/L AS FE)	(UG/L AS MN)	(MG/L AS C)	(MG/L AS C)	(MG/L)	
		-623	-665	-666	-671	-1046	-1056	-681	-689	-80154	-70331
APR	1996										
2	2...	0.2	<0.010	<0.010	<0.010	37	190	1.3	0.3	7	81
MAY											
2	8...	0.2	0.03	0.01	<0.010	39	110	1.6	1.3	83	97
JUN											
1	1...	0.4	0.09	0.08	<0.010	47	110	1.8	0.5	12	98
JUL											
1	8...	0.2	0.04	<0.010	0.01	30	9	1.7	0.5	20	87
AUG											
1	3...	<0.20	0.02	<0.010	0.01	44	19	2.4	0.7	--	--
SEP											
1	2...	0.2	<0.010	0.02	0.01	45	71	1.9	0.5	13	94
1	9...	--	--	--	--	--	--	--	--	--	--
1	9...	--	--	--	--	--	--	--	--	--	--
OCT											

0	4...	--	--	--	--	--	--	--	--	--	--
0	4...	--	--	--	--	--	--	--	--	--	--
1	7...	<0.20	0.01	<0.010	<0.010	33	32	1.5	0.4	--	--
NOV											
0	5...	<0.20	0.02	<0.010	<0.010	28	98	1.9	0.5	--	--
DEC											
1	8...	<0.20	<0.010	<0.010	<0.010	10	120	1.2	0.6	7	94
JAN	1997										
3	1...	0.3	0.03	<0.010	<0.010	8	160	1.5	0.9	24	83
FEB											
1	1...	<0.20	<0.010	<0.010	<0.010	21	120	1.4	0.4	6	75
MAR											
0	4...	<0.20	0.37	<0.010	<0.010	29	92	2.3	>5.0	--	--
APR											
2	3...	<0.20	0.07	0.011	<0.010	38	147	1.2	0.6	--	--
MAY											
2	2...	<0.20	0.168	<0.010	<0.010	33	120	1.5	0.5	--	--
JUN											
1	7...	0.26	<0.010	<0.010	<0.010	18	32	2.6	0.9	--	--
JUL											
2	4...	0.22	0.051	0.056	<0.010	17	1.4	2	0.9	--	--
AUG											
1	9...	<0.20	0.05	<0.010	<0.010	3.2	10	2.1	1.1	--	--
SEP											
0	8...	<0.20	0.034	0.01	<0.010	18	<1.0	1.7	1.7	--	--
OCT											
0	6...	<0.20	0.013	<0.010	<0.010	17	9.4	--	--	--	--
	AVG	0.2475	0.071143	0.031167	0.01	27.11579	80.6	1.755556	0.723529	21.5	88.625
	MIN	0.2	0.01	0.01	0.01	3.2	1.4	1.2	0.3	6	75
	MAX	0.4	0.37	0.08	0.01	47	190	2.6	1.7	83	98

WATER CHEMISTRY DATA

Pennsylvania Department of Environmental Protection STORET System
(1997)
Commonwealth of Pennsylvania
Department of Environmental Protection



**** STORET SUMMARY SECTION ****

FOLLOWING IS A RETRIEVAL OF DATA FROM THE ENVIRONMENTAL PROTECTION AGENCY'S STORET SYSTEM, A DATABASE OF SAMPLING SITES AND THEIR ASSOCIATED QUALITY DATA. THE INFORMATION WAS RETRIEVED USING SPECIFIC STORET INSTRUCTION SETS IN COMBINATION TO SELECT ONLY THE DATA REQUESTED FOR THIS RETRIEVAL. BRIEF EXPLANATIONS OF THE INSTRUCTION SETS ARE INCLUDED BELOW. QUESTIONS MAY BE DIRECTED TO THE STORET USER ASSISTANCE SECTION AT (800) 424-9067.

****

FOLLOWING IS THE FORMAT FOR THE STATION HEADER INFORMATION WHICH APPEARS ON EACH PAGE OF THE RETRIEVAL UNLESS STATION AGGREGATION WAS PERFORMED

	STATION NUMBER(S)
	LATITUDE/LONGITUDE PRECISION CODE
	STATION LOCATION
	STATE/COUNTY CODE STATE NAME COUNTY NAME
	MAJOR BASIN NAME MAJ/MIN/SUB BASIN CODE
	MINOR BASIN NAME
*STATION TYPE	AGENCY CODE STORED DATE HYDROLOGIC UNIT
	STATION DEPTH ELEVATION
	ECOREGION
	WATER BODY
	AQUIFERS
	LOCKED DATE
*RIVER MILE INDEX	

CONTINUED ON NEXT PAGE(S)

RETRIEVAL PROGRAM

PGM=INVENT
THIS IS AN INVENTORY RETRIEVAL SHOWING SUMMARY STATISTICS FOR ALL PARAMETERS

A BEGINNING DATE OF (YY/MM/DD) 96/06/01 WAS REQUESTED
NO ENDING DATE WAS REQUESTED -- STORET ASSUMED THE ENDING DATE WAS THAT OF THE MOST RECENT DATA VALUE FOUND

STATION SELECTION WAS BY:

AGENCY CODE(S) AND STATION NUMBER(S) FOR THE FOLLOWING AGENCY(S):
21PA

STATIONS SELECTED WERE RESTRICTED TO:

AGENCIES WHOSE DATA HAS NOT BEEN 'RETIRED'

CONTACTS FOR AGENCY CODES RETRIEVED:

AGENCY	PRIMARY CONTACT NAME	ORGANIZATION	PHONE NUMBER(S)
21PA	SCHREFFLER, TAMMY	PENNSYLVANIA DPT ENV PROT	(717)783-3638

DATA RESTRICTIONS:

NOTE
NO DEPTH INDICATOR RESTRICTIONS WERE SPECIFIED - COMPUTATIONS WILL
BE PERFORMED WITHOUT REGARD TO DEPTH INDICATORS

NOTE
NO GRAB/COMPOSITE RESTRICTIONS WERE UTILIZED, SO BOTH GRAB AND COMPOSITE SAMPLE TYPES MAY HAVE
BEEN INCLUDED - COMPUTATIONS WILL BE PERFORMED WITHOUT REGARD TO SAMPLE TYPE

NOTE
NO COMPOSITE SAMPLE RESTRICTIONS WERE SPECIFIED - COMPUTATIONS WILL INCLUDE STATISTICAL FEATURES OF
THE COMPOSITING PROCESS, PRODUCING VALID RESULTS ONLY WHEN SOPHISTICATED COMPOSITES ARE NOT ENCOUNTERED.
SPECIFY COMPOSITE HANDLING KEYWORDS "ANC" AND/OR "DSROC" IF NEEDED

***** END OF SUMMARY SECTION *****

WQN0701 03085000 PFBC8-003
40 24 19.0 079 52 53.0 1
MONONGAHELA RVR-RANKIN BR OFF SR837 LOCK/DAM 2
42003 PENNSYLVANIA ALLEGHENY
OHIO RIVER 050100
MONONGAHELA RIVER
21PA 770419 05020005001 0009.250 ON
0000 FEET DEPTH

/TYPA/AMBNT/STREAM/BIO

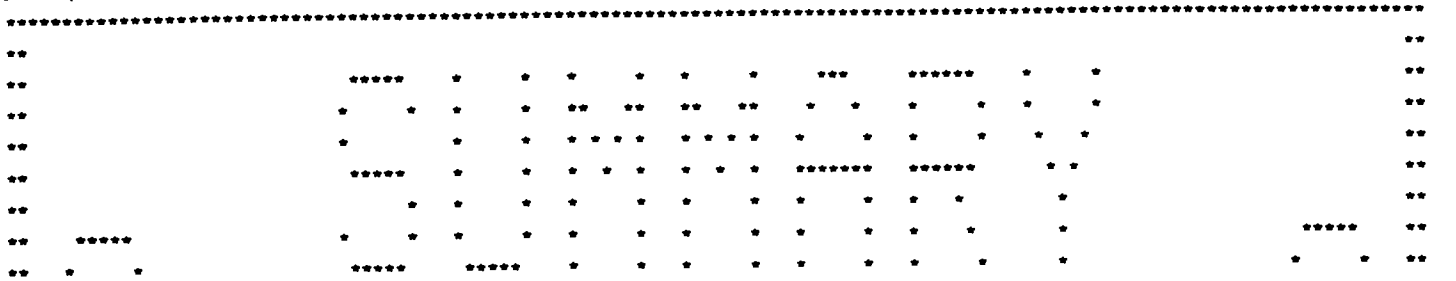
INITIAL DATE				96/01/29	96/02/27	96/03/12	96/04/18	96/05/16	96/06/24	96/07/23	96/08/21	96/09/23
INITIAL TIME				1230	1220	0940	0940	1125	1330	0950	0950	0930
MEDIUM				WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
00010	WATER	TEMP	CENT	4.0	12.0	6.1	11.9	14.5		21.5	26.7	17.6
00011	WATER	TEMP	FAHN	39.2$	53.6$	43.0$	53.4$	58.1$		70.7$	80.1$	63.7$
00095	CNDUCTVY	AT 25C	MICROMHO	229	266	330	305	211	383	187	249	238
00300	DO		MG/L	12.4	10.6	9.6	8.6	8.0		7.2	6.2	7.8
00301	DO	SATUR	PERCENT	94.7$	98.1$	76.8$	79.6$	76.9$		80.0$	76.5$	82.1$
00400	PH		SU	6.62	6.90	6.64	6.52	6.77		7.01	6.94	7.94
00403	PH	LAB	SU	6.7	6.5	6.7	6.5	6.4	7.5	6.4	6.5	6.4
00410	T ALK	CACO3	MG/L	20	26	26	34	26	44	28	30	30
00515	RESIDUE	DISS-105	C MG/L	186	180	2K	248	180	320	186	332	190
00530	RESIDUE	TOT NFLT	MG/L	2K	9	22	10	30	366	76	8	28
00556	OIL-GRSE	FREON-GR	MG/L	5.00K	5.00K	5.00K	5.70	5.00K	5.00K	5.00K	5.00K	5.00K
00610	NH3+NH4-	N TOTAL	MG/L	.110	.190	.120	.130	.060	.070	.040	.040	.070
00612	UN-IONZD	NH3-N	MG/L	.00005$	.0003$	.00007$	.00009$	.00009$		.0002$	.0002$	.002$
00615	NO2-N	TOTAL	MG/L	.006	.010	.012	.018	.010	.022	.012	.012	.016
00619	UN-IONZD	NH3-NH3	MG/L	.00006$	.0004$	.00009$	.0001$	.0001$		.0002$	.0003$	.002$
00620	NO3-N	TOTAL	MG/L	1.090	.970	.910	.640	.610	.990	.650	.650	.730
00665	PHOS-TOT		MG/L P	.060	.040	.040	.040	.030	.320	.080	.100	.060
00680	T ORG C	C	MG/L	2.1	1.6	2.0	2.2	4.9	3.3	4.4	2.8	3.0
00719	CN FREE	HBG METH	UG/L	1.000K	1.000K	1.000K	1.000K	1.000K	1.000K	1.000K	1.000K	1.000K
00720	CYANIDE	CN-TOT	MG/L	.001	.001	.003	.004	.001K	.004	.002	.001	.003
00900	TOT HARD	CACO3	MG/L	68	94	108	100	86	98	57	83	72
00945	SULFATE	SO4-TOT	MG/L	56	71	69	70	58	113	42	66	56
00951	FLUORIDE	F,TOTAL	MG/L	.20K	.20K	.20K	.20K	.20K	.20K	.20K	.20K	.20K
01042	COPPER	CU,TOT	UG/L	10K	10K	10K	11	10K	24	10K	35	10K
01045	IRON	FE,TOT	UG/L	2770	1440	1500	717	1840	16300	5900	6750	4140
01051	LEAD	PB,TOT	UG/L	3	2	2	1K	3	18	6	8	5
01055	MANGNESE	MN	UG/L	277.0	241.0	198.0	244.0	139.0	576.0	240.0	391.0	190.0
01067	NICKEL	NI,TOTAL	UG/L	25K	25K	25K	39	25K	25K	29	25K	25K
01092	ZINC	ZN,TOT	UG/L	42	28	40	29	50K	106	45	97	68
01105	ALUMINUM	AL,TOT	UG/L	2180	773	1100	437	1620	8640	5950	3970	1850
32730	PHENOLS	TOTAL	UG/L	0	0	0	0	0	0	0	0	0
74041	WQF	SAMPLE	UPDATED	960415	960613	960613	960820	960911	960911	970106	970107	970107

WQN0701 03085000 PFBC8-003
40 24 19.0 079 52 53.0 1
MONONGAHELA RVR-RANKIN BR OFF SR837 LOCK/DAM 2
42003 PENNSYLVANIA ALLEGHENY
OHIO RIVER 050100
MONONGAHELA RIVER
21PA 770419 05020005001 0009.250 QN
0000 FEET DEPTH

/TYPA/AMBNT/STREAM/BIO

	INITIAL DATE			96/10/17	96/11/18	96/12/10	97/01/22	97/02/18	97/03/19	97/04/23
	INITIAL TIME			1000	0940	0940	0930	1300	0900	0930
	MEDIUM			WATER	WATER	WATER	WATER	WATER	WATER	WATER
00010	WATER	TEMP	CENT	17.5	8.6	4.8	4.7	8.4	9.7	14.4
00011	WATER	TEMP	FAHN	63.5$	47.5$	40.6$	40.5$	47.1$	49.5$	57.9$
00095	CNDUCTVY	AT 25C	MICROMHO	393	260	239	369	371	237	390
00300	DO		MG/L	9.0	11.6	12.0	12.0	9.8	12.0	9.2
00301	DO	SATUR	PERCENT	92.8$	100.0$	93.8$	93.8$	82.4$	106.2$	88.5$
00400	PH		SU	7.32	7.23	7.16	7.30	7.14	7.47	7.49
00403	PH	LAB	SU	7.0	6.9	6.8	6.7	6.7	6.8	6.7
00410	T ALK	CACO3	MG/L	44	34	32	38	42	32	40
00515	RESIDUE	DISS-105	C MG/L	285	190	162	240	260	166	272
00530	RESIDUE	TOT NFLT	MG/L	86	22	12	4	18	14	28
00556	OIL-GRSE	FREON-GR	MG/L	5.00K	5.00K	5.00K	5.00K	5.00K	5.00K	6.20
00610	NH3+NH4-	N TOTAL	MG/L	.050	.080	.100	.200	.120	.090	.080
00612	UN-IONZD	NH3-N	MG/L	.0003$	.0002$	.0002$	.0005$	.0003$	.0005$	.0006$
00615	NO2-N	TOTAL	MG/L	.016	.010	.008	.020	.010	.020	.020
00619	UN-IONZD	NH3-NH3	MG/L	.0004$	.0003$	.0002$	.0006$	.0003$	.0006$	.0008$
00620	NO3-N	TOTAL	MG/L	.840	.850	.700	.770	.760	.710	.840
00665	PHOS-TOT		MG/L P	.090	.020	.020K	.020K	.020	.020	.040
00680	T ORG C	C	MG/L	2.4	2.4	2.1	1.4	1.5	1.4	1.5
00719	CN FREE	HBG METH	UG/L	1.000	1.000K	1.000K	1.000K	1.000K	1.000K	1.000
00720	CYANIDE	CN-TOT	MG/L	.004	.003	.001	.004	.001	.003	.001
00900	TOT HARD	CACO3	MG/L	94	90	68	123	57	76	108
00945	SULFATE	SO4-TOT	MG/L	104	59	40	118	82	60	117
00951	FLUORIDE	F,TOTAL	MG/L	.20K	.20K	.20K	.20K	.20K	.20K	.20K
01042	COPPER	CU,TOT	UG/L	15	10K	10K	10K	10K	10K	10K
01045	IRON	FE,TOT	UG/L	6050	1350	1010	1040	960	1080	1720
01051	LEAD	PB,TOT	UG/L	6	2	1	3	1K	1K	2
01055	MANGNESE	MN	UG/L	345.0	170.0	132.0	227.0	175.0	153.0	226.0
01067	NICKEL	NI,TOTAL	UG/L	25K	25K	25K	25K	25K	25K	25K
01092	ZINC	ZN,TOT	UG/L	46	23	22	26	41	18	41
01105	ALUMINUM	AL,TOT	UG/L	3000	820	706	360	367	751	890
32730	PHENOLS	TOTAL	UG/L	0	0	0	0	0	0	0
74041	WQF	SAMPLE	UPDATED	970107	970228	970306	970519	970520	970520	970722

THAT'S ALL FOLKS



**** STORET SUMMARY SECTION ****

FOLLOWING IS A RETRIEVAL OF DATA FROM THE ENVIRONMENTAL PROTECTION AGENCY'S STORET SYSTEM, A DATABASE OF SAMPLING SITES AND THEIR ASSOCIATED QUALITY DATA. THE INFORMATION WAS RETRIEVED USING SPECIFIC STORET INSTRUCTION SETS IN COMBINATION TO SELECT ONLY THE DATA REQUESTED FOR THIS RETRIEVAL. BRIEF EXPLANATIONS OF THE INSTRUCTION SETS ARE INCLUDED BELOW.

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(800) 424-9067.

****

FOLLOWING IS THE FORMAT FOR THE STATION HEADER INFORMATION WHICH APPEARS ON EACH PAGE OF THE RETRIEVAL UNLESS STATION AGGREGATION WAS PERFORMED

	STATION NUMBER(S)
	LATITUDE/LONGITUDE PRECISION CODE
	STATION LOCATION
	STATE/COUNTY CODE STATE NAME COUNTY NAME
	MAJOR BASIN NAME MAJ/MIN/SUB BASIN CODE
	MINOR BASIN NAME
*STATION TYPE	AGENCY CODE STORED DATE HYDROLOGIC UNIT*
	STATION DEPTH ELEVATION
	ECOREGION
	WATER BODY
	AQUIFERS
	LOCKED DATE
*RIVER MILE INDEX	

CONTINUED ON NEXT PAGE(S)

RETRIEVAL PROGRAM

PGM=ALLPARM
THIS PROGRAM PRINTS ACTUAL SAMPLE VALUES FOR ALL PARAMETERS

NO BEGINNING DATE WAS REQUESTED -- STORET ASSUMED THE BEGINNING DATE WAS THAT OF THE OLDEST DATA VALUE FOUND
NO ENDING DATE WAS REQUESTED -- STORET ASSUMED THE ENDING DATE WAS THAT OF THE MOST RECENT DATA VALUE FOUND

TATION SELECTION WAS BY:

LATITUDE/LONGITUDE COORDINATES OR AREA SURROUNDING A SPECIFIED COORDINATE 1 mi @ 402430/7950

STATIONS SELECTED WERE RESTRICTED TO:

STATION TYPE(S) AND/OR SPECIFIC PARAMETER COVERAGE
AGENCIES WHOSE DATA HAS NOT BEEN 'RETIRED'

ONTACTS FOR AGENCY CODES RETRIEVED:

AGENCY	PRIMARY CONTACT NAME	ORGANIZATION	PHONE NUMBER(S)
112WRD	WILLIAMS, OWEN	US GEOLOGICAL SURVEY	(703)648-5610

DATA SPECIFICATIONS:

NOTE
NO REMARK CODE RESTRICTIONS WERE SPECIFIED - COMPUTATIONS WILL
BE PERFORMED WITHOUT REGARD TO DATA REMARKS

DATA RESTRICTIONS:

NOTE
NO DEPTH INDICATOR RESTRICTIONS WERE SPECIFIED - COMPUTATIONS WILL
BE PERFORMED WITHOUT REGARD TO DEPTH INDICATORS

NOTE
NO GRAB/COMPOSITE RESTRICTIONS WERE UTILIZED, SO BOTH GRAB AND COMPOSITE SAMPLE TYPES MAY HAVE
BEEN INCLUDED - COMPUTATIONS WILL BE PERFORMED WITHOUT REGARD TO SAMPLE TYPE

NOTE
NO COMPOSITE SAMPLE RESTRICTIONS WERE SPECIFIED - COMPUTATIONS WILL INCLUDE STATISTICAL FEATURES OF
THE COMPOSITING PROCESS, PRODUCING VALID RESULTS ONLY WHEN SOPHISTICATED COMPOSITES ARE NOT ENCOUNTERED.
SPECIFY COMPOSITE HANDLING KEYWORDS "ANC" AND/OR "DSROC" IF NEEDED

***** END OF SUMMARY SECTION *****

03084700
40 24 11.0 079 49 29.0 2
TURTLE CREEK AT TURTLE CREEK, PA.
42003 PENNSYLVANIA ALLEGHENY
050292

'YPA/AMBNT/STREAM

112WRD 05020005
0000 FEET DEPTH

	INITIAL DATE			69/03/24
	INITIAL TIME			0930
	MEDIUM-USGS REMARK			WATER
00010	WATER	TEMP	CENT	8.0
00011	WATER	TEMP	FAHN	46.4$
00060	STREAM	FLOW	CFS	65
00080	COLOR	PT-CO	UNITS	5
00095	CNDUCTVY	AT 25C	MICROMHO	892
00400	PH		SU	6.70
00410	T ALK	CACO3	MG/L	8
00440	HCO3 ION	HCO3	MG/L	10
00900	TOT HARD	CACO3	MG/L	293
00902	NC HARD	CACO3	MG/L	285
00915	CALCIUM	CA,DISS	MG/L	86.0
00925	MGNSIUM	MG,DISS	MG/L	19.0
00931	SODIUM	ADSBTION	RATIO	1.9
00932	PERCENT	SODIUM	%	35
00933	NA+K		MG/L	73.00
00940	CHLORIDE	TOTAL	MG/L	76
00945	SULFATE	SO4-TOT	MG/L	310
46570	CAL HARD	CA MG	MG/L	293$
70300	RESIDUE	DISS-180	C MG/L	639
70302	DISS SOL	TONS/DAY		112.00
70303	DISS SOL	TONS PER	ACRE-FT	.87
71851	NITRATE	DISS-NO3	MG/L	16.0

03084800
40 24 19.0 079 49 41.0 2
THOMPSON RN AT TURTLE CREEK
42003 PENNSYLVANIA ALLEGHENY

TYPA/AMBNT/STREAM

112WRD 790908 05020005
0000 FEET DEPTH

	INITIAL DATE			79/06/11	79/08/18	80/04/01	80/09/05	80/09/05	81/03/23	81/08/15
	INITIAL TIME			1525	1630	1830	0750	0835	0740	0730
	MEDIUM-USGS REMARK			WATER	WATER	WATER	WATER	WATER	WATER	WATER
00010	WATER	TEMP	CENT	16.0	18.0	9.5	19.5		4.5	19.0
00011	WATER	TEMP	FAHN	60.8$	64.4$	49.1$	67.1$		40.1$	66.2$
00028	ANALYZE	AGENCY	CODE	80010	80010	80010	80010	80010	80010	80010
00061	STREAM	FLOW,	INST-CFS	54	29	37	13		21	11
00095	CNDUCTVY	AT 25C	MICROMHO	960	1020	950	1040		1450	1060
00400	PH		SU	6.80	8.50	7.50	7.70		7.50	7.50
00403	PH	LAB	SU						7.5	7.0
00410	T ALK	CACO3	MG/L	56	68	50	60		39	50
00435	T ACDITY	CACO3	MG/L	0	0					
00686	BM INORG	CARBON	GM/KG-C				1.100			
00687	BM ORG	CARBON	GM/KG-C				7.400			
00693	CARBON,B	M-IN+ORG	. GM/KG				8.5			
00945	SULFATE	SO4-TOT	MG/L	300	58	270	320		340	290
01003	ARSENIC	SEDMG/KG	DRY WGT		.00					
01028	CD MUD	DRY WGT	MG/KG-CD		10.00K					
01029	CHROMIUM	SEDMG/KG	DRY WGT		40.00					
01038	CO MUD	DRY WGT	MG/KG-CO		30.00					
01043	COPPER	SEDMG/KG	DRY WGT		120.00					
01044	IRON	FE,SUSP	UG/L	1500	1700	1200	240		810	2200
01045	IRON	FE,TOT	UG/L	1700	1700	1400	250		880	2200
01046	IRON	FE,DISS	UG/L	190	10K	170	10		70	30
01052	LEAD	SEDMG/KG	DRY WGT		120.00					
01053	MN MUD	DRY WGT	MG/KG-MN		1800.00					
01054	MANGNESE	MN,SUSP	UG/L	80.0	110.0	20.0	30.0		40.0	140.0
01055	MANGNESE	MN	UG/L	510.0	590.0	650.0	470.0		870.0	680.0
01056	MANGNESE	MN,DISS	UG/L	430.0	480.0	630.0	440.0		830.0	540.0
01093	ZINC	SEDMG/KG	DRY WGT		200.00					
01148	SELENIUM	SEDMG/KG	DRY WGT		.00					
01170	FE MUD	DRY WGT	MG/KG-FE		47000.00					
70300	RESIDUE	DISS-180	C MG/L			698	725		955	829
70302	DISS SOL	TONS/DAY				68.80	24.70		53.10	24.60
70303	DISS SOL	TONS PER	ACRE-FT			.95	.99		1.30	1.13
71825	T ACDITY	AS H	MG/L	.1K	.1K					
71921	MERCURY	SEDMG/KG	DRY WGT		.0					
72005	SAMPLE	SOURCE	CODE		40					

(SAMPLE CONTINUED ON NEXT PAGE)

03084800
40 24 19.0 079 49 41.0 2
THOMPSON RN AT TURTLE CREEK
42003 PENNSYLVANIA ALLEGHENY

TYPA/AMBNT/STREAM

112WRD 790908 05020005
0000 FEET DEPTH

(SAMPLE CONTINUED FROM PREVIOUS PAGE)

INITIAL DATE				79/06/11	79/08/18	80/04/01	80/09/05	80/09/05	81/03/23	81/08/15
INITIAL TIME				1525	1630	1830	0750	0835	0740	0730
MEDIUM-USGS REMARK				WATER	WATER	WATER	WATER	WATER	WATER	WATER
80154	SUSP SED	CONC	MG/L	62	56	83			39	13
80155	SUSP SED	DISCHARG	TONS/DAY	9.10	4.40	8.20			2.20	.39
82031	COAL IN	BOT MAT	DWT G/KG					1.00		

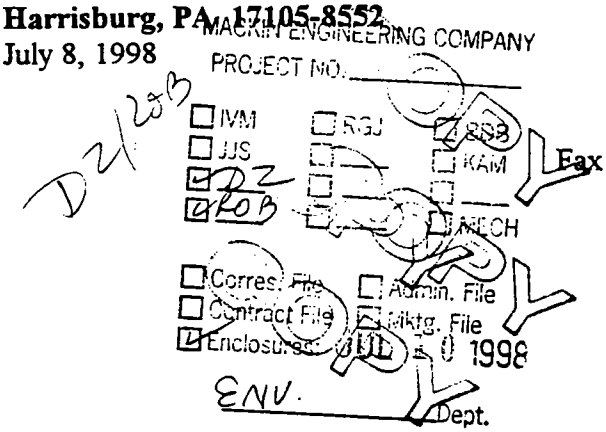
THAT'S ALL FOLKS

APPENDIX F: Pennsylvania Natural Diversity Index Data

Pennsylvania Department of Conservation and Natural Resources

Rachel Carson State Office Building
P.O. Box 8552
Harrisburg, PA 17105-8552

July 8, 1998



Bureau of Forestry

717-787-3444
Fax 717-783-5109

David A. Zimsky
Mackin Engineering Company
R.I.D.C. Park West
117 Industry Drive
Pittsburgh, PA 15275-1015

Re: PNDI Review Request for Species of Special Concern Reported to Occur in lower Monogahela River watershed **PER number: 006674**

Dear Mr. Zimsky:

In response to your data request of November 4, 1997, I have enclosed a printout listing all species of special concern tracked by the PNDI program reported to occur in or near the above area. Please contact our office if any land disturbance is planned for this site.

From left to right, the columns are as follows: scientific name, common name, global element rank, state element rank, state protection status, Pennsylvania Biological Survey suggested protection status, federal protection status, date last observed. Handouts explaining element ranks and protection statuses have been included in order to decipher the printout. If you have any further questions or problems feel free to contact me at the above number, and please refer to the P.E.R. Reference Number in future correspondence related to this project.

PNDI is a site specific information system that describes significant natural resources of Pennsylvania. This system includes data descriptive of plant and animal species of special concern, exemplary natural communities and unique geological features. PNDI is a cooperative project of the Department of Conservation and Natural Resources, The Nature Conservancy and the Western Pennsylvania Conservancy. This response represents the most up-to-date summary of the PNDI data files and is good for one year. An absence of recorded information does not necessarily imply actual conditions on-site. A field survey of any site may reveal previously unreported populations. Please reference the PER Number listed above in any further correspondence concerning this response or the PNDI system.

Sincerely,

Julia M. Letnaunchyn

Julia Letnaunchyn
Plant Program Intern

1 PNDI TRACKED SPECIES REPORTED FROM THE LOWER MONOGAHELA RIVER 04 JUN 1998

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	PA	PBS	US	LASTOBS
ACALYPHA DEAMII	THREE-SEEDED MERCURY	G?	SX	N	PX		1990-09-22
ACONITUM UNCINATUM	BLUE MONKSHOOD	G4	S2	PT	PT		1988-07-14
AMELANCHIER HUMILIS	LOW SERVICEBERRY	G5	S1	TU	PE		1921-04-28
ARISTOLOCHIA MACROPHYLLA	PIPEVINE	G5	S4	TU	DL		1974-07-17
ARISTOLOCHIA MACROPHYLLA	PIPEVINE	G5	S4	TU	DL		1991-09-07
ARISTOLOCHIA MACROPHYLLA	PIPEVINE	G5	S4	TU	DL		1992-06-01
ASTRAGALUS CANADENSIS	CANADIAN MILKVETCH	G5	S2	N	TU		1901-07-09
CAREX BUXBAUMII	BROWN SEDGE	G5	S3	TU	PR		1890-05-30
CASSIA MARILANDICA	WILD SENNA	G5	SU	TU	TU		1917-08-10
CASSIA MARILANDICA	WILD SENNA	G5	SU	TU	TU		1908-10-05
CASSIA MARILANDICA	WILD SENNA	G5	SU	TU	TU		1907-08-03
CAVE, SANDSTONE FRACTURE	CAVE, SANDSTONE FRACTURE	G?	S?				
CAVE, SANDSTONE FRACTURE	CAVE, SANDSTONE FRACTURE	G?	S?				
COLLINSIA VERNA	SPRING BLUE-EYED MARY	G5	S3	PR	PR		1942-05-02
DELPHINIUM EXALTATUM	TALL LARKSPUR	G3	S1	PE	PE		1939-10-07
DRYOBIUS SEXNOTATUS	SIX-BANDED LONGHORN BEETLE	G?	SH				1975-07-29
ELLIPSARIA LINEOLATA	BUTTERFLY MUSSEL	G4	SX		PX		1919-PRE
ELLIPSARIA LINEOLATA	BUTTERFLY MUSSEL	G4	SX		PX		1919-PRE
ELLIPTIO CRASSIDENS	ELEPHANT EAR	G5	SX		PX		1919-PRE
ERIGENIA BULBOSA	HARBINGER-OF-SPRING	G5	S2	PT	PT		1988-03-29
ERIGENIA BULBOSA	HARBINGER-OF-SPRING	G5	S2	PT	PT		1993-04-08
ERIGENIA BULBOSA	HARBINGER-OF-SPRING	G5	S2	PT	PT		1935-04-06
ERIGENIA BULBOSA	HARBINGER-OF-SPRING	G5	S2	PT	PT		1940-04-20
ERIGENIA BULBOSA	HARBINGER-OF-SPRING	G5	S2	PT	PT		1922-04-22
ERIGENIA BULBOSA	HARBINGER-OF-SPRING	G5	S2	PT	PT		1970-04-11
FUSCONAIA FLAVA	WABASH PIGTOE	G5	S2		PE		1919-??-??
FUSCONAIA FLAVA	WABASH PIGTOE	G5	S2		PE		1919-PRE
FUSCONAIA FLAVA	WABASH PIGTOE	G5	S2		PE		1919-PRE
FUSCONAIA FLAVA	WABASH PIGTOE	G5	S2		PE		1919-PRE
FUSCONAIA FLAVA	WABASH PIGTOE	G5	S2		PE		1909-PRE
FUSCONAIA SUBROTUNDA	LONG-SOLID	G3	S1S2		PE		1919-PRE
FUSCONAIA SUBROTUNDA	LONG-SOLID	G3	S1S2		PE		1919-PRE
GOMPHAESCHNA ANTILOPE	SOUTHERN BOG DARNER	G4	SH				1903-06-03
HYPERICUM DRUMMONDII	NITS-AND-LICE	G5	SX	TU	PX		1927-09-14
ICTIOBUS BUBALUS	SMALLMOUTH BUFFALO	G5	S1	PC	CR		1978-05-03
IGNEOUS MATERIALS	IGNEOUS MATERIALS	G?	S?				
IODANTHUS PINNATIFIDUS	PURPLE ROCKET	G5	S1	PE	PE		1922-??-??
IODANTHUS PINNATIFIDUS	PURPLE ROCKET	G5	S1	PE	PE		1988-06-01
IODANTHUS PINNATIFIDUS	PURPLE ROCKET	G5	S1	PE	PE		1891-06-10
JUNCUS TORREYI	TORREY'S RUSH	G5	S2	PT	PE		1887-06-02
LAMPSILIS ABRUPTA	PINK MUCKET	G2	SX		PX	LE	1919-PRE
LEPISOSTEUS OSSEUS	LONGNOSE GAR	G5	S2	PC	CR		1983-06-07
LEPOMIS GULOSUS	WARMOUTH	G5	S2	PC	CR		1976-??-??
LEPTODEA FRAGILIS	FRAGILE PAPERSHELL	G5	S1		PT		1919-PRE
LITHOSPERMUM LATIFOLIUM	AMERICAN GROMWELL	G4	S2	PE	PE		1992-06-01
LITHOSPERMUM LATIFOLIUM	AMERICAN GROMWELL	G4	S2	PE	PE		1881-05-25
LITHOSPERMUM LATIFOLIUM	AMERICAN GROMWELL	G4	S2	PE	PE		1885-09-17
LITHOSPERMUM LATIFOLIUM	AMERICAN GROMWELL	G4	S2	PE	PE		1902-07-??
MATELEA OBLIQUA	OBLIQUE MILKVINE	G4?	S1	PE	PE		1896-10-01
MEEHANIA CORDATA	HEARTLEAF MEEHANIA	G5	S1	TU	PE		1902-06-08
MYRIOPHYLLUM HETEROPHYLLUM	BROAD-LEAVED WATER-MILFOIL	G5	S1	PE	PE		1952-06-07
NOTROPIS BUCHANANI	GHOST SHINER	G5	S1	PC	CR		1978-04-03
OBLIQUARIA REFLEXA	THREEHORN WARTYBACK	G5	SX		PX		1919-PRE
OBOVARIA SUBROTUNDA	ROUND HICKORYNUT	G4	S1		CU		1919-PRE
OBOVARIA SUBROTUNDA	ROUND HICKORYNUT	G4	S1		CU		1909-PRE

SCIENTIFIC NAME.....	COMMON NAME.....	GRANK....	SRANK.....	PA....	PBS...	US.....	LASTOBS...
ONOSMODIUM HISPIDISSIMUM	FALSE GROMWELL	G4	S1	PE	PE		1929-09-29
ONOSMODIUM HISPIDISSIMUM	FALSE GROMWELL	G4	S1	PE	PE		1921-06-25
OXYDENDRUM ARBOREUM	SOURWOOD	G5	S3S4	TU	TU		1940-08-10
OXYDENDRUM ARBOREUM	SOURWOOD	G5	S3S4	TU	TU		1988-??-??
PASSIFLORA LUTEA	PASSION-FLOWER	G5	S1	PE	PE		1988-07-20
PASSIFLORA LUTEA	PASSION-FLOWER	G5	S1	PE	PE		1940-07-25
PASSIFLORA LUTEA	PASSION-FLOWER	G5	S1	PE	PE		1909-07-29
PASSIFLORA LUTEA	PASSION-FLOWER	G5	S1	PE	PE		1880-10-05
PASSIFLORA LUTEA	PASSION-FLOWER	G5	S1	PE	PE		1880-10-??
PHYSALIS VIRGINIANA	VIRGINIA GROUND-CHERRY	G5	S1S2	TU	PE		1918-10-06
PLETHOBASUS CYPHYUS	SHEEPNOSE MUSSEL	G2G3	S1		PE		1919-PRE
PLEUROBEMA CORDATUM	OHIO PIGTOE	G3	SX		PX		1919-PRE
PLEUROBEMA CORDATUM	OHIO PIGTOE	G3	SX		PX		1919-PRE
POPULUS BALSAMIFERA	BALSAM POPLAR	G5	S1	PE	PE		1906-05-21
POTAMILUS ALATUS	PINK HEELSPLITTER	G5	S1		PT		1919-??-??
POTAMILUS ALATUS	PINK HEELSPLITTER	G5	S1		PT		1919-PRE
POTAMILUS ALATUS	PINK HEELSPLITTER	G5	S1		PT		1919-PRE
QUADRULA CYLINDRICA	RABBITSFOOT	G3	S1		PE		1919-PRE
QUADRULA METANEVRA	MONKEYFACE	G4	SX		PX		1919-PRE
QUADRULA PUSTULOSA	PIMPLEBACK	G5	SX		PX		1919-PRE
QUADRULA PUSTULOSA	PIMPLEBACK	G5	SX		PX		1919-PRE
RANUNCULUS MICRANTHUS	SMALL-FLOWERED CROWFOOT	G5	S3	PR	DL		1941-05-10
RUELLIA STREPENS	LIMESTONE PETUNIA	G4G5	S2	PT	PT		1892-08-??
RUELLIA STREPENS	LIMESTONE PETUNIA	G4G5	S2	PT	PT		1950-06-24
SALVIA REFLEXA	LANCE-LEAVED SAGE	G5	S2	TU	DL		1918-10-06
SPEYERIA IDALIA	REGAL FRITILLARY	G3	S1				1988-07-14
SPOROBOLUS ASPER	LONGLEAF DROPSEED	G5	S3	N	DL		1902-10-31
STYLURUS NOTATUS	MARKED CLUBTAIL	G3G4	SX				1921-08-06
TRILLIUM NIVALE	SNOW TRILLIUM	G4	S3	PR	PR		1985-04-04
TRILLIUM NIVALE	SNOW TRILLIUM	G4	S3	PR	PR		1986-03-24
TRILLIUM NIVALE	SNOW TRILLIUM	G4	S3	PR	PR		1889-04-25
TRILLIUM NIVALE	SNOW TRILLIUM	G4	S3	PR	PR		1919-03-19
TRITOGONIA VERRUCOSA	PISTOLGRIP MUSSEL	G4	S1		PE		1919-PRE
VILLOSA IRIS	RAINBOW MUSSEL	G5	S1		PE		1919-??-??
VITIS CINEREA VAR BAILEYANA	A PIGEON GRAPE	G4G5T?	S?	TU	PE		1919-06-22

BUREAU OF FISHERIES

Delano R. Graff, Director
(814) 359-5154
FAX: (814) 359-5153

DIVISION OF FISHERIES MANAGEMENT

Richard A. Snyder, Chief
(814) 359-5110
FAX: (814) 359-5153

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA FISH & BOAT COMMISSION
Division of Fisheries Management
450 Robinson Lane
Bellefonte, PA 16823-9620
(814) 359-5110

DZ/ROB
COPY
DEC 15 1997

IN REPLY REFER TO
PNDI# 2349

December 12, 1997

MACKIN ENGINEERING COMPANY
David Zimsky
R.I.D.C. Park West
117 Industry Drive
Pittsburgh, PA 15275-1015

Dear Mr. Zimsky:

RE: Environmental Assessment
Mackin Project NO. 3887-001
Monongahela River Conservation Plan
Glenwood Bridge to Point Marion
Allegheny/Washington/Fayette/Westmoreland Counties, Pennsylvania

I have examined the map accompanying your recent correspondence which shows the location for the proposed above referenced project. Based on records maintained in the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files, the following rare or protected species are known from the vicinity of the project site. Please note that this review represents a general search of the U.S.G.S. quadrangles provided by your office.

Common Name	Scientific Name	PA Status
Southern bog darner	*Gomphaeschna antilope*	Candidate
Eastern Dancer	*Argia tibialis*	Candidate
Marked clubtail	*Stylurus notatusi*	Candidate
Kirtland's snake	*Clonophis kirtlandii*	Endangered
Longnose gar	*Lepisosteus osseus*	Candidate
Ghost shiner	*Notropis buchanani*	Candidate
Bullhead minnow	*Pimephales vigilax*	Candidate
Smallmouth buffalo	*Ictiobus bubalus*	Candidate
River redhorse	*Moxostoma carinatum*	Candidate
Warmouth	*Lepomis gulosus*	Candidate
Three-ridge	*Amblema plicata*	Candidate
Purple wartyback	*Cyclonaias tuberculata*	Candidate
Butterfly mussel	*Ellipsaria lineolata*	Candidate
Elephant ear	*Elliptio crassidens*	Candidate
Snuffbox	*Epioblasma triquetra*	Candidate
Wabash pigtoe	*Fusconaia flava*	Candidate
Long-solid	*Fusconaia subrotunda*	Candidate
Pink mucket	*Lampsilis abrupta*	Candidate

Fragile papershell	*Leptodea fragilis*	Candidate
Threehorn wartyback	*Obliquaria reflexa*	Candidate
Round hickorynut	*Obovaria subrotunda*	Candidate
Sheepnose mussel	*Plethobasus cyphyus*	Candidate
Ohio pigtoe	*Pleurobema cordatum*	Candidate
Pink heelsplitter	*Potamilus alatus*	Candidate
Rabbitsfoot	*Quadrula cylindrica*	Candidate
Monkeyface	*Quadrula metanevra*	Candidate
Pimpleback	*Quadrula pustulosa*	Candidate
Pistolgrip mussel	*Tritogonia verrucosa*	Candidate
Rainbow mussel	*Villosa iris*	Candidate

If this project will involve any invasive environmental disturbance in addition to the River Conservation Plan, then further review will be required, including a detailed project description. Depending on the project, there may be adverse impacts to those mussel species that are known from this section of the Monongahela River.

Thank you for the opportunity to comment on this plan.

Please call me at (814) 359-5113 or (814) 359-5186 if you have any questions regarding my response.

Sincerely,

Quinn Metheny for

Andrew L. Shiels
Nongame and Endangered Species Unit

QM/sal

cc: R. Snyder, PFBC

APPENDIX G: Recreational Data

SPORTSMEN & FISHING ASSOCIATIONS

SPORTSMEN'S ASSOCIATIONS			
Allegheny County Rifle Club, Inc.			
Allegheny County Sportsmens League	Pittsburgh	882-9115	
Braddock District Sportsmen's Association			
East Monongahela Sportsmen's Assoc., Inc.			
Elizabeth TWP. Sportsmen's Assoc., Inc.			
Fay West Sportsman's Club	PO Box 392 Vanderbilt, PA 15486	529-0675	Barry Graft
Fayette County Sportmen's Club	14 North Morgantown Street Fairchance, PA 15436	564-4751	Thomas Guy
Homestead District Sportsmen's Association, Inc.			
McKeesport Sportsmens Association, Inc.	Jack Run Road White Oak, PA	664-1288	
PA Federation of Sportmen's Clubs	2426 North Second St. Harrisburg, PA 17110	717-232-3480	
Penn's Waters Bass Busters			
Perry Township Sportsmen's Club	Perryopolis, PA	736-0920	Dan Boyle
Rostraver Sportsmens Club		872-4399	Frank Donnii
Star Junction Fish and Game Club	Route 51 Star Junction, PA	736-8170	
Trout Unlimited - Chestnut Ridge Chapter	PO Box 483 Uniontown, PA 15401	329-4898	Craig Cheleske
Westmoreland County Federation of Sportmens' Clubs	1313 Coal Hollow Road West Newton, PA 15089	872-9269	John Dainty

RECREATIONAL FACILITIES AND AMENITIES

Map Identification Number	River Mile	River Bank	Public/ Private	Facility Name	Location	Facilities									
						River Access	Restaurant	Docks	Athletic Fields	Playground equipment	Pavilions	Restroom	Fuel	Lodging	Other
183	90.50	R	Public	Point Marion Ballfield	Point Marion	●			●	●	●	●			
211	90.30	R	Public	PFBC Ramp	Point Marion	●									Paved ramp
158	88.60	L	Private	Two Rivers	West Point Marion	●	●	●			●	●	●	●	Boat sales, camping, RV's, storage facilities, swimming, entertainment, fishing
159	87.30	L	Private	Shady Cove Marina	Dunkard Creek	●	●	●							
165	85.50	R	Public	Friendship Hill	New Geneva		●				●	●			Walking trial, visitors center
210	84.50	L	Public	Public Ramp	Greensboro	●									
181	84.10	L	Public	Mon View Park	Greensboro				●	●	●	●			Roller rinks, swimming pools
239	80.00	R	Public	Masontown Ballfield	Masontown				●						
238	79.80	R	Public	Masontown Athletic Field	Masontown				●						
188	79.00	R	Public	Mason-German Park	Masontown				●	●	●	●			
157	75.60	R	Private	Chuck's Marina	Adah	●	●	●							Ramp not paved
237	74.30	R	Public	Palmer Ballfield	Palmer				●						
156	74.20	R	Private	Earl E. Smith Marina	Palmer	●	●	●							
155	72.80	L	Private	Jessop Boat Club	Riverside	●		●							
209	71.00	L	Public	Public Ramp	Crucible	●									
208	68.80	L	Public	PFBC Ramp	Rice's Landing	●									
180	68.70	L	Public	Rice's Landing Riverfront Park	Rice's Landing	●									Entertainment
187	68.70	L	Public	Pumpkin Run Community Park	Rice's Landing				●	●	●	●			
236	65.75	R	Public	East Millsboro Ballfield	East Millsboro				●						
149	65.50	L	Private	Holiday Harbour	Tenmile	●	●	●				●	●		
151	65.50	L	Private	Tenmile Yacht Club	Tenmile	●		●				●	●		
153	65.50	R	Private	Green Cove Yacht Club	Tenmile	●	●	●	●	●	●	●	●	●	Camping & RV's
154	65.50	R	Private	Sunset Marina	Tenmile	●		●					●		
206	65.50	L	Public	Tenmile Public Park	Tenmile	●			●	●	●				

207	65.50	L	Public	Washington County Ramp	Tennile	●										
148	65.20	L	Private	Landmark Hotel	Millsboro	●	●	●				●		●		Fishing supplies
235	65.00	L	Public	East Bethlehem Ballfield	East Bethlehem				●							
205	63.90	R	Public	PFBC Ramp	East Fredericktown	●										
147	63.80	L	Private	Riviera Hotel	Fredericktown	●	●	●					●	●		
146	62.90	L	Private	Packrall Bay	Vesta #6	●	●	●					●			
234	62.40	R	Public	Dutch Hill Ballfield	Dutch Hill				●							
145	58.80	L	Private	Denbo Marina (Pechin's)	Denbo	●	●	●				●	●			
204	56.00	L	Public	West Brownsville Public Ramp	West Brownsville	●										
143	55.40	L	Private	American Legion	West Brownsville	●		●				●	●			
203	51.80	L	Public	California Public Ramp	California	●										
142	51.25	L	Private	California Boat Club	California	●		●					●			
179	50.80	R	Public	Newell Ballfield	Newell											
141	49.40	L	Private	Tim's Marina and Restaurant	Elco	●	●	●				●				Fishing supplies
202	48.50	L	Public	Public Ramp	Newell	●										
233	46.30	L	Public	Allenport Park	Allenport					●						
231	45.75	R	Public	Naomi Athletic Field	Naomi				●							
140	45.70	L	Private	G.M. Bradish Riverfront Inc.	Dunlevy	●	●	●					●			
230	45.30	R	Public	Naomi Ballfield	Naomi				●							
228	44.40	L	Public	Dunlevy Recreation Park & Center	Dunlevy				●	●	●					
227	44.00	R	Public	Belle Vernon Athletic Field	Belle Vernon				●							
139	43.50	L	Private	Speers Boat Club	Speers	●		●								
226	43.50	L	Public	Speers Community Park	Speers											
213	43.50	R	Public	Belle Vernon Public Ramp	Belle Vernon	●										
201	43.50	L	Public	PFBC Ramp	Speers	●										Paved ramp
138	43.40	L	Private	Harbour Towne Marina	Speers	●	●	●				●	●			Rentals, service & storage facilities
225	43.00	R	Public	North Belle Vernon Recreation Park	North Belle Vernon				●	●						
200	42.30	L	Public	Borough of Charleroi Public Ramp	Charleroi	●										
186	42.10	L	Public	Charleroi Riverfront Park	Charleroi	●		●		●	●					
199	41.10	L	Public	North Charleroi Public Ramp	North Charleroi	●										
224	39.75	R	Public	Ninth Street Park	Monessen				●	●						
223	39.50	R	Public	Sixth Street Park	Monessen				●	●						
222	38.80	R	Public	Shawnee Park	Monessen				●	●						
220	37.00	L	Public	Annex Field	Donora				●	●						
221	37.00	L	Public	Cascade Park	Donora				●	●						
219	36.75	L	Public	Ken Griffey Park	Donora				●	●						
189	36.50	L	Public	Palmer Community Park	Donora				●	●	●	●				Walking trail

218	36.50	L	Public	Donora Community Park	Donora				●	●	●				
137	36.40	R	Private	Webster Boat Club	Webster	●		●				●			Refreshments
212	36.40	R	Public	Webster Ramp	Webster	●									
198	36.30	R	Public	Rostraver Twp Ramp	Webster	●									Not paved
136	34.50	R	Private	Frank & Fay Irey Marina	Sunnyside	●		●							
185	34.10	R	Public	Sunnyside/Gallatin Park	Sunnyside	●			●	●	●				
197	34.10	R	Public	Forward Twp Public Ramp	Sunnyside	●									Paved ramp
217	33.30	L	Public	Hillcrest Park	Monongahela				●	●					
196	33.15	L	Public	PFBC Ramp	Monongahela	●									
241	32.75	L	Private	Monongahela Country Club	Monongahela		●		●						9 hole golf course, proshop
216	32.75	L	Public	Riverview Ballfield	Monongahela				●						
134	32.30	R	Private	Marina Specialties	Monongahela East	●									Service and storage facilities
135	32.10	R	Private	Grandview Marina	Monongahela East	●	●	●				●	●		
215	32.00	L	Public	Carroll Township Racetrack	Monongahela										
178	31.90	L	Public	Monongahela City Aquatorium	Monongahela	●		●							Bleachers, entertainment
195	31.90	L	Public	Monongahela Public Ramp	Monongahela	●									
133	31.80	L	Private	Monongahela Mariners Boat Club	Monongahela	●		●							
175	31.50	L	Public	Monongahela Ballfield	Monongahela				●						
132	30.90	L	Private	Beach Club Marina	New Eagle	●		●				●	●		Service facilities, floating convenience store, boat and watercraft rentals, storage facilities
174	30.20	L	Public	New Eagle Ballfield	New Eagle				●						
184	30.00	L	Public	Larry Hall Memorial Park	New Eagle	●					●	●			Refreshments
173	30.00	L	Public	New Eagle Ballfield	New Eagle				●						
194	30.00	L	Public	New Eagle Public Ramp	New Eagle	●									
131	29.00	R	Private	Molnar's Marina	Elkhorn	●		●			●	●		●	Service facilities, storage facilities, camping
130	27.50	R	Private	Sloan's Carousel Marina	Bunola	●	●	●				●			
240	26.50	R	Public	Riverview Golf Course	Bunola		●					●			18 hole golf course, proshop, bar
129	26.50	R	Private	Evan Ford Marina	Bunola	●	●								
128	26.40	R	Private	Pine Run Outboard Club	Bunola	●		●						●	Camping
127	26.00	R	Private	Evan Ford Development (Waterfront)	Bunola	●	●	●							

171	24.30	L	Public	Beedle Park	Jefferson Borough				●	●	●	●			
193	23.20	R	Public	PFBC Ramp	Elizabeth	●									
177	23.00	R	Public	Elizabeth Riverfront Park	Elizabeth	●					●				Deck over water, entertainment
126	22.80	R	Private	Elizabeth Boat Club	Elizabeth	●		●							
168	19.50	L	Public	Clairton Resident Park	Clairton				●	●	●	●			Lodge, swimming pool
167	18.75	L	Public	Glassport Athletic Field	Glassport				●						
166	16.50	L	Public	US Steel Ballfield	Dravosburg				●	●		●			
124	15.90	R	Private	Mon Valley Speedboat Club	McKeesport	●	●	●				●	●		
121	15.50	R	Public	McKee's Point Park	Yough	●	●	●			●	●			Bicycle storage, rental, locker rooms
122	15.50	L	Private	Rivers Edge	Yough	●	●	●				●			
123	15.50	L	Private	Bertie's Landing	Yough	●		●							
164	15.50	R	Public	Gergely Park	McKeesport						●	●			
192	15.50	L	Public	PFBC Ramp	Yough	●									Parking
163	11.20	L	Private	Kennywood Park	West Mifflin				●	●	●	●			Amusement Rides
191	10.80	R	Public	Braddock Public Ramp	Braddock	●									Limited Parking
162	8.75	R	Public	Les Getz Memorial Park	Swissvale				●	●	●				
161	8.00	R	Public	Frick Park	Nine Mile				●	●	●	●			Nature Reserve, Nature Center
176	6.20	L	Public	SandCastle	Glenwood	●	●	●				●			Water slides, swimming pool
160	6.00	L	Public	Hays Tot Lot	Hays					●					

APPENDIX H: Historical Timeline

Era and Event Timeline of the Monongahela River Valley

	>1500	**1600**	1650	**1700**	1750	1760	1770	1780	1790	**1800**	1810	1820	1830	1840	1850	1860	1870	1880	1890	**1900**	1910	1920	1930	1940	1950	1960	1970	1980	1990	**2000**
PREHISTORY																														
Mound Builder Period																														
EARLY WHITE SETTLERS																														
Period of the Iroquois Indian Nation																														
Period of Early Traders																														
Period of British & French Land Claims																														
French and Indian War																														
EARLY MANUFACTURING																														
Coal (small-scale mining & transport)																														
Growth of Cottage Industries																														
Revolutionary War																														
Whiskey Rebellion																														
Keelboat & Flatboat Era																														
COMMERICIAL DEVELOPMENT																														
War of 1812																														
Era of Early Manufacturing																														
Period of Heaviest Coal Mining																														
National Road Era																														
First Dams Constructed on the Mon River																														
Steamboat Era																														
INDUSTRIAL REVOLUTION																														
Civil War																														
Early Construction of Railroads																														
Railroad Boon Era																														
Period of Coke Manufacturing																														
Big Steel Era																														
Edgar Thomson Plant Opened																														
Homestead Works Bessemer Plant Opened																														
Homestead Steel Strike																														
Duquesne Blast Furnace Plant Opened																														
Organization of US Steel Co.																														
Clairton Works Opened																														
Carrie Furnaces 6 & 7 Opened																														
WWI																														
1919 Steel Strike																														
WWII																														
POST INDUSTRIAL PERIOD																														
Urban Renewal - Pgh's Renaissance I																														
Closing of Area Mills																														
Pgh's Renaissance II																														
	>1500	1600	1650	1700	1750	1760	1770	1780	1790	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000

Note: Timeline does not depict start and finish dates the line items, but rather the dominate years of their repective activity.

APPENDIX I: Historical Sites

Appendix I
Historical Sites

ALLEGHENY COUNTY

Municipality	*Historic Site/ Structure*	*Map ID Nunber*
Braddock	St. Thomas Roman Catholic Church	5
Braddock	1100 Braddock Avenue at Frazier Street	6
Clairton	Glassport-Clairton Bridge	172
Clairton	Clairton Works	173
Clairton	02 10 0376 0 013350	19
Duquesne	Duquesne Steel Company	181
East Pittsburgh	Westinghouse, George Memerial Bridge	174
Elizabeth	P&LE Railroad Station/ Wylie Station	21
Elizabeth	McKeesport RD (Monongahela Avenue at Chicago Avenue)	22
Elizabeth	Elizebeth Cemetery	23
Elizabeth	02 2 0 0239 0 042420	25
Forward	Gardner House	28
Forward	R/R Over Monongahela River	29
Forward	Rt. 136 E of Manown Hollow Rd	30
Glassport	P&LER Station	17
Glassport	P&LER Station	18
Homestead	Homestead Pennsylvania Railroad Station	2
Homestead	Homestead Historical District	179
Jefferson	02 20 0066 0 026923	24
Jefferson	Lobb's Cemetery	26
Jefferson	Glass House Road	27
Lincoln	02 2 0 0239 0 050647	20
McKeesport	Sterling Steel Company	183
McKeesport	National Tube Works	182
McKeesport	National Tube Works	9
McKeesport	Ruben Building	10
McKeesport	The People's Bank	11
McKeesport	McKeesport National Bank	12
McKeesport	Jerome Street Bridge	13
McKeesport	B & O Railroad Site	14
McKeesport	McKeesport Water Filtration Plant	15
McKeesport	Walnut Street over Youghiogheny River	16
Munhall	St. John's Greek Catholic Church	3
North Braddock	Edgar Thompson Works- USX (Frazier Farm)	175
North Versailles	Linclon Highway over Turtle Creek	8
Pittsburgh	Homestead High Level Bridge	178
Rankin	Monongehela River Flood Plain (Mile 9)	1
Swissvale	Carnegie Steele/ Carrie Furnaces	177
West Homestread	Mesta Machine Company	4
West Homestread	Mesta Machine Company	7
West Mifflin	Kennywood Park (Kenny's Grove)	176

Source: SPRPC

Appendix I
Historical Sites

FAYETTE COUNTY

Municipality	*Historic Site/ Structure*	*Map ID Number*
Belle Vernon	137 State Street	47
Belle Vernon	139 Main Street	48
Belle Vernon	132 Madison Street	49
Belle Vernon	American Window Glass Company: Factory No. 4	50
Brownsville	203 Walnut Street	63
Brownsville	Christ Episcopal Church	64
Brownsville	Church Street	65
Brownsville	401 Church Street	66
Brownsville	405 Church Street	67
Brownsville	422 Church Street	68
Brownsville	Spring Street	69
Brownsville	Monongahela Railway Company: Brownsville Tunnel	70
Brownsville	Shaffner Road	71
Brownsville	Nemacolin Castle	72
Brownsville	512 Church Street	73
Brownsville	St. Peter's Church	74
Brownsville	Bowman's Castle	75
Brownsville	Monongahela Bank	76
Brownsville	Monongahela Railway Company: Union Station	77
Brownsville	Brownsville Bridge	78
Brownsville	209 Front Street	80
Brownsville	218 Brashear Street	79
Brownsville	Brownsville Commons	81
Brownsville	Black Horse Tavern	82
Brownsville	209 Front Street	83
Brownsville	Frondorf House	84
Brownsville	Connellsville Central RR: Dunlap Creek	86
Brownsville	Brownsville Avenue	87
Brownsville	315 front Street	88
Brownsville	306 front Street	89
Brownsville	301-305 Front Street	90
Brownsville	514 Market Street	91
Brownsville	Market Street	92
Brownsville	Brownsville Pumping Station	166
Brownsville	Knox, Philander House	93
Brownsville	402 Front Street	94
Brownsville	Dunlap's Creek Bridge	95
Brownsville	412 Brashear Street	96
Brownsville	The Academy	97
Brownsville	418-420 Brashear St	98
Brownsville	407-411 Front Street	100
Brownsville	Pearsall, Samuel H. House (Moose Lodge)	101
Brownsville	Dunlap Creek Bridge	102
Brownsville	219 Water Street	103
Brownsville	Water Street	104
Brownsville	108 Bank Street	106
Brownsville	420 Water Street	107
Brownsville	Monongahela Railway Company: Shops	167
Brownsville	International Baking Company	108
Brownsville	Near Brownsville Avenue	109

Source: SPRPC

FAYETTE COUNTY (continued)

Municipality	*Historic Site/ Structure*	*Map ID Number*
Brownsville	903 Water Street	110
Brownsville	Brownsville Brewing Company	111
Brownsville	15 Angle Street	112
Brownsville	815 Water Street	113
Brownsville	600 Front Street	114
Brownsville	213 Sibbet Avenue	115
Brownsville	806 Second Street	116
Brownsville	261 High Street	118
Brownsville	127 Angle Street	119
Brownsville	135 Angle Street	120
Brownsville	Stable Alley	121
Brownsville	Monongahela Railway Company: Three Bridges	122
Brownsville	Accross Dunlap Creek at Jackson Street	123
Fayette City	Route 201	51
Fayette City	Cemetery Street	52
Fayette City	California Street	53
Fayette City	128 Fourth Street	54
Fayette City	4th Street	55
Fayette City	212-216 Main Street	56
Fayette City	223-225 Main Street	57
Fayette City	308 Main Street	58
Fayette City	323-325 Main Street	59
Fayette City	Pittsburgh & Lake Erie Railroad: Fayette City Station	60
German	Gates: Mine and Company Town	128
German	Trotter Waterworks	129
Jefferson	Colonial Dock	170
Jefferson	Pittsburgh & Lake Erie Railroad Complex	61
Luzerne	Hillman Barge & Construction Company	117
Luzerne	LaBelle Coal Preparation Plant	124
Luzerne	TR 703 near West Bend	125
Luzerne	Davidson's (Arenberg) Ferry	126
Luzerne	Adam Jacob's Summer Residence	127
Masontown	524 N. Main Street	130
Masontown	307 N. Washington Street	132
Masontown	210 N. Main Street	133
Masontown	211 N. Main Street	134
Masontown	Washington Street	135
Masontown	Liberty Theater	140
Masontown	29 Main Street	141
Masontown	Masonic Temple	142
Masontown	105 Main Street	138
Masontown	N. Main and Spring Street	136
Masontown	Main and Spring Street	137
Monongahela	LR Bridge 26008	131
Newell	General Chemical Company: Company Housing	168
Newell	General Chemical Company: Newell Works	169
Newell	Fourth and Morgan Street	62
Nicholson	LR 579 Bridge	143
Nicholson	New Geneva Petroglyph Site 36FA37	144
Nicholson	Harmony House	145
Nicholson	Front Street New Geneva	146
Nicholson	PA Route 166 at New Geneva	147
Nicholson	Deffenbach Residence	148
Nicholson	Albert Galliton House (Friendship Hill)	149

Source: SPRPC

Appendix I
Historical Sites

FAYETTE COUNTY (continued)

Municipality	*Historic Site/ Structure*	*Map ID Number*
Point Marion	127 Railroad Street	153
Point Marion	Houze Convex Glass Company Housing	154
Point Marion	Sidwell Building	155
Point Marion	Jeanette Window Glass Company	156
Point Marion	LR 116 Bridge	157
Springhill	County Bridge #139 26 0081 0 014910	150
Springhill	PA Route 166 near New Geneva	151
Springhill	LR 116 Bridge	152
Springhill	Nilan Glass Company	158
Springhill	Mueller Distrillery	159

GREENE COUNTY

Municipality	*Historic Site/ Structure*	*Map ID Number*
Cumberland	LR 30097 Bridge 30 2 0 0097 0 017077	163
Dunkard	LR 451 Bridge 30 1 0 0451 0 014135	164
Dunkard	Marion Bridge	165
Jefferson	LR 268 Bridge 30 1 0 0268 0 069128	160
Rices Landing	Rice's Landing Hisroric District	161
Rices Landing	LR 30077 Bridge 30 2 0 0077 000427	162

WASHINGTON COUNTY

Municipality	*Historic Site/ Structure*	*Map ID Number*
California	62196 Over Pike Run	40
California	Pennsylvaina Railroad Passenger Station	180
California	Old Main, California State College	41
Centerville	Driftwood Mine	43
Charleroi	Charleroi United States Post Office	38
Donora	Webster-Donora Bridge	36
Donora	Donora Works, American Steel & Wire Company	37
Monongahela	Acheson, Edward G. House	32
Monongahela	Butler-Hohn House	33
Monongahela	Elks Club	34
Monongahela	Robinson, John House	35
New Eagle	62 1 0 0736 0 000590	31
Speers	LR 118 over Maple Creek	39
West Brownsville	Kinder Mine	42

WESTMORELAND COUNTY

Municipality	*Historic Site/ Structure*	*Map ID Number*
Monessen	Pittsburgh Steel Company	171
North Belle Vernon	Carnegie Free Library	45
Rostraver	Frist Street at Bridge	44
Rostraver	Pittsburgh & Lake Erie Railroad: Belle Vernon Station	46

SOURCE: SPRPC

APPENDIX J: Evaluation Criteria

Landing Site Rating Criteria

INFRASTRUCTURE

Site Location/Name:_____

Site Access..... (Maximum Score = 27 Points)

Land Access (Existing): **Maximum = 9 points**

Type:.....Maximum = 6 points
- Interstate..... 3
- State 2
- Local 1

NOTES:

Condition: (based upon traffic, maintenance, type, etc.).....Maximum = 3 points
- Excellent 3
- Fair..... 2
- Poor..... 1

NOTES:

Constraints: .....Maximum = -3 points
- Railroad Crossing.....-1
- Topography.....-1
- Restricted areas .....-1
- (i.e. private land, locks & dams)

NOTES:

River Access (Existing): **Maximum = 18 points**

Facility Type: .....Maximum = 12 points
- PFBC ramp 3
- Marina..... 3
- Municipal ramp..... 2
- Private ramp..... 1
- Old lock 1
- Wharf wall 1
- Old ferry crossing 1

NOTES:

Ramp Type:.....Maximum = 3 points
- Concrete 3
- Asphalt..... 3
- Aggregate..... 2
- Dirt..... 1

NOTES:

Condition: ..... Maximum = 3 points
- Maintained 3
- Not maintained 2
- Abandoned 1

NOTES:

Constraints: ..... Maximum = -7 points
- Seasonal restrictions ..... -1
- Bridges ..... -1
- Water depth ..... -1
- Restricted areas ..... -1
- Wake zones ..... -1
- Locks ..... -1
- Size of landing (> 50 ft) .... -1

NOTES:

Site Infrastructure ..... (Maximum Score = 16 Points)

Existing Infrastructure: ..... Maximum = 8 points
- Utility Access (electric, telephone) 2
- Sewage/Water 2
- Parking Facilities 2
- Pedestrian Access 2

NOTES:

Access to Available Land for: ..... Maximum = 8 Points
- Landing Site Development 2
- Parking 2
- Industrial Reuse 2
- Commercial Development 2

NOTES:

TOTAL OVERALL INFRASTRUCTURE ..... MAXIMUM = 43 POINTS

Total Points received =

Landing Site Rating Criteria

AMENITIES

Site Location/Name_____

Historical Attributes — **Maximum Score = 10 Points**

- Registered Historic District
- Registered Historic Structure
- Eligible Historic District
- Eligible Historic Structure
- Locally Recognized Structures
- Existing Thematic Programs/ Projects

NOTES:

Cultural Attributes — **Maximum Score = 10 Points**

- Festivals
- Craft Shows
- Shops for Cultural items or Local Crafts
- Cultural Events
- Museums
- Theaters
- Arts Community

NOTES:

Recreational Attributes — **Maximum Score = 10 Points**

- Federal Parks
- National Parks
- State Parks
- Regional Parks
- Local Parks
- Recreational Trails
- Marinas
- Amusement Parks
- Golf Courses

NOTES:

Commercial Attributes (existing) — **(Maximum Score = 5 Points)**

- Access to Shopping/Retail
- Access to Restaurants
- Access to Lodging
  - AAA (Approved/Rated) Facility
  - B & B
  - Hotel/Motel
  - Camping

NOTES:

Natural Area Attributes **(Maximum Score = 5 Points)**

Game Lands
Natural Heritage Areas

NOTES:

TOTAL OVERALL AMENTIES .....MAXIMUM = 40 POINTS

Total Points received =

APPENDIX K: Intergovernmental Task Force on Monitoring Water Quality, Final Report

The Strategy for Improving Water-Quality Monitoring in the United States---Final Report of the Intergovernmental Task Force on Monitoring Water Quality

Table of Contents

References

General Intent

This is the third and final report of the Intergovernmental Task Force on Monitoring Water Quality (ITFM). It proposes changes in water-quality monitoring that are needed to support sound decisionmaking at all levels of government and in the private sector. The proposed changes in water-quality monitoring are necessary to obtain a better return on public and private investments in monitoring, environmental protection, and natural-resources management. Implementing the strategy and recommendations is necessary to achieve nationwide water-quality goals to protect human health, to preserve and restore healthy ecological conditions, and to sustain a viable economy. The proposed strategy will expand the base of information useful for multiple purposes and a variety of users. In some cases, ITFM recommendations ratify and encourage ongoing efforts. In other cases, ITFM calls for fundamental changes in the ways that water-quality-monitoring programs are defined, designed, prioritized, conducted, and funded.

Background

History of the Intergovernmental Task Force on Monitoring Water Quality

The ITFM was formed in early 1992 in response to Office of Management and Budget (OMB) Memorandum No. 92--01. This memorandum set forth specific requirements to review and evaluate water-quality-monitoring activities nationwide and to recommend improvements. Also, it delegated lead-agency responsibility for water information coordination to the USGS. The OMB memorandum and the Terms of Reference of the ITFM are provided in the ITFM first-year report (Intergovernmental Task Force on Monitoring Water Quality, 1992).

The ITFM is a Federal/State or Tribal partnership that includes representatives from 20 Federal, State, Tribal, and interstate organizations. The U.S. Environmental Protection Agency (USEPA) serves as co-chair, and the U.S. Geological Survey (USGS) serve as co-chair and the executive secretariat. In addition to the 20 officially designated ITFM representatives, more than 150 individuals in Federal and State agencies participate in nine working groups to provide additional perspective and technical expertise. Private sector organizations also participate in the process through the Federal Advisory Committee on Water Data for Public Use, public meetings announced in the *Federal Register*, and an initiative to promote coordination of ambient and compliance monitoring. The work of the ITFM is sponsored by the Federal interdepartmental Water Information Coordination Program.

Previous Reports

The two preceding ITFM reports provide information that will enhance understanding of the recommendations in this final report. In December 1992, the ITFM completed its first-year report, *Ambient Water-Quality Monitoring in the United States: First Year Review, Evaluation, and Recommendations.* The report focused on the evaluation of current ambient-monitoring efforts and the opportunities for improvement. The report concluded that monitoring programs must keep pace with changing water-management programs, a collaborative strategy is needed to link the many separate monitoring programs, a genuine appreciation of the need for cooperation currently exists among monitoring agencies, and recent advances in technology provide new opportunities for interaction and cooperation. The report recommended that an integrated, voluntary, nationwide strategy should be designed and implemented to improve water-quality monitoring in this country.

The ITFM published its second year report, *Water-Quality Monitoring in the United States: 1993 Report of the Intergovernmental Task Force on Monitoring Water Quality,* in June 1994. This report documented the ITFM's recommendations for the technical "building blocks" needed to implement

the strategy and presented for public review the supporting technical reports prepared by the ITFM working groups.

These technical reports, which were published as separate appendixes, address monitoring frameworks, environmental indicators, methods comparability, data management and sharing, resource assessment and reporting, and ground-water issues. Also, the second-year report contains information about a pilot project in Wisconsin designed to test ITFM assumptions and recommendations. [See the inside front cover of this present report for information needed to order the previous reports.]

Definitions and Scope

The ITFM recommendations address the full range of aquatic resources, which include ground and surface waters and fresh and marine environments, in the United States. International considerations also are important but are beyond the scope of this report. Canada and Mexico, however, have been very interested in ITFM activities, and the ITFM envisions future work with agencies in other countries. To identify improvements needed to support more effective decisionmaking, the ITFM broadly defined monitoring functions. To identify the multiple elements of a complex subject clearly, the ITFM identified five major purposes for monitoring. Table 1 lists the ITFM consensus definitions for aquatic resources and monitoring functions and the purposes of water-quality monitoring. A glossary of terms used by the ITFM is provided in Technical Appendix A.

Table 1. Key Intergovernmental Task Force on Monitoring Water Quality Definitions.

Key ITFM definitions	
Aquatic resources	Surface and ground waters, estuaries, and near waters. Associated aquatic communities and physical hab which include wetlands. Sediments.
Aquatic resources data	Physical, which includes quantity. Chemical/toxicological. Biological/ecological. Associated data needed to interpret the aquatic including habitat, land use, demographics, contaminant discharges, and other "ancillary" information,such as atmospheric deposition.
Monitoring program activities	Identifying and documenting program goals and purposes. Designing and planning monitoring programs. Coordinating and collaborating with other monit agencies.

	Selecting environmental indicators.
	Locating appropriate monitoring sites.
	Selecting data-collection methods.
	Collecting field observations and samples.
	Analyzing samples in laboratories.
	Developing and operating quality-assurance prog
	Storing, managing, and sharing data.
	Interpreting and assessing data to produce usef information.
	Reporting and distributing monitoring results t different audiences.
	Evaluating the effectiveness of monitoring prog
Purposes of monitoring	Assessing status and trends (includes spatial a temporal variability).
	Characterizing and ranking existing and emergin
	Designing and implementing programs and project
	Evaluating program and project effectiveness.
	Responding to emergencies (ITFM did not address

Historical Context

Control of water pollution became a major environmental priority during the last three decades, and in response, water-quality monitoring has expanded rapidly. In the 1970's, Federal and State governments began requiring the regulated community---industry, public water suppliers, municipalities, and others---to monitor water quality. The resulting data are being used to demonstrate compliance with pollution-control permits and to obtain information required to estimate pollution loading from human sources into the environment. Today, tens of thousands of public and private organizations spend hundreds of millions of dollars a year on compliance monitoring.

These important compliance-monitoring efforts focus on well-defined sources of pollution, such as industrial facilities, sewage-treatment plants, or waste-disposal sites. The primary intent is to characterize the concentrations of water-quality constituents at their sources, or "the ends of pipes." In part, point-source concentrations of pollution were the initial focus of regulatory monitoring because knowledge of the interactions between human activities and natural systems was more limited than it is today. Point sources are easier to define and monitor compared with nonpoint sources. As a result, more money has been spent on point-source-compliance monitoring than on either nonpoint or ambient monitoring. As a further result, few ambient-monitoring programs assessed overall water quality and the causes and sources of nonpoint-source and habitat problems.

When it became widely apparent in the late 1980's that water-quality protection and management goals could not be achieved without considering point and nonpoint sources of pollution, as well as habitat degradation, the need to reshape the overall monitoring strategy became clear. Thus, the public and the private sectors have initiated several new ambient-monitoring and assessment efforts (Intergovernmental Task Force on Monitoring Water Quality, 1992). However, significant gaps remained, and until the ITFM effort, coordination among the various new programs was uneven. Today, agreement is widespread that existing data programs cannot be added together to provide all the information needed to answer the more recent complex questions about national or regional water quality (National Research Council, 1987, 1990a, b; U.S. Environmental Protection Agency, 1987; Knopman and Smith, 1992). Wide recognition of the need to improve water-quality monitoring to accomplish clearly defined objectives and to obtain better ambient and compliance information has bolstered the ITFM's efforts to develop a strategy.

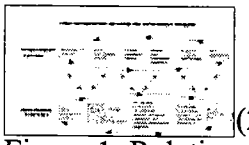
Fortunately, technology has advanced during the last 25 years. Better tools and knowledge are now available, and a monitoring strategy can now be created to support the development of policies and programs that target available resources to priority problems within watersheds, ecosystems, and specific geographic areas. It is now possible to develop a monitoring strategy that will be useful for evaluating the effectiveness of resource-management and environmental protection actions. Monitoring to evaluate program effectiveness is needed not only to protect human health and ecosystems, but also to ensure that money is spent wisely. From 1972 through 1986, the total public and private costs for water-pollution abatement exceeded $500 billion (Carlin and the Environmental Law Institute, 1990), and by the end of this century, hundreds of billions of dollars more will be spent (U.S. Environmental Protection Agency, 1990).

Institutional and technical changes are needed to improve water-quality monitoring and to meet the full range of monitoring requirements. The proposed strategy provides a long-term blueprint for making the changes that are needed. As more organizations adopt the recommendations and become partners in implementing the strategy, the nationwide capability to assess water-quality conditions will grow. As a result, the information gathered from implementing the strategy will be greater than the sum of the measurements produced by individual organizations.

Water-Quality Questions

Water-quality monitoring provides an objective source of information to answer questions that support the wise management of vital water resources. Appropriate ambient and compliance monitoring provides the basis for informed management throughout the decisionmaking process (Figure 1 below). Adequate monitoring is needed at many scales---site, watershed, State, Tribal, regional, and national. Historically, some questions have been difficult or impossible to answer, especially at the regional and the national scales. Improved monitoring is needed to assess the quality of essentially all the Nation's water resources in a targeted way that will provide quantitative answers to the following questions:

- What is the condition of the Nation's surface, ground, estuarine, and coastal waters?
- Where, how, and why are water-quality conditions changing over time?
- Where are the problems related to water-quality? What is causing the problems?
- Are programs to prevent or remediate problems working effectively?
- Are water-quality goals and standards being met?

 (21K .gif file)
Figure 1. Relation of monitoring purposes and management actions.

Uses of Water-Quality Information

Monitoring programs over the past 3 decades have provided large amounts of data; many of these data have not been analyzed to provide water-quality managers and regulators with the information needed to manage water resources relative to the questions listed above. One potential explanation for this lack of data analysis is a limited appreciation of the uses and the users are of water-quality information. In fact, monitoring information is used by Federal, State, and Tribal governments; legislators; regulators and natural-resources managers; private industry; scientists; academia; and the general public. Users and uses of water-quality information include the following:

- *Citizens.*---Need information to understand environmental risks, exercise environmental stewardship through responsible behavior, and support needed policy and program changes.
- *Legislators.*---Develop water-quality and related resource goals, policies, and programs and evaluate progress in achieving the goals.
- *Regulators.*---Plan, operate, and evaluate programs; protect public health, aquatic habitats, and wildlife populations; determine if water-quality standards and permit requirements are being met; and take appropriate enforcement action when necessary.
- *Resource managers.*---Develop plans and policies, support operational decisions, resolve water-use disputes, and evaluate the success of programs.
- *Municipalities and industries.*---Plan and manage water supplies and discharges; identify sites for development, preservation, and other purposes; and comply with water-quality standards and permits.
- *Environmental groups.*---Evaluate government policies and programs and identify problems that need to be addressed.
- *Scientists.*---Improve understanding of the relations among ecological, chemical, physical, biological, and hydrological processes and conditions.

Findings and Changes Needed

The ITFM members have found that there are opportunities to improve current water-quality-monitoring efforts nationwide in the public and the private sectors. Although many individual monitoring networks have been well designed to meet their own goals, data solely from these networks often will not provide a broad and comprehensive assessment of water quality at national, interstate, State, Tribal, or watershed scales. Also, data from some of the net-works cannot be readily shared and integrated to help with similar assessments in related areas. The ITFM identified several kinds of problems for which changes are recommended in later sections of this report. The changes needed are summarized as follows:

- *Identify indicators to measure goals.*---It is critical that the specific purposes and goals for a monitoring program be identified as it is being designed. This establishes a foundation for choosing indicators to measure progress toward meeting water-quality goals or to evaluate the effectiveness of programs and policies.
- *Allocate monitoring resources on the basis of water-quality goals, conditions, and uses.*---The United States cannot afford to monitor all geographic locations by using the same frequency, spatial density, selection of indicators, or other design factors. A rationale is needed to target monitoring resources more effectively on the basis of the goals, conditions, and uses of the waters. For instance, monitoring designs to assess potable supplies in Arizona need to be different from designs to monitor salmon habitat in the Pacific Northwest.
- *Integrate surface- and ground-water monitoring.*---Water-quality and water-quantity information for fresh and saline surface- and ground-water resources need to be integrated. Ground- and surface-water systems are hydraulically connected. Land- and water-use and other human activities within watersheds affect water quality on the surface and underground. However, the scopes of individual monitoring programs are limited by the sponsoring

organizations' missions, legislative mandates, and staffing and financial resources within single organizations. Consequently, management decisions and monitoring programs often narrowly focus on surface- or ground-water-quality considerations. Such separation hampers the effectiveness of water-quality-management programs.

- *Link compliance and ambient monitoring.*---Historically, water-quality-monitoring efforts have been oriented to support single programs. Ambient and compliance monitoring have been done in separate, often unrelated, programs. Comprehensive watershed, ecosystem, and ground- and surface-water management requires monitoring that is more complete and useful for comprehensively characterizing water conditions. It is necessary to understand pollution loading impacts on ambient conditions and the impacts of ambient characteristics on regulatory decisions and water uses. These issues are mutually dependent and need to be linked better.
- *Include ecological, biological, and toxicological information.*---Specific ecological and biological conditions and toxicological constituents of recent concern need to be monitored. Many existing water-monitoring networks were designed and implemented without direct measurements of ecological conditions and before many toxic constituents were widely recognized as being important. Although many components of ecosystem monitoring are still in the research and development phases, improved field and laboratory methods for biological measures of ecological conditions and toxicants (for example, tissue and bed-sediment analyses) and the use of biomarkers create opportunities to fill some of the gaps in monitoring programs. The new information will significantly improve ecosystem-, watershed-, and aquifer-management decisions.
- *Implement comparable methods.*---Data compatibility must be improved so that organizations can use information from multiple sources. Differences in methods used to collect and analyze water-quality samples frequently pose impediments to making full use of data from other sources. Also, organizations use different names or different definitions for the same or similar parameters. Finally, even if the methods, names, and definitions are compatible, adequate quality-assurance (QA) programs are needed to quantify the precision, accuracy, and integrity of environmental data to ensure that these data can be used for the appropriate application.
- *Make data more accessible and of known quality.*---A secondary user cannot access most water-quality data. When these data are accessible, they require considerable additional effort to understand or use. Frequently, the data are poorly documented. Consistent with the findings about comparable methods, information-management systems need to use common data-element names, definitions, and data descriptors to facilitate the use of the information.
- *Modernize information systems.*---Many existing data-storage and information systems need to be modernized. Large-scale data-base-management systems fulfilled their original purposes; by today's standards, however, they are narrowly focused to the historical requirements of the managing organizations. As the technology of data collection, analysis, storage, retrieval, and interpretation matures, organizations need to revise their data-management systems. The revisions will permit the storage of new types of data, as well as more convenient access and use by secondary users. Modern structured systems design has only recently begun to address issues, such as identification of common data descriptors and metadata standards, that allow secondary users to evaluate whether someone else's data meets their needs. As systems are created or redesigned, the ability to transfer information easily among organizations needs to be incorporated. Also, the overall design of new systems should incorporate new querying tools, such as WAIS or MOSAIC. In addition, new systems should provide links to modern statistical, modeling, and information-presentation software.
- *Assess data and report results.*---It is no longer enough to collect and store data. Basic data need to be routinely interpreted, assessed, and reported because most users rely on available interpreted information rather than raw data. Also, routine interpretation helps to reveal inadequacies in monitoring-program design or implementation so that timely adjustments can be made.
- *Identify research needs.*---Applied research and development are needed in several areas.

These needs include methods for collecting and using ancillary data, modeling complex hydrogeologic systems and ecosystems, measuring and assessing ecological health, and sampling and analyzing toxic constituents (such as trace elements, pesticides, other organic chemicals) at affordable costs. Also, methods are needed to design and operate monitoring for nonpoint sources of pollution and highly variable wet-weather runoff that are difficult to quantify. Technology is needed to improve monitoring instrumentation, which includes sensor development. Achieving the watershed-management and ecosystem-protection goals will require sustained interagency support for applied interdisciplinary technology development and research to address these and other knowledge gaps.

- *Cost effectiveness.*---Resources for monitoring water quality need to be applied more effectively to produce more useful results. Many of the recommendations discussed later in this report are intended to improve resource sharing among monitoring organizations or to expand the base of information that can serve multiple uses.

To respond to these findings, the ITFM proposes a comprehensive nationwide strategy for water-quality monitoring and resource assessment. Implementation of the following strategy and recommendations by all levels of government and the private sector will make information available in a timely manner to support management decisions and to measure progress towards meeting water-quality goals. The intent is to set in motion a process that makes it advantageous for all data collectors to embrace the proposed changes in monitoring water quality voluntarily and to make the resulting information more useful.

Nationwide Strategy for Improving Water-Quality Monitoring

Major recommendations that have resulted from the ITFM's 3-year evaluation of water monitoring in the United States are presented below. Some recommendations are based on longstanding coordinating mechanisms that work, given the existing constraints. Other recommendations propose voluntary intergovernmental and private sector collaboration that takes into consideration specific Federal, State, Tribal, regional, local, and watershed and private interests. Simply put, these recommendations present a nationwide strategy that would improve the ability to monitor, assess, and manage the Nation's water resources at all geographic scales.

Goal-Oriented Monitoring and Indicators

The ITFM, as well as the public, endorses the USEPA Office of Water's proposed nationwide water goals. These goals are to protect and enhance public health, to conserve and enhance ecosystems, to meet State water-quality standards, to improve ambient conditions, and to prevent or reduce pollutant loadings. In addition, the quantity and quality of water needed to sustain a viable economy must be provided.

Specific environmental indicators will measure whether or not the goals are being achieved. The ITFM defines an environmental indicator as "a measurable feature which singly or in combination provides managerial and scientifically useful evidence of environmental and ecosystem quality or reliable evidence of trends in quality." Environmental indicators need to be measured by using available technology that is scientifically valid for assessing or documenting ecosystem quality. They also need to provide information upon which resource managers can base decisions and communicate results to the public. Environmental indicators encompass a broad suite of measures that include tools for assessment of physical, chemical/toxicological, and biological/ecological conditions and processes at several scales. Water-quality indicators must explicitly measure the identified goals and relate to State standards. The ITFM has developed some preliminary guidance that includes criteria to assist organizations in selecting indicators for specific goals (see Technical Appendixes D and E). The development of such guidance is continuing in conjunction with the USEPA's 305(b) consistency workgroup, which includes 22 States, 3 Tribes, and other Federal agencies. At the national level, Federal agencies are developing indicators in concert with actions mandated in each Federal agency through the Government Performance Results Act of 1993.

Gathering and Evaluating Existing Information Gaps and Priorities

Before significant improvements in water-quality monitoring are implemented, existing monitoring efforts and information need to be identified and evaluated. This evaluation can be structured by attempting to characterize current surface- and ground-water-quality conditions by using available information. Geographic information systems (GIS) can be very helpful in conducting such evaluations and presenting maps and analyses of the spatial relations among the associated information on water bodies. The actual locations of impaired water bodies and the reasons for the impairments should be included if information permits. In addition, special protection areas and waters that are not impaired should be mapped. Special protection waters include endangered species habitats, and impaired waters are those that do not meet water-quality standards. A useful tool for locating and georeferencing surface waters is the USEPA's computerized River Reach File 3 (RF3), which was originally developed by using USGS topographic maps. It is now being adapted for use as a future Federal Information Processing Standard. After mapping and evaluating existing information, monitoring gaps can be identified and ranked by priority. Ranking by priority is important because monitoring gaps that are lower priority and that can not be monitored within available resources can be explicitly acknowledged. Once the initial information is properly structured in a GIS system, new information can be added as it becomes available. Also, the information can be used more easily for many management purposes.

Flexible and Comprehensive Monitoring

To provide adequate and cost-effective information for resource management and environmental protection, comprehensive assessments of the Nation's ambient water resources are needed; such a comprehensive assessment would use basins rotating in and out of 5 to 10-year cycles in which feasible monitoring designs and monitoring techniques are targeted to the condition of and goals for the water. Ambient-monitoring resources should be targeted at the State or Tribal scale and, as needed, at the regional and the watershed scales and depend on water-quality conditions, designated uses, and goals for the water. The most intense and frequent monitoring should focus on threatened or impaired water bodies. Outstanding natural water resources, endangered species habitats, sole-source aquifers, and other water bodies that are identified for special management and protection should be monitored comprehensively, but less frequently than impaired waters, in periodic cycles every few years. If detrimental changes are detected, however, then more intensive monitoring would be needed. Waters that have been assessed and determined to meet their designated uses and that are not impaired or threatened should be monitored less intensively on a rotational screening basis every 5 to 10-years to confirm that new problems have not emerged. Temporal frequency, spatial density, suites of parameters or indicators, and other design factors should be tailored to the conditions, uses, and goals for the water that is monitored (Table 2 below).

To initiate the flexible and comprehensive monitoring approach described above, Federal, State, and Tribal agencies would need to use key existing information to categorize the surface and ground waters in their jurisdictions by using the criteria discussed above and shown in Table 2. At first, the waters would be assigned to categories on the basis of the information currently available and aggregated into an overall assessment by using GIS. By using the approach recommended, confirmation or adjustments could be made to the characterization of the waters as a result of monitoring programs that would be designed for each water resource on the basis of conditions, uses, and goals. The design would include physical, chemical/toxicological, biological/ecological, habitat, and ancillary information and would incorporate monitoring efforts from local municipalities, private industry, and all levels of government. Within the selected indicators, a core set of comparable indicators would be chosen by mutual agreement and obtained for local use and for aggregation in regional and national assessments. Water for which information is insufficient to define the water-quality condition will need to be sampled in a stratified manner that reflects potential sources of pollutants from anthropogenic activities, climate, hydrogeologic setting, and goals for the water. During the 5- to 10-year cycles, the waters would be comprehensively assessed by using flexible

monitoring designs (table 2). Information that results from the monitoring would be routinely interpreted, assessed, and reported by the responsible agencies to the public and decisionmakers. In addition, at the national level, the USEPA would aggregate information from States, Tribes, and others to produce the assessment report required by Section 305(b) of the Clean Water Act. Because the current Clean Water Act mandates a 305(b) report every 2 years, this recommendation would be implemented by linking a series of three reports that would cover all States and Tribal waters in 6 years. If legislative changes are made, then the USEPA would report to Congress every 5 years. The 305(b) report and other national and regional assessments would incorporate the suite of comparable core parameters collected and made available by States, Tribes, and other participating groups. On the basis of the results of the monitoring and assessments, the Federal, State, and Tribal agencies would adjust the category of each water resource and refine the monitoring design, as appropriate.

Table 2. Targeted monitoring strategy.
Monitoring data from all partners can be used in any category. Site Selection design can range from probabilistic to targeted in any category.

Management focus for resource	Categories of water	Flexible monitoring desig
Maintenance	Meets or exceeds standards and objectives	Long-term. Low frequency or rot Low/moderate density Screening by using a comprehensive site indicators.
Special protection	Outstanding natural resource waters habitat of endangered species; ecological reference conditions; sole-source aquifers	Long-term periodic f Moderate spatial den Comprehensive suite indicators.
Remediation and restoration	Do not meet standards and objectives. Or may not meet in the future unless action is taken.	Shorter term. High frequency. High density. Indicators tailored specific problems.

Institutional Collaboration

Thousands of organizations operate water-quality-monitoring programs and projects nationwide. Collaboration is necessary because few single organizations can afford to collect all the information needed for informed decisionmaking. The strategy to integrate these diverse institutional efforts is to establish collaborative partnerships of multiorganizational teams at national, interstate, State or Tribal, and watershed levels. These teams should include municipal, private, and volunteer monitoring groups. Formal mechanisms are needed at the national and the State or Tribal levels to ensure effective planning and coordination for monitoring efforts. At the watershed and the interstate levels, planning and coordination mechanisms need to be flexible enough to adapt to changing situations and resource limitations (Figure 2).

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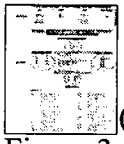
Figure 2. Key monitoring relations.

Federal Programs

Like other monitoring efforts, Federal programs are designed to meet mission-specific objectives. [See the first year report (Intergovernmental Task Force on Monitoring Water Quality, 1992, Appendix B) for a description of relevant Federal programs]. Collectively, they could convey a reasonably complete nationwide or regional story about water quality. As part of the nationwide strategy, the ITFM proposes that national monitoring programs collaborate to provide a strong ambient-water-quality framework within which States, Tribes, and watersheds could contribute their geographically specific information. Non-Federal organizations should be involved in collaborating with and advising Federal programs and be able to access Federal information easily. Federal programs should among themselves identify common physical, chemical, and biological indicators, reference conditions, and comparable core parameters to share and report together. Major Federal information systems should be linked through shared reference tables, minimum data elements, common data-element definitions and names, and information-transfer software, such as Internet or MOSAIC. Federal agencies with national status and trends programs or major water-resources responsibilities are shown in Figure 3 below.

The ITFM strategy includes an annual meeting of all managers of Federal water-status and water-trends programs to report on the previous year's monitoring results, to coordinate the future workplan, and to collaborate on nationwide products. In addition, the ITFM recommends that an advisory group be formed to support the major Federal ambient-assessment programs, such as the USGS's National Water-Quality Assessment (NAWQA) Program and the National Stream Quality Accounting Network (NASQAN), the USEPA's Environmental Monitoring and Assessment Program (EMAP), the National Oceanic and Atmospheric Administration's (NOAA) National Status and Trends Program (NS&T), and the National Biological Service's (NBS) Biomonitoring of Environmental Status and Trends (BEST) Program. This advisory group would foster better integration of Federal programs and more effective use of available resources. It would include members from all levels of government and the private sector. Currently, some Federal programs have their own advisory committees to support program-specific issues that require additional attention. As needed, these should continue as working groups of the assessment advisory group.

The Administration should consider issuing an Executive order to provide guidance to Federal agencies about their activities and participation. Active Federal leadership is needed to support such nationwide efforts as developing standards and guidelines, sharing data, leveraging program resources, facilitating technology transfer, and building consensus.

 (56K .gif file)
Figure 3. Federal Agencies and National Status and Trends Programs.

State and Tribal Programs

States and Tribes report water-quality status to the USEPA in the biennial 305(b) reports. USEPA has identified two concerns about its national report aggregated from the State reports. First, the data from the States and the Tribes are often not comparable and make a consistent aggregation of data at larger scales, especially the interstate and the national, difficult. Second, States and Tribes assess considerably less than all their water resources in any 2-year reporting period, in part, because many State budgets for monitoring programs have decreased over the years.

The ITFM recommendations of a 6-year cycle for the 305(b) report (5 years vs. current 2 years if legislative changes are made) and increased State comparability of assessment and collection methods would answer the concerns. In addition, some State and Tribal programs now are using program designs that allow them to monitor their water resources over a longer time period, say 5 to 10 years, often targeting their limited resbiological indicators, reference conditions, and comparable core parameters to share and report together. Major Federal information systems should be linked sources to address specific issues. In other words, some States and Tribes are already using revolving watershed assessments and priority systems similar to the approach endorsed by the ITFM.

The ITFM recommends that a redesign of State and Tribal monitoring programs begin with evaluating, synthesizing, and mapping existing information that would actively involve many different monitoring partners in a collaborative effort. This collaborative effort would include the following:

- *Delineate the area.*---The boundaries of water areas need to be determined. Depending on the objective of the program, the boundaries may be political or natural, such as hydrologic systems or ecosystems. Whichever method is chosen, GIS overlays of the boundaries should be available.
- *Map the waters.*---Key information about the chosen areas, which includes locating impaired waters, special protection waters, and unimpaired waters, as previously described, needs to be portrayed. The ITFM recommends using the RF3 as a uniform way to identify waters. The RF3 is a computer-mapping system that includes codes for surface waters, the direction of flow, and stream-reach locations. The USGS's Regional Aquifer System Analysis is the best source of information on major ground-water aquifers.
- *Map scientific knowledge and human influences.*---Scientific information and human influences need to be overlaid on the basic map of surface and ground waters. Several examples are listed as follows:
    - Natural and political boundaries, which include watersheds, municipalities, counties, and States.
    - Surface-water characteristics, which include water bodies, hydrography, hydrologic characteristics, biological communities, and waste-water treatment plants.
    - Human infrastructures and activities, such as land use or water intake and effluent discharge facilities and nonpoint sources.
    - Ground-water characteristics, which include vertical and lateral extent and hydraulic properties of aquifers and confined units, waste-injection sites, and landfills.
    - Natural characteristics, such as soils, geology, altitude, dominant vegetation, and precipitation values.
- *Map the desired goals for the waters.*---The goals that residents wish their waters to meet should be shown as overlays on a multilayer map. These goals will include the water-quality

standards that States and Tribes set for their waters and also may include specific additional goals that, for instance, a watershed team may desire.

The ITFM recommends that comprehensive assessments of State or Tribal water resources be conducted by using criteria shown in table 2. In this design, States and Tribes would first characterize their waters with available information and knowledge. Then, on a 5- to 10-year rotating basis or other design (at the discretion of the State or Tribe), they would comprehensively assess their water resources by using different monitoring intensities and techniques according to the conditions of the water bodies and other factors, as described above. Volunteer and private sector monitoring can be integrated into any of the three program priorities, and data from Federal, State, Tribal, local, and private assessments could be shared in all categories. Statistical monitoring designs, as well as targeted and intensive surveys, also can be integrated.

State and Tribal Teams

The ITFM recommends the establishment of collaborative teams at the State or Tribal level that would include representatives of all the major monitoring sectors active in the jurisdictions. The primary responsibility for promoting collaborative water-monitoring and assessment programs should reside with a national monitoring council and with the State or Tribal teams. In some places, the establishment or use of existing monitoring teams may be appropriate. For example, each State or Tribal team also should include, as needed, representatives from Federal, regional, and local agencies, and other institutions, such as universities, industrial organizations, and volunteer monitoring groups that collect and analyze surface and ground-water information within the State or Tribal geographic area.

The State or Tribal and regional teams would have several principal functions. They would clarify roles and responsibilities and facilitate communication and collaboration among Federal, State, Tribal, interstate, local, and private water-monitoring and assessment programs that participate in the strategy. They would identify major issues or programs that joint efforts could address most effectively. Also, the teams would tailor the national guidelines to meet regional needs and encourage their adoption by participating agencies and institutions.

Watershed Managers

Managers of local watershed resources need aggregated data from a variety of sources to guide their policies and activities. To help meet this need, the ITFM recommends that a National Water-Quality Monitoring Council develop a guidance document that summarizes where existing data can be found. Some organizations are already addressing this need. The U.S. Forest Service (1994) and the U.S. Environmental Protection Agency (1991) have written watershed-assessment handbooks; the U.S. Forest Service (USFS) handbook describes ecosystem management for forested watersheds. The Soil Conservation Service (1994) has prepared a handbook on monitoring water-quality conditions that are related to agricultural activities. The American Society for Testing and Materials (ASTM) is developing a standard for water-quality monitoring in conjunction with the ITFM. As part of the nationwide strategy, the proposed National Water-Quality Monitoring Council will work with agencies, private and volunteer organizations, and academia to produce a handbook for monitoring and assessing water-quality watersheds that is applicable for nationwide use.

The ITFM encourages agencies at all governmental levels to develop and evaluate monitoring and assessment programs by using the frameworks for monitoring program design that are described in Technical Appendixes B and L. The ITFM also promotes the coordination of new and existing ambient- and compliance-monitoring programs to provide needed information within watersheds and other geographic areas of concern for all potential data users. Each monitoring program is specific to its geographic location and purpose. At the same time, each is a part of the nationwide monitoring effort to generate information on surface- or ground-water conditions, which is the basis for regional and nationwide descriptions of water quality. Unless each monitoring program develops comparable

information on mutually selected core indicators, the regional and the nationwide descriptions will be difficult to assemble, and comparison of conditions among locations will be difficult.

Compliance and Ambient Monitoring

Ambient information is critical to compliance efforts, and compliance information about pollution locations and loads is needed to interpret ambient data. Compatible compliance information about pollution loads is vital to assessing the relative contributions of point and nonpoint sources of pollution for watershed management. In many cases, the compliance community performs some ambient monitoring, most of which is for compliance-monitoring purposes. For example, water suppliers monitor source-water supplies to determine the treatment needed for drinking water. During its third year, the ITFM began working with organizations that represent the regulated community to define how these programs can more effectively work together.

The regulated community---industry, public water suppliers, municipalities, and others---provides much of the money spent for water-quality monitoring, most of which is spent for compliance-monitoring purposes. Much of the compliance and ambient data generated by the regulated community, however, is unavailable for other uses because of differing designs and goals in collecting the data and also because no one has asked for it in a systematic way beyond its narrow compliance context. Also, these same data are not likely to be available in the future until capture and storage of the data become easier. Because of its unavailability and because it was collected for different purposes, often using different methods and quality assurance/quality control (QA/QC), data from the regulated community have been used infrequently in ambient-assessment studies.

The ITFM monitoring strategy is to form partnerships among compliance monitors and ambient monitors to make applicable data from both communities more usable and accessible. The goal is to find opportunities that are mutually beneficial and more efficient to gather data and develop more useful and comprehensive interpretive products. Because of the different purposes for which data is collected, it may not always be possible to integrate ambient and compliance information. However, some integration will be beneficial, particularly in the area of source-water monitoring for drinking water. It also will be useful to determine natural seasonal variability, to separate natural from anthropogenic causes, and to identify spacial variability.

Potential areas of cooperation include developing a data-storage system that is easily accessible, that is easy to use for data entry and retrieval, and that can store generally useful compliance data. For example, water suppliers' data could go into the new USEPA Public Water Supply System, ambient data collected by dischargers could go into the modernized USEPA's STOrage and RETrievel System (STORET) system, or interfaces could be built between facility data systems and national or State data systems.

In return, agencies would work with the regulated community to:

- Consider adjusting the frequency and parameter coverage of required compliance monitoring inaccord with geographic water-quality conditions.
- Design ambient monitoring at locations selected to provide users of raw water with timely water-quality information.
- Develop jointly and use comparable protocols and QA guidelines for ambient- and compliance-monitoring activities so that data can be aggregated for differing objectives.
- Include the regulated community in training programs as instructors and attendees.
- Use the water-quality information more effectively to make key resource decisions.

Closer cooperation on monitoring can help the compliance-monitoring community and State or Tribal environmental agencies identify more cost-effective ways to protect the environment. For example, Florida is considering ways to allow a reduction in compliance monitoring at wells after water companies have achieved an effective well-head-protection program that minimizes the

likelihood of contamination in the aquifer.

To enhance the integration of compliance- and ambient-monitoring information for decisionmaking, the ITFM, under the leadership of the USEPA and the USGS, plans to initiate pilot projects in selected NAWQA Program study units and other key watersheds. The general approach for the pilot project will involve defining the areas of study, identifying the water-quality information needs and objectives for the area, determining the limitations of existing compliance and ambient programs to meet those needs, implementing actions to overcome the impediments encountered and to provide the necessary information, evaluating the strengths and weaknesses of actions taken, and collaborating to improve the balance between compliance and ambient information.

Examples of questions that could be addressed in these projects include the following:

- What contaminants are important for monitoring in the selected watersheds and aquifers? What are their sources? How frequently does an area need to be sampled to address key management issues and concerns?
- What are the sources, transport, fate, and effects of selected contaminants in important stream reaches or in the watershed as a whole?
- Does the information collected during the project provide a clear framework for key management and control decisions by the key stakeholders in the watershed?
- How do pollutant loadings affect the biological condition of the waters?

Volunteer Monitoring

Nationwide, participants in more than 500 volunteer monitoring programs are collecting a great variety of water-quality information. These programs involve more than 340,000 volunteers of all ages and backgrounds in almost every State. Volunteers monitor all types of water bodies and collect physical, chemical, biological, and habitat data.

In general, volunteers monitor for one or both of the following purposes:

- To provide an opportunity when the community, youth, land owners, and planners can become educated about local water-resources characteristics and problems, and a sense of stewardship is fostered for those natural resources.
- To provide data for Federal, State, Tribal, and local water-quality agencies and private organizations for use in watershed planning, assessment, and reporting and water-quality management. Volunteers collect data from water that otherwise may not be assessed, and they increase the amount of water-quality information available to decisionmakers at all levels of government. Uses of volunteer data include delineating and characterizing watersheds, screening for water-quality problems, some compliance monitoring if rigorous quality assurance documentation is provided, and measuring baseline conditions and trends.

Because volunteer monitoring organizations can be strong partners in the nationwide monitoring strategy, the ITFM recommends integrating volunteer monitoring into existing and planned monitoring programs. To improve the quality and utility of volunteer efforts, the ITFM recommends the following:

- Links between volunteer monitoring programs and water-quality and planning agencies should be established at all levels of government to encourage cooperative planning, training, and data exchange between volunteer groups and agencies. These links may include State or Tribal associations or councils of volunteer program coordinators and agency representatives, agency-sponsored volunteer programs, and sharing and collaboration in such areas as volunteer training, data management, and resource sharing.

- Nationally consistent quality-assurance guidance should be developed for volunteer monitoring groups to help volunteer programs document their methods and quality-assurance protocols. This national guidance can be adapted to meet individual State, regional, Tribal, or local data requirements. The USEPA is currently leading such an effort that involves other Federal, State, Tribal, and volunteer organizations. Such documentation has the following benefits:
  - Enhances credibility and replicability of volunteer methods.
  - Allows volunteer collection and analytical methods, site selection, and other volunteer program design characteristics to be understood by potential data users.
  - Allows volunteer data to be compared with those of other programs.
  - Encourages volunteer programs to practice sound quality-assurance methods.
- Standard volunteer monitoring field methods should be developed. Use of these methods cannot be mandatory because of differing needs, goals, capabilities, and resources of volunteer programs. However, their development and availability will provide a common baseline for many programs, thereby improving comparability among the programs.
- Nationwide training on laboratory, field, and quality-assurance methods for volunteers should be promoted. Such training helps encourage consistency in methods, increases the level of quality assurance for volunteer information, and promotes the exchange of ideas and the development of advanced methods.
- The incorporation of proper documentation of volunteer data into water-quality-data systems should be promoted to facilitate data sharing and use of volunteer data. Documentation in water-data systems of volunteer collection methods, analytical approaches, and quality-assurance protocols helps potential data users understand the limitations and strengths of volunteer data, thereby increasing confidence in its use.
- Volunteer participation should be provided for on State, Tribal, watershed, aquifer, and regional water-monitoring teams. Volunteer programs will provide these teams with unique links to academic organizations, advocacy groups, civic associations, government, and private enterprise. Team members, including volunteers, will serve to integrate monitoring efforts to meet local, regional, and nationwide information needs.

Methods Comparability

One of the biggest barriers to sharing water-monitoring data is that agencies often use methods that are not comparable to obtain data (collect and analyze samples) for the same variable. This means that data from these agencies cannot be combined to allow scientists and the public to assess water-quality conditions.

To assess similar conditions objectively across a variety of scales up to and including national assessments, monitoring data produced by different organizations should be comparable, of known quality, available for integration with information from a variety of sources, and easily aggregated spatially and temporally. The ITFM recommends several actions to improve data compatibility. First, partners in the strategy must adopt common parameter/indicator names and definitions. This is fundamental to achieving compatible data. The ITFM has begun a Data-Element Glossary that will support data compatibility and facilitate information sharing (Technical Appendix M). Partners in the strategy should begin by adopting the initial set of common names and definitions and then expand that set as rapidly as possible.

In addition, the ITFM strategy proposes a performance-based methods system (PBMS) for the field and laboratory (Technical Appendixes I, N, O). The PBMS accommodates the use of different methods for measuring the same constituent provided that all methods produce the same results for the same sample within a specified level of confidence. Analytical reference materials also can be an important component of a PBMS. This approach is technically practical and allows implementation of improved, and sometimes more economical, sampling and analytical techniques over time. The PBMS will require institutional support at the national level; therefore, the ITFM recommends an Intergovernmental Methods and Data Comparability Board (MDCB; Technical Appendix H).

The ITFM recommends the use of reference conditions in biological and ecological assessments (Technical Appendixes F and G). Reference conditions allow the comparison of observed water-quality characteristics to appropriate baseline conditions; they also can be used to calibrate a method for a specific ecoregion or habitat. As a way to specify reference conditions, the ITFM recommends using the concept of ecoregional reference sites. An ecoregion is a homogeneous area defined by similarity of climate, landform, soil, potential natural vegetation, hydrology, or other ecologically relevant variables. Such regions help define the potential designated-use classifications of specific water bodies. In theory, reference conditions are single measurements or sets of selected measurements of unimpaired water bodies that are characteristic of an ecoregion and (or) habitat. In practice, reference conditions represent conditions (biological, physical, chemical) exhibited at either a single site or an aggregation of sites that represent the least impacted (by anthropogenic disturbances and pollution) reference sites or the reasonably attainable condition at the least impacted reference sites.

Information Automation, Accessibility, and Utility

The vast amount of water-quality information collected by public and private entities is not often easily accessible to users outside the collecting organization. The principal barriers to data and information sharing can be overcome through several approaches that are described in the following paragraphs:

- The large amount of generally useful information that is archived only in hard-copy form should be available in computer-readable form to make it more widely accessible and usable.
- Common data-element names and definitions need to be adopted to provide a common set of terminology for documenting water-quality data. Once adopted, names and definitions related to water-quality monitoring can be used by Federal and State agencies and other organizations.
- An easy-to-use standard interface to individual water-data systems based on adopted minimum data elements and additional data that agencies consider to be appropriate for sharing needs to be developed.
- Potential sources of reference tables, such as aquifer names and taxonomic codes, need to be identified and specific agencies need to be designated as the authorities to maintain individual reference tables. For example, the USGS may be the authority for aquifer names, the newly developing Federal consortium for taxonomy may be the authority for taxonomic codes, and the recommended MDCB may be responsible for reference tables, such as sampling and analysis methods. The designated authorities would need to accept update requests from all participating agencies.
- A self-documented export format must be provided from each agency data base, and the development of standard report formats must be promoted.
- The participating organizations should make their data holdings available to secondary users by including the adopted minimum elements in the user interfaces of agency data systems to facilitate the sharing of existing data.
- Data-management systems should be redesigned to accommodate not only data values, but also metadata, which is information that describes the content, quality, condition, and other characteristics of data (Federal Geographic Data Committee, 1994). The metadata are used to judge whether or not specific information is potentially useful for other applications.
- Networked, distributed data bases, rather than only centralized data bases, are needed. Improvements in telecommunications make the use of distributed systems very promising. Furthermore, centrally operated information systems of national scope, which are often large, difficult to access, and hard to use, are becoming obsolete. Improvements in telecommunications and query systems, such as MOSAIC or WAIS, make it easier to use distributed systems. Close cooperation is needed for the effective development of common user interfaces and query languages, data dictionaries, data formats, report generators, and other technical software, such as statistical programs. With agreement on such conventions,

data can be more easily shared by using networked systems. This permits and encourages the distribution of data-management and data-storage responsibilities. The use of multiple systems also allows and encourages the distribution of data-management responsibility, as well as the data.

- Standard export formats and existing query systems, such as WAIS, MOSAIC, and Internet, should be used to share data and information with other users.
- Remote sensing and LANDSAT capabilities should be more widely investigated and used.
- Computer security concerns must be identified and addressed.

Assessment and Reporting

Better processes and methods are required to share monitoring findings and results among national, regional, State, and Tribal resource-assessment programs. Also, guidelines and tools are needed that describe ways to aggregate and interpret information for regional and national summaries of water conditions and trends. Technology transfer should be promoted among various national and State reporting programs, such as the U.S. Department of Agriculture Resource Conservation Assessment, the USGS's biennial *National Water Summaries*, and the States' and the USEPA's 305(b) reports to Congress that are mandated by the Clean Water Act.

The strategy encourages and helps resource-assessment programs produce publications that meet the needs of a wider audience. It is not sufficient for technical assessment programs to communicate only with their technical peers; they also must communicate with a broad audience that is concerned with the overall significance of their assessments. This requires a careful analysis of audiences and an approach to communication that recognizes the particular style, format, media, and content considerations appropriate to each audience. As a corollary activity, mechanisms are needed to ensure the best uses of the technical information derived from assessment activities.

Interpretations of results from national programs and the integration of results from State and regional programs should lead to similar conclusions about the conditions of our Nation's water. The only differences in interpretations should be in the areal extent of coverage (presumably broader coverage for the national programs) and the degree of resolution (presumably finer resolution for the regional, State, and Tribal programs). Both types of programs are critical components in the nationwide strategy.

Improved mechanisms for performing and sharing top/down and bottom/up interpretation, assessment, and aggregation of water-resources information will make it possible to produce information products more quickly after resource assessments are completed. However, complex review and approval procedures within many agencies can cause significant delays in releasing those products to their intended audiences. Implementation of an effective national strategy must address issues of timeliness and audience identification for reporting, integrating information across disciplines, comparing data analyses and interpretations, and providing mechanisms for information aggregation (see Technical Appendixes J and K).

Modeling is an assessment tool that uses data, helps identify data needs, and allows management decisions to be made on the basis of predictions. Implementation of the ITFM strategy should include use of modeling.

Evaluation of Monitoring Activities

Collaborative teams at all levels should periodically evaluate their monitoring activities to confirm that they are meeting their objectives in the most effective and economical manner. The successor to the ITFM should produce a report every 5 years to evaluate water-quality-monitoring activities and to document progress in implementing the nationwide strategy and making appropriate adjustments. This report should include a summary of water-monitoring activities over the previous 5 years, an evaluation of the applicability of the monitoring program, and the Nation's ability to obtain and share

information needed to evaluate water quality. The report should present successes at the national and the watershed scales and should identify continuing barriers to understanding water-quality conditions. This report should not address the status of water-quality conditions; existing Federal, regional, State, and Tribal agencies have that responsibility. However, greater collaboration and information sharing should enhance the individual reports.

Ground-Water and Other Specific Water-Resource Considerations

Selected categories of aquatic resources should receive specific attention when water-quality-monitoring programs are planned and implemented. These categories include ground water, wetlands, lakes, and coastal water. For these categories, additional guidance and recommendations are needed to supplement the general information provided throughout this report. The ITFM has addressed some of the monitoring issues specific to ground water, and the results are discussed below. However, additional work needs to be done on the other three categories. Focus groups of appropriate experts are needed to develop guidelines and to make recommendations for these three resource categories.

Historically, ambient-water-quality considerations have focused on surface-waters. The original goals of the Clean Water Act primarily targeted State-designated uses for surface waters. Surface and ground waters are, however, hydraulically connected. Geochemical processes are reflected in the quality of ground water and can profoundly affect surface-water quality and aquatic biota because approximately 40 percent of flowing surface water comes from ground water.

Water-quality-monitoring programs must consider differences in spatial, temporal, and other characteristics between ground- and surface-water resources. Ground water normally is not easily accessed for monitoring, and suitable wells must be located or drilled (except in special circumstances). Further, ground water has distinct three-dimensional distributions within geologic formations of rock and soil that are often in units that have very different physical, chemical, and biological characteristics. In particular, water flows in aquifers at extremely slow rates compared with surface-water-flow rates. For example, ground water may move fractions of an inch per day, or even per year, while streams and rivers frequently move miles per day. As a result of these and other differences, ground-water interactions with the biosphere and lithosphere differ significantly from the interactions of surface waters. The ITFM recognized these differences and accordingly established a special focus group for ground-water monitoring to ensure that ITFM proposals, such as the framework for monitoring programs (Technical Appendix B), address specific ground-water needs. Additional results of the deliberations of the Ground Water Focus Group are presented in Technical Appendix L, and their work is continuing to address indicators for ground-water monitoring.

Project on Biological Integrity of Surface Waters

As an initial step in implementing the nationwide monitoring strategy, the ITFM proposes that existing information about the biological conditions of streams and rivers be gathered and evaluated. In addition to supporting the goal to conserve and enhance ecosystems, this biological evaluation would initiate the implementation of technical concepts and institutional collaboration integral to the strategy. Most water-monitoring networks were designed and implemented at a time when detection and control of chemical pollutants in water was of paramount importance. Now, however, the need for aquatic biological information is more widely recognized.

In addition, the biological evaluation would integrate information from different organizations, show data gaps, and test recommendations designed to improve information compatibility. Because of differences in monitoring purposes, various Federal, State, and Tribal programs produce data that vary in parameters, spatial density, frequency of collection, analysis methods, and level of QA.

Further actions following the initial data gathering would need to be implemented through a series of

iterations of data collection, data interpretation, and voluntary refocusing over an extended time period. The NBS is a key agency to participate in this project.

Training

One of the key implementation issues is that training must be available to all Federal, regional, State, Tribal, local, private, and volunteer personnel involved in water monitoring. Training would be the cornerstone to promoting the use of the monitoring framework, the correct use of environmental indicators, the application of comparable methods of sample collection techniques and analytical methods, the storage and sharing of environmental data, and the use of new methods to interpret and report results.

Training programs are now available in such organizations as the USGS, the USEPA, the U.S. Army Corps of Engineers (USACE), the Tennessee Valley Authority (TVA), the U.S. Department of Agriculture, associations, societies, and the Water Resources Research Institutes and academic organizations. A collaborative effort is needed to conduct water-monitoring and data-management training. Training should include monitoring and data management for water quality. Training would be tailored to selected audiences, which would include managers who use water-quality information for decisionmaking, research scientists, field and laboratory technicians, and interested members of public, volunteer, and private organizations. An interagency training team should be formed at the national level to coordinate an inventory of training programs now available from public agencies, academic institutions, and private organizations and the development of a list of training needs and the number of trainees anticipated, training materials, and plans to meet identified training for different sectors.

Participating agencies should make training available at various locations across the country on a continuing basis; the training would use formal and informal formats as appropriate. The collaborative training plans should include a QA program to measure the effectiveness of training efforts and should include a complete review every 5 years. Training may not be fully implemented for several years because of the massive effort that will be required to organize and operate a coordinated nationwide training effort.

It also is important to broaden training into collaboration and education. Many groups, such as the Nature Conservancy, the Ecological Society of America, and the Association of Environmental Engineering Professors, were involved in commenting on or were suggested as collaborators for implementation of the strategy for nationwide monitoring.

Pilot Studies

Before some ITFM proposals are implemented nationwide, additional pilot studies are needed. Groups working at the national level need feedback to move from strategy to tactics for implementation. More tailored guidance is needed to ensure that the flexibility required in different areas of the country is accommodated. In addition, information on implementation costs and on the savings that result from improvements also are needed. Although the ITFM believes that many improvements to monitoring can be accomplished within available resources, such improvements must be thoughtfully planned and coordinated. When program updates or new monitoring efforts are funded, the ITFM recommendations can be more readily accommodated. However, special care must be taken to ensure that attempts to implement aspects of the strategy by using available monitoring resources do not adversely impact existing monitoring that now supports critical objectives.

Incentives

Because of its voluntary nature, the strategy proposed by ITFM must offer tangible benefits to encourage organizations that monitor or fund water-quality activities to participate in the strategy. The major incentives for participation are discussed below:

- By improving water-quality information nationwide, public and private organizations can increase the effectiveness of natural-resources management and environmental protection efforts and can document the benefits of actions taken. This will answer the water-quality questions listed at the beginning of this report that Federal agencies are often asked by Congress and that agencies at all scales are asked by the public. Multiple agencies with varied expertise and responsibilities working together on the same problem will have the information necessary to achieve comprehensive ecosystem management for aquatic and related terrestrial resources. Managers will be able to make more effective decisions and to consider policies and programs more comprehensively. Disagreements among agencies about water-quality conditions and assessment results will be fewer, and it will be possible to base more decisions on objective information rather than on opinion. State, Tribal, and local agencies with enforcement responsibilities will have a better technical basis for taking regulatory action. The regulated community will have more complete knowledge to ensure that actions required of them will correct environmental problems. Better, more comprehensive information will improve the connection between public programs and the conditions they are supposed to address.
- Because data collection will be coordinated, use of available resources will be more effective, and efforts will not be duplicated. Monitoring programs that evolve from a coordinated effort among major data-collecting agencies in an area will provide more complete coverage in space, time, and parameters. The resulting information will better support decisionmaking for complex contemporary problems and allow for joint monitoring and assessment of water-quantity and water-quality and surface- and ground-water issues. Partnerships among agencies responsible for compliance- and ambient-monitoring programs will be able to design programs that complement each other. These coordinated and collaborative programs produce a consistent distributed data set that is jointly supported by many agencies and that includes agreed-upon data-quality-control measurements. The coordination and collaboration also will identify the ancillary data, as well as the scale and accuracy, that is needed.
- Participants in the ITFM strategy will have tools to monitor water quality more effectively. Examples of these tools include:
    - Common format for designing monitoring programs.
    - Comparable use of indicators.
    - Comparable performance-based methods used for field and laboratory work.
    - Consistent QA/QC activities that produce data of known quality.
    - Metadata collected and recorded to aid with interpretations.
    - Ancillary data needs identified, located, and shared.
    - Compatible data-storage system.
    - Software that encourages data sharing.
    - Methods for data analysis.
    - Examples and guidelines for publishing and speaking to many types of audiences.
    - Formats for evaluating the effectiveness of monitoring programs.
- Valuable services will be provided for participants in the strategy. The services will include guidance and advice on new pollutants, new research methods, and interagency questions. The ITFM will be able to review and advise on newly designed monitoring programs, as well as on agency and organization collaboration among existing ones.
- The training program to promote the use of guidelines and recommendations will be available to all participants and will bring together talents, skills, and knowledge from Federal, State, Tribal, watershed, local, and private representatives and volunteers.
- The credibility of water-quality information will improve as many organizations produce the information and agree on its assessment and presentation.

Implementation

An institutional infrastructure is needed to support the implementation of the strategy. The

infrastructure should include a national collaboration forum and formal or informal State and Tribal implementation teams. If State or Tribal entities identify the need for regional or watershed-level implementation teams, then regional teams also should be used to carry out the strategy. It is important to the success of the strategy that existing collaborative mechanisms be used to the extent possible. Maximum flexibility is needed at the interstate, the regional, and the watershed levels to assure effective implementation. Figure 4 shows an overview of the proposed organizational framework.

 (38K .gif file)
Figure 4. Organizational framework for implementing the strategy.

National Water-Quality Monitoring Council

A National Water-Quality Monitoring Council will be established to carry forward national aspects of the strategy. The National Council would develop guidance and tools to provide technical support and serve as a forum for collaborative program planning. The viewpoints of business, academia, and volunteers are critical to the successful implementation of the strategy. Membership on the National Council would include the private sector, volunteer monitoring organizations, and government agencies at all levels---Federal, State, Tribal, interstate, and local. Non-Federal representation would be drawn from various geographic areas of the country to cover the full range of natural, social, and economic settings. The National Council would operate as part of the Water Information Coordination Program (WICP), which is required by OMB Memorandum No. 92--01. A draft charter for the proposed National Council is presented in Technical Appendix C.

The National Council would assume broad responsibility for promoting implementation of the nationwide monitoring strategy and the ITFM recommendations that would improve monitoring and resource assessments in the United States. In principle, the National Council would facilitate monitoring and assessment programs to fulfill their intended initial purpose and support national compatibility and information sharing where purposes overlap. The National Council would be concerned with water monitoring, which has been broadly defined to include measuring the physical, chemical/toxicological, and biological/ecological characteristics of surface and ground waters, including freshwater, marine, and wetlands, as well as associated data that involve habitat, land use, demographics, weather, and atmospheric deposition. The National Council would coordinate its activities with the ongoing work of the Federal Geographic Data Committee (FGDC), which is authorized by OMB Circular A--16. The National Council would be concerned with the monitoring of streams, rivers, lakes, estuaries, wetlands, coastal and ground waters, sewer and industrial outflows, and public drinking-water sources (not finished water). It would consider the following monitoring purposes, which are implemented by individual monitoring agencies: to assess status and trends, to identify and rank existing and emerging problems, to design and implement programs, to determine whether goals and standards are being met, to assure regulatory compliance, to facilitate responses to emergencies, to support hydrologic research, and to help target monitoring, prevention, and remediation resources.

The National Council would issue voluntary guidelines to promote consistency. These guidelines would address the comparability of field and laboratory methods, recommended minimum sets of parameters for specific monitoring purposes, environmental indicators, QA programs, metadata requirements, data management and sharing, and reader-friendly formats for reporting information to decisionmakers and the public.

These guidelines would build on the progress achieved by the ITFM and other groups, should yield significant improvements in the nationwide consistency of data-collection activities, and should provide comparable methods and results when reporting and sharing data. The National Council

would encourage the voluntary adoption of these guidelines by relevant federally funded State, Tribal, public, and private organizations operating watershed monitoring and assessment programs and other monitoring efforts. Through its relations with State and Tribal teams, it also would promote adoption of these guidelines by cooperating State, Tribal, regional, and local agencies, as well as private and volunteer organizations. The National Council would coordinate the development of a nationwide training effort to help ensure that appropriate individuals acquire the knowledge and skills needed to carry out monitoring and assessment responsibilities.

To facilitate implementation of the Strategy, the ITFM recommends that the Administration consider issuing an Executive order that provides guidance and requirements for Federal agencies with water-quality-monitoring responsibilities.

Methods and Data Comparability Board

To provide the national infrastructure necessary to implement methods comparability, the ITFM recommends that an MDCB be established under the auspices of the National Council. The mission of the MDCB would be to promote and coordinate the collection of monitoring data of known quality by using comparable field techniques and analytical chemical and biological measurement methods, where objectives are similar, through the voluntary participation of the monitoring community. A draft charter for the MDCB is provided in Technical Appendix H.

The scope of the MDCB would be to provide a framework and a forum to identify interagency priorities for parameters that most need comparable methods, to take actions that improve the scientific validity of water-quality data, to establish comparable approaches among agencies for collecting water-quality-monitoring information, to provide a forum for advancing state-of-the-technology water-quality methods and practices, and to assist all levels of government in collecting monitoring information in a comparable and coordinated manner. The MDCB would work closely with other organizations that promote methods comparability, such as the ASTM and the USEPA's Environmental Monitoring Management Council.

Environmental Indicators Guidance Committee

To develop necessary guidance for indicators, the ITFM recommends establishing an Environmental Indicators Guidance Committee that would carry on the activities of the ITFM's Environmental Indicators Task Group work in conjunction with the MDCB. The National Council and this Committee should develop guidelines for the selection and reporting of environmental indicators and criteria for determining reference conditions to assess water-quality and related ecological systems. Also, the National Council and this Committee should adopt recommended data elements for water-quality-data systems and the minimum elements to facilitate the sharing of environmental indicator information.

Data-Elements Glossary

The ITFM's Data Management and Information Sharing (DMIS) Task Group has prepared a Data-Elements Glossary to support data collection, interpretation, presentation, and sharing (Technical Appendix M). The full glossary of recommended data elements represents the base data requirement proposed for implementation as agencies develop new water-quality-data systems. The DMIS Task Group also has identified minimum data elements that are needed to share water-quality data effectively among existing systems. The minimum data elements would be incorporated in user interfaces of data systems maintained by participating agencies. Finally, the DMIS Task Group has identified core water-quality-data sets, such as ecoregions, hydrologic units, river reaches, land use/land cover, taxonomic codes, and aquifer names, that will be maintained by one organization or a consortium of organizations and shared by all ITFM organizations. The next steps will involve reaching an agreement on minimum data sets and common data-exchange formats. Modern technology can now provide the means to achieve data sharing and efficiencies not thought possible

just a few years ago.

The ITFM recommends that the National Council promote a coordinated effort of data-management-system enhancement or development with the objective of creating linked multiagency information systems with common standards. Agencies would not develop a common system, but rather a linked series of key systems that would coordinate their designs to facilitate the storage of data at many locations and still be able to share information effectively. This coordinated design would involve the sharing of data models and, in some cases, data-base structures; environmental data and associated QA information would be maintained in a data management system operated by the Federal, State, Tribal, or local agency or private organization responsible for collecting the data. The design also would include an interface whose components would be used by all participating organizations. The interface would include the ability to query the various data bases by using the minimum data elements of the DMIS Task Group. The coordinated design also should include a series of standard reports and (or) an exchange format. This effort would likely need a multiagency consortium to design, develop, test, implement, and maintain the linked systems.

Funding

Some Federal resources must be provided to help support pilot studies in selected areas. The USEPA is planning to provide $500,000 to selected States during FY 1995. The USEPA worked with the ITFM and the States to determine how the monies can best be used to achieve targeted comprehensive monitoring to measure progress toward the nationwide goals. Much of the money will be used to georeference State waters to RF3. USEPA also targeted $2 million to Tribal monitoring programs. In addition, the USGS will identify the implementation of the ITFM strategy as one of the priorities of the National Water Resources Research and Information System---Federal/State Cooperative Program in Fiscal Year 1995 and beyond. Through the Cooperative Program, agencies at State, Tribal, and local levels of government are partners with USGS in data collection and special studies of mutual interest on a 50/50 cost-sharing basis. This priority will provide an edge for ITFM pilot studies and future water-quality-monitoring-design efforts that compete for Federal matching funds. In FY 1995, the appropriated Federal matching funds in the Cooperative Program will exceed $60 million. The above funds are in addition to Federal monies already available to States and Tribes for monitoring through existing mechanisms in a number of agencies including the USEPA Section 106 grants.

Better environmental protection and resource-management decisionmaking, which are the results of better monitoring, will result in cost savings. By improving and using more complete water-quality-monitoring results, decisionmakers can target scarce financial and other resources to priority problems, evaluate the effectiveness of actions taken, make needed adjustments, and avoid costly mistakes. Many of the recommendations can be jointly funded within existing budgets by the participating agencies. In some cases, financial agreements will be developed among agencies to support mutually beneficial monitoring projects. In other cases, basic agreements exist and are being used. Because the strategy will be implemented over time and almost all the recommendations are intended for future monitoring, major adjustments in funding are not required in the short term. By leveraging technical capability and cost sharing, agencies can make better use of existing expertise and funding resources nationwide. It is noteworthy, however, that the early successes of the ITFM are due, in large part, to the energy and enthusiasm of the members and contributions from participating agencies for specific projects. A modest amount of short-term funding to support the administrative infrastructures for the groups that are implementing the strategy may be needed. Such support would ensure that the process of collaboration continues, thereby allowing the Nation to realize the expected long-term benefits and efficiencies. This would allow all participants to achieve a higher return for their existing and future investments. As changes are made, the savings will be used to support improvements in other functions. The result will be more cost-effective monitoring and a significant expansion and improvement in the information that can be used for decisionmaking. As the strategy is implemented and participating agencies jointly develop and implement detailed plans, specific information on cost savings and costs for implementation should

be documented and reported. After available funds are used effectively, then participating agencies will need to address resource requirements for future actions.

Initial Agency Actions to Improve Monitoring

Benefits from the ITFM 's strategy and recommendations are already being identified. Member agencies have taken significant steps to improve water-quality monitoring and to achieve cost savings now and in the future. The progress to date includes actions that foster different aspects of the strategy. Selected examples are presented below.

Eight Federal agencies, which include the Smithsonian Institute, the Agricultural Research Service (ARS), the National Marine Fisheries Service (NMFS), the National Resources Conservation Service (NRCS), the NBS, NOAA's National Ocean Data Center, the USEPA, and the USGS, are taking an important step forward to improving consistency among Federal data-storage systems that contain biological information. These agencies are developing joint agreements to maintain and use the same reference table for taxonomic codes. The codes would be related to the same taxonomic identifiers and hierarchy in the participating agencies' automated information systems. NOAA, the USEPA, and the USGS have agreed to use these codes. This major advance will reduce costs and facilitate data sharing among the systems. It is the first time that more than two agencies have agreed to support and use the same taxonomic codes.

Five Federal environmental monitoring programs in the USEPA, the NBS, the USGS, and NOAA have formed a partnership with the USGS's Earth Resources Observation Systems (EROS) Data Center to facilitate the development of comprehensive land-characteristics information for the United States. The Multi-Resolution Land Characteristics Consortium is generating land-cover data for the conterminous United States and is developing a land-characteristics data base that meets the diverse needs of the participating programs. Cost savings for purchasing the data are $4 million, and large additional savings will result from the joint image-processing and data management.

Regarding modernizing or creating new Federal information systems, the USEPA is modernizing STORET, and the USGS is modernizing its system (NWIS--II). For many years, much water-quality information collected by the USGS has been loaded into STORET. During this modernization phase, the agencies are working closely together to implement common data-element names and reference tables that will make it easier to exchange and aggregate data. In addition, the USGS has worked with the NBS to facilitate the compatible development of their information system. Such initiatives will make it easier for States and others to aggregate information from Federal systems. Also, successful efforts to make Federal systems compatible will encourage the non-Federal sector to adopt the common data-element names and reference tables. Significant cost savings nationwide over long periods of time and a larger, more useful environmental information base will result from such compatibility.

With leadership from the USEPA, the ITFM created the Master Directory of Water Quality and Ancillary Data that includes printed texts, data, and indexes of data holdings (U.S. Environmental Protection Agency, 1993). The Master Directory is available on diskette, CD--ROM, and Internet. The Master Directory greatly simplifies users' access to relevant information and reduces costs by using modern information-transfer technology.

The ITFM has initiated pilot studies in three member States to help develop and test concepts. Federal, State, and local agencies are participating in these initiatives. Arizona is focusing on data management and information sharing. Florida is developing a statewide network that integrates surface- and ground-water monitoring in the Suwannee River Basin. Wisconsin is comparing monitoring methods used by Federal and State agencies and evaluating the differences in the results; the ultimate goal is to improve the comparability of data for Wisconsin so that data can be aggregated for a variety of applications.

The ITFM sponsored 10 regional meetings during summer 1993 to review its proposals and recommendations and to discuss monitoring opportunities and problems in the Federal regions. Additional meetings and review activities to contribute final comments and facilitate regional collaboration were held in 1994. In addition, Florida, Idaho, New Jersey, and Wisconsin have held statewide monitoring meetings that have included monitoring organizations and information users. The purpose of these meetings is to begin the design of statewide monitoring strategies. During the review of this strategy, other States, which included California, Michigan, Minnesota, and Arizona, stated they were pursuing collaborative monitoring teams of some kind.

In the area of monitoring program design, the USEPA, the States, and the Tribes are using the ITFM monitoring program framework as the basis for developing monitoring guidance for the USEPA Section 106 grants to States and Tribes. The use of the program throughout the Nation will significantly improve the usefulness of water-quality information and the cost effectiveness of the programs (Technical Appendix B). Federal agencies also are redesigning monitoring programs to parallel the ITFM program concepts more closely. For example, the USGS is redesigning NASQAN to implement such monitoring concepts, as well as to respond to budget constraints. The USACE is developing guidance documents for its water-quality-monitoring program that closely parallels the ITFM recommendations. This guidance will address water-quality-monitoring activities at hundreds of USACE projects nationwide.

The ITFM analytical work related to indicators is a major contribution to proposed changes to the USEPA guidelines for the States' 1996 305(b) reports. These changes are being made in consultation with representatives from Federal, State, Tribal, and interstate agencies that conduct environmental monitoring and assessment activities. The changes to the guidelines will produce more comparable information and will help link the information collected more directly to water-quality goals nationwide.

Regarding the establishment of ecological reference sites and conditions, representatives from States, USGS/NAWQA, and USEPA/EMAP are working together to identify and use reference conditions characteristic of waters and associated habitats that meet desired goals. The resulting reference conditions are needed as baselines against which to compare and assess the biological integrity of aquatic systems generally. All levels of government and the private sector will be able to use the information generated from the reference sites and conditions to make more effective regulatory and resource-management decisions.

The USGS, through the NAWQA Program, hosted an interagency workshop on the biological methods used to assess the quality of streams and rivers (U.S. Geological Survey, 1994). The purposes of the workshop were to promote better communication among Federal agencies and to facilitate data exchange and interagency collaboration. The workshop focused on community assessment methods for fish, invertebrates, and algae; characterization of physical habitats; and chemical analyses of biological tissues. The 45 biologists who attended the workshop evaluated similarities and differences among biological monitoring protocols and identified opportunities for collaboration and research, improving data compatibility, and sharing information.

Conclusion

Implementation of the recommendations and strategy in this report will result in an adequate waterinformation base to achieve natural-resource-management and environmental protection goals in the public and the private sectors. Identified changes are already being made, but implementation of the full strategy cannot be achieved quickly. Each participating organization will need to revise its monitoring activities in a series of deliberate steps over several years as money and time become available. However, because benefits from the changes are incremental, improvement of water-quality monitoring has begun as described in the preceding section.

As the competition for adequate supplies of clean water increases, concerns about public health and

the environment escalate, and geographically targeted watershed-management programs increase, more demands will be placed on the water-quality-information infrastructure. These demands cannot be met effectively and economically without changing our approach to monitoring. The agencies that participated on the ITFM believe that the implementation of this strategy for nationwide water-quality monitoring will provide sound answers to the fundamental questions posed in the introduction to this report.

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APPENDIX L: Management Options Matrix

Monongahela River Conservation Plan
Management Options

RESOURCE CATEGORY	MANAGEMENT OPTIONS AND PRIORITIES	POTENTIAL PARTNERSHIPS and/or RESPONSIBLE PARTIES	POTENTIAL FUNDING SOURCES	RECOMMENDED BEGINNING
EC, C, R, NR	**Develop a series of landings for riverboat tours.**	SIHC, private consultants, local CDC's, State Senators, State Representatives, U. S. Congressmen, PFBC	DCNR's PITA Grant, Deed's Community Revitalization Grant, TEA-21, PFBC, DCNR's Heritage Parks Program	1999
EC, NR	**Complete an inventory of brownfields and prioritize their redevelopment potential under PA Act 2 and Act 4.**	SIHC, local municipalities, county planning departments, Regional Industrial Site Evaluation System, PADEP	PADEP's Land Recycling Program, ARC, DCED: Communities of Opportunity and Community Revitalization	1999
EC, R	**Create a Business Directory and map that highlights the commercial districts and other amenities near river landings.**	SIHC, DCED, City of Pittsburgh Planning Department, local chamber of commerce, County Planning or Economic Development Departmants	Local businesses through advertisements	1999
EC, R	**Complete and maintain the Steel Heritage Trail, Montour Trail, Sheepskin Trail, and Greensboro Riverwalk.**	SIHC, ATA, local governments, county planning departments, Fayette County Planning Commission, Borough of Greensboro	DCNR's Heritage Parks Program, DCNR's Rails to Trails, Community Grant Program, National Recreational Trails Program, private foundations, TEA-21	1999
R, EC	**Develop a cooperative process with the Port of Pittsburgh to address both the commercial shipping and recreation industry interests, proposed developments, potential conflicts, and safety issues.**	SIHC, Port of Pittsburgh, ACOE, Coast Guard	No direct cost involved	1999
NR	**Develop a watershed database to coordinate conservation activities among governmental agencies, private organizations, and the general public.**	SIHC, local watershed organizations, Trout Unlimited, county conservation districts, EPA, USGS, PADEP, ACOE, PFBC, DCNR, Pennsylvania BASS Federation Chapter	PADEP Bureau of Watershed Restoration and Bureau of Watershed Conservation, PFBC, private foundations, colleges and universities, county conservation districts	1999
NR	**Establish a relationship with the Appalachian Clean Streams Initiative.**	PADEP, EPA's Mine Drainage Program, PFBC, ACOE, USGS, US Office of Surface Mining	No direct cost involved	1999
PZ, C, NR, R	**Coordinate with other River Conservation Plans within the vicinity.**	Greene County Conservation District, LYRC, Borough of Brownsville, Studio for Creative Inquiry at CMU, City of Pittsburgh	No direct cost involved	1999
PZ, EC	**Work with municipalities to promote more aggressive enforcement of zoning.**	Local COG's, county planning departments, local municipalities	permit fees, violation fees	1999
PZ	**Use zoning regulations to restrict building in floodplains.**	ACOE, FEMA, NOAA, local government	DCED's SPAG and SCPAP grants, FPMS	1999
R, EC	**Foster partnerships and agreements with private marinas to provide boat tours and Rivers of Steel access.**	SIHC, private marinas	TEA-21, DCNR's Heritage Parks Program, PFBC	1999
R	**Develop and maintain the proposed recreational facilities along the river.**	SIHC, DCNR, associated municipalities, county planning departments, DCED	DCNR's Rails to Trails, DCNR's Heritage Parks Program Community Grant Program, DCED's Community Revitalization Grant, Land and Water Conservation Fund	1999
R	**Renovate and maintain the Glassport Community Park.**	SIHC, Borough of Glassport	DCNR's Rails to Trails, DCNR's Heritage Parks Program, Community Grant Program, DCED's Community Revitalization Grant, Land and Water Conservation Fund	1999
R, EC	**Ensure the continued operation of the Fredericktown Ferry by improving the operation, maintenance and equipment.**	SIHC, Fredericktown officials, Fayette County officials, PennDOT, State Senators, State Representatives, US Congressmen, Fay Penn, PHMC	TEA-21, Community Revitalization, Surface Transportation Program	1999

Legend

C - Cultural/Historic
EC - Economic Development
ED - Education
NR - Natural Resources
PZ - Planning and Zoning
R - Recreation

Monongahela River Conservation Plan
Management Options

RESOURCE CATEGORY	MANAGEMENT OPTIONS AND PRIORITIES	POTENTIAL PARTNERSHIPS and/or RESPONSIBLE PARTIES	POTENTIAL FUNDING SOURCES	RECOMMENDED BEGINNING
R, EC	**Foster the relationship between Rivers of Steel Heritage Area and the National Road Heritage Park at Brownsville.**	SIHC, National Road Heritage Park	No direct cost involved	1999
R	**Partner with the PFBC Water Trails Initiative.**	SIHC, PFBC	No direct cost involved	1999
ED	**Inform the public of the value of the resources of the Monongahela Valley.**	SIHC, PADEP, EPA, USGS, PFBC, PGC, ACOE, DCNR, WPC	PADEP Environmental Education Grants, county conservation districts, DCNR's Heritage Parks Program	1999
ED	**Initiate educational programs on floods and floodplain development which include "flood emergency response" educational materials and flood awareness seminars for residents and recreational river users.**	SIHC, NWS, NOAA, FEMA, ACOE, PADEP, local fire departments	PADEP Environmental Educational Grants, PADEP Federal Flood Protection Cost Share Projects and Flood Protection Program, NOAA, FEMA, ACOE	1999
C	**Facilitate regional coordination between historical groups and municipalities through PHMC and SIHC.**	PHMC, SIHC, local historical societies, local municipalities	No direct cost involved	1999
EC	**Monitor the success and impacts of economic development projects along the river.**	SIHC, county planning departments, DCED, local chambers of commerce	DCED	2000
EC, R, NR	**Promote fishing, hiking, and biking through events.**	SIHC, regional municipalities, county conservation districts, county planning departments, local sportsmen's groups, special interest groups, Pennsylvania BASS Federation Chapter, PGC, PFBC, Trout Unlimited, outfitters	Volunteer services from special interest groups, public and private donations, corporate sponsorships, Pennsylvania BASS Federation Chapter, Trout Unlimited	2000
C, R, EC	**Create a Steamboat Museum at Brownsville.**	SIHC, PHMC, ACOE	PHMC, ACOE, HPP, USNPS, private foundations, colleges and universities	2000
C, R, EC	**Investigate partnerships with ACOE for the development of a Lock and Dam Museum.**	ACOE, SIHC	HPP, USNPS, private foundations	2000
ED, C	**Promote an essay and/or photo contest throughout school districts within the Monongahela River corridor.**	SIHC, regional municipalities, local school districts	PADEP Environmental Education Grants, private foundations, local school districts, volunteers	2000
ED, NR	**Educate land owners and municipalities on the importance of riparian buffers.**	PADEP, PFBC, PGC, DCNR, PA Bureau of Forestry, regional timber harvesters, county conservation districts	PADEP Bureau of Watershed Conservation, DCNR Land Trust Grant, PADEP Environmental Education Grants, PADEP Stream Improvement Program	2000
ED, NR	**Create and distribute an educational pamphlet describing the potential threat and actions to maintain the zebra mussel and Asiatic clam.**	PFBC, PADEP, USGS, ACOE, county conservation districts, colleges and universities, Pennsylvania BASS Federation Chapter	PFBC's Adopt a Stream Program, Trout Unlimited Embrace a Stream Grants, PADEP Environmental Educational Grants, Pennsylvania BASS Federation Chapter	2000
R	**Participate in the nomination of the Monongahela River as a Modified Recreational River on the Pennsylvania Scenic Rivers Inventory.**	SIHC, DCNR	No direct costs involved	2000

Legend

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Monongahela River Conservation Plan
Management Options

RESOURCE CATEGORY	MANAGEMENT OPTIONS AND PRIORITIES	POTENTIAL PARTNERSHIPS and/or RESPONSIBLE PARTIES	POTENTIAL FUNDING SOURCES	RECOMMENDED BEGINNING
NR	**Initiate and complete Natural Heritage Inventories for Westmoreland, Fayette, and Greene Counties through WPC.**	SIHC, WPC, County Conservation Districts	WPC, DCNR Keystone Recreation, Park, and Conservation Fund: County Natural Area Inventory Grant, colleges and universities	2000
R, EC	**Develop and maintain new public boat ramps within West Homestead, Clairton, Masontown, and Greensboro that comply with safety and accessibility standards.**	SIHC, PFBC, regional municipalities	PFBC, HPP, regional municipalities	2000
R	**Emphasize water quality improvements consistent with sportfishing programs such as the PFBC's "Pittsburgh Pool" Hybrid Striped Bass Program.**	SIHC, PFBC, PA Cleanways, local sportsmen's groups, colleges and universities, Trout Unlimited, Pennsylvania BASS Federation Chapter, PADEP Bureau of Water Quality Protection	No direct costs involved	2000
NR, ED	**Implement a volunteer trash removal or land stewardship program to clean and preserve the river corridor.**	PA Cleanways, local conservation groups, county conservation districts, local sportsmen's groups, local waste management facilities	Private foundations, county and local government, volunteers	2000
NR	**Coordinate with PADEP's Bureau of Abandoned Mine Reclamation to identify "Problem Area" abandoned mine sites within the study corridor for reclamation and funding prioritization.**	PADEP-Bureau of Abandoned Mine Reclamation, SIHC, US Office of Surface Mining	PADEP Bureau of Abandoned Mine Reclamation and Bureau of Watershed Conservation, WPCAMR	2000
NR	**Investigate the potential for utilizing abandoned tipples and other structures as public fishing piers.**	SIHC, PFBC, Pennsylvania BASS Federation	PFBC, regional municipalities	2000
NR	**Encourage citizen monitoring and reporting of industrial and residential effluent violations.**	PADEP Bureau of Watershed Conservation and Bureau of Water Quality Protection	PADEP's Citizen Volunteer Monitoring Program	2000
NR	**Identify and remove abandoned barges along the river.**	SIHC, Port of Pittsburgh, PADEP, PFBC, ACOE, Aquatic Systems Inc.	Port of Pittsburgh, private foundations, volunteers, public and private donations	2000
PZ	**Reconnect zoning and planning.**	local governments, county planning departments	DCED's SCPAP and SPAG Grants	2000
PZ	**Have municipalities that do not adopt zoning develop an Official Map.**	county planning departments, local governments	DCED's SCPAP and SPAG Grants	2000
C, R, EC	**Coordinate an exchange of historical literature between communities in order to market a regional experience and interest among travelers to the river communities.**	SIHC, local municipalities, county government, local historical societies, PHMC	No direct costs involved	2000
EC, C, R	**Evaluate, and where appropriate acquire and rebuild abandoned ferry sites to be used as ferry launch sites, public boat launches, and interpretive areas.**	SIHC, PFBC, ACOE, PADEP, PHMC, DCNR	Private foundations, volunteers, DCNR Keystone Recreation, Park, Conservation Fund: Land Trust Grant, private foundations, PFBC	2001
EC, C, R	**Link Greensboro and New Geneva by ferry.**	SIHC, ACOE, Greene and Fayette County Planning Departments, local governments, State Senators, State Representatives, US Congressmen	TEA-21, HPP	2001

Legend

C - Cultural/Historic
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Monongahela River Conservation Plan
Management Options

RESOURCE CATEGORY	MANAGEMENT OPTIONS AND PRIORITIES	POTENTIAL PARTNERSHIPS and/or RESPONSIBLE PARTIES	POTENTIAL FUNDING SOURCES	RECOMMENDED BEGINNING
C, R, EC	**Investigate and create a trail under the Dunlap Creek Bridge in Brownsville.**	SIHC, BARC	Private foundations,Key 93, TEA-21, corporate sponsers	2004
C, EC	**Redevelop an existing bridge to hold small shops.**	SIHC, developers	Corporate sponsors, private developers	2004
NR, PZ	**Enforce deficient municipalities to establish compliance with existing sewage treatment regulations by preparing and updating formal Act 537 sewage facilities plans and prioritizing construction of sewage treatment facilities.**	SIHC, regional municipalities	PADEP Sewage Management Grants	2004
EC	**Coordinate any planned development projects that have the possibility of being impacted by the Mon-Fayette Expressway with the Pennsylvania Turnpike Commission.**	SIHC, PTC	No direct costs involved	Ongoing

Legend
C - Cultural/Historic
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PZ - Planning and Zoning
R - Recreation

APPENDIX M: Public Comments

COMMONWEALTH OF PENNSYLVANIA
TD-518 - 10-90

SPEED MESSAGE

DATE 5/14/98

SUBJECT Monongahela River Corridor Draft PFR

REPLY BY

TO Dave Rogers
Homestead, PA

FROM Jim Hays
Hbg. PA.

MESSAGE Thanks for the opportunity to review this Draft. I have only a few comments and I included copies of the pages with the comments. If any of the numerous maps will be reproduced in B&W then the legend designations need to be changed since black dots or squares look the same.

Give a call if you have any questions 717.783.8526

Keep in Touch

Jim Hays

REPLY N/R/N

DATE

JEREMY -

FYI.

RECIPIENT-RETURN THIS COPY TO SENDER

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
WILLIAM S. MOORHEAD FEDERAL BUILDING
1000 LIBERTY AVENUE
PITTSBURGH, PA 15222-4186

REPLY TO ATTENTION OF

May 21, 1998

Natural and Cultural
Resources Branch

Mr. Jeremy P. Muller
Steel Industry Heritage Corporation
338 East Ninth Avenue, 1st Floor
Homestead, Pennsylvania 15120

Dear Mr. Muller:

We have reviewed your Draft Preliminary Findings Report for the Monongahela River Conservation Plan which you sent to Mr. Conrad Weiser by letter dated May 1, 1998. As your report acknowledges, the Corps of Engineers is intimately involved with the Monongahela River in areas of particular concern to your potential future projects - navigation, regulatory permits, water quality, and flood plains. We noted, however, that some of the reported information on our facilities and programs is not current or complete, or does not conform to our conventional nomenclature. We would like to discuss this and the potential for our involvement in some of your management options prior to general public review of your report.

Please call Mr. Weiser at 412-395-7220 to arrange a meeting time and place with us.

Sincerely,

John M. Goga
Chief, Planning Division

Resource Planning Coordinator

COMMONWEALTH OF PENNSYLVANIA
Pennsylvania Fish and Boat Commission
P.O. Box 67000
Harrisburg, PA 17106-7000

June 9, 1998

Steel Industry Heritage Corporation
338 East Ninth Street
Homestead, PA 15120

RE: Monongahela River Conservation Plan

Dear Sirs:

Thank you for forwarding the Monongahela River Conservation Plan - Draft Preliminary Findings Report to the Commission for review. The document arrived in Harrisburg after the formal response deadline had passed, but I hope my observations and comments will still be of some assistance to you.

Congratulations on compiling an outstanding reference resource on the Monongahela River. The topics covered and the depth of discussion is quite impressive. The document is well written.

The Pennsylvania Fish and Boat Commission's mission is, "to provide fishing and boating opportunities through the protection and management of aquatic resources." Our legislative mandates include promoting fishing and boating opportunities. We see the provision of boating access as a key to meeting these mandates. For this reason, it was refreshing to see riverfront parks, boat launches and landings discussed in some detail in the document.

As your document shows, there are local and private entities interested in improving fishing, boating and outdoor recreation infrastructure, including boat ramps. The Commission would like to offer our cooperation. We would like to coordinate our programs with the Steel Industry Heritage Corporation to further our common goals and objectives.

The Commission is particularly interested in ways we can help each other improve access to the river. The Commission is currently developing an access grants program and a water trail program that will certainly be of interest and possibly help to you. We would

like to discuss the status of these programs and develop appropriate mechanisms for cooperation if you are interested.

If you have any questions or would like to set up a meeting, please contact me at (717) 657-4394.

Sincerely,

Thomas P. Ford

Thomas P. Ford
Resource Planning Coordinator

TF/cs

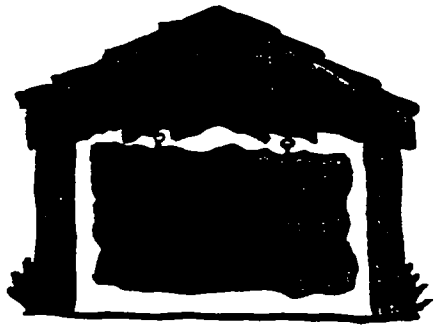
cc: J. Simmons
J. Young
B. Kiesnoski
A. Murawski

BOARD OF TRUSTEES

CHARLEROI COMMUNITY PARK FUND

CHARLEROI CHAMBER OF COMMERCE

ONE CHAMBER PLAZA CHARLEROI, PA. 15022



July 21, 1998

Mr. Don Santoro
Mackin Engineering
117 Industry Drive
Pittsburgh, PA 15275-1015

The following are comments regarding the Rivers of Steel project and should be considered as constructive.

1. Project as presented is too vast in scope and too general, as one who has exerted considerable time and effort on community projects as well as businesses, I have found the "shot-gun" approach to be a hindrance to success.

2. We should be realistic, the Monongahela River does not have the "character" of a Rhine, a Mississippi, or a Hudson River.

3. The question of ownership of river front property has not been addressed.

4. The question of maintaining and sustaining any facilities has not been addressed.

5. The question of responsibility and liability remains open on these proposals.

6. Presentation has not utilized previous studies for river front development that are more specific and detailed. Much time and effort as well as funds could have been saved by review of these studies, ZHA and Community and Economic Revitalization Program, dated August 14, 1992 by Delta Development and GAI Cconsultants for Mon Valley Progress Council.

7. Suggest concentrating on specific projects along river as "do-able" would increase overall success of this plan.

Trustees Community Park

Ronald A. Monack

Ronald A. Monack
Chairman

trustees riverst.wps

MACKIN ENGINEERING COMPANY
PROJECT NO. _____

☐ MM ☐ MJ ☐ BCB
☑ JJS 7/24 ☐ ☐ 7/29 ☐ AM
☑ DDS ☐ ☐ 7/29 ☐ _____
☐ ☐ 7/29 ☐ ☐ 7/29 ☐ MECH

☑ Corres. File ☐ Admin. File
☐ Contract File ☐ Mktg. File
☐ Enclosures:

JUL 23 1998 Dept.

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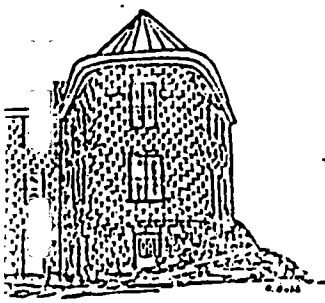
PHONES: 483-3507 and 483-3508



FLATIRON BUILDING HERITAGE CENTER

69 Market Street Brownsville, PA 15417
724-785-9331 e-mail FLATIRON@LCSYS.COM

MACKIN ENGINEERING COMPANY
PROJECT NO. 3887-001

☐ IVM ☐ RGJ ☐ BDB
☐ JJS ☑ DDS 8/14 ☐ KAM
☑ ROB 8/11 ☑ RGJ 8/13 ☐ ___
☐ ___ 8/11 ☐ ___ ☐ MECH

☐ Corres. File ☐ Admin. File
☐ Contract File ☐ Mktg. File
☐ Enclosures:

August 7, 1998

Mr. Rob Hilliard
Mackin Engineering Company
RIDC Park West
117 Industry Drive
Pittsburgh, PA 15275

Dept.
AUG 10 1998

Dear Rob,

Enclosed are some suggestions for the Preliminary Findings Report of the Monongahela River study for Steel Industry Heritage Corporation.

Have a few questions, What is the McDonald Marina at MM55.9 and the A.B. Marina at 55.4?

Please be sure to include the Brownsville Wharf in the plan, since we have made application for a grant to DCNR through the River Plan you completed for Brownsville.

I truly enjoyed reading this report. It is so full of great information. You all did a super job! Sure am happy that our paths crossed long time ago through the efforts of Dennis when he was with your company.

Need to meet up with your boss someday and discuss Italy. We are thinking about a trip in the Spring of 2000 when my granddaughter graduates from College.

Best wishes to all of you,

Sincerely,

Norma J. Ryan

P. S. Have a letter from DCNR that the Brownsville Borough papers are all approved and the request has been submitted to the Controller for the funds due to you. Hope it will be soon.

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