CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 4-25-2024 FILE REF: NA

TO: Mike Polkinghorn, Limit Calculator; Carson Johnson, Compliance Engineer

FROM: Madeline Roberts, Stream Biologist; Kristi Minahan, Water Quality Standards; Diane Figiel, Limit Calculator Coordinator

SUBJECT: Puris Proteins, Unnamed Tributary to S. Branch Beaver Brook (WBIC 2624400), Barron County

Overview of issue

In preparation for conversion of the Puris Proteins permit from a general permit to an individual permit, staff were requested to do a site visit to determine the appropriate stream classifications for the receiving waters. Puris Proteins is currently a noncontinuous discharger, with an estimated approximate daily maximum flow of non-contact cooling water of ~.109 MGD (0.169 cfs); they may have an approximate annual average flow of .105 MGD (0.195 cfs) but data is minimal as only quarterly numbers are available (all of their process wastewater is either land applied or sent off-site). They discharge up to 5 days per week throughout the year. The facility may be considering changing to a continuous discharge depending on upcoming thermal limits. If continuous flow were added that increases their flow rates (by adding well water or cooling tower water), that may result in enough increased flow to affect the stream classification. They are considering combining three types of flows: non-contact cooling water, continuous cooling tower water, and/or continuous well water discharge. Based on previous flows, an estimate of peak flow (daily max) of their non-contact cooling water with additional well water added for continuous flow would be 0.145 MGD. Process flow with cooling tower water would be 0.224 MGD. All three combined would be 0.260 MGD. The addition of any of those waters would likely result in a continuous discharge.

The facility discharges into a PVC pipe that goes into a stormwater culvert traveling under Pine Street until it reaches the beginning of the open channel portion of a railroad drainage ditch (Segment 1). The railroad drainage ditch travels west on the south side of Cattail Trail before joining a storm water outfall and becoming an intermittent stream which meanders across a farm field (Segment 2) to South Branch Beaver Brook (Segment 3). None of these segments are listed as code as LAL or LFF.

Madeline Roberts, DNR Streams Biologist, conducted a site visit on August 1, 2023, and fish surveys on August 8, 2023. The facility had not been in production or discharging since June 2023. The main objectives of the site visits were to determine existing and potential fish and aquatic life communities, and the appropriate designated use of each segment. Their additional discharge is likely to affect the appropriate stream classification.

Summary of recommendations

- **Segment 1 (most upstream): Ditch running parallel to Cattail Tail from outfall to confluence with stormwater input.**
  - *Codified designated use:* The drainage ditch is not listed in NR 104 as LAL/LFF, as this is the first time this facility would be covered under an individual permit.
    - [Note that while NR 104 Table 7 row 6 states that a "Drainage-Tributary South Branch Beaver Brook (Clayton)" is listed as a Diffused surface water, that is for a tributary that is farther south near the Village of Clayton outfall: "Drainage area east of railroad tracks in W ½, SE ¼, NE ¼, Sec. 13, T33N, R15W".]
  - *Classification used for previous permit issuance:* NA
  - *Previous stream class recommendations:* NA
  - *Modeled Natural Community:* NA
  - *New recommended Natural Community and Designated Use:* When there is no flow from the facility, there is an LFF community present in part of the ditch (though the ditch is somewhat drier close to the facility). With added flows it may be a full aquatic life warmwater.

- **Segment 2: Intermittent stream from confluence with stormwater input to S. Branch Beaver Brook**
  - *Codified designated use:* The drainage ditch is not listed in NR 104 as LAL/LFF.
  - *Classification used for previous permit issuance:* NA
  - *Previous stream class recommendations:* NA
  - *Modeled Natural Community:* NA
  - *New recommended NC & DU:* When there is no flow from the facility, there is an LFF community likely present seasonally. With added flows it may be full aquatic life warmwater.
- **Segment 3: South Branch Beaver Brook (WBIC 2624400)**
  - *Codified designated use:* Not listed in NR 104 or as LAL/LFF or Trout Water so defaults to Warmwater
  - *Classification used for previous permit issuance:* NA
  - *Previous stream class recommendations:* NA
  - *Modeled Natural Community:* Cool-Warm Headwater
  - *New recommended NC & DU:* Around 125th Avenue (Cemetery Avenue), when there is no flow from the facility, there is an LFF community likely present seasonally. With added flows it may be full aquatic life warmwater. (Note: Farther downstream at 25th Street it is a Warmwater Designated Use; see Fig. 2.)

Site overview maps

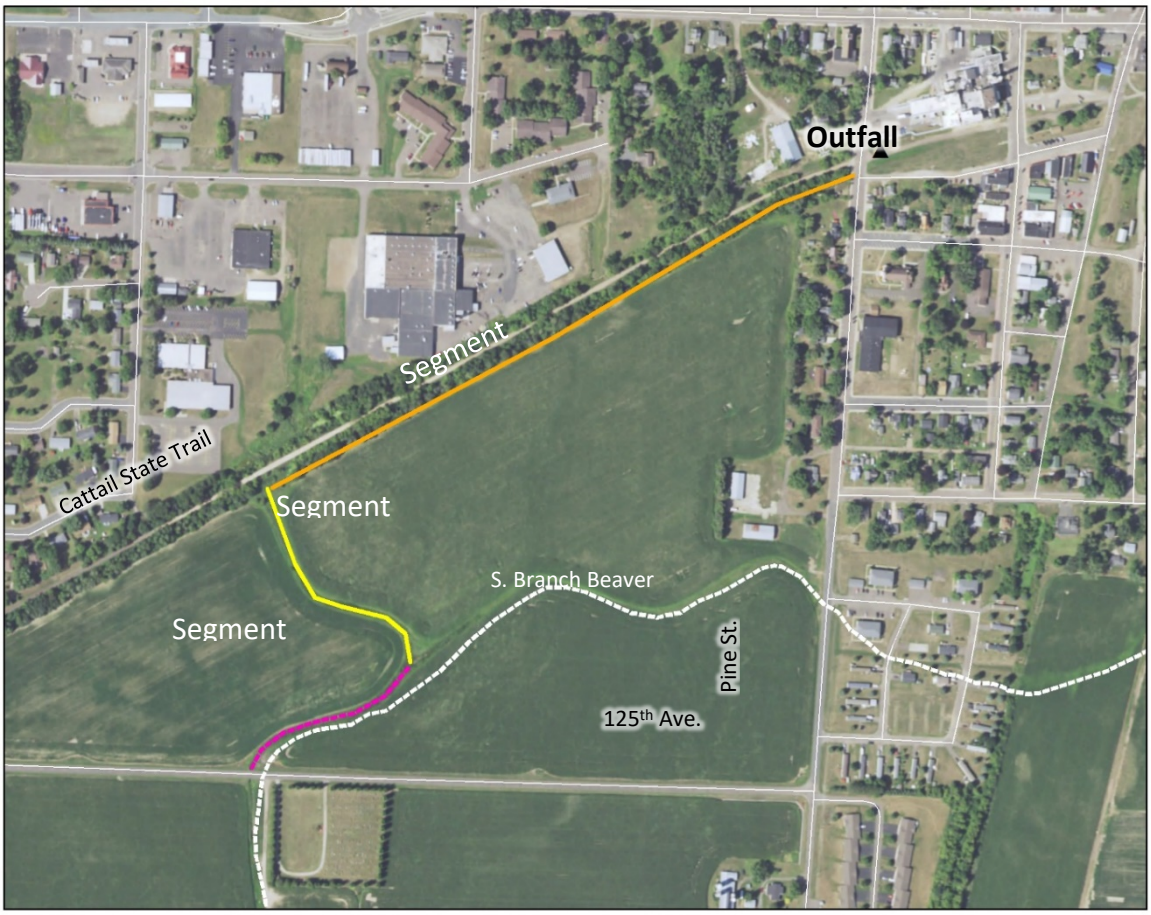

Figure 1. Site map of Puris Proteins outfall (black triangle), unnamed tributary (no WBIC, segment 1 & 2), and South Branch of Beaver Brook (segment 3, WBIC 2624400). Fish survey was done from the downstream end of Segment 1 to 100m upstream.

Figure 2. Fish and habitat survey sites: On Segment 1, the general fish survey extent is indicated with a yellow circle. A survey farther downstream was done on S. Br. Beaver Brook, downstream from 25th Street, indicated with an orange circle.

Site observations

The area was in a drought during the summer of 2023 and likely played a role in the observed water levels. An initial site visit was done for the road crossings on August 1, 2023. Water levels dropped significantly between August 1 and 8; for instance, at the US HWY 63 crossing there was a 0.5ft – 1ft drop in water level. The facility had been idle since June 2023 and was not discharging on either date.

- **Segment 1: Ditch running parallel to Cattail Tail from outfall to confluence with stormwater input**
  Near the outfall the ditch has a high amount of vegetation in it, including ferns, shrubs, and herbaceous plants. As water moves west along the ditch, vegetation thins, and plants are restricted to the agricultural field edge and the old railroad embankment that Cattail Trail is on. At this point aquatic duckweed was found on wet mud. Upstream 100m from the confluence the ditch held shallow water. Water became deeper as it approached the confluence. At least 2 other aquatic plants were present in the ditch, and horsetails were growing thickly on the trail embankment up to the top. The ditch channel narrowed as it connected to the stormwater flow coming from under Cattail Trail via a culvert.
- **Segment 2: Intermittent stream from confluence with stormwater input to S. Branch Beaver Brook**
  An intermittent stream formed below the confluence of the stormwater input and the ditch. A meandering channel with thick reed canary grass on the banks went out into an agricultural field. The channel was dry during the site visit but distinct with no vegetation growing in it. Staff did not have permission to enter the agricultural field, so the state of the channel at the confluence with South Branch Beaver Brook is unknown.
- **Segment 3: South Branch Beaver Brook**
  At 125th Avenue, South Branch of Beaver Brook had standing water both upstream and downstream of the crossing on August 1, 2023. Cattails were in the channel upstream. Algae was present in the channel downstream.

Fish Habitat Survey Results

Fish and qualitative habitat surveys were done on August 8, 2023 (see Fig. 2 for locations). Water levels changed significantly from the initial site check, which affected where surveys could occur. The facility was not discharging on this date.

- **Segment 1: Ditch running parallel to Cattail Tail from outfall to confluence with stormwater input**
  A fish survey was conducted in the water present from the confluence with the intermittent stream to 100m upstream (Table 1). Ten central mudminnows were captured. Capture was impeded by thick aquatic plants, so more fish could be present than were captured. Abundant macroinvertebrates were observed. The ditch was wide and depth varied along its length with an average depth of 0.5 - 1 foot. The habitat was monotonous and substrate was fine sediments (Table 2). The aquatic plants provided cover for fish and there was some woody debris. Qualitative habitat score was 20.
- **Segment 2: Intermittent stream from confluence with stormwater input to S. Branch Beaver Brook**
  Staff did not have permission to conduct a fish survey at this location and the stream was dry at the time of the site visit.
- **Segment 3: South Branch Beaver Brook**
  - Staff did not have permission to conduct a fish survey at 125th Avenue (Cemetery Avenue). The US HWY 63 crossing further downstream was checked, but water levels had dropped to where a fish survey would have been difficult.
  - A 100m survey was conducted ~ 3 mi downstream of 125th Avenue in a perennial stretch of South Branch Beaver Brook to assess the fish community potential of the stream. The survey was done downstream of 25th Street (Table 3). A total of 147 fish were caught of 9 species, including one game fish: northern pike. Thick aquatic vegetation inhibited capture of fish, so more fish were present than what is reported. The stream had good depth with good pool areas, many bends, and undercut banks (Table 4). A diverse aquatic plant community was present. Overall qualitative habitat score was 65. A natural community verification could not be done on this survey with the high number of tolerant species. The observed fish community is typical of a cool-warm headwater. However, a cool-cold community as modeled may be possible if land use practices improved.

Discussion and Designated Use Recommendations

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

Overall the ditch, intermittent stream, and South Branch of Beaver Brook appear to have a flashy hydrology, where they experience pulses of high water but may dry out or have no flow at certain times of the year. Water levels changed within a week of checking the sites and conducting a fish survey. This survey happened during a drought year, so lower water levels and lower flows than normal were likely observed. These ditches and streams receive water from developed areas in Turtle Lake, and they flow through an agricultural field. Both waterbodies are likely impacted by this, and urban and agricultural land use can lead to flashy hydrology. Puris Proteins has previously had a thermal limit of 120°F. This may have influenced the observed fish community and other aquatic life. Despite these impacts, fish were found upstream in the ditch, demonstrating that fish are present in the system and using the available habitat. Because of the presence of a fish community, Limited Aquatic Life is not appropriate for these waterbodies. If Puris Proteins resumes discharge, the fish community would likely increase if the effluent limits are suitably protective.

- **Segment 1: Ditch running parallel to Cattail Tail from outfall to confluence with stormwater input**
  This segment had fish at the time of the site visit demonstrating this segment does support fish in the absence of effluent discharge. Since thick aquatic vegetation impeded capture, there may be more fish in the system than were captured. Low dissolved oxygen and intermittent flow are currently limiting the fish community. Therefore, at this time the designated use that best reflects the existing community is limited forage fish. However if flows are increased by effluent, full aquatic life warmwater is possible because there is sufficient depth already for fish.
- **Segment 2: Intermittent stream from confluence with stormwater input to S. Branch Beaver Brook**
  While a fish survey and site visit were not possible on this stream, it appears that the stream is intermittent given it has a defined channel that was dry the day of the site visit. Because this segment is downstream of an area

currently supporting fish, it is expected that when water is present it would also support fish. Therefore, at this time the designated use that best reflects the existing community is limited forage fish. However if flows are increased by effluent, full aquatic life warmwater may occur here.

- **Segment 3: South Branch Beaver Brook**
  While a fish survey was not possible on this segment, it appears that the stream is intermittent given the standing water found on August 1 at the crossing with 125th avenue. This was a dry year, so there may be more continuous flow in a normal or wet year. At the perennial stretch ~3 mi downstream, South Branch of Beaver Brook has a full fish community. Because the segment by 125th Avenue is downstream and upstream of an area currently supporting fish, it is expected that when water is present it would also support fish. Therefore, at this time the designated use that best reflects the existing community is limited forage fish. However if flows are increased by effluent, full aquatic life warmwater may occur here.

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

Under current conditions, the fish community reflects what would be expected of an LFF community (though it is somewhat drier close to the facility). With added effluent flows it may be a Warmwater community. If there is desire to further consider whether an LFF classification could be appropriate, it would require further monitoring while the facility is discharging, a use attainability analysis (UAA), and a code revision. This may be a low priority because the difference in temperature limits between warmwater and LFF is relatively small and is not expected to provide significant relief to the facility. If limits are assigned based on LFF, then additional monitoring is recommended after the facility starts discharging to verify whether LFF is still applicable with increased flows.

Attachments

Fish Survey Data for Ditch along Cattail Trail

Site	Station length (m)	Fish species	Count
upstream of the confluence with a stormwater culvert	100	Central mudminnow	10

Table 1. Fish survey data for ditch along Cattail Trail (no WBIC). Fish survey was conducted on August 8, 2023. No IBI or NC Verification done because of too few fish.

Habitat Survey Results for Ditch along Cattail Trail

Site	Mean Stream Width (m)	Riparian buffer width	Bank erosion	Pool area	Width:depth ratio	Riffle:riffle or bend:bend ratio	Fine sediments	Cover for fish	**Overall score**
upstream of the confluence with a stormwater culvert	4	Fair (5)	Good (10)	Poor (0)	Poor (0)	Poor (0)	Poor (0)	Fair (5)	20

Table 2. Qualitative habitat survey data for ditch along Cattail Trail (no WBIC). Survey was conducted on the same stretch as the fish survey on August 8, 2023.

Fish Survey Data for South Branch of Beaver Brook

Site	Station length (m)	Fish species	Count	Length
downstream of 25th Street	100	Creek chub	23	
		Central mudminnow	82	
		White sucker	12	
		Common shiner	1	
		Hornyhead chub	3	
		Northern pike	1	4.9
		Johnny darter	1	
		Black bullhead	3	
		Western blacknose dace	11	
Total			147	
Small Stream IBI			50 (fair)	

Table 3. Fish survey data for South Branch of Beaver Brook (WBIC 2624400) downstream of 25th St. Fish survey was conducted on August 8, 2023. NC Verification not done due to high number of tolerant species.

Habitat Survey Results for South Branch of Beaver Brook

Site	Mean Stream Width (m)	Riparian buffer width	Bank erosion	Pool area	Width:depth ratio	Riffle:riffle or bend:bend ratio	Fine sediments	Cover for fish	**Overall score**
Downstream of 25th Street	3	Good (10)	Good (10)	Excellent (10)	Good (10)	Good (10)	Poor (0)	Excellent (15)	65

Table 4. Qualitative Habitat Survey for South Branch of Beaver Brook (WBIC 2624400) downstream of 25th St., conducted on August 8, 2023. Survey was done on the same segment as the fish survey.

Photo 1. Upstream view of Segment 1 above fish survey end.

Photo 2. Upstream view of Segment 1 in fish survey.

Photo 3. Upstream view of Segment 1 near fish survey start.

Photo 4. Downstream view of Segment 1 near fish survey start.

Photo 5. Upstream view of Segment 1 and fish survey start.

Photo 6. Upstream view of stormwater culvert pool.

Photo 7. Downstream view of intermittent stream downstream of stormwater culvert.

Photo 8. Downstream view of stormwater culvert pool and intermittent stream from Cattail Trail.

Photo 9. Upstream view of S Branch Beaver Brook upstream of 125th Ave.

Photo 10. Downstream view of S Branch Beaver Brook downstream of 125th Ave.

Photo 11. S. Branch of Beaver Brook looking upstream at fish survey end.

Photo 12. S. Branch of Beaver Brook looking downstream in fish survey.