

EXECUTIVE SUMMARY

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

River assessments are prepared to provide a comprehensive reference for citizens and agency personnel who desire information about a particular aquatic resource. These assessments will provide an approach to identifying fishery management opportunities and solving fishery related problems. This river assessment will increase public awareness of the Kalamazoo River and its challenges and serve to promote a sense of public stewardship and advocacy for the resources of this watershed. The ultimate goal is to provide information to enable increased 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 response. The river assessment is the nucleus of the report. The characteristics of the Kalamazoo River and its watershed are described in twelve sections: geography, history, geology and hydrology, soils and land use, channel morphology, dams and barriers, water quality, special jurisdictions, biological communities, fishery management, recreational use, 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 MDNR, Fisheries Division does not necessarily recommend the options listed. Rather, they are intended to provide a foundation for public discussions and comment.

The Kalamazoo River and its tributaries form a network draining approximately 2,020 square miles of southwest Michigan. The mainstem is 175 miles long and there are 899 miles of tributaries. Major tributaries include North Branch Kalamazoo, Battle Creek, Gun, and Rabbit rivers and Rice, Wabascon, Augusta, and Portage creeks. There are 287 lakes greater than 10 acres within the basin. Gun Lake is the largest lake at 2,661 acres.

For purpose of discussion, the Kalamazoo River mainstem is divided into five sections called mainstem valley segments. Mainstem valley segments represent portions of a river that share common channel and landscape features and were identified using major changes in hydrology, channel and valley shapes, land cover, and surficial geology. The headwater segment consists of the South Branch Kalamazoo River, which is cold with stable flows. The upper segment begins near Albion and continues 30 miles downstream to the city of Battle Creek. The river in this segment meanders freely and is warm with stable flows. The middle segment is 50 miles long and extends to the town of Otsego. The river here is large as it picks up a major portion of the watershed drainage. The river also becomes cooler through this segment as groundwater flows to the river increase. The lower segment is in a confined glacial-fluvial valley and extends 24 miles to Lake Allegan. The last 24 miles of river flow across a lake plain and make up the mouth segment.

The history of the watershed is very rich and can be traced back as far as the Paleo-Indians almost 10,000 years ago. Indian communities were drawn to the Kalamazoo River area because of its valuable natural resources. Hunting and fishing camps were common in the watershed. European settlers used the area as early as 1680 for trapping and fur trade. By the mid-1800s, communities and cities began to emerge in Battle Creek, Kalamazoo, and Plainwell. Kalamazoo and Plainwell became

sites for paper production, which helped spur economic development and later led to contamination problems in the river.

The hydrology of the Kalamazoo River watershed is strongly influenced by glacial deposits. A majority of the surficial geology is composed of outwash sand and gravel. These glacial deposits contribute to the stable flows of the Kalamazoo River by providing permeable soils that allow groundwater inflow. Less permeable soils coupled with agricultural land use lead to stream flow instability. Fine glacial till material and channelization have led to some flow instability in both the Battle Creek and Rabbit rivers. Tributaries in the middle segment have the most stable flows and include Seven Mile, Augusta, and Portage creeks. Urbanization, stream channelizations, filling of wetland retention areas, and installation of drainage systems for agriculture and urban development also contribute to stream flow instability. Seasonal flooding occurs throughout the watershed, but most damage occurs to developments within the floodplain.

Soils and land use have a significant effect on river hydrology and water quality. Soils consist of 71% loamy type (sandy, silty, and clay loams), which is 10% less than its neighboring St. Joseph watershed. Land use is dominated by agriculture (58%) with forest land comprising the second most frequent land use at 25%. Intensive agriculture with poor management practices has led to bank erosion and sedimentation problems. Channelization, drainage of wetlands, and installation of artificial drainage systems have altered stream temperature regimes and decreased flow stability. Most large cities are located along the mainstem, and many significantly affect water quality. The middle segment is threatened by increased development pressure. The continual increase of impervious surfaces (roofs, parking lots, and roads) will change the hydrology of several groundwater fed streams in this area. With increased development also come more stream crossings. There are 2,755 road and utility stream crossings over the Kalamazoo River and tributaries. Improper crossing installations can lead to channel and fish habitat degradation.

The average gradient of the Kalamazoo River mainstem is 3.0 feet per mile with a range of 0-40 feet per mile. The highest gradients on the mainstem (5-40 feet per mile) are in the headwaters upstream of Mosherville and in short reaches near Homer, Marshall, and Plainwell. The mainstem of the Kalamazoo River is mostly low-gradient channel; 113.0 miles (62%) have a gradient less than three feet per mile. Fish and other aquatic animals are typically most diverse and productive in river sections with gradient between 10 and 70 feet per mile. This highly desirable gradient class is now found in only 5.5 miles (3.0%) of the mainstem. Dams in Mosherville, Marshall, Ceresco, Kalamazoo, and Plainwell have inundated many of the high-gradient areas. These dams and their impoundments have eliminated and fragmented some of the best pool and riffle habitat.

The channel cross section of the Kalamazoo River is normal, based on stream widths compared to average discharge. The headwaters are characterized as having a narrow channel that is straight to meandering. The channel widens going downstream through the upper and middle segments. The river channel narrows in the middle and lower segments as it meanders confined in a narrow glacial valley and widens again near the mouth. Substrates in the headwaters consist of mostly sand and gravel. The upper segment has more diverse substrates that are made up of more sand and gravel with some cobble. The middle segment near Plainwell has the greatest abundance of gravel and cobble. The mouth is dominated by sand and silt substrate as the river begins to lose power and deposits its bedload. Woody cover is common in the mainstem but varies in tributaries. Agricultural activities such as stream dredging and riparian vegetation clearing has removed or reduced the availability of woody structure. Woody cover creates excellent fish habitat and provides good substrate for production of aquatic insects and other fish food organisms.

There are 110 dams in the Kalamazoo River watershed registered with Michigan Department of Environmental Quality. Fifteen are on the mainstem. Dams fragment river systems and turn high

gradient river habitat into slow flowing habitat more typical of a shallow lake. Dams were generally constructed in areas of highest stream gradient. These high-gradient riverine areas are essential spawning habitat for several species of fish. Dams impede fish movements to refuge habitats, fragment populations, and block spawning migrations. Mortality or injury often results while passing through or over dams, especially those with hydroelectric turbines. Great Lakes migratory fish can move from Lake Michigan upstream 26 miles to the Lake Allegan Dam. Impoundments can increase stream temperatures resulting in an elimination of certain aquatic species below dams. Dams also act as sediment and woody structure traps. Sediment-free water released below dams has high erosive power and can cause bank and bed erosion. Dams and lake-level control structures disrupt seasonal flow patterns by reducing incidence and severity of flooding.

Point source water pollution from industrial and municipal sources in the watershed has decreased significantly over the past 20 years. Pollution from point sources will continue to be reduced as municipal wastewater treatment plants upgrade their facilities and technology and industrial discharge permits are tightened. However, PCB contaminated sediments from historical discharges have continued to degrade wildlife populations and have resulted in nearly a complete ban on fish consumption between the city of Kalamazoo and Lake Allegan.

Nonpoint source pollution is the greatest factor that degrades water quality. This type of pollution generally consists of sediments, nutrients, bacteria, organic chemicals, and inorganic chemicals from agricultural fields, livestock feedlots, construction sites, parking lots, urban streets, septic seepage, and open dumps. Implementing best management practices with farmland, construction sites, and urban development designs can significantly reduce runoff, erosion, and influxes of sediment, nutrients, and other chemicals to lakes and streams.

Based on Michigan Fish Commission surveys as early as the 1880s and fish collections from the University of Michigan, Museum of Zoology, the Kalamazoo River watershed originally had 89 fish species. The watershed now contains 102 species of fish due to intentional and accidental introductions. Rare species such as the lake sturgeon (threatened) and creek chubsucker (endangered) can be found within the watershed while the weed shiner has been extirpated. Although present fish species diversity in the watershed remains high, certain species of fish have declined. Dams on the mainstem create barriers to upstream migration of potamodromous fish. Dams have inundated high-gradient areas that have 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. Silt-tolerant fish species have increased in the watershed, whereas fishes requiring clean gravel substrate or clean water with aquatic vegetation at some point of their life cycles have declined. Agricultural and urban development activities have reduced flow stability and increased sediment load in streams throughout the watershed. Introduced pest species including sea lamprey, zebra mussels, rusty crayfish, purple loosestrife, and Eurasian milfoil have had negative effects on native fishes and macroinvertebrates. Draining and filling of wetlands has negatively affected populations of fish, amphibians, reptiles, birds, and mammals.

Fishery management of the Kalamazoo River mainstem and tributaries ranges from minimal in the headwater and upper segments to more active in the middle, lower, and mouth segments. Stocking fish is the main management tool used throughout the watershed. Coldwater fishery management has been vigorous at times and continues to be a high priority for tributary streams. Development and enhancement of warmwater fishing opportunities are needed in the upper, middle, and lower mainstem and tributaries. Dam removal and PCB contaminated sediment clean-up are the two most important management options for the middle and lower segments. They would significantly improve the resident fishery and angler use, provide a potamodromous fishery up to the city of Kalamazoo, and increase available habitat for lake sturgeon rehabilitation. The lower 26 miles has an excellent fishery that consists of Chinook salmon, steelhead, walleye, and channel catfish. The salmon fishery

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is primarily supported by stocking with some natural reproduction from tributaries such as Rabbit River, Sand, and Bear creeks.

Recreational use of the river is highest within the mouth segment. The Allegan State Game Area provides 48,000 acres of state-owned land in the lower river and mouth areas. Many people use the river corridor and area lakes for fishing, canoeing, motor boating, swimming, picnicking, and hunting. Lack of assured public access is the largest deterrent to the recreational potential of upstream areas and tributaries. There are only 17 boat and canoe launches on the mainstem. This is an average of one launch site every 10 miles of river. Most recreation plans strive for at least one access site every six miles.

The Kalamazoo River's public image was tainted until the late 1990s. A growing public interest for the river has begun to change the river's image. Several organizations now work on various aspects of the river including fishing, hunting, and other recreational use. The Kalamazoo Valley Chapter of Trout Unlimited has been improving coldwater fisheries in the watershed since 1965. The Kalamazoo River Protection Association and several other local organizations have been instrumental in keeping PCB river clean-up plans moving forward. With decreases in government funding and personnel, public involvement through local and watershed organizations will continue to be important to ensure that habitat protection and enhancement of water quality and recreational opportunities move forward in the Kalamazoo River watershed.