

EXECUTIVE SUMMARY

Introduction

This is one in a series of river assessments being prepared by the Michigan Department of Natural Resources, Fisheries Division, for Michigan rivers. This report describes physical and biological characteristics of the Clinton River, discusses how human activities have influenced the river, and will serve as an information base for managing the river's future.

River assessments are intended to provide a comprehensive reference for citizens and agency personnel who need information about a river. 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 Clinton 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 responses. The river assessment is the nucleus of the report. The characteristics of the Clinton River and its watershed are described in twelve sections: geography, history, geology and hydrology, soil and land use patterns, channel morphology, dams and barriers, special jurisdictions, water quality, 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. They are intended to provide a foundation for public discussion, setting priorities, and planning the future of the Clinton River.

Geography

The Clinton River drains approximately 763 square miles of Southeast Michigan into Lake St. Clair. The mainstem is 79 miles long with 260 miles of major tributaries. Most of the watershed is included in Oakland and Macomb counties, a portion in Wayne County, with a very small section that reaches into St. Clair and Lapeer counties. Major tributaries include Sashabaw Creek, Galloway Creek, Paint Creek, Stony Creek, Red Run, Middle Branch of the Clinton River, North Branch of the Clinton River, and the Clinton River Cut-off Channel.

For the purpose of discussion, the Clinton 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 Segment is from the Clinton River's origin in north-central Oakland County to Middle Lake in Clarkston. The river in this segment is small, cool with good gradient, and fair base flow. The Upper Segment extends to Interstate-75, just south and east of the City of Pontiac. The river in this segment is wider, has less gradient, and is dominated by the large number of lakes that it passes through. The Middle Segment extends to M-59 in Utica. The river increases in gradient and water temperature cools from groundwater inflow and the influence of cool to cold water tributaries: Galloway and Paint creeks. Decreasing gradient and increasing temperature characterize the Lower Segment, which ends at the confluence with the North Branch of the Clinton

River. The Mouth Segment is the final section and is characterized as wide, with very low gradient and warm water.

History

The Clinton River watershed has a colorful history. Native Americans used the river as a transportation route and its fishes for food. Europeans originally used the river for trapping and fishing, and then built mills to harvest the rivers power. The human population increased dramatically, especially following the end of World War II. The Clinton River watershed is today the most populous watershed in the state. Rapid industrial and residential growth have had major effects.

Geology and Hydrology

The hydrology of the Clinton River is strongly influenced by glacial deposits. Surface geology of the watershed is composed of two very distinct areas. The west half of the watershed, which includes the Headwaters, Upper and Middle segments, is made up of a complex mosaic of outwash deposits and moraines which are well drained. The eastern half of the watershed is dominated by clay lake plain and sand lake plain and soils associated with these areas have low infiltration capacity.

Over its 79 miles, the Clinton River drops a total of 465 ft, or an average gradient of 5.9 ft per mile. The gradient varies among river segments; averaging 9.1 ft per mile in the Headwaters Segment, 4.6 ft per mile in the Upper Segment, 12.1 ft per mile in the Middle Segment, and 2.8 and 0.4 ft per mile in the Lower and Mouth segments. Fish and other aquatic animals are typically most diverse and productive in river sections with higher gradient and well established riffle-pool sequences with good hydraulic diversity. However, urbanization, stream channelization, filling of wetlands, and installation of drainage systems for agriculture and urban development have contributed to stream flow instability throughout portions of the watershed.

Soils and Land Use Patterns

Land use in the Clinton River watershed is split between agriculture (37%) and urban areas (32%), followed by forested (21%), wetlands (6%), and open water (4%). Channelization, drainage of wetlands, and installation of artificial drainage systems have altered stream temperature regimes and decreased flow stability. Even though a large portion of the watershed is already developed, significant growth of urban areas is anticipated. The increase in urban areas caused the growth and spread of impervious surfaces which threaten environmental quality of surface and groundwater resources. Increases in impervious surfaces cause dramatic changes in timing and volume of storm water delivered to nearby streams, causing a decrease in rate of groundwater recharge and increase in stream erosion rates.

Channel Morphology

Channel width increases as the river proceeds downstream; averaging 14.2 ft wide in the Headwaters Segment, 54.2 ft in the Upper Segment, 55.7 ft in the Middle Segment, 76.4 ft in the Lower Segment and 175.7 ft in the Mouth Segment. Gradient varied among segments, with gradient being 12.4 ft per mile in the Middle Segment, 9.1 ft per mile in the Headwaters Segment, and the other three segments ranging from 0.4 to 3.1 ft per mile. Tributaries such as Galloway and Paint creeks are small (average 16.7 to 26.3 ft wide), high gradient streams (average 16.7 to 17.7 ft per mile gradient).

Dams and Barriers

There are 79 dams in the Clinton River watershed, with 62% occurring in the Clinton River, Paint Creek, and Stony Creek subwatersheds. Most dams are private and the listed purpose is recreation. Dams have a direct affect on a river environment by altering the natural cycle of water flow, fragmenting river continuity, blocking fish passage, and modifying downstream flows, temperature, water quality, and habitat.

Water Quality

Historically, the Clinton River has suffered from degraded water quality below the City of Pontiac due to unregulated discharges by industries and municipalities. Point source pollution has decreased over the past thirty years through restrictive discharge regulations and with improved water treatment technology and managerial practices. Pollution from point sources will continue to be reduced as municipal wastewater treatment plants upgrade their facilities and restrictions on industrial discharge permits are tightened. Unfortunately, many chemicals from prior industrial discharges persist in the sediments of the Clinton River.

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.

Increased volume and rate of runoff from impervious surfaces and concentration of pollutants in runoff are two issues associated with storm water control. Increases in flow from storm water runoff contribute to habitat modification and loss, increase flooding, decrease aquatic biological diversity, increase sedimentation and erosion. The NPDES Phase II permitting process provides a framework for addressing storm water and flow issues, with seven active subwatershed groups involving nearly 50 municipal, county, and school jurisdictions.

Special Jurisdictions

Several government agencies have regulatory responsibilities that affect the river. The Michigan Department of Natural Resources and Environmental Quality manage natural resources and state-owned lands, and enforce environmental regulations. The U.S. Fish and Wildlife Service, U.S. Department of Agriculture, and U.S. Environmental Protection Agency all have responsibilities for specific federal mandates. Counties and townships are involved in planning and zoning activities.

Biological Communities

There is little information on the Clinton River's original fish community, although fisheries surveys show 100 species of fishes recently in the Clinton River drainage. Most species are native, although 3 species have colonized and 17 species were introduced (some intentional and others accidental). Four introduced species (coho and kokanee salmon, cutthroat trout, and lake whitefish) are no longer present because their stocking programs have stopped. Nine species have been identified as status unknown because they have not been captured during recent fisheries surveys. Although present fish species richness in the Clinton River watershed remains high, certain species have declined.

Watershed development has favored tolerant species with broad habitat requirements. Agricultural and urban development activities have reduced flow stability and increased sediment loads. The abundance of silt-tolerant fish species have increased, whereas fishes requiring clean gravel substrate or clean water with aquatic vegetation at some point in their life cycles have declined. Introduced pest species including sea lamprey, zebra mussels, rusty crayfish, purple loosestrife, and Eurasian milfoil have had negative effects on native fishes and invertebrates.

Fish sampling was conducted by Fisheries Division at 38 sites throughout the watershed during the summer of 2001 and 2002. Sixty-one species of fish were caught, with white suckers, creek chubs, bluegills, green sunfish, largemouth bass, and johnny darters being the most frequently seen species among sites. This most recent fish sampling found that both species richness and fish densities improved dramatically from that found during an extensive survey in 1973. These findings support an improvement in water quality over the past thirty years.

The invertebrate community can provide a direct indication of water quality because they are less mobile than fish. The headwaters area and some major tributaries, such as Paint Creek and North Branch of Clinton River have good species diversity, including sensitive species that are indicators of good water quality. However, abundance of sensitive species has declined in recent samples, indicating reduced water quality. Conversely, other sections that were severely degraded, such as downstream of Pontiac, have shown recovery.

A comprehensive mussel survey was conducted throughout the watershed in 1977 and 1978. Species richness in the Clinton River was excellent (26 species). A small population of purple lilliput is the only known location of the species in the state, however recent surveys indicate its density is declining. The upper Clinton also supports what is likely the only population of rayed bean living in Michigan's streams. Many species found in the Clinton River have been extirpated from their range in eastern Michigan, and the North Branch, as of 1978, contained the finest remaining example of a large river mussel fauna in eastern Michigan. A 2004 survey duplicating the 1977 and 1978 sites and methods indicated that overall species richness had declined further, from 26 in 1978 to 14 in 2004 and this decline had occurred in all seven major tributaries of the river. In addition to decreasing species richness, mussel density declined. This recent decline is likely due to the extremes in flow instability. Flashiness results in bottom scouring and mussel displacement during high-water events as well as flow stoppage during low-water periods.

Fishery Management

Fishery management of the Clinton River ranges from low in the Headwaters and Upper segments to high in the Middle and Lower segments, and Paint Creek. Past management practices have included fish stocking, habitat improvements, fishing regulations, and chemical reclamation to reduce competitors. A number of fish species have been stocked at various times and locations. Current significant sport fisheries include a brown trout fishery on Paint Creek and a seasonal steelhead and walleye fishery on the lower portion of the Clinton River. There are also ongoing stocking efforts at various lakes.

Recreational Use

Recreational use of the Clinton River is limited in the Headwater Segment, but is high in the rest of the watershed. The abundance of lakes in the Upper Segment provides opportunities for fishing and recreational boating. Many people use the Middle, Lower, and Mouth segments, as well as tributaries and corridors for fishing, canoeing, picnicking, trapping, and hunting. The recreation value of the

Clinton River Assessment

Clinton River system is huge due to its proximity and accessibility to Southeast Michigan anglers. There are 1.4 million residents living in the Clinton River watershed, the state's most populous. However, the potential use of the river is limited by public access and high bacteria levels. Improved public access throughout the river and corrective action to reduce bacterial contamination will improve recreational potential.

Citizen Involvement

The Clinton River watershed has an improving public image with growing public support. Several organizations work on various aspects of the river including fishing, canoeing, and other recreational use. With decreases in government funding and personnel, public involvement through local and watershed organizations are important to ensure that habitat protection and enhancement of water quality and recreational opportunities continues to move forward in the Clinton River watershed.