

Appendix G: Fish Status and Trends Report 2010

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
FISHERIES DIVISION
APRIL 2011

SUMMARY REPORT

A FISH SURVEY OF SITES ON THE KALAMAZOO RIVER AND TALMADGE
CREEK NEAR THE ENBRIDGE OIL SPILL IN MARSHALL
CALHOUN AND KALAMAZOO COUNTIES, MICHIGAN
SEPTEMBER 2010

INTRODUCTION

On July 26, 2010, a 30-inch diameter pipeline ruptured discharging heavy crude oil into a wetland and then into Talmadge Creek, a tributary to the Kalamazoo River. The amount of oil discharged is estimated at 819,000 to 1,000,000 gallons. The oil flowed down 2.2 miles of Talmadge Creek, a small coolwater stream, before entering the Kalamazoo River. The oil migrated approximately 35 miles downstream to Morrow Pond. The Kalamazoo River drains approximately 2,020 square miles of southwest Michigan and has a length of 175 miles from its headwaters to Lake Michigan. It is a medium to large sized warmwater river with a sporadically confined channel as it meanders between moraine and man-made features from Marshall to Battle Creek and meanders freely in broad valleys from Battle Creek to Morrow Pond (Wesley 2005).

During September 2010, staff of the Michigan Department of Natural Resources, Fisheries Division with assistance from Entrix, Inc. (a consultant of Enbridge) and Michigan Department of Environmental Quality, Water Resources Division conducted fish community and habitat surveys on the Kalamazoo River and Talmadge Creek. The objective of these surveys was to assess the effects of the oil spill and associated cleanup activities on fish communities and habitat. Surface Water Assessment Section, Water Resources Division, Department of Environmental Quality also collected macroinvertebrate and aquatic habitat data using their Procedure 51 protocol (MDEQ 2011). A study plan has been developed and additional surveys will be conducted in the future to monitor the long-term effects of the oil spill and associated cleanup activities on the fish and macroinvertebrate communities and aquatic habitat (Wesley and Walterhouse 2010). Refer to Appendix 1 for more detailed site and catch data.

METHODS

Selected sites (Figure 1) were chosen with emphasis on sites with historic (i.e. baseline) survey data that were collected prior to the oil spill (Wesley and Walterhouse 2010). Fisheries Division has a long-term Status and Trends Site at 11 Mile Road on the Kalamazoo River. Surveys at this site follow standardized sampling procedures that allow for temporal comparisons as well as comparisons to similar streams across the region and

state (Wills et al. 2008). This Status and Trends protocol, described in Wills et al. 2008, was used at the other sites for consistency. Wadeable shocking equipment and methods were used on Talmadge Creek at the 17 Mile Road (reference) and 15½ Mile Road sites, and on the Kalamazoo River at the 17 Mile (reference), 15 Mile, and 11 Mile sites. Boomshocking (boat) equipment and methods were used at the Custer Road site on the Kalamazoo River. Historic surveys at these sites used similar shocking equipment except the 15 Mile Road and Custer Road sites were conducted using a fish toxicant known as rotenone (Towns 1984).

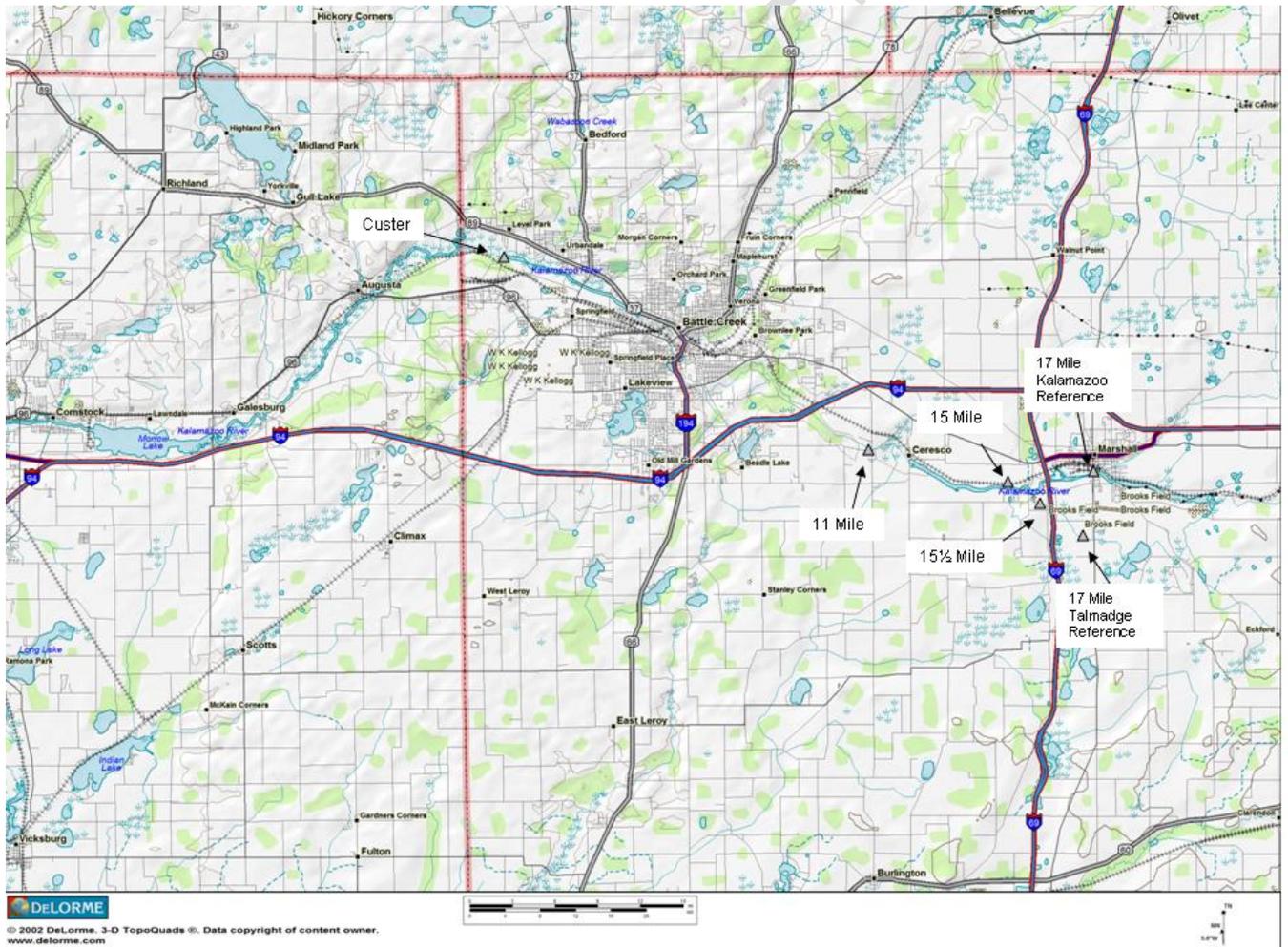


Figure 1. Fish sampling locations on the Kalamazoo River and Talmadge Creek, September 2010.

SUMMARY and OBSERVATIONS

The fish abundance and diversity in Talmadge Creek were significantly lower downstream of the oil spill compared to the reference site and the 2002 survey. Habitat conditions also changed with a wider and shallow stream with low abundance of cover at the downstream location, which was a result of clean up activities.

Fish diversity and catch at the 15 Mile site on the Kalamazoo River was consistent with the reference site at 17 Mile Road. Diversity and catch declined at the 11 Mile Road and Custer Road sites. Smallmouth bass catch was much lower at the 11 Mile Road site compared to 2008 and 2009. There also appeared to be a decline in the number of age 0 smallmouth bass at the 15 and 11 Mile Road sites.

Although the focus of this summary was not on habitat, there was a reduction in woody structure and over-hanging brush at the 15 and 11 Mile Road sites. Bank erosion was observed around the island at 11 Mile Road.

SAMPLING RESULTS

Talmadge Creek

Two surveys were conducted on Talmadge Creek on September 16th, 2010. The reference site was between the spill site and 17 Mile Road. The habitat at 17 Mile Road had more wetland than stream characteristics, so the crew continued downstream until a stream channel was more evident. There was no historic fisheries data for comparison at this reference site. Talmadge Creek was also sampled in the oil impacted reach at 15½ Mile Road (MP 1.25), which was historically surveyed on July 12th, 2000.

Talmadge Creek – 17 Mile Road (Reference)

The 17 Mile Road site had an average stream width of 9.2 ft with an average depth of 4.3 inches. The water clarity was slightly turbid, and it appeared to be at an average flow based on visual observations. The substrate was mostly sand (82%), silt (8%), gravel (5%), large cobble (3%), and small cobble (2%). The stream was characterized as all run habitat. Undercut banks, overhanging vegetation, aquatic vegetation, and woody structure were observed in moderate abundance. The measured stream discharge was 1.04 cfs.

A backpack shocker was used to sample 500 ft of stream. A total of 633 fish were surveyed representing six species. Most of the catch was made up of central mudminnow and mottled sculpin. These species of fish are typically associated with headwater and coolwater streams. For standardization purposes, the catch per effort (number of fish per acre of area surveyed) was calculated to assist with comparison among sites and sample years (Figures 2 and 3).

Talmadge Creek - 15½ Mile Road

The 15½ Mile Road site was located downstream of the road to avoid response activities and for easier access (a wood matt road ran down the floodplain). The stream had an average width of 14.9 ft with an average depth of 3.5 inches. Talmadge Creek gains groundwater between this section and 17 mile Road as the discharge increased to 2.4 cfs. The water clarity was turbid and flowing at an average level based on visual observations. The substrate consisted of gravel (63%), sand (20%), silt (7%), boulders (7%), large cobble (1.5%), and small cobble (1.5%). The stream was characterized as 54% run and 46% riffle habitat. The few boulders and logs were the only cover habitat available. The July 2000 survey was conducted upstream of 15½ Mile Road. This section of stream was narrower (5.5 ft), deeper (1.1 ft), and had more habitat in the form of overhanging brush, wild celery, and watercress. This section was adjacent to a mowed yard.

A backpack shocker was used to sample 500 ft of stream in both the 2000 and 2010 surveys. Only three species of fish were collected in 2010. The central mudminnow was most numerous with 53 fish collected followed by brook stickleback (6) and grass pickerel (1). These species are typically associated with small streams and wetlands. The survey in 2000 collected 11 species of fish with a total of 192 fish collected. The catch per effort was also higher in 2000 compared to 2010 for all species except brook stickleback, which were not observed in 2000 (Figure 3).

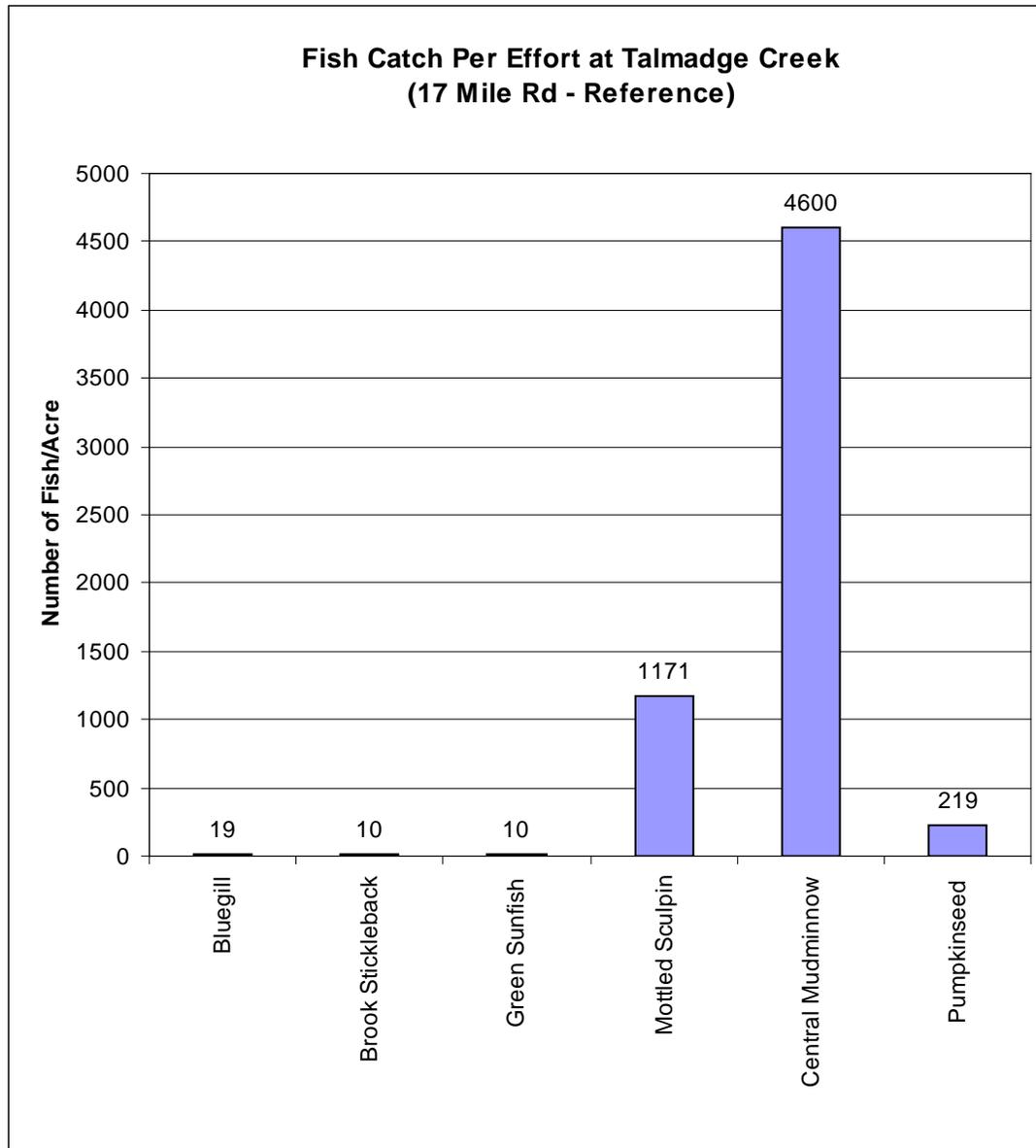


Figure 2. Fish catch per effort (number per Acre) in September 2010 for Talmadge Creek at 17 Mile Road (reference site).

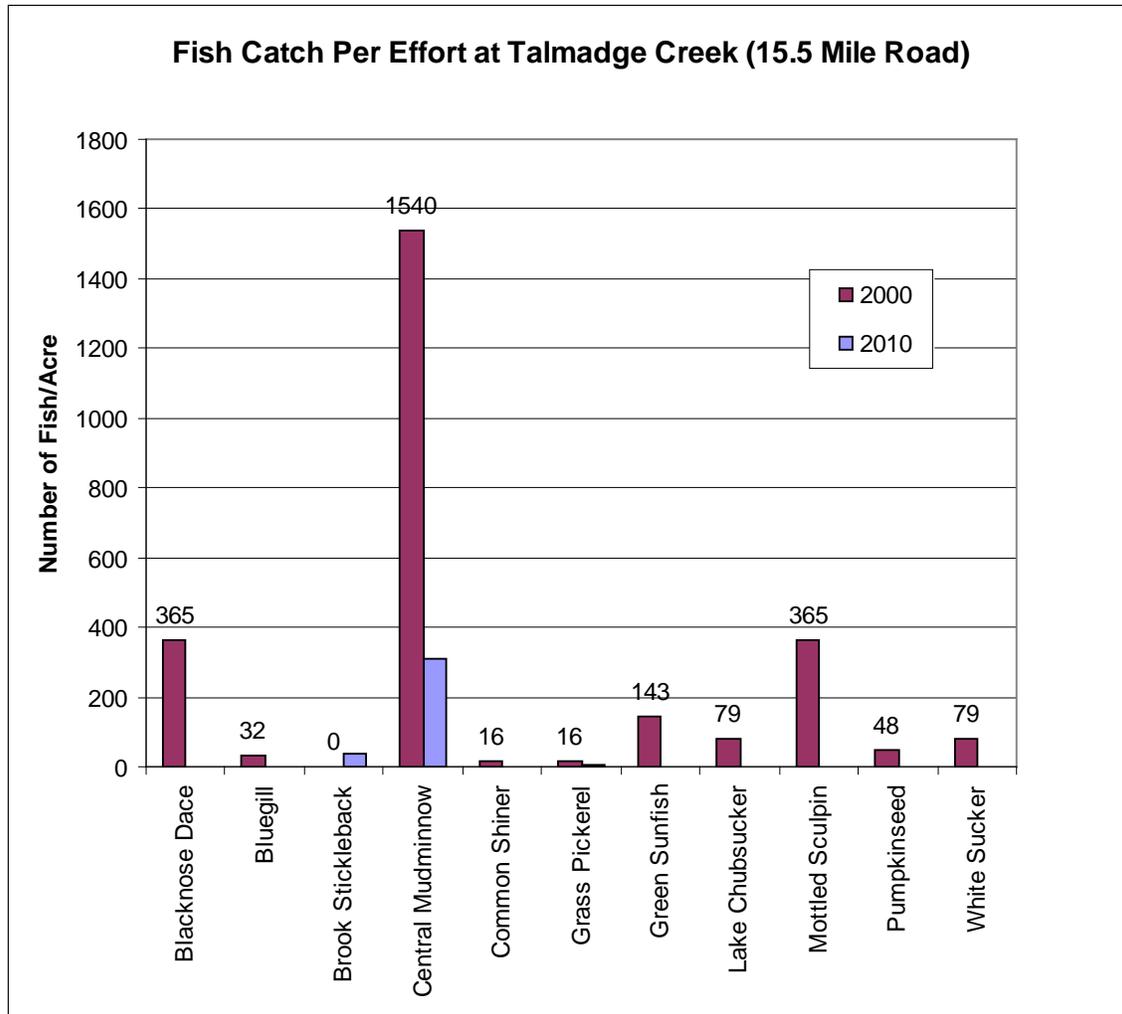


Figure 3. Fish catch per effort (number per Acre) in July 2000 and September 2010 for Talmadge Creek at 15½ Mile Road.

Kalamazoo River – 17 Mile Road (Reference)

The 17 Mile Road location was upstream of the oil spill and had historical fish data from 2002 making it a good reference site for the Kalamazoo River. This site was relatively deep making some areas difficult to wade and shock. As a result, the section length was reduced from 1,000 ft to 800 ft during the survey conducted on September 8, 2010.

The average width was 100 ft with an average depth of 21.6 inches. The water clarity was slightly turbid. Cover consisted of a moderate abundance of undercut banks, aquatic plants, and woody structure with limited deep pools, boulders, and overhanging vegetation. Habitat conditions appeared similar to 2002.

A stream shocker was used to sample the left and right banks. The catch was combined from both banks giving a total catch of 403 fish representing 25 species. Based on catch per effort, northern hog sucker, rock bass, and smallmouth bass were the most abundant species (Figure 4). The catch per effort and species composition were similar between 2010 and 2002 except pumpkinseed sunfish and common white sucker made up more of the catch in 2002. Smallmouth bass from age 0 to age 10 were collected with most (87%) of the catch being age 0. The average length of the smallmouth bass was 4.5 inches.

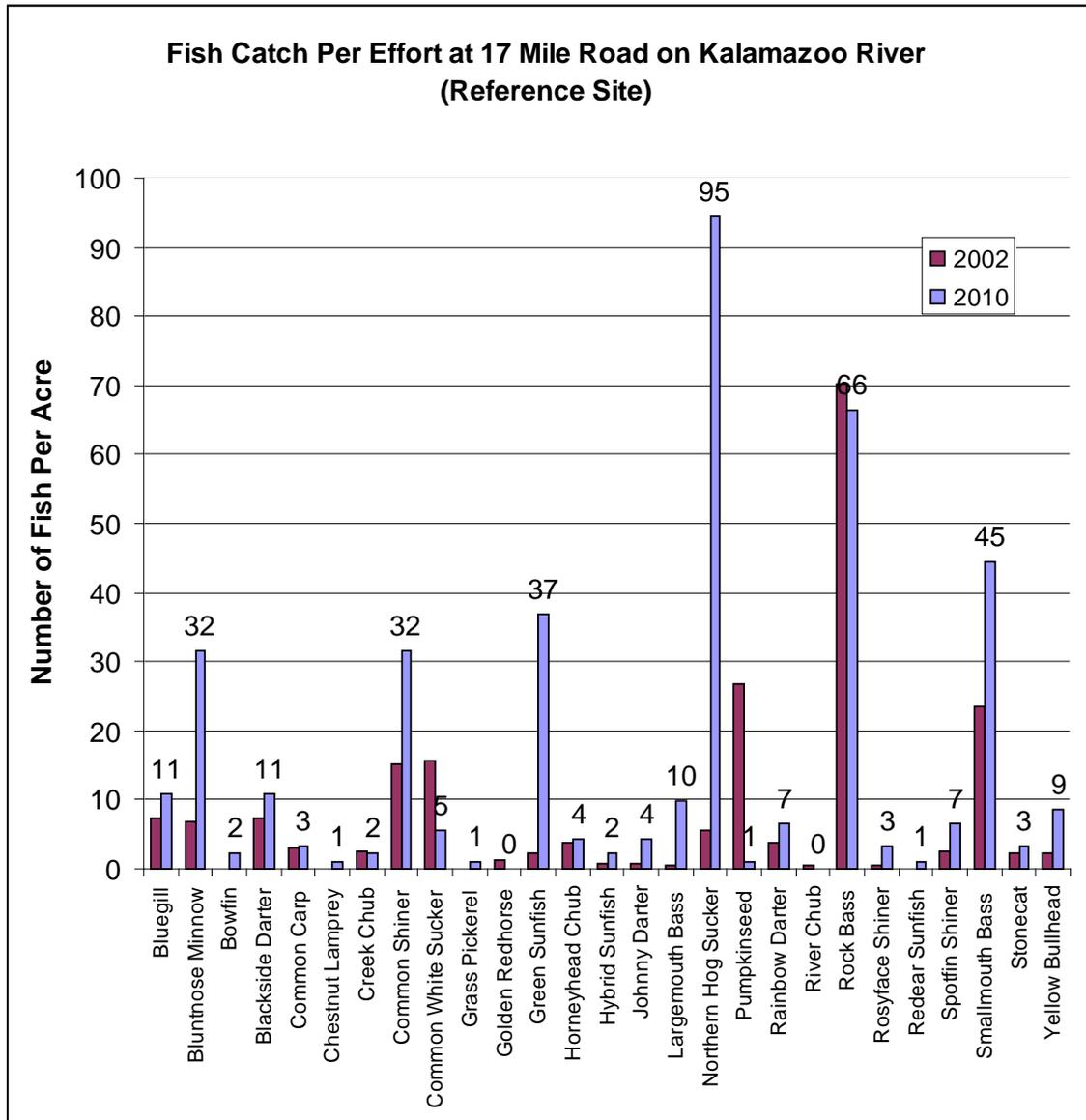


Figure 4. Fish catch per effort (number per Acre) in August 2002 and September 2010 for the Kalamazoo River at 17 Mile Road (reference site).

Kalamazoo River – 15 Mile Road

The 15 Mile Road site started 500 ft below the Squaw Creek mouth and ended 500 ft upstream for a total of 1,000 ft. This section is downstream from the 1982 rotenone survey (Townsend 1984), which was conducted right at the 15 Miles Road bridge. The site was moved for a more wadeable section and to move away from a busy response access site.

The average width was 153 ft with an average depth of 18.2 inches. The water clarity was slightly turbid. The channel was characterized as 54% run and 46% riffle habitat. Cover consisted of a moderate abundance of boulders and aquatic plants with limited deep pools, overhanging vegetation, undercut banks, woody structure. The bottom substrate consisted of gravel (45%), small cobble (28%), sand (14%), large cobble (6%), silt (5%), and boulder (2%). Water levels appeared slightly above normal with an estimated discharge of 304 cfs. The section of river surveyed in 1982 was deeper and narrower than this section.

A stream shocker was used to sample the left and right banks. The combined total catch was 871 fish with 27 different species. Rainbow darter, green sunfish, rock bass, and creek chub were the most abundant (Figure 5). The presence and number of darters is a good indication of more riffle habitat compared to the deeper water surveyed upstream in 1982. The relatively high species diversity is an indication of transitional habitat as the Kalamazoo River enters the Ceresco Impoundment. Catch per effort comparisons are shown in Figure 5; however, different methods were used between 1982 (rotenone) and 2010 (stream shocking). Rotenone is a fish toxicant that samples the entire river section; whereas, the stream shocking effort only sampled the left and right banks. Smallmouth bass from age 0 to age 10 were collected with most (63%) of the catch being age 0. The average length of the smallmouth bass was 7.8 inches. The species diversity and catch were similar to the 17 Mile Road reference section, although there appeared to be more and younger smallmouth bass at the reference site compared to this section (based on age data in Appendix 1).

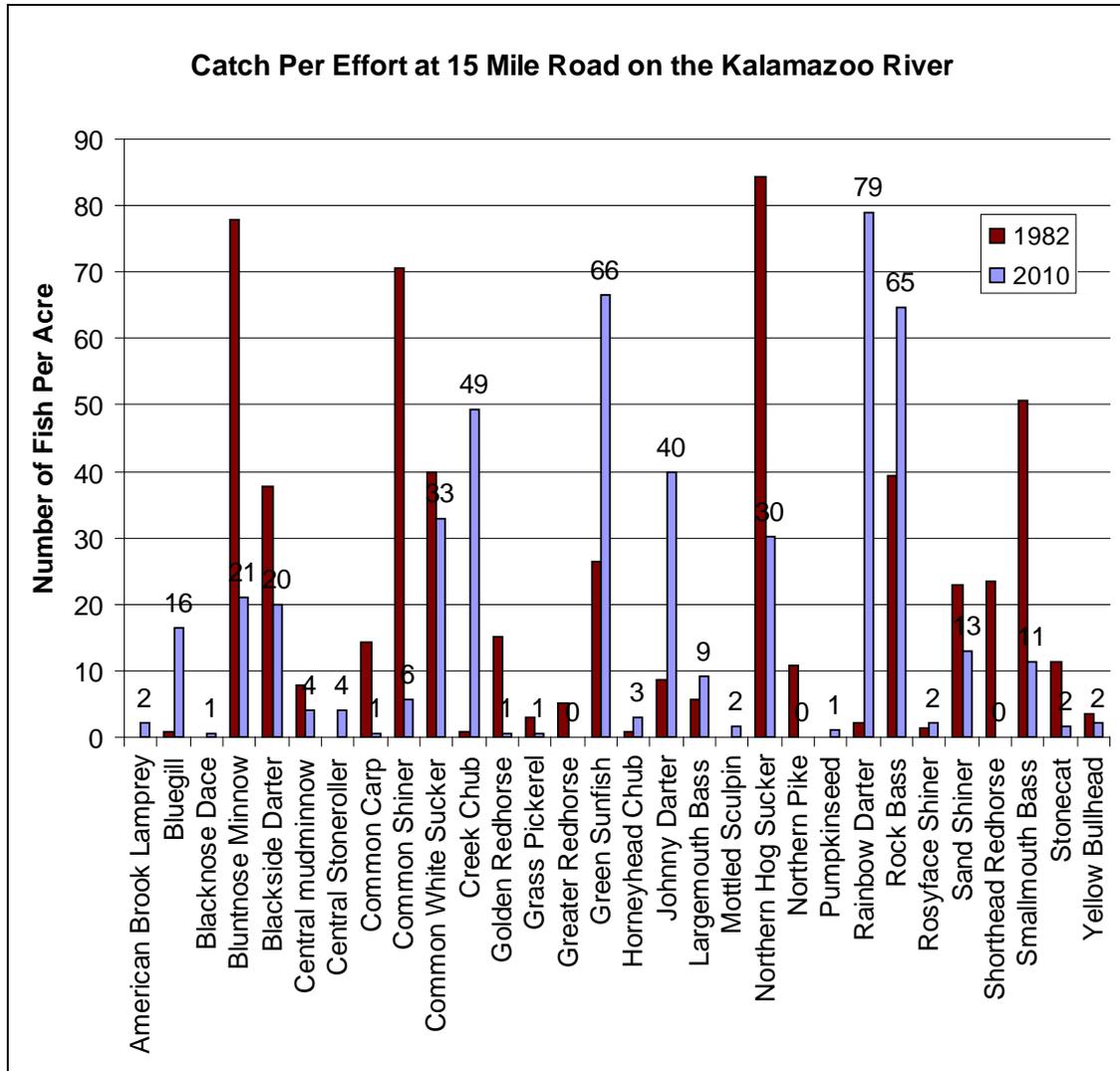


Figure 5. Fish catch per effort (number per Acre) in July 1982 and September 2010 for the Kalamazoo River at 15 Mile Road.

Kalamazoo River – 11 Mile Road

The 11 Mile Road site was a Status and Trends fixed site for smallmouth bass that has been surveyed annually since 2008. Only smallmouth bass were collected in 2008 while all species of fish were collected in 2009 and 2010. The site extends 1,000 ft downstream of 11 Mile Road and is permanently marked to ensure the same effort from year to year. The entire site was wadeable.

The water clarity was slightly turbid. The average width was 142 ft with an average depth of 15.8 inches, which has been consistent for the past three years. The channel habitat was primarily riffle (85%) and run (15%). The bottom type consisted of gravel (33%), small cobble (26%), large cobble (15%), boulder (12%), sand (7%), silt (3%), and island (2%). This is similar to past surveys with a small reduction in the size of the island. The

vegetation on the island had been removed, and there was evidence of bank erosion. Cover consisted of a moderate abundance of boulders and aquatic plants with limited deep pools, overhanging vegetation, undercut banks, and woody structure. Water levels appeared above normal with an estimated discharge of 321 cfs.

The combined total catch of the left and right bank streamshocker efforts was 327 fish representing 20 species. These results were lower than the 2009 survey that collected 594 fish representing 24 species. Rock bass dominated the catch (Figure 6). Compared to 2009 the catch of each species was down except for rock bass and green sunfish. The smallmouth bass catch per effort was 56% and 43% lower than 2008 and 2009, respectively. There appeared to be a lack of small sized bass from the 2009 and 2010 year classes. Smallmouth bass ages ranged from 0 to 8 with most (34%) of the catch at age 3. The average length of the smallmouth bass was 10.0 inches.

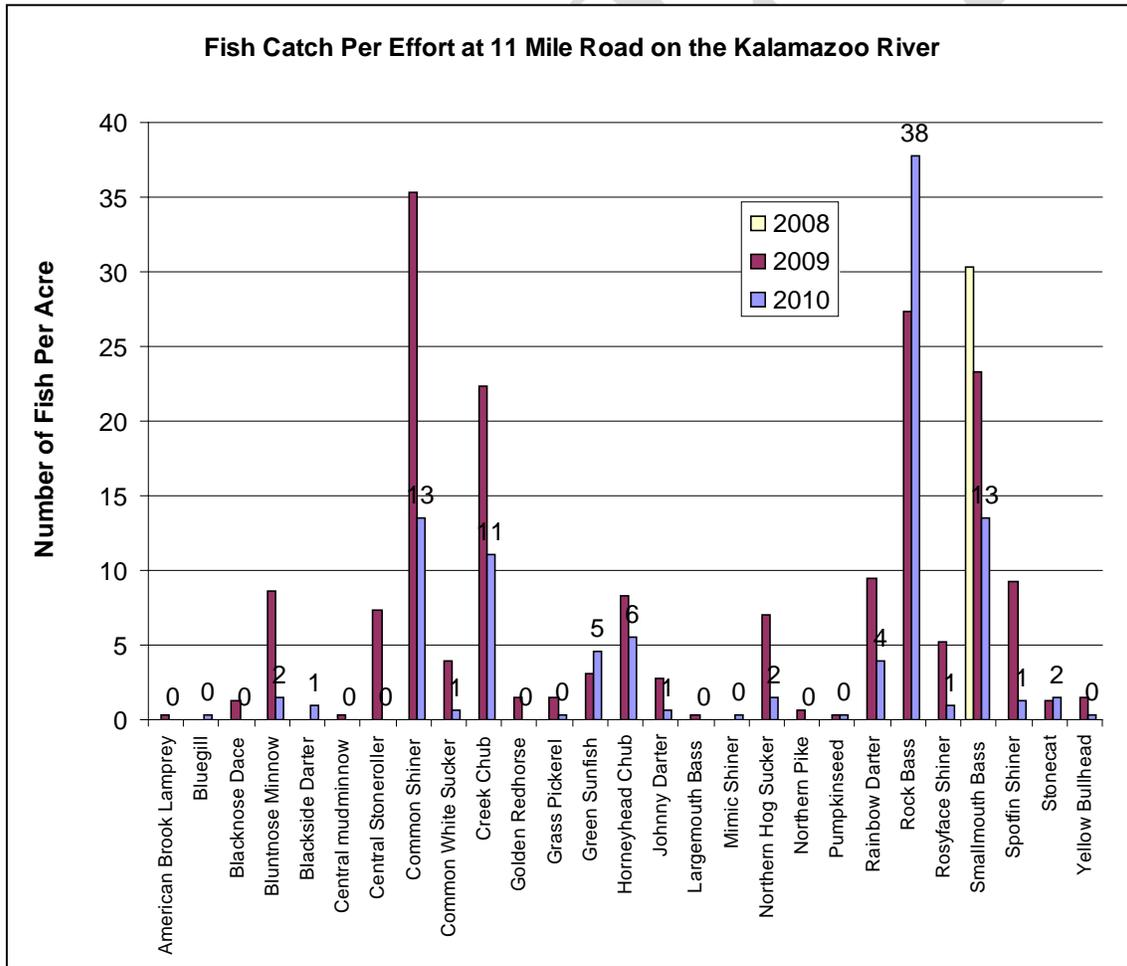


Figure 6. Fish catch per effort (number per Acre) in August 2008, September 2009, and September 2010 for the Kalamazoo River at 11 Mile Road.

Kalamazoo River – Custer Road

This site began approximately 1,320 ft downstream of Custer Road and continued downstream 4,224 ft (approximately MP 21.5 to 22.5). The 1982 rotenone survey sampled 540 ft of stream starting 2,640 ft downstream of Custer Road (Towns 1984). This section of river was not wadeable and required all sampling to be conducted from a boat.

The average width was 71 ft with an average depth of 36 inches. The water clarity was clear. Woody structure and undercut banks were common with limited overhanging vegetation and aquatic vegetation for cover habitat. Due to the depth of the site, other habitat parameters were not measured. Refer to MDEQ (2011) for more habitat details.

A boomshocker (boat) was used to sample the left descending bank in a downstream direction as part of a non-wadeable protocol (Wills et al. 2008). The total catch was 223 fish with 17 different species represented. Golden redhorse, northern hog sucker, rock bass, and smallmouth bass were most abundant (Figure 7). The presence of golden redhorse, walleye, and channel catfish indicate deeper river habitat characteristics. The 1982 survey collected 28 species. The lower species diversity in the 2010 survey was probably due to the difference in sampling procedures. Boomshocking gear sampled the top three to five feet of water, making it difficult to collect smaller species such as darters and minnows that inhabit gravel areas on the bottom of the river. Direct catch per effort comparisons should not be made between 1982 and 2010, since rotenone was used in 1982. Rotenone was much more efficient at sampling all water depths compared to the boomshocking gear. Better comparisons can be made with future boomshocking data at this site. Smallmouth bass from age 1 to age 10 were collected with most (33%) of the catch being age 1. No young of year smallmouth bass were collected. The average length of the smallmouth bass was 11.0 inches.

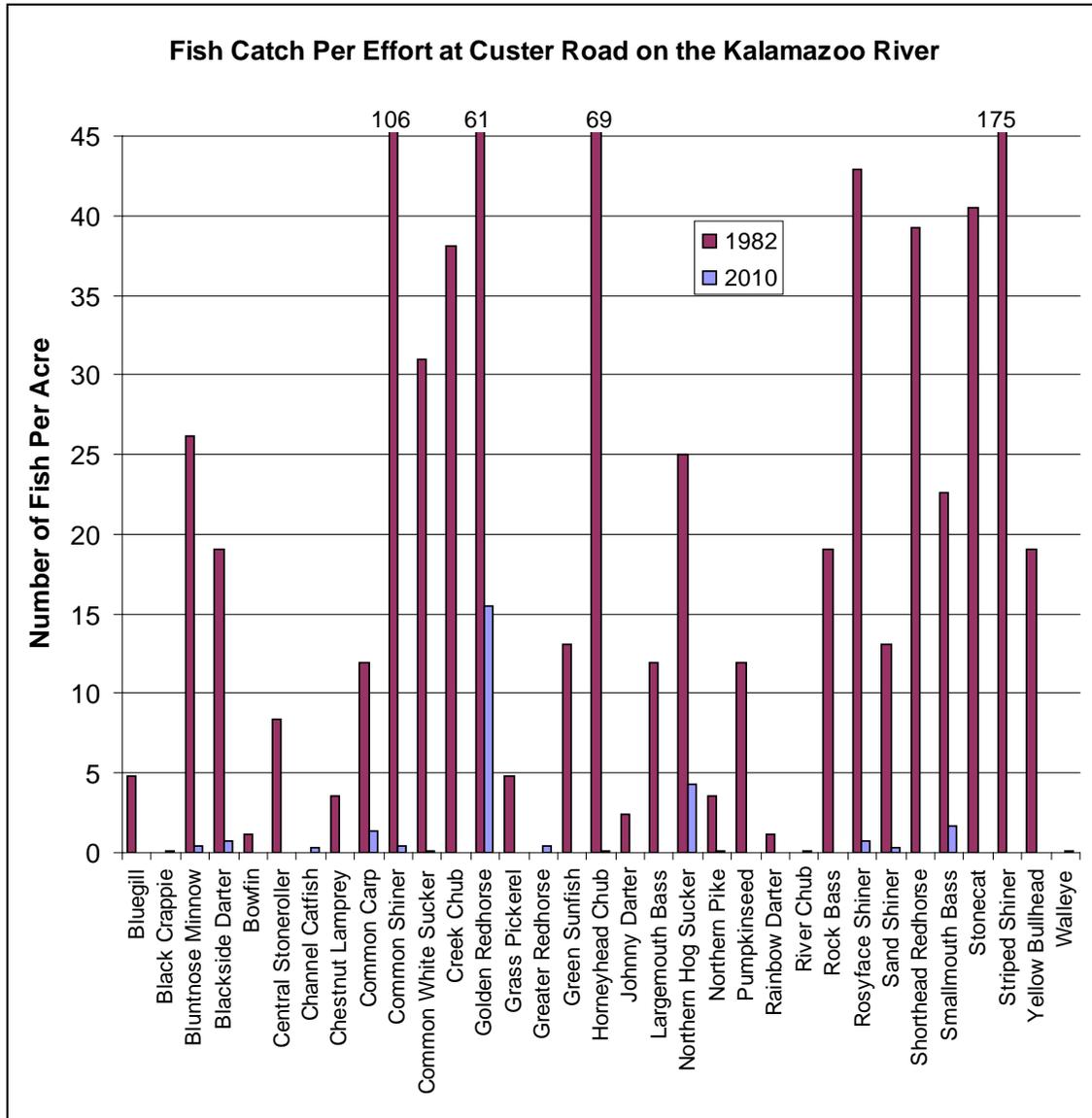


Figure 7. Fish catch per effort (number per Acre) in August 1982 and September 2010 for the Kalamazoo River at downstream of Custer Road.

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