State of Indiana

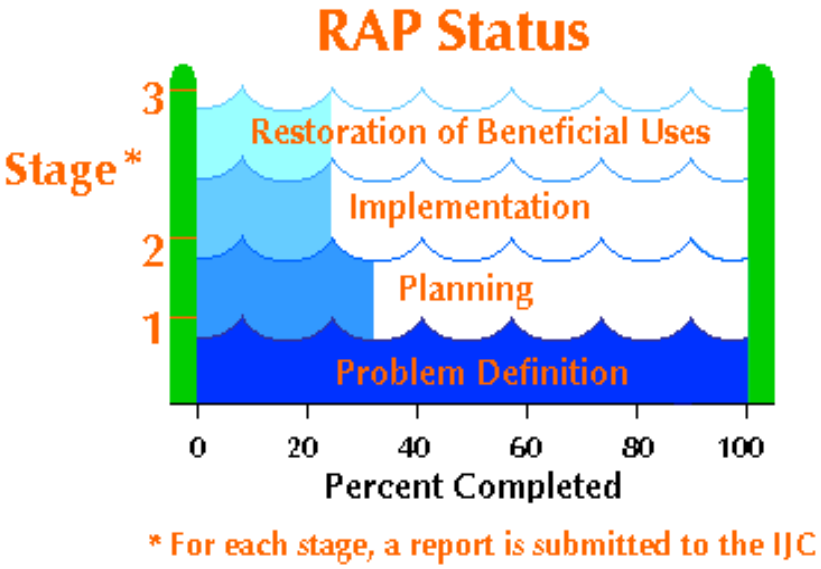
Grand Calumet River Area of Concern

Background

The Grand Calumet River, originating in the east end of Gary, Indiana, flows 13 miles (21 km) through the heavily industrialized cities of Gary, East Chicago and Hammond. The majority of the river's flow drains into Lake Michigan via the Indiana Harbor and Ship Canal, sending about one billion gallons of water into the lake per day. The Area of Concern (AOC) begins 15 miles (24 km) south of downtown Chicago and includes the east branch of the river, a small segment of the west branch and the Indiana Harbor and Ship Canal. Today, 90% of the river's flow originates as municipal and industrial effluent, cooling and process water and stormwater overflows. Although discharges have been reduced, a number of contaminants continue to impair the AOC.

RAP Status

The Stage 2.5 Remedial Action Plan is under revision for submittal to the International Joint Commission. Stage 2.5 extends the Stage 2 ecosystem approach and reviews how each regulatory, voluntary and enforcement activity in the AOC helps restore beneficial uses. The document begins to link these activities to environmental stressors. With the Citizens Advisory for the Remediation of the Environment (CARE) committee's assistance, the State expects to finish the Stage 2.5. By tracking the myriad of activities that help restore beneficial uses, the CARE committee and State have begun to track Stage 3 progress, implementation.



The State submitted a Stage 2 document to the International Joint Commission in December 1997. Stage 2 links physical, biological and chemical stressors to each use impairment. Due to extensive use impairments and the complex nature of the ecosystem activities required to restore those uses, the RAP process divided Stage Two into smaller, more manageable components for planning purposes. It also makes integration of each new component an important concern as the planning process proceeds.

The Remedial Action Plan (RAP) process produced a Stage One document in January 1991.

Beneficial Use Impairments

Use Impairments -- Grand Calumet AOC			
√	Restrictions on fish and wildlife consumption	√	Eutrophication or undesirable algae
√	Tainting of fish and wildlife flavor	√	Restrictions on drinking water consumption, or taste & odor
√	Degradation of fish and wildlife populations	√	Beach closings
√	Fish tumors or other deformities	√	Degradation of aesthetics
√	Bird or animal deformities or reproductive problems	√	Degradation of phytoplankton and zooplankton populations
√	Degradation of benthos	√	Added cost to agriculture and industry
√	Restriction on dredging activities	√	Loss of fish and wildlife habitat

Problems in the AOC include contamination from polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs) and heavy metals, such as mercury, cadmium, chromium and lead. Additional problems include high fecal coliform bacteria levels, biochemical oxygen demand (BOD) and suspended solids, oil and grease. These contaminants originate from both point and nonpoint sources.

Nonpoint sources include:

- **Contaminated Sediment**. The Grand Calumet River and Indiana Harbor and Canal contain 5 to 10 million cubic yards (3.9 to 7.7 million cubic meters) of contaminated sediment up to 20 feet (6 m) deep. Contaminants include toxic compounds (e.g., PAHs, PCBs and heavy metals) and conventional pollutants (e.g., phosphorus, nitrogen, iron, magnesium, volatile solids, oil and grease).

- **Industrial Waste Site Runoff**. Stormwater runoff and leachate from 11 of 38 waste disposal and storage sites in the AOC, located within .2 mi (.3 km) of the river, are degrading AOC water quality. Contaminants include oil, heavy metals, arsenic, PCBs, PAHs and lead.

- **CERCLA Sites**. There are 52 sites in the AOC listed in the federal Comprehensive Environmental Response Compensation and Liability System (CERCLA). Five of these sites are Superfund sites on the National Priorities List (NPL).

- **Hazardous Waste Sites under RCRA**. There are 423 hazardous waste sites in the AOC regulated under the Resource Conservation and Recovery Act (RCRA), such as landfills or surface impoundments, where hazardous waste is disposed. Twenty-two of these sites are treatment, storage and disposal facilities.

- **Underground Storage Tanks (USTs)**. There are more than 460 underground storage tanks in the AOC. More than 150 leaking tank reports have been filed for the Lake County section of the AOC since mid-1987.

- **Atmospheric Deposition**. Atmospheric deposition of toxic substances from fossil fuel burning, waste incineration and evaporation enter the AOC through direct contact with water, surface water runoff and leaching of accumulated materials deposited on land. Toxins from this source include dioxins, PCBs, insecticides and heavy metals.

- **Urban Runoff**. Rain water passing over paved urban areas washes grease, oil and toxic organics such as PCBs and PAHs into AOC surface waters.

- **Contaminated Groundwater**. Groundwater contaminated with organic compounds, heavy metals and petroleum products contaminates AOC surface waters. The United States Environmental Protection Agency (U.S. EPA) estimates that at least 16.8 million gallons (63.6 million liters) of oil float on top of groundwater beneath the AOC.

Point sources of contaminants include:

- **Industrial and Municipal Wastewater Discharges**. Three steel manufacturers contribute 90% of industrial point source discharges to the AOC. One chemical manufacturer discharges into the AOC. Permitted discharges include arsenic, cadmium, cyanide, copper, chromium,

lead and mercury. Three municipal treatment works (Gary, Hammond and East Chicago Sanitary Districts) discharge treated domestic and industrial wastewater into the AOC.

- **Combined Sewer Overflows (CSOs)**. Fifteen CSOs contribute untreated municipal waste, including conventional and toxic pollutants, to the AOC. Annually, CSO outfalls discharge an estimated 11 billion gallons (41.6 billion liters) of raw wastewater into the harbor and river. Approximately 57% of the annual CSO volume is discharged within eight miles (12.9 km) of Lake Michigan, resulting in nearshore fecal coliform contamination.

Historically, the Grand Calumet River supported highly diverse, globally unique fish and wildlife communities. Today, remnants of this diversity near the AOC are found in the Gibson Woods and Pine nature preserves. These areas contain tracks of dune and swale topography and associated rare plant and animals species, such as Franklin's ground squirrel, Blanding's turtle, the glass lizard and the black crowned night heron, among others. The problems mentioned above, however, have impaired many desired uses of the AOC, including the 14 beneficial uses listed below.

Restrictions on Fish & Wildlife Consumption:
Total fish consumption restrictions exist for the Grand Calumet River, the Indiana Harbor and the Canal. Partial consumption restrictions exist for all of Lake Michigan. The Indiana Department of Environmental Management (IDEM) has identified degraded fish populations, including tainted fish.

Tainting of Fish & Wildlife Flavor:
No current information is available on this BUI. For further information, contact the RAP Coordinator listed under "Contacts" below.

Degradation of Fish & Wildlife Populations:
A lack of food, low dissolved oxygen and toxic stress have destabilized river, harbor and canal resident fish communities. Pollution-tolerant species such as carp and oligochates (worms) dominate.

Bird or Animal Deformities or Reproductive Problems:
No current information is available on this BUI. For further information, contact the RAP Coordinator listed under "Contacts" below.

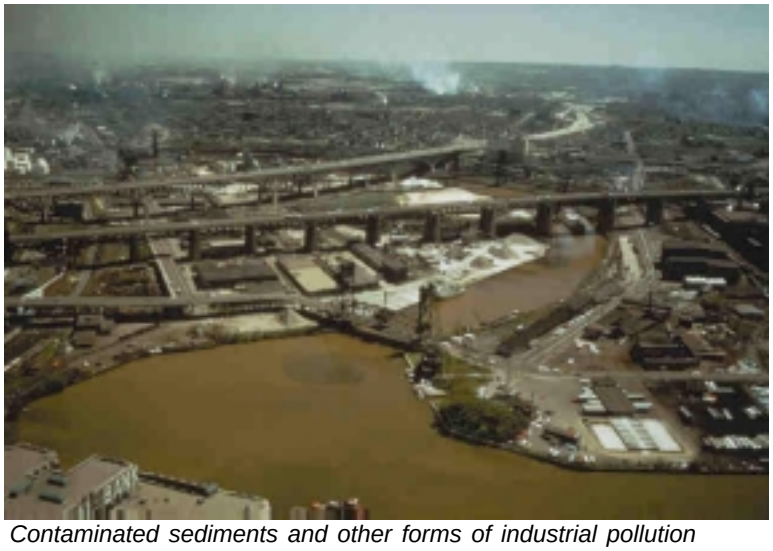
Degradation of Benthos
Only sludge worms inhabit the Indiana Harbor and ship Canal, suggesting that severe pollution exists. Phytoplankton counts are low in nearshore Lake Michigan.

Restrictions on Dredging Activities
Due to concern over disposing of contaminated sediments, no dredging activities have occurred since 1972. Accumulated sediment in the harbor and restrictions on sediment removal have reduced shipping capacity 15%, increasing shipping costs.

Eutrophication or Undesirable Algae:
No current information is available on this BUI. For further information, contact the RAP Coordinator listed under "Contacts" below.

Restrictions on Drinking Water Consumption, or Taste & Odor:
No current information is available on this BUI. For further information, contact the RAP Coordinator listed under Contacts below.

Beach Closings
Swimming is prohibited in the river, harbor and canal. The Hammond Beach has been closed for several years.



Contaminated sediments and other forms of industrial pollution continue to plague the Grand Calumet River.

Degradation of Aesthetics
Debris litters the river banks and the canal. The river and harbor often have an oily sheen, and nearshore Lake Michigan waters often appear murky.

Degradation of Phytoplankton & Zooplankton Populations:
No current information is available on this BUI. For further information, contact the RAP Coordinator listed under Contacts below.

Added Cost to Agriculture & Industry:
No current information is available on this BUI. For further information, contact the RAP Coordinator listed under Contacts below.

Loss of Fish & Wildlife Habitat:
No current information is available on this BUI. For further information, contact the RAP Coordinator listed under Contacts below.

Progress and Achievements

RAP Milestones:
- The Stage 2.5 RAP is under revision for submittal to the IJC. The CARE committee has proposed a suite of short-term and long-term environmental indicators and endpoints to delist each beneficial use.
- The Stage Two document was submitted to the IJC in December of 1997.
- The Remedial Action Plan (RAP) process produced a Stage One document in January 1991.
- The first success of the RAP was the opening of the first Regional Office in Gary, Indiana in 1990. Since then, the Northwest Regional Office has grown to include more than 20 staff people, including air, land and water quality inspectors, RAP and Lakewide Management Plan (LAMP) coordinators and a director of the office.

Recent achievements and other projects:
- U.S. Steel Gary Works plans to begin dredging the East Branch of the Grand Calumet River. The project should begin in 2002 and will last 3 years.
- On July 20, 2001, the City of Hammond acquired the north basin of George Lake. The City of Hammond will consult with the George Lake Watershed-Environmental Advisory Committee on how to restore, preserve and enhance George Lake.
- IDEM is working with the RAP technical workgroup, USEPA and GLNPO to develop the AOC delisting guide document. Work began in June 2001.
- IDEM completes technical work for the Total Maximum Daily Load (TMDL) assessment, May 2001.
- IDEM and The U.S. Fish and Wildlife Service release the Sediment Injury Report for the Grand Calumet River as part of the Natural Resource Damage Assessment (NRDA), April 2001.
- IDEM and Illinois-Indiana Sea Grant sponsor: *The First Biannual Grand Calumet River: Science in the Area of Concern Symposium* at Indiana University Northwest, March, 2001.
- ISPAT-Inland performed a demonstration of a hydraulic dredge (Eddy Pump) in the Indiana Harbor Ship Canal, September 2000.
- Permit for the Passive Dewatering Facility for U.S. Steel Dredging project is approved by IDEM and EPA.
- Wolf Lake Bi-State Vision Document completed.
- IDEM established 14 Technical Teams to develop indicators for the RAP.
- Costal Zone Management Funding is being sought for the Southern Lake Michigan. The area includes the AOC.
- IDEM is working with USEPA / GLNPO in developing the Lake Michigan Monitoring Coordinating Council.
- IDEM developed a RAP web page for the Grand Calumet River Citizens Advisory for the Environment (CARE).
- The City of Hammond has completed the Youth Golf Course on the south basin of George Lake.
- The ADID project is complete.


Dredging of the Grand Calumet is in process

Water Quality and Toxic Pollution Prevention

- The draft Water Quality Component of Stage Two is being finalized in response to public comments. Several of its provisions are already being implemented through indirect methods, although direct resources for implementation have been limited.

Plumes of toxic pollution into the Grand Cal will soon be a site of the past as implementation of the RAP moves forward.

- The RAP process has developed and obtained funds for a Toxic Pollution Prevention (TPP) Program on the waterway through a highly participatory, public process. The Gary, Hammond and East Chicago Sanitary Districts (River Districts) have formally adopted the RAP's Common Policy on Toxic Pollution Prevention.
- The RAP process has involved IDEM's pollution prevention staff, local industry and the general public in implementing a Household Hazardous Waste Collection Project in the AOC. Collections began in April 1994. Local educators have helped IDEM develop an Enviromobile which stops at area schools to educate school children about ways to prevent pollution while increasing their environmental consciousness.
- IDEM has funded a Steel Industry Pollution Prevention Project at Indiana University Northwest to involve local steel makers in minimizing waste.
- IDEM and U.S. EPA have funded a sediment cleanup and restoration alternatives document through the RAP process. This document is currently available to the public.

Reduction of Combined Sewer Overflows

- The Stage One RAP identified CSOs as a major cause of contamination of sediments. The RAP process has begun to address CSOs from the three municipal sanitary districts on the river. IDEM and the U.S. EPA Consent Decrees now require the sanitary districts to implement CSO Operational Plans and the state is including additional CSO provisions. IDEM is including additional CSO requirements in discharge permits as they are renewed in the basin pursuant to a state CSO Strategy.

Urban Nonpoint Source Pollution Reductions

- The RAP process has developed an Urban Nonpoint Source Pollution Control Program with the Lake County Soil and Water Conservation District, local officials and organizations, School of Public and Environmental Affairs and the Purdue School of Civil Engineering. This project demonstrated best management practices by cooperating with public and private landowners, and estimated the amounts of nonpoint source pollution and the costs of locally financing best management practices. A watershed land use study has been produced for the AOC and sub-area watershed management plans are being developed, starting on the west side of the AOC.
- The U.S. Geological Survey (USGS) is currently mapping fill sites, especially the sites where steel slag has historically been deposited. This fill map will have multiple uses for ecosystem restoration due to the high water table and the historical dune and swale topography of the AOC. It will be especially useful in identification of likely sources of groundwater and wetland contamination.

Biodiversity and Habitat Restoration

- A volunteer steward from the Friends of Gibson Woods, Mr. Paul Labus, co-chairs this Subcommittee with Mr. Jim Smith from IDEM's office of Emergency Response. Mr. Labus and Mr. Smith lead the Subcommittee in a group consensus process to finalize and prioritize habitat goals and objectives. They focus on preservation, protection and restoration of upland natural areas of high native biodiversity, as well as on improvement of aquatic habitat for beneficial species (especially native species).

- In a cooperative effort, IDEM, U.S. EPA, U.S. Fish and Wildlife Service and IDNR have obtained a new state Nature Preserve on the Grand Calumet River in Gary through natural resource damage litigation about the Midco I and II Superfund sites. Called the "Bongi property", this 102 ha (253 acre) parcel contains one of the highest biodiversity areas of vascular plants in the state and is part of the historic Chicago Lake Plain of dune and swale topography.
- The RAP process has initiated a RAP Rights of Way (ROW) Project to cooperate with ROW owners to manage their land in an ecologically sensitive manner. This project includes railroads, utilities and pipeline companies in a joint effort to reconnect portions of the biological corridors which once paralleled the lake shore.

Volunteer Stewards Network

- The RAP's Stage Two Habitat Component calls for the development of a volunteer stewards network to restore natural areas of high biodiversity. The RAP process has fostered the development of the Friends of Gibson Woods, an independent volunteer stewardship organization, to help restore native dunes and oak savannas toward their pre-settlement condition, including the Bongi property and the Gibson Woods Nature Preserves.
- The Nature Conservancy, as part of its Southern Lake Michigan Conservation Initiative, is organizing a Calumet Stewards Network and will focus on the preservation and restoration of the natural areas of highest biodiversity in the Calumet Region.

Community Involvement

The community is currently involved in the work of the RAP through the CARE Committee (The Citizens Advisory for the Remediation of the Environment).

Schedule

Meetings:

- The Citizens Advisory for the Remediation of the Environment (CARE Committee) meets every third Thursday of every month.

Outlook

The Stage Two document currently contains an ecosystem approach for restoration of 14 impaired uses. The document uses a matrix system to prioritize restoration projects.

Current Priorities include:

- Continue the Natural Resources Damages Assessment.
- Complete the three-year Total Maximum Daily Load for the River and Canal.
- Complete design of the proposed confined disposal facility that will hold dredged sediments from the Canal's Federal Navigation Channel.
- Continue planning USX project to dredge five miles of Grand Calumet River.

Partners

- CARE (Citizens Advisory for the Remediation of the Environment) Committee
- East Chicago Waterway Management District
- Indiana Department of Natural Resources
- U.S. Army Corps of Engineers
- U.S. Department of the Interior
- U.S. Environmental Protection Agency
- U.S. Environmental Protection Agency, Great Lakes National Program Office (GLNPO)

Partners also include numerous local businesses, organizations, agencies, institutions, units of government and individuals.

Research

- *A Historical Perspective on the Flora of the Grand Calumet River; What are Realistic Expectations for Restoration?* Robin Scribailo, Purdue University North Central
- *Distribution of Chinook Salmon (Oncorhynchus tchawytscha) in the Grand Calumet River and Indiana Harbor Canal, Lake County, Indiana* - Joseph Exl, US Fish and Wildlife Service
- *Toward a Holistic Ecological Approach to Restoring the Grand Calumet River Basin* - Richard Whitman and Meredith B. Nevers, U.S. Geological Survey
- *Differentiating Human and Non-human E-coli Contamination by RAPD Analysis* - Charles C. Tseng and Evert W.T. Ting, Purdue University-Calumet
- *Polyaromatic Hydrocarbon Analysis of A Sediment Sample From the West Branch of the Grand Calumet River* - Kay Rowberg, Purdue University-Calumet
- *Status of Wetland Flora along the Grand Calumet River with a Regard to the Potential Impacts of Proposed Sediment Removal* - Young Choi, Purdue University-Calumet
- *An Ecosystem Partnership in the Calumet basin in Illinois: A review with Questions* - Janet I. Haplin and Mark Bouman, Chicago State University

Publications

- Proceedings for *Grand Calumet River: Science in the Area of Concern Symposium*, held at Indiana University Northwest - March, 2001.
- *The Sediment Cleanup and Restoration Alternatives Project* document, funded by IDEM and the U.S. Army Corps of Engineers, is currently available to the public.
- The Natural Resources Trustees have issued an assessment plan for public review. This plan supports the RAP process.

Contacts

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