

St. Joseph River Assessment

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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 St. Joseph 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 opportunities and solving problems. Hopefully, this river assessment will increase public awareness of the St. Joseph 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 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 response. The river assessment is the nucleus of the report. The characteristics of the St. Joseph River and its watershed are described in twelve sections: geography, history, geology and hydrology, channel morphology, dams and barriers, soils and land use patterns, 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. They are intended to provide a foundation for public discussions and comment.

The St. Joseph River and its tributaries form a network draining approximately 4,685 square miles of southwest Michigan and northern Indiana. The mainstem is 210 miles long and there are 1,641 miles of tributaries. Major tributaries include Prairie, Coldwater, Fawn, Pigeon, Elkhart, Dowagiac, and Paw Paw rivers.

For purpose of discussion, the St. Joseph River mainstem is divided into five sections called valley segments. 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 section is from Baw Beese Lake to Union City. The upper segment is cool and moderately stable and extends down to Mendon. The river goes from medium to large in the middle segment (from Mendon to Elkhart) as it drains a major portion of the watershed. The lower segment is in a confined valley as it cuts through the Kalamazoo moraine and extends 65 miles downstream of Elkhart. The last 8 miles of river flows across a lake plain and makes up the mouth segment.

The hydrology of the St. Joseph 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 St. Joseph River. The headwater and upper segments have fairly stable flows; however, some tributaries in the middle segment have decreased flow stability. **Tributaries in the lower and mouth segments have the most stable flows including Juday Creek, Dowagiac and Paw Paw rivers.** Less permeable soils coupled with agricultural land use lead to stream flow instability. 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 tends to be to developments within the floodplain.

The average gradient of the St. Joseph River mainstem is 2.5 feet per mile with a range of 0-45 feet per mile. The best gradients on the mainstem (5-45 feet per mile) are in the headwaters below Baw Beese Lake and in small reaches near Union City, Sturgis Dam, and Niles. The lowest gradient (0 feet per mile) is at Sturgeon Lake near the town of Colon. The mainstem of the St. Joseph River is mostly low-gradient channel - 157.5 miles (74.9%) having 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 1.9 miles (0.9%) of the mainstem. Dams in Litchfield, Union City (Riley Dam), Centreville (Sturgis Dam), Mottville, Elkhart, Niles, and Buchanan have inundated many of the high-gradient areas. These dams and their impoundments have eliminated and fragmented some of the best fish habitat on the river.

The channel cross section of the St. Joseph 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 lower segment as it meanders confined in a narrow glacial valley and widens again near the mouth. Tributaries in the middle and lower segments including Pigeon, Forker, and Juday creeks and the Dowagiac River have significantly narrow channels due to channelization. Substrates in the headwaters consist of mostly silt and sand. The upper and middle segments have more diverse substrates that are made up of more sand and gravel with some cobble. The best substrate is in the lower segment where there is more gravel and cobble. The mouth segment has more sand and silt substrate as the river begins to lose power. 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 debris. Woody cover creates excellent fish habitat and provides good substrate for production of aquatic insects and other fish food organisms.

There are 190 dams in the St. Joseph River watershed registered with Michigan Department of Environmental Quality and Indiana Department of Natural Resources. Seventeen are on the mainstem. Dams fragment river systems and turn high gradient river habitat into lentic habitat. 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, segment populations, and block spawning migrations. Mortality or injury often results while passing through or over dams, especially those with hydroelectric turbines. Potamodromous fish can migrate from Lake Michigan to the Twin Branch Dam through the use of fish ladders at Berrien Springs, Buchanan, Niles, South Bend, and Mishawaka dams. Salmonines composed 99.6% of all fish passed at the ladders. Existing

ladder designs are not sufficient to pass warm water species. Impoundments created by dams warm temperatures and can lead to elimination of certain aquatic species below dams. Dams also act as sediment and woody debris traps. Sediment-free water released below dams has high erosive power and can cause bank erosion. Seasonal flow is disrupted with dams and lake-level control structures by reducing incidence and severity of flooding.

The headwater segment has nine dams that are used for recreation and lake-level control structures. None of the mainstem dams in this area have official portage facilities. There are 24 dams in the upper segment. The Riley Dam at Union City is the largest and only hydroelectric dam in this segment that is not licensed by the Federal Energy Regulatory Commission (FERC). The middle segment has the most dams (104); Sturgis, Three Rivers, Mottville, Constantine, and Elkhart are all hydroelectric dams on the mainstem. Thirty-two dams exist in the lower segment, and four of the eight dams on the mainstem are hydroelectric. Berrien Springs is the only dam in this section exempt from FERC licensing due to an Act of the U.S. Congress. Entrainment at the Niles (French Paper) and Buchanan dams was 12.3% and 21% for chinook salmon and 2.3% and 19.8% for steelhead, respectively. Temporary turbine shut downs in May reduce entrainment mortality for chinook salmon and to a lesser degree for steelhead. **There are 24 registered dams in the mouth segment that are all within the Paw Paw River sub-watershed.** These dams are all low head or on small tributaries, so potamodromous trout and salmon can migrate into its headwaters at Campbell Creek.

Land use in the St. Joseph River watershed is dominated by agriculture (58%) followed by forested land (19.8%) and urban development (7.7%) based on Michigan counties in the watershed. 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 in the watershed are located along the mainstem, and many have significant effects on water quality. The lower and mouth segments are also threatened by increased development pressure. High-speed rail with service from Niles to Chicago is expected to increase residential development of commuters. The potential increase of impervious surfaces (roofs, parking lots, and roads) could change the hydrology of several groundwater fed streams.

Point source water pollution from industrial and municipal sources in the St. Joseph River watershed has decreased significantly over the past 30 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, combined sewer overflows from Elkhart and South Bend, Indiana continue to be a problem and are the cause for non-attainment of designated water uses in the lower segment.

Nonpoint source pollution is the greatest factor that degrades water quality in this watershed. 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. streams in southwest Michigan.

Based on Michigan Fish Commission surveys as early as the 1880s and fish collections from the University of Michigan, Museum of Zoology, the St. Joseph River watershed originally

had 97 fish species. The watershed now contains 114 species of fish due to intentional and accidental introductions. The creek chubsucker, river herring, and lake sturgeon are present and considered threatened in the state of Michigan. Although present fish species diversity in the St. Joseph River watershed remains high, certain species of fish have declined. Dams on the mainstem and headwaters 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 St. Joseph River mainstem and tributaries ranges from low in the headwater and upper segments to high in the lower and mouth segments. Stocking fish is the main management tool used in the headwater and lower segments. Development and enhancement of warmwater fishing opportunities are needed in this area. The Interstate Anadromous Fish Passage Project between the states of Indiana and Michigan has created unique fishing opportunities in the lower and mouth segments by installing fish ladders at five dams, building new boat launches, and construction of the Twin Branch Fish Hatchery in Indiana. In conjunction with this project, fish passage is estimated at three dams using time-lapse video recording, catch rates are estimated through creel surveys, and salmon and trout are stocked. There are also several tributaries in the lower segment managed for brown trout through stocking and habitat improvement projects.

Recreational use of the river is high in the middle, lower, and mouth segments. Many people use the river and corridor for fishing, canoeing, motor boating, swimming, picnicking, and hunting. Lack of assured public access is the largest deterrent to the recreational potential of the mainstem and tributaries. There are only 17 boat and canoe launches on the mainstem. This is an average of one launch site every 12 miles of river. Canoe portages at dams are also lacking. Hydroelectric dams are required to install portages through FERC licensing, but owners of other dams are not required by law to build them.

The St. Joseph River watershed has an improving public image with growing public support. Several organizations work on various aspects of the river including fishing, hunting, and other recreational use. Most groups work at the local level, but Trout Unlimited and Friends of the St. Joseph River work at a watershed level. With decreases in government funding and personnel, public involvement through local and watershed organizations is important to ensure that habitat protection and enhancement of water quality and recreational opportunities continues to move forward in the St. Joseph River watershed.