Slagle Creek
Wexford and Manistee Counties, multiple sections
Manistee River Watershed, last surveyed August, 2012

Mark A. Tonello, Senior Fisheries Management Biologist

Environment

Slagle Creek is a small tributary stream in the Manistee River watershed. The majority of the Slagle Creek watershed is located in western Wexford County (Figure 1). Slagle Creek flows generally west through a valley that is bordered by Briar Hill to the north (elevation 1,706 feet) and the Harrietta Hills to the south (elevations over 1,500 feet). A number of small spring-fed creeks join together several miles east of the Village of Harrietta to form Slagle Creek. Slagle Creek flows just south of the Village of Harrietta, and continues west through the Harrietta State Fish Hatchery property. After flowing under M-37, Slagle Creek flows through a large private club (the Slagle Creek Trout Club) for approximately four miles. Downstream of #1 Road, the creek enters Manistee County and flows through a deep valley for approximately three miles before joining the Manistee River. Both the headwaters and the final four miles of Slagle Creek flow through federally owned land that is part of the Manistee National Forest, which is managed by the United States Forest Service (USFS). The Slagle Creek watershed is primarily forested with hardwoods and pine, with some reaches flowing through coniferous wetlands. Slagle Creek flows into the Manistee River in the "Hodenpyl Reach," located approximately five miles downstream from Hodenpyl Dam.

Migratory fish from Lake Michigan cannot access Slagle Creek, as it lies upstream of Tippy Dam, which blocks all fish passage on the Manistee River. According to Trautman (1934), prior to the construction of Tippy Dam (known then as "Junction" Dam), migratory steelhead made it all the way to Slagle Creek, where they "spawned in considerable numbers" and created good fishing opportunities. Trautman (1934) also discusses the landscape changes that occurred in the Slagle Creek watershed in the 50 year prior to his report. He mentions the "removal" of the forest and the introduction of farming in the watershed, and the negative impacts to the stream from these changes. He advocates for instream woody debris work to create habitat for trout, and also recommends stabilizing eroding streambanks that are actively feeding sand into the stream.

Because of its cold, spring-fed nature, Slagle Creek was an ideal stream for aquaculture activities. Harrietta State Fish Hatchery was opened in 1901, and it utilized both springs and water from Slagle Creek for its coldwater fish production activities. In 1979, the hatchery was renovated and since then uses only wells for its water source. A private fish hatchery has also operated on Slagle Creek for many years. Located about 2 miles downstream from the Harrietta State Fish Hatchery, it is currently known as the Harrietta Hills Trout Farm. It was started in the 1950s, and still utilizes Slagle Creek water for its operations. Although Harrietta Hills Trout Farm uses Slagle Creek water, the dams there do not entirely block Slagle Creek, allowing for fish passage.

There are two known dams on Slagle Creek that block fish passage, both located on the Slagle Creek Trout Club property. The dams were apparently constructed in 1915 (MDNR files, Cadillac) to create fishing ponds, and have been maintained since then. For a number of years, the dams functioned as sand traps, with the Slagle Club excavating the ponds on a regular basis to keep them deep enough for

fishing purposes. The Slagle Club annually stocks their ponds with approximately 5,500 rainbow trout to create angling opportunities for club members. In recent years, the Slagle Club has also conducted stream habitat improvement projects on Slagle Creek where it flows through Slagle Club property downstream from their ponds. Instream habitat structures were constructed to maintain depth and overhead cover for the resident brown trout.

Discharge for lower Slagle Creek was measured repeatedly in the summer of 2012 by Danhoff (2014), with the estimated discharge being approximately 18-19 cubic feet per second. Danhoff also measured the temperature of Slagle Creek continuously from 2009 to 2013. The coldest mean July temperature was found in 2009, when it was 54.5 degrees F. The warmest was in 2012, when it was 58.1 degrees F. Danhoff also noted that Slagle Creek had a profound cooling effect on the Manistee River below the confluence of the two streams.

Slagle Creek and its tributaries are Designated Trout Streams (Fisheries Order 210). Slagle Creek is classified as a top quality trout mainstream, while its tributaries are top quality trout feeder streams (Anonymous 2000). Slagle Creek and its tributaries are regulated as Type-1 Trout Streams, which means that they can be fished from the last Saturday in April through September 30. The minimum size limits are 7" for brook trout, 8" for brown trout, and 10" for rainbow trout. A total of five trout can be kept per day, with no more than three of those over 15".

History

Although there are no known records of the Slagle Creek fish community prior to European settlement, it is likely that Slagle creek originally supported Arctic grayling. At some point, the grayling became extinct and were replaced by non-native brook, brown, and rainbow trout. The first known fish stocking of Slagle Creek occurred in 1881 when brook trout were stocked by the Michigan Fish Commission (Table 1). Subsequently, brook, brown, and rainbow trout were stocked in many years by the Michigan Department of Conservation (MDOC), the precursor to the Michigan Department of Natural Resources (MDNR). The last recorded stocking of state-reared fish into Slagle Creek was in 1976 when 6,344 brook trout were stocked. Although there haven't been any official stockings of state-reared fish since then, hatchery-reared fish (primarily rainbow trout) are routinely caught by anglers fishing in Slagle Creek. Most likely these fish are escapees from Harrietta State Fish Hatchery, Harrietta Hills Trout Farm, or the stocked ponds at the Slagle Creek Trout Club.

The first known fisheries survey of Slagle Creek was conducted in July of 1966 by the MDOC. The researchers sampled three different sites in the watershed by backpack electrofishing (Figure 2). One site was on the mainstem of Slagle Creek, just upstream from 15 ½ Rd. At this site, the researchers caught 11 brook trout from 2.7 to 8.4 inches in length and three sculpins from 2 to 3 inches long. The other two sites sampled in the 1966 survey were on tributaries to Slagle Creek. Both are small headwater tributaries east of the Village of Harrietta. The first was on a tributary flowing in from the north, in the eastern portion of Section 8 at the crossing of USFS Road 5255. At this site, 20 brook trout measuring from 1.9 to 6.7 inches were caught, and the researchers noted that "most were small." No other species were recorded. The other site was in Section 17 on a tributary flowing in from the south, on the upstream side of 30 Road. A 5.1 inch brook trout was the only fish captured in the survey.

The only other known historical data collection effort on Slagle Creek occurred on July 11, 2001, when MDNR personnel sampled three sites in an effort to collect fish for testing for Whirling Disease (Figure 3). This survey was also conducted by backpack electrofishing. The first site was approximately one mile downstream from the Harrietta State Fish Hatchery, on USFS land in Section 11. In approximately 150 yards of sampling, 20 brown trout from 5 to 8 inches long were captured and sacrificed for disease testing. Several brown trout larger than 9 inches and many smaller brown trout were observed but not captured. The only other fish species observed were sculpins. In this area, Slagle Creek flows through a cedar swamp and has abundant woody cover. In some spots the creek was overgrown with tag alder. Holes were up to three feet deep.

The second site sampled in 2001 was just downstream of the M-37 crossing. In approximately 100 yards, the crew captured and sacrificed 20 brown trout from 5 to 8 inches for Whirling Disease sampling. Dozens of other brown trout up to 15 inches in length were observed. The researchers noted that "this is extremely productive water with a very dense population of brown trout". The only other species observed were sculpins. Gradient was higher in this reach, with abundant gravel and cobble present. Holes were up to 2.5 feet deep, and undercut banks provided cover as well.

The final site sampled in 2001 was located just over the border into Manistee County, approximately ¼ mile downstream of #1 Road, on USFS land. In about 100 yards of shocking, the crew captured and sacrificed 20 brown trout from 5 to 8 inches long for Whirling Disease testing. This site also hosted a very dense population of brown trout, with fish observed up to approximately 20 inches in length. This site had relatively high gradient, with holes up to 4 feet in depth and a fair amount of woody debris present.

Testing on the trout brown trout captured in the 2001 DNR sampling effort produced positive results for Whirling Disease.

At times in the past, there have been reports of degraded stream conditions below both Harrietta State Fish Hatchery and the Harrietta Hills Trout Farm. A 1982 water quality survey conducted downstream of the Harrietta State Fish Hatchery by MDNR Water Quality Division (Kenaga and Wuycheck 1982) showed highly elevated levels of phosphorous and growths of Sphaerotilus (filamentous bacteria) and filamentous algae. However, by 1990, those had been resolved. Another water quality and macroinvertebrate survey was conducted in the same vicinity as the survey above on Slagle Creek (Morse 1990), and conditions were not degraded at that time.

Current Status

The most recent fisheries survey of Slagle Creek was conducted by MDNR between August 17 and August 22, 2012. Sampling was conducted at four different sites in the watershed (Figure 4), using a Wisconsin battery-powered 12-volt backpack shocker with one probe.

The most upstream site sampled was the 15 ½ Road crossing, which is located several miles upstream of the Village of Harrietta. The station ran 250 feet upstream to the road crossing. At this site, Slagle Creek averaged about seven feet wide and four inches deep. Substrates here consisted of approximately 90% sand, 5% gravel, and 5% cobble. Stream channel morphology consisted of 90% run, 5% riffle, and 5% pool. In this reach, only three species were captured- brook trout, bluegill, and

sculpin. A total of 41 brook trout (2-9 inches long), 8 bluegills (2-3 inches long), and 10 sculpins (1-3 inches long) were caught (Table 2). At 11:45 am, the air temperature was 64º F, and the water temperature 58º F. This is a relatively low-gradient stream reach, with abundant sand in the channel. The 15 ½ Road crossing consists of two old culverts, with the southern tube carrying most of the flow. The culverts are perched, possibly impeding fish passage. Instream fish cover consisted mostly of undercuts and the culvert pool. Riparian cover here consisted of mature forest and tag alder.

The next survey site downstream was the Boon Road (30 Rd.) crossing on the southern edge of the Village of Harrietta. The station ran 125 feet upstream to the crossing. At this site, the stream averaged about 8 feet wide and 1.5 feet deep. Substrates consisted of approximately 50% sand, 40% gravel, and 10% cobble. Stream morphology consisted of an estimated 80% run, 10% pool, and 10% riffle. Three species of fish were present, including brook trout (16 from 3 to 10 inches long), brown trout (11 from 2 to 11 inches long), and two 3 inch bluegills (Table 3). At 11:10 am, the air temperature was 64º F, and the water temperature 59º F. This area has a narrow, deep channel with heavy tag alder cover. The Boon Road crossing consists of a bridge that was constructed after the previous crossing was destroyed in a June 2008 flood. The current crossing adequately spans the base channel width and has a natural bottom.

The next survey site downstream was near the #1 Road crossing, just over the county line into Manistee County. Here the survey crew sampled about 400 feet of stream, ending approximately ¼ mile downstream of the #1 Road crossing. At this site, the stream averaged 22 feet in width and 1 foot in depth. Substrates consisted of 55% gravel, 30% sand, 10% cobble, 3% silt, and 2% boulder. Stream channel morphology consisted of 60% riffle, 20% run, and 20% pool. The catch consisted of 131 brown trout (2-17 inches long), one 8 inch rainbow trout, and 43 sculpins from 1 to 3 inches long (Table 4). Slagle Creek here flows through a beautiful wooded valley, and has relatively high gradient. Cover is present in the form of downed trees, logjams, undercut banks, and overhanging vegetation. Watercress is also prevalent. The riparian cover consists primarily of white pine, cedar, and tag alder. The one rainbow trout captured at this site appeared to be of hatchery origin, based on observed fin erosion.

The furthest downstream sample site on Slagle Creek began at the confluence with the Manistee River and progressed upstream approximately 1,200 feet. At this site, Slagle Creek averaged 25 feet in width and 1.5 feet deep. Substrates consisted of 55% gravel, 30% clay, 5% sand, 5% cobble, and 5% boulder. Stream channel morphology consisted of 60% riffle, 25% run, and 15% pool. The catch at this site consisted of 44 brown trout (2-16 inches long), one 3 inch brook trout, two rainbow trout (6 and 10 inches), six longnose dace from 1 to 2 inches long, and 36 sculpins from 1 to 4 inches long (Table 5). The larger of the two rainbow trout appeared to be of hatchery origin. This reach of Slagle Creek is very high gradient and flows swiftly, which made shocking capture efficiency lower than at the other sites. Over its last mile before entering the Manistee River, Slagle Creek falls 43 feet. This reach flows through a beautiful deep, wooded valley. This reach features abundant downed wood, undercut banks, logjams, and log waterfalls. Overall trout abundance seemed lower here when compared to the #1 Road site.

Analysis and Discussion

Despite having two large aquaculture facilities and two dams on it, the trout populations of Slagle Creek remain remarkably healthy, with naturally reproducing brook trout dominating the upper portion of the watershed and naturally reproducing brown trout dominating the lower portion of the watershed. This is due in part to the spring-fed nature of the stream. The watershed is bordered by large glacial moraines that consist of highly permeable sand and gravel. Instead of running off as it would do on less porous soils, rainwater infiltrates into the ground and then enters the stream as groundwater. The groundwater keeps the stream relatively cool in the summer, and relatively warm in the winter, creating favorable conditions for species like brown and brook trout. Although a few small bluegills were captured at the two upstream sites in the 2012 survey, Slagle Creek does not present ideal conditions for this species due its cold nature. These fish were likely migrants from a pond or beaver flooding somewhere in the upper watershed.

Slagle Creek currently has a very good reputation among anglers as an excellent trout fishing stream. However, it is not fished nearly as heavily as it once was. For example, MDNR file correspondence from 1951 indicates very heavy fishing pressure, despite the fact that the stream was only lightly stocked. The correspondence states that "38 cars were counted along the highway in the first mile west of the hatchery on opening day." While the opening day of trout season (the last Saturday in April) is still one of the busiest fishing days of the year, Slagle Creek currently does not see that level of pressure.

Management Direction

Because the watershed remains mostly healthy, the primary management goal for Slagle Creek should be protection. It is far easier and less expensive to protect a watershed than it is to restore one that has been degraded. Protection should occur by working with the Michigan Department of Environmental Quality to review both wetlands (Part 303) and inland lake and stream (Part 301) permit applications in the watershed. Also, USFS timber management in the watershed and particularly those actions close to the stream should be planned with the conservation of Slagle Creek in mind.

A road/stream crossing inventory should be conducted for Slagle Creek. This survey documented one road/stream crossing (15 ½ Rd.) that should be a candidate for replacement with a more hydrologically correct structure, and there are likely more in the watershed. Poor road/stream crossings are responsible for a number of negative impacts on streams, including blocked fish passage and sediment input.

Finally, Slagle Creek should be surveyed again sometime within the next 10 years. Several different sites within the watershed should be sampled by backpack electrofishing to monitor the health of the fish populations of the creek.

References

Anonymous. 2000. Michigan stream classification: 1967 system. Chapter 20 in Schneider, James C. (ed.) 2000. Manual of fisheries survey methods II: with periodic updates. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.

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Kenaga, D., and J. Wuycheck. 1982. A benthic macroinvertebrate and water chemistry survey of Slagle Creek, in the vicinity of Harrietta, Wexford County, Michigan, April 29, 1982. Michigan Department of Natural Resources, Water Quality Division. Lansing.

Morse, D. 1990. Biological survey of the Slagle Creek, Wexford County, Michigan. Michigan Department of Natural Resources Surface Water Quality Report 90-056. Lansing.

Trautman, M. B. 1934. Report on an investigation of Slagle Creek, especially that part on and adjoining the Slagle Resort Club. Institute for Fisheries Research Report 254, Michigan Department of Conservation, Ann Arbor.

Figure 1. Slagle Creek Watershed, Manistee and Wexford Count, MI.

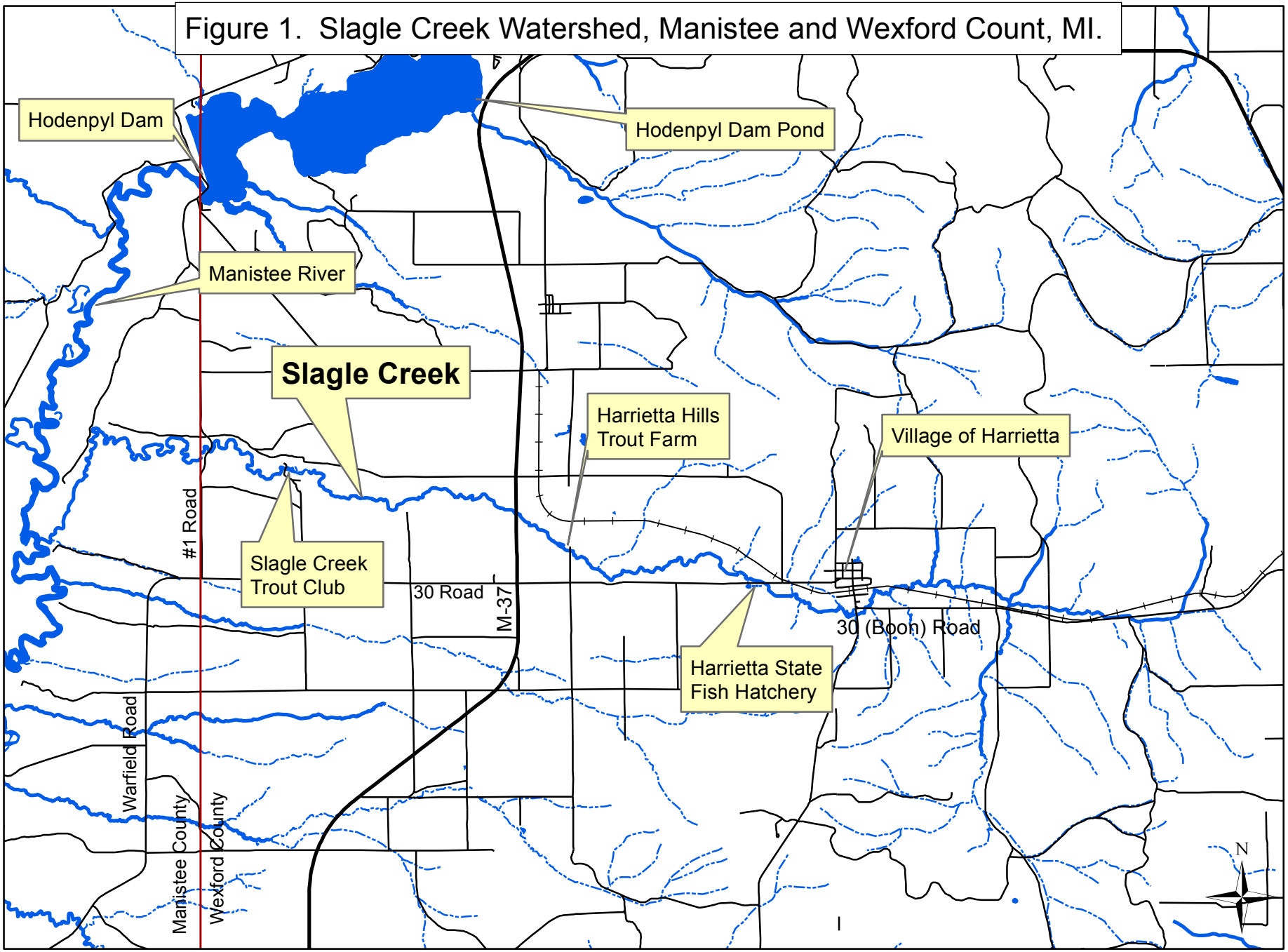

Figure 2. Sample sites from the 1966 Michigan Department of Conservation fisheries survey of Slagle Creek.

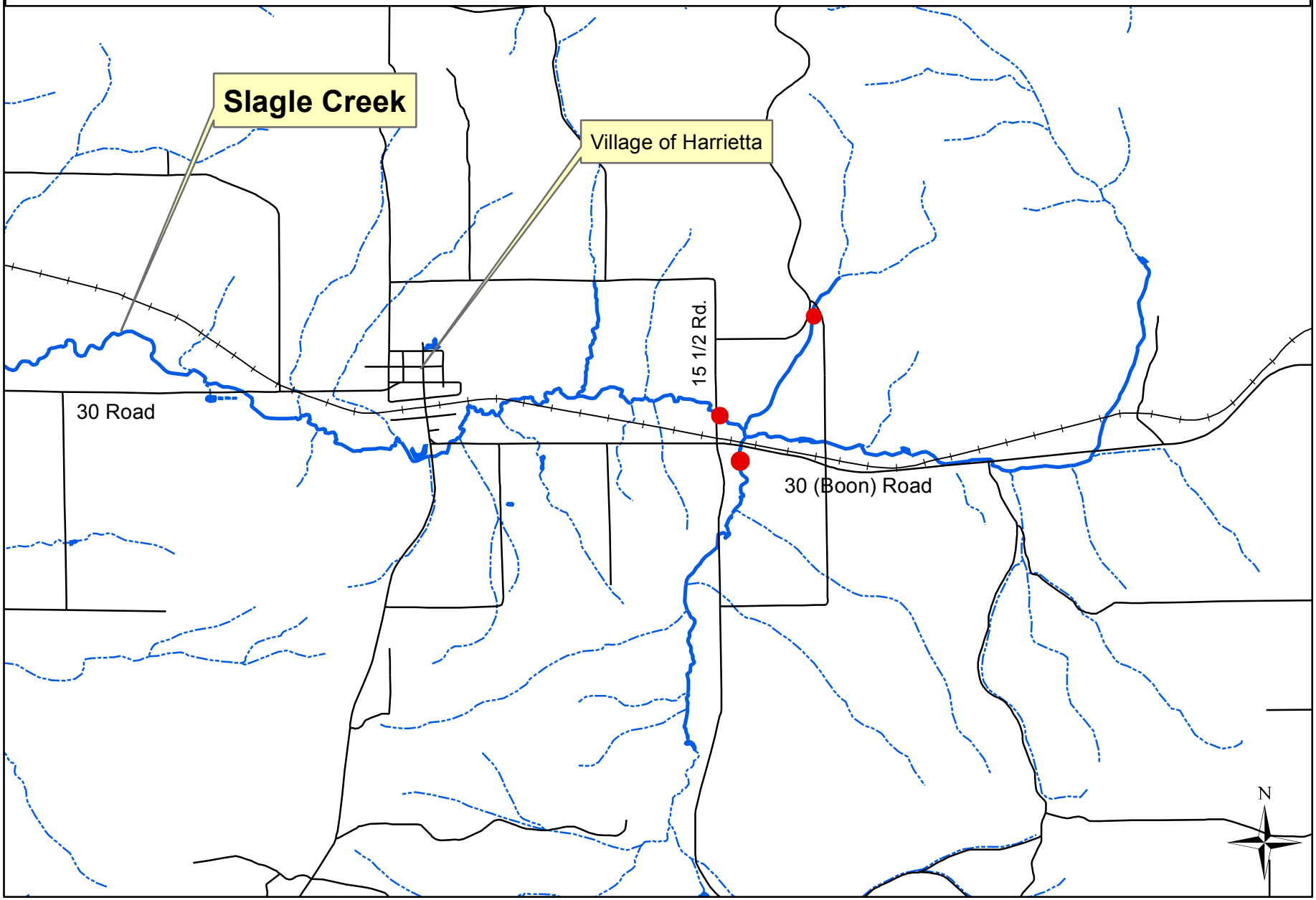

Figure 3. Sample sites from the 2001 Michigan Department of Natural Resources Whirling Disease survey of Slagle Creek.

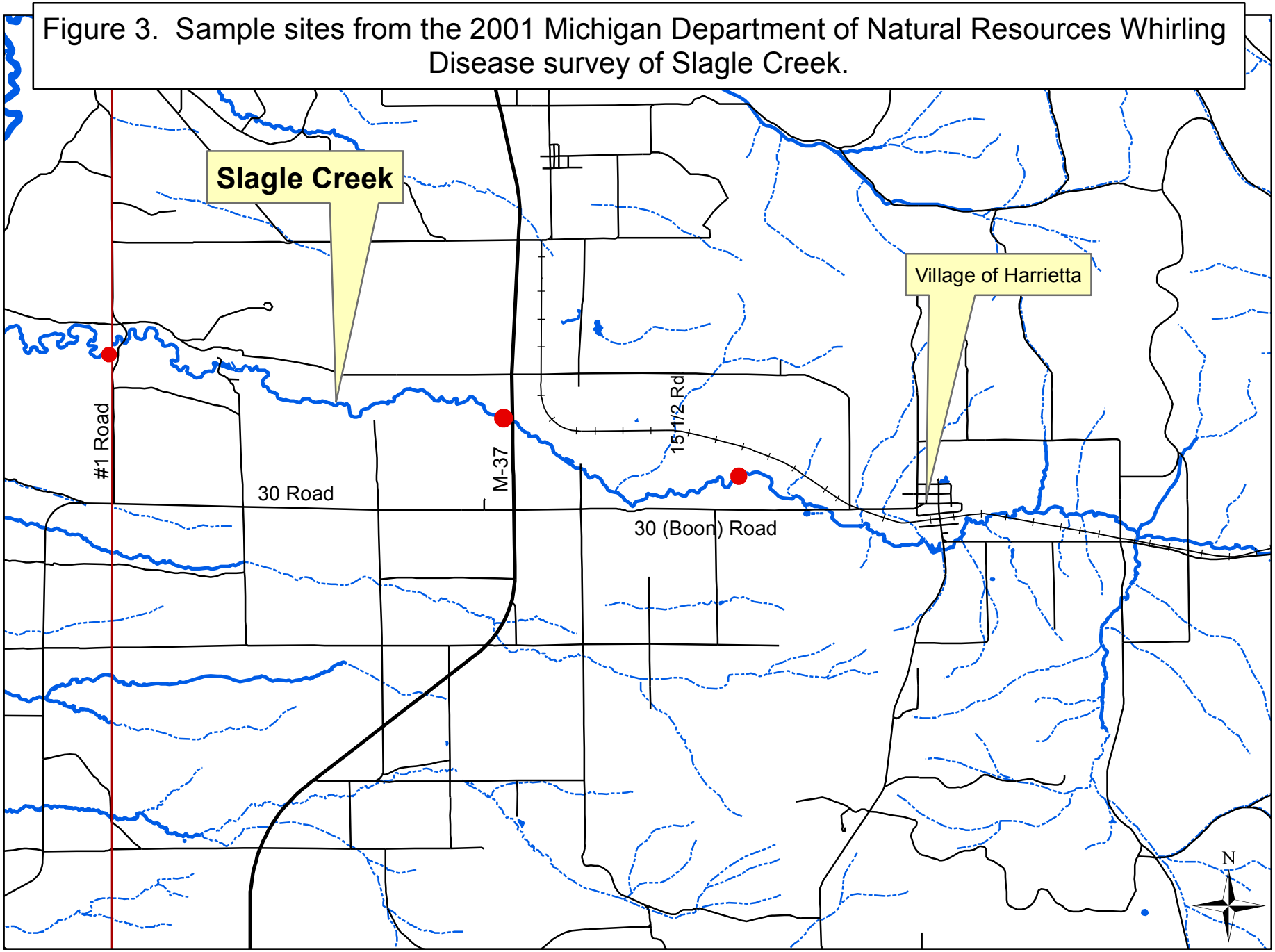

Figure 4. Sample sites from the 2012 Michigan Department of Natural Resources fisheries survey of Slagle Creek.

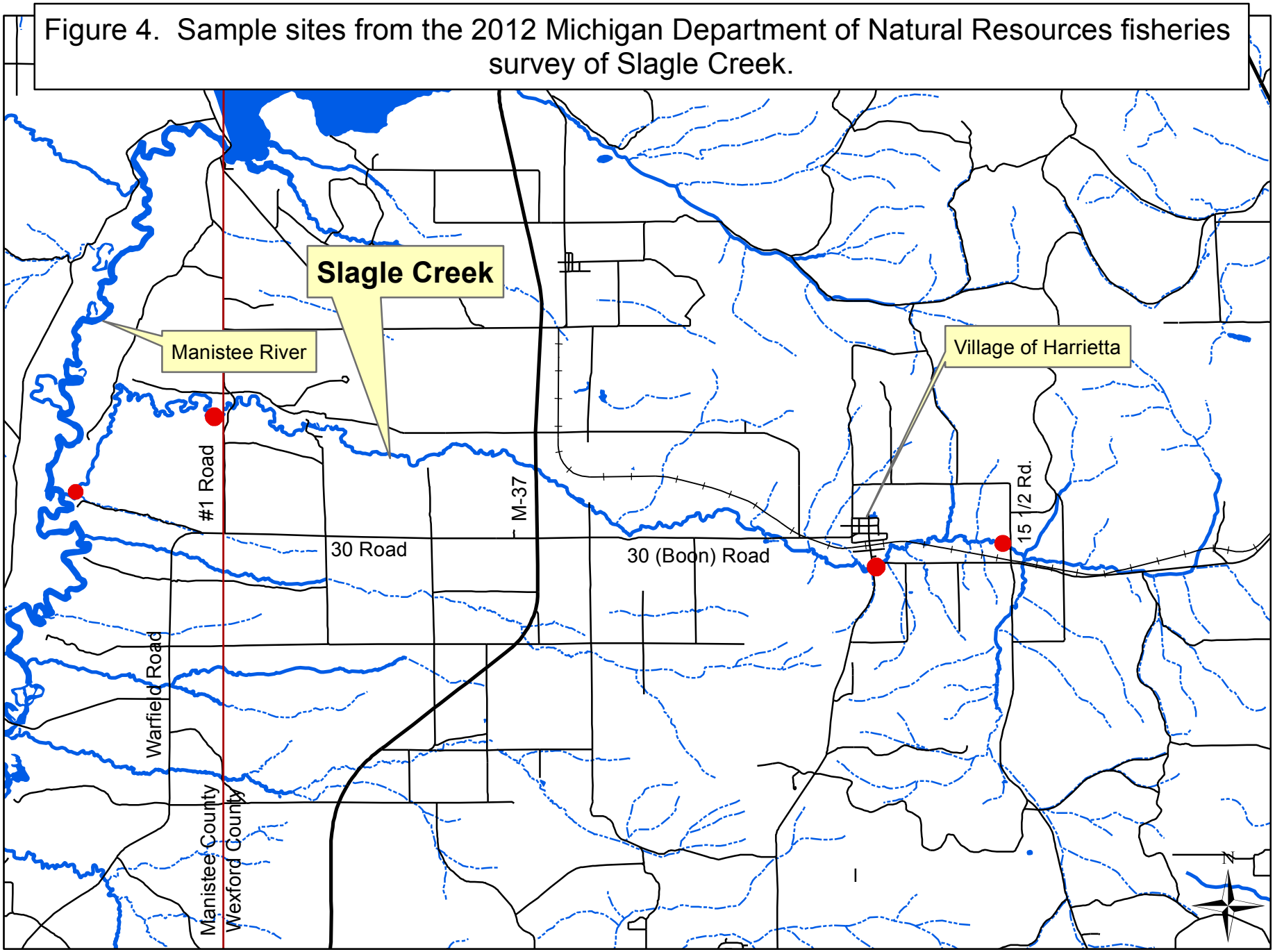

Table 1. Fish stocked in Slagle Creek, Wexford and Manistee Counties.

Year	Species	Number	Life stage	Strain
1881	Brook trout	5,000	fry	
1883	Brook trout	21,000	fry	
1894	Brook trout	27,000	none indicated	
1895	Brook trout	13,000	none indicated	
1896	Brook trout	10,000	none indicated	
1898	Brook trout	15,000	none indicated	
1905	Brook trout	35,000	none indicated	
1909	Brook trout	4,000	fry	
1910	Brook trout	10,000	none indicated	
1933	Brook trout	10,500	none indicated	
1934	Brook trout	17,000	fall fingerlings	
	Rainbow trout	13,000	fall fingerlings	
1935	Brook trout	23,500	fall fingerlings	
	Brown trout	4,500	fall fingerlings	
1936	Brook trout	11,000	fall fingerlings	
		265	adults	
	Rainbow trout	182	adults	
1937	Brook trout	12,500	yearlings	
	Rainbow trout	11,500	yearlings	
	Rainbow trout	16,500	5 mo.	
1938	Brook trout	3,000	fall fingerlings	
		4,000	adults	
		10,000	yearlings	
	Brown trout	21,000	fall fingerlings	
	Rainbow trout	1,000	adults	
1947	Brook trout	600	adults	
	Brown trout	840	adults	
	Rainbow trout	1,600	4 mo.	
		2,150	yearling	
1948	Brook trout	1,945	legal	
	Brown trout	450	legal	
	Rainbow trout	1,600	legal	
1949	Brook trout	350	legal	
	Brown trout	1,800	legal	
	Rainbow trout	13,000	2.5" fingerlings	
		575	legal	
1950	Brook trout	1,800	legal	
	Brown trout	20	broodstock	
	Rainbow trout	2,300	legal	

Table 1 continued. Fish stocked in Slagle Creek, Wexford and Manistee Counties, 1881-2014.

Year	Species	Number	Life stage	Strain
1951	Brook trout	3,200	legal	
	Brown trout	2,325	legal	
	Rainbow trout	50	adults	
		1,350	legal	
1952	Brook trout	3,775	legal	
	Brown trout	40	broodstock	
		1,300	legal	
	Rainbow trout	1,700	legal	
1953	Brook trout	10,000	fry	
		400	fall fingerlings	
		4,080	legal	
	Brown trout	300	legal	
	Rainbow trout	20,000	fry	
		955	legal	
1954	Brook trout	1,000	fall fingerlings	
		1,045	legal	
	Brown trout	100	legal	
	Rainbow trout	1,270	legal	
1955	Rainbow trout	1,400	legal	
1956	Rainbow trout	10,400	legal	
1957	Rainbow trout	50,000	fry	
		2,071	legal	
1958	Rainbow trout	2,000	legal	
1959	Rainbow trout	2,000	legal	
1960	Rainbow trout	2,000	legal	
1961	Rainbow trout	1,200	legal	
1962	Brook trout	1,200	legal	
	Rainbow trout	2,500	legal	
1963	Brook trout	750	legal	
	Rainbow trout	800	legal	
1964	Rainbow trout	900	legal	
1973	Brown trout	40,171	fry	
1976	Brook trout	6,344	spring fingerlings	

Table 2. Catch from 8/17/2012 DNR electrofishing survey of Slagle Creek downstream of 15 1/2 Rd.

Inch Class	Brook trout	Bluegill	Sculpin
1			3
2	3	4	4
3	1	4	3
4	4		
5	16		
6	9		
7	3		
8	4		
9	1		
Total:	41	8	10

Table 3. Catch from 8/17/2012 DNR electrofishing survey of Slagle Creek at the 30 Road (Boon Road) crossing.

Inch Class	Brook trout	Brown trout	Bluegill
1			
2		1	
3	2	1	2
4			
5	1	2	
6	2	2	
7	3	1	
8	5	2	
9	2		
10	1		
11		2	
Total:	16	11	2

Table 4. Catch from 8/22/2012 DNR electrofishing survey of Slagle Creek near the #1 Road crossing.

Inch Class	Brown trout	Rainbow trout	Sculpin
1			6
2	5		23
3	35		14
4	9		
5	23		
6	16		
7	12		
8	10	1	
9	15		
10	1		
11	1		
12			
13	2		
14			
15	1		
16			
17	1		
Total:	131	1	43

Table 5. Catch from 8/22/2012 DNR electrofishing survey of Slagle Creek near the confluence with the Manistee River.

Inch Class	Brook trout	Brown trout	Rainbow trout	Longnose dace	Sculpin
1				5	2
2		4		1	30
3	1	4			4
4					
5		6			
6		6	1		
7		2			
8		5			
9		2			
10		3	1		
11		2			
12		4			
13		2			
14		2			
15					
16		2			
Total:	1	44	2	6	36