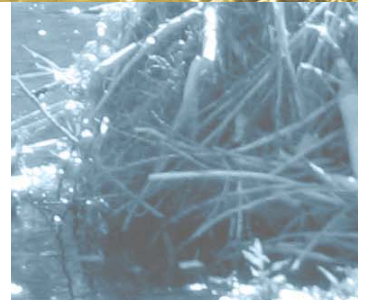




*We have inherited the past;  
we can create the future*

Unknown



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## 1. BACKGROUND

The community of Grand Rapids is proposing a legacy conservation effort to restore their urban waters. This is a project proposed in and on the Grand River through the urban corridor of Grand Rapids, Michigan. The 2009 Green Grand Rapids Special Study, Grand River Whitewater Park Preferred Alternative (FTCH 2009) first prioritized the project for the community. The total project area covers 127 acres of the Grand River that can be significantly improved for habitat, whitewater, fishing, aesthetics and stream health. Rapid habitat has always been extremely rare in the Great Lakes region. Works of man have further disconnected and degraded these habitats. The life cycle of many native species depends on the healthy function of rapid habitat and access to these rare habitats.

*Problem Statement:* The ecological, cultural and recreational functions of the rapids in the Grand River have been degraded by five low head dams, flood walls, urban encroachment, and channelization (dredging and grading).

*Objective:* The community seeks to remove the dams, and enhance the channel bed and banks, to restore the ecological, cultural and recreational functions of the historic rapids.

*Goals:*

- Install water quality and habitat enhancements;
- Connect historic sturgeon spawning habitat;
- Improve access and recreational opportunities for residents;
- Enhance natural aesthetics and riparian function of the riverfront;
- Attract tourism, businesses and employment opportunities;
- Create access to natural areas for under-represented community members;
- Invigorate the cultural significance of the rapids;
- Implement a comprehensive plan for watershed and green infrastructure issues; and
- Generate a stewardship ethic for the river through education and outreach.

## 2. CONCEPTUAL PLAN

Diversification is the major theme of the Grand Rapids Restoration plan. Diversification of the currents, habitats and recreation use can be achieved through enhancements to the channel bed. The diversified channel will spread out the use, as well as maximize the economic benefits of fishing, whitewater, and aesthetics. Diversification is also the key to stream health as the life cycles of species that evolved with the river can be maximized in a complex and diverse environment.

Early pre-dam reports indicate that the river was strewn with granite boulders and cobble stones.

*Before the river was changed by the work of man the rapids had a nearly uniform descent for about a mile, from where is now Leonard Street to Pearl Street. The total amounted to about eighteen feet, or sufficient to give a decided turbulent and wild appearance to the waters, and to make a noise that broke the stillness of the forest and echoed from the neighboring hills. (Charles A. Whittemore, Kent Scientific Institute of Grand Rapids, 1895 )*



Five low head dams have been constructed in the project reach. Sixth Street dam is the most significant structure with over 8 feet of hydraulic drop. All dams would be significantly modified or removed as part of the restoration. Upstream of Sixth Street Dam is a submerged limestone shelf that was likely the prime spawning grounds for the abundant sturgeon reported to have been in Grand Rapids prior to the construction of dams. The five dams, floodwalls and historic grading of the channel bed have limited aquatic habitat and degraded stream function.

The conceptual plan envisions mimicking the boulder strewn rapid downstream of Sixth Street Dam and uncovering the limestone shelves upstream of the dam. All five dams would be modified, buried or removed. The channel bed would be restored with diverse gravel, cobble and boulder substrates. Fish passage and aquatic habitat would be greatly enhanced. As many as 12 Class III whitewater features may form at different flows, with longer runs and pools between the focused whitewater. Wade fishing from the shore and banks would also be facilitated by structures in the channel bed.

### 3. *OPPORTUNITIES AND CONSTRAINTS*

The Grand Rapids Restoration project has significant opportunity for habitat, recreation and aesthetic improvement in the Grand Rapids area. The constraints are important, but may feasibly be overcome with careful planning and coordination backed up with detailed engineering and design. The most significant constraints are:

- Sea lamprey barrier and control

Efforts to control lamprey parasitism of Great Lakes fish populations have been ongoing since the late-1940s by the U.S. Fish and Wildlife Service. Sixth Street Dam is not considered a complete barrier for sea lamprey (Klinger, USFWS personal communication) as spawning populations have been observed upstream of the dam. The incompleteness of the existing barrier increases the feasibility that it can be modified and mitigated, and USFWS has stated openness to modification ideas. Any proposed modifications to Sixth Street Dam, and especially those required to maximize sturgeon habitat, will require additional detailed analysis and approval from USFWS prior to construction.



- Lands and easements

In Grand Rapids, private parties may have rights to the river bed. Riparian rights and easements were identified and obtained during the construction of the floodwalls. These rights are being reviewed and additional easements may be necessary for the project. The City of Grand Rapids owns many parcels adjacent to the Grand River, which will facilitate the compilation of easements. The project may be adjusted in final design as accommodated by lands that become available.

- A total project cost of \$27.5M

Preliminary budget estimates for implementation of the complete concept plan are a total project cost of \$27.5 Million. This total includes \$8.0 Million for “soft costs” including: lands; easements; design; long-term maintenance; and contingencies. Soft costs may represent the local contribution to the project, currently estimated at 29%. Grants usually require a cost share of at least 25 percent, and usually a federal grant requires a 35 percent non-federal cost share. Partnerships for this project will likely require at least \$2 Million in donated or local government cash to complete a 35% match. Additional partnership cash will serve to facilitate the efficiency, completeness and timeliness of the project.

A fundraising strategy is being developed to create a solid foundation of support for the project to ensure that the benefits to the whole community are understood. The funding strategy focuses on each of the components of the project and identifies the most appropriate funding source or sources for each component. The strategy includes a project timeline to be able to anticipate funding opportunities and be proactive in pursuing and submitting applications.

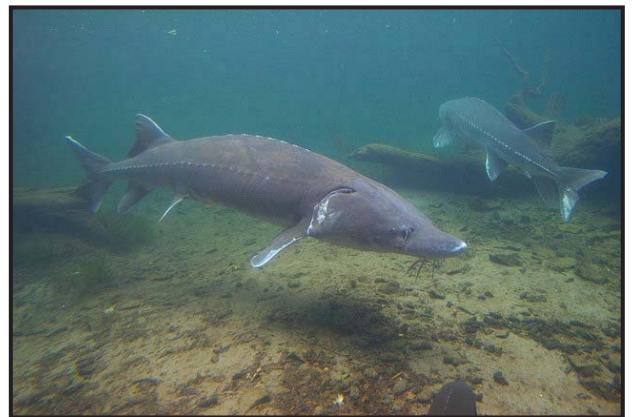


- Flood conveyance

The flood hazard of the Grand River is a constraint on the project and a concern of the DEQ, which has permit authority. Most of the river through the project area is lined with elevated floodwalls. The combination of the backwater submergence and the constriction of the project area bridges results in the channel bed having very little influence on the elevations of the flood flows. A proposed conditions hydraulic model (HEC-RAS) was created to determine the feasibility of reasonable drops in the low flow channels and to evaluate the affect of proposed low flow channel modifications on flood flows. It has been determined that substantial work can be performed on the low flow channel without reducing the flood capacity.

The benefits of restoration within the constraints include:

- 500% increase in fish holding habitat
- 5 times increase in habitat diversity
- 850% increase in lake sturgeon spawning habitat
- 100% upstream fish passage
- 1 sea lamprey adjustable velocity barrier
- 75% reduction in low flow width to depth ratio
- 1700% increase in hyporheic exchange (stream health)
- Direct improvement to aquatic habitat
- Reduction in fine sedimentation
- Propagation of 100,000 mussels
- 275% increase in sport fishing perimeter
- 4 additional acres of native riparian forest







- 100% downstream paddle and oar boat passage
- 2.5 mile drift boating reach
- 5,400 feet of Class II whitewater
- 3,300 feet of Class III whitewater
- 700 feet of Class IV whitewater
- 400 meters of International Canoe Federation Local Merit Slalom Course
- 10 to 15 International Canoe Federation Whitewater Rodeo features
- 1 adjustable whitewater surfing wave



- 8 lanes of 1,000+ meter FISA Masters Competition Rowing
- 6 lanes of 2,000+ meter FISA International Competition Rowing
- 2 new riverside parks
- Shoreline interaction at all riverfront parks
- 12 acres of limestone bedrock shoals
- 5 educational signs
- Greater than \$5M annual economic impact in the heart of Grand Rapids





Two new riverfront parks were envisioned as part of the Green Grand Rapids Master Plan prepared by the City of Grand Rapids. These parks conveniently bound the major restoration efforts in the channel. The park at the upstream end of the project would be at the defunct water filtration plant south of Ann Street. The City recently purchased some of that land and is planning to build a river trail to connect Riverside Park to Canal Street Park. The lamprey barrier is proposed to be built fronting the park area. The restoration of the river in front of the filtration plant park would expose 12 acres of shallow bedrock shelves. During low flows, the park will be very wadeable for all ages; similar to tidal pools along some ocean fronts. The filtration plant park may become a destination where the community can cool off in a natural water feature.

The park at the downstream end of the project would be at the City Maintenance yard on Market Street at the US-131 exit. This riverfront park would connect the extended riverwalk, provide shoreline access and act as the downstream takeout for drift boats and whitewater enthusiasts. A more significant boat ramp may include access for motor boats.

Existing pedestrian trails are completed between Sixth Street and Fulton Street on both sides of the river. Additional connections of the trails and walkways are envisioned in the Master Plan to connect on the east bank from the Filtration Plant to the City Maintenance yard. These and other envisioned connections would provide a fluid circulation between the shore based and river based recreational opportunities. On river left, the White Pine Trail connects to the river trail in Riverside Park. As mentioned above, the City plans to extend this trail to connect to the riverwalk at Canal Street Park. Plans have already been drawn up for the trail to extend downstream of Fulton Street to Wealthy Street, and eventually connect to the Oxford Street Bridge and Trail and on the Millennium Park.

On river right, the White Pine Trail is proposed to continue along the river's edge to Ann Street, and then head west to connect to the bike lane along Seward Avenue, connecting to Butterworth Avenue, to Indiana Street, to Wealthy Street and eventually to the Kent Trails System.

The Grand Rapids Restoration will create a number of shores to trail access points for wade fishing and boating as well as passive recreation. The trail connection projects will also offer opportunities for additional restoration of riparian forests and greenways, expanding on the efforts of the Project.

#### 4. *TIMELINE*

In 2009 Grand Rapids Whitewater (GRWW) was formed as a 501 c3 non-profit with the mission to bring whitewater to the City. GRWW is championed by the vision of local residents Chip Richards and Chris Muller. In 2010 the project was included as a preferred alternative in the Green Grand Rapids planning process. In 2011 GRWW retained RiverRestoration of Glenwood Springs, Colorado for river engineering expertise. Fall of 2011 channel and sediment surveys were conducted and a real estate strategy developed. Winter of 2012 efforts included ongoing project specific coordination and outreach with stakeholders.

This Grand Rapids Restoration Opportunities and Constraints report has identified an achievable project with wide spread social, environmental and economic benefits. Design is a process and the final feasible configuration of the project will be identified through further technical coordination with stakeholders in 2012. The remaining 2012 planning and design tasks for this project include the following activities:

- Detailed hydraulic designs of sea lamprey barrier and USFWS review and comment
- Additional survey and review of flood impact model
- Documentation for permit applications
- Fresh water mussel survey
- Hydraulic ice analysis
- Economic impact study
- Lands and easements negotiations
- Baseline monitoring surveys
  - macroinvertebrates
  - substrate (pebble counts, geomorphology survey)
  - fish population
  - habitat conditions

## 5. CONCLUSION

Significant restoration of the Grand River in Grand Rapids is achievable. Restoration is expected to have valuable social, environmental and economic benefits for the entire community. Further studies will show how the proposed project conforms to major constraints including flood conveyance and sea lamprey control. Restoration of lake sturgeon and fresh water mussel habitats are regionally rare opportunities. Based on concepts, the Grand Rapids Restoration has broad support from the managers and regulators of the river. Compelling community support is being voiced and gaining sustained momentum. A community legacy can be established in restoring the regionally rare functions of the Grand Rapids.





# Grand Rapids Restoration

