

Upper end of Portage Canal – lock section

Visitors can park at dead end of Macfarlane Street just off of Edgewater Street

<https://goo.gl/maps/5JGS7Ye4Cmpumgdi8>

- Significance of Location:
 - The University of Wisconsin-Madison historian William Cronon, speaking on Wisconsin Public Television's "Wisconsin Hometown Stories: Portage Memories," summed it up: "One of the things that is so remarkable about this location is that it is one of the very few places on the North American continent where you can walk just 2,700 paces, a mile and a quarter over flat ground, and by doing so connect two the most important watersheds of the eastern portion of this continent."
 - The [Native Americans] called the "portage" Wau-wau-o-nah, now more commonly known as "Wauona" which means "the place where one takes up his canoe and carries it on his back." The one and four-tenths mile trail through this marshy area was very difficult. Sometimes during high water boats could paddle from one river to the other. (Source: www.portagecanal.org)
- History of Canal (Source: www.portagecanal.org)
 - The "portage" between the Wisconsin and the Fox Rivers was used by Indians, early and unknown French explorers and fur trappers. Possibly, the first reference to this area was made by Nicolet, who might have visited this area in 1640. The first description of the "portage" came from the journals of Marquette and Joliet, who arrived at the "portage" June 14, 1673.
 - In 1837, a company was chartered under the name of the "Portage Canal Company," for the purpose of constructing a canal connecting the Fox and Wisconsin Rivers. The Company was composed of stockholders who were also the incorporators of the Shot Tower Company of Helena. They needed to be able to move their lead shot to the East more efficiently. In the year 1838, the digging of the canal was began, which was parallel to Wauona Trail...[with] shovels and wheelbarrows.

- [Attention was called] to its value as a route for military communication and transportation...in June of 1849, a new route was chosen for the canal, which is the present one. Work progressed slowly...[ultimately left] it in an unfinished condition. Although, in this unfinished state, canoes did make use of the canal.
- Little was done on the canal until 1853. A new company was incorporated called the Fox and Wisconsin Improvement Company. The Company was supposed to complete the construction of the canal in three years...Company went into bankruptcy [and] the works and improvements and the balance of the land granted by Congress went unsold.
- In 1854, the City passed an ordinance forbidding nude bathing in the Canal and Wisconsin River.
- In 1874, the Corps of Engineers, Department of Army started at the Fox River end and completed the canal in 1876, which was 75ft. wide, 7 ft. deep, 2 1/2 miles long with a draw of 6 ft., a right of way on the Northside of 45 ft. and 75 ft. on the Southside. The first boat through the completed canal was the Boscobel, on June 30, 1876. According to the Fort Winnebago Lock Tenders book dated 1878-1908, there were many big boats through the canal, some of 300 ton capacity, as well as pleasure craft.
- The canal was used until 1951 when the Fort Winnebago Lock was bulldozed in and the Wisconsin River Locks welded shut. In 1961, the ownership of the canal was transferred from the Department of Army to the State of Wisconsin. **coincides with the general fate of the locks up and down the Fox**
- Current Efforts:
 - DNR's cleanup and associated work is part of a larger plan to transform the Portage Canal area into a usable, local resource that places the Ice Age National Scenic Trail along the canal. Completion of the remediation will support the city, its partners and Department of Transportation efforts to construct the multi-use path, to be completed in 2022. As the owner of the Portage Canal, DNR is responsible for taking the necessary actions to address the historical contamination that has impacted the canal. The project is expected

to cost approximately \$8 million, which includes the remediation of the canal and shoring up the canal banks to support the recreational path. From Adams Street to just past Canadian Pacific Railroad bridge, the 3,600-foot stretch of waterway has not been dredged in nearly a century. The canal is contaminated with metals related to a rich history of industrial activity along the canal. (Source: www.portagecanal.org/canal-rehab/)

Portage Levee at Riverside Park

Ample parking in park

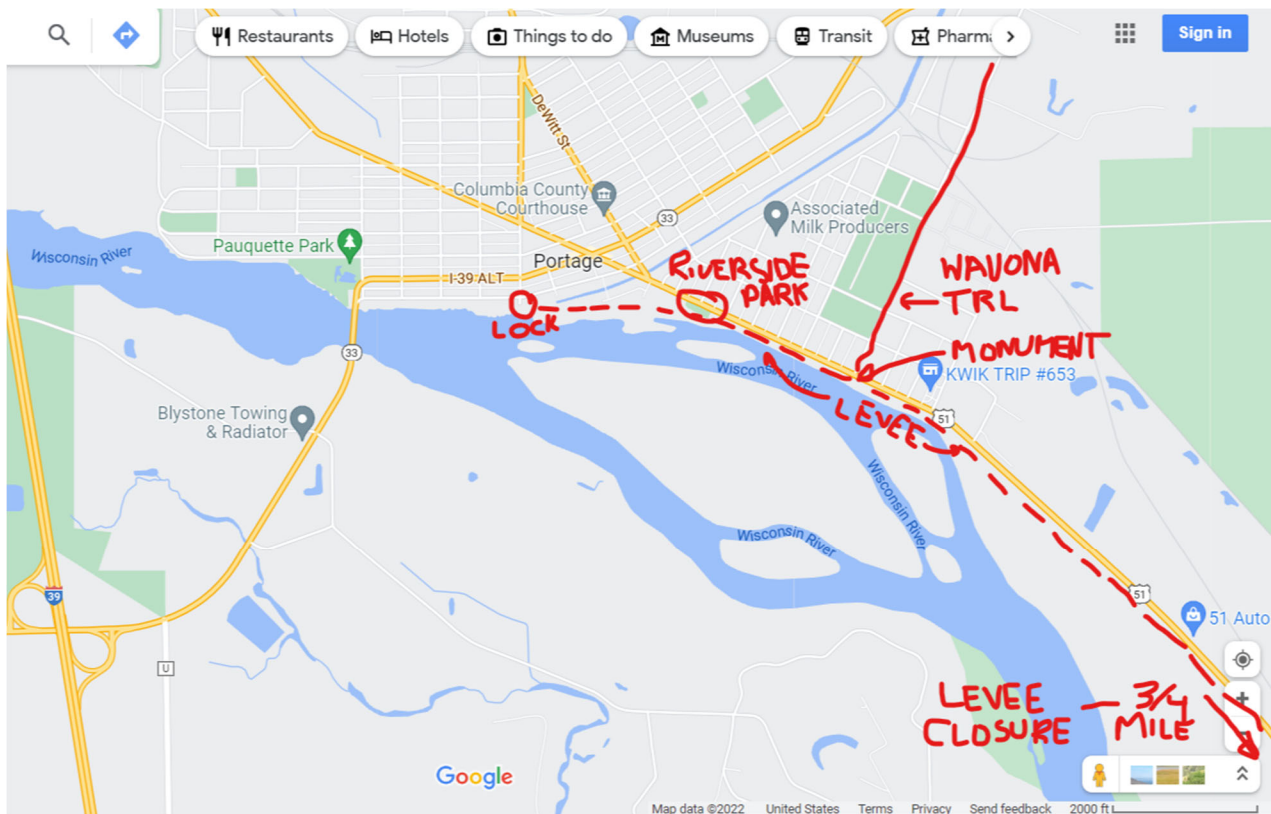
<https://goo.gl/maps/VgckMvAUW1j2vReu6>

- Other Levees in the Vicinity
 - Caledonia (9 miles), Lewiston (5 miles), Portage (3 miles) constructed in mid- to late-1800s with no engineering or planning
 - Caledonia and Lewiston still exist, assigned responsibility to the State, not flood protection
 - Current Portage Levee built in late 1990s after extensive planning by ACOE
- History of Floods
 - 1994 Corps General Design Memorandum listed nine historic floods with crests of 18.9 feet to 20.5 feet, the largest being in 1938.
 - Levee failed in 1938, when a 20-foot-wide breach formed, causing widespread flooding and ~\$9.25 M in damages (1992 dollars). Levee raised about 2 feet (to elevation of 1938 flood) after this event. School bus???
 - In 1969 levee was extended about 1000 feet at south end to meet high ground
 - The levee held in the 1973 flood, but only through active flood fighting efforts (20 ring dikes around boil areas)
 - Interesting to note that the 9 floods essentially were spaced out with one occurring each decade (2x in 30s, 0x in 80s). NWS gage shows six years with peaks in this range over the last 3 decades (2010, 2019,

2016, 2011, 1993, 1996) with 2010 cresting about 0.2' higher than 1938.

- Complexity of Hydraulics
 - Hydrologic studies contained in ACOE GDM discuss various scenarios for “breakout” flows to other waterways
 - Failure of the Portage Levee would send flows to Fox River
 - Failure of Lewiston Levee would send flows through Big Slough, ultimately to Neenah Creek and Fox River
 - Failure of Caledonia Levee would send flows toward interstates and into Baraboo River, ultimately back into Wisconsin River
 - Multiple combinations of these scenarios were used to determine the flows that Portage Levee would need to protect against – “levees hold” scenario is the “worst case” for Portage (no flow reduction upstream)
 - Side note – FIS profiles in this area of the Wisconsin regulate to multiple possibilities
- Design and Construction of Current Levee
 - Current Levee built at an estimated cost of \$7.87 M
 - Corps calculated a cost-benefit ratio of 2.42 for levee elevation of 787 at canal – lower elevs had similar ratios, then diminishing returns for greater elevations.
 - Other levee upgrades were considered, most notably just upstream of levee at Pauquette Park but cost was not justifiable.
 - Some controversy about the tie-in at upstream end – preservationists interested in the lock and its operation wanted the lock gate to be part of the levee, DNR and ACOE deemed the lock structure inadequate for flood protection; due to cost/benefit results earthen levee upstream of the lock was the ultimate design.
 - Reconstructed on location of pre-project existing levee from lock down to Ontario Street, then new construction downstream of Ontario Street – old levee was close to river, project removed this levee (essentially a ‘setback’ project)
 - Top width 10', exterior side slope 3:1, interior 5:1
 - Interior slope grassed, exterior rip-rapped – on outside of curve of the river, subject to scour

- Pervious fill, no core
- Ponding area to handle 'internal' drainage; there is also 6' of elevation difference to Fox River and that is how most internal drainage is handled ** this differs from many other levee systems that I have seen, which usually form a 'bowl' out of the protected area. This system inhibits interflow between Wisconsin and Fox. Open ended system.**
- Gaps at south end to let USH 51/STH 16 and the railroad through
- Culvert lets water in to keep circulation in the canal – some controversy
- Wauona Trail – ancient portage route and initial attempt at canal
- Monument noting end of trail and point of entry of Marquette and Joliet to Wisconsin River



Discussion Regarding Levees in General in Wisconsin

- Currently, these levees are recognized as providing flood protection
 - Chippewa Falls Levee
 - Portage Levee
 - Beaver Dam floodwall
 - Black River Falls Levee
 - Riverside Lofts in Jefferson, WI
 - Pleasant Prairie Levee
 - Stevens Point Hydroelectric Project Left Seawall
 - Allison Park Dike (Richland Center)
 - Amacoy Lake Levee (Rusk County)
- These levees may be recognized in the Future as providing flood protection
 - Valley Park Levee (MKE)
 - Hart Park (Wauwatosa)
 - Western Milwaukee
 - Arcadia
- Regulation of Levees (GIVE THIS DISCUSSION AT RIVERSIDE PARK, SO THERE CAN BE A VIEW OF THE AREA THAT WOULD BE ZONED AS FLOODPLAIN IF IT DID NOT EXIST)
 - NR 116.17(2) governs adequacy of levees for flood protection
 - (a) A levee or floodwall shall be considered adequate if all of the following criteria and the requirements of par. (b) are met:*
 - 1. The minimum top elevation of the levee or floodwall shall be calculated using whichever of the following provides the greater protection from floods:*
 - a. The profile of the regional flood with that regional flood confined riverward of the proposed levee or floodwall, plus 3 feet of freeboard; or*
 - b. The standard project flood and/or the 500 year flood confined riverward of the proposed levee or floodwall.*
 - c. Exceptions to the standards in subd. 1. a. and b. may be granted by the department on a case-by-case basis for levees and floodwalls not used to protect human life.*

2. U.S. army corps of engineers standards for design and construction of levees and floodwalls shall be the minimum standard for levees and floodwalls.

3. Interior drainage shall be provided using designated ponding areas, pumps or other similar means, in accordance with U.S. army corps of engineers standards.

4. An emergency action plan, concurred in by the division of emergency government and approved by the department, shall be in effect for the area behind the levee or floodwall that would be in the floodplain without the proposed levee or floodwall in place.

5. The municipality shall provide notification to all persons receiving construction permits in the area behind the proposed levee or floodwall that would be in the floodplain without the proposed levee or floodwall in place that they are in an area protected by a levee or floodwall which is subject to flooding if the levee or floodwall is overtopped.

6. The levee or floodwall shall be annually inspected and certified, by a professional engineer registered in Wisconsin, that the levee or floodwall meets the standards in subs. 1. to 5. Annual reports of the inspection and certification shall be sent to the department for review.

7. The department reviews and approves the material submitted under subs. 1. to 5.

(b) No obstruction to flood flows caused by construction of levees or floodwalls may be allowed unless amendments are made to the floodway lines, regional flood profiles, floodplain zoning maps and floodplain zoning ordinances in accordance with the provisions of ss. NR 116.11, 116.12 (3) and 116.21 (6). Calculations of the effect of the levee or floodwall on regional flood heights shall compare existing conditions with the condition of the regional flood confined riverward of the proposed levee or floodwall.

(c) Floodplain areas protected by the adequate levee or floodwall shall be designated as flood fringe but may be regulated as areas outside of the floodplain unless the department determines that the levee or floodwall is no longer adequate.

(3) Inadequate levees or floodwalls. If the department determines that an existing levee or floodwall does not meet the criteria of sub. (2) (a), all floodplain areas landward of the inadequate levee or floodwall shall be regulated as if the levee or floodwall does not exist. (44 CFR 65.10) describes the information needed for FEMA to determine if a levee system provides protection from the 1% annual chance flood.

Other points of interest:

Governor's Bend County Park – <https://goo.gl/maps/huv956bL2jAdn3Ku8>

- Most upstream lock on old Fox River system

Buffalo Lake Dam in Montello – <https://goo.gl/maps/boQLY587UHCjTUyJ9>

- Historical Interest
- Example of Change of Use over Time
- Example of Aging Infrastructure

