2015 Point Creek Smallmouth Bass Survey

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ABSTRACT

Point Creek is located in eastern Wisconsin in Manitowoc County and is a direct tributary to Lake Michigan. This 19.3 km stream drains a 55.9 km^2 watershed that is mostly agricultural cropland. It is classified as having a warm water sport fishery although it does support seasonal migrations of Lake Michigan trout and salmon in its lower reaches.

Historically, Point Creek supported a robust Smallmouth Bass fishery that was well known across the state. This fishery was severely impacted by declining water quality, habitat loss and a series of fish kills. By the early 2000's, the fish community of the river was dominated by forage fish with very low numbers of gamefish present.

The purpose of the 2015 survey was to determine the status of Smallmouth Bass in Point Creek and to qualitatively assess habitat in the stream allowing for a comparison of the results from the current survey to those conducted in 2004, 2005 and 2010.

The survey in 2015 mirrored the 2010 survey in that the same sites were sampled unlike in 2004 and 2005 when a subset of these sites were sampled. The 2010 survey found a mixture of Smallmouth Bass, Largemouth Bass and Northern Pike and panfish at each survey location. In 2015, no bass and only one Northern Pike was captured. In 2015, IBI scores declined from those calculated in 2010. As with past surveys, forage fish dominated the catch in 2015. Habitat scores calculated in 2010 and 2015 were similar indicating that habitat was stable and classified as good.

INTRODUCTION

Point Creek is located in eastern Wisconsin in Manitowoc County and is a direct tributary to Lake Michigan. This 19.3 km stream drains a 55.9 km^2 watershed that is mostly agricultural cropland (77.1%). In 1987, it was estimated that this cropland contributed 32,800 tons of soil per year into Point Creek.

Within the watershed, Point Creek is the major drainage and has an overall average width of 2.5 meters and depth of 15 cm (WDNR 1987). It is classified as having a warm water sport fishery although it does support seasonal migrations of Lake Michigan trout and salmon in its lower reaches (WDNR 2001).

Historically, Point Creek supported a robust Smallmouth Bass fishery that was well known across the state. This fishery was severely impacted by declining water quality, habitat loss and a series of fish kills. By the early 2000's, the fish community of the river was dominated by forage fish with very low numbers of gamefish present.

A large fish kill in 2001 caused by liquid manure runoff resulted in the mortality of at least 4,000 forage minnows, 25 panfish, 3 Northern Pike, 5 Smallmouth Bass and 1 Largemouth Bass (Hogler and Surendonk 2001). In 2004, another manure runoff caused smaller fish kill. Very few dead fish were observed as a result of this spill. Money from a court settlement with the party responsible for these fish kills was used to purchase Smallmouth Bass and Northern Pike (Table 1). Fish surveys were conducted in 2004 and 2005 to determine the status of the fish community following the fish kills of 2001 and 2004 (Hogler, Surendonk and Gansberg 2004) and 2005 (Hogler 2005). These surveys found that: flow may be limiting in the upper reaches of the river, diel swings of dissolved oxygen frequently occurred that likely limited gamefish numbers, HBI and IBI scores ranged from poor to good with forage fish dominating the fish community. Few gamefish were captured although Lake Michigan Rainbow Trout were captured in several locations.

Table 1. Point Creek fingerling stocking totals by year and species. Fish were obtained from state, federal and private hatcheries.

Year	Northern Pike	Smallmouth Bass
2007	199	
2008	200	1,000
2009	80	
2010	350	3,497
Total	829	4,497

Surveys in 2010 had a wider geographic distribution than did the surveys in 2004 and 2005, although several sites surveyed in 2010 were similar in location to those surveyed in previous years (Hogler and Surendonk 2010). Survey results from 2010 indicate that Point Creek was slowly recovering from the fish kills that

occurred in 2001 and 2004. In 2010, although forage species still clearly dominated the catch, a mixture of gamefish such as Largemouth Bass, Smallmouth Bass and panfish were captured at each sampled location. IBI scores in 2010 improved to the upper ranges of fair with a greater number of species and individual fish captured than in previous surveys. Captured gamefish and panfish were dominated by small, likely young fish. The Smallmouth Bass that were captured during the 2010 survey ranged from 104 mm to 207 mm. Based on the size distribution of the captured Smallmouth Bass, it is likely they were stocked during the previous two years. It was hoped that stocked Smallmouth Bass from (2008-2010) would begin to reproduce and improve the bass population of Point Creek.

The purpose of the 2015 survey was to determine the status of Smallmouth Bass in Point Creek and to qualitatively assess habitat in the stream. By quantifying the type and number of each fish species, we can calculate the Index of Biotic Integrity (IBI) and catch per effort (CPE) which will allow us to judge the current condition of the fish population in the stream and to compare the results from the current survey to those conducted in 2004, 2005 and 2010.

METHODS

The selection of the four survey locations on Point Creek was based on past surveys, management needs and professional judgment (Figure 1). Protocols for Tier 1 monitoring of Wisconsin bass streams were followed while surveying Point Creek.

Figure 1. Site locations that were evaluated during 2010 and 2015 bass surveys of Point Creek.

Although standard protocols call for stations that are 800 meters in length, Smallmouth Bass sites surveyed in 2015 ranged from 305 meters to 1176 meters because of stream conditions. Fish were collected in a single upstream pass using a stream shocker with three anodes or a backpack shocker with a single anode. All fish were netted for at least 100 meters at all stations to calculate an IBI score for the site while gamefish were netted over the entire survey segment. CPE's for gamefish were based on the total station length while CPE for non-gamefish were based on the length of the segment length in which all fish were netted. Since station length was variable between the sites this year and in previous surveys, CPE was standardized to the number of fish per 100 meters to allow for comparisons. All netted fish were identified and counted. Gamefish and panfish were measured to the nearest millimeter.

Other variables that were measured at each site included air and water temperature, dissolved oxygen, percent oxygen saturation, and flow. Habitat was qualitatively rated based on stream width. Qualitative scores can range from 0 to 100 with scores less than 25 indicating poor habitat, 25 to 49 fair habitat, 50 to 74 good habitat and scores above 74 indicating excellent habitat. Within the scoring matrix, items that are rated included buffer width, bank erosion, pool depth, stream width to depth ratio, riffle to riffle distances, fine sediment coverage and cover for fish. Streams that score high on the rating index have diverse habitats, deep pools and no erosion. Streams that score low include those that have limited buffers, shallow water, erosion, sediment deposition and little fish habitat.

The Index of Biotic Integrity (IBI) based on the fish community at each sampling location was calculated using an excel spreadsheet for warmwater or coldwater communities (Lyons 1992). IBI scores can range from 0 (poor) to 100 (excellent). Fish communities that receive poor IBI scores have many species that are tolerant to low dissolved oxygen levels or disturbed habitat while streams with high scores have species intolerant to low DO or habitat disturbances.

RESULTS

Four locations (Highway LS, Point Creek Road, County F and Newton Road) were scheduled to be surveyed 2015, however only two sites (County F and Point Creek Road) were fully surveyed. One site was reduced in length because of safety concerns caused by high water level (Highway LS) and another site (Newton Road) was not surveyed because it was dry (Figure 1). All surveys were conducted between July 15th and August 4th following stream sampling protocols.

CTH LS

The station is located downstream of CTH LS (43.993824, -87.798513 to 43.9621, -87.706623) and the water level at the site can be influenced by Lake Michigan (Figure 2). Bottom sediments are sandy clays and the stream gradient is near zero. At times, conditions on Lake Michigan may cause stream waters to have zero flow or flow upstream.

In 2015 because of high lake levels, only 305 meters of stream was surveyed because deep water caused unsafe shocking conditions. At the time of survey, the air temperature was 25.1 C, the water temperature was 17.4 C and the water was 83% saturated with dissolved oxygen (DO) measured at 7.8 mg/l. At this location, Point Creek is a 3rd order stream, 10 meters in width and judged to be turbid.

Figure 2. Looking downstream at Point Creek from County Highway LS.

During the electrofishing survey, all fish were netted over the course of the entire survey segment. Total electroshocking effort was 45 minutes. During the survey, a total of seven fish representing four species were captured (Table 2). Round Goby was the most abundant species captured. Too few fish were captured to calculate an IBI score for this location.

Table 2. The species list and the number captured for fish collected by electroshocking below CHT LS on Point Creek. CPE for each species is based on all fish being captured over the course of 305 meters.

Species	Number	CPE (Fish/ 100 meters)
Northern Pike	1	0.33
Central Mudminnow	1	0.33
Spotfin Shiner	1	0.33
Round Goby (not in IBI)	4	1.31
Total	**7**	

Following shocking, staff evaluated stream habitat using the qualitative habitat scoring sheet. At this location, the river had high rankings for buffer width and pool area. It scored lower rankings for moderate erosion, low habitat diversity, and extensive fine sediments. Overall, the stream at this location scored 65 points indicating good qualitative habitat.

Point Creek Road

The fish survey site at this location was upstream of Point Creek Road and ran for 1,146 meters (43.965305, -87.72674 to 43.9692246, -87.731211). At this location, Point Creek averaged four meters in width and was a 3rd order stream (Figure 3). The gradient at this site was 3.72 meters per kilometer and the creek had a sinuosity of 2.02. Lower stream segments were dominated by sand and gravel sediments while upper sections had cobble, boulder and silt sediments. The water was clear and flow was measured at 0.018 m^3/second. On the date of the survey, air temperature was 20.7 C, water temperature was 20.8 C and stream DO was 79% saturated at 6.9 mg/l.

Figure 3. Looking upstream at Point Creek above Point Creek Road.

All fish were netted for the first 555 meters and gamefish were netted for the entire 1,146 meters of the site. During the 115 minutes of shocking, 982 individual fish representing fourteen species were captured (Table 3).

Table 3. The numbers of captured fish by species collected by electroshocking above Point Creek Road on Point Creek. CPE for gamefish is based on the total length of the station (1,146 m) while CPE for all other species is based on the 601 meters when all fish were netted.

Species	Number	CPE (Fish/ 100 meters)
Creek Chub	410	73.8
Blacknose Dace	123	22.1
Southern Redbelly Dace	29	5.2
Common Shiner	137	24.7
Johnny Darter	59	10.6
White Sucker	108	19.4
Hornyhead Chub	78	14.0
Central Mudminnow	4	0.7
Fathead Minnow	2	0.4
Rainbow Trout	10	1.8
Longnose Dace	4	0.7
Mottled Sculpin	14	2.5
Stonecat	3	0.5
Spottail Shiner	1	0.2
Total	**982**	

Forage species such as Creek Chub, Blacknose Dace, White Sucker, and Common Shiner dominated the catch. Other species were captured in much lower number (Table 3). Based on our catch the IBI score for this site was 25 indicating a poor population of warmwater fish.

The only gamefish collected at this location were ten rainbow trout that ranged in length from 57 mm to 81 mm. Based on the size distribution of these fish, it is likely that all are young of year trout.

Visual assessment of the habitat resulted in a qualitative habitat score of 62 indicating that the habitat was good. At this survey site, the river habitat ranked high for the amount of riparian buffer, limited bank erosion and the lack of fine sediments. Low habitat rankings were for: over abundant pools, its width to depth ratio (too wide and shallow) and limited habitat diversity.

County Highway F

The station at this site was 756 meters in length and was located upstream of CTH F (43.979300, -87.759032 to 43.9809000, -87.7649000). At this location, Point Creek is a 3rd order stream and averaged 4 meters in width (Figure 4). At the time of survey, the water was judged to be clear and at near normal depth. The gradient was moderately steep at 4.74 m/km and the sinuosity was 1.28:1 at this site. There was some evidence that the lower 100 meters of the station had been channelized at least 20 years previously. On the day of the survey, the air temperature was 22.3 C, the water temperature was 17.5 C, and the dissolved oxygen (DO) was 64% saturated at 6.4 mg/l. Flow was measured at 0.014 m^3/sec.

Figure 4. Point Creek looking upstream from CTH F. This picture shows the old channelization and grassy banks that are characteristic of the lower section of this survey site.

For the first 429 meters of this site, all fish were netted to facilitate the calculation of an IBI score. For the remainder of the station, only gamefish were netted. During the 126 minutes of shocking, we captured 827 individual fish representing twelve species (Table 4). Creek Chub dominated the catch followed by

Blacknose Dace, Mottled Sculpin and Central Mudminnow. The IBI score for this location was 25 indicating a poor population of warmwater fish.

Table 4. The number of fish captured by species captured during electroshocking above CTH F on Point Creek. CPE for gamefish is based on the total length of the station (756 m) while CPE for all other species is based on the 429 meters when all fish were netted.

Species	Number	CPE (Fish/ 100 meters)
Creek Chub	224	51.5
Blacknose Dace	191	44.0
Mottled Sculpin	97	22.3
White Sucker	60	13.8
Southern Redbelly Dace	36	8.3
Central Mudminnow	66	15.2
Johnny Darter	40	9.2
Common Shiner	46	10.6
Brook Stickleback	38	8.7
Fathead Minnow	14	3.2
Pearl Dace	3	0.7
Rainbow Trout	12	1.6
Total	**827**	

The twelve Rainbow Trout that were captured ranged in length from 74 mm to 95 mm and had an average length of 84 mm. Based on the length distribution, it is likely that these fish were young of year trout.

Following shocking, staff evaluated stream habitat using the qualitative habitat scoring sheet. At this location, the river had high rankings for buffer width, limited bank erosion and habitat diversity. It scored somewhat lower because the survey section had fine sediments that were common, a poor width to depth ratio and limited fish cover. Overall the stream at this location scored 57 points indicating good qualitative habitat.

Newton Road

The survey site at this location was upstream of Newton Road and ran for 800 meters (43.993824, -87.798513 to 43.999831, -87.798178). On the date of survey, Point Creek at this location was dry and the electroshocking survey was not completed.

DISCUSSION

Following Wisconsin sampling protocols, we surveyed three sites on Point Creek to assess the Smallmouth Bass population. The work in 2015 was similar to work that was done in 2004 (Hogler, Surendonk and Gansberg 2004), 2005 (Hogler 2005) and 2010 (Hogler and Surendonk 2010). In addition to electrofishing to assess the fish population at each site, we measured DO, flow and qualitatively assessed habitat during the 2015 survey.

The survey in 2015 mirrored the 2010 survey in that the same sites were sampled each year. Unlike the 2010 survey, in which a mixture of Smallmouth Bass, Largemouth Bass, Northern Pike and panfish were captured at each survey location, no bass and only one Northern Pike was captured in 2015. In 2015, the two calculated IBI scores were indicative of a poor warmwater fish gamefish community compared to fair in 2010. Overall, the total number of fish captured in 2015 increased over the previous surveys but catch per 100 meters declined (Table 5). As in past surveys, forage fish dominated the catch in 2015.

Qualitative habitat scores in 2015 indicated a rating of good at habitat for each location which were similar to those calculated in 2010. Since 2004, we have noted a decrease in the amount of soft sediment and sand in Point Creek and an increase the amount of rocky riffles and woody debris. In 2015, however, we noted the continued lack of deep pool habitat needed by fish as either a summer temperature refuge or an overwintering location.

While conducting our fish surveys, we also measured stream temperature, DO and stream flow. The stream temperatures and DO's that we measured in 2015 were within the normal ranges for warmwater streams in eastern Wisconsin. Instantaneous DO readings were all above the state standard 5.0 mg/l for warmwater streams although it is likely diel DO sags are occurring in Point Creek.

From these data, it appears that poor water quality, likely low DO and low flow are the main stressors of the fish community in Point Creek. The low DO is likely caused by the intermittent low flow of the stream and as noted in the habitat evaluation the wide-shallow nature of the stream. Although DO was good during our visits in 2015, it is likely that diel swings in DO occur in the creek and may impact intolerant species. Regular occurrences of low DO caused by low flow or runoff will continue to limit the fish community to those species tolerant of low DO at this location.

At this time, there is no evidence that suggests that sustained natural reproduction is occurring from the Smallmouth Bass or Northern Pike that were stocked following the 2004 fish kill. Since habitat quality appears to be stable, it

is likely that poor water quality and previous years of low flow has negatively impacted the gamefish populations in Point Creek.

Table 5. The average catch of fish per 100 meters shocked from surveys conducted on Point Creek in 2010 and 2015.

	Fish/ 100 Meters	
Species	2010	2015
Creek Chub	62.23	62.65
Blacknose Dace	51.55	33.05
Southern Redbelly Dace	28.36	6.75
Mottled Sculpin	27.85	12.4
White Sucker	25.99	16.6
Common Shiner	20.85	17.65
Johnny Darter	17.21	9.9
Central Mudminnow	12.67	5.41
Brook Stickleback	6.90	8.7
Pearl Dace	4.44	0.7
Hornyhead Chub	3.43	14
Round Goby	2.89	1.31
Fathead Minnow	2.18	1.8
Smallmouth Bass	1.18	
Green Sunfish	0.69	
Bluntnose Minnow	0.66	
Largemouth Bass	0.57	
Bluegill	0.53	
Hybrid Sunfish	0.43	
Rock Bass	0.17	
Black Bullhead	0.16	
Rainbow Trout	0.14	1.7
Yellow Perch	0.14	
Alewife	0.13	
Longnose Dace		0.7
Northern Pike		0.33
Spotail Shiner		0.2
Spotfin Shiner		0.33
Stonecat		0.5
Total	271.33	194.68

RECOMMENDATIONS

The recommendations for Point Creek include;

- Long-term stream monitoring in the form of fish surveys, macroinvertebrate surveys and water quality monitoring to aid in the evaluation of the fish community.
- To encourage land owners within this watershed to embrace land management practices that are protective of stream water quality and habitat.
- To encourage other partners including Manitowoc County to pursue habitat improvements like pool development to offer refuges for gamefish.
- Stock Smallmouth Bass and Northern Pike to improve their populations when water quality and habitat improves enough to sustain the stockings.

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