

CHAPTER FIVE ACTIONS TO ATTAIN GOALS

I. Actions in Progress

A number of actions are currently underway in the Area of Concern that could lead to restoring and maintaining the beneficial uses. Through multi-stakeholder involvement, industry, regulatory agencies, not-for-profit groups and citizens work together to identify critical issues to reach the ultimate goal of delisting the impaired beneficial uses. Some voluntary actions are initiated by Remedial Action Plan subgroups or through Remedial Action Plan processes while others are initiated through other mechanisms but still support Remedial Action Plan goals. In addition to voluntary actions, federal, state and local agencies may initiate actions or institute procedures pursuant to regulations that support the Remedial Action Plan goals. Finally, administrative orders, agreed orders, or consent decrees also support Remedial Action Plan goals. Although often unilateral, these administrative or civil actions may be accomplished with multi-stakeholder involvement.

A. Voluntary Actions Initiated Through the Remedial Action Plan

1. The Cooperative Partnership Effort

A program for multi-stakeholder involvement in the Remedial Action Plan is an evolving cooperative effort to cleanup and restore the Grand Calumet River (the Partnership). The community recognizes that, given the immensity of the sediment contamination problem, the limited resources for cleanup and restoration may be applied more effectively by a community-based, consensus-driven, public/private partnership. This partnership will promote clean up and restoration of segments of the Grand Calumet River and Indiana Harbor Ship Canal. The mission of the Partnership is to:

- Balance the goals and objectives of the participants.
- Provide a forum for coordinated planning and implementation.
- Provide a communication network that links individual efforts.

This partnership was proposed through the auspices of CARE. The Partnership was proposed to avoid fragmentation by enabling industry, municipalities, citizen groups, educational institutions, and state and federal agencies to work cooperatively with pooled resources. Partners may contribute funds or resources for design, dredging, disposal, restoration, sampling, and administration. Similarly, partners may contribute land for disposal and habitat restoration. Working cooperatively, the partners will plan and carry out sediment cleanup and restoration projects. The eventual success of the partnership approach will be determined by the partners' commitment to its effectiveness and by their continued commitment to environmental

compliance.

The Partnership is a forum where participants can update each other monthly on progress of area initiatives. Through these updates, parties will accomplish the Partnership mission. The CARE Committee distinguishes itself from the Partnership in that it is a public advisory group whose current role is to work with IDEM to restore beneficial use impairments.

2. *Sediment Cleanup Restoration Alternatives Project (SCRAP)*

In the summer of 1995 members of the Sediments Committee and the Compliance/Enforcement Committee met to discuss the objectives of the Northwest Indiana Environmental Initiative Action Plan. In this plan, IDEM and the U.S. EPA committed "to continue the development of individual strategies targeting specific pollutants and broad strategies bringing together responsible parties to address key geographic areas." (Northwest Indiana Action Plan, 1995). Given the potential for several sediment remediation projects on the Grand Calumet River and Indiana Harbor Ship Canal and the uncoordinated implementation of consent decrees, both agencies recognized the need for a basin wide planning document. It was agreed that this document would identify:

- total volume of contaminated sediments,
- ecological risk associated with those contaminants,
- impacts dredging activities might have on the hydrography of the basin,
- remediation alternatives for each reach of the river and the impacts each alternative will have on restoring the beneficial uses,
- cost and feasibility of each alternative,
- project sequencing, and
- disposal options.

This analysis has been designated as the Sediment Cleanup and Restoration Alternatives Project. (See Figure vii, Flow Chart of the Sediment Cleanup and Restoration Alternatives Project Process, next page). Under the Water Resources Development Act, the U.S. Army Corps of Engineers may contract with the state to perform this work. Every dollar IDEM spends on the project (up to a certain cap) will be matched by U.S. Army Corps of Engineers planning and technical assistance dollars.

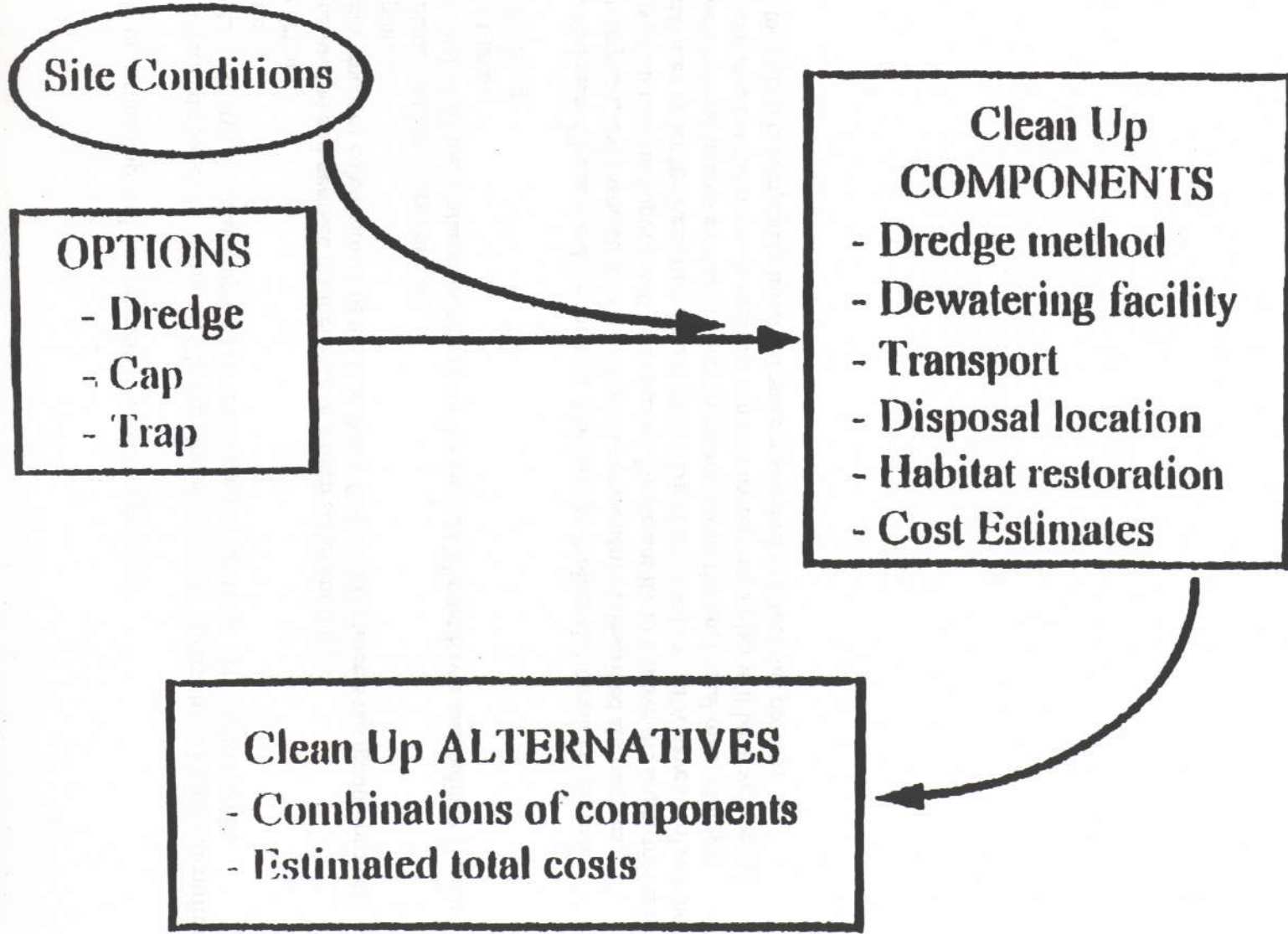
IDEM and the U.S. Army Corps of Engineers have provided funding and technical and planning assistance totaling \$1 million in developing the Sediment Cleanup and Restoration Alternatives Project. The U.S. EPA has committed more than \$208,000 to develop a Geographic Information System in support of this project. The remedial and restoration alternatives presented in the Sediment Cleanup and Restoration Alternatives Project will serve as guidance for the participants in the Sediment Remediation Partnership effort. Implementation of remedial activities in the Grand Calumet River and Indiana Harbor Ship Canal will be coordinated with the Sediment Cleanup and Restoration Alternatives Project. Remediation conducted through

enforcement or partnership will be compatible with this approach.

As described above, the Sediment Cleanup and Restoration Alternatives Project identifies and evaluates a variety of remedial options for each reach of the river. The options to be evaluated are:

- no action
- construction and periodic maintenance of a deep sediment trap;
- enlargement or enhancement of the U.S. Army Corps of Engineers navigation project;
- capping;
- contaminant hot spots removal;
- removal of all contaminated sediment on the Grand Calumet River and Indiana Harbor Ship Canal;
- or dredging.

The Sediment Cleanup and Restoration Alternatives Project also considers project sequencing, impacts, and associated costs with each component of described alternatives. Additionally, each remedial option will be evaluated for the ability to remove the impairments to the beneficial uses under the Remedial Action Plan. IDEM and the U.S. EPA have involved the CARE Committee and interested stakeholders in the review of the analytical methodology applied to each reach of the river. A separate community relations plan will be developed to ensure that the public is adequately informed and empowered to affect this process.



Flowchart Figure 3: The Sediment Cleanup and Restoration Alternatives Project

3. *The Native Revegetation of Steel Slag Project*

IDEM created this effort in cooperation with the U.S. Department of Agriculture and National Resource Conservation Service's District Conservationist. The City of Hammond is administering this funded project to develop a replicable, inexpensive procedure that can be pursued by land managers to revegetate the 16,000 acres of steel slag till sites in the Calumet Region. The participants in this project include the Morton Arboretum, the U.S. Department of Agriculture Plant Materials Center, the Friends of Gibson Woods, and The Nature Conservancy. The Land Remediation Committee is working with Lake County on the Bairstow Property and Industrial Fuels and Asphalt Superfund site.

4. *The Remedial Action Plan Geographic Information System (GIS) System*

The Remedial Action Plan GIS has been developed in this stage to be used to collect current and historic data, to review this data for gaps and quality, and to provide direction to the CARE Committee, and various Remedial Action Plan teams, as partners on the course to fill these gaps. Once a comprehensive compilation of data coverages is established, the Remedial Action Plan GIS tools will be used extensively in the implementation of the Stage III portion of the Remedial Action Plan, as well as continuing to track Stage II activities. This tracking will provide for information to the CARE Committee and the Remedial Action Plan Coordinating Committee for updates to the Stage II documents, as needed. For more information on the Remedial Action Plan GIS, see Chapter 8.

B. Additional Voluntary Actions Supporting Remedial Action Plan Goals

1. *The Grand Calumet River/Indiana Harbor Ship Canal Corridor Vision and Planning Project*

The goal of this project is: to plan for the revitalization and restoration of the Grand Calumet River and Indiana Harbor Ship Canal Corridor of Northwest Indiana and to promote an effective balance of community and economic development, commercial and industrial uses, recreational opportunities, historical and cultural preservation, nature conservation, water quality improvement, and environmental education, through a partnership visioning and funding process. The Project is an eighteen to twenty-four month consensus building planning initiative capitalizing on the momentum of ongoing multi-stakeholder efforts. The community-based collaborative process to be used will identify the future vision for the corridor including land uses along the river and ship canal and linkages to adjoining neighborhoods. Together the project will strive to create a sustainable urban ecosystem that improves the quality of life while maintaining the unique social, cultural, and natural resources of the region. This Project will mimic other local and regional efforts where community organizations, residents, government agencies, and private companies have worked together to seek solutions to local problems. At the end of the planning period, a vision concept plan with an action agenda for implementation will be created.

The Grand Cal Task formed the Corridor Vision Project Steering Committee with representatives from public interest groups, industry, city planning departments, and various government agencies. Over the past year, the Steering Committee has met to conceptualize a process that will respond to the needs of its diverse participants. The Steering Committee will continue to lead and have decision-making authority for the project. The Grand Cal Task Force, a nonprofit, tax-exempt organization, serves as the fiscal agent for the Project and chairs the Steering Committee. Representatives of the following groups, corporations and agencies are members of the Steering Committee:

- Cities of East Chicago, Gary and Hammond
- AMOCO
- DuPont
- Inland Steel
- NIPSCO
- U.S. Steel Gary Works
- EPA, Great Lakes Program Office
- Indiana Department of Environmental Management
- Indiana Department of Natural Resources
- Lake County Parks and Recreation Department
- Northwest Indiana Regional Planning Commission
- USDA, Natural Resource Conservation Service
- Illinois/Indiana Sea Grant
- Calumet Ecological Park Association
- Grand Calumet Task Force
- The Nature Conservancy
- Save the Dunes Council
- The National Park Service

The Steering Committee has determined that the corridor boundary will be established through community participation. For initial planning purposes the Lake Shore of Gary and East Chicago is the northern boundary, the Lake County line forms the east and west boundaries, and the Little Calumet River is the southern boundary. The boundary will be refined through the public consensus building process.

2. *Public Outreach and Education*

Community involvement serves many functions. It provides opportunities to educate the public about the Remedial Action Plan and solicit public comment for the document. Multiple educational programs encourage members of the public and regulated community to view the various sources of pollution and use impairments resulting from these pollutants as part of one ecosystem or watershed. IDEM, the Conservation Technology Information Center and the Indiana University School of Public and Environmental Affairs respectively coordinate the Coordinated Resource Management Process, Know Your Watershed Campaign, and the

Volunteer Monitoring Program. Consideration of all sources of pollutants as part of one integrated system represents a change from the traditional approach of regarding each stream as a separate entity. Projects must contain a public outreach component and partners seek other organizational partners within the watershed(s) to form watershed partnerships. Workshops and conferences on best management practices and their effectiveness and design criteria, prevention programs, innovative practices, funding opportunities, and local implementation programs are encouraged.

Some smaller scale activities in the Area of Concern through existing projects sponsored by state and local entities include:

- publication of new releases and newsletters,
- development of maps,
- organization of tours of the area and public meetings for project comment and analysis,
- reviewing of alternatives based on public concern,
- coordination efforts among project partners,
- completion and distribution of plans to interested parties,
- implementation of the plans as proposed in each project, and
- participation of individuals in the volunteer monitoring program.

Other activities include the placement of signs indicating Remedial Action Plan project sites and participation in Grand Calumet River Days, a week of river based activities designed to increase public awareness of and concern for the river. Ongoing efforts such as public meetings on the U.S. Steel dredging project, an annual canoe trip and other activities continue to increase public awareness of the area's environmental problems, and to improve the image of the Area of Concern.

The Grand Calumet Task Force sponsors several annual events to involve and educate the public on river restoration and water pollution issues. A canoe trip on the Grand Calumet River has become a popular event with as many as seventy canoes making the seven mile trip from Gary to East Chicago. Several river side clean ups, natural area hikes, the Great Lakes Beach Sweep, and an Adopt-A-River program are sponsored in river communities, usually in conjunction with other organizations and agencies.

The broad scope of the Remedial Action Plan makes it imperative that proponents of the plan take advantage of all these approaches to inform people about the potential changes in store for the river and the surrounding area and to receive input from all facets of the community about how these changes should be accomplished. As the plan reaches the implementation stage, different phases of implementation will be vital to its success. Individuals who wish to become involved in the Remedial Action Plan process on a more regular basis should be given the opportunity to do so. In some cases, this might require providing technical assistance or funding to significantly impacted groups in Northwest Indiana. This funding may promote a feeling of ownership of the Remedial Action Plan.

Simply getting on agendas or holding special meetings to explain the Remedial Action Plan will not be enough to get the broad public support necessary to implement the Remedial Action Plan successfully. The Remedial Action Plan process must include a commitment to create the management structure needed to inform people about the issues they care about, to respond to their concerns, and to enlist their support in finding solutions.

3. *Citizen Advisory Groups*

Some businesses in the Area of Concern have also developed mechanisms to solicit public input. For example, Amoco formed a Citizen's Advisory Committee in a voluntary effort to create a dialogue with the community. The committee was first formed in 1991 to address underground oil issues but has since been expanded to include all environmental issues at the refinery. Members include representatives from local neighborhoods, local businesses, community leaders, IDEM, refinery union members and refinery management. The public is encouraged to attend the quarterly meetings and ask Amoco staff members questions after the meeting. This effort has improved communications between the community and Amoco, and has provided Amoco direction on numerous community issues.

4. *The Southern Lake Michigan Conservation Initiative*

The Nature Conservancy (TNC) runs this program to recruit and train volunteer stewards to restore the natural areas in the Calumet Region, including the area of concern. The Lake County staff person is Paul Labus, who Co-chairs the CARE Habitat Subcommittee. Area of Concern residents are now participating as stewards at Area of Concern sites. The sites include: Gibson Woods Nature Preserve, Clark & Pine Nature Preserve, DuPont's Natural Area, and AMOCO's Lost Marsh. At the current rate, volunteers are estimated to have contributed about 3,000 hours of habitat restoration work during 1995 in the Area of Concern.

5. *The Ivanhoe Nature Preserve Restoration*

This preserve is owned by The Nature Conservancy and is surrounded by a residential community in West Gary. Restoration is proceeding with local volunteers and three part-time workers hired by The Nature Conservancy from the local community.

6. *The Clark & Pine Nature Preserve, Eastern Addition Restoration*

The original Clark & Pine (C&P) Nature Preserve tract is 47 acres on the west side of Clark Road and contains the highest number of rare plants per acre in Indiana. A 253 acre addition was acquired by the state in the negotiated amendment to the MIDCO Superfund consent decree. The C&P Addition is frequently called the Bongi property. The C&P addition is being restored with stewards under the guidance of IDNR Division of Nature Preserves and the Natural Resource Trustees (IDEM, IDNR, and U.S. FWS), who are legally responsible for developing a restoration plan.

7. *The Lost Marsh Restoration*

AMOCO employees are leading the effort to restore this ten acre marsh south of George Lake. Remedial Action Plan participants include the United Citizens Association and the Friends of Gibson Woods.

8. *Interagency Technical Task Force on E. coli*

Representatives from IDEM and IDNR decided that the current efforts and experiences should be collaborated to address this problem. Members of these agencies brought together a group of technical experts from local, state, and federal agencies to address beach closures, an impaired beneficial use identified by the International Joint Commission. The resulting group of individuals, the Interagency Task Force on *E. coli* (Task Force), is currently working to solve Northwest Indiana's bacteria-induced beach closure problem.

The vision of the Task force is to take a comprehensive approach to the problem of beach closures. This will include consistent methods of data collection for the development of a real-time forecasting system, identification of the sources and fate of the bacteria, and a systemic program of remediation. These measures are necessary to ensure the safety, public health and economic vitality of the recreational use of the Lake Michigan shoreline.

Common Goals of the Task Force are:

- Prepare a scope of work which sets forth objectives and outlines a technical strategy to comprehensively eliminate bacteria induced beach closings.
- Define and prioritize the actions consistent with the scope of work that are needed to be accomplished in order to eliminate bacteria induced beach closings.
- Educate local officials and the general public about the efforts of the technical task force to eliminate the problem.
- Invite broad public participation in the development of a strategy to assure a healthy beach environment and for active participation in the solutions to beach closings.
- Pursue funding opportunities through active partnerships among the participants and through support for individual efforts, which are in harmony with the implementation of the actions outlined in the scope of work.
- Maintain a forum that provides the opportunity for continued communication and exchange of information between cooperating agencies and interested citizens.

The Task Force also plans to support a variety of projects in the Lake Michigan Basin. Through

the establishment of minimum standards, the group will provide guidance to these projects.

9. *Indianapolis Boulevard Sewer Project*

The storm sewer replacement and roadway infrastructure upgrade of Indianapolis Boulevard is an example of cooperation between Indiana Department of Transportation, IDEM, and Amoco. Amoco worked with Indiana Department of Transportation and IDEM to handle ground water and soils from the project. Temporary wellpoint systems were installed by Amoco to lower ground water levels so that the storm sewer could be installed. The removed ground water was treated through the Amoco wastewater treatment plant. Soils were stored on site by Amoco until they could be hauled to a landfill for disposal.

10. *Amoco Bank Cleaning and Stabilization Project*

Amoco Petroleum has obtained a Section 401 Water Quality Certification to "clean and stabilize" 670 lineal feet of a drainage ditch connecting Lake George to the Lake George Canal. The ditch is in the northeast section of the intersection of US 912 and Calumet Avenue. The first phase of the project involved installing a french drain and sheet piling barrier near the same drainage ditch. The second phase involves the removal of oil contaminated soil from the ditch banks, reconfiguration of the ditch, the placement of an impermeable barrier on the east bank of the ditch, and overlay of the impermeable barrier with riprap.

11. *Coordinated Resource Management Process*

Through IDEM's Nonpoint Source Program, assistance has also been provided to watershed restoration and other interest groups in the utilization of the Coordinated Resource Management (CRM) process. CRM is a tool for local land users, managers, and other concerned parties for cooperative development of management plans that reflect the needs and desires of the citizens in the use of the many resources within a watershed. The CRM process should continue to be used to develop watershed management plans in the Area of Concern. Partnerships that form through the process can use The Natural Resources Planning Guide for Indiana, to assist them in the development of the management plans.

12. *Great Lakes Watershed Initiative*

In conjunction with The Conservation Fund, the Great Lakes Council of Governors announced a Great Lakes Watershed Initiative in all of the Great Lakes states. Each state is sponsoring a nonpoint source pollution control project. Indiana's project will be located in Northwest Indiana, and sponsored locally by the Northwest Indiana Pollution Reduction Work Group working in conjunction with the IDEM. The work elements will be initiated and completed by Purdue University.

The project will initially monitor nonpoint source pollution from a highway segment

which discharges directly to the Grand Calumet River, and evaluate BMPs for control of this discharge. An implementation of a pilot-scale demonstration BMP will follow, with results of this demonstration to be monitored. According to available statistics, highways account for 2.3 percent of the land area within the watershed, but they may contribute over nine percent of the total suspended solids to waterways.

The Great Lakes Watershed Initiative is the outgrowth of recommendations made by the National Forum on Nonpoint Source Pollution. It was convened in 1994 by The Conservation Fund and the National Geographic Society and co-chaired by Governor Engler of Michigan. The forum brought together Fortune 500 corporations, national environmental organizations, and governmental groups seeking to formulate nonregulatory solutions to nonpoint source pollution based on economic incentives, voluntary initiatives, and education.

Environmental Issues of Concern

- Removal of contaminated sediments alone will not restore the impaired beneficial uses. In fact, it will temporarily destroy habitat used by a limited number of species. This temporary destruction of habitat may be preferable to the existing risk of injury to organisms that use the river. Proper source control is necessary to avoid re-contamination that might jeopardize the environmental improvements achieved by sediment remediation activities.
- Although environmental benefits will result from the U.S. Army Corps of Engineers project in the Indiana Harbor Ship Canal, it was not designed to be solely an environmental remedy. The U.S. Army Corps of Engineers is concerned with restoring navigation to this waterway. Unless private sponsors are found, substantial amounts of contaminated sediment will remain in the canal outside the navigation channel.
- Large portions of the Area of Concern were once wetlands. These areas have been filled by slag, fill material, sediment, and other solid wastes. The contamination caused by these materials has not yet been determined although the potential certainly exists. If these "sources" of contamination are not evaluated and controlled then other source control and remediation efforts may be ineffective.

13. *Sediment Transport Model*

The U.S. Army Corps of Engineers is developing a sediment transport model to estimate loadings to the water column during dredging. The estimates of sediment transport will be used as inputs to the GIS in preparation of Total Maximum Daily Load modeling. For a complete discussion of the implications of this project on the Area of Concern, please see the Sediment Clean-up and Restoration and Alternatives Project, 1997, by the U.S. Army Corps of Engineers.

14. *Dredged Sediments Disposal*

Many dredging activities to remove deposited sediments from major waterways are currently under way in Northwest Indiana. Many of these sediments are heavily contaminated and require the waste characterization and proper disposal of large volumes of material. The U.S. EPA and IDEM under the Northwest Indiana Action Plan have an agreement to coordinate all these efforts and to facilitate future actions to cleanup other areas of these waterways.

15. *Memorandum of Cooperation (MOC)*

U.S. EPA, IDEM, and five companies who own property along the Grand Calumet River and the Indiana Harbor Canal negotiated, in August 1994, a Memorandum of Cooperation, known as the Grand Calumet Cooperative Project. This project aims to identify, contain, and/or clean up free phase hydrocarbons, or simply, remove oil that is floating on the ground water. The companies who signed are: Amoco Corp., Mobil Oil Co., Northern Indiana Public Service Co. (NIPSCO), Phillips Pipe Line Co., and Safety-Kleen Corp.

The Memorandum of Cooperation outlines voluntary actions the companies will take to identify the presence of and to prevent the movement of oil floating on top of ground water. It is a voluntary effort to stem the migration of this oil to the Lake George Branch of the Indiana Harbor and Ship Canal and, ultimately, into Lake Michigan. The companies will install a barrier and/or collection system along the canal if they find the oil migrating toward the canal.

This cooperative endeavor is precedent setting. The U.S. EPA and IDEM are working together with industry, in a voluntary association to improve the environment without use of the traditional "command and control" regulatory approach. While enforcement actions are still possible for violations of the law, the two agencies consider current voluntary efforts as a better way of cleaning up the environment. U.S. EPA, IDEM and the companies began discussion on this approach in 1992.

The project used two steps. 1) A neutral mediator met with the property owners and determined their key concerns. The City of East Chicago also participates in these meetings as an interested outside party. 2) The agencies and the companies then met and, using the neutral mediator, developed the actions and schedule for the activities identified in the Memorandum of Cooperation. The companies agreed to the following: 1) The neutral mediator will continue to facilitate communications among all parties and will review all relevant reports to insure the technical criteria are met. 2) The companies will measure fluid levels and gather other information to determine if oil is migrating from ground water on their property to surface water in the area. 3) The companies will install a barrier, or a barrier collection system if one is not already in place, should the installation of such a system become necessary. The system is monitored for effectiveness in preventing the migration of oil.

16. *Lake Michigan Air Directors Consortium*

Indiana has been active in the Lake Michigan Air Directors Consortium (LADCO) which was formed to address the severe ozone pollution in the Chicago-Milwaukee-Northwest Indiana region. LADCO also includes Illinois, Wisconsin, and Michigan. Recognizing ozone as a regional problem, this consortium has worked together to study ozone formation and look for regional approaches to reducing ozone. In the summers of 1990 and 1991, a comprehensive monitoring and modeling study, known as the Lake Michigan Ozone Study, (LMOS), was undertaken by LADCO to develop a better understanding of the relationship between precursor emissions and ambient ozone concentrations. The LMOS was also designed to develop a photochemical model that could be used to predict ozone concentrations under varying meteorological conditions and under various control scenarios. LADCO is currently evaluating the recommendations of the Ozone Transport Assessment Group, discussed later in this chapter. In addition, modeling efforts continue to evaluate regional transport of ozone and its precursors.

17. *Ride sharing*

The Clean Air Act also required states to develop rules requiring employers with 100 or more persons to implement programs to reduce work related vehicle trips and miles traveled by employees. The Indiana Air Pollution Control Board adopted an Employee Commute Options (ECO) rule in 1993 to establish these requirements. IDEM began initial outreach on the rule to help affected companies in Northwest Indiana become familiar with the rule's requirements. Because of the many concerns with the ECO requirements including the administrative burden, lack of viable alternatives, and the questionable ability of employers to change employee commuting habits, Congress relaxed these provisions of the Clean Air Act making ECO voluntary instead of mandatory.

IDEM works with the Northwestern Indiana Regional Planning Commission (NIRPC), the Indiana Department of Transportation and other interested partners in the development and implementation of measures to reduce transportation-related emissions. NIRPC is responsible for ensuring that transportation plans, programs, and projects that are federally funded or approved conform with state and federal air quality planning provisions. Conformity determinations are required in Lake County because it is a non attainment area for ozone.

18. *Clean Cities Program*

While not solely transportation-related, another approach being considered in Northwest Indiana is the Clean Cities Program. This program, which is voluntary and is coordinated by the United States Department of Energy (U.S. DOE), uses a "grass roots" approach to developing an alternative fuels market in an effort to reduce reliance on imported oil and to improve air quality, and in general raise public awareness of alternative fuels. In this program, local government and industry work together to develop and implement flexible market based solutions to meet the program's objectives. NIRPC has indicated interest in possibly becoming a partner in this

program in Northwest Indiana.

19. *Ozone Action Days*

While continuing with the more traditional regulatory approach, Indiana has also focused resources recently on a voluntary ozone reduction program that emphasizes public awareness and individual responsibility for high-emitting activities. During the Summer of 1995, Indiana, along with Illinois, Michigan, and Wisconsin implemented the Ozone Action Day program in the Chicago-Milwaukee-Northwest Indiana Region. The intent of this program is to forecast a day in advance when meteorological conditions will be conducive to high ozone formation and encourage the public, through various types of outreach activities, to refrain from activities that may contribute to ozone formation. To spread the word about Ozone Action Days, Indiana and Illinois have formed the Partners for Clean Air, a cooperative partnership of the states, the American Lung Association, industry, and other groups. The partners agree to proactively reduce activities that contribute to ozone formation whenever an Ozone Action Day is forecast. The program, which started in Lake and Porter Counties, has been very positively received and now includes LaPorte County.

As of January 16, 1997, Indiana has 63 Partners in Lake, Porter, and LaPorte Counties. They include business and industry, state and local government, environmental groups, hospitals and health associations, educational institutions, and transportation organizations. During the summer of 1996, six Ozone Action Days were declared with seven days when ozone levels exceeded the standard of 120 ppb. However, only one exceedence was within the Area of Concern. Some creative approaches used by Indiana Partners to spread the word included: flying banners with the Partners logo at all factory exits, posting Ozone Action Day notifications and a list of "Top Ten Tips" for reducing ozone on a company's electronic bulletin board, sending out information on ozone in customer bills, and providing a bike rack in order to encourage employees to ride bicycles to work on Ozone Action Days. In 1996, Gary Public Transportation and Hammond Transit System received a federal grant to begin offering free bus rides on Ozone Action Days.

20. *Ozone Transport Assessment Group (OTAG)*

In an unprecedented cooperative effort to control ozone, the 37 states east of the Rocky Mountains have formed a partnership with U.S. EPA, known as the Ozone Transportation Assessment Group. OTAG's mission is to undertake a "supra regional" modeling study of the entire eastern region of the country and develop control strategies on a much broader scale than the current non attainment area approach contemplates. States that do not have any nonattainment areas, or only marginal non attainment areas are included in OTAG. National measures such as clean cars are being considered in addition to more geographically specific measures.

One of the most significant developments in the area of ozone control occurred during

1995 with the formation of the Ozone Transport Assessment Group (OTAG). It has been recognized for some time that ozone is a regional air quality issue, not confined within the boundaries of an individual state or even a single interstate region. In the 1990 Clean Air Act Amendments, Congress authorized the establishment of "Ozone Transport Regions" for interstate ozone problems and required the creation of the Ozone Transport Commission for the northeast United States. The Lake Michigan Air Directors Consortium (LADCO), though not formally created as an Ozone Transport Region under the Act, functions in the same way: states working together to study and address a shared ozone non attainment problem.

As LADCO has done, the Ozone Transport Commission and other areas of the eastern United States have developed their air quality models and other tools necessary to identify a menu of control measures that will bring their areas into attainment with the ozone standard, it has become clear that contributions of ozone and ozone precursors from areas outside the designated nonattainment areas contribute significantly to high ozone in the nonattainment areas. Modeling completed by LADCO demonstrates that the levels of ozone coming into the non attainment area are already so high that drastic, unrealistic control measures would need to be implemented in the nonattainment area itself (for example, a 90 percent reduction in NO_x) in order to reach the standard.

Indiana is fully engaged in the OTAG process and, through LADCO, is taking a leadership role in the technical work and policy decisions necessary to move this project forward. U.S. EPA has formally recognized the OTAG project and has asked states with non attainment areas to commit to participating in the project prior to developing their ozone attainment demonstrations.

The OTAG process was completed in June 1997 with consensus reached on a variety of control strategies to be recommended to U.S. EPA. The following recommendations were made:

- Utility NO_x controls;
- Additional monitoring and air quality analysis;
- Non-utility point source analysis;
- National measures, such as additional engine standards;
- Vehicle Emission Inspection and Maintenance Controls;
- Use of Federal Reformulated Gasoline;
- Consideration of diesel fuel standards;
- Voluntary ozone programs;
- Market-based trading approaches for NO_x.

Several of the recommended measures are already in place within the Area of Concern, including enhanced vehicle inspection and maintenance, reformulated gasoline, and a voluntary ozone program.

21. *Atmospheric Deposition*

The USGS will have utilized approximately \$422,000 by 1998 to establish and conduct a program in the Grand Calumet River Basin to appraise the water quality impacts of atmospheric deposition, including toxic inorganic and organic compounds. The first study began in 1992 and was the first precipitation data collected in this watershed.

The final report on the methods from the first project is being used in the follow-up projects, entitled "Quality of Precipitation/Area of Concern" and "Quality of Precipitation in the Grand Calumet Watershed, Northwest Indiana". All of these projects were funded through FFY 1991 and FFY 1994 Section 319 Nonpoint Source Program grants.

The wet deposition monitoring has been conducted at a site located at the Gary Regional Airport. The first project collected 52 weeks of data and is being followed up by an additional 104 weeks of monitoring at the same location. To provide for an historical perspective of the types and qualities of atmospheric pollutants affecting the water quality of the Area of Concern, it would be advantageous to continue this work through the Stage III Implementation of the Remedial Action Plan. A proposed study for the continuation of these studies has been outlined in chapter 6, along with a proposal for a study of dry deposition.

22. *Coastal Environmental Management Project*

Three sanitary districts in the Area of Concern are currently evaluating the extent to which Combined Sewer Overflows (CSOs) contribute to sediment contamination. In an effort to help watershed development by controlling CSOs, the FY 1996 Coastal Environmental Management (CEM) grant awarded \$300,000 collectively to the Gary, Hammond, and East Chicago Sanitary Districts. The districts are working to meet the goals of enhancing the water quality of the Grand Calumet River, determining how CSOs respond to wet weather conditions, and ascertaining long term control plans for the entire watershed. The districts are also generating their Stream Reach Characterization Evaluation Reports in satisfaction of other regulatory requirements.

The three districts have met numerous times and have dispersed the grant money. The sanitary districts are now evaluating and prioritizing key elements of the plan in order to create a more sustainable watershed. The results will be used by numerous future parties to further gain knowledge of CSO operations relating to wet weather event discharges and to improve water quality in the Grand Calumet River and its watershed.

C. Federal, State and Local Regulatory Actions that Support Remedial Action Plan Goals

1. *Natural Resource Damage Assessment (NRDA)*

The elements of a natural resource damage assessment include: a pre-assessment screen; assessment plan; an injury determination phase; an injury quantification phase; damage determination and finally, restoration. The natural resource trustees issued the pre-assessment screen in June 1996. The trustees have developed an Assessment Plan and initiated a public comment process. (For a more detailed discussion of NRDA, see Appendix, "Description of Regulatory and Resource Management Programs for the Northwest Indiana Area of Concern Remedial Action Plan - Stage II").

2. *Soil and Water Conservation District (SWCD) Programs*

At this time, the Lake County Soil and Water Conservation District has taken the technical lead in the local field work of this joint effort until more IDEM staff are available to assist with the Remedial Action Plan and the Lakewide Management Plan (LaMP) on coastal Nonpoint source assignments. Thus far, the SWCD and the Natural Resources Conservation Service have been working with the area municipalities and other interested groups to implement demonstration best management practices, such as sand filters at storm water discharges, grassed swales with and without check dams, filter strips along streams and tributaries, and dune restoration along the Lake Michigan shoreline.

IDEM has sponsored work by the Lake County SWCD and the IDNR's Division of Soil Conservation and Division of Water to provide technical assistance for the prevention of soil erosion within the Area of Concern. The SWCD has provided the technical advise necessary to apply urban best management practices to specific sites within the Area of Concern. The locations include:

- a. The south bank of the Grand Calumet River in Gary, Ambridge/Mann area

The Lake County SWCD has designed a BMP to control the seasonal storm water runoff from the adjacent residential neighborhood, and supervised the construction of this during the summer of 1993.

- b. Roxanna Marsh in East Chicago

As a part of the mission of Indiana's SWCDs, the Lake County SWCD provided technical information to a local industrial firm in the re-design of a storm water discharge to the Marsh. The new design will reduce Nonpoint source pollution to Roxanna Marsh. Any reduction in pollutant loadings to the marsh is significant because it may benefit long-range migratory shorebirds which feed at this site. The ornithological value of this wetland of the Grand Calumet

River is important in restoring the impaired uses dealing with wildlife and habitat degradation.

c. The east shore of Wolf Lake in Hammond

The Lake County SWCD has designed and reconstructed an old concrete rubble revetment which had been previously ineffective in preventing erosion of the shoreline. Erosion had visibly progressed toward Calumet Avenue in recent years. The BMP construction methods protected the stand of Silverweed Cinquefoil (*Potentilla anserina*), an Indiana endangered species found on site, by coordinating with IDNR ecologists.

The IDNR, Division of Natural Resources has been providing a program of technical assistance to the Lake County Area of Concern in order to help implement the nonpoint source best management practices plan developed by the Lake County SWCD. Baseline data of the effects of the practices are being collected to complement the educational effort by the Grand Calumet Task Force.

3. *Coastal Coordination Project*

The Lake Michigan Coastal Coordination Program is an initiative by the State of Indiana to improve communications and cooperation among the agencies, organizations, and individuals who participate in activities in the Lake Michigan coastal region. The program is administered by IDNR. IDEM will cooperate with IDNR on the Coastal Coordination Project to the extent feasible. IDEM will include appropriate Coastal Coordination Project requirements in the State's Nonpoint Source Management Program as it is updated. Also, IDEM will encourage local conservation and environmental organizations with water quality expertise to participate in coastal zone management citizen education within the Remedial Action Plan process.

4. *Watershed Management Program*

The nonpoint source Program will continue to include best management practice demonstration projects, technical assistance, surveillance of water conditions, Nonpoint source education programs for local officials and citizens, sampling and biomonitoring, data collection and analysis, and a coastal nonpoint source pollution prevention program. Priorities for the Section 319 nonpoint source program are found in the Section 319 Management Plan. Further nonpoint source priorities are included in the Section 104(b)(3) Watershed Management Program and the Section 604(b) Water Quality Planning Program, both of which address point source pollution issues that may also relate to the NPDES permit program. The Nonpoint Source Program (Section 319) is not involved with point source pollution issues, but may be involved in the mitigation of pollutants before they reach the water body.

5. *Water Quality Certification*

Data gathered from the Section 401 Water Quality Certification program within IDEM's Office of Water Management (OWM) is useful for evaluating the wetland impacts in the Area of Concern. The Water Quality Certification program has been tracking wetland impact data since 1984. According to the OWM data, a total of 384 projects have resulted in approximately 200 acres of wetlands lost to filling, or excavation. Most of the impacts were a result of commercial or residential site development.

Mitigation was required as a condition of the Water Quality Certification granted to some of the applicants whose impacts are included in the above total. Applicants were required to mitigate losses by restoring or creating wetlands. The approximate total of wetlands restored or created in the Area of Concern was 20.16 acres.

The Water Quality Certification program recognizes that not all wetland impacts in the Area of Concern are on record. The reasons for this are that the OWM assumes an unknown number of impacts occurred before the regulations were in place, and some impacts did not go through the permitting process.

The U.S. Army Corps of Engineers permits wetlands under Section 404 of the CWA. The U.S. Army Corps of Engineers does not issue the permit if the State denies Section 401 certification.

6. *Storm Water Control Program, Including Best Management Practices*

The IDEM is operating the storm water control program as required by 327 IAC 5 and 327 IAC 15 under Rules 5 and 6. Rule 5 requires land disturbing activities of five (5) acres or more to operate and maintain soil erosion control practices. Rule 6 requires affected industries to implement best management practices to prevent storm water runoff from contamination caused by their operations.

7. *Control of Urban Runoff*

Through IDEM funds granted to local agencies, specific sites have been and will continue to be determined for the installation of best management practices to help prevent urban runoff. Urban runoff may include excess concentrations of road de-icing agents, petroleum products leached from paving materials, herbicides, pesticides, fertilizers, and animal waste. Additionally, atmospheric deposition of pollutants can result from windborne particles and gases. Some of the best management practices which may be utilized include vegetated buffer strips to filter runoff from developed areas before discharge to live streams or ground water bodies, construction of retention basins, and revitalization of wetlands. The latter could include the preservation and restoration of ecologically functioning wetlands and oak savannas and prairies to utilize their natural filtering and water retention functions without overloading their natural capacities or

reducing their native biodiversity.

8. *U.S. Army Corps of Engineers' Indiana Harbor and Canal Dredging Project*

The Indiana Harbor Ship Canal has not been dredged since 1972 "due to the lack of an approved economically feasible and environmentally acceptable disposal facility for dredged materials from" the Indiana Harbor Ship Canal (Indiana Harbor and Canal Maintenance Dredging and Disposal Activities Feasibility Report and Draft Environmental Impact Statement 1995). The sediments exceed criteria for open water disposal. According to the U.S. Army Corps of Engineers's Environmental Impact Statement released in October 1995, the system is in equilibrium, meaning that the total volume of sediment in the Indiana Harbor Ship Canal is generally constant. Incoming material pushes existing material into Lake Michigan. The U.S. Army Corps of Engineers estimates that one hundred thousand (100,000) to two hundred thousand (200,000) cubic yards of material is flushed into Lake Michigan annually. (Indiana Harbor and Canal Maintenance Dredging and Disposal Activities 1995). Acute toxicity was observed during toxicity analysis of sediment collected from the Indiana Harbor Ship Canal (ARCS, 1993). Assays conducted with Hyaella azteca, Chironomus riparius, and Chironomus tentans showed mortality ranging from 53 percent to 100 percent when exposed to sediments collected from the Indiana Harbor Ship Canal.

The accumulation of sediment in the Indiana Harbor Ship Canal has increased costs for industry. Ships carrying raw materials have difficulty navigating in the Harbor and Canal. "In addition, ships come into the harbor loaded at less than optimum vessel drafts. There is also restricted use of various docks requiring unloading at alternate docks and double handling of bulk commodities to the preferred dock. Some vessels approaching the Inland Steel Company docks must temporarily berth in the navigation channel and then be winched into the docks as they are unloaded and their draft decreases. These problems are currently causing increased transportation costs of waterborne commerce at Indiana Harbor Ship Canal, presently estimated at \$12.4 million annually." (Draft Environmental Impact Statement, 1995). Removal of these sediments will address one use impairment, added cost to industry, in the Indiana Harbor Ship Canal.

The U.S. Army Corps of Engineers and the U.S. EPA undertook an extensive review of the environmental and economic impacts of contaminated sediment in the Indiana Harbor Ship Canal in 1995. This review is entitled "Indiana Harbor and Canal Maintenance Dredging and Disposal Activities" and can be found at the IDEM Northwest Regional Office or at local libraries in Northwest Indiana. The Confined Disposal Facility (CDF) at the former Energy Cooperative, Inc. (ECI) site has a design capacity of 4.67 million cubic yards.

The U.S. Army Corps of Engineers, Chicago District, issued a Draft Environmental Impact Statement (DEIS) in October, 1995. In the DEIS, the U.S. Army Corps of Engineers proposed to dredge portions of the Indiana Harbor and Ship Canal to allow for the passage of

ships. The proposed work includes: construction of a CDF; maintenance dredging of the channel to authorized depths; disposal of dredged sediments in the CDF; and routine maintenance of all navigation structures.

A portion of the Indiana Harbor Ship Canal will not be a part of this Federal navigation project. Additionally, the U.S. EPA and IDEM have determined that a portion of the sediments within the navigation channel are "presumptively hazardous" and subject to the provisions of the Resource Conservation and Recovery Act (RCRA). These sediments will have to be addressed by non-Federal interests as part of site-specific remedial activities which will be undertaken in the berthing/dock areas adjacent to the Federal channel.

A portion of the ECI property is the tentative site for the construction of a Confined Disposal Facility (CDF). ECI is located in East Chicago and is the former site of a petroleum refinery. The site acquired interim status for storage and treatment of hazardous waste under RCRA in 1981 because the past petroleum refining activities contaminated soils and ground water. This site housed several RCRA hazardous waste units. Under a court order in the mid-1980's, all buildings on the site were razed, and the site was graded and covered with top soil. These activities failed to meet the closure requirements under RCRA for hazardous waste units. ECI is also subject to RCRA corrective action provisions. The RCRA closure and corrective action requirements associated with the affected portions of the site have been integrated into the proposed CDF design.

The proposed plan will provide many environmental benefits to the Indiana Harbor Ship Canal. Millions of cubic yards of contaminated sediments will be removed. The migration of sediments into Lake Michigan will also be partially mitigated. Section 312 of the Water Resources Development Act of 1990, also enables the U.S. Army Corps of Engineers to perform additional dredging beyond the navigation channel boundaries, provided a non-federal sponsor pays 50 percent of the dredging costs and 100 percent of the disposal costs.

9. *Ralston Street Lagoon*

The Gary Sanitary District has received Section 401 Water Quality Certification for the placement of fill material in wetlands adjacent to the Grand Calumet River as part of the raising and widening the existing berm between the Ralston Street Lagoon. The purpose of the project is to protect the Grand Calumet River from additional contamination by discharge by seeping or leaking of water from the lagoon through the existing berm as well as the river coming in direct contact with the lagoon via flooding.

10. *Elimination of the Use of Slag as Fill Material*

Several parties bordering Lake Michigan have used slag to fill in the lake and reclaim submerged lands. Placement of material in Lake Michigan is regulated by the IDNR's Division of Water in the Lake Permits Section. Parties wishing to use slag in such reuses must

demonstrate that the slag does not have a detrimental environmental effect and that the material serves as a legitimate substitute for a normally used material. IDEM has recently issued decisions which indicate that the use of slag to fill in bodies of water is not a legitimate and demonstrated environmentally protective reuse.

11. *U.S. EPA Advanced Identification of Wetlands Unsuitable for Filling*

In 1987, the U.S. EPA, Region V, and the U.S. Army Corps of Engineers, produced a study and map of wetlands in the Grand Calumet River and Indiana Harbor Canal Area under the Advanced Identification of Wetlands program. Areas identified during this study are presented in the map on the following page; wetlands on the west side of Lake George in Section 18, T 37 N, R 9 W, and wetlands on the southeast side of Wolf Lake in Sections 12, and 13, T 37 N, R 10 W are not included on the map. The base maps were adapted from National Wetlands Inventory maps produced by the U.S. Fish and Wildlife Service.

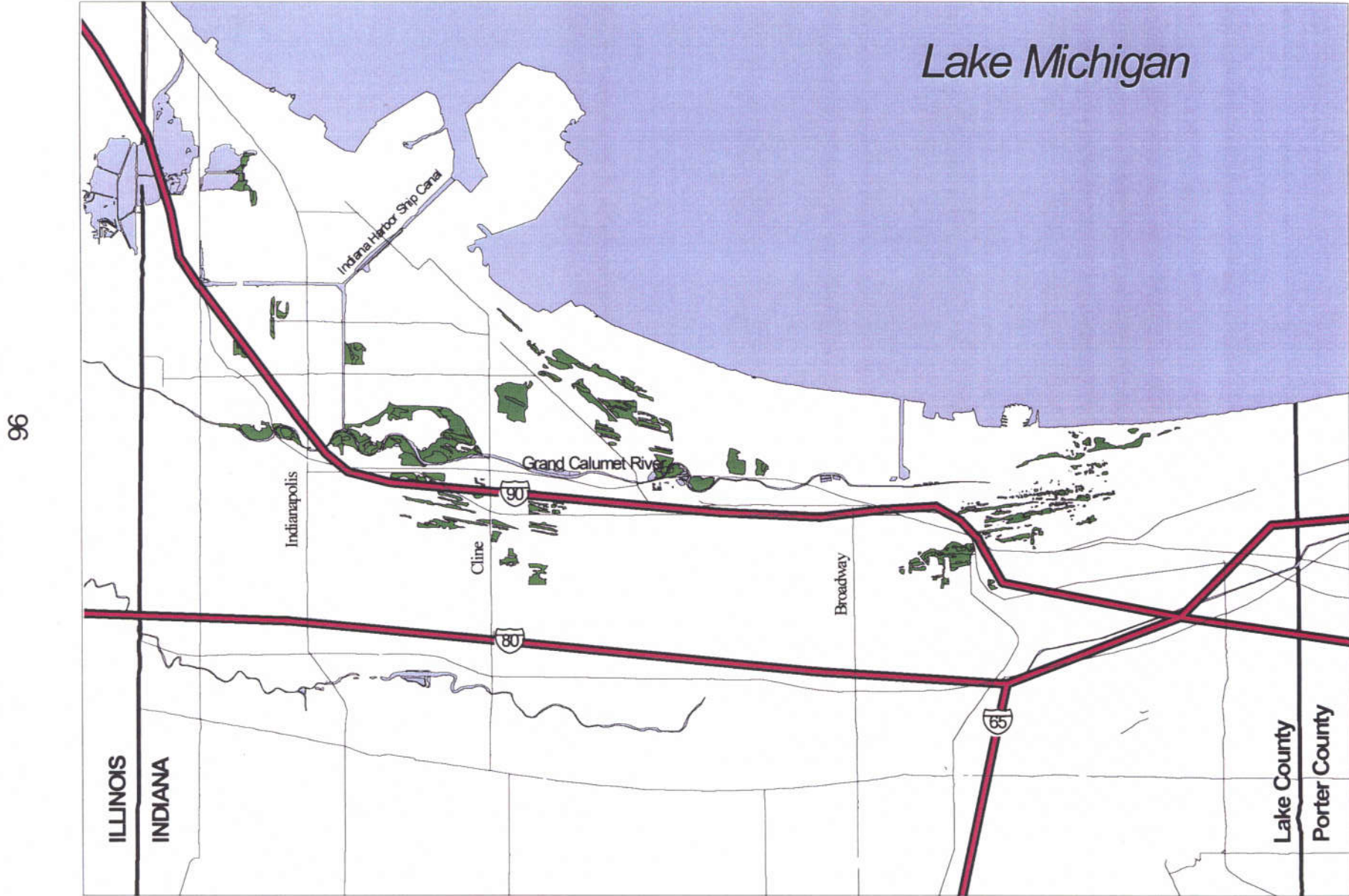
Section 230.80 of the Guidelines provide U.S. EPA with the authority to make a determination on the suitability of specific wetlands for filling before the U.S. Army Corps of Engineers receives a permit application. This process was used to advise the U.S. Army Corps of Engineers that filling these wetlands would likely fail to meet requirements of the Guidelines and that U.S. EPA would recommend that permit applications for these wetlands should be denied. The advanced identification of these wetlands was anticipated to help landowners (planners) develop plans that did not involve filling of these wetlands, increasing chances of approved permits and preserve this most important natural resource. The Advanced Identification of Wetlands Unsuitable for Filling adds predictability to the Clean Water Act Section 404 permitting process; it increases its efficiency as well.

This study concluded that natural wetlands five acres or larger, where surface water was present for more than 25 percent of the growing season, and all natural wetlands regardless of size that are part of a dune and swale complex, were unsuitable for filling. A total of 1,758.4 acres of wetlands were identified as unsuitable for filling in the Grand Calumet River and Indiana Harbor Ship Canal area of Lake County. These included palustrine wetlands which were five acres or greater, water regime seasonal or wetter, not artificial or excavated. Other wetlands identified in the area included 869.3 acres of palustrine wetlands greater than five acres, water regime seasonal or wetter, but excavated or disturbed; 249.6 acres of riverine wetlands; and 6,312.3 acres of lacustrine wetlands and palustrine wetlands less than five acres in size. A total of 9,189.6 acres of wetlands existed in the area. This acreage represents approximately 30 percent of the area's original wetland acreage.

Wetlands in the Area of Concern that were not included in the advanced identification project are not necessarily suitable for filling. A permit from the U.S. Army Corps of Engineers is still required for placing fill material in these wetlands, and the U.S. Army Corps of Engineers will deny permits for activities that are not in the public interest.

Currently, an advanced identification of wetlands unsuitable for filling is being prepared for Lake, Porter and LaPorte Counties. This project should result in a map and functional analysis of high quality wetlands. The study will provide information that can be used to plan for growth while protecting the natural resource values provided by wetlands. Applications of information provided include wetland avoidance, storm water retention planning, and development of wetlands protection ordinances.

Wetlands Unsuitable for Fill



2 0 2 4 Miles



Source of Data: U.S. EPA Advanced Identification of Sites Program
Map Date: October 1997

12. *Hazardous Waste - Facilities regulated under the Resource Conservation and Recovery Act*

IDEM continues to utilize formal enforcement action for facilities out of compliance. However, an increased emphasis has been placed on compliance assurance tools to reduce the number of severe violations by working with facilities through the use of more frequent and targeted inspections; compliance assistance; compliance monitoring; appropriate permit conditions; and incentive and recognition programs. This provides more opportunities for IDEM to assist facilities in the education and understanding of environmental rules and requirements. In addition, IDEM is working with facilities to identify areas of waste reduction and waste minimization, removing the presence of hazardous waste wherever possible. While it is too early to measure the effectiveness of these measures, IDEM will be monitoring these activities to determine overall effectiveness.

Since 1990, Indiana has taken advantage of additional hazardous waste grant funding under U.S. EPA's Great Lakes Initiative. The state will seek increased funding to provide for the current and ongoing activities identified.

13. *Solid Waste (Illegal Dumps)*

Illegal solid waste dumping has been an historic, recurring problem in northern Lake County. Open dumps have contributed to urban blight, fire hazards, and degradation of sensitive habitats for plants and animals. These open dumps have frequently led to more serious pollution problems on those sites, such as dumping of hazardous waste and contaminated debris. IDEM has obtained the cooperation of municipal authorities in targeted, coordinated compliance inspections and joint municipal/state enforcement efforts. Frequent referrals are made for criminal enforcement of serious violations.

In addition, IDEM has been able to organize groups within the Area of Concern to prevent future dumping on some of the oldest recurring dump sites after they have been cleaned. Local neighborhood groups, block clubs, and environmental organizations have been recruited to notify officials of suspicious activities near historic open dump sites. IDEM is cooperating with an effort of The Nature Conservancy and the Shirley Heinze Environmental Fund to clear debris from the Ivanhoe Nature Preserve, Ivanhoe South, and surrounding natural areas and buffer zones and to keep those sites under surveillance. Solid waste dumping can only be prevented by a combination of responsive compliance activities by state and local officials and locally involved residents.

As a result of IDEM's compliance activities in the Northwest Regional Office, 1,780,200 used tires, 60 tons of construction debris and 40 tons of yard waste was identified and removed from open and illegal dumps in the Area of Concern in 1996.

14. *State Clean Up*

Only four of the original eight sites are currently active within the State Cleanup program. Two sites (ECI and Indiana Harbor Ship Canal) have been combined, two other sites (Amoco Refinery and USS Lead) have been turned over to RCRA Corrective Action, one has been remediated (Black Oak Drums), one remains open but with no further action at this time (Calumet Containers), and one site has been referred to Site Investigations for scoring. U.S. EPA completed its final removal action at the Industrial Fuels and Asphalt site in April 1996. U.S. EPA has no other actions planned for this site.

15. *Superfund*

There are four Superfund sites in the Area of Concern: Lake Sandy Jo; MIDCO I; MIDCO II; and Ninth Avenue Dump. These four sites are all on the National Priority List (NPL) and are currently involved in remediation activities between IDEM, U.S. EPA, and the potentially responsible parties. One site, Lake Sandy Jo, is expected to be removed (delisted) from the National Priority List by the end of 1997.

16. *Waste Minimization*

Waste minimization was introduced in the 1984 Hazardous and Solid Waste Amendments to RCRA and has been defined as "the reduction, to the extent feasible, of hazardous waste that is generated and subsequently treated, stored, or disposed of. It includes any source reduction or recycling activity that is undertaken by a generator that results in either (1) the reduction of total volume or quantity of hazardous waste, or (2) the reduction of toxicity of hazardous waste, or both, so long as such reduction is consistent with the goal of minimizing present and future threats to human health and the environment."

The hazardous waste manifest program has provided generators with documentation to identify areas for potential improvement in the inventory management, operations, production process, and recycling/reuse of hazardous waste. IDEM is working with facilities to identify opportunities for reduction of hazardous waste generation.

17. *Transportation Programs*

Using Clean Water Act Section 104(b)(3) grant funding, the IDEM hired a staff person to be based in the Northwest Regional Office to work with the Indiana Department of Transportation staff. This person surveys areas to identify sites that are suitable for installing best management practices. This person also uses the Source Loading and Management Model, or another Nonpoint Source model presently used by the Federal Highway Administration, to estimate pollutant loadings from various discharge points that are identified during site surveys.

Based on these estimates, stretches of the toll road that are significant sources of nonpoint

source pollution will be identified, and best management practices will be included in design plans to control highway runoff. The staff person also works with staff from the Federal Highway Administration and from Indiana Department of Transportation to initiate demonstration projects along the toll road. Funding to install and monitor a best management practice may become available in the near future from outside current operating programs.

Over the term of the Section 104(b)(3) project, this employee solicits additional support from the Cities of Gary and Hammond, Indiana Department of Transportation, and the Lake County Soil and Water Conservation District to implement additional best management practices along the toll road and to help maintain the demonstration sites. After completion of the project, the IDEM may work with the Indiana Department of Transportation to broaden the geogRemedial Action Planhic scope by initiating toll road best management practice demonstration projects such as grassed swales, filter strips, and wetlands.

In addition, the Indiana Department of Transportation participates regularly in the reduction of Nonpoint Source pollution. For example, sensors are installed in roadbeds to more accurately gauge the need for road salt. Additionally, the Borman expressway is swept regularly to help reduce debris entering the runoff.

18. *Air Toxics Program*

The 1990 Clean Air Amendments substantially revised the way facilities that emit hazardous air pollutants are regulated. The list of pollutants regulated under the federal air toxics program was expanded to 189. Section 112 (Title III) of the Clean Air Act provides that U.S. EPA establish technology-based control strategies for numerous categories of sources. These standards are known as National Emission Standards for Hazardous Air Pollutants (NESHAP). IDEM is developing a comprehensive statewide program to reduce emissions of hazardous air pollutants. Incorporation of the NESHAP and other federal air toxics regulations and programs will be part of this program. IDEM has also initiated the process to receive delegated authority from U.S. EPA for the implementation of all Section 112 standards and programs. U.S. EPA has published approval of Indiana's delegation request.

Several of the NESHAPS, also referred to as Maximum Achievable Control Technology standards, will help to reduce the emission of toxic contaminants from major stationary sources into the air. These new standards regulate sources such as coke oven batteries, synthetic organic chemical manufacturing, petroleum refineries, gasoline distribution, chromium electroplaters, halogenated degreasers, and dry cleaners. Future NESHAPs that should have significant impact on toxic emissions from sources in Lake County include coke oven battery requirements, integrated iron and steel manufacturing, steel pickling, and foundries.

Several NESHAPs address smaller sources that traditionally have not been regulated by IDEM (e.g., dry cleaners, vapor degreasers, chromium electroplaters). IDEM is helping these sources to understand why these new requirements apply to them and what they need to do to

come into compliance. IDEM has made great efforts to provide educational and outreach opportunities to these sources and to make information (e.g., guidance, fact sheets) readily available through mailings and access to other information systems.

Section 112(r) of the Clean Air Act requires U.S. EPA to promulgate regulations to prevent accidental releases of regulated substances and reduce the severity of those releases that do occur. These provisions require U.S. EPA to develop a list of pollutants to be regulated, primarily those that are of concern due to acute toxicity, and establish requirements for source reporting.

In 1994, U.S. EPA published a final list of pollutants to be regulated under these provisions. U.S. EPA has subsequently published final rules establishing requirements for sources to develop a risk management program and submit "risk management plans." The risk management program will include:

- a) a hazard assessment including worst-case analysis and five-year accident history,
- b) a documented risk management system,
- c) a prevention program including safety information, operating procedures, training, maintenance, incident investigation, and compliance audits,
- d) an emergency response plan and program, and
- e) a written risk management plan.

The level of detail required for the risk management program is determined based on potential off site impacts of an accidental release and whether the source is within specified high risk source categories.

Beyond the Clean Air Act requirements, IDEM is looking at new ways to identify, evaluate, and prioritize addressing pollutants and sources of concern. This includes gaining a better understanding of the sources that emit hazardous air pollutants and identifying appropriate approaches to controlling their emissions, identifying sources subject to federal standards and addressing compliance issues, and developing an inventory of sources of hazardous air pollutants. These efforts are especially focused in Northwest Indiana.

Currently, IDEM does not have a comprehensive emissions inventory for sources of hazardous air pollutants. The Toxic Release Inventory (TRI) database provides the greatest amount of information on air release of toxic chemicals. The Emergency Planning and Community Right-to-Know Act (EPCRA) of 1996, requires companies to submit an annual report of their toxic chemical releases to all environmental media. Two hundred and seventy-four sources in Lake County reported toxic air emissions to TRI in 1994.

The three main limitations of TRI data are:

- a) Only manufacturing companies within a specified Standard Industrial

Classification Code (SIC) range are required to report. Types of industrial sources that impact air quality in the area of concern that are not required to report include electric utilities, publicly owned treatment plants, bulk gasoline terminals and municipal solid waste landfills. However, newer regulations will require utilities and others to submit TRI reports;

- b) Only manufacturers who use over a specific quantity (more than 10,000 or 25,000 pounds per year) must report. Many smaller types of sources, commonly referred to as area sources, are not required to report. This includes smaller surface coating and printing operations, degreasing operations, and combustion sources. Of the 9700 manufacturing facilities in Indiana in 1991, only 1000 facilities submitted a report. An analysis of the data reported to TRI by the Office of Pollution and Technical Assistance (OPPTA) indicated that if all nonreporting manufacturing facilities used one toxic chemical just below the reporting threshold, and this entire quantity of chemical was converted to an environmental waste, the cumulative totals would only increase by 10 percent;
- c) Emissions reported are only estimates and are not subject to quality assurance measures. Because of the importance of this data in evaluating the effectiveness of statewide pollution prevention efforts, the OPPTA has started working with companies to assist in submitting the required information and to assure the quality of information that is submitted for Indiana sources.

IDEM is currently participating in an air toxics emissions inventory development project as part of the Great Waters Program (see below). This inventory project, which is known as the Regional Air Pollutant Inventory Development System, is designed to establish a repository for air toxics emissions information for the Great Lakes region and coastal waters. Indiana is one of three states working on the pilot project to develop the database software and inventory development protocol. This emissions inventory will help states to be able to identify pollutants and source categories that have the most significant impact on water quality.

IDEM monitors ambient air concentrations of certain toxics and heavy metals at the Hammond CAAP site. Additional ambient air data will become available through the photochemical assessment monitoring site (PAMS-II) which recently began operation at the Gary IITRI air monitoring site. This monitoring will be performed during the ozone formation season, April 1 to September 30, and will provide hourly determinations of ozone precursors (56 organic compounds and carbonyl compounds), most of which are considered Hazardous Air Pollutants (HAPs).

Congress recognized that air pollution can have a significant impact on water quality, and thus, included provisions in the Clean Air Act requiring U.S. EPA to take a closer look at this impact. A program, known as the Great Waters Program, was established to focus on atmospheric deposition of air pollutants to the Great Lakes, Lake Champlain, Chesapeake Bay,

and coastal waters. The Great Waters Program focuses primarily on bioaccumulative pollutants (those that become more concentrated with each level of the food chain) that persist (do not readily degrade) in the environment (Table 16). The Clean Air Act requires U.S. EPA to report back to Congress. The *First Report to Congress: Deposition of Air Pollutants to the Great Waters* was published in May 1994. The relationship between atmospheric deposition and the impaired uses of bodies of water is uncertain. Information contained in the Great Waters Report was derived from three detailed reports developed by committees of leading independent scientists. These committees were established by U.S. EPA to summarize the current state of scientific knowledge on atmospheric deposition to the Great Waters. These committees prepared reports of their research on atmospheric loading to the Great Waters, identification of sources contributing to this contamination, and the effects of exposure.

Table 16. Pollutants of Concern in the Great Lakes¹

Pollutant	Examples of Uses ²
Cadmium and compounds	Naturally occurring element used in metals production processes, batteries, and solder. Often released during combustion of fossil fuels and waste oil and during mining and smelting operations
Chlordane	Insecticide used widely in the 1970s and 1980s. All U.S. uses except termite control canceled in 1978; use for termite control voluntarily suspended in 1988. Use of existing stocks permitted.
DDT/DDE	Insecticide used widely from introduction in 1946 until significantly restricted in U.S. in 1972. Still used in other countries. Used in U.S. for agriculture and public health purposes only with special permits.
Dieldrin	Insecticide used widely after introduction in late 1940s. Used in U.S. for termite control from 1972 until registration voluntarily suspended in 1987.
Hexachlorobenzene	Fungicide used as seed protectant until 1985. Byproduct of chlorinated compound and pesticide manufacturing. Also, a byproduct of combustion of chlorine-containing materials. Present as a contaminant in some pesticides.
<i>α</i> -Hexachlorocyclohexane (<i>α</i> -HCH)	Component of technical-HCH, an insecticide for which use is restricted in U.S., but used widely in other countries.
Lindane (<i>γ</i> -Hexachlorocyclohexane) (<i>γ</i> -HCH)	Main component of lindane, an insecticide used on food crops and forests, and to control lice and scabies in livestock and humans. Currently used primarily in China, India, and Mexico. U.S. production stopped in 1977. Use restricted in 1983; however, many uses are still registered, but are expected to be voluntarily canceled in the future.
Lead and compounds	Naturally occurring element commonly used in gasoline and paint additives, storage batteries, solder, and ammunition. Released from many combustion and manufacturing processes and from motor vehicles. Use in paint additives restricted in U.S. in 1971. U.S. restrictions on use in gasoline additives began in 1973 and have continued through the present, with a major use reduction in the mid-1980s.
Mercury and Compounds	Naturally occurring element often used in thermometers, electrical equipment (such as batteries and switching equipment), and industrial control instruments. Released from many combustion, manufacturing, and natural processes. Banned as paint additive in U.S., for interior paint (1990) and for exterior paint (1991).

Polychlorinated biphenyls (PCBs)	Industrial chemicals used widely in the U.S. from 1929 until 1978 for many purposes, such as coolants and lubricants and in electrical equipment (e.g., transformers and capacitors). In the U.S., manufacture stopped in 1977 and uses were significantly restricted in 1979. Still used for some purposes because of stability and heat resistance, and still present in certain electrical equipment throughout the U.S.
Polycyclic organic matter (POM) ³	Naturally occurring substances that are byproducts of the incomplete combustion of fossil fuels and plant and animal biomass (e.g., forest fires). Also, byproducts from steel and coke production and waste incineration.
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	Byproduct of combustion of organic material containing chlorine and of chlorine bleaching in pulp and paper manufacturing. Also, a contaminant in some pesticides.
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	Byproduct of combustion of organic material containing chlorine and of chlorine bleaching in pulp and paper manufacturing. Also, a contaminant in some pesticides.
Toxaphene	Insecticide used widely on cotton in the southern U.S. until the late 1970s. Most U.S. uses banned in 1982; remaining uses canceled in 1987.
Nitrogen Compounds	Byproducts of combustion processes and motor vehicles. Also, compounds used in fertilizers.

¹ Published in "First Report to Congress: Deposition of Air Pollutants to the Great Waters, U.S. EPA, May 1994.

² Applicable restrictions (including bans) on use or manufacture in the United States also are described.

³ POM is a large class of chemicals consisting of organic compounds having multiple benzene rings and a boiling point greater than 100 °C. Polycyclic aromatic hydrocarbons (PAHs) are a chemical class that is a subset of POM.

The report recommended that U.S. EPA continue to develop and implement provisions of the Clean Air Act Amendments of 1990, especially the development of section 112 standards and programs. It also recommended the U.S. EPA publish emission standards affecting pollutants of concern to the Great Waters ahead of schedule and establish lesser-quantity emission rates (LQERs) to define smaller sources of these emissions as "major sources" and require that they install maximum achievable control technology (MACT).

Discussions among the U.S. EPA Region V states - Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin - indicate the states generally agree that applying some level of control to reduce emissions of pollutants identified as high risk pollutants on the Great Lakes Commission list makes sense. The mechanism for accomplishing this would be to accelerate the MACT development schedule and identify smaller sources that contribute significant emissions of these pollutants. A lot of this effort will be tied into other work going on in the Great Waters program including the development of the RAPIDS emissions inventory and integration of

atmospheric deposition monitoring activities with the inventory efforts. Much of U.S. EPA's work on LQERs has slowed due to the complexity of establishing thresholds and partly because of budget constraints.

Further, there needs to be an integrated multimedia approach to this problem. Coordination will have to occur across other program areas to address nonwaterborne sources of water pollution. U.S. EPA is looking at ways to exercise powers under other regulatory programs, such as the Clean Water Act, and at ways to strengthen these laws to further reduce releases of toxics to the Great Waters. There is also a national effort to inventory pesticide use with the United States and to establish a program to identify and quantify stockpiles and emissions of pesticides of known and potential concern, including banned pesticides. The states and U.S. EPA have recognized that pollution prevention plays a significant role in reducing releases to the Great Waters. Several pollution prevention projects have been initiated over the last few years including a "virtual elimination pilot project" which is focusing on a small group of toxics and performing an in-depth analysis of opportunities for reductions from all sources.

Finally, U.S. EPA will focus research planning on a mass balance approach, and research will continue to develop tools such as risk assessment and loading models. The focus is on how to better identify those persistent chemicals with the tendency to bioaccumulate that may become problematic if emissions continue. This research will integrate monitoring, modeling, and emission inventory efforts.

IDEM actively participates in regional efforts to provide a better understanding of the linkage of air deposition to water quality. The Great Lakes Action Team (Action Team) has been established to advance environmental issues relevant to the Great Lakes region and works closely with U.S. EPA in research and policy development. Efforts of this group have led to a joint project between U.S. EPA and Great Lakes states to develop a more comprehensive emission inventory for hazardous air pollutants. This effort is part of the Great Waters Program. Indiana, Illinois and Wisconsin participated in the pilot project to develop the database repository for this inventory information. Due to uncertainty on funding at the federal level, completion of initial testing and implementation of this program is not certain at this time. Other work has included developing a model to help create greater linkages between the Great Waters program and MACT standard development. This model, once completed, would help the Action Team to prioritize efforts on those MACT standards that have the greatest impact in the Great Lakes region.

Complementing the Great Waters program are several regional efforts that focus on specific pollutants or issues of concern. Among these are focused efforts on reducing mercury and PCBs from the environment. These efforts involve participants from federal, state, local, and tribal governments as well as the public and industry. The focus is to identify realistic measures to reduce emission of these pollutants into all environmental media (e.g., air, water).

19. *Mercury*

Mercury is in Indiana's environment. Indiana has mercury fish advisories for a number of lakes, rivers and streams in Indiana. Many of Indiana's fish can not be eaten due to mercury contamination. Mercury gets into our fish through the water and sediment where the fish live. Mercury entered the sediment and water primarily through air deposition and waters discharged from waste water treatment plants. Other ways the mercury enters Indiana's waters and land include spills, discharges, industrial and chemical products, and a variety of consumer products. Sources producing airborne mercury include burning coal for fuel, incinerating mercury-containing waste and a variety of other sources. This airborne mercury can then be redeposited on fields and in watersheds across Indiana.

Once mercury is introduced into the air, land or water, bacteria and other processes in lakes and rivers can convert mercury into methylmercury, which fish may acquire from the water and food they eat. Methylmercury builds up in the fish tissue and may then be carried up the food chain to humans. Mercury contamination can affect the human central nervous system, kidneys and liver. Fetuses and young children are the most sensitive to mercury toxicity.

Mercury is used because of its unique characteristics. Its high conductivity and liquidity at room temperature make it a useful component in electrical switches and thermostats. Mercury is also used in dental amalgams, thermometers, lighting, electrical equipment, laboratory chemicals and pharmaceuticals. IDEM is working to reduce mercury in all aspects of our environment through the efforts summarized in this document and the Environmental Performance Partnership Agreement with EPA Region V.

IDEM's Approach: For the past four years, IDEM has worked to reduce mercury levels throughout the state. In the beginning, IDEM worked through a three pronged approach: 1) opportunistic initiatives; 2) monitoring mercury levels; and 3) permitting facilities where we could. Two years ago, Indiana changed to a risk based approach for mercury contamination in fish tissue to better protect human health. Indiana published the fish consumption advisories which included mercury detections based on the OWM monitoring studies. IDEM worked with the Indiana State Department of Health and the Indiana Department of Natural Resources to publish the Indiana Fish Consumption Advisories. Finally, IDEM permitted facilities for air, water and waste wherever possible.

In order to focus efforts, IDEM formed an internal mercury workgroup. The focus of this workgroup is to continue approaching mercury reduction from three prongs. However, now we are integrating the work of each office and coordinating our activities. The workgroup insures all IDEM mercury initiatives take a multi-media approach and not only deal with the problem, but also figure out how mercury is getting to the environment. The workgroup continues to look into what is out there related to mercury and what IDEM can do control the mercury in our environment. Every six weeks, members of each office attend a workgroup meeting to discuss office activities and ideas concerning mercury reduction are discussed. The workgroup continues

to work together between meetings and discuss the best approaches for mercury reduction and how to measure progress.

IDEM staff also participate on national and regional workgroups which focus on reducing the amount of mercury in the environment. The Region V Mercury Workgroup addresses sources of concern for mercury in the Midwest and tries to achieve tangible reductions in mercury emissions. The group has been active in the halting of the sale of the national mercury stockpile and in establishing a thermostat take-back program with the Thermostat Recycling Corporation. IDEM staff participate in the national Virtual Elimination Group, actively follow and provide comments on the National Mercury and Utilities Studies, and have provided formal comments on U.S. EPA's risk assessment and carcinogenic pathway information contained in both studies.

20. *Dioxin*

Dioxin has been identified as one of the pollutants of concern for the Great Waters. A significant effort and several studies have attempted to identify the fate of dioxin in the environment. These efforts focused on bioaccumulation and the risks to humans and wildlife in the environment. U.S. EPA has established a focused strategy to reduce emissions of dioxin into the air and water including stringent air and water quality standards for specific source categories.

U.S. EPA has proposed or promulgated more stringent standards to reduce air emissions from waste combustion sources (medical, municipal and hazardous). Other major sources of dioxin include cement kilns, sinter plants, and bituminous coal combustion. U.S. EPA is currently conducting research on dioxin emissions from these operations and will propose new standards by 1999. In most cases, emission reductions will be greater than 99 percent.

U.S. EPA is currently conducting research on air toxics emissions from steel mills and will propose new standards by 1999 to reduce air toxic emissions including dioxins from sinter plants and emissions from coke oven batteries.

21. *Accidental Releases*

The Clean Air Act Amendments included provisions to develop a comprehensive program to prevent the accidental air release of certain toxic, flammable and explosive substances. This program, which is being developed under Section 112(r) of the Act, will require comprehensive release prevention and emergency planning measures to be put in place by companies that use listed substances above a specified threshold.

22. *Particulate Matter (PM₁₀)*

Particulate emissions have historically been a significant concern in Lake County. In the

1970s and 1980s ambient levels of Total Suspended Particulates frequently exceeded health standards by significant margins. In 1993, IDEM completed a rulemaking that established new emission limitations for sources in Lake County to meet the NAAQS for PM₁₀. These rules are part of Indiana's PM₁₀ State Implementation Plan (SIP). The PM₁₀ SIP requires the collection and continual update of source emissions data and ambient air monitoring data. IDEM analyzes data on an ongoing basis to identify issues of concern and then develops rules and policies in an effort to maintain the PM₁₀ National Ambient Air Quality Standards (NAAQS).

The PM₁₀ SIP also includes a control strategy that focuses on Lake County which has the most serious particulate pollution in the state. This strategy includes process specific emission limitations for major stationary sources which have resulted in significant emission reductions (e.g., shutdown of the Inland Steel coke batteries), fugitive dust control plans, and other measures meant to ensure continuous compliance and improved enforceability. The PM₁₀ SIP was approved by U.S. EPA in 1995, making it federally enforceable. The PM₁₀ levels in Lake County have dropped significantly due to new particulate rules and efforts of Lake County industry.

U.S. EPA is also in the process of reviewing the health- and welfare-based NAAQS for particulate matter. On November 27, 1996, the U.S. EPA announced its proposal to revise the current health-based particulate matter standard by adding a new annual PM_{2.5} (particles less than 2.5 microns in diameter) standard set at fifteen micrograms per cubic meter and a new 24-hour PM_{2.5} standard set at 50 micrograms per cubic meter. The U.S. EPA also sought comment on stricter and more lenient levels of the PM_{2.5} standards. Over the duration of the public comment period, the U.S. EPA received thousands of comments regarding the revision to the particulate matter standard. The U.S. EPA has reviewed these public comments and promulgated a rule revising the state health-based standard and added a PM_{2.5} component.

23. *Ozone*

The Clean Air Act requires states to develop a State Implementation Plan containing comprehensive measures to eliminate the health threat from ozone in severe non attainment areas by 2007. Based on the three percent annual rate of progress requirement of the Clean Air Act, total Volatile Organic Compound (VOC) emission reductions by that time should total approximately 48 percent from 1990 baseline emission levels. The first phase of the ozone reduction strategy is the development of measures aimed at reducing VOC emissions by 15 percent from 1990 baseline emission levels by 1996. Indian submitted a "15 Percent Plan" for the reduction of emissions from stationary sources to U.S. EPA on November 15, 1994.

The 15 Percent Plan relies on eight volatile organic compound reducing measures. New requirements for the area include an enhanced vehicle inspection and maintenance program, which commenced testing early in 1997, Stage II vapor recovery at gasoline stations and other refueling operations, a ban on residential open burning, and the application of reasonably available control technology to certain industrial facilities. Two federal programs, reformulated

gasoline and requirements for architectural and industrial paints, provide significant volatile organic compound reductions. Closure of major volatile organic compound emitting industrial facilities at two Lake County sources provides the remainder of the necessary credits. Table 17 provides a summary of the measures included in the 15 percent plan and the associated VOC reductions.

TABLE 17. LAKE AND PORTER COUNTY 15% PLAN	
Reduction needs by 1996 to achieve 15% net of growth	68,130
Measure	Reductions (lb/day)
Mandatory Controls	
Mobile Sources	
Enhanced I/M Program	6,817
Reformulated Gasoline (Phase I)	14,905
Area Sources	
Stage II Vapor Recovery	9,824
Architectural and Industrial Maintenance Coatings	2,920
Point Sources	
Non-CTG RACT	4,559
Non Mandatory Controls	
Point Sources	
Keil Agreed Order	5,327
Coke Oven Battery Shutdowns at Inland Steel Flat Products	22,850
Area Sources	
Residential Open Burning	929
Total Reductions	68,131

IDEM met with its NW Indiana Advisory Committee several times during the development of the 15 percent plan to get community input and comment. A formal public hearing on the plan was also held before the plan was finalized. U.S. EPA has published approval of Indiana's 15 Percent Plan.

The rules and programs put into place by the 15 percent plan will complement existing rules that regulate emissions from mobile sources, and industrial and commercial facilities such as surface coating operations, metal degreasing, gasoline marketing, oil refining, petroleum storage,

printing, and other processes that use organic solvents. Many of the National Emission Standards for Hazardous Air Pollutants (NESHAPS) will help to reduce emissions of those volatile organic compounds that are also classified as hazardous air pollutants. IDEM recently incorporated several NESHAPS into state rules that will affect VOC sources located in Lake County including the Hazardous Organic National Emission Standards for Hazardous Air Pollutants, Coke Oven Battery, halogenated solvent cleaning (degreasing), and dry cleaning NESHAP.

IDEM is currently developing the second phase of the ozone reduction strategy which will achieve another nine percent reduction in VOC emissions from the 1990 baseline. These measures will be in place no later than 1999 and include several additional NESHAPs. A key component of the nine percent plan is a rule currently being developed by IDEM to control emissions from sintering operations at steel mills.

IDEM works with the Northwestern Indiana Regional Planning Commission (NIRPC), the Indiana Department of Transportation and other interested partners in the development and implementation of measures to reduce transportation-related emissions. NIRPC is responsible for ensuring that transportation plans, programs, and projects that are federally funded or approved conform with state and federal air quality planning provisions. Conformity determinations are required in Lake County because it is a non attainment area for ozone.

24. *Other Transportation Measures*

Starting in January 1995, only "reformulated" gasoline can be sold in Lake County. Reformulated gasoline contains less of the volatile organic compounds that are precursors of ozone. In 1990, the enforcement mechanism for the inspection/maintenance (I/M) program was revised to require each motorist to provide proof of passing an emissions test (certificate) before new license plates were issued. This requirement greatly improved the effectiveness of this program. An enhanced I/M program was implemented in 1997. The new program more effectively identifies high emitting vehicles. In Lake County, both Stage I and Stage II vapor recovery systems are required for gasoline handling. Stage I vapor systems collect and control gasoline vapors emitted during the loading and unloading between gasoline transports and storage tanks. Stage II vapor systems collect and control vapors from the refueling of vehicles.

Effective November 27, 1995, most gasoline stations in Lake County are required to install and utilize Stage II vapor recovery. There are approximately two hundred and fifty retail gasoline stations in Lake County subject to these requirements with about 40 percent being smaller independent oil marketers. All sources subject to these requirements must submit a registration to IDEM when the Stage II vapor recovery system has been installed. The Hammond Department of Environmental Management is currently working under agreement with IDEM to conduct all Stage I and II vapor recovery system inspections in Lake County. Each station is inspected annually on a random basis. Other measures, such as anti-tampering and fuel switching rules, which have been in place since 1990, have also helped reduce emissions

in Lake County.

25. *The Environmental Performance Partnership Agreement*

One of the ten strategic goals that IDEM and the U.S. EPA have formally agreed to cooperate on is to "Focus on Northwest Indiana". The vision of this goal is that Northwest Indiana's air is safe to breathe; its water is safe for swimmers, fish, wildlife, and the public water supply; and its land is restored for productive use for the citizens of Lake, Porter, and LaPorte counties. For a complete discussion of this topic, see the September 1997 - June 1999 Environmental Performance Partnership Between the Indiana Department of Environmental Management and the U.S. Environmental Protection Agency Region V. This document is available upon request from IDEM.

26. *Oil Pipeline Memorandum of Cooperation*

Proposed Pipeline Memorandum of Cooperation - IDEM and US EPA Region V are pursuing a partnership with pipeline companies operating in northwest Indiana. The purpose for the partnership is to investigate and recover crude oil and petroleum distillates in the ground water that are entering or threatening to enter surface water from active and abandoned pipelines. The primary purpose for this agreement is to protect the surface water resource. The Northwestern Indiana Regional Planning Commission (NIRPC) and Clean Sites will be facilitating anticipated discussions.

D. Administrative Orders, Agreed Orders and Consent Decrees that Support Remedial Action Plan Goals

1. *H & H Autofluf Contaminant Removal Project*

Unilateral Administrative Order issued by U.S. EPA requires reconstruction of "dune and swale" habitat in previously filled wetland areas after removal of autofluf from site.

2. *Amoco Pipeline Company*

IDEM and Amoco Pipeline Company entered into an agreed order for further assessment and remediation activities for a xylene pipeline spill area near Calumet Avenue and 129th Street in Hammond.

3. *U.S. Steel (water decree)*

In October 1990, U.S. Steel entered into a consent decree, Civil Action No. H88-558, with the U.S. EPA. The decree alleged that U.S. Steel violated the Clean Water Act, National Pollutant Discharge Elimination System Permit Number IN0000281, and U.S. EPA Administrative Order V-W-88-AO-04. The original decree required a compliance program that

includes the following:

a. Remedial Wastewater Programs: Plans to limit the discharges of contaminants from the Coke Plant, the Blast Furnace/Sinter Plant Area, Steelmaking Area, and the Finishing Mill Area, shall be developed and implemented.

b. Visible Oil Discharges: U.S. Steel developed a Visible Oil Corrective Action Monitoring Program (VOCAMP) for outfalls 007, 010, 019, 028, 030, 033, and 034. The objectives of the VOCAMP were to determine the source or sources of visible oil and to identify and implement any corrective actions that will eliminate or reduce to the maximum extent practicable the discharge of visible oil.

Since this decree was filed in court, the U.S. EPA and U.S. Steel have begun negotiating a new consent decree. This proposed decree expands the size of the Grand Calumet River Sediment Remediation Project.

4. *U.S. Steel (sediment)*

a. Grand Calumet River Sediment Characterization and Remediation Project: In accordance with the October 1990 Decree, U.S. Steel conducted an investigation of sediment contamination of a thirteen mile stretch of the Grand Calumet River, from the culvert upstream of USS outfall 001 to the Columbus Street Bridge in East Chicago, including the West Branch of the River between Indianapolis Boulevard and the confluence of the Indiana Harbor Ship Canal. The study was completed in 1993 and showed that the river sediments contained heavy metals, oil and greases, PCBs, PAHs, benzene, cyanide and other pollutants.

b. Proposed Remediation Project/RCRA Corrective Action

The proposed RCRA Consent Decree is the subject of ongoing negotiations among U.S. Steel, U.S. EPA, and IDEM. U.S. Steel has offered to hydraulically dredge approximately five miles of contaminated sediment in the river. The dredging would begin at USS outfall 001 and would continue downstream to the Pennsylvania Railroad Bridge in Gary. The sediments would then be placed in a forty acre RCRA corrective action management unit for dewatering and disposal. Because certain sediments contain elevated levels of PCBs, the disposal unit will contain a special cell for PCB wastes. Water generated by the dredging and dewatering processes would be processed in a treatment system built specifically for this project prior to discharge back into the river. The corrective action management unit will be designed with excess capacity that may be used by U.S. Steel to dispose of other compatible remediation wastes from the U.S. Steel Gary Works. Other remediation wastes may be generated by U.S. Steel Gary Works as it implements RCRA corrective action to clean areas where wastes from its facility may pose a threat to human health or the environment.

c. Public Involvement

During June, July, and August 1996, U.S. EPA and U.S. Steel sponsored public meetings in Gary to explain the proposed Sediment Remediation Project, the proposed corrective action management unit for sediment disposal (including the cell for PCB-contaminated sediments) and the proposed RCRA corrective action order. There were also opportunities for oral and written public comment on each of the proposals. At this writing, U.S. EPA is in the process of reviewing the public comments. If a decision is made to not construct this proposed corrective action management unit, another disposal method will need to be proposed and evaluated. U.S. EPA will document and announce its decision with respect to the proposed corrective action management unit including the PCB disposal cell in a Response to Comments document.

5. *Inland Steel Sediment Characterization Study in the Indiana Harbor Ship Canal*

Inland Steel entered into a federal Consent Decree in June, 1993, which addressed the characterization of contaminated sediments in the Indiana Harbor Ship Canal and Roxana Marsh. The Consent Decree requires Inland to study sediment in the Indiana Harbor Ship Canal and remediate portions of the Indiana Harbor Ship Canal next to its property. U.S. EPA estimated that as much as 750,000 cubic yards of sediments may be remediated when the entire project is complete.

The contaminated sediments contain lead, zinc, PAHs, PCBs, and other contaminants which present a potential threat to health, aquatic life, and the environment. Such contaminants can affect human health through the food chain. The U.S. Army Corps of Engineers estimates that as much as 157,000 cubic yards of contaminated sediments enter Lake Michigan annually from the Grand Calumet River and Indiana Harbor Ship Canal. Lake Michigan is the primary source of drinking water for six million people in Northwest Indiana, Chicago, and Chicago's suburbs and is used by citizens of these communities for fishing and recreational purposes. This study work plan is in its final phase of review.

6. *Removal Action by LTV Steel*

The U.S. EPA and LTV Steel entered into a consent decree on May 26, 1992. The decree stated that LTV Steel illegally discharged oil and other pollutants into a waterway at its Indiana Harbor facility. In February, 1988, several hundred gallons from an oil reclamation site escaped into the facility's primary intake channel. LTV recovered a portion of the oil from the channel, but some oil reached the Indiana Harbor and Lake Michigan. An investigation revealed that sediments in the intake channel were contaminated with oil. The project was completed in 1996; 116,000 cubic yards of contaminated sediments were removed, dewatered and properly disposed, at a cost to \$16 million to LTV. 30,000 gallons of petroleum product were removed from the sediments.

7. *Gary Sanitary District (GSD)*

The U.S. EPA and Indiana entered into a consent decree with the Gary Sanitary District in

October 1992. That consent decree required the Gary Sanitary District to implement a remedial program to clean and close its Ralston Street Lagoon under the Toxic Substance Control Act (TSCA) and implement a Grand Calumet River Remediation Project with a value of at least \$1.7 million. The remediation project is to be coordinated with the U.S.S. proposed project, working toward the goal of long term improvement of the Grand Calumet River.

8. *Amoco Soil Characterization Work Plan and Ground Water Evaluation*

Amoco has conducted environmental remediation projects at the Whiting Refinery for a number of years. Most of these projects have been directed at the goal of containment and recovery of subsurface free phase hydrocarbons (FPH) that resulted from historic releases. At present there are thirty-six separate active systems operating to recover subsurface FPH and prevent FPH migration. While control of FPH migration has been accomplished, additional systems will continue to be installed for recovery of the subsurface oil that is present within the interior of the refinery. Other remediation projects that have been conducted at the site have included the removal and proper disposal of wastes and closure of a surface water impoundment. Concurrent with remediation work, many projects are underway that will improve spill prevention. These include replacing underground piping in road crossings with new, more corrosion resistant crossings and a line raising project to eventually move most below ground piping to above ground.

In the past, some instances of oil migrating past the refinery boundaries have occurred. Amoco has addressed these instances by construction of perimeter recovery systems that have prevented further migration and begun the removal process. In addition, Amoco has installed a bioventing system in one off-site area to clean up the stained soils that remained after the oil was recovered. The construction of this system required the placement of more than a half-mile of underground piping, and was conducted utilizing new drilling technologies that minimized disturbances to the residents in the area.

In December of 1995, Amoco and IDEM signed an agreement to govern the future course of the majority of environmental remediation projects at the refinery. Under this agreement (Agreed Order Cause No. H11187), IDEM has review and approval authority for the installation of further remediation systems or programs. IDEM will also have enforcement authority to ensure that completed systems meet the requirements of the agreement.

The agreed order incorporates provisions for continuing certain community relations activities including continued Citizens' Advisory Committee (CAC) meetings, and public access to work plans and reports. In addition, the agreed order contains guidelines for continued action by Amoco for leak and spill prevention. In essence, the agreed order is a continuation of the past investigation, remediation, and spill prevention measures begun by Amoco. Now, however, IDEM as a part of the corrective action team, will exercise review, approval and verification authority. Programs no longer rest solely on Amoco's initiative.

One program that was initiated by Amoco and will continue under the agreed order is periodic fluid level monitoring. Amoco monitors fluid levels at selected locations on a schedule ranging from weekly to semi-annually. On a semi-annual basis, fluid levels from approximately 750 monitoring wells are measured to provide a broad picture of the groundwater and subsurface oil status. More frequently, fluid levels from about 130 selected wells are measured. This information is used to insure that remediation systems continue to prevent oil migration and to monitor progress in subsurface oil recovery. Maps are generated showing groundwater gradients and the extent of subsurface oil plumes. Volumes of subsurface oil are estimated and recovery progress evaluated. Some of the information from this program was recently shared with the United States Geologic Survey (USGS) that was conducting an unrelated study in the area. In return, the USGS provided ground water information that helped complete the ground water gradient maps.

Also, under agreements with the U.S. EPA and IDEM, Amoco decommissioned a surface water impoundment at the Amoco Lakefront Wastewater Treatment Facility. The six acre stormwater surge basin was closed and its sludges solidified in place in 1992. Closure plans were designed such that the area is suitable for future reuse for construction of other refinery facilities. Under the provisions of the post-closure plan for this unit, ground water gradients and quality are monitored at the Lakefront and annual reports prepared.

9. *Amoco Agreed Order*

In addition to the previously mentioned Memorandum of Cooperation, there are three additional cooperative efforts Amoco has taken with the community and IDEM:

a. Amoco Agreed Order: IDEM and Amoco have worked together to combine three mutual concern issues within the refinery into one voluntary but enforceable agreement. The areas covered by the Agreed Order are solid waste management units, petroleum contamination and the J&L site. This Agreed Order is a product of IDEM working with industry to address suspected problems in an effective and workable program. This Agreed Order provides IDEM additional oversight and enforcement authority over the many remedial measures in place at the refinery, as well as those which will be installed in the future.

b. The Biovent Project: A plume of free phase hydrocarbons that had migrated off site into a residential area was pulled back to refinery property. This plume left the soils stained. The Biovent Project is a voluntarily installed system to address hydrocarbon stained soil off site of Amoco property. Amoco installed this system under First Street in Whiting after discussing the project and receiving input from the Citizen's Advisory Committee, IDEM, and the City of Whiting officials. The Biovent System uses horizontal piping and a vacuum system to pull air through the soil, increasing the amount of oxygen available to enhance growth of natural occurring bacteria that breaks down hydrocarbons.

10. *Gary Lagoons Removal Site; 5622 and 5624-34 Industrial Highway, Gary, Indiana*

On April 12, 1996, U.S. EPA issued an Administrative Order pursuant to Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. Section 9606 (a) directing potentially responsible parties to conduct a removal of contaminated sludges from lagoons and other impacted areas on this site. Various legal and economic considerations resulted in the U.S. EPA conducting a fund lead removal action on this site. The U.S. EPA completed its final removal action at the Gary Lagoons site in May 1997.

The Gary Lagoons site was a seven acre vacant property containing two unlined and uncovered lagoons situated in a sandy environment adjacent to wetlands. Analyses indicated presence of PCBs and heavy metals in lagoons as result of historic illegal dumping. Sampling to identify extent of contamination was conducted in late August 1996. Between September 25 and December 20, 1996, 500,600 gallons of surface water was collected and 8,700 tons of TSCA-contaminated (containing >50ppm PCBs) soils and sediments were excavated from the south lagoon; and 1,550 tons of special waste soils and sediments (containing < 50 ppm PCBs) and 9,000 gallons of PCB-contaminated oil were excavated or collected from the north lagoon. Over 340 cubic yards of construction debris, a truck load of tires and grubbed vegetation were recycled. All excavated or collected media were disposed offsite. All excavated areas were backfilled with a clay/loam soil at least two feet deep. Sand was placed over the fill material to a depth of two to five feet; deepest areas were associated with reconstructed dunes. With the assistance of the U.S. Fish and Wildlife Service, Indiana Department of Environmental Management and Indiana Department of Natural Resources, a seed mixture of native plants was selected and planted on the entire area (approximately ten acres).

11. *United States Steel Corporation (U.S. Steel)*

In a landmark agreement, U.S. Steel and IDEM settled more than one hundred air pollution violations at the blast furnace, coke battery, sinter plant, steel making shops and other Gary Works Operations. U.S. Steel Corp. agreed to pay a \$6 million fine, make \$100 million in additional environmental improvements, and reduce air emissions from its Gary, Indiana facility by more than 15,000 tons each year. This agreement is the largest administrative settlement in state history and was achieved without filing a lawsuit or involving the U.S. EPA or the Department of Justice.

The agreement requires several Gary Works operations to be brought into compliance with Indiana clean air standards, and requires rigorous monitoring of operations now in compliance. All operations affected by the agreement are scheduled to be in compliance by July, 1997. Additionally, U.S. Steel agreed to invest in four supplemental environmental projects to reduce air emissions. (*Material taken from IDEM press release*).

III. Additional Actions Necessary to Delist Impaired Beneficial Uses

The impaired beneficial uses in the Area of Concern are driven by contamination of water and/or sediments in the Grand Calumet River, Indiana Harbor Canal, Indiana Harbor and Nearshore Lake Michigan and the impacts of contaminants from adjacent/surrounding areas. Delisting of the Area of Concern can not occur until the sources of contaminant have been addressed. Items identified in the Actions in Progress have, and will continue to address sources of contamination which result in impaired beneficial uses. Activities need to be initiated to address any contaminant source in the Area of Concern that is not addressed in current/planned actions.

Over the past one hundred years our industrial culture has restructured the landscape of the Calumet Region to fit its needs. Dunes were leveled, wetlands drained and filled, and rivers channelized in order to make the area more suitable for urban development. The destruction of habitat and disruption of ecological processes shattered the natural landscape leaving only small fragments that are out of context with their surroundings. Storm water that once recharged the groundwater table is now urban run-off, and considered non-point source pollution that is collected in sewer systems to be piped away. Native species no longer range freely across the lakeplain to form and reshape communities. A small number of exotic species that thrive in the wake of urban development dominate the landscape.

Physical changes to the river corridor and surrounding landscape will in part determine the levels to which we can restore natural processes. The drainage pattern and flow of the river are dramatically different from one hundred and fifty years ago. With 90 percent of the water coming from industrial and municipal discharge, water quality will be determined more by government regulation than natural processes. Wetland complexes occur sporadically along the river, with artificial berms forming large sections of the bank. On much of the river industrial and residential development pushes right to the water's edge. The situation dictates that habitat quality will not be consistent throughout the corridor. By maximizing habitat potential in key areas and establishing system-wide standards that support diversity, improvements will be made to the ecology of the river.

With at least 90 percent of the dune and swale destroyed, the fragments are the last refuge for the biotic communities that formed while natural processes shaped the landscape of the Grand Calumet River watershed. Significant ecological interaction is restricted, for the most part, to these fragments. Currently our stewardship of these lands is limited to management of protected nature preserves. They are like gardens that operate independent of the surrounding landscape. At present, our best efforts to restore ecological processes keep the dynamic flow alive only within the borders of individual preserves.

Nature preserves are created to protect the highest quality examples of natural communities, their intrinsic value as a natural area controls their cultural land use. Conservation and restoration of biodiversity that is limited to designated Nature Preserves is severely restricted in

its range. If we can develop a conservation ethic geared toward maintaining ecosystem health throughout the region a variety of habitats will be available to support native species. Creating buffers around existing natural areas, developing biological corridors, and replacing exotics with native species on properties not solely dedicated to conservation will enhance habitat conditions. To accomplish this, conservation and restoration activities will need to be coordinated with compatible land uses, and implemented through partnerships between government agencies, private landowners and conservation organizations.

Several broad-based initiatives in the Calumet Region are assessing current and future land use. The Remedial Action Plan, Corridor Planning, Brownfield Redevelopment and Sustainable Development all offer opportunities for incorporating conservation into broader land use planning. Conservation issues, remediation of environmental degradation, economic development and community development will all help shape the changing landscape.

Protection and stewardship of the fragments of the native landscape are essential to maintaining biological diversity in the region. These areas hold the biological reserves necessary for reintroduction of native species to the broader landscape. They are also the last examples of the natural systems and serve as models for improving degraded areas.

The physical destruction of habitat has created a series of problems associated with fragmented communities. Physical changes in habitat conditions along the edges of fragments disrupt biotic communities and allow for the influx of exotic species. Small habitat patches generally have increased rates of extinction, decreased rates of re-colonization and lower levels of species diversity. Species that once interacted across the broader landscape are limited to these small islands, impacting ecological interactions such as succession, pollination, and predator - prey relationships. The ecological niches created by natural and human influences on the landscape go unfilled without the influx of new species. Buffering natural areas and restoring connectivity between sites compensates for some of the negative impacts of fragmentation. The potential for positive impacts on high quality natural areas should be a priority in designing specific restoration projects.

Ongoing stewardship is needed to maintain the ecological processes necessary to preserve the biotic communities at these sites. Natural processes are so impaired that without management the habitat quickly degrades. Without fire the savannas and prairies become choked with saplings and brush, shading out herbaceous species. Areas left unburned build-up heavy fuel loads that, in the event of a wildfire, can be dangerous to people, property and the natural system. Controlled burns re-introduce fire as a process to maintain the balance of woody and herbaceous species. Dividing natural areas into burn units, so that an entire tract is never completely burned, helps insure re-colonization of fire sensitive species.

A. Protection of critical habitats

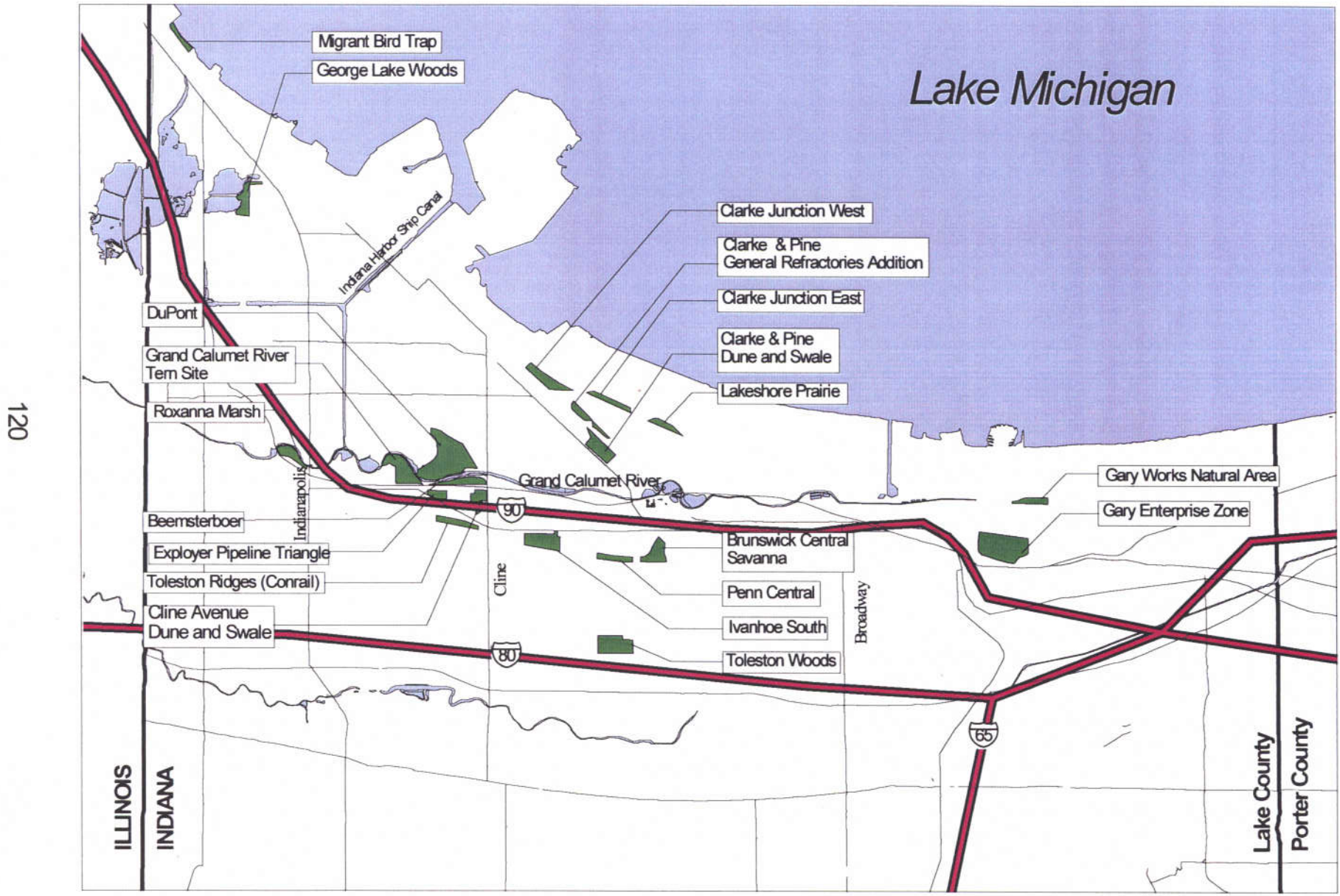
The Habitat Subcommittee of the CARE has identified twenty areas that should be targeted

for preservation and restoration in attempting to meet the subcommittee's objective to preserve and restore globally endangered and other critical habitats in the Area of Concern. The areas are listed in the order of priority for protection, recognizing that any opportunity to protect and or restore these sites would be addressed.

1. Lakeshore Prairie
2. Gary Enterprise Zone
3. Clarke & Pine Dune and Swale
4. Clarke Junction West
5. Clarke & Pine General Refractories Addition
6. Toleston Ridges (Conrail)
7. Gary Works Natural Area
8. Cline Ave. Dune and Swale
9. Ivanhoe South
10. DuPont
11. Beemsterboer
12. Clarke Junction East
13. Brunswick Central Savanna
14. Grand Calumet River Tern Site
15. Toleston Woods
16. Penn Central
17. Exployer Pipeline Triangle
18. Roxanna Marsh
19. Migrant Bird Trap
20. George Lake Woods

The above sites represent the remaining dune and swale habitat in the Area of Concern that is not in some type of protective ownership with the exception of Roxanna Marsh, The Migrant Trap and George Lake Woods. The remnant dune and swale areas, if protected would greatly enhance biodiversity and provide core areas for maintaining ecosystem integrity of the Area of Concern. The other three areas, while not representing high quality habitat, provide critical habitat to migratory birds within the area. See Figure vii on the next page for location of these sites.

Critical Habitat to Preserve or Protect



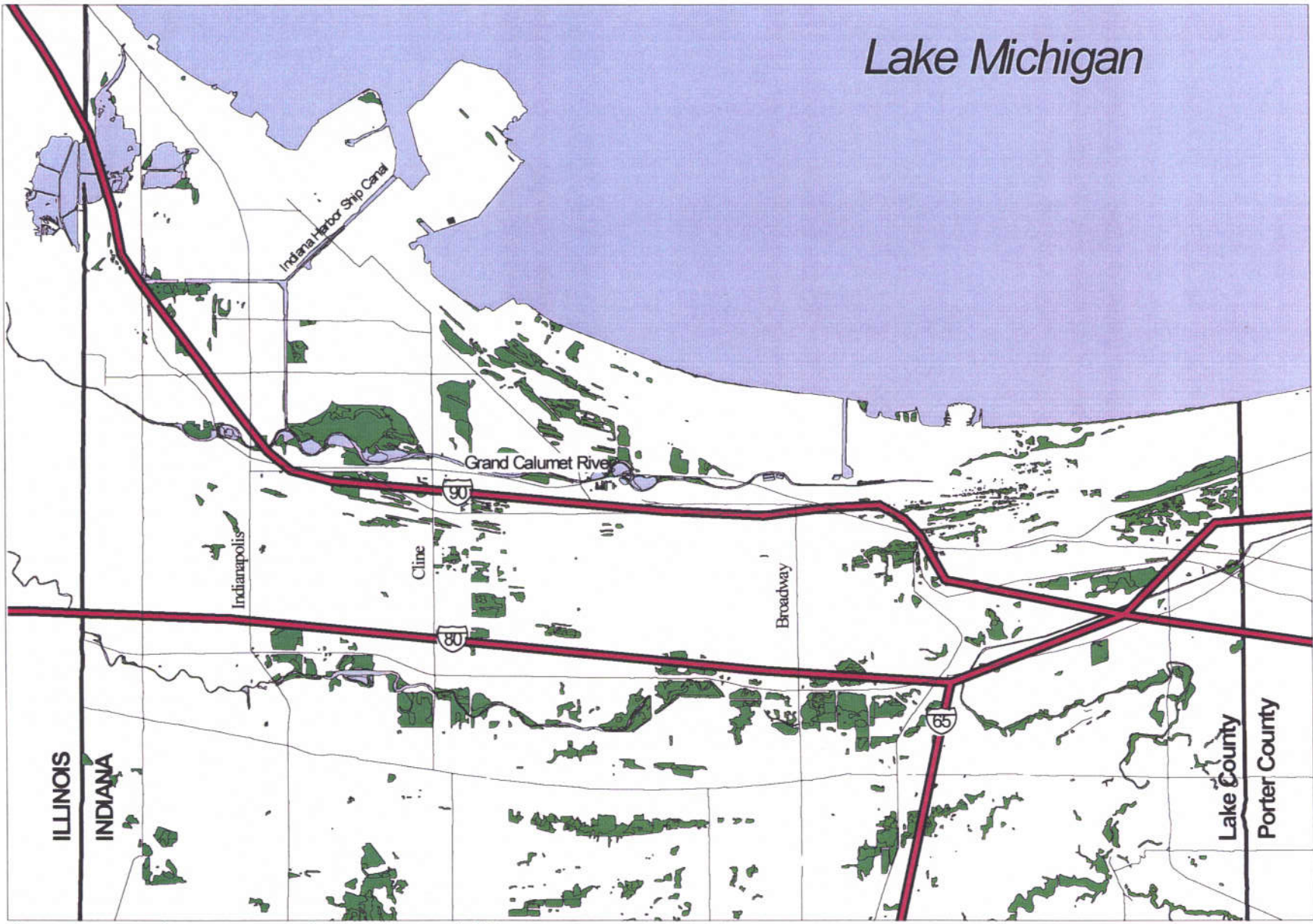
120



Source of Data: Habitat Subcommittee of the CARE Committee
 Date of Map: October 1997

Wetlands

121



Source of Data: National Wetlands Inventory
Date of Map: October 1997



B. Riparian Restoration

Habitat restoration/protection should accompany remedial activities along the river corridor. Activities that enhance or preserve shoreline habitat should be addressed during or immediately after dredging and/or *in situ* isolation of contaminants within the river channel. Contaminated side channels should be remediated. Banks should be stabilized by placement of clean materials (sand, soil, stone, etc.) and/or revegetated with native plants. Shallow emergent wetlands could be created by dredging or cutting back banks where feasible. These areas should then be revegetated to native plants. Control of invasive plants should be incorporated into riparian restoration.

The Grand Calumet River formed as a natural land feature along with the dune and swale on the Tolleston strandplain. Despite fragmentation, the river corridor and remnant sites share a common ecological heritage. The divisions between these areas are artificial impairments to the natural ecological processes. No matter how disturbed the landscape, the remnants are elements of a larger system. Understanding how that system functions and its potential for improvement gives context to habitat restoration projects along the river corridor. The long term viability of the native communities will depend on restoring ecological processes along the river and throughout the watershed. The key ecological processes of the dune and swale system are: the natural succession of communities, the interplay of prairie, Atlantic coastal plain and boreal species, the hydrologic link between the groundwater table and Lake Michigan, and periodic fires. Habitat restoration projects along the river corridor should be designed to help remove impairments to these processes.

C. Wetland Protection/Restoration

As the opportunity to create new wetlands is extremely limited, all wetlands remaining in the Area of Concern should be protected to the fullest extent possible. Preservation of wetlands was a primary purpose of the Advance Identification of Wetlands Unsuitable for Filling and Dredging described earlier in this document. For purposes of protection and/or restoration wetlands should be defined and recognized by the scientific definition adopted by the Indiana Wetlands Conservation Plan (1996): "Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year (from Cowardin et al., 1979. Classification of Wetlands and Deepwater Habitats of the United States, U.S. Fish and Wildlife Service FWS/OBS-79/31. 104 pp.)". Wetlands meeting this definition in the Area of Concern are identified on National Wetland Inventory Maps developed by the U. S. Fish and Wildlife Service (see Figure XXX). National Wetland Inventory maps were developed from aerial photographs with some ground proofing. As with all large scale mapping projects, the maps have some degree of error and actual wetlands identification should

be ground proofed.

The responsibility to protect wetlands is described in the U.S. EPA Guidelines to Section 404 of the Clean Water Act. Individuals must obtain a permit from the U.S. Army Corps of Engineers in order to fill wetlands meeting regulatory definitions. The U.S. Army Corps of Engineers is required to deny a request for a permit if the proposed activity fails to comply with the guidelines. Proposed activities fail to meet the guidelines when: a) there is a less damaging alternative; b) will result in adverse affects on water quality; or c) there will be adverse affects on fish and wildlife or wetland functions.

Filling, draining or development of all remaining wetlands in the Area of Concern should be prevented. All legal avenues available should be employed to prevent draining or filling of Advanced Identified Wetlands. Restoration of degraded wetlands should be given a high priority.

D. Instream Habitat Restoration

Activities that could be completed to enhance instream habitat include the construction of underwater riffles by placement of gravel or cobble in deeper areas of the channel, construction of Lunker boxes along steep banks to create cover for fish and add stability to banks, placement of other structures within the remediated channel as biologs, halflogs, or natural snags to enhance cover for various species of fish. The feasibility of placement of underflow culverts to create silt free areas within the stream channel (Kelso and Hartig, 1995) might also be explored to enhance fish spawning areas within the river channel. The feasibility of creating off channel shallow wetland areas should be explored. Cleaning and replanting side channels, dredging shallow off channel areas and connecting or reconnecting wetlands, lagoons, ponds and lakes with the river should all be considered. Enhancement of sheet pile walls with sloping cobble in areas outside the navigation channel should also be explored.

E. Invasive Plant Control

A major stressor to habitat function in the Area of Concern is the large, sometimes monotypic, expanses of invasive plants such as common reed, purple loosestrife, narrow-leaved cattail and others along the river, in wetland areas and in terrestrial habitats in the Area of Concern. A major effort should be initiated to eliminate where possible, and control where elimination is not possible, these invasive species. Areas where these plants are removed should be replanted and/or monitored to ensure native vegetation reestablishment.

The proliferation of exotic species is one of the greatest management concerns in the region. Species introduced through human activity, that have no natural controls, need to be removed manually. Although they will never be completely eradicated, effective management programs can prevent their spread. Phragmites and purple loosestrife are exotic species that are well established throughout the entire river corridor, and need to be addressed at a system-wide level. Each purple loosestrife plant can produce as many as 250,000 seeds, that are dispersed through

flowing water. Phragmites spreads by sending off long rhizomes and seeds. Both of these plants form large monocultures, choking out beneficial native species. The long-term viability of all wetland habitat is subject to our ability to control these plants throughout the entire river system. Control of non-native species will be an ongoing management issue. Programs to control exotic species need to be established to ensure the integrity of both natural areas and restored habitat.

Without proper management the long-term viability of conservation and restoration efforts is questionable. The ongoing stewardship requirements of sites and identification of potential land management agencies or organizations is a necessary part of planning restoration projects.

II. Conclusion

Individual actions alone may not result in delisting of impaired uses. However, voluntary actions initiated through or in support of the Remedial Action Plan process, coupled with regulatory action initiated in support of the Remedial Action Plan may lead to delisting. Environmental Performance Partnership Agreements also support Remedial Action Plan goals. These actions will at least fill information gaps or delineate new actions to be accomplished to lead to ecosystem health.