

Huron River and Impoundment Management Plan

Our vision for the future of the Huron River in Ann Arbor can be summarized as: A healthy Huron River ecosystem that provides a diverse set of ecosystem services. We envision a swimmable, fishable and boatable river, including both free-flowing and impounded segments, which is celebrated as Ann Arbor's most important natural feature and contributes to the vibrancy of life in the city. The river and its publicly-owned shoreline and riparian areas create a blue and green corridor across the city that contains restored natural areas and adequate, well-sited public trails and access. Ample drinking water, effective wastewater removal and a full range of high quality passive and active recreation and education opportunities are provided to the citizens of Ann Arbor. Ongoing public engagement in the river's management leads to greater stewardship and reduced conflict among users. Our approach to management creates a model that other communities upstream and downstream emulate.



Executive Summary

The Huron River and Impoundment Management Plan Committee is pleased to provide the following draft plan, report, and recommendations to the Environmental Commission and City Council for their review and approval.

The committee has met for the past two years to better understand the sometimes-complex interrelationships among the Huron river ecology, community recreation preferences, the effect of dams on river processes, and the economic implications of different recommendations.

The Committee heard presentations from key user groups (e.g., anglers, paddlers and rowers, among others) and regulatory agencies (e.g., MDEQ Dam Safety, MDNR Fisheries). The committee included representatives from key user groups and community organizations including river residents, rowers, paddlers, anglers, the University of Michigan, Detroit Edison, the Environmental Commission, Park Advisory Commission, Planning Commission, and the Huron River Watershed Council. The Committee worked in three subcommittees - Aquatic Vegetation, Dam Management, and Recreation - to develop working drafts of reports and recommendations. City staff from Parks, Systems Planning, and Natural Area Preservation acted as valuable resources to the committee throughout the process. Water Plant staff played a key role in providing the Committee with a better understanding of dam management and the various costs associated with hydropower and recreation dams.

The Committee held three well-attended public meetings to present draft recommendations and hear from the public about ways to refine the information and options. Virtually all information has been available on the city web site. From the beginning this process has been well supported by facilitators Professors Steve Yaffee and Julia Wondolleck from the University of Michigan.

The planning process carried out by the committee was managed to see if a consensus could be achieved on a vision, set of objectives and list of recommendations. An extensive period of joint learning built a shared understanding of the problems, opportunities and potential strategies for effective river management. Options were explored through extensive committee discussions and by requesting input from user groups and outside experts. At several points, committee members were asked to outline their preferences and rankings among options to give the committee input on which options to work on and improve. As a consensus-building process, the committee did not conduct votes, but rather sought to build the support of all committee members for the directions outlined in the report. The Committee crafted recommendations that all committee members could support, preferably with enthusiasm. In places where committee members differed on their advice to the city, we worked hard to make the options as clear as possible and outlined the benefits and impacts of each to inform the Commission and Council.

The following report outlines a consensus vision statement, set of objectives and detailed analyses, along with 32 recommendations, 30 of which the committee is in full support. These include recommendations on strategies for:



- ☞ Providing aquatic vegetation monitoring and harvesting
- ☞ Improving water quality
- ☞ Providing riparian buffers
- ☞ Providing for limited and appropriate development of restaurants and other public facilities
- ☞ Improving recreational facilities along the river
- ☞ Improving the quality of recreation, including angling, swimming and boating
- ☞ Expanding capacity for ongoing river stewardship through citizen engagement, City staffing and innovative funding arrangements
- ☞ Apportioning costs to more appropriate funds

The committee is also providing two options as to recommendations to the Commission on the future of the Argo Dam area. While there is not unanimous agreement among committee members as to which of the two options is preferred, the recommendations contained in the report have been analyzed and developed as fully as possible, and are supported by the committee as two viable alternatives. Both recommendations are being forwarded to the Commission and Council as the committee's best advice. Uncertainty about several aspects of these decisions remains, and the committee articulates several strategies for moving forward contingent on resolution of some of these uncertainties.

Preserving Argo Impoundment: The committee recognizes that there are clear recreational benefits to preserving the Argo Impoundment. This stretch of the river is the preferred rowing venue by the two high schools, the Ann Arbor Rowing Club, and the UM Men's club team. There are other users including some anglers, canoers, and walkers who prefer the flat water provided by the impoundment. The committee recognizes that preserving the impoundment requires continued dam maintenance and managing the aquatic vegetation. The committee also recognizes that there are other nearby areas of the Huron River that may be developable into alternate rowing sites if the decision is to remove the dam. In general, the Committee believes that these challenges are not insurmountable given enough time and clear direction from City Council.

Removing Argo Dam: The Committee recognizes that there are clear benefits to removing the dam including eliminating the inherent liabilities associated with dams and detrimental effects on aquatic habitat including the warming effect of the impoundment and decreased dissolved oxygen. Removing the dam increases the length of free flowing river through the city. There are users including some anglers, canoers, and walkers who prefer the free flowing water provided by an unimpounded river. The Committee also recognizes that removing the dam is dependent on more detailed sediment sampling and requires a one-time investment of funds for dam removal and land reclamation. The Committee is recommending that creation of new rowing venue(s) must precede dam removal to maintain rowing continuity. Each of the possible rowing sites at Barton and Geddes impoundments has significant challenges. In general, the Committee believes that these challenges are not insurmountable given enough time and clear direction from City Council.

The committee has examined best available cost information and over a 20-year period finds that the likely overall costs of removing the dam and preserving the impoundment are similar. The Committee finds that the reintroduction of hydropower at Argo dam is not economical at this time with current economic conditions and no viable sources of outside funding.



The option to develop a whitewater recreational amenity is available with either option and should be pursued. Whitewater in the dam removed option could be either a more natural set of rapids along the steeper river gradient created by removing the dam – or engineering a channelized course along some of the reclaimed parkland. Whitewater in the preserved impoundment option could be an engineered whitewater course below the dam. The Committee does not believe that the whitewater option should drive the decision at the Argo area.

The decision at the Argo area comes down to one of community preference. Both options will require significant investment of capital and operation and maintenance dollars in addition to staff time.

As a community, the city regularly makes decisions to create opportunities or conveniences for residents that come with inherent risks and expenses. These include bridges, swimming pools, golf courses, and dams. For the most part, if well planned for and sustainably funded, these are opportunities with risks that can be managed. The committee also believes that there is an opportunity to apportion recreation dam maintenance costs to more appropriate funds.

One option creates a dense urban recreation area by removing the existing canoe portage on the millrace and preserving the preferred rowing venue. This recommendation commits the city to maintaining the dam for the sole purpose of recreation – as is true at Geddes Dam.

The other option returns one portion of the Huron River to a more free-flowing state . This recommendation creates an estimated 28 acres of new parkland, creates a cool water fishery, provides a much longer stretch of free-flowing river as habitat and recreational space, and eliminates ongoing dam maintenance costs and future liability. This recommendation also requires development of two alternate rowing venues - each with its own challenges.

The Committee is excited about the possibilities for managing the river and impoundments more effectively as Ann Arbor's most important natural feature. The committee is impressed by the amount of interest by the citizens of Ann Arbor in the river and the planning process, and look forward to the Commission's and Council's decisions and future implementation of a number of these strategies.



Huron River and Impoundment Management Plan Overview

This Plan is organized to provide you with the key findings, recommendations, and background information developed by the Committee and staff.

The first section - **Introduction to Planning Along the Huron** – provides you with an overview of the Huron River and Impoundment Management Plan Committee - how and why the committee was created, who is on the committee, and the vision statement and objectives created by the committee to guide this process.

The second section - **Proposed Plan for the Huron River** – outlines the key management strategies proposed for the four stretches of the river and describes three options at Argo dam that attempt to balance the recreational, environmental, and economic interests of the community.

The third section – **Implementation Plan** – begins to outline the near, mid, and long-term elements of implementing the plan and evaluating the plan through an adaptive management strategy

The **Report** contains several introductory pieces developed to provide the public with core information used by the committee in their research and discussions.

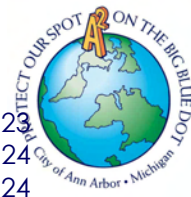
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- Introduction to Aquatic Vegetation
- Introduction to Ann Arbor Dams Along the Huron
- Introduction to Canoeing & Kayaking
- Introduction to Rowing
- Introduction to Angling
- Introduction to Sailing
- Introduction to Swimming
- Ecological Benefits of Dam Removal
- Economic considerations (spreadsheet)
- Whitewater Study
- Parks Recreation and Open Space plan (excerpt)
- Letter from MDEQ regarding Argo Dam

Background documents can be found at www.a2gov.org/green under Huron River and Impoundment Management Plan Committee.



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Creekshed Organizations





Introduction to Planning Along the Huron

The Huron River is a key natural feature in Ann Arbor. The River is important to residents because it provides:

- ☞ The primary source of drinking water for city residents;
- ☞ 600 acres of wet recreational space accommodating more than 40,000 canoe and kayak rentals, more than 600 rowers, and numerous anglers, sailors, birdwatchers, joggers, cyclists and walkers;
- ☞ Hydropower at Barton and Superior dams;
- ☞ Stormwater conveyance from seven city creeksheds; and
- ☞ Habitat for terrestrial and aquatic species.

The City takes an active role in understanding and managing the natural environment. Key management questions and challenges facing city staff and river users include:

Aquatic Vegetation Management: City staff are routinely asked about city management of the aquatic vegetation in the river that can be unaesthetic and impair some recreational uses, but there are no policies or budgets for managing vegetation.

Dam Impoundment Maintenance: The City owns and maintains four dams: Barton, Argo, Geddes and Superior. Two of these (Barton and Superior) generate hydroelectric power. Barton, Argo and Geddes dams create ponds that are used by area residents for recreation. Sediment will fill in at all of these impoundments over time, but monies are not budgeted for impoundment maintenance to maintain recreational uses.

Argo Dam Repair or Removal: The Michigan Department of Environmental Quality – Office of Dam Safety requires the city to take steps to repair the toe drains at Argo Dam. Argo dam currently requires a repair to toe drains along its 1500 foot earthen berm. Repairing the dam will require future additional investments in dredging and vegetation management to maintain recreational uses. Alternatively, removing the dam has a cost including additional investments to restore newly created parkland along the new river course, pedestrian crossings, and recreation facilities. Whether to repair or remove the Argo Dam will also have implications on the flow of the river and recreational activities available in this area of the river. The community faces challenging decisions regarding the future of this area of the river and how these decisions may impact the other impoundments in a variety of ways.

Resources for Aquatic Areas (or Aquatic Ecosystems) Management: The City has staff and resources to manage terrestrial natural or recreational areas but not for aquatic natural or recreational areas.

The City initiated a process with representatives from key interested parties to begin discussing the future of the Huron River. In March 2006, the Ann Arbor Environmental Commission created the Huron River and Impoundment Management Plan (HRIMP) Committee and charged them with developing a Huron River and Impoundment Management Plan. The Committee considered a broad range of management recommendations for aquatic vegetation, dams, and recreation. These recommendations will be reviewed by the Environmental Commission and, if approved, forwarded to





City Council. Both the Park Advisory and Planning Commissions are represented on the committee and provided input on the recommendations. City Council, at their discretion, will choose to accept any or all of the recommendations before directing the City Administrator and staff to implement one or more recommendations.

Initial committee meetings focused on building the Committee's knowledge of the relationship of the city, citizens, and critters to the Huron River. Presentations were made by:

- ☞ City staff about drinking water, stormwater, dam management, and parks and recreation
- ☞ MDNR regarding fisheries
- ☞ MDEQ regarding dam safety and removals
- ☞ Anglers about fishing opportunities and needs
- ☞ Sailors about the history and challenges of sailing in Barton
- ☞ Rowers about their history on Argo and future needs
- ☞ UM graduate student project – Visions of Argo

The Committee then developed a vision for the Huron and created subcommittees to further research key issues regarding:

Aquatic Vegetation Management – What are the available techniques to manage vegetation (i.e., dredging, herbicides, biological controls, harvesting, and drawdown), the pros and cons, example communities, and costs? What monitoring should be undertaken to understand the problem and effects of future management strategies.

Dam Management – How are dams funded and managed in the city? What are likely costs for repairing and maintaining and removing one or more dams? Are there opportunities for additional renewable hydropower at the two recreational dams?

Recreation – Who are the recreational and sport users of the river (e.g., number of users, revenue)? Are there new recreational opportunities that could be developed (e.g., sailing, swimming, and camping)? What are the implications of dam repair or removal on recreational uses?

Preliminary recommendations were developed by the Committee in anticipation of public meetings to gather additional input from the broader community. The Committee has developed one vision for the Huron that has alternate routes based on the repair or removal of Argo Dam, and associated management recommendations based on how the city chooses to use the River.



The Committee Vision Statement

Our vision for the future of the Huron River in Ann Arbor can be summarized as: A healthy Huron River ecosystem that provides a diverse set of ecosystem services. We envision a swimmable, fishable and boatable river, including both free-flowing and impounded segments, which is celebrated as Ann Arbor's most important natural feature and contributes to the vibrancy of life in the city. The river and its publicly-owned shoreline and riparian areas create a blue and green corridor across the city that contains restored natural areas and adequate, well-sited public trails and access. Ample drinking water, effective wastewater removal and a full range of high quality passive and active recreation and education opportunities are provided to the citizens of Ann Arbor. Ongoing public engagement in the river's management leads to greater stewardship and reduced conflict among users. Our approach to management creates a model that other communities upstream and downstream emulate.

Management Plan Objectives

To achieve this vision, the plan sets out the following major objectives:

Water Quality and Ecosystem Health

1. Ensure a healthy and sustainable aquatic ecosystem, including the river and its floodplain and watershed.
2. Maintain an adequate drinking water supply.

Improve and maintain water quality.

3. Minimize stormwater runoff and maximize infiltration.
4. Management of the Shoreline and Riparian Corridor
5. Identify, protect and enhance natural features, including native forest fragments, scenic vistas, greenways and designated natural areas.

Public Use and Access

6. Support and improve a broad range of recreational opportunities consistent with ecosystem health and the quality of the recreational experience.
7. Consider non-recreational uses (such as restaurants, cultural facilities and power generation) as long as they are supportive of other goals.
8. Improve opportunities for public education and stewardship that build support for the plan.

To achieve these objectives, the City needs to:

River Management and Decision-Making

1. Manage the river in a spatially appropriate way, recognizing different uses and natural/individual system and impoundment characteristics and effects.
2. Ensure a logical and sustainable funding structure that incorporates a full assessment of costs and benefits associated with strategies.
3. Anticipate and plan for the impact of large-scale forces such as climate change, development pressures and population changes.



4. Improve the understanding of the river, its impoundments, and the plan's effectiveness through monitoring, evaluation and adaptive management.

City and Watershed Partnerships

5. Ensure that the citizens of Ann Arbor are strongly connected to the river through a sense of place that is widely recognized and celebrated.
6. Foster relationships and build partnerships up- and downstream and across the watershed to support the plan's goals and build a greater sense of place associated with the river.
7. Provide leadership in the watershed to achieve the plan's goals.

Committee Representatives

Dave Barrett, Park Advisory Commission
Scott Dierks, Allens Creekshed
Tom Edsall, Ann Arbor Area Chapter of Trout Unlimited
Dirk Fischbach, Angler
Paul M. Ganz, DTE
Cathy Gendron, Barton Boat Club
Sue Gott, University of Michigan
Chris Graham, Ann Arbor Environmental Commission
Cheryl MacKrell, Barton Village
Jeffrey Plakke, Nichols Arboretum
Evan Pratt, Traver Creekshed
Catherine Riseng, (previous member of the Environmental Commission and Park Advisory Commission)
Scott Rosencrans, Park Advisory Commission
Laura Rubin, Huron River Watershed Council
David Stead, Ann Arbor Environmental Commission
David Szczygiel, Ann Arbor Public Schools
Mike Taft, Former AARC President, Huron Rowing Coach
Shirley White-Black, Residential property owner

Wendy Woods, City Council (former)

Staff Representatives

Michelle Aldridge, Graduate Intern
David Borneman, Natural Area Preservation
Craig Hupy, Manager – Systems Planning
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Matthew Naud, Environmental Coordinator
Cheryl Saam, Canoe Livery Facility Supervisor
Colin Smith, Parks and Recreation Manager
Jeff Straw, Parks and Recreation Deputy Manager
Jason Tallant, Natural Area Preservation
Molly Wade, Water Quality Manager
Mary Walton, Graduate Intern

Facilitators

Professor Steve Yaffee, University of Michigan
Professor Julia Wondolleck, University of Michigan



River-wide Adaptive Management Strategies

Proposed Plan for the Huron River and Impoundments

The proceeding section outlines the key management recommendations and strategies proposed for the four impounded sections of the river that attempt to balance the recreational, environmental, and economic interests of the community.

Barton - The Committee recommends that the Barton Impoundment be managed to produce safe, clean drinking water for Ann Arbor residents and generate hydropower. Sailing, fishing, kayaking, canoeing, and birding continue to be popular activities on and around Barton Pond.

Preserve Impoundment: Argo – The Committee recommends that the Argo Impoundment continue to be managed for diverse recreation as a key feature of Bandemer Park. Argo continues to be a heavily-used body of water, as rowers, canoers, kayakers, and anglers use the pond, and joggers, in-line skaters, bikers, walkers, birders, and others use trails along the river.

Remove Dam: Argo – The Committee recommends that the Argo area continue to be managed for diverse recreation as a key feature of Bandemer Park. Argo continues to be a heavily-used body of water, as canoers, kayakers, and anglers use the river, and joggers, in-line skaters, bikers, walkers, birders, and others use trails along the river.

Geddes - The Committee recommends that the Geddes Impoundment be managed for recreation as a key feature of Gallup Park. Gallup Park continues to be Ann Arbor's most heavily-used and popular park as walkers, joggers, in-line skaters, and bikers use trails along the river, and picnickers take advantage of open spaces and shelters.

Furstenberg Pond - The Committee recommends that Furstenberg Pond be managed as natural ecological area. Paddling on Furstenberg Pond gives canoers and kayakers an opportunity to experience wetland conditions and view wildlife on land and in the water. While the City continues to support canoeing and fishing in the pond, there are no plans to provide additional recreational opportunities.

South Pond - The Committee recommends that South Pond be managed to receive and provide treatment of storm water from Mallets' and Swift Run creeks and to provide wildlife habitat and recreational opportunities including fishing, bird-watching, walking, and paddling.

Superior - The Committee recommends that the Superior Impoundment be managed to continue generating hydropower until other uses are defined. With the other Ann Arbor impoundments meeting the demand for recreation, there is little pressure on the City or on user groups to look to Superior Pond as a recreation venue. In the near-term, the City makes contact with riparian owners and local governments to discuss a future vision for the improving the water quality in the impoundment.



RIVER MANAGEMENT STRATEGIES

RM1 – Create River Stewardship Committee

Establish a River Stewardship Committee (RSC) to provide oversight to the implementation of the Huron River and Impoundment Management Plan. The RSC should be created with representatives from the Environmental Commission and Park Advisory Commission and others appointed by City Council with expertise in river science (e.g., ecology, hydrology) and river recreation (e.g., canoeing, rowing, angling, and other user groups). This committee should be supported by staff from Systems Planning, Natural Area Preservation, Field Operations, and Parks and Recreation Services.

This group will meet at a routine frequency to:

- ☛ Develop, evaluate, and make recommendations to city staff on river and impoundment management and monitoring strategies for aquatic vegetation, water quality, and sedimentation including the potential use of herbicides - in impoundments other than Barton - or dredging.
- ☛ Make recommendations to reduce user conflicts that balance environmental and recreational interests.
- ☛ Monitor progress on expansion of native buffers
- ☛ Report annually to the Environmental Commission and Park Advisory Commission on the implementation of this plan.
- ☛ Monitor long-term maintenance requirements and evaluate apportioning some long-term maintenance costs associated in part with continued recreational options to those users
- ☛ Make recommendations to Council on impoundment management and future evaluations of dam preservation or removals.

RM2 – Expand Natural Area Preservation Capacity

The Committee recommends developing a plan to expand the capabilities of the Natural Area Preservation program to include preservation of local aquatic natural areas including the river, creeks, ponds, and lakes based on sustainable funding.

RM3 – Develop formal policy on recreational user cost sharing for impoundments

The Committee recommends that a policy is developed to cover appropriate cost sharing by recreational users of the impoundments.

Relationship to the PROS Plan

The 2006-2011 Parks Recreation Open Space (PROS) Plan identifies four creekshed groups - the Malletts Creek Association, the Allen Creek Group, the Friends of Traver Creek, and the Millers Creek Action Team – that currently participate in the Huron River Watershed Council's stewardship goals. These groups are focused on water quality and flow improvement, wildlife habitat improvement, and increasing citizen awareness of and connection with stewardship of local creeks and watersheds. They may be important contacts for the River Stewardship Committee mentioned above.



Impoundment Management – Preserve Impoundment Option

IM1 – Maintain Argo Dam to Preserve the Impoundment

Manage the Argo Dam and associated embankments to maintain the impoundment and allow continued recreational use by all current users.

Related Recommendations

RF3 – Develop Geddes Rowing Facility

Explore developing an additional rowing facility on the Geddes Impoundment

RF4 – Evaluate Argo Facility Opportunities

Evaluate a multi-use facility to house increased canoeing, kayaking, and rowing, private non-motorized boat storage, public meetings, expanded concessions, and environmental education programs to accommodate Bandemer and/or Argo park users. Opportunities to leverage public and private funds should be developed to build a facility that best meets the needs of existing and future park users.

RF6 – Rebuild the Argo Millrace to Remove the Canoe Portage

Rebuild the Argo millrace to allow canoers to bypass the Argo dam via a narrower and shallower channel to the river by Broadway Bridge. The millrace should maintain the current Argo Pond level and be designed to maintain regular flows in all but the lowest river flow conditions.

RF7- Maintain Canoe Liveries on Argo Pond

The Argo stretch of the river is home to two city canoe liveries; maintain the livery at Argo Park and a small livery at the base of Barton Dam.

Benefits

- ☞ Allows for continued use of Argo Impoundment for rowing, which heretofore has been the city's designated preference location for rowing and which is the stated preference of the rowing community. The water is flat, much less affected by wind than all other impoundments, is sufficiently long for practices, and the existing area for facilities at Bandemer Park meets current and future expansion needs. The close proximity of the venue to downtown and its central location for all users makes it the most easily accessed.
- ☞ Provides an opportunity for a combined facility at Bandemer to improve the rowing facilities, and add new community facilities that could include river science education, private non-motorized boat storage, and public meeting space that could be rented to generate revenue.

- ☞ Maintains a range of other uses, including pond fishing opportunities, walking experiences around the pond, and the flat water kayaking and canoeing opportunities.
- ☞ Provides an opportunity for future reintroduction of hydropower if the economics change or the addition of a whitewater amenity downstream of the dam if funds are available and upstream floodplain changes are modeled and acceptable.
- ☞ Enhances the experience of canoeists by removing the portage below Argo Dam.

Impacts

- ☞ Requires the city to continue to incur dam maintenance, aquatic vegetation management, insurance and regulatory costs in addition to new monitoring and management costs.
- ☞ Costs to test and manage sediments.
- ☞ Costs to rebuild the millrace to remove the canoe portage
- ☞ Maintains inherent risks associated with dams
- ☞ Potential cost to extend road access to Bandemer if the railroad crossing is lost.
- ☞ One unknown cost impact associated with maintaining any dam is the potential for catastrophic failure. Dams have finite lifetimes even with regular maintenance. Dam failure could have significant downstream impacts with cost implications. There is a long-term deferred cost of either dam failure or significant repair.
- ☞ Maintain existing ecological impacts of impounded conditions at Argo dam including significant fluctuations in downstream flow, decreasing dissolved oxygen, excessive plant growth, elevated nutrients, and impaired aquatic habitat and community diversity.

IM2- Maintenance Costs for Recreational Dams

The Committee recommends that the City Council should:

- ☞ Apportion recreation dam maintenance costs to more appropriate funds.
- ☞ Implement the Drinking Water Sourcewater protection plan using funds made available from apportioning recreation dam maintenance costs.
- ☞ Develop a long-term recreational maintenance fund for recreational impoundments.
- ☞ Develop a cost sharing agreement with recreational user groups for maintenance of recreational dams and impoundments.



Impoundment Management – Remove Dam Option

IM1 – Remove Argo Dam

The Committee recommends that the Argo Dam is removed. Several detailed implementation plans must be developed. There are several studies that should be conducted prior to a final decision to remove the dam including, but not limited to sediment management, dam removal protocols, land reclamation strategies and overcoming obstacles to development of new rowing facilities at Barton and Geddes. Dam removal cannot begin until a rowing facility is operational on Barton Impoundment.

Related Recommendations.

RF1 – Barton Livery

Explore establishing a larger livery at the base of Barton Dam to serve paddlers using the new 1.8 miles of free-flowing river

RF3 – Develop Geddes Rowing Facility

Develop a rowing facility on the Geddes Impoundment – (see location options in document)

RF4 – Evaluate Argo Facility Opportunities

To accommodate Bandemer and/or Argo park users, evaluate a multi-use facility to house increased canoeing and kayaking, private non-motorized boat storage, public meetings, expanded concessions, and environmental education programs. Opportunities to leverage public and private funds should be developed to build a facility that best meets the needs of existing and future park users.



RF8 – Develop new pedestrian crossing and trails near Argo Livery

Develop a new pedestrian crossing at the Argo Canoe livery as part of the border to border trail. Improve existing trail along the millrace embankment.

RF9 – Develop Barton Recreation Facility

Develop a new facility at Barton Impoundment for rowing, and add new community facilities that could include river science education, private non-motorized boat storage, and public meeting space that could be rented to generate revenue. Public access from Barton drive is necessary for this facility to be accessible to the community.

Benefits

-  Canoers and kayakers now have a longer fast-moving stretch of water from the base of Barton dam to the beginning of Geddes pond.
-  Eliminates unknown cost impact associated with maintaining any dam and the potential for catastrophic failure. Dams have finite lifetimes even with regular maintenance. Dam failure could have significant downstream impacts with cost implications. There is a long-term deferred cost of either dam failure or significant repair.

- ☞ Improves the river water quality and restores the area to a free-flowing river - increasing flow and dissolved oxygen content and decreasing water temperature by eliminating the warming action of the impoundment
- ☞ Excessive aquatic plant growth is eliminated because increased water velocity prevents most undesirable, non-native plants from becoming established
- ☞ Improved fisheries and diversity of aquatic community due to an increase in habitat diversity and lowered water temperatures
- ☞ Regain an estimated 28 acres of parkland for the City of Ann Arbor
- ☞ Reduce the floodplain in the area between Argo and Barton dams
- ☞ Restores normal flows to the river stretch downstream of Argo Dam - small changes at the dam to maintain impoundment levels cause significant increases and decreases in downstream flows with negative impacts to river ecology and recreational users
- ☞ Removes portage at Argo dam.
- ☞ Removes financial and other liabilities associated with recurring and episodic expenses to cover maintenance, insurance, and regulatory costs.
- ☞ Opportunities for a white water amenity remain but in different forms with either a lower cost natural rapid areas in the river or a higher cost channelized kayak run along portions of the reclaimed land by the river.

Impacts

- ☞ The city incurs costs to test and manage sediments upstream of the dam, remove the dam, replace the pedestrian crossing, manage revegetation of the reclaimed land, and plan for alternate park uses at Bandemer based on the new land configuration.
- ☞ Future opportunities for hydropower and rowing are eliminated.
- ☞ Recreating rowing facilities and moving rowing teams to two alternate rowing venues. The land area east of Barton dam is redeveloped as a rowing venue with a boathouse and bathrooms. A new rowing facility is developed at Geddes impoundment.
- ☞ Ongoing maintenance for 28 acres of reclaimed land
- ☞ Increased boat traffic on Barton and Geddes impoundments and vehicle traffic at associated parks and access points
- ☞ Reduces available flat-water for recreational users

IM2- Maintenance Costs for Recreational Dams

The Committee recommends that the City Council should:

- ☞ Apportion recreation dam maintenance costs to more appropriate funds.
- ☞ Implement the Drinking Water Sourcewater protection plan using funds made available from apportioning recreation dam maintenance costs.
- ☞ Develop a long-term recreational maintenance fund for recreational impoundments.
- ☞ Develop a cost sharing agreement with recreational user groups for maintenance of recreational dams and impoundments.



WATER QUALITY

The water quality of the Huron River is impacted by inputs from upstream uses, stormwater discharges, industrial and wastewater treatment plant discharges. The City of Ann Arbor's stormwater and wastewater systems are permitted and regulated by the Michigan Department of Environmental Quality. Those permits set limits on discharges of treated wastewater and require the city to develop a comprehensive Stormwater Management Plan. The HRIMP Committee supports the commitments of the City that are detailed in this management plan. The HRIMP Committee explicitly supports and recommends the following:

WQ1 –Reduce the sources of non-point source pollution.

Reduce the sources of non-point source pollution in an effort to improve water quality in streams and impoundments. This should be accomplished by not only following commitments set forth in the Stormwater Management Plan, but by implementing additional best management practices. The committee recommends expanding upstream educational efforts.

WQ2 – Manage Stormwater onsite or regionally

Manage stormwater at the source in an effort to reduce the quantity of stormwater entering the system, and in turn the number of outfalls needed downstream.

WQ3 – Promote clean engine use on the impoundments through Public Education and other opportunities

Install clearly posted signage to encourage boaters to use cleaner four-stroke and electric motors.

WQ4 –Implement Drinking Water Source Water Protection Plan

Implement the City's Source Water Protection Plan with appropriate resources to ensure adequate protection of the city's drinking water sources.

WQ5 –Ecological Assessment of Impoundments

Assess the river ecology of each impoundment and repeat at appropriate intervals. This assessment will generate data including but not limited to depth of sediments, type of sediments, nutrient and temperature status, dissolved oxygen, extent of aquatic plant growth, turnover rates, sedimentation rates, toxic algal blooms, etc.

Relationship to the PROS Plan

The PROS Plan makes specific recommendations for improvements in park design that address water quality in the Huron River and its tributaries, including exploring use of park lands to absorb and cleanse stormwater in ways that integrate stormwater management with park uses, approaching a goal of no net run-off; and minimizing and reducing impervious surfaces and curbs in parks and disconnecting them from the stormwater pipe system.



RIPARIAN BUFFERS

Summary: The City expands its proactive approach to improving water quality by encouraging more native plant buffers along waterways. Riparian buffers provide native landscaped areas that reduce pollution inputs to the river. These areas also provide habitat for bird, small mammal, and amphibian populations and shade the river, resulting in cooler water temperatures.

RB1 – Improve Riparian Buffers

Identify areas where expansion of native riparian buffers is possible to further protect the river ecology and improve fish habitat. Set buffer priorities and work with Natural Area Preservation, the Huron River Watershed Council and volunteers to develop and maintain these buffers.

Relationship to the PROS Plan

The PROS Plan recommends the expansion of plant buffers on City parkland. It promotes the creation of 75-150 feet unmowed or infrequently mowed native vegetation buffers along creeks and the river to protect from runoff.



AQUATIC VEGETATION

Summary: The City takes a more active role in aquatic vegetation monitoring and management and sets a priority on preventing spread of key invasive species like Eurasian watermilfoil to maintain recreational uses. The goals of the aquatic vegetation management program are first to focus on preventative measures, and second to employ engineered measures in targeted areas where recreation is impaired and the management strategy does not significantly impair river ecology.

Regular monitoring of aquatic plants, water quality, and impoundment status provides staff with a baseline and long-term record of river conditions that aids in developing adaptive management strategies based on sound science. Meanwhile, regular bathymetric surveys of City impoundments help staff plan and budget for future dredging needs, and a sustainable funding mechanism enables long-term aquatic vegetation monitoring and management.

Barton – Harvest – Prohibit herbicide use

Preserve Impoundment: Argo – Harvest - In the long term, the City considers selective herbicide use and/or dredging in limited areas to control weeds, increase water depth, and enhance recreation.

Remove Dam: Argo – no management required

Geddes – Harvest - In the long term, the City considers selective herbicide use and/or dredging in limited areas to control weeds, increase water depth, and enhance recreation.

Furstenberg - Managed with hand pulling and selective herbicide use (similar to Geddes Pond) or minimal dredging if needed to provide and insure open water paths.

South Pond – Harvest and selective herbicide use if indicated. Establish emergent vegetation wetland or a settling basin at the mouth of Mallets creek to collect inflowing sediments and facilitate their removal by dredging or pumping as is recommended for stormwater retention ponds.



AQUATIC VEGETATION RECOMMENDATIONS

AV1 - Harvest and Compost Aquatic Vegetation (annual)

Harvest aquatic vegetation as a management strategy for invasive and native plants that impair recreation. The committee is recommending purchasing a harvester and associated equipment to harvest at city impoundments and compost at city facilities based on sustainable funding and staffing using a model similar to other recreational space maintenance.

AV2 – Monitor Aquatic Vegetation

Monitor aquatic vegetation to determine the presence and absence of invasive and native plants. These data will guide harvesting and other aquatic vegetation management strategies and detect new invasives as early as possible to develop effective responses.

AV3 –Evaluate use of biological controls and herbicides

The City prohibits herbicide use in Barton Pond. The city evaluates use of biological controls and herbicides through the River Stewardship Committee and the Environmental Commission.



COMMERCIAL DEVELOPMENT

CD1 – Development in the Broadway Bridge/Argo area

Encourage limited development of a restaurant and/or other public-use facilities where the public congregates and can enjoy the river in the Broadway Bridge/Argo area, especially if it generates revenue for river planning and implementation.

Relationship to PROS Plan

The PROS plan promotes the establishing careful controls to encourage developments that complement, rather than compromise, the scenic and natural qualities of the Huron River in the Broadway/Argo area.



RECREATION – FACILITIES

Summary: The committee recommends that the city evaluate opportunities for restaurant and concession facilities at selected access points along the river.

RF1 – Barton Livery

Preserve Impoundment: Explore establishing a small livery at the base of Barton Dam.

Remove Dam: Explore establishing a larger livery at the base of Barton Dam to serve paddlers using the new 1.8 miles of free-flowing river.

RF2 – Evaluate Gallup Facility Opportunities

To accommodate Gallup Park users, evaluate a multi-use facility to house increased canoeing and kayaking, private non-motorized boat storage, public meetings, expanded concessions, and environmental education programs.

RF3 – Develop Geddes Rowing Facility

Preserve Impoundment: Explore developing an additional rowing facility on the Geddes Impoundment

Remove Dam: Develop a rowing facility on the Geddes Impoundment.

RF4 – Evaluate Argo Facility Opportunities

Preserve Impoundment: To accommodate Bandemer and/or Argo park users, evaluate a multi-use facility to house increased canoeing, kayaking, and rowing, private non-motorized boat storage, public meetings, expanded concessions, and environmental education programs. Opportunities to leverage public and private funds should be developed to build a facility that best meets the needs of existing and future park users.

Remove Dam: To accommodate Bandemer and/or Argo park users, evaluate a multi-use facility to house increased canoeing and kayaking, private non-motorized boat storage, public meetings, expanded concessions, and environmental education programs. Opportunities to leverage public and private funds should be developed to build a facility that best meets the needs of existing and future park users.

RF5 – Develop trailered boat launch upstream of Geddes Dam



Preserve Impoundment

RF6 – Rebuild the Argo Millrace to Remove the Canoe Portage

Rebuild the Argo millrace to allow novice canoers to bypass the Argo dam via a narrower and shallower channel to the river by Broadway Bridge. The millrace should maintain the current Argo Pond level and be designed to maintain regular flows in all but the lowest river flow conditions.

RF7- Maintain Canoe Liveries on Argo Pond

Preserve Impoundment: The Argo stretch of the river is home to two city canoe liveries; maintain the livery at Argo Park and a small livery at the base of Barton Dam.

Remove Dam: The Argo stretch of the river is home to two city canoe liveries; maintain the livery at Argo Park and a larger livery at the base of Barton Dam.

Remove Dam

RF8 – Develop new pedestrian crossing and trails near Argo Livery

Develop a new pedestrian crossing at the Argo Canoe livery as part of the border to border trail. Improve existing trail along the millrace embankment.

Remove Dam

RF9 – Develop Barton Recreation Facility

Develop a new facility at Barton impoundment to improve the rowing facilities, and add new community facilities that could include river science education, private non-motorized boat storage, and public meeting space that could be rented to generate revenue. Public access from Barton Drive is necessary for this facility to be accessible to the community.



RECREATION – ANGLING

Summary: The Huron River supports an excellent warm water fishery, and fishing is a popular activity along the Barton-Superior stretch that flows through Ann Arbor. The Committee recommends angling opportunities be maintained and improved where possible.

RA1 – Expand Angling Access Times

Work with the angling community to identify opportunities to provide extended hours at City properties to allow for early morning and late evening access for anglers and other users.

RA2 – Improve Fish Habitat

Work with local anglers to identify areas where additions of woody cover, boulders, and underwater debris improve fish habitat diversity.

RA3 – Improve Signage

Identify opportunities to create new signage that directs river users to access points

RA4 – Increase Accessibility

Identify opportunities to improve or create handicap accessible facilities to give more users a chance to experience the River.

Barton – Create additional fishing platforms and docks to allow anglers greater access to shore and deeper waters. Explore the feasibility of a new boat launch near the Foster Bridge to enable recreational boaters additional access to the resource.

Preserve Impoundment: Argo – Solicit Michigan Department of Natural Resources input on fishery management recommendations for the Argo Impoundment.

Remove Dam: Argo – Manage as a cool water fishery with focus on smallmouth bass. Develop access points for wading and bank anglers and encourage use of livery launch site below Barton for angling paddlers.



Geddes – Establish additional access points with the addition of a trailered boat launch just upstream of Geddes Dam and a new fishing platform and parking area beneath the Huron Parkway Bridge.

Relationship to the PROS Plan

The PROS plan references a 1985 study that concluded the demand for fishing exceeds the supply of available opportunities in Southern Michigan. In addition to improving water quality restoring the native fish community of the Huron River, the PROS Plan recommends improving river access to promote greater bank and float fishing and providing on-site signage or literature to help anglers use improved angling facilities.



RECREATION – SWIMMING

Summary: The Committee recommends that opportunities for swimming are re-established along the river to the extent body contact standards can be met and monitored.

RS1 – Swimming Beach at Barton

Develop a new swimming beach on the southwest shore of the pond - near the berm - that is accessible through Barton Nature Area. Install a new buoy system to ensure boaters and swimmers maintain a safe distance from the dam.

Relationship to the PROS Plan

The PROS Plan recommends a study to determine the feasibility of establishing a swimming beach like the one that used to exist in Argo Pond. The plan also recommends continued water quality monitoring for body contact activities

RECREATION – CANOEING-KAYAKING-ROWBOATS

Summary: The committee recommends that the city maintain and improve canoe, kayak and rowboat opportunities on the Huron River encouraging outdoor recreation experiences for the general public.

RC1 - Maintain navigable river

Manage the river for consistent water flow levels over dams, and eliminate deadfalls, woody debris, and other barriers to navigation without significantly disrupting aquatic habitat.

RC2 - Develop Canoeing & Kayaking Improvements

Preserve Impoundment: Explore opportunities to create greater access and inclusiveness in canoe & kayak river trips, facilities, programs and services for people of all ages and abilities. Removing the portage around Argo Dam facilitates ease of use and a more enjoyable experience for canoe and kayak river trips to Gallup Park. Other improvements could include expanding city livery facilities by adding a canoe livery at Barton Dam, accessible public boat launches, and offer canoe & kayak boat storage on the river. Preserve Gallup Park's core circle for canoeing, kayaking, paddleboating and rowboating.

Remove Dam: Explore opportunities to create greater access and inclusiveness in canoe & kayak river trips, facilities, programs and services for people of all ages and abilities. Removing Argo Dam improves canoeing and kayaking by offering a wider variety of river trip opportunities with an additional 1.8 miles of free-flowing river from Barton Park to Gallup Park. To



accommodate growth in canoeing and kayaking on this section of river develop a livery at Barton Dam. Other improvements could include accessible public boat launches and offering canoe & kayak boat storage on the river. Preserve Gallup Park's core circle for canoeing, kayaking, paddleboating and rowboating.

RC3 – Water Trail

Explore opportunities to establish River Trails - historical, cultural or environmental education trails - with interpretive sign locations, brochures and educational programs.

RECREATION – TRAILS

Summary: The Huron River and Impoundment Management Plan Committee supports the PROS plan recommendations on continuing to create and connect trail sections along the Huron River and better connect the downtown to the River.

Related Recommendation

Dam Removed

RF8 – Develop new pedestrian crossing and trails near Argo Livery

Develop a new pedestrian crossing at the Argo Canoe livery as part of the border to border trail. Improve existing trail along the millrace embankment.

RECREATION – ROWING

Preserve Impoundment: Summary: The stretch of river from Argo Dam to Barton Dam continues to be the designated venue for rowing activity, including Argo Pond and rowing facilities located at Bandemer Park. The committee recommends rowing opportunities and facilities are maintained and improved where possible. The committee supports the rowing community - both recreational and competitive - and is committed to sustaining it as a permanent partner on the river with appropriate facilities and space on the water.

Remove Dam: Summary: The stretch of river on the Barton impoundment and the Geddes impoundment are the designated venues for rowing activity, including new rowing facilities located on Barton and Geddes impoundments. There are significant issues to establishing new rowing venues at either impoundment including public access, private property, available space for facilities and parking, safety, and operations. The committee recommends rowing opportunities and facilities are maintained and improved where possible. The committee supports the rowing community - both recreational and competitive - and is committed to sustaining it as a permanent partner on the river with appropriate facilities and space on the water.



RR1 – Develop Rowing Improvements

Develop rowing specific impoundment improvements consistent with other stated visions, goals, and policies. Investigate selected modifications to the stretches of river designated for rowing that help to improve the rowing experience. Such improvements could include selective sculpting and dredging of the river bottom, aquatic vegetation management with location-specific treatments, optimal dock location and configuration, and improved parking and road access.

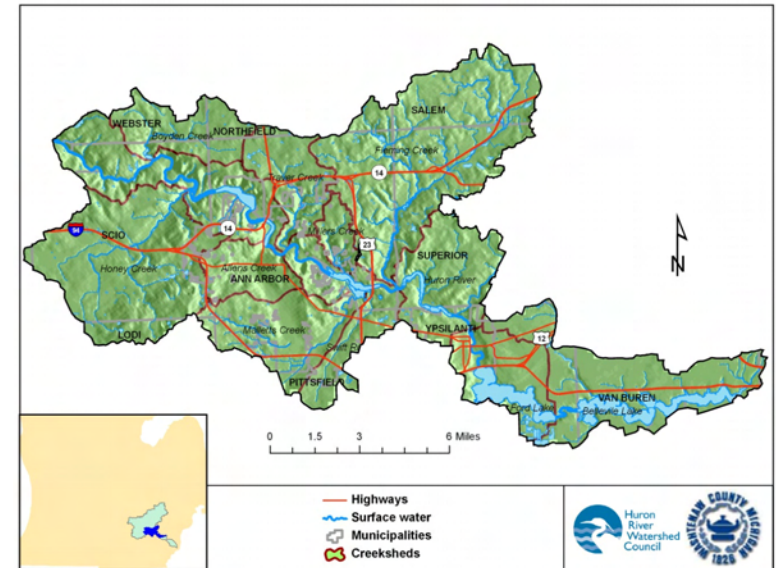


Appendices

Introduction to the Huron River

The following is taken from the Ann Arbor – Ypsilanti Watershed Management Plan Update (2008) developed by the Huron River Watershed Council.

The Middle Huron Watershed is part of the Huron River Watershed, one of Michigan's natural treasures. The Huron River supplies drinking water to approximately 150,000 people, supports one of Michigan's finest smallmouth bass fisheries, and is the State's only designated Scenic River in southeast Michigan. The Huron River Watershed is a unique and valuable resource in southeast Michigan that contains ten Metroparks, two-thirds of all southeast Michigan's public recreational lands, and abundant county and city parks. In recognition of its value, the State Department of Natural Resources has officially designated 27 miles of the Huron River and three of its tributaries as "Country-Scenic" River under the State's Natural Rivers Act (Act 231, PA 1970). The Huron is home to one-half million people, numerous threatened and endangered species and habitats, abundant bogs, wet meadows, and remnant prairies of statewide significance.



The Huron River basin encompasses approximately 900 square miles (576,000 acres) of Ingham, Jackson, Livingston, Monroe, Oakland, Washtenaw, and Wayne counties (Figure 1.1). The main stem of the Huron River is approximately 136 miles long, originating at Big Lake and the Huron Swamp in Springfield Township, Oakland County. The main stem of the river meanders from the headwaters through a complex series of wetlands and lakes in a southwesterly direction to the area of Portage Lake. Here, the river begins to flow south until reaching the Village of Dexter in Washtenaw County, where it turns southeasterly and flows to its final destination of Lake Erie. The Huron is not a free-flowing river. At least 98 dams segment the river system, of which 17 are located on the main stem.

The immediate drainage area to the Middle Huron Watershed is 217 square miles (138,593 acres), representing approximately 24% of the Huron River Watershed. The Middle Huron Watershed is defined as the land area that drains to the Huron River downstream of the confluence with Mill Creek and through Ford and Belleville Lakes. All or portions of 13 local communities are situated in the Middle Huron Watershed, of which the largest portions are within the Cities of Ann Arbor and Ypsilanti, and the townships of Scio, Ann Arbor, Superior, Pittsfield, Ypsilanti and Van Buren. Other communities with smaller areas in the watershed include the townships of Webster, Northfield, Salem, Lodi, as well as the Village of Dexter and the City of Belleville. The entire watershed lies in Washtenaw County, with the exception of the majority of the drainage to Belleville Lake, which is in Van Buren Township and the City of Belleville in Wayne County.



Middle Huron

The segment of the Huron River in the Middle Huron Watershed begins at the outfall of Mill Creek in Dexter and ends at the French Landing Dam, which creates the Belleville Lake impoundment. From the Mill Creek outlet, the river flows unrestricted toward the southeast until it reaches a series of impoundments beginning with Barton Pond and ending in Belleville Lake. Nine major tributaries and the two lake drainages run directly into the Huron River system. These eleven distinct sub-basins are also known as "creeksheds." The mainstem of the Huron River in the Middle Huron Watershed is approximately 40 miles long with additional 593 miles of contributing streams. A relatively significant elevation drop from watershed inlet to outlet coupled with intensive urban development means that fewer lakes and wetlands remain in the Middle Huron than in the Upper Huron watersheds or other watersheds in Michigan. The elevation drops 199.5 feet over 40 river miles for an average gradient of 5.0 ft/mi. This gradient compares to an average of 3.3 ft/mi for the entire Huron River. Approximately 5,393 acres (8.4 sq. miles) of wetlands remain in the Watershed as of 2000, comprising about 6% of the total watershed area. The Middle Huron area contains 378 lakes and impoundments, of which 43 are greater than 5 acres and 10 of which are greater than 20 acres. All the waters greater than 20 acres in size are impoundments.

The watershed contains a few small protected natural areas including Dexter-Huron Metropark, Delhi Metropark, Barton Park, Bird Hills Park, Nichols Arboretum, Matthaei Botanical Gardens, and Belleville Park, as well as numerous other public and private local parks. The watershed's land cover is dominated by urban and sub-urban residential, commercial and industrial uses, with low-density residential areas, grasslands/old agricultural fields, forested lands, and wetlands scattered primarily in the northern and western fringes of the watershed.

Development Pressure

In recent decades, the Huron River Watershed has experienced amplified development pressures from a growing economy and urban sprawl. According to the U.S. Census data and the Southeast Michigan Council of Governments (SEMCOG), the total population of the seven communities (Scio Township, City of Ann Arbor, Ann Arbor Township, Superior Township, City of Ypsilanti, Ypsilanti Township, and Van Buren Township) that comprise over 90% of the Middle Huron Watershed's population increased 5.5% from 1990 to 2007. The forecast to 2030 shows a 13.5% increase in population from 2007 levels. This growth rate falls in between that of other sub-watersheds of the Huron River: Wayne and Oakland Counties' populations are hovering at a constant rate or declining, while rapid growth is occurring in Livingston County.

Washtenaw County continues to be one of the fastest growing counties in the state, reflecting a trend in growth out from Detroit to the more outlying areas spurred by highway improvements, the establishment of infrastructure, and a desire for open space, among other factors. According to SEMCOG, Washtenaw County's population increased by almost 9% from 2000 to August 2007, compared with 2.2% in Oakland County, -0.9% in Wayne County (excluding Detroit) and 23% in Livingston County. SEMCOG predicts that most of Washtenaw County's growth in the next 23 years will take place in Scio, Superior and Ypsilanti Townships, with projected growth rates all over 30%. The more developed municipalities are projected to experience more modest growth below 10%.



If current development practices are employed to accommodate the projected increase in population and associated infrastructure, then SEMCOG estimates 40% of the remaining open spaces will be developed within the Huron River Watershed by 2020. Much of this projected conversion of undeveloped land will occur in the Middle Huron area where it will hasten degradation of the hydrology and water quality of surface waters.

Common practices that impact hydrology and water quality include draining wetlands, straightening and dredging streams ("drains"), removing riparian vegetation, installing impervious surfaces and storm sewers, inadequately controlling soil erosion, and poorly designing stream crossings. Such practices result in altered hydrology ("flashy" flows and flooding), soil erosion and sedimentation, elevated nutrients, nuisance algal blooms, dangerous levels of pathogens, and degraded fisheries. Water Quality Standards

Portions of the Middle Huron Watershed fail to meet minimum water quality standards or provide designated uses protected under Michigan law. In 1996, based on water quality monitoring studies, the Michigan Department of Environmental Quality (MDEQ) listed the Middle Huron River Watershed as significantly contributing phosphorus to the impaired waterbodies of Ford and Belleville lakes. The MDEQ placed the lakes on the State's 303(d) list of impaired waters, which means that their quality is poor enough to require the establishment of a Total Maximum Daily Load (TMDL). A TMDL is the maximum amount of a particular pollutant a waterbody can assimilate without violating numerical and/or narrative water quality standards. The reason for the impaired status was cited as excess phosphorus loading from point and nonpoint sources in the Middle Huron River Watershed.

Both point and nonpoint source contributions need to be reduced if the goal is to be met. The communities of the Middle Huron are under mandate from the State of Michigan to reduce phosphorus loading to the river by 50% in order to meet the TMDL. As a result of field studies, MDEQ established a TMDL target concentration of 50 micrograms per liter ($\mu\text{g/L}$) of phosphorus for Ford Lake, and 30 micrograms per liter ($\mu\text{g/L}$) of phosphorus for Belleville Lake to significantly reduce or eliminate the presence of nuisance algal blooms. Scientists estimate that the areas covered under this WMP contribute about 75% of total phosphorus to the Middle Huron, with Mill Creek contributing the remainder.

Total Maximum Daily Loads

A Total Maximum Daily Load (TMDL) is the maximum amount of a particular pollutant a waterbody can assimilate without violating state water quality standards. Water quality standards identify the applicable "designated uses" for each waterbody, such as swimming, agricultural or industrial use, public drinking water, fishing, and aquatic life. MDEQ establishes scientific criteria for protecting these uses in the form of a number or a description of conditions necessary to ensure that a waterbody is safe for all of its applicable designated uses.

The state also monitors water quality to determine the adequacy of pollution controls from point source discharges. If a waterbody cannot meet the state's water quality criteria with point-source controls alone, the Clean Water Act requires that a TMDL must be established. TMDLs provide a basis for determining the pollutant reductions necessary from both point and nonpoint sources to restore and maintain the water quality standards. Point sources is the term used to describe direct



discharges to a waterway, such as industrial facilities or waste water treatment plants. Nonpoint sources are those that enter the waterways in a variety of semi- or non-traceable ways such as stormwater runoff.

In Michigan, the responsibility to establish TMDLs rests with the MDEQ. Once a TMDL has been established by the MDEQ, affected stakeholders must develop and implement a plan to meet the TMDL, which will bring the waterbody into compliance with state water quality standards

As of the 2006 303(d) List of Nonattaining Waterbodies from the DEQ, ten waterbodies in the Middle Huron are listed for water quality problems. To date, four TMDLs have been established for Ford and Belleville Lakes (phosphorus), Geddes Pond (pathogens), Malletts Creek (poor fish and macroinvertebrates), and Swift Run (poor macroinvertebrates). Six TMDLs for other pollutants are scheduled for future establishment in the watershed, as described in Table 1.1.



Table 1.1: Waterbodies requiring TMDLs in the Middle Huron Watershed
 (Source: MDEQ 2006 303(d) list of nonattaining waterbodies)

Waterbody	Pollutant or Problem	TMDL Status	Location/Area
Ford Lake/ Belleville Lake	Nutrient enrichment (phosphorus)	Approved in 2000; To be updated 2010	Impoundments of the Huron River located between the cities of Ypsilanti and Romulus.
Huron River (Geddes Pond and Allen Creek)	Pathogens (rule 100)	Approved in 2001	Geddes Pond Dam upstream to Argo Dam, Ann Arbor
Malletts Creek	Poor fish and macroinvertebrate communities	Approved in 2004	Huron River confluence u/s to Packard Rd.
Swift Run	Poor macroinvertebrate community	Approved in 2004	SE Ann Arbor: Huron River confluence upstream to Ellsworth Rd
Honey Creek	Pathogens (rule 100)	Scheduled for 2009	Confluence of Huron River upstream to Wagner Rd..
Barton Pond	Fish Consumption Advisory for Polychlorinated Biphenyls (PCBs)	Scheduled for 2010	Impoundment of Huron River in vicinity of Barton Hills (suburb of Ann Arbor). From dam u/s to Conrail RR bridge crossing.
Ford Lake/ Belleville Lake	Fish Consumption Advisory for Polychlorinated Biphenyls (PCBs)	Scheduled for 2010	Impoundments of the Huron River located between the cities of Ypsilanti and Romulus.
Huron River	Water Quality Standard Exceedence for Polychlorinated Biphenyls (PCBs)	Scheduled for 2010	Lake Erie confluence upstream to include all tributaries.
Second Sister Lake	Fish Tissue-Mercury	Scheduled for 2011	W of Ann Arbor.
Unnamed Lake	Fish Consumption Advisory for PCBs, and Fish Tissue- Mercury	Scheduled for 2010 (PCBs) and 2011 (Mercury)	S. of Ford Lake in the NE corner of Sec. 26, T3S, R7E (Textile Road and Burton Road).



Introduction to Aquatic Vegetation

The impoundments along the Huron River in Ann Arbor are ideal environments for aquatic vegetation growth. Plants are essential for aquatic ecosystem function, but in many areas, excessive plant growth has decreased the diversity of the native plant community, created aesthetic problems, increased the rate of sedimentation in the impoundment, reduced water clarity, and hindered recreational use.

Aquatic Vegetation Conditions

In August of 2006, the City of Ann Arbor hired LimnoTech, Inc. to survey aquatic vegetation in the Huron River Impoundments. LimnoTech determined the species composition of aquatic plants and mapped occurrences of nuisance plant growth in each impoundment. Vegetation reaches nuisance level when there are solid or near solid surface canopy conditions that limit navigation and recreational activities. LimnoTech researchers observed nuisance vegetation covering 114 acres.

	Total Acres	Nuisance Acres	% Nuisance Area	Dominant Nuisance Species
Barton	265	43	16%	Eurasian watermilfoil, curly leaf pondweed, coontail, water lily, elodea
Argo	85	3*	4%	Eurasian watermilfoil, coontail
Geddes	146	44	30%	Eurasian watermilfoil, curly leaf pondweed, coontail, water lily
South	51	24	47%	Eurasian watermilfoil, coontail, water lily,
Superior	85	Not Measured		
TOTAL	632 acres	114 ACRES		

* This estimate of nuisance acres is underestimated due to regular vegetation mowing by rowers.

Anecdotal information provided by residents of South Pond and City Canoe Livery staff suggests that nuisance areas in Geddes and South Ponds in August 2008 are larger than those identified in 2006. In June and August of 2008, Professional Lakes Management provided a harvesting program for South Pond. It was determined that the impoundment was now 80% covered in nuisance vegetation composed of approximately 75% coontail and 25% white water lily and curly pondweed.

Eurasian watermilfoil, coontail, and water lily were the most commonly observed species in each of the impoundments. Eurasian watermilfoil (EWM) is an invasive species that becomes established early in the growing season. Spreading mainly by fragmentation, EWM grows into a thick surface mat that shades out other plant species. Coontail and water lily are native species that can achieve nuisance levels under conditions optimal for their growth such as high nutrient levels. Curly leaf pondweed (CLP), another invasive species, was observed in Barton, Argo, and Geddes ponds during a spring 2008 during a visual assessment of vegetation carried out by the City staff. Curly leaf pondweed's tolerance for low light and low water



temperatures gives it a head start over native species early in the growing season. It grows in dense patches, reproduces, and then dies off by mid-summer, adding to the sedimentation problem.

Aquatic Vegetation Management Strategies

The Aquatic Vegetation Subcommittee examined a number of aquatic plant management strategies including mechanical harvesting, herbicide, dredging, drawdown, and biological control. Because no single approach is known to be effective, the Subcommittee supports an integrated vegetation management approach that combines multiple strategies with regular monitoring of the plant community. The strategies include one or more of the following based on river use and costs and may change over time.

Mechanical Harvesting - Plants are cut and removed from the system using a specially designed harvesting machine. This method of vegetation management is currently used on South Pond, where it is funded by private citizens. Harvesting is also used in many other areas throughout Michigan.

Advantages

- ☞ removes biomass and nutrients (including phosphorus) from the pond
- ☞ provides visible, immediate results
- ☞ nutrient rich harvested material can be composted
- ☞ repeated harvesting may reduce the density of certain species

Disadvantages

- ☞ non-selective process - all plants in the path of the harvester are removed
- ☞ may affect non-target species including fish, invertebrates, and turtles
- ☞ can augment a weed problem by spreading fragments to unaffected areas
- ☞ temporary fix - must be repeated two or more times per growing season
- ☞ harvesting equipment is difficult to maneuver in shallow areas

Cost Considerations

Option 1: City purchases and operates its own harvesting equipment

- ☞ upfront costs estimated at \$180K
- ☞ annual costs (equipment depreciation, maintenance, fuel, composting, labor) estimated at \$50K
- ☞ costs are based on assumptions that City harvests all nuisance vegetation (estimated 114 acres in 2006 aquatic plant study completed by LimnoTech, Inc.)
- ☞ only harvest selected sections of river

Option 2: City hires contractor to carry out harvesting duties

- ☞ contractor rates estimated at \$500/acre
- ☞ total costs - \$114,000 per year to harvest 114 acres twice at \$500 per acre.
- ☞ only harvest selected sections of river – costs depend on number of acres harvested



Regulation

- ☞ no permit currently required

Drawdown – Plants, especially root systems, are exposed to freezing conditions for a period of time sufficient to kill the plants and their reproductive structures. Historically, this method was used at Barton Pond, but the Michigan Department of Natural Resources (MDNR) does not support drawdown to manage aquatic vegetation.

Advantages

- ☞ may reduce coontail and water lily

Disadvantages

- ☞ invasive plants are least affected by drawdown because they tend to recover and repopulate bare areas faster than natives, effectively increasing invasive species in near-shore areas and decreasing biological diversity
- ☞ nutrient production from dewatered sediments may increase following drawdown, leading to excessive algae growth
- ☞ timing of drawdown critical, but often unpredictable
- ☞ may be stressful to invertebrate, fish, and amphibian populations
- ☞ requires ecological assessment and detrimental effects study
- ☞ need to drawdown repeatedly over the longer term – every one or two years

Costs Considerations

- ☞ Drawdowns reduce pond levels and the 'head' at the dam, thereby reducing hydropower production. At Barton, this is estimated at \$15,000.00 for a 2 month drawdown period.
- ☞ permitting costs

Regulation

- ☞ Part 301 Permit required (DEQ Land and Water Management Division)
- ☞ Part 315 Permit (DEQ) Dam Safety Unit
- ☞ FERC permit (Barton and Superior)

Dredging - Sediments are physically removed to increase the depth of the water body to below the depth of light penetration, resulting in virtual elimination of plant growth. Dredging was used to create the area for the Gallup Canoe Livery in the 1970s.

Advantages

- ☞ can be done in targeted areas
- ☞ results are generally longer lasting (5-10 years) than other plant control methods
- ☞ increases water depth, which may enhance recreation opportunities

Disadvantages

- ☞ non-selective process that removes majority of aquatic life in targeted area
- ☞ destroys critical shallow-water fish habitat, site of 90% of fish production



- ☞ causes turbidity and sedimentation in nearby areas
- ☞ to be effective, sediments must be dredged to a depth that significantly reduces the growth of key nuisance species (Eurasian watermilfoil can grow in 25 feet of water)
- ☞ sediment analysis to test for contamination required prior to dredging
- ☞ creates bare river bottom and invasive plants tend to repopulate area

Costs Considerations

- ☞ widely variable, depending on contamination and transportation
- ☞ most costly, but most long-lasting
- ☞ clean sediment: \$10-\$50 per cubic yard
- ☞ contaminated sediment increases costs significantly

Regulation

- ☞ Part 301 Permit (DEQ Land and Water Management Division)
- ☞ NPDES permit (DEQ Water Bureau)

Chemical Control – Nuisance species are controlled using an approved aquatic herbicide. There are two classes of herbicides. Contact herbicides affect only the parts of the plant with which they come in contact. Systemic herbicides are taken up by the plant and affect metabolic processes within part or all of the plant. In general, contact herbicides work more quickly but are effective for shorter periods of time than systemic herbicides.

Advantages

- ☞ selective control of nuisance species possible by varying chemical, timing, and rate of application
- ☞ minimal effect on aquatic organisms
- ☞ only impacts targeted areas
- ☞ many chemicals are fast-acting (effective within days or weeks)
- ☞ products on market do not bioaccumulate in animal tissue

Disadvantages

- ☞ many chemicals have water use restrictions for one or more days after application
- ☞ if not used properly, there is potential environmental/human health impact
- ☞ not all water bodies are suitable - works best in low-flow conditions
- ☞ repeat application is often necessary within the year
- ☞ little is known about accumulation of the chemical in the sediment
- ☞ plant biomass remains in system and consumes oxygen during decomposition

Costs Considerations

- ☞ Permit fee (\$75-\$1500), dependent on size of treatment area
- ☞ Cost varies with chemical type and treatment area, typically \$200-\$400/acre
- ☞ Overall, chemical control considered one of most cost-effective management strategies



Regulation

- ☛ Permit required (DEQ Aquatic Nuisance Control)

Biological Control - use of a living organism to exert some level of control over a plant community

The milfoil weevil, (*Euhrychiopsis lecontei*) is a small, herbivorous, aquatic beetle that specializes in feeding on Eurasian watermilfoil (EWM). The most damage to milfoil plants is caused by larvae. Adult weevils lay their eggs in the growing tips of milfoil. Once the eggs hatch, larval weevils burrow into the stem, eating as they go. This weakens the stem, causing it to collapse. Milfoil weevils show a preference for EWM over native milfoil species. The milfoil weevil was used by the Barton Boat Club to control EWM with some success in Barton Pond in 2001 and 2002, but the weevil populations did not become established and the club did not have funding to re-stock.

Advantages

- ☛ milfoil weevil is a native species
- ☛ selective control of EWM – does not affect native plant community
- ☛ potential for long-term control reduces need for repeated treatments required with chemical and mechanical controls
 - helps promote regeneration of desirable native plants

Disadvantages

little research on use of weevils in riverine system

weevils do not control other nuisance species

decreasing EWM can open areas for other nuisance species (e.g., in Barton Pond weevils reduced the EWM, but coontail became dominant)

weevil populations need to be monitored and may need to be restocked if populations do not become established

biological control is less effective in areas where mechanical and chemical methods are also used

not a quick-fix – generally takes 3-5 years to see results

Cost Considerations

- ☛ EnviroScience, Inc. charges \$1.20 per weevil, and stocks several thousand in a few small areas throughout waterbody -
 - Costs include stocking and monitoring by trained technicians
- ☛ Previous seeding at Barton was \$15K

Regulation

use of weevils not currently regulated

other biological controls such as Asian carp are strictly prohibited

The Michigan Department of Natural Resources (DNR) ranked the available aquatic vegetation control options based on impact to the aquatic community¹ from most preferred to least preferred. The HRIMP committee had no disagreement with the DNR ranking. The HRIMP Committee favors an integrated vegetation management approach that includes some or all of the available options.

Manual – Harvesting

Chemical
Manual - Dredging (of small areas)

*Biological control of EWM by the milfoil weevil was not included because it is not effective against other nuisance species, and, in some cases, it allows other nuisance species to take over. Drawdown was not included because MDNR strongly discourages the method.





Introduction to Ann Arbor Dams Along the Huron

- ☞ 2,500,000 dams in the United States
- ☞ 2,500 in Michigan
- ☞ 96 in the Huron River watershed, 19 on main river stem
- ☞ 4 owned by the City of Ann Arbor, 2 of which are in the City of Ann Arbor

History

Original dams built by Detroit Edison (DTE) in early 1900s for hydropower.

DTE decommissioned the dams in 1963, and sold them to the City of Ann Arbor

Flood in June 1968 required complete rebuilding of Geddes Dam and damaged Barton, Argo, and Superior dams.

Ann Arbor voters approved a \$3M bond proposal to rebuild and restore the dams in 1970

The City performed a hydropower feasibility study. As a result of the study, the City restored hydropower to Barton and Superior dams in 1986

In 1988, the City entered into 50-year contract to sell energy to DTE.

Ann Arbor Dams

All four dams on the Ann Arbor stretch of the Huron River are classified as “run of the river” dams, meaning the amount of water entering each reservoir equals the amount of water exiting. The dams must maintain a river flow of 100 cubic feet per second (cfs). The dams do not provide flood control.

Barton Dam is a hydropower dam regulated by the Federal Energy Regulatory Commission (FERC). The reservoir created by the dam provides 80% of Ann Arbor's drinking water, along with sailing, canoeing, kayaking, and fishing opportunities.

Argo Dam is a recreational dam regulated by the Michigan Department of Environmental Quality (MDEQ). While Argo dam no longer produces hydropower, its reservoir provides recreational space for rowing, canoeing, kayaking, and fishing. The dam also serves as an important pedestrian access point across the river.

Geddes Dam is a recreational dam regulated by MDEQ. Gallup Park was designed around the rebuilding of Geddes Dam after it failed in 1968. Geddes Dam does not produce hydropower, but its impoundment is one of the most popular recreational spaces in Ann Arbor.

Superior Dam is a hydropower dam regulated by FERC. Together, Barton and Superior dams produce 6000 megawatt hours per year of hydroelectricity. The reservoir created by Superior Dam provides recreational opportunities, but access to the space is limited.



Community Benefits of Dams

- ☞ Dams create impoundments for calm water activities such as rowing, kayaking, sailing, canoeing, and still, warm water fishing. Geddes impoundment is home to over 15,000 boat rentals and a public boat launch. Argo impoundment is home to a public rowing club, the UM club rowing team, and two of the most successful high school rowing teams in the state.
- ☞ Some dams create reservoirs for drinking water storage (Barton)
- ☞ Some dams generate renewable energy - hydropower (Barton, Superior)

Community Costs of Dams

- ☞ Annual and episodic maintenance (see Economic Considerations – next page)
- ☞ Regulatory expenses – inspections, permitting
- ☞ Sediment maintenance – e.g., dredging

Ecological Effects of Dams

- ☞ Dams impede a river's natural flow and prevent sediment and nutrients from being transported downstream.
- ☞ Dams cause sediment to build up in the ponds, resulting in shallow water conditions. Shallow depths allow sunlight to easily reach the bottom, causing more plant growth.
- ☞ Dams alter water temperatures, dissolved oxygen levels, turbidity and salinity both upstream and downstream of the structure.
- ☞ Dams fragment rivers and block the movements of fish, mussels and other aquatic species

Dam Removal

- ☞ As dams age, fall into disrepair, or become too costly to maintain, many communities consider dam removal. Dam removal can benefit rivers by:
 - ☞ Restoring the natural flowing character of a stream and ecological processes of the river
 - ☞ Making previously inaccessible segments of water accessible to a variety of fish species
 - ☞ Restoring fish spawning habitat and other critical stream habitat
 - ☞ Eliminating unnatural temperature variations below the dam

Community benefits may include:

- ☞ Removing the liability associated with dam failure
- ☞ Removing ongoing maintenance costs
- ☞ Expanded riverine recreational activities
- ☞ Creates habitat and bank/wading fishing opportunities for highly valued fishes found in free-flowing water, such as smallmouth bass and walleye.

Community costs may include:

- ☞ Loss of recreational activities that relied on the impoundment – rowing, still water boating and fishing, walking trail views
- ☞ Re-establishment of a new rowing venue at another impoundment
- ☞ Removing the dam structure



- ☞ Establishing and maintaining the newly created park land
- ☞ Controlling sediments – these costs could be significant if sediment is contaminated
- ☞ Loss of pedestrian access across dam – this access may need to be replaced.



Introduction to Canoeing & Kayaking

The City of Ann Arbor operates two canoe liveries - one on Argo Pond and one on Geddes Pond at Gallup Park. In 2007, more than 30,000 people paddled on the Huron River, and an additional 40,000 people used Gallup and Argo Parks for other activities such as special events and meetings. Canoe livery patrons, along with visitors to riverside parks, make up a significant portion of Huron River users in Ann Arbor.

The Ann Arbor canoe liveries operate seven days a week, from 9 AM – 9 PM, between Memorial Day and Labor Day, plus Gallup operates seven days a week in the spring and fall months and Argo is open on weekends during spring and fall. The current livery fleet includes 133 canoes and 81 kayaks. In addition, five rowboats and 15 paddleboats are available for rent at the Gallup livery. Activities offered by the liveries include paddle parties, educational school programs, birthday parties, river day camps (grade school ages at Gallup, middle school at Argo), preschool programs, senior programs, walks, wetlands by canoe, full moon paddles, instruction workshops, meeting room rentals, festivals at Gallup Park, corporate trips, river clean-ups, and working with Huron Clinton Metroparks at Delhi. The Gallup Livery also operates a coffee shop with Zingerman's baked goods, cold beverages, and ice cream.

Paddling Opportunities - About one half of canoe livery patrons elect to do river trips, while the remaining half rent boats by the hour and paddle around Geddes Pond. Four river trips of varying lengths are available for paddlers.

- ☞ Argo Park to Gallup Park (1.5-2 hours, 83% of trips)
- ☞ Barton Dam to Gallup Park (3 hours)
- ☞ Delhi Metropark to Argo Park (4 hours)
- ☞ Dexter-Huron Metropark to Argo Park (6 hours, only about 100 trips per year)

Key Findings

- ☞ Removing Argo Dam would create an un-interrupted five mile stretch from below Barton Dam to Gallup Livery, approximately a three hour trip. Currently patrons have to bypass Argo Dam by paddling through the mill race and portaging boats down a steep ramp.
- ☞ City Parks and Recreation staff are considering adding a third canoe livery below Barton Dam.
- ☞ If Argo Dam is repaired, this livery would operate on weekends to help reduce traffic at Argo and Gallup, which operate at full capacity in the summer months.
- ☞ If Argo Dam is removed, this third livery would be located at the start of the un-interrupted five mile trip and would likely serve the users taking advantage of the portage-free trip to Gallup.

Possibilities to consider in the future for the canoe liveries

- ☞ Expand the Argo Livery site - increase vans, trailers, boats, parking and teen kayak day-campers.
- ☞ Private boat storage on the river for area residents to store boats
- ☞ Determine the feasibility and long-term popularity of a natural or engineered kayak course on the Huron River.
- ☞ If Argo Dam is repaired, this whitewater course may occupy part of the mill race.
- ☞ If Argo Dam is removed, there is potential to take advantage of a portion of the river's natural gradient, one of the steepest on the entire Huron system.



City of Ann Arbor Canoe Liveries – Summary 2007	
Average Number of people renting boats on summer weekend day	675 people (472 Argo people+ 203 Gallup people)
Number of boats at Liveries	234 (133 canoes, 81 kayaks, 15 paddle, 5 row)
Number of people on Pond Paddles in 2007	17,164 or 51% of all rentals
Number on paddleboats	5741
Number on rowboats	873
Number on canoes/kayaks	10550
Number of people on River Trips in 2007	16,440 or 49% of all rentals
Number of people Dexter to Argo - 6 hours	135 or 1%
Number of people Delhi to Argo - 4 hours	1080 or 7%
Number of people Barton to Gallup - 3 hours	1535 or 9%
Number of people Argo to Gallup- 2 hours	13690 or 83%
Number of Ann Arbor Residents – Livery Rentals only	23745 or 71%
Number of Non Residents – Livery Rentals only	9859 or 29%
Number of campers in River Day Camps 2007	288
Number of participants in programs & festivals 2007	3530
Number of students participated River EE Programs 2007	330
Total number of people in livery boats 2007	37,752



Introduction to Rowing

Rowers comprise one of the largest organized user-groups of Argo Pond. The University of Michigan (UM) men's crew team began rowing on Argo in 1976. They were joined by the Ann Arbor Rowing Club (AARC), an organization open to the public, in the early 1980s, the Huron High crew team in 1993, and the Pioneer High crew team in 1999. In all, about 600 rowers are active in these organizations annually, while a few additional rowers use the Huron unaffiliated. Throughout the Huron River planning process, the Huron River and Impoundment Management Plan (HRIMP) Committee has engaged representatives from the rowing community to learn about their needs and preferences regarding rowing venues, space, and facilities that will help their programs continue to grow and succeed in the future.

Rowing on Argo Pond

Argo Pond, although S-shaped and narrow at some points, provides 3200 meters of rowable water, from Argo Dam to the pedestrian bridge just downstream of Barton Dam. It is the longest stretch of water in Ann Arbor, and the users have learned to maneuver every obstacle and pinch point. Peak use times on Argo Pond are April-June and September-November, when all of the teams are practicing in the afternoon/evening (Table 1). Although all groups are not on the water at the same time, practices do overlap, and the boathouse, dock, and water can become crowded.

Table 1. Use of Argo Pond by Rowing Organizations

Organization	Members; Coaches	Annual River Trips	Rowing Season	Rowing Hours
UM Men's Crew	50-70; 6	9,000	Mar-Jun; Aug-Nov	M-F: 6:30-8:30 am, 4:15-6:45 pm
Ann Arbor Rowing Club	300 adult, 55 Youth; 25	11,000	Apr-Nov	M-F: 5:30-7 am, 6:30-8 pm; Sat: 8-10:30 am
Huron High School	75-80; 6	10,000	Mar-Jun; Aug-Nov	M-F: 5:30-7:30 pm
Pioneer High School	85-90; 6	11,000	Mar-Jun; Aug-Nov	M-F: 4-6:15 pm

On land, all the rowing organizations operate from a single dock at Bandemer Park. The AARC, Huron, and Pioneer teams share the Beal Boathouse - constructed by the city in 2002 and being repaid through rental fees - but this facility is already filled to capacity. During the season, space restrictions require teams to store some of their boats, oars, and other expensive equipment outdoors. The UM team has its own smaller boathouse at Bandemer Park. The rowing teams use mostly four and eight-person boats. At a typical practice, each team has four to eight boats on the water, and the teams break into smaller groups that include 2-4 boats and a coach's launch.

The rowing community believes that if it continues to grow, then additional rowing venues will need to be considered for expansion beyond the Argo impoundment. If Ann Arbor decides that Argo Dam is to be removed, all of the existing rowing

organizations, along with a potential new Skyline High School program, will likely need to relocate to two other impoundments. There may be engineered options for removing the dam and maintaining a rowable impoundment, but this should be evaluated. Currently rowers are cutting vegetation in the the pond as a management method for nuisance weed growth. This practice, while providing an immediate solution, actually facilitates the growth and spread of nuisance weeds. If rowing continues on Argo Pond, an aquatic vegetation management strategy that does not exacerbate the existing problem should be employed.

Current use of Bandemer Park involves crossing an ungated railroad crossing and accessing Main Street, which is close to M-14, with heavy traffic. These are safety concerns and will likely need to be resolved with an additional road constructed from the bridge on the north side of Bandemer Park.

Exploration of Existing and Alternate Rowing Venues

Because removing Argo dam is under discussion, options for rowing were discussed among committee members and some members of the rowing community. These represent some of the information and opinions generated at meetings to date.

The rowing community believes that Argo Pond is best possible location for rowing in the City, for several reasons.

- ☞ **Water:** The water is good, flat, and the length is entirely rowable with few hazards. Wind conditions very seldom make the water unrowable, unlike other impoundments.
- ☞ **Accessibility:** The location is central to all participants, and has the smallest transportation-related carbon footprint of any of the venues; many rowers bike to the facility. In addition, if a connecting road is extended down to the current boathouse location, Argo has no railroad crossing access conflicts.
- ☞ **Facility and parking:** There is an existing boathouse structure with adequate parking, unlike all other venues; in addition, the docks are new. One single rowing venue allows all the clubs to benefit from the synergy of shared assets and resources and collaborate on various efforts

Argo dam facilitates the ability to have rowing in Ann Arbor. This facility typically plays host to one regatta each year which draws several hundred participants/spectators to the city. Rowing is a major coeducational scholastic, varsity sport for the two existing high schools, accounting for almost 200 students. It is second in single-season subscription only to football and is a two-season sport, which makes it the highest athlete count of any sport. Many of these rowers stay active through the summer using the Argo/Bandemer facility. Currently, Argo/Bandemer is the only rowing facility available that is also centrally located for all three high schools. The Beal boathouse has the ability to be expanded to meet increased need and a study has been done to demonstrate that feasibility. Because the boathouses and canoe livery exist on opposite sides of Argo Pond conflict between user groups is minimized and not a factor as might be the case in other alternate locations. The current facility functions as a larger unified community- where high school athletes, adult masters athletes and collegiate athletes may interact.

"The vision of the rowing community in Ann Arbor is to continue to offer and support excellent rowing programs to the community in a location that is most accessible to the community at large. As stewards of Bandemer Park we fully support



efforts to mitigate the effects of our actions, and are actively pursuing low-noise, electric and other “green” alternatives to current operations. We envision also an expanded boathouse facility on Argo Pond, our venue of choice and best location for rowing in Ann Arbor, that reflects the commitment of the community to the high school varsity rowing programs and community recreational rowing programs that are among the largest and best in the State.”

To move rowing from the Argo Pond venue will require development of rowing facilities on two additional impoundments, neither of which are as favorable in most key regards. The rowing community believes a move to Barton or Geddes will increase the clubs' operating costs, tear apart the unique shared culture of an integrated recreational community, and greatly diminish the quality of the rowing experience compared to Argo. Any impending action on the dam which could lead to its removal warrants a viable community approved and funded alternative to permit an uninterrupted scholastic and recreational rowing venue.

Barton Pond: In discussions with rowing community representatives, Barton Pond emerged as the top alternative to Argo Pond in terms of rowable water. Barton, from the dam to the first railroad bridge, offers about 3000 meters of water, including a 1500 meter long, 150 meter wide straightaway that would be good for racing. The UM men's crew team rowed briefly on Barton Pond in the early 1980s, but the rowers were asked to leave due to traffic, safety, land stewardship, and noise issues. New headset technology can help reduce noise.

Several obstacles must be overcome and issues addressed to make rowing a successful recreational feature on Barton Pond. One drawback of Barton Pond is its mostly privately-owned shoreline. The City owns large parcels along each side of the dam. There is some parking off of Huron River Drive but little room for boat storage on the west side of the dam. Access to the site from across the river presents potential safety hazards, especially for high-school age students, who would have to follow a path up and across the top of the dam, or who could also take a shorter pedestrian bridge route and then follow a dirt path across the railroad tracks. There is potentially room on the east side of the dam for a boathouse but access through Barton Hills Village is limited by a private road. The site itself is a narrow lot that restricts on-shore boat handling and boat trailer turns, and space for parking is limited. In addition, precautions are required to keep users at a safe distance from the dam and safe rowing operations at this end of the Pond are severely impacted by winds. It should be noted that Barton Pond could not support all of the current rowing community, and an additional venue would be needed. Barton offers no space on land to host a rowing regatta with visiting clubs, who all bring boat trailers and multiple passenger vehicles

Geddes Pond: Geddes is also a possible alternative to Argo Pond, perhaps more so for the high school programs, but it also has some distinct limitations. While Geddes Pond is already heavily used by canoeists and kayakers via the Gallup Park livery, the present peak use times for livery do not significantly overlap with the high school and UM rowing seasons. The length of water available for rowing is distinctly shorter than Argo, about 1900 meters from Geddes Dam to the island chain pedestrian bridge, impacting optimal distance training programs. Longer rowing venues would require rebuilding the pedestrian bridge along with landscape sculpting and allowing rowing inside the island chain. User conflicts are also a significant concern. If rowing does occur on Geddes Pond, City Parks and Recreation staff would like to limit it to the area between the dam and the island chain. Because most canoeists turn around at the island chain, limiting rowing to the downstream portion of the impoundment would reduce conflicts between rowers and other water users. One advantage of Geddes Pond is the space it offers other

rowing teams and spectators for rowing regattas. Gallup Park already has some amenities not currently available at Barton, including rest rooms, public access, and some parking. Geddes Pond is also located very close to Huron High School.

Superior Pond: Presently, Superior only offers about 2000m of rowable water due to impassable bridges. The railroad bridge is passable, but the Starkstrasse Bridge (private road and bridge) has supports that are not aligned with the railroad bridge - there are more supports and they produce a space too narrow to row a shell through without pulling the oars in (problem), and thus are too narrow for passage. In addition, there are several old bridge pilings in the water at a depth of six inches making passage unsafe for rowing boats and for coach launches. Otherwise the water appears excellent, with no other conflicts. Above the railroad bridge (toward the wastewater treatment plant) offers an additional 800m or so of rowable water. Access to city-owned property would have to be arranged, and the railroad cuts off any road access at the present. The City-owned property on Superior is also several miles from downtown, and the most remote of any of the possible recreation sites. Superior Pond is an under-utilized resource, one on which rowers would be unlikely to experience user conflicts. While most of the shoreline is privately owned, the City owns some property around Superior Pond that could be considered in the future for recreational uses.

Table 2. Comparison of Rowable Space on Barton, Argo, Geddes and Superior Ponds

Pond	Full Length	Straightaway Breakdown	Straightaway width ranges/averages
Barton	2600 (3100*)	1500, 1100, 500*	140, 140-100, 120-100
Argo	3200	1100, 450, 400, 450, 500, 300	120, 100, 60, 55, 60
Geddes	2700	1000, 500, 400, 750**	120-60, 130, 120, 120-60
Superior	2000		

Straightaways: lengths of water that allow for line of site from one end to the other

Straightaway breakdown ordered from downstream to upstream

*indicates a stretch of water on Barton Pond between the Foster Rd. bridge and the first railroad bridge, which may not be accessible.

**indicates the stretch of water on Geddes Pond inside the island chain, an area designated by Parks Staff as preferably off limits to rowers

(Table prepared by Joel Batterman, 2006 – updated by the rowing community)



Introduction to Angling

The Huron River supports an excellent warm water fishery, and fishing is a popular activity along the Barton-Superior stretch that flows through Ann Arbor. Because the angling community is less formally organized than other recreational users, the HRIMP committee administered an online survey in August 2008 to gather information about current fishing activity and future fishery expectations in the ten mile stretch of Huron River between Barton Pond and Superior Dam. Two hundred ninety-five people completed the survey, and the key findings are summarized below.

Key Findings

Who is fishing on the Huron River?

Only one-third of survey respondents are Ann Arbor residents. Non-resident anglers come from nearby communities such as Chelsea, Dexter, and Ypsilanti, and many report traveling from more distant areas including Detroit, Lansing, Howell, Kalamazoo, and Toledo.

Many respondents are members of at least one fishing or environmental organization, with Trout Unlimited being the most popular, followed by the Huron River Fly Fishing Club, the Huron River Watershed Council, Ducks Unlimited, and the Federation of Fly Fishers.

Where do people prefer to fish?

The free-flowing river stretch between Argo Dam and the headwaters of Geddes Pond is the most popular fishing location. The free-flowing stretch between Geddes Dam and the headwaters of Superior Pond is also frequently used by survey respondents.

Barton Pond and Argo Pond are the most popular areas impounded fishing areas.

Why do people fish on the Huron River in Ann Arbor?

Survey respondents fish on the Huron River in Ann Arbor first because the resource is close to home, and second for recreation.

Fishing Activity

The majority of anglers wade to fish and fish in the free flowing stretches, while fishing from boats, shore, or pedestrian bridges are less common.

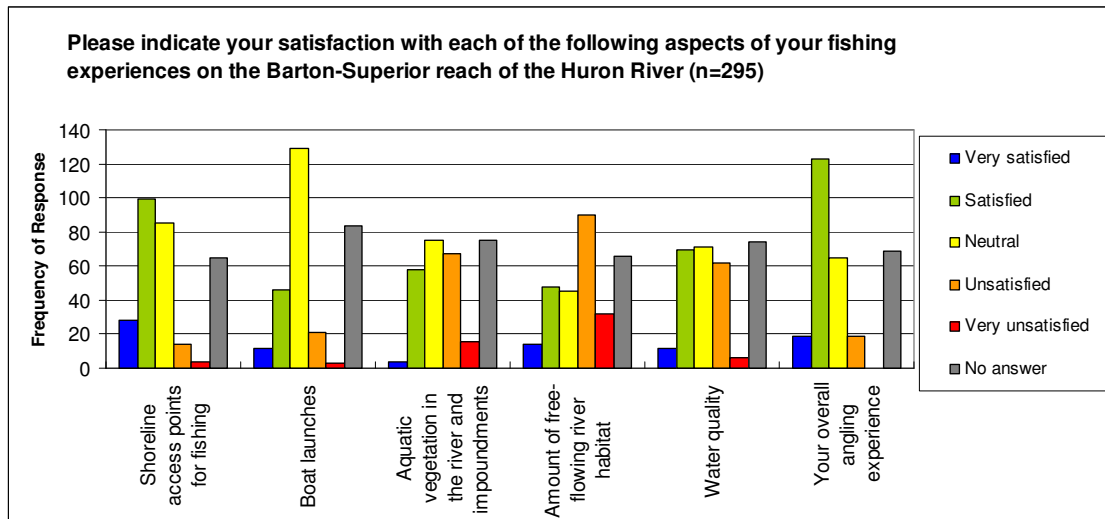
The most common catches among survey respondents include smallmouth bass, sunfish, rock bass, largemouth bass, northern pike, crappie, and carp.

Conflicts

Approximately 50 respondents identified specific conflicts that interfered with their fishing on the Huron River. These included:
Conflicts with canoers, kayakers, and tubers, including both the high volume of paddlers and reports of loud, rude behavior
Conflicts with other fishermen, especially over fishing spots and with some anglers harvesting under-sized fish.
Conflicts with crew teams, for example with the wakes caused by chase boats, the noise, and occasional harassment.
Conflicts with motor boats in general

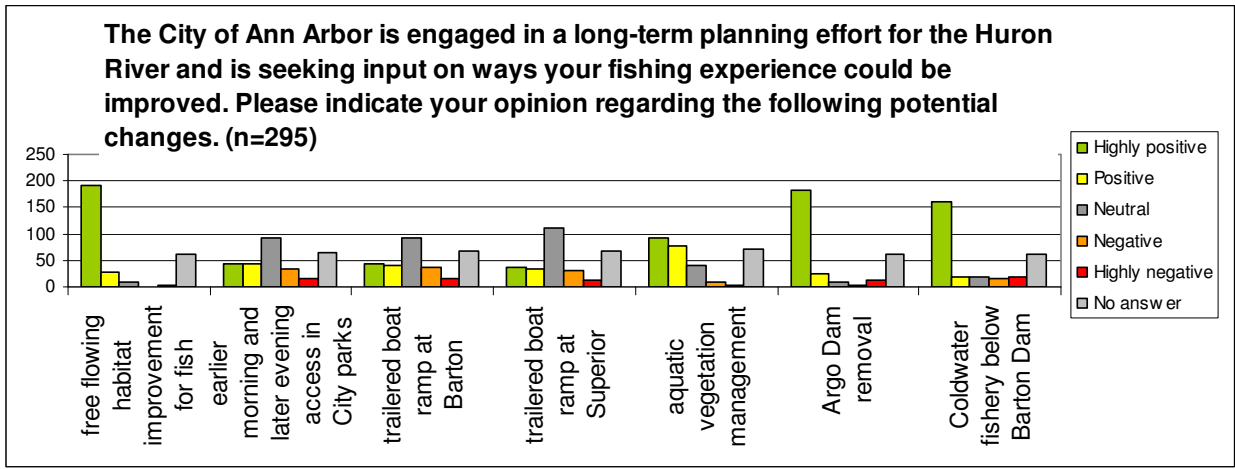
Angler Satisfaction

Survey respondents are very satisfied, satisfied, or have a neutral opinion regarding shoreline access points for fishing, boat launches, and their overall angling experience.
Anglers express dissatisfaction with the amount of aquatic vegetation in the impoundments, the amount of free-flowing river habitat, and, to a lesser extent, water quality.



Future Expectations

Respondents reacted positively to improving free-flowing river habitat for fish, removing Argo Dam, creating a coldwater fishery, and managing aquatic vegetation.
Increasing access hours in city parks and adding trailered boat launches to Barton and Superior Ponds had many neutral responses, but few highly positive or highly negative ratings.



Introduction to Trails along the Huron River

The City of Ann Arbor has over five miles of pathways along the Huron River, starting at Dixboro Road and ending in Bandemer Park. Walking and bicycling were consistently the highest rated activities in the City survey of 600 households as part of the public input to the Parks and Recreation Open Space Plan. Trails along the river rated the highest of all desired amenities. Consequently, one of the primary goals of the Parks and Recreation Open Space Plan is to have a continuous pathway along the length of the Huron River through the City.

A parallel effort is the Border to Border Trail through Washtenaw County, being coordinated with the Washtenaw County Parks and Recreation Commission. The goal of this effort is to have a continuous paved pathway along the Huron River to the borders of the County. Some progress has been made, but it is a long way from completion.

The City's portion of this trail is nearly complete. Not all sections of the trail, however, border the river. Construction of these sections would make the experience more pleasant, while others are necessary for safety and accessibility.

Missing gaps in the trail system include the following:

- ☛ An accessible paved pathway between the Argo Dam and the Broadway Bridge: A narrow dirt pathway on the mill race (the earthen berm that is part of the structure of the Argo Dam) connects the Argo Dam to the Broadway Bridge.
- ☛ An underpass from Bandemer Park to Huron River Drive: Pedestrians and bicyclists currently cross the railroad tracks to access Huron River Drive from Bandemer Park. This is an issue both of trespassing and of safety, as the sight distance is poor where the majority of pedestrians cross. An underpass would alleviate these issues, including barrier free access, and pave the way for a future connection through Barton Park to facilitate the next phase of the Border to Border Trail north to Dexter.
- ☛ A trail connection through Fuller Park along the Huron River: The trail currently parallels Fuller Road as a wide sidewalk. The path functions to move pedestrians from one park to another, but a trail adjacent to the river would improve the user experience and separate the pedestrians and bicyclists from motorized traffic. It would connect directly to the pedestrian bridge at Island Park.
- ☛ A pedestrian bridge crossing under the Maiden Lane vehicle bridge to connect the trail from Riverside to Island Park. Currently, the trail crosses Maiden Lane at the Fuller Road intersection. The trail is effectively separated from the river and the park system. This bridge would allow pedestrians and bicycles to traverse from one park to the other along the river, creating a safer and more aesthetically pleasing experience.

Challenges to implementation:

- ☛ Remaining sections of the trail system are the most difficult to achieve, either because of lack of adequate funding, or because the City does not control the land in question.



Introduction to Sailing

The Barton Boat Club (BBC) is a small but active group of sailors primarily interested in racing sailing.

History of Barton Boat Club

Barton Dam, which created Barton Pond, was built from 1912-1914. The boathouse, built from utility poles in 1920, was originally intended as a clubhouse for DTE employees who settled around the dam. The Barton Boat Club began in 1937. When Barton Hills Village incorporated in the 1940s, the Club began leasing the land. Currently, the Club pays \$2500 per season to rent the property, and the Club cares for the grounds, boathouse and docks, and does repairs as needed.

The BBC is open to the public. It is not part of Barton Hills Village or Barton Country Club. Membership in the Club has varied. Barton Hills Village limited the membership to 80 members, and anyone from Barton Hills may join at any time.

The BBC has always emphasized racing sailing. The Club began with Rhodes Bantams, which were replaced with Snipes (2-person boat) in the 60s; later added Lasers (single-handed boat) to the fleet. For a short period of time, they also raced windsurfers. For many years, the Club was at capacity and had a waiting list. Over the last 20 years, invasive weeds made navigating the sailing area increasingly more difficult. As a result, membership has declined to its present level of 20 to 25 sailors.

Requirements for the club:

- ☞ Member must own a class boat
- ☞ Dues are \$285 annually with a \$100 initiation fee for new members.

Weed Control History

Until the mid-1980s Detroit Edison used a "winter drawdown", lowering the water each year to allow for dam maintenance, control erosion and possibly curtail weed growth. The City discontinued the practice in the mid to late 1980s.

- ☞ In 1999 or 2000 BBC began looking at weed issues and determined that Barton Pond was suffering from excessive growth of Eurasian milfoil, curlyleaf pond weed, coontail and other species
- ☞ BBC looked at weed control options including mechanical, chemical and biological controls
- ☞ BBC contracted with Envirotech to plant weevil seedlings in select patches as a form of biological control. This project was financed with \$12,000 of BBC resources made possible with a generous rent abatement from the Village of Barton Hills.
- ☞ Weevils proved to be an effective control for Milfoil, but problems with other invasives remained.

With the help of the HRWC, a committee continued to study weed control in Barton Pond and eventually proposed a draw down as a 1-year test. The purpose of a drawdown is to expose weed roots and seeds to freezing, thus killing the plants. To be effective, a drawdown must occur over a period of two months. Loss of power generation at Barton dam was calculated at \$15,000. Due to costs, no drawdown occurred.

Introduction to Swimming

The Huron River and Impoundment Management Committee has identified two potential locations, both upstream of the Allen Creek drain, for swimming on the Huron River. Currently, a City of Ann Arbor ordinance disallows swimming in the Huron River from any City parkii. The City has not invested resources in regular water quality monitoring for body contact.

Safety Concerns

The Huron River, like any natural water body, receives run-off from its watershed. During storm events, rainwater carries many pollutants into the river – fertilizers from lawns and farm fields, chemicals for roads and parking lots, sediment, and waste from wild and domestic animals. While the Huron River, one of the cleanest urban rivers in Michigan, is generally safe for swimming, doing so in the first 48 hours after a rain event is not recommended.

The most immediate concern to anyone swimming in the Huron River is *Escherichia coli* (E.coli), a naturally occurring bacteria that live in the digestive tract of humans and other warm-blooded animals. The presence of E. coli in the water indicates there is a potential for pathogens to be present in the water. Sources of E.coli in surface waters include illicit sewer connections, leaking septic systems, combined sewer or sanitary sewer overflows, storm run-off, wild and domestic animal waste, and agricultural run-off.

Potential Locations

The southwest shore of Barton Pond, near the berm, and Bandemer Park are two potential locations for a swimming beach on the Ann Arbor stretch of the Huron River. Both sites are upstream of the Allen Creek drain, which carries most of the City's stormwater to the River, so water quality is consistently fairly good. The HRIMP committee does not recommend a beach downstream of Allen's Creek at this time. Historically, there was a swimming beach on Argo pond near the site of the current canoe livery.

Monitoring

The city could decide to create a public beach with associated monitoring and lifeguards, or could simply not prohibit swimming at city owned property. This would equate to swimming "at your own risk." If a public beach were created, the City, in conjunction with the Washtenaw County Health Department, would develop a monitoring program for that swimming area. The Michigan Public Health Code (PA 368) authorizes local health departments to monitor public beaches, and to close them if bacteria levels exceed established limits. Washtenaw County already monitors five area beaches. Each swimming beach is tested five times per month throughout the swimming season (Memorial Day - Labor Day). Three samples are collected from each beach during each sampling event. Costs of the actual analyses are low, but considerable staff hours are needed for the frequency of sampling and reporting during the season. MDNR offers beach monitoring grants to help cover these costs.



Ecological Benefits of Dam Removal

Characterization of the Watershed

The Huron River Valley is a special place. It's home to ½ million people, supplies drinking water to over 150,000 people, supports one of the state's best smallmouth bass fisheries and is the only State designated scenic river in southeast Michigan. Its watershed contains two-thirds of the public recreational land in southeast Michigan.

Portions of the Huron River system fail to meet minimum water quality standards or provide designated uses. Although reductions in point source phosphorus discharges since the late 1970's have resulted in significant improvements in water quality, the pattern and intensity of land development and use of the river for wastewater disposal have taken their toll on the integrity of the aquatic system. Nutrient enrichment, sedimentation, and excessive and erratic flows are identified as specific concerns in the Huron River system. All of these factors have led to twenty-one (21) water bodies or river segments within the watershed being listed on the Michigan 303(d) List of Impaired Waters--*more than in any other river basin in Michigan*. Concern over the entire Huron River system is such that the river is cited on the State's Unified Watershed Assessment as a Category 1 watershed, indicating highest restoration priority.

The Huron watershed is made up of 24 sub-watersheds and covers 910 sq. miles. There are eight sub-watershed management plans in the Huron Watershed (Kent Lake, Brighton Lakes, Chain of Lakes, Mill Creek, Millers Creek, Ann Arbor-Ypsilanti Area, Portage, and Lower Huron Watershed Management Plans). In these plans, the primary pollutants were prioritized during the planning process. The consistent top three pollutants are: altered hydrology/high stormwater peak flows; sedimentation and soil erosion; and high nutrient load.

River ecologists are unified in their recommendation to remove three priority dams: the Mill Pond Dam and Impoundment in Dexter, Michigan, Argo Dam in Ann Arbor, and Peninsular Paper Dam in Ypsilanti, Michigan. The Michigan Department of Natural Resources (MDNR), Fisheries Division, recommended the removal of these three dams as a key component in the rehabilitation of the Huron River (Fisheries Special Report, No. 16, Huron River Assessment, April 1995).

Problem Statement

Across the United States, 2.5 million dams of all sizes block and impound rivers; of those, 80,000 dams are greater than 6 feet high and store a combined total of approximately 1 billion acre-feet – the equivalent to one year's runoff (Graf, 1999). Dams serve a wide range of purposes such as hydroelectric power, water supply and irrigation, recreation, shipping, and flood control; they have become integral to the identity of some communities. The Huron River Watershed alone has no fewer than 98 dams, but a comprehensive inventory likely would increase the tally.

Dams have egregious impacts on rivers as they alter chemical, physical and biological processes. Downstream environmental costs of dams captured scientific attention only recently as obvious effects have resulted in the past 2 decades. Dams block free-flowing river systems and impede a river's flushing function that enables transport of sediment and nutrients downstream;

instead sediment and nutrients build up behind the dam causing eutrophication of the system. Dams fragment rivers and block movement of fish, mussels and other species. Dams have contributed to or caused many species to become threatened, endangered or extinct, in part, because they are located on prime spawning habitat. Many fish species require high gradient, well-oxygenated water and gravelly streambeds for spawning, which typically occur at sites most favorable for dam construction. Dams alter water temperatures, dissolved oxygen levels, turbidity and salinity both upstream and downstream of the structure. Essentially, dams prevent a river and its tributaries from fulfilling their most basic need – to flow and transport nutrients and materials to lower, more trophically rich stream stretches.

The Huron River system is typical of Great Lakes Basin rivers in that this formerly free-flowing river is interrupted by dams on its tributaries and mainstem. Unique to the Huron River is the opportunity to restore more than 100 miles of a unique freshwater ecosystem, expand viable habitat for sensitive fish, mussel and benthic macroinvertebrate species, and to capture important data during all phases of restoration in order to benefit future dam removals.

After many years of research, discussion, and planning the citizens and decision makers in the Village of Dexter recommended full removal of the Mill Pond Dam. The Mill Pond Dam was removed in the summer of 2008. Park planning and restoration are being worked on in 2009.

Downstream from the confluence of Mill Creek and the Huron River is Argo Dam and Pond, which are located in the urban setting of Ann Arbor. Over the century since the dam was built, sediment has filled the impoundment, resulted in erratic flows, and impaired the fishery, ecology, and recreational uses by paddlers of the river.

Thousands of dams remain on the river systems of the Great Lakes Basin that create sediment-laden impoundments upstream and sediment-starved conditions downstream. *The Huron Watershed alone has 98 dams making it the most heavily dammed river in Michigan.* Only with a coordinated effort to remove dams that no longer serve a purpose will these river systems be restored to provide habitat for indigenous fish, mussels and other aquatic and terrestrial organisms, to provide recreation to the surrounding communities, and to enable a free-flowing river to transport sediment and nutrient loads naturally.

Ecologic Benefits of Argo Dam Removal

Argo Dam was built in 1920 by Detroit Edison to produce power for the City of Ann Arbor. However, the dam was retired from hydroelectric production in 1963 due to poor profitability and public relation problems, leaving recreation as the primary benefit.

Argo Dam impacts the Huron River and surrounding community in numerous ways: the ecological damage the dam creates on a high gradient stretch of the Huron River; the financial burden to the City of Ann Arbor; and the risk to public safety in the

Argo Dam facts

Status: retired from hydropower production; recommended for removal

Dam Owner: City of Ann Arbor

Built: 1920 (Reconstructed in 1972)

Height: 18 ft.

Width: 1940 ft. (200 ft. concrete + 1740 ft. earthen dike)

event of the dam's failure. Recreation that requires a lake-type environment, such as rowing, benefit from the presence of the pond.

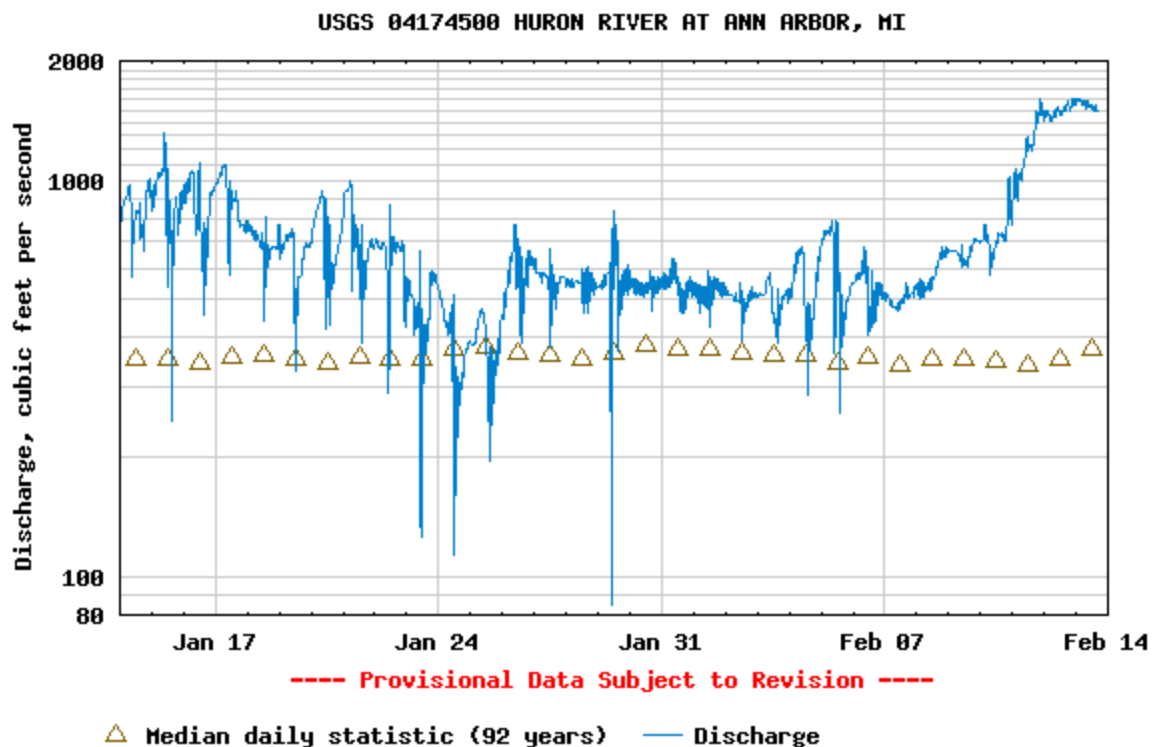
Ecologic Benefits to Argo Dam Removal:

☛ **Improve the Water Quality and restore the hypereutrophic conditions of Argo Pond to a free-flowing, “mesotrophic” river:**
 The removal of Argo Dam would improve water quality by increasing flow and dissolved oxygen content and decreasing water temperature. In addition, excessive aquatic plant growth would not occur because increased water velocity would prevent most undesirable, non-native plants from becoming established and because an overabundance of nutrients and sediments that lead to excessive aquatic plant growth would be flushed continuously from the system.

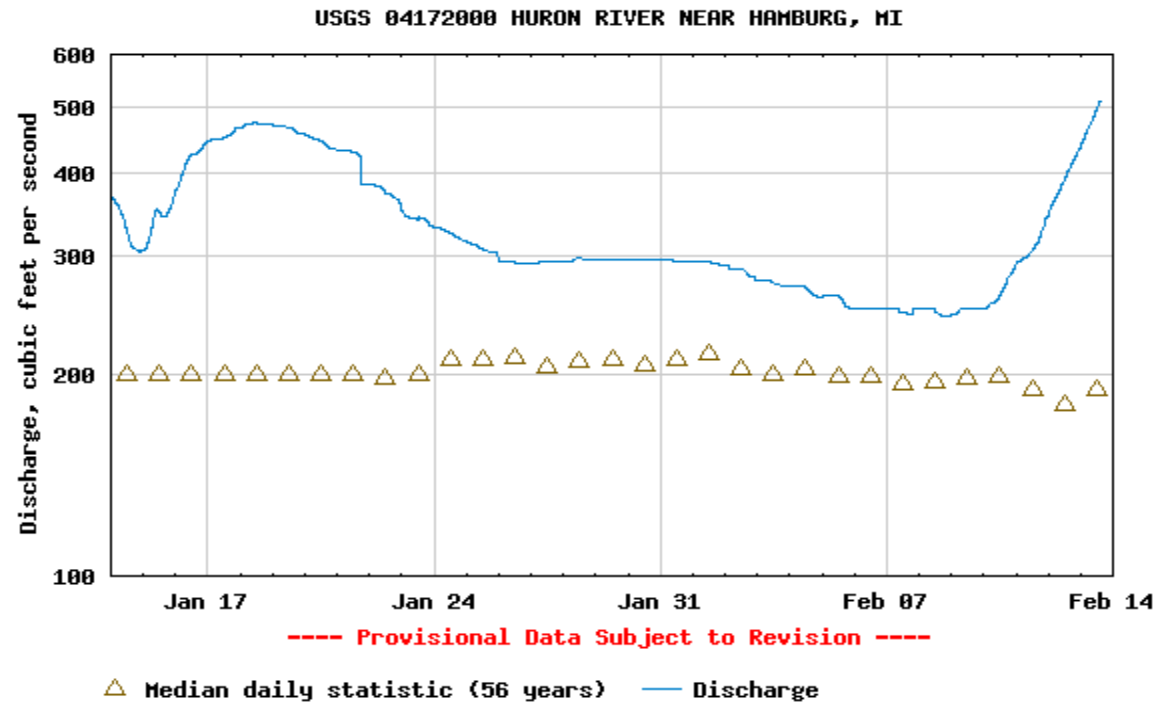
☛ **Improve the fisheries:** The Michigan Department of Natural Resources conducted fish stocking in Argo Pond as recently as 1991. Stocked fish species included channel catfish, smallmouth bass and walleye. In 2001, the Fisheries Division recommended discontinuation of fish stocking in Argo Pond due to declining quality of the Pond, and declining recreational fishing use. The removal of Argo Dam would increase the available habitat for many fish species throughout the Ann Arbor area. The fish community would become more diverse and dominated by riverine fish such as small mouth bass that were once dominant. Currently the fish community is dominated by bluegill and rock bass. A riverine stretch with increased gradient would provide spawning habitat for walleye. The aquatic community in general would become more diverse due to an increase in habitat diversity and lowered water temperatures along the 7 miles of high gradient stream once the river from Barton Dam to Geddes Dam is reconnected.

☛ **Increase mussels and other aquatic species:**
 According to recent and historic accounts, a wide variety of aquatic species have been found in and around Argo Pond. These species include roughly a dozen species of mussels, the most endangered freshwater organisms in North America, and as many as 55 species of fish. A high gradient stretch with good water quality would encourage return of native mussel fauna.

☛ **Gain 28 acres of parkland for the City of AA and the associated aesthetic and economic value of this parkland.**



- Restore a more natural flow to the river downstream of the dam: The U.S. Geological Survey, which maintains a stream gage downstream of the Dam, cites Argo Dam as one of two dams in Michigan that most dramatically alters the natural stream hydrology of its host river.





Relevant sources

Assessment of the Feasibility of Hydroelectric Development of Four City-owned Dams. Ayres, Lewis, Norris, and May Inc. April 1981. Ann Arbor, Michigan.

Huron River Assessment. Fisheries Special Report No. 16. Michigan Department of Natural Resources, Fisheries Division. April 1995. Lansing, Michigan.

2000-2005 Parks, Recreation and Open Space Plan. Ann Arbor Parks and Recreation Department.

Argo Pond Sediment Sampling Study. December 2002. Prepared by Barr Engineering Co. for the Huron River Watershed Council.

Economic Considerations

0.03	Repair Argo Dam	Repair Argo Dam w/o maint	Remove Argo Dam	Remove Argo Dam w/grants	Remove Argo Dam - high rowing costs	Rebuild Millrace	Rebuild Millrace w/whitewater
2028	(\$1,937,889.90)	(\$1,874,048.66)	(\$15,125.90)	(\$15,125.90)	(\$15,125.90)	(\$1,937,889.90)	(\$1,687,170.46)
Annual Vegetation Management	(\$34,048.66)	(\$34,048.66)				(\$34,048.66)	(\$34,048.66)
Annual Dam Maintenance	(\$34,048.66)					(\$34,048.66)	(\$17,024.33)
Annual Dam Insurance	(\$29,792.58)					(\$29,792.58)	(\$29,792.58)
Annual Maintenance of new land Dredging	(\$1,840,000.00)	(\$1,840,000.00)	(\$15,125.90)	(\$15,125.90)	(\$15,125.90)	(\$1,840,000.00)	(\$1,840,000.00)
Whitewater Revenue							\$233,695.11

	Repair Argo Dam	Repair Argo Dam w/o maint	Remove Argo Dam	Remove Argo Dam w/grants	Remove Argo Dam - high rowing costs	Rebuild Millrace	Rebuild Millrace w/whitewater
Total	(\$4,416,972.04)	(\$3,042,337.37)	(\$2,969,514.14)	(\$1,393,514.14)	(\$3,569,514.14)	(\$4,916,972.04)	(\$3,740,428.06)
NPV	(\$2,490,168.13)	(\$1,621,587.72)	(\$2,614,283.54)	(\$1,198,322.53)	(\$3,183,003.92)	(\$2,964,101.78)	(\$3,007,325.59)
0.055	3	2	4	1	6	5	
Value of Aquired Land			\$2,800,000.00	\$2,800,000.00	\$2,800,000.00		
Total	(\$2,490,165.13)	(\$1,621,585.72)	\$185,720.46	\$1,601,678.47	(\$382,997.92)	(\$2,964,096.78)	(\$3,007,325.59)
	5	4	2	1	3	6	

Repair Argo Dam
 Repair Argo Dam w/o maint
 Remove Argo Dam
 Remove Argo Dam w/grants
 Rebuild Millrace
 Rebuild Millrace w/whitewater

Repair Argo to preserve impoundment
 Repair Argo to preserve impoundment - but all annual maintenance costs are paid for by someone other than the city
 Full Removal of Argo Dam
 Full Removal of Argo Dam - but grants pay for part of removal, and all revegetation and bridge replacement
 Rebuild Millrace to remove portage - maintain impoundment and dam maintenance expenses
 Build whitewater and generate revenue to support whitewater investment - annual dam maintenance is cut in half

Inflation 3.00% Assumes that costs go up each year by this percent
 Depreciation 5.50% Interest rate used for NPV - based on city cost of money (bonds)

Toe Drain Repair \$500,000.00 Contractor bid with additional costs to work around endangered species (CIP)
 Purchase Harvester \$200,000.00 City analysis based on Dane County Data
 Annual Vegetation Management \$20,000.00 Apportionment of \$50,000 annual harvesting cost to Argo Pond
 Annual Dam Maintenance \$20,000.00 City estimate from past data on recreation dam management
 Annual Dam Insurance \$17,500.00 City Treasurer estimate of marginal cost of Argo Insurance
 Establish Rowing at Barton \$440,000.00 Assumes two \$100,000 buildings, \$40,000 restroom, \$200,000 in site prep and other costs
 Rebuild Millrace \$1,000,000.00 Based on REP estimate of \$750,000
 Remove Dam \$1,200,000.00 Based on Stantec estimate obtained by the city (likely an upper bound)
 Revegetate Aquired Land \$476,000.00 Based on acre estimates provided by JFNew for 28 acres
 Replace Pedestrian Bridge \$500,000.00 City estimate based on Gallup bridge
 Revegetation Maintenance \$56,000.00 JFNew - estimate for two years after revegetation
 15-20 year Dam Maintenance \$250,000.00 in the City CIP - based on recent work at Superior
 Annual Maintenance of new land \$10,000.00 Dave Borneman estimate to continue to manage revegetated land
 5year Dam Maintenance \$45,000.00 City estimate from past data on recreation dam management
 Dredging \$1,840,000.00 Assumes 184000 cubic yards (Barr Study) times \$10/cubic yard (twice current USACE estimate) 20 years from now
 Value of Reclaimed Land \$2,800,000.00 Assumes 28 acres at \$100,000 per acre

Whitewater Report



Parks Recreation and Open Space (PROS) Plan (excerpt)

The following is taken directly from the HURON RIVER section of the PROS plan.

THE HURON RIVER

The Huron River is the most dominant natural resource that exists in Ann Arbor. More than ten miles of this river are located within the City limits, traversing the City from northwest to southeast. The river has been altered over the past decades and currently provides multiple uses including:

- City's domestic water supply
- Waste and stormwater depository
- Recreational resource
- Wildlife habitat

The river within the Ann Arbor area has been impounded by construction of four dams: Barton, Argo, Geddes and Superior. There has been ongoing discussion of removing the dam at Argo to address safety and maintenance concerns, improve water quality and wildlife habitat. Further study is needed.

The dominant land use adjacent to the river is park or public land use: a green "necklace" of parks exists on both sides of the river. Single-family residential and multiple-family housing backs up to the park land in most cases, however, dominant structures such as the University of Michigan hospital buildings, Concordia College, the Lowertown shopping area at Broadway and the industrial use along the North Main and the Broadway section of the river have a significant aesthetic and environmental impact on the river.

The City park system currently encompasses much of the Huron River and portions of Malletts Creek, Traver Creek, Swift Run and Allen Creek. Park maintenance, development and acquisition should address the Huron River watershed as a whole natural system rather than piecemeal.

Water Quality

New construction in the community has accelerated soil erosion and resulted in increased amounts of sedimentation and siltation in the river as well as turbid conditions after major rain events. Studies of Huron River water quality concluded that higher levels of pollutants are present after a major rain event. This flushing effect could be minimized by treatment of the runoff before it enters the river. The Environmental Commission and staff are working together to study what the best management practice should be to deal with the issue of siltation and vegetation growth in the river and backwaters. Construction and maintenance of storm water management facilities is required by the City's development regulations to insure that stormwater runoff is treated before entering the river and its tributaries. A storm water control demonstration area was constructed at Olson Park that can be used as an educational tool for promoting environmentally effective "best management practices." The demonstration facility is based on new technology and provides three major functions: sediment and erosion control, storm water management and pollution management techniques. Pretreatment of storm



water would greatly aid efforts to improve water quality. Storm water treatment could include settling basins at or near the sewer mouth where land is available or possibly an interceptor sewer along the river, which would collect the discharge from each drain and bring the collected storm water to a central location downstream of Gallup Park for treatment and discharge back to the river. Pretreatment of stormwater could also occur in bioswales or other detention/retention facilities distributed throughout the watershed. This would help reduce peak flows in urban streams as well.

Major pollution to the river comes from the Allen Creek drain. Most illegal connections have been eliminated; however, many non-point source problems remain. Ongoing efforts of the Washtenaw County Health Department and the Washtenaw County Drain Commissioner's office to identify and correct illegal discharges into the Allen Creek drain should be extended to the remaining storm drains in Ann Arbor.

Studies of Huron River water quality in the vicinity of Gallup Park and Barton Pond resulted in some changes in the body contact use policy of the Huron River:

1. Restrict use of Gallup Park for all water body contact activities, including windsurfing, for a two-day period following a daily precipitation in the range of 0.1 - 0.49 inches, for a four-day period following a daily precipitation in the range of 0.5 - 0.99 inches, and for a five-day period following a daily precipitation greater than 1.0 inch.
2. Establish an official rain gauge to be operated by the City of Ann Arbor, which would be the main data source for restrictive use decision at Gallup Park.
3. Continue the routine water quality monitoring program in the Barton and Geddes Pond (Gallup Park) areas, especially for indicator bacteria. This would be used in refining the prediction of future periods of restrictive use.
4. Develop a plan for long-term solutions to minimize the impact of urban storm water discharge on the water quality of the Huron River in the vicinity of Ann Arbor.

Swimming was once common in the river and this plan recommends that a study be done to determine the feasibility of recreating a swimming beach like one that once existed in Argo Pond.

Fisheries and Wildlife

Southern Michigan has a variety of natural resources to provide recreational opportunities to large masses of potential outdoor users. However, better all-around management is needed. Major parts of this management infrastructure are land acquisition and leasing, habitat development and protection, public participation, long-range financing and research. In 1985, a state-level Fisheries and Wildlife Task Force completed a report with recommendations for expanding the fisheries and wildlife opportunities in southern Michigan. As part of that study, it recommended various improvements be made to these recreational resources. The report concluded that Southern Michigan, aside from its proximity to population centers, is also an area in which resource-based recreational opportunities could be made much more available. The region lacks needed public access; specifically, the region is deficient in fishing access, boat launching facilities, campgrounds, cross country ski trails, fishing piers, hiking trails, nature trails, nature areas and hunting access.

The demand for fishing exceeds the supply of available opportunities in Southern Michigan. For lack of these opportunities, fishing efforts in Southern Michigan have remained relatively constant over the past ten years, while they have risen in Northern Michigan. To look at this situation from another perspective, Southern Michigan has fewer resident anglers than other parts of the state. In part, this is due to the region's shortage of fishing opportunities, which likely accounts for some of the reasons more anglers from Southern Michigan travel outside of their area to fish than is the case for resident fishermen in Northern Michigan.

Recommendations from these studies, which should be implemented in the Ann Arbor area, include the following:

1. Restore a fish community native to the Huron River with a focus on predator species such as small-mouth and large-mouth bass.
2. Better "on-site" promotional literature to help anglers use these improved fishing opportunities.
3. Improvement of water quality through better erosion control and removal of toxic sediments, where possible.
4. Improved access to promote both bank and float fishing, which could include acquisition of easements as an alternative to outright ownership.

Within the City park system, Bandemer Park, Argo Park, and Olson Park fishing facilities have been targeted for improvement.

Creekshed Organizations

Four creekshed groups, the Malletts Creek Association, the Allen Creek Group, the Friends of Traver Creek, and the Millers Creek Action Team, participate in the Huron River Watershed Council's stewardship activities. They are governed by three main goals:

1. Water quality and flow improvement
 2. Wildlife habitat improvement
 3. Increasing citizen awareness of, connection with and stewardship of local creeks and watersheds
- The creekshed groups propose the following recommendations for park design considerations to address improvement of water quality and wildlife habitat in the Huron River and its tributaries.

- Improve and retain natural areas along creek banks within parks.
- Remove invasive plant species. Expand native plantings, including native wildflower displays, and use native species for tree and shrub replacements.
- Add constructed or reconstructed riparian and wetland habitat, as well as prairie and woodland plantings as part of park development where possible.
- Restore natural ravine systems where possible.



- Improve runoff protection by creating unmown or infrequently mown native vegetative buffers along creeks and the river of at least 75 to 150 feet, where feasible.
- Explore use of park lands to absorb and cleanse stormwater in ways that integrate stormwater management with park uses, approaching a goal of no net runoff.
- Minimize and reduce impervious surfaces and curbs in parks and disconnect them from the stormwater pipe system.

THE NORTH MAIN STREET AND ARGO POND AREA

The North Main Street/Huron River corridor has been examined for its redevelopment and land use potential. Ongoing planning efforts have included significant citizen involvement. The purchase of a southern addition to Bandemer Park was a first step in that direction. A proposed master plan for Bandemer Park is being revisited to respond to activities and trends. Planning issues include incorporating the needs of rowers into the master plan, removing existing infrastructure, providing more park amenities, restoring the shoreline and creating more efficient parking.

The redevelopment potential of this area may tend to favor more commercially-oriented development such as housing, shopping or office space. Some proposals could strain the natural value of the area; careful controls should be established to encourage developments that would complement, rather than compromise, the scenic and natural qualities of the Huron River Valley and ensure public access to the River.

Access

Currently, the only vehicular easement from Main Street into South Bandemer Park occurs at Lake Shore Drive, a narrow (16 feet wide) crossing of the railway tracks. In addition to access, parking must be provided based on the number of people expected to use the park site. The Argo Framework Study recommends an on-grade pedestrian crossing from Main Street south of the railroad near the Argo Dam and a below grade rail crossing Bandemer to Huron River Drive. An on-grade crossing may be very difficult to accomplish given how strict the railroad has become. A feasibility study indicates that construction of a tunnel under the railroad trestle along the river between Bandemer and Barton Parks remains a reasonable concept, however, the cost of this endeavor may be prohibitive without funding assistance.

Inclusion of bicycle/pedestrian access along the North Main portion of the Huron River Valley is also recommended for the following reasons: to provide continuity with the bicycle/pedestrian trails already existing in the City provide continuity with adjacent parks (i.e., Bandemer, Argo, Kuebler-Langford, Barton, Bluffs), provide an alternative to the traffic hazard associated with using North Main as a bicycle route and to capitalize on the unique scenic and natural qualities afforded by the Huron River Valley. A vehicular drive that traverses Bandemer Park to access South Bandemer from Barton Drive should be explored only if the at-grade railroad crossing at Lakeshore Drive is prohibited. This vehicular drive would provide safe access to the park for automobiles without having to cross the railroad or North Main traffic.

GOALS

The Huron River and the adjacent land have been of interest to planners for a long time. A prime goal of all park plans since the 1960s has been reservation of as much of the riverfront land as possible for public use. The objective of reserving the riverfront for public use remains a high priority in the 2006-2011 Plan. Linkages between parks and improved access to the river are also a high priority.

ii Chapter 39 (3.2 Restrictions)