

DATE: 12-15-2023 FILE REF: NA

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FROM: Craig Helker and Rachel Sabre, Stream Biologists; Kristi Minahan, Water Quality Standards; Diane Figiel, Limit Calculator Coordinator

SUBJECT: Kenosha Beef, Unnamed Tributary (WBIC 737250) to the Root River (WBIC 737200), Kenosha County

Overview of issue

In preparation for reissuance of the Kenosha Beef permit, staff were requested to do a site visit to determine the appropriate stream classifications for the receiving waters. Kenosha Beef is considered a continuous discharger, with an actual annual average flow of 0.067 MGD (0.104 cfs); however, there are times when a flow of zero has been reported.

The immediate receiving water is an Unnamed Tributary (WBIC 737250), which is shown below as two segments based on stream classification recommendations from 2003. Segment 1 is from the outfall to stream mile 1.3 (as measured from the mouth of the Unnamed Trib). Segment 2 is from Segment 1 to the Root River (Segment 3, WBIC 737200, a.k.a. Des Plaines Center Branch). The Root River flows into the Des Plaines River (WBIC 734000). None of these segments are in ch. NR 104 as Limited Aquatic Life or Limited Forage Fish (LAL/LFF). However, the facility's previous permit limits were based on the 2003 recommendations of LAL for the direct receiving water, with downstream protection phosphorus and ammonia limits based on LFF from stream mile 1.3 to the confluence with the Root River.

Summary of recommendations

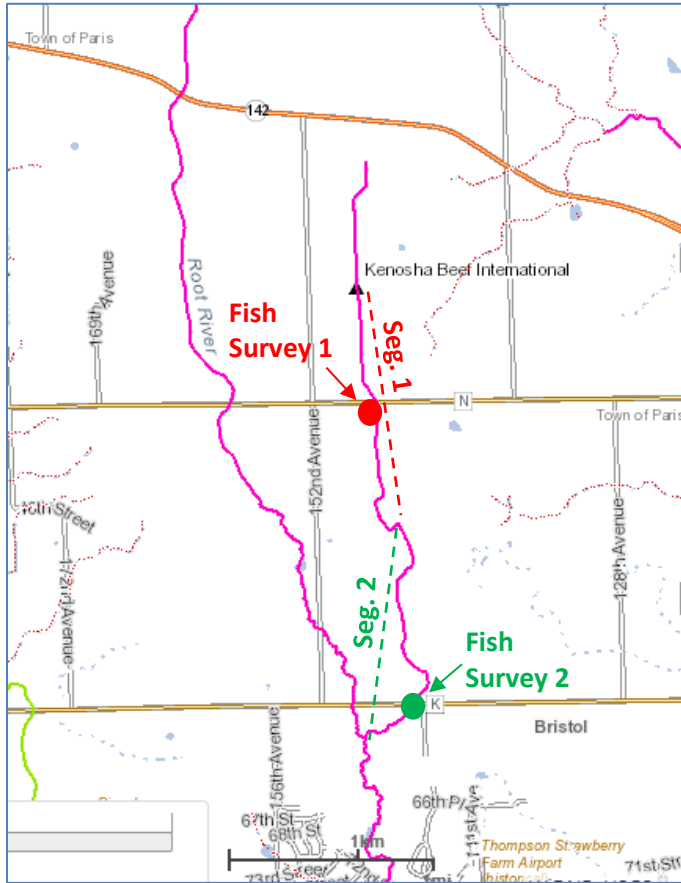
- **Segment 1 (most upstream): Unnamed Tributary (WBIC 737250) from headwaters to stream mile 1.3 (about halfway between Hwy N and Hwy K)**
 - *Codified designated use:* This segment is not listed as LAL or LFF in ch. NR 104 and is not a trout water.
 - *Classification used for previous permit issuance:* LAL
 - *Previous stream class recommendations:* The 2003 proposal recommended LAL "from the WWTP outfall in the NEQ NWQ T2N R21E S26 to an unnamed private road in the NEQ NWQ T2N R21E S35" (private road is not visible on the maps below).
 - *Modeled Natural Community:* Cool-Cold Headwater
 - *New recommended Natural Community and Designated Use:* We recommend Cool-Warm Headwater NC; see notes about the NC under "Discussion". We recommend permit limits continue to be based on Limited Aquatic Life based on limited habitat and limited flow during dry periods, not able to support a sustained fish community. The DU could be revisited in the future (see "Discussion").
- **Segment 2: Unnamed Tributary (WBIC 737250) from Segment 1 to the confluence with the Root River**
 - *Codified designated use:* This segment is not listed as LAL or LFF in ch. NR 104 and is not a trout water.
 - *Classification used for previous permit issuance:* LFF

- *Previous stream class recommendations:* The 2003 proposal recommended LFF “from the above named private road in the NEQ NWQ T2N R21E S35 to the confluence with the Center Branch Des Plaines River (a.k.a. Root River).
 - *Modeled Natural Community:* Cool-Cold Headwater
 - *New recommended Natural Community and Designated Use:* We recommend Cool-Warm Headwater NC; see notes about the NC under “Discussion”. Warmwater Forage Fish is recommended as the Designated Use as the stream is supporting a full forage fish community.
- **Segment 3:** Root River (WBIC 737200) from confluence with the Unnamed Tributary (above) to Des Plaines River (WBIC 734000)
 - *Codified designated use:* This segment is not listed as LAL or LFF in ch. NR 104 and is not a trout water.
 - *Classification used for previous permit issuance:* Warmwater
 - *Previous stream class recommendations:* NA
 - *Modeled Natural Community:* Cool-Cold Headwater
 - *New recommended NC & DU:* Root River was not sampled at this time and there is not sufficient existing data to provide an NC or DU recommendation.

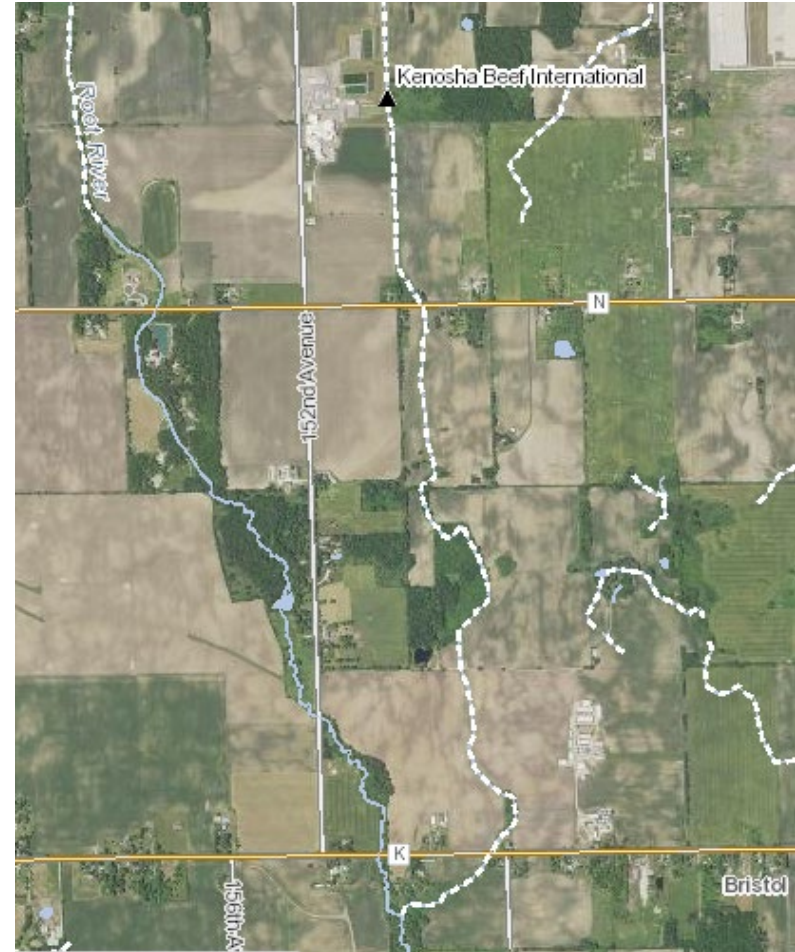
(continued)

Site overview map

Map 1. Map from Water Condition Viewer. Segment 1 is shown in red (proposed as LAL in 2003) and Segment 2 is shown in green (proposed as LFF in 2003). Dots show location of fish surveys 1 and 2. Pink lines indicate that the Unnamed Trib and Root River are both modeled Cool-Cold Headwater.



Map 2. Aerial photo (2022) from Water Condition Viewer.



Site observations and habitat survey results

- Segment 1 (observed upstream of CTH N):
 - Surveyed 100 meters of channel, which is approximately 3 meters in width and historically dredged and straightened, resulting in a very wide and shallow streambed. Water depth in channel was approx. 0.1-0.2 meters. Observed flow estimated at less than 1.0 cfs. Significant accumulation of silt across channel bottom, with an average depth of 0.4 meters. Filamentous algae present throughout reach length.

The cumulative Quantitative Fish Habitat Rating for Seg. 1 was 15 (Poor), scoring Fair for buffer width, and Good for bank erosion. All other categories (Pool Area, Width/Depth Ratio, Riffle/Bend Ratio, Fine Sediments, Cover for Fish) scored Poor.

Aquatic life observed included green frogs, crayfish, and a significant population of leeches (species unidentified.).

Looking upstream Segment 1.



- Segment 2: (observed downstream of CTH K):
 - Surveyed 90 meters of channel, which is approximately 2-3 meters in width with meanders present. Water depth in channel varied between 0.1-0.5 meters, with the deepest portion immediately downstream of CTH K. Flow estimated as less than 1.0 cfs. Bottom substrate was predominately a mix of fine silt and some sand, with areas of gravel accumulation. Dense riparian vegetation provided significant shading.

The cumulative Quantitative Fish Habitat Rating for Seg. 2 was 55 (Good), scoring Excellent in buffer width, and Good for bank erosion, Riffle/Bend Ration, and Fish Cover. Fine Sediments and Width/Depth Ration scored as Fair while Pool Area scored Poor.

Looking upstream, Segment 2.



Fish survey results

7/8/2023 Fish Collection Results

<i>Fish collected</i>	<i>CTH N</i>	<i>CTH K</i>
Green Sunfish	4	34
White Sucker		16
Creek Chub		44
Central Stoneroller		21
Johnny Darter		3
Fathead Minnow		1
Small Stream IBI Score	<i>Too few fish to calculate</i>	60 (Fair)

Discussion and Designated Use Recommendations

Note: Recommendations from this site visit are shown at the top of this memo.

On July 8th, 2023, Department staff conducted stream surveys at two locations on the Unnamed Tributary to Root River (WBIC 737250) in Kenosha County, Wisconsin. These surveys were completed in order to re-visit the Use Designation for the waterway. The two surveys were conducted under established DNR protocols and consisted of fish community assessments via single-probe backpack electrofishing and instantaneous water quality recording. In addition, quantitative fish habitat surveys were completed for each survey location.

After completing the surveys described above, reviewing guidance outlined in Guidelines for Designating Fish and Aquatic Life Uses for Wisconsin Surface Waters (December 2004) and applying Best Professional Judgement, staff recommend the following:

- Segment 1: The existing use (what is currently present) in the Unnamed Tributary (WBIC 737250) reflects Limited Aquatic Life in the headwaters area. Although there were 4 fish caught, this is expected to be only a transient fish community of limited number and diversity, due to poor fish habitat quality and low stream flow. Although the modeled natural community was Cool-Cold Headwater, because this segment has been ditched and straightened, and the surrounding land use is predominantly agriculture, even under well-managed conditions we do not expect that this stream would support a cool-cold community. We recommend Cool-Warm Headwater NC. Because existing conditions reflect LAL, we recommend that for this reissuance, permit limits continue to be based on LAL. While it is estimated that habitat improvement would slightly improve fish community numbers and diversity in this portion, the limiting factor would remain low water flow. The site could be revisited for an additional fish survey under different flows in the future to determine whether LAL or LFF may be the most appropriate Designated Use category, which should reflect what is attainable via a Use Attainability Analysis.
- In Segment 2, downstream to the confluence with the Root River, the existing use reflects Warm Water Forage Fish due to the quality of the fish community already present, consisting of cool water and warm water fish with a wide range of habitat preference. The Designated Use for Segment 2 is also determined to be Warm Water Forage Fish. Although this segment has better meandering and stream function, it is still limited by flow. Like segment 1, we recommend the NC be Cool-Warm Headwater.

Additional monitoring is not necessarily needed, but additional dissolved oxygen monitoring could be useful to better characterize diurnal swings, as instantaneous DO was right around 5 mg/L during the site visit. The facility's measured DO is from 4.9-14 mg/L (permit limit is 4 mg/L), similar to what's expected in other ag ditches.

Are code changes and/or a Use Attainability Analysis needed?

- For Segment 1, we recommend retaining existing permit limits for this reissuance based on LAL, although future sampling could be done to determine whether LAL or LFF would be most appropriate. This segment does not meet the definition of a wetland, diffuse surface water, or wastewater effluent channel (which receive automatic LAL status per code), but could be codified as LAL via a use attainability analysis (UAA) and a code revision.
- Segment 2 does not require any code updates because Warmwater Forage Fish is recommended.