Baffinland Iron Mines Corporation
Mary River Project

2024 Cockburn Lake Arctic Char Survey

REPORT

Prepared for Baffinland Iron Mines Corporation
By North/South Consultants Inc. • 83 Scurfield Blvd. • Winnipeg, MB • R3Y 1G4

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March 2025

North/South Consultants Inc.
Aquatic Environment Specialists

83 Scurfield Blvd.
Winnipeg, Manitoba, R3Y 1G4
Website: www.nscons.ca

Tel.: (204) 284-3366
Fax: (204) 477-4173
E-mail: nscons@nscons.ca

EXECUTIVE SUMMARY

ᓯᕗᓕᖅᑎᓂᕆᖅᓯᒪᔪᖅ ᓇᐃᓈᖅᓯᒪᔪᖅ

ᓄᓘᔾᖓ ᐱᓕᕆᐊᖅ ᐊᐅᓚᑦᑎᔪᖅ ᓴᕕᒃᓴᓂᒃ ᐅᔭᕋᖕᓂᐊᖅᓱᑎᒃ ᐃᓂᖅᑲᖅᓱᓂ ᕿᑭᖅᑕᓂ ᓄᓇᖁᑖᓂ ᓄᓇᕗᒻᒥ. ᐹᕝᕚᓐ ᓴᕕᒃᓴᓂᒃ ᐅᔭᕋᖕᓂᐊᖅᑏᑦ ᑯᐊᐳᕇᓴᓐ (ᐹᕝᕚᓐ; ᐱᓇᔪᒃᑐᑦ) ᓇᖏᓂᖃᖅᑎᐅᔪᑦ ᐊᒻᒪ ᐊᐅᓚᓂᖃᖅᑎᑦᑎᔪᑦ ᐱᓕᕆᐊᒥ. ᐃᓚᒋᔭᐅᓪᓗᓂ ᒪᓕᒐᖅᑎᒍᑦ ᐊᖏᖅᑕᐅᓇᓲᖕᓂᕐᒧᑦ, ᐹᕝᕚᓐᑯᑦ ᑐᓂᓯᓯᒪᔪᑦ ᑭᖑᓪᓕᖅᐹᒥᒃ ᐊᕙᑎᒧᑦ ᐊᒃᑐᐃᓂᐅᓂᐊᖅᑐᑦ ᐅᓂᒃᑳᑦ (FEIS) ᑖᒃᑯᓄᖓ ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔾᔨᖏᓐᓄᑦ (NIRB), ᓴᖅᑮᓯᒪᔪᖅ ᕿᒥᕐᕈᓂᖃᓪᓚᑦᑖᕐᓂᕐᒃ ᐊᒻᒪ ᖃᐅᔨᓴᕐᓂᕐᒃ ᐊᕙᑎᒥᒃ ᐊᒻᒪ ᐃᓅᓯᑦ-ᒪᑭᒪᐟᔪᑎᓄᓪᓗ ᐊᒃᑐᐃᑐᐃᓐᓇᕆᐊᓖᑦ ᐊᒃᑐᐊᓂᖃᖅᑐᑦ ᐱᓕᕆᐊᒧᑦ (ᐹᕝᕚᓐ 2012). 2012-ᒥ, ᐹᕝᕚᓐᑯᑦ ᐊᖏᖅᑕᐅᓚᐅᖅᑐᑦ ᓄᓘᔾᖓ ᐱᓕᕆᐊᒧᑦ, ᐱᖃᓯᐅᑦᔨᓯᒪᓪᓗᓂ 149 ᑭᓵᒥᑕᓂᒃ ᑕᑭᓂᓕᒃ ᓄᓇᓯᐅᑎᑯᑖᒃᓴᐅᑉ ᐊᖁᑎᑯᑖᒃᓴᖓ ᐊᒃᑐᐊᓕᖅᑎᑦᑎᔪᖅ ᓄᓘᔾᖓ ᐅᔭᕋᖕᓂᐊᕐᕕᖕᒥ ᐊᕿᒍᓕᒫᖅ ᑐᓚᒃᑕᕐᕕᒃᓴᒧᑦ ᐃᒃᐱᑎᑦᑐᕐᔪᐊᓄᑦ, ᐊᑐᖅᓱᒍ ᑐᓂᔭᐅᓂᖓ ᐅᔭᕋᖕᓂᐊᕈᓐᓇᐅᑦ ᓈᓴᐅᑖ 005 (ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ 2012).

ᐱᓇᔫᑎᕗᑦ ᐃᖃᓗᓕᕆᓂᕐᒧᑦ ᐱᖁᔭᒃᑯᑦ ᐱᔫᓇᐅᑏᑦ (FAA) ᓴᓇᔭᐅᓂᒃᓴᖓᓄᑦ ᐃᒃᐱᑭᑦᑐᕐᔪᐊᓄᑦ ᓄᓇᓯᐅᑎᑯᑖᒃᓴᐅᑉ ᐊᖅᑯᑎᑯᑖᒃᓴᖓ ᐊᒻᒪ ᑐᓚᒃᑕᕐᕕᒃᓴᖓ ᑐᓂᔭᐅᓯᒪᔪᑦ ᐃᒪᕐᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᓇᑕᒥ (DFO) ᕖᕝᕗᐊᕆ 1, 2024-ᒥ (ᓇᐃᑦ ᐲᓰᑦ ᓕᒥᑎᑦ 2024). ᑐᒃᓯᕋᖅᑕᐅᓯᒪᔪᑦ ᑭᖑᕚᓂᕐᒧᑦ ᐸᕐᓇᐅᑏᑦ ᓇᓗᓇᐅᔾᔭᖅᑕᐅᓯᒪᔪᑦ ᑕᐃᑲᓂ ᐃᖃᓗᓕᕆᓂᕐᒧᑦ ᐱᖁᔭᒃᑯᑦ ᐱᔫᓇᐅᑏᑦ (FAA) ᐱᓇᔫᑎᒥ ᐱᖃᓯᐅᑦᔨᔪᑦ ᓴᖅᑭᑕᐅᓂᖏᑦ ᑕᕆᐅᕐᒥᐅᑕᑦ ᐃᖃᓗᐃᑦ (*Salvelinus alpinus*) ᑕᓯᕐᓄᑦ (KP85 ᑕᓯᕐᒧᑦ) ᐃᓂᖅᑲᖅᑐᑦ ᑕᑉᐸᒃᑯᑦᑎᐊᓂ ᐅᐊᖕᓇᔾᔨ ᐱᓇᖕᓇᔾᔨ ᑰᕕᐊᓂ ᐃᒃᐱᑭᑦᑐᕐᔪᐊᑦ ᐊᕐᑯᑎᖏᓐᓂ. ᐅᑦᔨᕐᓇᖅᑐᑦ ᐊᑕᖏᖅᓱᒍ ᑰᕕᐅᔪᒧᑦ ᐅᐊᖕᓇᔫᖓᓂ ᐱᓇᖕᓇᖅᐸᓯᐊᓂ ᑰᒃᑐᓄᑦ ᐃᒃᐱᑭᑦᑐᕐᔪᐊᑦ ᑰᖓᓄᑦ ᑕᓯᖅᑕᖅᖠᑦᑐᑦ ᐃᑲᔪᕋᔭᖅᑐᓂᒃ ᐅᑮᓂᕐᒧᑦ ᐊᒻᒪ ᒪᔪᕕᐅᔫᓇᕐᓱᓂ ᑕᕆᐅᕐᒥᐅᑕᓂᒃ ᐃᖃᓗᖕᓂᒃ, ᐊᖅᑯᑎᓗ ᐃᒃᐱᑭᑦᑐᕐᔪᐊᑦ ᑕᓯᐊᓄᑦ ᐊᔪᕐᓇᖅᓱᓂ ᐊᒥᓱᓚᐅᓂᖏᓐᓄᑦ ᕐᑯᓪᓗᖖᑦ ᐃᓂᖅᑲᖅᑐᑦ 3.5 ᑭᓵᒥᑕᐸᓗᖕᓂᑦ ᐅᐊᖕᓇᖓᓂ ᑕᓯᐅᑉ ᐅᐊᖕᓇᖔᖓᓂ ᑰᖓᓂ. ᑕᕆᐅᕐᒥᐅᑕᑦ ᐃᖃᓗᐃᑦ ᐱᑕᖃᖏᑦᑐᑦ, ᑭᓯᐊᓂᓕ ᑲᑭᓛᓴᑦ (*Pungitius pungitius*) ᐱᑕᖃᖅᑐᑦ, ᑕᑉᐹᓂᒃᑳᓂᖅ ᑰᕕᐅᔪᒥ ᐱᖃᓯᐅᑎᓪᓗᒍ ᐊᑦᑎᖅᑕᐅᓯᒪᖏᑦᑐᒥ ᑕᓯᕐᒥ KP 85-ᒥᐸᓗᒃ ᐃᒃᐱᑭᑦᑐᕐᔪᐊᓄᑦ ᐊᖅᑯᑎᑯᑖᒃᓴᐅᑉ ᐊᖅᑯᑖᓂ ᑕᐃᔭᐅᓪᓗᓂ "KP85 ᑕᓯᖅ". ᑭᖑᕚᓂᕐᒧᑦ ᐸᕐᓇᐅᑎ ᓄᑖᖑᕆᐊᖅᑕᐅᓚᐅᖅᑐᑦ ᐱᒋᐊᓕᕐᓴᖅᑎᓪᓗᒍ 2025 ᐊᒻᒪ ᐊᑐᖅᑕᐅᕙᓪᓕᕐᓇᖅᑐᑦ ᓈᑕᐅᓗᑎᒃ ᑕᕆᐅᕐᒥᐅᑕᑦ ᐃᖃᓗᐃᑦ KP85 ᑕᓯᕐᒧᑦ ᒫᓐᓇ ᓇᓗᓇᐃᖅᑕᐅᓯᒪᓪᓗᓂ ᐅᐸᓗᖓᐃᔭᕐᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᕙᓪᓕᕐᓇᖅᑐᖅ (ᓄᐊᑦ/ᓴᐅᑦ ᑐᓴᕋᓯᐊᕐᓂᕐᒧᑦ ᐃᖅᑯᐊᐳᕇᑦ [NSC] 2025).

ᖃᐅᔨᓴᕐᓂᖅ ᑕᕆᐅᕐᒥᐅᑕᓂᒃ ᐃᖃᓗᖕᓂᒃ ᐱᓕᕆᐊᖑᓚᐅᖅᑐᑦ ᐃᒃᐱᑭᑦᑐᕐᔪᐊᐸ ᑕᓯᐊᓂ ᔪᓚᐃ/ᐋᒎᓯ 2024-ᒥ ᐱᑕᖃᓕᕐᑯᓪᓗᒋᑦ ᐱᒋᐊᕈᑕᐅᔪᑦ ᖃᐅᔨᓴᕈᑏᑦ ᑐᓴᐅᒪᐟᔪᑎᖏᑦ ᐃᑲᔪᖅᑐᖅᑕᐅᕐᑯᓪᓗᒋᑦ ᑐᒃᓯᕋᖅᑕᐅᓯᒪᔪᑦ ᐅᐸᓗᖓᐃᔭᕐᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᕙᓪᓕᕐᓇᖅᑐᑦ ᑭᖑᕚᓂᕐᒧᑦ ᐸᕐᓇᐊᑎᓄᑦ (ᑲᖏᕐᓕᓪᓗᒍ ᐃᒃᐱᑭᑦᑐᕐᔪᐊᑦ ᑕᓯᖓ ᐱᕝᕕᐅᔪᓐᓇᕐᓂᖓᓂᒃ ᑕᕆᐅᕐᒥᐅᑕᓂᒃ ᐊᒥᕈᔪᓂᑦ). ᑐᕌᒐᐅᔪᑦ ᓯᓚᒥ ᐱᓕᕆᓐᓇᖅᑎᓪᓗᒍ ᐱᓕᕆᐊᓄᑦ ᐃᒪᐃᑦᑑᓯᒪᔪᑦ:

- ᑲᑎᑕᐅᓗᑎᒃ ᐱᒋᐊᕈᑕᐅᔪᑦ ᖃᐅᔨᓴᕈᑏᑦ ᑐᓴᐅᒪᐟᔪᑎᖏᑦ ᑕᕆᐅᕐᒥᐅᑕᖃᕐᓂᖓᓄᑦ (ᓱᕐᓗ ᐊᑐᓂ-ᐊᖑᓂᒃᑕᐅᔪᑦ–ᐊᖑᓇᓱᖕᓂᕐᒧᑦ [CPUE]) ᐊᑐᓂ ᑰᑐᓂ
- ᑲᑎᑕᐅᓗᑎᒃ ᐱᒋᐊᕈᑕᐅᔪᑦ ᖃᐅᔨᓴᕈᑏᑦ ᑕᕆᐅᕐᒥᐅᑕᖃᕐᓂᖓᓄᑦ ᐋᖅᑭᒃᓯᒪᔪᑦ ᐊᒻᒪ ᐊᕕᒃᑐᖅᓯᒪᔪᑦ; ᐊᒻᒪᓗ
- ᑲᑎᑕᐅᓗᑎᒃ ᐱᒋᐊᕈᑕᐅᔪᑦ ᑐᓴᐅᒪᐟᔪᑎᖏᑦ ᑕᕆᐅᕐᒥᐅᑕᑦ ᖃᓄᐃᓕᖓᓂᖏᓐᓄᑦ ᐊᒻᒪ ᓂᕆᕝᕕᒃᑕᖏᓐᓄᑦ.

ᐊᑐᖅᑕᐅᕙᔪᒃᑐᑦ ᐊᒻᒪ ᒥᑭᑦᑐᑦ ᐊᖓᔪᖏᑦ ᒪᑦᑎᑦᑕᐅᑏᑦ ᓂᖏᑕᐅᓪᓗᑎ ᐊᑐᓂ ᐱᖓᓱᓂ ᑰᒃᑐᓄᑦ ᑐᕋᕚᕐᓱᑎᒃ ᐃᖃᓗᖕᓂᕐᒧᑦ ᐊᔾᔨᖐᖏᕈᓘᔭᖅᑐᓂᒃ ᐊᖏᓕᓈᓂᒃ/ᐃᓐᓇᐅᓕᓈᓂᒃ ᐊᕕᒃᑐᖅᓯᒪᔪᓂᒃ ᑕᕆᐅᕐᒥᐅᑕᓂᒃ ᐃᖃᓗᖕᓂᒃ. ᐃᖃᓗᐃᑦ ᐅᕐᑯᒪᐃᓐᓂᕐᓂᐊᖅᑕᐅᓪᓗᑎᒃ ᐊᒻᒪ ᐆᒃᑐᕋᖅᑕᐅᓪᓗᑎᒃ ᓴᖅᐱᐅᔫᖓᓂᒃ, ᐊᕐᓇᐅᓂᖓ ᐊᖑᑕᐅᓂᖓ ᐊᒻᒪ ᐃᓐᓇᕈᖅᓯᒪᓂᖓ ᓇᓄᓇᐃᖅᑕᐅᓪᓗᑎᒃ (ᐊᔪᕐᓇᖅᑭᒃᑳᖓᑦ), ᐊᒻᒪ ᓯᓚᑖᒍᑦ ᐃᓕᖅᑯᓯᖅᓱᖅᑭᑦᑐᑦ ᐅᕝᕙᓘᓐᓃᑦ ᕐᑯᐱᕐᕈᓖᑦ ᓇᓄᓇᐃᖅᑕᐅᓪᓗᑎᒃ ᓯᓚᒥ ᐱᓕᕆᓐᓇᐅᑎᓪᓗᒍ. ᐊᓪᓕᐅᓂᖅᓴᖅ-ᖃᐅᔨᓴᖃᒃᓴᓄᑦ ᑕᕆᐅᕐᒥᐅᑕᓄᑦ (n = 43) ᐱᔭᐅᓚᐅᖅᑐᑦ ᓇᓗᓇᐃᔭᖅᓯᒪᔪᓂ ᖃᐅᔨᓴᕐᕕᖕᒥ ᕿᒥᕐᕈᓂᕐᓂ ᐱᖃᓯᐅᑎᓪᓗᒋᑦ ᐅᑭᐅᖏᑦ, ᐊᕿᐊᕈᖏᑕ ᐃᓗᓕᖏᑦ ᕿᒥᕐᕈᔭᐅᓪᓗᑎᒃ, ᐊᒻᒪ ᖃᐅᔨᓴᖅᑕᐅᓪᓗᑎᒃ ᐊᕿᐊᕈᖏᓐᓂ

ᖁᐱᕿᑦ.

ᑲᑎᖅᓱᕆᑦ 113 ᐊᒻᒪ 79 ᑕᕆᐅᕐᒥᐅᑕᑦ ᐃᖃᓗᐃᑦ ᐃᖃᓗᒃᑕᐅᓚᐅᖅᑐᑦ ᐊᑐᖅᑕᐅᕙᒃᑐᓂ ᐊᒻᒪ ᒥᒃᑭᑦᑐᓂ ᐊᕐᒪᔪᓕᕐᓄᑦ ᒪᑦᑎᒃᑕᐅᑎᓄᑦ, ᐃᓘᓐᓇᑎᒃ (ᑲᑎᖅᓱᕆᑦ 192 ᐃᖃᓗᐃᑦ). ᑲᑎᖅᓱᕆᑦ ᐃᖃᓗᕙᓱᕐᓃᑦ (47 ᒪᑦᑎᑕᐅᑏᑦ ᓂᕐᕆᑕᐅᓪᓗᑎᒃ) 100 ᐸᓗᐃᑦ ᐃᑲᕿᑦ ᐊᑐᓂ ᐊᑐᖅᑕᐅᕙᒃᑐᓂ ᐊᒻᒪ ᒥᑭᑦᑐᓂᒃ ᐊᕐᒪᔫᑦ ᒪᑦᑎᑦᑕᐅᑎᓄᑦ.

ᐱᓕᕆᓇᓱᕐᓂᕐᕆᑦ±ᐊᑐᖅᑕᐅᕙᒃᑐᑦ ᓴᕐᒍᓯᒪᓂᖅ (SD) ᐊᑐᓂ-ᐊᕐᒍᓇᓱᕐᓂᕐᒨᑦ–ᐊᕐᒍᓂᒃᑕᐅᔪᑦ (CPUE) ᐃᒪᐃᓕᕐᕙᓚᐅᖅᑐᖅ 9.96±32.91 ᐃᖃᓗᒃ/100 m/24 ᐃᑲᕿᑦ ᐊᑐᖅᑕᐅᕙᒃᑐᓄᑦ ᒪᑦᑎᑦᑕᐅᑎᓄᑦ ᐊᒻᒪᓗ 18.36±18.35 ᐃᖃᓗᒃ/30 m/24 ᐃᑲᕿᓄᑦ ᒥᑭᓐᓂᖅᓴᓂᒃ ᐊᕐᒪᔪᓕᕐᓄᑦ ᒪᑦᑎᑦᑕᐅᑎᓄᑦ. ᐊᑐᓂ-ᐊᕐᒍᓇᓱᕐᓂᕐᒨᑦ–ᐊᕐᒍᓂᒃᑕᐅᔪᑦ (CPUE) ᐊᑦᑎᑏᕐᒍᓚᐅᖅᑐᑦ ᕿᑎᐸᓗᐊᓂ ᑰᒃᑑᐃᑦ ᑕᒪᐃᓐᓄᑦ ᒪᑦᑎᑦᑕᐅᑎᓄᑦ ᐊᔾᔨᒌᙱᐊᕐᔪᒃᑐᓄᑦ.

ᑕᕆᐅᕐᒥᐅᑕᑦ ᐃᖃᓗᐃᑦ ᓴᖅᐱᐅᔫᕐᕙᓂᑦ ᐆᒃᑐᕋᖅᑕᐅᔪᑦ ᐊᔾᔩᖃᑦᑕᓚᐅᙱᑦᑐᑦ 82-794 ᒥᓕᒦᑕᒥᑦ, ᐅᖁᒪᐃᓐᓂᕐᕆᑦ ᐊᔾᔩᖃᑦᑕᙱᖅᓱᑎᒃ 2-5480 ᒍᕚᒻ, ᖃᓄᐃᓕᕐᕙᓂᕐᕆᓐᓄᑦ ᐱᔾᔪᑕᐅᔪᖅ ᐊᔾᔩᖃᑦᑕᙱᖅᓱᑎᒃ 0.267-1.572 (ᒪᖁᒃ ᐊᔾᔨᐅᙱᑦᑑᒃ ᑭᑭᑕᐅᓪᓗᑎ)ᒃ ᑖᒃᑯᓄᕐᕙ 192 ᑕᕆᐅᕐᒥᐅᑕᓄᑦ ᐃᖃᓗᓐᓄᑦ ᐱᕙᐅᔪᑦ ᒪᑦᑎᑦᑕᕐᓂᕐᒥ ᐱᓕᕆᐊᓂᑦ. ᑖᒃᑯᓇᓂ 42-ᓂ ᐃᖃᓗᒃᑕᐅᔪᓂ ᒪᑦᑎᑦᑕᐅᑎᑎᒍᑦ ᐅᑭᐅᕐᕆᓐᓄᑦ, ᐅᑭᐅᕐᕆᑦ ᐊᔾᔩᖃᑦᑕᓚᐅᙱᑦᑐᑦ 3-20 ᐊᕐᕚᒍᓖᑦ. ᐊᕐᕚᒎᕙᒃᑐᑦ ᓇᓈᓐᓂᕐᕆᓐᓄᑦ ᐃᖃᓗᐃᑦ ᐃᖃᓗᒃᑕᐅᔪᑦ ᐊᑐᖅᑕᐅᕙᒃᑐᓄᑦ ᒪᕿᐃᓕᖅᑲᕐᕙᓪᓗᑎᒃ (8 ᐊᒻᒪᓗ 17 ᐊᕐᕚᒍᓖᑦ). ᓱᖅᑯᐃᓇᖅᑐᒥᒃ ᐃᓕᖅᑯᓯᖅᑕᖃᓚᐅᙱᑦᑐᑦ ᓇᓗᓇᐃᕈᑎᒃᓂ ᐅᑭᐅᖃᕋᔪᕐᓂᕐᕆᓐᓄᑦ ᑕᕆᐅᕐᒥᐅᑕᓄᑦ ᐃᖃᓗᒃᑕᐅᔪᓄᑦ ᒥᑭᓐᓂᖅᓴᓂ ᐊᕐᒪᔪᓕᕐᓂᒃ ᒪᑦᑎᑦᑕᐅᑎᓂ, ᐱᔾᔪᑕᐅᔫᒃᓴᐅᔪᖅ ᐅᓄᙱᑦᑑᓂᕐᕆᓐᓄᑦ ᖃᐅᔨᓴᕙᒃᓴᓕᐊᑦ, ᑭᓯᐊᓂᓕ ᐅᑭᐅᕆᔭᐅᕙᒃᑐᑦ ᐊᕐᒍᓂᒃᑕᐅᔪᓂ 3 ᐊᒻᒪ 6−ᕐᒍᕙᔪᓚᐅᖅᑐᑦ.

30 ᓂᕆᖃᑦᑕᐅᑎᓲᑦ ᐊᕕᒃᑐᖅᓯᒪᔪᑦ ᐆᒪᔪᑦ ᓇᓗᓇᐃᖅᑕᐅᓯᒪᔪᑦ ᑖᒃᑯᓇᙵᑦ 42 ᑕᕆᐅᕐᒥᐅᑕᑦ ᐊᕿᐊᕈᕐᒥᕐᕆᑦ (ᐊᑕᐅᓯᖅ ᖀᒃᑲᓐᓂᐊᒍᑦ ᐊᕿᐊᕈᕐᒥᕐᕙ ᖃᐅᔨᓴᖅᑕᐅᓯᒪᔪᖅ ᐃᓗᓕᖃᓚᐅᙱᑦᑐᖅ). ᑯᒪᕈᐃᑦ ᐊᔾᔩᙱᕆᕈᕝᔭᖅᑐᑦ ᑲᑎᙶᐅᖅᑐᑦ ᐅᔾᔨᕆᔭᐅᓚᐅᖅᑐᑦ ᐃᖃᓗᐃᑦ ᐊᕿᐊᕈᕐᒥᕐᕆᓐᓂ, ᐃᓗᓕᖃᖅᓱᑎᒃ ᒪᖁᒃ-ᐱᕙᓱᓪᓗᐊᓂ ᑲᑎᖅᓱᕆᑦ ᓂᕆᖃᑦᑕᐅᑎᓲᑦ ᖃᓄᐃᑦᑑᓂᕐᕆᓐᓄᑦ. ᓂᕕᐊᕐᔪᐅᑦ (ᐱᕚᓕᐊᓕᔅᑎᓪᓗᕆᑦ) ᓂᕆᖃᑦᑕᐅᑎᕚᒃᑐᓂ ᐱᑕᖃᐅᕉᕐᒍᓚᐅᖅᑐᑦ ᐆᒪᔪᑦ ᐊᕕᒃᑐᖅᓯᒪᔪᓂ, ᐊᑯᓚᐃᓐᓂᕐᕆᑦ ᐱᑕᖃᕋᔪᕐᓂᕐᕆᑦ 97.7%-ᕐᒍᔪᓂ ᐊᒻᒪ ᐊᒃᑐᐊᓂᓖᑦ ᐳᓴᓐᑎᓄᑦ ᐊᕐᒍᓂᒃᑕᐅᔪᓂ 64.2%−ᓂ. ᐃᖃᓗᐃᑦ (ᓇᓗᓇᐃᖅᑕᐅᔪᑦ ᐅᕝᕙᓘᓐᓃᑦ ᑕᐃᒪᐃᓐᓇᓱᕆᔭᐅᔪᑦ ᑕᕆᐅᕐᒥᐅᑕᓂ ᐃᖃᓗᙵ) ᖃᐅᔾᔭᐅᓚᐅᖅᑐᑦ ᐱᕙᓱᓂᑐᐊᖅ ᐊᕿᐊᕈᕐᒥᓂ ᑭᓯᐊᓂᓕ 35.9%-ᕐᕆᓐᓂᑐᐃᓐᓇᖅ ᐊᕐᒍᓂᒃᑕᐅᔪᓂ.

ᑲᑎᖅᓱᕆᑦ 37 ᑖᒃᑯᓇᓂ 43 ᐊᕿᐊᕈᕐᒥᕐᕆᓐᓂ ᖃᐅᔨᓴᕐᕙᒃᓴᓂ ᖃᐅᔨᓴᖅᑕᐅᔪᑦ ᐊᑕᐅᓯᖅ ᐃᓗᐊᒍᑦ ᖁᐱᕿᖃᓚᐅᖅᑐᖅ. ᑕᓪᓕᒪᑦ ᐊᕕᒃᑐᖅᓯᒪᔪᑦ ᐆᒪᔪᑦ (ᐊᑕᐅᓯᖅ ᖁᐱᕿᑯᑖᑦ, ᐱᕙᓱᑦ ᖁᐱᕿᑦ, ᐊᒻᒪ ᐊᑕᐅᓯᖅ ᖁᐱᕿᖅ) ᓇᓗᓇᐃᖅᑕᐅᓚᐅᖅᑐᑦ. ᖁᐱᕿᑯᑖᑦ ᑖᒃᑯᓈᙵᑦ genus *Dibothriocephalus* sp. (plerocercoid ᐃᓅᕝᕕᓕᐊᓕᖅᑐᖅ) ᐱᑕᖃᕋᔪᓚᐅᖅᑐᑦ ᑯᒪᕆᔭᐅᓪᓗᑎᒃ ᑕᕆᐅᕐᒥᐅᑕᑦ ᐊᕿᐊᕈᕐᕆᓐᓂ ᐊᒻᒪ ᐱᑕᖃᐃᓐᓇᖅᑐᑦ 86.0%-ᓂ ᐊᒻᒪ ᓈᓴᐅᑕᐅᕙᒃᑐᑦ ᐱᕝᕕᓕᐊᓂᕐᕆᑦ 55.5 ᖁᐱᕿᓖᑦ ᐊᑐᓂ ᑯᒪᖃᕕᐅᔪᓄᑦ ᐊᕿᐊᕈᕐᒥᓂ. ᑯᒪᐃᑦ (*Dibothriocephalus* cysts) ᐅᔾᔨᕆᔭᐅᓚᐅᖅᑐᑦ ᓯᓚᑖᓂ ᐊᒥᓱᓂ ᐊᕿᐊᕈᕐᓂ ᖃᐅᔨᓴᖅᑕᐅᔪᓂ ᐊᒻᒪ ᐊᐃᑦᑐᕐᓗᒃᑕᐅᔪᑦ ᓈᓴᐅᑎᕐᕆᑦ ᐊᔾᔩᖃᑦᑕᓚᐅᙱᑦᑐᑦ ᐱᑕᖃᙱᑦᑐᒥ ᐱᑕᖃᐅᖅᑐᒨᑦ (>100 ᑯᒪᓖᑦ).

ᑯᐱᕿᑯᑖᑦ (*Brachyphallus crenatus*), ᑕᑯᔭᐅᓚᐅᖅᑐᑦ ᐊᑕᐅᓯᕐᒥ ᐃᓐᓇᕈᖅᓯᒪᔪᒥ ᐊᕐᓇᓪᓗᕐᒥ ᓂᕆᐊᓂ ᑰᑦᑐᓂ ᐃᒃᐱᑭᑦᑐᕐᔪᐊᑦ ᑕᓯᕐᕙᓂ, ᐃᒫᓂᕐᒥᐅᑕᓂᒃ ᖁᐱᕆᓯᒪᓃᑦ ᐊᑐᓲᑦ ᐃᒫᓂ ᑯᒪᕈᕐᓂ ᐊᒻᒪ ᐊᑦᕝᕕᕆᓪᓚᑦᑖᖅᐸᒃᓱᕆᑦ. ᐃᖃᓗᐃᑦ ᑯᒻᒪᒃᓯᒪᔪᓐᓇᖅᑐᑦ ᑕᒪᒃᑯᓂᕐᕙ ᑯᒪᕈᕐᓂ ᓂᕆᓂᒃᑯᑦ ᐃᒫᓂ ᖁᐱᕿᓂᒃ ᐃᓂᖃᕝᕕᐅᔪᒥ ᐊᒻᒪ ᓂᕆᓂᕐᒥ ᐊᓯᕐᕆᓐᓂᒃ ᐃᖃᓗᙵᒃ ᐊᐃᑦᑐᕐᓗᒃᑕᐅᓯᒪᔪᓂ. ᐱᑕᖃᕐᓂᕐᕆᑦ ᐃᒫᓂ ᖁᐱᕆᓯᒪᓃᑦ ᐃᖃᓗᐃᑦ ᑕᕆᐅᕐᒥᐅᑕᑦ ᐊᕿᐊᕈᕐᕆᓐᓂ ᐃᒃᐱᑭᑦᑐᕐᔪᐊᑦ ᑕᓯᐊᓂ ᓇᓗᓇᐃᕈᑎᓕᒃ ᑖᒃᑯᐊ ᐱᑕᖃᕝᕕᐅᒍᑦ ᐃᖃᓗᐃᑦ ᑕᕆᐅᒧᐊᖅᓯᒪᔪᑦ ᑕᖅᑭᐅᕌᖅᑐᓂ (ᓇᓗᓇᐃᓪᓚᑦᑖᕐᓗᒍ ᐊᑯᓂᐅᑎᕆᓂᕐᕙ ᖁᐱᕆᓯᒪᓂᕐᒨᑦ ᓇᓗᓇᖅᑐᖅ) ᐅᕝᕙᓘᓐᓃᑦ ᓂᕆᑎᓪᓗᕆᑦ ᑕᕆᐅᕐᒥᐅᑕᒃᑲᓐᓂᕐᒥᒃ ᑕᕆᐅᒥᕐᕖᖅᓯᒪᔪᒥᒃ ᖁᐱᕆᑕᐅᓯᒪᔪᒥ. ᑕᒪᐃᓐᓂᒃ ᖃᓄᐃᓕᕐᕙᓃᑦ ᐃᒪᐃᓐᓇᓱᕆᓈᔪᑦ ᐃᒃᐱᑭᑦᑐᕐᔪᐊᑦ ᑕᓯᕐᕙ ᐊᑐᖅᑕᐅᓲᖅ ᑕᕆᐅᕐᒥᐅᑕᓂ ᐃᖃᓗᙵ ᒪᔪᓲᓂ. ᐊᓯᓗᒃᑖᕐᕆᑦ ᑯᒻᒪᒃᓯᒪᓃᑦ ᐅᔾᔨᕆᔭᐅᔪᑦ ᑕᕆᐅᕐᒥᐅᑕᓂ ᐃᖃᓗᙵ ᑕᓯᕐᓂᕐᓖᖅᓯᒪᔪᓂ.

EXECUTIVE SUMMARY

The Mary River Project is an operating iron ore mine located in the Qikiqtani Region of Nunavut. Baffinland Iron Mines Corporation (Baffinland; the Proponent) is the owner and operator of the Project. As part of the regulatory approval process, Baffinland submitted a Final Environmental Impact Statement (FEIS) to the Nunavut Impact Review Board (NIRB), which presented in-depth analyses and evaluation of potential environmental and socioeconomic effects associated with the Project (Baffinland 2012). In 2012, Baffinland received approval for the Mary River Project, which involves a 149-km long railway connecting the Mary River Mine to a year-round port in Steensby Inlet, through the issuance of Project Certificate No. 005 (NIRB 2012).

An application for a *Fisheries Act* Authorization (FAA) for the construction of the Steensby Rail and Port was submitted to Fisheries and Oceans Canada (DFO) on February 1, 2024 (Knight Piésold Ltd. 2024). The proposed offsetting plan described in the FAA application entails the introduction of Arctic Char (*Salvelinus alpinus*) to a lake (KP85 Lake) located in the upper northwestern drainage of the Cockburn River system. A notable feature of the entire sub-catchment that is drained by the northwest branch of the Cockburn River is the near total absence of lakes that could support overwintering and spawning for Arctic Char, and access from Cockburn Lake is precluded by several cataracts and high waterfalls located approximately 3.5 km north of the lake's north basin. Arctic Char are absent from, but Ninespine Stickleback (*Pungitius pungitius*) are present in, the upper drainage including an unnamed lake located at approximately KP 85 of the Steensby Rail alignment referred to as "KP85 Lake". The offsetting plan was updated in early 2025 and the option for the introduction of Arctic Char to KP85 Lake is now identified as a contingency option (North/South Consultants Inc. [NSC] 2025).

A survey of Arctic Char was conducted in Cockburn Lake in July/August 2024 to provide baseline information in support of the proposed contingency option for the offsetting plan (assuming Cockburn Lake would provide the donor char population). The objectives of the field program were to:

- Collect baseline information on char abundance (i.e., catch-per-unit-effort [CPUE]) in each of the basins;
- Collect baseline information on char population structure and characteristics; and
- Collect baseline information on char condition and diet.

Standard and small mesh gill nets were set in each of the three basins with the objective of capturing a wide range of size/age classes of char. Fish were weighed and measured for fork length, sex and maturity were determined (where feasible), and external anomalies or parasites were noted in the field. A sub-sample of char (n = 43) were retained for detailed laboratory analysis including ageing, stomach content analysis, and examination of stomach parasites.

A total of 113 and 79 Arctic Char were captured in standard gang and small mesh index gill nets, respectively (total of 192 fish). Total fishing effort (47 net sets) was approximately 100 hours for each of standard gang and small mesh gill nets.

Mean±standard deviation (SD) catch-per-unit-effort (CPUE) was 19.96±32.91 fish/100 m/24 hours for standard gang index gill nets and 18.36±18.35 fish/30 m/24 hours for small mesh index gill net gangs. CPUE was lowest in the middle basin for both gear types.

Arctic Char fork length ranged from 82-794 mm, weights ranged from 2-5480 g, and condition factor ranged from 0.267-1.572 (two outliers excluded) for the 192 Arctic Char captured in the gillnetting program. Of the 42 fish captured in gill nets that were aged, the ages ranged from 3-20 years. The age frequency distribution for char captured in standard gang index gill nets was bimodal (8 and 17 years). There was no clear pattern evident in age frequencies for char captured in small mesh index gill nets, likely due to the limited sample size, though the most frequently captured ages were 3 and 6 years.

Thirty prey taxa were identified from 42 Arctic Char stomachs (one additional stomach examined was empty). Insecta was the most diverse group observed in char stomachs, comprising two-thirds of the total prey types. Chironomidae (mostly in the pupal stage) was the dominant prey taxon, with a frequency of occurrence of 97.7% and a relative percentage of biomass of 56.2%. Fish (confirmed or probable Arctic Char) were found in only three stomachs but accounted for 35.9% of the biomass.

A total of 37 of the 43 stomach samples examined had at least one internal parasite. Five taxa (one nematode, three cestodes, and one trematode) were identified. Tapeworms of the genus *Dibothriocephalus* sp. (plerocercoid life stage) were the most common parasite in char stomachs with a prevalence of 86.0% and a mean intensity of 55.5 parasites per infected stomach. *Dibothriocephalus* cysts were also observed on the exterior of the majority of stomachs examined and infection rates ranged from none to heavy (>100 cysts).

The parasite *Brachyphallus crenatus*, which was found in a single sexually mature female from the south basin of Cockburn Lake, is a marine trematode that uses marine calanoid copepods as an intermediate host. Fish can become infected with this parasite by consuming the marine copepod hosts or potentially from eating another fish that has already been infected. The presence of this marine parasite in a char stomach from Cockburn Lake provides evidence that the host fish had either been to the ocean in recent months (precise longevity of the parasite is not known) or consumed another char that had returned from the ocean with this parasite. Both scenarios suggest that Cockburn Lake supports anadromous Arctic Char. All other parasites observed in char are of freshwater origin.

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ABBREVIATIONS AND ACRONYMS

CPUE	Catch-per-unit-effort
DELTs	Deformities, erosion, lesions and tumours
DFO	Fisheries and Oceans Canada
FAA	Fisheries Act Authorization
FEIS	Final Environmental Impact Statement
GPS	Global Positioning System
K	Condition factor
Max	Maximum
Min	Minimum
n	Sample size
NIRB	Nunavut Impact Review Board
NSC	North/South Consultants Inc.
QA/QC	Quality assurance/quality control
RPMD	Relative percent mean difference
SD	Standard deviation
SE	Standard error
TMS	Tricaine Methanesulfonate
UTM	Universal Transverse Mercator

1.0 INTRODUCTION

The Mary River Project is an operating iron ore mine located in the Qikiqtani Region of Nunavut. Baffinland Iron Mines Corporation (Baffinland; the Proponent) is the owner and operator of the Project. As part of the regulatory approval process, Baffinland submitted a Final Environmental Impact Statement (FEIS) to the Nunavut Impact Review Board (NIRB), which presented in-depth analyses and evaluation of potential environmental and socioeconomic effects associated with the Project (Baffinland 2012). In 2012, Baffinland received approval for the Mary River Project, which involves a 149-km long railway connecting the Mary River Mine to a year-round port in Steensby Inlet, through the issuance of Project Certificate No. 005 (NIRB 2012).

An application for a *Fisheries Act* Authorization (FAA) for the construction of the Steensby Rail and Port was submitted to Fisheries and Oceans Canada (DFO) on February 1, 2024 (Knight Piésold Ltd. 2024). The proposed offsetting plan described in the FAA application entails the introduction of Arctic Char (*Salvelinus alpinus*) to a lake (KP85 Lake) located in the upper northwestern drainage of the Cockburn River system (Figure 1). A notable feature of the entire sub-catchment that is drained by the northwest branch of the Cockburn River is the near total absence of lakes that could support overwintering and spawning for Arctic Char, and access from Cockburn Lake is precluded by several cataracts and high waterfalls located approximately 3.5 km north of the lake's north basin. Arctic Char are absent from, but Ninespine Stickleback (*Pungitius pungitius*) are present in, the upper drainage including an unnamed lake located at approximately KP 85 of the Steensby Rail alignment referred to as "KP85 Lake". The offsetting plan was updated in early 2025 and the option for the introduction of Arctic Char to KP85 Lake is now identified as a contingency option (North/South Consultants Inc. [NSC] 2025a).

A survey of Arctic Char was conducted in Cockburn Lake in July/August 2024 to provide baseline information in support of the proposed contingency option for the offsetting plan (assuming Cockburn Lake would provide the donor char population; Figure 2). The objectives of the field program were to:

- Collect baseline information on char abundance (i.e., catch-per-unit-effort [CPUE]) in each of the basins;
- Collect baseline information on char population structure and characteristics; and
- Collect baseline information on char condition and diet.

This report presents the methods and results of the Cockburn Lake Arctic Char survey conducted in July/August 2024. Results of a bathymetry and substrate survey and a water quality, benthic invertebrate, and fish survey conducted at KP85 Lake in 2024 are presented in NSC (2025b and c, respectively).

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Figure 1. Location of KP85 Lake.

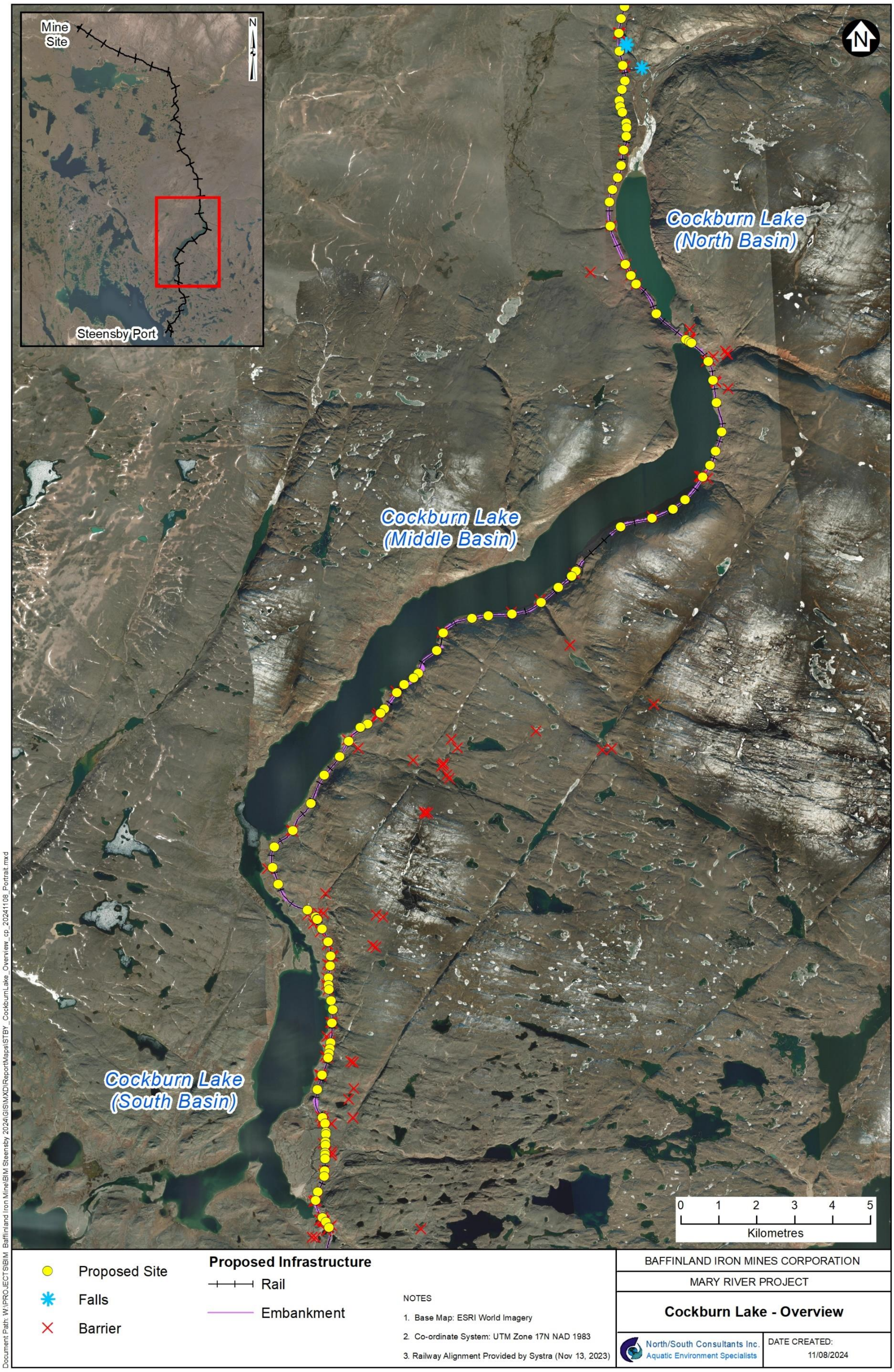


Figure 2. Location of Cockburn Lake.

2.0 METHODS

2.1 FIELD METHODS

2.1.1 Gillnetting

A gillnetting sampling program was conducted from July 26 to August 5, 2024, in Cockburn Lake. Standard and small mesh gill nets were set in each of the three basins of Cockburn Lake with the objective of capturing a wide range of size and age classes.

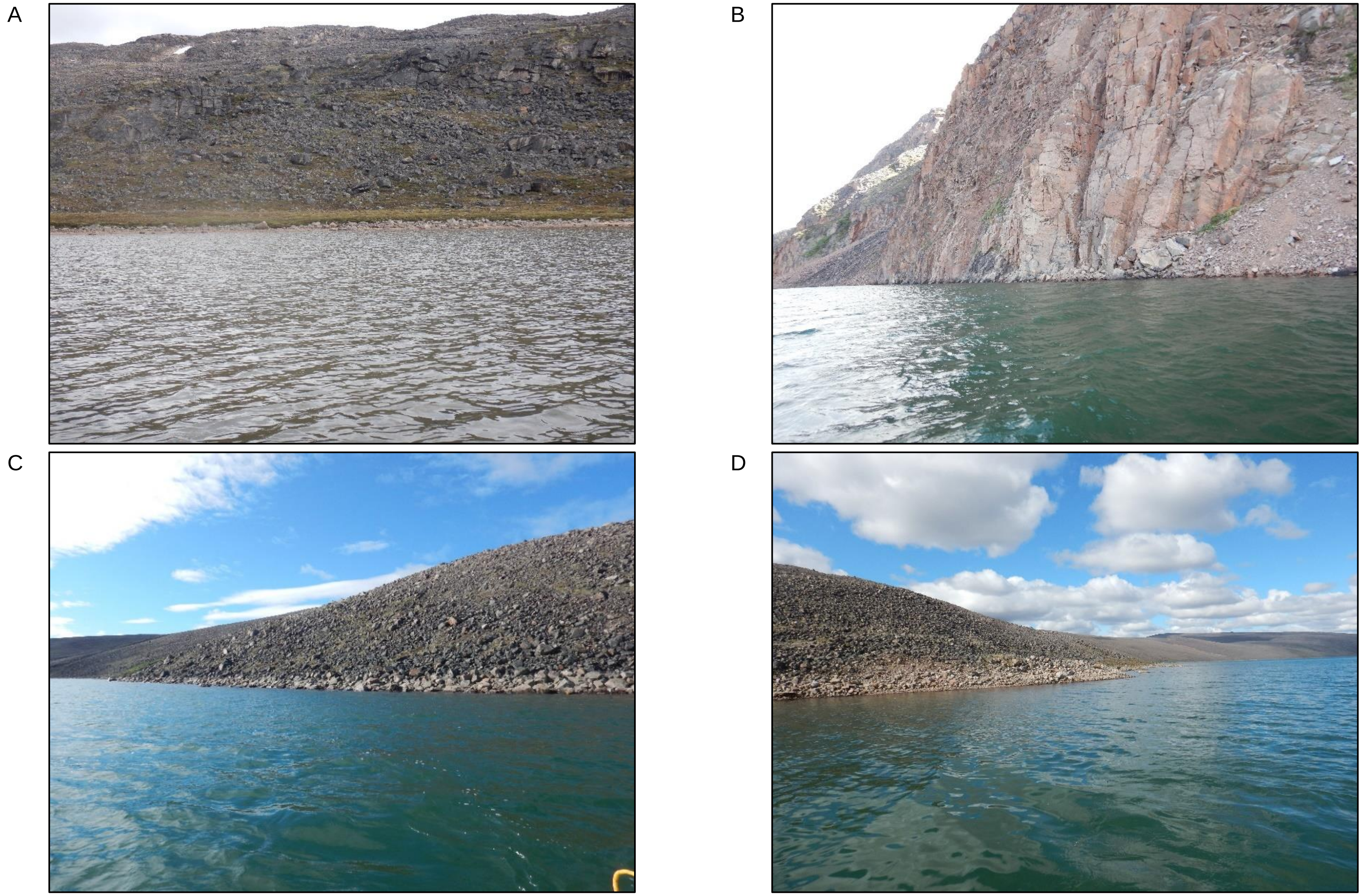
Standard gang index gill nets were composed of six 22.9 m (25 yd) long by 1.8 m (2.0 yd) deep gillnet panels made of twisted nylon mesh. Individual panels were joined together in a stretched mesh-size sequence of 1½, 2, 3, 3¾, 4¼, and 5 inches (or 38, 51, 76, 95, 108, and 127 mm).

Small mesh index gill nets were composed of three 10 m (10.9 yd) long by 1.8 m (2.0 yd) deep gillnet panels made of twisted nylon mesh. Panels were tied together in a stretched mesh-size order of 16, 20, and 25 mm (or 0.63, 0.78, and 0.98 inches). Small mesh gill nets were each attached to a standard gang and deployed together.

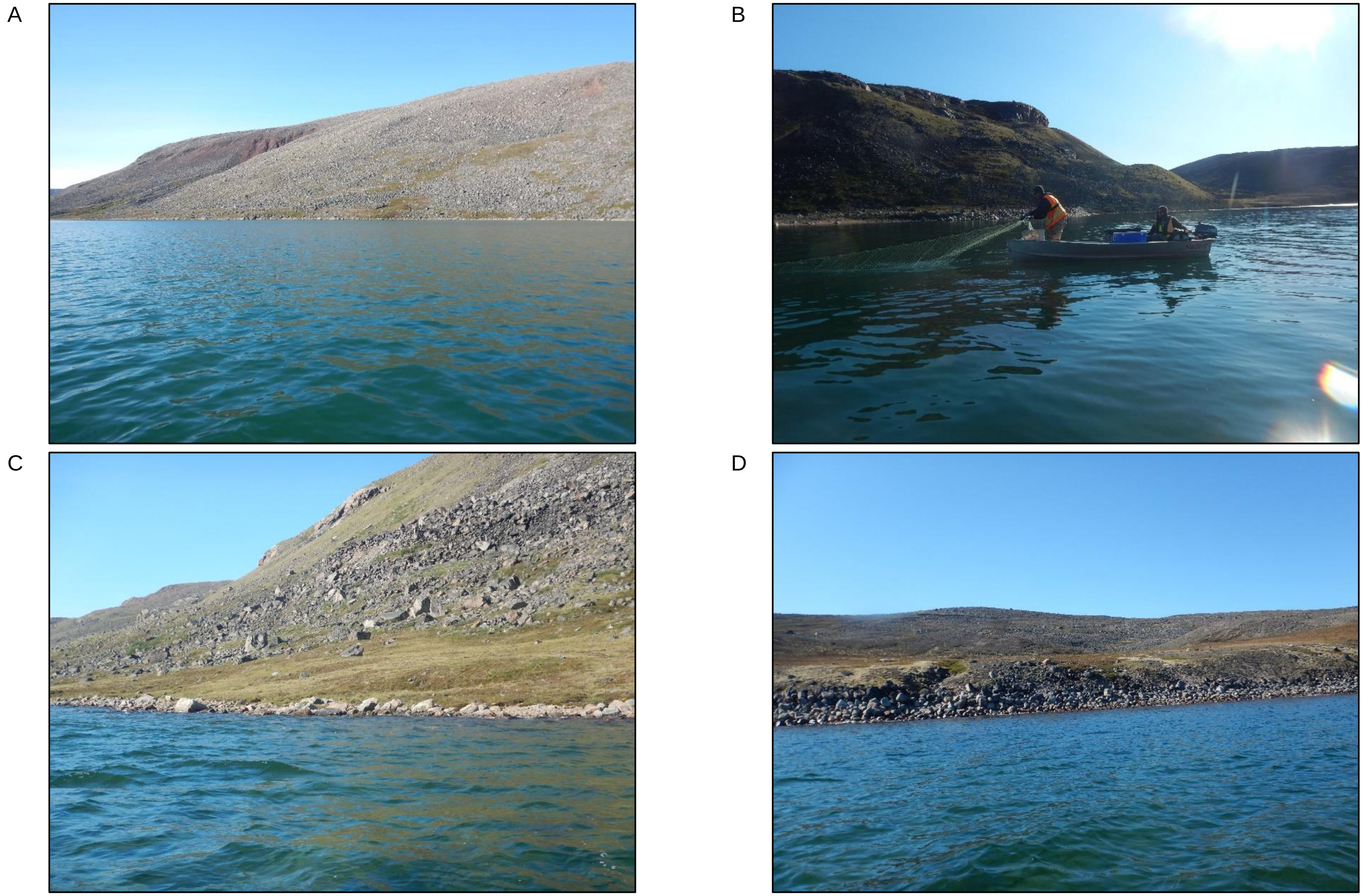
A total of 47 standard gang and 47 small mesh index gill nets were deployed in Cockburn Lake (Figures 3-5; Tables 1 and 2; Appendix 1). Nets were deployed for a short duration to minimize mortalities (durations were generally 2 hours but varied from approximately 1.5 to 3.5 hours). Gill nets were typically oriented parallel to shore to target the 2-10 m depth contours but were occasionally oriented perpendicular to shore where depth increased sharply. In instances when the nets were set perpendicular to the shoreline, the small mesh gang was set closest to shore where juvenile char abundance was expected to be greatest. Suitable depths for gillnetting sites were typically found in the narrows between basins and along the shoreline of Cockburn Lake. Four net sets were deployed and pulled each day (two by each of two crews). Nets were deployed in nearshore areas with rocky substrate when possible.

Water depth was measured using a Hawkeye® handheld depth sounder and site locations were recorded with a hand-held Garmin GPSMAP®78 Global Positioning System (GPS) unit. Information recorded at each net set included:

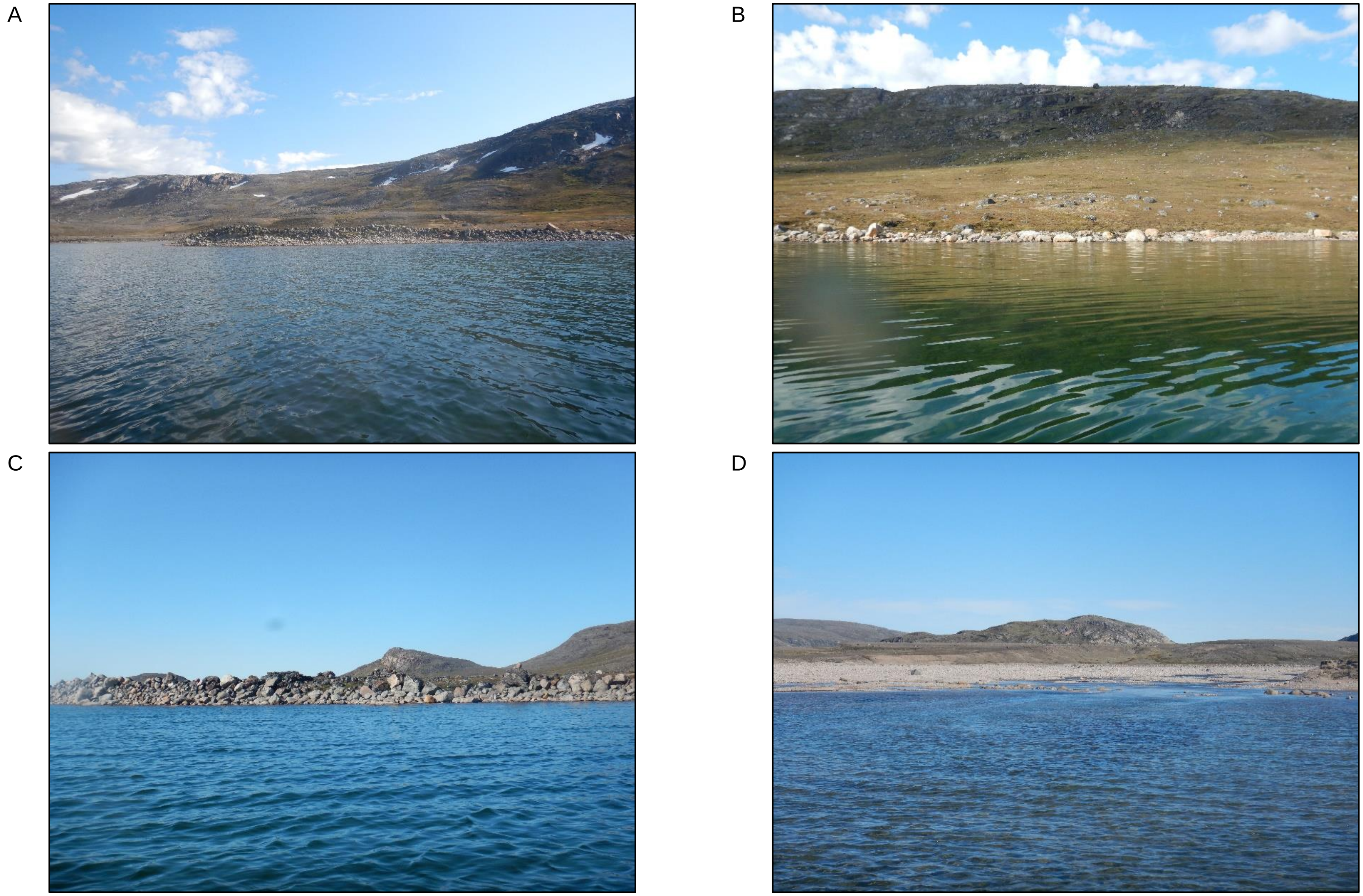
- Type of index net: standard gang (labelled as GN#) or small mesh gang (labelled as SN#);
- Date and time of net set/pull;
- Universal Transverse Mercator (UTMs) coordinates of both ends of the standard and small mesh gill nets;
- Site photos at time of sampling, including photos of shoreline type near each sampling site;
- Water depth at both ends of the nets, and where gangs were joined, to the nearest 0.1 m;
- Net configuration (i.e., end closest to shore and orientation to shore);
- Water temperature;
- Shoreline conditions (e.g., bedrock, boulder, etc.);
- Substrate description; and
- Aquatic vegetation present (none, low, medium, high).



Photograph 1. Photographs of gillnetting sites in the north basin of Cockburn Lake: (A) Site GN-05; (B) Site GN-09; (C) Site GN-08; and (D) Site GN-12.



Photograph 2. **Photographs of gillnetting sites in the middle basin of Cockburn Lake: (A) Site GN-18; (B) Site GN-19; (C) Site GN-26; and (D) Site GN-30.**



Photograph 3. Photographs of gillnetting sites in the south basin of Cockburn Lake: (A) Site GN-35; (B) Site GN-36; (C) Site GN-44; and (D) Site GN-41.

2.1.2 Fish Processing

All captured char were enumerated and assigned a unique fish ID for each net set. Fork lengths (±1 mm) and weights (to the nearest 10 g) were measured in the field. Fish were examined for external condition including parasites and deformities, erosion, lesions and tumours (DELTs) and sex/maturity was noted where feasible. Fish not retained for detailed laboratory analysis were then released live at the site of capture.

A sub-sample of Arctic Char were retained for detailed laboratory analysis including ageing, determination of sex/maturity, and stomach content analysis. Fish were opportunistically retained when gillnetting mortalities occurred or were euthanized in a Tricaine Methanesulfonate (TMS) solution (300 mg/L TMS) buffered with sodium bicarbonate (600 mg/L) followed by cervical dislocation or decapitation in accordance with the methods identified in the Ontario, Prairie and Arctic Animal Care Committee Animal Use Protocol Number OPA-ACC-2024-58. Large-bodied fish were processed in the field (i.e., sex and maturity were noted, stomachs were removed and frozen, and otoliths were removed); juvenile fish that were retained were frozen whole and processed at the NSC laboratory in Winnipeg, MB. Sex and maturity were noted (where possible) as follows:

- IMM: Immature; sex not discernible;
- F1: Immature female;
- F2: Sexually mature female;
- M6: Immature male; and
- M7: Sexually mature male.

2.1.2.1 Genetics (DNA) Sample Collection

Fin clips (pelvic fin) were collected from all char (except for two fish) and preserved in vials pre-charged with 95% biological grade ethanol for potential genetics analysis and to mark captured fish. Samples were shipped to the NSC laboratory and frozen (i.e., archived).

Table 1. Locations and set durations of standard gang gill net sites in Cockburn Lake.

Site		Pull Date	Orientation of Net (deg. from shore)	Start of Net Depth (m)	End of Net Depth (m)	Start UTMs		End UTMs		Duration (dec. hrs)
						Easting	Northing	Easting	Northing	
North Basin	GN-01	26-Jul-24	0	5.5	1.6	607047	7846169	607063	7846302	2.08
	GN-02	26-Jul-24	90	NA	32.0	606431	7845032	606494	7844932	1.93
	GN-03	26-Jul-24	45	1.9	2.2	606809	7845632	606724	7845522	3.08
	GN-04	26-Jul-24	0	NA	2.9	606126	7843994	606131	7844124	2.83
	GN-05	26-Jul-24	0	0.5	1.5	606741	7845334	606766	7845222	2.00
	GN-06	26-Jul-24	45	2.9	2.0	606296	7844886	606238	7844769	1.25
	GN-07	26-Jul-24	45	2.9	25.9	606874	7845045	606850	7844918	1.72
	GN-08	29-Jul-24	0	2.3	4.4	606436	7842981	606410	7843110	2.22
	GN-09	29-Jul-24	0	1.4	5.5	606987	7843898	606992	7843765	2.42
	GN-10	29-Jul-24	45	12	29.9	606576	7842623	606453	7842717	2.47
	GN-11	29-Jul-24	0	1.9	7.1	607029	7843466	607024	7843336	2.58
	GN-12	29-Jul-24	45	3.1	12.5	607135	7841863	607250	7841806	1.43
	GN-13	29-Jul-24	0	1.9	2.5	607579	7842323	607637	7842203	1.92
	GN-14	29-Jul-24	0	2.5	10.5	607234	7841509	607322	7841396	1.72
	GN-15	29-Jul-24	45	2.2	5.3	607527	7841593	607541	7841489	2.00
Middle Basin	GN-16	30-Jul-24	0	3.7	5.0	607933	7840798	607904	7840662	2.10
	GN-17	30-Jul-24	0	1.1	2.7	607941	7840989	607957	7840859	2.20
	GN-18	30-Jul-24	45	6.8	11.7	607651	7840479	607710	7840596	2.45
	GN-19	30-Jul-24	90	2.5	34.5	607966	7840640	607994	7840513	2.50
	GN-20	30-Jul-24	45	9.1	20.1	608561	7839885	608468	7839975	1.95
	GN-21	30-Jul-24	0	2.9	2.7	608175	7840534	608280	7840469	2.25
	GN-22	30-Jul-24	0	3.0	2.4	608557	7839695	608601	7839570	1.93
	GN-23	30-Jul-24	0	2.8	3.3	608381	7840370	608451	7840262	1.92
	GN-24	03-Aug-24	0	3.5	7.2	604501	7835995	604409	7835889	2.10
	GN-25	03-Aug-24	0	1.7	4.1	604051	7835541	603983	7835426	2.20
	GN-26	03-Aug-24	45	2.4	4.3	604351	7835789	604262	7835696	2.47
	GN-27	03-Aug-24	0	2.1	8.3	603946	7835341	603894	7835217	2.25
	GN-28	03-Aug-24	30	3.0	14.5	596305	7827606	596315	7827479	1.78
	GN-29	03-Aug-24	90	2.8	21.5	596666	7827295	596528	7827316	1.92
	GN-30	03-Aug-24	0	3.6	3.8	596218	7826975	596206	7826835	2.05
	GN-31	03-Aug-24	0	4.8	20.5	596604	7827189	596603	7827052	2.22
South Basin	GN-32	04-Aug-24	90	9.6	31	598099	7824109	598180	7824003	2.02
	GN-33	04-Aug-24	0	2.1	3.1	598175	7824463	598199	7824329	2.07
	GN-34	04-Aug-24	0	2.7	11.2	597636	7824141	597509	7824083	2.40
	GN-35	04-Aug-24	0	5.7	1.8	598228	7823823	598219	7823684	2.33
	GN-36	04-Aug-24	0	2.9	3.2	596834	7822045	596779	7821926	1.60
	GN-37	04-Aug-24	90	1.2	21.5	597823	7820670	597696	7820711	1.77
	GN-38	04-Aug-24	90	7.2	23.2	596743	7821718	596856	7821646	1.80

Table 1. - continued -

Site		Pull Date	Orientation of Net (deg. from shore)	Start of Net Depth (m)	End of Net Depth (m)	Start UTMs		End UTMs		Duration (dec. hrs)
						Easting	Northing	Easting	Northing	
South Basin	GN-39	04-Aug-24	0	3.8	7.4	597761	7820604	597635	7820569	2.00
	GN-40	05-Aug-24	90	2.3	6.6	595470	7818291	595344	7818331	2.22
	GN-41	05-Aug-24	30	6.5	11.8	597877	7818072	597963	7817957	2.08
	GN-42	05-Aug-24	0	2.0	9.8	595262	7817698	595339	7817596	2.75
	GN-43	05-Aug-24	90	8.3	9.3	598137	7817664	598043	7817760	2.28
	GN-44	05-Aug-24	0	2.6	8.9	594548	7818680	594672	7818715	2.08
	GN-45	05-Aug-24	0	2.1	7.1	597852	7817654	597789	7817770	1.97
	GN-46	05-Aug-24	45	4.4	9.0	595165	7818851	595065	7818762	2.18
	GN-47	05-Aug-24	45	6.3	24	597776	7817798	597781	7817926	2.00

Table 2. Locations and set durations of small mesh gill net sites in Cockburn Lake.

Site		Pull Date	Orientation of Net (deg. from shore)	Start of Net Depth (m)	End of Net Depth (m)	Start UTMs		End UTMs		Duration (dec. hrs)
						Easting	Northing	Easting	Northing	
North Basin	SN-01	26-Jul-24	0	1.1	1.2	607064	7846305	607065	7846334	2.12
	SN-02	26-Jul-24	90	1.2	NA	606398	7845079	606431	7845031	1.93
	SN-03	26-Jul-24	45	1.0	1.9	606833	7845668	606811	7845637	3.25
	SN-04	26-Jul-24	0	3.7	NA	606130	7843963	606126	7843994	2.83
	SN-05	26-Jul-24	0	0.8	0.5	606729	7845382	606741	7845334	2.13
	SN-06	26-Jul-24	45	2.1	2.9	606304	7844922	606296	7844886	1.25
	SN-07	26-Jul-24	45	1.1	2.9	606886	7845076	606874	7845045	1.85
	SN-08	29-Jul-24	0	2.8	2.3	606447	7842945	606436	7842981	2.22
	SN-09	29-Jul-24	0	5.5	1.4	606994	7843925	606987	7843898	2.57
	SN-10	29-Jul-24	45	2.5	12	606583	7842568	606573	7842623	2.58
	SN-11	29-Jul-24	0	1.7	1.9	607019	7843498	607029	7843466	2.75
	SN-12	29-Jul-24	45	2.0	3.1	607088	7841848	607135	7841863	1.53
	SN-13	29-Jul-24	0	1.4	1.9	607566	7842349	607579	7842323	1.90
	SN-14	29-Jul-24	0	10.5	9.6	607322	7841396	607347	7841374	1.70
	SN-15	29-Jul-24	45	1.6	2.2	607518	7841651	607527	7841593	2.15
Middle Basin	SN-16	30-Jul-24	0	2.2	3.7	607933	7840827	607933	7840798	2.12
	SN-17	30-Jul-24	0	0.9	1.1	607939	7841020	607941	7840989	2.28
	SN-18	30-Jul-24	45	3.5	6.8	607639	7840451	607651	7840479	2.47
	SN-19	30-Jul-24	90	1.2	2.5	607953	7840671	607966	7840640	2.67
	SN-20	30-Jul-24	45	2.0	9.1	608585	7839866	608561	7839885	1.95
	SN-21	30-Jul-24	0	1.9	2.9	608137	7840552	608175	7840534	2.37
	SN-22	30-Jul-24	0	2.3	3.0	608556	7839721	608557	7839695	1.92
	SN-23	30-Jul-24	0	3.3	1.3	608451	7840262	608467	7840229	1.92
	SN-24	03-Aug-24	0	7.2	1.5	604409	7835889	604391	7835864	2.05
	SN-25	03-Aug-24	0	2.2	1.7	604020	7835567	604051	7835541	2.32
	SN-26	03-Aug-24	45	1.9	2.4	604365	7835815	604351	7835789	2.43
	SN-27	03-Aug-24	0	2.0	2.1	603954	7835369	603946	7835341	2.45
	SN-28	03-Aug-24	30	2.1	3.0	596308	7827640	596305	7827606	1.83
	SN-29	03-Aug-24	90	1.1	2.8	596696	7827285	596666	7827295	2.12
	SN-30	03-Aug-24	0	3.8	2.3	596206	7826835	596210	7826806	2.07
	SN-31	03-Aug-24	0	0.8	4.8	596611	7827216	596604	7827189	2.37
South Basin	SN-32	04-Aug-24	90	0.9	9.6	598079	7824138	598099	7824109	1.97
	SN-33	04-Aug-24	0	1.7	2.1	598170	7824492	598175	7824463	2.18
	SN-34	04-Aug-24	0	11.2	7.3	597509	7824083	597483	7824072	2.37
	SN-35	04-Aug-24	0	10.3	5.7	598232	7823858	598228	7823823	2.43
	SN-36	04-Aug-24	0	3.6	2.9	596847	7822065	596834	7822045	1.62
	SN-37	04-Aug-24	90	0.5	1.2	597851	7820660	597823	7820670	1.78
	SN-38	04-Aug-24	90	2.8	7.2	596712	7821734	596743	7821718	1.87
	SN-39	04-Aug-24	0	5.8	3.8	597788	7820629	597761	7820604	2.17

Table 2. - continued -

Site		Pull Date	Orientation of Net (deg. from shore)	Start of Net Depth (m)	End of Net Depth (m)	Start UTMs		End UTMs		Duration (dec. hrs)
						Easting	Northing	Easting	Northing	
South Basin	SN-40	05-Aug-24	90	2.2	2.3	595504	7818287	595470	7818291	2.23
	SN-41	05-Aug-24	30	0.5	6.5	597863	7818114	597877	7818072	2.25
	SN-42	05-Aug-24	0	3.7	2.0	595246	7817728	595262	7817698	2.78
	SN-43	05-Aug-24	90	2.3	8.3	598152	7817643	598137	7817664	2.50
	SN-44	05-Aug-24	0	8.9	8.1	594672	7818715	594704	7818728	2.12
	SN-45	05-Aug-24	0	1.7	2.1	597866	7817623	597852	7817654	2.12
	SN-46	05-Aug-24	45	3.1	4.4	595187	7818872	595165	7818851	2.22
	SN-01	26-Jul-24	0	1.1	1.2	607064	7846305	607065	7846334	2.12

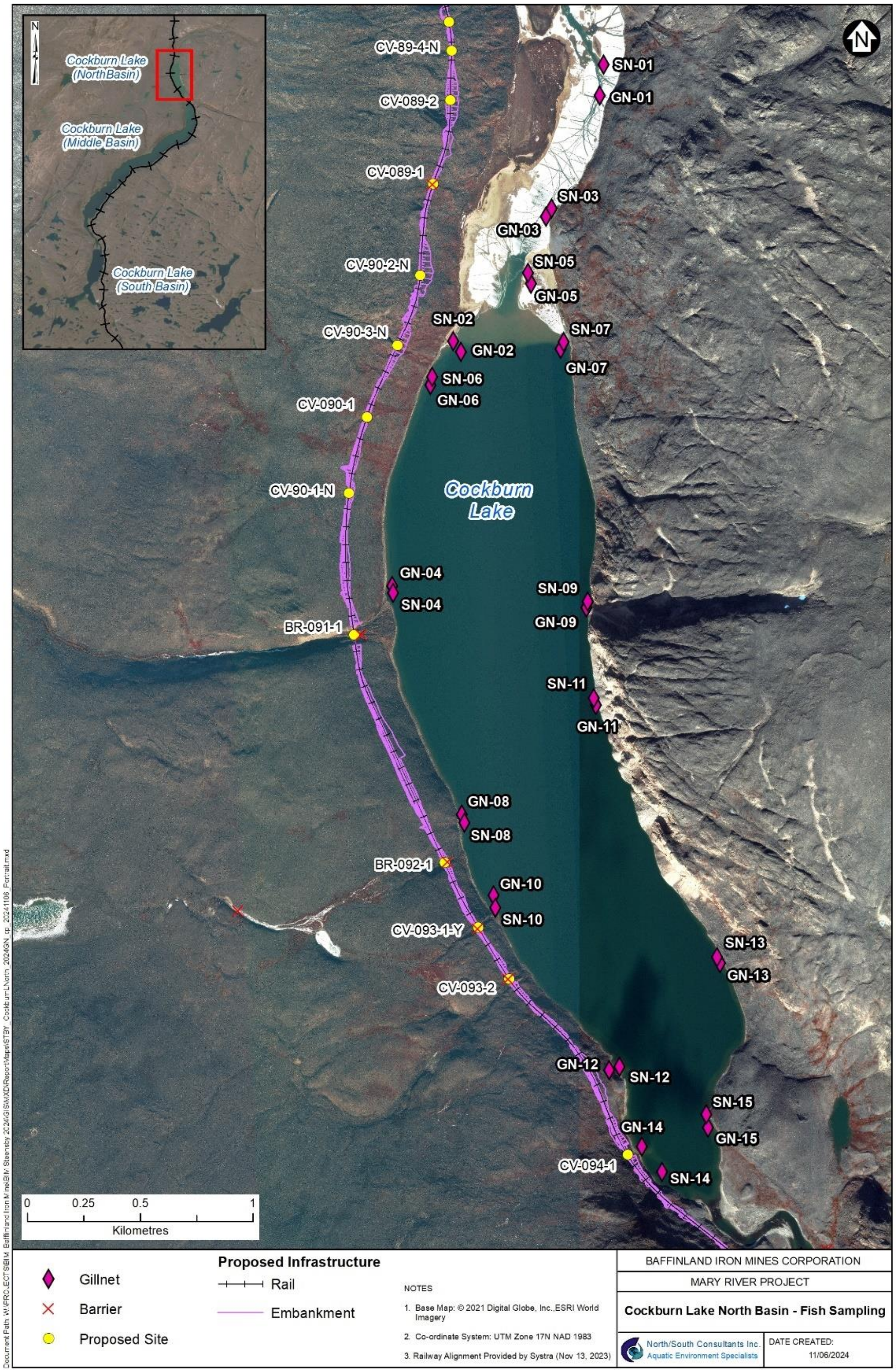


Figure 3. Gillnetting sites in Cockburn Lake: North basin.

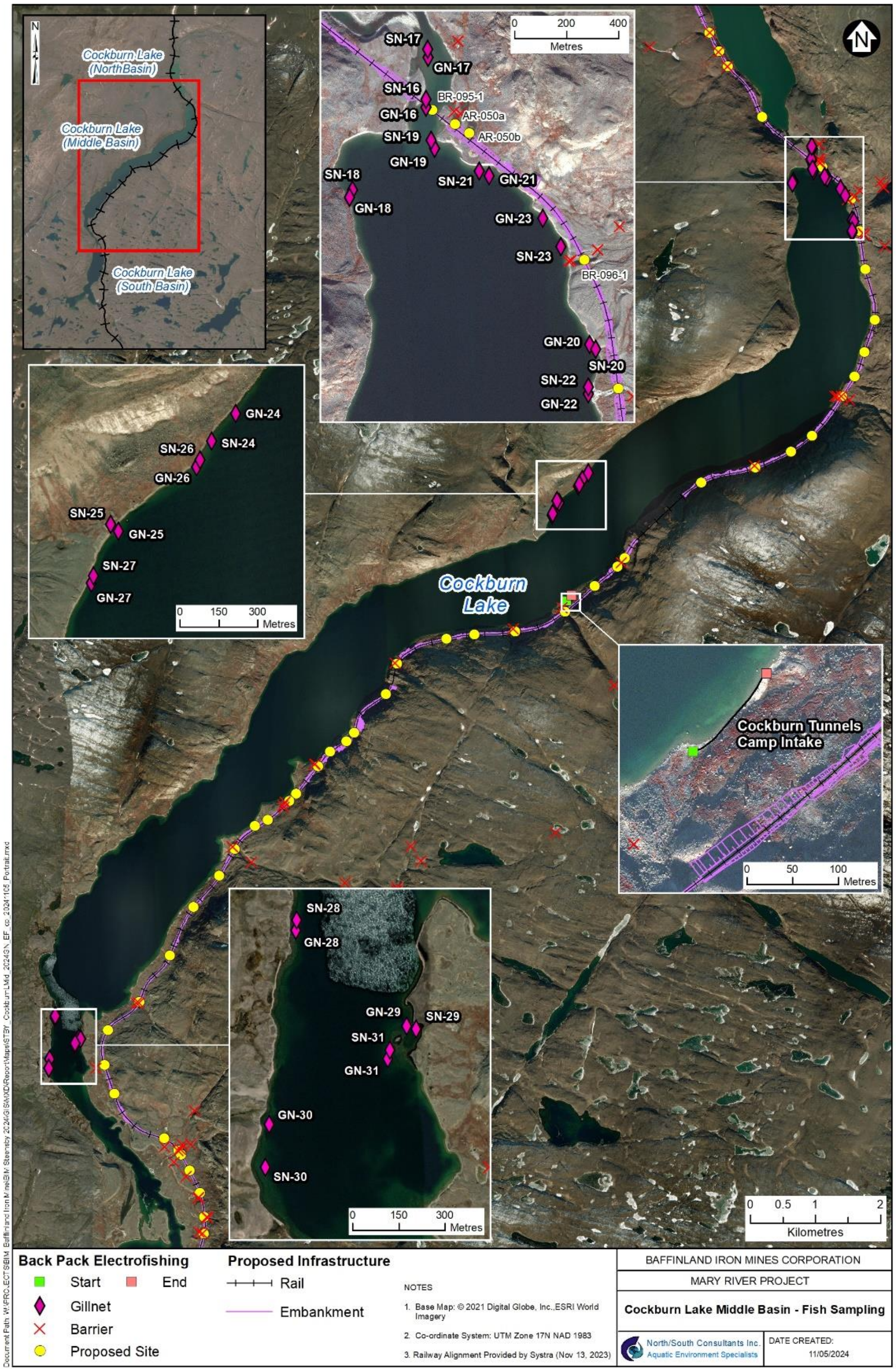


Figure 4. Gillnetting and electrofishing sites in Cockburn Lake: middle basin.

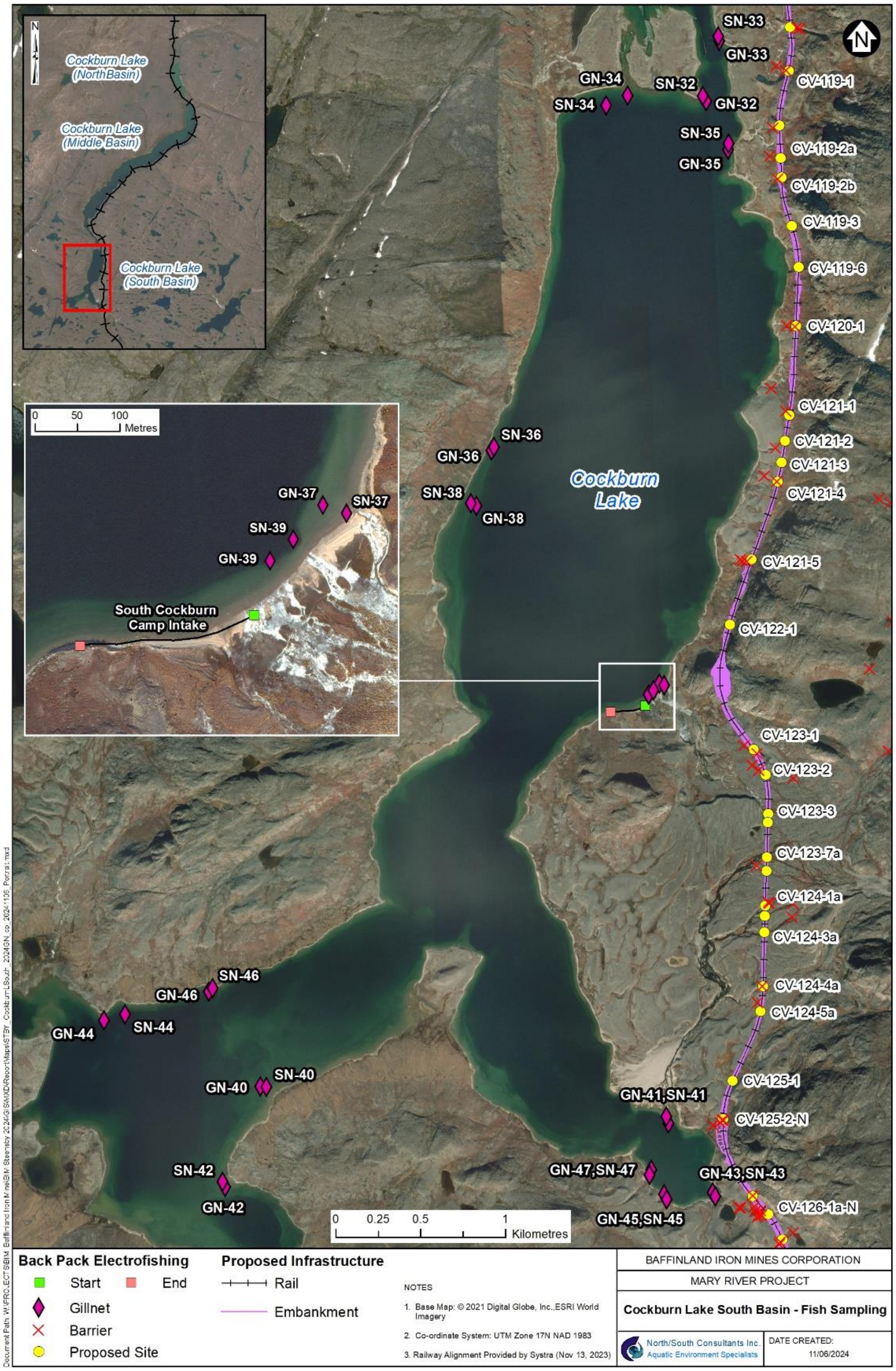


Figure 5. Gillnetting and electrofishing sites in Cockburn Lake: south basin.

2.2 LABORATORY METHODS

2.2.1 Ageing

Arctic Char otoliths were aged by thin sectioning. Otoliths were set in Cold Cure™ epoxy and allowed to harden for 48 hours, following which they were sectioned using a Struers Minitom™ low speed sectioning saw. Otolith sections were then permanently mounted on a microscope slide with Cytoseal-60™ and viewed under a Leica DM 1000 compound microscope with transmitted light.

All ageing structures were read once by an experienced ageing technician. Ten percent of the samples were analysed by a second ageing technician to verify precision of measurements as part of the quality assurance/quality control (QA/QC) program.

2.2.2 Stomach Content Analysis

Frozen stomachs were partially thawed prior to processing. Total stomach weight (±0.001 g) was recorded for all samples and the stomach was cut open and contents were removed by gentle scraping and rinsing under cold water into a 250 µm sieve, taking care that all contents from within the stomach folds were collected. Sieved contents were placed in glass petri dishes and examined under magnification. All contents were sorted to the lowest taxonomic groups possible given their state of digestion, enumerated, weighed (±0.001 g), placed separately in labeled Whirlpak bags, and refrozen. Taxonomic identification of contents was conducted using current keys and materials and the internal NSC photo library

The stomach lumen, internal lining, and exterior surface were also inspected for parasites (free or attached) and embedded cysts. All parasites were sorted, identified to the lowest taxonomic level possible using relevant keys, and enumerated. Cysts on the outside of the stomach were identified and grouped into four infection categories: None; Light (1-19 cysts); Moderate (20-100 cysts); and, Heavy (>100 cysts). Sub-samples of parasites were preserved in 70% ethanol. Digital camera-equipped microscopes were used to create photographic libraries of each diet and parasite taxon to assist with identifications.

2.3 DATA ANALYSIS

Gillnetting catches were tabulated by sampling location and set type. For fish captured in standard gang index gill nets, CPUE was expressed as the number of fish captured in a 100 m net set for 24 hours using the formula:

$$CPUE = C / E \times 24\ h / L \times 100\ m$$

where:

C = catch (number of individuals of a species or the total number of fish caught);

E = effort (hours); and

L = length of the gillnet gang.

For fish captured in small mesh index gill nets, CPUE was expressed as the number of fish captured in a 30 m net set for 24 hours using the formula:

$$CPUE = C / E \times 24\ h / L \times 30\ m$$

CPUE was calculated for standard gang and small mesh index gill nets separately for each site and summary statistics were derived for each lake basin and the lake as a whole.

Summary statistics (mean, median, standard deviation [SD], standard error [SE], minimum (min), maximum (max), and sample size [n]) were calculated for length, weight, condition factor (K), and age of Arctic Char for standard gang and small mesh index gill nets. Summary statistics (fork length, weight, condition factor, and age) were also calculated for males and females. Condition factor was calculated (after Fulton 1911 in Ricker 1975) for individual fish using the following equation:

$$K = W \times 10^5 / L^3$$

where: W = round weight (g); and

L = fork length (mm).

Length-weight, age-length, and age-weight relationships were assessed using regression analysis. Length-frequency distributions were plotted using length intervals of 25 mm (e.g., 176-200 mm) for standard gang and small mesh index gill nets separately and combined. Age frequency distributions were also plotted for standard gang and small mesh index gill nets separately and combined.

The ageing QA/QC results were compared using Relative Percent Mean Difference (RPMD) calculated as follows:

$$RPMD = (Value\ 1 – Value\ 2)/((Value\ 1 + Value\ 2)/2) \times 100$$

Fish stomach content analysis results were presented as the frequency of occurrence (percentage of stomachs with each prey taxon), relative frequency (percentage of each prey taxon relative to the total number of prey items), and relative percentage of biomass (percentage of each taxon's wet weight relative to the total wet weight of all diet items) of diet items. Prevalence (% of stomachs with parasites) and mean intensity (number of parasites per infected stomach) were calculated for each parasite species.

3.0 RESULTS

A total of 113 and 79 Arctic Char were captured in standard gang and small mesh index gill nets, respectively (Appendix 1). Total fishing effort (47 net sets) was approximately 100 hours for both standard gang and small mesh gill nets (Tables 2 and 3). Fish ageing QA/QC results are presented in Appendix 1; ages were identical for all but one fish which varied by one year.

3.1 CATCH-PER-UNIT-EFFORT

Mean±SD CPUE was 19.96±32.91 fish/100 m/24 hours for standard gang index gill nets (Table 3) and 18.36±18.35 fish/30 m/24 hours for small mesh index gill net gangs (Table 4). CPUE was lowest in the middle basin for both gear types.

Table 3. Catch and CPUE of Arctic Char from standard gang index gillnetting.

Locations	Standard Index Gill Net Gang							
	Total Fish Captured	Number of Net Sets	Total Effort (decimal hours)	CPUE (#fish/100 m/24/hours)				
				Mean	SD	SE	Min	Max
All sites	113	47	99.49	19.96	32.91	4.80	0.00	181.01
North Basin	62	15	31.65	35.34	49.97	12.90	0.00	181.01
Middle Basin	13	16	34.29	6.35	9.21	2.30	0.00	34.93
South Basin	38	16	33.55	19.15	21.70	5.42	0.00	84.27

Notes:

1 Excludes 1 char (Fish #96) recaptured in GN-21.

Table 4. Catch and CPUE of Arctic Char from small mesh index gillnetting.

Locations	Small Mesh Index Gill Net Gang							
	Total Fish Captured	Number of Net Sets	Total Effort (decimal hours)	CPUE (#fish/30 m/24 hours)				
				Mean	SD	SE	Min	Max
All sites	79	47	102.84	18.36	18.35	2.68	0.00	79.25
North Basin	22	15	32.76	16.85	16.65	4.30	0.00	57.60
Middle Basin	19	16	35.34	12.32	14.43	3.61	0.00	44.94
South Basin	38	16	34.74	25.83	21.56	5.39	0.00	79.25

3.2 SIZE, AGE, AND CONDITION

Fork length ranged from 82-794 mm, weights ranged from 2-5480 g, and condition factor ranged from 0.226-1.572 (two outliers excluded) for the 192 Arctic Char captured in the gillnetting program. Of the 42 fish captured in gill nets that were aged, the ages ranged from 3-20 years.

Fork lengths ranged from 200-794 mm (mean = 378.9 mm), weights ranged from 700-5480 g (mean = 723.7 g; one outlier excluded), and condition factor ranged from 0.267-1.401 (mean = 0.958; one outlier excluded) for char captured in standard gang index gill nets (Tables 5 and 6).

Fork lengths ranged from 82-558 mm (mean = 236 mm), weights ranged from 2-1580 g (mean = 247.2 mm; one outlier excluded), and condition factor ranged from 0.226-1.572 (mean = 0.964 mm; one outlier excluded) for char captured in small mesh gang gill nets (Tables 7 and 8).

There was a strong linear relationship (R^2 = 0.974; p <0.0001) between fork length and weight of char and between fish age and fork length (R^2 = 0.868; p <0.0001) and weight (R^2 = 0.827; p <0.0001; Figure 6). Length- and age-frequency distributions are presented in Figures 7 and 8, respectively. Modal length frequencies from standard gang and small mesh index gill nets were 251-300 mm and 76-125 mm, respectively. The age frequency distribution for char captured in standard gang index gill nets was bimodal (8 and 17 years). There was no clear pattern evident in age frequencies for char captured in small mesh index gill nets, likely due to the limited sample size, though the most frequently captured ages were 3 and 6 years.

Of the fish where sex and maturity was determined through internal examination, a total of 21 females and 14 males were captured in gill nets (Table 9). Fork length, weight, and age were higher for male char but condition factor was very similar between the sexes; the slope and intercept of the regression line between fork length and weight for males and females was similar (Figure 9).

DELTs were observed on three char as follows:

- Fish #181 captured in the south basin of Cockburn Lake had a stunted right pelvic fin (Photograph 4);
- Fish #27 captured in the north basin of Cockburn Lake had external lesions (Photograph 5); and
- Fish #46 captured in the north basin of Cockburn Lake had a swollen left eye (Photograph 6).

In addition, an external parasite (*Salmincola* sp.) was present on the body of Fish #148 captured in the south basin of Cockburn Lake (Photograph 7). This parasite normally infects the gills of char but can spread to the body and fins if infection intensities are high in the gills (i.e., limited space for attachment of new parasites).

Table 5. Summary statistics for Arctic Char fork length, weight, condition factor, and age: Standard gang index gill nets.

Metric	Standard Index Gill Net Gang						
	Mean	Median	SD	SE	Min	Max	n
Fork Length (mm)	378.9	342.0	123.0	11.6	200.0	794.0	113
Weight (g)	719.0	370.0	786.6	74.0	70.0	5480.0	113
Condition Factor	0.971	0.931	0.215	0.020	0.267	2.375	113
Age (years)	12.6	13.0	4.0	0.8	7.0	18.0	27

Table 6. Summary statistics for Arctic Char fork length, weight, condition factor, and age: Standard gang index gill nets with one outlier removed.

Metric	Standard Index Gill Net Gang						
	Mean	Median	SD	SE	Min	Max	n
Fork Length (mm)	378.9	342.0	123.0	11.6	200.0	794.0	113
Weight (g)	723.7	380.0	788.5	74.5	70.0	5480.0	112
Condition Factor	0.958	0.931	0.170	0.016	0.267	1.401	112
Age (years)	12.6	13.0	4.0	0.8	7.0	18.0	27

Notes:

1. Fish #38 (GN-02) weight excluded

Table 7. Summary statistics for Arctic Char fork length, weight, condition factor, and age: Small mesh index gill nets.

Metric	Small Mesh Index Gill Net Gang						
	Mean	Median	SD	SE	Min	Max	n
Fork Length (mm)	236.0	235.0	119.6	13.5	82.0	558.0	79
Weight (g)	244.4	140.0	335.5	38.5	2.0	1580.0	76
Condition Factor	0.977	0.928	0.260	0.030	0.226	1.973	76
Age (years)	7.2	6.0	4.8	1.3	3.0	20.0	15

Table 8. Summary statistics for Arctic Char fork length, weight, condition factor, and age: Small mesh index gill nets with one outlier removed.

Metric	Small Mesh Index Gill Net Gang						
	Mean	Median	SD	SE	Min	Max	n
Fork Length (mm)	236.0	235.0	119.6	13.5	82.0	558.0	79
Weight (g)	247.2	140.0	336.8	38.9	2.0	1580.0	75
Condition Factor	0.964	0.925	0.234	0.027	0.226	1.572	75
Age (years)	7.2	6.0	4.8	1.3	3.0	20.0	15

Notes:

1. Fish #110 (SN-18) weight excluded

Table 9. Summary statistics for Arctic Char fork length, weight, condition factor, and age: (A) females; and (B) males.

(A)

Metric	Females						
	Mean	Median	SD	SE	Min	Max	n
Fork Length (mm)	341.4	296.0	126.4	27.6	155	635	21
Weight (g)	561.0	240.0	655.9	143.1	30	2350	21
Condition Factor	0.961	0.931	0.153	0.033	0.639	1.343	21
Age (years)	11.0	11.0	4.1	0.9	5	18	21

(B)

Metric	Males						
	Mean	Median	SD	SE	Min	Max	n
Fork Length (mm)	440.9	460.0	169.2	45.2	180	794	14
Weight (g)	1257.9	945.0	1469.6	392.8	50	5480	14
Condition Factor	0.969	0.942	0.153	0.041	0.700	1.375	14
Age (years)	13.9	15.0	4.2	1.2	6	20	13

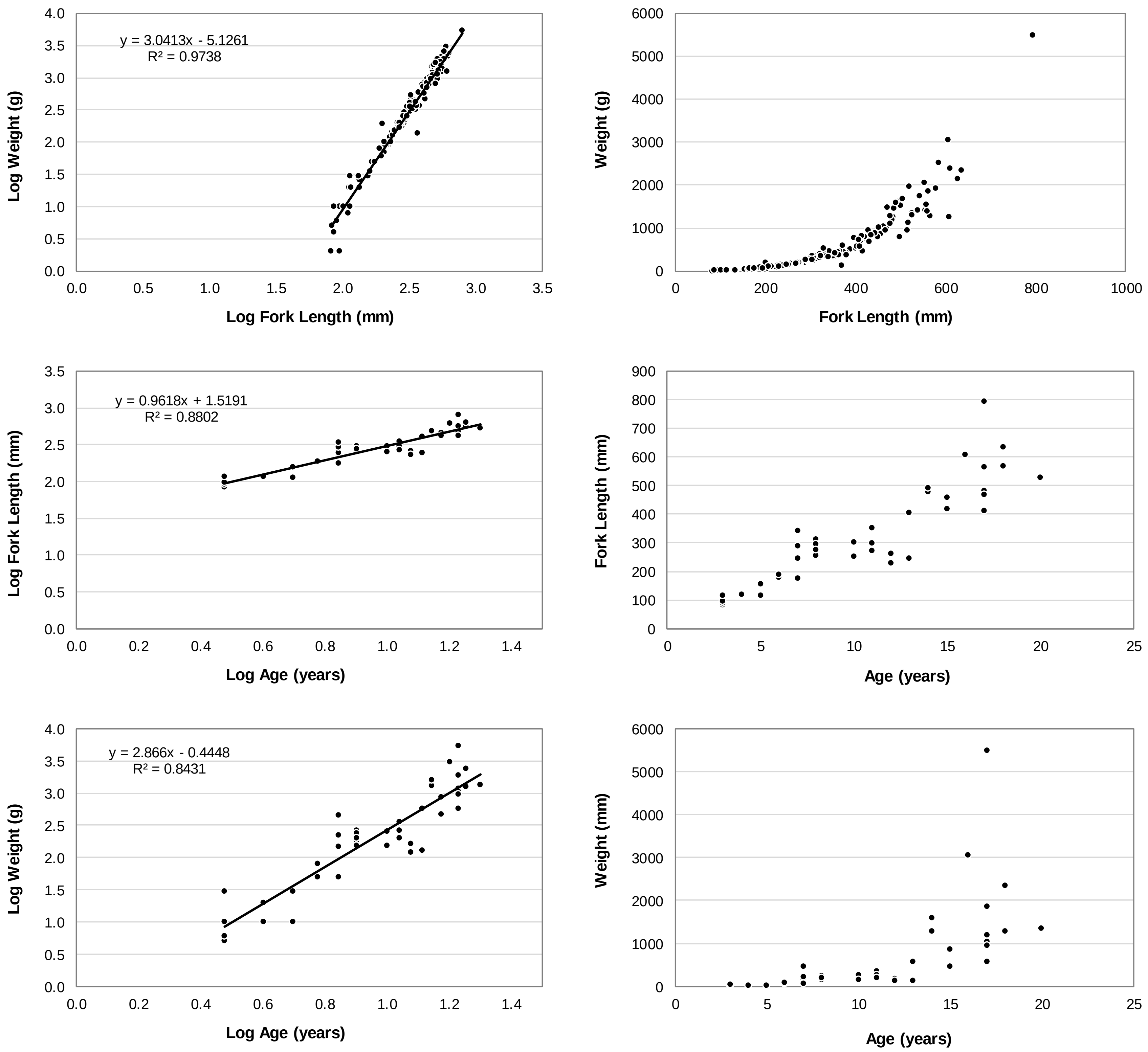


Figure 6. Linear regressions between fork length and weight (upper), age and fork length (middle), and age and weight (lower).

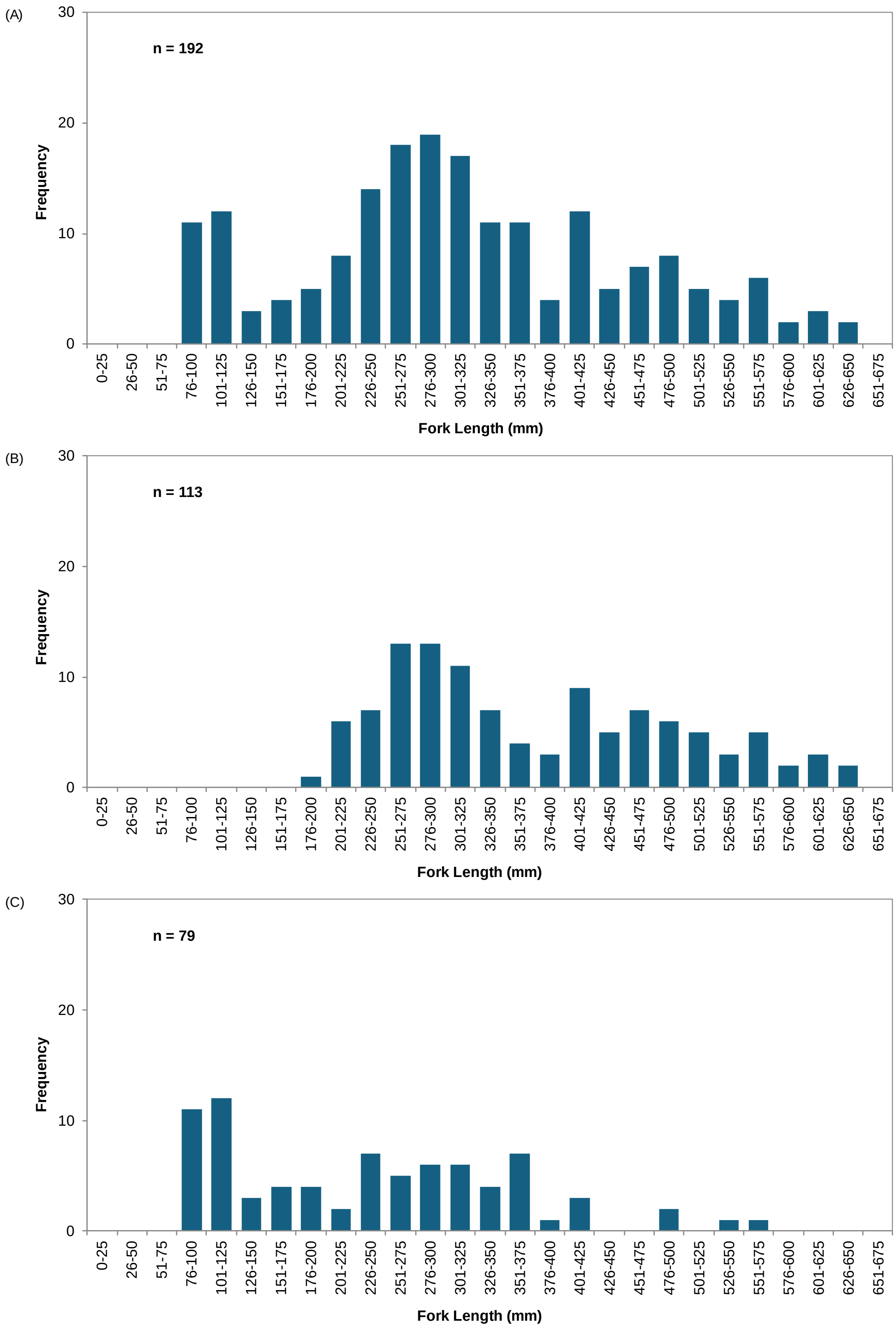


Figure 7. Length-frequency distributions for Arctic Char captured in gill nets set in Cockburn Lake: (A) standard gang and small mesh index gill nets combined; (B) standard gang index gill nets; and (C) small mesh index gill nets.

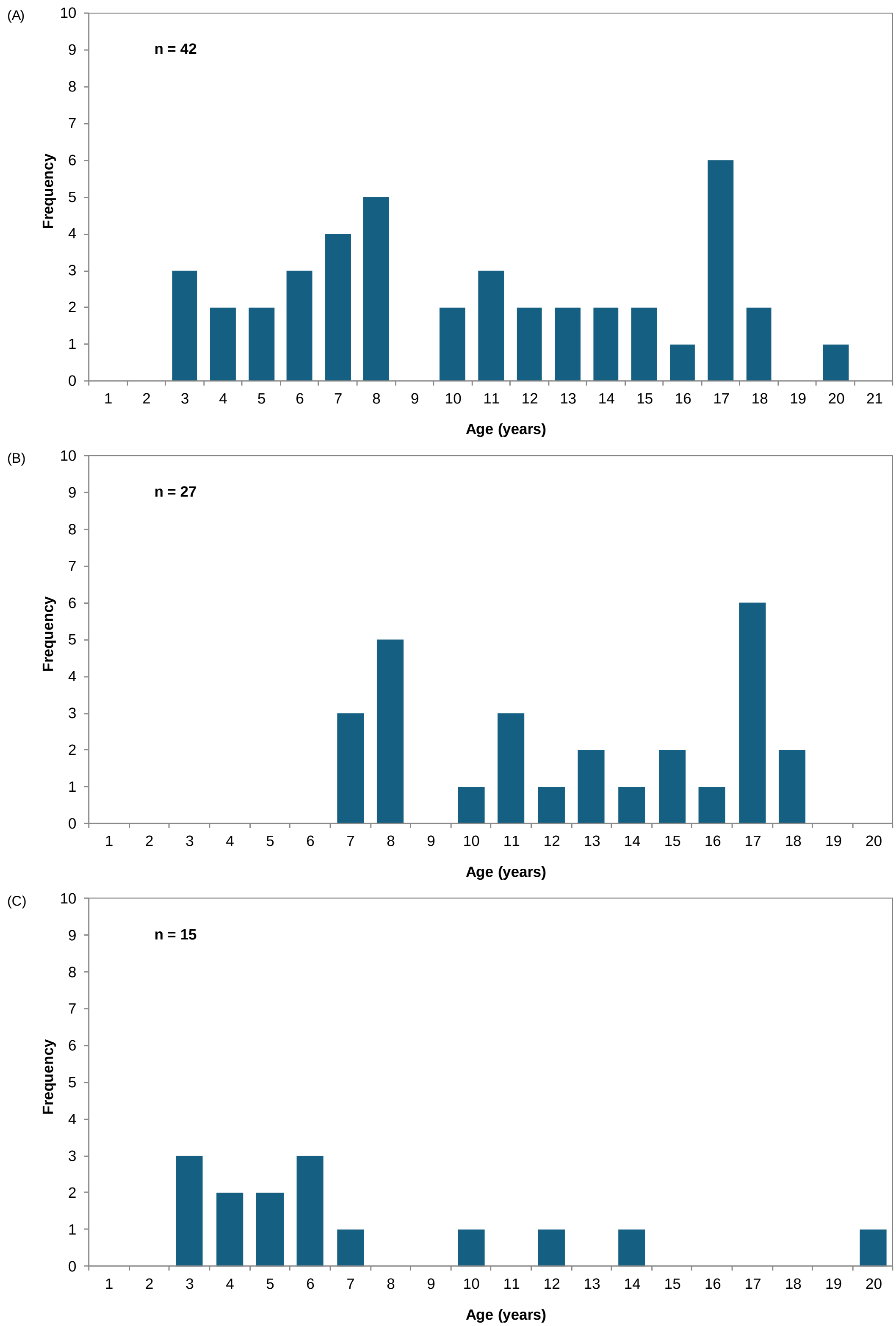


Figure 8. Age-frequency distributions for Arctic Char captured in gill nets set in Cockburn Lake: (A) Standard gang and small mesh index gill nets combined; (B) standard gang index gill nets; and (C) small mesh index gill nets.

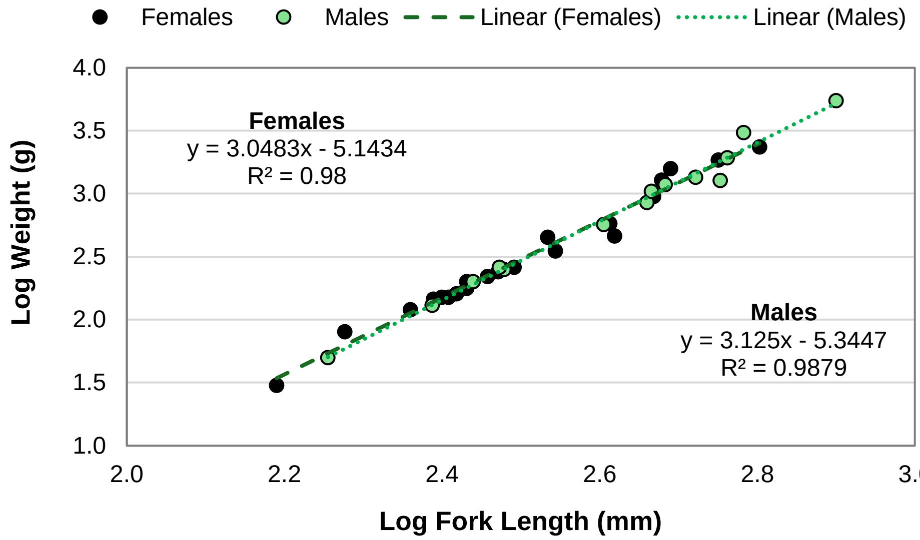


Figure 9. **Linear regression between fork length and weight of female and male Arctic Char captured in gill nets.**

Photograph 4. **Stunted right pelvic fin on Fish #181 captured in the south basin of Cockburn Lake.**

Photograph 5. Lesions on body of char #27 captured in the north basin of Cockburn Lake.

Photograph 6. Swollen left eye on char #46 captured in the north basin of Cockburn Lake.

Photograph 7. External parasite, *Salmincola* sp., on body of char #148 captured in the south basin of Cockburn Lake.

3.3 DIET

There was a single empty stomach among the 43 char stomach samples examined. Thirty prey taxa were identified from the remaining 42 stomachs (Table 10). Insecta was the most diverse group observed in char stomachs, comprising two-thirds of the total prey types. Chironomidae (mostly in the pupal stage) was the dominant prey taxon, with a frequency of occurrence of 97.7%, a relative frequency of 90.6%, and a relative percentage of biomass of 56.2% (Table 10; Figure 10). Only four other taxa were found in at least 10% of stomachs: Limnephilidae (23.3%), Tipulidae (14.0%), Ephemeroptera (11.6%), and *Cyclops* sp. (11.6%). Most of the diet taxa were found in very low abundances; *Cyclops* sp. (8.6%) was the only other taxon that comprised more than 0.5% of the total number of observed diet items. Fish (confirmed or probable Arctic Char) were found in only three stomachs but accounted for 35.9% of the biomass. Perlodidae (4.1%) was the only other taxon to represent more than 1% of the total biomass. Detailed results are provided in Appendix 1.

Table 10. Summary statistics for diet of Arctic Char captured in Cockburn Lake.

Diet Taxon	Number observed	Frequency of Occurrence (%)	Relative Frequency (%)	Total wet weight (g)	Relative Percent of Biomass (%)
Insecta	2	4.7	0.01	0.832	0.993
Coleoptera	2	4.7	0.01	0.028	0.033
Carabidae	5	9.3	0.03	0.244	0.291
Diptera	2	4.7	0.01	0.024	0.029
Chironomidae	17339	97.7	90.6	47.1	56.2
Empididae	1	2.3	0.01	0.008	0.010
Ephydridae	2	2.3	0.01	0.030	0.036
Muscidae	1	2.3	0.01	0.027	0.032
Simuliidae	1	2.3	0.01	0.006	0.007
Tipulidae	11	14.0	0.06	0.253	0.302
Ephemeroptera	8	11.6	0.04	0.041	0.049
Hemiptera					
Corixidae	1	2.3	0.01	0.020	0.024
Aphididae	2	4.7	0.01	0.002	0.002
Hymenoptera	5	7.0	0.03	0.041	0.049
Tenthredinidae	1	2.3	0.01	0.036	0.043
Lepidoptera	3	7.0	0.02	0.398	0.475
Plecoptera	1	2.3	0.01	0.068	0.081
Perlodidae	37	9.3	0.19	3.437	4.103
Capniidae	1	2.3	0.01	0.039	0.047
Trichoptera					
Limnephilidae	41	23.3	0.21	0.622	0.742
Branchiopoda					
Daphniidae					
Daphnia sp.	5	4.7	0.03	0.001	0.001
Copepoda					
Cyclopoida					
Cyclopidae	2	2.3	0.01	<0.001	N/A
Cyclops sp.	1645	11.6	8.59	0.274	0.327
Cyclops scutifer	1	2.3	0.01	<0.001	N/A
Harpacticoida					
Canthocamptidae	1	2.3	0.01	<0.001	N/A
Ostracoda	1	2.3	0.01	0.001	0.001
Arachnida					
Acari					
Hygrobatoidea	14	16.3	0.07	0.030	0.036
Araneae					
Lycosidae					
Pardosa glacialis	2	2.3	0.01	0.178	0.212
Teleostei	1	2.3	0.01	6.037	7.206
Salmoniformes					
Salmonidae					
Salvelinus alpinus	4	4.7	0.02	24.002	28.651

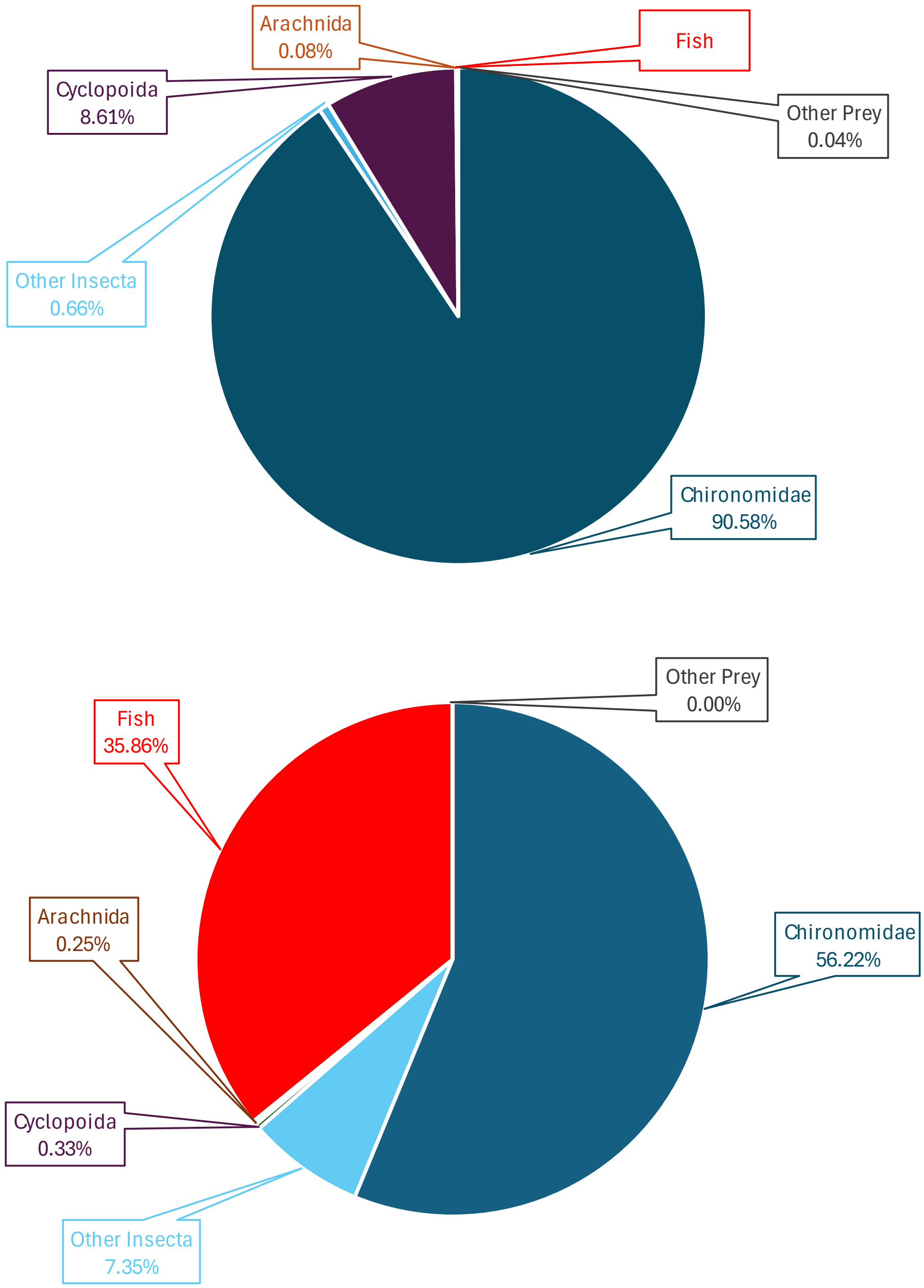


Figure 10. The relative frequency (top) and relative biomass (bottom) of prey categories identified from Arctic Char stomachs.

3.4 PARASITES

A total of 37 of the 43 stomach samples examined had at least one internal parasite (Appendix 1). Five taxa (one nematode, three cestodes, and one trematode) were identified (Table 11). Tapeworms of the genus *Dibothriocephalus* sp. (plerocercoid life stage either recently released from digested diet items or released from stomach cysts as the stomach was opened for processing) were the most common parasite in char stomachs with a prevalence of 86.0% and a mean intensity of 55.5 parasites per infected stomach.

Brachyphallus crenatus, which was found in a single sexually mature female from the south basin of Cockburn Lake (Fish #163; fork length = 635 mm; weight = 2350 g; age = 18 years), is a marine trematode that uses marine calanoid copepods as an intermediate host. Fish can become infected with this parasite by consuming the marine copepod hosts or potentially from eating another fish that has already been infected. The presence of this marine parasite in a char stomach from Cockburn Lake provides evidence that the host fish had either been to the ocean in recent months (precise longevity of the parasite is not known) or consumed another char that had returned from the ocean with this parasite. Both scenarios suggest that Cockburn Lake supports anadromous Arctic Char. All other parasites observed in char are of freshwater origin.

In addition to *Dibothriocephalus* sp. plerocercoids in the stomach, there were others encysted on the outside of the stomach. Cyst counts ranged from zero (37.2% of stomachs) to heavy infections (34.9%) of several hundred cysts in multiple layers that completely coated the stomach surface (Table 12). Cyst counts generally increased with size of char with cyst-free stomachs in char with a mean fork length of 267 mm and heavy infections common in char that were, on average, 407 mm. *Dibothriocephalus* sp. cysts can persist for long periods of time and bioaccumulate in larger fish, especially those that prey on smaller infected fish.

Of the parasites observed in Cockburn Lake char, two taxa are also known to infect Ninespine Stickleback: *Dibothriocephalus* sp.; and *Proteocephalus longicollis*. However, *Dibothriocephalus* sp. do not mature in Arctic Char; the definitive or final hosts for this parasite are fish-eating mammals. Therefore, translocation of char from Cockburn to KP85 Lake would not result in infection of stickleback with this parasite.

In contrast, *P. longicollis*, which is found as adults in char, could infect stickleback where suitable intermediate hosts are present. The common intermediate hosts for *P. longicollis* are cyclopoid copepods, which have been observed in the diet of stickleback from KP85 Lake (NSC 2025c).

Table 11. Summary statistics for Cockburn Lake Arctic Char stomach parasites.

Taxon	Prevalence (%)	Mean Intensity
Nematoda	14.0	1.8
Cestoda		
Diphyllobothriidae		
Dibothriocephalus sp.	86.0	55.5
Proteocephalidae		
Proteocephalus longicollis	7.0	13.7
Triaenophoridae		
Eubothrium salvelini	18.6	2.3
Trematoda		
Hemiuridae		
Brachyphallus crenatus	2.3	1.0
All Parasites	86.0	57.4

Table 12. Summary statistics for cysts of *Dibothriocephalus* sp. observed on the outer surface of Cockburn Lake Arctic Char stomachs.

Cyst Intensity Category	Number of Stomachs	Prevalence (%)	Mean Fish Fork Length (mm)
None	16	37.2	266.6
Light (1-19)	6	14.0	278.7
Moderate (20-100)	6	14.0	382.8
Heavy (>100)	15	34.9	407.4

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