QUALITATIVE HABITAT EVALUATION INDEX AND MACROINVERTEBRATE SURVEY BASELINE REPORT
NORDIC AQUAFARMS INC. LAND-BASED AQUACULTURE FACILITY
285 NORTHPORT AVENUE
BELFAST, MAINE

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Project 171.05027.009
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1.0 INTRODUCTION

This report presents the results of stream habitat assessments utilizing the Qualitative Habitat Evaluation Index (QHEI) and macroinvertebrate surveys conducted in accordance with Maine Department of Environmental Protection (MEDEP) Order L-28319-26-A-N/L-28319-TG-B-N/L-28319-4E-C-N/L-28319-L6-D-N/L-28319-TW-E-N, signed November 19, 2020 (MEDEP's Order). This MEDEP Order includes approvals for the Nordic Aquafarms Inc. land-based aquaculture facility (the "Project") to be constructed at the Belfast Water District property, Cassida Back Lot property, Mathews Brothers property, and project property abutting Penobscot Bay in Belfast, Maine (see project boundary on Figure 1). The additional baseline surveys were conducted in June 2021 in accordance with the following conditions in MEDEP's Order:

Condition #9: The applicant shall conduct additional baseline macroinvertebrate and QHEI stream habitat surveys for Stream 9 and submit the reported data to the Department prior to the start of construction to ensure the proposed enhancements improve aquatic habitat. Monitoring reports shall include QHEI survey data, observed macroinvertebrates, photographic documentation and a narrative of the observed condition of the subject streams. The applicant shall continue to conduct these surveys, and submit the reported data, on an annual basis until five years following the full build-out of the proposed project to ensure the functions of those reaches are improved in Stream 9. The surveys shall be conducted at an appropriate time of the year as determined in conjunction with the Department. If the Department determines the physical and biological characteristic of Stream 9 are not equal to or better than characteristics lost due to the proposed project, the applicant shall submit for review and approval a plan for enhancing these characteristics or otherwise compensating for the impacts.

Condition #10: The applicant shall conduct additional baseline macroinvertebrate and QHEI stream habitat surveys for the downstream reaches of Streams 3, 5, and 6, below the proposed impacted areas, and submit the reported data to the Department prior to the start of construction. Following construction of the primary facility, the applicant shall conduct additional QHEI and macroinvertebrate surveys in Streams 3, 5, and 6 to ensure aquatic habitat of the downstream reaches of Streams 3, 5, and 6 is maintained. Monitoring reports shall include QHEI survey data, observed macroinvertebrates, photographic documentation, and a narrative of the observed condition of the subject streams. The applicant shall continue to conduct these surveys, and submit the reported data, on an annual basis, until five years following the full build-out of the proposed project to ensure the functions of those reaches are maintained in Streams 3, 5, and 6. The surveys shall be conducted at an appropriate time of the year as determined in conjunction with the Department. If the Department determines the physical and biological characteristics of Streams 3, 5, and 6 are not equal to or better than their existing condition, the applicant shall submit a plan for enhancing these characteristics or compensating for the impacts.

The focus of this report is the additional baseline macroinvertebrate and QHEI stream habitat surveys for Streams 3, 5, 6, and 9; these stream assessment reaches are shown on Figure 1. Surveys were conducted in June 2021, following coordination with MEDEP on the appropriate timing of the surveys. The following sections provide survey methods and the results of the surveys. Completed QHEI assessment field sheets are provided in Appendix A, and Appendix B includes photos of the assessed streams.

2.0 METHODS

The QHEI is a general evaluation of macrohabitat that evaluates and scores the quality of stream habitat based on six parameters: 1) substrate, 2) instream cover, 3) channel morphology, 4) bank erosion and riparian zone, 5) pool/glide and riffle/run quality, and 6) gradient/drainage area[1]. The score for each of the six parameters is totaled to give a cumulative score representative of the quality of the stream habitat. According to the *Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI)* manual, cumulative scores greater than 70 are considered "excellent" and scores of less than 30 are considered "very poor."

A QHEI stream assessment was conducted along each of the stream reaches requested by MEDEP. For Streams 3, 5, and 6, the entire reaches downstream of the project site were assessed. These stream assessment reaches are approximately 280-300 feet in length and end at the outlets of the streams into Belfast Reservoir No. 1. Stream 9 is over 2,000 feet long within the project site. To accurately assess this stream, it was divided into four assessment reaches based on similarity of stream characteristics and floodplain quality. The QHEI assessments followed the *Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI)* manual. Assessments were conducted by walking the length of each stream reach, taking photos, and recording information to complete the QHEI assessment field sheet. QHEI assessments were completed in the office using desktop methods to verify field observations where applicable (e.g., measuring riparian zone widths, calculating stream gradients, etc.).

The macroinvertebrate surveys were conducted concurrently with the QHEI assessments. Surveys were performed using a D-net to collect invertebrates via kick-netting where flowing water occurred within the stream reaches. For stream reaches without flowing water, dip-netting and visual observations was conducted as feasible based on water levels. Observed macroinvertebrates were identified to the order or similar taxonomic level.

[1] State of Ohio Environmental Protection Agency, Division of Surface Water. 2006. Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI). Ohio EPA Technical Bulletin EAS/2006-06-1.

3.0 RESULTS

3.1 Qualitative Habitat Evaluation Index Assessments

The QHEI scores for each assessed stream reach are provided in Table 1. The stream assessment reaches (SARs) are shown on Figure 1, and completed QHEI assessment field sheets are provided in Appendix A. The following paragraphs describe each stream reach that was assessed.

Table 1. Summary of QHEI Scores

Stream Assessment Reach (SAR)	Metric 1: Substrate	Metric 2: Instream Cover	Metric 3: Channel Morphology	Metric 4: Bank Erosion and Riparian Zone	Metric 5: Pool/Glide and Riffle/Run Quality	Metric 6: Gradient	Total QHEI Score	Narrative Rating
SAR-3	3	6	10	8	-2	4	29	Very Poor
SAR-5	7	6	10	7	-2	4	32	Poor
SAR-6	8	7	10	7	-2	4	34	Poor
SAR-9A	8	7	10	7	-2	4	34	Poor
SAR-9B	8	10	10	5.5	-1	4	36.5	Poor
SAR-9C	2	6	4	4	-2	4	18	Very Poor
SAR-9D	16	5	13	7.5	0	4	45.5	Fair

Stream 3 was assessed from the southerly project boundary downstream to the stream's outlet at Belfast Reservoir No. 1, for a length of approximately 300 feet (SAR-3 on Figure 1). Stream 3 is relatively narrow and much of the stream bed was dry during the field visit. No flowing water was observed, although there were occasional pools of standing water (up to 2 inches deep). The stream substrate was primarily silt and detritus, although some areas with cobbles and boulders were observed (see Photo 1 in Appendix B); this stream reach scored low on the substrate metric due to the predominance of lower quality substrate types. Instream cover types observed at Stream 3 included undercut banks, overhanging vegetation, and logs or woody debris; Photo 2 shows an example of woody debris in the stream. Due to the shallow water found in this stream, the instream cover types were assumed to provide limited habitat function. Some erosion was observed along the stream, particularly the left bank, and the riparian zone was observed to be narrow to moderate in width. Land use surrounding this stream reach is a mix of public and private and includes a hiking trail (see Photo 3). Overall, Stream 3 is a small headwater stream with intermittent flow and, therefore, scored relatively low on several of the QHEI metrics. This stream reach had a total score of 29, which corresponds to a "very poor" quality rating.

Stream 5 was assessed from the southerly project boundary downstream to the stream's outlet at Belfast Reservoir No. 1, for a length of approximately 280 feet (SAR-5 on Figure 1). Stream 5 is relatively narrow and much of the stream bed was dry during the field visit. The stream bed and banks are more strongly defined at the upstream end of the reach, becoming less clear as the stream progresses down-gradient to the reservoir. Photos 4, 5, and 6 show Stream 5 at the upstream end of the reach, middle of the reach near the hiking trail, and downstream end of the reach, respectively. No flowing water was observed, although there were occasional pools of standing water (up to 1 inch deep). The stream substrate was primarily silt and gravel, although some cobbles, boulders, and broken culverts (see Photo 7) were also observed. Instream cover types observed at Stream 5 included overhanging vegetation, rootmats, and logs or woody debris. Due to the shallow water found in this stream, the

instream cover types were assumed to provide limited habitat function. Some erosion was observed along the stream banks, and the riparian zone was observed to be narrow as the stream occurs in a valley between two higher forested ridges. Land use surrounding this stream reach is a mix of public and private and includes a hiking trail. Overall, Stream 5 is a small headwater stream with intermittent flow and, therefore, scored relatively low on several of the QHEI metrics. This stream reach had a total score of 32, which corresponds to a "poor" quality rating.

Stream 6 was assessed from the southerly project boundary downstream to the stream's outlet at Belfast Reservoir No. 1, for a length of approximately 280 feet (SAR-6 on Figure 1). Stream 6 is relatively narrow and much of the stream bed was dry or damp (no water observed) during the field visit. Photos 8 and 9 show Stream 6 at the upstream end of the reach and middle of the reach near the hiking trail, respectively. No flowing water was observed, although there were occasional pools of standing water (up to 2 inches deep). The stream substrate was primarily silt and gravel, although some cobbles, boulders, and a concrete culvert (see Photo 10) were also observed. Instream cover types observed at Stream 6 included overhanging vegetation and logs or woody debris. Due to the shallow water found in this stream, the instream cover types were assumed to provide limited habitat function. Some erosion was observed along the stream, particularly the right bank, and the riparian zone was moderately wide on the left bank but very narrow on the right bank, where the bank rises sharply to a higher forested ridge. Land use surrounding this stream reach is a mix of public and private and includes a hiking trail. Overall, Stream 6 is a small headwater stream with intermittent flow and, therefore, scored relatively low on several of the QHEI metrics. This stream reach had a total score of 34, which corresponds to a "poor" quality rating.

Stream 9, Reach A (SAR-9A) extends from the northerly project boundary downstream for a length of approximately 650 feet (Figure 1). This stream reach was characterized by a dense, overgrown riparian zone with old fields occurring beyond the riparian zone on both sides of the stream. Much of the stream bed was dry or damp (no water observed) during the field visit. No flowing water was observed, although there were scattered pools of standing water (up to 4 inches deep). The stream substrate was dominated by silt and cobble, with some gravel, boulders, and detritus also occurring in the stream bed. Instream cover types observed at SAR-9A included undercut banks, overhanging vegetation, boulders, and logs or woody debris. Due to the shallow water found in this stream, the instream cover types were assumed to provide limited habitat function. Moderate erosion was observed along the stream, and some riffle-like areas were noted but did not contain sufficient water depth or flow to qualify as true riffles. Photos 11 and 12 provide typical views of this stream reach. Overall, SAR-9A is a small-to-medium intermittent stream that scored relatively low on several of the QHEI metrics. This stream reach had a total score of 34, which corresponds to a "poor" quality rating.

Stream 9, Reach B (SAR-9B) extends from SAR-9A downstream for a length of approximately 680 feet (Figure 1). In comparison to SAR-9A, this stream reach had a less herbaceous, more wooded riparian corridor and forests extending beyond the riparian zone on one or both sides of the stream. Much of the stream bed was dry or damp (no water observed) during the field visit, although more pools were observed within this reach and contained standing water up to 10 inches deep. Little evidence of flowing water was observed, although some areas appeared to have flowing water (up to 1.5 inches deep). The stream substrate was dominated by silt and cobble, with some gravel, boulders, and detritus also occurring in the stream bed. Instream cover types observed at SAR-9B included overhanging vegetation, rootmats, and logs or woody debris. Moderate erosion was observed along the stream, and some riffle-like areas were noted but did not contain sufficient water depth or flow to qualify as true riffles. Photos 13 and 14 provide typical views of this stream reach. Overall, SAR-9B is a small-to-medium intermittent stream

that scored relatively low on several of the QHEI metrics. This stream reach had a total score of 36.5, which corresponds to a "poor" quality rating.

Stream 9, Reach C (SAR-9C) extends from SAR-9B downstream to the existing culvert under Northport Avenue (Route 1), a length of approximately 400 feet (Figure 1). This stream reach appears to have a history of disturbance, as the stream channel is very narrow, there is no developed riparian zone along the stream, and the land use on both sides of the stream is predominately a mown lawn (as well as a driveway, parking lot, and buildings). Much of the stream bed contained shallow water that ranged from ½ to 2 inches deep, with a few deeper pooled areas up to 7 inches in depth; flowing water was observed in some shallower areas. The stream substrate was mostly (approximately 80%) silt, with some detritus, cobble, and gravel also occurring in the stream bed; this stream reach scored low on the substrate metric due to the predominance of lower quality substrate types. The only instream cover types observed at SAR-9C was overhanging vegetation, which, due to the shallow water found in this stream, was assumed to provide limited habitat function. No riparian zone occurs along this stream, although there is a narrow strip of unmown herbaceous vegetation located immediately adjacent to the stream. Photos 15 and 16 provide typical views of this stream reach. SAR-9C had a total score of 18, which corresponds to a "very poor" quality rating and is the lowest score of the stream reaches that were assessed for this report.

Stream 9, Reach D (SAR-9D) extends from the existing culvert under Northport Avenue (Route 1) downstream and into the intertidal zone of the bay, a length of approximately 290 feet (Figure 1). This reach of Stream 9 (SAR-9D) is located in a forested area that also includes a few residences, and, unlike SAR-9C, does not appear to have a history of disturbance. Water was present throughout the stream reach and was typically less than 2 inches deep, although some areas contained up to 8 inches of water. Some small fish were observed in the deeper water of this stream. The stream substrate was dominated by cobble and gravel, with some silt, boulders, and detritus also occurring in the stream bed; this stream reach scored high on the substrate metric due to the predominance of higher quality substrate types. Instream cover types observed at SAR-9D included overhanging vegetation and logs or woody debris. Erosion was observed along the stream, particularly on the right bank, and some riffle-like areas were noted but did not contain sufficient water depth or flow to qualify as true riffles. This stream segment includes the portion of Stream 9 that enters the intertidal zone, where a rocky substrate and little instream cover were observed. Photos 17 and 18 provide typical views of this stream reach in the forested area, while Photo 19 shows the area where water flows into the cobble beach and intertidal zone of the bay. SAR-9D is a medium-sized intermittent stream that had a total score of 45.5, which corresponds to a "fair" quality rating. SAR-9D had the highest score of the stream reaches that were assessed for this report.

3.2 Macroinvertebrate Survey

A macroinvertebrate survey was conducted concurrently with the QHEI assessments, as discussed above. Many portions of the stream assessment reaches were dry or had shallow water (< 2 inches). In areas where the net could not be submerged in the shallow water, visual inspection for macroinvertebrates was conducted, including turning over rocks and looking under woody debris. The macroinvertebrates observed in each stream reach are noted in Table 2; "X" notes the presence of a taxa and "-" indicates absence. Overall, a limited range of taxa were observed; this low diversity of macroinvertebrates indicates the relatively low habitat quality of these streams, which aligns with the results of the QHEI assessments.

Table 2. Macroinvertebrates Observed

Stream Assessment Reach (SAR)	Macroinvertebrate Taxa				
	Mosquito (Nematocera) Larvae	Scuds (Amphipoda)	Aquatic Earth Worms (Oligochaetes)	Snails (Gastropoda)	Mites (Acariformes)
SAR-3	X	-	X	-	-
SAR-5	X	-	X	-	-
SAR-6	X	-	-	-	-
SAR-9A	-	-	X	X	X
SAR-9B	-	-	-	X	-
SAR-9C	X	-	X	-	X
SAR-9D	-	X	X	-	-

4.0 CONCLUSIONS AND NEXT STEPS

This report has been prepared to provide the results of additional baseline surveys conducted in June 2021 in accordance with Conditions #9 and #10 in MEDEP's Order. This report has been provided to MEDEP prior to the start of construction as required. The applicant will continue to conduct these surveys, and submit the reported data, on an annual basis until five years following the full build-out of the project to ensure (1) the functions of stream reaches where enhancements are proposed are improved in Stream 9 and (2) the functions of the downstream reaches are maintained in Streams 3, 5, and 6.

RANSOM
Consulting Engineers and Scientists

Legend & Notes

- Site Boundary

Stream Reach

- Stream
- SAR (Symb 1)
- SAR (Symb 2)

Notes

1. Site Plan based on data from the Maine Office of GIS and The National Map.
2. Some features are approximate in location and scale
3. This plan has been prepared for Nordic Aquafarms, Inc. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.

Scale & Orientation

0 150 300

1 inch = 300 feet

Prepared For

Nordic Aquafarms, Inc.
159 High Street
Belfast, Maine

Site Address

Proposed Land-Based Aquaculture Facility
285 Northport Avenue
Belfast, Maine

171.05027.009 | Aug 2021

Figure 1
QHEI Stream Assessment Reaches

C:\Users\thomas.neilson\Documents\GIS\ME\Maps\NordicA

APPENDIX A

QHEI Forms

Qualitative Habitat Evaluation Index and Macroinvertebrate Survey Baseline Report
Nordic Aquafarms Inc. Land-Based Aquaculture Facility
285 Northport Avenue
Belfast, Maine

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 29

Stream & Location: Stream 3, downstream segment (SAR-3) **RM:** _ _ _._ **Date** 06/03/21

Nordic Aquafarms -- baseline assessment **Scorers Full Name & Affiliation:** Portia Osborne, Ransom Consulting LLC

River Code: n/a - _ _ _ - _ _ _ **STORET #:** n/a **Lat./ Long.:** (NAD 83 - decimal °) 44 . 3946 / -68 . 9944 **Office verified location** ☐

1] SUBSTRATE

Check **ONLY Two** substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]	5		☐ ☒ DETRITUS [3]	20	
☐ ☐ COBBLE [8]	10		☐ ☐ MUCK [2]		
☐ ☐ GRAVEL [7]	15		☒ ☐ SILT [2]	50	
☐ ☐ SAND [6]			☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]					

(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

Check ONE (*Or 2 & average*)

ORIGIN
- ☐ LIMESTONE [1]
- ☒ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY

SILT
- ☒ HEAVY [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]

EMBEDDEDNESS
- ☐ EXTENSIVE [-2]
- ☒ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate 3 *Maximum 20*

Comments

No riffles were observed; all substrate types recorded under "Pool."

2] INSTREAM COVER

Indicate presence 0 to 3: **0**-Absent; **1**-Very small amounts or if more common of marginal quality; **2**-Moderate amounts, but not of highest quality or in small amounts of highest quality; **3**-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

1 UNDERCUT BANKS [1]	POOLS > 70cm [2]	OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	ROOTWADS [1]	AQUATIC MACROPHYTES [1]
SHALLOWS (IN SLOW WATER) [1]	BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
ROOTMATS [1]		

AMOUNT Check ONE (*Or 2 & average*)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☒ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments No water >20 cm deep was observed. In-stream cover types observed were scored "1" because they provide only marginal quality cover due to shallow water depth.

Cover 6 *Maximum 20*

3] CHANNEL MORPHOLOGY

Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☒ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☒ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☒ LOW [1]
☐ NONE [1]	☒ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel 10 *Maximum 20*

4] BANK EROSION AND RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION L	EROSION R	RIPARIAN WIDTH L	RIPARIAN WIDTH R
☐	☒ NONE / LITTLE [3]	☐	☐ WIDE > 50m [4]
☒	☐ MODERATE [2]	☒	☐ MODERATE 10-50m [3]
☐	☐ HEAVY / SEVERE [1]	☐	☒ NARROW 5-10m [2]
		☐	☐ VERY NARROW < 5m [1]
		☐	☐ NONE [0]

FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R	
☒	☒	FOREST, SWAMP [3]
☐	☐	SHRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PARK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASTURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☐	☐	URBAN OR INDUSTRIAL [0]
☐	☐	MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian 8 *Maximum 10*

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check **ONE** (*ONLY!*)
- ☐ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☐ 0.2-<0.4m [1]
- ☒ < 0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☐ POOL WIDTH = RIFFLE WIDTH [1]
- ☒ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply

☐ TORRENTIAL [-1]	☐ SLOW [1]
☐ VERY FAST [1]	☐ INTERSTITIAL [-1]
☐ FAST [1]	☒ INTERMITTENT [-2]
☐ MODERATE [1]	☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments No evidence of flow observed during field visit. Pools of standing water up to 2" deep. Due to intermittent flow, no true pools/glides or riffles/runs have developed in this stream reach.

Pool / Current -2 *Maximum 12*

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☒ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments No riffles were observed.

Riffle / Run 0 *Maximum 8*

6] GRADIENT

DRAINAGE AREA (~175 ft/mi) (mi²)

- ☐ VERY LOW - LOW [2-4]
- ☐ MODERATE [6-10]
- ☒ HIGH - VERY HIGH [10-6]

%POOL: n/a %GLIDE: n/a %RUN: n/a %RIFFLE: n/a

Gradient 4 *Maximum 10*

EPA 4520 Comments: Gradient calculated for the assessed stream reach; value is above the upper bound of the "very high" gradient classification and therefore assigned a score of 4. 06/16/06

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☒ WADE
- ☐ L. LINE
- ☐ OTHER

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☒ OTHER

90 meters

STAGE

1st -sample pass-		2nd
☐	HIGH	☐
☐	UP	☐
☐	NORMAL	☐
☒	LOW	☐
☒	DRY	☐

CLARITY

1st	--sample pass--	2nd
☐	< 20 cm	☐
☐	20-<40 cm	☐
☐	40-70 cm	☐
☐	> 70 cm/ CTB	☐
☐	SECCHI DEPTH	☐

1st pass _____ cm

2nd _____ cm

CANOPY

- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☒ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

C] RECREATION

POOL: AREA ☐ >100ft² DEPTH ☐ >3ft

Comment RE: Reach consistency/ Is reach typical of steam?, *Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

Assessed reach extends from Nordic project boundary to stream outlet at Belfast Reservoir No. 1, a length of approximately 300 ft (90 meters).

Stage noted to be low/dry as some portions of streambed were dry, which appears to be typical for this stream.

Area used for recreation (hiking trail) but stream itself is too small for recreational use.

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:

See Photos 1 through 3.

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 32

Stream & Location: Stream 5, downstream segment (SAR-5) **RM:** _ _ _._ **Date** 06/03/21

Nordic Aquafarms -- baseline assessment **Scorers Full Name & Affiliation:** Portia Osborne, Ransom Consulting LLC

River Code: n/a - _ _ _ - _ _ _ **STORET #:** n/a **Lat./ Long.:** (NAD 83 - decimal °) 44 . 3954 / -68 . 9923 **Office verified location** ☐

1] SUBSTRATE

Check **ONLY Two** substrate *TYPE BOXES*; estimate % or note every type present

Check ONE (*Or 2 & average*)

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]	3		☐ ☐ DETRITUS [3]	20	
☐ ☐ COBBLE [8]	20		☐ ☐ MUCK [2]		
☐ ■ GRAVEL [7]	25		☐ ☐ SILT [2]	30	
☐ ☐ SAND [6]			☐ ☐ ARTIFICIAL [0]	2	
☐ ☐ BEDROCK [5]					

(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☐ 4 or more [2] ■ 3 or less [0]

ORIGIN	SILT	QUALITY
☐ LIMESTONE [1]		☐ HEAVY [-2]
■ TILLS [1]		■ MODERATE [-1]
☐ WETLANDS [0]		☐ NORMAL [0]
☐ HARDPAN [0]		☐ FREE [1]
☐ SANDSTONE [0]	EMBEDDEDNESS	■ EXTENSIVE [-2]
☐ RIP/RAP [0]		☐ MODERATE [-1]
☐ LACUSTURINE [0]		☐ NORMAL [0]
☐ SHALE [-1]		☐ NONE [1]
☐ COAL FINES [-2]		

Substrate 7 *Maximum 20*

Comments No riffles were observed; all substrate types recorded under "Pool." Artificial = concrete and metal culverts sitting in channel.

2] INSTREAM COVER

Indicate presence 0 to 3: **0**-Absent; **1**-Very small amounts or if more common of marginal quality; **2**-Moderate amounts, but not of highest quality or in small amounts of highest quality; **3**-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

_ UNDERCUT BANKS [1]	_ POOLS > 70cm [2]	_ OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	_ ROOTWADS [1]	_ AQUATIC MACROPHYTES [1]
_ SHALLOWS (IN SLOW WATER) [1]	_ BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
1 ROOTMATS [1]		

AMOUNT (Check ONE (*Or 2 & average*))

☐ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
■ SPARSE 5-<25% [3]
☐ NEARLY ABSENT <5% [1]

Comments No water >20 cm deep was observed. In-stream cover types observed were scored "1" because they provide only marginal quality cover due to shallow water depth.

Cover *Maximum 20* 6

3] CHANNEL MORPHOLOGY

Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	■ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
■ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	■ LOW [1]
☐ NONE [1]	■ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel *Maximum 20* 10

4] BANK EROSION AND RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

L	R	EROSION
☐	☐	NONE / LITTLE [3]
■	■	MODERATE [2]
☐	☐	HEAVY / SEVERE [1]

L	R	RIPARIAN WIDTH
☐	☐	WIDE > 50m [4]
☐	☐	MODERATE 10-50m [3]
■	■	NARROW 5-10m [2]
☐	☐	VERY NARROW < 5m [1]
☐	☐	NONE [0]

L	R	FLOOD PLAIN QUALITY
■	■	FOREST, SWAMP [3]
☐	☐	SHRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PARK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASTURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☐	☐	URBAN OR INDUSTRIAL [0]
☐	☐	MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments Narrow riparian width as stream located between steep, forested ridges on both sides.

Riparian *Maximum 10* 7

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH (Check **ONE** (*ONLY!*))

☐ > 1m [6]
☐ 0.7-<1m [4]
☐ 0.4-<0.7m [2]
☐ 0.2-<0.4m [1]
■ < 0.2m [0]

CHANNEL WIDTH (Check ONE (*Or 2 & average*))

☐ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
■ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY (Check ALL that apply)

☐ TORRENTIAL [-1]	☐ SLOW [1]
☐ VERY FAST [1]	☐ INTERSTITIAL [-1]
☐ FAST [1]	■ INTERMITTENT [-2]
☐ MODERATE [1]	☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments No evidence of flow observed during field visit. Pools of standing water up to 1" deep. Due to intermittent flow, no true pools/glides or riffles/runs have developed in this stream reach.

Pool / Current *Maximum 12* -2

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ■ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments No riffles were observed.

Riffle / Run *Maximum 8* 0

6] GRADIENT

DRAINAGE AREA (~400 ft/mi) (mi²)

☐ VERY LOW - LOW [2-4]
☐ MODERATE [6-10]
■ HIGH - VERY HIGH [10-6]

%POOL: n/a **%GLIDE:** n/a **%RUN:** n/a **%RIFFLE:** n/a

Gradient *Maximum 10* 4

EPA 4520 Comments: Gradient calculated for the assessed stream reach; value is above the upper bound of the "very high" gradient classification and therefore assigned a score of 4. 06/16/06

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☒ WADE
- ☐ L. LINE
- ☐ OTHER

STAGE

1st -sample pass- 2nd	
☐ HIGH	☐
☐ UP	☐
☐ NORMAL	☐
☒ LOW	☐
☒ DRY	☐

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☒ OTHER

85 meters

CLARITY

1st --sample pass-- 2nd	
☐ < 20 cm	☐
☐ 20-<40 cm	☐
☐ 40-70 cm	☐
☐ > 70 cm/ CTB	☐
☐ SECCHI DEPTH	☐

1st pass _____ cm

2nd _____ cm

CANOPY

- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☒ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

Comment RE: Reach consistency/ Is reach typical of steam?*, Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

Assessed reach extends from Nordic project boundary to stream outlet at Belfast Reservoir No. 1, a length of approximately 280 ft (85 meters).

Stage noted to be low/dry as some portions of streambed were dry, which appears to be typical for this stream.

Area used for recreation (hiking trail) but stream itself is too small for recreational use. Concrete and metal culverts observed sitting in channel.

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☒ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:

See Photos 4 through 7.

Ohio EPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 34

Stream & Location: Stream 6, downstream segment (SAR-6) **RM:** _ _ _._ **Date** 06/03/21

Nordic Aquafarms -- baseline assessment **Scorers Full Name & Affiliation:** Portia Osborne, Ransom Consulting LLC

River Code: n/a - _ _ _ - _ _ _ **STORET #:** n/a **Lat./ Long.:** (NAD 83 - decimal °) 44 . 3955 / -68 . 9921 **Office verified location** ☐

1] SUBSTRATE

Check **ONLY Two** substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]		
☐ ☐ BOULDER [9]	3	
☐ ☐ COBBLE [8]	15	
☐ ☐ GRAVEL [7]	30	
☐ ☐ SAND [6]		
☐ ☐ BEDROCK [5]		

OTHER TYPES	POOL	RIFFLE
☐ ☐ HARDPAN [4]		
☐ ☐ DETRITUS [3]	20	
☐ ☐ MUCK [2]		
☐ ☐ SILT [2]	30	
☐ ☐ ARTIFICIAL [0]	2	

(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☐ 3 or less [0]

Check ONE (*Or 2 & average*)

ORIGIN
- ☐ LIMESTONE [1]
- ☐ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY

SILT
- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]

EMBEDDEDNESS
- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate 8 *Maximum 20*

Comments

No riffles were observed; all substrate types recorded under "Pool." Artificial = concrete culvert sitting in channel.

2] INSTREAM COVER

Indicate presence 0 to 3: **0**-Absent; **1**-Very small amounts or if more common of marginal quality; **2**-Moderate amounts, but not of highest quality or in small amounts of highest quality; **3**-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	____ AQUATIC MACROPHYTES [1]
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
____ ROOTMATS [1]		

AMOUNT

Check ONE (*Or 2 & average*)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☐ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments No water >20 cm deep was observed. In-stream cover types observed were scored "1" because they provide only marginal quality cover due to shallow water depth.

Cover 7 *Maximum 20*

3] CHANNEL MORPHOLOGY

Check ONE in each category (*Or 2 & average*)

SINUOSITY
- ☐ HIGH [4]
- ☐ MODERATE [3]
- ☐ LOW [2]
- ☐ NONE [1]

DEVELOPMENT
- ☐ EXCELLENT [7]
- ☐ GOOD [5]
- ☐ FAIR [3]
- ☐ POOR [1]

CHANNELIZATION
- ☐ NONE [6]
- ☐ RECOVERED [4]
- ☐ RECOVERING [3]
- ☐ RECENT OR NO RECOVERY [1]

STABILITY
- ☐ HIGH [3]
- ☐ MODERATE [2]
- ☐ LOW [1]

Comments

Channel 10 *Maximum 20*

4] BANK EROSION AND RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

L	R	EROSION
☐	☐	NONE / LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY / SEVERE [1]

L	R	RIPARIAN WIDTH
☐	☐	WIDE > 50m [4]
☐	☐	MODERATE 10-50m [3]
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW < 5m [1]
☐	☐	NONE [0]

L	R	FLOOD PLAIN QUALITY
☐	☐	FOREST, SWAMP [3]
☐	☐	SHRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PARK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASTURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☐	☐	URBAN OR INDUSTRIAL [0]
☐	☐	MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments Right bank steeper and more eroded; left bank more gradual slope and wider riparian zone.

Riparian 7 *Maximum 10*

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check **ONE** (*ONLY!*)
- ☐ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☐ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH

Check ONE (*Or 2 & average*)
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☐ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply
- ☐ TORRENTIAL [-1]
- ☐ VERY FAST [1]
- ☐ FAST [1]
- ☐ MODERATE [1]
- ☐ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ☐ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments No evidence of flow observed during field visit. Pools of standing water up to 2" deep. Due to intermittent flow, no true pools/glides or riffles/runs have developed in this stream reach.

Pool / Current -2 *Maximum 12*

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH
- ☐ BEST AREAS > 10cm [2]
- ☐ BEST AREAS 5-10cm [1]
- ☐ BEST AREAS < 5cm [metric=0]

RUN DEPTH
- ☐ MAXIMUM > 50cm [2]
- ☐ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE
- ☐ STABLE (e.g., Cobble, Boulder) [2]
- ☐ MOD. STABLE (e.g., Large Gravel) [1]
- ☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Comments No riffles were observed.

Riffle / Run 0 *Maximum 8*

6] GRADIENT

DRAINAGE AREA (~400 ft/mi) (mi²)
- ☐ VERY LOW - LOW [2-4]
- ☐ MODERATE [6-10]
- ☐ HIGH - VERY HIGH [10-6]

%POOL: n/a **%GLIDE:** n/a **%RUN:** n/a **%RIFFLE:** n/a

Gradient 4 *Maximum 10*

EPA 4520 Comments: Gradient calculated for the assessed stream reach; value is above the upper bound of the "very high" gradient classification and therefore assigned a score of 4. 06/16/06

A] SAMPLED REACH

Check ALL that apply

METHOD

- [ ] BOAT
- [x] WADE
- [ ] L. LINE
- [ ] OTHER

STAGE

1st -sample pass-		2nd
☐	HIGH	☐
☐	UP	☐
☐	NORMAL	☐
☒	LOW	☐
☒	DRY	☐

DISTANCE

- [ ] 0.5 Km
- [ ] 0.2 Km
- [ ] 0.15 Km
- [ ] 0.12 Km
- [x] OTHER

85 meters

CLARITY

1st --sample pass--		2nd
☐	< 20 cm	☐
☐	20-<40 cm	☐
☐	40-70 cm	☐
☐	> 70 cm/ CTB	☐
☐	SECCHI DEPTH	☐

1st pass _____ cm

2nd _____ cm

CANOPY

- [ ] > 85%- OPEN
- [ ] 55%-<85%
- [x] 30%-<55%
- [ ] 10%-<30%
- [ ] <10%- CLOSED

Comment RE: Reach consistency/ Is reach typical of steam?*, Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

Assessed reach extends from Nordic project boundary to stream outlet at Belfast Reservoir No. 1, a length of approximately 280 ft (85 meters).

Stage noted to be low/dry as some portions of streambed were dry, which appears to be typical for this stream.

Area used for recreation (hiking trail) but stream itself is too small for recreational use. Concrete culvert observed sitting in channel.

B] AESTHETICS

- [ ] NUISANCE ALGAE
- [ ] INVASIVE MACROPHYTES
- [ ] EXCESS TURBIDITY
- [ ] DISCOLORATION
- [ ] FOAM / SCUM
- [ ] OIL SHEEN
- [x] TRASH / LITTER
- [ ] NUISANCE ODOR
- [ ] SLUDGE DEPOSITS
- [ ] CSOs/SSOs/OUTFALLS

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:

See Photos 8 through 10.

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 34

Stream & Location: Stream 9, Assessment Reach A (SAR-9A) **RM:** _ _ _._ **Date** 06/02/21

Nordic Aquafarms -- baseline assessment **Scorers Full Name & Affiliation:** Portia Osborne, Ransom Consulting LLC

River Code: n/a - _ _ _ - _ _ _ **STORET #:** n/a **Lat./ Long.:** (NAD 83 - decimal °) 44 . 3981 _ / -68 . 9924 _ **Office verified location** ☐

1] SUBSTRATE

Check **ONLY Two** substrate *TYPE BOXES*; estimate % or note every type present

Check ONE (*Or 2 & average*)

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]	5		☐ ☐ DETRITUS [3]	5	
☐ ■ COBBLE [8]	15		☐ ☐ MUCK [2]		
☐ ☐ GRAVEL [7]	10		☒ ☐ SILT [2]	65	
☐ ☐ SAND [6]			☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]					

(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☐ 4 or more [2] ■ 3 or less [0]

ORIGIN	SILT / EMBEDDEDNESS	QUALITY
☐ LIMESTONE [1]		☐ HEAVY [-2]
■ TILLS [1]		■ MODERATE [-1]
☐ WETLANDS [0]		☐ NORMAL [0]
☐ HARDPAN [0]		☐ FREE [1]
☐ SANDSTONE [0]		☒ EXTENSIVE [-2]
☐ RIP/RAP [0]		☐ MODERATE [-1]
☐ LACUSTURINE [0]		☐ NORMAL [0]
☐ SHALE [-1]		☐ NONE [1]
☐ COAL FINES [-2]		

Substrate 8 *Maximum 20*

Comments No riffles were observed; all substrate types recorded under "Pool."

2] INSTREAM COVER

Indicate presence 0 to 3: **0**-Absent; **1**-Very small amounts or if more common of marginal quality; **2**-Moderate amounts, but not of highest quality or in small amounts of highest quality; **3**-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

1 UNDERCUT BANKS [1]	POOLS > 70cm [2]	OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	ROOTWADS [1]	AQUATIC MACROPHYTES [1]
SHALLOWS (IN SLOW WATER) [1]	1 BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
ROOTMATS [1]		

AMOUNT (Check ONE (*Or 2 & average*))

☐ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
■ SPARSE 5-<25% [3]
☐ NEARLY ABSENT <5% [1]

Comments No water >20 cm deep was observed. In-stream cover types observed were scored "1" because they provide only marginal quality cover due to shallow water depth.

Cover *Maximum 20* 7

3] CHANNEL MORPHOLOGY

Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	■ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
■ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	■ LOW [1]
☐ NONE [1]	■ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel *Maximum 20* 10

4] BANK EROSION AND RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

L	R	EROSION
☐	☐	NONE / LITTLE [3]
■	■	MODERATE [2]
☐	☐	HEAVY / SEVERE [1]

L	R	RIPARIAN WIDTH
☐	☐	WIDE > 50m [4]
■	■	MODERATE 10-50m [3]
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW < 5m [1]
☐	☐	NONE [0]

L	R	FLOOD PLAIN QUALITY
☐	☐	FOREST, SWAMP [3]
■	■	SHRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PARK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASTURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☐	☐	URBAN OR INDUSTRIAL [0]
☐	☐	MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments Fields on both sides of stream dominated by herbaceous species (few shrubs or woody plants).

Riparian *Maximum 10* 7

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH (Check **ONE** (*ONLY!*))

☐ > 1m [6]
☐ 0.7-<1m [4]
☐ 0.4-<0.7m [2]
☐ 0.2-<0.4m [1]
■ < 0.2m [0]

CHANNEL WIDTH (Check ONE (*Or 2 & average*))

☐ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
■ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY (Check ALL that apply)

☐ TORRENTIAL [-1]	☐ SLOW [1]
☐ VERY FAST [1]	☐ INTERSTITIAL [-1]
☐ FAST [1]	■ INTERMITTENT [-2]
☐ MODERATE [1]	☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments Little evidence of flow observed during field visit; most areas damp/dry or with pools of standing water up to 4" deep. Due to intermittent flow, no true pools/glides or riffles/runs have developed in this stream reach.

Pool / Current *Maximum 12* -2

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
■ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments Some riffle-like areas but don't contain water >5 cm depth. Score of 0 for this metric.

Riffle / Run *Maximum 8* 0

6] GRADIENT

DRAINAGE AREA (~125 ft/mi) (mi²)

☐ VERY LOW - LOW [2-4]
☐ MODERATE [6-10]
■ HIGH - VERY HIGH [10-6]

%POOL: n/a **%GLIDE:** n/a **%RUN:** n/a **%RIFFLE:** n/a

Gradient *Maximum 10* 4

EPA 4520 Comments: Gradient calculated for the assessed stream reach; value is above the upper bound of the "very high" gradient classification and therefore assigned a score of 4.

06/16/06

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☑ WADE
- ☐ L. LINE
- ☐ OTHER

DISTANCE

- ☐ 0.5 Km
- ☑ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

STAGE

1st -sample pass-		2nd
☐	HIGH	☐
☐	UP	☐
☐	NORMAL	☐
☑	LOW	☐
☐	DRY	☐

CLARITY

1st --sample pass--		2nd
☐	< 20 cm	☐
☐	20-<40 cm	☐
☐	40-70 cm	☐
☐	> 70 cm/ CTB	☐
☐	SECCHI DEPTH	☐

1st pass _____ cm

2nd _____ cm

CANOPY

- ☐ > 85%- OPEN
- ☑ 55%-<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

Comment RE: Reach consistency/ Is reach typical of steam?*, Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

Assessed reach extends from Nordic project boundary (upstream end) down-gradient for a length of approximately 650 ft (200 meters). Moderate riparian zone width along this reach with old field beyond the riparian zone on both sides of stream. Most areas of streambed damp/dry; occasional pools of standing water observed throughout stream reach.

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION

	AREA	DEPTH
POOL:	☐ >100ft²	☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:

See Photos 11 and 12.

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 36.5

Stream & Location: Stream 9, Assessment Reach B (SAR-9B) **RM:** _ _ _._ **Date** 06/02/21

Nordic Aquafarms -- baseline assessment **Scorers Full Name & Affiliation:** Portia Osborne, Ransom Consulting LLC

River Code: n/a - _ _ _ - _ _ _ **STORET #:** n/a **Lat./ Long.:** (NAD 83 - decimal °) 44 . 3965 / -68 . 9908 **Office verified location** ☐

1] SUBSTRATE

Check **ONLY Two** substrate *TYPE BOXES*; estimate % or note every type present

Check ONE (*Or 2 & average*)

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]	5		☐ ☐ DETRITUS [3]	5	
☐ ■ COBBLE [8]	20		☐ ☐ MUCK [2]		
☐ ☐ GRAVEL [7]	10		☐ ■ SILT [2]	60	
☐ ☐ SAND [6]			☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]					

(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☐ 4 or more [2] ■ 3 or less [0]

ORIGIN
- ☐ LIMESTONE [1]
- ■ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY

SILT
- ☐ HEAVY [-2]
- ■ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]

EMBEDDEDNESS
- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate 8 *Maximum 20*

Comments

No riffles were observed; all substrate types recorded under "Pool."

2] INSTREAM COVER

Indicate presence 0 to 3: **0**-Absent; **1**-Very small amounts or if more common of marginal quality; **2**-Moderate amounts, but not of highest quality or in small amounts of highest quality; **3**-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

_ UNDERCUT BANKS [1]	_ POOLS > 70cm [2]	_ OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	_ ROOTWADS [1]	_ AQUATIC MACROPHYTES [1]
_ SHALLOWS (IN SLOW WATER) [1]	_ BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
1 ROOTMATS [1]		

AMOUNT

Check ONE (*Or 2 & average*)
- ☐ EXTENSIVE >75% [11]
- ■ MODERATE 25-75% [7]
- ☐ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments

Cover *Maximum 20* 10

3] CHANNEL MORPHOLOGY

Check ONE in each category (*Or 2 & average*)

SINUOSITY
- ☐ HIGH [4]
- ☐ MODERATE [3]
- ■ LOW [2]
- ☐ NONE [1]

DEVELOPMENT
- ☐ EXCELLENT [7]
- ☐ GOOD [5]
- ☐ FAIR [3]
- ■ POOR [1]

CHANNELIZATION
- ■ NONE [6]
- ☐ RECOVERED [4]
- ☐ RECOVERING [3]
- ☐ RECENT OR NO RECOVERY [1]

STABILITY
- ☐ HIGH [3]
- ☐ MODERATE [2]
- ■ LOW [1]

Comments

Channel *Maximum 20* 10

4] BANK EROSION AND RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION L	EROSION R		RIPARIAN WIDTH L	RIPARIAN WIDTH R		FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R	
☐	☐	NONE / LITTLE [3]	☐	☐	WIDE > 50m [4]	■	■	FOREST, SWAMP [3]
■	■	MODERATE [2]	☐	☐	MODERATE 10-50m [3]	☐	☐	SHRUB OR OLD FIELD [2]
☐	☐	HEAVY / SEVERE [1]	■	■	NARROW 5-10m [2]	☐	☐	RESIDENTIAL, PARK, NEW FIELD [1]
			☐	☐	VERY NARROW < 5m [1]	☐	☐	FENCED PASTURE [1]
			☐	☐	NONE [0]	■	☐	OPEN PASTURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
■	■	URBAN OR INDUSTRIAL [0]
☐	☐	MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments Land uses include forest, rowcrops, and developed area (buildings and parking areas).

Riparian *Maximum 10* 5.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check **ONE** (*ONLY!*)
- ☐ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ■ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH

Check ONE (*Or 2 & average*)
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☐ POOL WIDTH = RIFFLE WIDTH [1]
- ■ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

☐ TORRENTIAL [-1]	☐ SLOW [1]
☐ VERY FAST [1]	☐ INTERSTITIAL [-1]
☐ FAST [1]	■ INTERMITTENT [-2]
☐ MODERATE [1]	☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments Little evidence of flow observed during field visit; most areas damp/dry or with pools of standing water up to 10" deep. Due to intermittent flow, no true pools/glides or riffles/runs have developed in this stream reach.

Pool / Current *Maximum 12* -1

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH
- ☐ BEST AREAS > 10cm [2]
- ☐ BEST AREAS 5-10cm [1]
- ■ BEST AREAS < 5cm [metric=0]

RUN DEPTH
- ☐ MAXIMUM > 50cm [2]
- ☐ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE
- ☐ STABLE (e.g., Cobble, Boulder) [2]
- ☐ MOD. STABLE (e.g., Large Gravel) [1]
- ☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Comments Some riffle-like areas but don't contain water >5 cm depth. Score of 0 for this metric.

Riffle / Run *Maximum 8* 0

6] GRADIENT

DRAINAGE AREA (~100 ft/mi) (mi²)
- ☐ VERY LOW - LOW [2-4]
- ☐ MODERATE [6-10]
- ■ HIGH - VERY HIGH [10-6]

%POOL: n/a **%GLIDE:** n/a **%RUN:** n/a **%RIFFLE:** n/a

Gradient *Maximum 10* 4

EPA 4520 Comments: Gradient calculated for the assessed stream reach; value is above the upper bound of the "very high" gradient classification and therefore assigned a score of 4.

06/16/06

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☒ WADE
- ☐ L. LINE
- ☐ OTHER

DISTANCE

- ☐ 0.5 Km
- ☒ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

STAGE

1st -sample pass-	2nd
☐ HIGH	☐
☐ UP	☐
☐ NORMAL	☐
☒ LOW	☐
☐ DRY	☐

CLARITY

1st --sample pass--	2nd
☐ < 20 cm	☐
☐ 20-<40 cm	☐
☐ 40-70 cm	☐
☐ > 70 cm/ CTB	☐
☐ SECCHI DEPTH	☐

1st pass _____ cm

2nd _____ cm

CANOPY

- ☐ > 85%- OPEN
- ☒ 55%-<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

Comment RE: Reach consistency/ Is reach typical of steam?*, Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

Assessed reach extends from end of Reach A down-gradient for a length of approximately 680 ft (207 meters). This reach has a narrow riparian zone with a mix of land use types beyond the riparian zone. Most areas of streambed damp/dry; scattered pools of standing water observed throughout stream reach. Pool depths were typically up to 5 inches, with a few pools up to 10 inches deep. Flow observed in a few areas with water up to 1.5 inches deep.

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:

See Photos 13 and 14.

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 18

Stream & Location: Stream 9, Assessment Reach C (SAR-9C) **RM:** _ _ _._ **Date** 06/02/21

Nordic Aquafarms -- baseline assessment **Scorers Full Name & Affiliation:** Portia Osborne, Ransom Consulting LLC

River Code: n/a - _ _ _ - _ _ _ **STORET #:** n/a **Lat./ Long.:** (NAD 83 - decimal °) 44 . 3953 / -68 . 9889 **Office verified location** ☐

1] SUBSTRATE

Check **ONLY Two** substrate *TYPE BOXES*; estimate % or note every type present

Check ONE (*Or 2 & average*)

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]			☐ ☒ DETRITUS [3]	10	
☐ ☐ COBBLE [8]	5		☐ ☐ MUCK [2]		
☐ ☐ GRAVEL [7]	5		☐ ☐ SILT [2]	80	
☐ ☐ SAND [6]			☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]					

(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

ORIGIN
- ☐ LIMESTONE [1]
- ☒ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY

SILT
- ☒ HEAVY [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]

EMBEDDEDNESS
- ☒ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate 2 *Maximum 20*

Comments

No riffles were observed; all substrate types recorded under "Pool."

2] INSTREAM COVER

Indicate presence 0 to 3: **0**-Absent; **1**-Very small amounts or if more common of marginal quality; **2**-Moderate amounts, but not of highest quality or in small amounts of highest quality; **3**-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	____ AQUATIC MACROPHYTES [1]
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	____ LOGS OR WOODY DEBRIS [1]
____ ROOTMATS [1]		

AMOUNT

Check ONE (*Or 2 & average*)
- ☐ EXTENSIVE >75% [11]
- ☒ MODERATE 25-75% [7]
- ☒ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments No water >20 cm deep was observed. In-stream cover type observed was scored "1" because it provides only marginal quality cover due to shallow water depth.

Cover 6 *Maximum 20*

3] CHANNEL MORPHOLOGY

Check ONE in each category (*Or 2 & average*)

SINUOSITY
- ☐ HIGH [4]
- ☐ MODERATE [3]
- ☐ LOW [2]
- ☒ NONE [1]

DEVELOPMENT
- ☐ EXCELLENT [7]
- ☐ GOOD [5]
- ☐ FAIR [3]
- ☒ POOR [1]

CHANNELIZATION
- ☐ NONE [6]
- ☐ RECOVERED [4]
- ☐ RECOVERING [3]
- ☒ RECENT OR NO RECOVERY [1]

STABILITY
- ☐ HIGH [3]
- ☐ MODERATE [2]
- ☒ LOW [1]

Comments Disturbed channel, low stability.

Channel 4 *Maximum 20*

4] BANK EROSION AND RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION L	EROSION R	
☒	☒	NONE / LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY / SEVERE [1]

RIPARIAN WIDTH L	RIPARIAN WIDTH R	
☐	☐	WIDE > 50m [4]
☒	☐	MODERATE 10-50m [3]
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW < 5m [1]
☒	☒	NONE [0]

FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SHRUB OR OLD FIELD [2]
☒	☒	RESIDENTIAL, PARK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASTURE, ROWCROP [0]

☐	☐	CONSERVATION TILLAGE [1]
☐	☐	URBAN OR INDUSTRIAL [0]
☐	☐	MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments Mown lawn on both sides of stream, with narrow unmown corridor along stream banks. No developed riparian zone.

Riparian 4 *Maximum 10*

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check **ONE** (*ONLY!*)
- ☐ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☐ 0.2-<0.4m [1]
- ☒ < 0.2m [0]

CHANNEL WIDTH

Check ONE (*Or 2 & average*)
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☐ POOL WIDTH = RIFFLE WIDTH [1]
- ☒ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

☐ TORRENTIAL [-1]	☐ SLOW [1]
☐ VERY FAST [1]	☐ INTERSTITIAL [-1]
☐ FAST [1]	☒ INTERMITTENT [-2]
☐ MODERATE [1]	☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments Little evidence of flow observed during field visit; standing water in stream typically 1/2 - 2" deep with few deeper areas (up to 7"). Due to intermittent flow, no true pools/glides or riffles/runs have developed in this stream reach.

Pool / Current -2 *Maximum 12*

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☒ NO RIFFLE [metric=0]

RIFFLE DEPTH
- ☐ BEST AREAS > 10cm [2]
- ☐ BEST AREAS 5-10cm [1]
- ☐ BEST AREAS < 5cm [metric=0]

RUN DEPTH
- ☐ MAXIMUM > 50cm [2]
- ☐ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE
- ☐ STABLE (e.g., Cobble, Boulder) [2]
- ☐ MOD. STABLE (e.g., Large Gravel) [1]
- ☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Comments No riffles were observed.

Riffle / Run 0 *Maximum 8*

6] GRADIENT

DRAINAGE AREA (~65 ft/mi) (mi²)
- ☐ VERY LOW - LOW [2-4]
- ☐ MODERATE [6-10]
- ☒ HIGH - VERY HIGH [10-6]

%POOL: n/a %GLIDE: n/a
%RUN: n/a %RIFFLE: n/a

Gradient 4 *Maximum 10*

EPA 4520 Comments: Gradient calculated for the assessed stream reach; value is above the upper bound of the "very high" gradient classification and therefore assigned a score of 4. 06/16/06

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☒ WADE
- ☐ L. LINE
- ☐ OTHER

STAGE

1st -sample pass-		2nd
☐	HIGH	☐
☐	UP	☐
☒	NORMAL	☐
☒	LOW	☐
☐	DRY	☐

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☒ 0.12 Km
- ☐ OTHER

_____ meters

CLARITY

1st --sample pass--		2nd
☐	< 20 cm	☐
☐	20-<40 cm	☐
☐	40-70 cm	☐
☐	> 70 cm/ CTB	☐
☐	SECCHI DEPTH	☐

1st pass _____ cm

2nd _____ cm

CANOPY

- ☒ > 85%- OPEN
- ☐ 55%-<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

Comment RE: Reach consistency/ Is reach typical of steam?*, Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

Assessed reach extends from end of Reach B down-gradient for a length of approximately 400 ft (122 meters) to the existing culvert under Northport Avenue (Route 1).

The land use on both sides of the stream is a mown/maintained lawn, as well as driveways on the right bank. Water was observed in much of the channel, typically

1/2 - 2" deep with a few deeper pooled areas (up to 7"). Stream substrate is almost entirely silt and detritus.

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / (PRIVATE) / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / (LAWN) / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:

See Photos 15 and 16.

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 45.5

Stream & Location: Stream 9, Assessment Reach D (SAR-9D) **RM:** _ _ _._ **Date** 06/02/21

Nordic Aquafarms -- baseline assessment **Scorers Full Name & Affiliation:** Portia Osborne, Ransom Consulting LLC

River Code: n/a - _ _ _ - _ _ _ **STORET #:** n/a **Lat./ Long.:** (NAD 83 - decimal °) 44 . 3955 / -68 . 9876 **Office verified location** ☐

1] SUBSTRATE

Check **ONLY Two** substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]	5		☐ ☐ DETRITUS [3]	5	
☐ ■ COBBLE [8]	35		☐ ☐ MUCK [2]		
■ ☐ GRAVEL [7]	45		☐ ☐ SILT [2]	10	
☐ ☐ SAND [6]			☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]					

(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☐ 4 or more [2] ■ 3 or less [0]

Check ONE (*Or 2 & average*)

ORIGIN
- ☐ LIMESTONE [1]
- ■ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY

SILT
- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ■ NORMAL [0]
- ☐ FREE [1]

EMBEDDEDNESS
- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ■ NORMAL [0]
- ☐ NONE [1]

Substrate 16 *Maximum 20*

Comments

No riffles were observed; all substrate types recorded under "Pool."

2] INSTREAM COVER

Indicate presence 0 to 3: **0**-Absent; **1**-Very small amounts or if more common of marginal quality; **2**-Moderate amounts, but not of highest quality or in small amounts of highest quality; **3**-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

_ UNDERCUT BANKS [1]	_ POOLS > 70cm [2]	_ OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	_ ROOTWADS [1]	_ AQUATIC MACROPHYTES [1]
_ SHALLOWS (IN SLOW WATER) [1]	_ BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
_ ROOTMATS [1]		

AMOUNT

Check ONE (*Or 2 & average*)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ■ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover 5 *Maximum 20*

Comments

3] CHANNEL MORPHOLOGY

Check ONE in each category (*Or 2 & average*)

SINUOSITY
- ☐ HIGH [4]
- ☐ MODERATE [3]
- ■ LOW [2]
- ☐ NONE [1]

DEVELOPMENT
- ☐ EXCELLENT [7]
- ☐ GOOD [5]
- ■ FAIR [3]
- ☐ POOR [1]

CHANNELIZATION
- ■ NONE [6]
- ☐ RECOVERED [4]
- ☐ RECOVERING [3]
- ☐ RECENT OR NO RECOVERY [1]

STABILITY
- ☐ HIGH [3]
- ■ MODERATE [2]
- ☐ LOW [1]

Channel 13 *Maximum 20*

Comments

4] BANK EROSION AND RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION L	EROSION R	RIPARIAN WIDTH L	RIPARIAN WIDTH R	FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R	
■	☐ NONE / LITTLE [3]	☐	☐ WIDE > 50m [4]	■	■ FOREST, SWAMP [3]	☐ ☐ CONSERVATION TILLAGE [1]
☐	■ MODERATE [2]	■	■ MODERATE 10-50m [3]	☐	☐ SHRUB OR OLD FIELD [2]	■ ☐ URBAN OR INDUSTRIAL [0]
☐	☐ HEAVY / SEVERE [1]	☐	☐ NARROW 5-10m [2]	■	■ RESIDENTIAL, PARK, NEW FIELD [1]	☐ ☐ MINING / CONSTRUCTION [0]
		■	☐ VERY NARROW < 5m [1]	☐	☐ FENCED PASTURE [1]	
		☐	☐ NONE [0]	■	☐ OPEN PASTURE, ROWCROP [0]	

Indicate predominant land use(s) past 100m riparian.

Riparian 7.5 *Maximum 10*

Comments Land uses include forest and residences.

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check **ONE** (*ONLY!*)
- ☐ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ■ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH

Check ONE (*Or 2 & average*)
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ■ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply
- ☐ TORRENTIAL [-1]
- ☐ VERY FAST [1]
- ☐ FAST [1]
- ☐ MODERATE [1]
- ☐ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ■ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Pool / Current 0 *Maximum 12*

Comments Little evidence of flow observed during field visit. Pools of standing water up to 8" deep; most water <2" in depth. Due to intermittent flow, no true pools/glides or riffles/runs have developed in this stream reach.

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH
- ☐ BEST AREAS > 10cm [2]
- ☐ BEST AREAS 5-10cm [1]
- ■ BEST AREAS < 5cm [metric=0]

RUN DEPTH
- ☐ MAXIMUM > 50cm [2]
- ☐ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE
- ☐ STABLE (e.g., Cobble, Boulder) [2]
- ☐ MOD. STABLE (e.g., Large Gravel) [1]
- ☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle / Run 0 *Maximum 8*

Comments Some riffle-like areas but don't contain water >5 cm depth. Score of 0 for this metric.

6] GRADIENT

(~180 ft/mi)

DRAINAGE AREA (mi²)
- ☐ VERY LOW - LOW [2-4]
- ☐ MODERATE [6-10]
- ■ HIGH - VERY HIGH [10-6]

%POOL: n/a **%GLIDE:** n/a **%RUN:** n/a **%RIFFLE:** n/a

Gradient 4 *Maximum 10*

EPA 4520 Comments: Gradient calculated for the assessed stream reach; value is above the upper bound of the "very high" gradient classification and therefore assigned a score of 4. 06/16/06

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☑ WADE
- ☐ L. LINE
- ☐ OTHER

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☑ OTHER

90 meters

STAGE

1st -sample pass-		2nd
☐	HIGH	☐
☐	UP	☐
☑	NORMAL	☐
☐	LOW	☐
☐	DRY	☐

CLARITY

1st --sample pass--		2nd
☐	< 20 cm	☐
☐	20-<40 cm	☐
☐	40-70 cm	☐
☐	> 70 cm/ CTB	☐
☐	SECCHI DEPTH	☐

1st pass _____ cm

2nd _____ cm

CANOPY

- ☐ > 85%- OPEN
- ☑ 55%-<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

Comment RE: Reach consistency/ Is reach typical of steam?*, Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

Assessed reach extends from the existing culvert under Northport Avenue (Route 1) to the bay, a length of approximately 290 ft (90 meters). This stream reach has a very rocky substrate (dominated by cobble and gravel) and land use adjacent to the reach is a mix of forested and residential. Water was present throughout the reach and was typically <2" deep, with pools up to 8" in depth. This appeared to be normal water levels for this stream.

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:

See Photos 17 through 19.

APPENDIX B

Photograph Log

Qualitative Habitat Evaluation Index and Macroinvertebrate Survey Baseline Report
Nordic Aquafarms Inc. Land-Based Aquaculture Facility
285 Northport Avenue
Belfast, Maine

Photograph Log

Photo 1: Stream 3, facing downstream near the Nordic property boundary.

Photo 2: Stream 3, facing upstream from hiking trail.

Photo 3: Hiking trail that passes over Stream 3 near its downstream end.

Photo 4: Stream 5, facing upstream near the Nordic property boundary (upstream end of assessment reach).

Photo 5: Stream 5, facing downstream from the hiking trail.

Photo 6: Stream 5 at the downstream end of the assessment reach (near outlet to Belfast Reservoir No. 1); photo taken from outlet and facing upstream.

Photo 7: Broken culvert observed in sitting in the channel of Stream 5.

Photo 8: Stream 6, facing downstream near the Nordic property boundary (upstream end of assessment reach).

Photo 9: Stream 6, facing downstream from the hiking trail.

Photo 10: Concrete culvert observed in sitting in the channel of Stream 6.

Photo 11: Stream reach 9A, facing downstream near the upstream extent of this reach.

Photo 12: Stream reach 9A, facing upstream near the downstream extent of this reach.

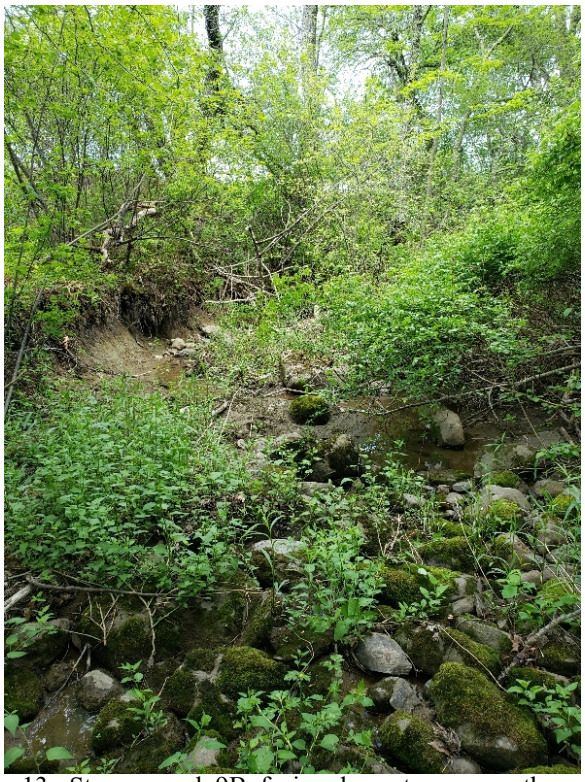

Photo 13: Stream reach 9B, facing downstream near the upstream extent of this reach.

Photo 14: Stream reach 9B, facing upstream near the downstream extent of this reach.

Photo 15: Stream reach 9C, facing downstream near the upstream extent of this reach.

Photo 16: Stream reach 9C, facing upstream near the downstream extent of this reach.

Photo 17: Stream reach 9D, facing downstream near the upstream extent of this reach.

Photo 18: Stream reach 9D, facing upstream near the downstream extent of this reach.

Photo 19: Stream reach 9D, facing downstream where the stream flows into the intertidal zone.