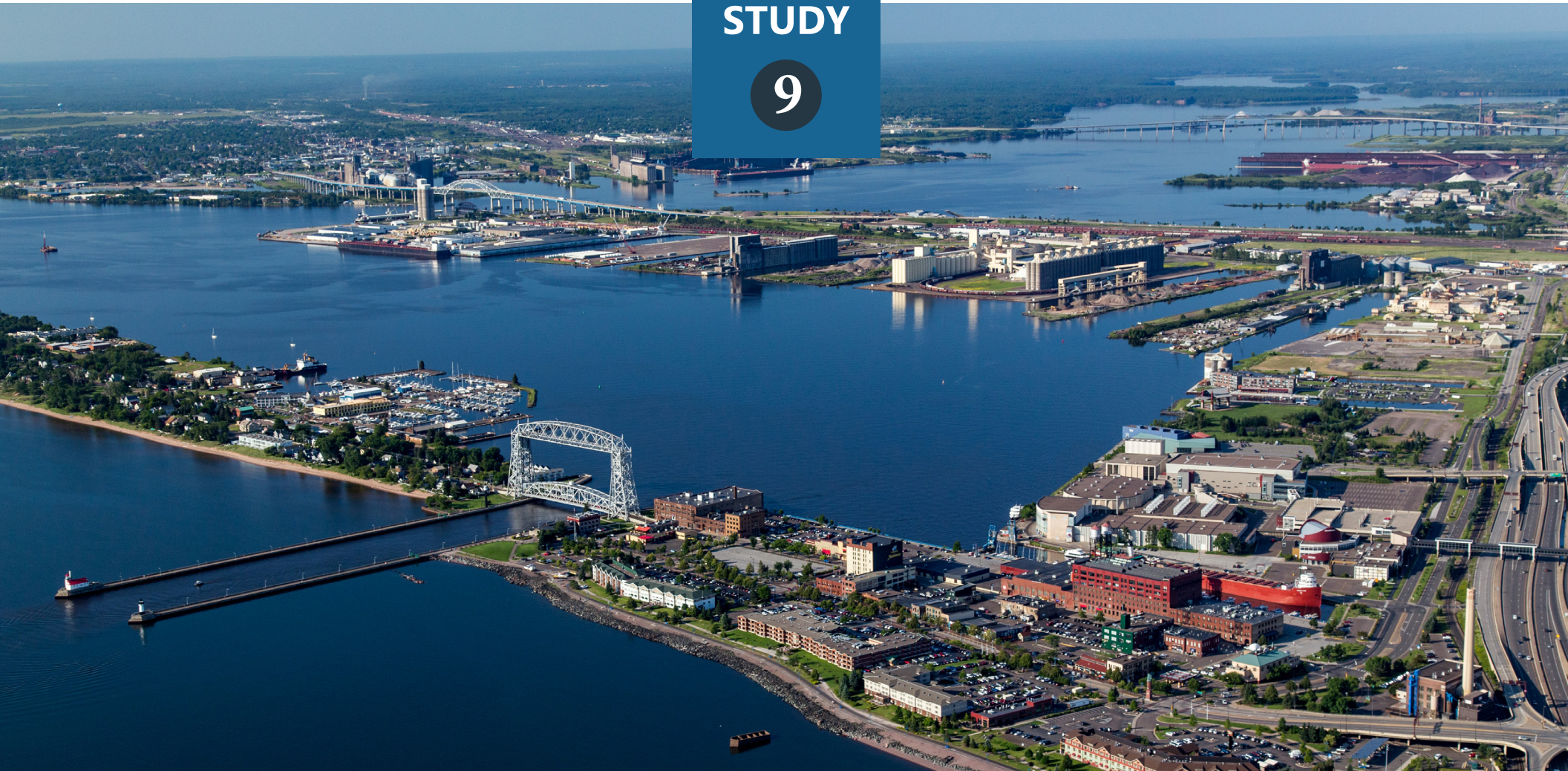


CASE
STUDY

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From Remediation to Restoration and Revitalization

THE ST. LOUIS RIVER STORY



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The St. Louis River Story

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During the late 1800s and early 1900s, Duluth, Minnesota, experienced tremendous growth and expansion of industry, including grain, timber harvesting, iron mining, manufacturing, shipping by rail and boat, and shipbuilding. Tycoons such as Andrew Carnegie, Jay Cooke, Andrew Mellon, J.P. Morgan, and John D. Rockefeller helped develop Duluth into an industrial powerhouse and booming community. Located at the western end of the Great Lakes-St. Lawrence Seaway System and situated along a natural harbor at the mouth of the St. Louis River, Duluth was the busiest port in the United States during the early 1900s, surpassing New York City in gross tonnage.

Through this period, the St. Louis River Estuary was changed substantially to accommodate development along the water. At the river mouth, Superior Bay and St. Louis Bay form a large natural harbor at the western end of Lake Superior. These bays were an expansive, shallow marsh prior to European settlement.

Over time, an estimated 7,000 acres (2,800 hectares) of aquatic habitat was dredged or filled (Minnesota Pollution Control Agency [MPCA] and Wisconsin Department of Natural Resources [WDNR], 1992). Today, the area is home to the largest dry bulk port in the U.S. and the largest port on the Great Lakes (U.S. Army Corps of Engineers, 2015). The navigation channel is regularly dredged to 27 feet (8.2 meters) to accommodate the bulk cargo ships that carry grain, taconite, limestone, timber, coal, and sometimes passengers to U.S. and international ports (MPCA and WDNR, 1992; Duluth Seaway Port Authority, 2018).

Superior Bay and St. Louis Bay were also home to the industrial heart of the cities of Duluth and Superior, Wisconsin. Heavy industry that operated during the late 1890s through the mid-1900s built much of the cities' wealth and the river communities' identities. Duluth produced about one-half billion board feet of white pine lumber in the late 1800s. Along its banks, the

St. Louis River had steel foundries, mills and blast furnaces, grain elevators, and shipbuilding operations. Later, facilities that made everything from chemicals and refrigerators to shoes lined the river.

This industrial expansion took a toll on the health of the river through the discharge of untreated or partially treated industrial and municipal effluents, resulting in the contamination of estuarine sediments. The legacy of industrial development is still apparent today in Superfund sites, contaminated sediment hotspots, and sawmill waste sites that compromise aquatic habitat.

Discharges and legacy pollution were from days prior to adoption of current environmental protection laws and rules. With the advent of the Clean Water Act in 1972, U.S.-Canada Great Lakes Water Quality Agreement in 1972, Endangered Species Act in 1973, and Comprehensive Environmental Response, Compensation and Liability Act in 1980, a basic

structure of pollution control and environmental regulation was established, effectively limiting pollutant discharge and the likelihood of creating additional contaminated sites.

In the 1980s, the era of heavy industry ended. The loss devastated the area and inspired a Duluth billboard, “Will the last one leaving Duluth please turn out the light?” In addition to the environmental degradation left behind, the Twin Ports faced the loss of their economic base and identity.

Remedial Action Plan Era

At the same time industry was leaving the Twin Ports, efforts to clean up the river started in earnest. In 1985, the International Joint Commission’s Great Lakes Water Quality Board identified the St. Louis River as one of 42 Great Lakes Areas of Concern (AOCs), requiring the development and implementation of a remedial action plan (RAP) to restore all impaired beneficial uses. The binational commitment to RAPs was incorporated into the 1987 Protocol to the U.S.-Canada Great Lakes Water Quality Agreement. The initial Stage I RAP (i.e., problem definition) for the St. Louis River AOC was completed in 1992 (MPCA and WDNR, 1992), and the initial Stage II RAP (i.e., action plan to restore beneficial use impairments) was

completed in 1995 (MPCA and WDNR, 1995). To ensure continued progress on the newly approved RAP, the original Citizen Advisory Committee, which was formed in 1987 to support the creation of the RAP, was subsequently incorporated into a nonprofit organization in 1996 called the St. Louis River Citizen’s Action Committee (Williams, 2015). The organization has since been renamed the St. Louis River Alliance.

Although the Stage I and II RAPs did not have budgets and action timelines necessary to secure the financial commitments, the alliance continued to organize the partners to produce the *Lower St. Louis River Habitat Plan* in 2002 (Williams, 2015). Establishment of the Great

Lakes Restoration Initiative (GLRI) in 2010 catalyzed the implementation of the habitat plan, as well as a more focused set of management actions delineated in the 2013 *St. Louis River Area of Concern Implementation Framework: A Roadmap to Delisting* (LimnoTech, Inc., 2013), including specific timelines and budget estimates to address the beneficial use impairments identified in the initial Stage II RAP.

The RAP process built on the success of ongoing regulatory actions that improved water quality, including approximately \$320 million to improve wastewater treatment infrastructure; \$85 million to remediate contaminated sediment at Wisconsin’s Hog Island-Newton Creek and



Contaminated sediment remediation in the St. Louis River, Duluth, Minnesota. Credit: Minnesota Pollution Control Agency.

Minnesota's St. Louis River Interlake Duluth Tar sites; and \$15 million to acquire and restore more than 16,000 acres (6,500 hectares) of habitat in Wisconsin (French et al., in press).

The development in 2013 of a plan for collaboration and funding helped identify and leverage the financial resources required to remediate and restore the AOC through a partnership approach (LimnoTech, Inc., 2013). Between 2011 and 2017, approximately \$57 million was raised and applied strategically toward restoration of impaired beneficial uses. Between 2018 and 2021, an additional \$155-170 million will be needed to implement all necessary remedial actions identified in the RAP that will



Western Waterfront Trail and Munger Landing along the St. Louis River. Credit: U.S. Environmental Protection Agency.

lead to future delisting (French et al., in press). Reaching this level of commitment is possible because a clear collective vision and goals have been translated into action by aligning plans and budgets to better connect with funding sources. At this time, the target date to complete all management actions, remove beneficial use impairments, and delist the AOC is 2025.

The actions currently underway through the St. Louis River RAP result from a long history of land development and natural resource use and exploitation. Today's focus on sediment remediation and habitat restoration aims to eliminate the ecological damage left as a legacy of these past practices. This new era of remediation and restoration requires an integrative approach that considers multiple uses and benefits, and a broad array of stakeholders and cooperative financial commitments.

Multi-faceted Waterfront Revitalization in Duluth

Duluth is evolving to embrace a new relationship with the St. Louis River by expanding the basis of its economy and identity. Tourists were historically drawn to the Lake Superior shores along the eastern side of Duluth, where there is a popular walking trail, commercial district, and tourism attractions; however, now attention is turning toward the western side of Duluth along

the banks of the St. Louis River. According to Don Ness, mayor of Duluth from 2008 to 2015:

There is no question that if not for Lake Superior, Duluth would be defined as a river city. Duluth should be defined by both the world's greatest lake AND the world's largest fresh water estuary. By doing so, we open up many possibilities along the River (City of Duluth, 2015a).

Capitalizing on this growing interest in the river, the City of Duluth developed a multi-faceted St. Louis River Corridor strategy that includes building mountain bike and multi-use trails; restoring or creating access to the St. Louis River through habitat restoration and infrastructure improvements; upgrading and enhancing neighborhood parks; and creating or improving nearby recreational amenities. Building on this St. Louis River revival, the city intends its efforts to support environmental restoration, enrich neighborhood quality of life, attract new homebuyers, establish a new visitor destination, stimulate appropriate development, and leverage additional funding (City of Duluth, 2015b). The initiative is being implemented through a public investment of \$18 million in bonds secured with a tourist tax (City of Duluth, 2015b).

The St. Louis River corridor continues to serve as the industrial heart of the city, but also is home to a rich outdoor tradition and abundant high-value natural areas (Williams et al., 2018). By turning toward the river, the City of Duluth is capitalizing on the natural assets and ecosystem services made more accessible and attractive through AOC cleanup actions (Williams et al., 2018). According to former Mayor Ness, “Most cities put a premium on making life easy; cities like Duluth put a premium on making life interesting” (Ross, 2014). By promoting world-class mountain biking, skiing, kayaking, and sailing in the city, Duluth is reclaiming its waterfront and inviting people back to the water through investments in access.

An important feature that will connect the community to the river is the extension of the Western Waterfront Trail, a walking, hiking, and biking trail that will continue to follow the riparian corridor for an additional 10 miles (16 kilometers) through much of the formerly industrialized and contaminated lands. To complete the trail, large-scale remediation and restoration projects are necessary along its entire course. The first project to be completed is located at the trail’s end, in Chambers Grove Park, where a park improvement project was paired with a fish habitat restoration project to greatly enhance the quality of the park and the



Pier B Resort Hotel along the St. Louis River, Duluth, Minnesota. Credit: Giuliani and Hoff.

way park users experience the river. The next major project, the Grassy Point-Kingsbury Bay project, is anticipated to begin in 2019. The project will improve habitat at two large coastal wetlands along the trail. In the near future, four major remediation or restoration projects (i.e., Erie Pier Ponds, Munger Landing, Spirit Lake, and Mud Lake) will begin. Collectively, these projects will provide a new generation of citizens

the opportunity to connect to the St. Louis River by learning about and experiencing the cultural heritage and natural resources.

The City of Duluth is not relying solely on outdoor recreation to advance revitalization. The Port of Duluth-Superior contributed \$1.4 billion in economic activity in 2017 (Martin Associates, 2018). The port operations have benefited from a synergistic relationship with the AOC. The



ENDI mixed-use development overlooking Lake Superior and steps from the Duluth Lakewalk. Credit: U.S. Environmental Protection Agency.

U.S. Army Corps of Engineers must dredge sediment from the navigational channel of the St. Louis River to maintain the required depth for commercial maritime traffic, but then must somehow dispose of the dredged material. This maintenance dredging has proved useful to the AOC, which needs sediment for remediation projects and habitat restoration. The dredged

sediment is sufficiently clean to be used for the large-scale habitat restoration projects occurring within the AOC and can be provided directly to those projects for beneficial use. Since, 2013, nearly 1.1 million cubic yards (841,000 cubic meters) of sediment have been used in wetland restoration projects in the AOC, with about 700,000 cubic yards (535,000 cubic meters) placed at the 21st Ave W project site and the remainder at the 40th Ave W project site. This unique relationship has allowed the port to continue to serve its important economic role for the community, while enhancing the environmental quality of the St. Louis River along Duluth's waterfront.

Furthermore, the city has developed a Brownfields Areawide Plan for the Irving and Fairmount neighborhoods adjacent to the St. Louis River and near the port (Williams et al., 2018). Neighborhood planning includes finding ways to enhance infrastructure for legacy and newer industrial uses, improve access to the St. Louis River, create new housing opportunities, attract new retail businesses, and enhance the quality of life (City of Duluth, 2017; U.S. EPA, 2012). Several of the plan recommendations focus on enhancing ecosystem services through green infrastructure and community gardens. In short, the new vision for the City of Duluth is one where

industry and nature coexist and contribute to community well-being.

Environmental restoration and intentional planning create better access to the waterfront and draw attention to the renewed resources through new developments and national recognition. New waterfront developments include a \$34 million resort that converted a cement terminal into a luxury resort (Personal Communication, 2018; Renalls, 2016) and a \$38 million mixed-use housing development ((Council of Great Lakes Industries and Great Lakes Commission, 2018; Johnson, 2017). Moreover, Duluth has been recognized by Outside magazine for its abundance of recreational opportunities, many close to the river (Helal, 2014; Rayno, 2017). Finally, the increased vitality is attracting younger people to the city, where around 27% of the population is between 20 and 34 years old (U.S. Census Bureau, 2017).

Concluding Thoughts

Adaptation to environmental change is an ongoing process. In the St. Louis River Estuary, environmental change started with industrialization, evolved through contaminated sediment remediation and aquatic habitat restoration, and now is entering community

revitalization. The public investment through GLRI and the St. Louis River Corridor Initiative has prompted private investment to improve access to the water and enhance community quality of life.

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St. Louis River, Duluth, Minnesota. Credit: Kathleen Williams.

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Cover Photo

Lower St. Louis River, Duluth, Minnesota. Credit: Dennis O'Hara, courtesy of Duluth Seaway Port Authority.

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The St. Louis River case study is part of a larger project to evaluate achievements and lessons learned from 32 years of efforts to clean up Great Lakes AOCs. Case studies will be used to help sustain support for cleaning up AOCs and to inspire and motivate others to restore other degraded aquatic ecosystems.

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