

EXECUTIVE SUMMARY

This is one of a series of river assessments to be prepared by the Fisheries Division of the Michigan Department of Natural Resources (MDNR) for Michigan rivers. This report describes the characteristics of the River Raisin and its biological communities.

River assessments are prepared to provide a comprehensive reference for citizens and agency personnel who desire information about a particular fisheries resource. These assessments will provide an approach to identifying opportunities and solving problems related to aquatic resources in watersheds. It is hoped that this river assessment will increase public awareness of the River Raisin and its challenges and serve to promote a sense of public stewardship and advocacy for the resources of the watershed. The ultimate goal is to increase public involvement in the decision making process to benefit the river and its resources.

This document consists of four parts: an introduction, a river assessment, management options, and public comments and responses. The river assessment is the nucleus of the report. The characteristics of the River Raisin and its watershed are described in twelve sections: geography, history, geology and hydrology, channel morphology, soil and land use patterns, biological communities, special jurisdictions, recreational use, dams and barriers, water quality, fishery management, and citizen involvement.

The management options section of the report identifies a variety of challenges and opportunities. These management options are categorized and presented following the organization of the main sections of the river assessment. It must be stressed that the options listed are not necessarily recommended by MDNR, Fisheries Division. They are intended to provide groundwork for public discussion and comment.

The River Raisin and its tributaries form a network draining approximately 1,070 square miles of southeastern Michigan and northwestern Ohio. The basin contains portions of the following Michigan counties: Hillsdale, Jackson, Washtenaw, Lenawee, and Monroe. A small portion of Fulton County, Ohio is also in the watershed. Major tributaries of the River Raisin include the South Branch, Wolf Creek, Macon Creek, Black Creek, and Saline River.

For purposes of discussion, the River Raisin mainstem is divided into three sections. The first section is from the headwaters in the extreme northwestern portion of the watershed downstream to Tecumseh. The second is the low-gradient, meandering mid-section of the mainstem from Tecumseh downstream to Dundee. The final section is from Dundee downstream to the mouth at Lake Erie.

Streams in the upper portion of the watershed above Tecumseh have moderately stable flows. However, flow stability decreases in streams in the middle and most downstream portions of the watershed primarily because of less permeable soil type coupled with intensive agricultural land use. Stream channelization, removal of floodplains and wetland retention areas, and installation of artificial surface and tiled drainage systems to facilitate agriculture have reduced flow stability throughout the watershed. Water withdrawals for agricultural irrigation aggravate natural low flow situations during droughts, particularly in the upstream portion near Brooklyn, Manchester, and Clinton. Water withdrawals for municipal use also reduce stream flows. The communities of Adrian, Blissfield, Deerfield, and Dundee rely on the River Raisin for public water supply. Flooding is a recurring problem in the lower watershed in Monroe and Frenchtown townships and the City of Monroe. Much flooding is attributable to ice jams in the lower river and periodic high levels of Lake Erie.

The average gradient of the River Raisin mainstem is 3.2 feet per mile. However, gradient is not uniform throughout. The highest average gradient (5.7 feet per mile) is from the headwaters to Highway M-50 in Tecumseh. The lowest average gradient (1.3 feet per mile) is in the mid-portion of the river between Tecumseh and Dundee. The mainstem of the River Raisin is mostly low-gradient channel, 92 miles (62 %) having gradient less than three feet per mile. Fish and other aquatic animals are typically most diverse and productive in river gradient between 10 and 70 feet per mile. This highly desirable gradient class is found in only 7.5 miles (5%) of the mainstem in the extreme headwaters of the watershed and in localized areas near Brooklyn, Manchester, and Tecumseh. Much of this high-gradient habitat has been inundated by dams in Brooklyn, Manchester (2 dams), and Tecumseh (3 dams). These dams and their impoundments have eliminated and fragmented some of the best fish habitat on the river.

The channel of the mainstem has been adversely altered over the years by agricultural activities. Flow instability and resulting erosion have caused the channel to be excessively narrow in the middle portion where stream banks with high clay content are resistant to erosion. Conversely, the channel is excessively wide below the confluence of the mainstem and Saline River, downstream from Dundee. The substrate from this point downstream to the mouth at Lake Erie is composed of gravel, cobble, rock, and limestone bedrock. Therefore, during high flow, the less erosion-resistant stream banks are eroded. Agricultural activities including channelization and drainage have decreased the hydraulic diversity of tributary streams throughout the watershed. Intensive agricultural land use has caused woody cover to be sparse in many portions of the mainstem and major tributaries. Woody cover creates excellent fish habitat and provides good substrate for production of aquatic insects and other fish food organisms.

Land use is the primary factor causing decline of fisheries resources in stream ecosystems. The River Raisin watershed has the highest percentage of agricultural land use (92%) of any watershed in Michigan. Intensive agricultural land use coupled with fine particle soil types has degraded the river system by decreasing flow stability, altering natural channel morphology, and creating severe erosion and sedimentation problems. Channelization, drainage of wetlands, and installation of surface and tiled artificial drainage courses to facilitate agriculture have also decreased flow stability and altered temperature regimes.

Based on biological surveys conducted during the past thirty years and early twentieth century University of Michigan records, the River Raisin watershed is known to have contained at least ninety fish species. Although present fish species diversity remains high, certain species are declining and potamodromous fishes have been virtually eliminated by the cooling water intake at the Detroit Edison Monroe Power Plant near the mouth. A series of six low-head dams in Monroe and Waterloo Dam at the western edge of the city also create barriers to upstream migration of potamodromous fish. Silt-tolerant fish species have increased, whereas fishes requiring clean gravel substrate or clear water with aquatic vegetation at some point in their life cycles have declined. Dams have inundated high-gradient areas with gravel, cobble, and rock substrates. These high-gradient areas are of critical importance to certain species as spawning habitat and for the production of aquatic insects and other macroinvertebrates that are important fish food organisms. Agricultural activities have reduced flow stability and increased sediment load in streams throughout the watershed. Mussel species have declined primarily as a result of increased sediment loading resulting from agriculture and urban development. Introduced pest species including zebra mussels, rusty crayfish, Eurasian milfoil, curlyleaf pondweed, and purple loosestrife have had negative effects on native fishes and macroinvertebrates. Wetland drainage and filling primarily to facilitate agriculture have negatively affected populations of fish, amphibians, and reptiles.

The River Raisin watershed has great potential for recreational use because of its proximity to population centers in the watershed and in the heavily populated surrounding area of southeastern

Michigan and northwestern Ohio. The mainstem is canoeable from Brooklyn to the mouth, although logjams between Adrian and Deerfield make canoe travel difficult in localized areas. Bona fide access to the river is only fair, and assured public access to impoundments is needed at Sharon Hollow, Manchester, Clinton, and Tecumseh (Red Millpond). Small access sites are needed on the mainstem downstream of the Ford Dam in Manchester, upstream of the Clinton Impoundment, downstream of Tecumseh, east of Adrian, and in southern Palmyra Township. Public parcels of property at Ida-Maybee Road and downstream of Dundee should be developed to facilitate canoe access and shore fishing. Very little land in the intensively agricultural River Raisin watershed is in public ownership. The acquisition of more public property would benefit recreational users. Legislative adoption of a recreational rather than commercial definition of navigability would benefit canoeists.

According to two independent sources, there are about sixty dams in the River Raisin watershed. Twenty-two of these dams, including the six low-head dams in Monroe, are on the mainstem and 38 are on tributaries. Dams fragment habitat of fish and other aquatic organisms. Spawning runs of potamodromous and river fish species are blocked by dams. Northern pike populations have decreased particularly in southern Michigan because the installation of lake-level control structures (dams) on lake outlets has eliminated access to pike spawning habitat. Dams disrupt normal downstream drift of aquatic insects and other invertebrates, sediment, and woody debris. Fish are killed outright or injured passing over dams. None of the dams in the River Raisin watershed has effective fish passage facilities. Dams were generally constructed in areas of highest stream gradient. This enables the dam builders to create the highest possible drop (greatest potential energy) while minimizing the amount of inundated land. These high-gradient river areas are essential spawning habitats for several fish species and highly productive areas for aquatic insects and other fish food organisms. Dams also alter the natural flow and temperature regimes of rivers. Many of the impoundments in the River Raisin watershed are shallow, sediment-laden, and choked with aquatic vegetation. They provide poor quality habitat for sport fish species and have only modest recreational value.

The Detroit Edison Monroe Power Plant at the mouth of the River Raisin presents a formidable obstacle to upstream and downstream migration of potamodromous fish. This power plant's cooling water requirement of up to 3000 cfs greatly exceeds the River Raisin annual mean flow of 741 cfs. Therefore, during all but high flow periods, the entire flow of the River Raisin is processed through the power plant as cooling water. Besides the available River Raisin stream flow, Lake Erie water is drawn upstream to the plant through the river channel. This process essentially reverses the flow of the river and forces it to "flow" upstream. The processed cooling water is then returned to Lake Erie through a separate outlet channel to Plum Creek Bay that is out of the River Raisin watershed. Impingement of adult and juvenile fish and entrainment of larval fish and fish eggs at the power plant are significant problems. Unless the cooling water intake situation at the power plant is altered, potamodromous fisheries management in the lower River Raisin is impractical.

Point source water pollution from industrial and municipal sources in the watershed has been dramatically abated over the past thirty years. Pollution from point sources will continue to be reduced in the future as municipal wastewater treatment plants upgrade their facilities and technology and industrial discharge permits are tightened.

The greatest remaining factor that degrades water quality in the watershed is nonpoint source pollution resulting from agriculture. Recent studies have shown conclusively that implementing best management practices on farmland can significantly reduce runoff, erosion, and delivery of sediment, nutrients, and agricultural chemicals to watercourses.

The lower River Raisin has been identified by the International Joint Commission as one of Michigan's fourteen Areas of Concern (AOC) due to polychlorinated biphenyl (PCB) and heavy

metal contamination of fish and sediments. The AOC includes the most downstream 2.6 mile portion of the river and the immediate Lake Erie area extending one mile north and south of the river mouth and one-half mile lakeward. Problems that exist in the River Raisin AOC are heavy metals (zinc, chromium, copper) and PCB contamination of sediments and water column, sediment from nonpoint agricultural sources outside the AOC, and a fish consumption advisory concerning carp and white bass.

Fishery management of the mainstem and major tributaries has been neglected. Past municipal and industrial point source pollution, excess turbidity from intense agricultural land use, lack of assured public access, and a very poor public image of the river particularly from Tecumseh to Dundee have combined to discourage fishery management. Enhancement and promotion of angling opportunities on southern Michigan rivers are one of few remaining frontiers available to fishery managers.

The greatest impediment to beneficial change in the River Raisin watershed is the poor public image of the river and its major tributaries. This negative public image and perception of the river must be improved to motivate people to take pride in the river and advocate habitat protection and enhancement of water quality and recreational opportunities. An improved public image of the river would serve to foster an ethic of public stewardship that would act to drive all other beneficial changes. Direct involvement of local citizens with the River Raisin and its watershed is the only way to improve public image and erase negative perceptions.