Stearns Bayou
Ottawa County 7N, 15W, 5,6
Grand River Watershed, last surveyed in 2019

Addie Dutton, Fisheries Management Biologist

Environment

Stearns Bayou is a 77-acre bayou of the Grand River located southeast of the city of Grand Haven in Ottawa County. The bayou limits are commonly defined as the area from the headwaters of Stearns Creek downstream to the Green Street Bridge. The lower end of Stearns Bayou near Green Street is developed with houses and altered shorelines. The upper end of the bayou is almost entirely natural shoreline with little to no development. Stearns Bayou has a maximum depth of 26 feet with most of the bayou deeper than 15 feet. The bottom substrate is dominated by pulpy peat with areas of marl mixed into the pulpy peat near the shore at the lower end of the bayou.

Public access is available on both the upper and lower ends of Stearns Bayou. A Grand Haven Charter Township Boating Access Site is located on the Grand River slightly downstream of Stearns Bayou. In addition, Stearns Creek Park, an Ottawa County Park is located near the upper extent of the Bayou and allows carry in access for boats or ice fishing anglers.

History

Stearns Bayou had only been surveyed twice prior to 2019. On August 30, 1974, the Michigan Department of Conservation (the precursor to the current Michigan Department of Natural Resources [DNR]) surveyed Stearns Bayou specifically assessing the limnological features. Notes from this survey provide an idea of the surrounding area of Stearns Bayou in 1974. The shoreline was almost entirely natural with approximately 20% marshy and the other 80% upland with steep banks of grass and hardwoods. Only six cottages were present on the bayou at that time. The water was quite clear with a Secchi disk of 10 feet, but a light brown tinge was noted. The bayou was stratified with surface water temperatures around 76F, and the thermocline was around 18 feet from the surface where water temperatures dropped from 70F to 64F. Dissolved oxygen ranged from 9.8 parts per million (ppm) at the surface to 10.3 ppm at 15 feet and 0.9 ppm at 18 feet. Notes also described the vegetation in the lake as abundant with floating, submergent, and emergent plants present. Elodea and Ceratophyllum were the dominant submergent plants. Although no fisheries gear was deployed, the survey notes that Bluegill, Black Crappie, and Largemouth Bass were all abundant and Northern Pike were common in Stearns Bayou. In addition, fishing pressure was indicated as high during summer and winter months with ice fishing being "terrific". In addition, notes indicate that there was a creel census in the late 1930s through the early 1940s describing a very good fishing reputation for the bayou.

The paper files also indicate that a fisheries survey was conducted by the DNR in September 1978 using fyke and trap nets. However, the data for this survey was not present in the files and the records only mention is that one Northern Pike was collected and aged. Unfortunately, no additional information is available as the survey was conducted before electronic data recording was implemented.

An aquatic vegetation survey conducted in 2019 by the Michigan Department of Environment Great Lakes and Energy (EGLE), West Michigan Cooperative Invasive Species Management Area (CISMA), Gun Lake Tribe, and Michigan State University Extension on the Grand River documented European Frogbit, an invasive plant species. European Frogbit is a watchlist species in Michigan meaning it is prohibited to have in your possession based on the severe ecological consequences that could occur if this species became established in the state. It has been found in patches throughout the state and many of these areas, including the lower Grand River, are being actively managed to slow the spread. The concern for Stearns Bayou is high because the preferred habitat of European Frogbit is slow moving water such as bayous (Catling et al. 2003). If this species became established within Stearns Bayou, it would potentially negatively alter the fish community by reducing oxygen and light throughout the water column.

Current Status

A discretionary fisheries survey was conducted in April and May of 2019 to assess the fisheries community in Stearns Bayou. A variety of gear was used to target different fish species in Stearns Bayou (Figure 1). Two trap nets, three large mesh fyke nets, and two experimental gill nets were deployed on April 29, 2019. All nets were checked daily. The trap nets and gill nets were removed on May 1, 2019, and the fyke nets were removed on May 2, 2019. In addition, three 10-minute boom electrofishing transects were completed on the evening of May 21, 2019. All fish captured were measured for total length into one-inch length bins. Weights for all fish species were calculated using the length-weight regression equations compiled by Schneider et al. (2000). An index was calculated for Bluegill size structure using the formula provided by Schneider (1990). In addition to the fisheries data, a temperature and dissolved oxygen profile was recorded on August 27, 2019.

A total of 2,512 fish representing 24 species and one hybrid were captured during the 2019 survey on Stearns Bayou (Table 1). Bluegill dominated the catch with 1,900 individuals captured representing nearly 76% of the total catch by number and approximately 40% of the total catch by weight (Table 1; Figure 2). Bluegill were captured in all gear types but were most common in trap nets. The Schneider Index was calculated for both electrofishing and impounding gears (fyke and trap nets). The Schneider Index provides a score for the Bluegill fishery in a lake that ranges from 1 (very poor) to 7 (superior). The Schneider Index score for Bluegill captured by electrofishing was 4.5 (satisfactory to good); whereas the score for Bluegill captured in fyke or trap nets was 5 (good). Black Crappie were the second most abundant fish species captured by number in the 2019 survey with 119 representing almost 5% of the catch. Nearly all (96%) of the Black Crappie captured were 7 inches or longer which is considered the acceptable size by anglers. Other panfish species captured included: hybrid sunfish (n=9), Pumpkinseed (n=50), Warmouth (n=72), White Crappie (n=1), and Yellow Perch (n=11).

Other gamefish species captured included Largemouth Bass, Northern Pike, and Smallmouth Bass (n=1). For Largemouth Bass, a total of 110 were captured and ranged in total length from 3.0 to 19.9 inches (3-19 inch bins). Of these, 41% were legal for harvest (14-inch minimum size limit) and 16 Largemouth Bass were 16 inches in length or longer (Figure 3). Twenty Northern Pike were captured and ranged in total length from 19.0 inches to 35.9 inches. Nearly all (80%) of the Northern Pike were legal for harvest (24-inch minimum size limit) and seven were 30 inches in length or longer (Figure 4).

One species of note that was captured was Spotted Gar which is a species of special concern in Michigan. Nine Spotted Gar were captured and ranged in length from 12.0 to 22.9 inches. Spotted Gar are native to the Grand River and potentially occur at higher abundances in bayous based on their preference for clear, well vegetated, slower moving water.

The summer water temperature and dissolved oxygen profile indicated that Stearns Bayou does thermally stratify during the summer months (Figure 5). Surface water temperatures were around 72F and were similar (within 1 degree) until around 12 feet. From 12 feet of water to the bottom (21 feet), water temperatures decreased from 70F to 53F. Dissolved oxygen was between 6-7ppm from the surface to 8 feet of water. The dissolved oxygen was strange between 9 feet and 12 feet varying from 4.0 ppm to 1.37 ppm but not in a descending or ascending nature. Stearns Bayou was anoxic from 13 feet to the bottom. These results were similar to the 1974 survey although the thermocline was approximately 5 feet higher in the water column.

Analysis and Discussion

The fish community in Stearns Bayou is impressive based on number of species, size structure of popular gamefish, and abundance of both nongame and game fish. Discussions with Ottawa County conservation officers indicate that fishing pressure is extremely high on Stearns Bayou year-round and is expected to increase with the recent addition of Stearns Creek Park. The high fishing pressure does not appear to be reducing the quality or quantity of many popular game fish species.

The Bluegill fishery in Stearns Bayou is robust with a high Schneider Index score, and many Bluegill which would be desirable for most anglers. Bluegill catch rates, measured as catch per unit effort (CPUE) in Stearns Bayou was between the 25th and 50th percentile for other lakes in the Southern Lake Michigan Management Unit (SLMMU) for boom-shocking and between the 50th and 75th percentile for large-mesh fyke net catch rates. Catch rates were at least the 50th percentile or higher when compared to statewide CPUE efforts. The density of Bluegill in Stearns Bayou is similar to lakes in SLMMU and above average when compared to lakes across Michigan. Although age and growth data were not taken during the 2019 survey, the length-frequency and catch data suggest that Bluegill are growing similar or slightly faster compared to statewide averages.

The Largemouth Bass fishery in Stearns Bayou is strong with an overall high size structure and many fish of legal size. Compared to other lakes within SLMMU, the Largemouth Bass CPUE was slightly above the 75th percentile and well above the statewide average. In addition, recruitment of younger fish into the fishery appears to be occurring with Largemouth Bass as small as 3.0 inches captured. The number of fish in the 14-16 inch size bins was unusually high for southwestern Michigan and is most likely a result of the continued influx of fish migrating between the Grand River and Stearns Bayou.

Although the timing was not ideal for capturing Northern Pike, the number of individuals collected and the overall size was impressive. After spawning in March-early April, Northern Pike move away from the shoreline and gill nets become the most efficient sampling gear. Relative to lakes sampled as part of the DNR's Status and Trends Program during 2002-2007, the gill net CPUE for Northern Pike in Stearns Bayou was above the 75th percentiles for both the SLMMU and the state as a whole. Most of the Northern Pike captured were legal for harvest and were most likely of various age classes based on

the size ranges present in the survey. Thirty percent of the Northern Pike were 30 inches or larger, which suggests that growth is rapid in this system.

The presence of Spotted Gar in Stearns Bayou is not surprising given their known presence in the Grand River. It appears that the bayou is providing nursery habitat for young gar as four juveniles were collected during the 2019 survey. These observations are important to the future management and conservation for Spotted Gar because this species is of special concern in Michigan.

Management Direction

1. Work with the Michigan Department of Environment, Great Lakes, and Energy, Ottawa County Parks, and private landowners to protect natural shorelines and nearshore fish habitat in Stearns Bayou.

2. Continue to monitor and address the invasion of European Frogbit to avoid increased, problematic populations within the Grand River and Stearns Bayou.

3. No stocking or regulation changes are recommended at this time for Stearns Bayou.

References

Catling, P.M., G. Mitrow, E. Haber, U. Posluszny, and W.A. Charlton. 2003. The biology of Canadian weeds. 124. Hydrocharis morsus-ranae L. Canadian Journal Plant Science. 83:1001-16.

Schneider, J. C., 1990. Classifying Bluegill populations from lake survey data. Michigan Department of Natural Resources, Fisheries Technical Report 90-10, Ann Arbor.

Schneider, J. C., P. W. Laarman, and H. Gowing. 2000. Length-weight relationships. Chapter 17 in Schneider, J. C., editor. 2000. Manual of fisheries survey methods II: with periodic updates. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.

Tables

Table 1. Number, weights, lengths, and percent legal or harvestable size for fish species collected during the April and May 2019 survey on Stearns Bayou. Fish were captured using fyke nets, trap nets, gill nets, and nighttime electrofishing gear.

Species	Number	Percent by number	Weight (lbs.)	Percent by weight	Length range (in)	Percent harvestable size[1]
Black Crappie	119	4.7	54.5	5.3	5.0-13.9	96
Bluegill	1,900	75.6	411.2	40.1	1.0-8.9	73
Blacknose Shiner	1	<0.1	<0.1	<0.1	2.0-2.9	N/A
Bowfin	46	1.8	119.5	11.7	12.0-29.9	N/A
Brown Bullhead	22	0.9	15.4	1.5	8.0-13.9	N/A
Brook Silverside	4	0.2	<0.1	<0.1	2.0-3.9	N/A
Common Carp	2	0.1	23.0	2.2	28.0-30.9	N/A
Channel Catfish	9	0.4	21.6	2.1	15.0-22.9	100
Freshwater Drum	3	0.1	4.5	0.4	12.0-17.9	N/A
Golden Shiner	26	1.0	2.6	0.3	4.0-8.9	N/A
Grass Pickerel	3	0.1	0.5	<0.1	6.0-11.9	N/A
Gizzard Shad	5	0.2	9.0	0.9	15.0-19.9	N/A
Hybrid Sunfish	9	0.4	2.2	0.2	4.0-8.9	78
Largemouth Bass	110	4.4	136.9	13.4	3.0-19.9	41
Northern Pike	20	0.8	112.2	10.9	19.0-35.9	80
Pumpkinseed	50	2.0	9.1	0.9	3.0-7.9	50
Quillback	13	0.5	32.1	3.1	14.0-191.9	N/A
Smallmouth Bass	1	<0.1	0.8	0.1	11.0-11.9	0

Species	Number	Percent by number	Weight (lbs.)	Percent by weight	Length range (in)	Percent harvestable size[1]
Spotted Gar	9	0.4	6.6	0.6	12.0-22.9	N/A
Spotted Sucker	11	0.4	9.4	0.9	7.0-18.9	N/A
Warmouth	72	2.9	17.9	1.7	1.0-9.9	65
White Crappie	1	<0.1	1.3	0.1	13.0-13.9	100
White Perch	5	0.2	2.2	0.2	8.0-11.9	N/A
Yellow Perch	11	0.4	1.6	0.2	3.0-8.9	45
Yellow Bullhead	60	0.2	31.1	3.0	7.0-12.9	N/A

[1] Harvestable size is defined as 6 inches for Bluegill, Hybrid Sunfish, Pumpkinseed, and Warmouth and 7 inches for Black Crappie, White Crappie and Yellow Perch.

Figures

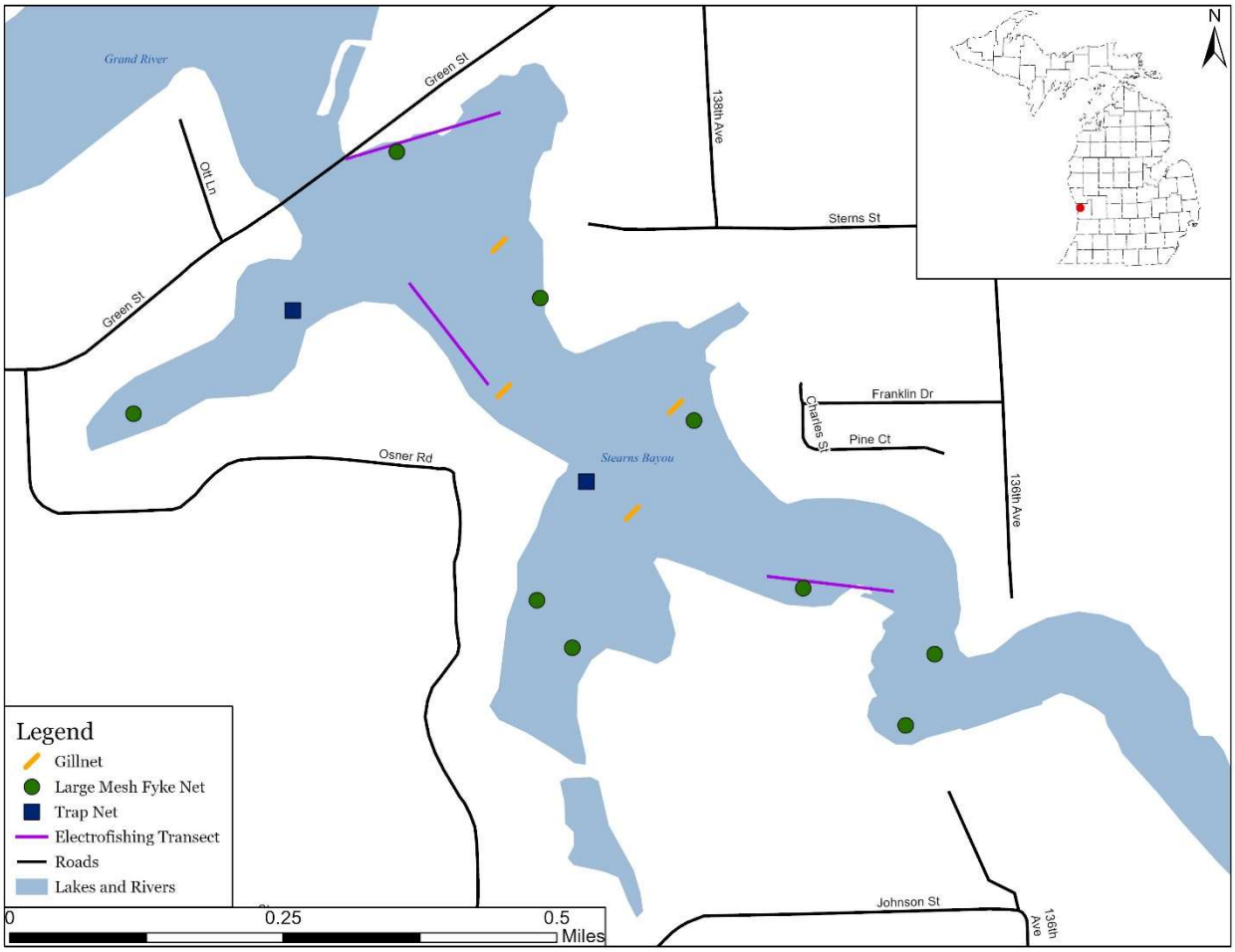

Figure 1. Map of Stearns Bayou, Ottawa County, Michigan. Yellow bars represent locations gill nets were set, green circles represent locations large mesh fyke nets were set, blue squares represent areas trap nets were set, and purple bars represent shoreline areas that were electrofished during the 2019 survey.

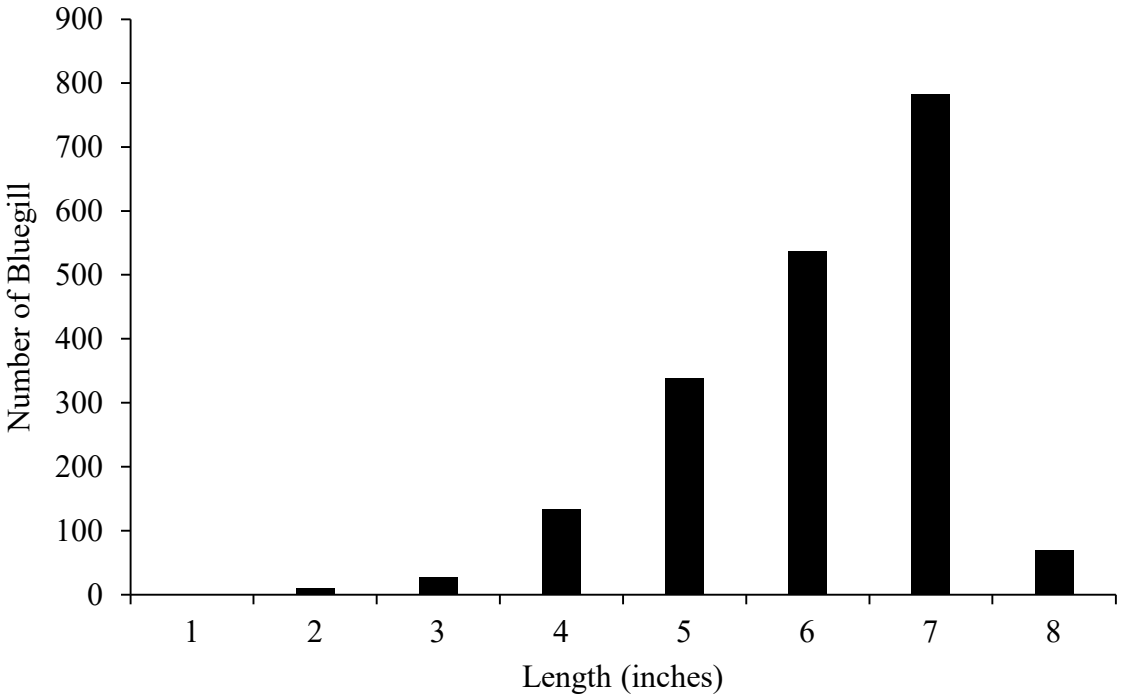

Figure 2. Length frequency distribution of Bluegill captured during the 2019 survey on Stearns Bayou.

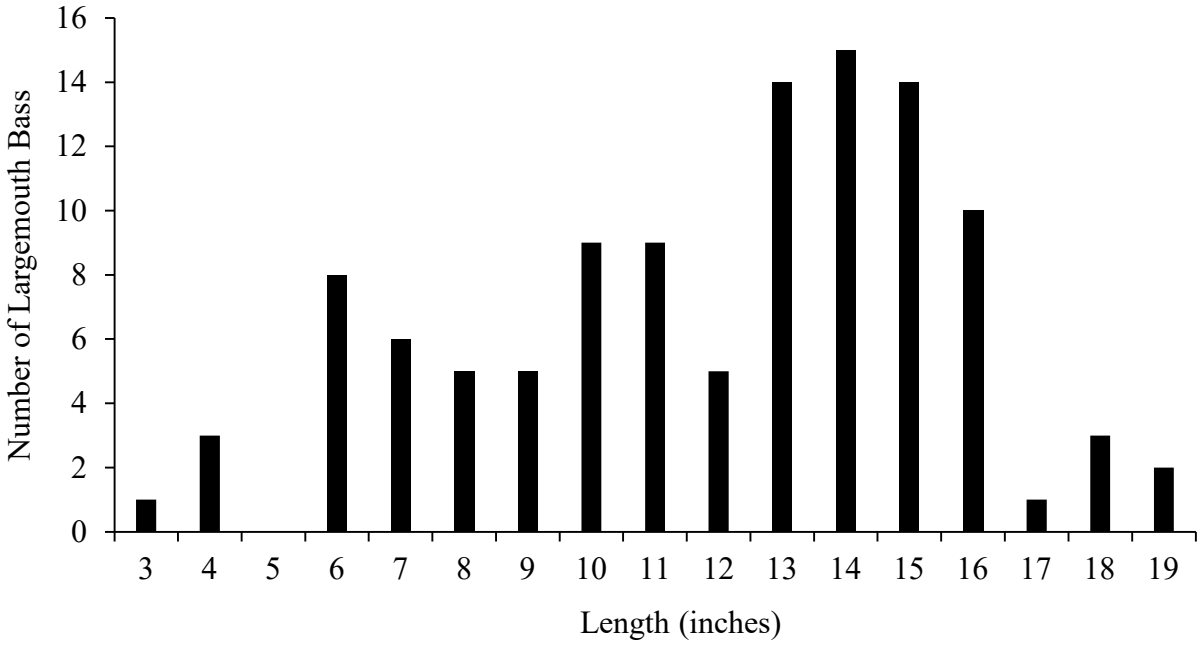

Figure 3. Length frequency distribution of Largemouth Bass captured during the 2019 survey on Stearns Bayou.

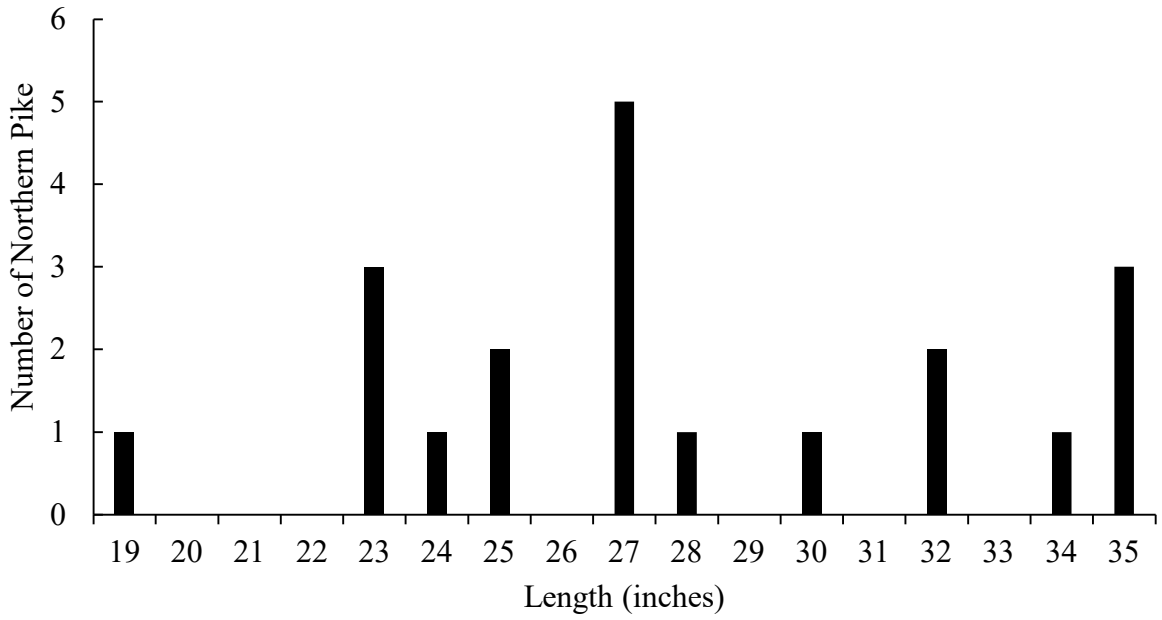

Figure 4. Length frequency distribution of Northern Pike captured during the 2019 survey on Stearns Bayou.

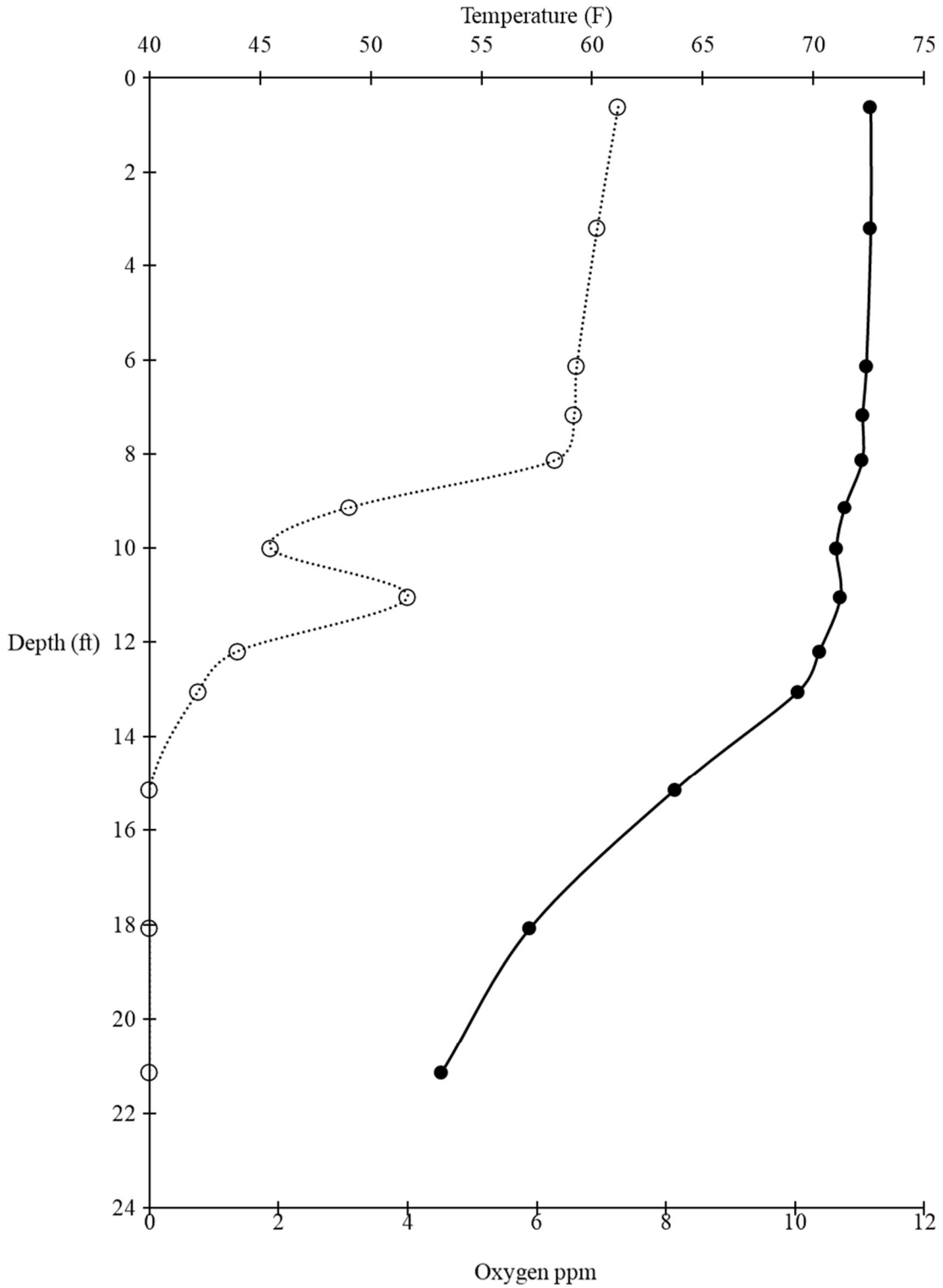

Figure 5. Temperature (F) at depth and dissolved oxygen (ppm) at depth in Stearns Bayou on August 27, 2019. The black line with filled circles is temperature and the dotted line with open circles is dissolved oxygen.