Habitat Parameter	Condition Category			
	Optimal	Sub-Optimal	Marginal	Poor
1. Available Cover/ Epifaunal Substrate	Greater than 70% of substrate favourable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Substrate Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity / Depth Regime	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5m).	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Habitat Parameter	Condition Category			
	Optimal	Sub-Optimal	Marginal	Poor
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Recent channelization or dredging absent or minimal; stream with normal pattern.	Some new channelization, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or Bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural rest areas is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosion scars.
SCORE	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0
SCORE	Right Bank 10 9	8 7 6	5 (4) 3	2 1 0

Habitat Parameter	Condition Category			
	Optimal	Sub-Optimal	Marginal	Poor
9. Bank Vegetative Protection (score each bank)	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or non-woody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 centimetres or less in average stubble height.
SCORE	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Condition (score each bank)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
11. Pool Substrate	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0
12. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0

FINAL SCORE = 154

"SUB-OPTIMAL"

From: Daniel Chranowski
Sent: Monday, November 22, 2021 9:48 AM
To: Daniel Chranowski
Subject: FW: 2021 General scientific fisheries collection permit # 26575638: Final Report

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From: Daniel Chranowski
Sent: October 3, 2021 9:48 PM
To: Janusz, Laureen R (ARD) <Laureen.Janusz@gov.mb.ca>
Cc: Subject: 2021 General scientific fisheries collection permit # 26575638: Final Report

Hi Laureen,

Matrix Solutions biologists conducted an aquatics assessment of Pipestone Creek at two locations where horizontal directional drilling (HDD) will occur to install a flowline underneath the creek by Tundra Oil & Gas (license pending).

- Eleven minnow traps and one hoop net were placed for 24 hour sets and shoreline seine netting was conducted upstream and downstream at both locations.
- All fish captured were identified, counted and released on-site, the same day.
    - No fish deaths occurred.
    - No SAR fish captured or detected
    - No tagged fish were captured
    - No aquatic invasive species detected
    - No fish captured in minnow traps or hoop nets

- Sampling Dates: June 9 (location 1 & 2), 10 (location 1 & 2) and 12 (location 2).

- Pipestone Creek Location #1: UTM coordinates 14U 333397 Easting by 5516994 Northing.
    - Approx. 3 mi. east and 4.5 mi south of Kola, MB
    - Fish species captured with seine netting: ~ 390 white sucker fry (*Catostomus comersonii*)
    - 43 northern crayfish (*Orconectes virilis*) captured in minnow traps
    - Aquatic insects/invertebrates/reptiles observed included: backswimmers, dragonfly nymphs, water striders, freshwater clams/snails, western painted turtle

- Pipestone Creek Location # 2: UTM Coordinates 14U 339569 Easting by 5510327 Northing.
    - Approx. ½ mi south and 1.5 mi east of Cromer, MB
    - Fish species captured with seine netting: ~ 85 white sucker fry (*Catostomus comersonii*)
    - 136 northern crayfish (*Orconectes virilis*) captured in minnow traps
    - Aquatic insects/invertebrates observed included: backswimmers, dragonfly nymphs, water striders, freshwater clams/snail.

I hope you are doing well.

Let me know if you need anything else from me.

Take care.

Thank you.

Daniel Chranowski
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Senior Environmental Scientist
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