Prospects and Limitations for Ecocultural Tourism in the City: Developing an Urban Heritage Water Trail on the Portage Creek

Kerney

Follow this and additional works at: https://scholarworks.wmich.edu/masters_theses

Part of the Geography Commons

Recommended Citation
https://scholarworks.wmich.edu/masters_theses/4147
PROSPECTS AND LIMITATIONS FOR ECOCULTURAL TOURISM IN THE CITY: DEVELOPING AN URBAN HERITAGE WATER TRAIL ON THE PORTAGE CREEK

by

Eric Mark Kerney

A Thesis
Submitted to the
Faculty of the Graduate College
in partial fulfillment of the
requirements for the
Degree of Master of Arts
Department of Geography

Western Michigan University
Kalamazoo, Michigan
April 2008
ACKNOWLEDGEMENTS

The landscape and waters of Michigan provide the inspiration for my interest in the natural world. As a child I formed a strong bond with the Great Lakes while traveling throughout the state and swimming in their waters. For this I must thank my parents.

I need to thank Dr. David Lemberg for initiating the Michigan Heritage Water Trails Program, and for helping me find my way into the Geography Department. He has given guidance throughout the project, and has been there to review my thesis when deadlines were tight. Dr. Kathleen Baker also provided much helpful assistance for this project. She came through with excellent suggestions to improve the quality of this thesis, and helped me to bring it all together. I also would like to thank Dr. Lynne Heasley for her participation on my thesis committee.

The time I spent working with the Kalamazoo River Watershed Council fostered my awareness of river conservation. I also need to acknowledge the Kalamazoo Community Foundation for their support of this project. Lastly, I need to thank my partner Caroline Anderson for bearing through the process, and the rest of my family for helping to push me to finish.

Eric Mark Kerney
The decline in Michigan's economy and rapid loss of manufacturing jobs has forced communities to look towards new possibilities. The state's abundant water resources have potential to enhance regional economies and improve the quality of life. The Michigan Heritage Water Trails Program was initiated in 2002 by Michigan Public Act 454 in response to a lack of established routes in the state. The Portage Creek is located within the Kalamazoo River Watershed, which is being explored as a pilot project for a connected system of regional water trails. The study area of the Portage Creek is located entirely within the boundaries of the cities of Kalamazoo and Portage, Michigan. The upstream portions are a coldwater trout stream, while the downstream reach is heavily industrialized and included in the Kalamazoo River National Priorities List site. This study thoroughly examines navigation and potential access points on the Portage Creek. A GPS unit was used to collect crossing and hazard data. Local heritage themes relating to Kalamazoo and Portage were developed for interpretive signage along the route. Projects to improve Creek navigation are suggested, along with a brief evaluation of the impacts of dams on recreation and ecology.
TABLE OF CONTENTS

ACKNOWLEDGEMENTS................................................................................................................ ii

LIST OF TABLES.......................................................................................................................... vi

LIST OF FIGURES........................................................................................................................ vii

CHAPTER

I. INTRODUCTION ....................................................................................................... 1

Heritage Water Trails in the Kalamazoo River Basin ......................................................... 3

II. STUDY AREA ............................................................................................................ 5

Kalamazoo River Watershed .............................................................................................. 5

Local Restoration .................................................................................................................. 8

Portage Creek ...................................................................................................................... 9

Kalamazoo County ............................................................................................................. 12

III. LITERATURE REVIEW ............................................................................................. 15

Water Trails and Recreation ............................................................................................. 15

Water Trail History ............................................................................................................. 17

Heritage Tourism ................................................................................................................. 19

Access and Navigation Background .................................................................................. 22

Dam Removal Studies ......................................................................................................... 23

Local Benefits of Water Trails ............................................................................................ 26

IV. DATA COLLECTION METHODS ............................................................................... 27
## Table of Contents - Continued

### CHAPTER

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation Assessment</td>
<td>27</td>
</tr>
<tr>
<td>Access Evaluation Scoring</td>
<td>30</td>
</tr>
<tr>
<td>Map Creation with Geographic Information Systems</td>
<td>34</td>
</tr>
<tr>
<td>Heritage Data Collection</td>
<td>35</td>
</tr>
<tr>
<td><strong>V. RECREATION AND PLANNING</strong></td>
<td>37</td>
</tr>
<tr>
<td>Portage</td>
<td>37</td>
</tr>
<tr>
<td>Kalamazoo</td>
<td>39</td>
</tr>
<tr>
<td>Regional Developments</td>
<td>42</td>
</tr>
<tr>
<td><strong>VI. NAVIGATION ASSESSMENT</strong></td>
<td>45</td>
</tr>
<tr>
<td>Portage Creek Float Trips</td>
<td>46</td>
</tr>
<tr>
<td>Detailed Navigation Assessment</td>
<td>53</td>
</tr>
<tr>
<td><strong>VII. ACCESS SITE EVALUATION</strong></td>
<td>73</td>
</tr>
<tr>
<td><strong>VIII. HERITAGE AND CULTURAL RESOURCES</strong></td>
<td>88</td>
</tr>
<tr>
<td>Portage</td>
<td>91</td>
</tr>
<tr>
<td>Kalamazoo</td>
<td>102</td>
</tr>
<tr>
<td><strong>IX. PORTAGE CREEK DAMS</strong></td>
<td>119</td>
</tr>
<tr>
<td>Introduction</td>
<td>119</td>
</tr>
<tr>
<td>Effects of Dams on River Ecology</td>
<td>122</td>
</tr>
<tr>
<td>Ecological and Cultural Impacts of Dam Removal</td>
<td>124</td>
</tr>
</tbody>
</table>
Table of Contents - Continued

CHAPTER

Dam Removal on the Portage Creek .......................................................... 126

Dam Report Summary ................................................................................ 133

X. NAVIGATION IMPROVEMENT PROJECTS .................................................. 134

Portage ....................................................................................................... 136

Kalamazoo .................................................................................................. 140

XI. SUMMARY ........................................................................................................... 146

REFERENCES .............................................................................................................................. 151

APPENDIX

Portage Creek Float Survey Form .................................................................... 162
LIST OF TABLES

1. Creek Access Site Assessment Summary with Weighted Scores..........................74
LIST OF FIGURES

2.1. Kalamazoo River Watershed and the Portage Creek Sub-Watershed ......................... 6

2.2. Portage Creek Watershed ........................................................................................ 11

4.1. Bicycle, trailer and kayak packed in bag ..................................................................... 29

4.2. Unfolding the hull and assembling the kayak ............................................................ 29

4.3. Side chambers inflated and deck stretched over hull ................................................ 29

5.1. Kalamazoo River Valley Trailway Map ..................................................................... 43

6.1. Central Park to Milham Road Access ...................................................................... 48

6.2. Milham Road Access to Kilgore Road ................................................................. 50

6.3. Monarch Mill Pond .................................................................................................. 52

6.4. Milham Park Navigation .......................................................................................... 60

6.5. Navigation for Bryant Mill Area ............................................................................. 65

6.6. Navigation on the Portage Creek from Reed Street to the Kalamazoo River ......... 72

7.1. Central Park access site ............................................................................................ 77

7.2. Portage canoe livery near Celery Flats Park .......................................................... 77

7.3. Milham road canoe access ....................................................................................... 79

7.4. Possible access site north of Kilgore Road .............................................................. 79

7.5. Potential access site at Blanche Hull Preserve ......................................................... 82

7.6. Monarch Mill Pond Dam Site .................................................................................. 82
List of Figures - Continued

7.7. Egleston Avenue access .................................................................................................... 87

7.8. Rose Veteran’s Memorial Park site ................................................................................. 87

9.1. Location of dams on the Portage Creek ........................................................................ 121

9.2. Portage Mill Dam picture and summary ...................................................................... 127

9.3. Milham Park Dam picture and summary ..................................................................... 128

9.4. Monarch Mill Dam picture and summary .................................................................... 129

9.5. Bryant Mill Dam picture and summary ...................................................................... 130
CHAPTER I

INTRODUCTION

Reports of a declining Michigan economy have become a common news headline. State employment statistics do not dispute these claims. From the year 2000 through 2006 Michigan lost 246,500 manufacturing jobs, or 27.5 percent of that industry (State of Michigan, 2008b). Overall, Michigan has lost 7.2 percent of all non-farm jobs during this same period. Unemployment in the state is currently 7.1 percent, which ranks it highest in the country. Michigan must also contend with the legacy of industrial pollution that has endured throughout the last century. While manufacturing still ranks as the number one employer, tourism and agriculture have become the second and third largest employers respectively. Tourism in past years has been limited to traditional excursions such as summer vacations and Great Lakes boating. The expansion of winter sports such as skiing and ice fishing has lengthened tourism to a year-round activity (State of Michigan 2008c). Historical sites and museums throughout the state are presenting additional year round attractions. Travelers to Michigan and those traveling within its borders spent a combined $17.5 billion in 2004, generating 193,000 jobs statewide (State of Michigan 2008c).

Heritage Water Trails have been proposed as a form of ecocultural tourism that could improve the economy and the quality of life in Michigan. The state is suitable for this development with 3,200 miles of Great Lake shoreline, an abundance of navigable waterways and a diverse cultural heritage. The Michigan Heritage Water Trail Program
was created in response to a lack of recognizable inland water routes in the state (Michigan Heritage, 2008). Water trails can provide initiative for waterway protection through land preservation. The increased use of local lakes and rivers through established routes can also enhance nature recreation options (Ammeson, 2006). Urban areas need these attractions to promote economic development, and to retain young creative professionals that have come to expect these amenities.

The Kalamazoo metro area is dealing with an economic situation similar to other regions of the state. The Kalamazoo River Watershed is one of the first river systems in Michigan to explore the creation of a regional network of water trails. The Portage Creek is located within this watershed in an urbanized area, and is a candidate for inclusion in this trail network. The location of the Creek can provide access to greater numbers of people by being situated in a more densely populated area. Local surface water quality has also improved since the introduction of environmental legislation. Planners are taking this opportunity to explore the increased use of environmental assets in the region. The heritage water trail can emphasize the role that the Portage Creek has played in transportation and industry in the Kalamazoo area.

This thesis is only the first step in the eventual creation of a Portage Creek Heritage Water Trail. Additional initiatives and funding will need to be implemented to realize this program. Both the City of Portage and the City of Kalamazoo will need to share the vision of floating a canoe from Central Park in Portage to the Kalamazoo River. This work is meant to be used as a guide and reference. While some of the details may
change for implementation plans, information necessary for the establishment of the
heritage water trail is contained in this project.

Heritage Water Trails in the Kalamazoo River Basin

Michigan Public Act 454 of 2002 directed the Great Lakes Center for Maritime
Studies at Western Michigan University to develop a blueprint for local and regional
water trails through a series of pilot studies for the research, planning, implementation,
monitoring, and marketing of heritage water trails (Michigan Heritage 2008). A system
of inter-connected heritage water trails are planned for the Kalamazoo River
Watershed. One of the goals of the Kalamazoo River Heritage Water Trail is to
investigate the feasibility of implementing a significant trail system through an entire
watershed. The Portage Creek, a tributary of the Kalamazoo River, would be
incorporated into the Kalamazoo River Watershed Heritage Trail. More specifically the
Portage Creek may serve as a unique model for developing water trails on smaller urban
streams.

The main features of a water trail are access points, resting places, attractions,
and amenities for users of non-motorized watercraft (Peterson, 2004). The inclusion of
the heritage component integrates natural and cultural interpretation of the local region
with the paddle sport experience. The Kalamazoo area has a rich history of Indigenous
and European settlement, and numbers of people who engage in heritage tourism is
expected to steadily increase.
The Portage Creek runs through some of the more densely populated urban areas in southwest Michigan. The proximity of the Creek to this population, and the major expressways I-94 and US-131, make it an ideal candidate as part of the water trail system. The built environment grants access and mass transit possibilities that are not supported in more rural locales. Water-based recreation in urbanized locations is expected to show the greatest increase in numbers of participants (Bowker et al., 1999). There is a trade-off that comes with the accessibility of the city. Low road and railroad bridges result in difficult portages, and other remaining structures present barriers. The objectives of this project were to evaluate the entire navigable length of the Creek and its riparian features. In addition to navigation, the project also investigated other aspects of what will include the heritage and interpretive aspects of the water trail.

The following chapters outline much of the information in the design and implementation of a heritage water trail. The methods used for data collection and scoring methods are discussed in Chapter 4. Chapter 5 examines some of the current recreation plans related to the Portage Creek and the surrounding study area. Chapter 6 gives a list of the paddle trips that are currently accessible on the Portage Creek, and a detailed navigation description for its entire length. Current and potential access points are described and scored in Chapter 7, and themes developed for interpretive signs are specified in Chapter 8. Chapter 9 gives a report on the impacts of dams and options for dam removal on the Portage Creek. An inventory of projects that could be conducted to improve navigation on the Creek are presented in Chapter 10.
Kalamazoo River Watershed

The Portage Creek is a sub-watershed of the greater Kalamazoo River Basin. The Kalamazoo River Watershed drains over 2000 square miles of land in southwest Michigan, emptying to Lake Michigan near the town of Saugatuck (Beck 2000). The region is located within the Great Lakes Basin, which contains 20% of the U.S. population and 60% of the Canadian population (Beck, 2000). The Kalamazoo River Watershed occupies portions of 10 Michigan counties, and drops 540 feet from its headwaters to Lake Michigan (See Figure 2.1). There are 542 linear miles of streams in the River Basin (Wesley, 2005). The average amount of precipitation per year in the watershed is 34 inches, although recent global climate trends indicate increasing precipitation in southwest Michigan.

The Kalamazoo River is in a state of recovery from a long legacy of urban and industrial impairments. In 1990 the River was placed on the National Priorities List in accordance with CERCLA, due to the presence of PCBs (U.S. Environmental Protection Agency, 2007b). The last 3.3 miles of the Portage Creek downstream to the Kalamazoo River are included in the CERCLA Site. While remediation of PCB contaminated sediments is crucial for recreation potential on the River and the Creek, the main pathway that PCBs affect human health is the consumption of contaminated fish.
Figure 2.1: Kalamazoo River Watershed and the Portage Creek Sub-Watershed
The glacial geology and geography of the Kalamazoo River Basin shape the landscape and stream characteristics of the Creek. The watershed was formed at the confluence of three separate glacial lobes (Wesley, 2005). Large deposits of coarse textured glacial materials associated with end moraines provide permeable aquifers that contribute high levels of baseflow. This results in stable and perennial flows of cool groundwater to the Portage Creek. Water levels in the watershed may be impacted by well extraction as the Kalamazoo River Watershed has the largest number of groundwater withdrawals in the state (Wesley, 2005).

There are a host of governmental and conservation organizations working on various issues related to the Kalamazoo River. A Total Maximum Daily Load (TMDL) project to reduce phosphorus in the watershed has been active for several years. Various tributary watershed management plans have been created from this effort, including a plan for the Portage and Arcadia Creeks (Kieser & Associates, 2007). Additional plans for phosphorus and non-point source pollution are being developed for mainstem segments of the river. The Kalamazoo River Watershed Council (KRWC) has grown out of advocacy for the Superfund Site and the Great Lakes Area of Concern (AOC) Program. The Council is currently transitioning to be the central organization and clearing house for River related information. The KRWC has also become the coordinator for the Kalamazoo River Heritage Water Trail.

The Kalamazoo Nature Center and Binder Park Zoo of Battle Creek have both been actively involved in efforts to restore the River and improve recreation efforts. The Kalamazoo River Protection Association in Allegan has advocated the concerns of
residents further downstream. The Southwest Michigan Land Conservancy has protected numerous tracts of sensitive land within the watershed. Conservation Districts have been highly involved with management projects for reducing erosion and improving water quality (Allegan Conservation District, 2007). More groups than can be mentioned across the watershed have become involved in the ongoing issue of basin management and non-point source pollution. Two paddle sport groups in the watershed are the Kalamazoo Downstreamers and the Kalamazoo Canoe and Kayak Club. The Downstreamers have assisted in efforts such as Kanoe the Kazoo and the Kalamazoo River Conservation Day.

Local Restoration

There has been a larger movement in the Kalamazoo River Watershed to work towards restoration and appreciation of this once devastated resource. In past years the river was an eyesore and detracted from community aesthetics. Industrial discharges of PCBs and other materials have caused the lower section of the Portage Creek to be listed as part of the Kalamazoo River CERCLA site. The introduction of both industrial and municipal water treatment systems and the discontinuation of the production of PCBs have improved the quality of both the Kalamazoo River and the Creek (Beck 2000). The US Environmental Protection Agency has recently announced a project to remove PCBs from the Plainwell impoundment and partially remove the dam, although this effort is complicated by concern over waste disposal locations (U.S. Environmental Protection Agency 2007a).
Efforts such as Kanoe the Kazoo, River Conservation Day, the Superfund Cleanup, and the establishment of the Kalamazoo River Valley Trailway network, are underway to highlight positive qualities and recreation potential in the watershed. The Kalamazoo Watershed Heritage Water Trail is a multi-jurisdictional effort in Allegan, Kalamazoo, and Calhoun counties. Partners include the Allegan County Recreation Department and the Allegan County Conservation District, the Kalamazoo Nature Center, the Kalamazoo River Watershed Council, the Calhoun County Recreation Department, the City of Kalamazoo, and WMU’s Great Lakes Center for Maritime Studies. The first section of the water trail network is scheduled to run from Morrow Dam above Comstock to Lake Michigan near Saugatuck. Upstream segments of the River and its tributaries are currently being planned for inclusion. This project explores adding the Portage Creek to the network, linking the cities of Portage and Kalamazoo by water trail. The trail is focused on the main branch of the Portage Creek from Hampton Lake in Portage to the Creek’s confluence at Rose Park in downtown Kalamazoo. The Portage Creek Heritage Water Trail provides a unique and challenging opportunity for the development of a trail that is located entirely within the borders of the two cities.

Portage Creek

The main-stem of the Portage Creek is located within the municipal boundaries of the cities of Kalamazoo and Portage, although a portion of the watershed lies in Texas Township (See Figure 2.2). It is an urban stream that presents a dichotomy in riparian environments; natural areas comprise much of the upstream portions, while
downstream stretches are mostly concrete channels. Two major tributaries, the West Fork, and the Axtell Creek empty into the main branch. The Portage Creek is a 3rd order stream, with an average discharge of 39.7 cubic feet per second, recorded at a USGS gauging station 4.5 miles upstream from its terminus (Nedeau et al., 2003). The hydrologic unit code for the Creek at the gauging station is 04050003. The portion from Hampton Lake in Portage to Milham Park in Kalamazoo is listed as a top-quality coldwater stream. The Portage Creek has been anthropogenically impacted since a grist mill was first constructed in 1834. Areas of the Creek currently impounded by dams had previously contained excellent river gradients that are unusual in a low-relief River Basin. There is also a fish advisory on the Portage Creek that runs the length of the CERCLA site (Michigan Department of Community Health 2007).

The steady contribution of groundwater stabilizes discharge levels throughout the year, and as a result the Creek does not experience extreme flow variations. Historical records indicate that groundwater levels have been lowered through groundwater extraction for industry and agriculture (Lane, 2006). This has resulted in lower discharges in the Creek, and low water can be a problem in this small Creek during the summer. Urbanization and the resulting increase in impervious cover have been shown to result in longer periods of low flow levels (Hodgkins et al., 2007).
Figure 2.2: Portage Creek Watershed
The Portage Creek Watershed supports unique plant and animal life with some portions set aside as public preserves. A state endangered species, the Kirtland's Snake (Clonophis kirtlandii) has been noted in the area. Other state threatened species include Narrow-leaved Reedgrass (C. stricta), Rattlesnake Master (Eryngium yuccifolium), Cut-leaved Water Parsnip (Berula erecta), White Lady's Slipper (Cypripedium candidum), Rosinweed (S. laciniatum), and Frosted Elfin (Incisalia irus). Bird species that have been spotted in the study area include the Green Heron (Butorides virescens), Belted Kingfisher (Megaceryle alcyon), Hooded Warbler (Wilsonia citrina), Cooper's Hawk (Accipiter cooperii) and Northern Goshawk (Accipiter gentilis) (Brudegerle, 1995). During a Natural Features Inventory (NFI) in 1995, 109 bird species were recorded in the Portage Creek Basin. A 1997 DNR survey found Brown Trout (Salmo trutta), Johnny Darter (Etheostoma nigrum), White Sucker (Catostomus commersonii), Blacknose Dace (Rhinichthys atratulus), and Creek Chub (Semotilus atromaculatus), species at various locations on the Creek in the City of Portage. Brown Trout are stocked at several locations on the Portage Creek. Sections of riparian corridors along the Portage Creek have been listed as unique habitat niches for an urban environment (Western Michigan University, 1976).

Kalamazoo County

Kalamazoo County was set off from other counties in 1830 by the Michigan Territorial Legislative Council. Kalamazoo County is located in southwest Michigan, halfway between Detroit and Chicago. This midpoint status has boosted the area's
status as a transportation hub. Historically Kalamazoo has been a central point for various railroad lines from all directions (Meints, 1979). The estimated population of the County in 2006 is 240,000 (U.S. Census Bureau, 2008). The County is within a 100 mile radius of 5 million people, and a 250 mile radius includes 40 million (Kalamazoo County Convention, 2008). The area has a sizable population, and many more pass through on I-94 (Detroit and Chicago) or US-131 (Grand Rapids and South Bend).

Kalamazoo is home to Kalamazoo College, the oldest private college in the state, and Western Michigan University is the 4th largest university in the state (Kalamazoo County Convention, 2008).

Kalamazoo has been fortunate to offer a variety of recreational activities in close proximity to its population. There are 3,880 acres of lake surface area in the county, and the beaches and summer resort towns of Lake Michigan are a 35 mile drive from the City of Kalamazoo (Beck, 2000). The Kalamazoo Air Zoo, Kalamazoo Valley Museum, and Kalamazoo Nature Center are all local and regional attractions. There is a considerable amount of greenspace in or near urbanized areas. Some of the parks and recreation areas in the county include Al Sabo Preserve, Gourdneck State Game Area, Kalamazoo Nature Center, and The Portage Creek Bicentennial Park. Fort Custer is a 3,000 area recreation area with access on the Kalamazoo River (Beck, 2000). River Oaks Park is owned by the county and has a boat launch on Morrow Pond, an impoundment of the Kalamazoo River. There are numerous other city and county owned parks, and land preserves in the county. Springbrook, Augusta Creek, Sand Creek, and the Portage
Creek all provide coldwater trout fisheries. 53 plants and 7 animals are also listed as threatened or endangered in Kalamazoo County.

The City of Kalamazoo was incorporated in 1831 as the village of Bronson, and its name was changed to Kalamazoo in 1836. Kalamazoo did not officially become a city until 1884 (Massie, 1981). The estimated population of Kalamazoo in 2003 is 75,000 over a land area of 25 square miles (U.S. Census Bureau, 2008). Portage Township was set off from Pavilion Township in 1838, and not until 1963 did the entire township become a city. While Portage is considered part of the Kalamazoo Metro Area, it developed as a distinct settlement until more recent times. The 32 square miles in Portage are inhabited by an estimated population of 45,700 in 2003 (U.S. Census Bureau, 2008). Histories and major events for both cities are given in more detail in Chapter 8.
CHAPTER III

LITERATURE REVIEW

The section provides a background for the following chapters. Existing water trails and their development history will be discussed. Heritage tourism has become a trend of interest in the tourism field, and this sector will be evaluated. Some dam removal studies will be summarized to demonstrate what effects they have had on river systems. Methods used to collect information will be detailed in the next chapter. Recreation uses in and adjacent to the Portage Creek are reviewed in Chapter 5.

Water Trails and Recreation

For water trail tourism to be successful, a clear definition of what comprises a water trail is first needed. David Getchell, author of several important books on water trails defines them as: "...A recreational waterway on lake, river or ocean between specific points, containing access points and day use and/or camping sites for the boating public. An important ingredient is an ethic of low-impact use and personal stewardship of the lands and waters being used (Getchell, 2000)." The creation of water trails in southwest Michigan can help to create tourism related jobs and boost local economies. The provision of enhanced recreation opportunities may also influence local families to spend a weekend closer to home as an alternative to traveling ‘up north’. Modern water trails have increased in popularity since the mid 1980’s (Uunila & Currie,
When tourists are placed in natural environmental settings they tend to spend locally, which can result in the creation of new jobs (Johnson, 2002).

Heritage water trails make sense for a future vision of Michigan that highlights the plentiful and numerous water resources of the state. City governments are realizing that unique features such as water trails increase the quality of life and attract young, highly educated workers (Michigan Land Use Institute, 2007). The Michigan Heritage Water Trail Program was initiated in 2002 as a response to the lack of established water trails in the state (Michigan Heritage, 2008). Many of the popular destination rivers are in northern Michigan such as the Pine River, a part of the Manistee River System. The refinement of water trails in the St. Joseph and Kalamazoo River systems has served as a pilot project for developing trail standards for statewide applications (Ammeson 2006).

Heritage water trails are designed to provide several useful services. These routes will include online GIS based mapping, which assist in trip planning. Maps and guides give information about access, hazards, and interpretation, and serve as a gateway to the users of the trail. Signage at bridge crossings and markers enhances the overall float experience.

Recreational river boating is one of the nation’s most popular outdoor activities, and in 1996 over 24.9 million people paddled in canoes, kayaks, and rafts. The number of activity days spent paddling is anticipated to grow by 73 percent by 2050 (Settina & Kauffman, 2001). The potential creation of a Portage Creek Water Trail will help to meet this growing demand. There are 1 million recreational boats registered in Michigan which includes all types of boats. In 2003 there were 364,000 paddle craft
registered in the Great Lakes States (Great Lakes Commission 2007). As the expense of maintaining and fueling large watercraft becomes less feasible, lower cost leisure activities such as water trails may look more appealing. Water based recreation in 13 small New Hampshire towns on the Connecticut River generated up to $31 million annually, and up to 750 jobs (Mullens & Bristow, 2003). Water trails and greenspace conservation also have been shown to improve property values. Studies in Ohio have shown that proximity to a nearby park and river is estimated to account for between 5 and 35 percent of property value (Kimmel, 1985). A study of property values in Boulder, Colorado found that housing prices decline about $4.20 per foot of distance away from a greenbelt area (Correll et al., 1978).

Water Trail History

The concept of water trails, also called blueways, began to take shape in the 1970’s with the initiation of several projects. The Boundary Waters Canoe Area in Minnesota is recognized as one of the first and largest modern water trail systems in North America (Kesselheim, 2000). Other major trails that developed early were the Cascadia Marine Trail in northern Oregon, and the Maine Island Water Trail, which covers 325 miles of coastline (Maine Island Trail Association, n.d.). A common factor for these trails is that they are comprised of mostly of open waters such as oceans and lakes. In 2000, it was estimated that the number of established water routes in North America was around 150. A key factor in water trails is the cost saving they provide over pathways. While land trails require the creation of a trail, a water trails uses previously
existing blueways. These trails do not require the clearing and paving necessary for a land route. Blue trails have been shown to present a low cost per mile of development than green trails.

More recently the cultivation of water trails in urban areas has been explored. The Northeastern Illinois Water Trail is a progressive project to link 10 waterways and 500 miles of water routes in Chicago and its surrounding counties (Openlands, 2008). The Illinois Trail is an impressive effort, and interactive online mapping allows users to click on points of interest for additional information. The website also contains guidance for local governments interested in creating water trails in their jurisdictions. Several water trail routes have been implemented or planned in Michigan. Three of these trails including the Keweenaw, Hiawatha, and the Les Cheneaux, are located along great lakes shoreline in the Upper Peninsula (Skarp, 2005). The Tip of the Thumb Heritage Water Trail is located in the ‘thumb’ region of the Lower Peninsula along the shore of Lake Huron.

Not as many blueways have been established through interior sections of Michigan (Dennis & Date, 1986). River trails present can difficulties with bridge crossings and low water that are not as problematic for shoreline trails. A small water trail is in the works for northern Oakland County on the Shiawassee River (Headwaters, 2007). The greatest progress for inland routes has been in southwest Michigan as part of the Michigan Heritage Water Trail Program. River Country Heritage Water Trails in St. Joseph County have been implemented and are active on three rivers in the area.
(Ammeson, 2006). The Black River Water Trail in Van Buren County is still in progress, however much of the trail has been constructed.

A few pertinent resources have been most helpful in the growth of this project. Two water trail thesis papers have been completed through the WMU Geography Department, Peterson (2004) and Skarp (2005). These relevant projects have provided a framework and guidance for many topics from literature, to access points, and evaluation methods. Online resources are also some of the most current sources for trail specifications. The Michigan Heritage Water Trails site (http://www.wmich.edu/glcms/watertrails/), outlines a list of tasks to initiate the entire process of trail creation from planning to grand opening. The Northeastern Illinois Water Trail site (http://www.openlands.org/watertrails.asp), and America’s Water Trails (http://americaswatertrails.org/), also present details for organizations and governments interested in planning a trail. The Rivers, Trail and Conservation Assistance (RTCA) program is a small federal program of the National Parks Service. RTCA is a technical service program that has been instrumental in the creation of trailways through land conservation. Each year RTCA conserves more than 750 miles of rivers corridors, and offer several case studies and guidance documents related to water trails (Dolesh, 2003).

Heritage Tourism

A Heritage water trail represents a relationship between several differing areas of the tourism sector. The combination of ecotourism and heritage tourism can draw a
wider range of participants. Heritage tourism can complement ecotourism with its focus on preservation of cultural assets (Garrod & Fyall, 2000). Heritage tourism is regarded as one of the most significant and fastest growing aspects of tourism (Poria et al., 2003). The growing field of heritage tourism involves the attractions at a site combined with the cultural history and perceptions of visitors to the site (Poria et al., 2006). While heritage is tied to a particular space, the relationship of that space to time is central in tourism planning (Johnson, 1999). People need the past to explain the present, because patterns in the world make more sense when we have a shared history (Lowenthal, 1975). Taking part in a heritage water trail gives participants a connection to the maritime history in Michigan, and the historical importance of local waterways for transportation and commerce.

The growth in the uses of water trails and historical tourism sites looks promising in the coming years. The number of people who visit historical places will increase 75 percent from 1995 through 2050 (Bowker et al., 1999). A heritage water trail incorporates a combination of features to accommodate multiple interest groups, and can be linked to growing agritourism efforts such as wineries and organic farm tours in southwest Michigan (Michigan Heritage, 2008). Heritage and history, wildlife viewing, trout fishing, cycling, and paddle sport recreation can all be factors in a vacation experience (National Park Service, 1995).

The heritage sector is a significant and understudied component of tourism in developed countries. In the United Kingdom it is estimated that heritage tourism accounts for 28 percent of tourist expenditures and is sighted as a major potential
growth area (Garrod & Fyall, 2000). In Oregon, 50 percent of all visitors indicate that they visit historic sites and museums, making it the third most popular tourist activity (Taylor et al., 1993). The aging baby boomer population is anticipated to travel extensively after retirement. Sixty-five percent of this demographic includes a visit to cultural, heritage, or historic sites while traveling (National Assembly, 2004). According to the Travel Industry Association, heritage tourists also spend more per trip, $631, versus non-heritage tourists ($457). A diverse range of tourists also frequent historic sites while traveling. A survey by the Travel Industry of American indicated that 35 percent of respondents intended to visit a historic site while on vacation (National Park Service, 1995). In general, heritage and cultural tourists are better educated and earn higher incomes than other travelers (Kerstetter et al., 2001).

Sustainable tourism and ecotourism have become a popular topic in tourism research and journals (Garrod & Fyall, 2000). As the world has embraced corporate global monoculture, local variety and difference have become highly prized destination qualities (Chang et al., 1996). More and more travelers are looking for a unique experience beyond popular tourist destinations and theme parks (Chang et al., 1996). Modern travelers are seeking an authentic encounter that is unobtainable through mass tourism (Nuryanti, 1996). Successful heritage tourism cultivates an experience based on a particular sense of place that can not be easily replicated.

Preservation of heritage qualities must be balanced against excessive use of cultural resources. Historic spaces have the potential to lose their sense of place through the commodification of that place through tourism (Teo & Yeoh, 1997). Local
communities should be invested stakeholders, and support using cultural assets to
generate tourist income. Some ecotourism examples have shown that local indigenous
populations have been exploited and excluded from the benefits accrued from tourist
expenditures (Wallace and Pierce, 1996). Information on guides and signs should
receive input from diverse groups in the community. Interpretation of events is the
main method through which heritage tourists interact with local culture. The
perspective of the interpreter can cause result in differences in perception of particular
events or historic sites.

Access and Navigation Background

While planners looking to create a water trail can find several general water
trail examples, locating navigation specifications can be difficult. Some of the most
useful sources are road and trail construction manuals that concern bridges over
navigable rivers. Even when addressing navigable rivers, most still looked at longer
bridges and large boats. Navigational clearance is important to this project as the
Portage Creek flows under many bridges on its journey to the Kalamazoo River. The
national park service was again a source for both bridge clearance and access points
(National Park Service, 1996, 2004). The state of Wisconsin has some of the most
accessible and useful guidelines for vertical clearance with bridge construction (State of
Wisconsin, 1996). A recent thesis from North Carolina on developing paddle trails
worked on the creation of standards for differing levels of access sites and other trail
components (Trask, 2006). More background is provided on these topics in the methods, access, and navigation chapters.

**Dam Removal Studies**

While dam removal science is a relatively new body of information, American Rivers have documented the removal of 465 in the U.S. since 1912, and 54 dams were set to be demolished or removed in 2007 alone. Less than 5 percent of these removals were accompanied by ecological studies (Hart et al., 2002). Even fewer studies have specifically targeted genetic or biologic population structures (Jager et al., 2001). Recent studies have set out to look into some of these questions, and several are currently underway. Of the 465 removals documented in this country, there have been a number of qualitative and quantitative observations regarding these projects. As described earlier, the impacts of dams include increased water temperature, decreased dissolved oxygen levels, impeded fish migration, and disruption of natural flow regimes. The main reasons for removal are usually for fish restoration, or improving recreation. The Stronach Dam on the Pine River, a tribute of the Manistee, was removed in a staged process starting in 1996. The channel upstream of the former dam has begun to restore itself with increased water velocities, and numbers of brook and brown trout have increased. The Pine River is a popular Michigan destination for paddle recreation. Several other dam removals have resulted in an increased number and diversity of fish species (Hart et al., 2002).
The Souadabscook Stream is located in Maine, and the Grist Mill Dam was built in the late 1700's. The Dam on the Souadabscook Dam was 14 feet tall with a 58 acre-ft impoundment (American Rivers, 1999). Dams on the Portage Creek are of similar stature and some contain larger impoundments. Within four months of the dam's removal, Salmon were found spawning at sites upstream after being blocked for over 200 years. Migration routes for other fish such as sea-run brook trout, American Shad and smelt were also restored. The numbers of avian and mammal species have improved with an increasing forage base (American Rivers, 1999). Preliminary results have also shown that dissolved oxygen levels have increased, while temperature has decreased in the former impoundment, but more quantitative studies need to be conducted to verify anecdotal observations. Higher dissolved oxygen levels could improve trout habitat in the Portage Creek.

Other removal projects have documented increased numbers of species variety and expanded migration pathways for fish. The number of fish species nearly doubled from 34 to 61 in portions of the Chipola River in Florida, when the Dead Lakes Dam was removed (American Rivers, 1999). As has been demonstrated at several other sites, dissolved oxygen levels were enhanced through the project. The Woolen Mills Dam on the Milwaukee River in Wisconsin, a dam with a 6 foot head, was knocked down in 1988. The numbers of Carp went down while smallmouth bass recovered in the former impoundment (Kanehl et al., 1997). Other native fish returned due to the change in predominant substrate types from silt and mud, to rocks and gravel (American Rivers, 2002). The establishment of greater biotic integrity on the River is an important
component in improved aquatic diversity. The Waterworks dam on the Baraboo River is a comparable example for the Portage Creek. Removal of the Waterworks Dam on the Baraboo River in Wisconsin more than doubled the number of fish species in the impounded area from 11 to 24 (Bednarek, 2001). High quality riffle habitat was uncovered in the River following removal.

Aquatic ecology is based on the complexity and inter-connectedness of all ecosystem components. Even if fish gain access to new areas, they may not become self-sustaining without meeting food intake and spawning requirements. Dam removal has also had positive changes upon benthic and macro invertebrate communities when stagnant waters are restored to lentic conditions. The macro invertebrate community in the Manatawny Creek has changed composition to more pollution sensitive species, and has also seen a decrease in fish parasites after the removal was completed (Hart, 2001). This trend has been repeated at other former dam sites such as the Shopiere Dam in Wisconsin, and the Edwards Dam on the Kennebec River in Maine.

Other sites have the potential to expand habitat for terrestrial species by exposing previously inundated areas. The Rodman Dam on the Oklawaha River in Florida may improve mammal and waterfowl habitat when removed (Kaufman, 1992). The removal of two dams on the Elwha River in Washington is expected to restore at least 715 acres of vegetation, and expand elk migration corridors (Bednarek, 2001). Much of this body of work is still theoretical; however the link between aquatic and terrestrial systems is well documented.
Local Benefits of Water Trails

The cultivation of tourism is important and beneficial to the area economy, and can also improve the quality of life and increase regional sustainability. Providing nature based activities within close proximity to population centers will cut down on pollution from lower consumption of gasoline. As an alternative to dollars being spent ‘up north,’ more will be invested in local businesses. Recreational river boating is one of the most nation’s most popular outdoor activities (National Park Service, 1995). Discovering natural places in ‘your backyard’ can be a powerful experience to change the notion that places of beauty can only occur in remote wilderness areas. Residents can gain a new appreciation for conservation and restoration by experiencing their city from a water trail. This greater involvement in the community may foster a greater sense of pride and connection to the places people live.

Paddle sports are typically associated with populations that possess higher amounts of disposable income. While these are desirable participants, the goal of this project is not the creation of playground that excludes lower income populations. An urban water trail has the possibility for low-income for participation in an experience they may not normally have access to. Local schools could be partnered with to get students on the water for low cost. Schools can incorporate historical themes with the heritage portion to reinforce learning themes.
CHAPTER IV

DATA COLLECTION METHODS

Navigation Assessment

This chapter outlines the methods employed in the collection of data and execution of this project. The major component of this research was to conduct a detailed assessment of the Portage Creek environment, from Central Park in the city of Portage, to its confluence with the Kalamazoo River in the city of Kalamazoo. A majority of the surveys were conducted by walking in and along the Creek. Walking surveys allow evaluation of bridge crossings and riparian features, and don’t have the temporal and physical restraints of float surveys. Walking surveys employed written notes in combination with photographs taken with a compact Kodak digital camera. Additionally, a Garmin Rino GPS unit was employed to collect GPS data for many features.

Walking surveys were conducted for all accessible sections of the study area. Where conditions did not give views from the bank, waders were used to walk short portions of the Creek. Many aspects of the Creek were documented during surveys. All road, railroad, and pedestrian bridges were described, photographed, and entered with the GPS. Other obstructions such as dams and portage sites were also documented in a similar fashion. Other barriers to navigation were also noted, such as major strainers and deadfalls. Over 600 pictures were taken and indexed according to their location along the Portage Creek. Possible locations for heritage signage were also
evaluated and photographed throughout the surveys. Parts of the built environment, and historic markers encountered along surveys provided several ideas for local heritage themes.

Float surveys were conducted with a Pakboats 12 foot folding puffin kayak. Float surveys of navigation on the Portage Creek were essential to verify observations made through walking surveys. Most sections of the Creek were floated during the research. Some areas near the Kalamazoo River/Portage Creek CERCLA Site are closed off from public access and not surveyed. Notes, photos, and the collection of GPS data were also used with this method. GPS data collected or estimated from the banks was verified during floats. When surveys were initiated, basic variables were recorded such as date and time, location, current weather, and weather during the past 48 hours.

A Pakboats folding kayak was used to conduct the paddle surveys. The kayak can be packed into a large duffel bag that only weighs 22 pounds, compared to an average of 50 – 70 pounds for similar boats. The boat is comprised of a flexible hull, aluminum frame, inflatable chambers, and a deck that is stretched over the top. A folding kayak presents unique possibilities for use in an urban setting, such as the ability to use mass transit or pedestrian transportation options. The Pakboat was compact enough to be easily pulled on a bicycle trailer, and the transportation for the paddle surveys was accomplished by bicycle. Kalamazoo Metro Transit bus routes are located near the entire length of the Creek, although some sites require a .25 - .50 mile walk from water access. Figures 4.1 through 4.3 show the equipment used in float surveys.
Figure 4.1: Bicycle, trailer and kayak packed in bag

Figure 4.2: Unfolding the hull and assembling the kayak

Figure 4.3: Side chambers inflated and deck stretched over hull
A majority of the floats would be conducted solo, and this created the need for an easy method to document information while piloting the kayak. Entering observations is less cumbersome with the assistance of a standardized format. Some version of a survey form was required to meet this need. There are a variety of survey forms that have been created to evaluate numerous aspects of the fluvial environment. While some of these formats provided partial solutions, none covered all the necessary variables that were essential to this program. A new river survey form was needed to meet the needs of the project. The creation of this form could also be adapted for other rivers conducting a survey, particularly those in urban settings.

The primary categories for the form were drawn from observations during field work. These ideas constituted the main body, and pre-existing forms provided some of the format and categories. The usage of percentages as a measurement technique, and substrate classifications were adapted from The Haw River Watch Project survey. The United Kingdom Environment Agency has a very detailed seven-page river habitat survey form that provided useful categories for riparian land cover and other data. The Michigan Department of Environmental Quality uses a form for stream evaluations at road crossings, which provided additional guidance. The resulting Portage Creek navigation assessment form is included in Appendix A.

**Access Evaluation Scoring**

Access to water routes can be a deciding factor in choosing a destination for paddle sports (Peterson, 2004). Enthusiasts of varying abilities need to be able to land
and launch into the water without causing injury to either self or equipment (National Park Service, 2004). In Tim Peterson’s Thesis planning multiple water trails in St. Joseph County, he developed an access site scoring system. This system was adapted and slightly modified in a graduate thesis by Benjamin Skarp which addressed water trails on the Nottawa and Pine Creeks in Calhoun and Branch Counties. These categories were adapted to fit the needs of this research. Skarp added an additional Heritage scoring category, which has been expanded to include both heritage and other aesthetic qualities of the site (Skarp, 2005). A further variable was added to the scoring, proximity to amenities. Being able to access services such as convenience stores, restaurants, and outfitters, is an important aspect of attracting users and providing positive experiences.

A pathway leading to the access should be designated with a visible marker and be well kept with grass no higher than five inches (Trask, 2006). Access sites or trailheads should be marked with signs that can be easily spotted from the water. There is currently only very little signage on the Creek, and implementation of the trail will need to include access and hazard signs. The state of North Carolina has undergone a process to standardize requirements for various levels of access sites. Standardization allows potential trail users to understand and plan based on desired paddling experience (Trask, 2006).

The National Park Service Rivers, Trails & Conservation Assistance Program offers guidance for the features needed in a quality access site, and examples of well designed launches. The Chicago Openlands project has created a checklist for local governments which inventories important facilities for a non-motorized boat launch. While Skarp and
Peterson used possible scores of 70 and 55, a total of 100 possible points was given for the access scoring method. The 100-point scale is logical and easier to interpret for future users of this information. A simple five point Likert scale is used to score each feature. A rating of 5 represents an ideal site, while a score of 1 shows a poor site quality. The order will go from least to most important factor. To normalize the scores to 100, the lowest category Proximity to Amenities is given a weight of 2, and the highest factor, water access is given a weight of 6.

**Proximity to Amenities:** A complete water trail experience is augmented by easy access to services and goods at stopping points. Restaurants and other attractions can be popular destinations after a long day of river travel. Being able to purchase necessary goods such as snacks and sun screen can be a selling point for a water trail. Proximity to Metro Transit bus routes is also factored into this score. Although some users may not be interested in these types of amenities, many groups such as families can be drawn to this type of experience. Proximity to Amenities is assigned a weighted score of 2.

**Heritage & Aesthetics:** Sites that are related to a historic or significant feature present opportunities for interpretation at the access point. Highlighting the heritage features at the point of entry can emphasize the cultural experience on the water trail. Sites with greater heritage potential will receive a higher score although, this aspect is not crucial to the development of a particular location. The aesthetics of a particular site can have a positive or negative impact on the user of a water trail. Sites such as city
parks are more visually pleasing and help create a sense of “being in nature.” Heritage and Aesthetics are assigned a weight of 2.

**Restroom Facilities:** Adequate restrooms provide a more comfortable experience for users of the water trail. They can also be helpful in preventing the unauthorized use of private land adjacent to the water. A trail can benefit from well-placed restrooms, although facilities are not essential at each launch. Knowledge of downstream restroom locations can be sufficient to satisfy trail users (Peterson, 2004). Restroom Facilities are given a scoring weight of 3.

**Site Ownership/Current Uses:** The viability of any site as an access location may be limited by the landowner. Ideal sites will be publicly owned by an entity such as the city or the Michigan Department of Natural Resources. Privately owned sites are not disqualified, but will require cooperation and support from the landowner. The North Carolina Department of Environment and Natural Resources requires property owners to acquire liability insurance for endorsement of the site by the agency (Trask, 2006). Ownership is assigned a weight of 3.

**Parking Space:** Most transportation to access points is accomplished by personal vehicles, and a lack of parking will limit the usability of the site. Parking space needs to be a safe distance away from traffic, and on a level surface (Skarp, 2005). A road shoulder itself may not be far enough from busy roads to provide sufficient parking. Other transportation options may be provided from a canoe livery or through the use of urban transit alternatives. Parking also takes into consideration the distance that boats will be carried from vehicles. Parking space is less important than water access, but
more essential than other factors such as restrooms and ownership and given weight of 4.

**Water Access**: This is the primary consideration for an access site. Poor water access can result in great difficulty getting in and out of the water, and these challenges are greater for individuals with disabilities. The pathway to the water should be clear of debris, and the surface should be firm. The slope of the launch should not exceed 8.33% if possible, and a slope greater than 15% is difficult for any paddler (National Park Service, 2004). While a slope less than 15% is desired, other guides have specified 20% as the high end for more rustic sites (North Carolina, 2007). The point of access should be able to be identified on the land and water. Closed deck boats such as kayaks are more difficult to step into than open boats and require closer water levels and some type of structure to support the paddler when entering (Openlands, 2008). The landing should also be of some soft material such as smaller diameters sand and gravel that will not damage boat hulls (Peterson, 2004). Due to the importance of Water Access, this variable is assigned a multiplier value of 6.

**Map Creation with Geographic Information Systems**

GIS is a powerful tool for spatial assessment and organization of data. ArcGIS provided a visual arrangement of data and was operated on multiple levels in the completion of the research. Basic survey maps were created with data layers from the Michigan Center for Geographic Information (MCGI). These maps assisted in visualizing the survey sections, while showing nearly all crossings of the Creek. The maps were
marked up as a visual reference during field work. Most field GPS data was entered into ArcGIS through the creation of new layers corresponding to features such as dams and access sites. Additional base layers were also previously created by the Michigan Heritage Water Trail program by the Western Michigan University Geography Department. These layers were incorporated into GIS. ArcGIS is being used as both a spatial arrangement for features and a database for data storage. All GPS points have been correspondingly entered into an Excel Spreadsheet file for storage and future access.

Multiple portions of the project have been mapped and will appear in segments of this report. Various maps were created for themes such as navigation, the locations of dams, access sites, and potential sites for interpretive signage. Basic analysis capabilities of GIS were employed to calculate the distances on the Creek, and other factors such as river gradient. Gradient values were generated from the Digital Elevation Model raster layer retrieved from MCGI. The collection and storage of GIS data on the Portage Creek is an ongoing process, and GIS files from this project will be stored at WMU for future use.

Heritage Data Collection

The Kalamazoo metro area is endowed with excellent historical archives and research libraries. Western Michigan University, Kalamazoo College, and Kalamazoo Valley Community College are located in the area and bring with them extensive library collections. The Kalamazoo Public Library was awarded the national library of the year
award in 2002, and features a local history room. The library hosts an extensive archive of the Kalamazoo Gazette and other papers that provided historical events and photographs. The library has also a file of clippings and other literature related to the Kalamazoo River and the Portage Creek. The Library has also preserved a series of papers from Kalamazoo College. These papers were published in the 1940’s and 1950’s and cover many local history topics. Local historian Steve Rossio at the Portage Public Library was additionally able to provide ideas for heritage themes.

The research library at WMU contains sections relating to statewide and local history and events. WMU also maintains a Local and Regional History Archive located in historic East Hall. East Hall was constructed in 1905 and was the first permanent building for the “Western State Normal School” which would become WMU (Hamann, 1996). The archives house a collection of maps and atlases dating back to the 1800’s, and these resources were valuable in determining the historic locations of the Portage Creek channel and surrounding features. Another tool for heritage resources was The Michigan County Histories and Atlases Digitization Project, introduced by librarians at the Local History Archives. The project is collaboration among 15 Universities and the Library of Michigan, and contains 428 digitized titles published before 1923 (Michigan County Histories, 2007). The titles are searchable online, and can be viewed page by page in adobe .pdf format. Experiencing the Portage Creek firsthand was also a key method for gathering interpretive themes that relate to the stream.
CHAPTER V

RECREATION AND PLANNING

This chapter reviews current recreation uses on and around the Portage Creek. Available plans for future recreation are also discussed. Municipalities on the Kalamazoo River and Portage Creek have been fighting to improve their image from the days when paper companies treated them as industrial sewers. These old brownfields, particularly in Kalamazoo, have begun to be transformed into new spaces that are suitable for recreation. Much of the heavy industry in the area operated in Kalamazoo, while the riparian corridor of the Portage Creek in Portage has not been nearly as industrialized. The creation of land and water trails on the Portage Creek has been more difficult in Kalamazoo for these reasons. The large section of land included in the Superfund Site has been a barrier to advancing pedestrian connectivity between these two communities. While the Portage Creek begins from the southwest in Texas Township, the planned water trail is limited to the cities of Portage and Kalamazoo. Land-based trailways and plans are closely linked to the future development of blueways and are also discussed.

Portage

Historically, much of the land surrounding the Portage Creek was comprised of low-lying plains with a high water table. Some of this land was left in a natural state due to these soils being unsuitable for building. To celebrate the nation’s bicentennial in
1976, the City of Portage made progressive plans to preserve the Creek corridor and build a linear trail running north/south through the city (City of Portage, 2008b). The City completed Phase 1 of the Portage Creek Bicentennial Park (PCBP) in 1991 and has expanded the trail to include 3.5 miles of paved trails (Massie, 2006). The trail has won awards from the Michigan Park and Recreation Association. Additional links to the trail have been created, allowing cyclists to travel through much of the City on dedicated pathways supplemented by bike lanes. Blue and orange signs throughout Portage designate the 30 mile bikeway system in the city (City of Portage, 2003). The City of Kalamazoo has expressed an interest in linking bicycle routes with this system.

The creation of the PCBP has been significant for several reasons. It has provided a naturalized buffer along the Creek that protects it from some of the impacts of polluted runoff. This greenspace also gives wildlife a corridor to travel away from human impact. The linear park has created a framework for connections with other linked parks. Preservation of this land has also allowed public access to the water for small craft navigation. The City of Portage runs a small canoe livery on the Portage Creek from Celery Flats Park to Milham Road. Canoes are available for rental from the city several days a week in the summer months. The Celery Flats Park is located within the PCBP system and features historic buildings and an interpretive center. This park system has made a water trail in Portage possible on the Creek. While there are several barriers in its path, no sections of the Creek are currently inaccessible to paddlers. In its 2007-2017 Capital Improvement Program, the City of Portage is planning to clear some
obstacles from the Portage Creek and add an additional access (City of Portage, 2007).

This project is not scheduled until fiscal year 2016-2017.

Beyond connecting to the Kalamazoo River, there is a possible portage that allows access to the St. Joseph River system. The history behind the name of the Portage Creek is that it once offered a vital link between the two river systems for Native Americans and Pioneers. West and Austin Lakes in the City of Portage are part of the St. Joseph River drainage system. The outlet for these lakes becomes a stream that leads through Vicksburg and to the Portage River. A 1976 plan by the Southwest Michigan Planning Council proposed a regional system of canoe trails. This plan discussed taking advantage of the slow moving waters in the region to create a looping canoe network (Wayland P. Smith, 1976). The network included utilizing a portage at this point as a key feature of the loop system. The distance for the traverse is about one mile.

Kalamazoo

The Portage Creek enters the City of Kalamazoo through the parklands of Milham Park and the Blanche Hull Preserve. Public lands are a good start for the creation of connected land and water trails, although none are established through these parks. Milham Park was opened in 1911, and has a fascinating history that is included as themes for signage. Milham Park is a gathering place for families to walk and enjoy the waters of the Portage Creek. Many bridges and stonework in the park was constructed in the depression era, and were not designed with navigation in mind.
Blanche Hull is a natural preserve that has thickly wooded lands lining the banks of the Creek. There are some rough trails through Blanche Hull that do not currently provide any linear connection with other paths.

Other parks along the Portage Creek are Upjohn Park in downtown Kalamazoo, and Rose Veterans Memorial Park at the confluence with the Kalamazoo River. A short river Trailway has been built at Rose Park, and Upjohn Park contains land adjacent to the Creek for future Trailway construction and water access. A pedestrian bridge crosses the Portage Creek at Upjohn Park. The Upjohn Park master plan includes a Trailway connection along the Creek, but does not currently include a designated water access. Being under public ownership, the park would make a good candidate for an access site.

A major roadblock to land and water trail creation are contaminated brownfields from historic paper mills and related industries near the Creek. A large parcel of land bounded by Alcott and Cork Streets to the north and south is fenced off from the surrounding community. This area was the site of mills and lagoons where wastes from manufacturing processes were disposed, and is part of the Superfund Site (U.S. Environmental Protection Agency, 2007b). Contaminated sediments at the Bryant Mill Pond Site have been dredged from the Creek and placed in adjacent landfills. Much of the area north of Alcott and south of Reed is also closed off with barbed wire fence from public access. This area has several historic deteriorating industrial buildings, including the Illinois Envelope Co. Building which is listed on the National Historic Register. Demolition of buildings on the site has begun, and fenced off areas contain
contaminated sediments (Nixon, 2007). Ongoing resolution of the Superfund remediation and the sluggish state cleanup of the Brownfield have stalled efforts for recreational use.

While the Bryant Mill Pond area has experienced these challenges, the city has included new future plans for the site. The city has considered acquiring portions of the land to be designated as a mixed use zone (Gove Associates, Inc., 2003). Recreation facilities in the surrounding Milwood and Edison neighborhoods are limited and could benefit by recreational use of the land. The city has only planned passive recreation for the site such as a bicycles path due to the soil contamination (Gove Associates, Inc. 2003).

The city of Kalamazoo has planned a connection with the PCB in Portage for a number of years. This would create a continuous land trail along the Portage Creek from Centre Avenue in Portage to its confluence at the Kalamazoo River. Kalamazoo has not had as much interest as Portage in fostering paddle recreation on the Creek. This is partially due to the state of the Bryant Mill Pond site. The city has considered the idea of a Portage Creek blueway that would eventually run through this area. Ideas for passage through the Mill area have included re-routing part of the Creek around the Alcott Dam, taking it west of its current channel. Moving this part of the Portage Creek channel may provide the best hope for connecting the waterway for recreational purposes. Some possibilities for navigation issues are also mentioned in chapter 10. Both land and water trail plans are on hold until environmental issues for the Bryant site
are resolved, although the city is closely monitoring the situation (Corradino Group, 1998).

Regional Developments

The Kalamazoo River Watershed is one of the first watersheds to test the model of creating a basin-wide system of connecting heritage water trails. Trails are planned for the Rice Creek, Battle Creek River, Portage Creek, Gun River, Swan Creek, Rabbit River, and on the main stem of the Kalamazoo from Albion to Lake Michigan. This watershed-wide water trail will give more options for residents of southwest Michigan that have grown tired of the time demands and expense of driving north. The main stem segment is moving forward in the planning stages and has 100 interpretive sign themes established. Many local governments and organizations are putting time and resources into the implementation of separate heritage water trail portions. The watershed-wide trail will become more popular as additional tributaries are added to the network. This scope of the project may even draw visitors from northern Indiana and Ohio looking for a unique water experience. Trail users will be able to explore various cities and villages located along the Kalamazoo River and its tributaries.

Another major recreational development is the creation of a regional Kalamazoo River Valley Trailway (KRVT). After years of degradation and a poor reputation, the Kalamazoo River corridor became the focus of restoration in 1991. Seed money from the Department of Natural Resources initiated a vision of 130 miles of trailways from Battle Creek to Lake Michigan (Kalamazoo County Parks, n.d.). The KRVT is significant
for its focus on the Kalamazoo River, Portage Creek, and the scope of the project. The trail is planned to connect the 30 mile Battle Creek Linear Park, the 35 Kal-Haven Trail, and the Portage Creek Bicentennial Park. This would provide a continuous bicycle route from South Haven to Kalamazoo, a southern connection to Portage, and east through Ft. Custer Recreation Area to Battle Creek (See Figure 4.1). The City of Kalamazoo and Kalamazoo County have been strong advocates of this development. The Friends of the Kalamazoo River Valley Trailway is the main organizational focus for the plan and have partnered with 13 units of local government through which the trail will pass (Kalamazoo County Parks, n.d.). Several segments of the trail have been completed and a capital campaign is underway to fund further construction of Trailway segments. The inclusion of a Portage Creek connection to the KRVT may help to expedite recreational uses for the Creek corridor.

Figure 5.1: Kalamazoo River Valley Trailway Map
Source: Parks Foundation of Kalamazoo County & The Kalamazoo River Valley Trailway
http://www.kaltrailway.org/KRVTmap.htm
Another project, Kanoe the Kazoo, grew out of the Kalamazoo River/Lake Allegan TMDL for Phosphorus Committee. One of the goals of the committee was to promote positive uses and recreation on the Kalamazoo River and its tributaries. The campaign began in 2003 and introduced thousands of community leaders, decision makers, and citizens to the natural beauty of the waterways in the basin (Kellogg Biological Station, 2006). The canoe trips were also an opportunity to educate the public on the improvements in water quality and various projects and organizations working on the Kalamazoo River. An educational float down the Portage Creek was conducted by the Kalamazoo River Watershed Council to highlight local projects and the beauty of the Creek.
CHAPTER VI

NAVIGATION ASSESSMENT

This chapter provides a detailed summary of the Creek from Central Park to its confluence with the Kalamazoo River. This evaluation will be used for long-term planning with water trails and recreation in the Portage Creek environment. A brief guide of currently feasible trips is given preceding the full navigation summary. These could be used as an introduction to the Creek, or for educational excursions. Short descriptions of the positive and negative aspects for each stretch, and coordinates for access sites are given. Paddlers should be able to legally float on the Portage Creek even when surrounded by private property due to its historical use as a navigable waterway.

The head waters of the Portage Creek begin as a series of wetlands and small ponds west of US-131 in Texas Township (Forum of Greater Kalamazoo, 2006). The Creek flows underneath US-131 into Hampton Lake, which is located partially in the Gourdneck State Game Area. The Creek is still a small stream upon exiting Hampton Lake, and has not gained enough flow to be easily navigable. While a group of Portage employees have floated the Creek from as far upstream as Hampton Lake, they spend a considerable amount of time walking their boats around obstacles and low water. Surveys during the summer of 2007 indicated multiple deadfalls and deteriorating pedestrian bridges that would make for tedious portages between Centre Avenue and
Central Park. The furthest recommended upstream public access is Central Park in Portage, located behind the Portage fire and police station.

Portage Creek Float Trips

Central Park to Milham Road Access

Start: (42.20458 N, 85.59090 W), End: (42.22994 N, 85.57670 W).

This segment begins at Central Park in Portage, and ends at the Milham Road canoe access (Figure 6.1). Parking is available at both the put-in and take-out, although parking is a short walk from the Milham access. Central Park does not currently support a developed canoe access, though most paddlers should be able to enter their watercraft from the reasonably sloped banks. Restrooms are provided at both ends of the trip. This segment adds some length to the current canoe livery trip maintained by the City of Portage. They provide a canoe livery from May through September which is open several days each week (City of Portage, 2008). This trip should last about 3 hours or possibly less for experienced paddlers. The water on this float is mostly smooth and easy, although quicker currents and the need to duck under bridges, and several portages increase the physical demands of the float.

Highlights of this segment include a possible stop over at the Celery Flats Interpretive Center, which is a 500 ft walk from the downstream access. The Creek is somewhat wild and protected downstream of this point, and sightings of deer, blue heron, and other wildlife are common. Key themes for this segment will be the
Underground Railroad, the old Native American portage route, the Creek as a coldwater trout stream, and celery cultivation in Portage. A portage is required for the culvert at Garden Lane, followed by a somewhat difficult re-entry. A low railroad bridge immediately before the Celery Flats access, followed by large submerged rocks, may also require portage. A large deadfall west of South Westnedge is currently blocking passage and several strainers before Garden Lane may cause problems if they remain in their present condition. The Creek becomes wide and shallow as it approaches Milham Road, and during periods of low water this could cause boats to get stuck.

**Milham Access to Kilgore Road**

Start: (42.22994 N, 85.57670 W), End: (42.24494 N, 85.57617 W).

This trip starts at the Milham Road access, which is located in a park connected to the Portage Creek Trailway (Figure 6.2). Trail users will be able to take vehicles to the access point, and then be able to park a short distance away. The access is developed and features a partially floating dock and synthetic ramps on either side. Restrooms are provided near the access, and are also a short distance away from the exit point. This segment is not maintained by the City, and does present some difficulties. The trip should take around 2 to 3 hours for most, although a tough portage could add additional time. This float is also considered easy, and no whitewater is encountered. There is a dam that contains a spillway with several drops of a few feet. Although paddlers on the Creek have previously run the dam, dams generally create a dangerous hydraulic and are not safe. There are also minor riffles near some railroad bridges.
Figure 6.1: Central Park to Milham Road Access
This stretch is less plagued by shallow water levels than the previous segment however the impoundment behind the dam is packed with a considerable amount of sediment. The scenery downstream of the dam is quite beautiful, and there are nice meanders past the I-94 Bridge. Brown trout have been seen in some of the pools in this area and could provide possibilities for boats fishing. Catching a glimpse of a muskrat, wood ducks, and other animals is a common experience in this stretch of the Portage Creek aquatic environment. Off the eastern bank of the Creek is a mature riparian forest with some large diameter oak and maple. Some of the heritage themes in this stretch are Native American villages, area railroad history and the unusual past of Milham Park.

The dam downstream of Milham is a hazard and requires a difficult portage that needs to be maintained. There is also a culvert downstream of the dam that requires a short portage. The Creek crosses under 4 railroad bridges between I-94 and Kilgore Road. Although these can be passed in the water, clearance is tight and may be impossible during high water. Before reaching Kilgore, some riffle and pool sections create shallow bars of gravel and sand. The take-out is undeveloped and can be accomplished after Kilgore, or past Lovers Lane in Milham Park.

Monarch Mill Dam to Milham Park

Start: (42.25730 N, 85.57550 W), End: (42.24785 N, 85.57407 W).

The Monarch Mill Pond is a large impoundment of the Portage Creek created by the Monarch Mill Dam. The Pond has a slow to non-existent current, and is able to be paddled both up and downstream. This trip begins downstream near the dam, and
Figure 6.2: Milham Road Access to Kilgore Road
then heads upstream through the pond to the northwestern border of Milham Park at Lovers Lane (Figure 6.3). Once reaching this point a paddler can then take the easy float back downstream to the dam access. The Monarch access is undeveloped and currently owned by the adjacent the Fabri-Kal Corporation. Parking is available, however contacting the property owner is advised before leaving a vehicle.

The nature of this float eliminates the need to have a shuttle or additional vehicle to transport paddlers back to the access. This float can be accomplished in 1.5 hours, and its short duration and single access point makes it an ideal introduction to paddling on the Portage Creek. The launch site has seen some use, and has resulted in a dirt and gravel launch, with slow a current from the dam backwaters. There is currently no sign from the water that warns of the nearby dam, and care should be exercised when accessing the launch.

The float through the pond is scenic, bordered by wetlands to the east, with swans, kingfisher, and numerous other bird species. Once south of the pond, the Creek enters the Blanche Hull Preserve, forested land owned by the city of Kalamazoo. The character of the stream shifts from impounded to lotic, and presents some natural meanders that work underneath railroad bridges. Shortly before the Lovers Lane Bridge, the West Fork of the Portage Creek has its confluence with the main branch. Paddlers should be able to pass through the large culvert underneath Lovers Lane, and view the Milham Park Dam from downstream. This also creates a possibility to exit at the park which has restrooms, a playground, pavilions, and grills. The banks are short concrete brick banks, making access somewhat challenging.
Figure 6.3: Monarch Mill Pond
The water in the pond is shallow, and while not often causing boats to get stuck, does not allow a full paddle stroke. There is a small rock rapid less than 100 feet upstream of the first railroad bridge. The current picks up through the rocks and can make passing upstream a bit difficult. The Creek is also wide with low water levels in the area south of the first railroad bridge, and paddlers should avoid shallow point bars in this section.

Detailed Navigation Assessment

Portage

The Creek passes through the northern portion of Central Park, and creates a natural access site. The access is evaluated more thoroughly in the access scoring section. The park provides a pleasant natural setting, and many deer can be found in the riparian woodlands and wetlands. The City of Portage has conducted some stream restoration for brown trout, and signage documents the project. Habitat could be further improved by native bank plantings and increased shading. Some portions of the banks have a gradual slope, and a small floating dock anchored to the bank would allow excellent access. Additionally, other useful amenities such as parking, restrooms, metro bus access, and nearby stores are conveniently located here.

Soon after departing this point, paddlers will encounter a large deadfall, created by a tree of considerable stature. It is not likely this deadfall will get flushed out in the near future, and could be partially cut to provide passage. Portaging around obstacles
in this section is particularly difficult, with artificially steep banks covered with woody plants and trees leading to parking lots. When portaging at this site, I had difficulty exiting and entering the Creek due to thick silt on the bottom, and was covered in burrs and scratches after bush-whacking through the brush. After the deadfall, businesses on the left bank are encroaching upon the water, and some asphalt is starting to collapse into the water. The Westnedge Avenue Bridge is a short distance downstream of the deadfall, and has good headroom. The constriction caused by the bridge will give canoes an extra burst of current speed. A small submerged pipe runs lengthwise across the stream, and paddlers will want to stay to the middle. Several bridges that cross the Creek provide some of the more interesting obstacles encountered on this tame stream.

After crossing South Westnedge, the Creek enters Liberty Park. The City of Portage has recently landscaped this park to include native plantings and stormwater infiltration techniques. Water levels at this point can still be questionable, and canoeists need to read the river to avoid getting beached on shallow sand and gravel bars. There is an island after the Creek leaves the park, and the right channel provides the best passage. A moderate strainer downstream will require getting out a boat to climb around it. Businesses begin to come into view on the west bank, and the turf grass is mown to the Creek's edge with waterfowl frequenting the area. A double culvert passes the Creek underneath garden lane, and there is no choice but to Portage here. The culvert also creates shallow backwater upstream, and could be engineered to give less resistance and avoid the Portage.
The entry back into the Creek is not simple due to vegetated banks and silt deposits. The Creek begins to take on a more natural aesthetic downstream of Garden Lane. This begins the Portage Creek Bicentennial Park, a 3.5 linear park that has a non-motorized trailway. The park follows the Creek the rest of the distance through Portage, providing a riparian buffer for much of the stream corridor. Shallow water may be encountered past Garden Lane, before the Creek turns toward the east. Shortly after this meander the Creek passes under a railway bridge, and then the pedestrian trailway bridge. The bridge has low clearance, and requires lying down in a boat to get past. Immediately past this bridge is a small rapid with rocks emerging from the water, which is difficult to adjust to after ducking the rail bridge. The clearance for the trailway bridge is good.

Past the bridge is the City of Portage canoe livery. The livery is operated 3 days per week in the summer season. The launch contains a wood ramp, and a deck that is several feet above the water. This section should be maintained by the city of Portage, although there are some minor navigation issues. This part of the Creek is highly naturalized, with thick riparian vegetation and forest lining the water. White-tail deer, wood ducks, and blue heron are common sights in this portion of the stream corridor. There are some minor strainers in this stretch, but they should be able to be navigated without an exit from the watercraft.

Downstream from the access point the Creek makes its way under a well-designed bridge that allows easy passage for paddlers. The Creek then winds its way through thick forest and wetlands as it passes a few observation decks provide a view
and environmental interpretative signs. The water becomes wider and shallow as Milham Road approaches. The deposits of silt here make exiting a boat and walking on the bottom difficult. These conditions are likely related to the presence of a dam downstream of Milham Road. The access at Milham Road features a wood dock structure with two synthetic ramps leading into the water on either side. The dock has a rail to assist with balance. Vehicles are also able to pull up close to the launch which makes for convenient access.

Past the access a sign warns boaters not to continue any farther, although it is possible to continue past this point. The bridge for Milham Road is well designed with excellent clearance, although there are some rocks under and past the bridge to avoid. Heading downstream, portions of a large willow are lying in the water and can be passed to the left. The affects of the approaching dam are also apparent as the stream becomes greater in width and some islands of emergent muck. This impoundment may be the reason for the Creek characteristics upstream of Milham Road. It has an east and west chute, and several drops of about 2 feet each. Running this dam is not recommended, although I have spoken with paddlers who have gone over the dam without capsizing. Portage is only possible on the left bank, and presents some difficulty. Current access to the banks is blocked by woody debris and the sediments are thick silt.

After exiting the water, a dense thicket of briars must be negotiated to reach the other side. With some clearing and maintenance the portage could become much less treacherous. After re-entering the water, a culvert blocks the path 1/5 of a mile
downstream. Passing through the culvert is unlikely, and the portage is easiest on the right bank, although it is not an ideal access. Grading of banks, adding gravel, and support rails would make the portage a more enjoyable experience. Once past the culvert, the Creek becomes more natural and provides a nice environment in this urban area. Lovers Lane is visible briefly to the east, although it does not excessively encroach upon the banks. The Creek here goes through a few meanders before encountering a deadfall that requires a portage on the right bank. There is evidence of a trail here that has been used by previous paddlers, and the portage is not complicated. The Creek again becomes heavily forested on both sides is free of major impediments for a decent stretch.

The sounds of traffic can be heard from I-94, and the Creek passes underneath the highway. Keeping to the right is the best passage around some large rocks under I-94. The Creek then goes under a pedestrian bridge before crossing the first of several close railroad bridges. There is some woody debris near the bridge, although it should be navigable. At this point the PCBP is on the east side of the Creek, and the riparian zone on that side has dense shrub and forest cover. This provides a nice cover with areas of thick floodplain forest with some larger trees. A man-made island upstream creates a section of shallow water, and the left passage around the island is the deepest. The banks on the left side consist of flat concrete blocks, and mark the end of grass lawns that lead to the creek. A large dead tree sits across the entire Creek and requires a Portage onto the land.
The Creek now meanders back and forth several times, crossing over three railroad bridges. The first bridge has the best clearance and is followed by a small riffle. The next two bridges are low and may require boats with higher drift above the water to portage, although I was able to pass them in my kayak during low water. There is a bolt protruding downward from the second bridge that presents a hazard to paddlers. There is a natural riffle pool sequence in this reach, and paddlers will need to read some of the shallow riffles to avoid getting stuck. The Kilgore Road Bridge is set well above the Creek. Kilgore Road marks the barriers between the Cities of Portage and Kalamazoo. The west bank immediately downstream of Kilgore is mostly clear of vegetation, likely from Railway maintenance. This site could be an opportunity for access before Milham Park which follows downstream.

Kalamazoo

The Portage Creek enters Kalamazoo as it passes under Kilgore Road. Briefly past Kilgore it goes under another bridge, the first of two on Lovers Lane. This bridge is a large culvert with low clearance that could be a problem, particularly during higher flows. The first of several pedestrian bridges is crossed downstream of Lovers Lane. Milham Park is a generally low lying area that surrounds a large Creek meander. There are a considerable number of obstacles including a dam in the Park that make it unsuitable for navigation. A portage on the railroad right-of-way downstream of Kilgore to the Blanche Hull Preserve may be preferable to the shallow water and multiple portages required in Milham Park.
After entering the park, a small bridge to an island occupies the south half of the Creek and can be passed on the north side. Caution should be used to avoid large rocks here. A large, low pedestrian bridge is encountered soon after, and leaves a paddler no choice but to exit the water. Two bridges spanning an island across the Creek are encountered only 300 feet downstream. Paddlers may choose to stay out of the water to avoid another possible portage for this double bridge. After re-entering the Creek the best path is stay to the left under the small arched bridge, and avoid the furthest minor channel on the left before the road bridge.

The next section contains a low road bridge another 300 feet downstream that is too low for passage. Continuing through the park, the Creek passes under a second road bridge, though this bridge has better clearance and should not require exiting the Creek. The water in this section is slow and impounded due to the upcoming Milham Park Dam. This creates low water levels throughout the park which can cause canoes and kayaks to often round aground. The dam features a drop of about 5 feet resulting in a dangerous hydraulic that should not be run. The Creek will need to be portaged upstream of the dam and then put in either before or after Lovers Lane, neither side offering an attractive portage. There is a large culvert underneath Lovers Lanes that was able to be passed in a kayak.

Multiple low bridges and shallow water from the dam make Milham Park an unpleasant experience for paddlers. The banks throughout much of the park are comprised of rocks or low concrete berms, posing some difficulty for entering and exiting the water. Figure 6.4 shows an aerial view of navigation in Milham Park.
Aerial View of Milham Park Navigation

Figure 6.4: Milham Park Navigation
After passing under Lovers Lane, the Portage Creek flows through Blanche Hull Preserve, public land owned by the City of Kalamazoo. Here begins one of the better stretches of water through a highly naturalized area, particularly for this urban setting. It is here that the West Fork joins the main branch of the Portage Creek. An island of sediment has been deposited near the confluence and can be paddled around to avoid getting stuck. Clearance is ample for the first of two railroad bridges in the Preserve. The Creek begins to get wider as it turns towards the north east. There is some accumulated debris and wood in this area that could be cleared out for easier passage. There is potential to get beached in this section in the shallow water. Before turning through the second railroad bridge the Creek flows through a small rock rapid, that provides a pleasant increase in current when passed through the middle. The railroad bridge is somewhat low, but can be passed without portaging.

Adjacent to the rapid is a potential access site located in the Blanche Hull Preserve. The site has wildlife and waterfowl, is aesthetically appealing, and has an easily accessible bank. The major issue with this access is its location nearly a quarter mile from the park road access. Due to its placement in the middle of this stretch, this site is not in a desirable location for a developed access.

The Creek opens up following the bridge, into the Monarch Mill Pond, which is impounded by the Monarch Mill Dam approximately ½ mile downstream. The Mill Pond has an almost imperceptible current, and is less than 12 inches deep throughout most of its reach. Paddlers should be able to float the Pond without running aground, although the shallow depth does not allow for a full stroke of the paddle. Canoeists will turn up
this thick silt substrate with their paddles, soiling both boat and occupants. The pond ends as the Creek flows over the Monarch Mill Dam, which has a head of about 15 feet. There is currently no warning sign for the upcoming dam. To the immediate right of the dam is an access area that looks to have had some previous use. The bank has a low slope and the take-out is comprised of sand, gravel, and silt. This site is currently owned by the Fabri-Kal Corporation, a plastic manufacturing company with an adjoining facility located to the southeast of this location, separated by a small tract of forest. There are signs that indicate no trespassing where the road intersects the open field that surrounds the dam and the access area. The company seems to be fairly tolerant of the use of this site, and the signs are placed as a liability issue due to the safety hazards posed by the dam.

Paddlers can take advantage of the slow current of the pond by floating upstream to Milham Park, and then back downstream to create a short paddle trip on the Portage Creek. With current conditions, this is the best float opportunity located within the City of Kalamazoo. The Kalamazoo River Superfund Site begins downstream of this dam. The portion from here to Cork Street is open to the public, but is not likely to be included as part of the water trail in the immediate future.

There are several hazards in the 2/10 mile to the Cork Street Bridge. Two largestrainers block passage and would likely require a portage. After the strainers, there are several old concrete pilings emerging from the water. These pilings and other remaining structures in the Creek create a rapid section that is hazardous and has sharp edges that could cause damage to a boat. There is also an old section of sheet piling that has
separated from the banks, which now lies in the middle of the Creek. A small stream also enters the Creek through an adjacent wetland to the west. The railroad also runs parallel to the Creek along its western bank, fragmenting this sizable piece of wetland from the riparian habitat of the Creek. There is a large cylindrical metal object partially submerged in the water downstream of this area. A partial rock dam has been created before the Creek winds its way underneath Cork Street. The reason for this structure is unknown, but there is a deck located on the Creek banks here that is privately owned. There are also signs here indicating no trespassing.

Downstream of Cork Street marks the southern boundary of the Kalamazoo River/Portage Creek Superfund Site. Due to the ongoing remediation of contaminated sediments in the soils and sediments of this area, recreation on the Creek is not permitted. This includes about 1.46 river miles of the Creek. The City of Kalamazoo has expressed interest in using the Creek corridor for recreation and as a non-motorized trail to link up with the Portage Creek trailway (Kalamazoo County Parks, n.d.). The Superfund Site is an area that is separated from the surrounding community by barbed wire fencing. Signs stating NO ENTRY – HAZARDOUS SUBSTANCES adorn the perimeter of the fence. The unresolved nature of this site has been a major hurdle for recreational possibilities, and to the revitalization of the neighborhood. There is a considerable amount of public land owned by the City of Kalamazoo that surrounds the Creek up to this point. Remediation of the site to allow for passive recreation would provide the first step necessary for greenway and blueway trail development.
Public access is not allowed from Cork Street through Alcott Street, where a dam that had provided water for use at the paper mills is located. The Alcott dam and the other dams on the Portage Creek will be discussed in more detail in a separate section. The dam has several small drops for about a total of 15 feet. The spillway door is always open, and when closed likely sent water through a massive pipe to the immediate west of the dam structure. There is still some water that flows through this pipe opening, but the section that would have connected it across the road is no longer in place. On the downstream end of the road there is a large concrete channel structure with a number of pipes and metal girders lying scattered and broken. Further downstream additional large broken pipes, debris and other structures and located in the stream channel. The Creek also disappears underground about 430 feet downstream from the road. The Creek emerges 230 feet later, 50 feet upstream of the crossing under Bryant Street. Figure 6.5 shows some of the navigation obstacles near the Bryant Mill Pond stretch.

Bryant Street terminates west of the bridge, and once was a service road for the large paper mill located here. The Bryant Paper Company was at one time the world’s largest producer of book grade paper (Pyle, 1982). The water resources of the Portage Creek played a key role in the development and capabilities of this large scale paper facility. There are numerous obstacles and hazards within the Creek around the Bryant Bridge. Large pipes running parallel to the Creek go above and underneath the water. Other pipes and girders also intersect the Creek, along with broken pipes, a plastic 55-gallon drum, debris situated upstream of the bridge. There is also another inaccessible
Figure 6.5: Navigation for Bryant Mill Area
bridge of questionable clearance several hundred feet downstream. The Creek then exits the Superfund area after crossing under Reed Street.

Navigation on the Creek is again possible at the Reed Street Bridge. Field surveys helped to note a potential access site where Egleston Avenue terminates to the west of Reed Court, about 900 feet north of the Reed Street bridge. Ideally this stretch could then be floated through to the confluence with the Kalamazoo River, and the access at Rose Park. This section of the Creek is characterized by many road crossings, at times less than 500 feet apart. There is nice riparian cover near the access, and a small forested floodplain on the west bank. The Creek then flows underneath a Railroad bridge and which is followed shortly by Stockbridge, both of which support reasonable clearance. A bend in the Creek here creates some small riffles, and there is also a large log on the left to pass. Downstream of Stockbridge there is a significant debris pile blocked by a downed limb, and several large items such as a Television and an old shopping cart are tied up in this pile. A quick trash pick-up on the Annual River Conservation Day could clear out this unpleasant hazard. Access to the Creek from the banks is blocked here by a fenced off section, which may need to be examined for safety access reasons in the future.

The distance to Lake Street is about 1000 feet, and looks to be a fairly nice float. The banks are buffered with either a dense riparian forest or shrubs. Before the Lake Street Bridge there is some woody debris that is collecting trash and other materials, along with the remnants of an old barbed wire fence. Clearance under the Lake Street Bridge is not great, but should be passable. Downstream of Lake the Creek flows
through Upjohn Park, which contains a newly built playground, sports fields, and the city pool. The city also has further plans for development of this park. There should be some interaction with the water trail plans, including some type of basic access and signage in the park. The west side of the Creek is land owned by the City of Kalamazoo, apparently used to store some vehicles and equipment.

The Axtell Creek has its confluence with the Portage Creek in Upjohn Park. There is an attractive pedestrian bridge downstream of the junction. A sign in the park highlights the Axtell Creek and provides a brief amount of watershed education. Both Portage and Axtell Creeks are involved with a local watershed management program, which has focused on non-point source methods of improving water quality, such as reducing sediment loads and phosphorus concentrations. There is a large wood and trash debris pile near the confluence of the two Creeks. Before the double-culvert is encountered at Crosstown Parkway, there is a submerged metal 55-gallon drum that should be removed. GPS coordinates were entered for the drum.

The culvert at Crosstown does not provide enough head room for most boats to pass through. These culverts could also cause flooding problems by restricting high-flows at this point. The banks upstream of Crosstown are composed of low edges and mown grass, and take-out would be possible. Larger problems arise at this point. Dragging a boat across a semi-busy road is only one of these problems. A boat could be put in after portaging Crosstown, where the riparian buffer is mostly mud, grass, and hydro-phyllc plants. Less than 500 feet downstream however, the low Vine Street Bridge is encountered. The clearance here is only about 24 inches and will require a
portage for all but the lowest boat heights. The take-out access is similar to the conditions at Crosstown, but the put-in is much less desirable. The Creek channel becomes mostly concrete walls, and would require a drop of several feet to get a boat back into the water.

The Dutton Bridge presents itself before the Creek has covered 500 more feet. The Dutton Bridge also has low clearance, and may likely require an additional portage. The banks are constructed of stone gabions on the right side, and concrete on the left side. Both sides present difficulties in a paddler being able to exit the Creek to avoid the bridge. The banks downstream become thick with small trees and shrubs, and make for another challenge to re-enter the Creek. There is also a partially submerged metal 55-gallon drum and a wheel immediately upstream of the bridge.

The last of several low-bridges, Walnut Street may be the most problematic. It has a lower clearance than both the Vine and Dutton bridges, concrete banks, and is fenced off on the east side. A portage is required to avoid the particularly low Walnut Street Bridge. Downstream of the bridge the banks are comprised of large flat stones. This distance from the top of the bank to the water level is at least 2 feet, and paddlers will need to carefully step into the water and make a floating entry in their boats. The water levels in this stretch are fairly consistent at around 1.5 to 2.0 feet, depending on seasonal precipitation.

These flat stone vertical banks continue for the short distance until the Portage Street Bridge. The Portage Bridge presents much better clearance than the preceding bridges, and the concrete support would be a visible location to place a heritage sign.
Continuing downstream from Portage, the Creek is still heavily channelized with tall banks made of either concrete or stone gabions. The bridge at Pitcher has better clearance than some of the other Kalamazoo bridges, but it may need to be re-evaluated.

This area is highly urbanized, with stores, businesses, and parking lots encroaching upon the edges of the Creek. Some of the Pfizer industrial facilities are visible off the west side of the Creek, giving this area an industrial aesthetic. On the east bank a water sampling station is visible. This station is currently operated by Kieser and Associates, the firm that has worked with the Portage/Arcadia 319 project. Near the Pfizer facilities there is a series of Railroad bridges over the Creek. There is some considerable debris caught up in some of the piling channels of these bridges. While a paddler may have some difficulty with this passage, there is enough vertical clearance and with a little effort they should be able to pass through.

While there are some navigation difficulties from this point to the River junction, a canoe should be able to pass the nearly ½ mile to the Kalamazoo River without leaving their boat. There are the remnants of an old bridge at what was Rochester Avenue. There are only some pipes running through supports currently, along with debris underneath, but should be navigable. Before the Creek makes a turn to the north it passes an operational factory on the right. This facility is so close to the Creek that its back wall comprises the right bank of the Creek here. The left side has some forest cover that leads to a large Brownfield-like area. The concrete walls have caused an odd buildup of sediments and gravel, and these islands are close enough to the surface to
snag a boat. Boats should be able to push through these piles, but they can be unpleasant for a stuck paddler.

The Portage Creek flows underneath another railroad bridge after making a sharp bend. Shortly after this bridge there is a large pile of dead trees suspended over the Creek. On a float trip I was capable of floating under this difficult obstacle both floating upstream and downstream. There are rocks and a sharp metal object near the right side of the tree pile, and a paddler may want to slow down before working through the debris. Boats may get twisted around and have difficulty manually pushing themselves through these trees. At this point there is only about 1000 feet till the confluence with the Kalamazoo River. While there have been strainers spotted in this corridor, they appear to have washed out with high flows. The east side of the Creek is fenced off here for private property, and the west bank is the backside of an old factory that is only 5 feet from the edge. Part of the fence extends about 5 feet out into the cross-section of the water. Exit in this section would not be possible, and the access is only a short distance downstream. The Creek passes under the Michigan Avenue Bridge with high clearance.

Once near the mouth of the Portage Creek, there are several options for an immediate exit from the water. The first possibility is an access on the east bank of the Creek before it flows into the river. This site could be easily turned into a reasonable access with some clearing of brush, grading the slope, and the addition of gravel or a comparable material at the entry point. Another option is to cross over the Kalamazoo River to its east bank, which is also public land and part of the Rose Park. The access
would not need clearing or grading, but just some development of the access point. The issue with this access is that a watercraft would need to pass across the Kalamazoo River, and fight the downstream current. This current is not usually excessively strong, and so this access remains a possibility with some paddling effort and a little skill. There is some existing parking that is adjacent to the Kalamazoo River access, and closer than the Creek site. Downstream, a short distance on the Kalamazoo River is Verburg Park run by the City of Kalamazoo. Verburg Park is located on a lagoon off of the River and has a soft boat launch. Although Verburg Park is not as aesthetically pleasing as Rose Park, it is an access that is currently available. Figure 6.6 shows navigation from Reed Street to access points on the Kalamazoo River.
Figure 6.6: Navigation on the Portage Creek from Reed Street to the Kalamazoo River
CHAPTER VII

ACCESS SITE EVALUATION

Eight potential and current access sites on the 8.35 miles of the Portage Creek were referenced and scored. An access point will ideally be located every 2.5 miles along a water trail (North Carolina, 2007). The Creek would have about one access per mile if each of these sites were used. Two of the eight are located on private land. While this is a barrier to the establishment of the site, it does not mean an access at that location is impossible. The City of Portage has two improved access locations for use with the Celery Flats Canoe Livery. There are not currently any developed access sites on the Portage Creek in the City of Kalamazoo.

The methods used for rating access sites are listed in Chapter 4, methods. Scoring was adapted from both Tim Peterson and Benjamin Skarp, who published water trail thesis papers in 2004 and 2005 respectively. The State of North Carolina has also standards that were developed for varying access levels (Trask, 2006). An additional proximity to amenities variable was added to the evaluation. Supplementary guidance was provided through National Park Service documents. The categories are listed with the most important on the left, with declining significance to the right. Scores are based on a 100 point scale, and are ranked using a simple Likert rating system. Table 1 shows a summary of the weighted scores for the access sites. They have been normalized for a total possible score of 100.
Table 1: Portage Creek Access Site Assessment Summary with Weighted Scores

<table>
<thead>
<tr>
<th>Access Number &amp; Name</th>
<th>Water Access (Score * 6)</th>
<th>Parking Space (Score * 4)</th>
<th>Site Ownership (Score * 3)</th>
<th>Restroom Facilities (Score * 3)</th>
<th>Heritage &amp; Aesthetics (Score * 2)</th>
<th>Proximity to Amenities (Score * 2)</th>
<th>Total Score (100 MAX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - Celery Flats</td>
<td>5 / 30</td>
<td>3 / 12</td>
<td>5 / 15</td>
<td>4 / 12</td>
<td>5 / 10</td>
<td>3 / 6</td>
<td>85</td>
</tr>
<tr>
<td>4 – Kilgore Road /Milham Park</td>
<td>2 / 12</td>
<td>4 / 16</td>
<td>5 / 15</td>
<td>5 / 15</td>
<td>3 / 6</td>
<td>3 / 6</td>
<td>70</td>
</tr>
<tr>
<td>5 – Blanch Hull Preserve</td>
<td>2 / 12</td>
<td>1 / 4</td>
<td>5 / 15</td>
<td>1 / 3</td>
<td>5 / 10</td>
<td>3 / 6</td>
<td>50</td>
</tr>
<tr>
<td>6 – Monarch Mill Pond Dam</td>
<td>3 / 18</td>
<td>3 / 12</td>
<td>2 / 6</td>
<td>1 / 3</td>
<td>4 / 8</td>
<td>3 / 6</td>
<td>53</td>
</tr>
<tr>
<td>7 – Egleston Avenue</td>
<td>3 / 18</td>
<td>3 / 12</td>
<td>2 / 6</td>
<td>1 / 3</td>
<td>3 / 5</td>
<td>3 / 6</td>
<td>50</td>
</tr>
<tr>
<td>8 – Rose Veterans Memorial Park</td>
<td>3 / 18</td>
<td>3 / 12</td>
<td>5 / 15</td>
<td>2 / 6</td>
<td>4 / 8</td>
<td>4 / 8</td>
<td>67</td>
</tr>
</tbody>
</table>
Central Park (42.20458 N, 85.59090 W)

Central Park is located adjacent to the City of Portage fire and police station. The park features a band shell, pavilion, maintained restrooms, playgrounds, and Creek access. The site is not currently intended as a canoe launch, but could be suitable with few minor alterations. The slope angle leading to the water is fairly mild, and a low lying area provides a natural landing platform. Parking is available a short distance from the water, and there is sufficient public parking to accommodate multiple daily users.

The Creek view has a pleasant natural aesthetic, and deer often wander from the riparian forest into the confines of the park. The City of Portage has also conducted a trout rehabilitation project in this portion of the Creek with signage acknowledging their efforts. The project has served to deepen the channel, which is also beneficial for paddle sports. There is a drugstore within walking distance and other restaurants in close proximity to the Creek.

With some signage and parking currently in place, and access like this can be developed for only a few thousand dollars (Openlands, 2008). For an undeveloped access, this site meets many of the qualifications desired in a quality site. Its location in an existing public park provides useful amenities for an access point. Water access is only given a score of 3/5 and could be increased by the addition of a platform structure on the outside bend of the Creek in the park. Steps or a low slope path could be added to make reaching the water safer and more accessible. This site receives an overall score of 82/100.
Celery Flats Park (42.21253 N, 85.58424 W)

This canoe launch site is located a short walk of about 1000 feet from the Celery Flats Interpretive Center. The access to the site is through the Portage Creek Bicentennial Park (PCBP), a 3.5 mile linear park along the Creek that connects with 55 miles of bikeways in Portage (City of Portage, 2008a). This access site is a developed canoe launch, and is owned and operated as a canoe livery several days each week from May through September. The site is well designed, although only allows boats to be launched one at a time. A properly graded ramp consisting of small diameter gravel and sand leads to the Creek below the bridge. There is also a deck to the right of the ramp that sits around 1.5 feet above the water, depending on the flow volume.

Parking and restrooms are located at the Interpretive Center, although restrooms may not be open in off times or hours. Portage has allowed vehicles to use to the trailway to avoid the 1000 foot carry from the lot; however, prior arrangements may need to be made with the city. The aesthetics of this site are superb, and the Celery Flats Park and relocated historic buildings allow for excellent interpretive opportunities. A minor improvement that could be made to the access is the addition of rails to the ramp and deck. The site score is 85, which ranks it as a good site in need of few changes. Although sufficient parking is available, the portage from the lot for paddlers with their own boats gives a 3/5 parking score. If this was resolved the site score would change to 93.
Figure 7.1: Central Park access site

Figure 7.2: Portage canoe livery near Celery Flats Park
Milham Road Access (42.23011 N, 85.57645 W)

The Milham Road Access is the landing point for the City of Portage’s Canoe Livery. The site is on land owned by the city and adjacent to the PCBP. This access features two wooden walkways that connect to synthetic floating ramps. A dock is situated between the surrounding ramps, and a pipe railing at the water end of the dock helps to support paddlers. A gravel area adjoins the road and allows for vehicles to get within close distance of the access ramp. This area is only for temporary use, and cars can be parked at the PCBP trailhead lot located 500 feet to the west of the access.

Being a previously existing site, there are no major problems with the Milham Road Access. Restrooms are available near the parking lot, and could be used by paddlers making a short stop. This site is on parkland owned by the city of Portage, and interpretive themes in this region will discuss historic Potawatomi Native American villages that existed in this area. The Milham Road access receives a score of 88/100, which ranks it as a very good site. This facility features nearly all of the qualities that make for an excellent heritage water trail access. Metro Transit bus routes are a moderate .66 mile distance away, along with stores and restaurants. Minor issues are the 2 – 3 feet deep waters around the launch ramp, and the thick layer of silt on the Creek bottom. These conditions can make landing difficult for a paddler to exit their boat comfortably near the ramp.
Figure 7.3: Milham Road canoe access

Figure 7.4: Possible access site north of Kilgore Road
Several options exist for a site near where the Portage Creek enters Milham Park. An access feature before the park is preferable in due the numerous low bridges and shallow waters located within the grounds. The Kilgore Road Bridge is designed to allow sufficient room, however the first Lovers Lane Bridge presents a culvert of questionable height. Two possibilities are the west bank north Kilgore, and the east bank immediately before Lovers Lane. The land in this corner is owned by the City of Kalamazoo, although the adjacent Railroad Track Right of Way creates a possible access conflict. The east bank location features a lower slope, and is only a short road crossing from Milham Park. Care will need to be exercised when crossing Lovers Lane, and a crosswalk is located at the Kilgore intersection.

Parking and restrooms are located in the park, along with pavilions, a drinking fountain, and picnic tables. This is an ideal spot to enjoy a picnic after a vigorous float on the Creek. Milham Park has an interesting history and through its nearly 100 year history has featured a wading pool in the Creek, a zoo, bath houses, in addition to other elements. This history will be highlighted in the interpretive aspects of the water trail. Another attractive feature of this site is the position of two city bus routes #12 and #13 that serve the Milham Park vicinity.

The water access for this site is very rough which gives it a lower overall score of 67/100, which places it in the fair category. The road crossing can also be difficult for a solo paddler to quickly portage a boat across the road. The site could be improved with improvements to the launch such as the addition of a dock or ramp, and floating decks.
leading away from the dock. Any conflicts with the Railroad right-of-way property should also be resolved.

Blanche Hull Preserve Access (42.24791 N, 85.57439 W)

This site is located within the Blanche Hull Preserve, land owned and maintained by the City of Kalamazoo. While the launch site here is fairly attractive, the distance from roads and parking make it an unlikely candidate for further development. The route from Burdick Street is .25 miles as the crow flies, although the path through the park is a winding trail. Most recreation users would not be expected to portage a distance down this dirt trail, particularly in lieu of two separate access locations within about a half mile.

The water access for this site is in a clearing just west of railroad bridge #7. The cleared area is wide enough for entry, and the slope is very mild. The surface is fine grained soil with some larger gravel and rocks. Several larger rocks create a small rapid with quicker current that flows through the downstream railroad bridge the borders the access. This could be difficult for paddlers to adjust to after having just boarded a canoe. The aesthetics of the site provide for a pleasant setting to view wildlife and waterfowl. The overall score for the Blanch Hull access is 55/100, which gives it a rating of Poor. While this site has some nice qualities, its distance from road access and neighboring access sites result in it not being recommended for further improvements.
Figure 7.5: Potential access site at Blanche Hull Preserve

Figure 7.6: Monarch Mill Pond Dam site
Monarch Mill Pond Dam Access \( (42.25730 \text{ N}, 85.57550 \text{ W}) \)

The Dam at this location was used historically to channel water for the Bryant Paper Company. No longer used for this purpose, it creates the Monarch Mill Pond impoundment which hosts multiple species of waterfowl and other birds, and provides minimal recreation opportunity. The site is works as a starting and stopping point for a trip from the Dam to Milham Park and back. This trip is detailed in the navigation assessment sections of this chapter. Water access at this site is reasonable, with low flat banks and a short sand and gravel ramp that has been created from previous use at the site. The launch could be improved by the addition of pea gravel, along with some type of structure to hold it in place. Railings along the side of the access could also help paddlers using boats with closed hulls to enter their watercraft.

The biggest problem facing this site is its private ownership status, being the property of the Fabri-Kal Corporation (City of Kalamazoo, 2008). Future plans for the site are uncertain, and the site at this time is used as open space by the owner. It would be expedient for the City to look into possible use of this site for some recreational uses. With plans for a possible land and water trail along the Creek, this site should be involved with that strategy. There are no public restrooms at the site, and it is a considerable walk to the nearest convenience store. The Burdick Street bus route is located a little less that 4/10 of a mile away.

The proximity of the access to the dam presents a safety issue. The current is almost non-existent at this point, but signage needs to be added to inform paddlers of the upcoming dam. Signs should also be placed at the ramp warning boats to stay clear
of the dam. This access is scored at 51/100, which places it in the poor category.

Private ownership, an undeveloped launch, and no restrooms are the major factors in the poor rating. Resolution of ownership and minor improvements could raise the score of this site considerably, and its current location makes it an ideal point for access.

**Egleston Avenue Access (42.27650 N, 85.57659 W)**

Egleston Avenue terminates at the Portage Creek between Stockbridge Avenue to the north and Reed Avenue to the south. The Creek has entered a very urbanized section of Kalamazoo at this reach. This access would be fairly convenient by being placed immediately downstream of the Brownfield/Superfund area. Water access is not currently available or recommended between Cork Street and Reed Avenue, a distance of approximately 1.45 river miles. The site is low lying land within the floodplain, although it is not often inundated. This gives the access a nearly flat slope leading to the Creek. Access from the banks is reasonable, with a moderate drop from the lip of the bank to the water surface.

The land is currently under private ownership, and this could create some issues for the potential use of this site. An agreement could potentially be made with the landowner to allow limited access. The surrounding lot is mostly open and could provide parking for several vehicles. There are currently no public restrooms located in the vicinity of this site. Commercial amenities are several blocks walking distance, and the Burdick Street bus route is only 1 block from the site. This site only receives a score of 52/100 giving it a poor rating. This is due to several factors such as the land
ownership, lack of restrooms, and undeveloped access. While this site does contain several of these issues, its location as the furthest upstream access from the Brownfield site makes it a valuable location. Recreational development of the Performance Paper Brownfield could also include the placement of a canoe access, making this site unnecessary. Minor improvements could be a step water access with railings to the side of the steps, and a landscaped path leading to the water.

**Rose Park Access (42.29542 N, 85.57212 W)**

A few possibilities exist for an access point near the confluence of the Portage Creek and the Kalamazoo River. The east bank of the Creek before it enters the River would be a convenient choice. The banks at this site are steep however, which makes the site currently undesirable. Immediately downstream of the junction and on the east bank of the Kalamazoo is the other possible point. This is in a low lying area, and the pathway is on nearly flat land. There are also some large tree roots that can help to stabilize a boat which launching. The site is part of the Rose Veterans Memorial Park, run by the City of Kalamazoo. There are only 2 parking spots on the east side of East Michigan Avenue/M-43, although additional parking is available across this busy highway. The City owns several adjacent land parcels.

Public restrooms are not located onsite, and their addition would improve the usability of the site for both the Portage Creek and the Kalamazoo River. Other amenities are located within a short distance such as several bus routes, a gas station, and Bell’s Brewery. Paddlers could walk the few blocks to Bell’s after a long day, and
enjoy food and home brewed beer at the largest micro-brewery in Michigan. Several interpretive signs relating to the indigenous and industrial history of the river have been placed around the pathway leading to the desired access place.

This site receives a score of 71/100, indicating that is usable but in need of some improvement. M-43 is a highly trafficked road, and would need to be crossed if parking was not open on the north side of the street. A benefit of improving this site is that it can be used for access on both the Portage Creek and the Kalamazoo River. Another issue is that when floating from the Creek, the River will need to be traversed will fighting the current. The current of the River is not strong enough that it cannot be paddled upstream, but this still presents a challenge to weaker paddlers. Another access is available .66 miles downstream in Verburg Park. Verburg Park may end up being the site preferred by the City of Kalamazoo with its existing boat launch. Needed improvements to this site would be a greater number of parking spots north of M-43, with the possibility for vehicles to unload boats closer to the water. The water access itself should also be developed by the use of a floating dock that allows trail users to load downstream of the dock so that it is able to divert some of the River current.
Figure 7.7: Egleston Avenue access

Figure 7.8: Rose Veterans Memorial Park site
Kalamazoo County and the Kalamazoo River Valley that cuts through it have a rich natural and anthropogenic history. Within the Kalamazoo River Watershed there are 120 historical sites, and 23 are listed on the National Register (Bicycles &, Inc., 1999). The archeological records show habitation for the last several hundred years by the Potawatomi, and can be traced back as far as the Paleo-Indians nearly 10,000 years ago (Wesley, 2005). Mounds and other structures may have been built by Mississippian or Hopewell cultures hundreds of years before the Potawatomi. Over 1,100 archeological sites have been identified in the Kalamazoo River Watershed (Wesley, 2005). A series of treaties displaced ownership of most of the lands of Michigan from the Native Americans to the U.S. Government. The 1821 Treaty of Chicago ceded all lands south of the Grand River. Several small reservations were designated, including most of the City of Kalamazoo, in the Match-e-wish-be-nash-e-wish reservation. This land was also appropriated from the Native Americans in 1827, and they were temporarily forced into a reservation in southern Kalamazoo County and northern St. Joseph County (Estes, 1978). Most remaining Potawatomi in the area were removed by military force in 1840.

The first French explorers visited Upper Peninsula in the mid 1600’s, and Fort Pontchartrain was founded at Detroit in 1701 (Library of Michigan, 2006). Due to the geographic isolation of the Great Lakes mostly wooded lands, much of Michigan...
remained wilderness through the early 1800’s. The completion of the Erie Canal in 1825 brought a new stream of settlers westward into Michigan and Kalamazoo County. Bazel and Martha Harrison arrived in 1828 and settled on a prairie near the current village of Schoolcraft. Their son Nathan Harrison operated the first ferry across the Kalamazoo River, and Bazel was to live to the old age of 103 (Potts, 1976). Various traders occupied seasonal trading posts in Kalamazoo, but the first settler to make Kalamazoo his permanent residence was Titus Bronson in 1829. He platted the village of Bronson, which was renamed in 1836 to Kalamazoo due to Bronson’s eccentricity and strange demeanor (Rzepczynski, 2005). Several prairies in Portage were settled around 1831 such as Dry Prairie near Milham and Westnedge, and Indian Prairie, where the airport now stands (Massie, 2006). While the two settlements have been closely related throughout history, in many ways they have been two distinct communities.

Navigation on local waterways was explored as a means of transporting commodities down the Kalamazoo River for shipping to Great Lakes ports. David Walbridge had the most successful operation of flat boats in the early 1840’s. Flour was ground at mills on the Portage Creek and floated down to its confluence with the River to be loaded on these massive barges (Williams, 1948). Waterway navigation became much less desirable when the Michigan Central Railroad reached Kalamazoo in 1846. In 1867 the Grand Rapids and Indiana Railroad arrived in Portage, and provided a north south connection for transportation and commerce (Meints, 1979). Being centrally located between Detroit and Chicago, Kalamazoo was a railroad hub and saw 57
passenger trains daily in 1916 (Michigan Railroads, n.d.). It still contains a number of historic railroad depot buildings.

Kalamazoo has been the home of several famous industries and products, including celery, paper, mint oil, fishing rods, guitars and stoves. Celery became prominent in the late 1800’s when Dutch immigrants cultivated wet low-lying areas in Kalamazoo and Portage (City of Portage, 2008a). Kalamazoo was known as the Celery City until it became the Mall City in the 1950’s when the downtown pedestrian mall was completed. The Paper Industry has its beginnings on the Portage Creek where the first paper mill was built in 1867 near Cork Street (Pyle, 1982). Kalamazoo became one of the foremost paper manufacturing areas in the world and the Bryant Mill produced more book grade paper than any other mill in the world for a time (Read, n.d.). Kalamazoo County was also a stopping place in the Underground Railroad during the antebellum period (Underground Railroad, 2004).

Many of these industries and products are recalled along the proposed heritage water trail on the Portage Creek. 40 sign themes have been compiled for the 8.35 miles planned for the trail. The large number of road and railroad crossings provides ample opportunities for locating signage. Some stretches of the Creek are currently non-navigable as discussed in Chapter 6. The signs for these segments have not been developed, but spaces have been left in the numbering if additional signs are desired. These themes present some of the stories of Kalamazoo and Portage, and highlight events related to the Portage Creek.
PC-47: Underground Railroad

*Central Park Access: 42.20458, N 85.59090 W; Mile 8.35*

Kalamazoo County was an active stop on the underground railroad, which unlike its name implies, was neither underground nor railroad. Kalamazoo initiated an anti-slavery society shortly after Michigan became a state in 1837 (State of Michigan, 2008). Pamela and Nathan Thomas were well known activists in Schoolcraft who are reported to have assisted from 1000-1500 to freedom. The Thomas House in Schoolcraft is listed on the National Historic Register and has been restored. Henry Montague of Kalamazoo was also a well known abolitionist, and the Montague House on Oakland Drive in Kalamazoo is also listed as a national historic site. There is a well known story about several slave owners from Kentucky that came to Michigan to capture the escaped slaves. The men were not well received in the area and avoiding hostility between them and other settlers was no easy task. While the routes of the Railroad are not easy to ascertain due to its covert nature, it is known to have passed through Schoolcraft, Climax, Kalamazoo, and Battle Creek (Underground Railroad 2004). The railroad likely passed near this spot on what is now Westnedge Avenue.

PC-46: Geology and Hydrology

*South Westnedge Pedestrian Bridge: 42.20558 N, 85.58962 W, Mile 8.26*

The geology of the Portage Creek is unique for streams in southern Michigan. The glaciers that once inhabited Kalamazoo County shaped the watershed of the Portage Creek and left thick deposits of coarse grained material. These highly
permeable soils feed the waters of the Portage Creek and keep the flow of the Creek fairly constant year-round. This baseflow is also consistently cool, and the Creek is a designated coldwater trout stream until it flows through highly urbanized downstream areas. The City of Portage has initiated a Brown Trout rehabilitation project just upstream of this bridge, and trout are stocked each year in the Creek by the MDNR. The Portage Creek also has a higher gradient (slope), than many other streams in the Kalamazoo River Basin.

**PC-45: Watershed Portage**

*Liberty Park Tree Adjacent to Creek: 42.20601N, 85.58886W; Mile 8.21*

The Portage Creek is named for being the site of a portage from the Kalamazoo to the St. Joseph River system. The route was used by the Native Americans as a method of transportation between these two rivers. Traveling down the Kalamazoo River, they would paddle the Portage Creek upstream to near this very location. From this point it is a fairly short distance to West Lake and Austin Lake, which are connected by a series of small streams to the Portage River. Not to be confused with the Portage Creek, the Portage River winds its way to connect with the St. Joseph River in the City of Three Rivers. Industry, agriculture, and utilities have possibly reduced the historic flow of the Creek by pumping groundwater (Lane, 2006).

**PC-44: Water Quality Projects**

*Liberty Park Island: 42.20653 N, 85.58846 W; Mile 8.18*

While the small waterfalls and ponds in this park are pleasant to look at, they are also in place to purify runoff that enters the Portage Creek. Runoff water from paved
surfaces picks up pollutants such as fertilizer, motor oil, and salt. The landscape in Liberty Park was created by the City of Portage to help filter some of these pollutants before they enter the Creek. The Consolidated Drain Project is another development targeted at reducing the amount of polluted stormwater reaching the Creek. The project drains much of the Crossroads Mall and surrounding commercial district. A series of ponds and wetlands south of Romence Road helps to filter substances such as Phosphorus and sediment from the runoff. Both parks are also open to the public and feature trailways and decks for nature viewing.

**PC-43: Celery Flats**

*Garden Lane Culvert: 42.21038 N, 85.58615 W; Mile 7.89*

Much of the land that is now the City of Portage was not highly regarded as potential farmland by the original settlers. There were a considerable amount of wetlands and soils with a high water table. This land proved to be ideal for celery cultivation for Dutch Immigrants in the late 1800’s. From 1890 to 1930 Kalamazoo was known as the celery capital of the world. The celery growers used a unique method to blanche the celery to give it a less bitter flavor. Celery was shipped from Kalamazoo County throughout the Unites States. Celery growing heritage is displayed at the center with agricultural artifacts from the era and personal recollections of what life was like on a celery farm. The park also contains several historic buildings that have been relocated from other places in Portage (City of Portage, 2008).

**PC-42: Charles Stuart Manor**

*Railroad Bridge #1: 42.21264 N, 85.58435W; Mile 7.70*
This house was constructed in 1846 by William Welch. It is the oldest remaining residential structure in Portage (City of Portage, 2008a). It was used as a summer house for US Senator Charles Stuart, the second US Senator from Michigan. The Stuart neighborhood in Kalamazoo also received its name from this senator who built his impressive house there in 1854. His was one of the first in this district which was at the time considered too far away from downtown for residents that were not wealthy (Stuart Historic District, 2007).

**PC-41: Bicentennial Park**

*Celery Flats Access Site: 42.21253 N, 85.58424 W; Mile 7.69*

Portage Creek Bicentennial Park was initiated in 1976 when the City of Portage was rapidly developing. The park was created for both the purpose of environmental stewardship and to provide recreation and nature opportunities. PCBP is a linear park that features a 3.5 mile paved trail for walking and biking. Additional trails can be accessed on Shaver to allow users a path to South Westnedge Park. The park was initiated as an effort to commemorate the celebration of the 200th birthday of the United States. Phase I of the park and the Celery Flats center were completed in 1991 and won awards from the Michigan Park and Recreation Association in 1992 (Massie, 2006). Portage was won additional awards by continually expanding bike paths and bikeways through most of the City. The park is kept open in winter to allow cross country skiing, and it continues to protect the Portage Creek from the effects of urban development.
PC-40: Michigan Land Rush

*Large Tree south of Romence Road: 42.21372 N, 85.58321 W; Mile 7.51*

The 1830’s were a period of rapid growth and land speculation in Kalamazoo County and throughout the state. Anxious entrepreneurs from New England states flocked to the land office in Kalamazoo to get in on a piece of the opportunity. Titus Bronson, the first pioneer in Kalamazoo had only built his cabin in the summer of 1829. Things were moving quickly. In 1836 the Kalamazoo land office set a record for the number of acres of land sold into private ownership for the entire country (Massie, 2006). Reuben Winchell of New York purchased 87 acres near the intersection of Milham and Westnedge in 1831. He platted out the designs for an entire village which never came to be. A strong depression spread across the eastern states in 1837 and slowed the stream of settlers to Michigan. Crop and other commodity prices fell, causing many businesses to go under effectively stopping the extreme speculation that had occurred earlier in the decade (Massie, 2006).

PC-39: Upjohn Company

*Romence Road Bridge: 42.21547 N, 85.58215 W; Mile 7.45*

Dr. Uriah Upjohn was born in Wales in 1808, immigrated to the United States in 1826, and came to settle near Richland with his brother William in 1835. Dr. Upjohn was somewhat of a legend, traveling courageously on horseback through a five county area to visit sick patients (Fisher, 1906). He lived to the age of 87 and died in 1896, and attributed his long life to those years spent in the open air on horseback.
Uriah and his wife Maria Mills become the parents of 12 children, including William E., Henry T., James T., and Fred L. Upjohn. William graduated from the University of Michigan medical school in 1875 and took medical practice in Hastings. Dr. William E. Upjohn and his brothers of which several were also doctors formed the Upjohn Pill and Granule Company in Kalamazoo in 1886 (Weissert, 1928). The basis of the Company was the friable pill, invented by William Upjohn, which was could be easily crushed into a powder and digested. Later to be known as The Upjohn Company, it became a successful and defining industry in Kalamazoo County. Dr. Upjohn established the commission manager form of government and contributed the seed money for what is now the Kalamazoo Community Foundation (Lohrstorfer & Larson, 2006). The Kalamazoo Gazette named Dr. Upjohn the person of the century in the year 2000, 70 years after his death, and a state historic marker commemorates his life on the Kalamazoo Mall. The legacy of the Upjohn Company, now part of Pfizer Inc., still resonates in the community, with a large manufacturing facility on Portage Road that was built in 1951.

PC-37: Cooley Brothers

PCBP Observation Deck: 42.22519 N, 85.57795 W; Mile 6.65

Thomas, Arad, and Benjamin Cooley, all brothers, first came to Kalamazoo and Portage in 1831 to select land for purchase (Durant, 1880). Arad and Thomas settled on land west of Westnedge near Milham Road which was then called Dry Prairie. The dry prairie lands were a welcome change from much of the wet, low lying areas that much of Portage Township consisted. The Cooley brothers became prominent families in the
area and also improved the mill on the Portage Creek built by Elijah Root (Potts, 1976). This site is likely where the abandoned dam sits on the Creek near Lovers Lane and downstream of Milham Road.

**PC-36: Indian Fields**

*Milham Road Access: 42.22994 N, 85.57670 W; Mile 6.31*

Portage was inhabited by the Native American Potawatomi Indians when pioneers began to settle the area in the 1830’s (Williams, 1948). The Kalamazoo River Valley was inhabited as early as 9,000 years ago, evidenced by notched projectile points from the early archaic period (Massie, 2006). Raised areas of land are located throughout Kalamazoo County and a large number were found at the Kalamazoo-Battle Creek International Airport. The true purpose of these garden beds is still debated among scholars. The Airport site, known as Indian Fields, was the site of a large Potawatomi settlement in the early 1800’s (Potts, 1976). By 1821 the Potawatomi had ceded most of the land south of the Grand River to the United States. The Potawatomi were a mostly peaceful tribe, and provided for themselves by fishing and trapping for furs along the Portage Creek, and harvesting several crops. This tribe, while allied with the British during the war of 1812, was friendly and willing to share and help the early settlers in their ordeals of life on the frontier (Potts, 1976). More discussion of interactions and eventual forced removal of the Potawatomi will be featured at later points along the trail.

**PC-35: Portage Settlement**

*Milham Road Bridge: 42.23011 N, 85.57645 W; Mile 6.29*
Early Portage pioneers followed the trend of establishing homesteads on areas recently or historically occupied by the Indigenous Americans. The first white settler to make Portage home was William Bishop in 1830, in the southwestern corner of the township. Many early colonists claimed open prairie lands, which were easier to plow for agriculture than forests (Potts, 1976). Some early settlers on the Indian Fields were Jonas Woodward, Stephen Butler, and Job Meyers (Massie, 2006). The Dry Prairie to the west was also occupied by several families in the mid 1830's, and additional homesteads were built near this bridge along the Portage Creek in 1833. These pioneers faced a difficult life of hard work, clearing land to grow food, and dealing with Malaria. The standard foods were bread potatoes and pork, supplemented by the hunting of deer, turkey, and bear (Massie, 2006).

**PC-34: Elijah Root**

*Portage Mill Dam: 42.23349 N, 85.57559 W; Mile 6.03*

Flour was an essential product for the pioneers who considered bread the "staff of life." While wheat could be ground by hand, grist mills were necessary to grind the amount of flour needed to feed the industrious colonists. In 1834 the nearest mills would have been in Vicksburg or Comstock, and would require a trip bearing large amounts of grain to be processed (Stewart, 1957). Elijah Root, one of the first settlers in Portage, built the first grist mill in Portage on this site in 1834 (Massie, 2006). A power source was required to turn the mill stones, and that source was the Portage Creek. Greater energy could be harnessed by creating falling water, which was the purpose of the dam located here.
The first township election was held at the house of Root in 1838, during which he was elected supervisor (Potts, 1976). This being a joyful occasion, the organizers consumed a healthy amount of whiskey, which was also said to keep away ague, later to be known as malaria. Elizabeth Root, daughter of Elijah, was the first official marriage to be recorded in the township in 1834 (Massie, 2006). The remnants of the old mill dam now sit abandoned and are a detriment to recreation and fishing on the Creek. Future restoration efforts could include a removal of this structure to improve the aquatic environment of the Portage Creek.

**PC-33: Potawatomi Trails**

**PCBP Culvert:** 42.23553 N, 85.57489 W; Mile 5.87

The land of Portage was the site of several well-worn trails used by the Potawatomi and other travelers. The current location of Portage Road was the path from the old Sauk Trail, which became US-12. This major north south trail connected near the Kalamazoo River with the Potawatomi Trail, which also became Michigan Avenue (Ross, 1941). Although many of these historic trails remain lost to history, they laid the foundation for the road network of Kalamazoo County. Both Westnedge Avenue and Oakland Drive were situated at the site of pre-existing trails (Potts, 1976).

**PC-32: Connecting Trails**

**I-94 Bridge:** 42.23724 N, 85.57943 W; 85.57943 W; Mile 5.53

While large roads and highways have replaced the Potawatomi Trails of the past, there has been a movement in recent decades to create greenways for walking and bicycling. The concept of a linear park along the Portage Creek emerged in 1976 as part
of the bicentennial planning and visioning for the City of Portage (City of Portage, 2008b). That vision has become the 4 mile linear park running along and occasionally crossing the Creek as it does here. A greater Kalamazoo River Valley Trailway has being planned to connect Battle Creek and Kalamazoo with other existing trail systems. This plan includes a connection with this trail from to the planned trailway along the Kalamazoo River. Plans for this important pedestrian link are on hold due to the ongoing cleanup of contaminated brownfield properties adjacent to the Creek (Kalamazoo County Parks, n.d.).

**PC-31: Natural Features**

*PCBP Pedestrian Bridge: 42.23791 N, 85.57937 W; Mile 5.49*

The Portage Creek Watershed supports several varieties of unique plant and animal life. In the early 1900’s the Creek corridor was mostly bare and surrounding by farms and grasses. The re-growth of vegetation and trees has provided excellent habitat and improved riparian diversity. The state endangered Kirtland’s Snake has been found in the area. Other state endangered plants such as the White Lady’s Slipper, Rosinweed and Frosted Elfin are located in the Watershed (Bruederle, 1995). Spotting White Tailed Deer, and both Blue and Green Heron is common while floating down the Creek. This section of the water trail is high quality cold water stream and is stocked yearly with Brown Trout. Fishing is not recommended downstream of Kilgore Road.

**PC-30: Lake Shore Railroad & Michigan Southern Railroad**

*Railroad Bridge #8: 42.24162 N, 85.57813 W; Mile 5.07*
While the railroad first pulled into Kalamazoo in 1846, it was not until 1867 that
the sound of the railroad whistle was heard in Portage (Massie, 2006). This was the
Lake Shore & Michigan Southern Railroad which connected White Pigeon with
Kalamazoo in that year. That rail line is still in use today and crosses the Portage Creek
multiple times, as with this bridge. The railroad closely follows the Creek from Centre
Avenue to its mouth at the Kalamazoo River. This Lake Shore line eventually become
the New York Central System and then part of the Penn Central railroad (Berry, 2008).
The advent of the railroads in Kalamazoo County brought an end to the use of rivers as
an important mode of transportation.

**PC-29: Portage Creek Plan**

Railroad Bridge #7: 42.24331 N, 85.57726 W; Mile 4.93

Environmental legislation such as the Clean Water Plan and the Superfund Act
have worked to remove and regulate the levels of pollution that enter rivers such as the
Portage Creek. While these measures have brought considerable improvements to the
water quality of the Creek, contaminated runoff from paved surfaces such as roads can
still cause degradation. Substances such as fertilizers, pesticides, motor oil, chemicals,
and sediment can enter the Creek when it rains. Roadside drains usually lead to the
directly to the Creek. A Watershed management plan has been created for the Portage
Creek, which outlines steps to reduce the amount of untreated stormwater that enters
the Creek. This plan was accepted by the US Environmental Protection Agency in 2006
and community leaders and citizens are continuing to work together to ensure that the
Portage Creek and its Watershed are protected and improved in the coming years (Forum of Greater Kalamazoo, 2006).

Kalamazoo

PC-28: Milham Park

Kilgore Road Bridge: 42.24494 N, 85.57617 W; Mile 4.76

Milham Park has a long and unusual history as a public park, a story that is written in the stone structures and bends of the Portage Creek. The Park is nearing will reach its 100th birthday in 2011, and was purchased from the John A. Milham estate in 1910 to open in 1911. More than 5,000 visitors visited the park on its first day (Peppel, 2006b). The City was eager to improve the park and quickly began building roads and bridges to enhance the park. In 1921 the park featured a tourist camp with several acres of woodlands. The camp was a popular site for visitors to the areas from other states and 33,000 people stayed in the camp in 1923.

The year 1926 saw another major addition to Milham Park attractions, a zoo with two buffalo, peacocks, monkeys, black bears, and other animals that lived on the land. The zoo was closed down in 1977 when only one lame bear remained (Peppel, 2006b). During the depression era of the 1930’s a bathhouse and bathing pools were created adjacent to the Portage Creek. The pools and baths were a pleasant and popular highlight of the Park for many years. Only a few stone structures left from these houses remain in Milham Park.
PC-24: More Milham Park

Lovers Lane Bridge #1: 42.24599 N, 85.57505 W; Mile 4.67

Milham Park began as a 60 acre parcel which has seen baseball fields, a golf course, concession stands, stone stoves, and a merry-go-round, among other various attractions. An additional 80 acres were added on in 1929 through an offer by Dr. W.E Upjohn, founder of the original Upjohn Company.

The Depression era had many profound effects upon life in Kalamazoo, and Milham Park was also impacted in several aspects. The popular tourist camp was initiated as a free camp, but was eventually inhabited by unemployed squatters who stayed on for the entire summer (Peppel, 2006b). The City began to charge 25 cents per night and increased the fee after patrons camped for more than several days. The public works program of the 1930’s brought many improvements and new infrastructure to Milham Park. Stonework along the Creek, stone bridges, large bathhouses and pools, were constructed during this period to provide work to the unemployed.

PC-23: West Fork

Railroad Bridge #5: 42.24846 N, 85.57545 W; Mile 4.07

Did you notice a tributary flowing into the Portage Creek about 200 feet upstream? That was the West Fork of the Portage Creek which begins as a series of wetlands and ponds in Texas Township, southwest of here. The West Fork flows through the Al Sabo Preserve, Limekiln and Howard Lakes, and drains water from Asylum Lake. The West Fork has been a source of controversy for years over dams and
diversions that were said to “pull the plug on the Creek” (Stersic, 1972). A considerable amount of groundwater in the West Fork watershed is pumped for municipal water supply in the area. Excessive groundwater pumping can contribute to the West Fork drying up at times in the summer months (Forum of Greater Kalamazoo, 2006).

**PC-21: Blanche Hull Preserve**

*Railroad Bridge #4: 42.25073 N, 85.57516 W; Mile 3.84*

This natural wooded section of the Portage Creek is the Blanche Hull Preserve, owned by the City of Kalamazoo. This 68 acre park has nature trails, picnic tables, and offers good opportunities for wildlife viewing along the Portage Creek. A connection to the Kalamazoo River Valley Trailway is planned to run through the Preserve, connecting with the Portage Creek Bicentennial Park Trailway at Kilgore Road.

**PC-20: Bryant Paper Company**

*Monarch Dam Access Site: 42.25730 N, 85.57550 W; Mile 3.32*

The first paper mill in Kalamazoo was built on Cork Street in 1867 (Pyle, 1982). The county had the two natural resources necessary for paper production, timber and a plentiful source of water. The Bryant Paper Company was established in 1895, chaired by Noah Bryant, with other memorable names such as Frank Milham and Charles Hayes on the board. Construction of the first mill began quickly in 1895, north of Alcott Street. The Bryant Paper Company expanded into a sprawling complex which included many new buildings and mills that became incorporated into the Company. In the 1930’s the Bryant Paper Company produced more book grade paper than any other mill in the world.
After 50 years in operation, the Bryant Company was purchased by Time, Inc. of New York (Pyle, 1982). After other owners the mills were purchased by the Allied Paper Company, a consolidation of several mills in the Kalamazoo area. The old mill lands have been listed as part of the Portage Creek/Kalamazoo River Superfund Site since 1990. A removal action by the U.S Environmental Protection Agency in 1999 dredged many of the PCBs out of the Creek and into surrounding landfills (U.S. Environmental Protection Agency, 2007b). Future reclamation of the site could include commercial use and extending a recreation trail from the Kalamazoo River south through Portage.

**PC-16: Illinois Envelope Company**

_Bryant Street Bridge: 42.27023 N, 85.57806 W, Mile 1.86_

The flourishing paper industry in Kalamazoo caused a host of related industries to appear in the area. Several various companies were spun-off of the Bryant Paper Company in the late 1800's and early 1900's. Many of these became absorbed into the general ownership of the Paper Company. The Illinois Envelope Company building was constructed in 1904 and is an example of three story, brick and heavy mill construction of the era (Pyle, 1982). The building is a well preserved piece of the once prosperous paper industry that was central to the development of Kalamazoo. This building is the last remnant structure on this site that is still in operation. The Illinois Envelope Company is on listed on the National Register of Historic Places.

**PC-14: Match-e-be-nash-e-wish**

_Egleston Avenue Access: 42.27650 N, 85.57659 W, Mile 1.51_
Potawatomi Indians lived in various communities near the Kalamazoo River many years before the arrival of Titus Bronson (Massie, 1981). Kalamazoo is located at the site of a ford in the river, where it can be more easily crossed, and where many old trails formed a junction. Even though the lands of Michigan were populated with numerous Native American villages, settlers began to encroach quickly during the 1830’s.

The Potawatomi were coerced into signing numerous treaties that were not to their long-term advantage. The Chicago treaty of 1821 saw the secession of all lands south of the Grand River to the United States government, except for five small reservations (Ross, 1941). One of these reservations was the Match-e-be-nash-e-wish reserve which consisted of a 3 x 3 square mile area that covered most of the current city of Kalamazoo. The Potawatomi and Miami bands became increasingly consolidated into smaller isolated settlements, and the 1827 Treaty of St. Joseph ceded the Kalamazoo reservation to the United States. The Potawatomi continued traditional use of the birch bark canoe, enjoyed trading, were renowned for medicinal herb gardens, and remained a strong tribe into the 1800’s.

**PC-13: Epaphroditus Ransom**

*Railroad Bridge #3: 42.27682 N, 85.57710 W; Mile 1.49*

Persuaded by letters from his brother, Epaphroditus Ransom moved his family from Vermont to the small village of Bronson which would be named Kalamazoo two years later (Forist, 2006). The trip to Michigan took longer than a month. Forming a partnership with future US Senator Charles Stuart, Ransom began his career in law and politics in Michigan. He became a circuit court judge in 1836 and eventually was elected...
governor of Michigan in 1848 for a two year term. Ransom focused on the newly found wealth of the Upper Peninsula, state infrastructure improvements, and helped established the Michigan Asylum for the Insane in Kalamazoo. Ransom was a strong advocate of not allowing slavery in newly formed territories of the States, which was not supported by many conservative members of the Democratic Party (Streeter, 1919). For these and other reasons, Ransom did not run for a second term.

Ransom was also sympathetic to the cause of the Potawatomi Indians, many of whom were still present in the area until forced removals happened in the late 1830’s (Low, 2006). Chief Leopold Pokagon asked for assistance for his Potawatomi village to legally remain on their land near Dowagiac Michigan. Justice Ransom issued an order maintaining the right of the Pokagon Tribe to remain on land which they had purchased from the government. Although he died in 1941, Pokagon achieved his goal when General Hugh Bradley gave the Tribe a pass to stay on their land.

**PC-14: Kalamazoo Farmer’s Market**

*Stockbridge Avenue Bridge: 42.27742 N, 85.57698 W; Mile 1.43*

The Bank Street Farmers’ Market is a bustling place on Saturday mornings. Farmers from Kalamazoo and surrounding counties bring produce, fruit, plants, baked goods, and handmade crafts to the Kalamazoo Market. Due to the moderating effects of Lake Michigan on the climate, a wide variety of fruits from strawberries to peaches are produced locally. The market is a renowned tradition, and will celebrate its 60th birthday in 2008. While Kalamazoo has been known for its industrial heritage, the legacy of agriculture in the valley extends for hundreds of years. Several local certified
organic farms are also featured at the farmers’ market. The market runs from 7 am to 2 pm on Saturdays in May through November, and Tuesdays and Thursdays are added from the months of June through October.

**PC-13: Lake Street Mill Pond**

*Lake Street Bridge: 42.27995 N, 85.57749 W; Mile 1.24*

The name of this road may seem out of place as there is not much of a lake view from this city road. The Crosstown ponds are not far away, however when most of the streets were named, the ponds were a wetland. A mill race was split from the Creek by a dam at Alcott Street that flowed to the northeast, near Race Street. A millpond extended from Jackson Street south, to nearly Washington Avenue. The pond covered the area where the Edison Elementary and the Boys and Girls Club are presently situated. The race rejoined the Creek near the junction of the current Pitcher and Portage Streets.

**PC-12: Axtell Creek Restoration**

*Upjohn Park Portage Creek Bridge: 42.27995 N, 85.57749 W; Mile 1.10*

The Axtell Creek joins the Portage Creek shortly before this bridge on the west bank. All of the land in the Axtell Creek Watershed is also part of the Portage Creek watershed, given that the Axtell empties into the Portage. The Axtell Creek begins as a series of wetlands and small lakes to the southwest. The Creek had been neglected for years and more closely resembled a storm sewer than a healthy stream (Forum of Greater Kalamazoo, 2006). Several projects have been enacted to improve and protect the Creek as part of the Portage and Arcadia Creeks watershed management plan.
Native plant gardens have been installed along the banks of the Creek and ponds to filter out runoff pollution. Rain gardens, buffers, improved culverts, signage, and other actions have been completed within the watershed. Additional projects are planned by a diverse grouping of neighborhood organizations and conservations groups such as Kalamazoo Wild Ones (Forum of Greater Kalamazoo, 2006).

**PC-11: Bronson Park Mounds**

*Crosstown Parkway Bridge: 42.28258 N, 85.57878 W; Mile 1.03*

The presence of large mounds and regularly shaped garden beds in Kalamazoo County has long been of interest to historians. The county has a greater number of these than many other sites in the state (Ross, 1941). There are a variety of shapes and patterns of these beds, ranging from a circular wheel with spokes, to a triangular arrowhead shape. The exact origin and time period when these mounds were constructed is unknown, although some are likely the remnants of an earlier Hopewell Indian culture from the first few centuries A.D. (Low, 2006). Descendants of the Michigan Potawatomi Tribe believe that the patterns beds were used by the Potawatomi for agriculture before European contact (Low, 2006).

Most of these beds have been destroyed, and they were noted where a large Potawatomi village once existed on the site of the Kalamazoo/Battle Creek International Airport. The Sumnerville Mounds near Dowagiac have survived into modern times and are noted with a historic marker. A small mound remains in Bronson Park, which is not far from this location. This mound has been excavated several times and did not reveal much of significance. Other valuable buried objects may have been removed years ago.
(Ross, 1942). Scholars have long debated whether the mounds originated from human or natural causes.

**PC-10: Kalamazoo Brewing Companies**

*Vine Street Bridge: 42.28393 N, 85.57902 W; Mile .95*

The beer brewing industry was once prosperous in Kalamazoo. The original Kalamazoo Brewing Company was started in 1860, until 1915 when local prohibition caused its closure (Christian, 1982). This brewery was the largest of about a dozen breweries that came and went and held the record for the city’s longest running brewery. It began at the corner of Walnut and John Streets, and moved to near Portage and Lake Street in 1890.

Kalamazoo has once again made a name as a place where good beer is brewed. Several location breweries are in operation, including Bell’s Brewery, Olde Peninsula, and Bilbo’s. Bell’s is currently the largest micro-brew producer in Michigan, and its beer has become popular with beer enthusiasts throughout the country.

**PC-9: Gibson & Shakespeare**

*Dutton Street Bridge: 42.28489 N, 85.57828 W; Mile .87*

Kalamazoo has been the home of many products that have been world renowned. The Kalamazoo Corset Company, the Gibson Guitar Company, Checker Cabs, and the Shakespeare Company, were all once located in downtown. William Shakespeare Jr. founded the Shakespeare Company 1897. He had patented a fishing reel that allowed anglers to wind their line evenly and was an improvement over existing equipment (Santamaria, 2005). Shakespeare has occupied locations on Water
Street, Pitcher Street, and Kalamazoo Avenue. Shakespeare was an innovator in angling gear and made the first fiberglass fishing rods in 1945. A United Steelworkers Union strike had an effect on many Shakespeare employees in 1948 and a riot broke out which resulted in a conspiracy trail. After being taken over by other companies, the 241 E. Kalamazoo Avenue facility was abandoned in 1989. Shakespeare’s Pub and a comedy club now occupy one of the company’s original buildings on Kalamazoo Avenue (Santamaria, 2005).

Orville Gibson was born in New York in 1856 and migrated to Kalamazoo in the 1880’s. He opened a store at 114 S. Burdick in 1896 and sold hand crafted mandolins. Due to this time consuming process, Gibson could only produce several mandolins each year. Gibson invented the modern mandolin and patented his arched top and back design in 1889. Investors approached Gibson to construct a facility to produce his instruments and formed the Gibson Mandolin Guitar Manufacturing Company in 1904 (Rzepczynski, 1998). Gibson moved back to New York in 1909 but the Company carried on innovation in instrument production, and created the first successful electric guitar (Gibson, 1999). A budget Gibson line featured the Kalamazoo name on its headstock. Gibson operated successfully in Kalamazoo for decades until all production was moved to Nashville in 1984. Several former employees moved into part of the old facility and created Heritage Guitar Inc. Heritage has continued the tradition of crafting high quality, hand-made instruments in Kalamazoo (Rzepczynski, 1998).

PC-8: Bog Iron

_Walnut Street Bridge: 42.28606 N, 85.57706 W; Mile .77_
Bog Iron is an impure type of iron that forms from springs with high iron content through wet or swampy areas. A bog iron deposit was discovered in 1837 north of the city, adjacent to the Kalamazoo River (Topp, 1953). Both timber and water power were needed at that time to fire furnaces to refine the iron, and these were readily available in the vicinity. Allen Potter, the first mayor of Kalamazoo, went into business with Jeremiah Woodbury and used the refined pig iron in a nearby stove factory (Historic Preservation Office, 1973). Later, William Burtt expanded the industry in Kalamazoo and led it to play an important part in the development of the area (Topp, 1953).

**PC-7: Trail Junction**

*Portage Street Bridge: 42.28677 N, 85.57623 W; Mile .69*

The location of Kalamazoo is important for several reasons. One of the most important may be that a low spot in the river, or ford, was situated near where Riverside Cemetery is to be found today (Lane, 2006). The Potawatomi Indians and later the Pioneers were both drawn to this crossing point of the river. Kalamazoo was a place where 16 trails that ran through Michigan and Indiana crossed (Ross, 1941). The fishing and game were excellent near Kalamazoo, and fish from Lake Michigan such as giant sturgeon would swim upstream due to mild water and the lack of barriers (Lieffers, 1949).

One of the main trails through Kalamazoo was the Washtenaw Trail, which led to Detroit and would eventually become the path of the Michigan Central Railroad. Another major trail ran from the area near Ft. Wayne to the present site of Grand Rapids. This trail connected with the major east-west route the Chicago Road. Other
trails converged from local prairies and became the basis for modern roads and railroads (Ross, 1942).

**PC-6: Kalamazoo Mint**

*Pitcher Street Bridge: 42.28886 N, 85.57553 W; Mile .54*

Albert May Todd created the A.M. Todd Company in 1869. The mint was grown on the wet, low lying farmlands in Kalamazoo and surrounding counties. Kalamazoo became a center for growing and processing mint when Todd moved his company here in 1891. Ninety percent of the world’s mint supply was grown within 75 miles of Kalamazoo at the turn of the century and the Todd Company processed most of it (Massie, 1981). Some of the mint farms were as large as 1500 acres, and the community of Mentha, west of Kalamazoo grew around the raising a mint crop. The Kalamazoo Haven rails to trails path follows the old railway line through some of these old mint plantations.

Todd made many trips to Europe and other countries, and he built a collection of rare books and artwork (Lohrstorfer & Larson, 2005). Many of these works were donated to Western Michigan University and the community which led to the establishment of the Kalamazoo Public Museum. Todd also became involved with politics as Congressman from the Democratic Party. His grandson Paul Todd Jr. later filled the same seat in Congress (Lohrstorfer & Larson, 2005). Later A.M. Todd showed an interest in Socialism and wrote several essays on the subject. The main Company headquarters are still located on Douglas Avenue in Kalamazoo as the business has continued worldwide success (Historic Preservation Office, 1973).
PC-5: Grand Rapids & Indiana Depot

_Railroad Bridge #2: 42.29009 N, 85.57571 W; Mile .45_

The first railroad to reach Kalamazoo was the Detroit and St. Joseph Railroad in 1846. The State legislature had originally intended Marshall to be the terminus, and the uproar from Kalamazoo and towns further west caused the track to be extended. The line was extended to Chicago in 1852, and the railroad was then under the private ownership as the Michigan Central Railroad (Ross, 1942). The Grand Rapids and Indiana Railroad station, just northwest on the tracks, was originally constructed in 1870. The building burned and this Italian Revival style depot was built in 1874 (Meints, 1979). The Grand Rapids and Indiana Railroad eventually became part of the Pennsylvania Railroad. The depot was closed as a passenger station in 1954 and became the Whistle Stop restaurant for a number of years (RootsWeb, 2008). It has seen a revival in recent years under the ownership of the Arcus Foundation. Renovation of the building preserved its historic features and now houses the Foundation and other community nonprofit organizations.

PC-4: David Walbridge

_Rochester Bridge Remains: 42.29170 N, 85.57453 W; Mile_

Before the railroad came to Kalamazoo in 1846, navigation by water was at times less troublesome than crossing the rough roads. The first known boat to transport a large amount of freight was a barge in 1836 that carried flour from Kalamazoo to Lake Michigan. On its second trip the barge floated out in Lake Michigan during a storm and was destroyed (Williams, 1948). David S. Walbridge arrived in Kalamazoo in 1841 and
built a line of flatboats to float large quantities of wheat to Saugatuck. Walbridge leased the mill on Lake Street, where wheat was processed and shipped down the Portage Creek to the Kalamazoo River (House, 1958).

The David S. Walbridge Company was the first successful operation to utilize local waterways as a means of transportation of commercial products. The flatboats were so large that they took several days to load, and then 3 days to navigate downstream to Saugatuck. Seven days was required for the return ship where the boats were equipped with sails to take advantage of a strong westerly wind (House, 1958). Hard labor was needed from the workers returning the boats to Kalamazoo, as they would use large heavy poles to force the craft upstream (Williams, 1948). The boats operated until the Michigan Central Railroad entered Kalamazoo in 1846.

PC-3: Titus Bronson

Railroad Bridge #1: 42.29271 N, 85.57360 W; Mile .19

Kalamazoo has long been a gathering site for Native Americans along the shallow ford in the River. In the 1820’s there was a trading post where Riverview Cemetery now stands, but no permanent American Settlements. Titus Bronson built his cabin near the current corner of Water and Church Streets in 1829. Bronson had the title to most of the land, which were some of the best sites from the recently defunct Match-e-be-nash-e-wish Indian Reservation (Massie, 1981). Bronson platted out many of the roads and of the future village, originally named Bronson. Bronson was an eccentric man and, those in the town who disliked him changed the name of the growing town to Kalamazoo in 1836. Bronson soon left Kalamazoo and eventually settled in Davenport, Iowa. Trouble
followed Bronson through his life, losing most of his wealth in 1842, followed shortly by his wife's death.

**PC-2: The Paper Industry and Kalamazoo**

*M-43/East Michigan Bridge: 42.29465 N, 85.57366 W; Mile .05*

The Paper Industry in Kalamazoo began on the Portage Creek near Cork Street in 1867. The abundance of natural resources such as water sources and raw materials in the region were important to the growth of the industry (Pyle, 1982). The Michigan Central Railroad was already in place and the Grand Rapids and Indiana Railroad came through the area in the late 1860’s (Lane, 2006). The paper industry rapidly expanded in the early 20th century in the Kalamazoo Valley. By 1925, 16 paper mills and other related plants employed 5200 in the area (Read, n.d.). The book grade paper output of the Bryant Paper Mill exceeded any other plant in the world in the 1930’s. Kalamazoo assumed one of the various nicknames it has been called through history, and became The Paper City. The village of Parchment was organized entirely around the Kalamazoo Vegetable Parchment Company by Jacob Kindleberger.

Growing competition and consolidation eventually ended the reign of the paper industry in Kalamazoo. The industry was known to be a big polluter and turned the Kalamazoo River into the “sewer of west Michigan.” Stricter environmental regulation in the 1970’s may have played a role in the decline of that industry in the Kalamazoo River Valley. While the River is much improved from its condition in the 1960’s and 1970’s, contaminated PCBs in the sediments cause the fish to still be unsafe for
consumption. Cleanup of River contamination was initiated in 2007 in the Plainwell area (U.S. Environmental Protection Agency, 2007a).

**PC-1: Native American Removal**

*Rose Park Access: 42.29496 N, 85.57343 W*

Kalamazoo and the nearby prairies were the location of numerous Potawatomi Indian villages. Much of Kalamazoo was part of the Match-e-be-nash-e-wish reservation established in 1821 by the Treaty of Chicago (Ross, 1941). A remnant of this reservation can be seen where Whites road jogs north from Cork Street and follows what were the boundaries of the reservation (Peppel, 2006). The reservation was taken away by treaty in 1827, and Native Americans were forced onto the Nottawaseppi reservation to the south. Fostered by the completion of the Erie Canal, numerous settlers flowed into West Michigan during the 1830’s. Some Potawatomi chiefs had signed agreements that they would depart in 1835 with the collection of payment for tribal lands. The Native Americans however were not interested in removing to foreign lands west of the Mississippi River, and many remained in the area (Massie, 1981). Many Potawatomi grew restless and several chiefs who had given away the land were killed.

By 1840 the government had decided that the Natives would be removed by military force. At this point the Potawatomi were weakened by the Black Hawk war and were unable to resist. They were gathered together in 1840 by Colonel Thomas Edwards near the current Amtrak Station and marched towards the west in what has come to be called the “Trail of Death” (Low, 2006). Eleven Potawatomi escaped the march, and nearly every member of the Huron Potawatomi Tribe is a descendent of
these escapees (Skarp, 2005). The Pokagon Band purchased their land and was allowed
to stay with assistance from Michigan Supreme Court Justice Epaphroditus Ransom of
Kalamazoo.
CHAPTER IX

PORTAGE CREEK DAMS

Introduction

Many dams, once a key power source for pioneers and industry, have fallen into disrepair and present a nuisance to ecology and recreation. Four dams are present on the 8.35 miles of the Portage Creek included in the study area. Several additional dams exist on the West Fork of the Creek. Dams present obstacles for river navigation and recreation, and the specific impacts are discussed in chapter 6. Dams on the Portage Creek present specific limitations on the length of open water available for water trail routes. Navigational impacts are not limited to the immediate vicinity of the dam. Impoundments can extend upstream, in some places up to one mile, causing shallow water and sediment build up. This section more specifically addresses the potential impacts of dams on aquatic ecology and discusses some alternatives for the dams on the Portage Creek. Improving the trout fishery in the Creek could also be an additional factor to increase its attractiveness. Water trail tourism is dependent upon a healthy river environment and safe recreation routes.

The United States has been the world leader in dam building over the past century, and the US Army Corps of Engineers has catalogued over 75,000 dams greater than six feet (American Rivers, 2000). More than 600,000 miles of the nation’s waterways are under reservoir waters (Heinz Center, 2002). There are almost 2,500 dams in Michigan alone (Public Sector Consultants, 2005), with 111 registered in the
Kalamazoo River Watershed (Wesley, 2005). The life expectancy of a dam averages 50 years, and every dam on the Portage Creek is over 50, with some more than 100 years old. Many small abandoned dams are structurally unsound, and have not been used for decades.

Once thought to be the answer to many of our problems, dams have quickly fallen out of favor in the last decade. While dams have provided beneficial services such as water power for mills, irrigation, and flood control, many dams are no longer used for their original purpose. Many modern large dam construction projects do not meet projected numbers for power generation or irrigation. Motives for construction can be conflicting and these conflicts may result in failure of the structure (Tomsic et al., 2007). Dams present a significant barrier to fish and other aquatic organisms that depend on a free flowing river to provide needed ecosystem services (Graber et al., 2001). Dams are also a major impediment for recreational activities, which for many rivers is a driving force for local restoration.

The Creek contains four dams on its main channel, and some of these dams are in a state of deterioration (Figure 9.1). Dam removal has become an increasingly appealing action for small river run dams that are no longer in use. Some earlier removals have not had sufficient data to back up anecdotal evidence, but recent projects are pushing for better pre and post removal data collection. The question addressed here is could the removal of dams on the Portage Creek have beneficial effects for aquatic communities and recreation?
Figure 9.1: Location of dams on the Portage Creek
Effects of Dams on River Ecology

What types of benefits could be gained from removing dams on the Portage Creek? What ecosystem and recreational components are currently being marginalized by their presence? These are the questions that need to be answered before any planning decisions relating to dams can be made. The push to restore rivers across the country has provided a new body of literature and research on dams and dam removals. Groups such as American Rivers, Trout Unlimited, and the Hydropower Reform Coalition have issued studies detailing some of the impacts of dams. Additional work is being conducted to provide quantitative data to determine if dam removals have caused negative effects.

Dams fragment a river system, modify flow, change movement patterns and available habitats, and result in a loss of biodiversity (Heinz Center, 2002). Dams limit the normal movement of fish, other aquatic organisms, and fluxes of organic materials. Many river fish such as trout species require a variation in seasonal flow levels (Schlosser, 1991). These seasonal flow levels drive the life-cycle migration of trout, which in turn need free-flowing streams to complete these migration cycles. Dams create both a physical barrier, and decrease the amount of spatial stream heterogeneity. Spatially heterogeneous environments provide refugia for stream fish from harsh conditions (Schlosser, 1991). Fish mortality is also known to occur when fish reach dams in an attempt to migrate upstream (Iverson et al., 1993).

Dams transform a river into a lake-like habitat by creating impoundments (Bednarek, 2001). Impoundments no longer have normal lotic features such as riffle and
pools sequences. The impounded areas are usually reaches of higher gradient, which are often the most productive and diverse areas of the stream (Michigan Department of Natural Resources, 2002). These zones of the river become relatively stagnant, collect nutrients and sediment, and can have poor water chemistry. Excessive algae growth and vegetation cause levels of dissolved oxygen to drop, and reasonable levels of oxygen are crucial for aquatic life (Graber et al., 2001). Rivers require transport of sediments to downstream areas to create fluvial features such as point bars and deltas (Graf, 2001)

Dams also affect the thermal regime of the stream system (American Rivers, 2002). Flowing waters are mixed as they move downstream, distributing the heat energy throughout the channel. The lentic environment of the impoundment develops stratified thermal layers that present temperature barriers to fish (Poole and Berman 2001). The overall energy in the water is increased due to the time spent in the impoundment, and its shallow depth. A study of the Salling Dam on the AuSable River estimated that removal of the dam could reduce water temperatures in the former impoundment by 5.4 F (Palowski & Cook, 1993). Salmo trutta, which is stocked yearly in the Portage Creek, is highly dependent upon cool water temperatures for survival. Shifts in stream temperature regimes can render formerly suitable habitat unusable for native species (Poole & Berman, 2001). The upstream reaches of the Creek are considered to be a top quality coldwater stream, with the middle sections listed as a second quality coldwater stream (Wesley, 2005). Native and desirable species are often displaced in river segments affected by dams. Coldwater trout stream environments are
fairly rare in Kalamazoo County. Additional quantitative studies on changes in post removal water temperatures are being conducted.

Ecological and Cultural Impacts of Dam Removal

While dam removal is often a beneficial tool for the restoration of river systems, the potentially negative impacts must be examined. One issue that must be dealt with is accumulated sediments. Most impoundments become entirely filled with sediments, and the sudden draw down of a dam can bury downstream substrate in this material. This can suffocate benthic communities resulting in high levels of mortality. The removal of the Kettle River Dam in Minnesota caused a decrease in mussel abundance due to sedimentation downstream (Hart et al., 2002).

Not all recent literature has supported the removal of dams as a tool to improve aquatic communities and increase biodiversity. The removal of a small dam on the Manatawny Creek in Pennsylvania caused the density and richness of the macroinvertebrate community to decline following full removal of the dam (Thomson et al., 2005). These impacts persisted for one year and demonstrated that sediment transport from dam removal can result in downstream benthic impacts. Heggenes & Røed (2006) studied brown trout populations in the Mana River which is fragmented by multiple dams. Some isolated populations exhibited genetic drift from neighboring communities separated by anthropogenic barriers. This is technically an increase in genetic diversity for the trout in the Mana. The authors however concluded the small benefits in genetics do not outweigh the problems created by fragmentation of habitat.
The Fort Edward Dam on the Hudson River in New York is a classic example of an early dam removal that caused unforeseen problems. The poor condition of the dam resulted in the decision of the Niagara Mohawk Power Corporation to remove the structure to avoid hazards posed by the unsafe dam in 1971 (American Rivers, 1999). The removal released sediments contaminated with PCBs downstream, causing problems with fish and wildlife quality, and impaired navigation. The example has become an important lesson for other agencies considering a dam removal or alteration. The cost for remediation has become much higher with the dispersal of sediments. A through fluvial geomorphic study of the river system could have prevented some of the complication.

Dam removal is a complex issue and should be approached carefully with a thorough understanding of the local environment and heritage. State natural resource agencies have become eager to remove dams to achieve fisheries and habitat objectives. Surrounding landowners however can be resistant to change, and concerns for a change in property values from impoundment drawdown. Impoundments provide recreational opportunities and avian habitat, particularly in arid areas that lack a density of hydrologic features. Dams often have historical significance and can be locally recognized as a source of identity for the community (Evans et al., 2002). A historic inventory should be conducted to assess the cultural values of the dam and related structures that could be affected.
The effects of dams have been well documented, and as discussed earlier, they can strongly impair native fisheries and biodiversity levels in streams. The coldwater fishery is currently threatened in the Portage Creek (Forum of Greater Kalamazoo, 2006). The impairment of this resource is the result of a complex interaction of factors, which are strongly influenced by alterations of the aquatic and terrestrial landscape. The removal of one or more dams on the Portage Creek will not result in complete restoration, but will likely have major benefits for the fishery, other organisms, and recreation. Before actual plans to engineer a removal of any of these structures, a considerable amount of information, scientific analysis, and community input is needed. With this in mind, creating a preliminary vision for a removal project can stimulate interest and expedite the process.

There are four major dams located on the main stem of the Portage Creek. These dams have been used for a variety of purposes, although several of them are now abandoned or no longer in productive use. The following figures provide a summary of information for each dam and are presented in order from upstream to downstream.
<table>
<thead>
<tr>
<th>Name</th>
<th>Portage Mill Dam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>8 ft (estimated)</td>
</tr>
<tr>
<td>Location</td>
<td>42.23349 N, 85.57559 W</td>
</tr>
<tr>
<td>Date Constructed</td>
<td>1834 (from historical records)</td>
</tr>
<tr>
<td>Impoundment</td>
<td>Size unknown</td>
</tr>
<tr>
<td>Owner</td>
<td>City of Portage</td>
</tr>
<tr>
<td>Hazard Rating</td>
<td>Moderate</td>
</tr>
<tr>
<td>Removal Potential</td>
<td>High</td>
</tr>
<tr>
<td>Original Purpose</td>
<td>Power for flour or saw mills</td>
</tr>
<tr>
<td>Ecology Impacts</td>
<td>Impounded river channel, impounded filled with sediment, increased water temperatures, aquatic barrier</td>
</tr>
<tr>
<td>Recreation Impacts</td>
<td>Navigational barrier, difficult portage, safety issues, shallow water</td>
</tr>
<tr>
<td>Services or Cultural Values</td>
<td>Currently inaccessible, no signage, historic links to Portage history</td>
</tr>
</tbody>
</table>

Figure 9.2: Portage Mill Dam picture and summary
<table>
<thead>
<tr>
<th><strong>Name</strong></th>
<th>Milham Park Dam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Head</strong></td>
<td>5 ft</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>42.24785 N, 85.57407W</td>
</tr>
<tr>
<td><strong>Date Constructed</strong></td>
<td>1927</td>
</tr>
<tr>
<td><strong>Impoundment</strong></td>
<td>Minor storage</td>
</tr>
<tr>
<td><strong>Owner</strong></td>
<td>City of Kalamazoo</td>
</tr>
<tr>
<td><strong>Hazard Rating</strong></td>
<td>Low</td>
</tr>
<tr>
<td><strong>Removal Potential</strong></td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>Original Purpose</strong></td>
<td>Park aesthetics, created bathing pools for recreation</td>
</tr>
<tr>
<td><strong>Ecology Impacts</strong></td>
<td>Slow water attracts waterfowl which contribute waste to the Creek, unsuitable fish habitat, barrier to migration</td>
</tr>
<tr>
<td><strong>Recreation Impacts</strong></td>
<td>Recreation barrier, shallow water in park, safety issues</td>
</tr>
<tr>
<td><strong>Services or Cultural Values</strong></td>
<td>Aesthetics, habitat, historical significance to Park</td>
</tr>
</tbody>
</table>

Figure 9.3: Milham Park Dam picture and summary
<table>
<thead>
<tr>
<th><strong>Name</strong></th>
<th>Monarch Mill Dam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Head</strong></td>
<td>16 ft</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>42.25730 N, 85.57550W</td>
</tr>
<tr>
<td><strong>Date Constructed</strong></td>
<td>1916</td>
</tr>
<tr>
<td><strong>Owner</strong></td>
<td>Privately Owned</td>
</tr>
<tr>
<td><strong>Impoundment</strong></td>
<td>81 acre/ft storage, 21 acre surface</td>
</tr>
<tr>
<td><strong>Hazard Rating</strong></td>
<td>High</td>
</tr>
<tr>
<td><strong>Removal Potential</strong></td>
<td>Currently Low, Limited by CERCLA</td>
</tr>
<tr>
<td><strong>Original Purpose</strong></td>
<td>Water supply for paper industry</td>
</tr>
<tr>
<td><strong>Ecology Impacts</strong></td>
<td>Impoundment filled with sediment, dominated by non-native species</td>
</tr>
<tr>
<td><strong>Recreation Impacts</strong></td>
<td>Pond very shallow (6-12 in), no sign warning of dam</td>
</tr>
<tr>
<td><strong>Services or Cultural Values</strong></td>
<td>Lake-like environment in neighborhood, aesthetics, avian habitat, upstream boundary of Superfund site</td>
</tr>
</tbody>
</table>

Figure 9.4: Monarch Mill Dam picture and summary
<table>
<thead>
<tr>
<th><strong>Name</strong></th>
<th>Bryant Mill Dam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Head</strong></td>
<td>14 ft</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>42.27023 N, 85.57806 W</td>
</tr>
<tr>
<td><strong>Date Constructed</strong></td>
<td>1948</td>
</tr>
<tr>
<td><strong>Impoundment</strong></td>
<td>104 acre/ft storage, 41 acre surface (these amounts may have changed since drawdown)</td>
</tr>
<tr>
<td><strong>Owner</strong></td>
<td>Privately owned</td>
</tr>
<tr>
<td><strong>Hazard Rating</strong></td>
<td>High</td>
</tr>
<tr>
<td><strong>Removal Potential</strong></td>
<td>Moderate, located in CERCLA site</td>
</tr>
<tr>
<td><strong>Original Purpose</strong></td>
<td>Water supply for paper processes, hydropower</td>
</tr>
<tr>
<td><strong>Ecology Impacts</strong></td>
<td>Low level contaminated sediments</td>
</tr>
<tr>
<td><strong>Recreation Impacts</strong></td>
<td>May present barrier to future recreation, safety hazard</td>
</tr>
<tr>
<td><strong>Services or Cultural Values</strong></td>
<td>Contains dispersal of contaminated sediment</td>
</tr>
</tbody>
</table>

Figure 9.5: Bryant Mill Dam picture and summary
The scope of this paper is not large enough to offer an in depth analysis of each of these dams. The lengthy reports related to the CERCLA site may provide some data on the dams involved with the Kalamazoo River/Portage Creek CERCLA Site. The Milham Park dam may eventually be re-examined by the City of Kalamazoo in conjunction with expanded recreation opportunities along the Creek corridor. Other cultural factors make removal of the Milham Dam unlikely in the short-term. The best prospect for removal and restoration is the Portage Mill Dam, downstream of Millham Road in Portage.

Several factors make this dam removal possible. The Mill Dam is the furthest upstream dam on the Creek. Removal of this barrier will restore several miles of free flowing river to the fishery. This could improve survival levels of *Salmo trutta*, which have had difficulty reproducing after being stocked by the DNR. Sections of the Creek upstream from Kilgore near the Portage Creek Bicentennial Park, feature natural stream meanders along with riffle and pool sequences (field research 2007). DEQ studies have shown the highest trout numbers in this portion of the Creek. While no immediate data on the size of the impoundment of this dam is available, the upstream Creek environment is shallow, and clogged with sediment for a considerable distance. This slow moving stretch of water becomes warmed in the summer months, causing undesirable water temperatures for trout.

Sediment management can be the most costly portion of a dam removal (American Rivers, 2002). Contaminated sediments have caused severe complications in the removal of dams on the Kalamazoo River. The stretch of the Creek that includes the
Portage Dam is not known to have contaminated sediments, and is not included in the CERLA site. There are no known fish advisories until several miles further downstream.

A successful dam removal project on the Baraboo River had a final cost of $214,000. The estimated cost of repair ranged from $695,000 to $1,900,000 (American Rivers, 1999). Any estimation of cost for the Portage Creek is speculative without a complete engineering study. Without the need to manage contaminated sediments, the project costs could range from $50,000 to several hundred thousand, based on the cost of other comparable removal projects. There are a variety of funding sources available for dam removal and stream restoration, and the DNR, American Rivers, and Trout Unlimited are willing to provide assistance.

Another possible source of funding is through the Natural Resource Damage Assessment (NRDA), which has been initiated due to damages related to PCB contamination (Michigan Department of Environmental Quality, 2005). The NRDA process has been moving forward through a series of reports and community input sessions. The amount available through NRDA could be anywhere from tens to hundreds of millions of dollars due to the large size of the CERCLA site. A small amount of these funds could be appropriated for upstream restoration on the Portage Creek. Another option for a cost effective removal is a cooperative demolition project with the Armed Services. The Marines or National Guard may be eager to get practice with dam demolition. Most of the costs are volunteered or donated from the cooperating branch. Community Foundations and other creative funding sources can also be explored for dam removal on the Portage Creek.
Dam Report Summary

Dams present a significant barrier to the movement of fish and aquatic organisms in a stream environment. They cause changes in the natural flow regime, convert lotic communities to lentic, and initiate a loss of aquatic organism biodiversity. Dams often create undesirable fish populations, and displace native fisheries. Navigational impediments formed by dams are unproductive and create recreational safety issues. Dams also create a very real physical obstacle to recreation opportunities. Dam removal can be an effective method for restoring important components in the river system. Substrate composition and water chemistry can be expected to improve. Removal of upstream dams on the Portage Creek is a possibility, and could meet management goals for both fisheries and recreation.

Removal of dams on the Portage Creek could be an important factor driving further restoration and protection. This effort would only be enhanced by the promotion of water trails on the Creek. Further studies comparing free-flowing versus impounded sections of the Creek could provide more impetus to explore this possibility, along with the initiation of a detailed engineering study of the site.
CHAPTER X

NAVIGATION IMPROVEMENT PROJECTS

The Portage Creek as an urban heritage water trail has unique possibilities for access that are not characteristic of rural spaces. There are 39 road, railroad, and dam crossings on these 8.35 miles of stream. While multiple crossings allow numerous access opportunities, they can present barriers when designed poorly without considering navigation and aquatic ecology. Other parts of the built environment can present problems and safety concerns such as dams and abandoned industrial structures in-situ. There are also some standard obstacles that can be expected for smaller stream navigation such as deadfalls and strainers. Large debris can block the Creek in sections where the channel width is narrow. Nearly every natural and anthropogenic obstacle was catalogued and marked with the GPS unit during field surveys.

Two navigation factors of importance for the Portage Creek Heritage Water Trail are the vertical distance between structures and the high water level, and water depth. Many states have differing requirements for vertical clearance of bridges and culverts to pass navigable watercraft (National Park Service, 1996). These specifications are most often given for large road bridges and pertain to powerboats and sailboats. Wisconsin and several other states have established a goal of 5 ft vertical clearance from high water level to the bottom of a bridge (State of Wisconsin, 2004). This level of clearance should be sufficient for any types of canoes or kayaks, and will also allow some other
recreational vehicles to pass. Although 5 ft is ideal, 4 ft is often enough headroom to allow most paddlers to pass comfortably (Lemberg, 2008). Experienced paddlers may be able to lie down and pass under a bridge with as little clearance as 2 ft or less; however, this should not be recommended to general trail users for safety concerns and liability issues. Increasing the height of bridges will not be recommended here if they exceed 3 ft. As use of the Kalamazoo River Watershed water trail network becomes more popular, municipalities may consider raising bridges that are between 3 ft and 4 ft above high water levels.

The Portage Creek is a small stream with an average discharge of 39.5 cfs at the Lovers Lane USGS gauging station (U.S. Geological Survey, 2008). This is located midway through the proposed water trail, and the Creek picks up the additional water from the West Fork and Axtell Creek before its outlet at the Kalamazoo River. Low water levels are one of the more difficult issues faced by small waterways such as the Portage Creek, particularly for riffle areas. Shallow water is problematic upstream of Celery Flats, upstream of the Portage Mill Dam, in Milham Park, and in Monarch Mill Pond. The ideal minimum depth level for small craft such as canoes or kayaks is 10 in (Mosley, 1982). 10 inches of water provides reasonable depth for boats of most varieties regardless of draft. Paddlers begin to run aground in depths between 4 in – 6 in, and less than 4 in will make the section non-navigable. Low water may also allow some obstacles to be cleared that do not allow passage during higher spring flows.

Many small obstructions can be easily cleared out or may be flushed during spring flows. Only major natural barriers unlikely to be transported downstream by
natural activities will be noted in this chapter. The objective of the section is to list each major problem to navigation and present one or two alternatives for remediating that problem. The development of more detailed plans and designs are outside the scope of this project. Several of the improvements will require limited resources and very little funding. Others plans, such as raising road bridges or dam removal will necessitate involvement by local municipalities, road commissions, and the public.

Some projects such as removing the Portage Mill Dam and the nearby culvert will restore the greatest amount of navigable creek. Other proposed projects to raise the height of road bridges in Kalamazoo would make sense only in logical order. Improvements that will give the most open water should be given the highest priority.

All vertical clearance measurements were conducted with a folding 6 ft rule, and should be considered basic estimates. The order will begin upstream at Central Park and work towards the confluence with the Kalamazoo River.

Portage

Immediately downstream of the proposed Central Park access is a large deadfall. This deadfall is of a substantial enough nature to require a portage. A portage near an access point can discourage users from utilizing a water trail. The portage is also complicated by thick silt deposits and dense growth near the banks. A section of the tree could be easily sawed away. While the tree does block boat navigation, it provides trout habitat and should not be entirely removed in the process.
A double culvert at Garden Lane prevents any travel underneath this road by paddlers. The culverts also provide a constriction that moderately impounds the Creek and creates shallow water upstream. If the City of Portage decides that navigation is important at this point, they may consider improving the crossing by installing an arched bridge and replacing the culverts. The improvement will have the benefit of allowing better passage and enhanced habitat for brown trout. The City has worked to improve trout habitat in other portions of the Creek. Another alternative is developing an accessible portage over the culvert. The upstream banks are low and easy to exit, although the downstream side has vegetation and saturated ground. There is also a wooden fence that blocks off the bike trail from the road. A cut in the fence, walkway across the road, and step path leading to the put-in would enhance the portage.

The first railroad bridge crossed by the Creek is immediately upstream of the Celery Flats access. The bridge has only about a 2 ft clearance and will be difficult for most paddlers. The most likely solution to this problem will be to facilitate a portage for paddlers who are not comfortable passing under the bridge. Permission will need to be acquired from Conrail to allow users to cross over the tracks. These tracks do not see heavy rail traffic so this should not be a major conflict. The railroad ballast rocks on the banks should be complemented with smaller diameter gravel to reduce damage to boats. There is also a wooden fence that currently keeps land trail users away from the tracks and this will need to allow boaters a path through. The access back into the Creek will be easily accomplished using the existing Celery Flats site. Another option for
this site is increasing the height of the railroad bridge at least 2 ft to allow adequate clearance.

The next major obstacle is not encountered until the Portage Mill Dam downstream of Milham Road. This dam is the cause of several recreational and ecological impairments to the Creek as discussed in detail in chapter 9. The preferred option for this dam is removal due to its deteriorated state and lack of use. The dam was likely last in production in the early 20th century and only serves as a recreation and safety hazard for current users. Detailed hydraulic and geo-morphologic analysis will need to be conducted to determine appropriate techniques. This may involve sediment removal or trapping, and as with many removals may use a staged draw down. Bio-engineering of the channel upstream and downstream may be necessary to achieve the desired results after over 170 years in its current state. Cultural assessment of the site should also be conducted to determine any historic value in preservation.

Removal of the dam would allow clear passage from the Celery Flats access to the culvert near the PCB. Low water levels upstream of the dam and Milham Road would also be expected to improve. Trout would have a clear run from Hampton Lake to the Milham Park Dam. The dam is a notable relic of the heritage of both Portage and the Portage Creek, and water trail signage would focus on its contribution to area history (Stewart, 1957). Other communities have used debris from the removal as recycled fill for post-removal restoration.

Until implementation of the preferred removal option, an improved portage needs to be established. A platform should be installed along the bank access to avoid
the deep silt sediments that have built up near the dam. Some roots and branches will need to be removed. The path must be cut to a 15 ft width to give ample room for boat transport. The thick brambles in this riparian area grow quickly and present many sharp thorns to exposed skins and inflatable boats. The path will need to be maintained on a regular basis to be safe and usable by paddlers.

Not far downstream from the dam is a culvert for a service road bridge to Lovers Lane. The double culvert has a diameter too small to allow passage. The portage is also complicated by steep banks and a difficult put-in. The City of Portage should explore the removal of this culvert to open up Creek navigation. A removal of the culvert should not be overly expensive and needs to address sediment transport from the construction project. The elimination of the culvert and upstream dam would put together a stretch of water from the Celery Flats access to Milham Park, nearly 3 miles without a major impassible barrier. A second option for this culvert is to grade the banks for easier portage. Fill and railings would help paddlers safely move in and out of boats to make the crossing.

A large deadfall is located between railroad bridges 8 & 9, downstream of I-94. This deadfall is sizable and currently requires a portage. A section of this tree could be cut to open a channel downstream.

Both railroad bridges 7 & 6 may cause problems with vertical clearance. Utility pipes running these bridges also have bolts that hang down even further. The Portage Creek is navigable based on its historic use for floating logs and flat boats to the Kalamazoo River. As the owners of the track, Conrail should be responsible for the
provision of the bridges that allow passage of small watercraft. When these bridges are scheduled for repair or inspection the span could be raised to a clearance of at least 4 ft. Increasing the height of these two bridges will also give better protection from flood damage to the structures. This type of bridge reconstruction is somewhat common, although more examples exist for much larger bridges (Hronek & Guarino, 2007). Conrail can use the experience they have with other similar projects and apply to these two short spans.

Another alternative is to improve the portage for both of these bridges. Most of the railroad grade throughout this track is supported by railroad ballast stones, which are coarse and larger than gravel. While this material can be used for a boat landing, it can cause damage to hulls, and adding sand and gravel fill to the site is preferred. The bottom silt can also present problems for walking and the fill should extend far enough to allow stable footing. Permission will also need to be obtained to permit boaters to portage legally. These tracks do not typically see high volumes of rail traffic.

Kalamazoo

Kalamazoo begins with the mostly non-navigable Milham Park, which is given a detailed description in Chapter 6. The Milham Park Dam creates a wider Creek with shallow water throughout the park. Depths in the park range between 6 - 10 in, with a flow of 38 cfs. Some stretches are as low as 4 – 5 in. This is contrasted with dangerously deep water up to 6 ft behind the dam. Full or partial removal of the dam
could create a deeper channel through the park, but due to cultural and social circumstances, this is unlikely in the near future.

Addressing the other low bridges in the park does not make much sense with the current condition of the dam. Three pedestrian bridges in the park have lower than 3 ft clearance. The upstream road bridge has a very low height of only 10 in above the water level. While the bridges provide a pleasant aesthetic to the park, some could be removed from the south section of the Creek. Other adjacent bridges would provide a crossing to the peninsula and save maintenance costs for Kalamazoo by reducing the number of bridges. The road bridges were built during the depression era as part of the Public Works projects of the New Deal. The historic qualities of the bridges should be assessed before any major modifications are made. Both bridges over Lovers Lane contain between 3.5 – 4.0 ft clearance and should be able to accommodate paddlers.

The Monarch Mill Dam begins the section of the Creek that is non-navigable until Reed Street. The dam also provides a barrier that fish and aquatic life that can not pass upstream from the Superfund area. At this time it is not recommended to consider any serious plans to remove this dam, although future assessments of the condition of the structure should evaluate several options. The mill pond has become nearly filled to capacity with sediments, and some dredging of the channel through the pond would improve navigation in this shallow impoundment.

Navigation downstream of the Dam through Alcott has been detailed in the navigation chapter. The use of this section remains a difficult issue for the City of Kalamazoo and for connectivity of blue and greenways in the region. Due to the large
number of obstacles encountered between Alcott Reed Streets, a westward re-routting of the Creek may be the best chance for navigation. Although moving the channel will be costly, the cost may be lower than removing the numerous obstacles and infrastructure that impedes the Creek. A wetland area has opened up after removing old buildings northwest of the Creek and Alcott junction, and this low area could be a possibility. The Creek would rejoin the original channel at Reed Street and the previous channel can be sealed with fill.

It is important to remember that historic maps have shown that the Creek has been routed through several different channels in this area to serve the needs of industry. Any alternatives in this area will be dependent upon the continued resolution of the Superfund site and cleanup of adjacent Brownfield areas. Use of the lands as a recreational corridor will need to be stressed to allow the chance for this possibility.

The free flowing section that starts at Reed continues .65 miles to a double culvert at Crosstown Parkway. Crosstown marks 4 consecutive road bridges of questionable clearance. Faced with these bridges, all within a ¼ mile stretch, some paddlers may choose to portage the entire section. This involves crossing roads with moderate traffic volumes. The current state of this section is not conducive to a possible paddling experience.

The Crosstown culvert is considerably too small to allow safe canoe passage. An option is to rebuild the crossing as a bridge to replace the culverts. The addition of a bridge would allow better water flow and reduce flooding upstream. The bridge should be constructed with at least 4 ft clearance to allow for navigation. The road surface
could be raised by cutting the span and adding some height to the step. An additional alternative is decommissioning the culvert crossing and re-routing traffic north to Jasper then east to Vine Street. This route would only add an extra 300 feet to the route.

The banks of the Creek upstream and downstream of Crosstown are low wet soils with varying grass and wetland vegetation. Access in and out is not as difficult as the bridges downstream, and wood steps or ramps would give better footing on the mucky banks.

The Vine Street Bridge presents a vertical clearance of less than 30 in, and a pipe on the downstream side reduces it by another couple inches. Vine Street is a major east-west two way road in Kalamazoo. Hardy paddlers may attempt to duck this bridge, but it is far short of the recommended 4 ft. This bridge is currently the easiest portage of the coming crossings. The west bank is fairly low and grassy, and shows some signs of erosion. Terraced concrete steps could be placed on this bank with a supportive rail to assist paddlers. Getting back into the water on the other end presents a steeper bank with some large stones and vegetation. The area is mulched for a nearby picnic area which is beneficial for the approach. A small floating dock would be a method to get paddlers back into the water.

The eventual preferred alternative would be to increase the height of the road bridge. The low clearance of the bridge could also cause it to be damaged in a large flood event, although the Portage Creek usually experiences fairly stable flows. Raising the height of a road bridge is a fairly routine project and can be accomplished by cutting the bridge and adding a few feet to each side (Shervington 1987). The construction will need to be examined in more detail by the Road Commission.
Each bridge has successively lower clearance and the Dutton Street Bridge has around 26 – 28 in. There is also a 55 gallon drum partially submerged before the bridge. A portage at this site is more difficult due to the channelized nature of the Creek and steep banks lined with gabions and concrete. The west bank of Dutton is currently the most accessible on the upstream side. The downstream banks contain more brush and will not provide easy access. Portions of the banks are fenced off, although they are not fenced on both sides of the Creek. Bank modifications and the addition of support structures would be needed to facilitate a safe portage.

Having slightly lower clearance than the Vine Street Bridge necessitates that this bridge also be raised to accommodate a 4 ft minimum clearance. This requires an increase of less than 2 ft. Again as with Vine Street improved clearance allows better water flow and less chance of over-topping during floods. Vine, Dutton and Walnut bridges present 3 crossings of the Creek in less than 2/10 mi. Dutton is not the primary crossing, and an option for Dutton is the elimination of this bridge entirely. Removal of the bridge will involve a lower cost than increasing its height.

The Walnut Street Bridge is only 1/10 mi downstream of Dutton, and has the lowest clearance of these three. The gap between the water and the bridge is only 24 in and the banks are 3 ft tall concrete channels. This is the furthest downstream major navigation barrier and its improvement will extend the length of the water trail. Walnut provides a connection to Bronson Hospital and is a major artery for the east side of Kalamazoo. An ideal alternative will be to increase the height of the Walnut Street Bridge. The clearance is too low for almost any paddler to pass. The Walnut, Dutton
Vine bridges have a large diameter water pipe running parallel to the bridges. These pipes will also need to be adjusted if the height of the bridges is raised, incurring additional project costs.

It would be very difficult for any paddler to pull a boat out upstream of the Walnut Bridge and fences on both sides could be tough to comfortably carry a boat through the gap. The downstream bank is not much better, with nearly vertical, short concrete blocks. The ledge structure of these blocks could be built upon to facilitate a put-in. Steps, a dock, or other adjustments will need to be made to the upstream bank to allow paddlers the ability to portage the bridge. The Bronson parking lot fence may also need to be shortened by a few feet.

There are several railroad bridges downstream of Portage Street. These bridges present sufficient clearance, though the bridges need to be kept clear of trash and woody debris jams. The last barrier is a large deadfall/strainer downstream of Railroad Bridge #9. With some technique it is possible to slip through the log to the left facing downstream. The obstacle creates a somewhat dangerous situation and can be cleared with a saw. Care should be taken to leave other woody debris that is beneficial for fish habitat.
CHAPTER XI

SUMMARY

The Kalamazoo area is slowly moving away from its industrial rustbelt image as the Paper City to a place that presents a high quality of life. While this has not been an immediate transition, the region’s proximity to numerous trailways, lakes, rivers, and Lake Michigan, show potential for recreation and tourism. Kalamazoo has a close mixture of urban and natural spaces, giving it a unique identity from other cites in the state. Continued conservation of greenspace within the borders of Portage and Kalamazoo is crucial to improving perceptions. The two developments that are most significant to becoming a regional recreation center are the Kalamazoo River Valley Trailway and the Kalamazoo River Watershed Heritage Water Trail. Both are exceptional for envisioning a network of green and blue trail systems to connect numerous communities in southwest Michigan. Parts of Kalamazoo County are also located in the St. Joseph River Watershed to the south, which already has a system of developed water trails.

Establishing water trails on streams such as the Portage Creek is part of that reclamation of resources from past abuses. This project examined both natural and disturbed segments of the Creek for potential as a water trail. It is likely in the short term that some stretches will remain usable for paddle recreation and others will not. Low water levels are also an issue, particularly in upstream and impounded areas. A basic hydrologic interpretation suggests that the four dams on the main stem are a
cause of shallow water for significant portions of the Creek. There are many obstacles that could be changed to improve navigation however the removal of several key barriers will open up longer sections of the Portage Creek.

Several tools and resources have been created to expedite the movement of this trail from planning to implementation. This study contains a reach by reach analysis of current navigation on the Portage Creek. Existing and potential access sites were photographed and scored to assist future water recreation planning involving the Creek. The maps also provide a visual reference to the navigation analysis, or a guide for adventurous paddlers looking for a homegrown experience. Although a hand-held unit was used, GPS coordinates for crossings, dams, and hazards may be useful for agencies or river cleanup efforts. Considerable investigation was conducted of local history themes near or related to the Portage Creek and local waterways. These themes have been compiled into a format that can be easily transferred into signage, or adapted to meet other needs. Concepts such as The Underground Railroad, Potawatomi habitation, and agricultural heritage warrant further exploration and visibility in the community. Heritage tourism projects are more effective if combined with local institutions such as the Kalamazoo Valley Museum and the Portage Public Library.

Focusing efforts on certain Creek projects will offer the greatest return for the cities or organizations working on navigation improvements. Deadfalls can be removed without much effort near Westnedge in Portage, north and south of I-94, and near the confluence with the Kalamazoo River. Options for the Portage Mill Dam downstream of Milham Road should be considered. This dam has not been used for many years and is
currently limiting navigation and the coldwater fishery. Its removal would open up much of the stretch between Celery Flats and Kilgore Road and present the best single action for improvement of trout habitat. The US Fish and Wildlife Service and American Rivers are very interested in dam removal and both offer grants for that purpose. Improvement of the culvert shortly downstream should be taken into account with alternatives for the dam. The culvert at Garden Lane should also be considered for replacement with a bridge. The small double culvert does not allow adequate water flow and creates poor conditions for trout. A structure that allows canoes to pass would have the added benefits of increased water capacity and habitat expansion.

On the downstream end, the first obstacles encountered from the Kalamazoo River are low road bridges. There are no quick and easy options for making these bridges navigable. However, all bridges have a life span and when they are up for repair, navigation should be considered. The three bridges, Walnut, Dutton, Vine, and the culvert at Crosstown, are the only major barrier from the Kalamazoo River to Egleston Avenue. They will need to be dealt with for any possibility of a water trail on the Creek through Kalamazoo.

Expanded applications of Upjohn Park in Kalamazoo are encouraging for the Creek. Clearance should be considered if additional pedestrian bridges are built and an access site could be included in future plans. The park gives a central access point to the Portage Creek in the City. Blanche Hull Preserve and Milham Park also have good potential for water access facilities. Master planning for these parks should contemplate removing barriers and creating new access points near roads and parking.
The Bryant Mill Pond Area is a problem for the viability of a continuous water and land trail through to the Kalamazoo River. The community needs to continue to relate to the USEPA plans for future uses of the area while the cleanup is current. Plans for locating additional PCBs in adjacent landfills were halted by local grassroots pressure. These actions are favorable for a more expedient reclamation of the site. The most likely scenario for allowing navigation through this site is the westward re-routing of the Portage Creek around obstructions. The Creek would still pass through the area, but would avoid a dam, numerous pipes and other industrial debris. It is important to remember that the Creek has been altered and diverted many times in its history. The condition of the Creek through this site is currently dangerous and poor for recreation and aquatic habitat. The continued pursuit of pathways along the Portage Creek and Kalamazoo River will be beneficial in retaining open access to these waterways in the future.

Folding and packable water craft are allowing new possibilities in paddle recreation and transportation. Investigators were able to float every section of the Portage Creek with a bicycle, trailer, and a folding kayak. A segment of the adventure sport population is looking for challenging activities that minimize environmental impacts, including emissions. This could be marketed as part of the urban heritage water trail experience. Most paddle experiences require the use of two vehicles to transport drivers back to their point of origination. Metro Transit Bus routes were used to avoid using a second vehicle by shuttling paddlers back to the starting access. The potential connection with the St. Joseph River system through the Portage River is also
worth further exploration. This historic route was speculated in the 1970's for use as a regional looping canoe trail incorporating both river basins (Wayland P. Smith, 1976). The slow moving waters in the area allow for this possibility of both upstream and downstream movement that is not possible in higher gradient rivers.

This study was limited by time, resources, and weather constraints. While the entire Creek in the study area was floated, follow up floats will further validate observations. The ability to canoe the Creek under various water conditions was of interest, but highly dependent upon precipitation. According to the USGS, water levels are at their highest during the spring months of April and May.

This report should be distributed for the information to be most useful for trail planning and development. Public involvement with the cities, the Kalamazoo River Watershed Council, and the Portage Arcadia Steering Committee is necessary. This information will be provided to the Watershed Council, which has taken over as the clearing house for Kalamazoo River Heritage Water Trail activities. A copy of this thesis will be located at the Western Michigan University Department of Geography, and data should be stored with the Great Lakes Center for Maritime Studies at WMU.
REFERENCES


City of Portage. (2008a). Celery Flats Interpretive Center & Historical Area. City of Portage Informational brochure.


Meints, G. (1979). The Kalamazoo Seven: The city with the funny name may have more extant railroad depots than any in U.S. The Inside Track, December 1979.


Stewart, R.P. (1957.) *History of the Early Flour Mills in Kalamazoo County*. Papers from the history seminar of Kalamazoo College, no. 70.


APPENDIX

Portage Creek Float Survey Form
# Portage Creek Water Trail Assessment Form

## GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Date:</th>
<th>Time:</th>
<th>Current Conditions:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stream Name:</th>
<th>Current Temperature:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>City:</th>
<th>Precip past 48 hrs:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Investigator:</th>
<th>Excess or Deficit Moisture During Last Month:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

## NAVIGATION BARRIERS

### Man-Made

<table>
<thead>
<tr>
<th>Total</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Dams

<table>
<thead>
<tr>
<th>□□□□ □□□□</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

#### Low Road Bridges

<table>
<thead>
<tr>
<th>□□□□ □□□□</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

#### Low Ped. Bridges

<table>
<thead>
<tr>
<th>□□□□ □□□□</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

#### RR Bridges

<table>
<thead>
<tr>
<th>□□□□ □□□□</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

#### Culverts

<table>
<thead>
<tr>
<th>□□□□ □□□□</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

#### Other

<table>
<thead>
<tr>
<th>□□□□ □□□□</th>
<th>(structures, pipes, braided channel, etc...)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Natural

<table>
<thead>
<tr>
<th>Total</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Deadfalls

<table>
<thead>
<tr>
<th>□□□□ □□□□</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

#### Strainers

<table>
<thead>
<tr>
<th>□□□□ □□□□</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

#### Other

<table>
<thead>
<tr>
<th>□□□□ □□□□</th>
<th>(debris, etc...)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### HERITAGE FEATURES

<table>
<thead>
<tr>
<th>POTENTIAL SIGN LOCATIONS</th>
<th>Features of Special Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### BANK CHARACTERISTICS

<table>
<thead>
<tr>
<th>LEFT</th>
<th>RIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes:</td>
<td>Notes:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% Bare Soil</th>
<th>% Bare Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Mown Grass</td>
<td>% Mown Grass</td>
</tr>
<tr>
<td>% Grasses</td>
<td>% Grasses</td>
</tr>
<tr>
<td>% Other Vegetation</td>
<td>% Other Vegetation</td>
</tr>
<tr>
<td>% Trees</td>
<td>% Trees</td>
</tr>
<tr>
<td>% Rocks</td>
<td>% Rocks</td>
</tr>
<tr>
<td>% Sheet Piling</td>
<td>% Sheet Piling</td>
</tr>
<tr>
<td>% Rip Rap</td>
<td>% Rip Rip</td>
</tr>
<tr>
<td>% Concrete</td>
<td>% Concrete</td>
</tr>
<tr>
<td>% Brick/Laid Stone</td>
<td>% Brick/Laid Stone</td>
</tr>
<tr>
<td>% Gabion</td>
<td>% Gabion</td>
</tr>
<tr>
<td>% Other</td>
<td>% Other</td>
</tr>
<tr>
<td>Erosion Problems:</td>
<td>Erosion Problems:</td>
</tr>
</tbody>
</table>

### RIPARIAN BUFFER - 100 Feet

<table>
<thead>
<tr>
<th>LEFT</th>
<th>RIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes:</td>
<td>Notes:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% Bare Soil</th>
<th>% Bare Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Mown Grass</td>
<td>% Mown Grass</td>
</tr>
<tr>
<td>% Grasses</td>
<td>% Grasses</td>
</tr>
<tr>
<td>% Scrub &amp; Shrubs</td>
<td>% Scrub &amp; Shrubs</td>
</tr>
<tr>
<td>% Conifer Forest</td>
<td>% Conifer Forest</td>
</tr>
<tr>
<td>% Deciduous Forest</td>
<td>% Deciduous Forest</td>
</tr>
<tr>
<td>% Agricultural</td>
<td>% Agricultural</td>
</tr>
<tr>
<td>% Impervious Surface</td>
<td>% Impervious Surface</td>
</tr>
<tr>
<td>% Housing</td>
<td>% Housing</td>
</tr>
<tr>
<td>% Commercial</td>
<td>% Commercial</td>
</tr>
<tr>
<td>% Parkland</td>
<td>% Parkland</td>
</tr>
<tr>
<td>% Other</td>
<td>% Other</td>
</tr>
</tbody>
</table>

### NATURAL FEATURES

<table>
<thead>
<tr>
<th>WILDLIFE</th>
<th>VEGETATION OF INTEREST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

164
## CHANNEL CHARACTERISTICS

### CHANNEL SUBSTRATE

<table>
<thead>
<tr>
<th>Substrate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silt (mud)</td>
<td>%</td>
</tr>
<tr>
<td>Sand (1/16&quot; - 1/4&quot; grains)</td>
<td>%</td>
</tr>
<tr>
<td>Gravel (1/4&quot; - 2&quot; stones)</td>
<td>%</td>
</tr>
<tr>
<td>Cobble (2&quot; - 10&quot; stones)</td>
<td>%</td>
</tr>
<tr>
<td>Boulders (&gt;10&quot; stones)</td>
<td>%</td>
</tr>
<tr>
<td>Dead leaves</td>
<td>%</td>
</tr>
</tbody>
</table>

### CHANNEL VEGETATION

<table>
<thead>
<tr>
<th>Vegetation</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silt (mud)</td>
<td>Submerged</td>
</tr>
<tr>
<td>Sand (1/16&quot; - 1/4&quot; grains)</td>
<td>Infrequent</td>
</tr>
<tr>
<td>Gravel (1/4&quot; - 2&quot; stones)</td>
<td>Often</td>
</tr>
<tr>
<td>Cobble (2&quot; - 10&quot; stones)</td>
<td>Predominant</td>
</tr>
<tr>
<td>Boulders (&gt;10&quot; stones)</td>
<td></td>
</tr>
<tr>
<td>Dead leaves</td>
<td></td>
</tr>
<tr>
<td>Algae</td>
<td>Emergent</td>
</tr>
</tbody>
</table>

### CHANNEL FEATURES

<table>
<thead>
<tr>
<th>Type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riffles</td>
<td>□□□□□</td>
</tr>
<tr>
<td>Pools</td>
<td>□□□□□</td>
</tr>
<tr>
<td>Islands</td>
<td>□□□□□</td>
</tr>
<tr>
<td>Point Bars</td>
<td>□□□□□</td>
</tr>
</tbody>
</table>

### PIPE AND DRAIN INVENTORY

<table>
<thead>
<tr>
<th>Type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storm Drain</td>
<td>□□□□□</td>
</tr>
<tr>
<td>Industrial</td>
<td>□□□□□</td>
</tr>
<tr>
<td>Unknown</td>
<td>□□□□□</td>
</tr>
<tr>
<td>Wastewater</td>
<td>□□□□□</td>
</tr>
<tr>
<td>Intakes</td>
<td>□□□□□</td>
</tr>
</tbody>
</table>

### OTHER FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Litter Present</td>
</tr>
<tr>
<td>Odor/Quality Issues</td>
</tr>
<tr>
<td>Low Flows</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

### NOTES

...