Jun 11th, 10:40 AM - 11:00 AM

Advancing Fish Passage in the Menomonee River Watershed

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University of Wisconsin - Madison

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Addressing Fish Passage Impediments in the Menomonee River Watershed
Menomonee River Watershed

• 136 Square Miles; 55 Miles of Rivers/Streams; 28 Miles Mainstem

Little Menomonee River
Honey Creek
Underwood Creek
Dousman Ditch
Willow Creek
Little Menomonee Creek
Butler Ditch
Lilly Creek
Nor-X-Way Channel
Grantosa Creek
Menomonee River Watershed

- 335,000 Residents (2463/sq. mile)
- 16 Municipalities:
  - Brookfield
  - Greenfield
  - Mequon
  - Milwaukee
  - New Berlin
  - Wauwatosa
  - West Allis
  - Brookfield
  - Germantown
  - Lisbon
  - Richfield
  - Butler
  - Elm Grove
  - Greendale
  - Menomonee Falls
  - West
  - Milwaukee
Menomonee River Watershed

Current Land Use:

- agriculture in N. 1/3, densely urban in lower 1/3, and rest is rapidly urbanizing
- 60% Urban, 40% rural
- 90% of the population receives sanitary sewer service
Land Use Changes

• Land use changes and increased imperviousness in the watershed has caused habitat degradation and stagnated fish diversity.

• Development has created many impassable culverts, has filled in/ altered habitat, and created other artificial barriers like small dams and drop structures.
Menomonee River Watershed Elevation Profile

Men River - Near Future Cond (8-16-05)  Plan: Near Future 8-2005

Main Channel Distance (mi)
Elevation (ft)

Legend

Ground
Menomonee River Watershed

Major Pollutants:

- Urban stormwater
  - Wildlife, pets & lawns
  - Construction site erosion
  - Illicit Discharges

- Rural nonpoint sources
  - Eroding agricultural lands
  - Eroding streambanks

- Sanitary & combined sewer overflows
Riparian Corridors Conditions

- Greater than 75 feet
- 51 - 75 feet
- 26 - 50 feet
- Less than 25 feet
- Enclosed conduit
Wetlands

- Filling, dredging, channel relocation, and engineering have destroyed most of the spawning wetlands in the lower portion of the river as well as the ecological functions they once provided.
- Wetland fish spawning habitat for northern pike and marsh spawning walleye are absent from the lower reaches of the Menomonee River and Milwaukee Estuary;
- Habitat suitable for sustaining potadromous fish populations is present throughout the upper Menomonee River and some of its major tributaries (estimated at 3,700 acres of riparian wetlands).
Stream Condition--SEWRPC
Menomonee Fish

- Central stoneroller
- Hornyhead chub
- White sucker
- Black bullhead
- Northern pike
- Largemouth bass
- Johnny darter
- Bluegill
- Pumpkinseed
- Green sunfish
- Black crappie
- Central mudminnow
- Rock bass
- Creek chub
- Bluntnose minnow
- Blacknose dace
(SEWRPC_TR-39) Menomonee River Biological Conditions

Fish Community

Macroinvertebrates - Aquatic Bugs
Fish Passage Project Goals

- Removing artificial barriers to aquatic life passage will increase access for Lake Michigan and other native fish to pass to upstream spawning habitats (e.g., vegetated wetlands, etc.);
- Improve fish productivity;
- Enhance recreational opportunities; and
- Provide a more cost-effective alternative to restoring degraded habitats or creating new ones further downstream.
Menomonee River Watershed Inventory
<table>
<thead>
<tr>
<th></th>
<th>Milwaukee</th>
<th>Ozaukee</th>
<th>Washington</th>
<th>Waukesha</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dam / Weir</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Low Water Crossing</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Railroad Culvert Barrier</td>
<td>1</td>
<td></td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Road Culvert Barrier</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>9</td>
<td>20</td>
</tr>
<tr>
<td>Rocky Debris Major</td>
<td>2</td>
<td></td>
<td>1</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Sediment Debris Major</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Waterfall / Cascade</td>
<td>3</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Woody Debris Major</td>
<td>43</td>
<td>13</td>
<td>4</td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>Total Impediments</td>
<td>62</td>
<td>19</td>
<td>12</td>
<td>25</td>
<td>118</td>
</tr>
<tr>
<td>&quot;Passable/Minor&quot; Impediments</td>
<td>140</td>
<td>74</td>
<td>35</td>
<td>15</td>
<td>264</td>
</tr>
<tr>
<td>Total Survey Points</td>
<td>202</td>
<td>93</td>
<td>47</td>
<td>40</td>
<td>382</td>
</tr>
</tbody>
</table>
Example Barrier Survey Form (from our Microsoft Access Database)

![Image of a barrier survey form]

### Menomonee Fish Passage Barrier Survey

<table>
<thead>
<tr>
<th>Site ID</th>
<th>Stream</th>
<th>Road</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1723-155</td>
<td>Butler Creek</td>
<td>Campbell Dr.</td>
<td>8/1/2012</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alt ID</th>
<th>Type</th>
<th>Pass Method</th>
<th>Outlet drop</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCSB65</td>
<td>Road Culvert Barrier</td>
<td>0</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Habitat</th>
<th>Scour Pool</th>
<th>Upstream Pond</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shape</th>
<th>Condition</th>
<th>Material</th>
<th>Drop</th>
<th>Slope</th>
<th>Plugged</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ellipse</td>
<td>New</td>
<td>Metal</td>
<td>0.2</td>
<td>0.009</td>
<td>1%</td>
<td>144.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>7.1</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
3 large metal corrugated culverts (perched), 3 small concrete stormwater outfalls. Rock blockage upstream of inlet.

![Images of the barrier from different angles]
### Stream Crossing Data Sheet

**Site ID:** 1723-155  **Date:** 8-1-2012

**Surveyed by:** Joe Zack  **Culvert(s):** Bridge

**Stream Name:** Butler Creek  **Dem:** Ford

**Road Name:** Campbell Dr  **Ford:**

**GPS Waypoint:** Lat: Long:

**Outcome:** Full survey  **Passage No survey**

**No crossing**  **No stream**  **No access**

**Notes:** 3 culverts perched; also 3 small stone culverts, rock blockage upstream of inlet.

**Photos:** Inlet: x  **Outlet:** x

**Upstream:** x  **Downstream:** x

**Other:** x

**Exotic Species:**

---

**Structure 1**

<table>
<thead>
<tr>
<th>SHAPE</th>
<th>Round Arch</th>
<th>Rectangular Open bottom</th>
<th>Elliptical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Metal</td>
<td>Concrete</td>
<td>Plastic</td>
</tr>
<tr>
<td>Interior Surface</td>
<td>Smooth</td>
<td>Corrugated</td>
<td>Corrugated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plugged</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushed</td>
<td>%</td>
</tr>
<tr>
<td>Rusted</td>
<td>%</td>
</tr>
</tbody>
</table>

**Inlet Elev. (ft):** 22.5

**Outlet Elev. (ft):** 23.8

---

**Structure 2**

<table>
<thead>
<tr>
<th>SHAPE</th>
<th>Round Arch</th>
<th>Rectangular Open bottom</th>
<th>Elliptical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Metal</td>
<td>Concrete</td>
<td>Plastic</td>
</tr>
<tr>
<td>Interior Surface</td>
<td>Smooth</td>
<td>Corrugated</td>
<td>Corrugated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plugged</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushed</td>
<td>%</td>
</tr>
<tr>
<td>Rusted</td>
<td>%</td>
</tr>
</tbody>
</table>

**Inlet Elev. (ft):** 22.64

**Outlet Elev. (ft):** 23.5

---

**Structure 3**

<table>
<thead>
<tr>
<th>SHAPE</th>
<th>Round Arch</th>
<th>Rectangular Open bottom</th>
<th>Elliptical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Metal</td>
<td>Concrete</td>
<td>Plastic</td>
</tr>
<tr>
<td>Interior Surface</td>
<td>Smooth</td>
<td>Corrugated</td>
<td>Corrugated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plugged</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushed</td>
<td>%</td>
</tr>
<tr>
<td>Rusted</td>
<td>%</td>
</tr>
</tbody>
</table>

**Inlet Elev. (ft):** 22.5

**Outlet Elev. (ft):** 23.3

---

*do not complete for open bottom structures.
Tier 1: Connection to Lake Michigan

Tier 2: Connection to Mainstem

Tier 3: Connection to highest quality areas

SEWRPC Prioritization
**Ozaukee County Prioritization**

### Tributary Impediment Prioritization

<table>
<thead>
<tr>
<th><strong>C</strong> = Impediment Ordination</th>
<th><strong>D</strong> = Tributary Sub-Basin Fragment Length (Miles) <strong>Y</strong></th>
<th><strong>E</strong> = Impediment Significance Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>&quot;Y&quot; total miles of tributary sub-basin channel fragment(s) length isolated by the impediment</td>
<td>1</td>
<td>Reach not isolated from mainstem river</td>
</tr>
<tr>
<td>1</td>
<td>&quot;Y&quot;</td>
<td>2</td>
<td>Reach isolated from mainstem river by 1 impediment</td>
</tr>
<tr>
<td>2</td>
<td>&quot;Y&quot;</td>
<td>5</td>
<td>Reach isolated from mainstem river by 2 impediment</td>
</tr>
<tr>
<td>3</td>
<td>&quot;Y&quot;</td>
<td>7</td>
<td>Reach isolated from mainstem river by 3 impediment</td>
</tr>
<tr>
<td>4</td>
<td>&quot;Y&quot;</td>
<td>10</td>
<td>Reach isolated from mainstem river by 4 impediment</td>
</tr>
<tr>
<td>&quot;Q&quot;</td>
<td>&quot;Y&quot;</td>
<td>10</td>
<td>Reach isolated from mainstem river by &quot;Q&quot; number of impediments</td>
</tr>
<tr>
<td>&quot;1000•Q&quot;</td>
<td>&quot;Y&quot;</td>
<td>10</td>
<td>Reach isolated from mainstem river by 1000 times &quot;Q&quot; number of impediments</td>
</tr>
</tbody>
</table>

**Diagram:**
- **SB** indicates a stream bifurcation.
- **SR** indicates a stream crossing.
- **W** indicates a water body.
- **H** indicates a highway.
- **W** indicates a water body.
- **N** indicates a nature preserve.
- **P** indicates a park.
- **C** indicates a conservation area.
- **P** indicates a power line.
- **H** indicates a highway.
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- **H** indicates a highway.
Potential Spawning Habitat Consideration

- 75 areas of promising spawning habitat were identified.
- Major tributaries with the best potential for spawning habitat include the Little Menomonee River and Creek, Nor-X-Way Channel, and Dretzka Park Creek among others.
Instream Measures

(1) Removal of approximately 1,000 linear feet of concrete (within reach MN-18) in the vicinity of Wisconsin Avenue and IH-94 to reestablish fish passage to upstream reaches from Lake Michigan.

(2) Removal and/or retrofitting of five low-gradient structures within the vicinity North Menomonee River Parkway between Swan Boulevard and Harmonee Avenue (within Reach MN-17A).
MMSD Concrete Removal
Menomonee River
River Crossing – Fish Passage Obstructions
N. Menomonee River Pkwy between Swan Blvd & Harmonee Ave
09-14-2009 (Low Flow)
Menomonee River
East of Swan Blvd & N. Menomonee River Pkwy
09-14-2009 (Low Flow)

Second Set of Pictures

#1) Sewer Crossing @ 90th Street & N. Menomonee River Pkwy
~2 feet wide; ~4-6 inches high

#2) Hoyt Park Playground Area Dam/Grade control
~ 4 feet wide; ~2.5 feet high
Menomonee River
N. Menomonee River Pkwy
&
Hoyt Park Drive
09-14-2009 (Low Flow)

First Set of Pictures

#2) Hoyt Park Playground
Dam/Grade control
~4 feet wide; ~2-3 feet high

#3) Sewer Crossing downstream of footbridge
~4 feet wide; ~2-4 inches high
Menomonee River
N. Menomonee River Pkwy & Charles Hart Pkwy
09-14-2009 (Low Flow)

First Set of Pictures

#4) Sewer Crossing @ Charles Hart Pkwy
& N. Menomonee River Pkwy
~ 3-4 feet wide; ~1-2 feet high

#5) Old Road Crossing
~ 8 feet wide; ~2.5 feet high
Interfluve Designs

Menomonee River Fish Passage Barriers
Crossing 1—Likely Removal

Crossing #1 - Sewer Crossing

Before.....

......After
Crossing 2 (and 5)--Removal

Crossing #2 - Stone Walking Path

Before.....

......After

This image can also serve as an example of the removal of Crossing #5 – Old Stone Road.
Crossings 3 and 4 – Removal or Ramp

Plan Sketch:
Rock ramp fishway at sewer crossing #4

This approach can be also be implemented at Sewer Crossing #3.
Upstream Work
Next Steps

- Start removal of several major woody debris jams with Great Lakes CCC and volunteers-focusing on man-made debris
- Start design of 5 priority infrastructure barriers (WCMP funded)
- Meet with private and public impediment owners
- Fundraise to address impediments/work with municipalities to budget for fish passage