Manistee River (Middle)
Wexford, Missaukee, Kalkaska Counties
Manistee River Watershed, last surveyed 2016

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Environment

The Manistee River is located in the northwestern part of Michigan's Lower Peninsula, and is one of the largest watersheds in Michigan. It is approximately 232 miles in length and drains an area of approximately 1,780 square miles (Rozich 1998). The watershed encompasses sections of ten different counties, including Antrim, Otsego, Crawford, Kalkaska, Missaukee, Grand Traverse, Wexford, Osceola, Lake, and Manistee. The Manistee River begins as springs emanating from cedar swamps in southeastern Antrim County. From there, it flows south through southwestern Otsego County and northwestern Crawford County. Shortly after flowing under M-72, the Manistee River turns to the southwest and enters Kalkaska County. It continues on a southwest course through Kalkaska, Missaukee, and Wexford Counties. Shortly after entering Manistee County, the river turns essentially due west and flows into Manistee Lake, and then into Lake Michigan.

This report will focus on the reach of the Manistee River from the Sharon area of Kalkaska County downstream to the Mesick area of Wexford County (Figures 1-4). This reach is approximately 83.6 river miles in length and is commonly known as the Middle Manistee River. The Middle Manistee River is much less well-known than either the Lower Manistee River below Tippy and Hodenpyl Dams (Tonello 2004a and 2004b) or the Upper Manistee River, upstream from Sharon. The Upper Manistee River provides cold water temperatures and robust wild trout populations, while the Lower Manistee River (below Tippy Dam) supports world-renowned runs of Chinook Salmon and Steelhead. Both reaches see much heavier fishing pressure than the Middle Manistee River.

Road crossings of the Middle Manistee River (Figures 1-4) include North Sharon Road, West Sharon Road, M-66 (also known as Smithville Bridge), Coster Road, Lucas Road (also known as Missaukee Bridge), US-131, 29 ½ Rd. (also known as Baxter Bridge), 19 Rd. (also known as Harvey Bridge), M-37 (also known as Sherman Bridge), 11 Rd. (also known as Glengary Bridge), and M-115. Public access sites with boat launches are available at Thayer Road (just upstream of West Sharon Road Bridge), Sandbanks Public Access Site (PAS; off Dutch John Road downstream of West Sharon Road), Smithville PAS (just downstream of M-66), Rainbow Jim's PAS (off Coster Road), Missaukee Bridge PAS, US-131 PAS, Baxter Bridge PAS, Harvey Bridge PAS, and Veteran's Memorial Community Park, just downstream of M-115. The Rainbow Jim's access site is named for James F. Coster III, a legendary river guide who fished and guided anglers on the Middle Manistee River from about 1920 until his passing in 1967 (Wells 2000).

The landscape surrounding the Middle Manistee River is hilly and mostly forested, primarily with northern hardwoods and conifers. There are also large wetland complexes present, along with a few agricultural areas. Land ownership is a mix of private and state, with large tracts of state forest land. Human development is relatively sparse, and there are no large towns near the Middle Manistee River. The highest elevation in the area is found near Mesick, where Briar Hill reaches a height of 1,650 feet (the second highest point in the Lower Peninsula). Other areas with higher elevations include the

Giddings area (just east of Sharon) at 1,289 feet and the Missaukee Mountain area, which reaches 1,437 feet. The area's soils are primarily glacial sand/gravel, and highly permeable. This leads to high groundwater recharge rates, making the Manistee River one of the most stable rivers in the United States (Rozich 1998). Near Sherman, MI, the Manistee River carries a base-flow of approximately 900 cubic feet per second (cfs).

Over its 83.6 mile course from North Sharon Road to the M-115 crossing, the Middle Manistee River falls approximately 228 feet. This leads to an average gradient of 2.7 ft/mile (Table 1). Within the Middle Manistee River, the reach from M-66 to Rainbow Jim's has the highest gradient, at approximately 4.2 ft/mile. The reach from US-131 to Baxter Bridge carries the lowest gradient, at approximately 2.0 ft/mile (Table 1). In contrast, other reaches of the Manistee River have higher gradients. According to Rozich (1998), the Upper Manistee River has a gradient of approximately 5.9 ft/mile, while the reach inundated by Hodenpyl Dam has a gradient of approximately 11 ft/mile. The reach inundated by Tippy Dam carries a gradient of 6.0 ft/mile.

The Middle Manistee River has a number of notable tributaries entering it. The North Branch of the Manistee River is the largest (Tonello 2018). The North Branch and Big Cannon Creek both flow in just upstream of West Sharon Road. Willow and Maple Creeks join the Middle Manistee just downstream of West Sharon Road. Little Cannon Creek joins just upstream of M-66, while Filer and Nelson Creeks join just downstream of M-66. Spring Creek flows in just upstream of Coster Road, while Ham Creek flows in between Coster Road and Lucas Road. Hopkins, Morissy, and Chase Creeks join between Lucas Road and US-131, as does the Fife Lake Outlet. Streams joining between US-131 and Baxter Bridge include the Walton Creek, Manton Creek, Sands Creek, Buttermilk Creek, and Silver Creek. Between Baxter and Harvey Bridges, the tributaries include Apple, Blind, Soper, Filer, and Anderson Creeks. Between Harvey Bridge and Hodenpyl Pond, the tributaries include Adams, Cole, Wheeler, and Burkett Creeks. All of these tributaries are Designated Trout Streams.

Due to the presence of Tippy and Hodenpyl Dams further downstream, the Middle Manistee River is inaccessible to migratory fish from Lake Michigan. Tippy and Hodenpyl Dams are large hydropower dams operated by Consumers Energy. Hodenpyl Dam, located near Mesick, MI, creates a 2,025-acre impoundment known as Hodenpyl Pond (Tonello 2012). It is possible for fish to migrate upstream into the Middle Manistee River from Hodenpyl Pond.

Much of the Middle Manistee River is classified as a State-designated Natural River, as it was included when the Upper Manistee River was designated in 2004. The Natural River designation consists of zoning that is designed to protect the natural character of a river. The Natural River designation applies from the headwaters of the Manistee River downstream to the Missaukee/Wexford County line. Most of the tributaries upstream of the Wexford/Missaukee County line are also included in the Natural River designation.

The Middle Manistee River is regulated by MDNR as a Type 4 fishing stream. This means that it can be fished year-round. Brown Trout and Brook Trout are closed to harvest from September 30 through the last Saturday in April, although Rainbow Trout can be kept year-round. The minimum size limit for both Brown and Rainbow Trout is 10 inches, while it is 7 inches for Brook Trout. A total of five Trout can be kept per day, with no more than three fish over 15 inches.

The first known non-profit group dedicated to the Manistee River was the "Manistee River Association" that existed in the 1950s, based out of Fife Lake. However, that group went silent at some point, leading to the establishment of the Upper Manistee River Association (UMRA). UMRA is a non-profit group that is dedicated solely to the Manistee River. The group was established in July of 1966, and advocates for the Manistee River from its headwaters downstream to US-131 (although most of their members come from the Upper Manistee River upstream from Sharon). UMRA's membership consists mostly of Manistee River riparian landowners.

In the late-1980s, a number of other conservation minded groups joined together to form the Upper Manistee River Restoration Committee (UMRRC; Kutkuhn 1990, 1993). The UMRRC is dedicated to habitat improvement of the Manistee River. Primary participants of the UMRRC have included Conservation Resource Alliance, Huron Pines, the Kalkaska Conservation District, several county road commissions, and a number of different Trout Unlimited chapters. Over the 25 years since its inception, UMRRC has tackled a number of different projects, including streambank stabilization, instream fisheries habitat improvement, sand trap establishment and maintenance, dam removal, road stream crossing replacement, and even public access site maintenance and improvement.

History

Over the years, the Upper Manistee River, from Sharon upstream to the headwaters, has captured far more attention from anglers and professional river guides than has the Middle Manistee. The Upper Manistee is smaller, colder, more wadeable, and easier to fish. The Middle Manistee is bigger, warmer, and more difficult to wade. The same can be said for fisheries management. Over the years, the Upper Manistee River has received far more attention from fisheries managers than the Middle Manistee River. This is likely due in part to the fact that it is colder, holds higher densities of trout, and is more heavily fished than the Middle Manistee. Fisheries index stations at Cameron Bridge and M-72 in Crawford County have been surveyed on a more regular basis than any station in the Middle Manistee River (Tonello 2011, 2015).

Although there are no records of the original fish community of the Middle Manistee River, the Arctic Grayling was likely the only native salmonid inhabitant of the river, and existed in large numbers in the upper and middle reaches of the Manistee River. Vincent (1962) also mentions that Arctic Grayling were historically documented from Fife Lake, which is directly connected to the Middle Manistee River via a tributary stream. It is likely that Arctic Grayling migrated between Fife Lake and the Manistee River via that tributary. According to Vincent (1962), Brook Trout were not native to the Manistee River, and were not present in the Upper Manistee River until around 1900. Brown and Rainbow Trout had been stocked in other streams in the mid-1880s, but were not present in the Upper Manistee River until after the turn of the century. The Arctic Grayling disappeared from the Manistee River sometime in the early 1900s. Exactly why they disappeared is unclear, but overharvest and habitat degradation during the logging era may have played a part. Competition with introduced Brook Trout may have also played a role. By 1905 or shortly thereafter, Arctic Grayling were extirpated from all streams in the lower peninsula of Michigan (Vincent 1962).

The Middle Manistee River has an extensive history of fish stocking (Tables 2-4). The first known fish stocking on the Middle Manistee River occurred in 1879 when Chinook Salmon were stocked in Wexford County by the Michigan Fishery Commission (Table 2), although it is unknown where exactly they were stocked. This effort was unsuccessful, as there are no reports of adults ever

returning. The next recorded fish stocking for the Middle Manistee River occurred in 1910, when Largemouth Bass were stocked in the section located in Kalkaska County. Arctic Grayling were stocked in the Kalkaska County section in 1934, unsuccessfully. It was not until the late 1930s and into the 1940s that regular stockings of Rainbow, Brook, and Brown Trout were recorded (Tables 2-4). It is highly likely that earlier stockings occurred but were not recorded. Several times in the 1970s, adult steelhead were trapped below Tippy Dam on the Lower Manistee River and transported and released into the Middle Manistee River in Kalkaska County by the Michigan Department of Conservation (MDOC; the precursor to the Michigan Department of Natural Resources (MDNR) of today; Table 4).

MDOC continued to stock the Middle Manistee River primarily with Rainbow Trout through the late 1960s (Tables 2-4). At that time, the switch was made to Brown Trout, which have been stocked consistently since then. Private plantings of Rainbow Trout and some Brook Trout continued in the 1980s and 1990s, funded by UMRA. Arctic Grayling were again stocked in the Upper Manistee River in 1987 in a reintroduction attempt (Nuhfer 1992). The reintroduction attempt was not successful.

During the first half of the 1900s, the predominant salmonid in the Middle Manistee River was the Rainbow Trout (Wells 2000). Brook Trout were also present, but in smaller numbers. Brown Trout did not become well established until at least the 1950s in the Middle Manistee River. Reports of large rainbow trout, sometimes even exceeding 10 lbs, were common from the Middle Manistee River in the first half of the 1900s (Wells 2000).

In the mid-20th century, both the Middle and Upper Manistee River were managed by MDOC as put/take trout fisheries. Larger, catchable-sized trout were stocked early in the spring and then targeted by anglers throughout the summer. In the 1970s, the department began to move away from this strategy; instead they began stocking sub-legal yearling trout for put/grow/take. However, in the 1980s and 1990s, both MDNR Biologists and anglers began to realize the potential of the Upper Manistee River as a wild trout stream. Trout stocking was gradually reduced, and then stopped altogether in the Upper Manistee River in 2000. The Middle Manistee River lacks the cold water temperatures of the Upper Manistee, and therefore continues to be modestly stocked by MDNR on an annual basis with yearling Brown Trout in Wexford County (Table 2).

In addition to the MDNR stocking program, the Walton Junction Sportsman Club (WJSC) has stocked Brown Trout into the Middle Manistee River for many years. The program is a cooperative venture in which MDNR gives WJSC fingerling Brown Trout in the spring, and the club rears them in a raceway located on club property. Then in the fall, the club stocks the Brown Trout (classified as "fall fingerlings") into the Manistee River at various locations in Kalkaska, Missaukee, and Wexford Counties (Tables 2-4). The cooperative program began in 1972, and since that time, WJSC has stocked over 1,000,000 Brown Trout into the Manistee River.

The effect of Michigan's native Chestnut Lamprey on Manistee River sport fish populations has long been a topic of discussion, although primarily on the Upper Manistee. There are significant filings and much correspondence on them in MDNR files in Cadillac. They have been the subject of a number of different lamprey-targeted surveys and research reports (Crowe 1939, 1959; Allison 1944; Hall 1963; Nuhfer 1993). Most reports indicated that the largest populations of Chestnut Lamprey were found upstream from Sharon. In 1966, the Manistee River was treated for Chestnut Lamprey with Bayluscide, a commonly used lampricide, from Cameron Bridge in Crawford County downstream to

M-66 (Jacob 1966). The treatment reportedly resulted in a good kill of Chestnut Lamprey, but other fish species, including many trout, were also killed. According to Nuhfer (1993), there were anecdotal reports of better trout fishing after the treatment, but there was insufficient data to prove the effectiveness of the treatment.

Nuhfer's study (1993) showed that the Manistee River from 1989 to 1991 had a population of Chestnut Lampreys similar to that prior to the 1966 treatment. He suspected that hatchery practices from the 1960s made conditions ideal for Chestnut Lamprey; in particular, the stocking of larger, catchable-sized rainbow trout that may have been easy prey for the Chestnut Lampreys. Nuhfer recommended against further chemical lampricide treatments, believing that the costs (both financial and negative effects on trout and invertebrates) were not worth the potential benefits. No lamprey treatments have been conducted on the Manistee River since 1966.

In the late 1990s, conflicts between river users and riparian landowners led to the creation of an Upper Manistee River Access Committee. The committee had wide representation and consisted of representatives from MDNR, UMRA, Trout Unlimited, professional fishing guides, canoe livery owners, etc. The goal of the committee was to identify and address access problems and issues along the Upper Manistee River corridor. The group produced a report and an action plan (Anonymous 2006). The efforts of the group were primarily focused upstream from Sharon, as most of the conflict occurred on the Upper Manistee as opposed to the Middle Manistee. However, one major recommendation from the group was to create a new public access site in the Sharon area. The previous Sharon access site was right along a dangerous curve on West Sharon Road, and had very little public parking. As a result of this recommendation, a new, much safer access site was constructed by MDNR in 2008 off Thayer Road, just upstream of the West Sharon Road crossing of the Manistee River.

Other correspondence in MDNR Manistee River files (Cadillac office) refers to a number of different habitat improvement projects that have been conducted (mostly on the Upper Manistee, but some on the Middle Manistee) over the years. Other issues include continuous lively discussion over trout stocking (species, life stage, location, etc.), erosion control, sand input into the river, and greenbelt zoning (zoning designed to protect the areas directly adjacent to the streambanks). The greenbelt zoning issue became prominent when UMRA and the UMRRC (Kutkuhn 1990, 1993) requested that MDNR consider the Upper Manistee River for the Natural Rivers program. This finally came to fruition in 2003, when the Upper Manistee River (defined as the headwaters downstream to the Missaukee/Wexford county line) was adopted as a Natural River (Anonymous 2003).

Although the historical record of the fish community of the Middle Manistee River is very sparse, Lake Sturgeon were surely native and likely present in large numbers. Lake Sturgeon are a migratory species, presiding primarily in lakes (such as Lake Michigan or possibly Manistee Lake) that migrate up river systems to spawn. The construction of Tippy Dam (1918) and Hodenpyl Dam (1925) blocked Lake Sturgeon from accessing the Middle Manistee River. However, correspondence in MDNR files indicates that Lake Sturgeon were present in the Middle Manistee River in large numbers as recently as the 1940s. It is possible that a number of Lake Sturgeon became landlocked when Hodenpyl Dam was constructed, and wound up living in Hodenpyl Dam Pond, migrating upstream into the Middle Manistee River to spawn. Only one Lake Sturgeon sighting has been reported in recent years. In that report from 2004, an angler reported seeing a Lake Sturgeon just upstream of the M-115 crossing. The

angler was out at night bowfishing for redhorse when he observed the Lake Sturgeon, which he estimated to be at least five feet in length.

Historical Fisheries, Habitat, and Temperature Surveys

Historically, the fish populations of the Middle Manistee River have been infrequently surveyed, especially when compared to the Upper Manistee. This is due to a couple of factors, the first being that the Upper Manistee River is more popular with anglers and more heavily fished, and the second being that the Upper Manistee is smaller, more wadeable, and more suitable for surveying with tow barge electrofishing gear (which is utilized by wading). Due to its size and depth, a boomshocker boat is necessary for conducting fisheries surveys on the Middle Manistee River.

The first known fisheries survey of the Middle Manistee River was conducted by MDOC personnel in 1956 in Kalkaska County. The survey was conducted "upstream from Sharon Bridge along N. bank and through side channel." However it does not indicate which Sharon Bridge the crew was sampling near. Only trout were collected in this survey (Table 5). More electrofishing was conducted in 1958, when MDOC crews shocked upstream from the West Sharon Road and upstream from M-66. The 1958 surveys were more thorough, with 11 species recorded, though Brook Trout was the only salmonid (Table 5). They were conducted as part of a research project studying the Chestnut Lamprey population of the Manistee River (Crowe 1959).

More electrofishing surveys were conducted on the Middle Manistee River during 1966-1968 (Table 5). Sampling was conducted in 1966 prior to the lampricide treatment (Jacob 1966), and then in 1967 as a follow up to the treatment. The 1966 sites included the West Sharon Road bridge and near the M-66 bridge. In 1967 the West Sharon Road bridge site was again shocked, but there was more focus on the area downstream from M-66, with boomshocking occurring as far downstream as Missaukee Bridge (Lucas Road). In 1968, only the West Sharon Bridge area was surveyed. That effort was part of an experiment in which MDOC personnel passed adult Coho Salmon upstream over Tippy and Hodenpyl Dams in the fall of 1967 in an effort to see if they would be able to successfully reproduce in the Manistee River or its tributaries. While no juvenile Coho Salmon were caught in the Sharon Bridge survey of 1968, many juvenile Coho Salmon were caught in surveys on reaches of the Upper Manistee River, as well as in nearly all tributaries of the Manistee River from the headwaters to Mesick.

In the 1966 survey, Redside Dace were recorded as being caught at the West Sharon Road station. However, Redside Dace have not been observed anywhere in the Manistee River watershed since then, or anywhere else in the northwestern lower peninsula. It is likely that this identification was an error. Common Carp were recorded in 1967 from a survey conducted downstream from M-66. None have been captured or even observed in the Manistee River since then. In that same survey, there is record of several fish called "Sturgeon Suckers" being caught. There is no fish commonly known by that name, so it is unknown what these actually were. One possibility is that they were juvenile Lake Sturgeon, although no Lake Sturgeon have been documented before or since in any MDOC or MDNR fisheries surveys.

Another fisheries survey was conducted in the four miles below M-66 in 1970, as a follow-up to see how the river had recovered since the lampricide treatment, and in particular to see how the stocked trout were doing. Rainbow Trout were numerous in the survey, but Brown Trout were rare. Other surveys were conducted near the West Sharon Road bridge in 1987 and 1988 in response to angler

concerns regarding Chestnut Lampreys and reportedly poor trout fishing. Most of these concerns were directed at the Upper Manistee River. It was in this time period that the Upper Manistee River Restoration Committee formed, and that group initiated a major habitat improvement initiative on the Upper Manistee River, with some work conducted on the Middle Manistee as well.

Two reaches of the Middle Manistee River were intensively surveyed via boomshocker in August of 1995. The upper station was the first third of the float from M-66 to Rainbow Jim's, which resulted in approximately 4.5 hrs of shocking. In this reach, the researchers collected 19 different species of fish (Table 5), including Brown, Brook, and Rainbow Trout. The second reach surveyed in 1995 was from Rainbow Jim's to Missaukee Bridge. In 3 hrs of shocking this reach, 18 species were collected (Table 5), with Burbot and Northern Pike observed but not captured.

In 2001, MDNR staff surveyed two more reaches on the Middle Manistee River, both in Wexford County. The first consisted of 3.9 hrs of electrofishing with a boomshocker boat between US-131 and Baxter Bridge, and the second consisted of 3.5 hrs of electrofishing between Baxter Bridge and Harvey Bridge. In those surveys, twenty species were recorded as caught (although only gamefish, White Suckers and Redhorse spp. were tallied; Table 6). Catches of Brown and Rainbow Trout were relatively sparse, although Walleye were abundant. The Brown Trout and Rainbow Trout captured in the surveys were growing above state average, while the Walleye and Smallmouth Bass were growing below the state average (Table 7).

In the summer of 2002, a creel survey was conducted on the Manistee River in Wexford County. The reach surveyed ran from US-131 downstream to Harvey Bridge. The survey resulted in an effort estimate of 59,019 angler hours for the period from May through September. Fish species caught by anglers during the survey included Brown Trout, Rainbow Trout, Walleye, and Smallmouth Bass.

Biologists from the Michigan Department of Environmental Quality (MDEQ) have conducted habitat and macroinvertebrate sampling on the Middle Manistee River a number of times in recent years. In 2004 the two sites sampled were Rainbow Jim's and Harvey Bridge. Both sites earned scores of "Excellent" for both the habitat sampling and the macroinvertebrate sampling (Chambers 2017). In 2009, macroinvertebrate sampling was conducted at two locations on the Middle Manistee River in Wexford County. The first site was near the mouth of Blind Creek, and that site earned a score of "Good". The second site, located further downstream near 21 Road, earned a score of "Excellent" (Lipsey 2012). Similar studies were conducted at three locations on the Middle Manistee River in 2014, including the Rainbow Jim's PAS, and two sites downstream (2.3 miles and 6.8 miles) from Baxter Bridge. The macroinvertebrate populations at the Rainbow Jim's site rated as "Excellent," while the two sites downstream from Baxter Bridge had ratings of "Good" (Lipsey 2016).

During the summer of 2012, MDNR personnel conducted a temperature study of the Manistee River at the Rainbow Jim's PAS (Table 8). A continuous recording thermometer was placed in the river at the site, with hourly temperature readings taken. Average water temperatures were 63.6°F for June, 68.2°F for July, and 63.8°F for August. The maximum water temperature recorded for the summer was 76.4°F, in July. This is nearing the lethal maximum temperature for any of the trout species in the Manistee River.

From 1994 to mid-2018, a total of 28 exceptional fish caught from the Middle Manistee River have been entered into the DNR Fisheries Division Master Angler program (Table 9). The species with the most entries is Redhorse, with seven entries. Channel Catfish, Bluegill, White Sucker, Brook Trout, Northern Pike, Walleye, Black Crappie, and Rock Bass were the other species with entries in the program.

Current Status

The most recent MDNR fisheries surveys of the Middle Manistee River were conducted in September 2016. These were discretionary surveys designed to assess the status of all fish populations in the Middle Manistee River, with the secondary purpose being to assess the fish stocking programs of the Middle Manistee River. The surveys were conducted with an 18-foot boomshocker boat. Five sites were sampled, including Baxter Bridge, US-131, Rainbow Jim's, M-66, and West Sharon Road. At each site, one mile of river was sampled with three shocking runs. One shocking run was conducted adjacent to each bank, with a third run conducted down the middle of the river. A grand total of 2,008 fish were caught at the five sites, representing 25 different species (Tables 5 and 10-13).

The first site (and the furthest downstream site) sampled was Baxter Bridge, on September 15, 2016. At this site, the station ran from the bridge downstream for one mile. A total of 265 fish representing 22 species were caught (Table 14). The most numerous species caught were White Sucker, Shorthead Redhorse, and Logperch. Salmonids were represented by Brown Trout (12 caught from 3 to 16 inches in length; Table 11) and Rainbow Trout (4 caught from 3 to 6 inches in length; Table 12). Field notes for this station indicate that several of the Brown Trout had Chestnut Lampreys attached to them, and that approximately half of the Brown Trout appeared to be of hatchery origin, based on fin erosion.

The next site upstream was US-131, sampled on September 16, 2016. The station ran from US-131 bridge downstream for one mile. A total of 358 fish representing 19 species were caught (Table 15). The most common species at this site were White Sucker, Logperch, Shorthead Redhorse, Brown Trout, and Blackside Darter. Salmonids were represented by Brown Trout (27 caught from 2 to 18 inches; Table 11) and Rainbow Trout (14 caught from 3-8 inches; Table 12). Field notes from this station indicate that approximately half of the Brown Trout caught appeared to be of hatchery origin.

The next site upstream sampled was Rainbow Jim's, on September 19, 2016. The station ran from the Coster Road Bridge downstream for one mile. A total of 306 fish representing 18 species were caught (Table 16). The most abundant species at this site were Logperch, Brown Trout, White Sucker, and Northern Hog Sucker. Salmonids were represented by Brown Trout (57 caught from 3 to 15 inches; Table 11), Rainbow Trout (3 caught from 8 to 18 inches; Table 12), and Brook Trout (15 caught from 3 to 7 inches; Table 13). Field notes indicate that this reach was shallower than the Baxter or US-131 reaches, but that woody debris was abundant. Only one of the Brown Trout appeared to be of hatchery origin.

The fourth site sampled in 2016 was at M-66, on September 21. The station ran from the M-66 bridge downstream for one mile. In this reach, a total of 578 fish were caught, representing 18 species (Table 17). The most abundant species included Logperch, White Sucker, Brown Trout, Brook Trout, and Shorthead Redhorse. Salmonids were represented by Brown Trout (64 from 3 to 19 inches; Table 11) and Brook Trout (42 from 2 to 11 inches; Table 13). Anecdotally, the crew was not impressed with the

habitat in this reach, yet this was the best station surveyed in 2016 for Brook Trout abundance (Table 13), and the second best station for Brown Trout abundance (Table 11).

The furthest upstream site sampled in 2016 was West Sharon Road, on September 27. Since there is no boat launch nearby that will accommodate an 18 foot boomshocker boat, we had to launch at the M-66 launch and motor upstream to West Sharon Road. We attempted to shock for one mile upstream of West Sharon Road, but logs spanning the entire river blocked this attempt. So the shocking station here ran from approximately _ mile upstream of West Sharon Road to ¼ mile downstream of West Sharon Road. In this station we caught a total of 501 fish representing 17 species. Unlike the other stations, the majority of the fish caught here were salmonids, with 252 Brown Trout from 2 to 25 inches and 18 Brook Trout from 3 to 8 inches (Tables 11, 13, and 18). Other abundant species at this site included Shorthead Redhorse, White Sucker, and Northern Hog Sucker.

Age and growth analysis was conducted on the panfish, gamefish, and salmonids caught in the 2016 MDNR survey of the Middle Manistee River. Depending on the species of fish, scales or spines were used to determine the age of each fish (Tables 19-23). To make statistical comparisons with State of Michigan average growth rates, there must be at least five individuals from any particular age class. In the 2016 survey, only enough Brown Trout and Brook Trout were caught to make such statistical inferences. Brown Trout were growing above the State average at all five sites (Tables 19-23). The best Brown Trout growth rates were for fish at the West Sharon Road site (Table 23), which also had the highest number of Brown Trout aged, with statistical analysis possible for five different age classes. At all three sites where Brook Trout were caught, they were also growing above the State average (Tables 21-23).

Analysis and Discussion

Conducting comprehensive fisheries assessments on large rivers is always difficult. Even with large, time-consuming efforts, survey results are often incomplete. For example, the 2016 MDNR fisheries surveys of the Middle Manistee River (which took five full work days) covered only 5 miles out of the 84 miles or so of the Middle Manistee River. Even so, the 2016 fisheries surveys provided valuable insight into the fish populations of the Middle Manistee River. The surveys showed diverse fish populations, with 25 different species represented over the five different sampling sites (Table 10). Two species were captured that had not been previously recorded for the Middle Manistee River: Golden Redhorse and Rock Bass (Table 5).

Salmonids in the Middle Manistee River were represented by three species including Brown Trout, Rainbow Trout, and Brook Trout. Only Brown Trout are stocked in the reach, so the Rainbow and Brook Trout are assumed to be naturalized, self-sustaining populations. Brown Trout were present at all five sites, and their abundance increased progressively in an upstream direction. Brown Trout were by far the most abundant species at the West Sharon Road site. Although there is little temperature data available for the Middle Manistee River, it is likely that colder temperatures are found further upstream. While stocked Brown Trout (determined by fin erosion from hatchery raceways) were present at some of the lower survey sites, the survey sites upstream supported naturally reproduced Brown Trout. At least some natural reproduction of Brown Trout is occurring at all five sites, as evidenced by the presence of 3-inch (or smaller) Brown Trout at each site that could have only come from natural reproduction.

While Brown Trout are present throughout the Middle Manistee River, the distribution of Brook and Rainbow Trout in the Middle Manistee River is patchier. This assertion is based both on the 2016 fisheries survey and on discussions with anglers and professional river guides. For example, Rainbow Trout were only caught at the three furthest downstream survey stations in 2016, while Brook Trout were only caught at the three upstream survey stations. Rainbow Trout have also been caught in fisheries surveys of Middle Manistee tributaries, with Morissy, Hopkins, and Big Cannon Creeks holding the largest populations. There is no doubt migration occurs to some extent between the Middle Manistee River and the tributaries, as large Rainbow Trout (large enough to likely not be resident in a small tributary) in spawning colors have been caught from these tributaries in spring months (MDNR unpublished data). Although the largest Rainbow Trout from the 2016 survey was 18 inches in length, professional river guides and anglers tell of Rainbow Trout from the Middle Manistee that often top 20 inches and occasionally even approach 30 inches.

Although Brook Trout were present at the three uppermost stations, they were less abundant at the West Sharon Road site, which likely has the best habitat and coldest water temperatures of the five stations surveyed. They were most abundant at the M-66 site, which has poorer habitat (less cover and channel diversity, at least anecdotally). This may be due to the abundance of Brown Trout at the West Sharon Road site. Brown Trout are known to compete with and prey upon Brook Trout, so the Brown Trout abundance at the West Sharon Road site may be limiting Brook Trout abundance there. Professional river guides have described Brook Trout distribution and abundance as being closely related to areas where groundwater seeps cool river temperatures. This is a reasonable assumption given what's known about the temperature regime of the Middle Manistee River.

There seems to be seasonal variation to the fishery in the Middle Manistee River. Conservation Officers advise that between Mesick and US-131, there is a productive and popular Walleye fishery. However, this fishery tends to be best right after the season opener in late April, May, and early June (Walleye season opens on the last Saturday in April). It is highly likely that at least some of the Walleyes caught in the river are migrants from Hodenpyl Pond, which is stocked with Walleyes by MDNR and is also known to have naturally reproduced Walleyes as well (Tonello 2012). The Middle Manistee River offers excellent spawning and rearing habitat for Walleyes. While some Walleyes are still caught by anglers in summer months, the fishery does seem to decline when temperatures get hotter.

While Northern Pike were not found in large numbers in the 2016 surveys, they were present at all sites and grow to large sizes. Several Northern Pike of Master Angler proportions have been recorded from the Middle Manistee River (Table 9). Although they were not prominent in the 2016 survey, Smallmouth Bass is another species that provides opportunities for Middle Manistee River anglers. They tend to be more common in the lower reaches of the Middle Manistee River, closer to Mesick. Anecdotal information from anglers indicates that they seem to be more abundant in hotter summers. It is possible that they migrate upstream out of Hodenpyl Pond during the summer seeking cooler water temperatures.

While anglers do pursue the other species of the Middle Manistee River, Brown Trout is the most popular fish in this reach for anglers. The slightly warmer water temperatures present in the Middle Manistee River result in outstanding growth for both wild and stocked Brown Trout (Tables 19-23). While the Middle Manistee River may not offer huge numbers of Brown Trout for anglers, the trophy

potential is very high. Anglers and professional river guides occasionally report catching Brown Trout approaching 30 inches in length. The Brown Trout fishery of the Middle Manistee is somewhat seasonal in nature. We receive reports of excellent fishing for Brown Trout in May and June, but then it tends to slow somewhat in the hotter summer months. We suspect that in the hotter months, at least some of the Brown Trout migrate upstream in search of cooler water. Certainly not all of the Brown Trout leave the Middle Manistee River, as anglers do continue to report catching them in the hotter months, albeit in smaller numbers.

Management Direction

In general, the Middle Manistee River watershed is intact and healthy. It hosts self-sustaining populations of Brown, Brook, and Rainbow Trout, in addition to some stocked Brown Trout. The Middle Manistee River has remained a high-quality stream in part due to a lack of intensive human development adjacent to it and its tributaries. Much of the watershed is in a forested, undeveloped state. Therefore, the primary goal for the Middle Manistee River watershed should be protection. Wetlands are critical to the continued health of the watershed. Future riparian development and wetland loss may result in deterioration of the water quality and reduced aquatic habitat. In particular, wetland loss and additional impervious surfaces in the watershed would lead to more surface runoff, increased flashiness, and higher summer water temperatures, all of which could potentially make the watershed less hospitable for salmonids. The State of Michigan's Natural Rivers designation helps protect the Middle Manistee River and its tributaries from ecologically unwise land-use practices. Also, MDNR Fisheries Division should continue to work with MDEQ to evaluate lake/stream/wetland permits to ensure that proposed projects will not result in damage to the river or its fish populations.

The dams on the Lower Manistee River have a profound effect on the Middle Manistee River. In particular, they block fish passage and impound miles and miles of what would be higher gradient, cold water habitat. Because of the dams, migratory species from Lake Michigan, including Chinook and Coho Salmon, Steelhead, Lake Sturgeon, White Sucker, Longnose Sucker, and many others are precluded from accessing the Middle Manistee River and its tributaries. If those species were allowed access to the Middle Manistee River and its tributaries, they would certainly thrive and reproduce naturally. In addition, the Hodenpyl Dam impounds the Manistee River likely as far upstream as Harvey Bridge. The impoundment effect reduces flow and increases sedimentation that results in sandy habitat that does not favor salmonids.

The Middle Manistee River offers outstanding angling opportunities, in particular for Brown Trout and Walleye. Brook Trout, Rainbow Trout, Northern Pike, and Smallmouth Bass are also present and commonly caught by anglers. The Middle Manistee River also offers trophy potential, particularly for Brown Trout. In addition, the Middle Manistee River is renowned for its scenic beauty. It has miles of forested, undeveloped shoreline, with banks over 100' high. Professional river guides and anglers tell us that the variety, trophy potential, and aesthetics of the Middle Manistee River fishery make it an attractive section to fish. Despite these positives, the Middle Manistee River does not receive the fishing pressure that other reaches of Manistee River do. The Lower Manistee River, with its highly popular runs of Chinook Salmon, Coho Salmon, and Steelhead, is one of the most heavily fished sections of river in Michigan. The Upper Manistee River, with its cold temperatures, outstanding insect hatches, and robust wild Brown and Brook Trout populations is also very heavily fished, much more so than the Middle Manistee.

The Brown Trout stocking programs for the Middle Manistee River should continue. The current plan is for MDNR to stock 21,000 yearlings (Wild Rose strain) in Wexford County. Those fish are divided equally between three sites: US-131, Baxter Bridge, and Harvey Bridge. In addition, MDNR currently provides 30,000 spring fingerling Brown Trout (Wild Rose strain) to the Walton Junction Sportsman's Club. The WJSC rears the fish all summer and stocks them into the river in the fall, typically scatter-planting them between Rainbow Jim's and US-131. These stocking efforts no doubt contribute to the Brown Trout fishery of the Middle Manistee River, especially in the lower reaches downstream from Rainbow Jim's.

The Middle Manistee River would also benefit from further scientific study. In particular, temperature data should be collected from several different locations up and down the reach. Comparable temperature data from different locations within the Middle Manistee River would likely help explain the differences in fish species distribution. In addition to temperature data, further electrofishing surveys should be conducted within 10 years. The five sites surveyed in 2016 should be re-surveyed in a similar fashion. If time and staffing level allow, more sites should be sampled, including Missaukee Bridge (Lucas Road), and Baxter Bridge. Habitat evaluation data would also provide helpful insight for future fisheries management of this reach.

The Middle Manistee River watershed should be considered for Arctic Grayling reintroduction. MDNR and the Little River Band of Ottawa Indians, with a number of other partners and stakeholder groups have undertaken an initiative to reintroduce Arctic Grayling to Michigan waters where they once lived (Anonymous 2017). Several tributaries of the Middle Manistee River possess a number of attributes that should make them potential candidates for Arctic Grayling reintroduction, including cold stream temperatures and low numbers of potential competitor species. The presence of Brown Trout and warmer water temperatures of the Middle Manistee River itself may preclude Arctic Grayling from thriving in the Middle Manistee River mainstem. However, if successful restoration occurred in some of the tributaries, the Arctic Grayling would likely also inhabit the Middle Manistee River, at least in some capacity, perhaps seasonally.

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Figure 1. The Middle Manistee River near Mesick, Wexford County, Michigan.

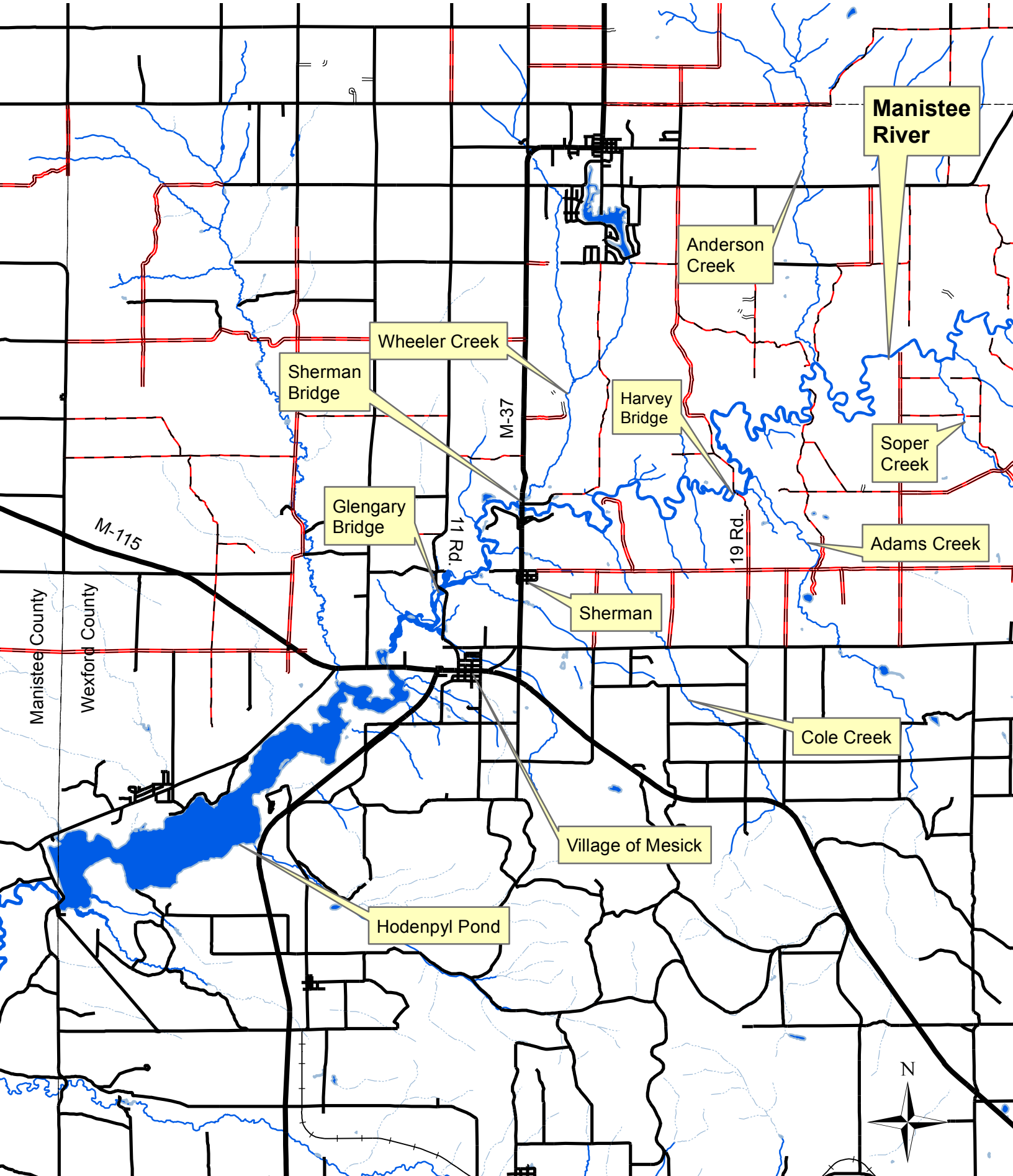

Figure 2. The Middle Manistee River near Manton, Wexford County, Michigan.

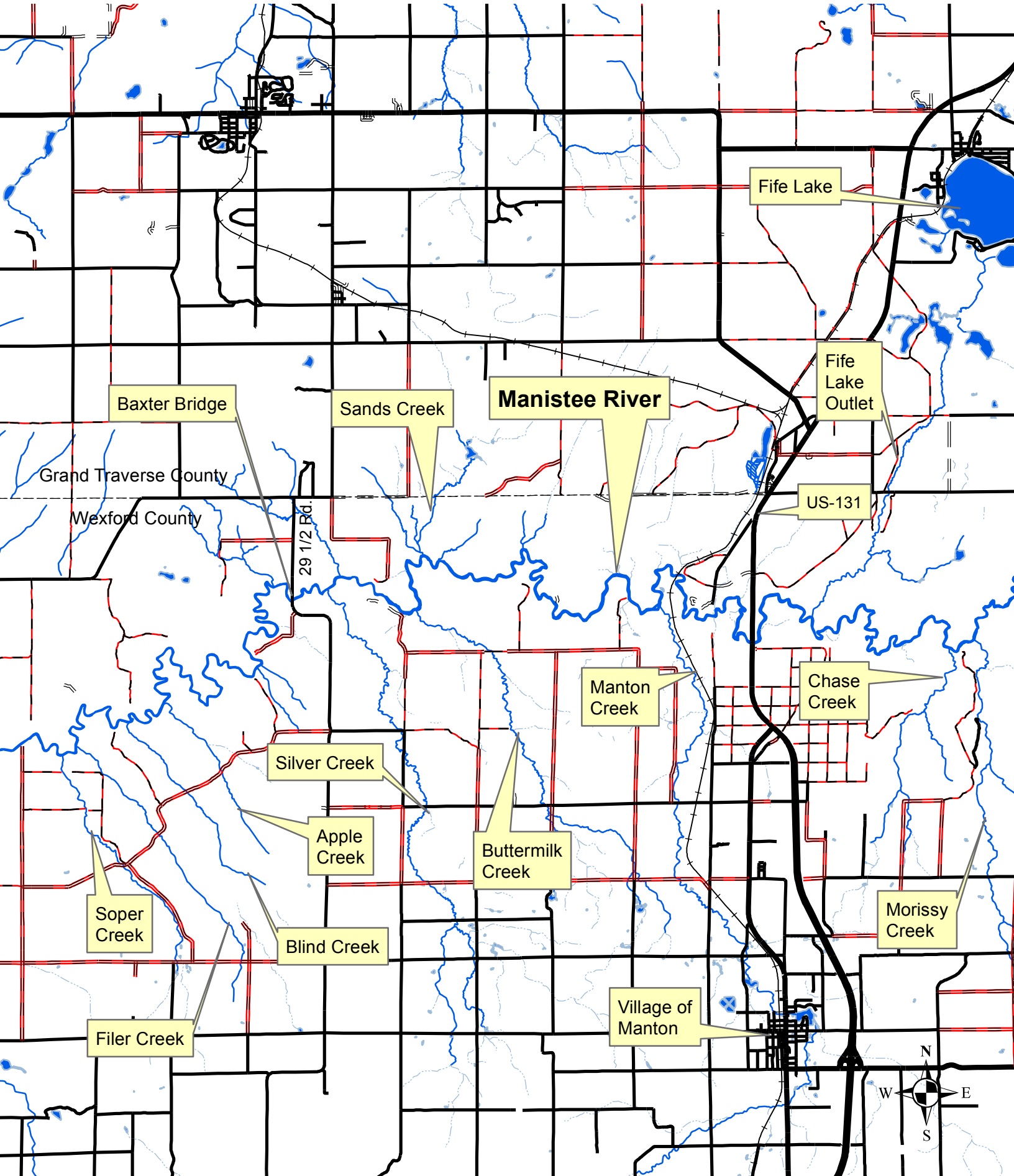

Figure 3. The Middle Manistee River in Missaukee and Kalkaska Counties, Michigan.

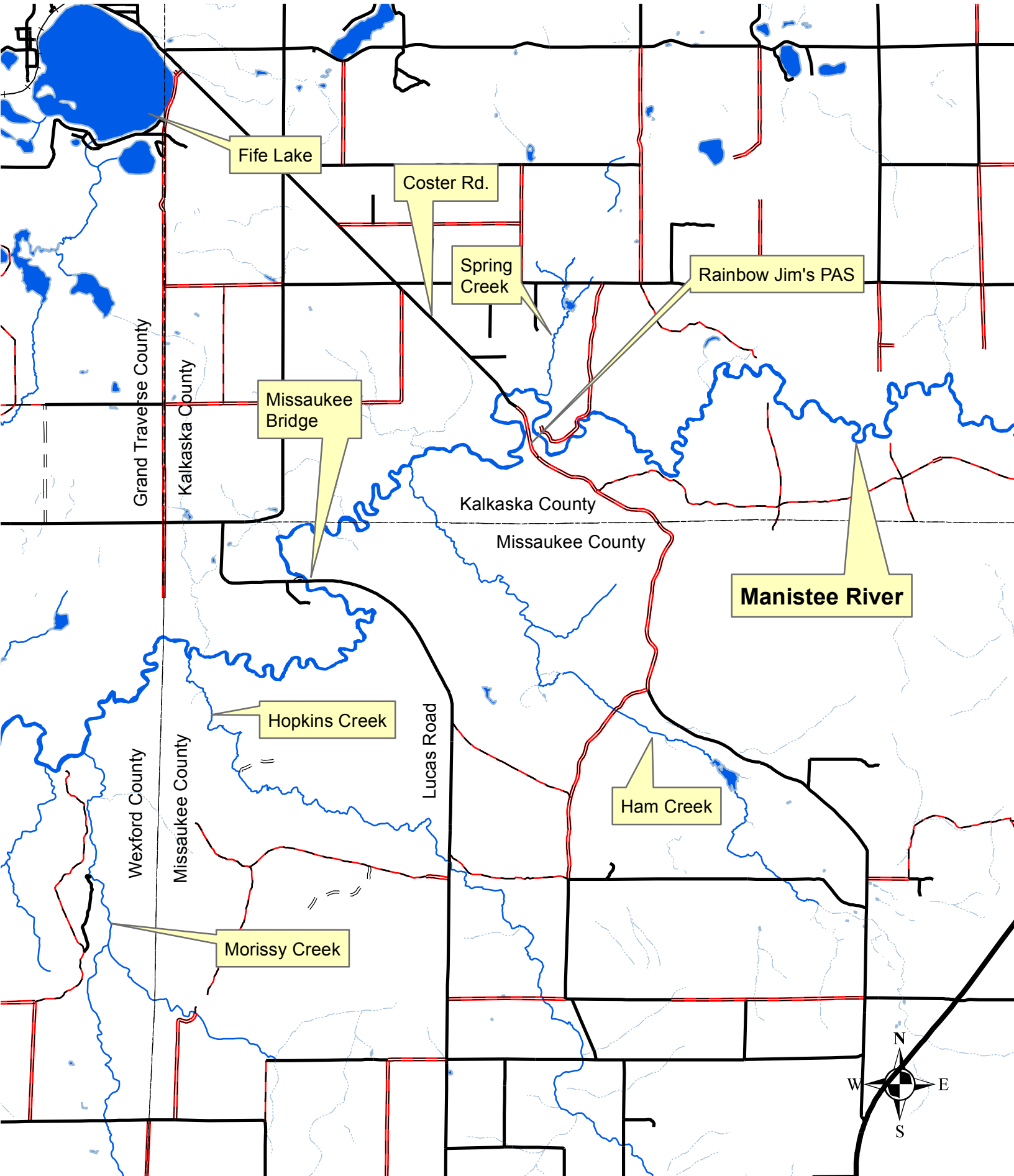

Figure 4. The Middle Manistee River in Kalkaska County, near Sharon, Michigan.

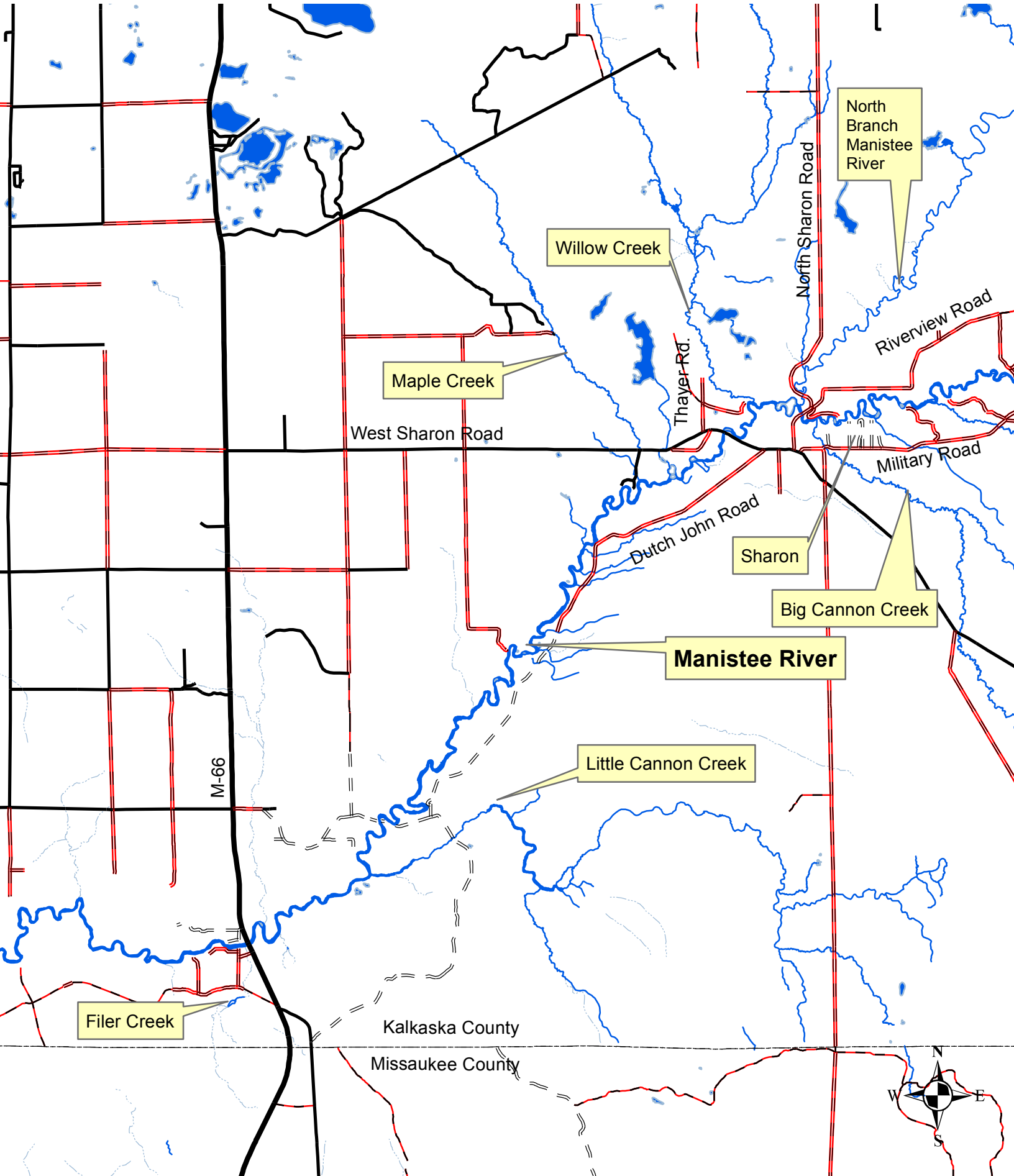

Table 1. Stream gradient in defined reaches of the Middle Manistee River, Michigan.

Reach	Distance (miles)	Drop (feet)	Gradient (ft/mi)
N. Sharon to M-66	11.2	26	2.3
M-66 to Rainbow Jim's	10.5	44	4.2
Rainbow Jim's to US-131	17.4	56	3.2
US-131 to Baxter Bridge	13.2	26	2.0
Baxter Bridge to M-115	31.3	76	2.4
Total:	83.6	228	2.7

Table 2. Fish stocked in the Manistee River, Wexford County, Michigan.

Year	Species	Number	Life stage	Strain
1879	Chinook Salmon	25,000	fry	
1937	Rainbow Trout	303	adults	
1939	Rainbow Trout	15,057	fingerlings - adults	
1940	Rainbow Trout	9,501	yearlings - adults	
1941	Rainbow Trout	1,110	yearlings - adults	
1942	Rainbow Trout	2,812	yearlings - adults	
1943	Rainbow Trout	1,775	yearlings - adults	
1944	Rainbow Trout	165	adults	
1945	Rainbow Trout	2,000	yearlings	
1946	Rainbow Trout	3,920	yearlings - adults	
1947	Rainbow Trout	1,054	yearlings - adults	
1948	Rainbow Trout	126,217	fingerlings - adults	
1949	Rainbow Trout	494	adults	
1950	Rainbow Trout	6,996	adults	
1951	Rainbow Trout	9,005	adults	
1952	Brown Trout	30	adults	
	Rainbow Trout	6,840	adults	
1953	Rainbow Trout	139	adults	
1954	Rainbow Trout	43	adults	
1955	Rainbow Trout	60	adults	
1956	Rainbow Trout	62	adults	
1962	Rainbow Trout	16	adults	
1965	Rainbow Trout	473	adults	
1967	Rainbow Trout	133	adults	
1968	Brown Trout	4,000	yearlings	
1969	Brown Trout	1,000	yearlings	
1970	Brown Trout	6,000	yearlings	
1971	Brown Trout	2,000	adults	
1972	Brown Trout	18,554	yearlings	
1973	Brown Trout	12,000	fall fingerlings	
	Brown Trout	17,664	yearlings	
	Rainbow Trout	1,408	yearlings	
1974	Brown Trout	12,000	yearlings	
	Brown Trout	8,584	fall fingerlings	

Table 2 continued.

1975	Brown Trout	12,000	yearlings	
	Brown Trout	10,280	fall fingerlings	
	Rainbow Trout	4,255	fall fingerlings	
1976	Brown Trout	6,000	yearlings	
	Brown Trout	4,512	fall fingerlings	
1977	Brown Trout	6,000	yearlings	
	Brown Trout	10,000	fall fingerlings	
1978	Brown Trout	3,000	yearlings	
	Brown Trout	9,810	fall fingerlings	
1979	Brown Trout	6,000	yearlings	
	Brown Trout	4,287	fall fingerlings	
1980	Brown Trout	3,000	yearlings	
	Brown Trout	6,776	fall fingerlings	
1981	Brown Trout	3,000	yearlings	Harrietta
1982	Brown Trout	1,200	yearlings	Harrietta
	Brown Trout	2,514	fall fingerlings	
1983	Brown Trout	6,000	yearlings	Harrietta
	Brown Trout	3,893	fall fingerlings	
1984	Brown Trout	5,000	fall fingerlings	
1985	Brown Trout	4,400	fall fingerlings	
1986	Brown Trout	4,540	yearlings	Wild Rose
	Brown Trout	2,270	yearlings	Plymouth Rock
	Brown Trout	9,500	fall fingerlings	Plymouth Rock
1987	Brown Trout	7,170	yearlings	Soda Lake
	Brown Trout	20,000	fall fingerlings	Soda Lake
1988	Brown Trout	9,000	yearlings	Plymouth Rock
	Brown Trout	7,800	fall fingerlings	
1989	Brown Trout	9,000	yearlings	Plymouth Rock
	Brown Trout	11,200	fall fingerlings	Soda Lake
1990	Brown Trout	8,992	yearlings	Soda Lake
	Brown Trout	11,048	fall fingerlings	Plymouth Rock
1991	Brown Trout	7,965	yearlings	Plymouth Rock
	Brown Trout	5,604	fall fingerlings	Plymouth Rock
1992	Brown Trout	8,850	yearlings	Wild Rose
	Brown Trout	3,481	fall fingerlings	Soda Lake
1993	Brown Trout	8,850	yearlings	Wild Rose
	Brown Trout	2,782	fall fingerlings	Saint Croix
1994	Brown Trout	3,000	yearlings	Wild Rose
	Brown Trout	6,000	yearlings	Saint Croix
	Brown Trout	2,925	fall fingerlings	
1995	Brown Trout	8,100	yearlings	Wild Rose
	Brown Trout	5,734	fall fingerlings	Wild Rose
1996	Brown Trout	8,550	yearlings	Wild Rose
	Brown Trout	6,936	fall fingerlings	Wild Rose
1997	Brown Trout	9,180	yearlings	Wild Rose
	Brown Trout	6,311	fall fingerlings	Wild Rose
1998	Brown Trout	8,700	yearlings	Wild Rose
	Brown Trout	5,299	fall fingerlings	Wild Rose

Table 2 continued.

1999	Brown Trout	9,000	yearlings	Seeforellen
	Brown Trout	11,876	fall fingerlings	Wild Rose
2000	Brown Trout	9,300	yearlings	Wild Rose
	Brown Trout	13,439	fall fingerlings	Wild Rose
2001	Brown Trout	9,060	yearlings	Wild Rose
2002	Brown Trout	9,060	yearlings	Wild Rose
	Brown Trout	10,924	fall fingerlings	Wild Rose
2003	Brown Trout	25,500	yearlings	Wild Rose
2004	Brown Trout	21,300	yearlings	Wild Rose
	Brown Trout	12,459	fall fingerlings	Wild Rose
2005	Brown Trout	24,000	yearlings	Wild Rose
2006	Brown Trout	25,800	yearlings	Wild Rose
2007	Brown Trout	19,200	yearlings	Wild Rose
	Brown Trout	5,113	fall fingerlings	Wild Rose
2008	Brown Trout	24,300	yearlings	Wild Rose
	Brown Trout	4,699	fall fingerlings	Wild Rose
2009	Brown Trout	19,000	yearlings	Wild Rose
2010	Brown Trout	28,367	yearlings	Wild Rose
2011	Brown Trout	21,050	yearlings	Wild Rose
2012	Brown Trout	31,800	yearlings	Wild Rose
	Brown Trout	30,000	fall fingerlings	Wild Rose
2013	Brown Trout	25,800	yearlings	Wild Rose
	Brown Trout	9,209	fall fingerlings	Wild Rose
2014	Brown Trout	21,000	yearlings	Wild Rose
	Brown Trout	5,954	fall fingerlings	Wild Rose
2015	Brown Trout	23,100	yearlings	Wild Rose
	Brown Trout	6,899	yearlings	Sturgeon River
	Brown Trout	15,446	yearlings	Gilchrist Creek
2016	Brown Trout	21,600	yearlings	Wild Rose
2017	Brown Trout	24,090	yearlings	Wild Rose

Table 3. Fish stocked in the Manistee River, Missaukee County, Michigan.

Year	Species	Number	Life stage	Strain
1941	Rainbow Trout	700	yearlings	
1942	Rainbow Trout	525	yearlings	
1943	Rainbow Trout	875	yearlings	
1945	Rainbow Trout	1,200	yearlings	
1946	Rainbow Trout	2,250	yearlings-adults	
1947	Rainbow Trout	1,650	yearlings	
1948	Rainbow Trout	1,300	yearlings	
1949	Rainbow Trout	600	yearlings	
1950	Rainbow Trout	1,875	yearlings	
1951	Rainbow Trout	2,225	yearlings	
1952	Rainbow Trout	2,370	yearlings	
1965	Rainbow Trout	50	yearlings	

Table 3 continued.

1968	Brown Trout	500	yearlings	
1970	Brown Trout	1,000	yearlings	
1972	Brown Trout	1,000	yearlings	
1973	Brown Trout	1,890	yearlings	
	Rainbow Trout	2,120	yearlings	
1974	Brown Trout	6,632	fall fingerlings	
1975	Brown Trout	2,320	fall fingerlings	
	Rainbow Trout	4,222	fall fingerlings	
1976	Brown Trout	3,152	fall fingerlings	
1977	Brown Trout	1,206	fall fingerlings	
1979	Brown Trout	4,287	fall fingerlings	
1980	Brown Trout	4,823	fall fingerlings	
1988	Brown Trout	5,850	fall fingerlings	
1989	Brown Trout	8,400	fall fingerlings	Soda Lake
1990	Brown Trout	8,286	fall fingerlings	Plymouth Rock
1991	Brown Trout	6,668	fall fingerlings	Plymouth Rock
1992	Brown Trout	6,960	fall fingerlings	Soda Lake
1993	Brown Trout	8,348	fall fingerlings	Saint Croix
1994	Brown Trout	8,775	fall fingerlings	
1995	Brown Trout	8,598	fall fingerlings	Wild Rose
1996	Brown Trout	10,404	fall fingerlings	Wild Rose
1997	Brown Trout	9,466	fall fingerlings	Wild Rose
1998	Brown Trout	7,948	fall fingerlings	Wild Rose
1999	Brown Trout	11,876	fall fingerlings	Wild Rose
2000	Brown Trout	10,079	fall fingerlings	Wild Rose
2002	Brown Trout	5,460	fall fingerlings	Wild Rose
2004	Brown Trout	6,230	fall fingerlings	Wild Rose
2007	Brown Trout	10,226	fall fingerlings	Wild Rose
2008	Brown Trout	9,398	fall fingerlings	Wild Rose
2009	Brown Trout	10,696	fall fingerlings	Wild Rose
2010	Brown Trout	10,324	fall fingerlings	Wild Rose
2011	Brown Trout	11,244	fall fingerlings	Wild Rose
2012	Brown Trout	25,000	fall fingerlings	Wild Rose
2013	Brown Trout	9,209	fall fingerlings	Wild Rose
2014	Brown Trout	12,197	fall fingerlings	Wild Rose
2016	Brown Trout	14,626	fall fingerlings	Wild Rose
2017	Brown Trout	15,071	fall fingerlings	Wild Rose

Table 4. Fish stocked in the Manistee River, Kalkaska County, Michigan.

Year	Species	Number	Life stage	Strain
1910	Largemouth Bass	1,000	fingerlings	
1934	Arctic Grayling	2,500	yearlings	
1935	Rainbow Trout	6,000	fall fingerlings	
1937	Brook Trout	12,000	fall fingerlings-yearlings	
	Rainbow Trout	53,000	fall fingerlings	
1938	Brook Trout	6,000	adults	
	Rainbow Trout	30,518	fall fingerlings-adults	
1939	Rainbow Trout	45,876	fingerlings-adults	
1940	Rainbow Trout	25,200	fingerlings-yearlings	
1941	Rainbow Trout	12,600	yearlings-adults	
1942	Rainbow Trout	12,425	yearlings-adults	
1943	Rainbow Trout	10,159	yearlings-adults	
1944	Brown Trout	3,300	adults	
	Rainbow Trout	16,250	yearlings-adults	
1945	Brown Trout	1,200	adults	
	Rainbow Trout	22,645	yearlings-adults	
1946	Brown Trout	4,300	adults	
	Rainbow Trout	25,520	yearlings-adults	
1947	Brown Trout	3,100	adults	
	Rainbow Trout	14,365	yearlings-adults	
1948	Brown Trout	13,539	yearlings-adults	
	Rainbow Trout	11,800	yearlings-adults	
1949	Brown Trout	4,427	yearlings-adults	
	Rainbow Trout	20,980	yearlings-adults	
1950	Brown Trout	2,800	yearlings-adults	
	Rainbow Trout	29,834	yearlings-adults	
1951	Brown Trout	8,500	yearlings	
	Rainbow Trout	24,969	yearlings-adults	
1952	Brook Trout	2,000	yearlings	
	Brown Trout	5,926	yearlings-adults	
	Rainbow Trout	26,957	yearlings-adults	
1953	Brown Trout	17,950	yearlings	
	Rainbow Trout	27,046	yearlings-adults	
1954	Brown Trout	600	adults	
	Rainbow Trout	47,428	yearlings-adults	
1955	Rainbow Trout	70,629	yearlings	
1956	Rainbow Trout	96,168	yearlings	
1957	Brown Trout	1,162	fall fingerlings-yearlings	
	Rainbow Trout	83,047	yearlings	
1958	Brown Trout	180	yearlings	
	Rainbow Trout	88,971	yearlings	
1959	Rainbow Trout	83,966	yearlings	
1960	Brown Trout	281	yearlings	
	Rainbow Trout	74,744	yearlings	
1961	Rainbow Trout	60,059	yearlings	
1962	Rainbow Trout	52,200	yearlings	

Table 4 continued.

1963	Brown Trout	7,500	yearlings	
	Rainbow Trout	40,000	yearlings	
1964	Rainbow Trout	44,900	yearlings	
1965	Brown Trout	15,000	yearlings	
	Rainbow Trout	35,200	yearlings	
1966	Brown Trout	55,025	fall fingerlings	
	Rainbow Trout	18,000	adults	
1967	Brown Trout	127,846	fingerlings-adults	
	Rainbow Trout	15,934	yearlings-adults	
1968	Brown Trout	30,000	fall fingerlings	
1969	Brown Trout	33,723	yearlings	
1970	Brown Trout	39,000	yearlings	
	Rainbow Trout	39,158	yearlings-adults	
1971	Brown Trout	30,500	yearlings	
	Rainbow Trout	55,190	yearlings	
1972	Brown Trout	42,224	yearlings-adults	
1973	Brown Trout	37,775	yearlings	
	Rainbow Trout	7,680	yearlings	
	Steelhead	375	adults	
1974	Brown Trout	37,720	yearlings-adults	
	Rainbow Trout	43,495	yearlings	
	Steelhead	375	adults	
1975	Brown Trout	35,100	yearlings	
	Rainbow Trout	59,109	fall fingerlings	
	Steelhead	250	adults	
1976	Brown Trout	32,612	yearlings	
	Rainbow Trout	43,395	fall fingerlings	
1977	Brown Trout	17,550	yearlings	
1978	Brown Trout	27,215	fingerlings-yearlings	
	Rainbow Trout	13,750	yearlings-adults	
1979	Brown Trout	13,500	yearlings	
	Brown Trout	4,287	fall fingerlings	
	Rainbow Trout	8,766	adults	
	Rainbow Trout	60,960	fall fingerlings	
1980	Brown Trout	12,825	yearlings	
	Brown Trout	5,114	fall fingerlings	
	Rainbow Trout	16,945	fall fingerlings	
1981	Brown Trout	13,500	yearlings	Harrietta
	Rainbow Trout	2,000	yearlings	private plant
	Brook Trout	6,000	yearlings	private plant
1982	Brown Trout	11,850	yearlings	Harrietta
	Brown Trout	2,943	unknown	private plant
	Rainbow Trout	5,000	unknown	private plant
	Brook Trout	3,000	unknown	private plant
1983	Brown Trout	24,500	yearlings	Harrietta
	Brown Trout	7,073	fall fingerlings	
	Rainbow Trout	4,700	yearlings	private plant

Table 4 continued.

1984	Brown Trout	24,500	yearlings	Harrietta
	Brown Trout	3,920	yearlings	private plant
	Brown Trout	8,000	fall fingerlings	
	Rainbow Trout	4,774	yearlings	private plant
1985	Brown Trout	17,750	yearlings	Harrietta
	Brown Trout	3,000	fall fingerlings	
	Rainbow Trout	1,076	yearlings	private plant
1986	Brown Trout	15,860	yearlings	Plymouth Rock
	Brown Trout	9,500	fall fingerlings	Plymouth Rock
	Brook Trout	3,750	yearlings	Assinica
	Rainbow Trout	2,565	yearlings	private plant
1987	Arctic Grayling	13,139	yearlings	
	Brown Trout	18,000	yearlings	Plymouth Rock
	Brook Trout	4,500	yearlings	Assinica
1988	Brown Trout	19,500	yearlings	Plymouth Rock
	Brown Trout	5,000	yearlings	Soda Lake
	Brown Trout	5,850	fall fingerlings	
	Brook Trout	1,000	yearlings	Assinica
	Rainbow Trout	3,000	yearlings	private plant
1989	Brown Trout	26,037	yearlings	Plymouth Rock
	Brown Trout	20,400	fall fingerlings	Soda Lake
	Brown Trout	981	yearlings	private plant
	Brook Trout	1,000	yearlings	Maine
	Brook Trout	4,300	yearlings	private plant
	Rainbow Trout	1,500	yearlings	private plant
1990	Brown Trout	23,275	yearlings	Plymouth Rock
	Brown Trout	8,286	fall fingerlings	Plymouth Rock
	Brook Trout	4,500	yearlings	Assinica
	Brook Trout	200	yearlings	private plant
	Rainbow Trout	5,400	yearlings	private plant
1991	Brown Trout	24,500	yearlings	Plymouth Rock
	Brown Trout	600	yearlings	private plant
	Brown Trout	1,980	fall fingerlings	Plymouth Rock
	Brook Trout	5,000	yearlings	Owhi
	Brook Trout	400	yearlings	private plant
1992	Brown Trout	21,940	yearlings	Wild Rose
	Brown Trout	10,443	fall fingerlings	Soda Lake
	Brown Trout	1,400	yearlings	private plant
	Brook Trout	4,500	yearlings	Owhi
	Brook Trout	800	yearlings	private plant
1993	Brown Trout	23,760	yearlings	Wild Rose
	Brown Trout	12,049	fall fingerlings	Saint Croix
	Brown Trout	1,300	yearlings	private plant
	Brook Trout	4,500	yearlings	Assinica
	Rainbow Trout	200	yearling	private plant
	Brook Trout	300	yearling	private plant

Table 4 continued.

1994	Brown Trout	24,000	yearlings	Wild Rose
	Brown Trout	625	yearlings	private plant
	Brown Trout	9,862	fall fingerlings	
	Brook Trout	4,300	yearlings	Assinica
1995	Brown Trout	12,879	yearlings	Wild Rose
	Brown Trout	8,601	fall fingerlings	Wild Rose
	Rainbow Trout	100	yearlings	private plant
1996	Brown Trout	14,699	yearlings	Wild Rose
	Brown Trout	10,404	fall fingerlings	Wild Rose
	Brown Trout	300	yearlings	private plant
1997	Brown Trout	7,498	yearlings	Seeforellen
	Brown Trout	7,500	yearlings	Gilchrist Creek
	Brown Trout	9,467	fall fingerlings	Wild Rose
1998	Brown Trout	7,500	yearlings	Gilchrist Creek
	Brown Trout	7,500	yearlings	Seeforellen
	Brown Trout	5,298	fall fingerlings	Wild Rose
1999	Brown Trout	7,500	yearlings	Gilchrist Creek
	Brown Trout	7,500	yearlings	Seeforellen
	Brown Trout	11,876	fall fingerlings	Wild Rose
2000	Brown Trout	7,500	yearlings	Gilchrist Creek
	Brown Trout	7,500	yearlings	Seeforellen
	Brown Trout	10,079	fall fingerlings	Wild Rose
2002	Brown Trout	8,190	fall fingerlings	Wild Rose
2004	Brown Trout	9,344	fall fingerlings	Wild Rose
2007	Brown Trout	15,339	fall fingerlings	Wild Rose
2008	Brown Trout	14,097	fall fingerlings	Wild Rose
2009	Brown Trout	16,044	fall fingerlings	Wild Rose
2010	Brown Trout	15,486	fall fingerlings	Wild Rose
2011	Brown Trout	22,488	fall fingerlings	Wild Rose
2012	Brown Trout	50,000	fall fingerlings	Wild Rose
2013	Brown Trout	9,208	fall fingerlings	Wild Rose
2014	Brown Trout	9,160	fall fingerlings	Wild Rose
2016	Brown Trout	5,012	fall fingerlings	Wild Rose
2017	Brown Trout	18,627	fall fingerlings	Wild Rose

Table 5. Presence/absence of fish species in historical fisheries surveys at various locations on the Middle Manistee River between Sharon and Mesick.

Species	1956	1958	1966	1967	1968	1970	1987	1988	1995	2001	2016
American Brook Lamprey		x	x				x			x	
Blacknose Dace		x	x	x					x	x	x
Blackchin Shiner			x								
Blackside Darter		x	x						x	x	x
Bluegill				x							x
Brook Trout	x	x	x		x		x		x		x
Brown Trout	x		x	x	x	x	x	x	x	x	x
Burbot			x		x		x	x		x	x
Central Mudminnow			x						x		x
Chestnut Lamprey		x	x	x						x	x
Common Carp				x							
Common Shiner			x	x				x	x	x	x
Creek Chub		x	x	x			x		x		x
Golden Redhorse											x
Golden Shiner									x		
Johnny Darter		x	x	x					x		x
Largemouth Bass				x							
Logperch		x		x			x	x	x	x	x
Longnose Dace			x	x					x	x	x
Mottled Sculpin		x	x	x							x
Northern Hog Sucker								x	x	x	x
Northern Pike			x	x		x				x	x
Pumpkinseed Sunfish				x						x	
Rainbow Trout	x			x	x	x		x	x	x	x
Redhorse Spp.				x				x			
Redside Dace*			x								
Rock Bass											x
Sculpin Spp.						x	x		x	x	
Silver Redhorse									x	x	x
Shorthead Redhorse									x	x	x
Slimy Sculpin		x	x								x
Smallmouth Bass				x		x				x	
Sturgeon Sucker**				x							
Trout-perch			x	x					x	x	x
Yellow Perch				x		x					
Walleye				x				x	x	x	x
White Sucker		x	x	x		x		x	x	x	x

*Redside Dace are not known to inhabit the Manistee River watershed or this part of the state. This was likely a mis-identification.

**There is no species with the name "Sturgeon Sucker." It is unknown what species they were referring to, although the most likely possibility is Lake Sturgeon.

Table 6. Numerical abundance of fish species in July 2001 electrofishing surveys of the Manistee River. An 18' boomshocker boat was used in the surveys. Reaches surveyed included US-131 to Baxter Bridge, and Baxter Bridge to Harvey Bridge.

Species	Baxter Bridge to Harvey Bridge	US-131 to Baxter Bridge
Brown Trout	11	13
Northern Pike	2	4
Pumpkinseed	1	
Rainbow Trout	6	10
Shorthead Redhorse	8	24
Silver Redhorse	2	3
Smallmouth Bass	27	2
Walleye	23	31
White Sucker	16	22
Total	96	109

Table 7. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from the Manistee River by electrofishing, July 16-17, 2001. Number of fish aged is given in parentheses. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age													
Species	0	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Mean Growth Index
Brown Trout		8.0 (8)	12.0 (6)	13.4 (2)	16.9 (3)	18.8 (2)								+2.7
Northern Pike	7.8 (2)				22.6 (3)	26.2 (1)								--
Pumpkinseed Sunfish					4.6 (1)									--
Rainbow Trout		7.1 (10)	15.0 (2)	14.9 (1)	19.5 (1)									+1.9
Smallmouth Bass			7.5 (1)	9.6 (2)	11.4 (9)	13.5 (8)	13.9 (6)			16.5 (1)				-1.5
Walleye			11.8 (2)	13.7 (24)	16.0 (3)	16.3 (11)	17.4 (4)	19.8 (1)	19.0 (2)	20.5 (1)	20.6 (2)	24.9 (1)	25.5 (1)	-1.2

Table 8. Manistee River temperature data from the Rainbow Jim's Public Access Site.

	2012
June Average	63.6
June Maximum	72.1
June Minimum	50.5
July Average	68.2
July Maximum	76.4
July Minimum	60.5
August Average	63.4
August Maximum	71.4
August Minimum	55.5

Table 9. Michigan DNR Master Angler awards issued for fish caught from the Manistee River, Wexford, Missaukee, and Kalkaska Counties, 1994 to mid-2018.

Species	Number of Master Angler awards issued
Redhorse	7
Channel Catfish	5
Bluegill	4
White Sucker	3
Brook Trout	3
Northern Pike	2
Walleye	2
Black Crappie	1
Rock Bass	1
Total:	28

Table 10. Numerical abundance of fish species in five September 2016 electrofishing surveys of the Middle Manistee River. An 18' boomshocker boat was used in the surveys. All five survey stations were one mile in length, with three shocking runs conducted at each station (right bank, center, and left bank).

Species	Baxter Bridge	US-131	Rainbow Jim's	M-66	West Sharon Road
Bluegill	1				
Blacknose Dace	6	6	6	5	7
Blackside Darter	9	23	11	12	6
Brown Trout	12	27	57	64	252
Brook Trout			15	42	18
Burbot	1	1	3	2	6
Central Mudminnow	1			1	
Chestnut Lamprey	3	6	3	6	
Common Shiner		3	1		11
Creek Chub	12	13	10	6	4
Golden Redhorse	1				
Johnny Darter	1	15	8	21	5
Longnose Dace	4	16	5	17	3
Logperch	33	40	88	159	10
Mottled Sculpin	1	6	10	5	1
Northern Hog Sucker	11	14	23	19	35
Northern Pike	2	3	4	3	2
Rainbow Trout	4	14	3		
Rock Bass	1				
Shorthead Redhorse	27	29	7	41	50
Silver Redhorse	5	9	3	4	18
Slimy Sculpin				28	25
Trout-perch	11	4			
Walleye	7	3			
White Sucker	112	126	49	143	48
Total	265	358	306	578	501

Table 11. Brown Trout caught in September 2016 electrofishing surveys of the Middle Manistee River. Five 1-mile reaches of the Manistee River were surveyed.

	Sampling Station				
Inch class	Baxter Bridge	US-131	Rainbow Jim's	M-66	West Sharon Rd.
2		1			1
3	1	3	18	2	33
4		2	14	2	48
5			1		5
6		1			1
7	1	1	3	5	26
8	1	5	8	12	49
9	2	3	4	17	28
10	3	4	4	9	14
11	2	3	1	10	11
12			2	2	14
13				1	4
14		1	1	2	3
15		1	1		3
16	2	1		1	1
17					
18		1			3
19				1	2
20					2
21					2
22					
23					1
24					
25					1
Total:	12	27	57	64	252

Table 12. Rainbow Trout caught in September 2016 electrofishing surveys of the Middle Manistee River. Five 1-mile reaches of the Manistee River were surveyed.

	Sampling Station				
Inch class	Baxter Bridge	US-131	Rainbow Jim's	M-66	West Sharon Rd.
2					
3	3	10			
4		1			
5					
6	1	1			
7		1			
8		1	1		
9					
10			1		
11					
12					
13					
14					
15					
16					
17					
18			1		
Total:	4	14	3	0	0

Table 13. Brook Trout caught in September 2016 electrofishing surveys of the Middle Manistee River. Five 1-mile reaches of the Manistee River were surveyed.

	Sampling Station				
Inch class	Baxter Bridge	US-131	Rainbow Jim's	M-66	West Sharon Rd.
2				1	
3			2	3	6
4				2	
5			2	1	
6			4	3	2
7			7	16	9
8				10	1
9				2	
10				2	
11				2	
Total:	0	0	15	42	18

Table 14. Number, weight, and length of fish collected from the Middle Manistee River at Baxter Bridge by boat electrofishing, September 15, 2016.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches)[1]	Average length
Bluegill	1	0.4	0.1	0.1	5-5	5.5
Blacknose Dace	6	2.3	0.0	0.0	1-3	2.3
Blackside Darter	9	3.4	0.0	0.0	1-2	2.1
Brown Trout	12	4.5	6.5	5.0	3-16	10.0
Burbot	1	0.4	0.4	0.3	11-11	11.5
Central Mudminnow	1	0.4	0.0	0.0	3-3	3.5
Chestnut Lamprey	3	1.1	0.1	0.1	7-7	7.5
Creek Chub	12	4.5	0.9	0.7	2-7	5.7
Golden Redhorse	1	0.4	2.6	2.0	19-19	19.5
Johnny Darter	1	0.4	0.0	0.0	2-2	2.5
Longnose Dace	4	1.5	0.0	0.0	1-2	1.8
Logperch	33	12.5	0.5	0.4	2-4	3.4
Mottled Sculpin	1	0.4	0.0	0.0	1-1	1.5
Northern Hog Sucker	11	4.2	1.2	0.9	2-9	5.3
Northern Pike	2	0.8	3.2	2.4	11-23	17.5
Rainbow Trout	4	1.5	0.1	0.1	3-6	4.0
Rock Bass	1	0.4	0.1	0.1	5-5	5.5
Shorthead Redhorse	27	10.2	36.6	28.0	10-19	14.9
Silver Redhorse	5	1.9	14.7	11.2	19-23	21.1
Trout-Perch	11	4.2	0.3	0.2	3-4	4.0
Walleye	7	2.6	10.5	8.0	10-22	17.1
White Sucker	112	42.3	53.0	40.5	1-18	8.9
Total	265	100	130.8	100		

[1]Note some fish were measured to 0.1 inch, others to inch group: e.g., "5"=5.0 to 5.9 inch, 12=12.0 to 12.9 inches; etc.

Table 15. Number, weight, and length of fish collected from the Middle Manistee River at US-131 by boat electrofishing, September 16, 2016.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches)[1]	Average length
Blacknose Dace	6	1.7	0.0	0.0	1-3	2.3
Blackside Darter	23	6.4	0.1	0.1	1-3	2.1
Brown Trout	27	7.5	11.9	8.4	2-18	9.3
Burbot	1	0.3	0.3	0.2	11-11	11.5
Chestnut Lamprey	6	1.7	0.2	0.1	6-7	7.2
Common Shiner	3	0.8	0.0	0.0	2-2	2.5
Creek Chub	13	3.6	0.1	0.1	1-4	2.4
Johnny Darter	15	4.2	0.1	0.1	1-2	2.1
Longnose Dace	16	4.5	0.1	0.1	1-3	2.2
Logperch	40	11.2	0.5	0.4	2-4	3.1
Mottled Sculpin	6	1.7	0.1	0.1	1-4	2.4
Northern Hog Sucker	14	3.9	3.0	2.1	2-14	6.6
Northern Pike	3	0.8	14.2	10.1	22-30	26.0
Rainbow Trout	14	3.9	0.6	0.4	3-8	4.6
Shorthead Redhorse	29	8.1	38.1	27.0	11-17	14.7
Silver Redhorse	9	2.5	25.7	18.2	19-22	20.9
Trout-Perch	4	1.1	0.1	0.1	3-4	4.3
Walleye	3	0.8	3.6	2.6	10-18	14.8
White Sucker	126	35.2	42.3	30.0	1-16	7.9
Total	358	100	141.0	100		

[1]Note some fish were measured to 0.1 inch, others to inch group: e.g., "5"=5.0 to 5.9 inch, 12=12.0 to 12.9 inches; etc.

Table 16. Number, weight, and length of fish collected from the Middle Manistee River at Rainbow Jim's by boat electrofishing, September 19, 2016.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches)[1]	Average length
Blacknose Dace	6	2.0	0.0	0.0	2-2	2.5
Blackside Darter	11	3.6	0.1	0.1	2-3	2.6
Brook Trout	15	4.9	1.6	2.3	3-7	6.4
Brown Trout	57	18.6	10.1	14.4	3-15	6.8
Burbot	3	1.0	0.5	0.7	6-9	8.8
Chestnut Lamprey	3	1.0	0.0	0.0	3-3	3.5
Common Shiner	1	0.3	0.0	0.0	2-2	2.5
Creek Chub	10	3.3	0.1	0.1	1-3	2.8
Johnny Darter	8	2.6	0.1	0.1	2-2	2.5
Longnose Dace	5	1.6	0.1	0.1	2-3	2.6
Logperch	88	28.8	1.5	2.1	2-5	3.6
Mottled Sculpin	10	3.3	0.2	0.3	2-3	3.4
Northern Hog Sucker	23	7.5	1.6	2.3	1-9	4.9
Northern Pike	4	1.3	11.5	16.4	12-26	22.3
Rainbow Trout	3	1.0	2.9	4.1	8-18	12.5
Shorthead Redhorse	7	2.3	7.1	10.1	11-15	13.5
Silver Redhorse	3	1.0	9.5	13.6	20-22	21.5
White Sucker	49	16.0	23.1	33.0	1-17	10.5
Total	306	100	70.0	100		

[1]Note some fish were measured to 0.1 inch, others to inch group: e.g., "5"=5.0 to 5.9 inch, 12=12.0 to 12.9 inches; etc.

Table 17. Number, weight, and length of fish collected from the Middle Manistee River at M-66 by boat electrofishing, September 20, 2016.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches)[1]	Average length
Blacknose Dace	5	0.9	0.1	0.1	1-3	2.3
Blackside Darter	12	2.1	0.1	0.1	2-3	3.0
Brook Trout	42	7.3	7.6	4.0	2-11	7.4
Brown Trout	64	11.1	26.4	14.1	3-19	9.6
Burbot	2	0.4	0.3	0.2	7-9	8.5
Central Mudminnow	1	0.2	0.0	0.0	3-3	3.5
Chestnut Lamprey	6	1.0	0.2	0.1	7-7	7.5
Creek Chub	6	1.0	0.3	0.2	4-6	5.1
Johnny Darter	21	3.6	0.1	0.1	1-3	2.5
Longnose Dace	17	2.9	0.2	0.1	1-3	2.9
Logperch	159	27.5	2.6	1.4	2-4	3.6
Mottled Sculpin	5	0.9	0.1	0.1	2-3	3.2
Northern Hog Sucker	19	3.3	7.0	3.7	4-13	8.8
Northern Pike	3	0.5	3.5	1.9	11-23	17.8
Shorthead Redhorse	41	7.1	64.0	34.1	10-17	15.6
Silver Redhorse	4	0.7	13.5	7.2	20-23	22.0
Slimy Sculpin	28	4.8	0.4	0.2	1-3	2.9
White Sucker	143	24.7	61.5	32.7	2-17	9.2
Total	578	100	187.9	100		

[1]Note some fish were measured to 0.1 inch, others to inch group: e.g., "5"=5.0 to 5.9 inch, 12=12.0 to 12.9 inches; etc.

Table 18. Number, weight, and length of fish collected from the Middle Manistee River at West Sharon Road by boat electrofishing, September 27, 2016.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches)[1]	Average length
Blacknose Dace	7	1.4	0.1	0.0	2-3	3.0
Blackside Darter	6	1.2	0.1	0.0	2-3	3.2
Brook Trout	18	3.6	1.9	0.7	3-8	6.2
Brown Trout	252	50.3	94.9	33.3	2-25	8.6
Burbot	6	1.2	1.2	0.4	7-11	8.8
Common Shiner	11	2.2	0.1	0.0	2-3	3.0
Creek Chub	4	0.8	0.1	0.0	2-5	3.3
Johnny Darter	5	1.0	0.0	0.0	1-2	2.3
Longnose Dace	3	0.6	0.0	0.0	1-3	2.5
Logperch	10	2.0	0.2	0.1	3-4	3.7
Mottled Sculpin	1	0.2	0.0	0.0	2-2	2.5
Northern Hog Sucker	35	7.0	19.3	6.8	1-15	8.6
Northern Pike	2	0.4	1.8	0.6	13-18	16.0
Shorthead Redhorse	50	10.0	80.2	28.1	13-17	15.8
Silver Redhorse	18	3.6	59.5	20.9	20-23	21.6
Slimy Sculpin	25	5.0	0.3	0.1	1-3	2.4
White Sucker	48	9.6	25.5	8.9	1-17	9.7
Total	501	100	285.2	100		

[1]Note some fish were measured to 0.1 inch, others to inch group: e.g., "5"=5.0 to 5.9 inch, 12=12.0 to 12.9 inches; etc.

Table 19. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from the Manistee River near Baxter Bridge by electrofishing, September 15, 2016. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age										
Species	0	I	II	III	IV	V	IX	X	XI	XII	Mean Growth Index
Bluegill					5.7 (1)						--
Brown Trout	3.6 (1)	7.8 (1)	9.8 (6)	11.8 (2)	16.5 (1)	16.6 (1)					+0.6
Northern Pike	11.0 (1)			23.5 (1)							--
Rainbow Trout	3.6 (3)	6.5 (1)									--
Rock Bass					5.7 (1)						--
Walleye		11.7 (1)	12.3 (3)				22.8 (1)	18.9 (1)		19.1 (1)	--

Table 20. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from the Manistee River near US-131 by electrofishing, September 16, 2016. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age							Mean Growth
Species	0	I	II	III	IV	V	VI	Index
Brown Trout	3.7 (6)	8.7 (10)	10.0 (2)	11.8 (6)	16.6 (3)			+0.9
Northern Pike			20.1 (1)		25.0 (1)	26.9 (1)		--
Rainbow Trout	3.4 (11)	7.6 (3)						--
Walleye		10.2 (1)			15.2 (1)		18.0 (1)	--

Table 21. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from the Manistee River near Coster Road (Rainbow Jim's PAS) by electrofishing, September 19, 2016. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age						Mean Growth
Species	0	I	II	III	IV	V	Index
Brook Trout	3.4 (1)	6.9 (13)					+1.2
Brown Trout	4.0 (20)	8.5 (15)	12.0 (9)				+2.0
Northern Pike		12.3 (1)	24.0 (1)		26.5 (1)	25.2 (1)	--
Rainbow Trout		8.7 (1)	10.8 (1)		18.2 (1)		--

Table 22. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from the Manistee River near M-66 (Smithville) by electrofishing, September 20, 2016. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age						Mean Growth
Species	0	I	II	III	IV	V	Index
Brook Trout	3.9 (7)	7.8 (24)	10.0 (5)				+1.5
Brown Trout	3.9 (4)	8.6 (18)	10.2 (22)	11.6 (7)	15.0 (2)	19.5 (1)	+0.9
Northern Pike		12.0 (2)				23.2 (1)	--

Table 23. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from the Manistee River near West Sharon Road by electrofishing, September 27, 2016. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age							
Species	0	I	II	III	IV	V	VI	Mean Growth Index
Brook Trout	3.4 (6)	7.3 (12)						+1.1
Brown Trout	4.1 (27)	8.4 (34)	11.6 (30)	13.7 (9)	19.2 (7)	21.8 (2)	24.0 (2)	+2.2
Northern Pike	13.2 (1)	18.9 (1)						--