CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 1/17/2023 FILE REF:

TO: Mike Polkinghorn, Limits Calculator

FROM: Kristi Minahan, Water Quality Standards; Jon Kleist, Stream Biologist; Alex Smith, Lakes Biologist; Diane Figiel, Limits Calculator Coordinator

SUBJECT: Advanced Food Products receiving water classification for unnamed stream (WBIC) and unnamed lake (WBIC), Polk County

Overview of issue

Staff were asked to review the receiving and downstream waters for Advanced Food Products (AFP) prior to its permit reissuance for the permit expiring 6/30/2022. Review was needed for the stream classifications for the direct receiving water which is a tributary to an unnamed lake, and the unnamed lake itself. Staff were also asked to take total phosphorus samples within the unnamed lake to determine whether more stringent limits are needed for downstream protection. In the previous permits, both the unnamed stream and the unnamed lake had been treated as limited aquatic life (LAL), but there were concerns that these may not be appropriate classifications. Jon Kleist conducted fish and habitat surveys on the unnamed stream on July 11, 2022, and Alex Smith took phosphorus samples in the unnamed lake throughout the summer (2022).

AFP is a continuous discharger, with two noncontact cooling water outfalls. One outfall has an average of 0.2 MGD with a max of 0.35, and the other has an average of 0.37, max 0.46. Their overall flow from the two discharges combined is a little over 0.8 MGD max. (1.3 cfs). They are considering future plans to either combine these two outfalls into one, or possibly to install a closed-loop system which would eliminate the surface water discharge.

Summary of recommendations

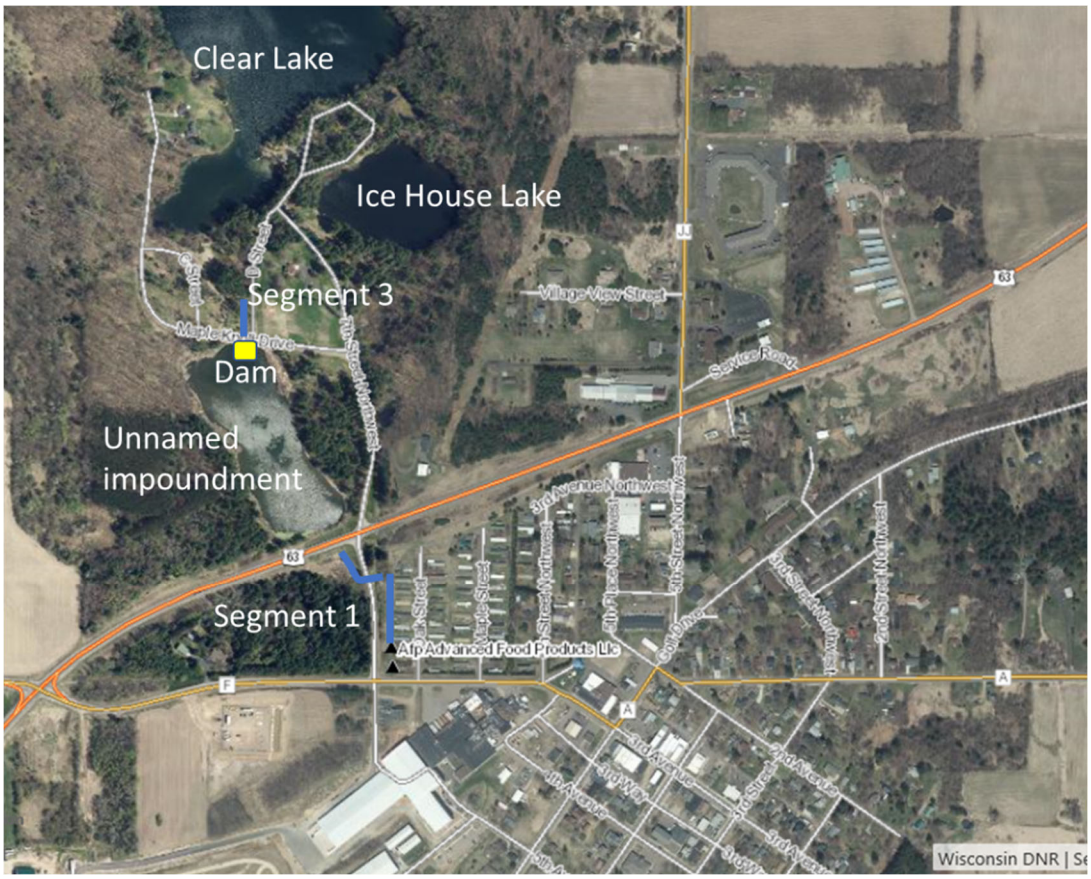
- **Segment 1 (most upstream): Unnamed stream from outfall downstream to STH 63**
  - **Codified designated use:** This is not in ch. NR 104 as LAL or LFF so the default assigned use would be warmwater.
  - **Classification used for previous permit issuance:** LAL/diffuse surface water
  - **Previous stream class recommendations:** LAL was proposed in the 2003 updates that did not take effect.
  - **Modeled Natural Community:** not modeled
  - **New recommended Natural Community and Designated Use**: There were not enough fish obtained to do a Natural Community Verification, but those found indicate the stream would be best described as a Warm Headwater Natural Community. We recommend that warmwater designated use be maintained because it is clearly not an LAL due to the fish community found, and it does not appear that a limited forage fish (LFF) use would be justifiable, as it should be capable of supporting a warmwater community. See Discussion section below.

- **Segment 2: Unnamed impoundment (WBIC 5526533) (from STH 63 to the dam structure in a local park)**
  - **Codified designated use:** Not listed in NR 104 as LAL or LFF, so the default assigned use would be warmwater.
  - **Classification used for previous permit issuance:** LAL
  - **Previous stream class recommendations:** It is unclear whether the unnamed lake was recommended to be part of the LAL description in the 2003 proposal.
  - **Modeled Natural Community:** Shallow drainage lake
- **New recommended NC & DU:** Shallow drainage lake

- **Segment 3: Stream segment between the unnamed impoundment and Clear Lake**
  - **Codified designated use:** This is not in ch. NR 104 as LAL or LFF so the default assigned use would be warmwater.
  - **Classification used for previous permit issuance:** NA
  - **Previous stream class recommendations:** none
  - **Modeled Natural Community:** not modeled
  - **New recommended Natural Community and Designated Use**: This stream segment was shocked to see if fish were living in this reach. Approximately 50 meters was surveyed to look for fish. We were limited on time so only a portion of this reach was surveyed which was too short to verify the natural community. However, several species of fish were easily captured. Those found indicate the stream would be best described as a Warm Headwater Natural Community.

- **Segment 4: Clear Lake (WBIC 2623500)**
  - **Codified designated use:** Not listed in NR 104 as LAL or LFF, so the default assigned use would be warmwater.
  - **Classification used for previous permit issuance:** NA; downstream protection impacts not considered
  - **Previous stream class recommendations:** It is unclear whether the unnamed lake was recommended to be part of the LAL description in the 2003 proposal.
  - **Modeled Natural Community:** Deep seepage lake
  - **New recommended NC & DU:** Deep seepage lake

Site overview map. Outfall for AFP is the 2 black triangles. Segment 1 blue line is about 100m of stream between outfall and unnamed impoundment. Dam (yellow rectangle) on Maple Knoll Drive. Segment 2 is the unnamed impoundment. Segment 3 (blue line) approximately 50 meters downstream of dam surveyed for fish to document fish community. Segment 4 is Clear Lake.


Clear Lake
Ice House Lake
Segment 3
Dam
Unnamed
impoundment
Segment 1
Afp Advanced Food Products Llc
Village View Street
Service Road
Wisconsin DNR | Se

Site observations

- **Segment 1: (most upstream) Unnamed stream from outfall downstream to STH 63**
  - The stream channel ranged from approximately 1 to 2 meters in width with thalweg depths approximately 0.3 to 0.5 meters. The channel bed was mostly silt near STH 63 and quicky became cloudy when disturbed. Upstream of 7th Ave the channel was rockier and shallower with depths of approximately 0.2 meters or less. There was discharge from a grated outfall structure that was most, if not all the observed stream flow volume.
- **Segment 2: Unnamed impoundment (from STH 63 to the dam structure in a local park)**
  - The impoundment was un-wadeable. The shorelines were well vegetated with submerged aquatic plants.
- **Segment 3: Stream segment between the unnamed impoundment and Clear Lake (Shortened survey station from the dam outlet downstream approximately 50 meters)**
  - The stream channel was approximately 2 meters in width with thalweg depths of approximately 0.2 to 0.4 meters. The streambed was mostly cobble with a little sand and gravel.

Fish survey results

- **Segment 1 (most upstream) Unnamed stream from outfall downstream to STH 63:**
  - The main purpose of the fish survey on July 11th, 2022, was to document and describe the fish community in the unnamed waterway from the AFP outfall to the impoundment. There is approximately 100 meters of stream channel present from the culverts at STH 63 upstream to the outfall structure. A backpack shocker was used to survey fish following standard WDNR electrofishing methods. All fish that were seen were attempted to be captured and identified to species. A total of 4 black bullheads and an adult bluegill were captured in the station (Table 1). There were not enough fish captured in the survey to verify the natural community or calculate an index of biotic integrity (IBI) for this stream reach.

Table 1. Fish survey results for Segment 1, July 11, 2022.

Species Name	Count	Length	Unit
Bluegill	1	196	MM
Black Bullhead	4		

- **Segment 2, Unnamed impoundment:**
  - We continued to survey for fish downstream. An attempt was made to shock fish in the impoundment at the culvert at STH 63. No fish were seen or captured. The bottom substrate was too soft and mucky to wade at this location. We continued downstream and attempted to shock fish in the impoundment along the dam face on Maple Knoll Drive. The shoreline was too soft to wade into the impoundment, but we were able to capture an adult largemouth bass and a juvenile bluegill along this shoreline. Several fish, probably bluegills, were observed in the submerged vegetation farther from shore and out of reach from our shocking equipment.
- **Segment 3: Stream between the unnamed impoundment and Clear Lake (Shortened survey station from the dam outlet downstream approximately 50 meters):**
  - We then proceeded to survey downstream of the dam in the channel between the impoundment and Clear Lake. We surveyed approximately 50m of steam channel and captured 15+ young of year bluegills, a black crappie, a pumpkinseed, 2 yellow bullheads and a brassy minnow. These fish were probably moving upstream form Clear Lake or went through the dam but were living in the tributary.

Habitat survey results

A habitat survey is requested if the fish survey does not find more than a few fish, but flow (including effluent) should be sufficient to support fish (above 0.03cfs, which is the cutoff for a Macroinvertebrate community). The goal is to determine whether the site is not expected to support fish due to poor habitat. A score above 30 indicates that it should support fish (if flow is sufficient), and ≤ 30 indicates that habitat may be insufficient.

Segment 1 (most upstream): Unnamed stream from outfall downstream to STH 63:

- We filled out a qualitative survey form for Segment 1 after completing the fish survey. It scored a 38 and is in the fair category. There was adequate habitat, including stream channel widths and depth to support a fish community. The survey crew was surprised given the proximity to the impoundment and flows observed that more fish were not seen or captured during the survey.
- The riparian buffer width was moderately disturbed as about half of the station was in the road ditch along 7th Street Northwest. There was limited bank erosion, limited pool areas and habitat diversity was low with occasional bends or riffles. The stream had some depth in the thalweg relative to its width and occasional fish cover. There were extensive fine sediments in the channel especially near the culverts at STH 63.

(Habitat surveys were not done on other segments)

Table 2. Qualitative habitat survey results for Segment 1, July 11, 2022.

Rating Item	Score	Rating
Riparian Buffer	5	Fair
Bank Erosion	10	Good
Pool Area	3	Fair
Width:Depth Ratio	5	Fair
Riffle:Riffle or Bend:Bend Ratio	5	Fair
Fine Sediments	5	Fair
Cover for Fish	5	Fair
Total Score	**38**	**Fair**

Total Phosphorus (TP) Samples

Unnamed impoundment: The unnamed impoundment has a classification of shallow drainage lake, with a TP criterion of 40 ug/L. Alex Smith took three TP samples in the unnamed impoundment in July, August, and September, 2022, resulting in values of 22.4, 18.4, and 25.7 ug/L, respectively (data from the SWIMS database shown below). All values are well below the TP criterion of 40 ug/L. Therefore, TP limits for downstream protection of the unnamed lake are not needed.

Monitoring Station

Station ID 10056160
Station Name Unnamed Lake - Center

Show specific parameter: PHOSPHORUS TOTAL

Sample Results

Project	Date/Time	DNR Parameter	Species	Result	Units
Review of stream designation for wastewater permitting	09/13/2022 12:00 PM	PHOSPHORUS TOTAL		0.0257	MG/L
Review of stream designation for wastewater permitting	08/10/2022 12:30 PM	PHOSPHORUS TOTAL		0.0184	MG/L
Review of stream designation for wastewater permitting , Extra Sampling - Northern Region - Spooner	07/12/2022 10:00 AM	PHOSPHORUS TOTAL		0.0224	MG/L

Clear Lake: Clear Lake is classified as a stratified seepage lake (deep lake with no outlet stream), with a TP criterion of 20 ug/L. Previous data were available for Clear Lake so no new sampling was done. The

average TP concentration for Clear Lake at SWIMS site 10052185 in the summers of 2019 and 2020 ranged from 9.6 ug/L to 16.5 ug/L with a mean of 13.6 ug/L These values are attaining the lake's TP criterion of 20 ug/L. Therefore, TP limits for downstream protection of the unnamed lake are not needed.

Discussion:

Segment 1. Unnamed stream classification:
We recommend the unnamed tributary be classified as warmwater, which would maintain its current "default" status as warmwater but would change the basis for permit limits that have previously been based on LAL. LAL is for waters that cannot support a fish community, and is not appropriate in this case since a fish community was found both in the unnamed tributary and the unnamed lake. We considered whether a classification of LFF would be appropriate but determined that we could not justify an LFF recommendation. An LFF proposal would require a use attainability analysis (UAA) and a promulgated use change. To justify a UAA proposal of LFF based on stream conditions, we would need to demonstrate that a designated use of warmwater is not attainable. Such a demonstration could be made based on the following factors; however, none of these factors pertains to this stream:

- Habitat (physical) conditions: If habitat conditions were too poor to support a warmwater fish community, LFF might apply. The department uses a threshold that if the quantitative habitat survey score is <30, its habitat is too poor to support a full fish community. The score for the unnamed tributary is 38, in the Fair category, which is considered sufficient habitat to support a full warmwater community.
- Low flow conditions: The flow in this stream is in the "headwater" range, which is sufficient to support a fish community. Most of the flow is from the continuous discharge, but that flow must be included in determining flow conditions of the stream and the community it should be able to support.
- Uncontrollable human-caused conditions: Water temperature and conductivity were both high here compared to other area waters, but both are likely due to the discharge itself. EPA considers all discharged pollutants to be controllable, so this cannot be used as a basis for an LFF listing. In addition, these values were not so high as to prohibit a fish community just a bit higher than what is typical for area waters.

Based on this reasoning and best professional judgement that this stream should be supporting a more robust warmwater community, we recommend a classification of warmwater.

Segment 2. Unnamed impoundment classification & TP samples:
We reviewed the classification for the unnamed lake. The lake is over 5 acres in size and therefore the total phosphorus (TP) criteria do apply to it. It is an unstratified (shallow) lake, with an inlet and outlet stream, although the inlet and outlet streams are not shown on the department's online maps in the Data Viewers. Therefore, it is classified as a shallow drainage lake, and the applicable TP criterion is 40 ug/L.
Note: The classification of downstream Clear Lake as a deep seepage lake was not in question.

Site Photos Unnamed tributary to Clear Lake. Photo Date October 17th 2022.

Photos arranged upstream to downstream from the AFP discharge to Clear Lake.

Photo 1. AFP outlet looking upstream. 7th Street Northwest in on the far-right side of the photo.

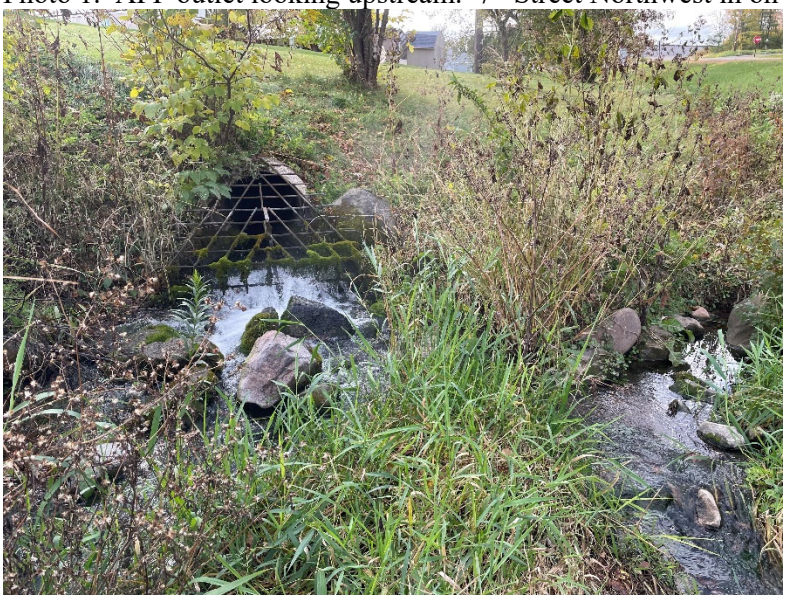


Photo 2. Unnamed tributary looking upstream along roadside upstream of 7th Street Northwest.

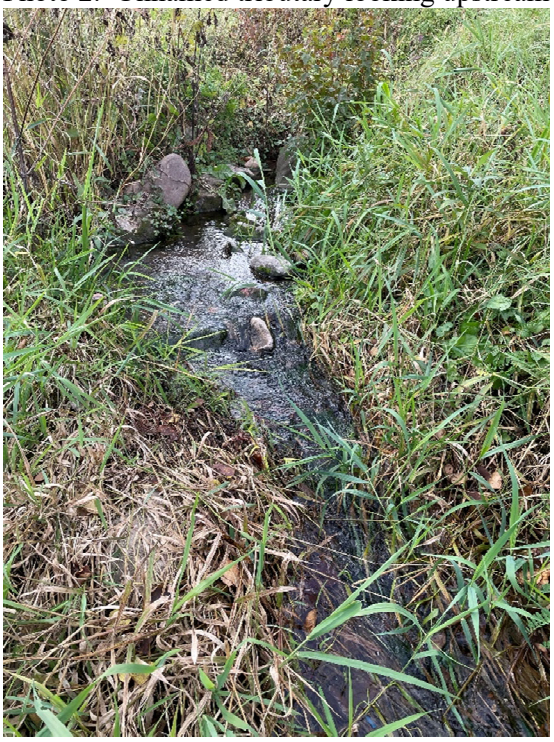


Photo 3. Unnamed tributary looking upstream at culverts at 7th Street Northwest.

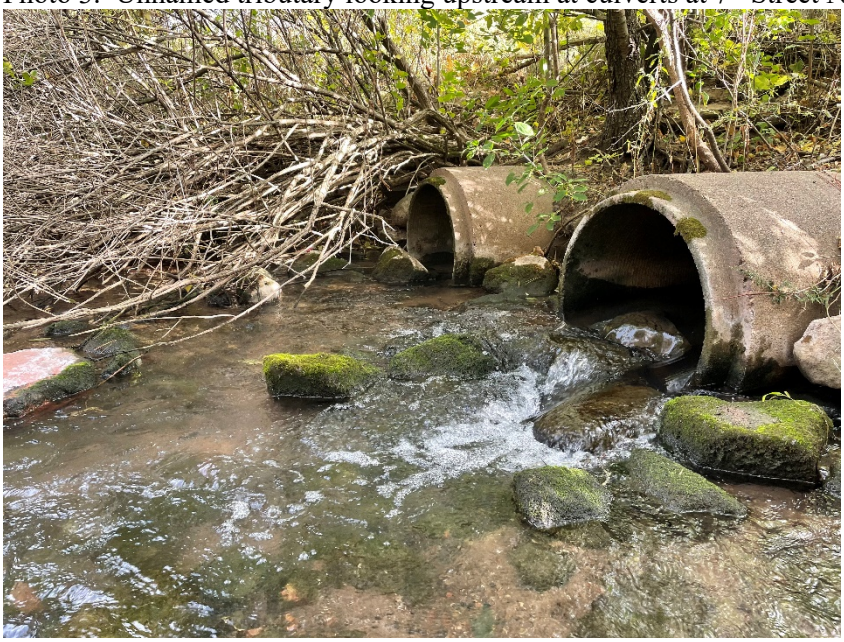


Photo 4. Unnamed tributary looking upstream in Segment 1 between STH 63 and 7th Street Northwest.

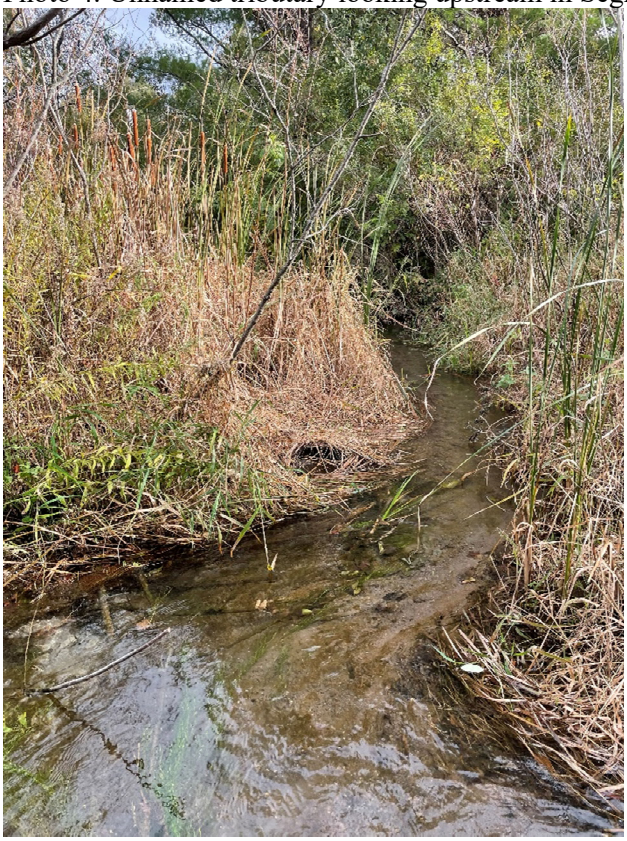


Photo 5. Unnamed impoundment looking downstream from Culvert at STH 63 toward dam along Maple Knoll Drive.

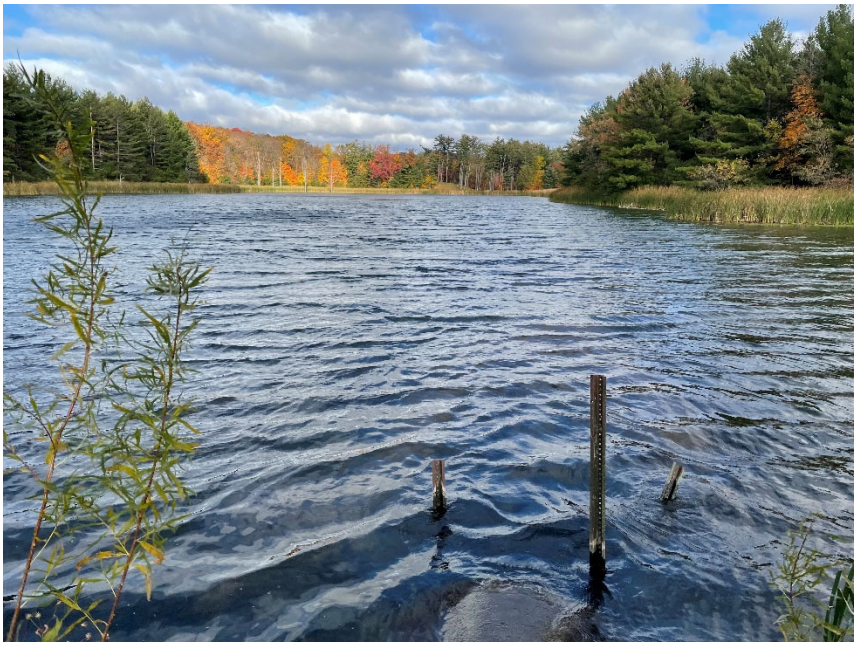


Photo 6. Dam structure outlet on unnamed impoundment looking upstream into unnamed impoundment.

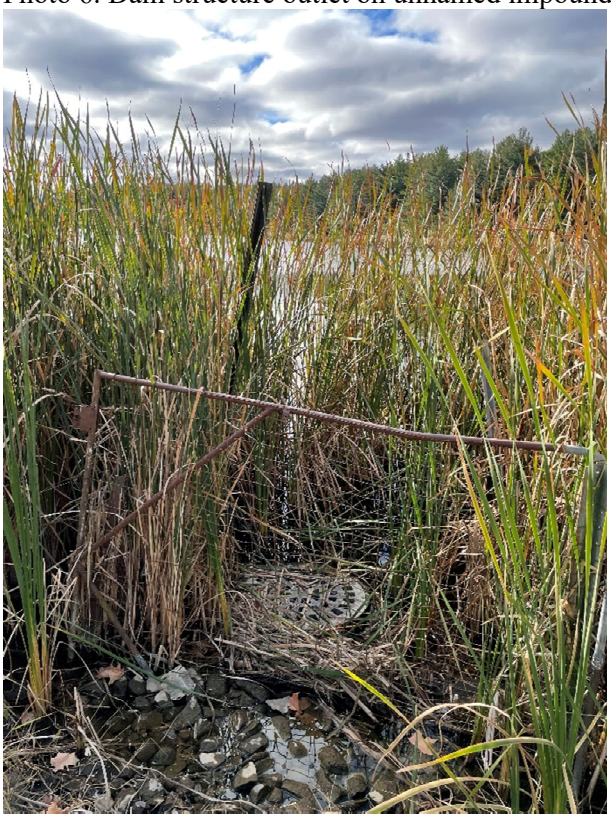
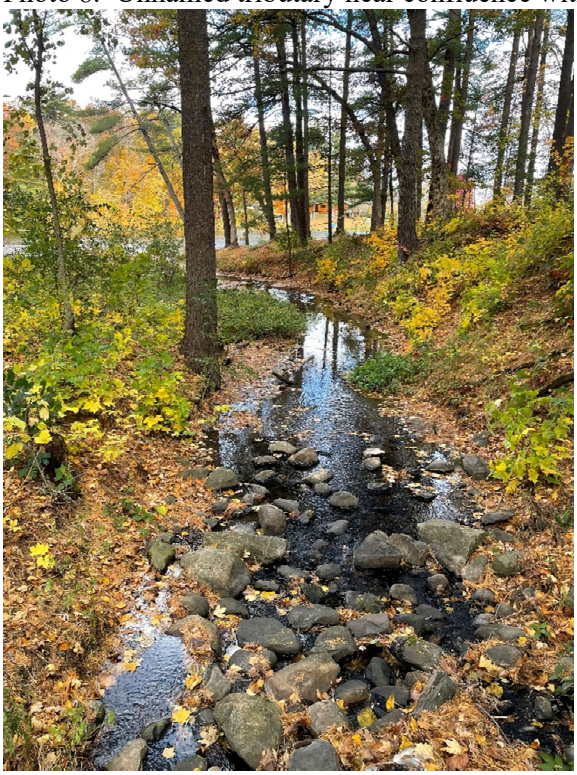


Photo 7. Unnamed tributary looking downstream of Maple Knoll Drive.

Photo 8. Unnamed tributary near confluence with Clear Lake looking downstream toward Clear Lake.



STREAM FISH SURVEY FORM

Stream Name: unnamed	X Backpack ___ Stream shocker	Date: 7/11/22
WBIC:	Current ___ DC X PDC	Start time: 13:30
Station Name/Description:	Volts: 84-130 Pulse Rate: 80	End time: 13:55
upstream Hwy 63 to culvert	Amps: 1.5-2.0 Duty Cycle: 10	Total time: 25
Durham Rd. Trailer Park	No. of dippers/anodes: ___	Distance shocked (m): 107
Start Lat: 45.25411	Water temp (C or F): 26.5	Mean width (m): 2.5 m
Start Long: -92.27662	D.O.(mg/l): 6.6 82.1%	Water Level -
End Lat: 45.25341	Conductivity (umhos/cm): 440	high ___ norm X low ___
End Long: -92.27583	pH: 7.4	
Collectors: Cunningham, Kleist,	Transparency (cm): 7120	
Roberts, AARTCA	Flow (cfs): ___	
	Field Sample i.d. ___	

Comments: Very clear water - no bugs visible - some snails - Elodea/Fontinalis algae. no visible periphyton. shocked above 63 in lake near outlet no fish

AIS Observed Narrow leaf cattail, Rusty crayfish

Crayfish Observed

Species/Count (list lengths for sportfish)

1
2 Bluegill - 196
3 Black bullheads - 4
4
5
6
7
8
9
10 X Note - Downstream shore at lake. Largemouth Bass (313)
11 - YOY Bluegill (53)
12
13 Downstream at camp street → Rocky, had macroinvertebrate
14 (caddis)
15
16 Bluegill (YOY) 14 or 15
17
18 Black crappie YOY 1
19
20 Yellow Bullhead 11
21
22 Brassy minnow 1
23
24 Pumpkin Seed (YOY) 1
25
26
27
28
29
30
31
32

Surveyed from STH 63 to the Grated Out flow pipe discharging or creating the flowing water. The Source of the water is not known if it is UP discharge water or D/S if there are storm sewers or other Sources of water. About 107 m of stream was Surveyed. The Stream bed was firm but ~~mud~~ was silty. Fines easily clouded the water. Stream had plenty of flow / width / depth to be suitable for fish and bank height was OK. Should have seen more fish in the Survey Considering the stream conditions. 4 Black bullhead + 1 adult Bluegill Captured. Water temp seemed unusually warm @ 26.5°C Conductivity fairly high @ 440.

We looked at the discharge / inflow to the impoundment across 63 and tried to shock fish from the concrete culvert - none observed and not captured. We then proceeded to the dam / outlet and banks where we could See fish - shocked a adult LMB an YOY bluegill but water was to deep to wade + a mucky bottom. Could See other Small fish in vegetation - impoundment was very "weedy" Shocked the outlet stream about 70-80m DS of the Dam. Several YOY Bluegills captured - likely from Clear Lake - There was a stair stepped rock riffle about 4-6 high that probably acted as a partial fish barrier about 50-60 m DS of the Dam. Above this barrier we shocked fewer fish which probably were from the impoundment. We captured 2 yellow bullheads, a Brassy minnow and a YOY pumpkinseed.

We looked at the rocks in the stream and could easily observe aquatic insect larvae - Caddis flies - couple families @ least — None were observed on the rocks at the station above STH 63 at the discharge grate

recommend a multimeter be used to look @ temp along the watercourse & conductivity. Stream should support WWSF - but did not in this survey other than a bluegill.

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Wadable Stream Qualitative Fish Habitat Rating for Streams < 10 m wide

Form 3600-532A (R 6/07)

Instructions: Bold fields must be completed. Record all measurements in metric units.

Station Summary

Stream Name	Waterbody ID Code	SWIMS Station ID	FH Database ID
Unnamed			

Date (MMDDYYYY)	Station Name
07/11/2022	

Latitude - Longitude Determination Method Used	Datum Used

Start Latitude	Start Longitude	End Latitude	End Longitude	County

Water Characteristics

Time (24-hr clock)	Air Temperature (C)	Water Temperature (C)	Conductivity (µs/cm)	Transparency (cm)

Dissolved Oxygen (mg/l)	Dissolved Oxygen % Saturation	pH

Flow (m³/sec)	Water Level (check one - measure distance if Above or Below Normal):	Water Clarity:
	☒ Normal ☐ Below: _____ (m) ☐ Above: _____ (m)	☒ Clear ☐ Turbid ☐ Stained

Channel and Basin Characteristics

Mean Stream Width (m)	Station Length (m)
2.5	107

Channel Condition: (check one) ☐ Natural ☒ 20-year-old Channelization ☐ 10- to 20-year-old Channelization ☐ < 10-year-old Channelization ☐ Concrete Channel

Percent Channelization	Sinuosity	Gradient (m/km)	Stream Order	Basin Area (km²)

Comments / Notes

Wadable Stream Qualitative Fish Habitat Rating for Streams < 10 m wide

Form 3600-532A (R 6/07)

Rating Item	Excellent	Good	Fair	Poor	Score
Riparian Buffer Width (m) Width of contiguous undisturbed land uses; meadow, shrubs, woodland, wetland, exposed rock	Riparian zone well protected; buffer wide (> 10.0 m) 15	Riparian zone protected, but buffer width moderate (5.0 - 10.0 m) 10	Riparian zone moderately disturbed, buffer narrow (1.0 - 4.9 m) (5)	Most of the riparian zone disturbed, buffer very narrow or absent (< 1.0 m) 0	5
Bank Erosion Width of bare soil on bank, along transects	No significant bank erosion; < 0.20 m of bank is bare soil 15	Limited erosion; 0.20 - 0.50 m of bank is bare soil (10)	Moderate erosion; 0.51 - 1.0 m of bank is bare soil 5	Extensive erosion; > 1.0 m of bank is bare soil 0	10
Pool Area % of stream length in pools	Pools common; wide, deep, slow velocity habitat, balanced by other habitats; 40 to 60% of station 10	Pools present; not frequent or over-abundant; 30 to 39% or 61 to 70% of station 7	Pools present, but either rare or overly dominant, few other habitats present; 10 to 29% or 71 to 90% of station (3)	Pools either absent or dominant, not balanced by other habitats; < 10% or > 90% of station 0	3
Width:Depth Ratio Average stream width divided by average thalweg depth in runs and pools	Streams very deep and narrow; width/depth ≤ 7 15	Stream relatively deep and narrow; width/depth 8-15 10	Stream moderately deep and narrow; width/depth 16-25 (5)	Stream relatively wide and shallow; width/depth > 25 0	5
Riffle:Riffle or Bend:Bend Ratio Average distance between riffles or bends divided by average stream width	Diverse habitats; meandering stream with deep bends and riffles common; ratio < 10 15	Diverse habitats; bends and riffles present, but not abundant; ratio 10 to 14 10	Habitat diversity low; occasional riffles or bends, ratio 15 to 25 (5)	Habitat monotonous; riffles or bends rare; generally continuous run habitat; ratio > 25 0	5
Fine Sediments % of the substrate that is < 2 mm (sand, silt, or clay)	Fines rare or absent, < 10% of the stream bed 15	Fines present but limited, generally in stream margins or pools; 10 to 20% of stream bed 10	Fines common in mid-channel areas, present in riffles and extensive in pools; 21 to 60% (5)	Fines extensive in all habitats; > 60% of stream bed covered 0	5
Cover for Fish % of the stream area with cover	Cover/shelter for fish abundant; > 15% of stream 15	Cover common, but not extensive; 10 - 15% of stream 10	Occasional cover, limited to one or two areas; 5 - 9% of stream (5)	Cover rare or absent; limited to < 5% of stream 0	5
				Total Score	38