Burning Rivers

Revival of Four Urban-Industrial Rivers that Caught on Fire

by

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Ecovision World Monograph Series
Aquatic Ecosystem Health & Management Society

- Cold winter day
- Workman’s torch ignited fire
- 5,500 kg of oil and grease discharged daily
- The river was closed for several days
- Fire was no big deal
The Buffalo River is a repulsive holding basin for industrial and municipal wastes. It is devoid of oxygen and almost sterile. Oil, phenols .... are present in large amounts.
Cuyahoga River Fire – June 22, 1969

- Wooden debris and substantial oil pollution
- Sparks from a passing train ignited fire
- Flames climbed five stories
- Fire lasted 30 minutes with $50,000 damage to bridges
Cuyahoga’s Long History of River Fires

- Fires occurred in 1868, 1883, 1887, 1912, 1922, 1936, 1941, 1948, and 1952
- The 1952 fire was a five alarm fire with $1.5 million of damage (see photo at left)
Rouge River Fire – Oct. 9, 1969

- Sparks from an acetylene torch ignited oil and wooden debris
- Flames shot 50 ft in the air
- 10 pieces of DFD equipment and 65 men fought the fire
“When you have a river that burns, for crying out loud, you have troubles. It happened on Cleveland’s Cuyahoga, and now it has happened on the Rouge River.”

Detroit Free Press Editorial
Oct. 12, 1969
Chicago River Fires

- Great Chicago Fire of 1871
- Oil waste on river ignited in 1888
- A lighted cigar dropped in the river in 1899 started a river fire that had to be extinguished by fire boats and land engines
Four Burning Rivers

- Perceived as working rivers that supported commerce and technological progress
- All dredged and channelized, and one even redirected
- River fires perceived locally as part of the cost of doing business
- River fires document peak water pollution and peak societal indifference to it
- Equally important are the revival stories of these four burning rivers
Revival of the Buffalo River
Buffalo and the Erie Canal

- Early fur trading post
- Terminus of the Erie Canal - 1825
- Opened the interior of the continent
- Provided safe and reliable passage for vast numbers of people and goods
Queen City of the Lakes

- Early ship building port
- Grain storage capital of the world and leading miller of grains in mid-1800s
- At the peak of maritime era in the 1800s, Buffalo was the 4th largest port in the world
- “Queen City of the Lakes”
Industrial and Municipal Expansion

- Stanley Spisiak – Mr. Buffalo River
- “Bucket of Slop” - 1966
- Executive Order banning open-water disposal of contaminated sediment
Raising Awareness of River Pollution

- Spisiak spoke out loudly and often about river pollution
- 1966 boat tour with Senator Robert Kennedy
- Spisiak credited with controlling industrial pollution
Buffalo River Revival

- Buffalo River Improvement Corporation in 1967
- Improved dissolved oxygen (< 1 mg/L in 1960s; > 5 mg/L from 1972 onward)
- Pollution prevention & control in the 1970s & 1980s
- RAP – 1985-present (BNR first nonprofit to be a local sponsor for a GLLA project)
- Biologically dead in 1960s; improved macrobenthic invertebrate community since
**Buffalo River Revival**

- Return of the fishery
- Return of peregrine falcons

<table>
<thead>
<tr>
<th>Date</th>
<th>Status of Fishery</th>
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<tbody>
<tr>
<td>1920s</td>
<td>No fish</td>
</tr>
<tr>
<td>1930s-1960s</td>
<td>No fish</td>
</tr>
<tr>
<td>1972</td>
<td>One sheepshead collected</td>
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<tr>
<td>1973-1974</td>
<td>15 species</td>
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<tr>
<td>1981</td>
<td>32 species</td>
</tr>
<tr>
<td>1984</td>
<td>24 species</td>
</tr>
<tr>
<td>1987</td>
<td>29 species</td>
</tr>
<tr>
<td>1991</td>
<td>32 species</td>
</tr>
<tr>
<td>1992</td>
<td>32 species</td>
</tr>
<tr>
<td>1993</td>
<td>24 species</td>
</tr>
<tr>
<td>2003-2004</td>
<td>25 species</td>
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Revival of the Cuyahoga River
Cleveland’s Early Transportation

- Ohio & Erie Canal opened in 1825
- Became major port
- One of the leading wooden ship building centers in the Great Lakes
- Cleveland became “Forest City”
Industrial Development

- Cleveland became the inevitable meeting place for coal and iron ore
- Industrial powerhouse
- Cleveland Flats
- Standard Oil Refinery in Cleveland, 1889
- Cuyahoga became a “flowing dump”
Pollution of Lake Erie & the Cuyahoga

- 1965 edition of Time Magazine
- Substantial oil pollution
- 16,000 tonnes of oil & grease in 599,000 tonnes of sediment
- Frank Samsel and his “Putzfrau” – the cleaning lady
Activist David Blaushild Raised Public Awareness

- May 22, 1964 advertisement in the Cleveland Plain Dealer
- David Blaushild, an automobile dealer, took out advertisements in the Cleveland Plain Dealer that generated much public support
• Blaushild also put up a billboard stating “Let’s Stop Killing Lake Erie”

• Blaushild, reporters for the Cleveland Plain Dealer, and other concerned citizens were the catalyst for federal public hearings on pollution of Lake Erie held in 1965
Cuyahoga River Revival

- Pollution prevention & control in the 1970s & 1980s
- RAP – 1985- present (Ohio EPA and CRCPO leadership)
- Improved macrobenthic invertebrate community since 1960s
- Improved dissolved oxygen
- No fish in lower river in the 1960s; 70 species today
- Return of bald eagles, peregrine falcons, and osprey
IBI Calculated from Fishery Data
Revival of the Rouge River
Industrial Development at Lower End

• Heavy industry at lower end
• Henry Ford consolidated automobile manufacturing at the Rouge Plant – the largest integrated factory in the world at that time (construction began in 1917 and was completed in 1928)
Ship Building – Eagle Boats

- During World War I submarine chasers called “Eagle Boats” were built along the lower Rouge River
- Detroit went on to become the “Arsenal of Democracy”
Tipping Point = the point in time where there is urgent need to take action and that, if nothing is done, we could see irreversible harm to an ecosystem
Oil Pollution

- In 1946-1948, 5.9 million gallons of oil & other petroleum products were discharged into the Rouge and Detroit rivers each year
- Enough to pollute the entire western basin of Lake Erie
Rouge Becomes Health Hazard

- As people began moving to the suburbs, intense urbanization resulted in widespread CSO and storm water problems.
- Raw and partially treated sewage was overwhelming the river.
Tipping Point

• In 1985 man dies of leptospirosis or rat fever
• Health Department advises the public to avoid contact with the river
• All 48 watershed communities join forces to clean up the river through the Rouge River RAP
Championing a Watershed Effort

- Jim Murray championed the Rouge watershed efforts
- Rouge institutional framework evolved from Rouge River Basin Committee, to Friends of the Rouge, to RRAC, to RRNWWDP, to ARC
- All 48 watershed communities join forces to clean up the river
The First Watershed-Based Storm Water Permit in the Nation

- Coordinate subwatershed planning
- Support watershed monitoring
- Coordinate public education and involvement under the permit
Rouge River Revival

- Pollution prevention & control in the 1970s & 1980s
- CSO and storm water controls in 1990s through present
- Elimination of obnoxious odors
- Remediation of Newburgh Lake and lifting of a health advisory on certain species
- Improved dissolved oxygen and elimination of frequent fish kills
- Some limited recovery of macrobenthic invertebrates and the fishery
- Return of pergrines near mouth
Improved Dissolved Oxygen

The bar chart illustrates the trend of improved dissolved oxygen (DO > 5mg/L) from 1973 to 2005. The percentage of years with improved DO has gradually increased over the years, indicating a positive trend in water quality.
Revival of the Chicago River
Waterborne Disease Epidemics Were the First “Tipping Point”
Citizens Spoke Out

• A Citizen’s Association was formed in 1880 to address water pollution problems.
• In 1889 the Sanitary District of Chicago was formed to address the epidemics.
• This led to the construction of the Chicago Ship and Sanitary Canal and the reversal of the Chicago River.
Bubbly Creek in 1916
Chicago River Revival

- Elimination of waterborne disease epidemics in the early 1900s
- Reversal of flow of the Chicago River away from Lake Michigan and to the Mississippi River system in 1889-1910
- Industrial and municipal water pollution control, particularly in the 1960s, 1970s, and 1980s
- Improvement of dissolved oxygen conditions since the 1960s
Chicago River Revival - Continued

- Improved water quality particularly downstream of Water Reclamation Plant outfalls
- Dramatic improvement in the fishery, from 10 species in 1974 to 70 species in 2006
- Return of peregrine falcons
It must be remembered...

- Chicago River constructed for navigation and water reclamation, not habitat
- Major concern for Asian carp and keeping them out of the Great Lakes
- There is growing public pressure to hydrologically separate the Chicago Ship and Sanitary Canal from Lake Michigan
More Work to be Done!

Although much has been accomplished in the revival of these four burning rivers, much needs to be done to restore their physical, chemical, and biological integrity.
Burning Rivers Challenges

- Preventing pollution
- Controlling contaminants at their source
- Remediating contaminated sediments and brownfields
- Adequately controlling nonpoint source pollution
- Rehabilitating and conserving habitats and biodiversity
- Achieving sustainable development
Challenges continued

• Simply put, if we don’t change to more preventive and sustainable design, planning, and management in these watersheds and communities, we will continue to be react to “tipping points” and practice crisis management.

• The challenge is to truly embrace sustainability, become proactive and avoid the next “tipping point”.

• All the major challenges identified in the book require that we learn to live sustainably.
• What were the major accomplishments of the public outcry over pollution in the 1960s? Answer: Clean Water Act, Endangered Species Act, U.S.-Canada Great Lakes Water Quality Agreement, Earth Day, etc.

• What are the major accomplishment of the environmental movement today?

• Answer: Expansion and Proliferation of Non-Governmental Organizations
Critical Elements for Success

- Local ownership of decision-making process; well recognized community champion
- Cooperative learning
- Use of an ecosystem approach on a watershed scale
- Shared vision and objectives, and complementary and reinforcing actions
Critical Elements - Continued

• Cooperative planning that shares responsibilities for delivery of programs
• Partnerships built on trust and respect
• Step-wise approach to restoration of beneficial uses and achievement of long-term goals
• Dynamic tension between proponents of step-wise approach and provocateurs
Critical Elements - Continued

• Coupling of research and monitoring with management leads to better solutions

• Government responsiveness, not top-down, command and control management

• Incentives

• Measuring and celebrating progress in a very public fashion – toward measurable endpoints
2011 Winner in the Scientific Category