This document has been prepared with a grant received by NOACA from Ohio EPA under Section 604 (b) of the Clean Water Act and from contributions of local public jurisdictions within the NOACA planning area.

1999 Annual Update

BLACK RIVER REMEDIAL ACTION PLAN

Implementing Strategies to Control Nonpoint Source Pollution Impacts in the Black River

June 2000

The purpose of this Annual Report is to inform the watershed community on the progress of the Black River RAP. It should provide basic background information on many of the projects being undertaken annually. If you would like more detailed information on any of the topics, feel free to contact the organizations referenced on page 21 of this report.

NONPOINT SOURCE POLLUTION

Nonpoint source pollution is a major problem in the Black River. It is a form of water pollution that can result from a variety of land use practices including agriculture and home construction, and from other sources such as urban streets, industrial lands and home sewage disposal systems.

Cover Photos:

Courtesy of Tom Holmes, Urban Stream Specialist and the Lorain County Soil and Water Conservation District

Courtesy of Beth Zajkowski, Republic Technologies International

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Seventh Generation
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Black River Related Web Sites

Ohio EPA - Black River RAP
http://www.epa.gov/glnpo.aoc/blackriver.html

Ohio EPA - Explore Your Watershed
http://www.chagrin.epa.state.oh.us/watershed/grp/group86.html

Oberlin College - Black River Watershed Education Project
http://oberlin.edu/-envs/projects/html

International Joint Commission - Great Lake Water Quality Board
http://www.ijc.org/boards/wqb/wqbrap.html

NOACA - Remedial Action Plans
http://www.noaca.org/Remedial Action Plans RAP/ remedial action plans.rap.htm

1999 BLACK RIVER RAP COORDINATING COMMITTEE MEMBERS

Local Jurisdictions

Lorain County General Health District Chairman, Black River RAP Coordinating Committee
Ken Pearce

Lorain County Board of Commissioners
Commissioner Betty Blair

City of Lorain
Mayor Joseph Koziura

City of Elyria
Greg Worcester

Lorain County Municipalities
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Lorain County Townships
Mary Beth Derikito

Lorain County Soil Townships Conservation District
Timothy Abraham

USDA/Natural Resource Conservation Service (NRCS)
Karl Schneider

Lorain County Metro Parks
Daniel Martin

NOACA
John Beeker, Secretary

Medina County Board of Commissioners
John Hocker

State/Federal Agencies

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Lorain County Port Authority
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Lorain County Farm Bureau
Julie Hruby

Lorain County Alliance
Mike Whitmore

Community Representatives

Seventh Generation
George Espy, Cheryl Wolfe and Lillian McPherson

Remedial Action Plan
Our River, Our Responsibility

1999 Annual Update

Prepared by:
Black River Remedial Action Plan Coordinating Committee

Black River RAP Secretariat
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MESSAGE FROM THE CHAIR

The Black River RAP is a partnership of public agencies, private businesses, community organizations, and citizens who have been dedicated to the protection and improvement of water quality throughout the Black River watershed since 1991. We are pleased to present this report on our activities in an effort to continue to raise river awareness in the community. We hope that it motivates citizens to take initiatives and become involved in some of our activities.

1999 was a banner year for the Black River RAP program. It saw the release of the *Protecting What Has Been Gained in the Black River* symposium report, which provides an overview of the discussions and recommendations from an event jointly sponsored by the Black River RAP and the International Joint Commission. The Black River RAP efforts have been recognized throughout the Great Lakes Basin in the United States and Canada as a result.

The symposium provided a forum for the exchange of ideas pertaining to an action-oriented watershed management agenda. The RAP's current focus on the need to control and manage nonpoint source pollution is a direct outgrowth of these discussions. As you will see in this annual report, we are undertaking a number of interesting activities to meet the nonpoint source challenge.

1999 also saw the release of Ohio EPA's most recent Biological and Water Quality Study of the Black River. Study results indicate that improvements have been made in the environmental quality of the Black River, but that the river continues to be susceptible to the impacts of uncontrolled, unmanaged nonpoint sources of pollution. Ohio EPA's report is summarized in this year's annual report. The full report can be accessed on line by visiting Ohio EPA's web site at http://chagrin.epa.state.oh.us/document_index/psdindx.html

Ohio EPA's report, coupled with the Ohio Department of Natural Resources 1998 Scenic Rivers report on the Black River provide a baseline for assessing future progress in protecting the Black River.

"Working together, we can continue to succeed in restoring the Black River to its potential."

We have a lot to protect here in the Black River and the means for doing valuable work is at hand. The Black River RAP is supporting a number of initiatives to protect the river which are described in more detail in this report. I am proud of what we are doing. The vision shared by citizens and the members of the RAP is that working together, we can continue to succeed in restoring the Black River to its potential. After all, protecting what has been gained in the Black River is a pursuit worthy of our best efforts! ■

Ken Pearce, Lorain County Health Commissioner

Chair, Black River RAP Coordinating Committee

WATERSHED RECOMMENDATIONS PART OF COUNTYWIDE COMPREHENSIVE PLAN

In June 1998, the Lorain County Board of Commissioners contracted with a consulting firm to develop a Comprehensive Plan for Lorain County. This was the first such effort in over 30 years. As part of this process, six Citizen Committees met over a fourteen-month period in 1999 to establish the overall policy direction that will guide the development of this Plan. Five committees each focused on particular topics relevant to the Plan including farmland preservation, utility issues, intergovernmental relations, transportation and the environment. Among the issues addressed by the environment committee were watersheds, open space, scenic resources, soils, cultural and historic resources, native plants and wildlife and air resources. Final reports and recommendations from these five committees helped the sixth committee, the Growth Management and Policy Committee, working with the consultant, to produce a report that describes Lorain County's environmental features and agricultural conditions. The following table highlights watershed recommendations under consideration for inclusion in the Plan. Once completed, the Comprehensive Plan can help to guide development in the county in a manner that preserves important natural resources like the Black River. ■

Summary of Watershed Recommendations

KEY ISSUES	RECOMMENDATION	IMPLEMENTATION
Nonpoint Source Pollution (Including: agricultural, hydromodification, industrial activities, mining, on-site sewage disposal systems, silviculture sources)	Public education	Public education of best management practices
Nonpoint Source Pollution (Construction-related)	Include verification of storm water pollution prevention plan (SWPPP) in the site design process	Ensure the site design review includes a SWPPP to specify best management practices and structural controls to minimize erosion and transportation of sediment.
Nonpoint Source Pollution (Urban sources)	Maximize vegetative cover and impervious areas	Require retention basins and certain percentages of vegetative cover in newly developed areas Public education of best management practices
Protection of Black River watershed	Adopt a watershed management plan	Public education of best management practices

KEY ISSUES AND RECOMMENDATIONS FOR CARLISLE TOWNSHIP

KEY ISSUES	RECOMMENDATION	RATIONALE	IMPLEMENTATION
Nonpoint Source pollution (Including: agricultural, hydro-modification, industrial activities, mining, on-site sewage disposal systems, silviculture sources)	Public education	Public education	Public education of best management practices
Nonpoint Source pollution (Construction related)	Include verification of stormwater pollution prevention plan (SWPPP) in	To prevent sedimentation of surface waters	Ensure the site design review includes a SWPPP to specify best management practices and structural controls to minimize erosion and transportation of sediment
Nonpoint Source pollution (Urban sources)	Maximize vegetative cover and pervious areas	To decrease amount of pollutants in runoff and slow the flow of the runoff	Require retention basins and certain percentages of vegetative cover in newly developed areas Public education of best management practices
Protection of Black River Watershed	Adopt a watershed management plan	Protection of agricultural lands, rural non-roplands, and urban areas.	Public education of best management practices
Protection of floodplains	Adopt a floodplain protection resolution	To prevent flood damages and preserve the location and character of natural drainage courses	A full inventory, definition, and delineation of resources
Protection of riparian corridors	Create vegetative buffer zone overlay district	Protection of wetlands, steep slopes, and critical habitat	A full inventory, definition, and delineation of resources
Degradation of stream habitat	Restore stream systems	Protection of surface waters	Public education and use of in-lieu-fees from mitigation
Unsuitability of soils for septic	Require regular inspection, maintenance and pump out of septic systems	Public health and safety and protection of groundwater resources	Charge homeowners a maintenance fee that is used for inspection, maintenance and education
Protection of wetlands	Include verification of wetlands permits in the site design process	To conserve the wetlands systems	A full inventory, definition, and delineation of resources, ensure the site design review addresses wetlands issues, wetlands banking
Preservation of woodlands and open space	Devise Open Space Residential Subdivision Design	Limit development in environmentally safe areas	Map and prioritize underdeveloped lands based on ecological evaluation
Protection of urban and community forests	Develop a tree preservation resolution	Canopy cover provides numerous health and safety benefits	Require developer to prepare tree preservation plans
Poor availability, yield, and quality of groundwater resources	Rely on other water resources, conduct pollution resource inventory, devise groundwater protection ordinance	Groundwater conditions are generally poor	Expand delivery systems of alternative water sources, community education, on-site sewage disposal systems, UST program
Development compatible with natural resource protection	Require environmental site design review process	Avoid adverse impacts on sensitive environments	Map and prioritize underdeveloped lands based on ecological evaluation
Protection of riparian corridors, recreation areas, and other natural areas	Develop greenway linkages and open space plans that provide multi-use functions and enhance the sense of community	To serve the community's active and passive recreational needs	Map contiguous open spaces and other potential corridor linkages Develop a strategy for acquisitions or easements

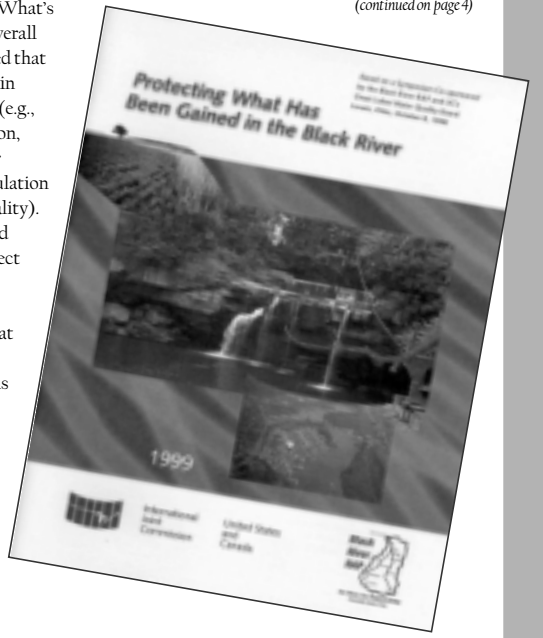
BLACK RIVER RAP JOINS IJC IN RELEASING SYMPOSIUM REPORT

In March 1999, the International Joint Commission (IJC) released a report entitled, *Protecting What Has Been Gained in the Black River*, based upon the October 8, 1999 public symposium co-sponsored by the Black River RAP and the IJC's Great Lakes Water Quality Board in Lorain, Ohio. The day's proceedings and resulting conclusions and recommendations were compiled into this report.

The symposium was attended by over 125 participants from local governments, industry, environmental groups, faculty and students from surrounding universities and concerned citizens who were challenged by the symposium's theme of "Protecting What's Been Gained in the Black River." Overall discussions of the day acknowledged that substantial progress is being made in implementing the Black River RAP (e.g., controlling point sources of pollution, progress toward elimination of liver tumors in the brown bullhead population and improvements in sediment quality). However, the symposium concluded that much needs to be done to protect what's been gained and to further rehabilitate degraded areas in the watershed, especially those areas that are or continue to experience nonpoint source pollution problems associated with land use activities.

The *Protecting What Has Been Gained in the Black River* report documents material presented at the symposium and the results of group discussions including strategies and recommended projects. One presentation reported on the 1997 study by the Ohio Department of Natural Resources, which evaluated the Black River's potential for Scenic River Status. It concluded that substantial portions of the riparian zone are in excellent condition, but need a sustained, focused effort to preserve them. This presentation reinforced the conference's theme and the concerns of the participants.

(continued on page 4)



BLACK RIVER RAP JOINS IJC IN RELEASING SYMPOSIUM REPORT *(continued)*

Symposium participants and the Black River RAP agreed that greater emphasis should be placed on protecting and restoring the riparian corridor and in establishing an urban sediment and erosion control program. More specifically, participants recognized that a greater emphasis should be placed on sustaining and improving aquatic life communities and habitat components within the riparian corridor. Participants agreed that land use planning, local ordinances and zoning can be utilized to protect the riparian corridor. Other watershed protection efforts identified include interjurisdictional storm water management, targeted initiatives at farmers to implement best management practices, and support for long-term environmental monitoring. Those involved agreed that there is a need to more effectively engage the public in the Black River RAP's community-based process, which requires active involvement of informed citizens. It is important that citizens who have been ecologically educated through effective volunteer training be engaged to act as stewards of the watershed.

For more information, the full report can be accessed at

http://www.ijc.org/boards/wqb/black/cover.html

What is the International Joint Commission?

The International Joint Commission is a binational Canada-U.S. organization established by the Boundary Waters Treaty of 1909. It assists the governments in managing waters along the border for the benefit of both countries in a variety of ways including examining issues referred to it by the two federal governments.

What is the Great Lakes Water Quality Agreement?

The Agreement, first signed in 1972 and renewed in 1978 and 1987, expresses the commitment of each country to restore and maintain the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem and includes a number of objectives and guidelines to achieve these goals. It reaffirms the rights and obligation of Canada and the United States under the Boundary Waters Treaty and has become a major focus of the International Joint Commission.

PLANNING FOR CARLISLE TOWNSHIP INCLUDES A NATURAL RESOURCE ANALYSIS

Planning consultants have been working with Carlisle Township and the Lorain County Community Development Department to develop a model township land use plan and community guide. A key step in the effort involves the preparation of a Natural Resource Analysis which identifies the location and relative importance of natural resources in Carlisle Township. The Analysis identifies the East and West Branches of the Black River as the most important natural resource in the Township but it identifies other features as well including aquatic features, floodplain corridors, woodland resources, wetlands, steep slopes, soils, groundwater resources, parks and open space resources, and unique, rare and endangered species.

Carlisle Township was chosen for the model because it is near the geographic center of Lorain County; it contains a mix of rural and urban areas; it is experiencing tremendous development pressure; it is traversed by a major transportation link (SR 10); it is immediately adjacent to a major metropolitan community, Elyria, that continues to annex property; it is lacking in a central community identity since it has no central commercial area and its children are sent to four different school districts; and most importantly, the community has both the East and the West branches of the Black River passing through its 25 square mile area. Other factors which distinguish Carlisle Township are the existence of two Metro Parks, three golf courses, and heavy clay soils that are typical to Lorain County.

Consultant firm Pflum, Klausmeier, and Gehrum Consultant, Inc. (PKG) and subcontractor Davey Resource Group produced the Natural Resource Analysis along with a detailed land use survey of existing land uses, a capacity analysis of remaining developable land, and population build-out scenarios. Collectively, these analyses provide a framework for the development of planning recommendations to be considered by Carlisle Township and its residents in late 2000. Davey Resource Group developed the following list of Key Issues and Recommendations planned for inclusion in Carlisle Township's final plan.

(continued with table on page 18)

In 1996 the Lake Erie Protection Fund awarded a grant to the Lorain County Community Development Department to develop a Model Township Comprehensive Plan. The aim of this project is to improve the sustainability of Carlisle Township and the Black River watershed.

HOME SEWAGE DISPOSAL SYSTEMS: MANAGING ANOTHER CONTRIBUTOR TO NONPOINT SOURCE POLLUTION

Failing home sewage disposal systems (HSDS) continue to contribute to poor water quality in the Black River and its tributaries, and are recognized as a major contributing nonpoint source of pollution. Existing bacteriological data from the Ohio EPA indicates that failing HSDS are contributing to bacterial pollution in the Black River.

There are several reasons why home sewage systems are causing high level of pollutants in the Black River watershed. Age and lack of maintenance are two of the most common reasons. Older systems may need replacement either because they were initially designed for lower wastewater flows or have simply exceeded their life expectancies. This can result in overflow into field tiles, ditches and streams that eventually reaches the Black River. The lack of routine homeowner maintenance, such as infrequent pumping of the contents of the tank or failing to keep the electrical pumps and aerators operating, will result in premature clogging of soils and filters. This eventually leads to system failure and stream pollution.

It is extremely important for homeowners to conduct routine maintenance and proper operation of their home sewage systems to protect the environment and preserve public health.

DOING THE DIRTY: SAMPLING AND TESTING SYSTEMS

The Lorain County General Health District has been evaluating the effects of residential HSDS located on streams and ditches in the upper Black River watershed with assistance from Seven Generation. Under a 319 grant, health department staff, with assistance from four Seventh Generation volunteers, have been collecting water samples from streams that are located in close proximity to residential areas, but not near agricultural or industrial runoff sources. Stream samples are tested for parameters that can be used to determine the impacts of failing or inadequately functioning home sewage disposal systems on water quality. Over 300 samples were taken from 46 sites in 1999. Collecting these samples is often very unpleasant , especially when the source being sampled smells of raw sewage, but these dedicated professionals and volunteers understand that someone has to do the dirty work.

Initial reports show that HSDS are having a significant impact upon the streams in the upper Black River watershed. The Health District plans to gather a similar number of samples during the spring, summer and fall of 2000. Volunteers are still needed for this important work. If you are interested in volunteering, please contact Seventh Generation.

The Lorain County Health Department will use the information gathered from this study to encourage public support for HSDS maintenance and inspection programs and to establish and enhance homeowner educational/outreach efforts.

For additional information on 319 grant funded activities in the Black River watershed, please read the companion article, *Precision Farming: A New Technology To Better Manage One Contributing Source Of Nonpoint Source Pollution*

Seventh Generation served as the fiscal agent and project coordinator for the 319 grant project. Through publicity and with the help of project intern, Maggie Sallah, Seventh Generation recruited volunteers for the water quality sampling, prepared training materials, obtained necessary sampling equipment/ supplies, scheduled weekly water sampling, coordinated sample delivery to the laboratory, and tracked sampling activity.

Other Volunteers included Jack Baumann, Ross Muir, and Virginia Erdy

BLACK RIVER SHOWS IMPROVEMENT, BUT PROBLEMS PERSIST

According to the Ohio Environmental Protection Agency's recently released survey, the Black River watershed continues to build on the significant improvements at wastewater treatment plant (WWTP) facilities begun in the 1980s. At the same time, impacts are worsening from a watershed-wide increase in runoff due to improper land use developments and the degradation of the natural vegetative buffer strip (riparian zone). This was recognized by the Black River RAP and resulted in a call for riparian corridor protection in 1997.

Excessive sediment from runoff continues to bury aquatic habitat sites in the Black River and causes stream segments to run shallower and wider. This leads to increased flooding in many places. The runoff can degrade life in and around the river because it may contain fertilizers and pesticides from farm fields and lawns, biological pathogens and nutrients from farms and failing home sewage disposal systems (HSDS), and oils, greases and road salt from highways.

Restoration and protection of the riparian zone is critical because the buffering vegetation slows the runoff, filters solids from the runoff, absorbs and traps excessive nutrients and other pollutants from the runoff. Simply put, with riparian zones, the runoff is cleaner when it reaches the river.

East Branch of the Black River

The East Branch subwatershed, gets its start with the East Fork flowing south to Lodi and meeting the West Fork out of Ashland County, and then flows north through northern Medina and eastern Lorain Counties to Elyria. Ohio EPA's 1997 survey showed a thirteen percent increase in the number of miles in the East Branch achieving Full or Partial warm water habitat (WWH) status, increasing to 37.5 miles from the 32.7 miles attaining this level in 1992.

Remarkably, one stretch of the East Fork met the Exceptional Warm Water Habitat (EWWH) standards where pollution

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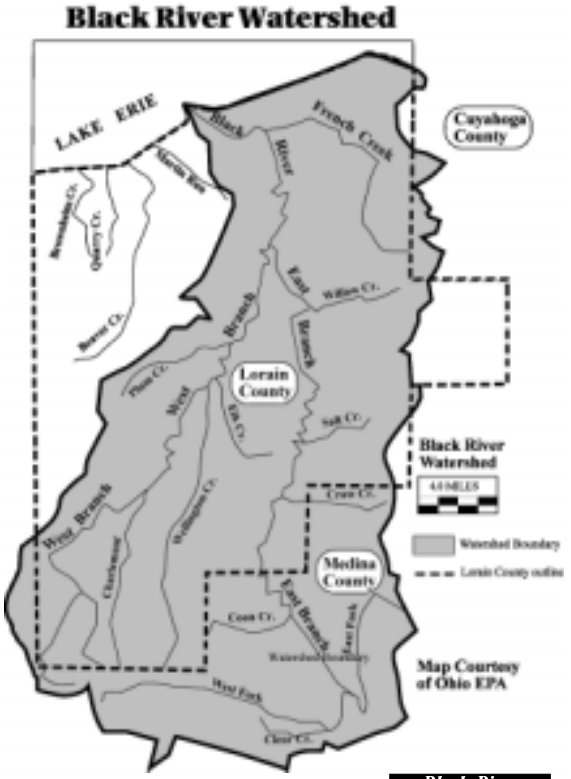


BLACK RIVER SHOWS IMPROVEMENT, BUT PROBLEMS PERSIST *(continued)*

sensitive stonefly larvae were collected. This stretch was rated an exceptional macro-invertebrate community, suggesting that with effort, there is potential for the remainder of the East Fork to achieve this elevated status. Downstream of the Lodi WWTP, the rating dropped to the marginally good range, probably due to phosphorus coming from the plant. Lodi WWTP's planned upgrade should address this problem.

In 1992, numerous HSDS failures were observed but WWTPs caused the greatest impacts. In fact, Grafton WWTP impacts were more noticeable in 1997 as the plant discharge essentially doubles the flow of the East Branch. Again, phosphorus appears to be the main culprit. This time, help may come by way of a plant expansion that will require compliance with the Great Lakes Water Quality Agreement for phosphorus reduction.

The river stretch between Grafton and Lodi is very susceptible to destabilization from a loss of riparian zone. Impacts have been observed from increased runoff and sedimentation from adjacent farm fields and development in the Spencer Lake area. Flowing northward, the East Branch surroundings change from rural to suburban to urban. Along this stretch, fecal coliform bacteria contamination is prominent. Probable sources include runoff from animal feedlots; failing HSDS's upstream of Elyria, and bypasses and overflows within Elyria's sewer system. Sediment studies reveal concentrations of heavy metals that may be coming from contaminated urban runoff. Fish data for 1992 and 1997 were very similar showing an absence of those fish species that thrive in unpolluted water. However, a small change in species types may indicate a lessening of some impacts and future improvements.

West Branch of the Black River

Collecting water from rural southwestern Lorain County, the West Branch subwatershed includes drainage from Rochester, Wellington, Lagrange, and Oberlin until it meets the East Branch in Elyria. Survey efforts in 1997 were not concentrated on this branch because little change was expected since the 1992 survey, and limited resources were available to Ohio EPA to undertake the survey.

Limited sampling in 1997 showed results similar to 1992. Fecal coliform bacteria continued to test high in all samples collected. This can be attributed to runoff from unsewered areas with failing HSDSs and combined sewer overflows (CSOs) of municipal systems. The macro-invertebrates (insects) studied showed progressive improvement. Sites that were poor in 1982 were fair in 1992 and good in 1997. Fish community data collected were similar to 1992 results, but showed some indications that populations can improve in the future.

French Creek

French Creek empties into the Black River mainstem in Sheffield Township, after having collected drainage from the vicinity of North Ridgeville and northern Elyria. Toxic effects from an unknown source upstream of the French Creek WWTP were again observed in 1997. Efforts to identify its cause and location have so far been unsuccessful. The 1997 data showed minor impacts (nutrients and sediment) from North Ridgeville's French Creek WWTP.

Fecal coliform bacteria contamination was also observed. This has been attributed to

(continued on page 7)

PRECISION FARMING: A NEW TECHNOLOGY TO BETTER MANAGE ONE CONTRIBUTING SOURCE OF NONPOINT SOURCE POLLUTION

Precision Farming (PF) is one of the newest technologies in the field of agriculture. PF provides farmers with the means to accurately measure soil fertility and place nutrients where they are needed. PF eliminates over-fertilizing, which contributes to unhealthy amounts of nutrients flowing into receiving streams. PF has the potential to reduce the cumulative effects of agricultural nonpoint source pollution in a stream. PF also gives farmers the technology to precisely measure crop yield distribution across fields.

With PF, crop fields are sampled in a 2½-acre grid to determine soil fertility. Sample location information is recorded by a global positioning system and stored in a computer database. With this information, farmers can return to a specific point and apply only those nutrients that are required. This allows a more efficient use of fertilizer dollars, while protecting water quality.

With a 319 grant from Ohio EPA, the Lorain County SWCD has been providing farmers with cost sharing as encouragement to try PF technologies in the Black River watershed. Thirty farmers from Ashland, Lorain and Medina Counties are participating in the program with over 7000 acres involved in the Black River watershed. Farmers use the services of local farm vendors to purchase computerized equipment, which samples the soil and then applies fertilizer based upon the level of nutrients found.

Seventeen farmers also received funding for GPS yield monitors under the grant. These were installed in field combines as a means to constantly monitor crop yield. This information is utilized to create maps that illustrate variable yield rates throughout the fields. In addition, five PF sites are being monitored for water quality over a three-year period with the assistance of John Carroll University. This will provide data that shows how much water quality can be improved using Precision Farming methods. ■

THE RESULTS OF PARTNERSHIPS - THE UPPER BLACK RIVER WATERSHED PROJECT: 319 Nonpoint Source Pollution Program

The Lorain and Medina County Soil & Water Conservation Districts teamed up with the Lorain County General Health District and Seventh Generation to collectively address the nutrient, bacteria and sediment loading in the Black River Watershed (East and West Branches) through the implementation of an integrated approach that addresses residential sewage systems and agricultural management practices in the watershed.

BLACK RIVER TO BENEFIT FROM NEW URBAN SEDIMENT CONTROL PROGRAM

The Lorain County Commissioners have accepted a grant from the Great Lakes Commission covering start up costs for a county urban sediment control program. This grant will be used to buy equipment needed to support the program. The Commissioners have agreed to establish the program in the offices of the Lorain County Soil and Water Conservation District using county funds and matching state funds available from the Ohio Department of Natural Resources.

The program would help reduce environmental damages caused by urban development by requiring developers to plan and implement best management practices to control sediment and stormwater runoff during construction. Implementation of a county wide urban sediment control program to help protect the Black River was a recommendation of the Black River RAP Coordinating Committee which identified degraded fish habitat and populations caused by high sediment rates as an important problem in the river.

The Lorain Soil & Water Conservation District plans to advertise for an urban sediment control specialist in late summer 2000 once the facilities of the Lorain SWCD have been enlarged to accommodate the additional staff. For more information contact Ron Twining at the Community Development Department. ■

agricultural runoff upstream of the WWTP and from the WWTP itself. During the low flow summer months, the effluent of the WWTP dominates the stream and proper disinfection of plant effluent is crucial. The trend is looking better for the fish population of French Creek, but this trend may soon be reversed by the loss of macro-invertebrate habitat caused by sedimentation and bank erosion resulting from uncontrolled suburban development, storm runoff, and the practice of building adjacent to river bank and disrupting the protection afforded by an intact riparian zone.

Black River Mainstem

The Black River mainstem has displayed some setbacks and some improvements. Sediments continue to show pollution from heavy metals, polychlorinated biphenols (PCBs), and the persistent polynuclear aromatic hydrocarbons (PAHs), but macro-invertebrate data displayed very good to exceptional characteristics except within the mixing zone below the Elyria WWTP discharge point. Fish communities have been showing consistent improvement since the 1970s and 1980s. The improvement continued in 1997 with an increased number of fish and improvements in the relative abundance of "better" species. Unfortunately, pollution intolerant species are still absent from the fish community in the mainstream of the Black River.

The greatest impact to the fish community is seen upstream of Elyria WWTP but downstream of the Elyria CSOs, showing that the CSOs remain a major problem. In 1997 the number of mainstem miles attaining Full or Partial WWH status declined to 8.6 miles from 11 miles in 1992. This is still an improvement over the zero miles attaining Full/Partial WWH status in 1982, but is a cause for concern. The primary reason for habitat non-attainment appears to be a lack of sufficient dissolved oxygen in the lower river. Heavy metals and PAHs in the sediment are seen as secondary reasons. The major cause for the oxygen depletion appears to be the interactions of several factors including:

- ★ the heavy sediment load from upstream,
- ★ ammonia from the WWTPs,
- ★ oils and greases from industry,
- ★ a persistent PAH-polluted sediment legacy,
- ★ Combined sewer overflows and sanitary system overflows, and
- ★ thermal pollutant levels not protective of habitat yet permissible under current permitting regulations.

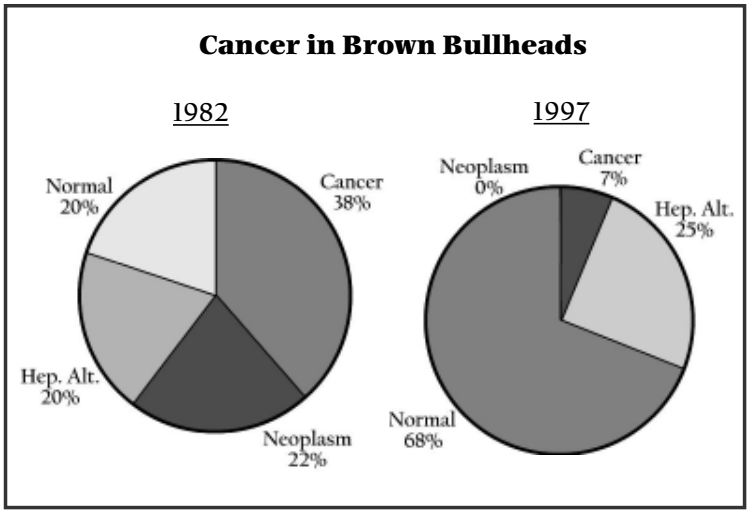
The problem is worsened by the reversal of river flow caused by proximity to Lake Erie (lake seiches and wind patterns). Development of a comprehensive model of the lower portion of the Black River that takes into account the variety of point source discharges affecting this region will be necessary to fully understand the problem. Following the RAP motto of "Our River, Our Responsibility," Black River RAP members are actively pursuing this objective.

To summarize, we are continuing to see improvements in many portions of the Black River, but continuing problems persist and more work needs to be done especially in the control of nonpoint sources of pollution to protect the river's future. Ohio EPA's 1997 survey, "Biological and Water Quality Study of the Black River Basin" (March 31, 1999) can be accessed on the agency's web site http://chagrin.epa.state.oh.us/documents/black97.html ■

THE BROWN BULLHEAD MAKES A COMEBACK

Brown bullheads are living longer and with less evidence of tumors and cancers than previously reported. A recently released report by Dr. Paul Baumann of Ohio State University and the USGS Field Research Station outlines three years of research and confirms that the brown bullhead (*Ameiurus nebulosus*) continues to make a comeback in the Black River. As a result, the existing fish advisory and a primary contact advisory are under review by the Ohio Department of Health.

In 1982, Dr. Baumann documented a high incidence of liver and external tumors, including cancers in the native brown bullhead. These were correlated to the presence of sediments contaminated with high concentrations of polynuclear aromatic hydrocarbons (PAHs) in the Black River. PAH concentrations of hundreds of parts per million were found in some sediment samples. The age of the resident fish population appeared to be drastically reduced with few



Lorain Port Authority's Grove Site Project

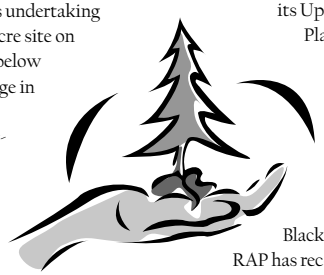
expanded to include the areas below and above existing bluffs, including a 100 feet wide buffer distance above the bluffs. RAP recommendations also included the utilization of bioengineering techniques in the design and construction of the project's "drainway" management system; that urban sediment, runoff an construction site control measures be stressed throughout the planning and development process; and that public access to the river be developed in a manner that minimizes or eliminates any and all impacts to wildlife habitat.

Members of the Black River RAP are encouraged by the responsiveness of project managers to address the concerns raised. However, it is important to continue to pursue protection of the riparian zone as other redevelopments adjacent to the Black River emerge as part of the revitalization of the older urban centers in the Cities of Lorain and Elyria. The community should seek assurances from developers that future river edge developments incorporate measures to protect the Black River's riparian zone. ■

BLACK RAP SEEKS RIPARIAN AREA PROTECTION FOR LORAIN CITY RIVER DEVELOPMENTS

The Black River RAP has identified protection of the Black River's riparian area as a critical strategy for preserving and restoring fish populations and other aquatic life in the Black River. Riparian areas act as a buffer between land and water, and use vegetation as a filter to minimize and slow the impacts associated with runoff. Two community development proposals in the City of Lorain directly adjacent to the Black River provide an excellent opportunity to maintain riparian zone and wetland characteristics in some of the most impact portions of the lower Black River.

The Lorain Port Authority is undertaking the development of a 30 plus acre site on the west bank of the river just below the Charles Berry Bascule Bridge in downtown Lorain. This development includes an inter-modal transportation hub and community plaza, which will serve as a focal point connecting waterfront and downtown development. The Black River RAP has recommended that special protection be afforded to the river bank to protect the present natural shore. The RAP has recommended that the development forego 1000 linear feet of sheet piling to reinforce the river bank since it will adversely impact aquatic life along this section of the river. Other recommendations call for the re-establishment of a riparian zone on the river edge of this property and the use of bioengineering techniques and indigenous plant life.

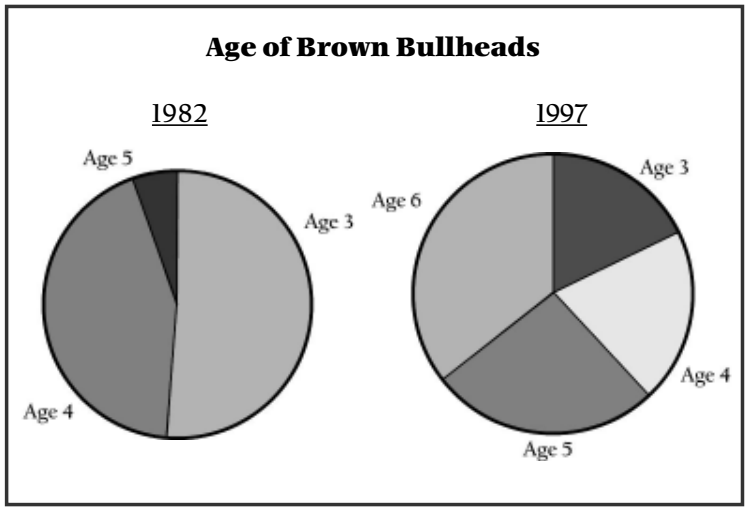


A second project involves the purchase and redevelopment of a 400-acre site on the east bank of the river south of Colorado Avenue and east of Henderson Road. The City of Lorain has proposed the redevelopment of this site for light industrial and recreational uses in its Upper Black River Master Plan. Approximately 11,000 feet of the west bank of the river will be affected by this development which includes some of the last remaining natural shore line in the lower Black River. The Black River RAP has recommended that the City of Lorain strive to maintain all existing wetlands and take steps to protect and enhance the riparian corridor throughout the entire length of this site. The RAP has also recommended that the riparian corridor be

fish surviving past the age of four and none past the age of five. A fish advisory and a primary contact advisory were issued for the river in the 1980s and have remained in place ever since.

Dr. Baumann surveyed brown bullhead fish populations in the Black River in 1987, in the early 1990s and again in 1997. These were done to reevaluate the contaminant levels in sediment and the health of the fish population after the closing of the USX coking plant and a court ordered dredging nearby and downstream from the closed facility had been implemented. Results show a dramatic decline in the incidence of tumors and other abnormalities and a significant increase in the age of the brown bullhead population in the Black River in the fifteen years since Dr. Baumann initiated his research. In 1982 only 20 per cent of fish surveyed were normal, without cancers or other abnormalities. By 1997 the number of normal fish jumped to 85 per cent of the population surveyed. Similarly in 1982 only 6 six percent of the fish survived to age five. By 1997 the percentage of fish surviving to age five or older had jumped to 62%. These results demonstrate what can be achieved with well-designed environmental remediation programs.

Dr. Baumann's report, *Health of Bullhead in an Urban Fishery After Remedial Dredging*, will soon be available at: **http://www.epa.gov/glnpo/sediments.html**. ■



BIOENGINEERING PRACTICES PROTECT AND RESTORE BLACK RIVER STREAMBANKS

Several bioengineering practices have been installed for research and bank stabilization in the upper Black River. These include evergreen revetments, log vanes, tree kickers and brush layers with fast rooted cuttings that serve to stabilize eroding streambanks. This program was made possible because the Lorain County Soil & Water Conservation District (SWCD) received a $15,000 grant from the Great Lakes Commission to introduce bioengineering practices to riparian landowners.

Willow Creek, in Eaton Township, benefited from the use of bioengineering practices. The creek was eroding pastureland and part of a newly-installed fence along the stream. Three log vanes were installed to redirect the energy and stream-forming flow back into the existing riverbed. Fourteen to eighteen feet Christmas trees were installed for toe protection and to trap sediment. The banks of the creek were also graded, seeded, mulched and netted.

1. ***Bioengineering Practices*** The design and implementation of stream restoration techniques to enable a stream corridor to recover dynamic equilibrium and function at a self-sustaining level. These techniques include use of natural vegetative materials to stabilize stream banks.
2. ***Evergreen Revetment*** are cut cedars, firs or Christmas trees that are anchored into an eroded streambank to absorb stream energy and trapping sediment.
3. ***Log Vanes*** are short dike structures that project from a stream bank into a stream channel. They redirect stream flow away from an eroding bank and are always oriented upstream.
4. ***Tree Kickers*** are hardwood logs anchored to the bank at an angle, which direct the stream flow away from the erosion point and back toward the center of the stream.
5. ***Brush layering*** is a bioengineering technique that uses fast rooted cuttings (willows and red osier dogwoods) to stabilize eroding streambanks. Fast rooted cuttings are used because they establish a dense matrix of roots throughout the year. The cuttings are placed in buried trenches along the slope of an eroding streambank.
6. ***Netted - erosion control netting*** uses plastic netting that is designed to hold mulch in place for better turf results.

Another project was implemented in the West Branch of the Black River in Carlisle Township. This also involved the application of bioengineering techniques to stabilize an eroding streambank. Thirty-nine large Christmas trees were installed for toe protection and to trap sediment. Lorain County SWCD staff cut into the bank and installed a two hundred foot long by three to three and a half foot deep bench. Willow and Red Osier Dogwood tree cuttings were placed into the bench and covered with topsoil. Two tree kickers were installed and the site was also graded seeded, mulched and netted.

The Lorain County SWCD also completed a *Streambank Guide for Homeowners* with the grant funds. This guidebook is available to homeowners, who want to learn more about how to protect streambanks from eroding by using bioengineering techniques.

Two urban stream specialists have been assigned to assist home owners and the community in the Black River watershed and adjoining rivers. These positions were funded and supported by the Ohio Department of Natural Resources as a means of organizing projects aimed at improving, restoring, and protecting portions of river systems. One specialist has been assigned to the Lorain County SWCD and one to the Medina County SWCD, who filled its position in 2000.

The Lorain County SWCD has also established a Technical Advisory Committee (TAC) to discuss and plan for educational opportunities, community outreach and identification of possible demonstration projects in the watershed.

The Lorain County SWCD publishes *Streamlines* to create awareness and identify volunteer activities in stream monitoring, riparian workshops, stream clean-ups, conservation easements, and continuing to protect water quality. The most recent edition of *Streamlines* can be obtained by contacting the SWCD. ■