Mary River Project 2023
Core Receiving Environment Monitoring Program Report

Part 3 of 3
(Appendices F to I)

Prepared for:
Baffinland Iron Mines Corporation
Oakville, Ontario

Prepared by:
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Georgetown, Ontario

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APPENDIX F

FIGURES

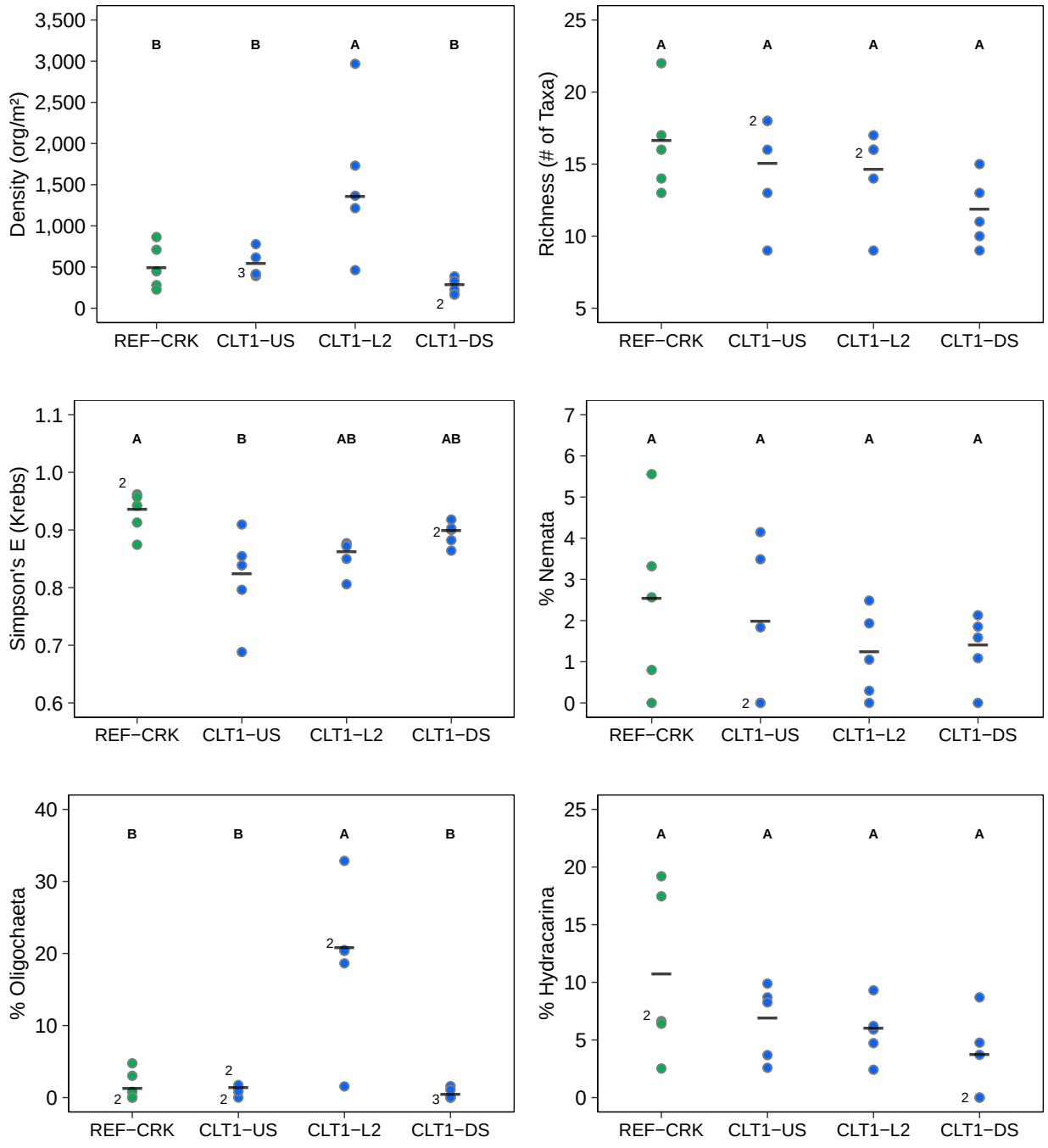
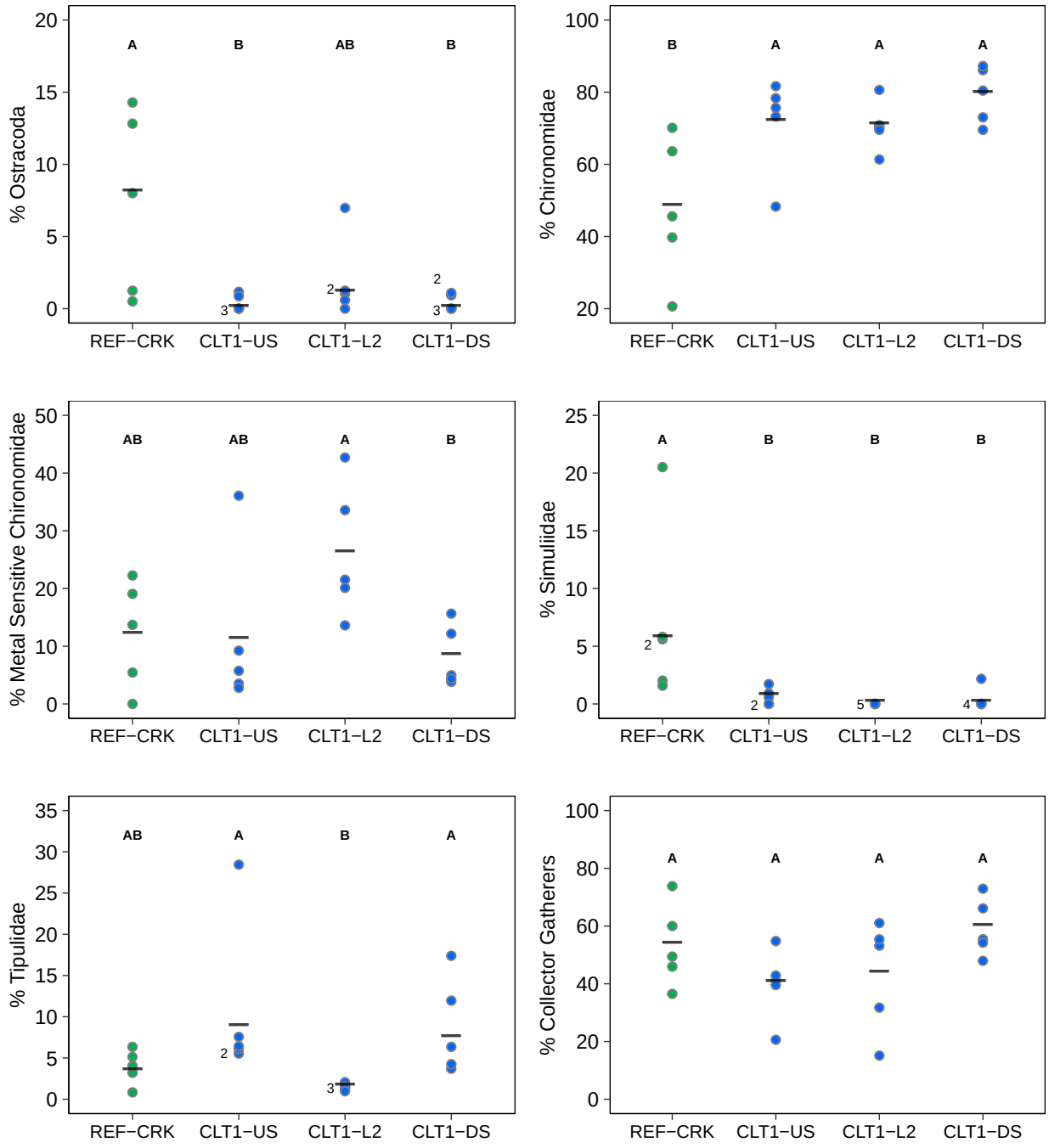


Figure F.1: Benthic Invertebrate Community Endpoints at Camp Lake Tributary 1 (CLT1) and Unnamed Reference Creek (REF−CRK) Areas, Mary River Project CREMP, August 2023

Notes: Green represents reference areas and blue represents mine−exposed areas. Areas that share a letter do not significantly differ (p−value < 0.1). Bars indicate measures of central tendency. Numbers indicate the number of overlapping points.



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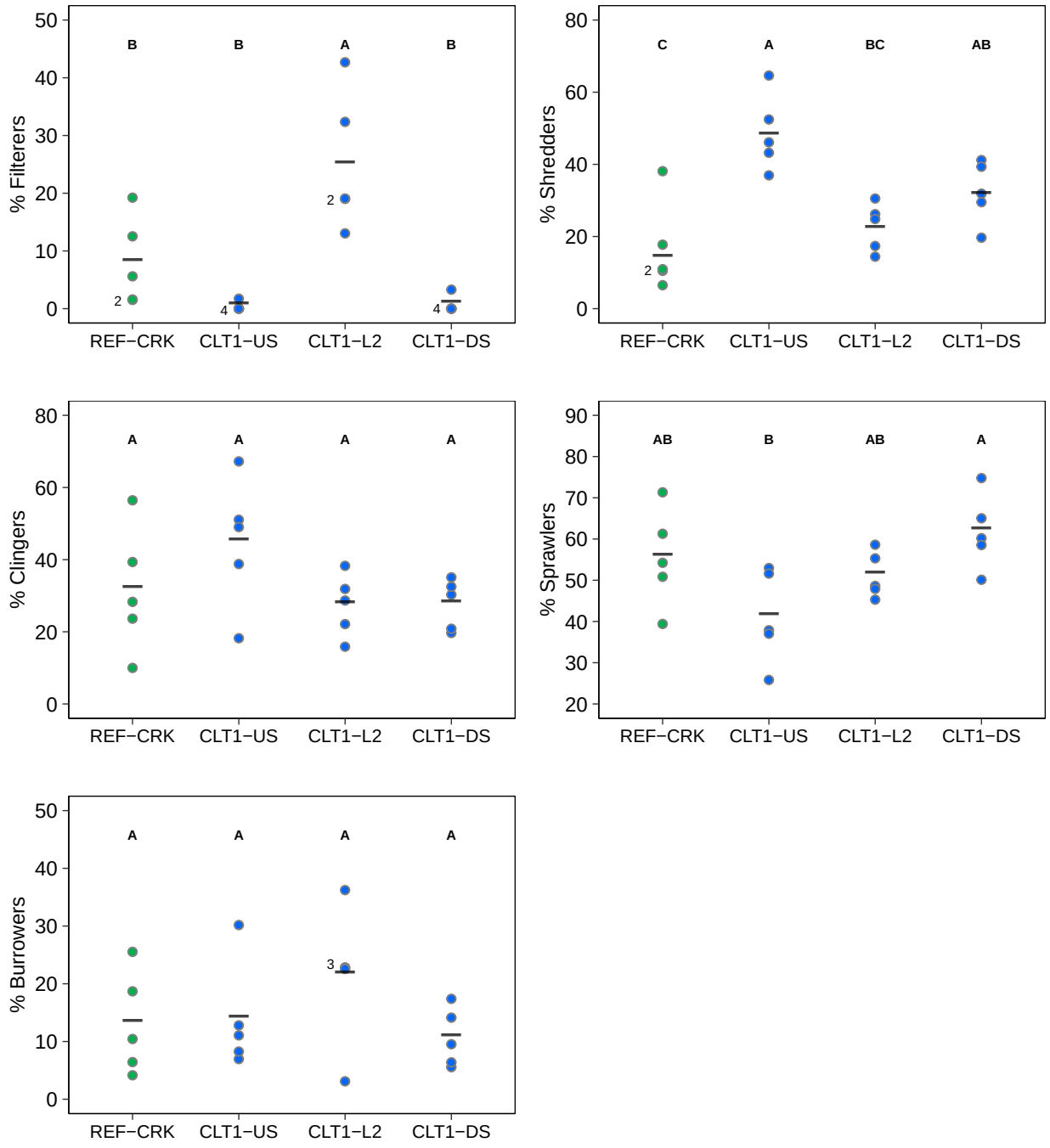

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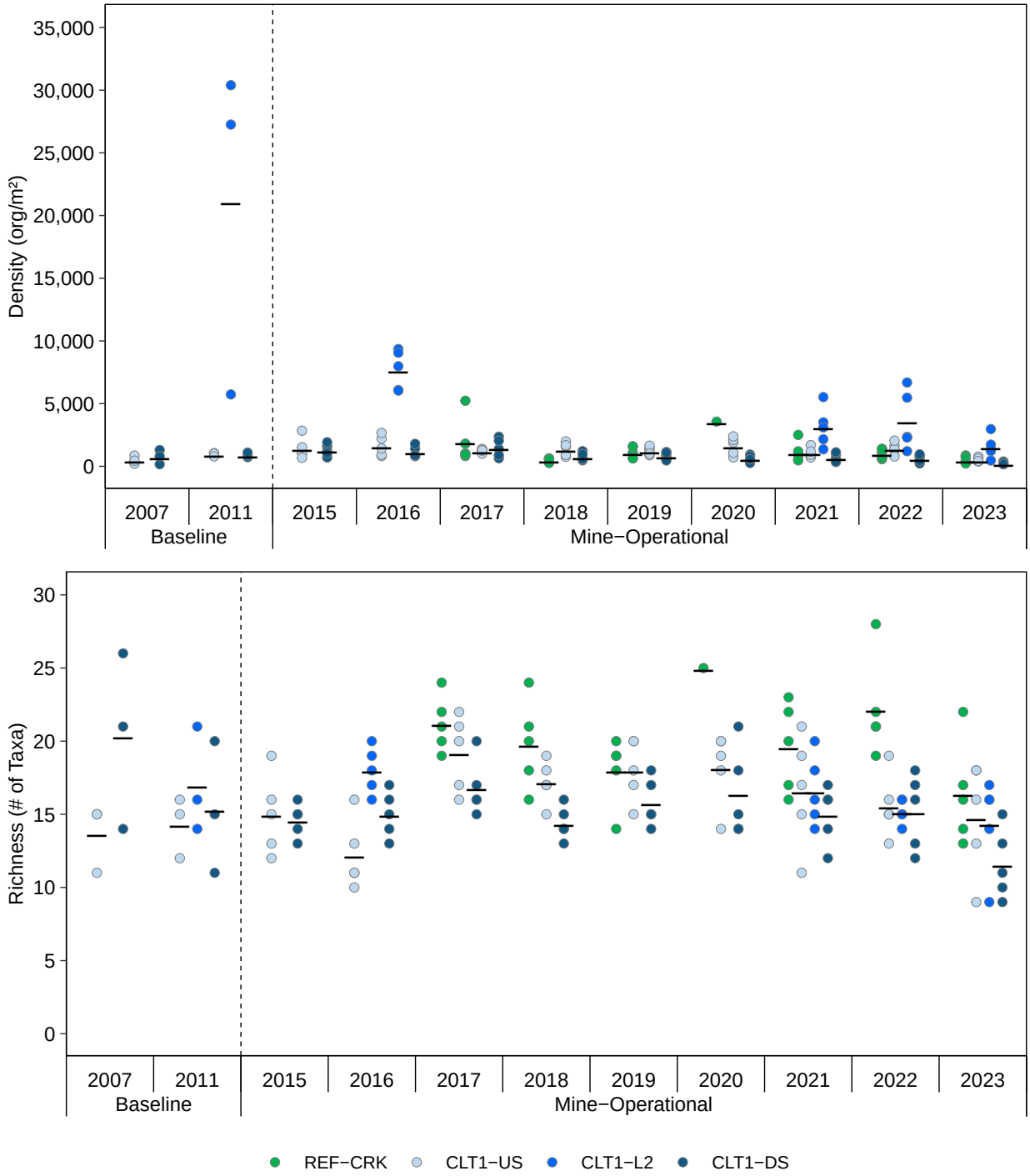

Figure F.2: Benthic Invertebrate Community Endpoints at Camp Lake Tributary 1 (CLT1) and Unnamed Reference Creek (REF−CRK) Areas among Mine Baseline (2007) and Operational (2015 to 2023) Periods

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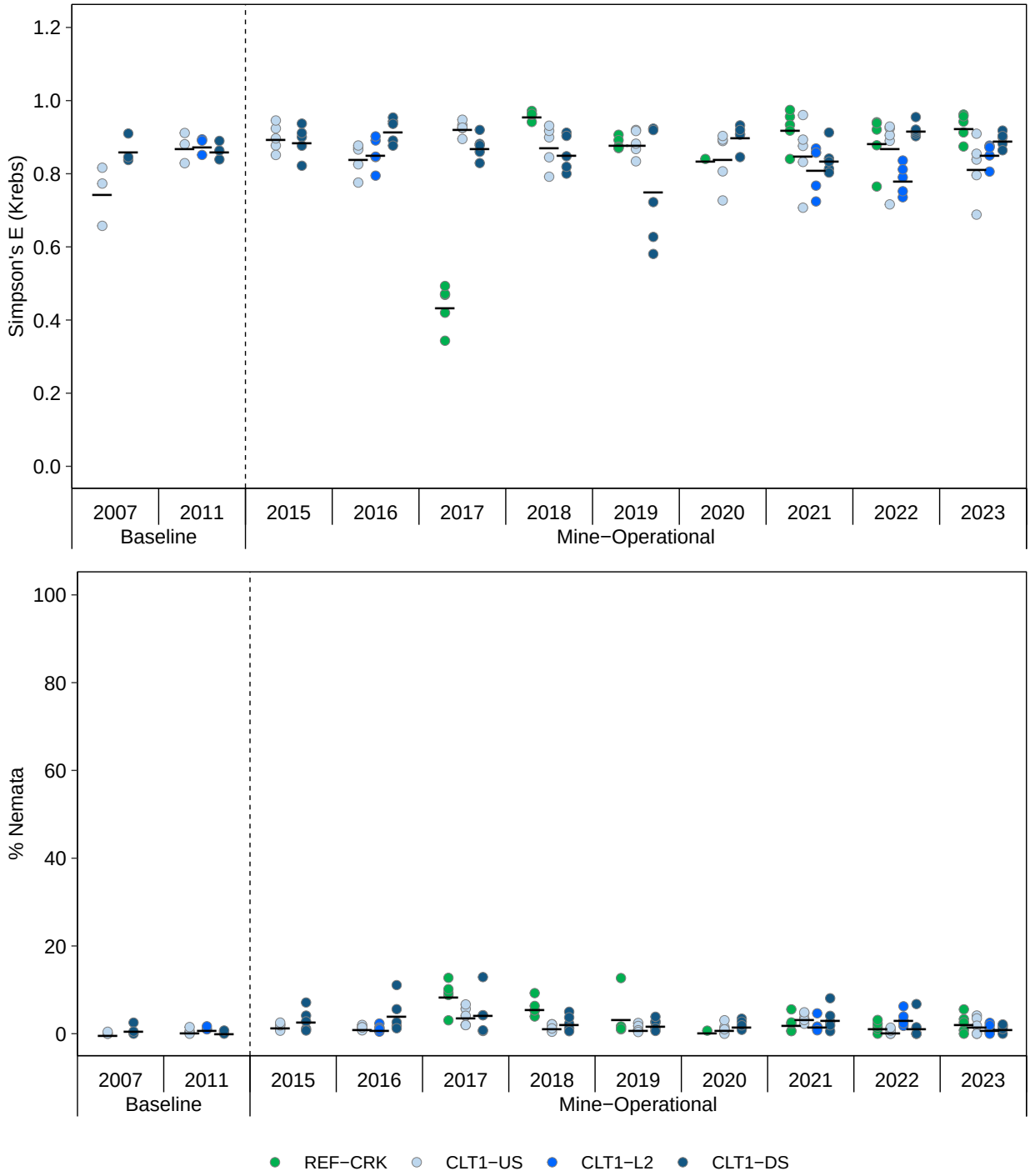

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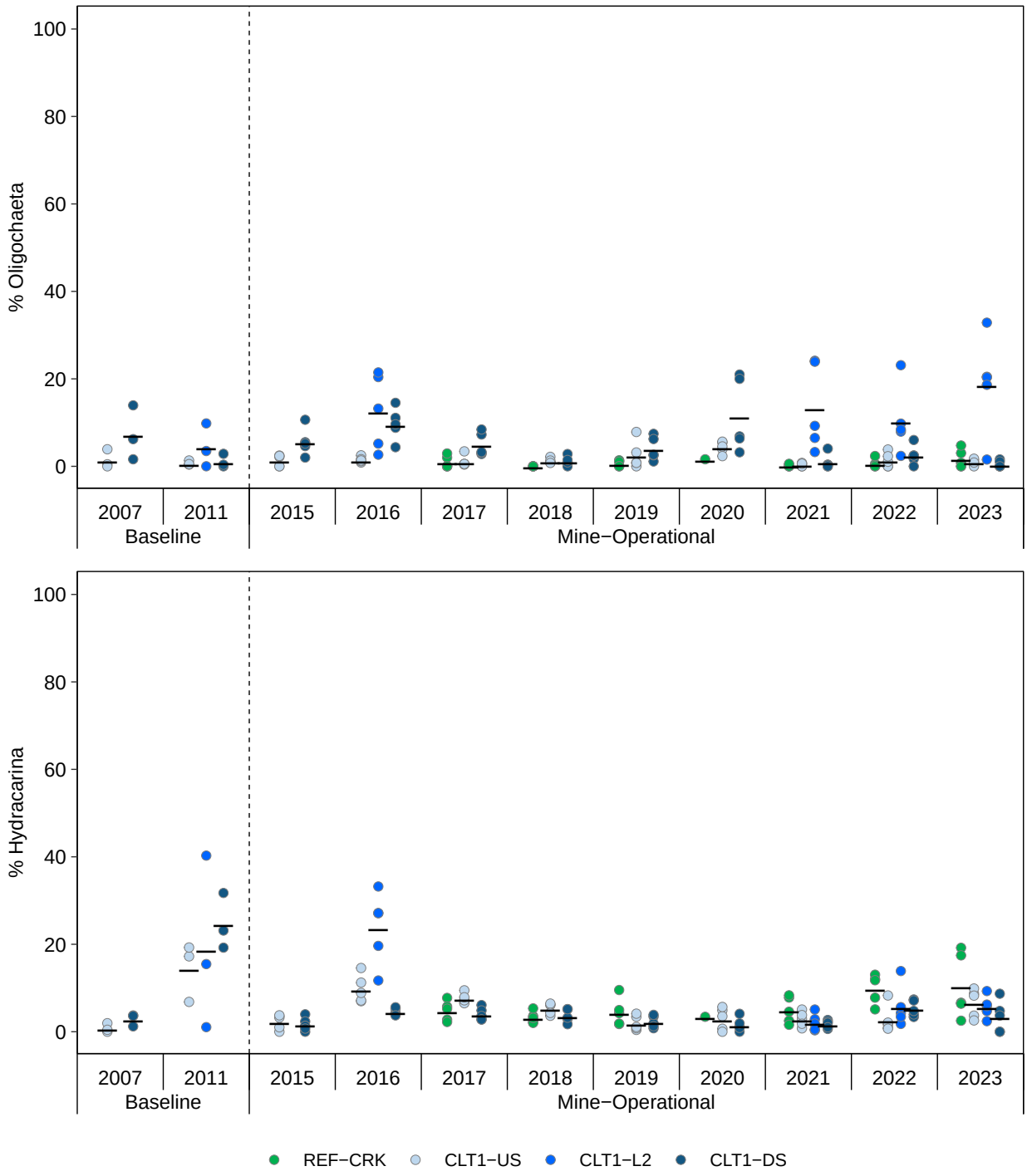

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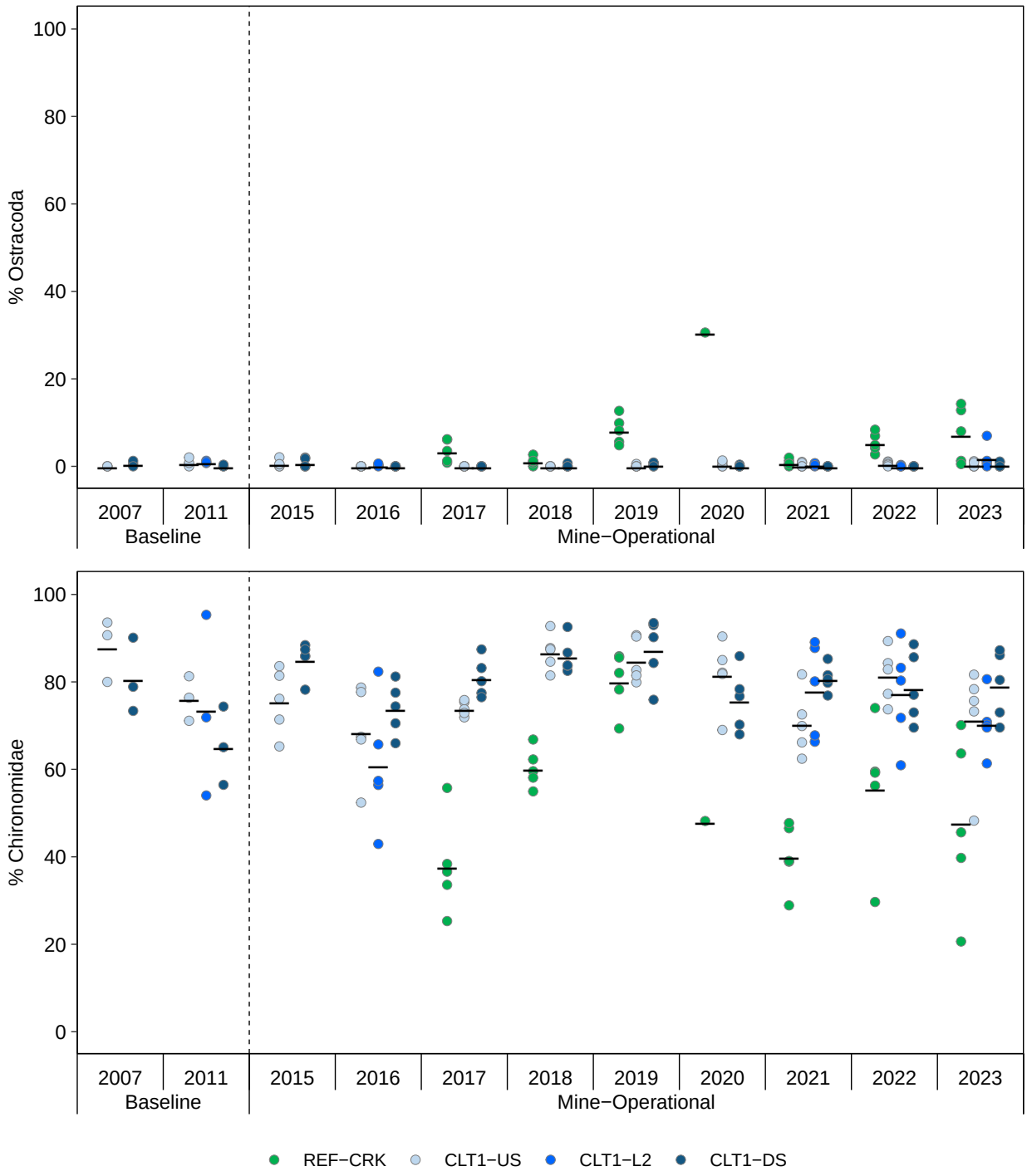

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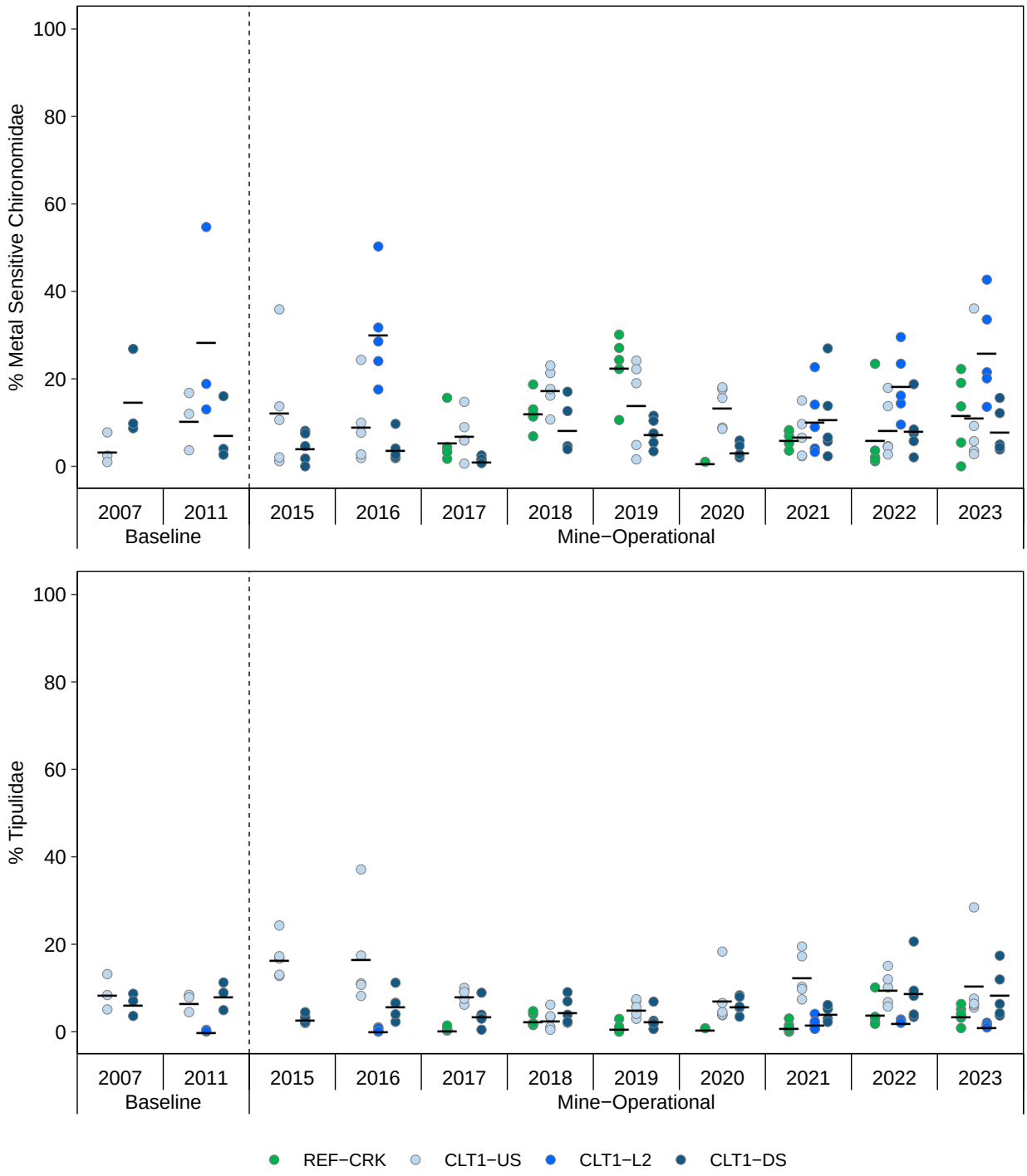

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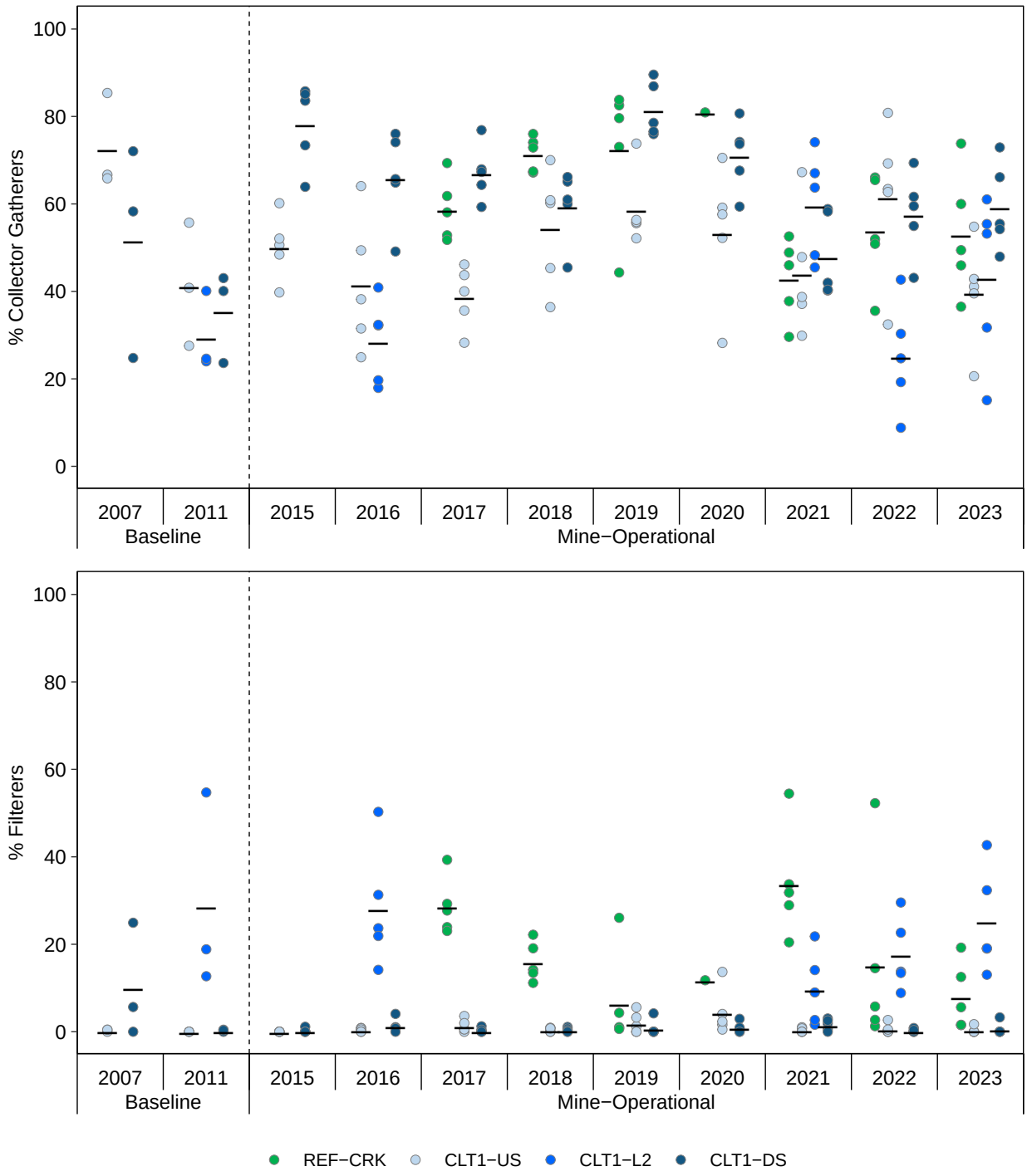

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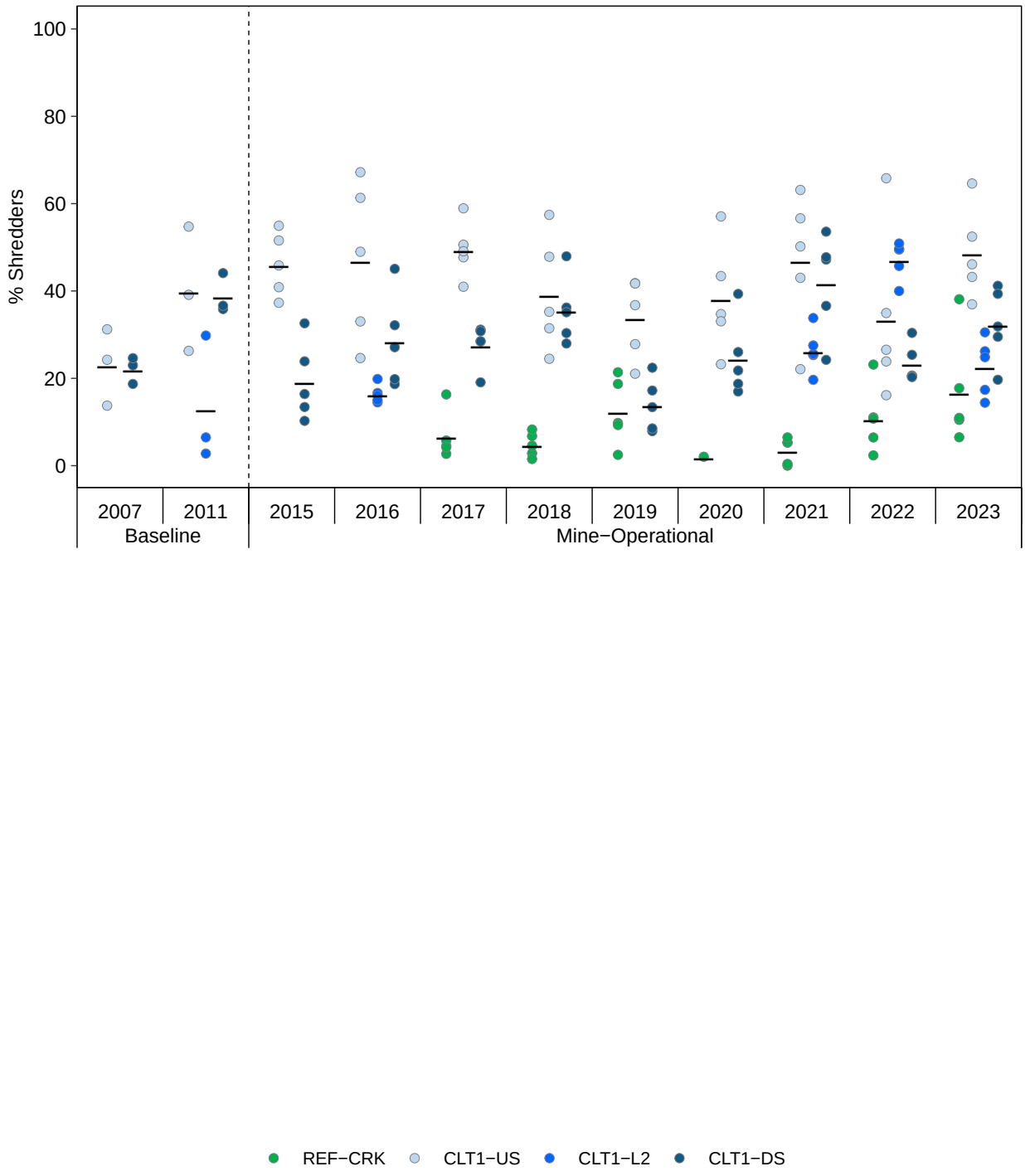

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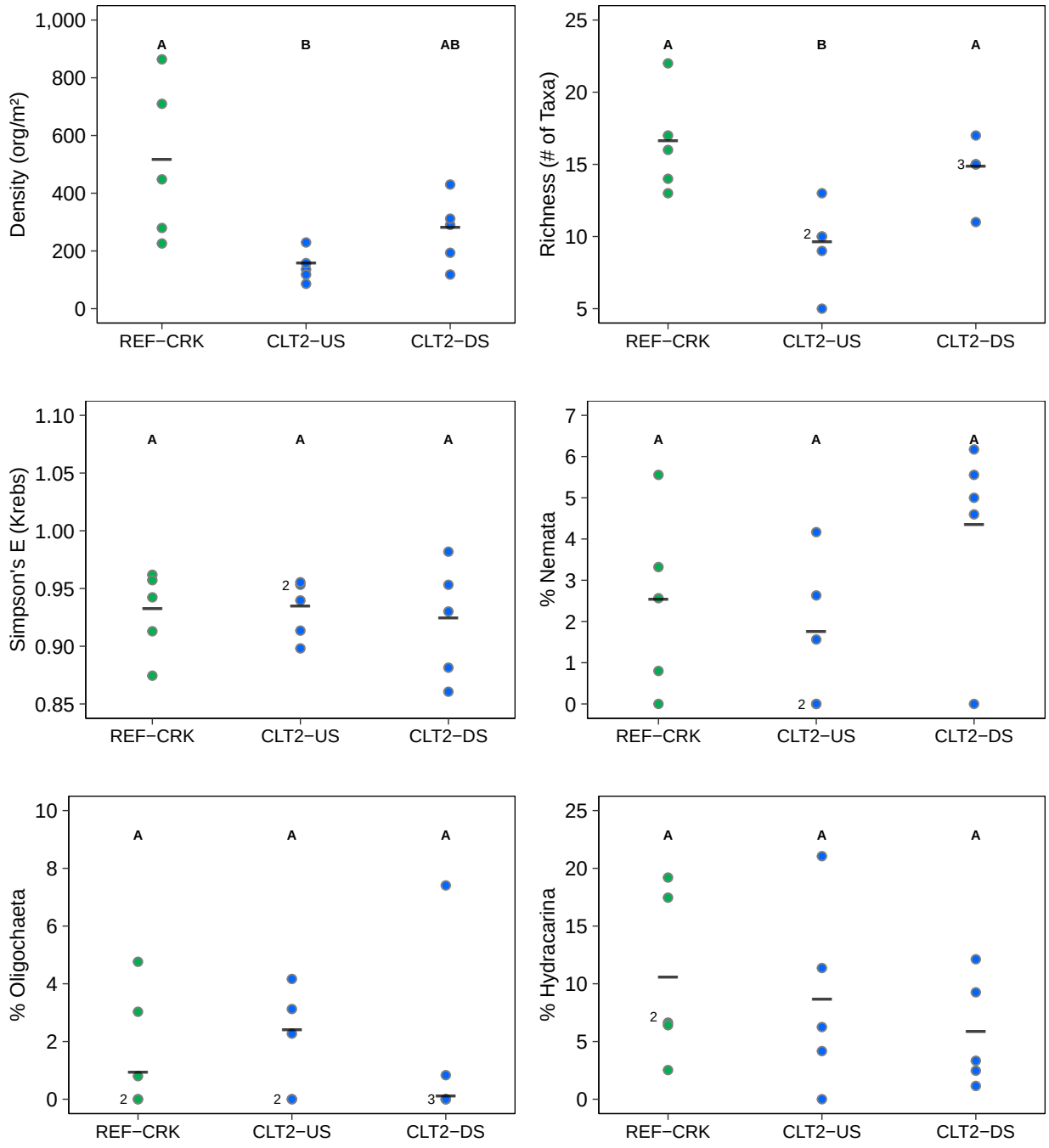

Figure F.3: Benthic Invertebrate Community Endpoints at Camp Lake Tributary 2 (CLT2) and Unnamed Reference Creek Areas (REF−CRK) Mary River Project CREMP, August 2023

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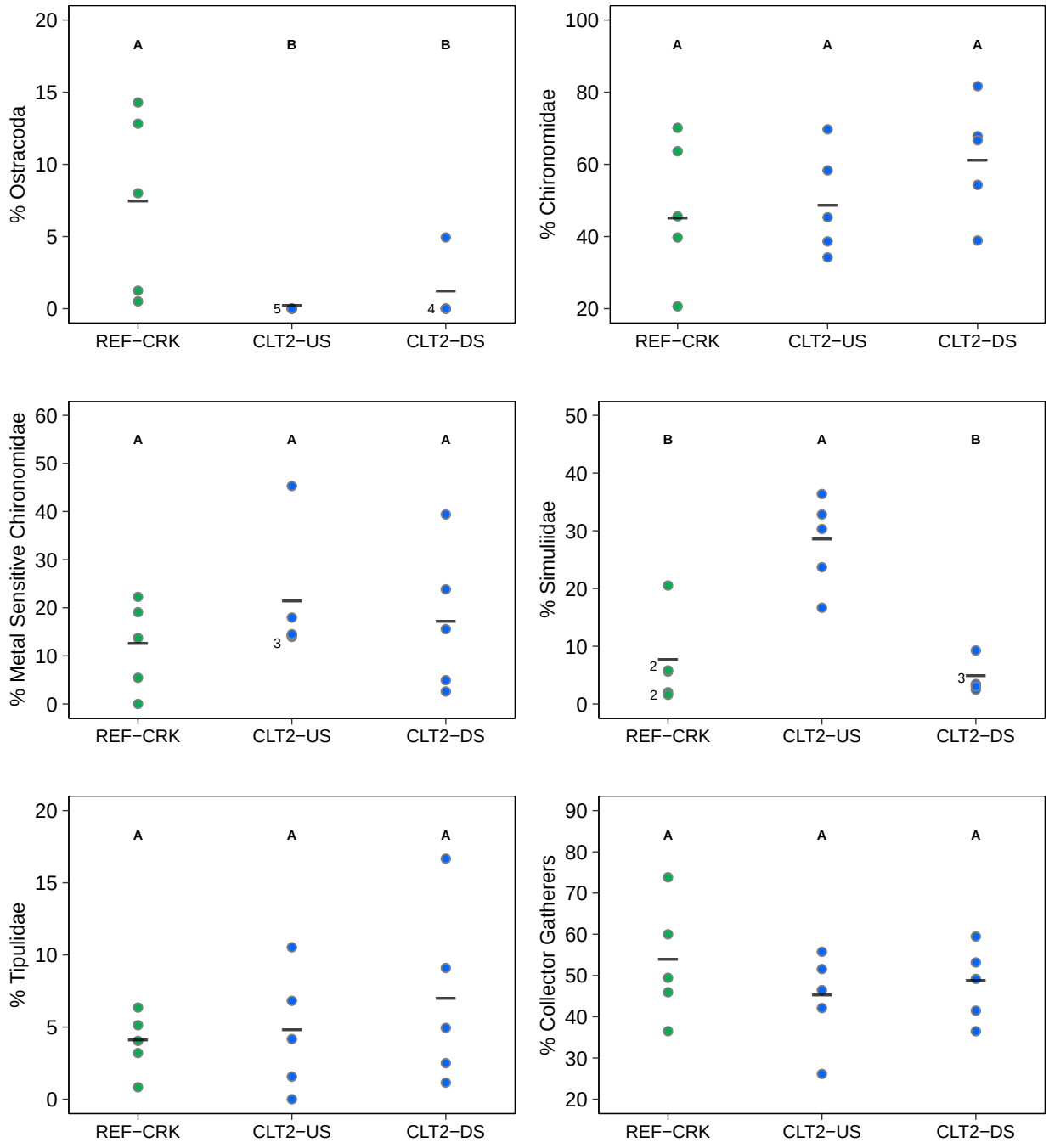

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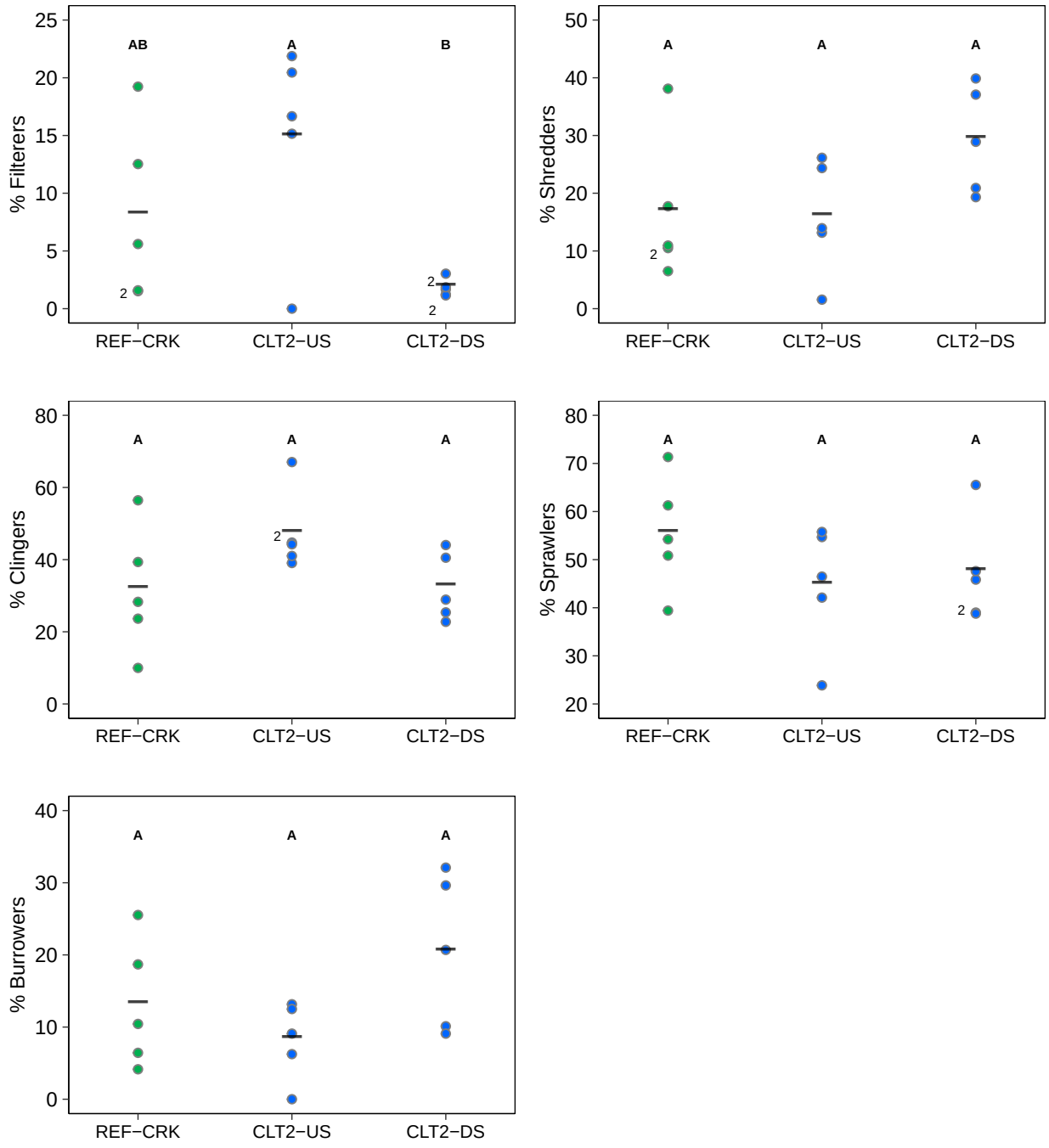

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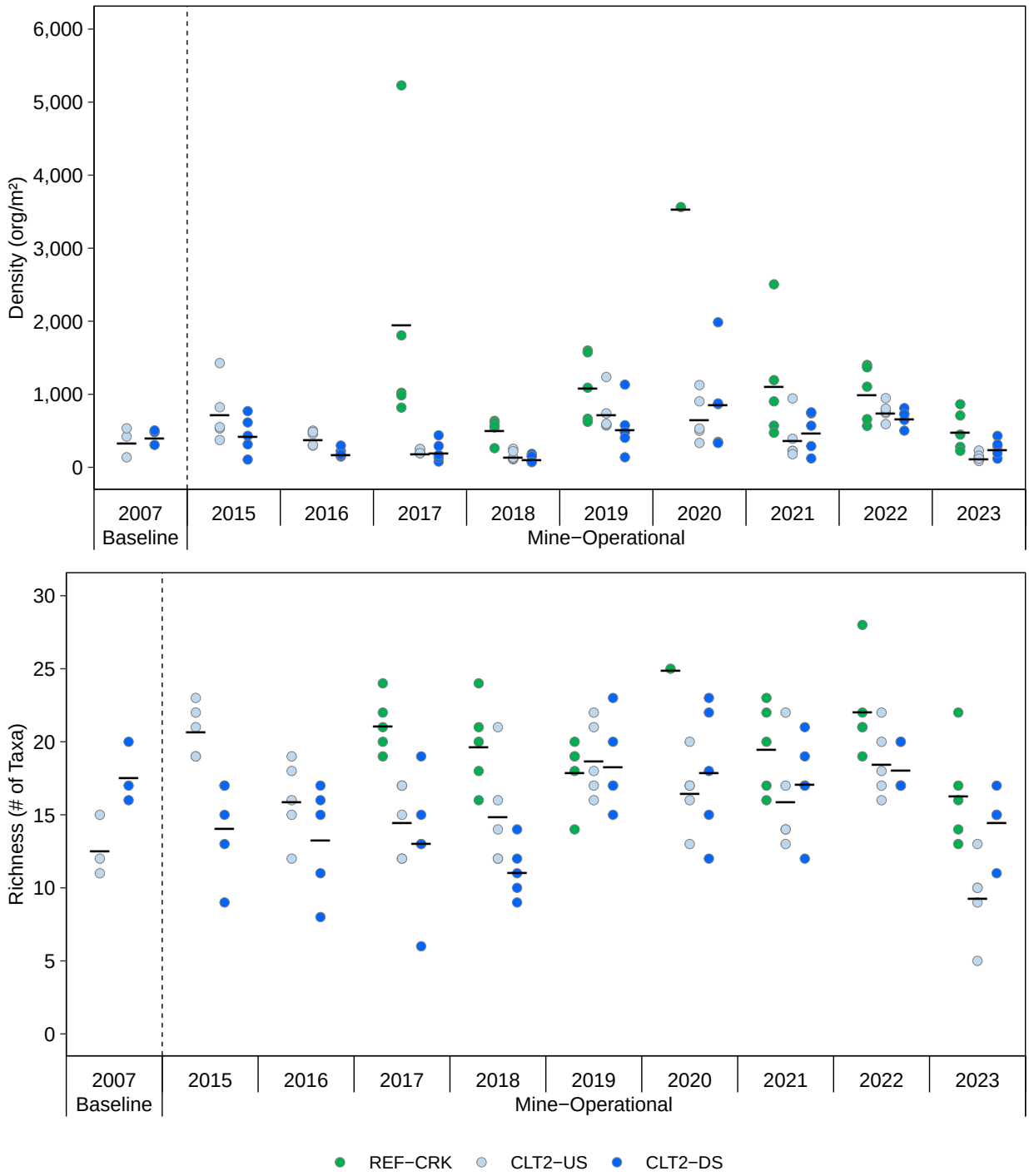

Figure F.4: Benthic Invertebrate Community Endpoints at Camp Lake Tributary 2 (CLT2) and Unnamed Reference Creek (REF−CRK) Areas among Mine Baseline (2007) and Operational (2015 to 2023) Periods

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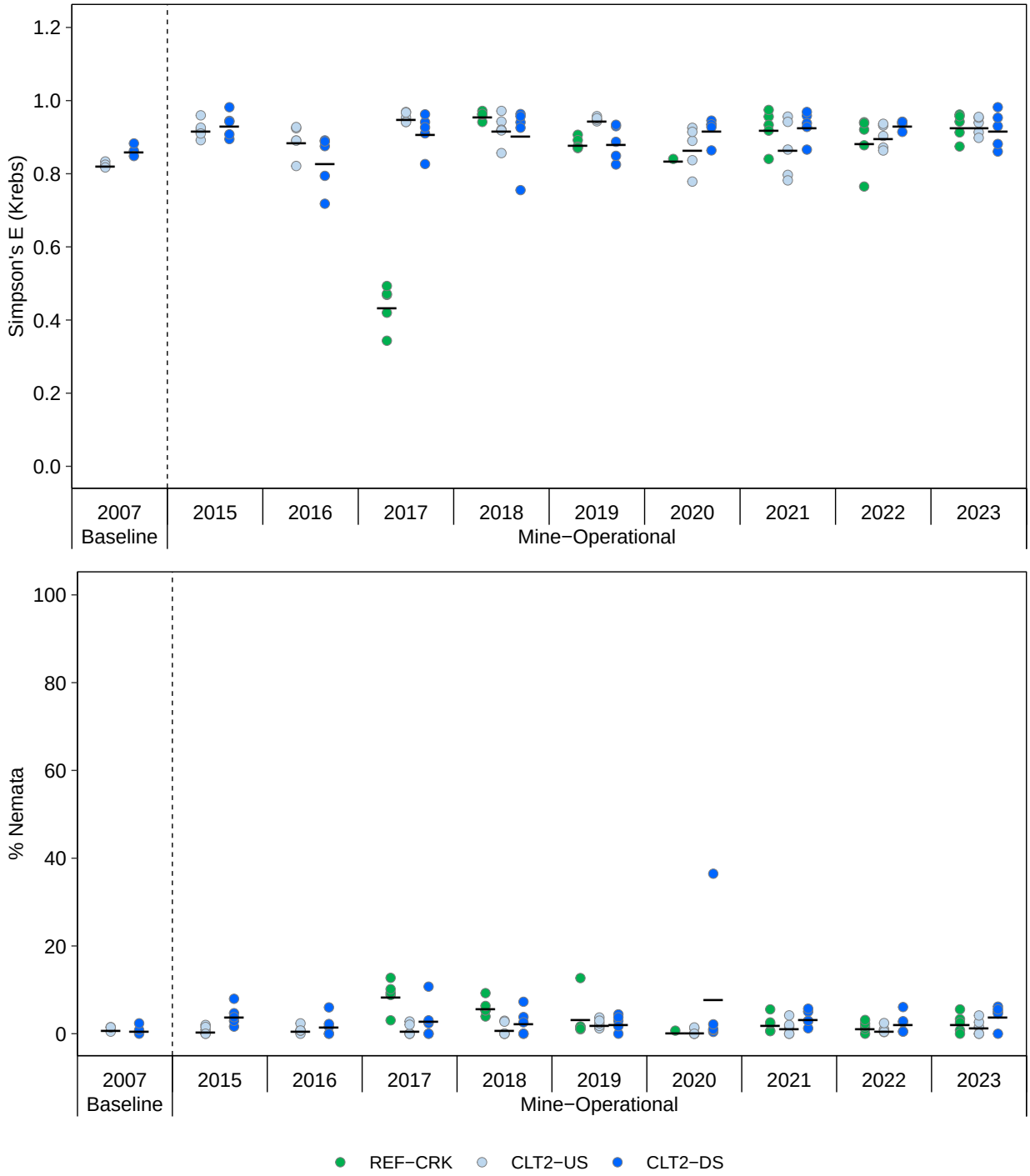

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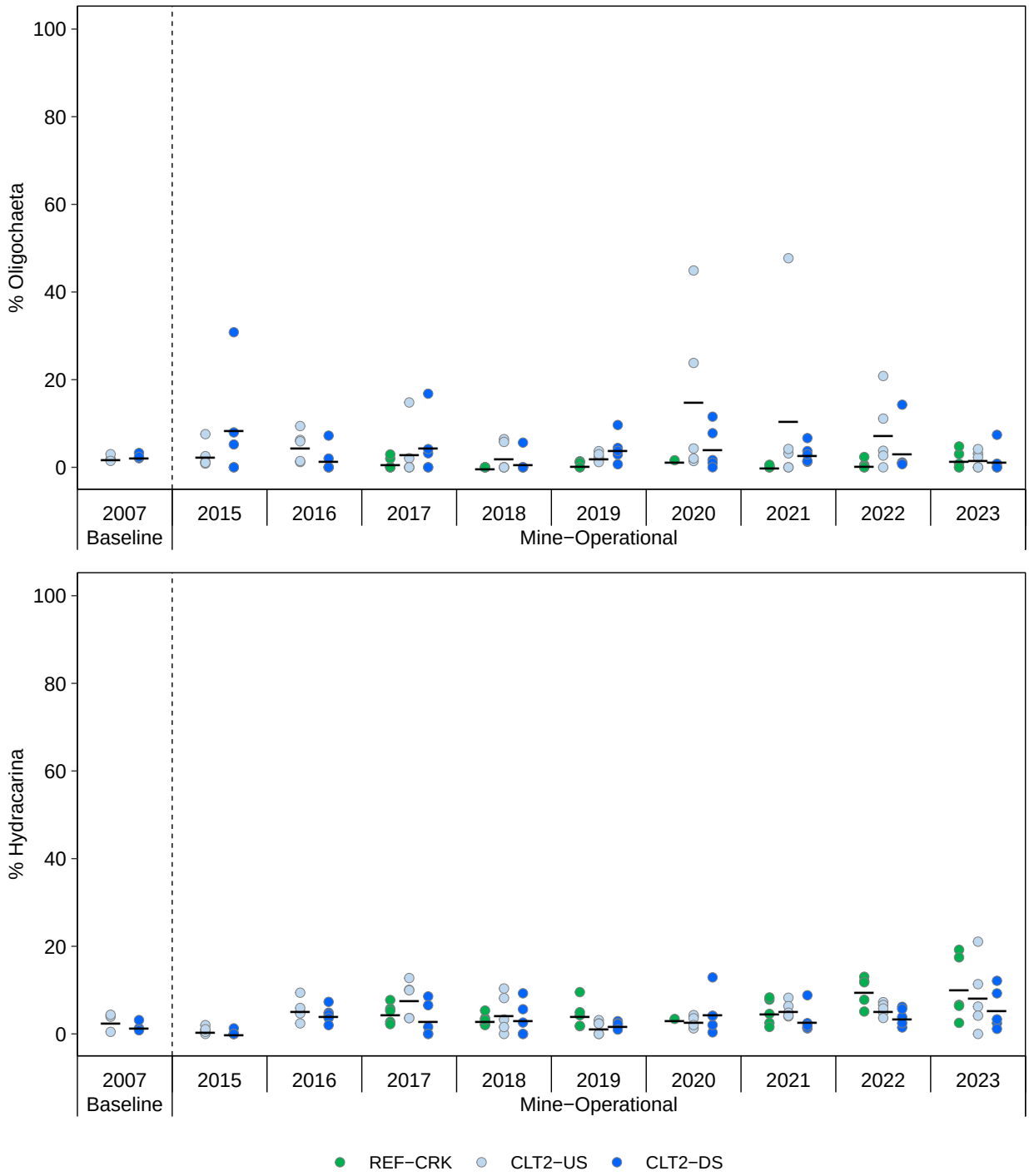

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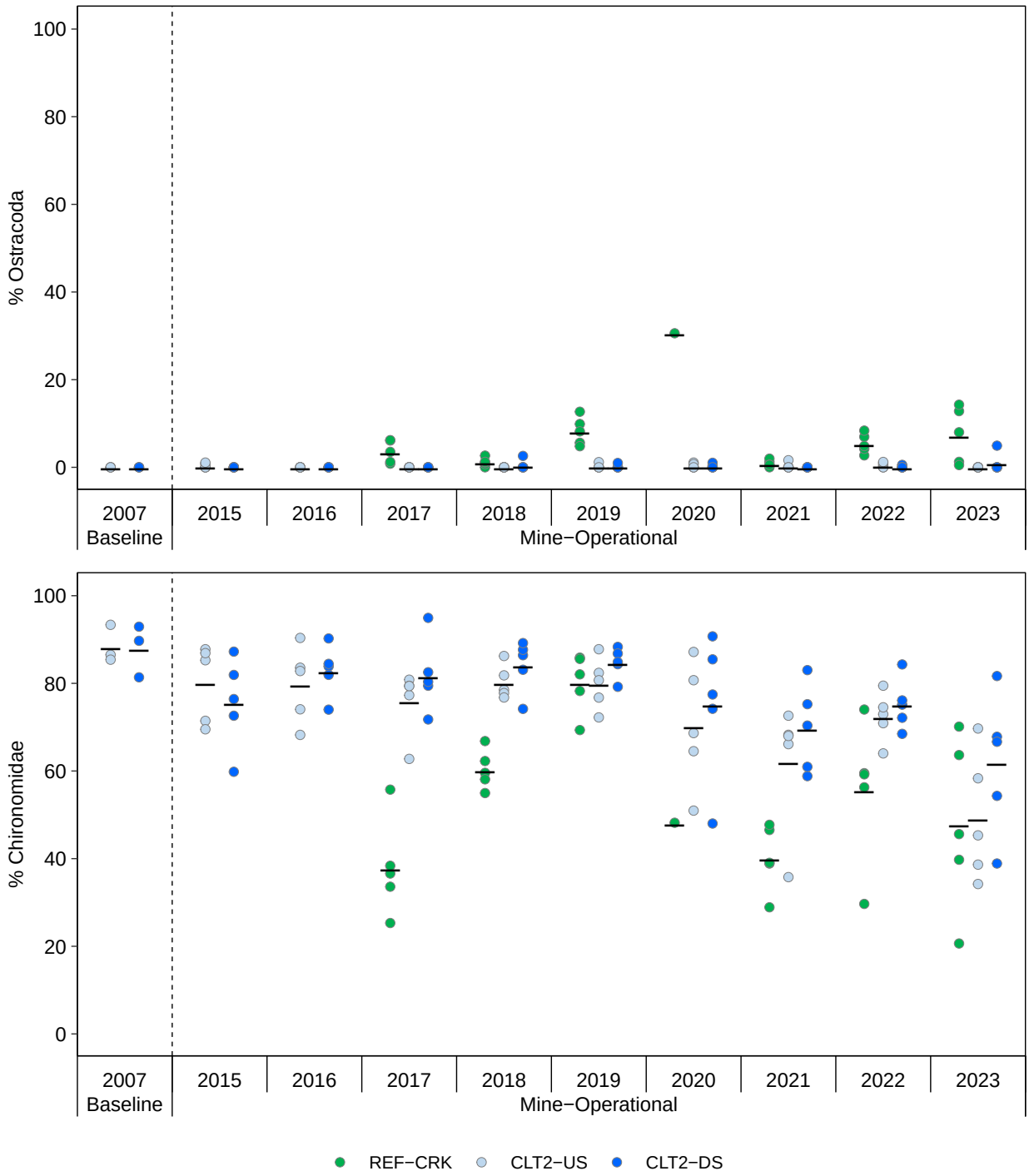

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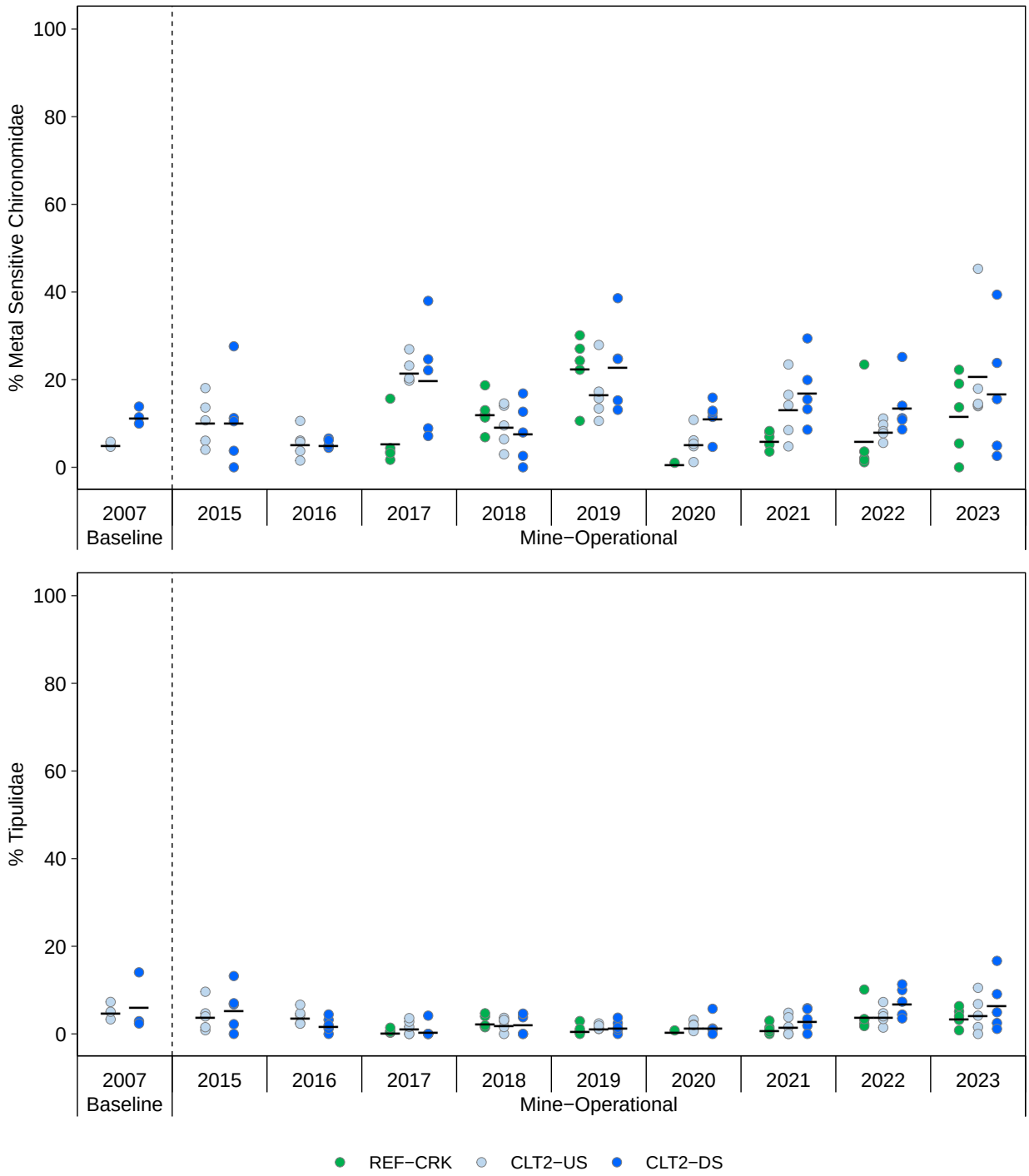

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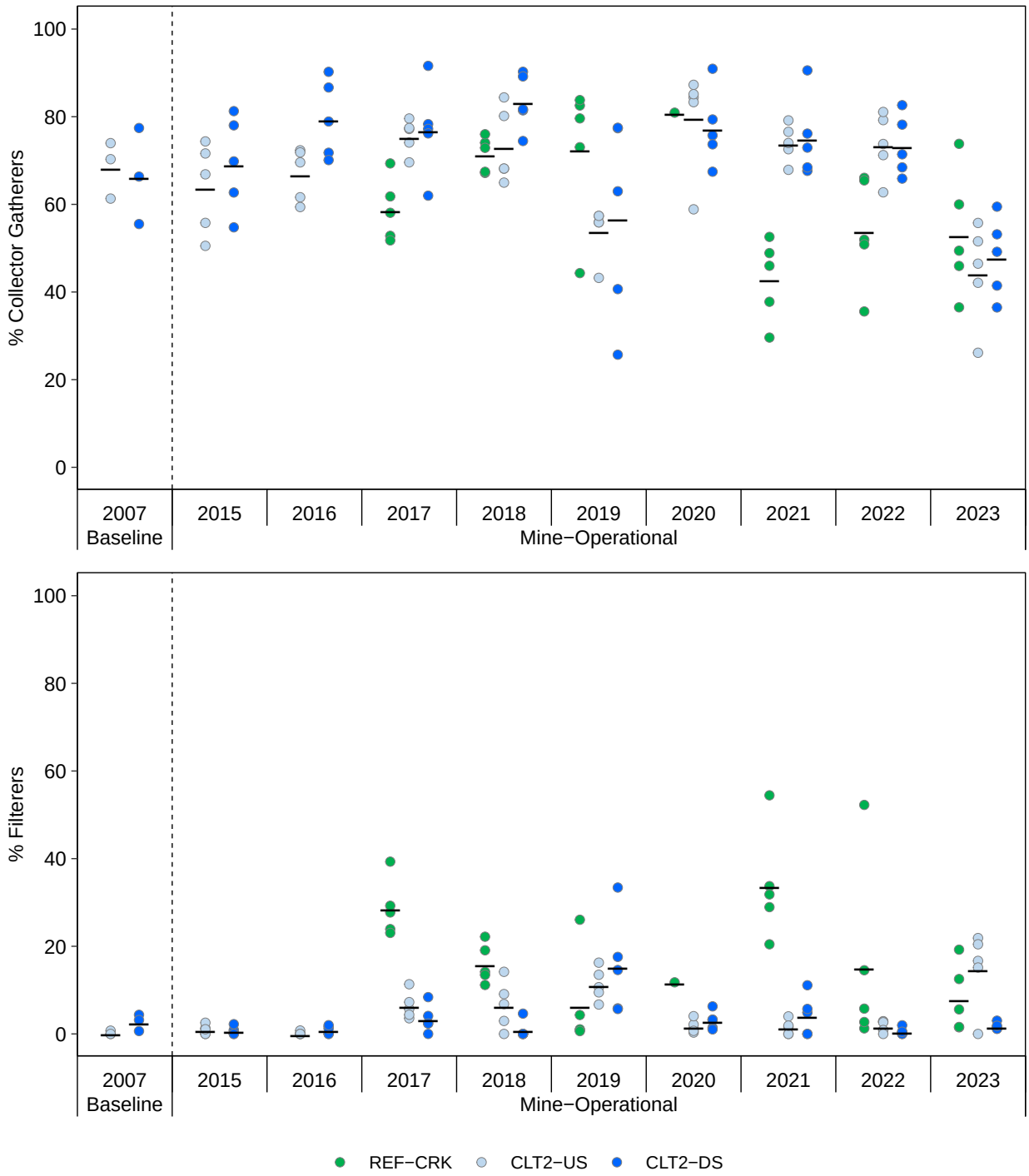

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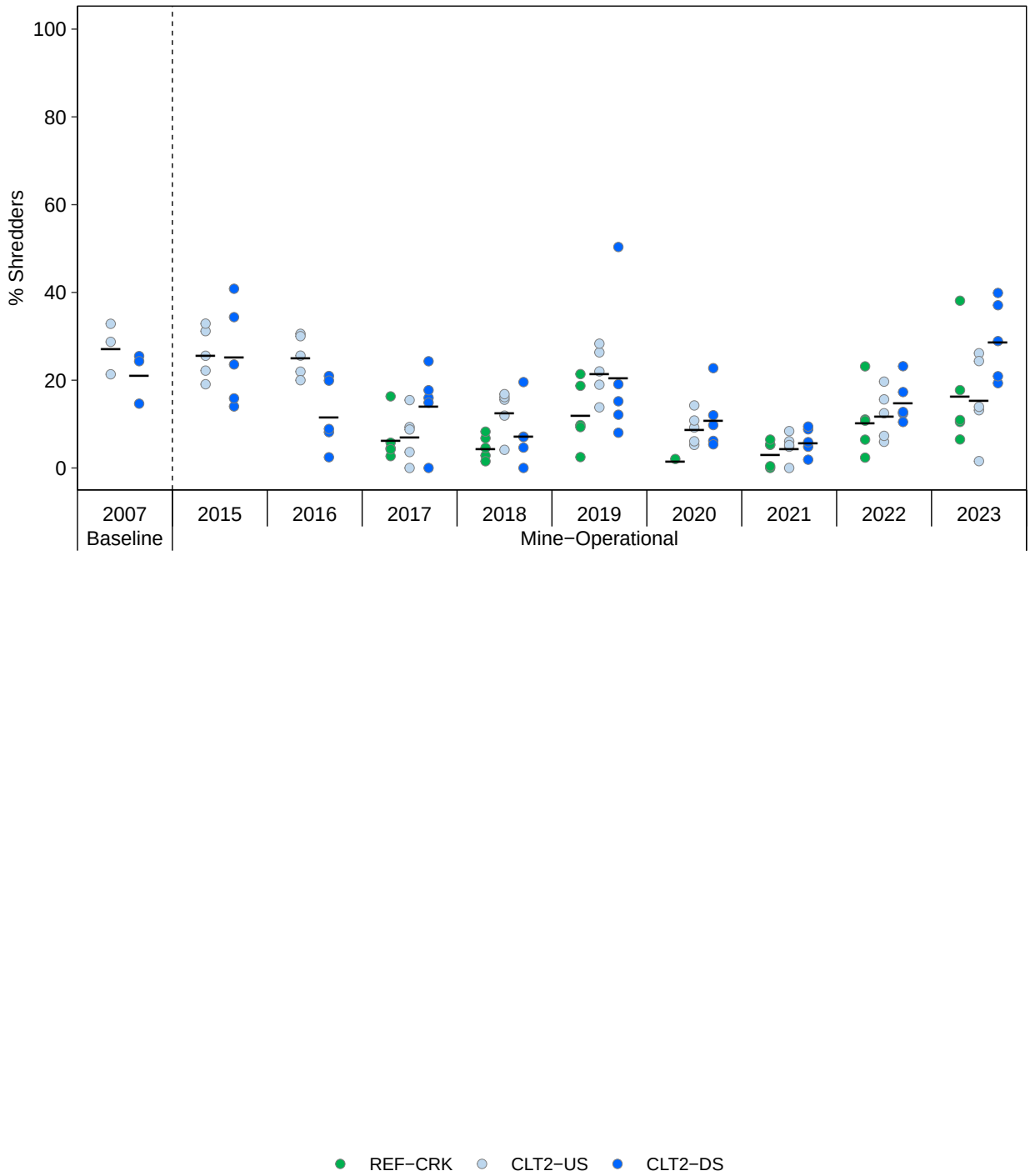

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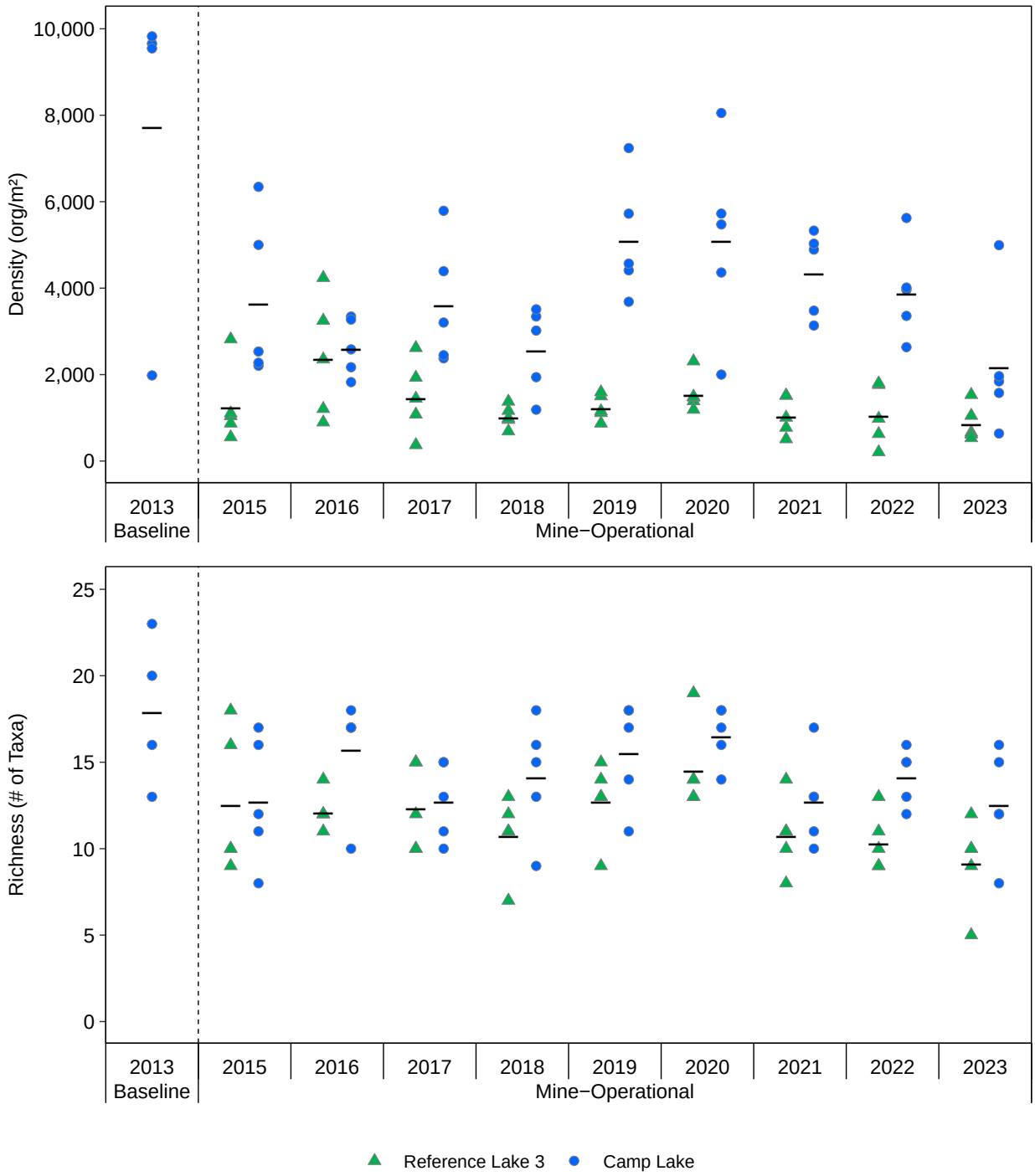

Figure F.5: Benthic Invertebrate Community Endpoints at Camp Lake (JL0) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2007) and Operational (2015 to 2023) Periods, Mary River Project CREMP

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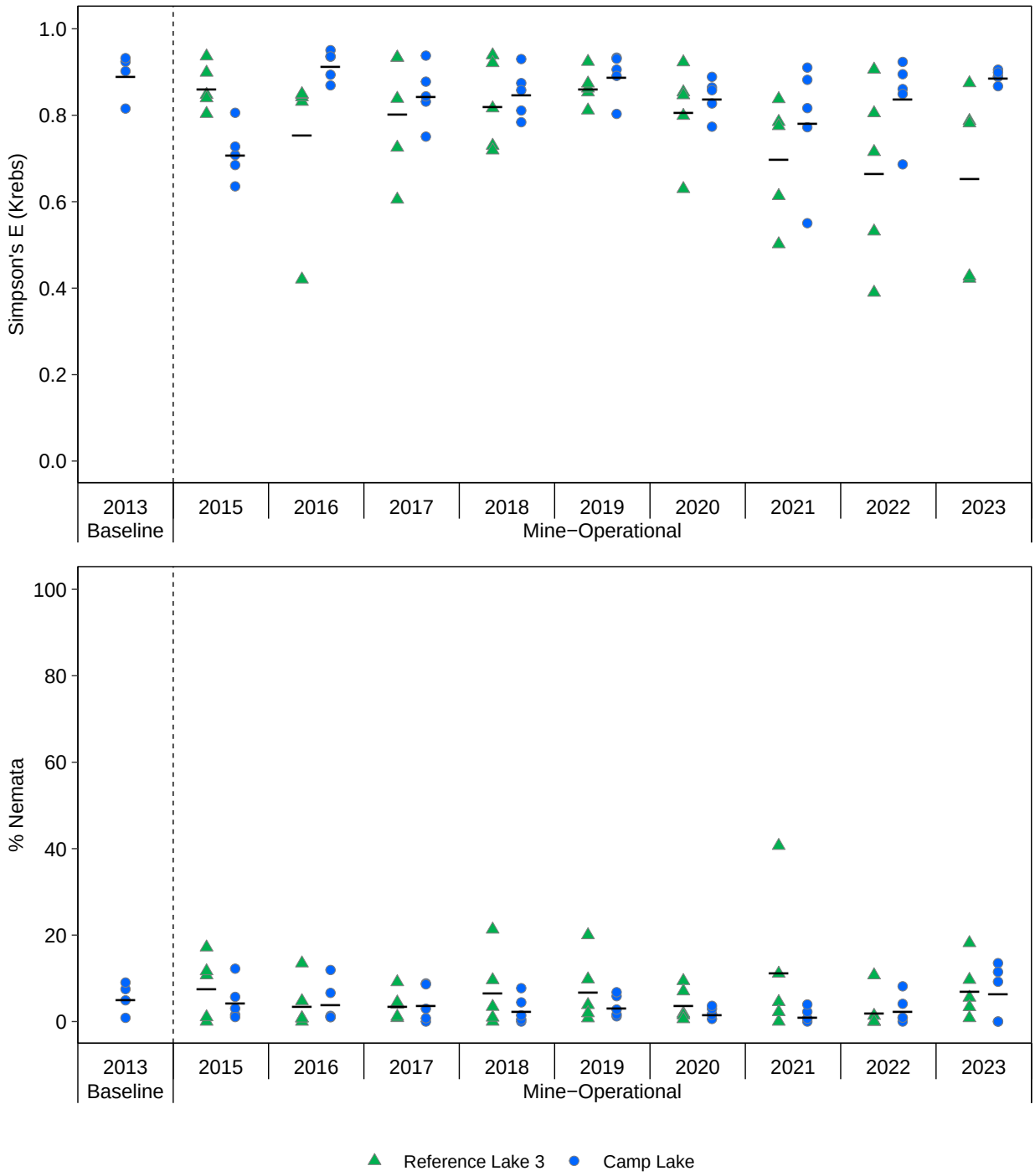

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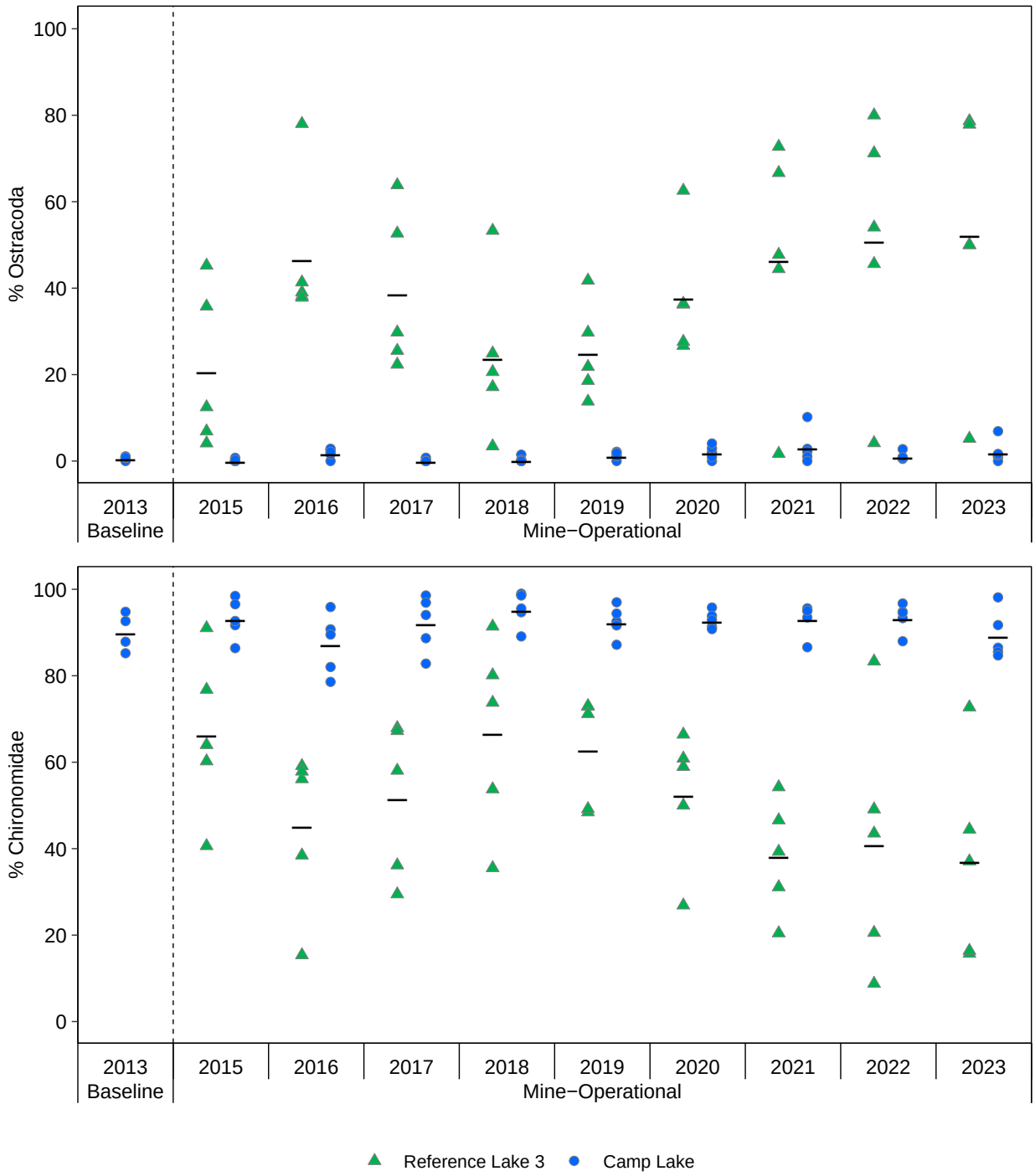

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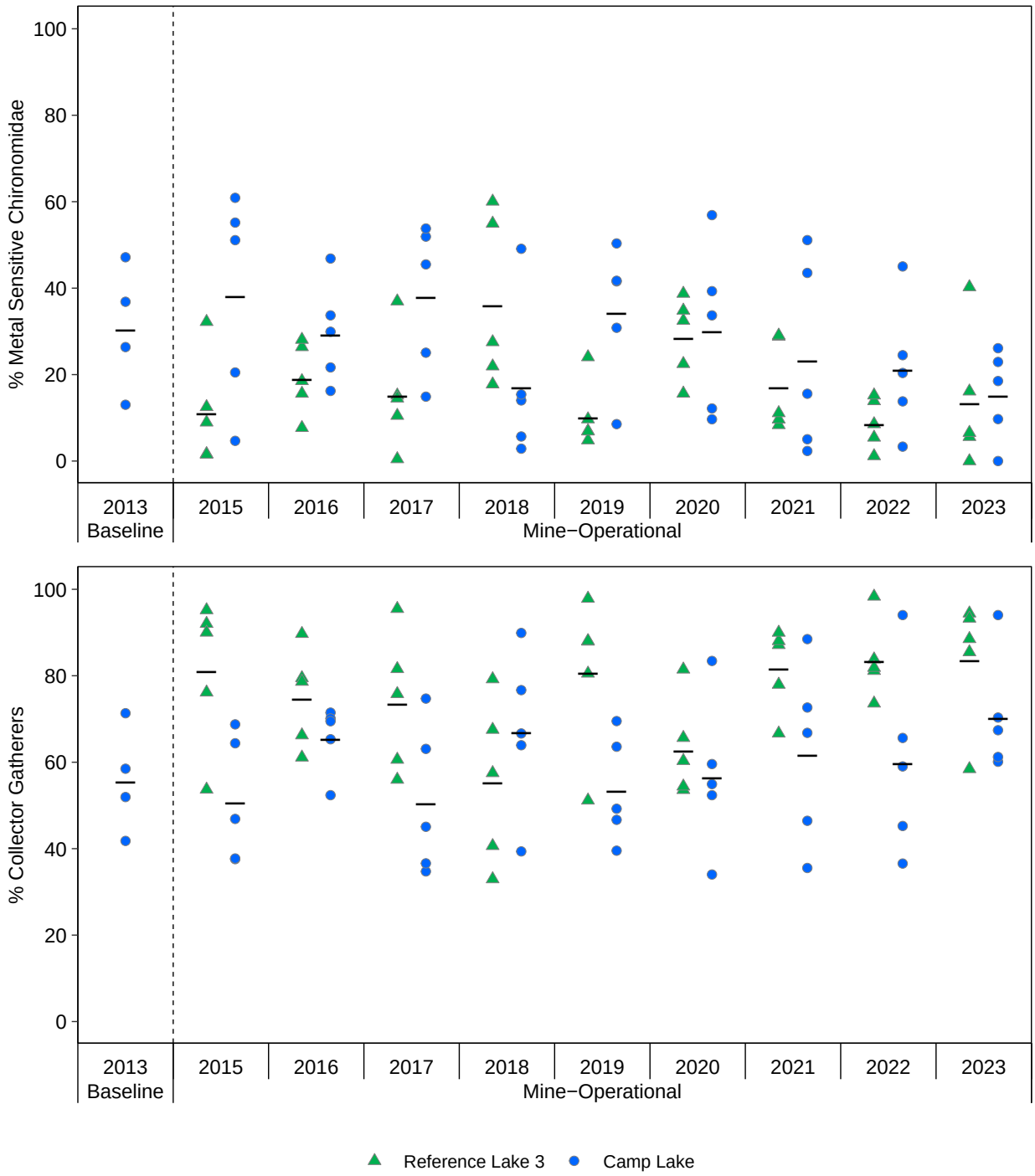

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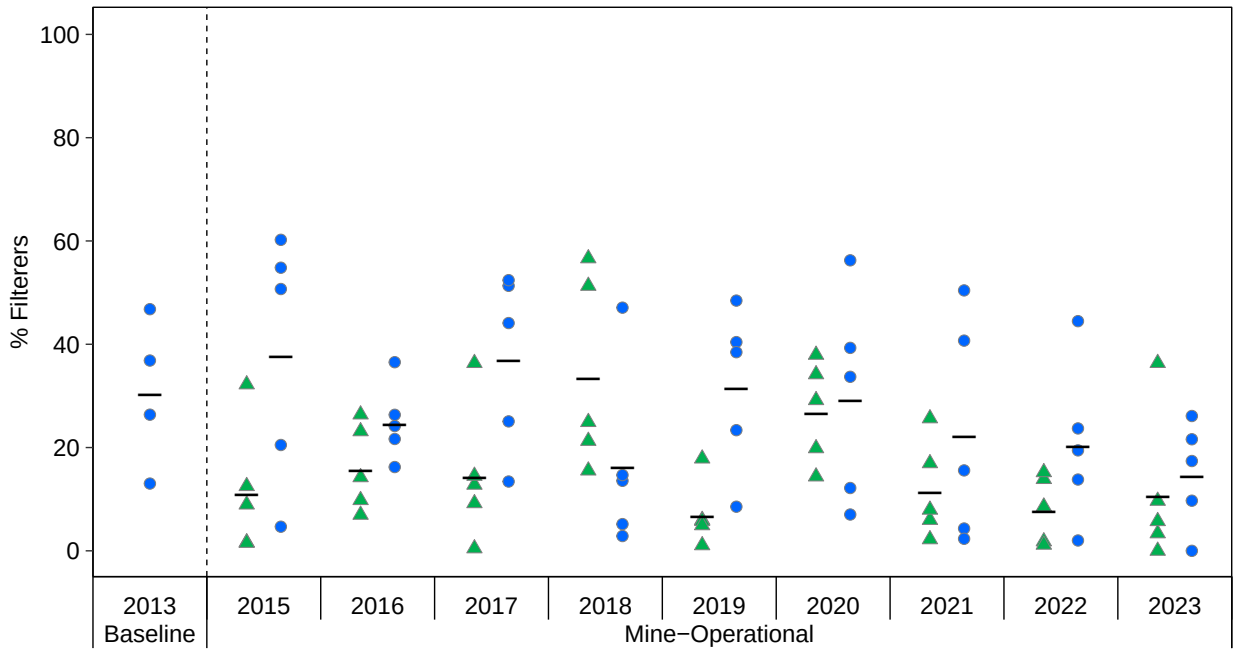

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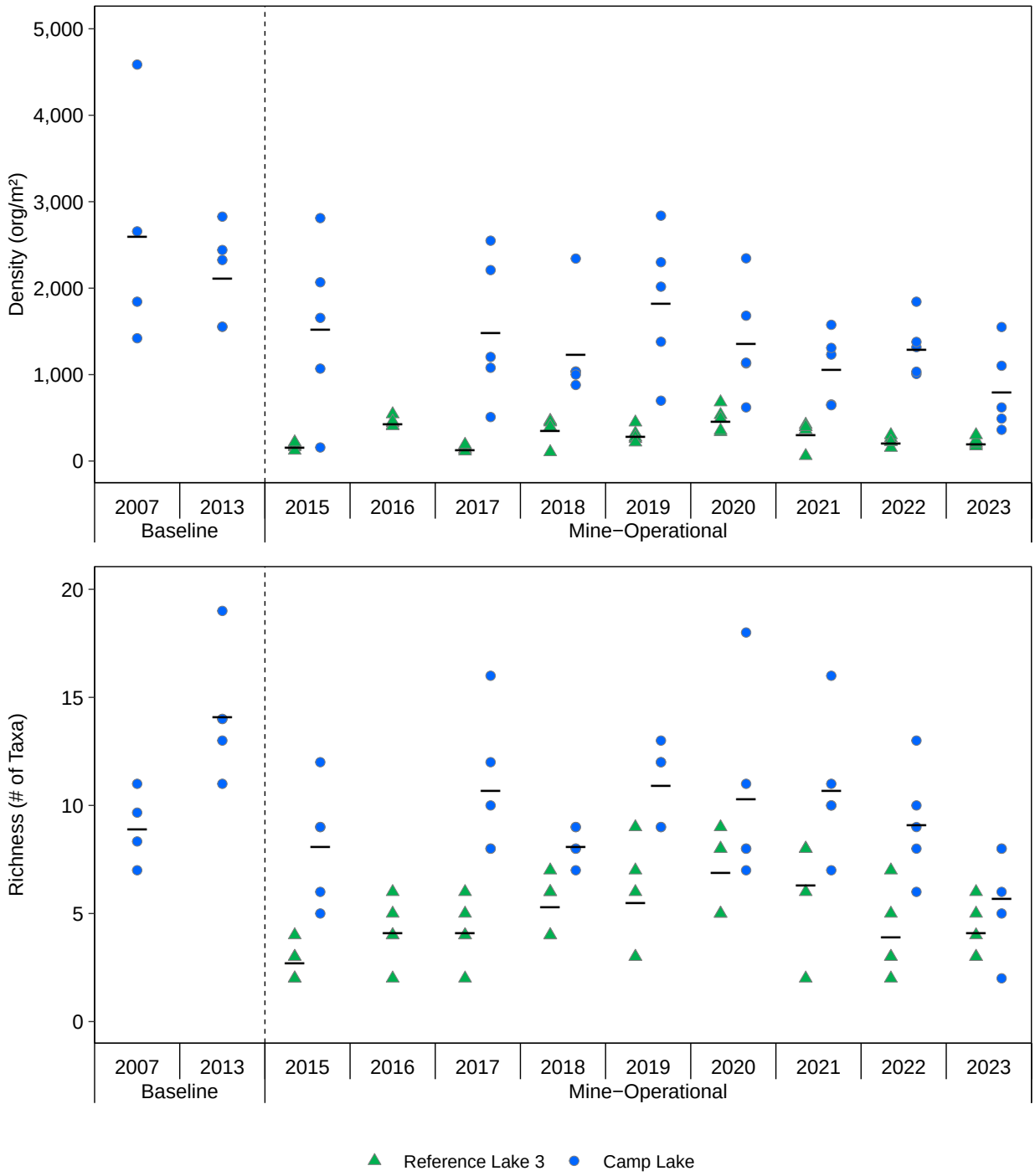

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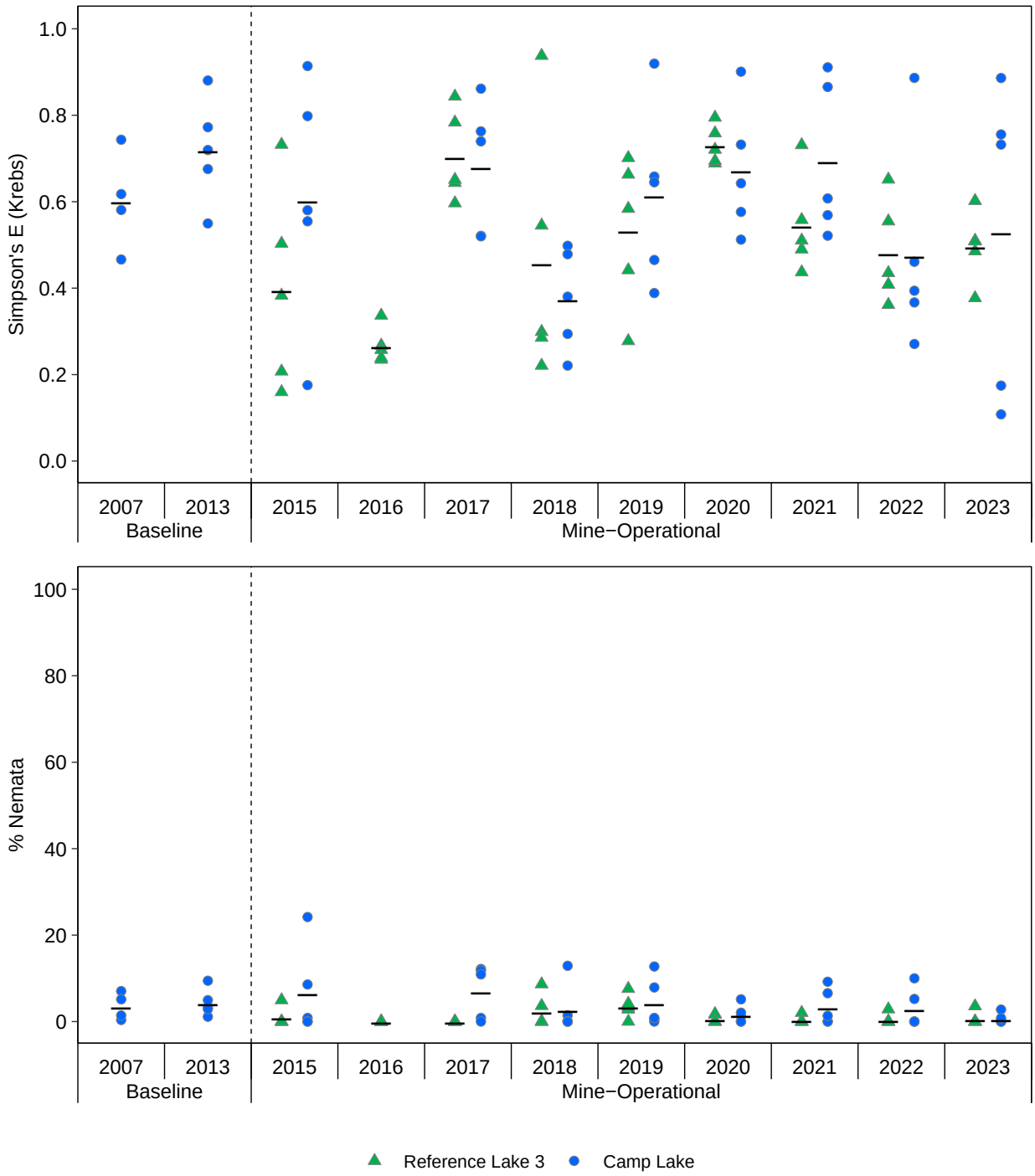

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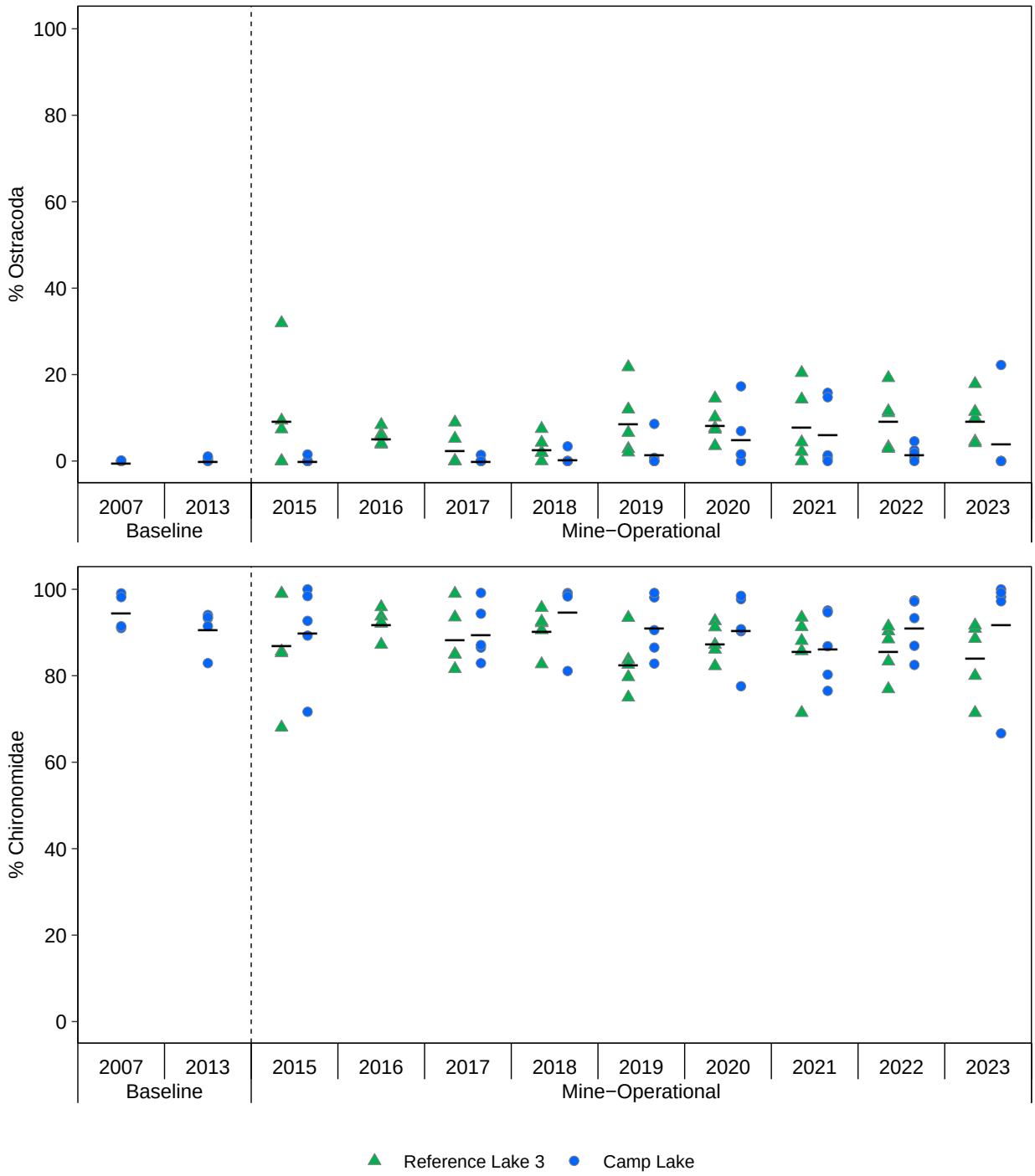

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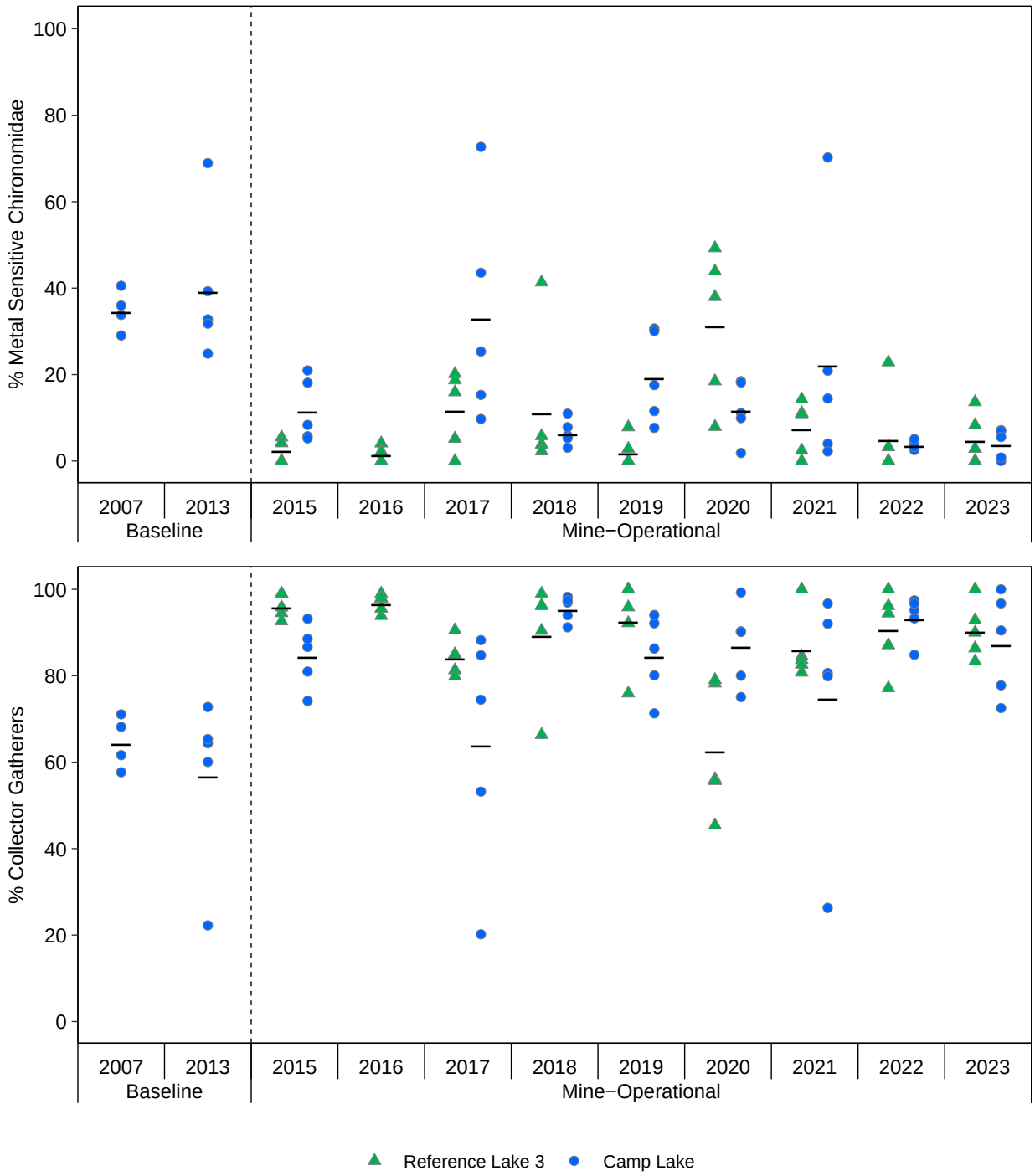

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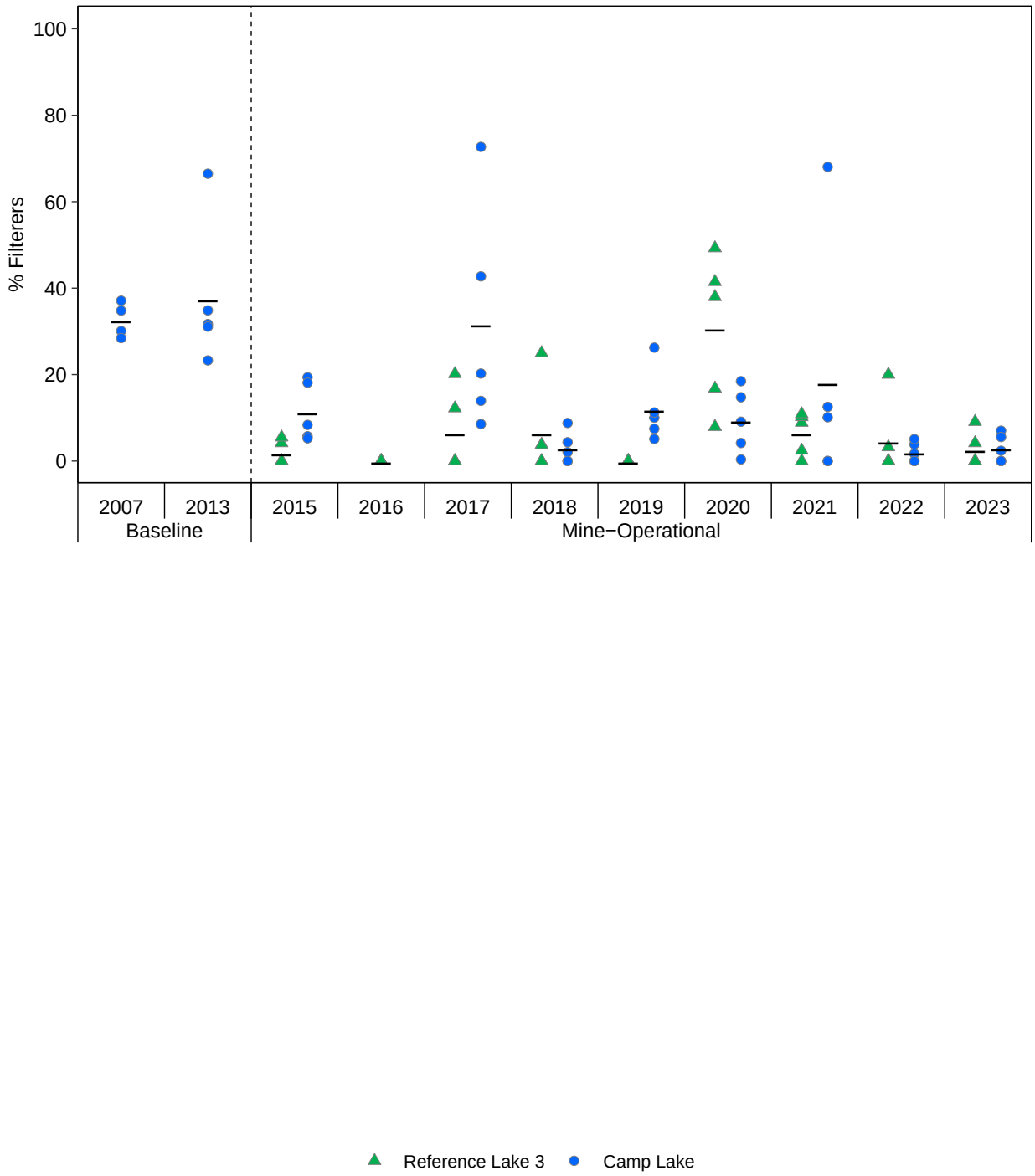

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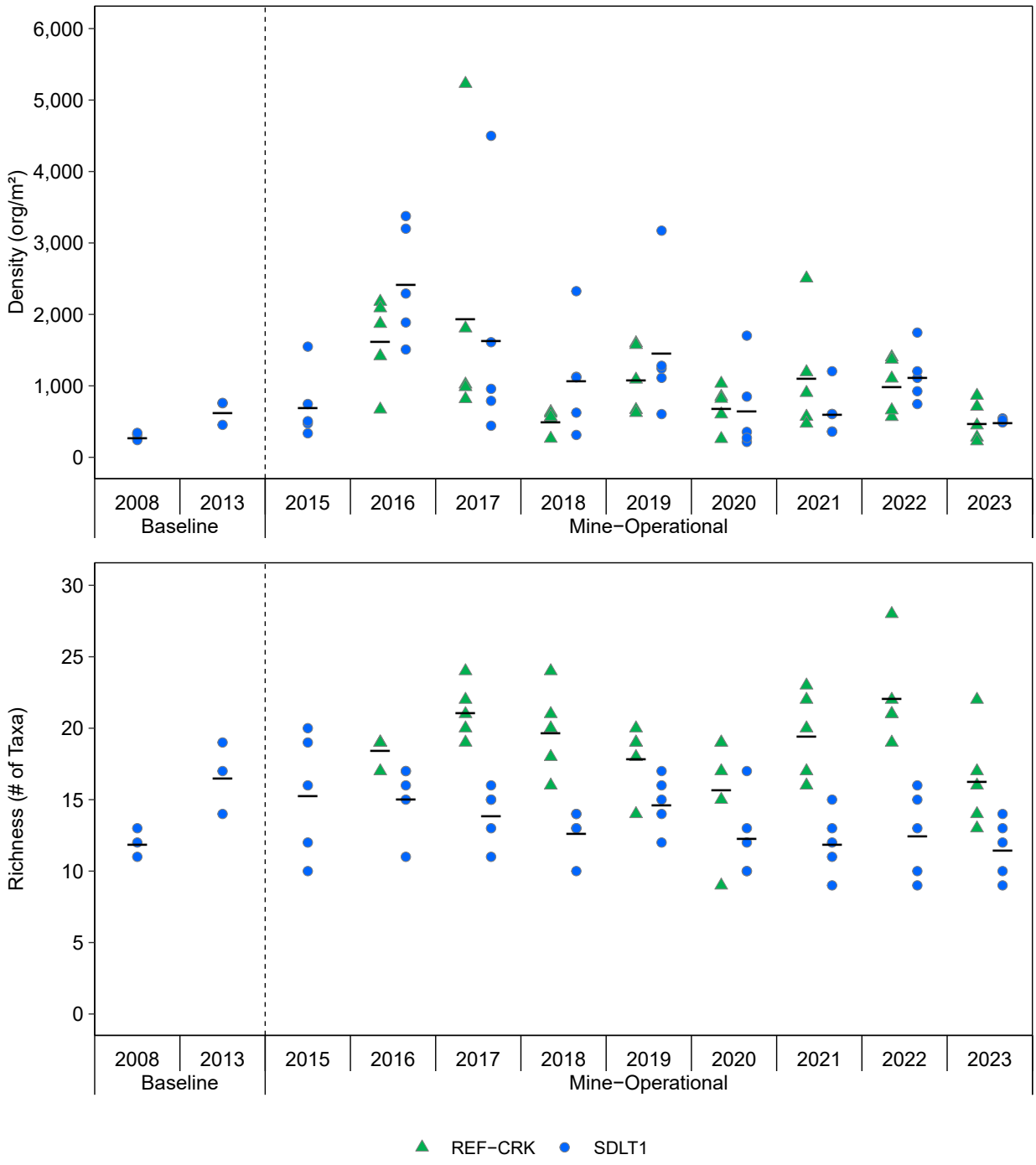

Figure F.7: Benthic Invertebrate Community Endpoints at Sheardown Lake Tributary 1 (SDLT1) and Unnamed Reference Creek (REF−CRK) Areas Among Mine Baseline (2008 and 2013) and Mine Operational (2015 to 2023) Periods

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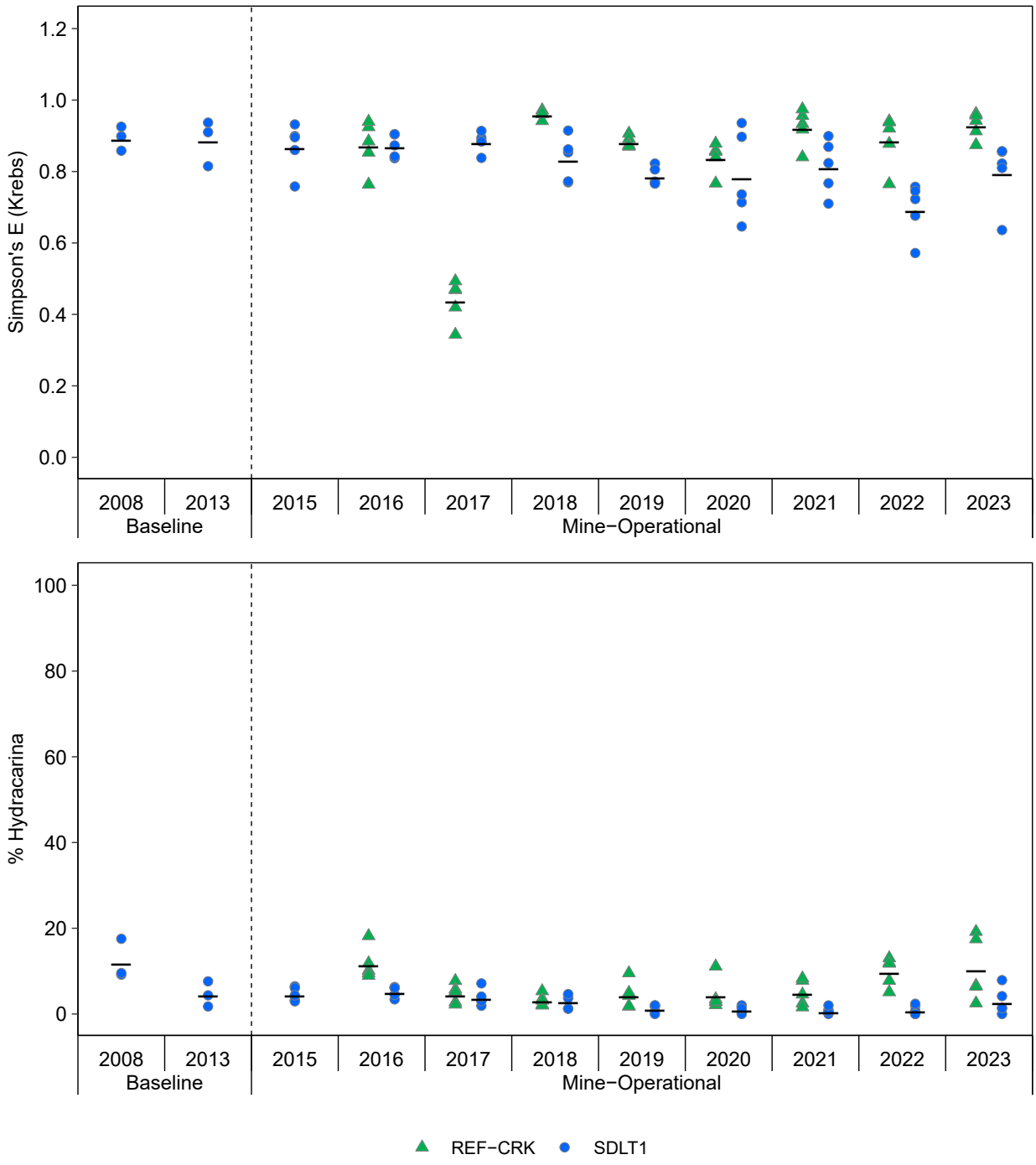

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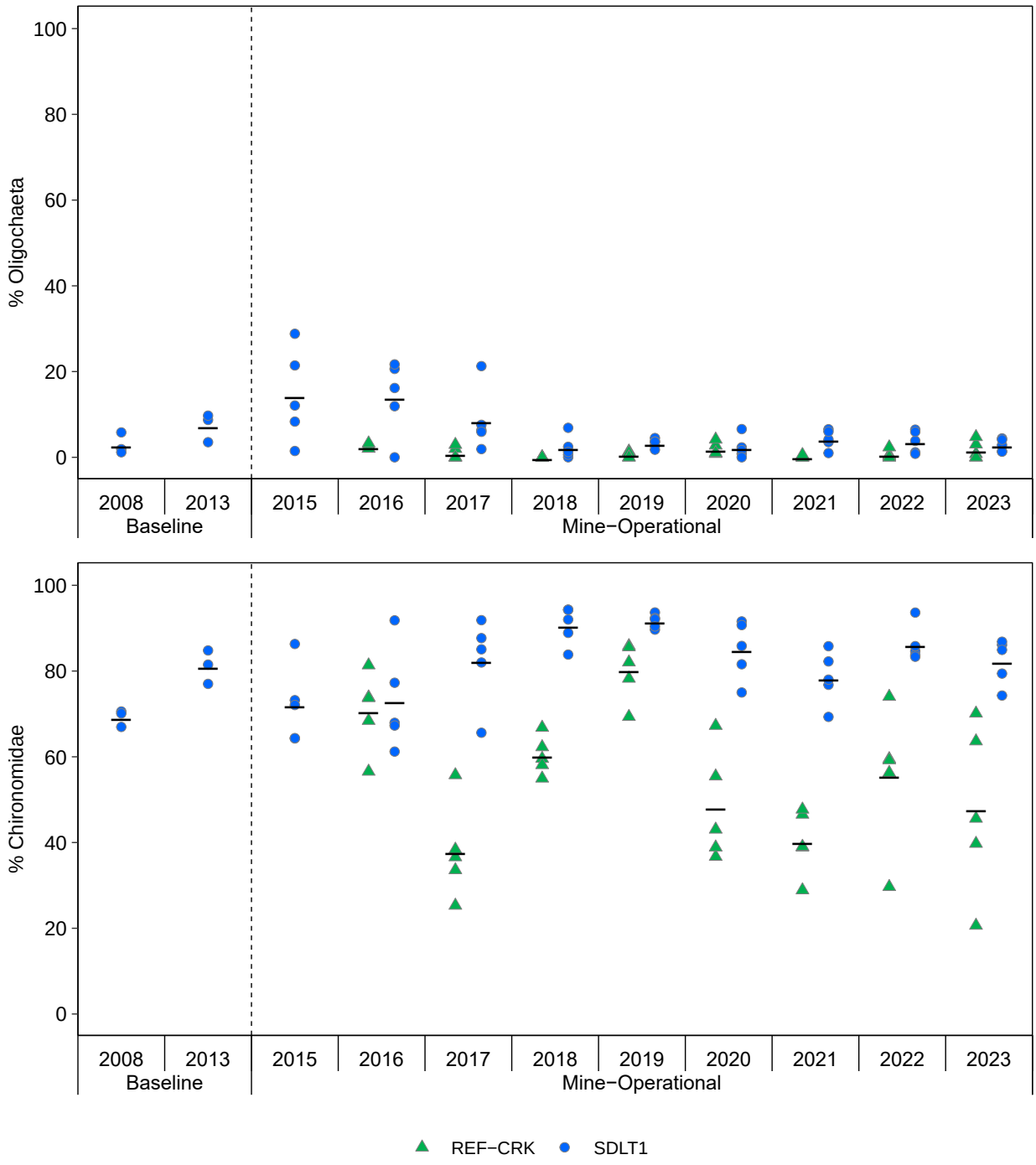

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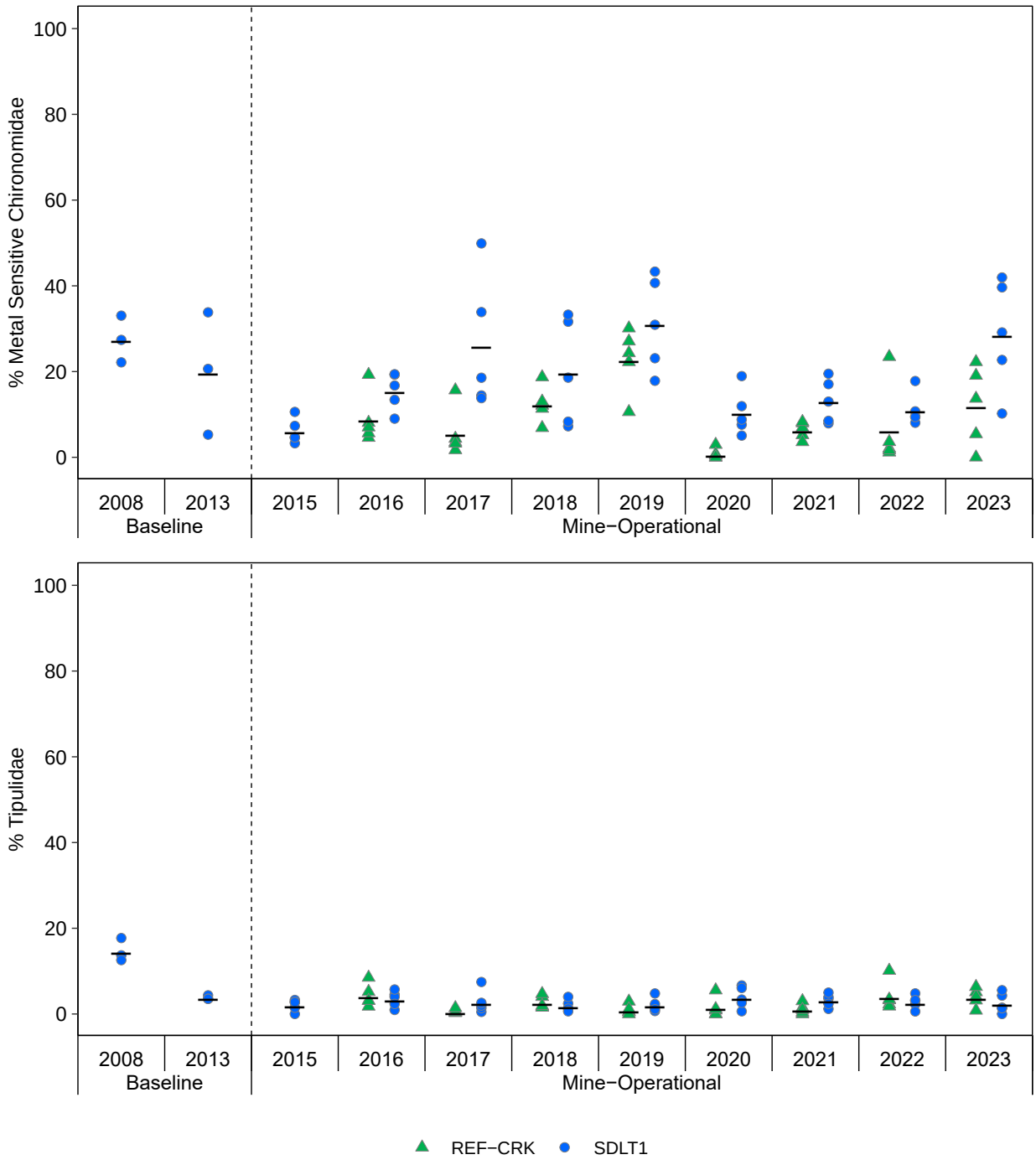

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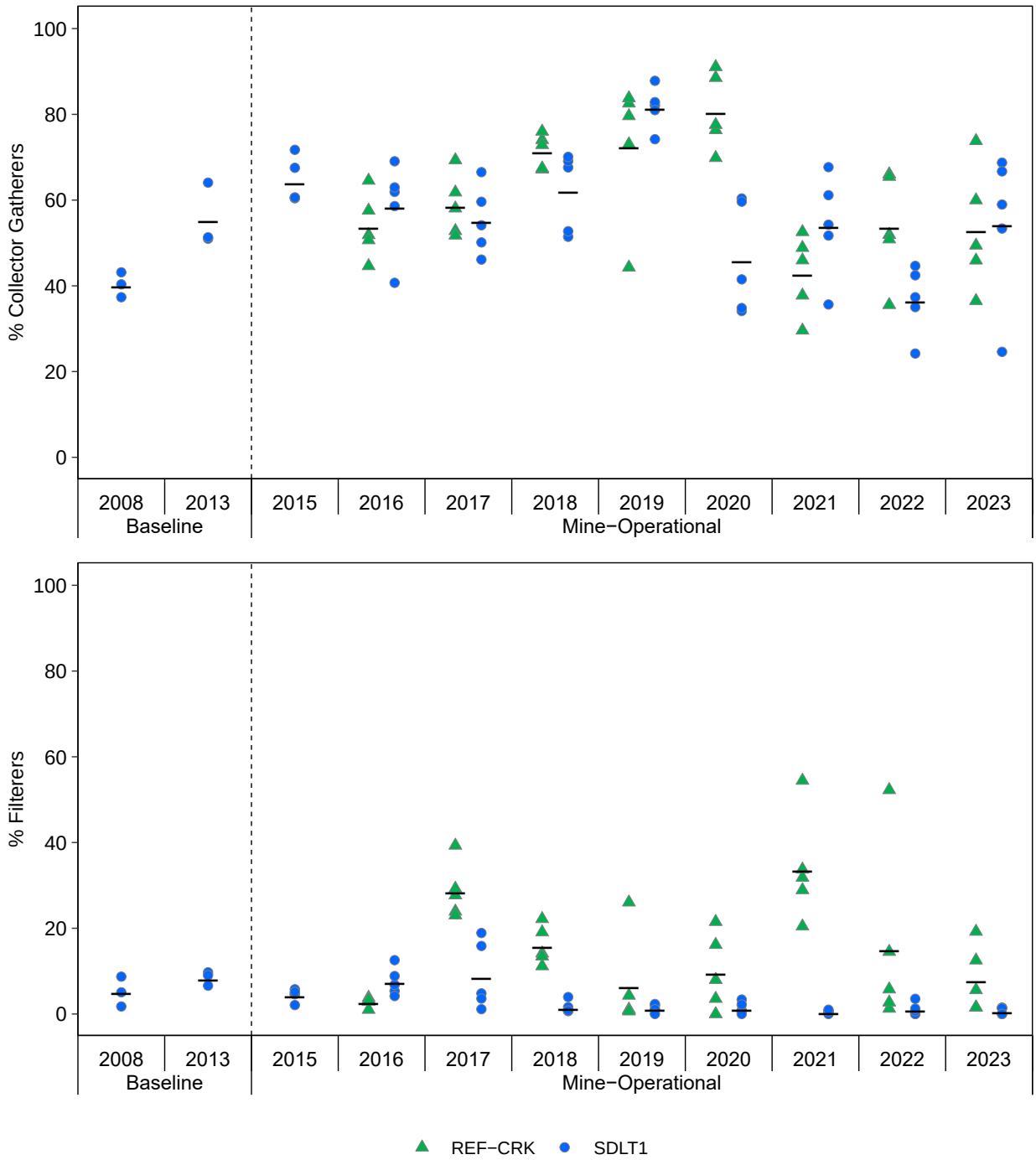

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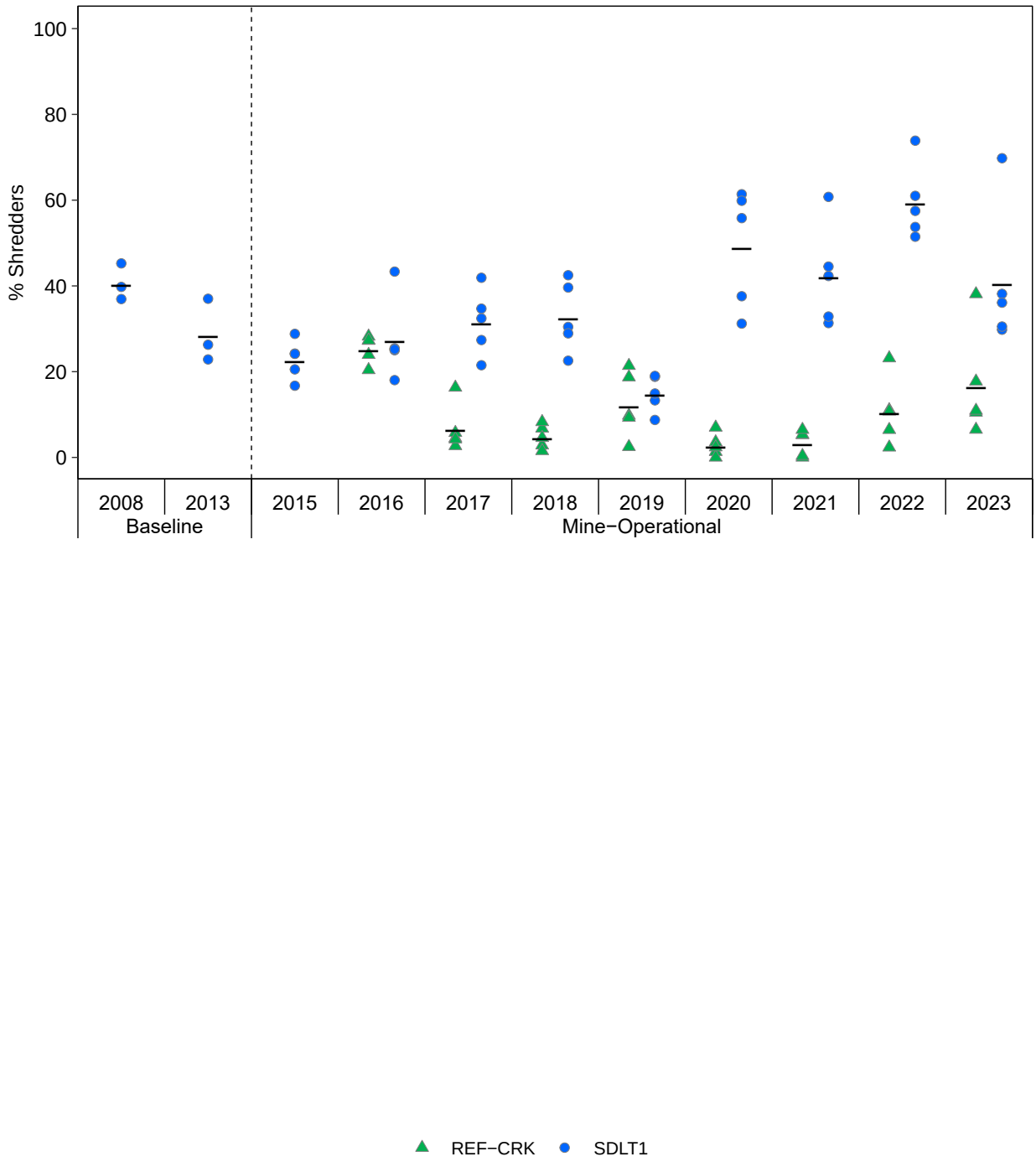

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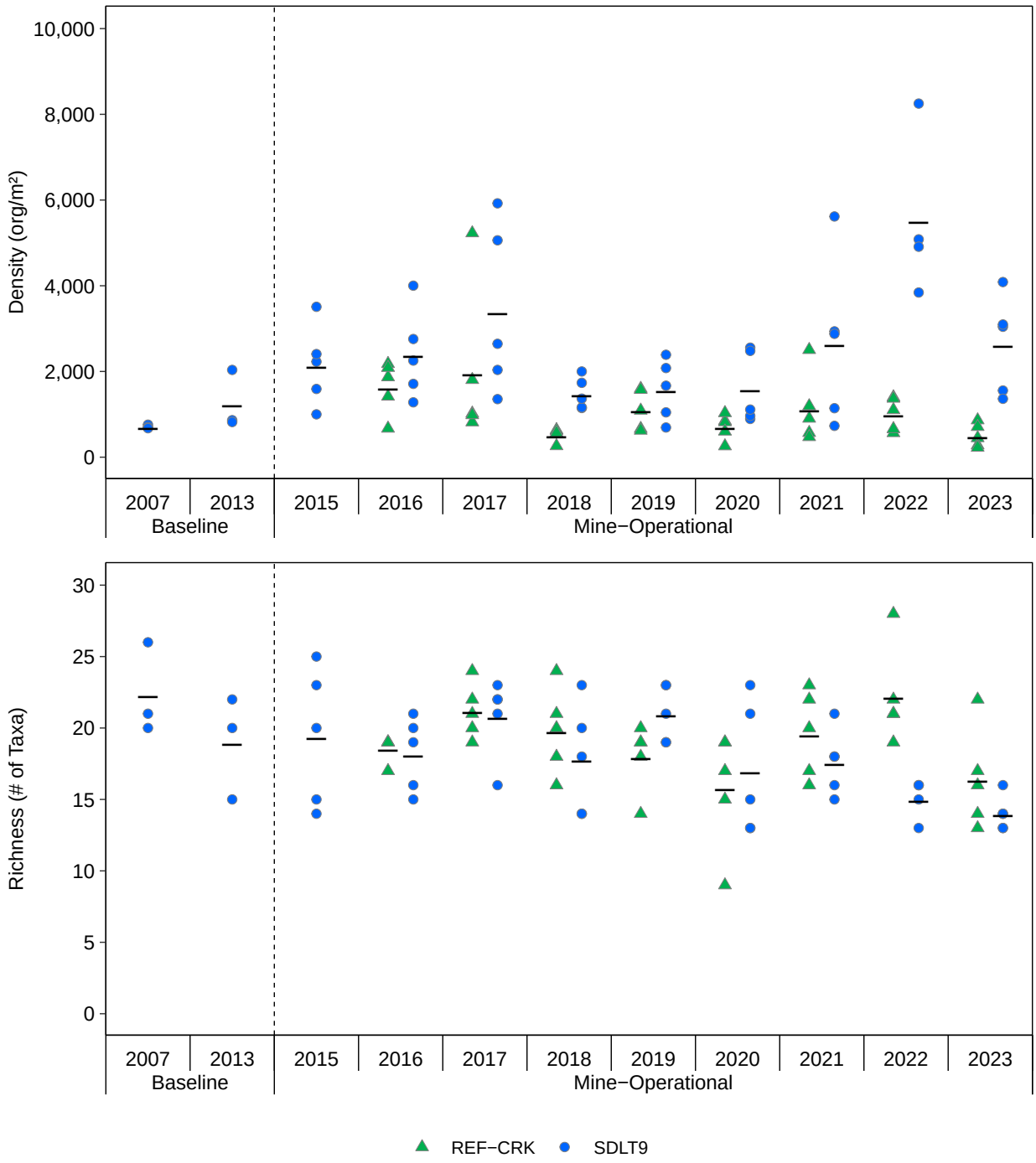

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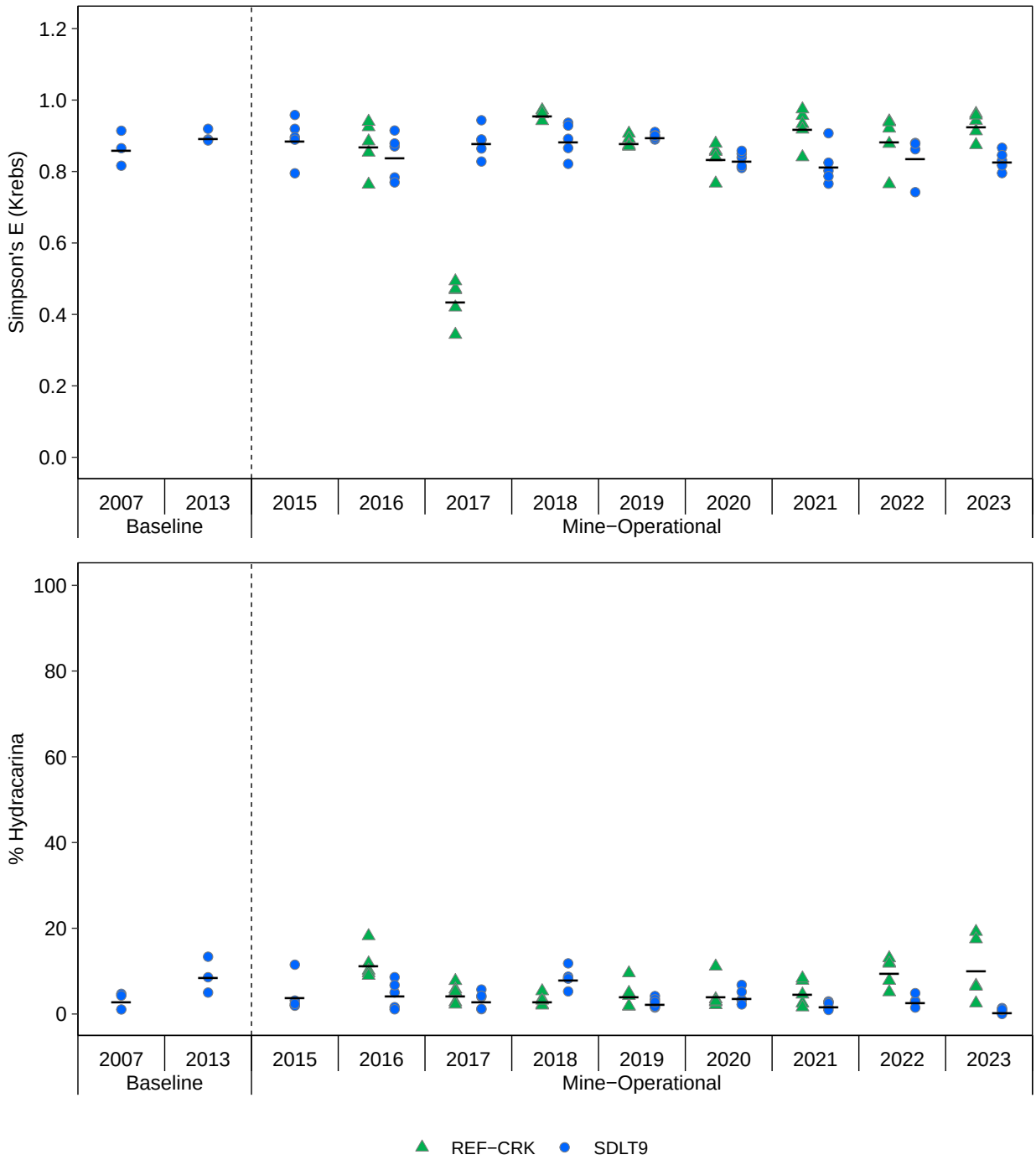

Figure F.8: Benthic Invertebrate Community Endpoints at Sheardown Lake Tributary 9 (SDLT9) and Unnamed Reference Creek (REF−CRK) Areas among Mine Baseline (2007 and 2013) and Operational (2015 to 2023) Periods

Notes: Green represents reference areas and blue represents mine−exposed areas. Bars indicate means of replicates.

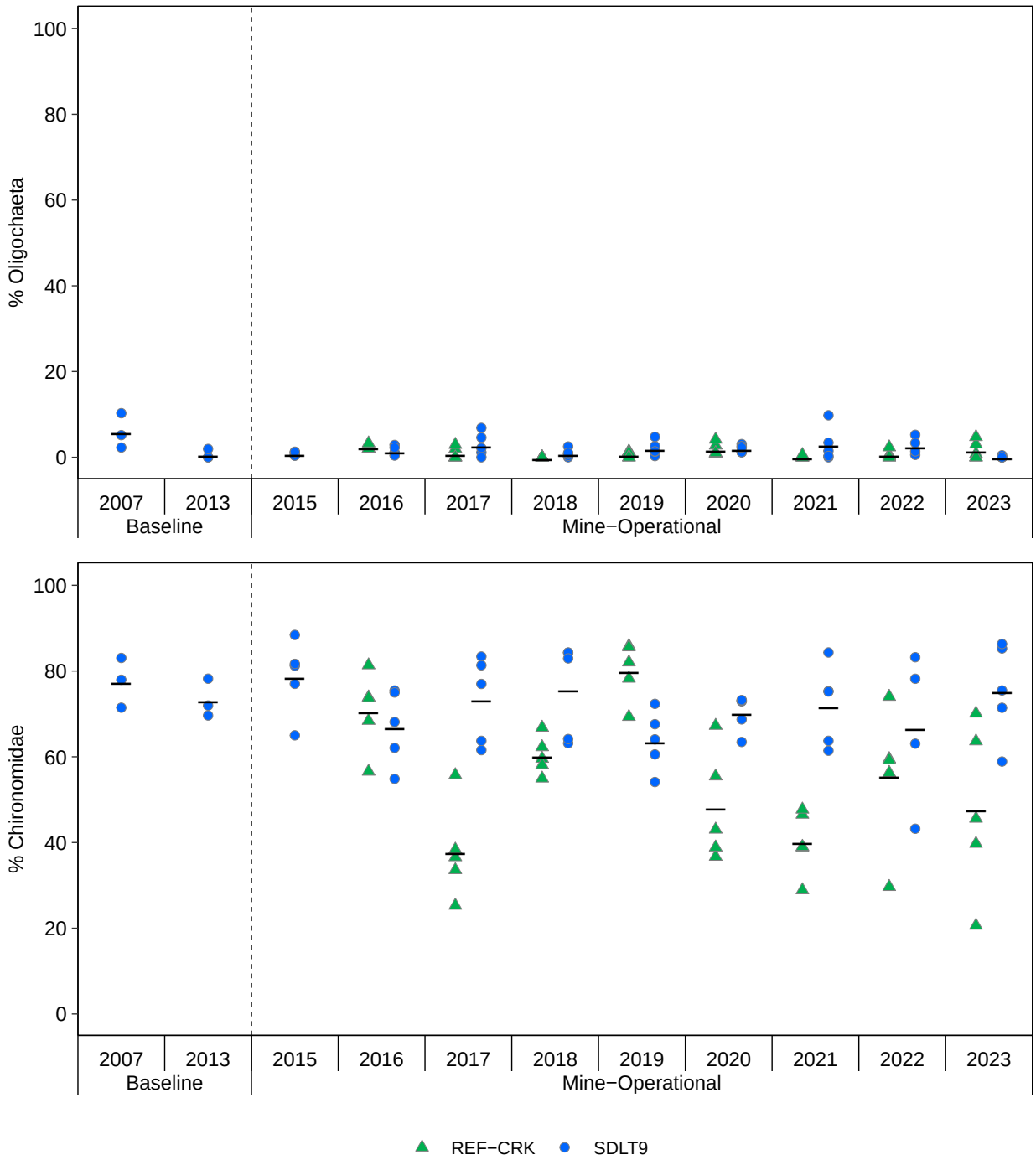

Figure F.8: Benthic Invertebrate Community Endpoints at Sheardown Lake Tributary 9 (SDLT9) and Unnamed Reference Creek (REF−CRK) Areas among Mine Baseline (2007 and 2013) and Operational (2015 to 2023) Periods

Notes: Green represents reference areas and blue represents mine−exposed areas. Bars indicate means of replicates.

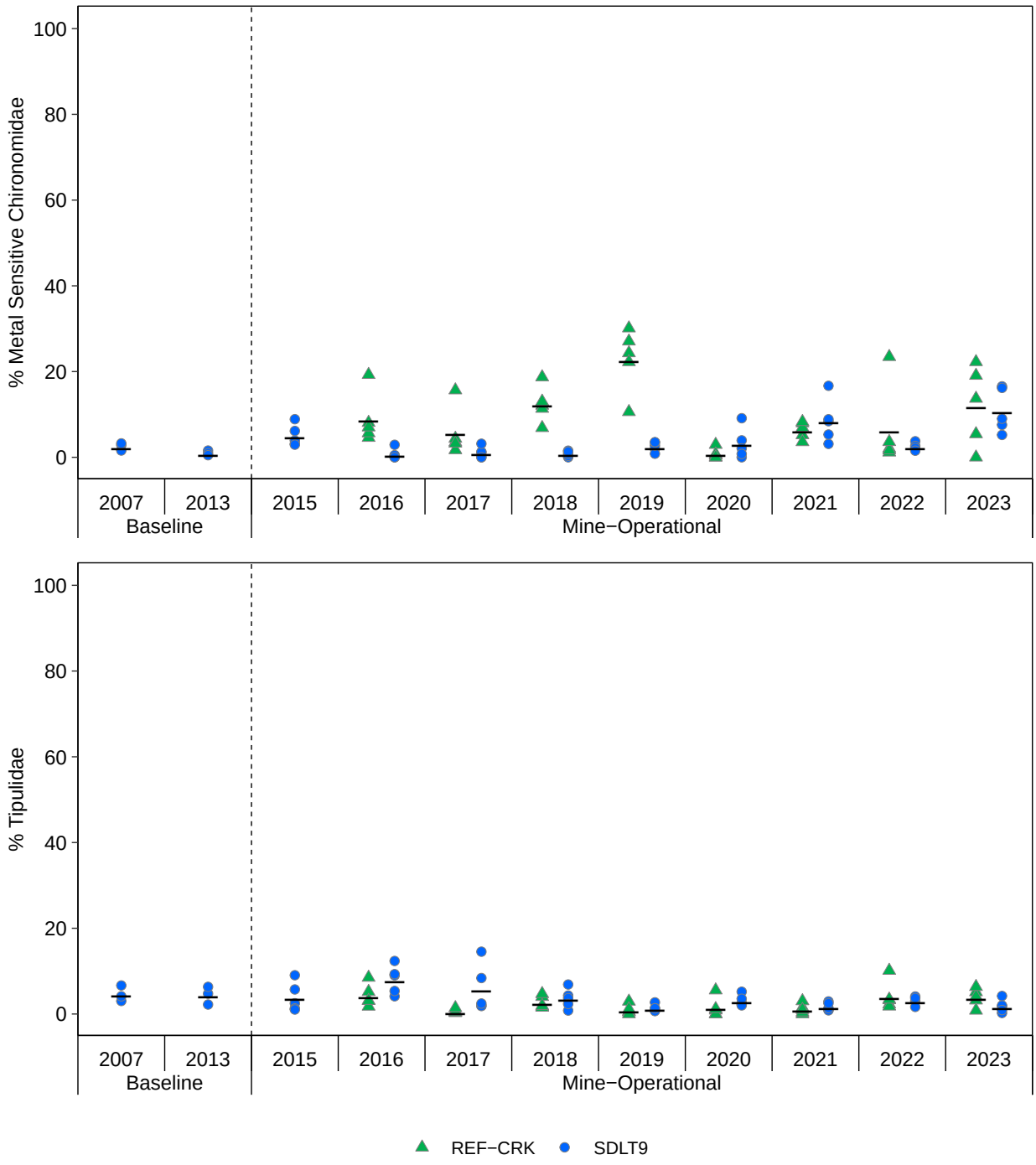

Figure F.8: Benthic Invertebrate Community Endpoints at Sheardown Lake Tributary 9 (SDLT9) and Unnamed Reference Creek (REF−CRK) Areas among Mine Baseline (2007 and 2013) and Operational (2015 to 2023) Periods

Notes: Green represents reference areas and blue represents mine−exposed areas. Bars indicate means of replicates.

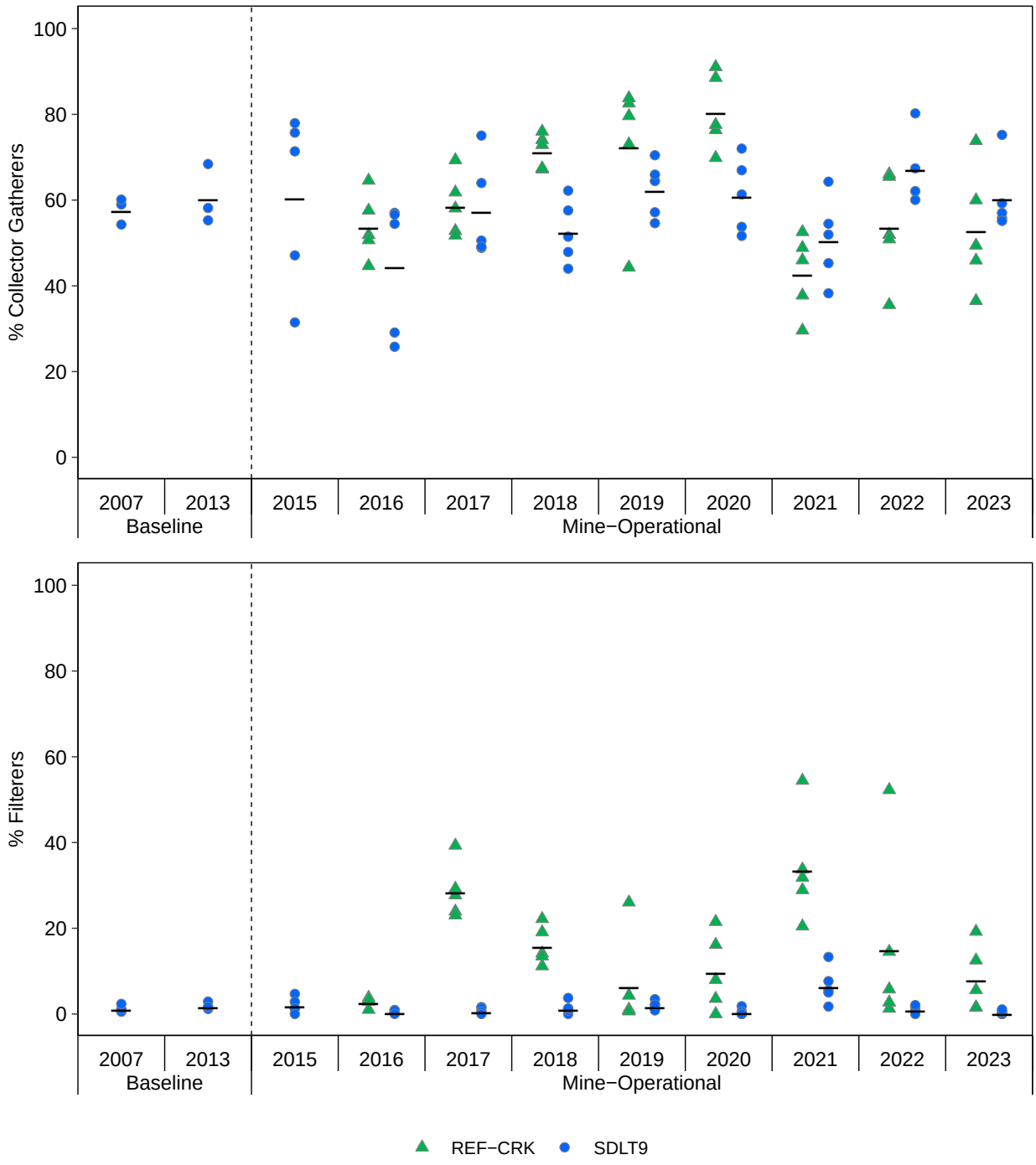

Figure F.8: Benthic Invertebrate Community Endpoints at Sheardown Lake Tributary 9 (SDLT9) and Unnamed Reference Creek (REF−CRK) Areas among Mine Baseline (2007 and 2013) and Operational (2015 to 2023) Periods

Notes: Green represents reference areas and blue represents mine−exposed areas. Bars indicate means of replicates.

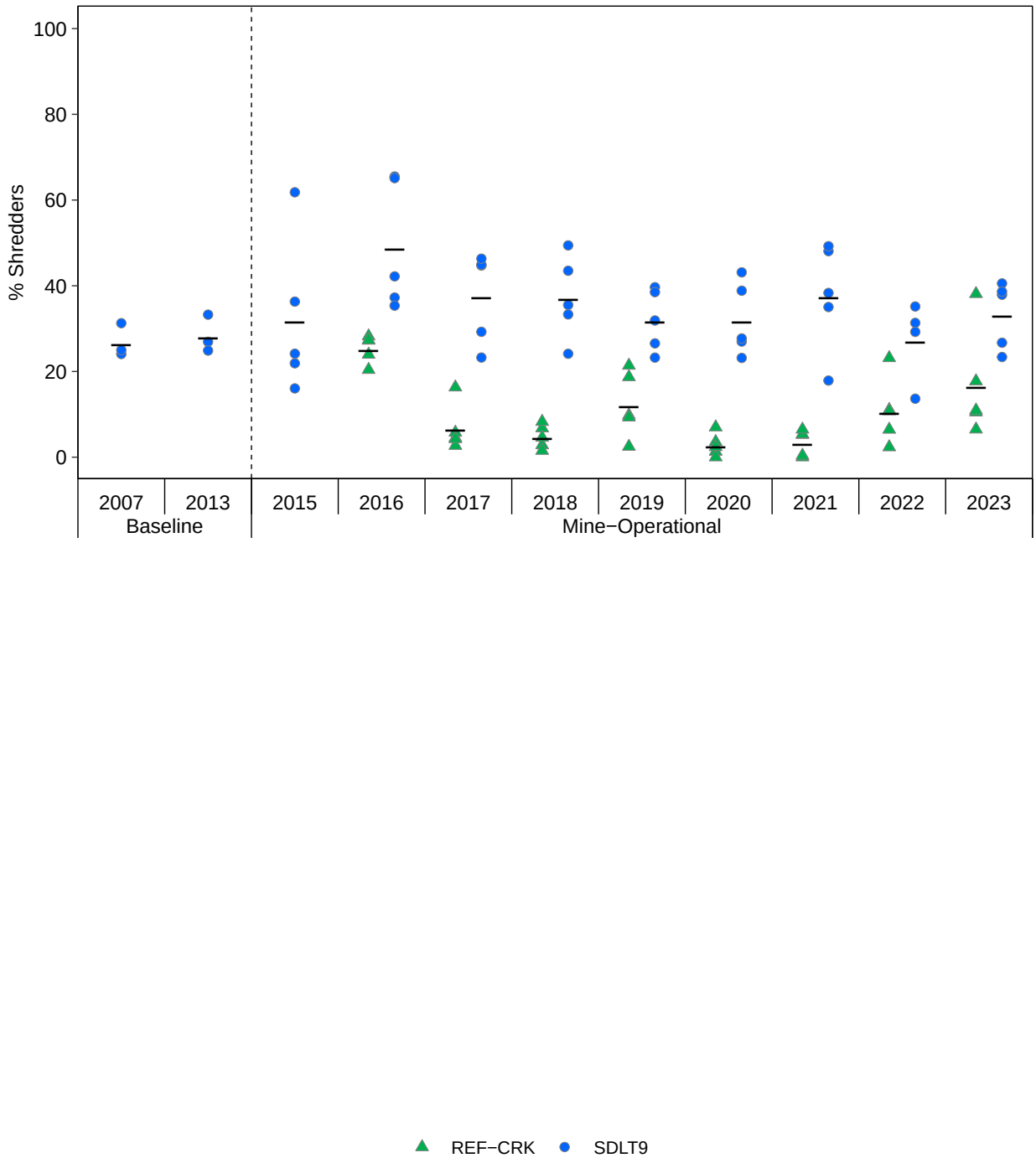

Figure F.8: Benthic Invertebrate Community Endpoints at Sheardown Lake Tributary 9 (SDLT9) and Unnamed Reference Creek (REF−CRK) Areas among Mine Baseline (2007 and 2013) and Operational (2015 to 2023) Periods

Notes: Green represents reference areas and blue represents mine−exposed areas. Bars indicate means of replicates.

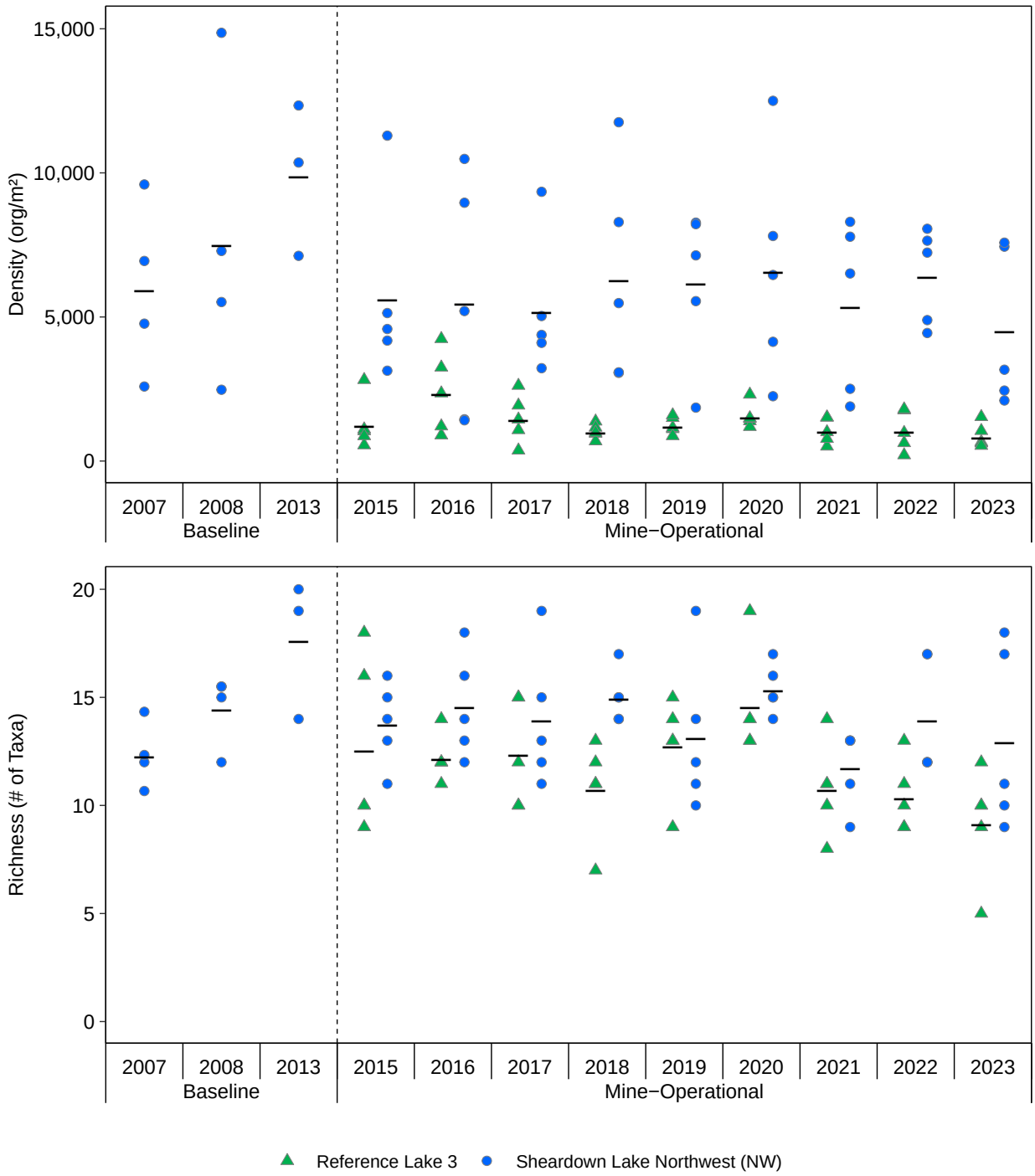

Figure F.9: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

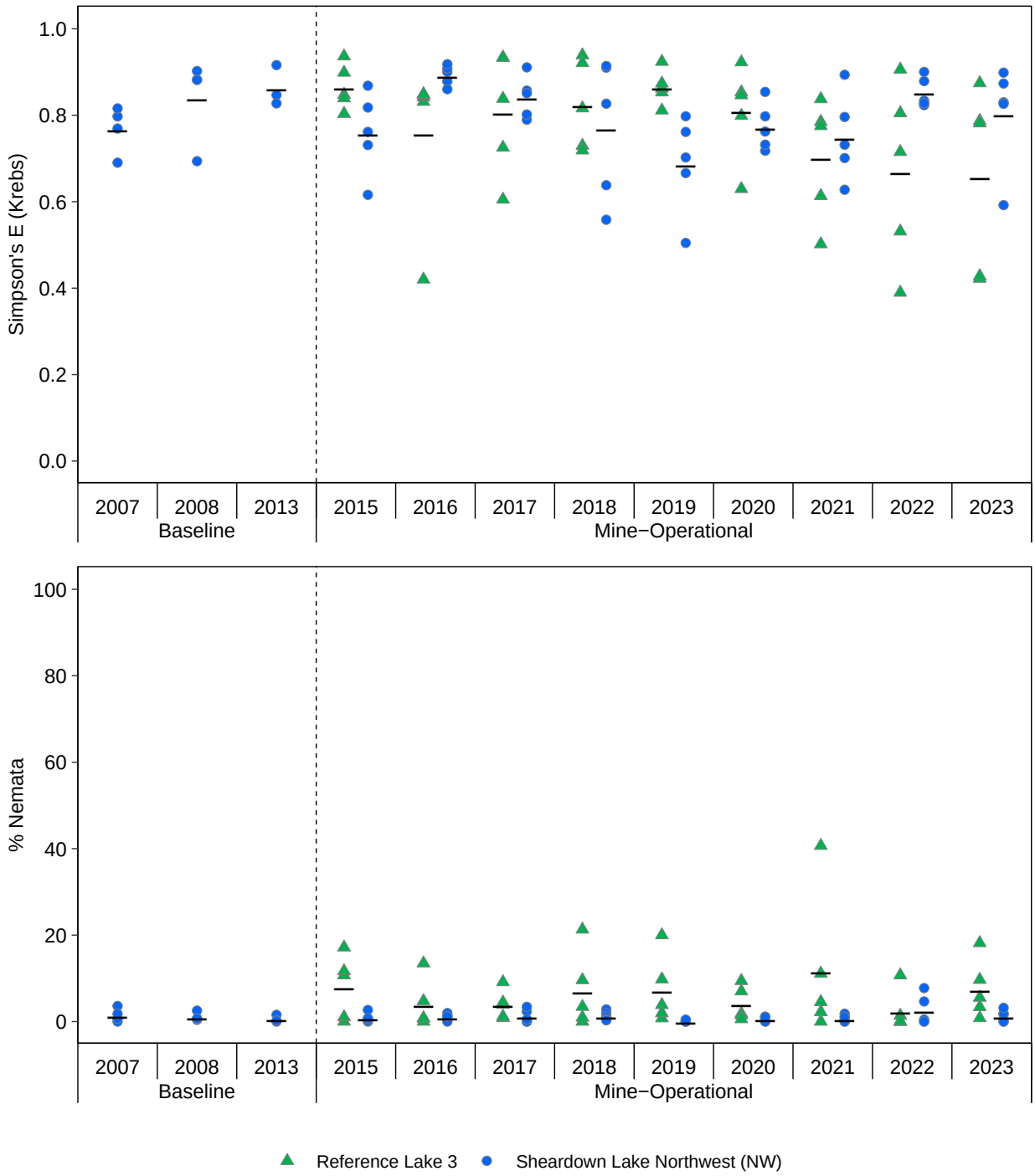

Figure F.9: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

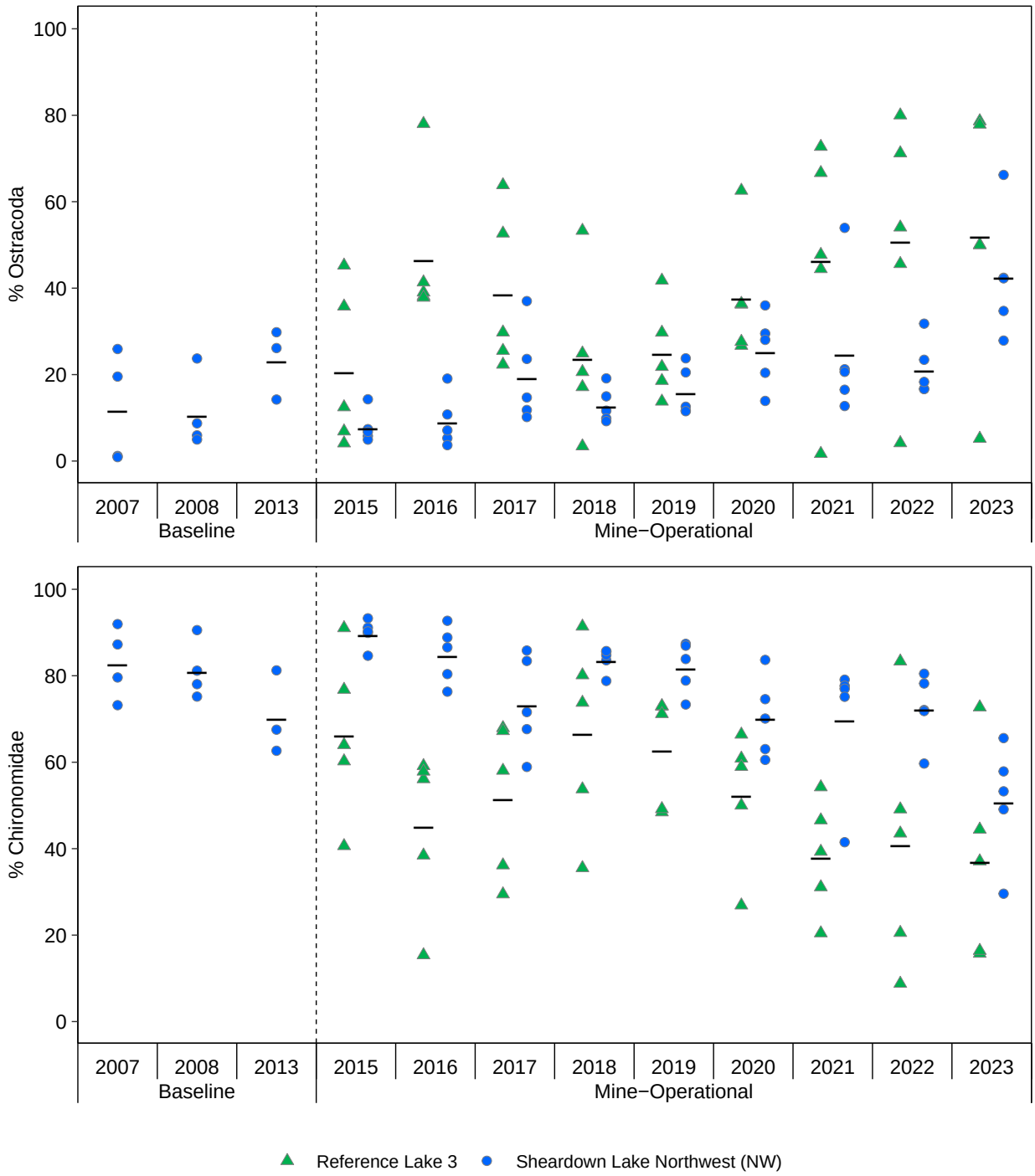

Figure F.9: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

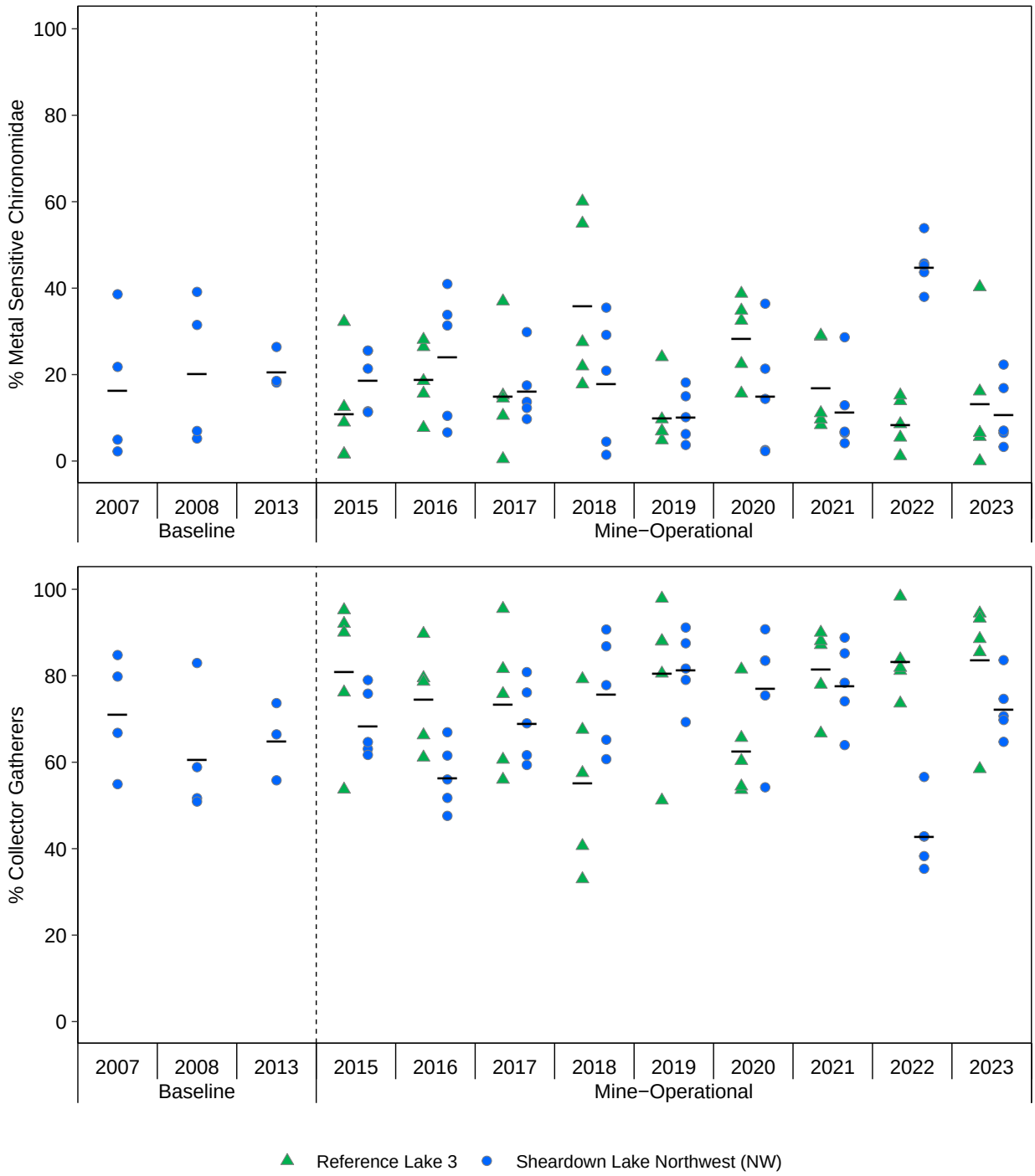

Figure F.9: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

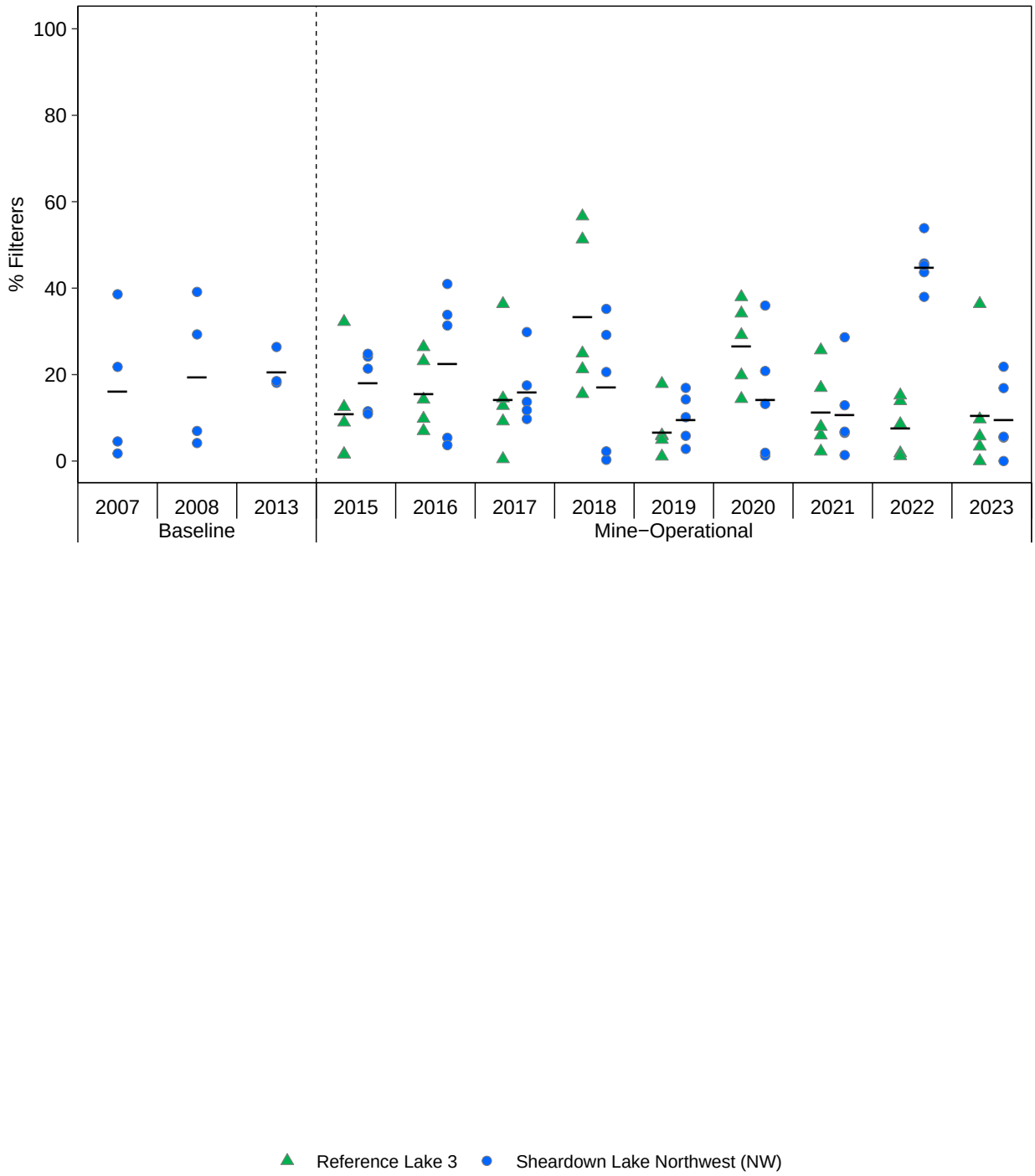

Figure F.9: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

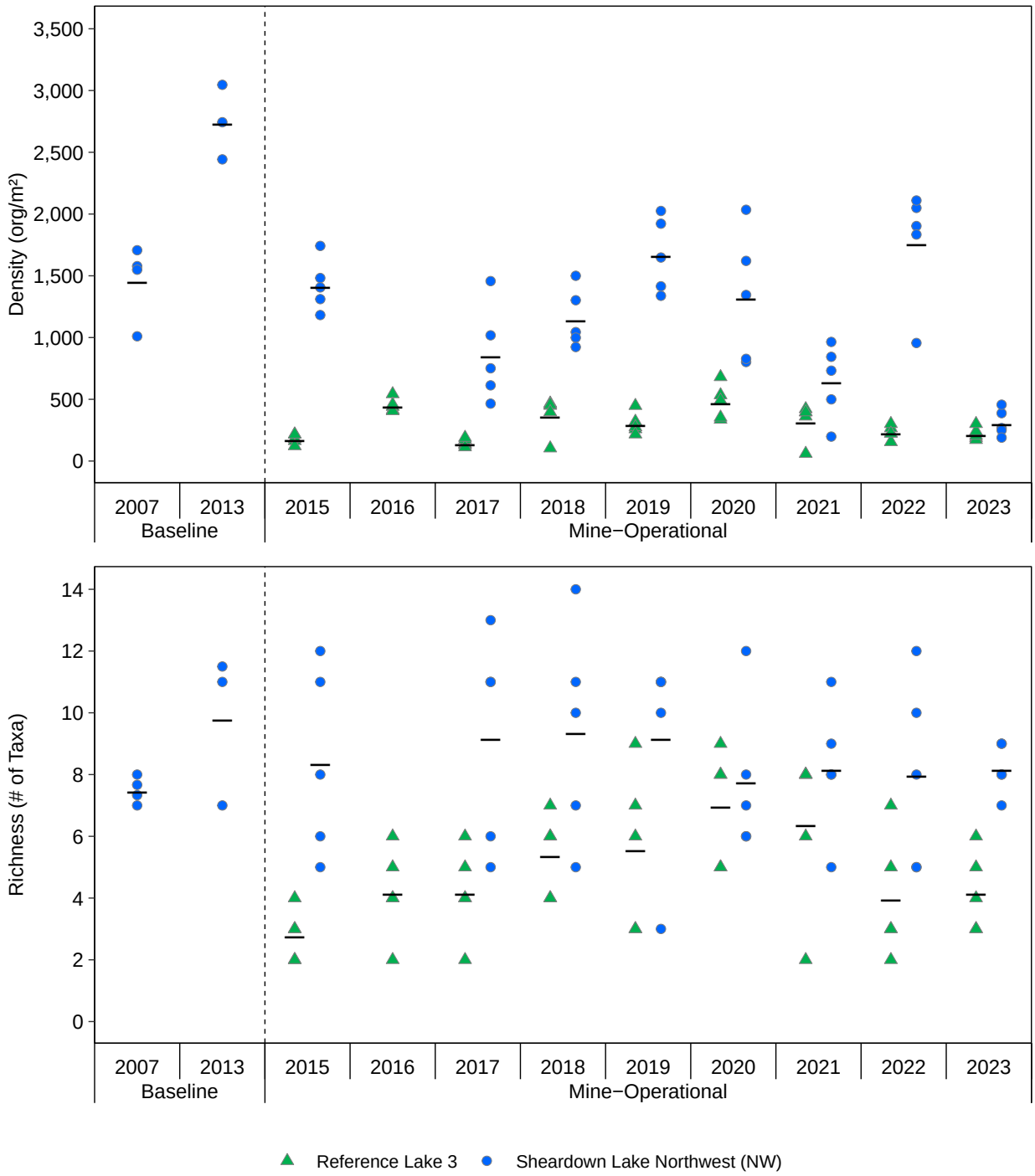

Figure F.10: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

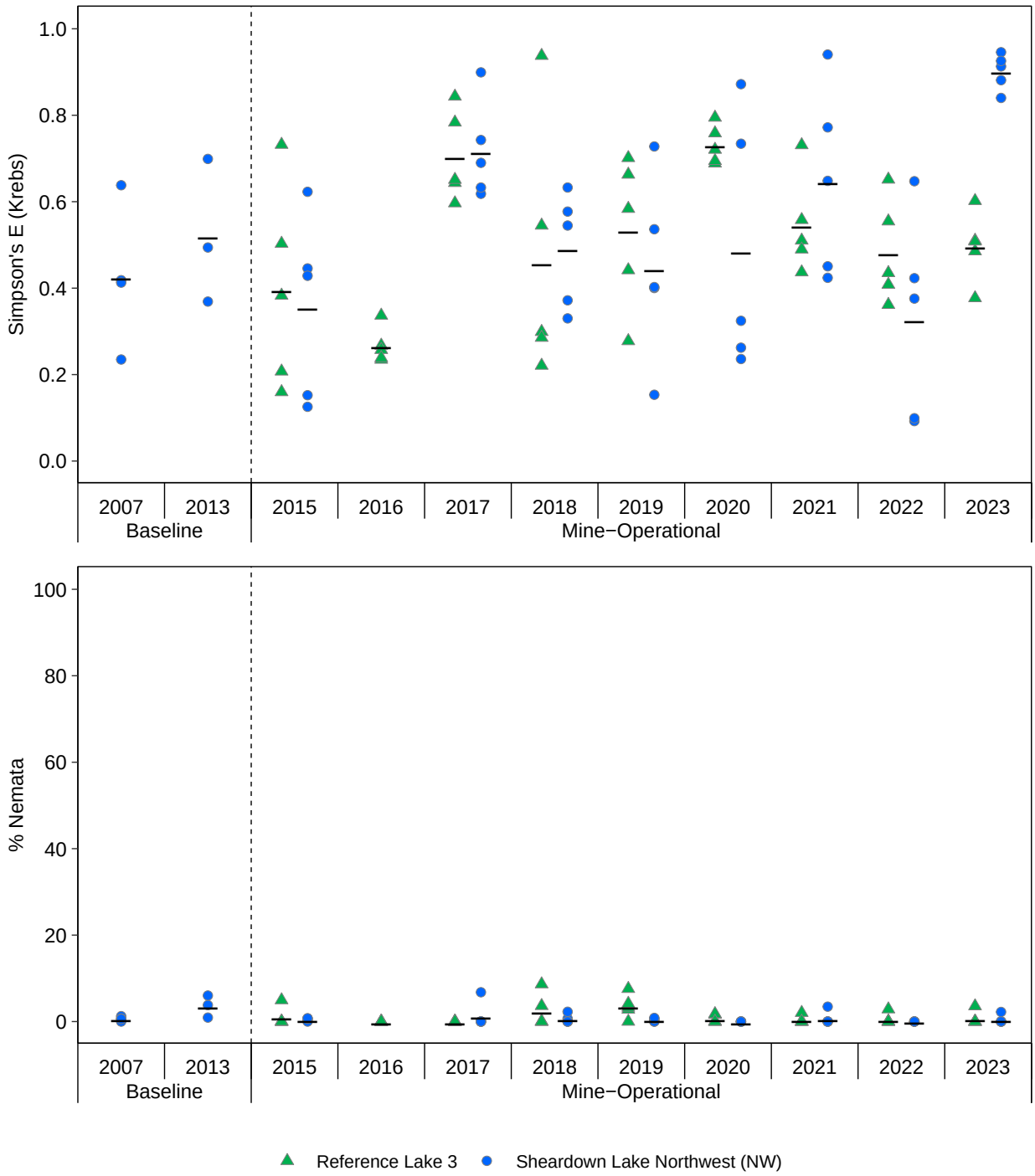

Figure F.10: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

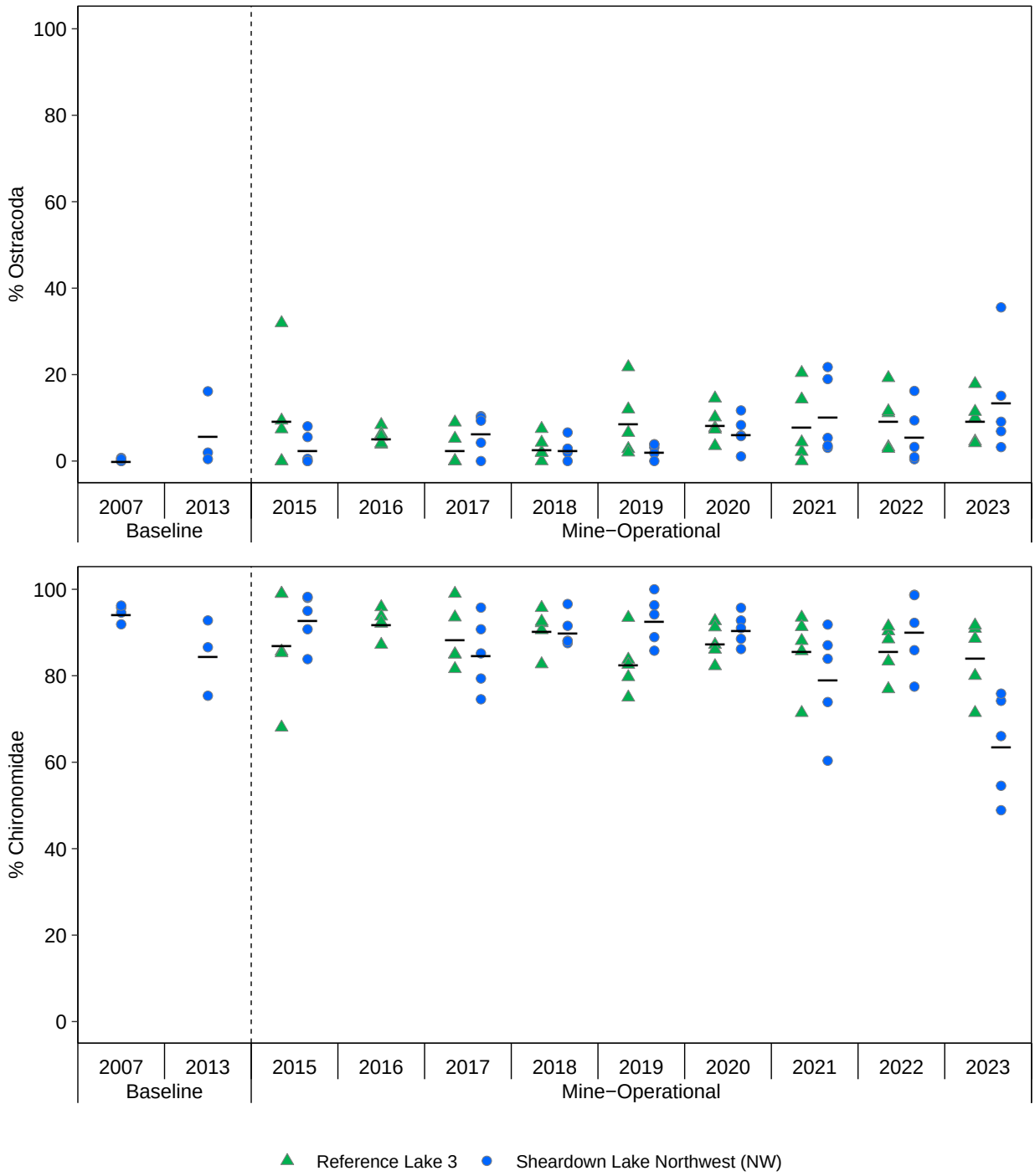

Figure F.10: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

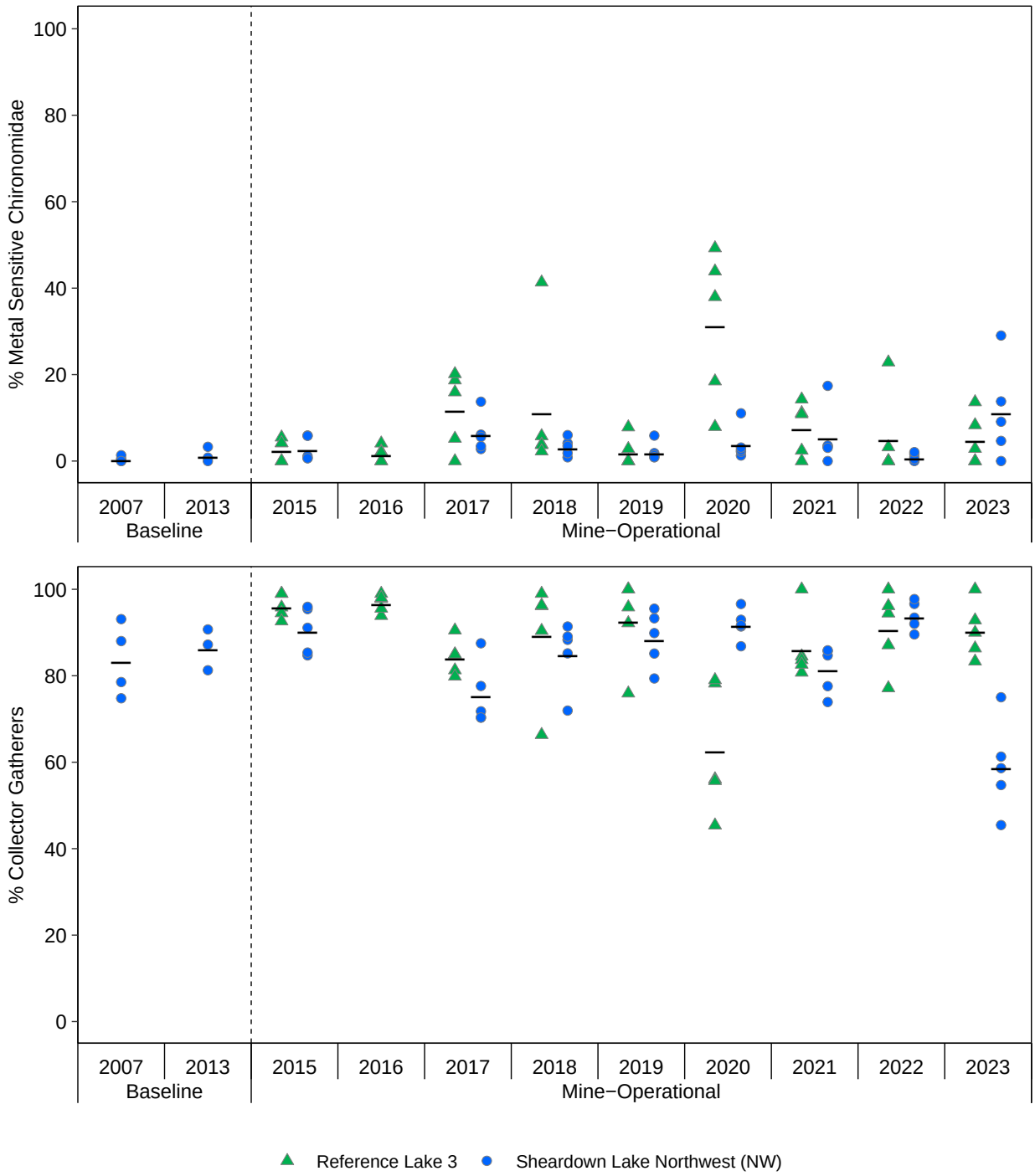

Figure F.10: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

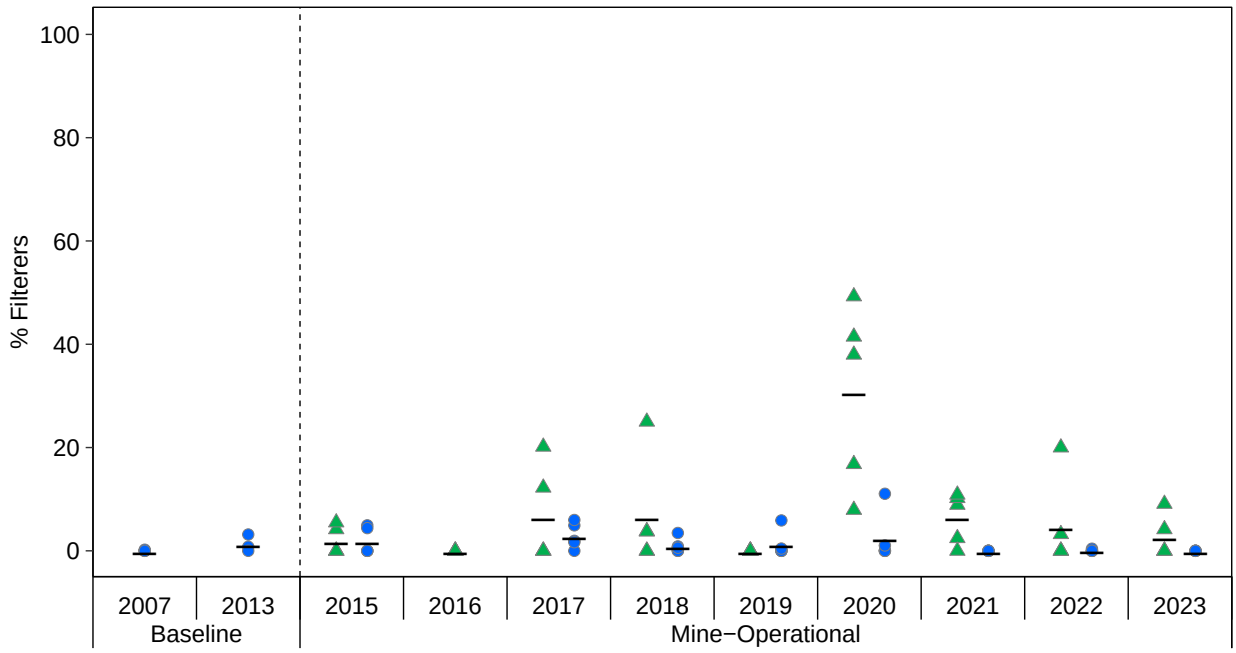

Figure F.10: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

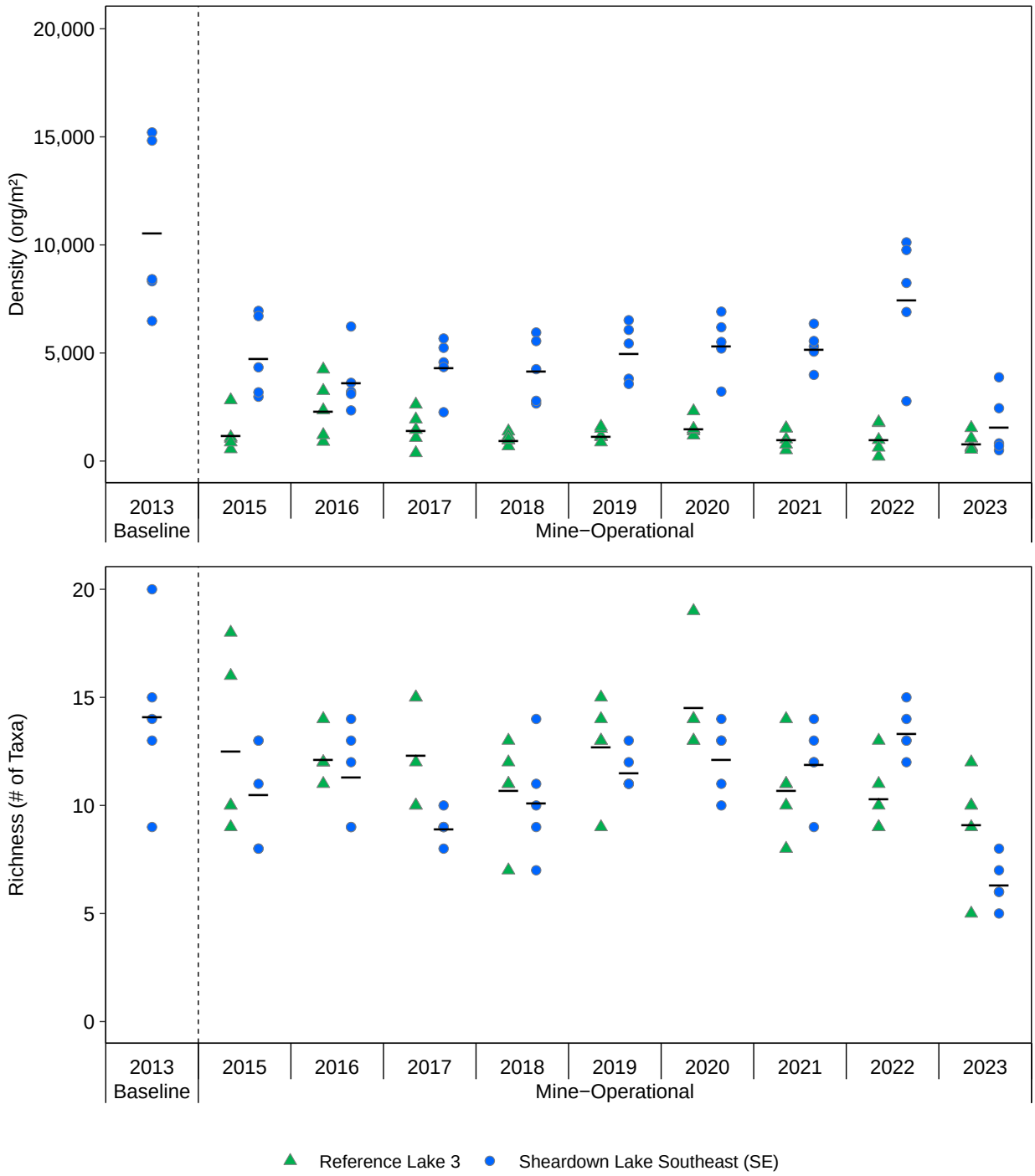

Figure F.11: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

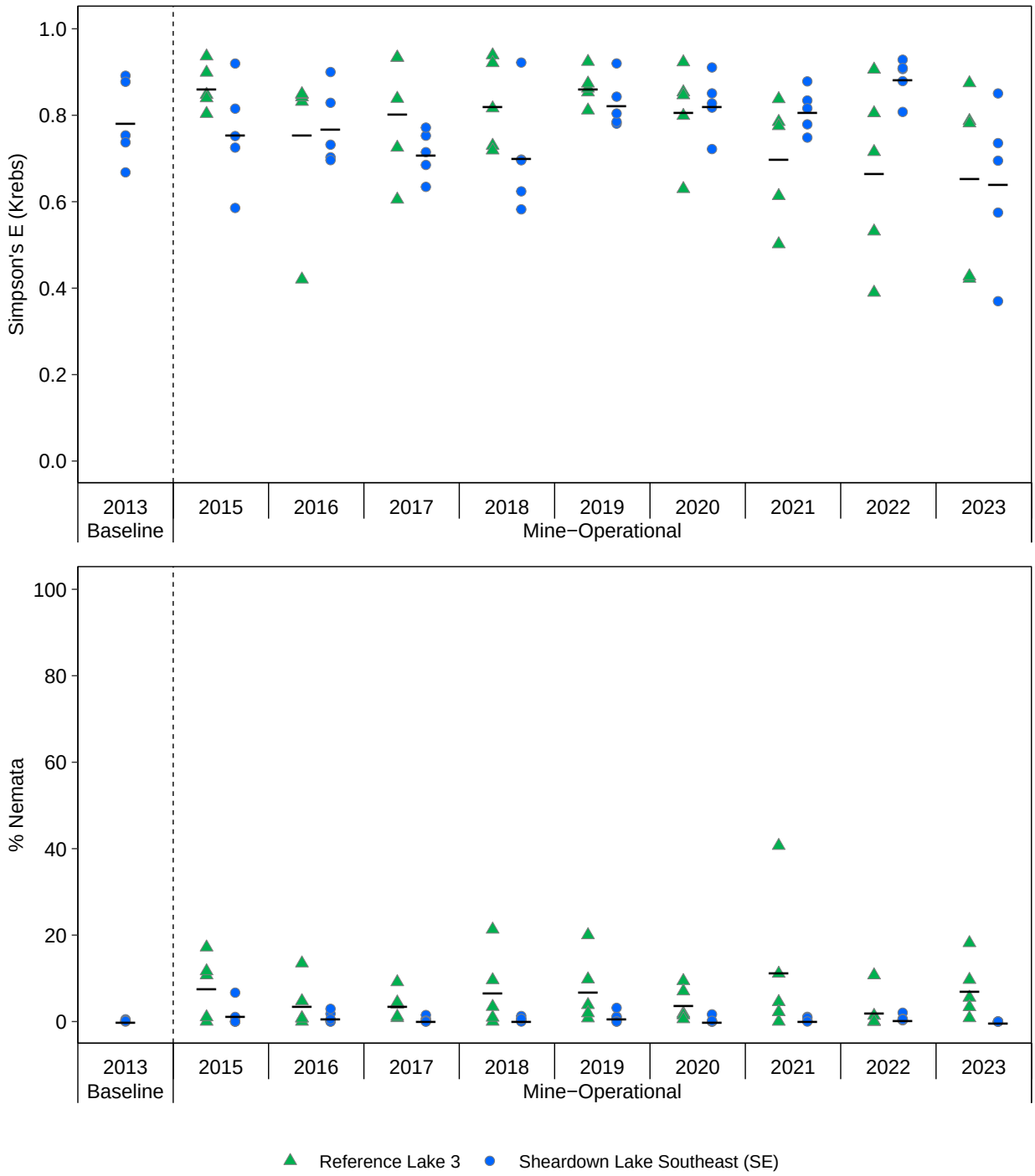

Figure F.11: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

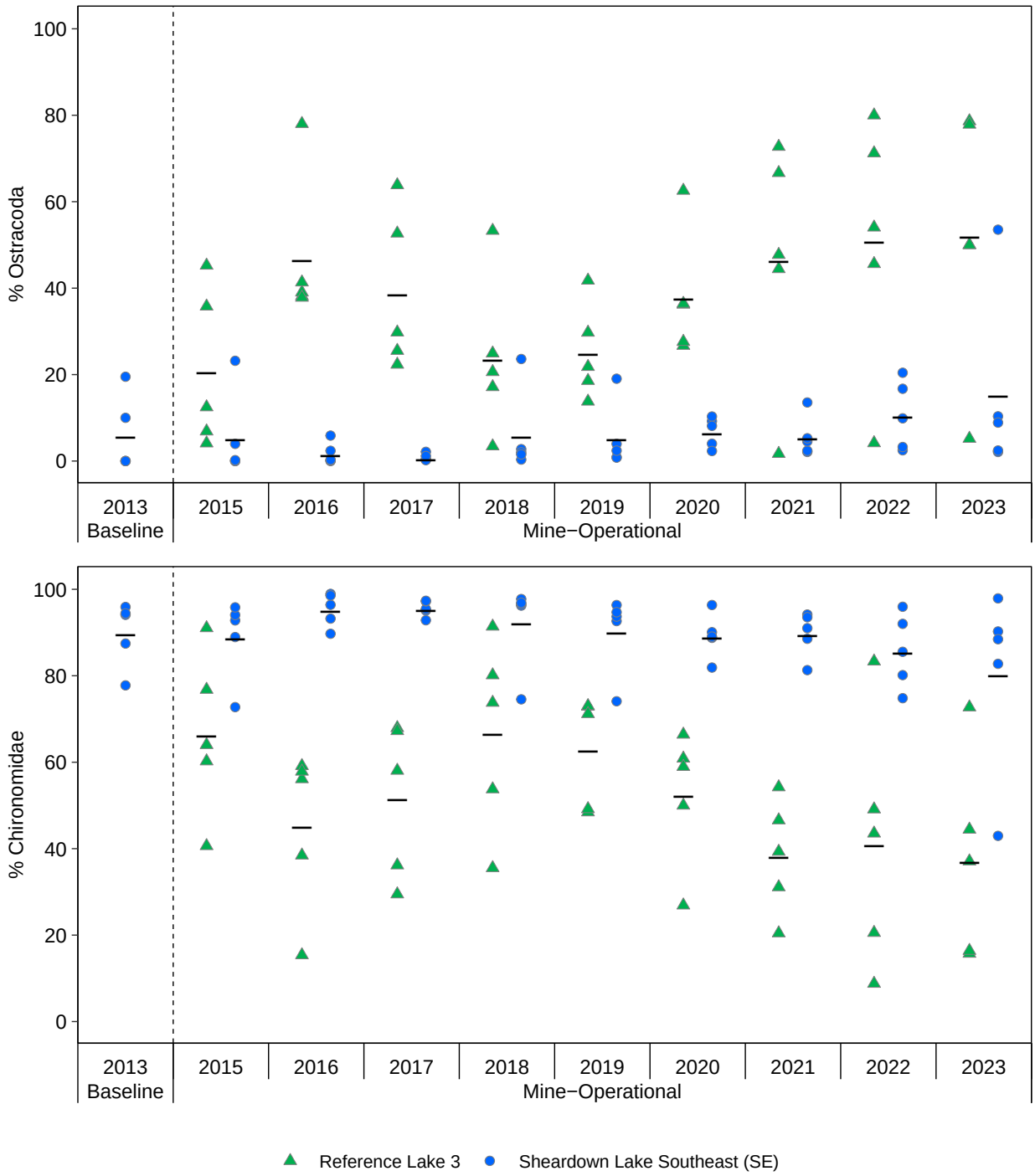

Figure F.11: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

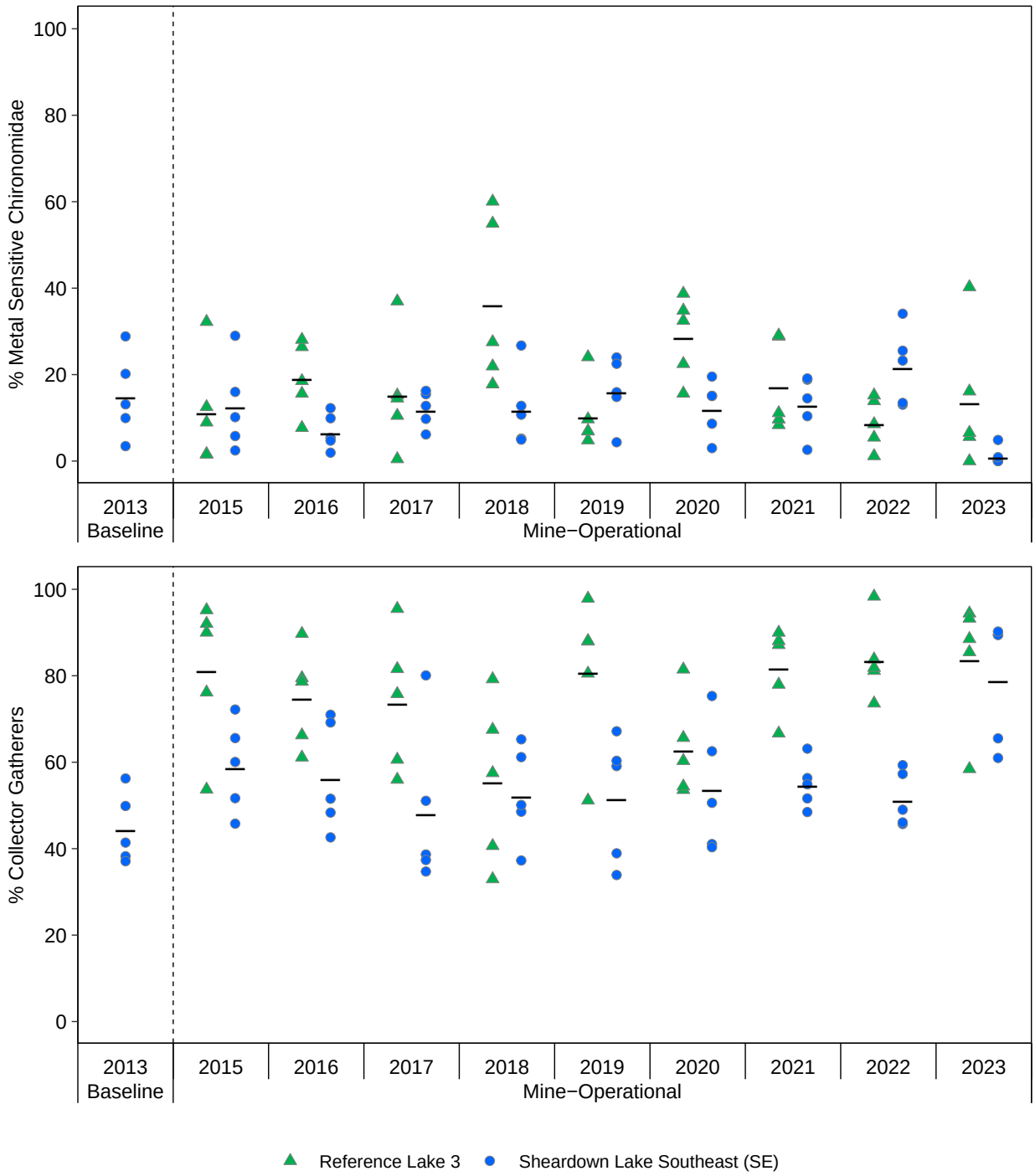

Figure F.11: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

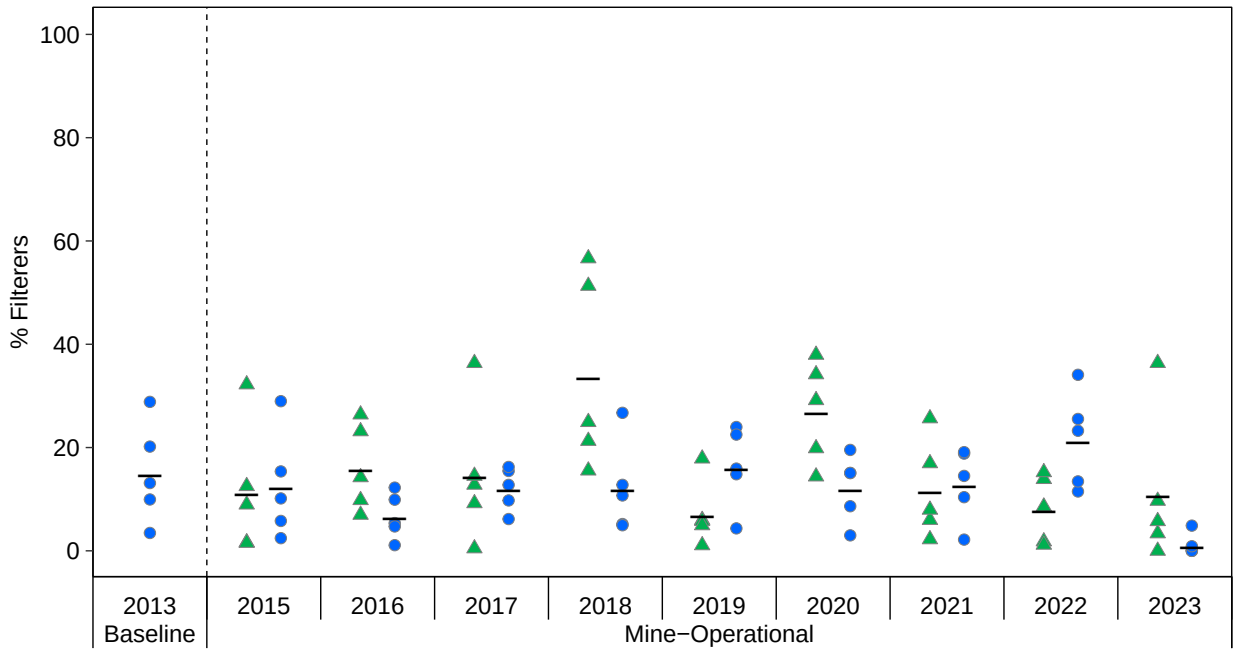

Figure F.11: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

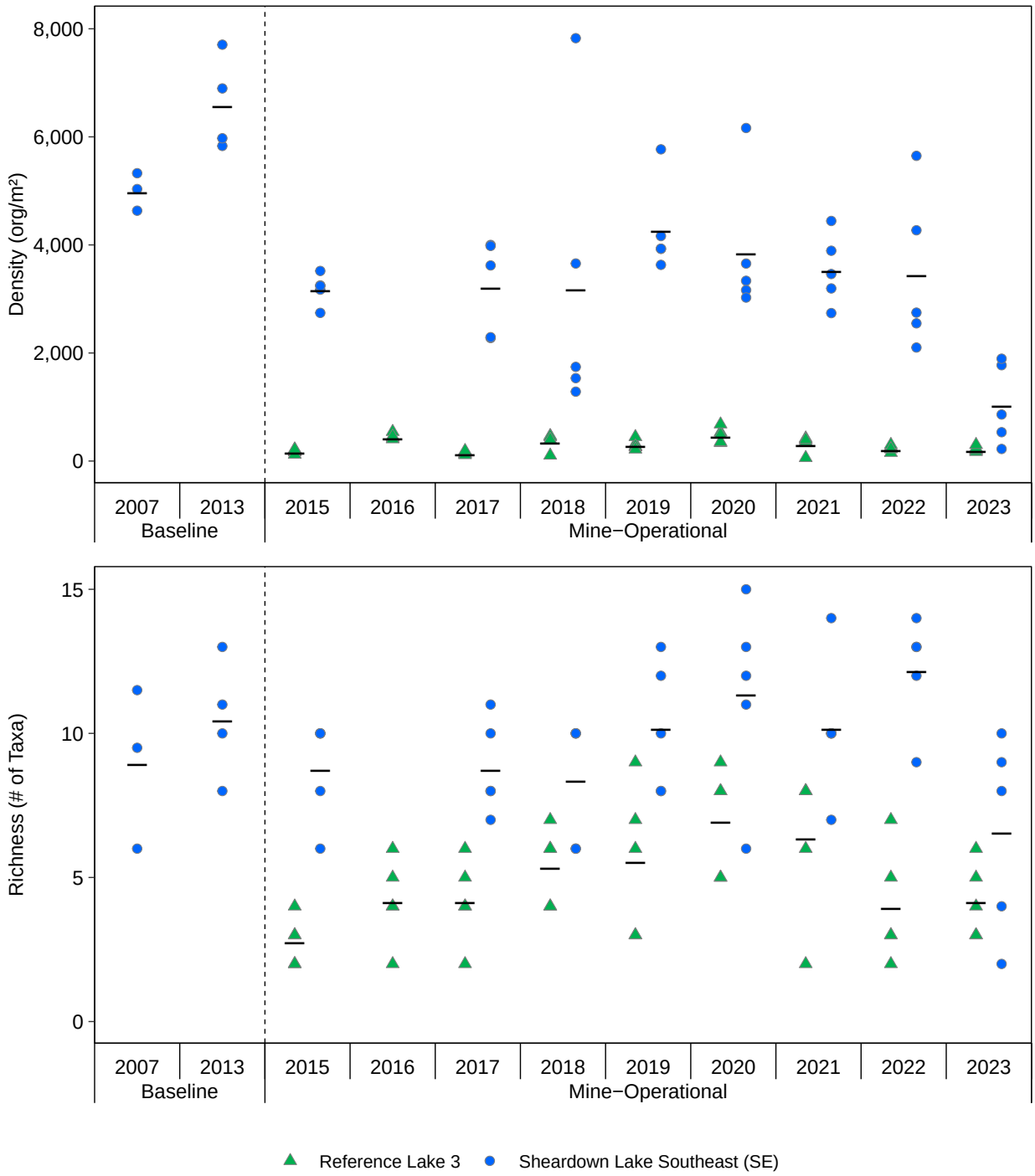

Figure F.12: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

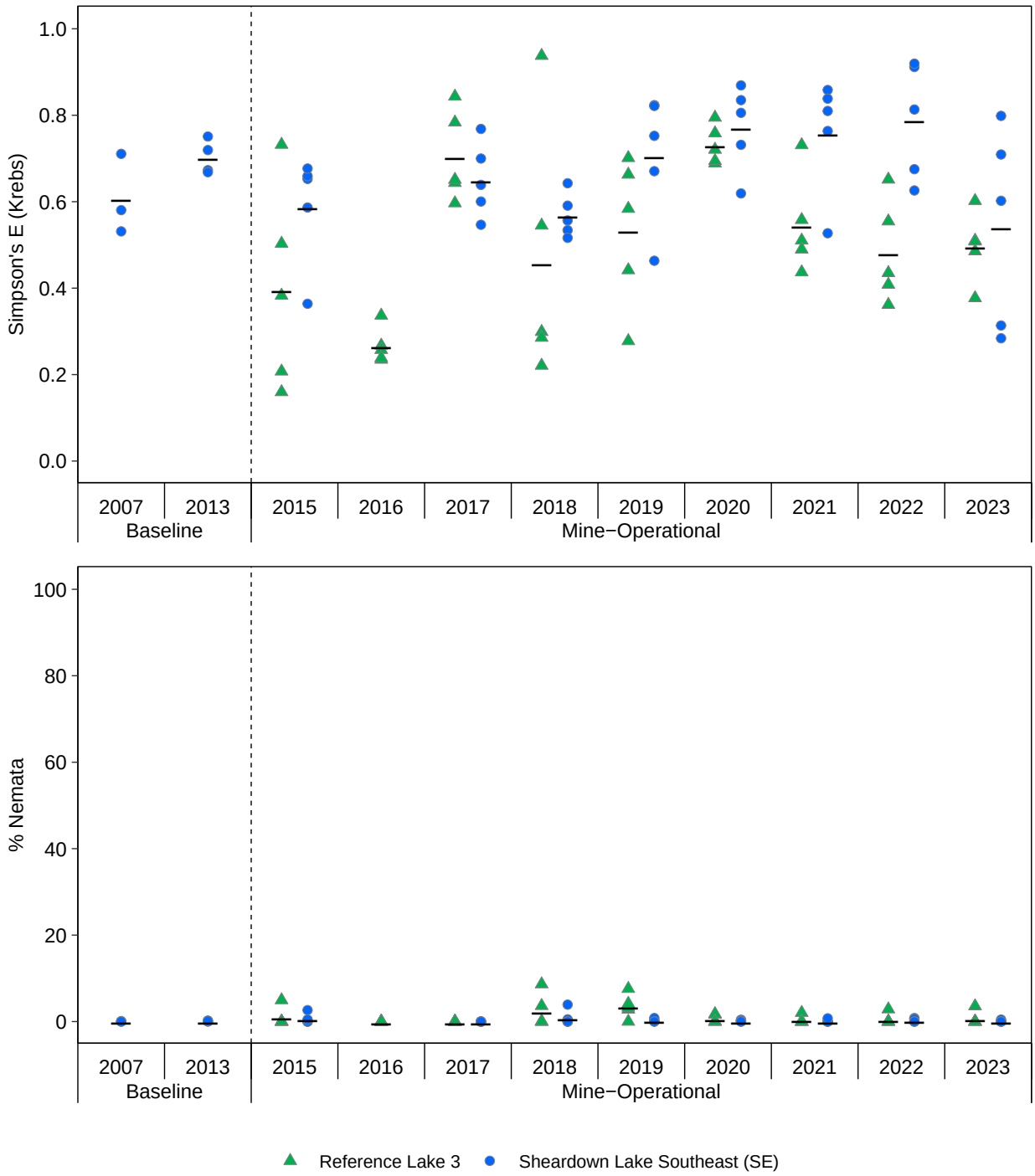

Figure F.12: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

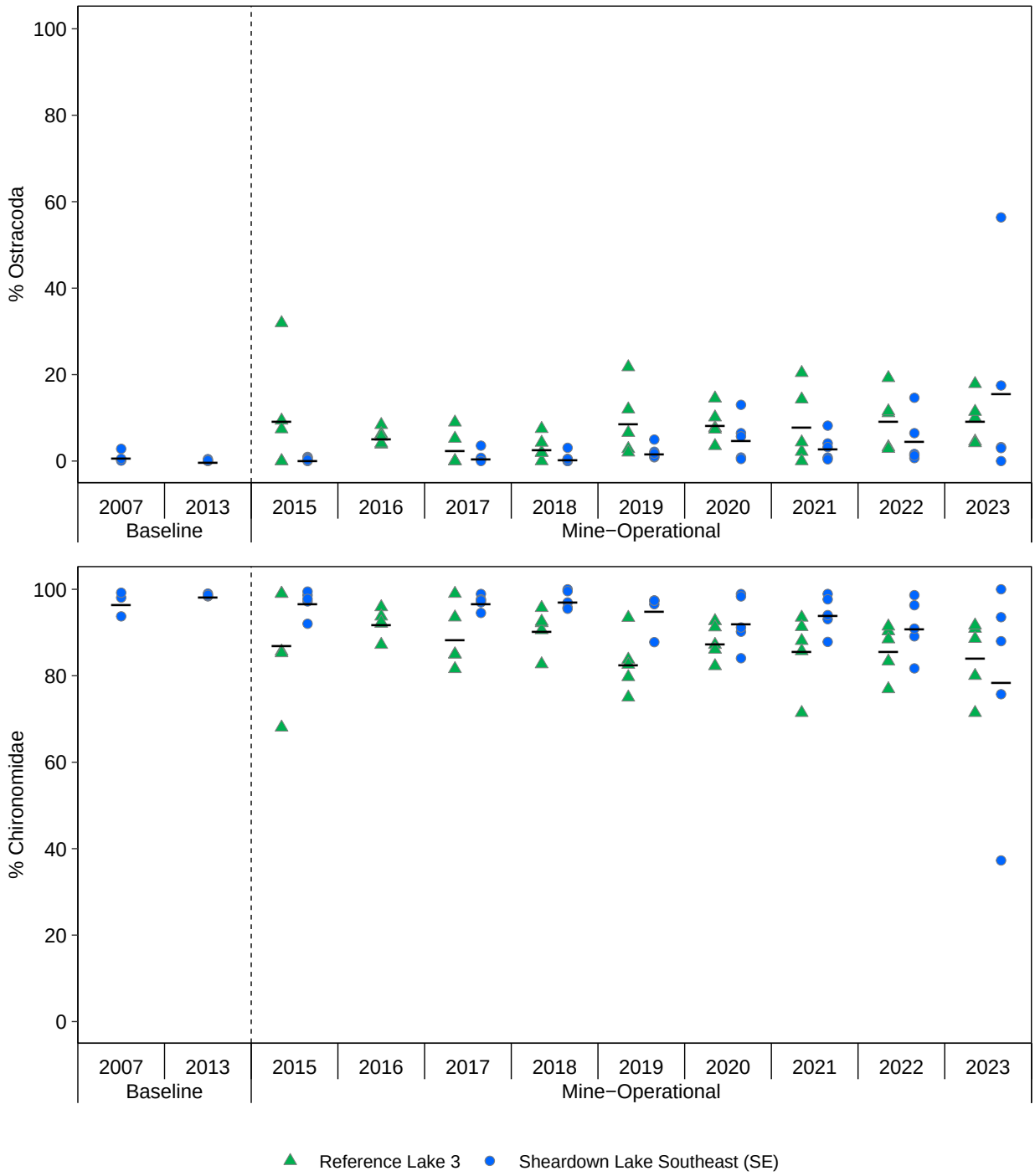

Figure F.12: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

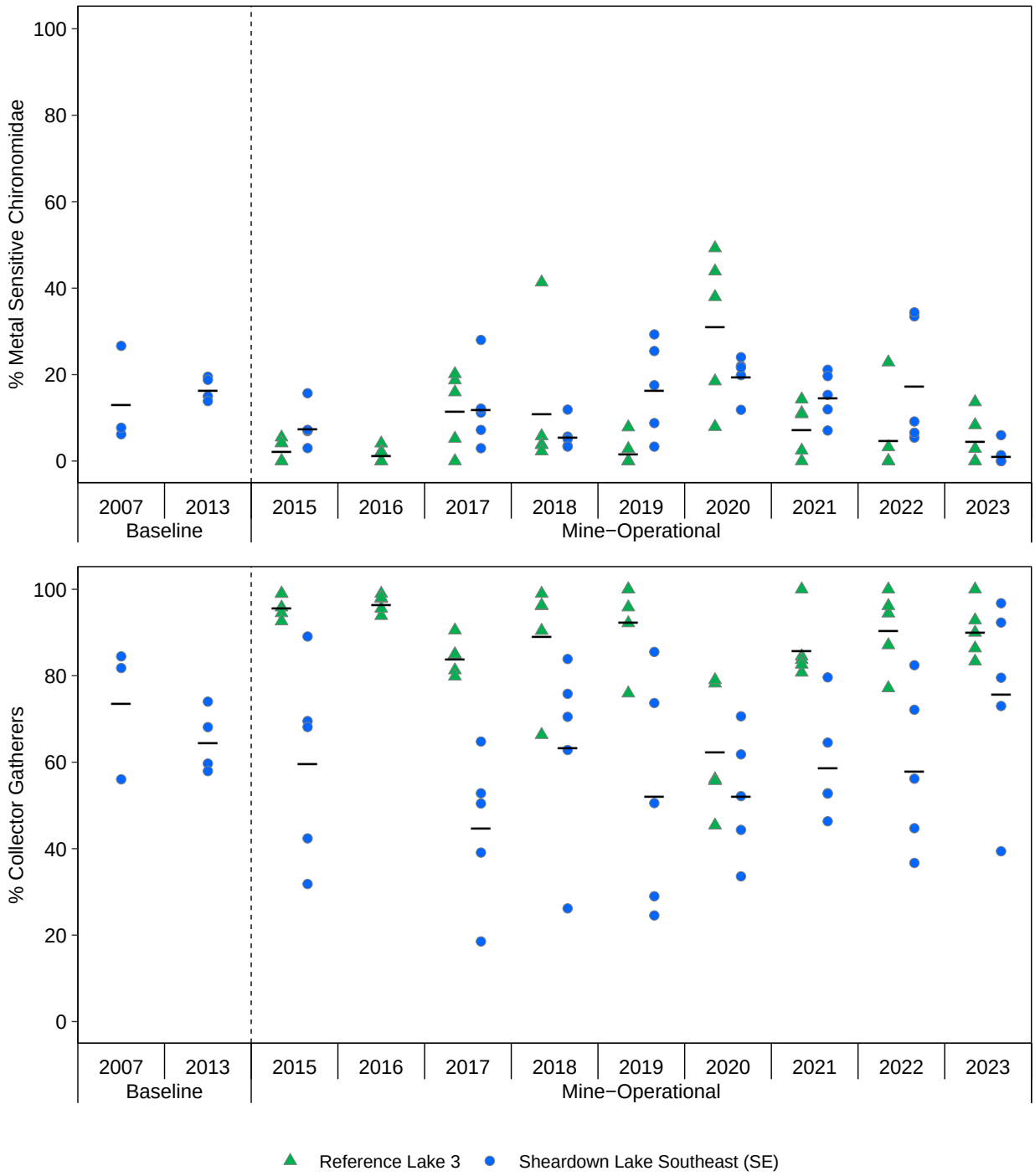

Figure F.12: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

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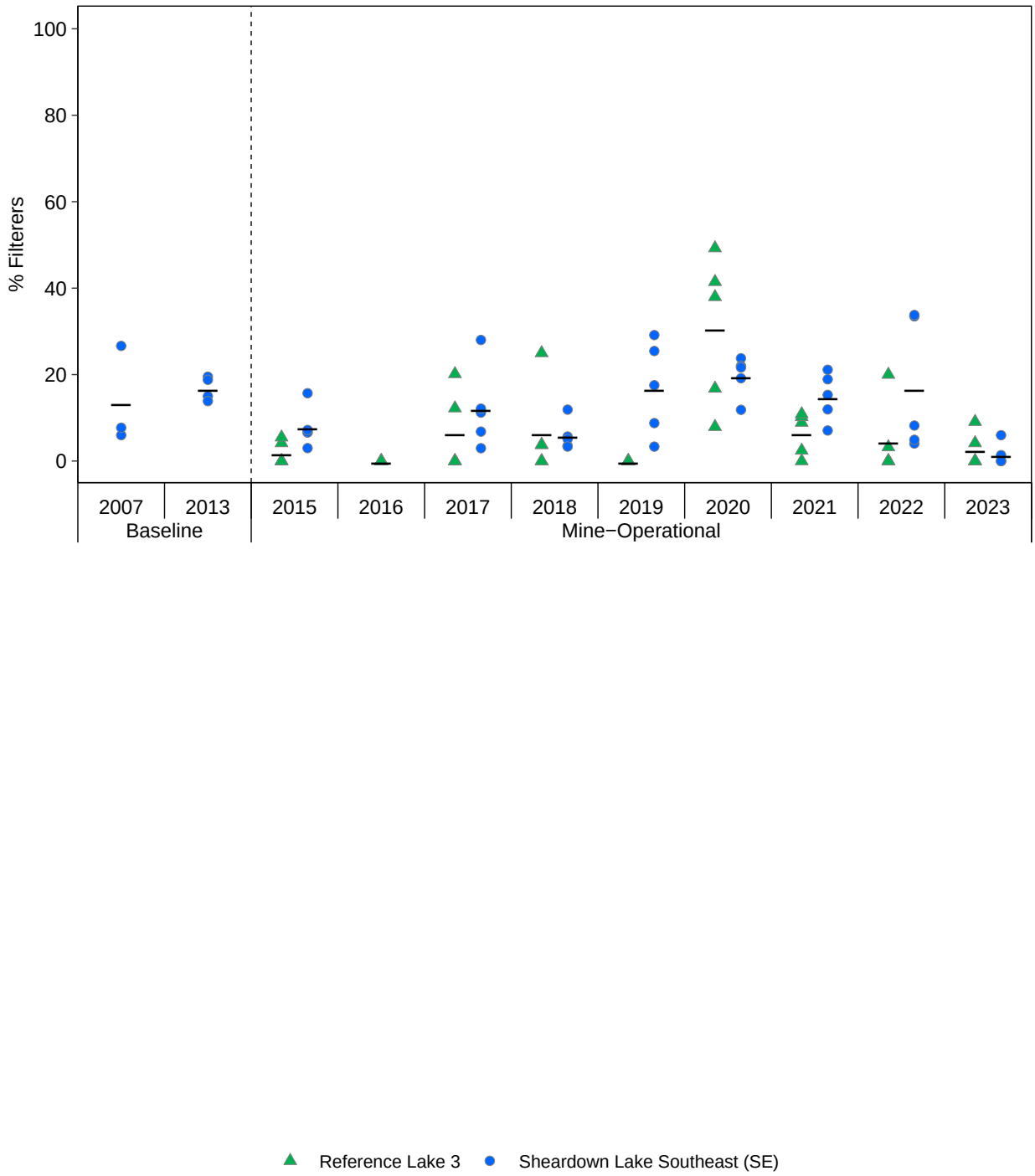

Figure F.12: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007 to 2013) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

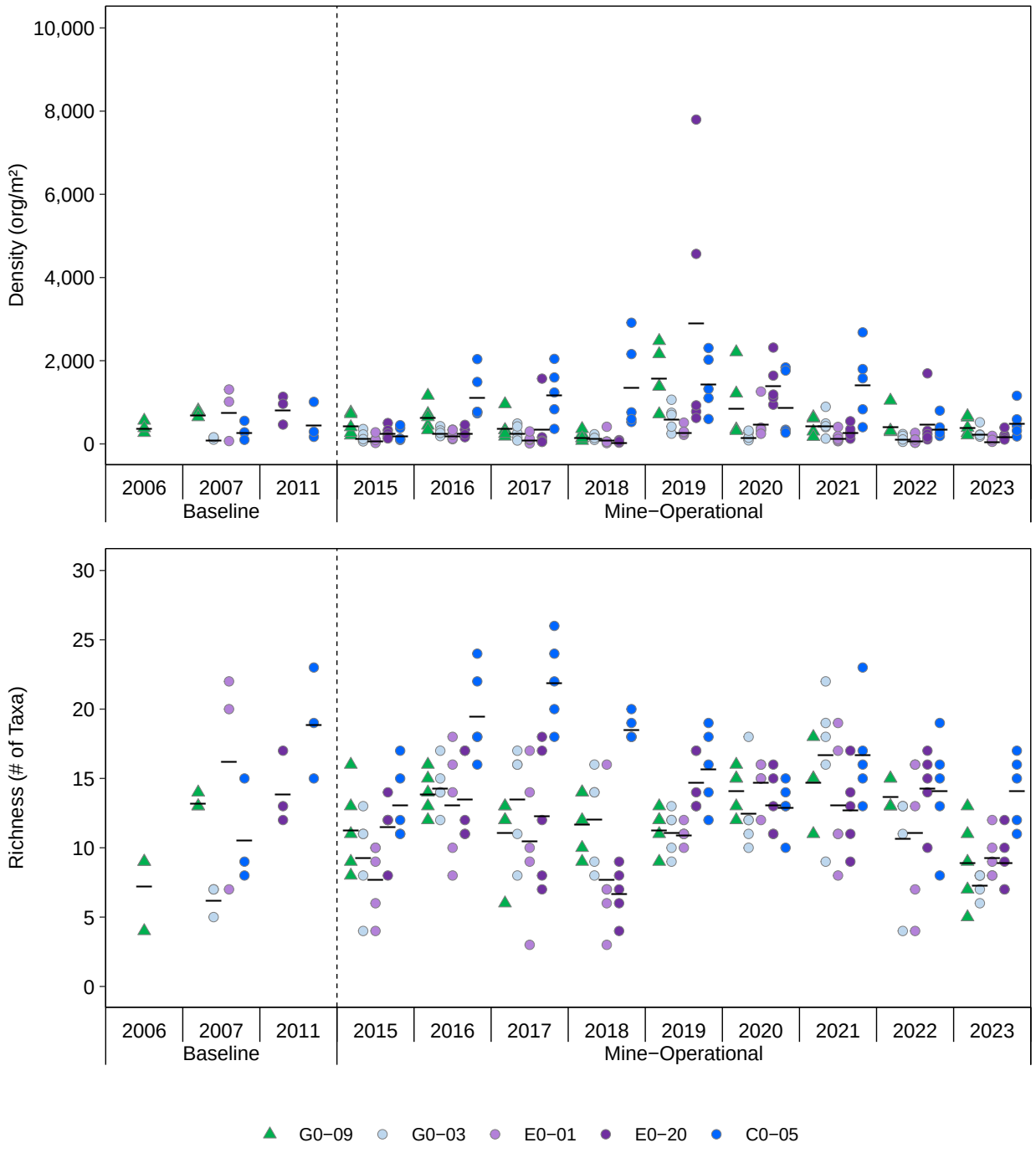

Figure F.13: Benthic Invertebrate Community Endpoints at Mary River Reference (G0−09), Upstream (G0−03), and Downstream (E0−01, E0−20, C0−05) Areas Among Mine Baseline (2007) and Mine Operational (2015 to 2023) Periods

Notes: Green represents reference areas, and blue and purple represents mine−exposed areas. Bars indicate means of replicates.

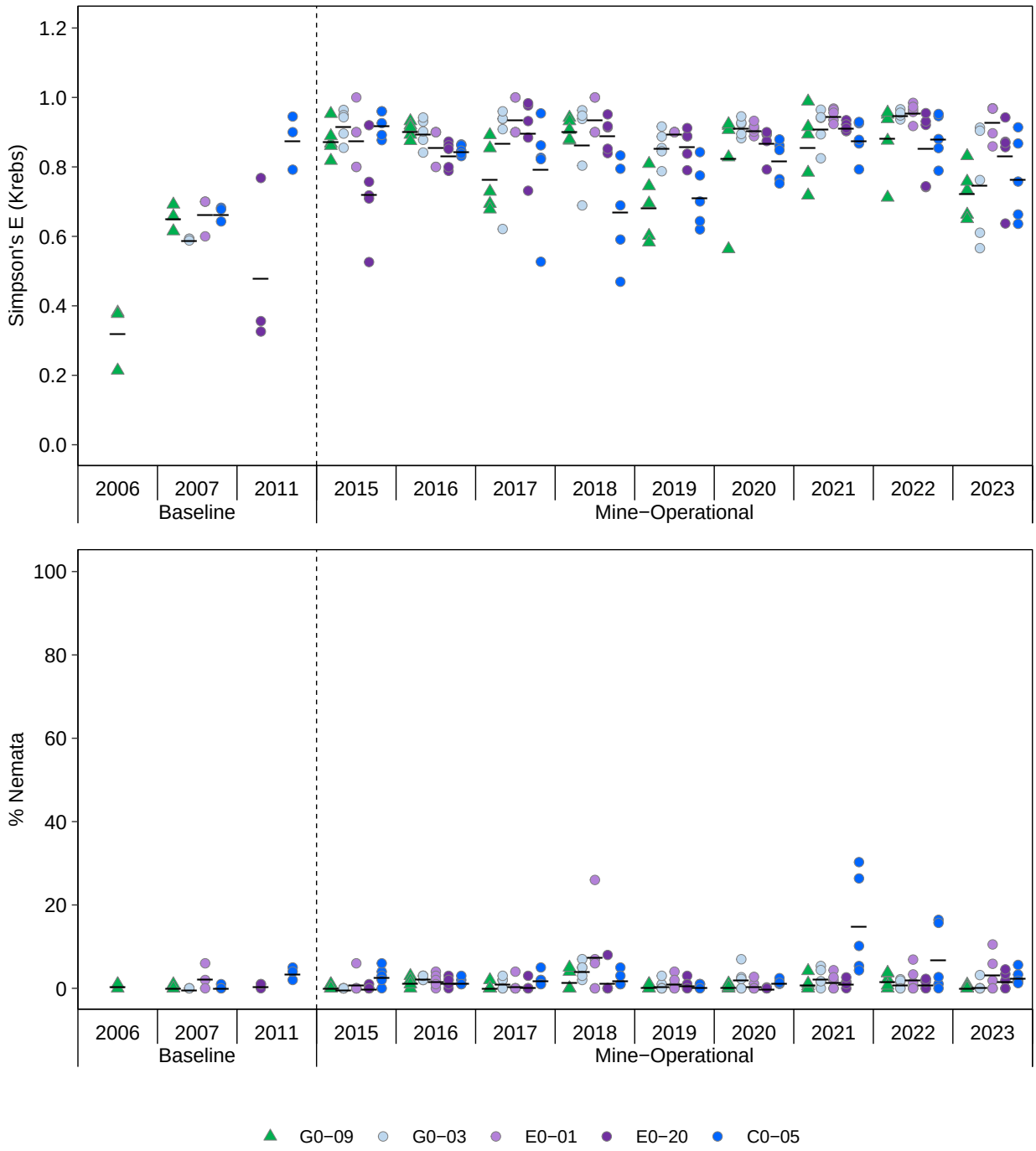

Figure F.13: Benthic Invertebrate Community Endpoints at Mary River Reference (G0−09), Upstream (G0−03), and Downstream (E0−01, E0−20, C0−05) Areas Among Mine Baseline (2007) and Mine Operational (2015 to 2023) Periods

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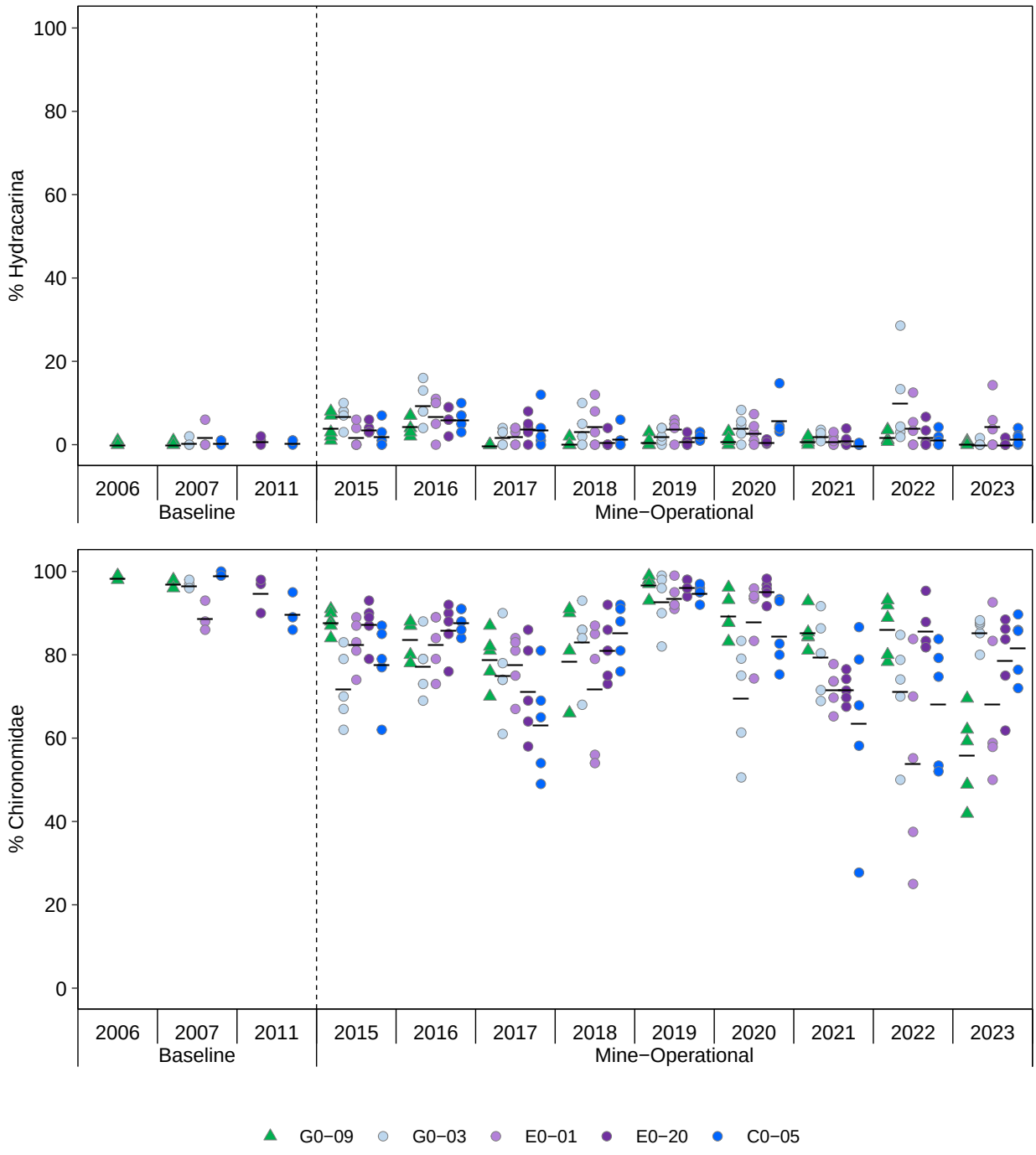

Figure F.13: Benthic Invertebrate Community Endpoints at Mary River Reference (G0−09), Upstream (G0−03), and Downstream (E0−01, E0−20, C0−05) Areas Among Mine Baseline (2007) and Mine Operational (2015 to 2023) Periods

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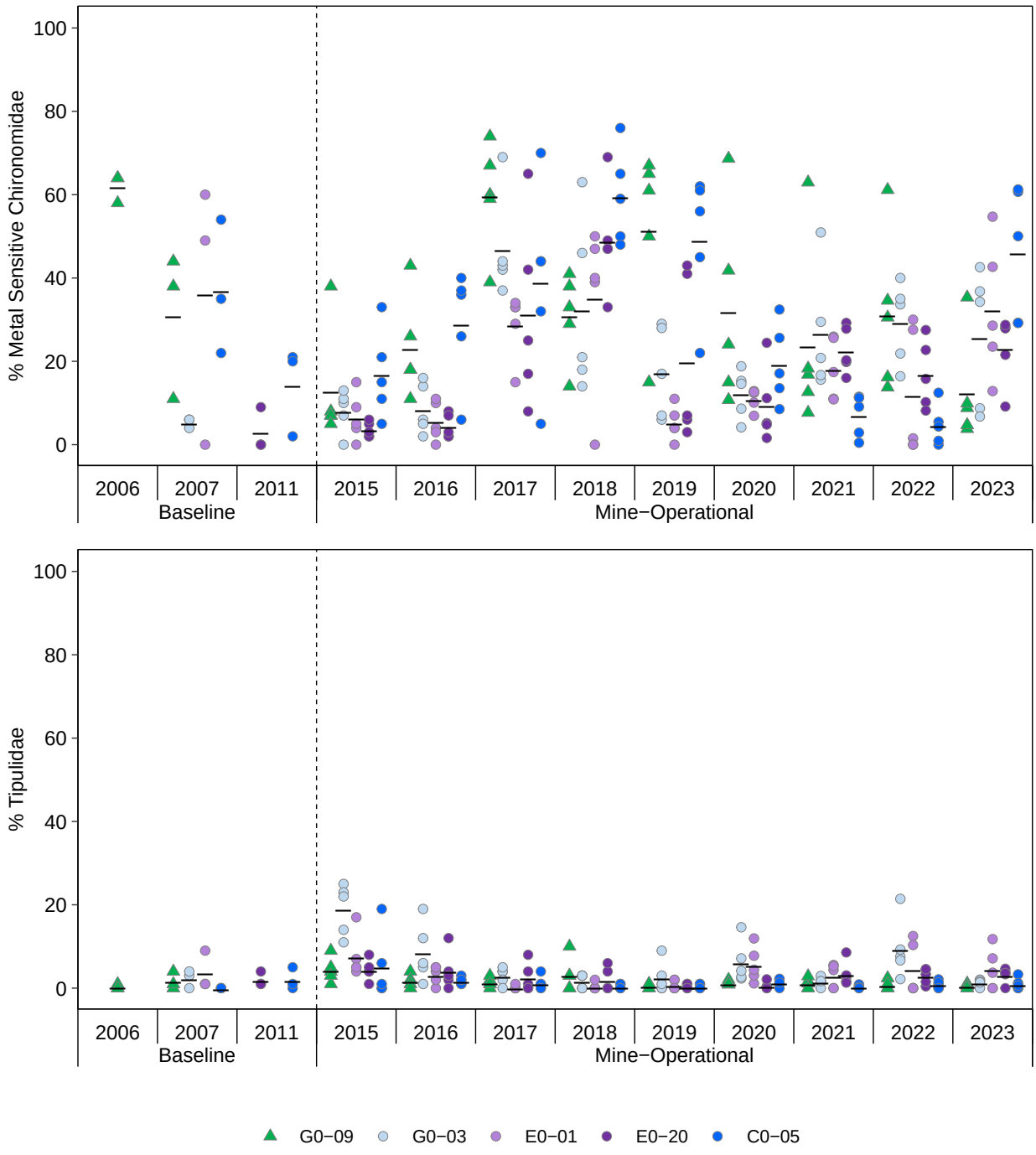

Figure F.13: Benthic Invertebrate Community Endpoints at Mary River Reference (G0−09), Upstream (G0−03), and Downstream (E0−01, E0−20, C0−05) Areas Among Mine Baseline (2007) and Mine Operational (2015 to 2023) Periods

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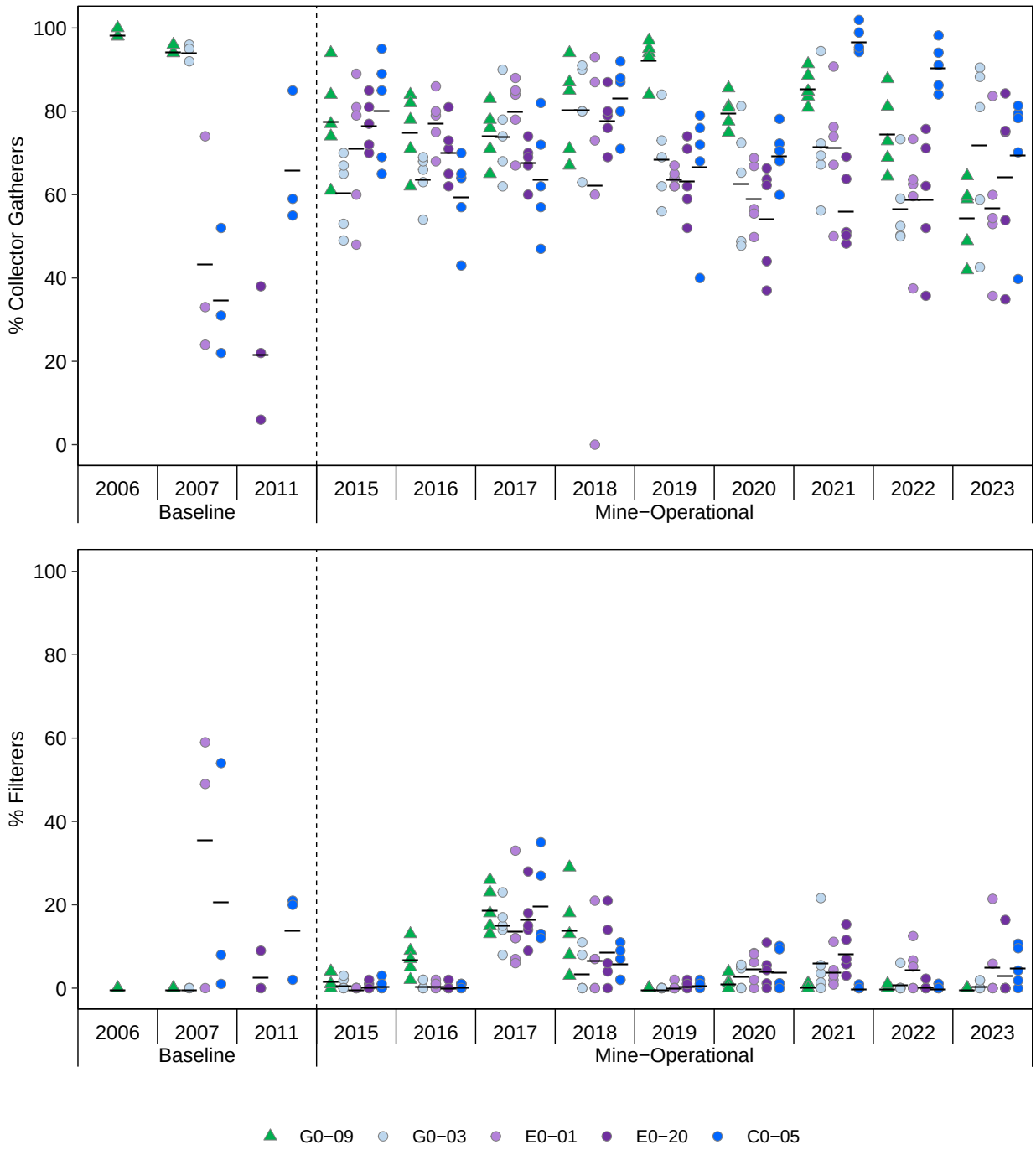

Figure F.13: Benthic Invertebrate Community Endpoints at Mary River Reference (G0−09), Upstream (G0−03), and Downstream (E0−01, E0−20, C0−05) Areas Among Mine Baseline (2007) and Mine Operational (2015 to 2023) Periods

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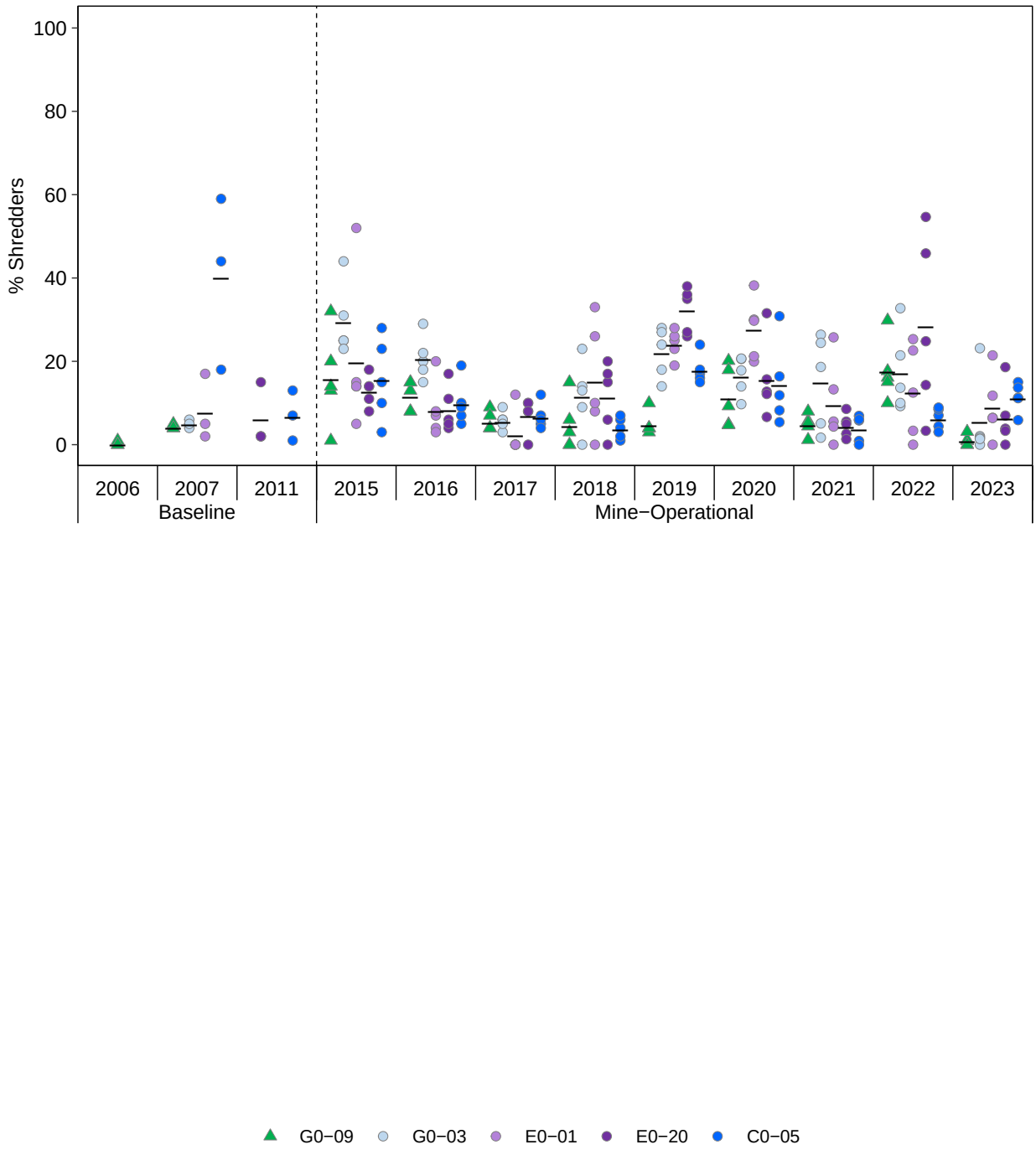

Figure F.13: Benthic Invertebrate Community Endpoints at Mary River Reference (G0−09), Upstream (G0−03), and Downstream (E0−01, E0−20, C0−05) Areas Among Mine Baseline (2007) and Mine Operational (2015 to 2023) Periods

Notes: Green represents reference areas, and blue and purple represents mine−exposed areas. Bars indicate means of replicates.

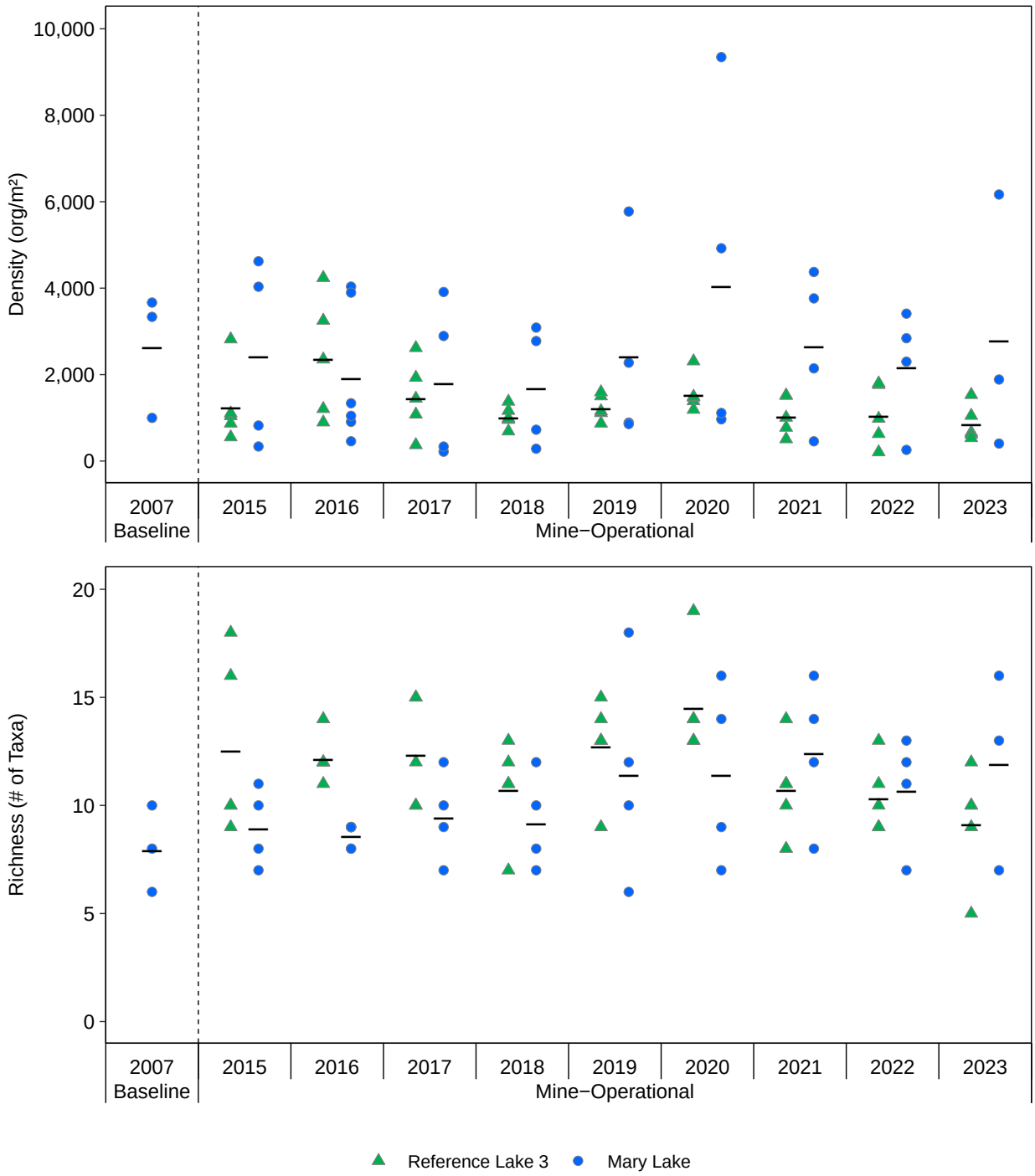

Figure F.14: Benthic Invertebrate Community Endpoints at Mary Lake (JL0) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2007) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

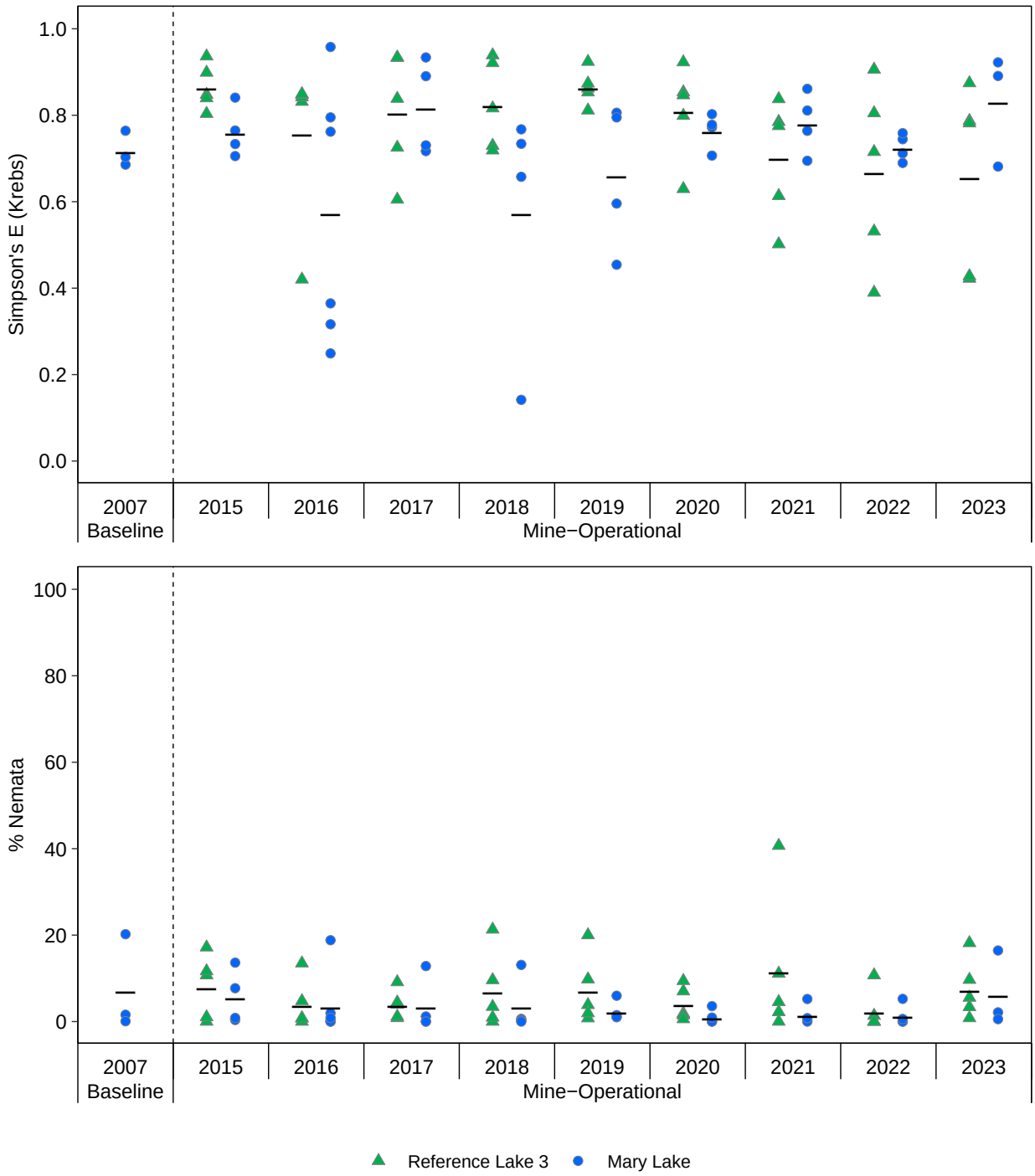

Figure F.14: Benthic Invertebrate Community Endpoints at Mary Lake (JL0) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2007) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

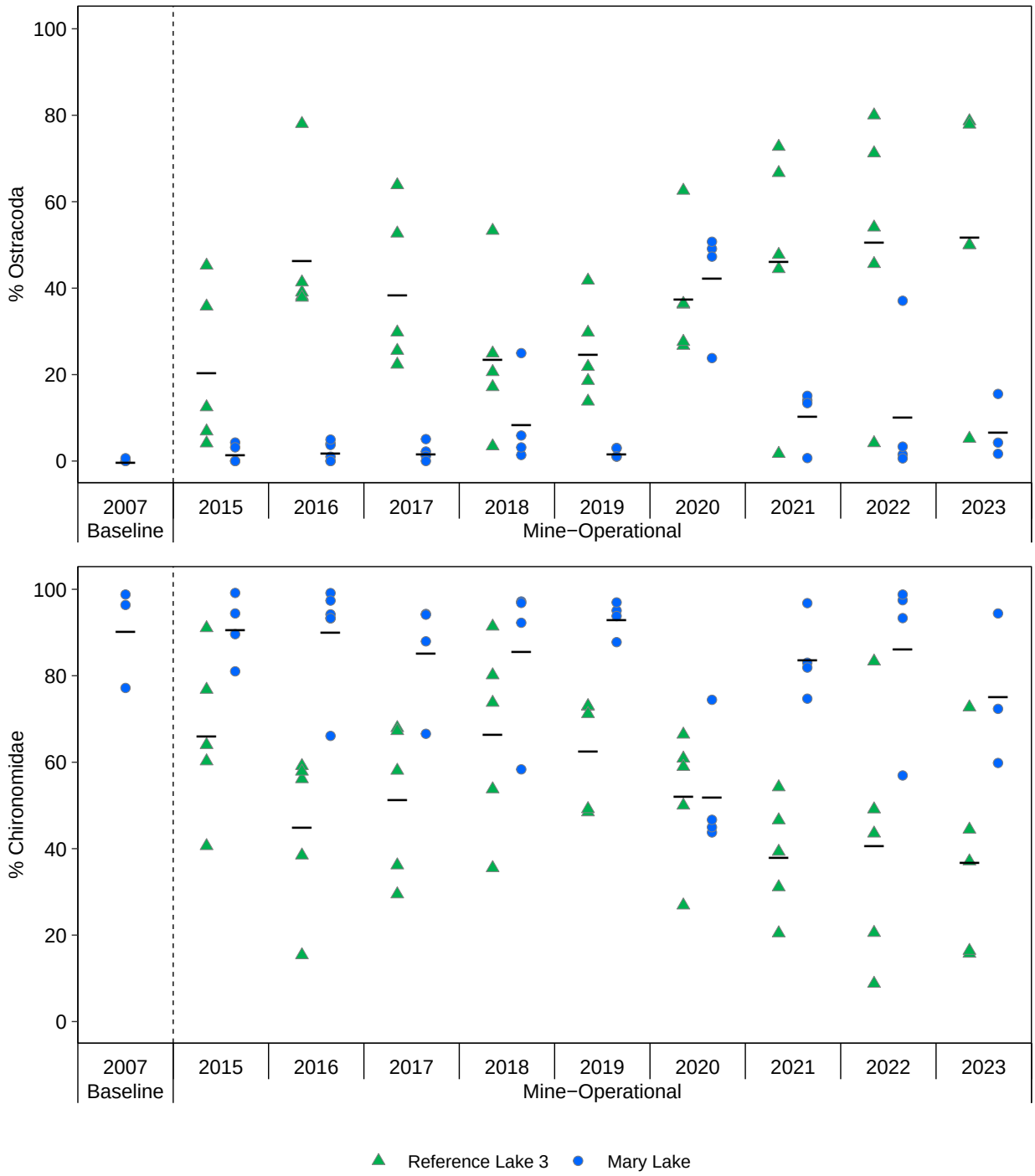

Figure F.14: Benthic Invertebrate Community Endpoints at Mary Lake (JL0) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2007) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

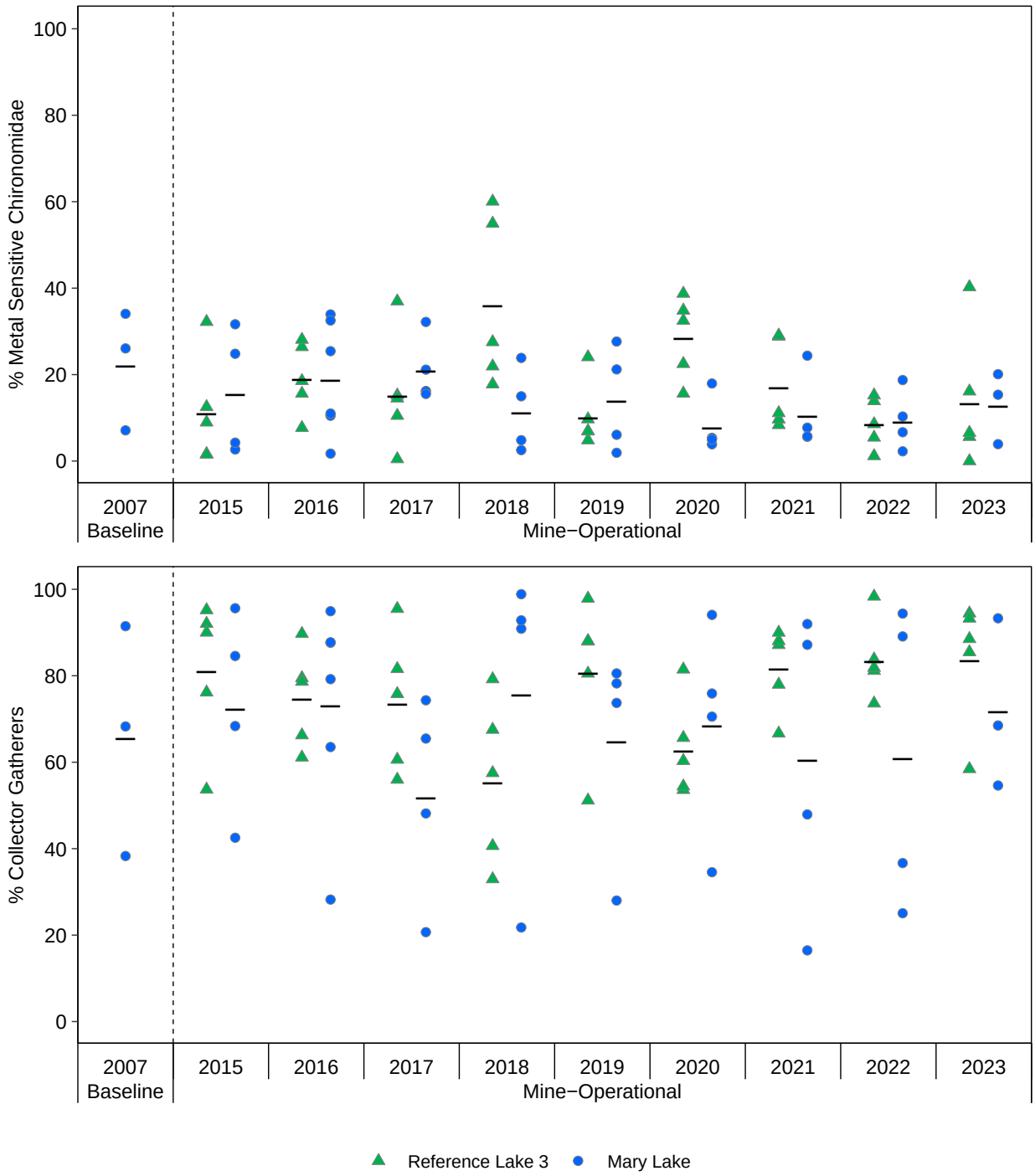

Figure F.14: Benthic Invertebrate Community Endpoints at Mary Lake (JL0) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2007) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

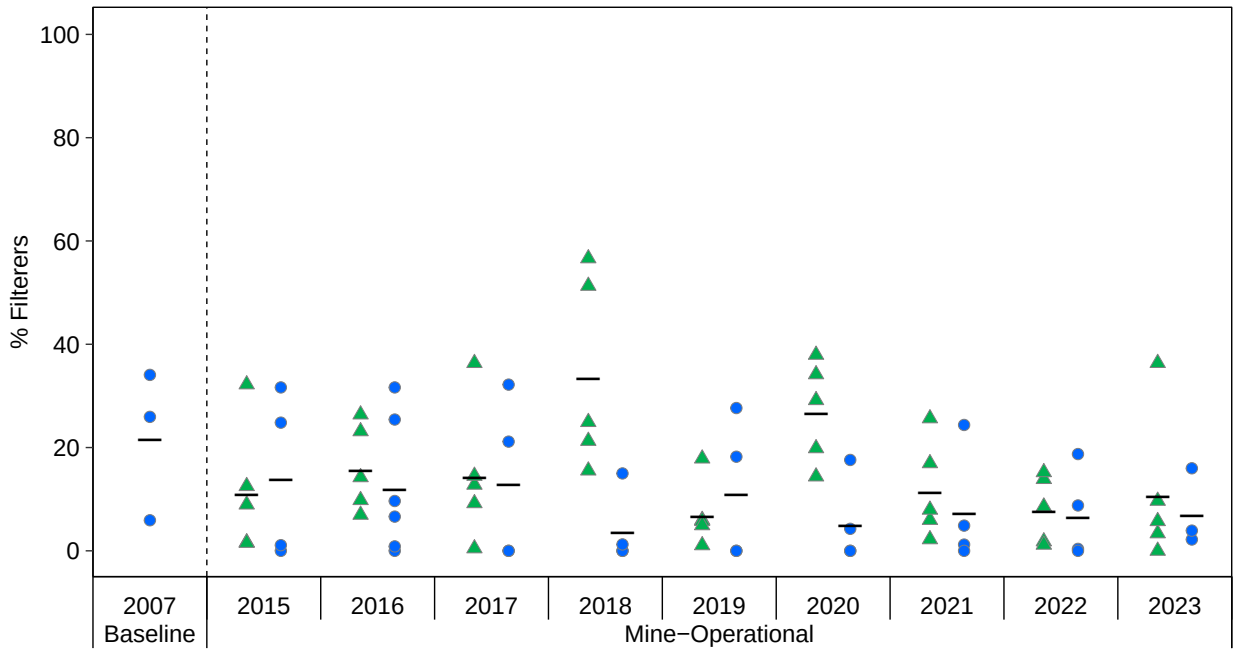

Figure F.14: Benthic Invertebrate Community Endpoints at Mary Lake (JL0) and Reference Lake 3 (REF3) Littoral Habitat Stations among Mine Baseline (2007) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

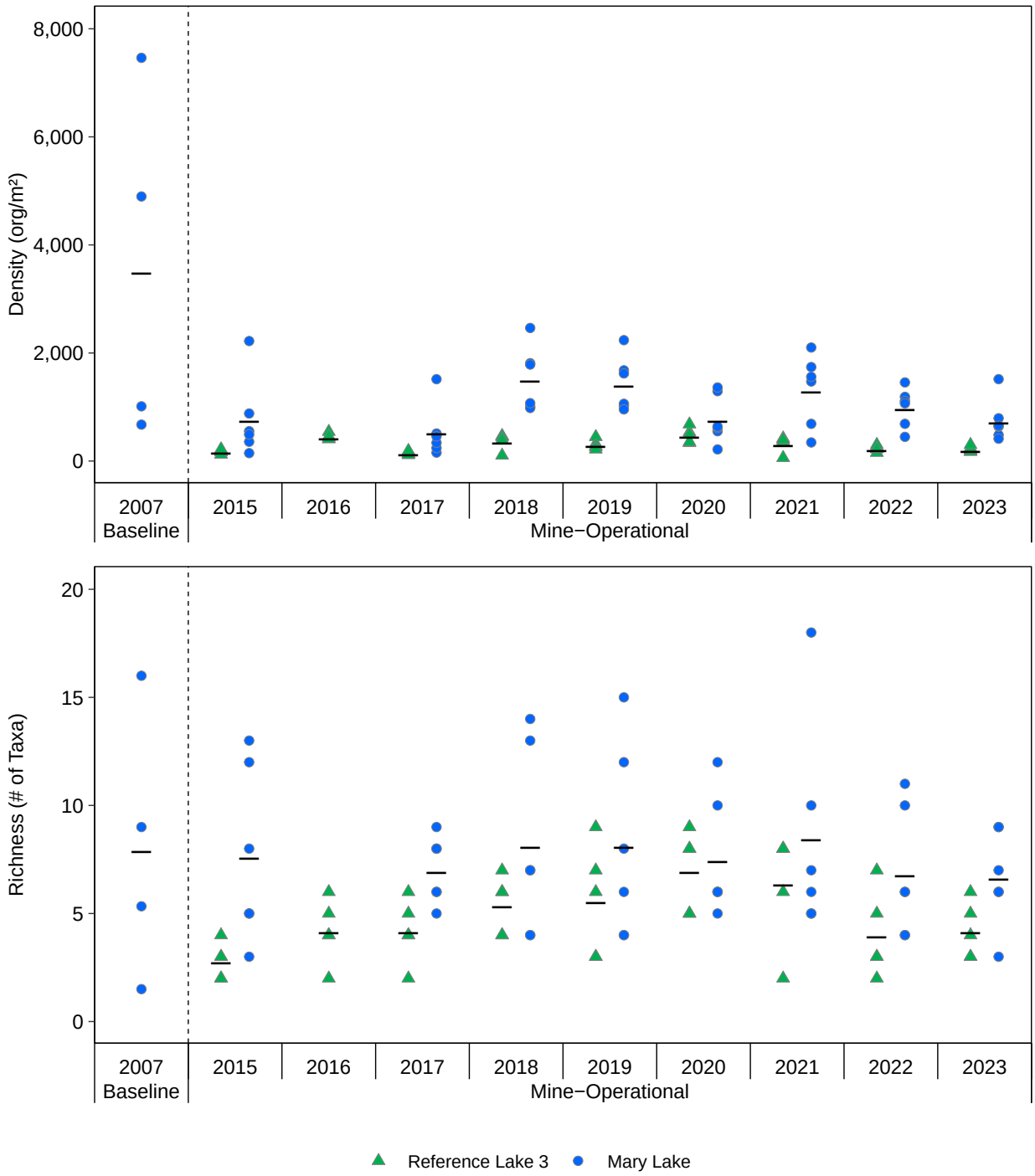

Figure F.15: Benthic Invertebrate Community Endpoints at Mary Lake (JL0) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

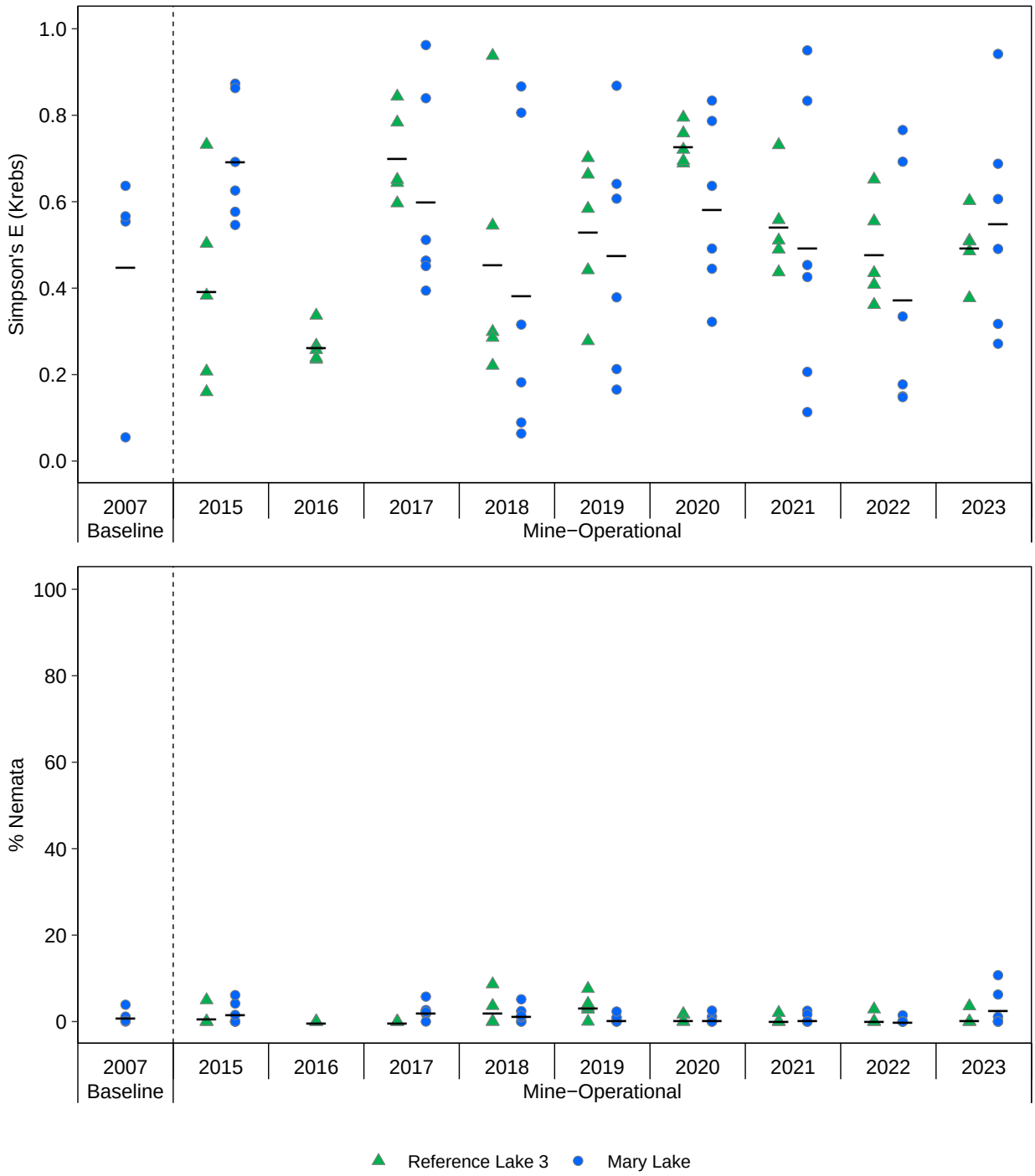

Figure F.15: Benthic Invertebrate Community Endpoints at Mary Lake (JL0) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

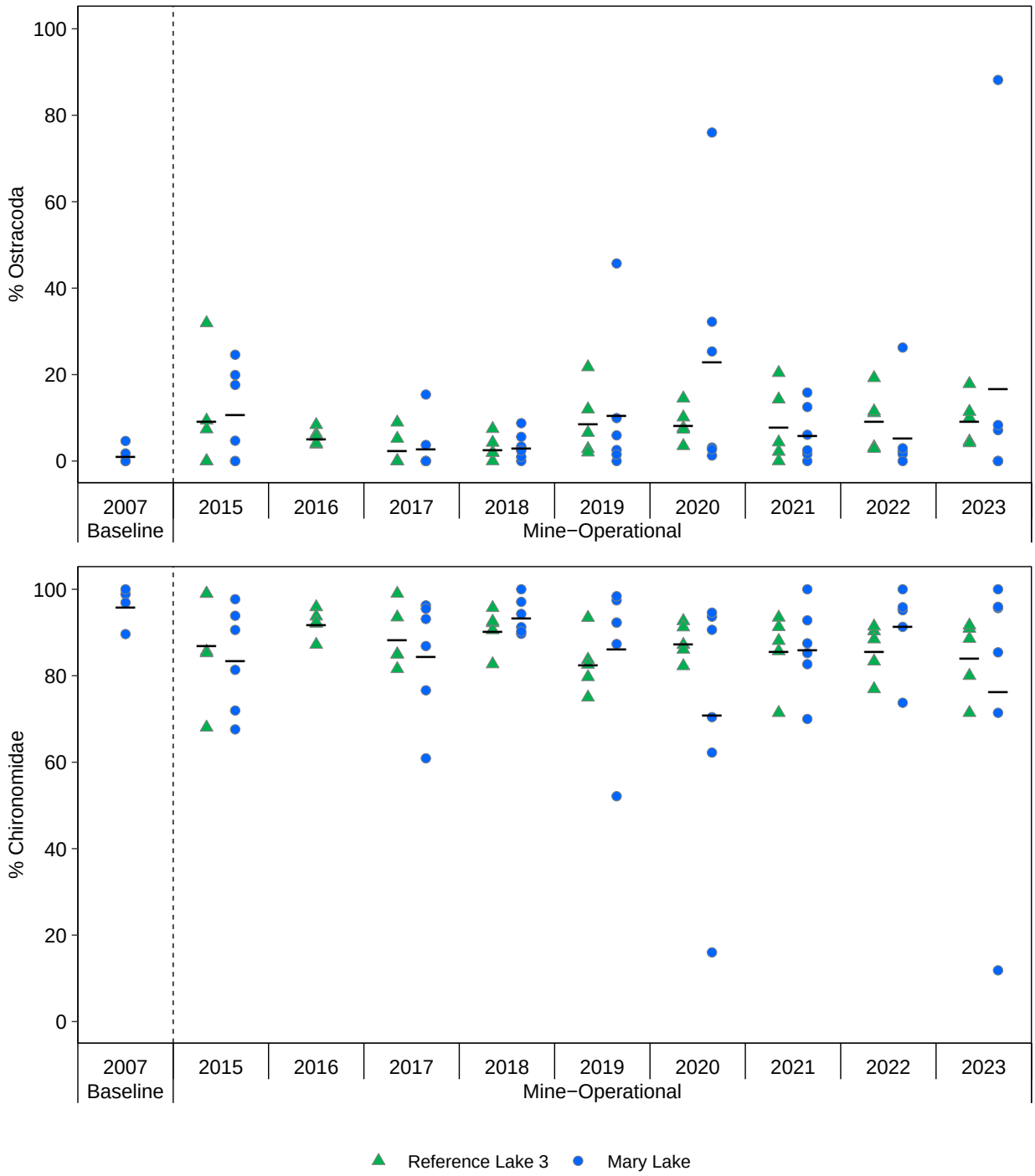

Figure F.15: Benthic Invertebrate Community Endpoints at Mary Lake (JL0) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

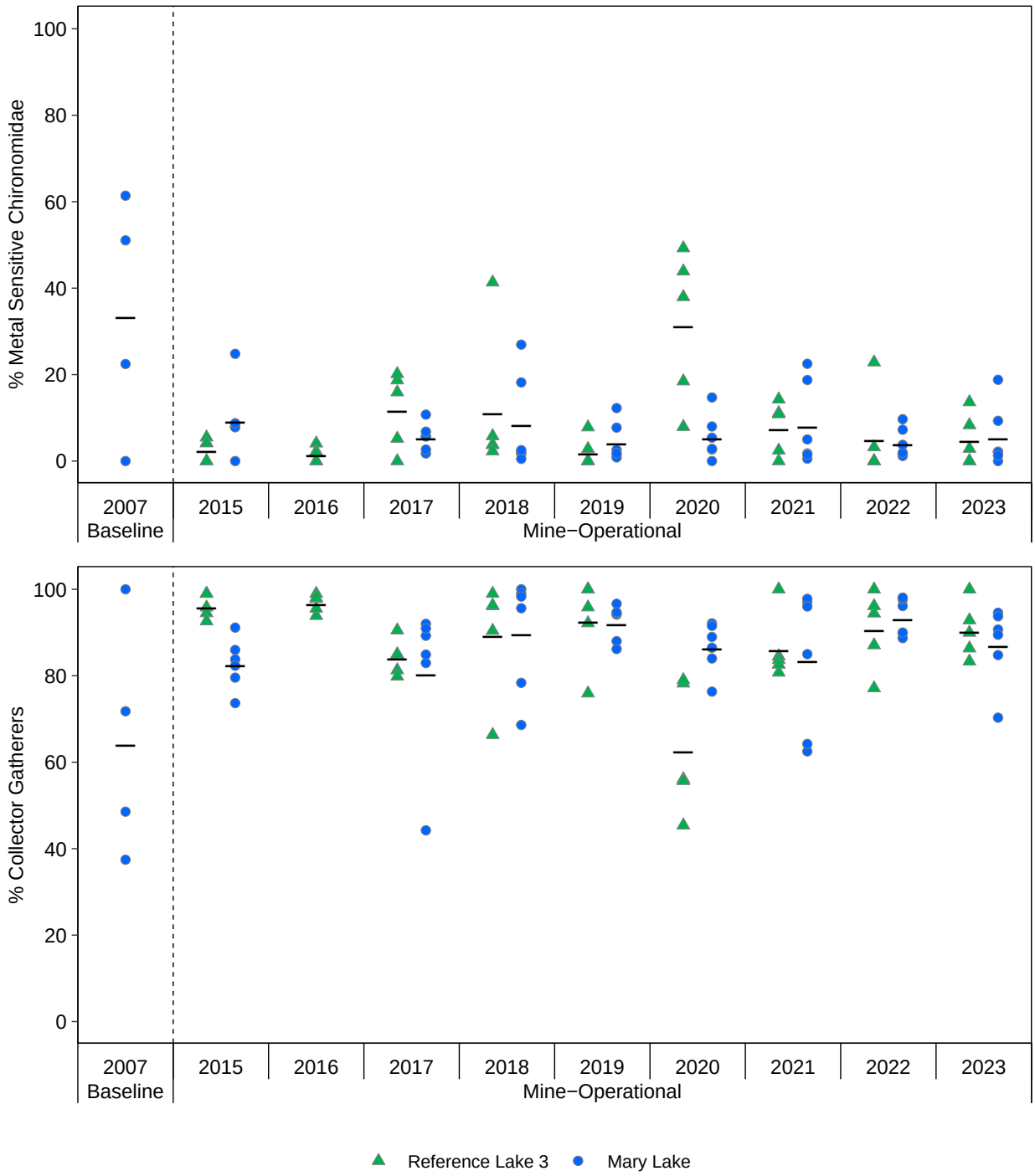

Figure F.15: Benthic Invertebrate Community Endpoints at Mary Lake (JL0) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

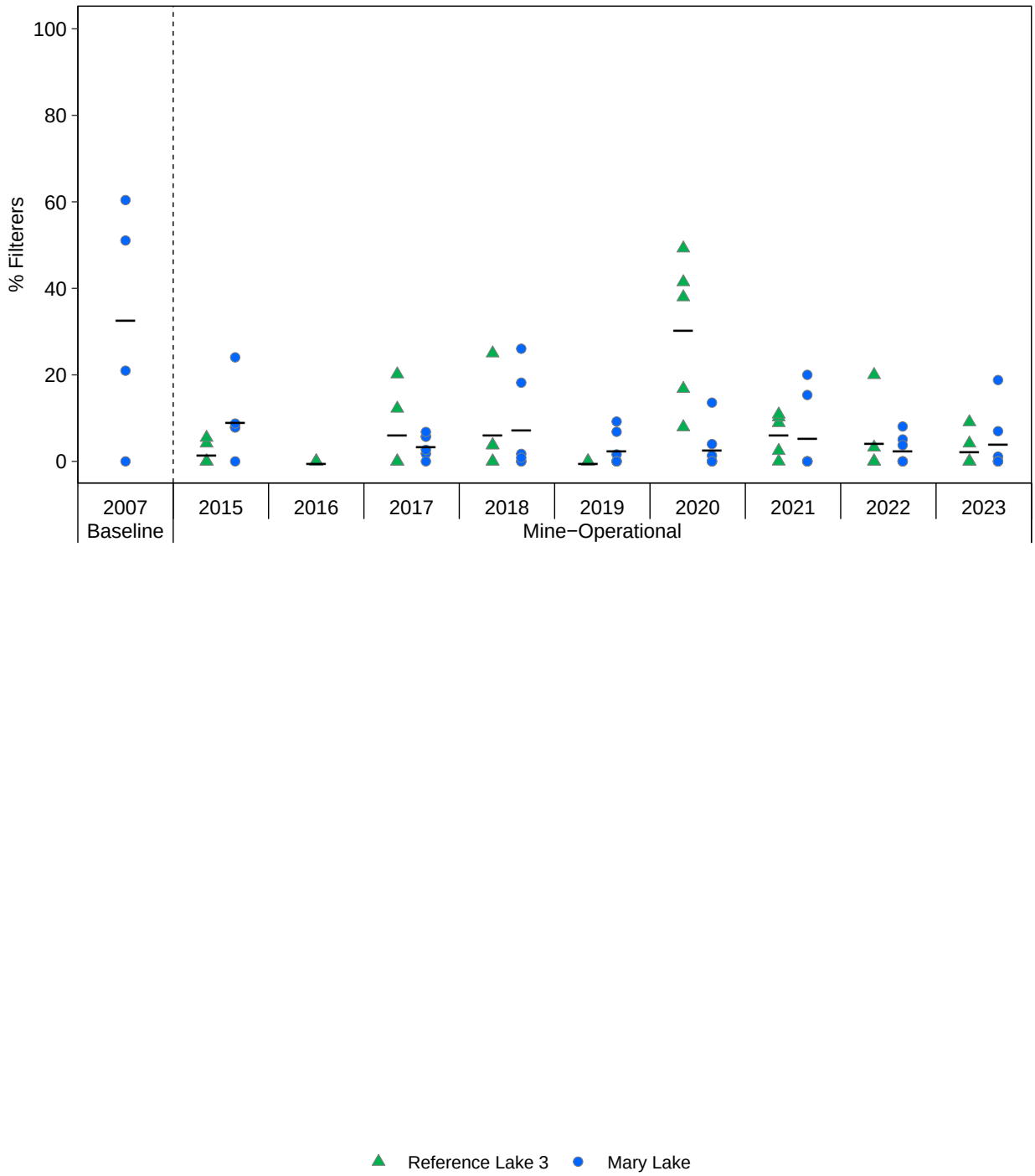

Figure F.15: Benthic Invertebrate Community Endpoints at Mary Lake (JL0) and Reference Lake 3 (REF3) Profundal Habitat Stations among Mine Baseline (2007) and Operational (2015 to 2023) Periods, Mary River Project CREMP

Notes: Bars indicate means of replicates.

TABLES

Table F.1: Replicate Grab Data for Benthic Invertebrate Community Samples Collected at Camp Lake Tributary 1 (CLT1) and the Unnamed Reference Creek (REF-CRK), Mary River Project CREMP, August 2023

Study Area	Station	Water Depth (cm)			Water Velocity (m/s)			Embeddedness			In-Stream Vegetation			Algae Presence		
		Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3
Unnamed Reference Creek	REF-CRK-B1	15	13	15	0.53	0.46	0.54	0%	0%	0%	None	None	None	Sparse	Sparse	Sparse
	REF-CRK-B2	19	17	17	0.38	0.44	0.48	0%	0%	0%	None	None	None	Sparse	Sparse	Sparse
	REF-CRK-B3	20	19	16	0.44	0.37	0.47	0%	25%	-	None	None	None	Sparse	Sparse	Sparse
	REF-CRK-B4	13	12	15	0.44	0.39	0.29	0%	-	-	None	None	Sparse bryophytes	None	Sparse	Sparse
	REF-CRK-B5	20	22	15	0.35	0.47	0.46	25%	50%	-	None	None	None	None	Sparse	None
Camp Lake Tributary 1 Upstream North Branch	CLT-1-US-B1	19	13	17	0.47	0.35	0.30	0%	0%	25%	Sparse bryophytes	None	Sparse bryophytes	Sparse	Sparse	Sparse
	CLT-1-US-B2	19	19	17	0.32	0.30	0.38	25%	50%	25%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	CLT-1-US-B3	22	19	19	0.35	0.32	0.25	0%	25%	0%	None	Sparse bryophytes	None	Sparse	Sparse	Sparse
	CLT-1-US-B4	20	23	19	0.29	0.39	0.47	50%	50%	75%	None	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	CLT-1-US-B5	19	23	19	0.25	0.27	0.33	25%	25%	25%	None	None	Sparse bryophytes	Sparse	Sparse	Sparse
Camp Lake Tributary 1 Upper Main Stem	CLT-1-L2-B1	12	10	11	0.33	0.31	0.32	0%	0%	0%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	CLT-1-L2-B2	13	16	16	0.35	0.35	0.34	0%	0%	0%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	CLT-1-L2-B3	12	13	13	0.61	0.55	0.32	0%	0%	0%	Sparse bryophytes, macrophytes	Sparse bryophytes, macrophytes	Sparse bryophytes, macrophytes	None	None	Sparse
	CLT-1-L2-B4	23	24	23	0.34	0.34	0.37	0%	75%	75%	Sparse bryophytes	Sparse bryophytes	Common bryophytes	None	None	Sparse
	CLT-1-L2-B5	15	17	17	0.46	0.49	0.38	0%	0%	0%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
Camp Lake Tributary 1 Lower Main Stem	CLT-1-DS-B1	19	14	13	0.38	0.37	0.30	25%	25%	-	None	None	None	Sparse	Sparse	None
	CLT-1-DS-B2	14	13	14	0.40	0.38	0.27	25%	0%	25%	None	None	None	Sparse	Sparse	Sparse
	CLT-1-DS-B3	18	18	17	0.45	0.42	0.43	25%	25%	25%	None	None	None	Sparse	Sparse	None
	CLT-1-DS-B4	13	12	14	0.48	0.33	0.27	0%	0%	0%	None	None	None	Sparse	Sparse	Sparse
	CLT-1-DS-B5	20	20	18	0.44	0.35	0.29	25%	0%	-	None	Sparse bryophytes	None	Sparse	Sparse	Sparse

Note: "-" = data not available

Table F.2: Replicate Station Habitat Feature Summary Statistics for the Camp Lake Tributary (CLT1 and CLT2) Benthic Stations, Mary River Project CREMP, August 2023

Metric	Study Area	Sample Size	Mean	Median	Standard Deviation	Standard Error	Minimum	Maximum
Water Depth (cm)	Unnamed Reference Creek	5	16.5	16.0	2.95	1.32	12.0	22.0
	CLT1-US North Branch	5	19.1	19.0	2.47	1.11	13.0	23.0
	CLT1-L2 Upper Main Stem	5	15.6	15.0	4.44	1.99	10.0	24.0
	CLT1-DS Lower Main Stem	5	15.7	14.0	2.83	1.27	12.0	20.0
	CLT2-US Upstream	5	19.07	18.00	2.15	0.96	16.00	23.00
	CLT2-DS Downstream	5	18.17	18.00	1.36	0.61	16.50	21.00
Water Velocity (m/s)	Unnamed Reference Creek	5	0.43	0.44	0.07	0.03	0.29	0.54
	CLT1-US North Branch	5	0.34	0.32	0.07	0.03	0.25	0.47
	CLT1-L2 Upper Main Stem	5	0.39	0.35	0.09	0.04	0.31	0.61
	CLT1-DS Lower Main Stem	5	0.37	0.38	0.07	0.03	0.27	0.48
	CLT2-US Upstream	5	0.37	0.37	0.07	0.03	0.25	0.49
	CLT2-DS Downstream	5	0.35	0.33	0.08	0.04	0.28	0.58
Substrate Embeddedness (%)	Unnamed Reference Creek	5	0.09	0.00	0.17	0.08	0.00	0.50
	CLT1-US North Branch	5	0.27	0.25	0.22	0.10	0.00	0.75
	CLT1-L2 Upper Main Stem	5	0.10	0.00	0.26	0.12	0.00	0.75
	CLT1-DS Lower Main Stem	5	0.15	0.25	0.13	0.06	0.00	0.25
	CLT2-US Upstream	5	0.30	0.25	0.24	0.11	0.00	0.75
	CLT2-DS Downstream	5	0.35	0.25	0.28	0.13	0.00	1.00

Table F.3: Benthic Station Habitat Feature Statistical Comparisons among Camp Lake Tributary 1 and Unnamed Reference Creek Study Areas, Mary River Project CREMP, August 2023

Metric	Overall 4-group Comparison				Pair-wise, *post hoc* comparisons			
	Statistical Test [a]	Transform-ation	Significant Difference between Areas?	p-value	Area		Significant Difference Between Areas?	P-value
Water Depth (cm)	ANOVA	none	NO	0.285	Unnamed Reference Creek	CLT1 North Branch	NO	ns
					Unnamed Reference Creek	CLT1 Upper Main Stem	NO	ns
					Unnamed Reference Creek	CLT1 Lower Main Stem	NO	ns
					CLT1 North Branch	CLT1 Upper Main Stem	NO	ns
					CLT1 North Branch	CLT1 Lower Main Stem	NO	ns
					CLT1 Upper Main Stem	CLT1 Lower Main Stem	NO	ns
Water Velocity (cm/s)	ANOVA	none	NO	0.058	Unnamed Reference Creek	CLT1 North Branch	NO	ns
					Unnamed Reference Creek	CLT1 Upper Main Stem	NO	ns
					Unnamed Reference Creek	CLT1 Lower Main Stem	NO	ns
					CLT1 North Branch	CLT1 Upper Main Stem	NO	ns
					CLT1 North Branch	CLT1 Lower Main Stem	NO	ns
					CLT1 Upper Main Stem	CLT1 Lower Main Stem	NO	ns
Substrate Embeddedness (%)	K-W	rank	NO	0.223	Unnamed Reference Creek	CLT1 North Branch	NO	ns
					Unnamed Reference Creek	CLT1 Upper Main Stem	NO	ns
					Unnamed Reference Creek	CLT1 Lower Main Stem	NO	ns
					CLT1 North Branch	CLT1 Upper Main Stem	NO	ns
					CLT1 North Branch	CLT1 Lower Main Stem	NO	ns
					CLT1 Upper Main Stem	CLT1 Lower Main Stem	NO	ns

Highlighted values indicate significant difference between study areas based on test p-value less than 0.05.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

Table F.4: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for Unnamed Reference Creek Study Area, August 2023

Waterbody	Unnamed Reference Creek (REF-CRK)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS					
P. Nemata	3.58	28.7	7.17	39.4	-
ANNELIDS					
P. Annelida					
WORMS					
Cl. Oligochaeta					
F. Enchytraeidae	3.58	-	-	21.5	10.7
F. Lumbriculidae					
Lumbriculus	-	-	-	-	-
ARTHROPODS					
P. Arthropoda					
MITES					
Cl. Arachnida					
O. Acarina					
immature	-	-	-	-	-
F. Lebertiidae					
Lebertia	-	-	-	-	-
F. Pionidae					
indeterminate	-	-	-	-	-
F. Sperchonidae					
Sperchon	86.0	57.3	17.9	17.9	39.4
SEED SHRIMPS					
Cl. Ostracoda	35.8	10.7	35.8	3.58	32.2
SPRINGTAILS					
Cl. Entognatha					
O. Collembola	-	-	-	-	-
INSECTS					
Cl. Insecta					
MAYFLIES					
O. Ephemeroptera					
F. Baetidae					
Acentrella feropagus	43.0	50.2	25.1	50.2	32.2
STONEFLIES					
O. Plecoptera					
F. Capniidae					
immature	-	-	-	7.17	-
TRUE FLIES					
O. Diptera					
BITING-MIDGE					
F. Ceratopogonidae					
Culicoides	3.58	-	-	43.0	28.7
MIDGES					
F. Chironomidae					
chironomid pupae	**7.17**	**7.17**	**7.17**	**32.2**	**3.58**
S.F. Chironominae					
Lipiniella	-	-	-	-	-
Paratanytarsus	-	-	-	-	-
Rheotanytarsus	-	57.3	-	-	-
Tanytarsus	-	-	-	-	-
S.F. Diamesinae					
Diamesa	14.3	-	-	-	-
Pseudokiefferiella	68.1	133	35.8	35.8	-
S.F. Orthocladiinae					
Cardiocladius	3.58	-	7.17	-	3.58
Corynoneura	-	-	-	-	-
Cricotopus	43.0	233	3.58	21.5	7.17
Cricotopus/Orthocladius	21.5	82.4	-	14.3	3.58
Diplocladius	-	-	-	-	-
Eukiefferiella	10.7	-	7.17	-	-
Hydrobaenus	-	3.58	-	43.0	-
Hydrosmittia	-	3.58	-	-	-
Krenosmittia	-	-	-	-	-
Limnophyes	-	-	3.58	46.6	-
Orthocladius (Euorthocladius)	3.58	-	-	-	3.58
Parakiefferiella	-	-	-	10.7	-
Parametriocnemus	-	-	7.17	35.8	-
Paraphaenocladius	-	-	-	-	-
Psectrocladius	-	-	-	-	-
Thienemanniella	-	-	-	3.58	-
Tokunagaia	-	-	-	3.58	3.58
Tvetenia	32.2	82.4	35.8	201	17.9
indeterminate	-	3.58	3.58	-	-
S.F. Tanypodinae					
Procladius	-	-	-	-	-
Thienemannimyia complex	-	-	-	3.58	3.58
F. Empididae					
Clinocera	28.7	53.7	10.7	32.2	17.9
pupae	-	-	-	-	-
F. Muscidae	-	-	-	-	-
F. Simuliidae					
Gymnopais	-	-	3.58	3.58	-
Metacnephia	7.17	32.2	17.9	3.58	-
Prosimulium	14.3	10.7	10.7	3.58	3.58
Metacnephia/Prosimulium pupae	**3.58**	**7.17**	**25.1**	**3.58**	-
F. Tipulidae					
Tipula	14.3	7.17	14.3	28.7	14.3
SUMMARY METRICS					
Density (No. organisms per m^2)	448	864	280	710	226
Richness (total number of taxa)[a]	17	13	16	22	14
Simpson's Evenness (E)	0.942	0.874	0.962	0.913	0.957
Shannon's Diversity	3.47	2.92	3.6	3.63	3.4
Dominant Group Composition					
% Nemata	0.8	3.32	2.56	5.56	0
% Acari	19.2	6.64	6.41	2.53	17.5
% Ostracods	8	1.24	12.8	0.505	14.3
% Chironomids	45.6	70.1	39.7	63.6	20.6
% Metal Sensitive Chironmids	19.1	22.3	13.7	5.44	0
Functional Feeding Group Composition					
% Collector - Gatherers	49.4	36.5	60	73.8	45.9
% Filterers	5.6	12.5	19.2	1.52	1.59
% Shredders	17.7	38.1	6.5	10.5	10.9
Habitat Preference Group Composition					
% Clingers	39.3	56.5	28.3	9.98	23.6
% Sprawlers	54.2	39.4	61.3	71.3	50.8
% Burrowers	6.43	4.15	10.4	18.7	25.5

Note: **"-"** indicates taxa not present in sample.

[a] Bold entries excluded from taxa count.

Table F.5: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for Camp Lake Tributary 1 Study Areas, August 2023

Waterbody	North Branch Upstream (CLT1-US)					Upper Main Stem (CLT1-L2)					Lower Main Stem (CLT1-DS)				
Station	B1	B2	B3	B4	B5	B1	B2	B3	B4	B5	B1	B2	B3	B4	B5
ROUNDWORMS															
P. Nemata	32.2	-	21.5	7.17	-	14.3	3.58	43.0	-	57.3	3.58	7.17	-	3.58	3.58
ANNELIDS															
P. Annelida															
WORMS															
Cl. Oligochaeta															
F. Enchytraeidae	10.7	3.58	10.7	-	3.58	279	222	322	7.17	932	3.58	-	-	3.58	-
F. Lumbriculidae															
Lumbriculus	-	-	-	-	-	-	25.1	-	-	43.0	-	-	-	-	-
ARTHROPODS															
P. Arthropoda															
MITES															
Cl. Arachnida															
O. Acarina															
immature	-	-	-	**3.58**	-	-	-	-	-	-	-	-	-	-	-
F. Lebertiidae															
Lebertia	-	-	-	-	-	21.5	39.4	21.5	43.0	14.3	-	-	-	-	-
F. Pionidae															
indeterminate	-	-	-	-	-	-	10.7	7.17	-	-	-	-	-	-	-
F. Sperchonidae															
Sperchon	28.7	35.8	60.9	28.7	10.7	43.0	21.5	78.8	-	57.3	10.7	14.3	14.3	-	-
SEED SHRIMPS															
Cl. Ostracoda	-	-	7.17	-	3.58	14.3	7.17	21.5	32.2	-	-	3.58	-	3.58	-
SPRINGTAILS															
Cl. Entognatha															
O. Collembola	-	-	7.17	-	-	-	-	-	-	-	-	-	-	-	-
INSECTS															
Cl. Insecta															
MAYFLIES															
O. Ephemeroptera															
F. Baetidae															
Acentrella feropagus	28.7	10.7	3.58	7.17	14.3	7.17	3.58	7.17	-	-	10.7	-	3.58	3.58	3.58
STONEFLIES															
O. Plecoptera															
F. Capniidae															
immature	3.58	-	-	-	3.58	-	-	-	-	-	-	-	-	-	-
TRUE FLIES															
O. Diptera															
BITING-MIDGE															
F. Ceratopogonidae															
Culicoides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MIDGES															
F. Chironomidae															
chironomid pupae	**50.2**	**28.7**	**25.1**	**10.7**	**14.3**	**71.7**	**28.7**	**208**	**7.17**	**115**	**14.3**	**10.7**	**14.3**	**7.17**	**3.58**
S.F. Chironominae															
Lipiniella	-	-	-	-	-	-	-	7.2	-	-	-	-	-	-	-
Paratanytarsus	-	-	-	-	-	136	380	272	193	530	-	-	-	-	-
Rheotanytarsus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanytarsus	-	-	-	-	-	28.7	-	-	-	-	-	-	-	-	-
S.F. Diamesinae															
Diamesa	21.5	-	7.17	3.58	7.17	-	-	-	-	14.3	25.1	10.7	-	21.5	-
Pseudokiefferiella	3.58	21.5	46.6	132.6	3.58	7.17	14.3	35.8	-	14.3	-	3.58	7.17	25.1	7.17
S.F. Orthocladiinae															
Cardiocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corynoneura	-	-	3.6	-	-	-	-	-	-	-	-	-	-	-	-
Cricotopus	140	150	100	57.3	21.5	215	229	150	78.8	272	14.3	-	7.17	25.1	17.9
Cricotopus/Orthocladius	211	57.3	100	57.3	46.6	14.3	7.17	57.3	-	71.7	32.2	46.6	17.9	21.5	17.9
Diplocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eukiefferiella	-	3.58	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrobaenus	93.2	3.58	104	-	14.3	-	-	-	-	-	10.7	93.2	35.8	35.8	17.9
Hydrosmittia	-	17.9	39.4	14.3	3.58	186	43.0	57.3	64.5	86.0	14.3	68.1	25.1	35.8	50.2
Krenosmittia	28.7	3.58	17.9	-	28.7	-	-	-	-	-	7.17	43.0	3.58	10.7	3.58
Limnophyes	7.17	3.58	-	-	3.58	-	-	-	-	-	-	14.3	-	3.58	-
Orthocladius (Euorthocladius)	14.3	10.7	-	10.7	10.7	-	-	-	-	-	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	28.7	10.7	-	3.58	143	-	14.3	-	-	-
Parametriocnemus	3.58	-	-	-	7.17	-	-	-	-	-	-	-	-	-	-
Paraphaenocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	-	-	-	-	21.5	-	-	-	115	-	-	-	-	-
Thienemanniella	3.58	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tokunagaia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tvetenia	32.2	10.7	7.17	32.2	39.4	222	82.4	387	14.3	387	46.6	28.7	3.58	75.2	25.1
indeterminate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.F. Tanypodinae															
Procladius	-	-	-	-	-	7.17	25.1	-	10.7	14.3	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-	28.7	32.2	28.7	-	57.3	-	-	-	-	3.58
F. Empididae															
Clinocera	14.3	25.1	3.58	-	50.2	-	3.58	-	-	-	17.9	14.3	3.58	3.58	7.17
pupae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Muscidae	-	-	-	-	3.58	-	-	-	-	14.3	-	-	-	-	-
F. Simuliidae															
Gymnopais	7.17	-	3.58	-	-	-	-	-	-	-	-	-	-	-	-
Metacnephia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prosimulium	-	-	-	-	7.2	-	-	-	-	-	-	-	-	3.58	-
Metacnephia/Prosimulium pupae	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.58**	-
F. Tipulidae															
Tipula	43.0	25.1	46.6	25.1	118	17.9	25.1	25.1	7.17	28.7	14.3	14.3	28.7	39.4	7.17
SUMMARY METRICS															
Density (No. organisms per m^2)	778	412	616	391	416	1,366	1,215	1,731	462	2,968	226	387	165	330	168
Richness (total number of taxa)[a]	18	13	16	9	18	16	17	14	9	16	11	13	9	15	10
Simpson's Evenness (E)	0.796	0.688	0.839	0.855	0.909	0.877	0.85	0.874	0.806	0.872	0.918	0.9	0.882	0.903	0.864
Shannon's Diversity	2.89	2.3	2.83	2.44	3.33	2.93	2.83	2.78	2.25	2.9	2.95	3.02	2.55	3.08	2.58
Dominant Group Composition															
% Nemata	4.15	0	3.49	1.83	0	1.05	0.295	2.48	0	1.93	1.59	1.85	0	1.09	2.13
% Acari	3.69	8.7	9.88	8.26	2.59	4.72	5.9	6.21	9.3	2.42	4.76	3.7	8.7	0	0
% Ostracods	0	0	1.16	0	0.862	1.05	0.59	1.24	6.98	0	0	0.926	0	1.09	0
% Chironomids	78.3	75.7	73.3	81.7	48.3	70.9	70.2	69.6	80.6	61.4	73	86.1	69.6	80.4	87.2
% Metal Sensitive Chironmids	3.52	5.75	9.23	36.1	2.79	13.6	33.6	21.5	42.7	20.1	12.2	3.83	4.97	15.6	4.36
Functional Feeding Group Composition															
% Collector - Gatherers	41.1	20.6	42.8	54.8	39.5	53.2	31.7	55.4	15.1	61	55.4	72.9	47.9	66.1	54.2
% Filterers	0	0	0	0	1.72	13	32.4	19	42.7	19.1	0	0	0	3.29	0
% Shredders	52.5	64.6	46.1	37	43.2	26.2	24.8	17.4	30.5	14.4	31.9	19.7	41.2	29.5	39.3
Habitat Preference Group Composition															
% Clingers	51.1	67.2	49	38.8	18.2	31.9	28.7	22.1	38.3	15.9	30.3	19.7	32.5	20.8	35.1
% Sprawlers	37.9	25.8	37	53	51.6	45.3	48.6	55.3	58.6	47.9	60.2	74.8	50.1	65	58.5
% Burrowers	11.1	6.96	12.8	8.26	30.2	22.8	22.7	22.6	3.1	36.2	9.52	5.56	17.4	14.1	6.38

Note: **"-"** indicates taxa not present in sample.

[a] Bold entries excluded from taxa count.

Table F.6: Benthic Invertebrate Community Summary Statistics for Camp Lake Tributary 1 Study Areas, Mary River Project CREMP, August 2023

Metric	Area	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
Density (No. per m2)	Unnamed Reference Creek	505	275	123	226	448	864
	CLT1 Upstream North Branch	523	170	75.8	391	416	778
	CLT1 Upper Main Stem	1,548	918	411	462	1,366	2,968
	CLT1 Lower Main Stem	255	99.4	44.4	165	226	387
Richness (No. of Taxa)	Unnamed Reference Creek	16.4	3.51	1.57	13.0	16.0	22.0
	CLT1 Upstream North Branch	14.8	3.83	1.71	9.00	16.0	18.0
	CLT1 Upper Main Stem	14.4	3.21	1.44	9.00	16.0	17.0
	CLT1 Lower Main Stem	11.6	2.41	1.08	9.00	11.0	15.0
Simpson's Evenness	Unnamed Reference Creek	0.930	0.0363	0.0163	0.874	0.942	0.962
	CLT1 Upstream North Branch	0.817	0.0829	0.0371	0.688	0.839	0.909
	CLT1 Upper Main Stem	0.856	0.0299	0.0134	0.806	0.872	0.877
	CLT1 Lower Main Stem	0.893	0.0208	0.00929	0.864	0.900	0.918
Nemata (% of community)	Unnamed Reference Creek	2.45	2.19	0.978	0	2.56	5.56
	CLT1 Upstream North Branch	1.89	1.92	0.860	0	1.83	4.15
	CLT1 Upper Main Stem	1.15	1.06	0.472	0	1.05	2.48
	CLT1 Lower Main Stem	1.33	0.837	0.374	0	1.59	2.13
Oligochaeta (% of community)	Unnamed Reference Creek	1.72	2.11	0.942	0	0.800	4.76
	CLT1 Upstream North Branch	0.972	0.658	0.294	0	0.870	1.74
	CLT1 Upper Main Stem	18.8	11.2	5.00	1.55	20.4	32.9
	CLT1 Lower Main Stem	0.535	0.753	0.337	0	0	1.59
Hydracarina (% of community)	Unnamed Reference Creek	10.4	7.41	3.31	2.53	6.64	19.2
	CLT1 Upstream North Branch	6.62	3.26	1.46	2.59	8.26	9.88
	CLT1 Upper Main Stem	5.71	2.50	1.12	2.42	5.90	9.30
	CLT1 Lower Main Stem	3.43	3.64	1.63	0	3.70	8.70
Ostracoda (% of community)	Unnamed Reference Creek	7.37	6.38	2.85	0.505	8.00	14.3
	CLT1 Upstream North Branch	0.405	0.565	0.253	0	0	1.16
	CLT1 Upper Main Stem	1.97	2.84	1.27	0	1.05	6.98
	CLT1 Lower Main Stem	0.403	0.554	0.248	0	0	1.09
Chironomidae (% of community)	Unnamed Reference Creek	48.0	19.7	8.82	20.6	45.6	70.1
	CLT1 Upstream North Branch	71.4	13.3	5.96	48.3	75.7	81.7
	CLT1 Upper Main Stem	70.5	6.84	3.06	61.4	70.2	80.6
	CLT1 Lower Main Stem	79.3	7.82	3.50	69.6	80.4	87.2
Metal Sensitive Chironomidae (% of community)	Unnamed Reference Creek	12.1	9.29	4.15	0	13.7	22.3
	CLT1 Upstream North Branch	11.5	14.0	6.25	2.79	5.75	36.1
	CLT1 Upper Main Stem	26.3	11.7	5.21	13.6	21.5	42.7
	CLT1 Lower Main Stem	8.19	5.37	2.40	3.83	4.97	15.6
Simuliidae (% of community)	Unnamed Reference Creek	7.11	7.75	3.46	1.59	5.60	20.5
	CLT1 Upstream North Branch	0.645	0.721	0.322	0	0.581	1.72
	CLT1 Upper Main Stem	0	0	0	0	0	0
	CLT1 Lower Main Stem	0.435	0.972	0.435	0	0	2.17
Tipulidae (% of community)	Unnamed Reference Creek	3.91	2.09	0.934	0.830	4.04	6.35
	CLT1 Upstream North Branch	10.8	9.89	4.42	5.53	6.42	28.4
	CLT1 Upper Main Stem	1.47	0.400	0.179	0.966	1.45	2.06
	CLT1 Lower Main Stem	8.73	5.84	2.61	3.70	6.35	17.4
Collector-Gatherer FFG (% of community)	Unnamed Reference Creek	53.1	14.3	6.39	36.5	49.4	73.8
	CLT1 Upstream North Branch	39.8	12.3	5.50	20.6	41.1	54.8
	CLT1 Upper Main Stem	43.3	19.3	8.62	15.1	53.2	61.0
	CLT1 Lower Main Stem	59.3	10.0	4.48	47.9	55.4	72.9
Filterer FFG (% of community)	Unnamed Reference Creek	8.09	7.67	3.43	1.52	5.60	19.2
	CLT1 Upstream North Branch	0.345	0.771	0.345	0	0	1.72
	CLT1 Upper Main Stem	25.2	12.1	5.39	13.0	19.1	42.7
	CLT1 Lower Main Stem	0.658	1.47	0.658	0	0	3.29
Shredder FFG (% of community)	Unnamed Reference Creek	16.8	12.6	5.64	6.50	10.9	38.1
	CLT1 Upstream North Branch	48.7	10.5	4.70	37.0	46.1	64.6
	CLT1 Upper Main Stem	22.7	6.62	2.96	14.4	24.8	30.5
	CLT1 Lower Main Stem	32.3	8.60	3.85	19.7	31.9	41.2
Clinger HPG (% of community)	Unnamed Reference Creek	31.5	17.5	7.81	9.98	28.3	56.5
	CLT1 Upstream North Branch	44.9	18.1	8.07	18.2	49.0	67.2
	CLT1 Upper Main Stem	27.4	8.67	3.88	15.9	28.7	38.3
	CLT1 Lower Main Stem	27.7	6.99	3.13	19.7	30.3	35.1
Sprawler HPG (% of community)	Unnamed Reference Creek	55.4	11.9	5.32	39.4	54.2	71.3
	CLT1 Upstream North Branch	41.1	11.3	5.06	25.8	37.9	53.0
	CLT1 Upper Main Stem	51.1	5.57	2.49	45.3	48.6	58.6
	CLT1 Lower Main Stem	61.7	9.06	4.05	50.1	60.2	74.8
Burrower HPG (% of community)	Unnamed Reference Creek	13.1	8.91	3.98	4.15	10.4	25.5
	CLT1 Upstream North Branch	13.8	9.41	4.21	6.96	11.1	30.2
	CLT1 Upper Main Stem	21.5	11.8	5.29	3.10	22.7	36.2
	CLT1 Lower Main Stem	10.6	5.07	2.27	5.56	9.52	17.4

Note: Sample size was five for all study areas.

Table F.7: Statistical Comparison of Bray-Curtis Index for Camp Lake Tributary 1 (CLT2) and 2 (CLT2) Compared to Unnamed Reference Creek (REF-CRK) Study Areas, Mary River Project CREMP, August 2023

Mine-Exposed Area	Comparison	n		Betadisper P-Value	Mantel Test			dbRDA			
		Reference	Mine-Exposed		r	R^2	P-Value	F-Value	R^2	R^2_{adj}	P-Value
Camp Lake Tributary 1	CLT1-US vs REF-CRK	5	5	0.778	0.852	0.726	0.008	8.66	0.520	0.460	0.002
	CLT1-L2 vs REF-CRK	5	5	0.828	0.932	0.869	0.008	17.7	0.689	0.650	0.007
	CLT1-DS vs REF-CRK	5	5	0.682	0.774	0.599	0.008	7.48	0.483	0.418	0.008
Camp Lake Tributary 2	CLT2-US vs REF-CRK	5	5	0.116	0.784	0.614	0.007	9.39	0.540	0.482	0.006
	CLT2-DS vs REF-CRK	5	5	0.834	0.780	0.608	0.008	6.41	0.445	0.376	0.007

Highlighted values indicate significant difference between study areas based on statistical test p-value less than 0.10.

Table F.8: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 1 North Branch (CLT1-US) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Eleven-Year Comparison				Pair-wise, *post hoc* comparisons						
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
Density (org/m^2)	ANOVA	log10	YES	<0.001	2007	3	505	330	nc	nc	B
					2011	3	949	139	1.1	nc	AB
					2015	5	1,446	836	1.5	2.0	A
					2016	5	1,609	806	1.7	2.8	A
					2017	5	1,242	143	1.5	1.8	A
					2018	5	1,379	524	1.5	2.1	A
					2019	5	1,260	313	1.5	1.7	A
					2020	5	1,635	711	1.7	3.0	A
					2021	5	1,087	377	1.2	0.65	AB
					2022	5	1,430	468	1.6	2.4	A
					2023	5	523	170	0.22	-4.1	B
Richness (#Taxa)	ANOVA	none	YES	0.007	2007	3	13.7	2.31	nc	nc	AB
					2011	3	14.3	2.08	0.29	nc	AB
					2015	5	15.0	2.74	0.58	0.32	AB
					2016	5	12.2	2.39	-0.64	-1.0	B
					2017	5	19.2	2.59	2.4	2.3	A
					2018	5	17.2	1.48	1.5	1.4	AB
					2019	5	18.0	2.12	1.9	1.8	A
					2020	5	18.2	2.49	2.0	1.9	A
					2021	5	16.6	3.85	1.3	1.1	AB
					2022	5	15.6	2.19	0.84	0.61	AB
					2023	5	14.8	3.83	0.49	0.22	AB
Simpson's E (Krebs)	K-W	rank	YES	0.039	2007	3	0.749	0.0821	nc	nc	D
					2011	3	0.874	0.0417	1.7	nc	BCD
					2015	5	0.899	0.0372	1.9	0.35	AB
					2016	5	0.843	0.0428	1.5	-0.32	CD
					2017	5	0.925	0.0192	2.4	1.00	A
					2018	5	0.877	0.0578	2.0	0.41	ABC
					2019	5	0.884	0.0358	1.7	0.032	ABC
					2020	5	0.844	0.0760	1.8	0.19	BCD
					2021	5	0.854	0.0941	1.6	-0.10	BC
					2022	5	0.873	0.0890	2.1	0.54	ABC
					2023	5	0.817	0.0829	1.0	-0.93	CD
Nemata (% of community)	ANOVA	log10(x+1)	YES	<0.001	2007	3	0.148	0.256	nc	nc	C
					2011	3	0.696	0.766	2.1	nc	C
					2015	5	1.68	0.734	5.9	1.3	BC
					2016	5	1.32	0.505	4.6	0.81	C
					2017	5	4.08	2.13	15	4.3	A
					2018	5	1.56	0.732	5.5	1.1	BC
					2019	5	1.27	0.825	4.4	0.75	C
					2020	5	1.30	1.13	4.4	0.78	C
					2021	5	3.70	1.08	14	3.9	AB
					2022	5	0.626	0.620	1.9	-0.091	C
					2023	5	1.89	1.92	6.7	1.5	ABC
Oligochaeta (% of community)	K-W	rank	YES	0.076	2007	3	1.46	2.13	nc	nc	BC
					2011	3	0.745	0.512	0.057	nc	BC
					2015	5	1.40	1.28	2.5	10	BC
					2016	5	1.50	0.627	1.3	5.2	AC
					2017	5	1.08	1.31	0.11	0.23	BC
					2018	5	1.21	0.568	0.66	2.6	BC
					2019	5	2.53	3.20	0.54	2.1	C
					2020	5	4.38	1.34	5.9	25	A
					2021	5	0.379	0.359	0.060	0.012	B
					2022	5	1.44	1.65	0.84	3.4	BC
					2023	5	0.972	0.658	0.58	2.3	BC

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.8: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 1 North Branch (CLT1-US) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Eleven-Year Comparison				Pair-wise, *post hoc* comparisons						
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
Hydracarina (% of community)	ANOVA	log10(x+1)	YES	<0.001	2007	3	0.798	1.02	nc	nc	C
					2011	3	14.4	6.67	12	nc	A
					2015	5	2.32	1.70	1.5	-1.9	C
					2016	5	9.77	3.19	8.4	-0.69	AB
					2017	5	7.65	1.13	6.5	-1.0	BD
					2018	5	5.34	1.27	4.4	-1.4	BCD
					2019	5	1.97	1.69	1.1	-1.9	C
					2020	5	2.96	2.52	2.1	-1.8	CD
					2021	5	2.89	1.67	2.0	-1.8	CD
					2022	5	2.72	3.17	1.8	-1.8	CD
					2023	5	6.62	3.26	5.5	-1.2	BCD
Ostracoda (% of community)	K-W	rank	YES	0.059	2007	3	0	0	nc	nc	CD
					2011	3	0.939	1.02	nm	nc	AB
					2015	5	0.603	0.850	nm	-0.28	ABC
					2016	5	0	0	nm	-0.67	D
					2017	5	0	0	nm	-0.67	D
					2018	5	0	0	nm	-0.67	D
					2019	5	0.107	0.240	nm	-0.67	BCD
					2020	5	0.547	0.607	nm	-0.35	AB
					2021	5	0.355	0.495	nm	-0.67	ABCD
					2022	5	0.568	0.431	nm	-0.23	A
					2023	5	0.405	0.565	nm	-0.67	ABCD
Chironomidae (% of community)	K-W	rank	YES	0.003	2007	3	88.1	7.15	nc	nc	A
					2011	3	76.3	5.09	-3.3	nc	BCD
					2015	5	75.6	7.47	-3.4	-0.033	CD
					2016	5	68.6	10.6	-5.4	-1.2	D
					2017	5	74.0	1.66	-3.9	-0.36	D
					2018	5	86.8	4.18	-0.76	1.5	A
					2019	5	85.0	5.11	-1.9	0.87	AB
					2020	5	81.7	7.87	-2.0	0.79	ABC
					2021	5	70.6	7.32	-4.8	-0.89	D
					2022	5	81.5	6.11	-1.8	0.89	ABC
					2023	5	71.4	13.3	-3.5	-0.10	CD
Metal Sensitive Chironomidae (% of community)	ANOVA	log10	NO	0.393	2007	3	3.73	3.57	nc	nc	A
					2011	3	10.8	6.64	1.2	nc	A
					2015	5	12.7	14.1	0.88	-0.39	A
					2016	5	9.33	9.05	0.83	-0.46	A
					2017	5	7.24	5.16	0.60	-0.76	A
					2018	5	17.8	4.82	1.8	0.81	A
					2019	5	14.4	10.4	1.2	0.066	A
					2020	5	13.8	4.70	1.5	0.46	A
					2021	5	7.21	5.34	0.72	-0.60	A
					2022	5	8.69	6.74	0.90	-0.37	A
					2023	5	11.5	14.0	0.96	-0.29	A
Tipulidae (% of community)	K-W	rank	YES	0.002	2007	3	8.89	4.06	nc	nc	ABCDE
					2011	3	6.92	2.14	-0.11	nc	CDEF
					2015	5	16.8	4.66	1.7	10.0	A
					2016	5	16.9	11.8	0.55	3.6	AB
					2017	5	8.41	1.54	0.14	1.4	BCDE
					2018	5	2.93	2.27	-1.0	-5.0	F
					2019	5	5.45	1.93	-0.56	-2.5	EF
					2020	5	7.42	6.20	-0.80	-3.7	DEF
					2021	5	12.8	5.23	0.38	2.7	ABC
					2022	5	9.94	3.81	0.36	2.6	ABCD
					2023	5	10.8	9.89	-0.40	-1.6	BCDE

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.8: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 1 North Branch (CLT1-US) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Eleven-Year Comparison				Pair-wise, *post hoc* comparisons						
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
Collector Gatherers FFG (% of community)	ANOVA	none	YES	0.011	2007	3	72.6	11.0	nc	nc	A
					2011	3	41.4	14.1	-2.8	nc	AB
					2015	5	50.2	7.33	-2.0	0.63	AB
					2016	5	41.6	15.5	-2.8	0.019	B
					2017	5	38.8	7.09	-3.1	-0.19	B
					2018	5	54.6	13.5	-1.6	0.94	AB
					2019	5	58.8	8.57	-1.3	1.2	AB
					2020	5	53.5	15.6	-1.7	0.86	AB
					2021	5	44.2	14.4	-2.6	0.20	AB
					2022	5	61.7	17.9	-0.99	1.4	AB
					2023	5	39.8	12.3	-3.0	-0.11	B
Filterers FFG (% of community)	K-W	rank	YES	0.035	2007	3	0.303	0.263	nc	nc	BCD
					2011	3	0	0	-13	nc	D
					2015	5	0	0	-13	nm	D
					2016	5	0.435	0.420	1.8	nm	BCD
					2017	5	1.33	1.46	3.4	nm	AB
					2018	5	0.501	0.459	9.7	nm	BCD
					2019	5	2.02	2.40	24	nm	ABC
					2020	5	4.44	5.33	56	nm	A
					2021	5	0.355	0.495	-13	nm	BCD
					2022	5	0.636	1.16	-13	nm	BCD
					2023	5	0.345	0.771	-13	nm	CD
Shredders FFG (% of community)	ANOVA	none	NO	0.150	2007	3	23.1	8.79	nc	nc	A
					2011	3	40.0	14.2	1.9	nc	A
					2015	5	46.1	7.29	2.6	0.42	A
					2016	5	47.0	18.1	2.7	0.49	A
					2017	5	49.5	6.44	3.0	0.66	A
					2018	5	39.3	13.2	1.8	-0.054	A
					2019	5	33.8	9.13	1.2	-0.44	A
					2020	5	38.3	12.7	1.7	-0.12	A
					2021	5	47.0	15.8	2.7	0.49	A
					2022	5	33.5	19.3	1.2	-0.46	A
					2023	5	48.7	10.5	2.9	0.60	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.9: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 1 Upper Mainsteam (CLT1-L2) Among Years of Mine Operation (2016 to 2023) and Baseline (2011) for the Mary River Project CREMP

Metric	Overall Five-Year Comparison				Pair-wise, *post hoc* comparisons					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
Density (org/m^2)	ANOVA	log10	YES	<0.001	2011	3	21,125	13,424	nc	A
					2016	5	7,701	1,580	-0.85	AB
					2021	5	3,128	1,579	-1.9	BC
					2022	5	3,601	2,347	-1.9	BC
					2023	5	1,548	918	-2.7	C
Richness (#Taxa)	ANOVA	none	NO	0.183	2011	3	17.0	3.61	nc	A
					2016	5	18.0	1.58	0.28	A
					2021	5	16.6	2.41	-0.11	A
					2022	5	15.2	0.837	-0.50	A
					2023	5	14.4	3.21	-0.72	A
Simpson's E (Krebs)	ANOVA	log10	YES	0.047	2011	3	0.879	0.0236	nc	A
					2016	5	0.856	0.0427	-0.99	AB
					2021	5	0.815	0.0654	-2.8	AB
					2022	5	0.785	0.0415	-4.2	B
					2023	5	0.856	0.0299	-0.98	AB
Nemata (% of community)	K-W	rank	YES	0.083	2011	3	1.25	0.389	nc	B
					2016	5	1.28	0.689	2.3	B
					2021	5	1.97	1.54	7.1	B
					2022	5	3.48	1.75	26	A
					2023	5	1.15	1.06	-0.031	B
Oligochaeta (% of community)	ANOVA	none	NO	0.314	2011	3	4.44	4.97	nc	A
					2016	5	12.6	8.57	1.6	A
					2021	5	13.4	9.92	1.8	A
					2022	5	10.3	7.69	1.2	A
					2023	5	18.8	11.2	2.9	A
Hydracarina (% of community)	ANOVA	log10	YES	0.004	2011	3	18.9	19.8	nc	A
					2016	5	23.8	8.28	0.50	A
					2021	5	2.13	1.95	-0.98	B
					2022	5	5.80	4.73	-0.34	AB
					2023	5	5.71	2.50	-0.27	AB
Ostracoda (% of community)	K-W	rank	YES	0.031	2011	3	0.986	0.259	nc	A
					2016	5	0.257	0.232	-2.5	B
					2021	5	0.377	0.296	-2.4	AB
					2022	5	0.105	0.148	-3.3	B
					2023	5	1.97	2.84	0.37	A
Chironomidae (% of community)	ANOVA	log10	NO	0.198	2011	3	73.8	20.7	nc	A
					2016	5	61.0	14.5	-0.66	A
					2021	5	78.2	10.8	0.27	A
					2022	5	77.5	11.5	0.23	A
					2023	5	70.5	6.84	-0.077	A
Metal Sensitive Chironomidae (% of community)	ANOVA	log10	YES	0.025	2011	3	28.9	22.6	nc	AB
					2016	5	30.4	12.3	0.25	A
					2021	5	10.6	8.01	-1.4	B
					2022	5	18.6	7.90	-0.43	AB
					2023	5	26.3	11.7	0.029	A
Tipulidae (% of community)	K-W	rank	YES	0.005	2011	3	0.218	0.207	nc	B
					2016	5	0.462	0.438	0.71	B
					2021	5	1.93	1.41	6.9	A
					2022	5	2.43	0.303	9.1	A
					2023	5	1.47	0.400	5.2	A
Collector Gatherers FFG (% of community)	ANOVA	none	YES	0.005	2011	3	29.6	9.13	nc	B
					2016	5	28.6	9.64	-0.10	B
					2021	5	59.7	12.3	3.3	A
					2022	5	25.2	12.6	-0.48	B
					2023	5	43.3	19.3	1.5	AB
Filterers FFG (% of community)	ANOVA	log10	YES	0.037	2011	3	28.8	22.7	nc	AB
					2016	5	28.3	13.7	0.12	A
					2021	5	9.84	8.38	-1.7	B
					2022	5	17.6	8.32	-0.50	AB
					2023	5	25.2	12.1	-0.028	A
Shredders FFG (% of community)	ANOVA	none	YES	<0.001	2011	3	13.0	14.6	nc	C
					2016	5	16.4	2.10	0.23	BC
					2021	5	26.4	5.09	0.91	B
					2022	5	47.1	4.43	2.3	A
					2023	5	22.7	6.62	0.66	BC

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.10: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 1 Lower Mainstream (CLT1-DS) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Eleven-Year Comparison				Pair-wise, *post hoc* comparisons						
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
Density (org/m^2)	ANOVA	none	YES	0.002	2007	3	754	573	nc	nc	ABC
					2011	3	898	183	0.25	nc	ABC
					2015	5	1,301	479	0.96	2.2	AB
					2016	5	1,143	444	0.68	1.3	AB
					2017	5	1,465	735	1.2	3.1	A
					2018	5	771	309	0.030	-0.69	ABC
					2019	5	843	293	0.16	-0.30	ABC
					2020	5	626	261	-0.22	-1.5	BC
					2021	5	675	344	-0.14	-1.2	ABC
					2022	5	638	301	-0.20	-1.4	BC
					2023	5	255	99.4	-0.87	-3.5	C
Richness (#Taxa)	ANOVA	none	YES	0.016	2007	3	20.3	6.03	nc	nc	A
					2011	3	15.3	4.51	-0.83	nc	ABC
					2015	5	14.6	1.14	-0.95	-0.16	ABC
					2016	5	15.0	1.58	-0.88	-0.074	ABC
					2017	5	16.8	1.92	-0.59	0.33	AB
					2018	5	14.4	1.14	-0.98	-0.21	BC
					2019	5	15.8	1.64	-0.75	0.10	ABC
					2020	5	16.4	3.05	-0.65	0.24	ABC
					2021	5	15.0	2.00	-0.88	-0.074	ABC
					2022	5	15.2	2.59	-0.85	-0.030	ABC
					2023	5	11.6	2.41	-1.4	-0.83	C
Simpson's E (Krebs)	K-W	rank	YES	0.095	2007	3	0.864	0.0397	nc	nc	BC
					2011	3	0.864	0.0254	1.5	nc	BC
					2015	5	0.889	0.0436	4.6	1.0	ABC
					2016	5	0.920	0.0342	7.6	2.0	A
					2017	5	0.874	0.0331	2.7	0.40	BC
					2018	5	0.857	0.0500	0.20	-0.43	BC
					2019	5	0.755	0.161	-10	-3.9	BC
					2020	5	0.903	0.0335	5.3	1.2	AB
					2021	5	0.841	0.0429	-1.0	-0.84	C
					2022	5	0.921	0.0202	5.9	1.5	A
					2023	5	0.893	0.0208	4.6	1.0	ABC
Nemata (% of community)	K-W	rank	NO	0.182	2007	3	1.01	1.34	nc	nc	A
					2011	3	0.427	0.381	0.063	nc	A
					2015	5	3.18	2.58	3.1	8.3	A
					2016	5	4.46	4.07	2.8	7.6	A
					2017	5	4.55	4.99	5.0	14	A
					2018	5	2.57	1.81	2.4	6.5	A
					2019	5	2.22	1.29	2.7	7.2	A
					2020	5	2.05	1.04	1.9	5.0	A
					2021	5	3.47	2.87	2.9	7.9	A
					2022	5	1.65	2.93	-0.67	-2.0	A
					2023	5	1.33	0.837	1.5	3.8	A
Oligochaeta (% of community)	K-W	rank	YES	<0.001	2007	3	7.26	6.23	nc	nc	AB
					2011	3	1.08	1.56	-0.86	nc	CD
					2015	5	5.60	3.14	-0.15	8.9	AB
					2016	5	9.68	3.69	0.50	17	A
					2017	5	4.97	2.66	-0.43	5.3	AB
					2018	5	1.20	1.04	-0.78	1.00	CD
					2019	5	3.99	2.70	-0.52	4.2	ABC
					2020	5	11.5	8.35	0.094	12	A
					2021	5	0.950	1.74	-0.86	-0.084	D
					2022	5	2.53	2.19	-0.55	3.9	BCD
					2023	5	0.535	0.753	-0.91	-0.67	D

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.10: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 1 Lower Mainstream (CLT1-DS) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Eleven-Year Comparison				Pair-wise, *post hoc* comparisons						
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
Hydracarina (% of community)	K-W	rank	YES	0.004	2007	3	2.87	1.42	nc	nc	BCD
					2011	3	24.7	6.39	157	nc	A
					2015	5	1.68	1.55	-18	-3.8	D
					2016	5	4.60	0.806	5.8	-3.2	AB
					2017	5	4.03	1.43	-0.31	-3.4	BC
					2018	5	3.64	1.50	-3.4	-3.4	BCD
					2019	5	2.27	1.35	-14	-3.7	CD
					2020	5	1.61	1.55	-20	-3.8	D
					2021	5	1.74	0.872	-13	-3.6	D
					2022	5	5.32	1.84	9.0	-3.2	AB
					2023	5	3.43	3.64	0.49	-3.4	BCD
Ostracoda (% of community)	K-W	rank	NO	0.148	2007	3	0.619	0.621	nc	nc	A
					2011	3	0.122	0.211	-0.67	nc	A
					2015	5	0.758	1.04	-0.67	nm	A
					2016	5	0	0	-0.67	nm	A
					2017	5	0	0	-0.67	nm	A
					2018	5	0.143	0.319	-0.67	nm	A
					2019	5	0.402	0.417	-0.29	nm	A
					2020	5	0.0763	0.171	-0.67	nm	A
					2021	5	0	0	-0.67	nm	A
					2022	5	0	0	-0.67	nm	A
					2023	5	0.403	0.554	-0.67	nm	A
Chironomidae (% of community)	ANOVA	log10	YES	<0.001	2007	3	80.8	8.53	nc	nc	AB
					2011	3	65.3	8.95	-2.1	nc	C
					2015	5	85.2	4.02	0.53	2.0	AB
					2016	5	73.9	5.94	-0.84	0.93	BC
					2017	5	80.9	4.46	0.042	1.6	AB
					2018	5	85.9	4.05	0.61	2.0	AB
					2019	5	87.4	7.37	0.76	2.1	A
					2020	5	75.8	7.09	-0.60	1.1	ABC
					2021	5	80.8	3.03	0.033	1.6	AB
					2022	5	78.8	8.14	-0.25	1.4	AB
					2023	5	79.3	7.82	-0.18	1.4	AB
Metal Sensitive Chironomidae (% of community)	K-W	rank	YES	0.020	2007	3	15.1	10.2	nc	nc	A
					2011	3	7.56	7.37	-3.6	nc	AB
					2015	5	4.41	3.52	-3.2	0.32	BC
					2016	5	4.08	3.26	-4.4	-0.67	BC
					2017	5	1.49	0.665	-5.2	-1.3	C
					2018	5	8.56	5.95	-3.2	0.33	AB
					2019	5	7.67	3.37	-1.4	1.8	AB
					2020	5	3.59	1.63	-4.4	-0.66	BC
					2021	5	11.1	9.82	-2.0	1.3	AB
					2022	5	8.52	6.24	-1.4	1.8	AB
					2023	5	8.19	5.37	-3.0	0.50	AB
Tipulidae (% of community)	ANOVA	log10	YES	0.040	2007	3	6.45	2.60	nc	nc	A
					2011	3	8.38	3.20	0.59	nc	A
					2015	5	3.06	1.00	-1.6	-2.3	A
					2016	5	6.13	3.38	-0.26	-0.92	A
					2017	5	3.90	3.09	-1.7	-2.5	A
					2018	5	4.85	3.06	-0.84	-1.6	A
					2019	5	2.75	2.41	-2.3	-3.2	A
					2020	5	6.20	2.01	-0.049	-0.69	A
					2021	5	4.40	1.67	-0.84	-1.5	A
					2022	5	9.11	6.95	0.42	-0.18	A
					2023	5	8.73	5.84	0.41	-0.19	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.10: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 1 Lower Mainstream (CLT1-DS) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Eleven-Year Comparison				Pair-wise, *post hoc* comparisons						
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
Collector Gatherers FFG (% of community)	ANOVA	none	YES	<0.001	2007	3	51.7	24.3	nc	nc	CDE
					2011	3	35.6	10.5	-0.66	nc	E
					2015	5	78.4	9.50	1.1	4.1	AB
					2016	5	66.0	10.6	0.59	2.9	ABCD
					2017	5	67.2	6.41	0.64	3.0	ABCD
					2018	5	59.5	8.30	0.32	2.3	BCD
					2019	5	81.5	6.28	1.2	4.4	A
					2020	5	71.1	8.02	0.80	3.4	ABC
					2021	5	47.9	9.72	-0.16	1.2	DE
					2022	5	57.7	9.69	0.25	2.1	CDE
					2023	5	59.3	10.0	0.31	2.3	BCD
Filterers FFG (% of community)	K-W	rank	NO	0.375	2007	3	10.2	13.1	nc	nc	A
					2011	3	0.275	0.242	-0.63	nc	A
					2015	5	0.227	0.508	-0.67	-2.7	A
					2016	5	1.37	1.57	-0.56	4.2	A
					2017	5	0.340	0.546	-0.67	-2.7	A
					2018	5	0.428	0.475	-0.64	-0.26	A
					2019	5	0.841	1.88	-0.67	-2.7	A
					2020	5	0.935	1.21	-0.58	3.3	A
					2021	5	1.62	1.29	-0.45	11	A
					2022	5	0.244	0.373	-0.67	-2.7	A
					2023	5	0.658	1.47	-0.67	-2.7	A
Shredders FFG (% of community)	ANOVA	none	YES	<0.001	2007	3	22.1	3.05	nc	nc	BCD
					2011	3	38.9	4.55	5.5	nc	AB
					2015	5	19.3	8.98	-0.91	-4.3	CD
					2016	5	28.6	10.7	2.1	-2.3	ABCD
					2017	5	27.6	4.92	1.8	-2.5	ABCD
					2018	5	35.5	7.73	4.4	-0.73	AB
					2019	5	13.9	6.10	-2.7	-5.5	D
					2020	5	24.6	8.93	0.81	-3.1	BCD
					2021	5	41.9	11.6	6.5	0.66	A
					2022	5	23.4	4.44	0.44	-3.4	BCD
					2023	5	32.3	8.60	3.3	-1.4	ABC

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

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Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.11: Replicate Grab Data for Benthic Invertebrate Community Samples Collected at Camp Lake Tributary 2 (CLT2) and the Unnamed Reference Creek (REF-CRK), Mary River Project CREMP, August 2023

Study Area	Station	Water Depth (cm)			Water Velocity (m/s)			Embeddedness			In-Stream Vegetation			Algae Presence		
		Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3
Unnamed Reference Creek	REF-CRK-B1	15	13	15	0.53	0.46	0.54	0%	0%	0%	None	None	None	Sparse	Sparse	Sparse
	REF-CRK-B2	19	17	17	0.38	0.44	0.48	0%	0%	0%	None	None	None	Sparse	Sparse	Sparse
	REF-CRK-B3	20	19	16	0.44	0.37	0.47	0%	25%	-	None	None	None	Sparse	Sparse	Sparse
	REF-CRK-B4	13	12	15	0.44	0.39	0.29	0%	-	-	None	None	Sparse bryophytes	None	Sparse	Sparse
	REF-CRK-B5	20	22	15	0.35	0.47	0.46	25%	50%	-	None	None	None	None	Sparse	None
Camp Lake Tributary 2 Upstream	CLT-2-US-B1	18	19	21	0.37	0.32	0.36	75%	25%	25%	None	Sparse bryophytes	None	Sparse	Sparse	Sparse
	CLT-2-US-B2	18	21	23	0.49	0.41	0.32	25%	25%	50%	None	None	None	Sparse	Sparse	Sparse
	CLT-2-US-B3	18	18	19	0.38	0.34	0.25	75%	50%	0%	None	None	None	Sparse	Sparse	Sparse
	CLT-2-US-B4	20	23	18	0.47	0.31	0.28	25%	25%	0%	None	None	None	Sparse	Sparse	Sparse
	CLT-2-US-B5	18	16	16	0.42	0.47	0.37	25%	25%	0%	None	None	None	Sparse	Sparse	Sparse
Camp Lake Tributary 2 Downstream	CLT-2-DS-B1	17	17	20	0.28	0.33	0.29	50%	50%	100%	None	None	None	Sparse	Sparse	Sparse
	CLT-2-DS-B2	17	17	17	0.35	0.35	0.33	25%	25%	25%	None	None	None	Sparse	Sparse	Sparse
	CLT-2-DS-B3	17	17	19	0.28	0.30	0.28	25%	25%	25%	None	None	None	Sparse	Sparse	Sparse
	CLT-2-DS-B4	18	19	21	0.32	0.32	0.35	75%	50%	50%	None	None	None	Sparse	Sparse	Sparse
	CLT-2-DS-B5	19	19	19	0.58	0.42	0.48	0%	0%	0%	None	None	None	Sparse	Sparse	None

Note: "-" = data not available.

Table F.12: Benthic Station Habitat Feature Statistical Comparisons among Camp Lake Tributary 2 and Unnamed Reference Creek Study Areas, Mary River Project CREMP, August 2022

Metric	Overall 3-group Comparison				Pair-wise, *post hoc* comparisons			
	Statistical Test [a]	Transformation	Significant Difference between Areas?	p-value	Area	Area	Significant Difference Between Areas?	P-value
Water Depth (cm)	ANOVA	none	NO	0.128	Unnamed Reference Creek	CLT2 Upstream	NO	ns
					Unnamed Reference Creek	CLT2 Downstream	NO	ns
					CLT2 Upstream	CLT2 Downstream	NO	ns
Water Velocity (cm/s)	ANOVA	none	NO	0.116	Unnamed Reference Creek	CLT2 Upstream	NO	ns
					Unnamed Reference Creek	CLT2 Downstream	NO	ns
					CLT2 Upstream	CLT2 Downstream	NO	ns
Substrate Embeddedness (%)	ANOVA	none	NO	0.148	Unnamed Reference Creek	CLT2 Upstream	NO	ns
					Unnamed Reference Creek	CLT2 Downstream	NO	ns
					CLT2 Upstream	CLT2 Downstream	NO	ns

Highlighted values indicate significant difference between study areas based on test p-value less than 0.05.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

Table F.13: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for Camp Lake Tributary 2 Study Areas, August 2023

Waterbody	Upstream (CLT2-US)					Downstream (CLT2-DS)				
Station	B1	B2	B3	B4	B5	B1	B2	B3	B4	B5
ROUNDWORMS										
P. Nemata	3.58	3.58	-	3.58	-	17.9	21.5	14.3	-	10.7
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	7.17	-	3.58	3.58	-	-	3.58	-	-	14.3
F. Lumbriculidae										
Lumbriculus	-	-	-	-	-	-	-	-	-	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
immature	-	-	-	-	-	-	-	-	-	-
F. Lebertiidae										
Lebertia	-	-	-	-	-	-	-	-	-	-
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	-	-
F. Sperchonidae										
Sperchon	14.3	28.7	17.9	3.58	-	7.17	14.3	3.58	14.3	17.9
SEED SHRIMPS										
Cl. Ostracoda	-	-	-	-	-	14.3	-	-	-	-
SPRINGTAILS										
Cl. Entognatha										
O. Collembola	-	-	-	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
MAYFLIES										
O. Ephemeroptera										
F. Baetidae										
Acentrella feropagus	3.58	7.17	7.17	-	-	-	3.58	-	3.58	10.7
STONEFLIES										
O. Plecoptera										
F. Capniidae										
immature	-	3.58	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
BITING-MIDGE										
F. Ceratopogonidae										
Culicoides	-	-	-	-	-	60.9	-	46.6	-	-
MIDGES										
F. Chironomidae										
chironomid pupae	**10.7**	**3.58**	**3.58**	**3.58**	**10.7**	7.17	7.17	14.3	-	3.58
S.F. Chironominae										
Lipiniella	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	-	-	-	-	-	-	-	-	-	-
Rheotanytarsus	-	-	-	-	-	-	-	-	-	-
Tanytarsus	-	-	-	-	-	-	-	-	-	-
S.F. Diamesinae										
Diamesa	25.1	17.9	17.9	14.3	46.6	7.17	71.7	14.3	28.7	14.3
Pseudokiefferiella	3.58	-	3.58	-	-	-	28.7	-	17.9	14.3
S.F. Orthocladiinae										
Cardiocladius	-	-	-	-	-	-	7.17	-	-	-
Corynoneura	-	-	-	-	-	-	-	-	-	-
Cricotopus	-	-	7.17	3.58	3.58	17.9	10.7	17.9	-	-
Cricotopus/Orthocladius	39.4	14.3	21.5	10.7	10.7	60.9	140	82.4	10.7	7.17
Diplocladius	-	-	-	-	-	-	-	-	-	-
Eukiefferiella	3.58	-	-	-	-	7.17	14.3	7.17	-	-
Hydrobaenus	-	-	-	3.58	-	14.3	3.58	10.7	-	10.7
Hydrosmittia	10.7	3.58	-	3.58	-	10.7	10.7	7.17	3.58	3.58
Krenosmittia	-	-	-	10.7	-	7.17	14.3	10.7	-	-
Limnophyes	-	-	-	-	-	-	-	21.5	-	7.17
Orthocladius (Euorthocladius)	10.7	3.58	-	-	-	7.17	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	3.58	3.58	-
Parametriocnemus	-	-	-	-	-	-	-	-	-	-
Paraphaenocladius	-	-	-	-	-	-	7.17	-	3.58	-
Psectrocladius	-	-	-	-	-	-	-	-	-	-
Thienemanniella	-	-	-	-	-	-	-	-	-	3.58
Tokunagaia	-	-	-	-	-	-	-	-	-	-
Tvetenia	-	3.58	3.58	-	10.7	17.9	35.8	21.5	10.7	10.7
indeterminate	-	-	3.58	-	-	-	-	-	-	-
S.F. Tanypodinae										
Procladius	-	-	-	-	-	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-	-	-	-	-	-
F. Empididae										
Clinocera	17.9	-	-	3.58	-	10.7	10.7	21.5	7.17	14.3
pupae	-	-	-	**3.58**	-	-	-	-	-	-
F. Muscidae	-	-	-	-	-	-	-	-	-	-
F. Simuliidae										
Gymnopais	25.1	32.2	25.1	-	17.9	3.58	7.17	7.17	-	14.3
Metacnephia	10.7	-	-	-	-	-	-	-	3.58	-
Prosimulium	32.2	-	14.3	14.3	10.7	3.58	3.58	-	-	-
Metacnephia/Prosimulium pupae	**7.17**	-	**17.9**	-	**7.17**	-	**3.58**	3.58	-	3.58
F. Tipulidae										
Tipula	3.58	14.3	10.7	3.58	-	14.3	10.7	3.58	10.7	32.2
SUMMARY METRICS										
Density (No. organisms per m^2)	229	136	158	86	118	290	430	312	118	194
Richness (total number of taxa)[a]	13	9	10	10	5	15	17	15	11	15
Simpson's Evenness (E)	0.914	0.94	0.953	0.955	0.898	0.93	0.861	0.881	0.953	0.982
Shannon's Diversity	3.08	2.8	3.01	3.03	2.08	3.36	3.11	3.12	3.15	3.74
Dominant Group Composition										
% Nemata	1.56	2.63	0	4.17	0	6.17	5	4.6	0	5.56
% Acari	6.25	21.1	11.4	4.17	0	2.47	3.33	1.15	12.1	9.26
% Ostracods	0	0	0	0	0	4.94	0	0	0	0
% Chironomids	45.3	34.2	38.6	58.3	69.7	54.3	81.7	67.8	66.7	38.9
% Metal Sensitive Chironmids	13.9	14.2	14.5	17.9	45.3	2.59	23.8	4.93	39.4	15.6
Functional Feeding Group Composition										
% Collector - Gatherers	51.6	42.1	26.1	46.5	55.8	41.5	49.2	36.5	59.5	53.2
% Filterers	21.9	0	20.4	16.7	15.2	1.23	1.67	1.15	3.03	1.85
% Shredders	1.56	13.2	26.1	24.4	13.9	28.9	39.9	37.1	19.3	20.9
Habitat Preference Group Composition										
% Clingers	39.1	44.7	67	41	44.2	28.9	44	40.5	25.4	22.8
% Sprawlers	54.7	42.1	23.9	46.5	55.8	39	45.8	38.8	65.5	47.6
% Burrowers	6.25	13.2	9.09	12.5	0	32.1	10.1	20.7	9.09	29.6

Note: "-" indicates taxa not present in sample.

[a] Bold entries excluded from taxa count.

Table F.14: Benthic Invertebrate Community Summary Statistics for Camp Lake Tributary 2 Study Areas, Mary River Project CREMP, August 2023

Metric	Area	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
Density (No. per m2)	Unnamed Reference Creek	505	275	123	226	448	864
	CLT1 Upstream North Branch	146	53.7	24.0	86.0	136	229
	CLT1 Lower Main Stem	269	119	53.2	118	290	430
Richness (No. of Taxa)	Unnamed Reference Creek	16.4	3.51	1.57	13.0	16.0	22.0
	CLT1 Upstream North Branch	9.40	2.88	1.29	5.00	10.0	13.0
	CLT1 Lower Main Stem	14.6	2.19	0.980	11.0	15.0	17.0
Simpson's Evenness	Unnamed Reference Creek	0.930	0.0363	0.0163	0.874	0.942	0.962
	CLT1 Upstream North Branch	0.932	0.0252	0.0113	0.898	0.940	0.955
	CLT1 Lower Main Stem	0.921	0.0501	0.0224	0.861	0.930	0.982
Nemata (% of community)	Unnamed Reference Creek	2.45	2.19	0.978	0	2.56	5.56
	CLT1 Upstream North Branch	1.67	1.79	0.798	0	1.56	4.17
	CLT1 Lower Main Stem	4.27	2.46	1.10	0	5.00	6.17
Oligochaeta (% of community)	Unnamed Reference Creek	1.72	2.11	0.942	0	0.800	4.76
	CLT1 Upstream North Branch	1.91	1.87	0.837	0	2.27	4.17
	CLT1 Lower Main Stem	1.65	3.24	1.45	0	0	7.41
Hydracarina (% of community)	Unnamed Reference Creek	10.4	7.41	3.31	2.53	6.64	19.2
	CLT1 Upstream North Branch	8.57	8.09	3.62	0	6.25	21.1
	CLT1 Lower Main Stem	5.67	4.76	2.13	1.15	3.33	12.1
Ostracoda (% of community)	Unnamed Reference Creek	7.37	6.38	2.85	0.505	8.00	14.3
	CLT1 Upstream North Branch	0	0	0	0	0	0
	CLT1 Lower Main Stem	0.988	2.21	0.988	0	0	4.94
Chironomidae (% of community)	Unnamed Reference Creek	48.0	19.7	8.82	20.6	45.6	70.1
	CLT1 Upstream North Branch	49.2	14.6	6.54	34.2	45.3	69.7
	CLT1 Lower Main Stem	61.9	16.1	7.20	38.9	66.7	81.7
Metal Sensitive Chironomidae (% of community)	Unnamed Reference Creek	12.1	9.29	4.15	0	13.7	22.3
	CLT1 Upstream North Branch	21.2	13.6	6.07	13.9	14.5	45.3
	CLT1 Lower Main Stem	17.3	15.0	6.72	2.59	15.6	39.4
Simuliidae (% of community)	Unnamed Reference Creek	7.11	7.75	3.46	1.59	5.60	20.5
	CLT1 Upstream North Branch	28.0	7.83	3.50	16.7	30.3	36.4
	CLT1 Lower Main Stem	4.31	2.79	1.25	2.47	3.33	9.26
Tipulidae (% of community)	Unnamed Reference Creek	3.91	2.09	0.934	0.830	4.04	6.35
	CLT1 Upstream North Branch	4.61	4.20	1.88	0	4.17	10.5
	CLT1 Lower Main Stem	6.87	6.25	2.80	1.15	4.94	16.7
Collector-Gatherer FFG (% of community)	Unnamed Reference Creek	53.1	14.3	6.39	36.5	49.4	73.8
	CLT1 Upstream North Branch	44.4	11.4	5.12	26.1	46.5	55.8
	CLT1 Lower Main Stem	48.0	9.15	4.09	36.5	49.2	59.5
Filterer FFG (% of community)	Unnamed Reference Creek	8.09	7.67	3.43	1.52	5.60	19.2
	CLT1 Upstream North Branch	14.8	8.73	3.90	0	16.7	21.9
	CLT1 Lower Main Stem	1.79	0.754	0.337	1.15	1.67	3.03
Shredder FFG (% of community)	Unnamed Reference Creek	16.8	12.6	5.64	6.50	10.9	38.1
	CLT1 Upstream North Branch	15.8	9.92	4.43	1.56	13.9	26.1
	CLT1 Lower Main Stem	29.2	9.26	4.14	19.3	28.9	39.9
Clinger HPG (% of community)	Unnamed Reference Creek	31.5	17.5	7.81	9.98	28.3	56.5
	CLT1 Upstream North Branch	47.2	11.3	5.06	39.1	44.2	67.0
	CLT1 Lower Main Stem	32.3	9.44	4.22	22.8	28.9	44.0
Sprawler HPG (% of community)	Unnamed Reference Creek	55.4	11.9	5.32	39.4	54.2	71.3
	CLT1 Upstream North Branch	44.6	12.9	5.77	23.9	46.5	55.8
	CLT1 Lower Main Stem	47.4	10.9	4.88	38.8	45.8	65.5
Burrower HPG (% of community)	Unnamed Reference Creek	13.1	8.91	3.98	4.15	10.4	25.5
	CLT1 Upstream North Branch	8.20	5.36	2.40	0	9.09	13.2
	CLT1 Lower Main Stem	20.3	10.7	4.77	9.09	20.7	32.1

Note: Sample size was five for all study areas.

Table F.15: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 2 Upstream (CLT2-US) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Ten-Year Comparison				Pair-wise, *post hoc* comparisons					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
Density (org/m^2)	ANOVA	log10	YES	<0.001	2007	3	364	205	nc	ABCDE
					2015	5	741	416	1.0	AB
					2016	5	409	100	0.33	ABC
					2017	5	216	30.2	-0.52	CDE
					2018	5	168	65.0	-0.94	DE
					2019	5	745	282	1.1	AB
					2020	5	679	325	0.93	AB
					2021	5	392	318	0.025	BCD
					2022	5	768	127	1.2	A
					2023	5	146	53.7	-1.1	E
Richness (#Taxa)	ANOVA	none	YES	<0.001	2007	3	12.7	2.08	nc	BC
					2015	5	20.8	1.79	3.9	A
					2016	5	16.0	2.74	1.6	AB
					2017	5	14.6	2.51	0.93	BC
					2018	5	15.0	3.74	1.1	B
					2019	5	18.8	2.59	2.9	AB
					2020	5	16.6	2.51	1.9	AB
					2021	5	16.0	3.67	1.6	AB
					2022	5	18.6	2.41	2.9	AB
					2023	5	9.40	2.88	-1.6	C
Simpson's E (Krebs)	ANOVA	none	YES	0.001	2007	3	0.825	0.00817	nc	D
					2015	5	0.922	0.0250	12	ABC
					2016	5	0.891	0.0428	8.0	ABCD
					2017	5	0.955	0.0133	16	A
					2018	5	0.922	0.0425	12	ABC
					2019	5	0.949	0.00536	15	AB
					2020	5	0.869	0.0611	5.4	BCD
					2021	5	0.869	0.0802	5.3	CD
					2022	5	0.901	0.0335	9.3	ABCD
					2023	5	0.932	0.0252	13	ABC
Nemata (% of community)	ANOVA	log10(x+1)	NO	0.517	2007	3	1.14	0.580	nc	A
					2015	5	0.878	0.900	-0.46	A
					2016	5	0.918	0.865	-0.39	A
					2017	5	0.970	1.35	-0.31	A
					2018	5	1.14	1.57	-0.016	A
					2019	5	2.41	0.971	2.2	A
					2020	5	0.540	0.742	-1.0	A
					2021	5	1.55	1.73	0.69	A
					2022	5	1.03	0.825	-0.20	A
					2023	5	1.67	1.79	0.89	A
Oligochaeta (% of community)	K-W	rank	NO	0.624	2007	3	2.12	0.791	nc	A
					2015	5	2.67	2.82	-0.90	A
					2016	5	4.84	3.50	6.2	A
					2017	5	3.37	6.45	-2.9	A
					2018	5	2.44	3.35	-2.9	A
					2019	5	2.43	0.959	0.68	A
					2020	5	15.3	19.0	3.7	A
					2021	5	11.0	20.6	2.0	A
					2022	5	7.68	8.43	2.9	A
					2023	5	1.91	1.87	0.57	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.15: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 2 Upstream (CLT2-US) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Ten-Year Comparison				Pair-wise, *post hoc* comparisons					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
Hydracarina (% of community)	K-W	rank	YES	0.008	2007	3	2.93	2.14	nc	ABCD
					2015	5	0.882	0.745	-4.7	C
					2016	5	5.49	2.55	1.6	AB
					2017	5	8.01	4.16	9.1	A
					2018	5	4.69	4.42	-0.95	ABD
					2019	5	1.58	1.47	-2.4	CD
					2020	5	3.03	1.31	-0.54	BCD
					2021	5	5.53	1.78	1.4	AB
					2022	5	5.64	1.42	2.8	AB
					2023	5	8.57	8.09	3.5	AB
Ostracoda (% of community)	K-W	rank	NO	0.181	2007	3	0	0	nc	A
					2015	5	0.359	0.507	nm	A
					2016	5	0	0	nm	A
					2017	5	0	0	nm	A
					2018	5	0	0	nm	A
					2019	5	0.235	0.525	nm	A
					2020	5	0.358	0.506	nm	A
					2021	5	0.323	0.721	nm	A
					2022	5	0.515	0.539	nm	A
					2023	5	0	0	nm	A
Chironomidae (% of community)	ANOVA	none	YES	<0.001	2007	3	88.4	4.30	nc	A
					2015	5	80.2	8.93	-1.9	AB
					2016	5	79.8	8.68	-2.0	AB
					2017	5	75.9	7.48	-2.9	AB
					2018	5	80.2	3.86	-1.9	AB
					2019	5	80.0	5.87	-2.0	AB
					2020	5	70.4	14.2	-4.2	AB
					2021	5	62.2	14.9	-6.1	BC
					2022	5	72.4	5.64	-3.7	AB
					2023	5	49.2	14.6	-9.1	C
Metal Sensitive Chironomidae (% of community)	ANOVA	log10	YES	<0.001	2007	3	5.33	0.591	nc	BC
					2015	5	10.5	5.68	4.8	ABC
					2016	5	5.55	3.36	-1.2	C
					2017	5	22.0	3.09	12	A
					2018	5	9.51	4.96	3.8	ABC
					2019	5	17.0	6.61	9.8	AB
					2020	5	5.66	3.45	-1.3	C
					2021	5	13.5	7.25	7.0	ABC
					2022	5	8.49	2.09	3.9	ABC
					2023	5	21.2	13.6	11	A
Tipulidae (% of community)	ANOVA	log10(x+1)	NO	0.122	2007	3	5.23	1.99	nc	A
					2015	5	4.14	3.46	-0.56	A
					2016	5	4.08	1.80	-0.58	A
					2017	5	1.60	1.63	-1.9	A
					2018	5	2.28	1.49	-1.5	A
					2019	5	1.56	0.559	-1.9	A
					2020	5	1.84	0.989	-1.7	A
					2021	5	2.05	2.21	-1.6	A
					2022	5	4.17	2.12	-0.53	A
					2023	5	4.61	4.20	-0.34	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.15: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 2 Upstream (CLT2-US) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Ten-Year Comparison				Pair-wise, *post hoc* comparisons					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
Collector Gatherers FFG (% of community)	K-W	rank	YES	<0.001	2007	3	68.5	6.51	nc	ABCD
					2015	5	63.8	10.3	-0.64	CD
					2016	5	67.0	6.03	-0.13	BCD
					2017	5	75.6	3.88	1.3	AB
					2018	5	73.2	8.55	-0.39	ABC
					2019	5	54.0	6.04	-2.7	DE
					2020	5	79.8	11.8	2.6	A
					2021	5	74.0	4.26	0.68	ABC
					2022	5	73.6	7.26	0.64	ABC
					2023	5	44.4	11.4	-4.4	E
Filterers FFG (% of community)	K-W	rank	YES	<0.001	2007	3	0.250	0.432	nc	D
					2015	5	0.987	1.06	nm	D
					2016	5	0.156	0.349	nm	D
					2017	5	6.45	3.07	nm	AB
					2018	5	6.61	5.49	nm	ABC
					2019	5	11.3	3.68	nm	A
					2020	5	1.69	1.49	nm	BCD
					2021	5	1.50	1.65	nm	CD
					2022	5	1.85	1.33	nm	BCD
					2023	5	14.8	8.73	nm	A
Shredders FFG (% of community)	ANOVA	none	YES	<0.001	2007	3	27.6	5.83	nc	A
					2015	5	26.2	5.85	-0.25	A
					2016	5	25.6	4.71	-0.35	A
					2017	5	7.44	5.91	-3.5	C
					2018	5	12.9	5.26	-2.5	BC
					2019	5	21.9	5.81	-0.99	AB
					2020	5	9.12	3.65	-3.2	C
					2021	5	4.90	3.07	-3.9	C
					2022	5	12.2	5.71	-2.6	BC
					2023	5	15.8	9.92	-2.0	ABC

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.16: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 2 Downstream (CLT2-DS) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Ten-Year Comparison				Pair-wise, *post hoc* comparisons					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
Density (org/m^2)	ANOVA	log10	YES	<0.001	2007	3	431	109	nc	ABC
					2015	5	447	258	-0.48	ABC
					2016	5	201	60.7	-2.8	BC
					2017	5	222	144	-3.0	BC
					2018	5	127	51.2	-4.6	C
					2019	5	546	366	0.20	AB
					2020	5	881	672	1.9	A
					2021	5	495	279	-0.12	AB
					2022	5	684	117	1.7	A
					2023	5	269	119	-1.9	ABC
Richness (#Taxa)	ANOVA	none	YES	0.009	2007	3	17.7	2.08	nc	AB
					2015	5	14.2	3.35	-1.7	AB
					2016	5	13.4	3.78	-2.0	AB
					2017	5	13.2	4.71	-2.1	AB
					2018	5	11.2	1.92	-3.1	B
					2019	5	18.4	3.13	0.35	A
					2020	5	18.0	4.64	0.16	A
					2021	5	17.2	3.35	-0.22	AB
					2022	5	18.2	1.64	0.26	A
					2023	5	14.6	2.19	-1.5	AB
Simpson's E (Krebs)	K-W	rank	YES	0.076	2007	3	0.865	0.0174	nc	CD
					2015	5	0.934	0.0343	3.8	A
					2016	5	0.833	0.0758	0.60	D
					2017	5	0.913	0.0522	3.0	ABC
					2018	5	0.908	0.0868	3.7	AB
					2019	5	0.885	0.0482	1.2	BCD
					2020	5	0.921	0.0326	3.4	AB
					2021	5	0.932	0.0403	3.6	A
					2022	5	0.935	0.0116	3.6	A
					2023	5	0.921	0.0501	3.2	AB
Nemata (% of community)	K-W	rank	NO	0.558	2007	3	1.07	1.21	nc	A
					2015	5	4.19	2.39	2.4	A
					2016	5	1.97	2.46	0.63	A
					2017	5	3.24	4.41	1.3	A
					2018	5	2.74	3.03	1.4	A
					2019	5	2.56	1.75	1.7	A
					2020	5	8.18	15.8	0.16	A
					2021	5	3.57	1.80	1.7	A
					2022	5	2.51	2.29	1.5	A
					2023	5	4.27	2.46	3.4	A
Oligochaeta (% of community)	K-W	rank	NO	0.436	2007	3	2.57	0.619	nc	A
					2015	5	8.80	12.8	6.4	A
					2016	5	1.85	3.13	-5.4	A
					2017	5	4.83	6.94	1.9	A
					2018	5	1.13	2.52	-5.4	A
					2019	5	4.28	3.31	3.1	A
					2020	5	4.41	5.02	-1.6	A
					2021	5	3.21	2.19	1.3	A
					2022	5	3.59	5.98	-3.2	A
					2023	5	1.65	3.24	-5.4	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.16: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 2 Downstream (CLT2-DS) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Ten-Year Comparison				Pair-wise, *post hoc* comparisons					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
Hydracarina (% of community)	K-W	rank	YES	0.098	2007	3	1.77	1.23	nc	AB
					2015	5	0.255	0.570	-1.9	B
					2016	5	4.44	1.94	4.4	A
					2017	5	3.34	3.97	0.41	A
					2018	5	3.50	3.97	1.8	A
					2019	5	2.11	0.719	1.4	A
					2020	5	4.72	4.84	4.0	A
					2021	5	3.18	3.19	0.85	A
					2022	5	3.94	2.03	3.6	A
					2023	5	5.67	4.76	2.9	A
Ostracoda (% of community)	K-W	rank	NO	0.604	2007	3	0	0	nc	A
					2015	5	0	0	nm	A
					2016	5	0	0	nm	A
					2017	5	0	0	nm	A
					2018	5	0.519	1.16	nm	A
					2019	5	0.198	0.443	nm	A
					2020	5	0.289	0.452	nm	A
					2021	5	0	0	nm	A
					2022	5	0.110	0.247	nm	A
					2023	5	0.988	2.21	nm	A
Chironomidae (% of community)	ANOVA	none	YES	0.009	2007	3	88.0	5.96	nc	A
					2015	5	75.6	10.4	-2.1	AB
					2016	5	82.9	5.86	-0.86	A
					2017	5	81.8	8.39	-1.0	A
					2018	5	84.1	5.99	-0.65	A
					2019	5	84.7	3.46	-0.55	A
					2020	5	75.2	16.5	-2.2	AB
					2021	5	69.7	10.0	-3.1	AB
					2022	5	75.2	5.88	-2.1	AB
					2023	5	61.9	16.1	-4.4	B
Metal Sensitive Chironomidae (% of community)	ANOVA	log10(x+1)	YES	0.074	2007	3	11.8	1.96	nc	AB
					2015	5	10.6	10.6	-0.78	AB
					2016	5	5.41	0.915	-3.3	B
					2017	5	20.2	12.6	3.9	AB
					2018	5	8.01	6.95	-2.0	AB
					2019	5	23.3	10.1	5.5	A
					2020	5	11.5	4.16	-0.17	AB
					2021	5	17.3	7.89	2.7	AB
					2022	5	14.0	6.54	1.1	AB
					2023	5	17.3	15.0	2.4	AB
Tipulidae (% of community)	ANOVA	log10(x+1)	YES	0.041	2007	3	6.45	6.59	nc	A
					2015	5	5.83	5.09	-0.089	A
					2016	5	2.18	1.73	-0.65	A
					2017	5	0.833	1.86	-0.87	A
					2018	5	2.60	2.39	-0.59	A
					2019	5	1.71	1.42	-0.73	A
					2020	5	1.82	2.24	-0.71	A
					2021	5	3.38	2.52	-0.46	A
					2022	5	7.33	3.39	0.15	A
					2023	5	6.87	6.25	0.064	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.16: Statistical Comparison of Benthic Metrics at Camp Lake Tributary 2 Downstream (CLT2-DS) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall Ten-Year Comparison				Pair-wise, *post hoc* comparisons					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
Collector Gatherers FFG (% of community)	ANOVA	none	YES	<0.001	2007	3	66.4	11.0	nc	ABC
					2015	5	69.3	10.9	0.26	ABC
					2016	5	79.5	8.88	1.2	A
					2017	5	77.1	10.5	0.97	AB
					2018	5	83.4	6.47	1.5	A
					2019	5	56.8	23.0	-0.87	BC
					2020	5	77.4	8.70	1.0	AB
					2021	5	75.2	9.28	0.80	AB
					2022	5	73.3	6.95	0.63	AB
					2023	5	48.0	9.15	-1.7	C
Filterers FFG (% of community)	K-W	rank	YES	0.007	2007	3	2.73	1.89	nc	ABCDE
					2015	5	0.762	0.916	-1.4	CDE
					2016	5	0.970	0.929	-1.1	BCDE
					2017	5	3.46	3.12	-0.43	BE
					2018	5	0.927	2.07	-1.8	C
					2019	5	15.4	11.3	6.4	A
					2020	5	3.05	2.08	0.032	AB
					2021	5	4.34	4.63	0.95	BDE
					2022	5	0.592	0.812	-1.5	CD
					2023	5	1.79	0.754	-0.85	BCDE
Shredders FFG (% of community)	ANOVA	log10(x+1)	YES	0.003	2007	3	21.5	5.95	nc	ABC
					2015	5	25.7	11.6	0.64	AB
					2016	5	12.1	8.04	-1.7	ABC
					2017	5	14.6	8.93	-1.2	ABC
					2018	5	7.68	7.25	-2.4	C
					2019	5	21.0	16.9	-0.22	ABC
					2020	5	11.2	6.98	-1.8	BC
					2021	5	6.17	3.08	-2.7	C
					2022	5	15.2	5.11	-1.1	ABC
					2023	5	29.2	9.26	1.2	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.17: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for Reference Lake 3 (REF 3) Study Areas, August 2023

Lake	Reference Lake 3 (REF-03)									
Station Type	Littoral					Profundal				
Station	1	2	3	4	5	6	7	8	9	10
ROUNDWORMS										
P. Nemata	121	34.4	51.7	51.7	8.61	-	-	8.61	-	-
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	-	-	-	-	-	-	-	-	-	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
Acalyptonotidae										
Acalyptonotus	-	-	8.61	-	25.8	17.2	8.61	17.2	-	8.61
F. Aturidae										
?Axonopsella	-	-	-	-	-	-	-	-	-	-
F. Hygrobatidae										
Hygrobates	-	-	-	-	8.61	-	-	-	-	-
F. Lebertiidae										
Lebertia	25.8	-	8.61	34.4	17.2	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	34.4	310	267	1,206	818	17.2	8.61	43.1	34.4	8.61
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
immature	-	-	-	-	-	-	-	-	-	-
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	-	-	-	-	-	-	-	-	-	-
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Micropsectra	233	-	51.7	51.7	60.3	-	8.61	-	-	17.2
Paratanytarsus	-	-	-	-	-	-	-	-	-	-
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	-	-	-	-	-
Stictochironomus	-	34.4	-	51.7	51.7	-	-	-	-	-
Tanytarsus	8.61	-	-	-	-	-	-	-	-	-
S.F. Diamesinae										
Protanypus	17.2	-	17.2	34.4	8.61	-	-	-	8.61	-
Pseudodiamesa	8.61	-	17.2	-	-	-	8.61	-	-	8.61
S.F. Orthocladiinae										
Abiskomyia	77.5	207	43.1	43.1	43.1	-	-	-	-	-
Eukiefferiella	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	129	-	34.4	43.1	-	138	155	172	258	146
Limnophyes	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	17.2	-	-	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	-	8.61	-	-	-	-	-	-	-
Zalutschia	-	34.4	8.61	17.2	-	-	17.2	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
S.F. Tanypodinae										
Arctopelopia	-	-	-	-	-	-	-	-	-	-
Procladius	8.61	-	-	-	8.61	-	-	-	-	-
SUMMARY METRICS										
Density (No. organisms per m^2)	663	620	534	1,533	1,051	172	207	241	301	189
Richness (total number of taxa)[a]	10	5	12	9	10	3	6	4	3	5
Simpson's Evenness (E)	0.874	0.787	0.782	0.422	0.428	0.51	0.508	0.602	0.377	0.486
Shannon-Wiener Diversity	2.58	1.72	2.56	1.38	1.38	0.922	1.37	1.23	0.695	1.21
Dominant Taxonomic Group Composition										
% Nemata	18.2	5.56	9.68	3.37	0.82	0	0	3.57	0	0
% Hydracarina	3.9	0	3.23	2.25	4.92	10	4.17	7.14	0	4.55
% Ostracods	5.19	50	50	78.7	77.9	10	4.17	17.9	11.4	4.55
% Chironomids	72.7	44.4	37.1	15.7	16.4	80	91.7	71.4	88.6	90.9
% Metal Sensitive Chironomids	40.3	0	16.1	5.62	6.56	0	8.33	0	2.86	13.6
Functional Feeding Group Composition										
% Collector - Gatherers	58.4	94.4	85.5	93.3	88.5	90	83.3	92.9	100	86.4
% Filterers	36.4	0	9.68	3.37	5.74	0	4.17	0	0	9.09
% Shredders	0	5.56	1.61	1.12	0	0	8.33	0	0	0
Habitat Preference Group Composition										
% Clingers	40.3	0	12.9	5.62	10.7	10	8.33	7.14	0	13.6
% Sprawlers	39	88.9	74.2	85.4	82.8	90	91.7	89.3	97.1	86.4
% Burrowers	20.8	11.1	12.9	8.99	6.56	0	0	3.57	2.86	0

Note: "-" indicates no taxa present.

[a] Bold entries excluded from taxa count.

Table F.18: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for Camp Lake (JL0) Study Areas, August 2023

Lake	Camp Lake (JL0)									
Station Type	Littoral					Profundal				
Station	2	21	20	19	18	1	7	16	11	12
ROUNDWORMS										
P. Nemata	-	181	-	181	86.1	-	-	8.61	-	43.1
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	17.2	-	34.4	-	-	-	-	-	-	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
Acalyptonotidae										
Acalyptonotus	-	17.2	34.4	34.4	-	-	8.61	-	-	-
F. Aturidae										
?Axonopsella	-	-	-	-	-	-	-	-	34.4	-
F. Hygrobatidae										
Hygrobates	-	-	-	-	-	-	-	-	-	-
F. Lebertiidae										
Lebertia	-	-	-	-	-	-	-	-	34.4	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	17.2	25.8	344	25.8	-	-	-	-	138	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
immature	-	-	-	-	-	-	-	-	-	-
F. Apataniidae										
Apatania	-	17.2	-	43.1	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	241	34.4	103	8.61	51.7	-	121	51.7	-	17.2
S.F. Chironominae										
Chironomus	-	-	-	-	34.4	-	129	-	344	-
Micropsectra	34.4	43.1	207	43.1	-	8.61	25.8	-	-	-
Paratanytarsus	68.9	129.2	482.2	94.7	-	-	-	-	34.4	-
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	-	17.2	-	-	-
Stictochironomus	327	586	1,550	164	121	129	86.1	25.8	-	-
Tanytarsus	51.7	94.7	586	284	-	-	-	-	-	-
S.F. Diamesinae										
Protanypus	-	17.2	-	25.8	-	8.61	-	8.61	-	-
Pseudodiamesa	-	-	-	-	-	8.61	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	86.1	155	930	646	103	8.61	17.2	-	-	-
Eukiefferiella	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	465	112	138	224	189	172	17.2	973	-	1,490
Limnophyes	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	17.2	-	-	-	-	-
Paracladius	-	-	-	43.1	-	-	-	-	-	-
Parakiefferiella	51.7	8.61	-	8.61	-	-	-	-	-	-
Psectrocladius	-	-	-	-	-	-	-	-	-	-
Zalutschia	34.4	17.2	34.4	17.2	17.2	17.2	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
S.F. Tanypodinae										
Arctopelopia	344	68.9	172	43.1	-	-	-	-	-	-
Procladius	103	68.9	379	77.5	17.2	8.61	68.9	34.4	34.4	-
SUMMARY METRICS										
Density (No. organisms per m^2)	1576	1576	4994	1963	637	362	491	1102	620	1550
Richness (total number of taxa)[a]	15	15	12	16	8	8	8	5	6	2
Simpson's Evenness (E)	0.867	0.867	0.899	0.89	0.905	0.732	0.886	0.175	0.756	0.108
Shannon-Wiener Diversity	3.02	3.02	2.89	3.15	2.53	1.89	2.46	0.507	1.88	0.183
Dominant Taxonomic Group Composition										
% Nemata	11.5	11.5	0	9.21	13.5	0	0	0.781	0	2.78
% Hydracarina	1.09	1.09	0.69	1.75	0	0	1.75	0	11.1	0
% Ostracods	1.64	1.64	6.9	1.32	0	0	0	0	22.2	0
% Chironomids	84.7	84.7	91.7	85.5	86.5	100	98.2	99.2	66.7	97.2
% Metal Sensitive Chironomids	18.5	18.5	26.1	22.9	0	7.14	7.02	0.82	5.56	0
Functional Feeding Group Composition										
% Collector - Gatherers	70.3	70.3	61.2	67.4	94	90.5	72.5	96.7	77.8	100
% Filterers	17.4	17.4	26.1	21.6	0	2.38	7.02	0	5.56	0
% Shredders	1.12	1.12	0.706	0.882	2.98	4.76	0	0	0	0
Habitat Preference Group Composition										
% Clingers	11.2	11.2	16.9	20.7	0	2.38	13.4	0	11.1	0
% Sprawlers	38.1	38.1	50.6	60.4	59.6	59.5	28.1	95.9	33.3	97.2
% Burrowers	50.7	50.7	32.4	18.9	40.4	38.1	58.5	4.06	55.6	2.78

Note: "-" indicates no taxa present.

[a] Bold entries excluded from taxa count.

Table F.19: Statistical Comparison of Benthic Invertebrate Community Bray-Curtis Index between the Mine-Exposed Lakes and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Waterbody	Comparison	n		Betadisper P-Value	Mantel Test			dbRDA			
		Reference	Mine-Exposed		r	R^2	P-Value	F-Value	R^2	R^2_{adj}	P-Value
Reference Lake 3	Littoral vs Profundal	5	5	0.669	0.818	0.669	0.008	12.5	0.611	0.562	0.008
Camp Lake (JL0)	Littoral Habitat, vs Reference Lake 3	5	5	0.770	0.638	0.407	0.008	5.78	0.420	0.347	0.008
	Profundal Habitat, vs Reference Lake 3	5	5	0.048	0.397	0.157	0.007	3.53	0.306	0.219	0.008
Sheardown Lake NW (DL0-1)	Littoral Habitat, vs Reference Lake 3	5	5	0.829	0.569	0.324	0.008	4.58	0.364	0.285	<0.001
	Profundal Habitat, vs Reference Lake 3	5	5	0.804	0.769	0.592	0.008	11.1	0.580	0.528	0.008
Sheardown Lake SE (DL0-2)	Littoral Habitat, vs Reference Lake 3	5	5	0.573	0.601	0.361	0.008	6.10	0.433	0.362	0.002
	Profundal Habitat, vs Reference Lake 3	5	5	0.411	0.731	0.535	0.008	10.0	0.556	0.501	0.007
Mary Lake (BL0)	Littoral Habitat, vs Reference Lake 3	3	5	0.482	0.344	0.118	0.036	1.80	0.231	0.102	0.121
	Profundal Habitat, vs Reference Lake 3	6	5	0.032	0.363	0.132	0.009	3.82	0.298	0.220	<0.001

Highlighted values indicate significant difference between study areas based on statistical test p-value less than 0.10.

Notes: dbRDA = distance-based redundancy analysis.

Table F.20: Statistical Comparison of Benthic Invertebrate Community Metrics at Camp Lake (JL0) Littoral (Shallow) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2013), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2013	Pairwise Comparison
Density (Individuals/m^2)	ANOVA	log10	YES	0.006	2013	4	7,752	3,849	-	A
					2015	5	3,671	1,891	-0.85	ABC
					2016	5	2,639	668	-1.2	ABC
					2017	5	3,642	1,449	-0.81	ABC
					2018	5	2,600	998	-1.3	BC
					2019	5	5,126	1,390	-0.34	AB
					2020	5	5,122	2,202	-0.42	AB
					2021	5	4,373	994	-0.53	ABC
					2022	5	3,918	1,104	-0.68	ABC
					2023	5	2,203	1,645	-1.6	C
Richness (Number of Taxa)	ANOVA	none	YES	0.094	2013	4	18.0	4.40	-	A
					2015	5	12.8	3.70	-1.2	A
					2016	5	15.8	3.27	-0.50	A
					2017	5	12.8	2.28	-1.2	A
					2018	5	14.2	3.42	-0.86	A
					2019	5	15.6	3.05	-0.55	A
					2020	5	16.6	1.67	-0.32	A
					2021	5	12.8	2.68	-1.2	A
					2022	5	14.2	1.64	-0.86	A
					2023	5	12.6	3.13	-1.2	A
Simpson's Evenness (E)	K-W	rank	YES	0.012	2013	4	0.893	0.0535	-	ABC
					2015	5	0.712	0.0625	-9.2	D
					2016	5	0.917	0.0341	1.0	A
					2017	5	0.848	0.0685	-3.1	BC
					2018	5	0.851	0.0569	-2.5	BC
					2019	5	0.893	0.0532	-0.32	AB
					2020	5	0.842	0.0443	-2.5	BCD
					2021	5	0.786	0.143	-4.3	CD
					2022	5	0.843	0.0922	-2.4	BC
					2023	5	0.890	0.0145	-1.0	ABC
Nemata (%)	ANOVA	log10(x+1)	NO	0.582	2013	4	5.58	3.57	-	A
					2015	5	4.71	4.58	-0.25	A
					2016	5	4.39	4.85	-0.34	A
					2017	5	4.24	4.24	-0.38	A
					2018	5	2.81	3.24	-0.78	A
					2019	5	3.67	2.52	-0.53	A
					2020	5	2.10	1.20	-0.97	A
					2021	5	1.52	1.60	-1.1	A
					2022	5	2.81	3.37	-0.78	A
					2023	5	6.84	6.43	0.32	A
Ostracoda (%)	K-W	rank	YES	0.030	2013	4	0.660	0.466	-	ABCD
					2015	5	0.203	0.326	-2.8	CD
					2016	5	1.84	1.14	4.8	A
					2017	5	0.155	0.346	-2.8	D
					2018	5	0.356	0.642	-2.8	BCD
					2019	5	1.27	0.830	1.5	AB
					2020	5	2.02	1.61	4.8	A
					2021	5	3.24	4.02	5.1	A
					2022	5	1.13	0.921	0.28	ABC
					2023	5	2.16	2.72	1.9	A
Chironomidae (%)	ANOVA	none	NO	0.306	2013	4	90.1	4.38	-	A
					2015	5	93.2	4.68	0.69	A
					2016	5	87.4	6.98	-0.63	A
					2017	5	92.2	6.46	0.47	A
					2018	5	95.4	3.97	1.2	A
					2019	5	92.5	3.64	0.55	A
					2020	5	92.9	2.00	0.64	A
					2021	5	93.2	3.76	0.69	A
					2022	5	93.5	3.31	0.77	A
					2023	5	89.3	5.64	-0.19	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = $(MCT_{year1} - MCT_{Baseline})/SD_{Baseline;}$ MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

Table F.20: Statistical Comparison of Benthic Invertebrate Community Metrics at Camp Lake (JL0) Littoral (Shallow) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2013), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2013	Pairwise Comparison
Metal Sensitive Chironomidae (%)	ANOVA	none	NO	0.401	2013	4	30.8	14.6	-	A
					2015	5	38.5	24.5	0.52	A
					2016	5	29.7	11.8	-0.081	A
					2017	5	38.2	17.3	0.51	A
					2018	5	17.4	18.5	-0.92	A
					2019	5	34.6	16.1	0.26	A
					2020	5	30.3	19.7	-0.034	A
					2021	5	23.5	22.4	-0.50	A
					2022	5	21.4	15.4	-0.65	A
					2023	5	15.4	10.6	-1.1	A
Collector Gatherers (%)	ANOVA	none	NO	0.553	2013	4	55.9	12.4	-	A
					2015	5	51.1	14.7	-0.39	A
					2016	5	65.8	7.82	0.80	A
					2017	5	50.8	17.4	-0.41	A
					2018	5	67.3	18.6	0.92	A
					2019	5	53.7	12.4	-0.18	A
					2020	5	56.9	17.7	0.079	A
					2021	5	62.0	21.1	0.49	A
					2022	5	60.1	22.1	0.34	A
					2023	5	70.6	13.8	1.2	A
Filterers (%)	ANOVA	none	NO	0.389	2013	4	30.8	14.5	-	A
					2015	5	38.2	24.3	0.51	A
					2016	5	25.0	7.48	-0.40	A
					2017	5	37.3	17.3	0.45	A
					2018	5	16.7	17.8	-0.97	A
					2019	5	31.9	15.9	0.075	A
					2020	5	29.7	20.2	-0.074	A
					2021	5	22.7	21.8	-0.56	A
					2022	5	20.7	15.6	-0.70	A
					2023	5	15.0	10.3	-1.1	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = $(MCT_{year1} - MCT_{Baseline})/SD_{Baseline;}$ MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

Table F.21: Statistical Comparison of Benthic Metrics at Camp Lake (JL0) Profundal (Deep) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2013), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]						
									Effect Size (MOD)		
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	vs. Baseline Year 2007	vs. Baseline Year 2013	Pairwise Comparison
Density (Individuals/m^2)	ANOVA	none	YES	0.041	2007	4	2,626	1,403	-	-	A
					2013	5	2,140	567	-0.35	-	AB
					2015	5	1,552	1,005	-0.77	-1.0	AB
					2017	5	1,510	844	-0.80	-1.1	AB
					2018	5	1,258	609	-0.97	-1.6	AB
					2019	5	1,847	830	-0.56	-0.52	AB
					2020	5	1,383	656	-0.89	-1.3	AB
					2021	5	1,083	416	-1.1	-1.9	AB
					2022	5	1,316	338	-0.93	-1.5	AB
					2023	5	825	493	-1.3	-2.3	B
Richness (Number of Taxa)	ANOVA	log10	YES	0.004	2007	4	9.00	1.72	-	-	AB
					2013	5	14.2	2.95	2.3	-	A
					2015	5	8.20	2.77	-0.65	-2.9	AB
					2017	5	10.8	3.35	0.83	-1.5	A
					2018	5	8.20	0.837	-0.43	-2.7	AB
					2019	5	11.0	1.87	1.0	-1.3	A
					2020	5	10.4	4.51	0.49	-1.8	A
					2021	5	10.8	3.27	0.83	-1.5	A
					2022	5	9.20	2.59	0.021	-2.3	AB
					2023	5	5.80	2.49	-2.7	-5.0	B
Simpson's Evenness (E)	ANOVA	none	NO	0.246	2007	4	0.602	0.114	-	-	A
					2013	5	0.720	0.122	1.0	-	A
					2015	5	0.604	0.283	0.022	-0.94	A
					2017	5	0.681	0.154	0.69	-0.32	A
					2018	5	0.374	0.118	-2.0	-2.8	A
					2019	5	0.615	0.206	0.12	-0.85	A
					2020	5	0.673	0.151	0.62	-0.38	A
					2021	5	0.695	0.180	0.81	-0.20	A
					2022	5	0.476	0.239	-1.1	-2.0	A
					2023	5	0.531	0.362	-0.62	-1.5	A
Nemata (%)	K-W	rank	NO	0.627	2007	4	3.49	3.13	-	-	A
					2013	5	4.35	3.16	0.021	-	A
					2015	5	6.72	10.4	-0.69	-1.1	A
					2017	5	7.14	6.16	2.2	3.2	A
					2018	5	2.87	5.64	-0.93	-1.4	A
					2019	5	4.43	5.65	-0.69	-1.1	A
					2020	5	1.72	2.11	-0.53	-0.82	A
					2021	5	3.42	4.22	-0.55	-0.84	A
					2022	5	3.05	4.50	-0.93	-1.4	A
					2023	5	0.712	1.20	-0.93	-1.4	A
Ostracoda (%)	K-W	rank	NO	0.117	2007	4	0.0375	0.0749	-	-	A
					2013	5	0.406	0.446	-[b]	-	A
					2015	5	0.306	0.684	-[b]	-0.67	A
					2017	5	0.282	0.631	-[b]	-0.67	A
					2018	5	0.680	1.52	-[b]	-0.67	A
					2019	5	1.87	3.78	-[b]	-0.67	A
					2020	5	5.46	7.12	-[b]	2.0	A
					2021	5	6.52	8.02	-[b]	1.6	A
					2022	5	1.96	1.75	-[b]	2.6	A
					2023	5	4.44	9.94	-[b]	-0.67	A
Chironomidae (%)	K-W	rank	NO	0.632	2007	4	94.9	4.29	-	-	A
					2013	5	91.1	4.66	-0.29	-	A
					2015	5	90.4	11.3	-0.40	-0.53	A
					2017	5	90.0	6.59	-1.5	-5.5	A
					2018	5	95.2	7.90	0.70	4.6	A
					2019	5	91.4	7.13	-0.80	-2.4	A
					2020	5	91.0	8.39	-0.76	-2.2	A
					2021	5	86.7	8.36	-1.5	-5.7	A
					2021	5	86.7	8.36	-1.5	-5.7	A
					2023	5	92.3	14.3	0.65	4.4	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Contrast MODs could not be calculated because the MAD=0.

Table F.21: Statistical Comparison of Benthic Metrics at Camp Lake (JL0) Profundal (Deep) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2013), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]						
									Effect Size (MOD)		
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	vs. Baseline Year 2007	vs. Baseline Year 2013	Pairwise Comparison
Metal Sensitive Chironomidae (%)	K-W	rank	YES	<0.001	2007	4	34.8	4.77	-	-	A
					2013	5	39.5	17.2	-0.42	-	A
					2015	5	11.7	7.33	-5.3	-2.5	BCDE
					2017	5	33.3	25.5	-1.9	-0.77	AB
					2018	5	6.61	2.97	-5.8	-2.8	CDE
					2019	5	19.5	10.5	-3.5	-1.6	ABC
					2020	5	11.9	6.85	-4.8	-2.3	BCDE
					2021	5	22.4	27.8	-4.1	-1.9	BCD
					2022	5	3.80	0.964	-6.2	-3.0	E
					2023	5	4.11	3.44	-5.9	-2.8	DE
Collector Gatherers (%)	K-W	rank	YES	0.001	2007	4	64.6	6.09	-	-	DE
					2013	5	57.0	19.9	-0.072	-	E
					2015	5	84.7	7.33	3.1	3.5	BC
					2017	5	64.2	28.1	1.4	1.6	CDE
					2018	5	95.6	2.91	4.6	5.0	A
					2019	5	84.8	9.30	3.1	3.4	ABC
					2020	5	87.0	9.51	3.6	4.0	ABC
					2021	5	75.1	28.2	2.2	2.5	BCD
					2022	5	93.5	5.09	4.3	4.8	AB
					2023	5	87.5	11.9	3.7	4.0	AB
Filterers (%)	K-W	rank	YES	<0.001	2007	4	32.6	4.03	-	-	AB
					2013	5	37.5	16.8	-0.16	-	A
					2015	5	11.4	6.85	-5.1	-5.0	CD
					2017	5	31.6	26.4	-2.6	-2.4	ABC
					2018	5	3.04	3.69	-6.5	-6.3	DE
					2019	5	12.0	8.29	-4.8	-4.6	BCD
					2020	5	9.37	7.41	-5.0	-4.8	CDE
					2021	5	18.1	28.5	-4.7	-4.6	CDE
					2022	5	2.12	2.29	-6.5	-6.4	E
					2023	5	2.99	3.20	-6.4	-6.3	DE

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Contrast MODs could not be calculated because the MAD=0.

Table F.22: Replicate Grab Habitat Data for Benthic Invertebrate Community Samples Collected at the Sheardown Lake Tributaries (SDLT1 and SLDT9) and the Unnamed Reference Creek (REF-CRK), Mary River Project CREMP, August 2023

Study Area	Station	Water Depth (cm)			Water Velocity (m/s)			Embeddedness			In-Stream Vegetation			Algae Presence		
		Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3
Unnamed Reference Creek	REF-CRK-B1	15	13	15	0.53	0.46	0.54	0%	0%	0%	None	None	None	Sparse	Sparse	Sparse
	REF-CRK-B2	19	17	17	0.38	0.44	0.48	0%	0%	0%	None	None	None	Sparse	Sparse	Sparse
	REF-CRK-B3	20	19	16	0.44	0.37	0.47	0%	25%	-	None	None	None	Sparse	Sparse	Sparse
	REF-CRK-B4	13	12	15	0.44	0.39	0.29	0%	-	-	None	None	Sparse bryophytes	None	Sparse	Sparse
	REF-CRK-B5	20	22	15	0.35	0.47	0.46	25%	50%	-	None	None	None	None	Sparse	None
Sheardown Lake Tributary 1	SDTL1-R1-B1	20	19	19	0.30	0.35	0.31	75%	-	-	None	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	SDTL1-R1-B2	18	18	19	0.24	0.32	0.26	75%	50%	100%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	SDTL1-R1-B3	19	18	20	0.31	0.28	0.40	100%	50%	50%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	SDTL1-R1-B4	19	18	19	0.44	0.35	0.35	75%	25%	50%	Sparse bryophytes	Sparse bryophytes	-	Sparse	Sparse	-
	SDTL1-R1-B5	18	18	20	0.25	0.26	0.36	0%	0%	25%	None	None	None	Sparse	Sparse	Sparse
Sheardown Lake Tributary 9	SDTL9-DS-B1	15	13	15	0.31	0.45	0.49	0%	0%	0%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	SDTL9-DS-B2	10	14	10	0.47	0.17	0.10	0%	50%	0%	Sparse bryophytes, macrophytes	Sparse bryophytes, macrophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	SDTL9-DS-B3	16	14	12	0.25	0.31	0.38	0%	25%	0%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	None	Sparse	Sparse
	SDTL9-DS-B4	15	20	15	0.38	0.53	0.38	0%	0%	0%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	SDTL9-DS-B5	14	14	15	0.41	0.33	0.34	0%	0%	25%	None	None	None	None	Sparse	Sparse

Note: "-" indicates no available data. Due to limited availability of appropriate habitat (i.e., the stream was not flowing), area SDLT12 could not be sampled in 2023. Therefore no data are presented for this area.

Table F.23: Replicate Station Habitat Feature Summary Statistics for the Sheardown Lake Tributary (SDLT1 and SDLT9) Benthic Stations, Mary River Project CREMP, August 2023

Metric	Study Area	Sample Size (n)	Mean	Median	Standard Deviation	Standard Error	Minimum	Maximum
Water Depth (cm)	Unnamed Reference Creek	5	16.5	16	2.95	1.32	12	22
	Sheardown Tributary 1 (SDLT1)	5	18.7	18.5	0.73	0.33	18	20
	Sheardown Tributary 9 (SDLT9)	5	14.1	14	2.41	1.08	10	20
Water Velocity (m/s)	Unnamed Reference Creek	5	0.43	0.44	0.07	0.03	0.29	0.54
	Sheardown Tributary 1 (SDLT1)	5	0.32	0.31	0.06	0.03	0.24	0.44
	Sheardown Tributary 9 (SDLT9)	5	0.35	0.38	0.12	0.05	0.1	0.53
Substrate Embeddedness (%)	Unnamed Reference Creek	5	0.09	0.00	0.17	0.08	0.00	0.50
	Sheardown Tributary 1 (SDLT1)	5	0.52	0.50	0.33	0.15	0.00	1.00
	Sheardown Tributary 9 (SDLT9)	5	0.07	0.00	0.15	0.07	0.00	0.50

Note: Due to limited availability of appropriate habitat (i.e., the stream was not flowing), area SDLT12 could not be sampled in 2023. Therefore no data are presented for this area.

Table F.24: Benthic Station Habitat Feature Statistical Comparisons Between Individual Sheardown Lake Tributaries and Unnamed Reference Creek, Mary River Project CREMP, August 2023

Metric	Pair-wise comparisons[a]					
	Area 1	Area 2	Statistical Test[a]	Data Transformation	Significant Difference between Areas?	P-value
Water Depth (cm)	Unnamed Reference Creek	SDLT1	tequal	none	NO	0.096
	Unnamed Reference Creek	SDLT9	tequal	none	NO	0.124
Water Velocity (m/s)	Unnamed Reference Creek	SDLT1	tequal	none	YES	0.004
	Unnamed Reference Creek	SDLT9	tequal	none	NO	0.080
Substrate Embeddedness (%)	Unnamed Reference Creek	SDLT1	tequal	none	YES	0.015
	Unnamed Reference Creek	SDLT9	M-W	rank	NO	1.000

Shaded values indicate significant difference between study areas based on statistical test p-value less than 0.05.

[a] Statistical tests included tequal (t-test assuming equal variance), tunequal (t-test assuming unequal variance), and M-W (Mann-Whitney U-test).

Table F.25: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for Sheardown Lake Tributary 1 (SDLT1), August 2023

Waterbody	Sheardown Lake Tributary 1 (SDLT1-R1)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS					
P. Nemata	21.5	14.3	7.17	28.7	7.17
ANNELIDS					
P. Annelida					
WORMS					
Cl. Oligochaeta					
F. Enchytraeidae	14.3	7.17	7.17	21.5	21.5
ARTHROPODS					
P. Arthropoda					
MITES					
Cl. Arachnida					
O. Trombidiformes					
F. Sperchonidae					
Sperchon	7.17	21.5	43.0	-	7.17
SEED SHRIMPS					
Cl. Ostracoda	7.17	-	-	-	-
SPRINGTAILS					
Cl. Entognatha					
O. Collembola	-	-	-	-	-
INSECTS					
Cl. Insecta					
MAYFLIES					
O. Ephemeroptera					
F. Baetidae					
Acentrella feropagus	57.3	-	7.17	35.8	28.7
STONEFLIES					
O. Plecoptera					
F. Capniidae					
immature	-	-	-	-	-
CADDISFLIES					
O. Trichoptera					
F. Limnephilidae					
immature	-	-	-	-	7.17
TRUE FLIES					
O. Diptera					
MIDGES					
F. Chironomidae					
chironomid pupae	**7.17**	**21.5**	**7.17**	**7.17**	**14.3**
S.F. Chironominae					
Rheotanytarsus	7.17	7.17	7.17	-	-
Tanytarsini indeterminate	-	-	-	-	-
S.F. Diamesinae					
Diamesa	-	-	-	7.17	-
Pseudokiefferiella	136	43.0	115	193	201
S.F. Orthocladiinae					
Cricotopus	122	136	93.2	129	93.2
Cricotopus/Orthocladius	7.17	21.5	43.0	7.17	7.17
Eukiefferiella	-	-	7.17	-	-
Hydrobaenus	-	-	-	-	7.17
Hydrosmittia	50.2	186	107	-	64.5
Krenosmittia	7.17	-	-	-	-
Orthocladius (Euorthocladius)	-	-	7.2	14.3	7.17
Parakiefferiella	7.17	21.5	28.7	-	7.17
Paraphaenocladius	-	-	7.2	-	-
Psectrocladius	-	-	-	-	7.17
Tvetenia	28.7	7.17	28.7	28.7	28.7
indeterminate	-	-	21.5	-	-
S.F. Tanypodinae					
Thienemannimyia complex	-	-	-	-	7.17
F. Empididae					
Clinocera	-	-	7.17	7.17	-
F. Simuliidae					
Gymnopais holopticoides	-	-	-	-	-
Simulium	-	-	-	-	-
F. Tipulidae					
Tipula	21.5	28.7	-	7.17	7.17
SUMMARY METRICS					
Density (No. organisms per m^2)	502	516	545	487	523
Richness (total number of taxa)[a]	12	9	13	10	14
Simpson's Evenness (E)	0.855	0.636	0.857	0.822	0.81
Shannon's Diversity	2.7	1.92	2.75	2.43	2.64
Dominant Group Composition					
% Nemata	4.29	2.78	1.32	5.88	1.37
% Acari	1.43	4.17	7.89	0	1.37
% Ostracods	1.43	0	0	0	0
% Chironomids	74.3	86.1	86.8	79.4	84.9
% Metal Sensitive Chironmids	29.1	10.2	22.7	42	39.6
Functional Feeding Group Composition					
% Collector - Gatherers	59	24.6	53.4	68.7	66.7
% Filterers	1.46	1.46	1.34	0	0
% Shredders	38.1	69.8	36.1	29.8	30.5
Habitat Preference Group Composition					
% Clingers	36.8	69.8	46.6	29.8	30.5
% Sprawlers	51.8	20.4	50.7	58.5	62.6
% Burrowers	11.4	9.72	2.63	11.8	6.85

Note: "-" indicates taxa not present in sample.

[a] Bold entries excluded from taxa count.

Table F.26: Benthic Invertebrate Community Summary Statistics for Sheardown Lake Tributaries, Mary River Project CREMP, August 2023

Metric	Area	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
Density (org/m^2)	Reference Creek	505	275	123	226	448	864
	SDLT1	515	21.7	9.72	487	516	545
	SDLT9	2,629	1,148	513	1,362	3,043	4,086
Richness (#Taxa)	Reference Creek	16.4	3.51	1.57	13.0	16.0	22.0
	SDLT1	11.6	2.07	0.927	9.00	12.0	14.0
	SDLT9	14.0	1.22	0.548	13.0	14.0	16.0
Simpson's E (Krebs)	Reference Creek	0.930	0.0363	0.0163	0.874	0.942	0.962
	SDLT1	0.796	0.0918	0.0410	0.636	0.822	0.857
	SDLT9	0.831	0.0270	0.0121	0.795	0.831	0.866
% Nemata (% of community)	Reference Creek	2.45	2.19	0.978	0	2.56	5.56
	SDLT1	3.13	1.96	0.878	1.32	2.78	5.88
	SDLT9	9.83	10.3	4.59	1.05	6.67	26.4
% Hydracarina (% of community)	Reference Creek	10.4	7.41	3.31	2.53	6.64	19.2
	SDLT1	2.97	3.14	1.40	0	1.43	7.89
	SDLT9	0.813	0.517	0.231	0	0.926	1.38
% Ostracoda (% of community)	Reference Creek	7.37	6.38	2.85	0.505	8.00	14.3
	SDLT1	0.286	0.639	0.286	0	0	1.43
	SDLT9	3.91	3.69	1.65	1.15	2.78	10.4
% Oligochaeta (% of community)	Reference Creek	1.72	2.11	0.942	0	0.800	4.76
	SDLT1	2.82	1.46	0.652	1.32	2.86	4.41
	SDLT9	0.0942	0.211	0.0942	0	0	0.471
% Chironomidae (% of community)	Reference Creek	48.0	19.7	8.82	20.6	45.6	70.1
	SDLT1	82.3	5.35	2.39	74.3	84.9	86.8
	SDLT9	75.5	11.2	5.02	58.9	75.5	86.3
% Metal Sensitive Chironomidae (% of community)	Reference Creek	12.1	9.29	4.15	0	13.7	22.3
	SDLT1	28.7	13.0	5.80	10.2	29.1	42.0
	SDLT9	10.9	5.17	2.31	5.22	9.01	16.6
% Simuliidae (% of community)	Reference Creek	7.11	7.75	3.46	1.59	5.60	20.5
	SDLT1	0	0	0	0	0	0
	SDLT9	4.62	6.77	3.03	0	0.702	15.9
% Tipulidae (% of community)	Reference Creek	3.91	2.09	0.934	0.830	4.04	6.35
	SDLT1	2.54	2.30	1.03	0	1.47	5.56
	SDLT9	1.82	1.51	0.674	0.230	1.75	4.21
% Collector Gatherers FFG (% of community)	Reference Creek	53.1	14.3	6.39	36.5	49.4	73.8
	SDLT1	54.5	17.8	7.96	24.6	59.0	68.7
	SDLT9	60.5	8.38	3.75	55.1	57.0	75.2
% Filterers FFG (% of community)	Reference Creek	8.09	7.67	3.43	1.52	5.60	19.2
	SDLT1	0.850	0.778	0.348	0	1.34	1.46
	SDLT9	0.403	0.445	0.199	0	0.463	1.08
% Shredders FFG (% of community)	Reference Creek	16.8	12.6	5.64	6.50	10.9	38.1
	SDLT1	40.9	16.6	7.40	29.8	36.1	69.8
	SDLT9	33.4	7.81	3.49	23.4	37.9	40.5
% Clingers HPG (% of community)	Reference Creek	37.3	18.0	8.04	14.5	32.1	62.7
	SDLT1	42.7	16.6	7.43	29.8	36.8	69.8
	SDLT9	36.9	9.22	4.12	22.3	41.2	43.9
% Sprawlers HPG (% of community)	Reference Creek	49.6	13.0	5.81	33.2	47.8	66.8
	SDLT1	48.8	16.6	7.42	20.4	51.8	62.6
	SDLT9	50.9	6.58	2.94	42.2	50.3	60.3
% Burrowers HPG (% of community)	Reference Creek	13.1	8.91	3.98	4.15	10.4	25.5
	SDLT1	8.48	3.80	1.70	2.63	9.72	11.8
	SDLT9	11.8	10.4	4.63	2.76	8.42	28.9

Note: Sample size equals five for Unnamed Reference Creek and SDLT1, and four for SDLT9.

Table F.27: Statistical Comparison of Bray-Curtis Index for the Sheardown Lake Tributaries Compared to Unnamed Reference Creek, Mary River Project CREMP, August 2023

Comparison	Betadisper P-Value	Mantel Test			dbRDA			
		r	R^2	P-Value	F-Value	R^2	R^2_{adj}	P-Value
SDLT1 vs Reference Creek	0.846	0.910	0.828	0.008	11.8	0.597	0.547	0.003
SDLT9 vs Reference Creek	0.366	0.925	0.856	0.008	14.6	0.675	0.629	0.007

Highlighted values indicate significant difference between study areas based on statistical test p-value less than 0.10.

Note: Sample size was five for all study areas except SDLT9, at which the sample size was four.

Table F.28: Statistical Comparison of Benthic Metrics at Sheardown Lake Tributary 1 (SDLT1) Among Years of Mine Operation (2015 to 2023) and Baseline (2008, 2013) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference [b] vs. Baseline Year 2008	Magnitude of Difference [b] vs. Baseline Year 2013	Pairwise Comparison
Density (org/m^2)	ANOVA	log10	YES	<0.001	2008	3	300	52.4	nc	nc	C
					2013	3	657	176	4.2	nc	ABC
					2015	5	722	485	4.0	-0.093	BC
					2016	5	2,453	814	11	4.4	A
					2017	5	1,660	1,643	7.6	2.1	AB
					2018	5	1,102	766	6.0	1.1	ABC
					2019	5	1,483	982	8.0	2.3	AB
					2020	5	679	625	2.8	-0.86	BC
					2021	5	627	345	3.5	-0.42	BC
					2022	5	1,146	379	7.1	1.8	AB
					2023	5	515	21.7	3.0	-0.73	BC
Richness (#Taxa)	ANOVA	none	YES	0.086	2008	3	12.0	1.00	nc	nc	A
					2013	3	16.7	2.52	4.7	nc	A
					2015	5	15.4	4.34	3.4	-0.50	A
					2016	5	15.2	2.49	3.2	-0.58	A
					2017	5	14.0	2.00	2.0	-1.1	A
					2018	5	12.8	1.64	0.80	-1.5	A
					2019	5	14.8	1.92	2.8	-0.74	A
					2020	5	12.4	2.88	0.40	-1.7	A
					2021	5	12.0	2.24	0	-1.9	A
					2022	5	12.6	3.05	0.60	-1.6	A
					2023	5	11.6	2.07	-0.40	-2.0	A
Simpson's E (Krebs)	ANOVA	none	YES	0.002	2008	3	0.894	0.0338	nc	nc	A
					2013	3	0.887	0.0641	-0.20	nc	A
					2015	5	0.869	0.0670	-0.74	-0.28	A
					2016	5	0.872	0.0323	-0.65	-0.23	A
					2017	5	0.883	0.0278	-0.33	-0.067	A
					2018	5	0.834	0.0625	-1.8	-0.82	A
					2019	5	0.787	0.0258	-3.2	-1.6	AB
					2020	5	0.786	0.125	-3.2	-1.6	AB
					2021	5	0.814	0.0765	-2.4	-1.1	AB
					2022	5	0.695	0.0754	-5.9	-3.0	B
					2023	5	0.796	0.0918	-2.9	-1.4	AB
% Oligochaeta (% of community)	K-W	rank	YES	0.058	2008	3	2.96	2.49	nc	nc	CD
					2013	3	7.32	3.33	6.3	nc	ABC
					2015	5	14.4	10.8	9.4	2.3	A
					2016	5	14.1	8.77	13	5.0	AB
					2017	5	8.61	7.39	4.1	-1.6	ABC
					2018	5	2.24	2.75	-0.60	-5.0	D
					2019	5	3.26	1.04	1.6	-3.4	BCD
					2020	5	2.28	2.56	-0.21	-4.7	D
					2021	5	4.25	2.21	2.1	-3.1	ABCD
					2022	5	3.65	2.62	1.8	-3.3	CD
					2023	5	2.82	1.46	0.89	-3.9	CD
% Hydracarina (% of community)	K-W	rank	YES	<0.001	2008	3	12.1	4.73	nc	nc	A
					2013	3	4.58	2.94	-9.5	nc	ABCD
					2015	5	4.63	1.60	-9.5	-0.00075	ABC
					2016	5	5.29	1.28	-6.4	0.45	AB
					2017	5	3.86	1.99	-12	-0.31	BC
					2018	5	3.06	1.69	-11	-0.17	BCDE
					2019	5	1.29	0.909	-14	-0.67	DEF
					2020	5	1.09	0.852	-15	-0.79	EF
					2021	5	0.835	0.741	-16	-0.98	F
					2022	5	1.02	1.10	-16	-0.93	EF
					2023	5	2.97	3.14	-15	-0.76	CDEF

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.28: Statistical Comparison of Benthic Metrics at Sheardown Lake Tributary 1 (SDLT1) Among Years of Mine Operation (2015 to 2023) and Baseline (2008, 2013) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference [b] vs. Baseline Year 2008	Magnitude of Difference [b] vs. Baseline Year 2013	Pairwise Comparison
% Chironomidae (% of community)	ANOVA	none	YES	<0.001	2008	3	69.2	1.97	nc	nc	C
					2013	3	81.1	3.91	6.0	nc	ABC
					2015	5	72.0	9.01	1.4	-2.3	C
					2016	5	73.1	11.9	2.0	-2.0	BC
					2017	5	82.4	10.1	6.7	0.34	ABC
					2018	5	90.7	4.42	11	2.4	A
					2019	5	91.6	1.60	11	2.7	A
					2020	5	85.0	6.86	8.0	0.98	ABC
					2021	5	78.4	6.22	4.7	-0.68	ABC
					2022	5	86.2	4.25	8.6	1.3	AB
					2023	5	82.3	5.35	6.7	0.31	ABC
% Metal Sensitive Chironomidae (% of community)	ANOVA	none	YES	0.001	2008	3	27.5	5.45	nc	nc	ABC
					2013	3	19.9	14.3	-1.4	nc	ABC
					2015	5	6.09	2.91	-3.9	-0.97	C
					2016	5	15.6	4.39	-2.2	-0.30	ABC
					2017	5	26.1	15.6	-0.26	0.43	AB
					2018	5	19.8	12.4	-1.4	-0.0073	ABC
					2019	5	31.2	11.0	0.67	0.79	A
					2020	5	10.5	5.34	-3.1	-0.66	BC
					2021	5	13.2	5.11	-2.6	-0.47	ABC
					2022	5	11.1	3.86	-3.0	-0.62	BC
					2023	5	28.7	13.0	0.22	0.62	AB
% Tipulidae (% of community)	ANOVA	log10(x+1)	YES	<0.001	2008	3	14.7	2.71	nc	nc	A
					2013	3	3.81	0.475	-4.2	nc	B
					2015	5	2.06	1.33	-5.0	-3.7	B
					2016	5	3.51	1.87	-4.4	-0.65	B
					2017	5	2.79	2.73	-4.7	-2.2	B
					2018	5	1.92	1.34	-5.0	-4.0	B
					2019	5	2.11	1.62	-4.9	-3.6	B
					2020	5	3.87	2.49	-4.2	0.083	B
					2021	5	3.22	1.48	-4.5	-1.3	B
					2022	5	2.80	1.54	-4.6	-2.2	B
					2023	5	2.54	2.30	-4.8	-2.7	B
% Collector Gatherers FFG (% of community)	ANOVA	none	YES	<0.001	2008	3	40.3	2.91	nc	nc	CD
					2013	3	55.5	7.46	5.2	nc	BCD
					2015	5	64.2	5.20	8.2	1.2	AB
					2016	5	58.6	10.7	6.3	0.43	BC
					2017	5	55.3	8.01	5.2	-0.021	BCD
					2018	5	62.2	9.28	7.5	0.90	ABC
					2019	5	81.6	4.89	14	3.5	A
					2020	5	46.1	13.0	2.0	-1.3	BCD
					2021	5	54.1	12.0	4.8	-0.18	BCD
					2022	5	36.7	7.99	-1.2	-2.5	D
					2023	5	54.5	17.8	4.9	-0.13	BCD
% Filterers FFG (% of community)	K-W	rank	YES	<0.001	2008	3	5.18	3.48	nc	nc	AB
					2013	3	8.45	1.64	0.81	nc	A
					2015	5	4.46	1.40	-0.085	-4.3	A
					2016	5	7.56	3.29	0.36	-2.2	A
					2017	5	8.86	7.96	-0.052	-4.1	A
					2018	5	1.56	1.39	-0.87	-8.0	BC
					2019	5	1.26	0.922	-0.81	-7.7	BC
					2020	5	1.38	1.38	-0.85	-7.9	C
					2021	5	0.565	0.359	-0.91	-8.2	C
					2022	5	1.09	1.47	-0.90	-8.1	C
					2023	5	0.850	0.778	-0.76	-7.5	C

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.28: Statistical Comparison of Benthic Metrics at Sheardown Lake Tributary 1 (SDLT1) Among Years of Mine Operation (2015 to 2023) and Baseline (2008, 2013) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference [b] vs. Baseline Year 2008	Magnitude of Difference [b] vs. Baseline Year 2013	Pairwise Comparison
% Shredders FFG (% of community)	ANOVA	log10	YES	<0.001	2008	3	40.6	4.23	nc	nc	ABCD
					2013	3	28.7	7.38	-3.5	nc	BCD
					2015	5	22.9	4.53	-5.7	-0.90	DE
					2016	5	27.4	9.44	-4.2	-0.27	CD
					2017	5	31.6	7.68	-2.7	0.37	BCD
					2018	5	32.8	8.15	-2.3	0.52	BCD
					2019	5	15.0	4.26	-10	-2.7	E
					2020	5	49.2	13.8	1.5	2.1	AB
					2021	5	42.4	11.8	0.15	1.5	ABC
					2022	5	59.5	8.81	3.7	3.0	A
					2023	5	40.9	16.6	-0.43	1.3	ABC

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc = no comparison; nm = MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.29: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for Sheardown Lake Tributary 9 (SDLT9), August 2023

Waterbody	Sheardown Lake Tributary 9 (SDLT9-DS)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS					
P. Nemata	39.4	272	803	387	14.3
ANNELIDS					
P. Annelida					
WORMS					
Cl. Oligochaeta					
F. Enchytraeidae	-	-	14.3	-	-
ARTHROPODS					
P. Arthropoda					
MITES					
Cl. Arachnida					
O. Trombidiformes					
F. Sperchonidae					
Sperchon	21.5	28.7	-	28.7	14.3
SEED SHRIMPS					
Cl. Ostracoda	17.9	129	315	86.0	28.7
SPRINGTAILS					
Cl. Entognatha					
O. Collembola	7.17	-	-	14.3	14.3
INSECTS					
Cl. Insecta					
MAYFLIES					
O. Ephemeroptera					
F. Baetidae					
Acentrella feropagus	96.7	14.3	14.3	14.3	-
STONEFLIES					
O. Plecoptera					
F. Capniidae					
immature	3.58	-	14.3	-	43.0
CADDISFLIES					
O. Trichoptera					
F. Limnephilidae					
immature	3.58	14.3	-	14.3	14.3
TRUE FLIES					
O. Diptera					
MIDGES					
F. Chironomidae					
chironomid pupae	**28.7**	**57.3**	**14.3**	**115**	**28.7**
S.F. Chironominae					
Rheotanytarsus	-	-	-	-	-
Tanytarsini indeterminate	-	-	14.3	-	14.3
S.F. Diamesinae					
Diamesa	100	305	143	487	201
Pseudokiefferiella	14.3	57.3	-	-	-
S.F. Orthocladiinae					
Cricotopus	115	907	258	573	100
Cricotopus/Orthocladius	279	638	373	502	301
Eukiefferiella	-	-	-	-	-
Hydrobaenus	14.3	122	143	-	28.7
Hydrosmittia	-	-	-	-	-
Krenosmittia	39.4	129	71.7	86.0	28.7
Orthocladius (Euorthocladius)	-	-	-	-	-
Parakiefferiella	-	-	-	-	-
Paraphaenocladius	-	-	-	-	-
Psectrocladius	-	-	-	-	-
Tvetenia	14.3	-	100	344	100
indeterminate	505	1268	674	229	373
S.F. Tanypodinae					
Thienemannimyia complex	-	-	-	-	-
F. Empididae					
Clinocera	3.58	43.0	14.3	-	-
F. Simuliidae					
Gymnopais holopticoides	247	28.7	14.3	172	-
Simulium	-	-	-	14.3	-
F. Tipulidae					
Tipula	3.58	71.7	60.9	28.7	57.3
SUMMARY METRICS					
Density (No. organisms per m^2)	1,556	4,086	3,043	3,097	1,362
Richness (total number of taxa)[a]	16	14	14	13	13
Simpson's Evenness (E)	0.831	0.795	0.866	0.846	0.817
Shannon's Diversity	2.64	2.48	2.7	2.59	2.52
Dominant Group Composition					
% Nemata	2.53	6.67	26.4	12.5	1.05
% Acari	1.38	0.702	0	0.926	1.05
% Ostracods	1.15	3.16	10.4	2.78	2.11
% Chironomids	71.4	85.3	58.9	75.5	86.3
% Metal Sensitive Chironomids	7.57	9.01	5.22	16.6	16.2
Functional Feeding Group Composition					
% Collector - Gatherers	55.8	57	75.2	55.1	59.2
% Filterers	0	0	0.475	0.463	1.08
% Shredders	26.7	40.5	23.4	37.9	38.6
Habitat Preference Group Composition					
% Clingers	43.8	41.2	22.3	43.9	33.4
% Sprawlers	53	50.3	48.8	42.2	60.3
% Burrowers	2.76	8.42	28.9	13.4	5.26

Note: "-" indicates taxa not present in sample.

[a] Bold entries excluded from taxa count.

Table F.30: Statistical Comparison of Benthic Metrics at Sheardown Lake Tributary 9 (SDLT9) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2013) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2013	Pairwise Comparison
Density (org/m^2)	ANOVA	log10	YES	<0.001	2007	3	712	41.9	nc	nc	C
					2013	3	1,240	690	7.9	nc	BC
					2015	5	2,147	942	18	1.1	ABC
					2016	5	2,401	1,054	20	1.3	ABC
					2017	5	3,404	1,983	24	1.9	AB
					2018	5	1,482	375	12	0.48	BC
					2019	5	1,575	705	12	0.46	BC
					2020	5	1,601	841	12	0.47	BC
					2021	5	2,661	1,929	18	1.2	ABC
					2022	4	5,522	1,900	34	3.0	A
					2023	5	2,629	1,148	21	1.5	AB
Richness (#Taxa)	ANOVA	none	YES	0.013	2007	3	22.3	3.21	nc	nc	A
					2013	3	19.0	3.61	-1.0	nc	AB
					2015	5	19.4	4.83	-0.91	0.11	AB
					2016	5	18.2	2.59	-1.3	-0.22	AB
					2017	5	20.8	2.77	-0.48	0.50	A
					2018	5	17.8	3.90	-1.4	-0.33	AB
					2019	5	21.0	2.00	-0.41	0.55	A
					2020	5	17.0	4.69	-1.7	-0.55	AB
					2021	5	17.6	2.30	-1.5	-0.39	AB
					2022	4	15.0	1.41	-2.3	-1.1	AB
					2023	5	14.0	1.22	-2.6	-1.4	B
Simpson's E (Krebs)	ANOVA	none	YES	0.054	2007	3	0.865	0.0490	nc	nc	A
					2013	3	0.899	0.0180	0.69	nc	A
					2015	5	0.892	0.0604	0.54	-0.40	A
					2016	5	0.843	0.0635	-0.45	-3.1	A
					2017	5	0.883	0.0422	0.36	-0.89	A
					2018	5	0.889	0.0473	0.48	-0.56	A
					2019	5	0.899	0.00797	0.69	0.018	A
					2020	5	0.834	0.0212	-0.63	-3.6	A
					2021	5	0.817	0.0546	-0.98	-4.5	A
					2022	4	0.841	0.0661	-0.50	-3.2	A
					2023	5	0.831	0.0270	-0.69	-3.7	A
% Oligochaeta (% of community)	K-W	rank	YES	0.026	2007	3	5.92	4.06	nc	nc	A
					2013	3	0.650	1.13	-1.2	nc	CD
					2015	5	0.837	0.429	-1.0	nm	BCD
					2016	5	1.54	1.01	-0.95	nm	ABC
					2017	5	2.95	2.77	-0.70	nm	ABC
					2018	5	0.941	0.972	-1.0	nm	BCD
					2019	5	2.08	1.72	-0.88	nm	ABC
					2020	5	2.06	0.856	-0.68	nm	AB
					2021	5	3.01	4.03	-0.86	nm	ABC
					2022	4	2.64	2.10	-0.65	nm	AB
					2023	5	0.0942	0.211	-1.2	nm	D
% Hydracarina (% of community)	ANOVA	log10(x+1)	YES	<0.001	2007	3	3.35	2.00	nc	nc	AB
					2013	3	8.98	4.19	2.7	nc	A
					2015	5	4.20	4.11	0.40	-1.2	AB
					2016	5	4.61	3.24	0.61	-1.1	AB
					2017	5	3.25	2.01	-0.050	-1.4	B
					2018	5	8.47	2.32	2.5	-0.11	A
					2019	5	2.72	1.13	-0.31	-1.5	B
					2020	5	4.15	1.82	0.40	-1.2	AB
					2021	5	2.15	0.859	-0.59	-1.7	B
					2022	4	3.10	1.38	-0.12	-1.4	B
					2023	5	0.813	0.517	-1.3	-2.0	B

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = (MCT_{Year} - $MCT_{Base\ Year}$)/$SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.30: Statistical Comparison of Benthic Metrics at Sheardown Lake Tributary 9 (SDLT9) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2013) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2013	Pairwise Comparison
% Chironomidae (% of community)	ANOVA	none	NO	0.393	2007	3	77.5	5.81	nc	nc	A
					2013	3	73.3	4.44	-0.73	nc	A
					2015	5	78.7	8.66	0.20	1.2	A
					2016	5	67.1	8.79	-1.8	-1.4	A
					2017	5	73.4	10.1	-0.70	0.028	A
					2018	5	75.8	11.1	-0.30	0.56	A
					2019	5	63.7	6.93	-2.4	-2.1	A
					2020	5	70.3	4.27	-1.2	-0.67	A
					2021	5	72.0	9.40	-0.94	-0.29	A
					2022	4	66.9	18.0	-1.8	-1.4	A
					2023	5	75.5	11.2	-0.35	0.50	A
% Metal Sensitive Chironomidae (% of community)	K-W	rank	YES	<0.001	2007	3	2.56	0.872	nc	nc	BCDE
					2013	3	0.996	0.545	-3.2	nc	DE
					2015	5	5.01	2.52	1.7	4.6	ABC
					2016	5	0.756	1.23	-4.2	-0.89	E
					2017	5	1.12	1.30	-2.8	0.37	DE
					2018	5	0.815	0.648	-3.3	-0.096	DE
					2019	5	2.51	1.13	-0.18	2.8	CD
					2020	5	3.19	3.64	-1.3	1.8	CDE
					2021	5	8.48	5.15	9.3	12	AB
					2022	4	2.52	0.930	-0.73	2.3	BCDE
					2023	5	10.9	5.17	10	12	A
% Tipulidae (% of community)	ANOVA	log10	YES	0.008	2007	3	4.61	1.86	nc	nc	AB
					2013	3	4.43	2.08	-0.19	nc	AB
					2015	5	3.92	3.42	-1.1	-0.67	AB
					2016	5	8.03	3.30	1.3	1.1	A
					2017	5	5.84	5.58	-0.20	-0.0060	AB
					2018	5	3.61	2.27	-1.0	-0.61	AB
					2019	5	1.41	0.780	-3.1	-2.1	B
					2020	5	3.12	1.30	-1.0	-0.59	AB
					2021	5	1.73	0.944	-2.7	-1.8	B
					2022	4	3.13	1.08	-0.98	-0.57	AB
					2023	5	1.82	1.51	-3.1	-2.1	B
% Collector Gatherers FFG (% of community)	ANOVA	none	NO	0.178	2007	3	57.8	3.09	nc	nc	A
					2013	3	60.6	6.91	0.91	nc	A
					2015	5	60.7	20.5	0.95	0.016	A
					2016	5	44.6	15.7	-4.3	-2.3	A
					2017	5	57.5	11.6	-0.091	-0.45	A
					2018	5	52.6	7.32	-1.7	-1.2	A
					2019	5	62.5	6.51	1.5	0.28	A
					2020	5	61.1	8.61	1.1	0.077	A
					2021	5	50.9	9.81	-2.2	-1.4	A
					2022	4	67.4	9.07	3.1	0.99	A
					2023	5	60.5	8.38	0.87	-0.020	A
% Filterers FFG (% of community)	K-W	rank	YES	0.007	2007	3	1.34	0.937	nc	nc	BC
					2013	3	1.93	0.880	0.63	nc	AB
					2015	5	2.03	1.80	0.20	-0.50	B
					2016	5	0.482	0.406	-0.87	-1.7	C
					2017	5	0.817	0.689	-0.67	-1.5	BC
					2018	5	1.42	1.40	0.074	-0.64	BC
					2019	5	2.01	0.992	1.1	0.58	AB
					2020	5	0.480	0.791	-1.3	-2.2	C
					2021	5	6.65	4.28	4.8	4.8	A
					2022	4	1.10	0.890	0.015	-0.71	BC
					2023	5	0.403	0.445	-0.75	-1.6	C

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.30: Statistical Comparison of Benthic Metrics at Sheardown Lake Tributary 9 (SDLT9) Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2013) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2013	Pairwise Comparison
% Shredders FFG (% of community)	ANOVA	none	NO	0.189	2007	3	26.8	3.91	nc	nc	A
					2013	3	28.4	4.37	0.40	nc	A
					2015	5	32.0	18.2	1.3	0.84	A
					2016	5	49.1	15.0	5.7	4.7	A
					2017	5	37.7	10.7	2.8	2.1	A
					2018	5	37.2	9.72	2.7	2.0	A
					2019	5	32.0	7.21	1.3	0.83	A
					2020	5	32.0	8.55	1.3	0.83	A
					2021	5	37.7	12.7	2.8	2.1	A
					2022	4	27.4	9.46	0.14	-0.23	A
					2023	5	33.4	7.81	1.7	1.2	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.31: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for Sheardown Lake NW (DL0-01) Study Areas, Mary River Project CREMP, August 2023

Lake	Sheardown Lake NW (DL0-01)									
Station Type	Littoral					Profundal				
Station	9	4	3	11	10	5	14	15	2	12
ROUNDWORMS										
P. Nemata	241	138	-	-	34.4	-	-	-	8.61	-
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	34.4	34.4	-	-	-	-	-	-	-	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
Acalyptonotidae										
Acalyptonotus	68.9	34.4	68.9	103	103	51.7	8.61	-	17.2	-
F. Aturidae										
?Axonopsella	-	-	-	-	-	-	-	-	-	-
F. Hygrobatidae										
Hygrobates	68.9	34.4	-	-	-	25.8	34.4	60.3	34.4	51.7
F. Lebertiidae										
Lebertia	68.9	34.4	-	-	-	8.61	-	8.61	-	8.61
HARPACTICOIDS										
O. Harpacticoida	34.4	103	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	3,203	2,583	1,619	1,343	586	68.9	17.2	17.2	138	8.6
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
immature	-	-	-	-	-	-	-	-	-	-
F. Apataniidae										
Apatania	138	172	34.4	34.4	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	310	172	-	-	-	-	-	-	8.61	-
S.F. Chironominae										
Chironomus	-	68.9	-	-	-	8.61	8.61	-	-	-
Micropsectra	758	551	34.4	68.9	-	-	-	-	-	-
Paratanytarsus	586	654	103	103	-	-	-	-	-	-
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	207	34.4	-	-	-	-	-	-	-
Stictochironomus	34.4	379	68.9	586	620	17.2	25.8	34.4	-	-
Tanytarsus	172	-	-	-	-	-	-	-	-	-
S.F. Diamesinae										
Protanypus	34.4	-	-	34.4	-	-	34.4	17.2	8.61	77.5
Pseudodiamesa	-	-	34.4	-	68.9	-	-	-	8.61	-
S.F. Orthocladiinae										
Abiskomyia	586	482	68.9	241	241	-	-	-	-	8.61
Eukiefferiella	-	-	-	-	-	-	-	8.61	-	-
Heterotrissocladius	620	1,068	-	34.4	207	155	60.3	8.61	121	68.9
Limnophyes	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	34.4	-	-	-	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	-	-	-	-	-	-	-	-	-
Zalutschia	-	-	-	-	34.4	8.61	-	-	8.61	-
indeterminate	-	34.4	-	-	-	-	-	-	-	-
S.F. Tanypodinae										
Arctopelopia	586	654	379	448	-	-	-	-	-	-
Procladius	34.4	-	-	172	207	112	60.3	34.4	34.4	43.1
SUMMARY METRICS										
Density (No. organisms per m^2)	7578	7440	2446	3169	2101	456	250	189	388	267
Richness (total number of taxa)[a]	17	18	10	11	9	9	8	8	9	7
Simpson's Evenness (E)	0.826	0.873	0.592	0.83	0.899	0.881	0.946	0.926	0.84	0.913
Shannon-Wiener Diversity	2.85	3.09	1.79	2.54	2.62	2.53	2.72	2.66	2.39	2.38
Dominant Taxonomic Group Composition										
% Nemata	3.18	1.85	0	0	1.64	0	0	0	2.22	0
% Hydracarina	2.73	1.39	2.82	3.26	4.92	18.9	17.2	36.4	13.3	22.6
% Ostracods	42.3	34.7	66.2	42.4	27.9	15.1	6.9	9.09	35.6	3.23
% Chironomids	49.1	57.9	29.6	53.3	65.6	66	75.9	54.5	48.9	74.2
% Metal Sensitive Chironomids	22.3	16.9	7.04	6.52	3.28	0	13.8	9.09	4.66	29
Functional Feeding Group Composition										
% Collector - Gatherers	64.7	69.8	74.7	70.7	83.6	54.7	58.6	45.5	75	61.3
% Filterers	21.8	16.9	5.63	5.43	0	0	0	0	0	0
% Shredders	0	0.482	0	0	1.64	1.89	0	0	2.33	0
Habitat Preference Group Composition										
% Clingers	17.9	14.3	7.04	6.52	4.92	18.9	17.2	36.4	13.3	22.6
% Sprawlers	77.4	77.1	90.1	73.9	63.9	75.5	55.2	36.4	82.1	48.4
% Burrowers	4.63	8.58	2.82	19.6	31.1	5.66	27.6	27.3	4.55	29

Note: "-" indicates no taxa present.

[a] Bold entries excluded from taxa count.

Table F.32: Statistical Comparison of Benthic Metrics at Sheardown Lake NW (DL0-01) Littoral (Shallow) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2008, 2013), Mary River Project CREMP

Metric	Overall 11-Year Comparison				Pair-wise, *post hoc* comparisons[a]							
									Effect Size (MOD)			
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	vs. Baseline Year 2007	vs. Baseline Year 2008	vs. Baseline Year 2013	Pairwise Comparison
Density (Individuals/m^2)	ANOVA	log10	NO	0.835	2007	4	5,974	3,000	-	-	-	A
					2008	4	7,536	5,273	0.26	-	-	A
					2013	3	9,940	2,634	1.1	0.60	-	A
					2015	5	5,665	3,230	-0.083	-0.26	-2.3	A
					2016	5	5,503	4,184	-0.53	-0.60	-3.2	A
					2017	5	5,216	2,398	-0.17	-0.33	-2.5	A
					2018	5	6,334	3,717	0.048	-0.16	-2.0	A
					2019	5	6,207	2,673	0.045	-0.16	-2.0	A
					2020	5	6,631	3,914	0.10	-0.12	-1.9	A
					2021	5	5,399	3,000	-0.28	-0.41	-2.7	A
					2022	5	6,455	1,665	0.28	0.015	-1.6	A
					2023	5	4,547	2,732	-0.56	-0.62	-3.2	A
Richness (Number of Taxa)	ANOVA	log10	NO	0.180	2007	4	12.3	1.52	-	-	-	A
					2008	4	14.5	1.68	1.3	-	-	A
					2013	3	17.7	3.21	2.9	1.5	-	A
					2015	5	13.8	1.92	0.90	-0.42	-1.3	A
					2016	5	14.6	2.41	1.3	0.014	-0.98	A
					2017	5	14.0	3.16	0.93	-0.39	-1.2	A
					2018	5	15.0	1.22	1.6	0.30	-0.80	A
					2019	5	13.2	3.56	0.39	-0.93	-1.6	A
					2020	5	15.4	1.14	1.9	0.51	-0.66	A
					2021	5	11.8	1.79	-0.40	-1.7	-2.1	A
					2022	5	14.0	2.74	0.97	-0.36	-1.2	A
					2023	5	13.0	4.18	0.14	-1.2	-1.7	A
Simpson's Evenness (E)	K-W	rank	YES	0.023	2007	4	0.768	0.0553	-	-	-	CE
					2008	4	0.840	0.0980	2.9	-	-	ABCD
					2013	3	0.863	0.0466	1.8	-2.3	-	AB
					2015	5	0.759	0.0957	-0.63	-7.9	-3.0	CDE
					2016	5	0.893	0.0235	3.4	1.2	1.9	A
					2017	5	0.842	0.0485	2.0	-2.0	0.15	ABCD
					2018	5	0.769	0.163	1.3	-3.6	-0.70	BCD
					2019	5	0.686	0.114	-2.3	-12	-5.0	E
					2020	5	0.773	0.0548	-0.61	-7.9	-2.9	BCDE
					2021	5	0.750	0.101	-1.5	-9.9	-4.0	CE
					2022	5	0.853	0.0347	1.5	-3.2	-0.47	ABD
					2023	5	0.804	0.122	1.4	-3.4	-0.59	ABCD
Nemata (%)	K-W	rank	NO	0.710	2007	4	1.52	1.58	-	-	-	A
					2008	4	1.09	0.976	-0.40	-	-	A
					2013	3	0.592	0.846	-0.77	-2.3	-	A
					2015	5	0.851	1.07	-0.47	-0.39	1.3	A
					2016	5	1.14	0.713	-0.020	2.4	3.1	A
					2017	5	1.26	1.55	-0.53	-0.78	0.99	A
					2018	5	1.34	1.03	-0.041	2.2	3.0	A
					2019	5	0.165	0.226	-0.93	-3.3	-0.67	A
					2020	5	0.610	0.569	-0.30	0.65	2.0	A
					2021	5	0.644	0.786	-0.67	-1.6	0.41	A
					2022	5	2.57	3.49	-0.59	-1.1	0.75	A
					2023	5	1.33	1.35	0.31	4.4	4.5	A
Ostracoda (%)	K-W	rank	YES	0.001	2007	4	11.9	12.8	-	-	-	CDE
					2008	4	10.8	8.73	-0.22	-	-	DE
					2013	3	23.4	8.14	1.1	6.8	-	ABC
					2015	5	7.84	3.72	-0.26	-0.20	-3.6	E
					2016	5	9.19	6.13	-0.23	-0.079	-3.5	E
					2017	5	19.5	11.1	0.31	2.7	-2.1	BCD
					2018	5	13.0	4.10	0.093	1.6	-2.7	CDE
					2019	5	16.0	5.73	0.16	1.9	-2.5	BCDE
					2020	5	25.6	8.56	1.3	7.5	0.35	AB
					2021	5	25.0	16.5	0.74	4.8	-1.0	ABC
					2022	5	21.4	6.45	0.58	4.0	-1.4	ABC
					2023	5	42.7	14.5	2.3	13	3.0	A

Table F.32: Statistical Comparison of Benthic Metrics at Sheardown Lake NW (DL0-01) Littoral (Shallow) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2008, 2013), Mary River Project CREMP

Metric	Overall 11-Year Comparison				Pair-wise, *post hoc* comparisons[a]							
									Effect Size (MOD)			
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	vs. Baseline Year 2007	vs. Baseline Year 2008	vs. Baseline Year 2013	Pairwise Comparison
Chironomidae (%)	K-W	rank	YES	<0.001	2007	4	83.0	8.28	-	-	-	ABC
					2008	4	81.2	6.67	-0.42	-	-	ABCD
					2013	3	70.5	9.64	-1.7	-2.7	-	BCDE
					2015	5	89.8	3.20	0.75	2.4	3.1	A
					2016	5	85.0	6.59	0.34	1.6	2.6	A
					2017	5	73.5	11.2	-1.3	-1.8	0.56	BCD
					2018	5	83.7	2.85	0.15	1.2	2.4	AB
					2019	5	82.1	5.95	0.049	0.96	2.3	ABC
					2020	5	70.4	9.29	-1.5	-2.1	0.35	DE
					2021	5	70.1	16.0	-0.70	-0.59	1.3	CDE
					2022	5	72.5	8.08	-1.2	-1.7	0.63	CDE
					2023	5	51.1	13.5	-3.3	-5.9	-2.0	E
Metal Sensitive Chironomidae (%)	ANOVA	log10	NO	0.149	2007	4	16.9	16.9	-	-	-	A
					2008	4	20.7	17.2	0.30	-	-	A
					2013	3	21.0	4.65	0.57	0.34	-	A
					2015	5	19.1	7.18	0.46	0.20	-0.70	A
					2016	5	24.6	15.2	0.53	0.30	-0.22	A
					2017	5	16.6	7.91	0.34	0.053	-1.4	A
					2018	5	18.3	15.0	0.064	-0.30	-3.1	A
					2019	5	10.6	5.98	-0.054	-0.45	-3.9	A
					2020	5	15.4	14.3	-0.051	-0.45	-3.9	A
					2021	5	11.8	9.95	-0.046	-0.44	-3.8	A
					2022	5	45.3	5.70	1.2	1.1	3.7	A
					2023	5	11.2	8.03	-0.073	-0.47	-4.0	A
Collector Gatherers (%)	ANOVA	log10	YES	<0.001	2007	4	71.6	13.4	-	-	-	AB
					2008	4	61.1	15.0	-0.84	-	-	AB
					2013	3	65.3	8.98	-0.43	0.36	-	AB
					2015	5	68.9	7.97	-0.15	0.59	0.39	AB
					2016	5	56.8	7.68	-1.2	-0.27	-1.0	AC
					2017	5	69.4	9.19	-0.12	0.62	0.43	AB
					2018	5	76.2	13.1	0.33	1.0	1.1	AB
					2019	5	81.7	8.43	0.73	1.4	1.6	B
					2020	5	77.5	14.1	0.40	1.1	1.2	AB
					2021	5	78.1	9.76	0.48	1.1	1.3	B
					2022	5	43.2	8.15	-2.6	-1.5	-3.0	C
					2023	5	72.7	7.06	0.13	0.84	0.78	AB
Filterers (%)	ANOVA	none	YES	0.004	2007	4	16.7	17.1	-	-	-	B
					2008	4	19.9	17.1	0.19	-	-	B
					2013	3	21.0	4.68	0.25	0.065	-	AB
					2015	5	18.6	6.83	0.11	-0.078	-0.52	B
					2016	5	23.0	17.3	0.37	0.19	0.44	AB
					2017	5	16.5	7.99	-0.0094	-0.20	-0.96	B
					2018	5	17.5	15.7	0.049	-0.14	-0.75	B
					2019	5	9.99	5.81	-0.39	-0.58	-2.4	B
					2020	5	14.6	14.5	-0.12	-0.31	-1.4	B
					2021	5	11.2	10.5	-0.32	-0.51	-2.1	B
					2022	5	45.3	5.70	1.7	1.5	5.2	A
					2023	5	9.95	9.04	-0.39	-0.58	-2.4	B

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

Table F.33: Statistical Comparison of Benthic Metrics at Sheardown Lake NW (DL0-01) Profundal (Deep) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2013), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]						
									Effect Size (MOD)		
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	vs. Baseline Year 2007	vs. Baseline Year 2013	Pairwise Comparison
Density (Individuals/m^2)	ANOVA	none	YES	<0.001	2007	4	1,461	308	-	-	BC
					2013	3	2,744	302	4.2	-	A
					2015	5	1,425	210	-0.12	-4.4	BC
					2017	5	861	391	-1.9	-6.2	CDE
					2018	5	1,154	240	-1.00	-5.3	BCD
					2019	5	1,670	302	0.68	-3.6	B
					2020	5	1,326	527	-0.44	-4.7	BC
					2021	5	648	304	-2.6	-6.9	DE
					2022	5	1,770	469	1.0	-3.2	B
					2023	5	310	109	-3.7	-8.1	E
Richness (Number of Taxa)	ANOVA	none	NO	0.958	2007	4	7.50	0.430	-	-	A
					2013	3	9.83	2.47	5.4	-	A
					2015	5	8.40	3.05	2.1	-0.58	A
					2017	5	9.20	3.49	4.0	-0.26	A
					2018	5	9.40	3.51	4.4	-0.18	A
					2019	5	9.20	3.49	4.0	-0.26	A
					2020	5	7.80	2.49	0.70	-0.82	A
					2021	5	8.20	2.17	1.6	-0.66	A
					2022	5	8.00	3.08	1.2	-0.74	A
					2023	5	8.20	0.837	1.6	-0.66	A
Simpson's Evenness (E)	ANOVA	log10	YES	0.011	2007	4	0.426	0.165	-	-	ABC
					2013	3	0.521	0.167	0.55	-	ABC
					2015	5	0.355	0.212	-0.74	-1.7	BC
					2017	5	0.717	0.113	1.4	1.1	AB
					2018	5	0.491	0.133	0.42	-0.17	ABC
					2019	5	0.444	0.210	-0.036	-0.76	ABC
					2020	5	0.486	0.295	0.10	-0.58	ABC
					2021	5	0.647	0.218	1.1	0.64	ABC
					2022	5	0.328	0.235	-1.2	-2.2	C
					2023	5	0.901	0.0414	2.0	1.8	A
Nemata (%)	K-W	rank	YES	0.037	2007	4	0.634	0.510	-	-	AB
					2013	3	3.58	2.56	6.6	-	A
					2015	5	0.521	0.304	-0.0087	-0.97	AB
					2017	5	1.36	3.03	-1.3	-1.2	BC
					2018	5	0.592	0.983	-1.3	-1.2	BC
					2019	5	0.412	0.390	-0.20	-1.00	BC
					2020	5	0	0	-1.3	-1.2	C
					2021	5	0.690	1.54	-1.3	-1.2	BC
					2022	5	0	0	-1.3	-1.2	C
					2023	5	0.444	0.994	-1.3	-1.2	BC
Ostracoda (%)	K-W	rank	YES	0.050	2007	4	0.297	0.359	-	-	C
					2013	3	6.18	8.65	5.0	-	ABC
					2015	5	2.82	3.74	0.82	-0.65	BC
					2017	5	6.81	4.55	26	3.3	AB
					2018	5	2.86	2.40	7.5	0.39	BC
					2019	5	2.55	1.65	8.5	0.54	BC
					2020	5	6.56	3.90	16	1.8	AB
					2021	5	10.5	9.06	15	1.5	A
					2022	5	6.04	6.72	8.8	0.59	AB
					2023	5	14.0	12.8	26	3.2	A
Chironomidae (%)	ANOVA	none	YES	<0.001	2007	4	94.6	1.94	-	-	A
					2013	3	84.9	8.83	-5.0	-	A
					2015	5	93.2	6.03	-0.75	0.93	A
					2017	5	85.1	8.51	-4.9	0.022	A
					2018	5	90.4	3.84	-2.2	0.62	A
					2019	5	93.0	5.70	-0.81	0.92	A
					2020	5	90.8	3.69	-1.9	0.67	A
					2021	5	79.4	12.5	-7.9	-0.62	A
					2022	5	90.6	9.05	-2.1	0.64	A
					2023	5	63.9	11.9	-16	-2.4	B

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann- Whitney U-test (M-W).

[b] Contrast MODs could not be calculated because the MAD=0.

Table F.33: Statistical Comparison of Benthic Metrics at Sheardown Lake NW (DL0-01) Profundal (Deep) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2013), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]						
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2007	Effect Size (MOD) vs. Baseline Year 2013	Pairwise Comparison
Metal Sensitive Chironomidae (%)	K-W	rank	YES	0.044	2007	4	0.470	0.638	-	-	E
					2013	3	1.36	1.72	1.3	-	CDE
					2015	5	2.84	2.77	2.2	0.31	ABCDE
					2017	5	6.33	4.37	14	4.1	A
					2018	5	3.26	2.01	8.1	2.3	ABC
					2019	5	2.17	2.11	2.7	0.48	BCDE
					2020	5	4.03	3.98	5.8	1.5	ABCD
					2021	5	5.49	6.81	8.1	2.3	ABC
					2022	5	1.02	0.843	1.6	0.10	DE
					2023	5	11.3	11.2	22	7.1	AB
Collector Gatherers (%)	ANOVA	none	YES	<0.001	2007	4	83.6	8.43	-	-	AB
					2013	3	86.4	4.78	0.33	-	AB
					2015	5	90.5	5.34	0.82	0.86	A
					2017	5	75.5	7.35	-0.96	-2.3	B
					2018	5	85.2	7.73	0.19	-0.26	AB
					2019	5	88.6	6.49	0.60	0.47	A
					2020	5	91.9	3.51	0.98	1.1	A
					2021	5	81.6	5.48	-0.24	-1.0	AB
					2022	5	93.9	3.34	1.2	1.6	A
					2023	5	59.0	10.8	-2.9	-5.7	C
Filterers (%)	K-W	rank	NO	0.117	2007	4	0.0543	0.109	-	-	A
					2013	3	1.32	1.65	-[b]	-	A
					2015	5	1.87	2.56	-[b]	-0.67	A
					2017	5	2.90	2.47	-[b]	0.99	A
					2018	5	0.984	1.43	-[b]	-0.16	A
					2019	5	1.27	2.59	-[b]	-0.67	A
					2020	5	2.42	4.85	-[b]	-0.67	A
					2021	5	0	0	-[b]	-0.67	A
					2022	5	0.0824	0.184	-[b]	-0.67	A
					2023	5	0	0	-[b]	-0.67	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann- Whitney U-test (M-W).

[b] Contrast MODs could not be calculated because the MAD=0.

Table F.34: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for Sheardown Lake SE (DL0-02) Study Areas, August 2023

Lake	Sheardown Lake SE (DL0-02)									
Station Type	Littoral					Profundal				
Station	1	11	10	4	9	12	8	13	2	3
ROUNDWORMS										
P. Nemata	-	-	-	-	-	-	-	8.61	-	-
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	-	-	-	-	-	-	-	-	-	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
Acalyptonotidae										
Acalyptonotus	-	17.2	-	17.2	68.9	51.7	43.1	94.7	-	-
F. Aturidae										
?Axonopsella	-	-	-	-	-	-	-	-	-	-
F. Hygrobatidae										
Hygrobates	-	17.2	34.4	-	-	34.4	17.2	8.6	-	-
F. Lebertiidae										
Lebertia	-	-	-	68.9	34.4	34.4	17.2	8.6	-	17.2
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	17.2	17.2	51.7	1,309	344	310	25.8	1,068	-	17.2
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
immature	-	17.2	-	-	-	-	-	-	-	-
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	-	-	-	-	-	34.4	-	-	-	-
S.F. Chironominae										
Chironomus	680	-	-	-	-	-	8.61	-	207	-
Micropsectra	-	-	-	-	-	86.1	-	25.8	-	-
Paratanytarsus	-	-	-	-	34.4	-	-	-	-	-
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	-	-	-	-	-
Stictochironomus	-	396	241	741	2,687	258	568	319	-	465
Tanytarsus	-	34.4	-	-	-	17.2	-	-	-	-
S.F. Diamesinae										
Protanypus	-	-	-	-	-	-	-	-	-	-
Pseudodiamesa	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	25.8	17.2	34.4	138	465	121	25.8	112	-	34.4
Eukiefferiella	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	8.6	-	-	-	-	-	-	-	-	-
Limnophyes	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	-	-	-	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	-	-	-	-	-	-	-	-	-
Zalutschia	-	-	-	-	-	17.2	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
S.F. Tanypodinae										
Arctopelopia	-	-	68.9	-	-	-	-	-	-	-
Procladius	86.1	189	68.9	172	241	809	155	250	17.2	-
SUMMARY METRICS										
Density (No. organisms per m^2)	818	706	499	2446	3875	1774	861	1894	224	534
Richness (total number of taxa)[a]	5	8	6	6	7	10	8	9	2	4
Simpson's Evenness (E)	0.37	0.695	0.85	0.735	0.575	0.798	0.602	0.709	0.284	0.314
Shannon-Wiener Diversity	0.907	1.84	2.17	1.7	1.52	2.35	1.65	1.93	0.391	0.748
Dominant Taxonomic Group Composition										
% Nemata	0	0	0	0	0	0	0	0.455	0	0
% Hydracarina	0	4.88	6.9	3.52	2.67	6.8	9	5.91	0	3.23
% Ostracods	2.11	2.44	10.3	53.5	8.89	17.5	3	56.4	0	3.23
% Chironomids	97.9	90.2	82.8	43	88.4	75.7	88	37.3	100	93.5
% Metal Sensitive Chironomids	0	4.88	0	0	0.889	5.98	0	1.36	0	0
Functional Feeding Group Composition										
% Collector - Gatherers	89.5	61	65.5	89.4	90.2	39.4	73	79.5	92.3	96.8
% Filterers	0	4.88	0	0	0.889	5.98	0	1.36	0	0
% Shredders	0	0	0	0	0	0.996	0	0	0	0
Habitat Preference Group Composition										
% Clingers	0	12.2	6.9	3.52	2.67	12.8	9	7.27	0	3.23
% Sprawlers	16.8	31.7	44.8	66.2	28	72.3	24	75.5	7.69	9.68
% Burrowers	83.2	56.1	48.3	30.3	69.3	14.9	67	17.3	92.3	87.1

Note: "-" indicates no taxa present.

[a] Bold entries excluded from taxa count.

Table F.35: Statistical Comparison of Benthic Invertebrate Community Metrics at Sheardown Lake SE (DL0-02) Littoral (Shallow) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2013), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2013	Pairwise Comparison
Density (Individuals/m^2)	ANOVA	none	YES	<0.001	2013	5	10,649	4,062	-	A
					2015	5	4,829	1,898	-1.4	BC
					2016	5	3,700	1,485	-1.7	BC
					2017	5	4,417	1,317	-1.5	BC
					2018	5	4,240	1,520	-1.6	BC
					2019	5	5,080	1,329	-1.4	BC
					2020	5	5,407	1,391	-1.3	BC
					2021	5	5,253	858	-1.3	BC
					2022	5	7,559	2,968	-0.76	AB
					2023	5	1,669	1,457	-2.2	C
Richness (Number of Taxa)	ANOVA	log10	YES	<0.001	2013	5	14.2	3.96	-	A
					2015	5	10.6	2.51	-0.99	AB
					2016	5	11.4	2.30	-0.71	AB
					2017	5	9.00	0.707	-1.5	BC
					2018	5	10.2	2.59	-1.1	AB
					2019	5	11.6	0.894	-0.60	AB
					2020	5	12.2	1.64	-0.44	AB
					2021	5	12.0	1.87	-0.51	AB
					2022	5	13.4	1.14	-0.099	A
					2023	5	6.40	1.14	-2.7	C
Simpson's Evenness (E)	ANOVA	none	YES	0.021	2013	5	0.785	0.0960	-	AB
					2015	5	0.759	0.123	-0.27	AB
					2016	5	0.772	0.0891	-0.14	AB
					2017	5	0.712	0.0547	-0.77	AB
					2018	5	0.704	0.131	-0.85	AB
					2019	5	0.826	0.0577	0.43	AB
					2020	5	0.826	0.0683	0.42	AB
					2021	5	0.811	0.0502	0.27	AB
					2022	5	0.886	0.0473	1.0	A
					2023	5	0.645	0.183	-1.5	B
Nemata (%)	K-W	rank	NO	0.320	2013	5	0.217	0.189	-	A
					2015	5	1.55	2.91	-2.2	A
					2016	5	1.06	1.29	3.7	A
					2017	5	0.473	0.637	0.054	A
					2018	5	0.557	0.476	4.4	A
					2019	5	1.07	1.30	9.1	A
					2020	5	0.366	0.733	-2.2	A
					2021	5	0.490	0.464	1.5	A
					2022	5	0.766	0.724	3.2	A
					2023	5	0	0	-2.2	A
Ostracoda (%)	K-W	rank	YES	0.092	2013	5	5.90	8.75	-	BCD
					2015	5	5.47	10.1	-[b]	BCD
					2016	5	1.74	2.52	-[b]	CD
					2017	5	0.838	0.815	-[b]	D
					2018	5	6.05	9.85	-[b]	ABCD
					2019	5	5.42	7.73	-[b]	ABCD
					2020	5	6.80	3.46	-[b]	AB
					2021	5	5.57	4.66	-[b]	ABC
					2022	5	10.6	7.98	-[b]	A
					2023	5	15.5	21.6	-[b]	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Contrast MODs could not be calculated because the MAD=0.

Table F.35: Statistical Comparison of Benthic Invertebrate Community Metrics at Sheardown Lake SE (DL0-02) Littoral (Shallow) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2013), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2013	Pairwise Comparison
Chironomidae (%)	K-W	rank	NO	0.143	2013	5	89.9	7.54	-	A
					2015	5	88.9	9.37	-0.48	A
					2016	5	95.4	3.90	0.86	A
					2017	5	95.6	1.84	0.50	A
					2018	5	92.4	9.99	0.91	A
					2019	5	90.3	9.16	-0.15	A
					2020	5	89.2	5.14	-1.9	A
					2021	5	89.7	5.20	-1.1	A
					2022	5	85.7	8.58	-3.2	A
					2023	5	80.5	21.6	-2.1	A
Metal Sensitive Chironomidae (%)	ANOVA	log10(x+1)	YES	0.010	2013	5	15.1	9.76	-	AB
					2015	5	12.7	10.4	-0.26	ABC
					2016	5	6.83	4.16	-0.86	BC
					2017	5	12.1	4.18	-0.29	ABC
					2018	5	12.1	8.87	-0.31	ABC
					2019	5	16.3	7.79	0.14	AB
					2020	5	12.3	6.48	-0.28	ABC
					2021	5	13.1	6.86	-0.19	ABC
					2022	5	21.9	8.85	0.69	A
					2023	5	1.15	2.12	-1.5	C
Collector Gatherers (%)	ANOVA	log10	YES	0.028	2013	5	44.6	8.22	-	B
					2015	5	59.0	10.6	1.6	AB
					2016	5	56.5	12.8	1.3	AB
					2017	5	48.4	18.8	0.24	B
					2018	5	52.5	11.1	0.88	AB
					2019	5	51.9	14.6	0.73	B
					2020	5	54.0	14.9	0.97	AB
					2021	5	54.9	5.52	1.2	AB
					2022	5	51.5	6.40	0.84	AB
					2023	5	79.1	14.6	3.2	A
Filterers (%)	ANOVA	log10(x+1)	YES	0.013	2013	5	15.1	9.76	-	AB
					2015	5	12.6	10.4	-0.27	ABC
					2016	5	6.66	4.42	-0.88	BC
					2017	5	12.1	4.18	-0.29	ABC
					2018	5	12.1	8.87	-0.31	ABC
					2019	5	16.3	7.79	0.14	AB
					2020	5	12.3	6.48	-0.28	ABC
					2021	5	13.0	7.03	-0.20	ABC
					2022	5	21.6	9.26	0.65	A
					2023	5	1.15	2.12	-1.5	C

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Contrast MODs could not be calculated because the MAD=0.

Table F.36: Statistical Comparison of Benthic Metrics at Sheardown Lake SE (DL0-02) Profundal (Deep) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2013), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]						
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2007	Effect Size (MOD) vs. Baseline Year 2013	Pairwise Comparison
Density (Individuals/m^2)	K-W	rank	YES	0.002	2007	3	4,998	348	-	-	AB
					2013	4	6,602	874	3.2	-	A
					2015	5	3,185	281	-4.1	-4.0	CD
					2017	5	3,234	880	-3.3	-3.6	BCD
					2018	5	3,209	2,747	-7.6	-5.9	DE
					2019	5	4,284	851	-2.5	-3.2	ABC
					2020	5	3,869	1,304	-3.9	-3.9	BCD
					2021	5	3,546	653	-3.6	-3.8	BCD
					2022	5	3,463	1,469	-5.3	-4.7	BCD
					2023	5	1,057	745	-9.6	-7.1	E
Richness (Number of Taxa)	ANOVA	none	YES	0.051	2007	3	9.00	2.78	-	-	AB
					2013	4	10.5	2.08	0.54	-	AB
					2015	5	8.80	1.79	-0.072	-0.82	AB
					2017	5	8.80	1.64	-0.072	-0.82	AB
					2018	5	8.40	2.19	-0.22	-1.0	AB
					2019	5	10.2	2.28	0.43	-0.14	AB
					2020	5	11.4	3.36	0.86	0.43	A
					2021	5	10.2	2.49	0.43	-0.14	AB
					2022	5	12.2	1.92	1.1	0.82	A
					2023	5	6.60	3.44	-0.86	-1.9	B
Simpson's Evenness (E)	K-W	rank	YES	0.039	2007	3	0.607	0.0927	-	-	BC
					2013	4	0.703	0.0395	1.6	-	AB
					2015	5	0.588	0.130	0.99	-1.1	BC
					2017	5	0.651	0.0862	0.80	-1.5	ABC
					2018	5	0.568	0.0501	-0.33	-3.7	C
					2019	5	0.706	0.149	2.4	1.5	AB
					2020	5	0.772	0.0994	3.1	2.9	A
					2021	5	0.759	0.135	3.1	3.0	A
					2022	5	0.789	0.134	3.2	3.1	A
					2023	5	0.541	0.232	0.30	-2.5	BC
Nemata (%)	K-W	rank	NO	0.693	2007	3	0.0301	0.0521	-	-	A
					2013	4	0.113	0.0944	-[b]	-	A
					2015	5	0.626	1.15	-[b]	-1.1	A
					2017	5	0	0	-[b]	-1.1	A
					2018	5	0.886	1.71	-[b]	-1.1	A
					2019	5	0.281	0.348	-[b]	0.39	A
					2020	5	0.183	0.181	-[b]	1.2	A
					2021	5	0.149	0.334	-[b]	-1.1	A
					2022	5	0.283	0.394	-[b]	-1.1	A
					2023	5	0.0909	0.203	-[b]	-1.1	A
Ostracoda (%)	K-W	rank	YES	0.024	2007	3	1.15	1.47	-	-	ABC
					2013	4	0.169	0.192	-0.63	-	C
					2015	5	0.506	0.388	-0.0035	3.7	C
					2017	5	1.03	1.44	-0.16	2.8	BC
					2018	5	0.803	1.29	-0.14	2.8	C
					2019	5	2.16	1.66	1.9	15	AB
					2020	5	5.29	5.11	8.0	50	A
					2021	5	3.34	3.13	4.2	28	AB
					2022	5	4.93	5.89	1.7	14	A
					2023	5	16.0	23.6	4.2	28	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Contrast MODs could not be calculated because the MAD=0.

Table F.36: Statistical Comparison of Benthic Metrics at Sheardown Lake SE (DL0-02) Profundal (Deep) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007, 2013), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]						
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2007	Effect Size (MOD) vs. Baseline Year 2013	Pairwise Comparison
Chironomidae (%)	K-W	rank	NO	0.212	2007	3	97.0	2.89	-	-	A
					2013	4	98.6	0.290	0.30	-	A
					2015	5	97.0	2.92	-0.17	-3.3	A
					2017	5	97.1	1.61	-0.38	-4.9	A
					2018	5	97.6	2.11	-0.65	-6.8	A
					2019	5	95.3	4.22	-0.40	-5.0	A
					2020	5	92.5	6.20	-4.0	-31	A
					2021	5	94.3	4.36	-2.4	-19	A
					2022	5	91.3	6.63	-4.2	-32	A
					2023	5	78.9	24.9	-5.9	-44	A
Metal Sensitive Chironomidae (%)	ANOVA	log10(x+1)	YES	0.011	2007	3	13.5	11.4	-	-	AB
					2013	4	16.8	2.78	0.32	-	AB
					2015	5	7.99	4.66	-0.48	-3.3	AB
					2017	5	12.3	9.50	-0.10	-1.7	AB
					2018	5	5.90	3.50	-0.68	-4.1	AB
					2019	5	16.9	10.9	0.30	-0.11	A
					2020	5	19.9	4.72	0.58	1.1	A
					2021	5	15.0	5.73	0.16	-0.67	AB
					2022	5	17.8	14.8	0.35	0.11	A
					2023	5	1.47	2.59	-1.1	-5.9	B
Collector Gatherers (%)	ANOVA	none	NO	0.380	2007	3	74.1	15.7	-	-	A
					2013	4	64.9	7.51	-0.58	-	A
					2015	5	60.2	22.9	-0.89	-0.63	A
					2017	5	45.1	17.4	-1.8	-2.6	A
					2018	5	63.8	22.4	-0.65	-0.15	A
					2019	5	52.6	26.8	-1.4	-1.6	A
					2020	5	52.5	14.5	-1.4	-1.7	A
					2021	5	59.2	13.2	-0.95	-0.76	A
					2022	5	58.4	18.9	-1.00	-0.87	A
					2023	5	76.2	22.7	0.13	1.5	A
Filterers (%)	ANOVA	log10(x+1)	YES	0.016	2007	3	13.4	11.5	-	-	AB
					2013	4	16.8	2.78	0.33	-	AB
					2015	5	7.82	4.70	-0.49	-3.4	AB
					2017	5	12.2	9.56	-0.10	-1.8	AB
					2018	5	5.90	3.50	-0.67	-4.1	AB
					2019	5	16.9	10.9	0.30	-0.12	A
					2020	5	19.7	4.68	0.57	1.0	A
					2021	5	14.9	5.59	0.15	-0.73	AB
					2022	5	16.9	15.4	0.27	-0.24	AB
					2023	5	1.47	2.59	-1.1	-5.9	B

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Contrast MODs could not be calculated because the MAD=0.

Table F.37: Replicate Grab Data for Benthic Invertebrate Community Samples Collected at the Mary River (G0, E0, C0), Mary River Project CREMP, August 2023

Study Area	Station	Water Depth (cm)			Water Velocity (m/s)			Embeddedness			In-Stream Vegetation			Algae Presence		
		Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3
Mary River Upstream Reference (G0-09)	G0-09-B1	23	19	20	0.19	0.19	0.24	0%	25%	75%	Sparse bryophytes	None	None	Sparse	None	None
	G0-09-B2	22	23	22	0.12	0.18	0.22	25%	50%	0%	Sparse bryophytes	None	Sparse bryophytes	Sparse	None	Sparse
	G0-09-B3	22	21	22	0.15	0.19	0.15	0%	25%	25%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	G0-09-B4	23	22	21	0.18	0.18	0.24	25%	50%	25%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Sparse
	G0-09-B5	26	24	23	0.10	0.20	0.17	100%	75%	25%	None	None	None	None	None	None
Mary River Upstream (G0-03)	G0-03-B1	19	22	23	0.20	0.22	0.23	25%	50%	75%	None	None	None	None	None	None
	G0-03-B2	22	21	20	0.24	0.20	0.16	100%	25%	50%	None	None	None	None	Sparse	None
	G0-03-B3	22	20	23	0.17	0.16	0.20	25%	50%	25%	None	None	None	None	None	None
	G0-03-B4	22	24	21	0.25	0.25	0.21	25%	25%	-	-	-	-	-	-	-
	G0-03-B5	22	21	17	0.15	0.20	0.19	-	-	-	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	None	None	None
Mary River Upper Mine-Exposed (E0-01)	E0-01-B1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E0-01-B2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E0-01-B3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E0-01-B4	18	20	21	0.36	0.40	0.48	25%	25%	25%	None	None	None	Sparse	Sparse	Sparse
	E0-01-B5	15	17	18	0.41	0.49	0.41	25%	25%	25%	None	None	None	None	None	None
Mary River Middle Mine-Exposed (E0-20)	E0-20-B1	22	23	23	0.40	0.30	0.27	50%	75%	75%	None	None	-	None	None	-
	E0-20-B2	18	23	26	0.27	0.29	0.35	75%	75%	75%	None	None	None	None	None	None
	E0-20-B3	17	19	19	0.55	0.31	0.31	25%	50%	25%	None	None	None	None	None	None
	E0-20-B4	14	16	17	0.38	0.42	0.33	75%	75%	75%	None	None	None	None	None	None
	E0-20-B5	20	15	16	0.37	0.56	0.45	50%	50%	50%	None	None	None	None	None	None
Mary River Lower Mine-Exposed (C0-05)	C0-05-B1	17	17	15	0.49	0.49	0.39	0%	100%	100%	None	None	None	Sparse	Sparse	Sparse
	C0-05-B2	19	20	15	0.50	0.50	0.31	25%	0%	0%	None	None	None	Sparse	Sparse	Common
	C0-05-B3	17	15	19	0.45	0.44	0.45	0%	0%	0%	None	None	None	Sparse	Sparse	Sparse
	C0-05-B4	17	18	18	0.35	0.34	0.30	0%	25%	25%	None	None	None	Sparse	Sparse	Sparse
	C0-05-B5	17	20	16	0.38	0.42	0.46	25%	50%	100%	None	None	None	Sparse	Sparse	Sparse

Note: "-" indicates no data available.

Table F.38: Replicate Station Habitat Feature Summary Statistics for Mary River (G0, E0, C0) Benthic Stations, Mary River Project CREMP, August 2023

Metric	Study Area	Sample Size (n)	Mean	Median	Standard Deviation	Standard Error	Minimum	Maximum
Water Depth (cm)	G0-09 Reference Area	5	22.1	22	1.57	0.70	19	25.5
	G0-03 Upstream Area	5	21.2	22	1.75	0.78	17	23.5
	E0-01 Upper Mine-Exposed Area	2	18.2	18	2.14	1.51	15	21
	E0-20 Middle Mine-Exposed Area	5	19.2	19	3.53	1.58	14	26
	C0-05 Lower Mine-Exposed Area	5	17.3	17	1.65	0.74	15	20
Water Velocity (m/s)	G0-09 Reference Area	5	0.18	0.18	0.04	0.02	0.1	0.24
	G0-03 Upstream Area	5	0.20	0.2	0.03	0.01	0.15	0.25
	E0-01 Upper Mine-Exposed Area	2	0.43	0.41	0.05	0.04	0.36	0.49
	E0-20 Middle Mine-Exposed Area	5	0.37	0.35	0.09	0.04	0.27	0.56
	C0-05 Lower Mine-Exposed Area	5	0.42	0.44	0.07	0.03	0.3	0.5
Substrate Embeddedness (%)	G0-09 Reference Area	5	0.35	0.25	0.30	0.13	0	1.0
	G0-03 Upstream Area	5	0.43	0.25	0.25	0.11	0.25	1.0
	E0-01 Upper Mine-Exposed Area	2	0.25	0.25	0.00	0.00	0.25	0.25
	E0-20 Middle Mine-Exposed Area	5	0.60	0.75	0.18	0.08	0.25	0.75
	C0-05 Lower Mine-Exposed Area	5	0.30	0.25	0.39	0.18	0.00	1.0

Table F.39: Benthic Station Habitat Feature Statistical Comparisons Among Mary River Reference (G0-09) and Mine-Exposed Study Areas, Mary River Project CREMP, August 2023

Metric	Overall 5-Area Comparison				Pair-wise, *post hoc* comparisons			
	Statistical Test [a]	Transformation	Significant Difference between Areas?	p-value	Study Area	Mean	Standard Deviation	Pairwise Comparison
Water Depth (cm)	ANOVA	none	YES	0.004	G0-09	22.100	1.347	A
					G0-03	21.200	0.811	A
					E0-01	18.167	2.121	AB
					E0-20	19.200	3.159	AB
					C0-05	17.300	0.628	B
Water Velocity (m/s)	ANOVA	none	YES	0.001	G0-09	0.180	0.022	B
					G0-03	0.202	0.025	B
					E0-01	0.425	0.016	A
					E0-20	0.371	0.062	A
					C0-05	0.418	0.051	A
Substrate Embeddedness (%)	ANOVA	none	NO	0.193	G0-09	0.350	0.190	A
					G0-03	0.417	0.152	A
					E0-01	0.250	<0.001	A
					E0-20	0.600	0.181	A
					C0-05	0.300	0.304	A

Indicates a significant difference for respective comparison (p-value≤ 0.05).

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD)*post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

Table F.40: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for the Mary River Upstream Reference (G0-09) Study Area, August 2023

Waterbody	Mary River Upstream Reference (G0-09)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	-	3.6	-	3.58	-
	-	-	-	-	-
ANNELIDS	-	-	-	-	-
P. Annelida	-	-	-	-	-
WORMS	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-
F. Enchytraeidae	-	-	-	-	-
	-	-	-	-	-
ARTHROPODS	-	-	-	-	-
P. Arthropoda	-	-	-	-	-
MITES	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-
O. Acarina	-	-	-	-	-
F. Sperchonidae	-	-	-	-	-
Sperchon	-	3.6	3.6	3.6	-
SEED SHRIMPS	-	-	-	-	-
Cl. Ostracoda	-	-	-	-	-
SPRINGTAILS	-	-	-	-	-
Cl. Entognatha	-	-	-	-	-
O. Collembola	-	-	-	-	-
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
BEETLES	-	-	-	-	-
O. Coleoptera	-	-	-	-	-
F. Staphylinidae	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
Acentrella feropagus	-	-	-	-	-
STONEFLIES	-	-	-	-	-
O. Plecoptera	-	-	-	-	-
F. Capniidae	-	-	-	-	-
immature	-	-	-	-	-
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-
indeterminate	-	-	-	-	-
MIDGES	-	-	-	-	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	**32.2**	**60.9**	**89.6**	**50.2**	**39.4**
S.F. Diamesinae	-	-	-	-	-
Diamesa	3.6	14.3	17.9	28.7	7.2
Pseudokiefferiella	3.6	10.7	3.6	182.7	7
S.F. Orthocladiinae	-	-	-	-	-
Cardiocladius	-	3.6	-	17.92	3.6
Chaetocladius	-	3.58	-	-	-
Corynoneura	-	3.58	-	-	-
Cricotopus	-	-	-	10.7	-
Cricotopus/Orthocladius	43.0	57.3	82.4	50.17	17.92
Diplocladius	-	-	-	-	-
Eukiefferiella	-	-	-	-	3.6
Hydrobaenus	-	3.6	3.6	-	3.6
Hydrosmittia	-	-	-	-	-
Krenosmittia	-	-	-	3.6	-
Limnophyes	-	-	-	-	-
Metriocnemus	-	-	-	-	-
Orthocladius (Euorthocladius)	25.1	60.9	111.1	103.9	46.58
Parakiefferiella	-	-	-	-	-
Paraphaenocladius	-	-	-	-	-
Rheocricotopus	-	-	-	-	-
Tokunagaia	3.6	7.2	3.6	17.9	-
Tvetenia	-	-	-	-	-
indeterminate	-	3.60	-	-	-
S.F. Podonominae	-	-	-	-	-
Trichotanypus	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-
F. Empididae	-	-	-	-	-
Clinocera	-	-	3.60	-	-
F. Simuliidae	-	-	-	-	-
Gymnopais	154.08	146.9	311.7	193.50	75.2
Helodon irkutensis	-	-	-	-	3.6
Metacnephia	-	-	-	-	-
Prosimulium	-	-	-	-	-
indeterminate pupae	-	-	-	-	-
F. Limoniidae	-	-	-	-	-
Erioptera	-	-	-	-	-
Symplecta =Ormosia	-	-	-	-	-
F. Tipulidae	-	-	-	-	-
Tipula	-	3.6	7.2	3.6	-
SUMMARY METRICS					
Density (No. organisms per m^2)	265	387	638	670	208
Richness (total number of taxa)[a]	5	13	9	11	7
Simpson's Evenness (E)	0.663	0.734	0.650	0.831	0.758
Dominant Group Composition					
% Nemata	0	0.926	0	0.535	0
% Oligochaeta	0	0	0	0	0
% Acari	0	0.926	0.562	0.535	0
% Ostracods	0	0	0	0	0
% Chironomids	41.9	59.3	48.9	69.5	62.1
% Metal Sensitive Chironmids	3.81	8.83	4.73	35.4	9.93
% Simuliidae	58.1	38.0	48.9	28.9	37.9
% Tipulidae	0	0.926	1.12	0.535	0
Functional Feeding Group Composition					
% Collector - Gatherers	41.9	58.9	48.9	64.5	59.6
% Filterers	0	0	0	0	0
% Shredders	0	0.926	1.12	3.12	0
Habitat Preference Group Composition					
% Clingers	58.1	38.9	50.0	32.0	37.9
% Sprawlers	41.9	58.0	48.9	63.9	59.6
% Burrowers	0	3.11	1.12	4.07	2.48

Note: **"-"** indicates no taxa present.

[a] Bold entries excluded from taxa count.

Table F.41: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for the Mary River Upstream of the Mine (G0-03) Study Area, August 2023

Waterbody	Mary River Upstream Reference (G0-03)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	-	7.17	-	-	-
	-	-	-	-	-
ANNELIDS	-	-	-	-	-
P. Annelida	-	-	-	-	-
WORMS	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-
F. Enchytraeidae	-	-	-	3.58	-
	-	-	-	-	-
ARTHROPODS	-	-	-	-	-
P. Arthropoda	-	-	-	-	-
MITES	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-
O. Acarina	-	-	-	-	-
Sperchonidae	-	-	-	-	-
Sperchon	-	3.58	-	-	-
SEED SHRIMPS	-	-	-	-	-
Cl. Ostracoda	-	-	-	-	-
SPRINGTAILS	-	-	-	-	-
Cl. Entognatha	-	-	-	-	-
O. Collembola	-	-	-	-	-
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
BEETLES	-	-	-	-	-
O. Coleoptera	-	-	-	-	-
F. Staphylinidae	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
Acentrella feropagus	-	-	-	-	-
STONEFLIES	-	-	-	-	-
O. Plecoptera	-	-	-	-	-
F. Capniidae	-	-	-	-	-
immature	-	-	-	-	-
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
NG-MIDGE	-	-	-	-	-
eratopogonidae	-	-	-	-	-
indeterminate	-	3.58	-	-	-
MIDGES	-	-	-	-	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	**121.8**	**125.4**	**107.50**	**121.8**	**415.66**
S.F. Diamesinae	-	-	-	-	-
Diamesa	14.3	-	-	3.6	3.6
Pseudokiefferiella	7.2	7.2	3.6	17.9	14.3
S.F. Orthocladiinae	-	-	-	-	-
Cardiocladius	10.7	-	3.58	14.33	-
Chaetocladius	-	-	-	-	-
Corynoneura	-	3.60	-	-	-
Cricotopus	-	-	-	-	-
Cricotopus/Orthocladius	10.75	35.83	17.92	7.17	3.60
Diplocladius	-	-	-	-	-
Eukiefferiella	-	-	-	-	-
Hydrobaenus	-	-	-	-	-
Hydrosmittia	-	-	-	-	-
Krenosmittia	-	-	-	-	-
Limnophyes	-	-	-	-	-
Metriocnemus	-	-	-	-	-
Orthocladius (Euorthocladius)	-	21.50	17.92	7.17	21.50
Parakiefferiella	-	-	-	-	-
Paraphaenocladius	-	-	-	-	-
Rheocricotopus	-	-	-	-	-
Tokunagaia	-	3.6	3.60	-	-
Tvetenia	-	-	-	-	-
indeterminate	-	-	-	-	-
S.F. Podonominae	-	-	-	-	-
Trichotanypus	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-
F. Empididae	-	-	-	-	-
Clinocera	3.60	-	3.60	7.17	-
F. Simuliidae	-	-	-	-	-
Gymnopais	17.92	7.17	14.33	14.33	32.25
Helodon irkutensis	-	7.17	-	3.60	7.17
Metacnephia	-	-	-	10.75	7.17
Prosimulium	-	-	-	-	7.17
indeterminate pupae	3.6	-	-	-	-
F. Limoniidae	-	-	-	-	-
Erioptera	-	-	-	-	-
Symplecta =Ormosia	-	-	-	-	-
F. Tipulidae	-	-	-	-	-
Tipula	3.6	-	3.6	3.6	7.17
SUMMARY METRICS					
Density (No. organisms per m^2)	194	226	176	215	520
Richness (total number of taxa)[a]	8	8	7	8	6
Simpson's Evenness (E)	0.913	0.566	0.610	0.904	0.762
Dominant Group Composition					
% Nemata	0	3.17	0	0	0
% Oligochaeta	0	0	0	1.67	0
% Acari	0	1.59	0	0	0
% Ostracods	0	0	0	0	0
% Chironomids	85.2	87.3	87.8	80.0	88.3
% Metal Sensitive Chironmids	42.6	8.73	6.75	34.3	36.8
% Simuliidae	11.1	6.35	8.16	13.3	10.3
% Tipulidae	1.85	0	2.04	1.67	1.38
Functional Feeding Group Composition					
% Collector - Gatherers	42.6	90.5	81.0	58.8	88.3
% Filterers	1.85	0	0	0	1.88
% Shredders	23.1	0	2.04	1.67	1.38
Habitat Preference Group Composition					
% Clingers	34.3	7.94	10.2	16.7	10.3
% Sprawlers	42.6	87.3	81.0	57.1	88.3
% Burrowers	23.1	4.76	8.79	26.2	1.38

Note: **"-"** indicates no taxa present.

[a] Bold entries excluded from taxa count.

Table F.42: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for the Mary River Upper Mine-Exposed (E0-01) Study Area, August 2023

Waterbody	Mary River Upper Mine-Exposed (E0-01)						
Station	B1	B2	B3	B4	B4-2	B5	B5-2
ROUNDWORMS	-	-	-	-	-	-	-
P. Nemata	3.58	7.17	3.58	-	-	-	-
	-	-	-	-	-	-	-
ANNELIDS	-	-	-	-	-	-	-
P. Annelida	-	-	-	-	-	-	-
WORMS	-	-	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-	-	-
F. Enchytraeidae	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
ARTHROPODS	-	-	-	-	-	-	-
P. Arthropoda	-	-	-	-	-	-	-
MITES	-	-	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-	-	-
O. Acarina	-	-	-	-	-	-	-
F. Sperchonidae	-	-	-	-	-	-	-
Sperchon	3.6	-	7.17	-	7.17	7.17	-
SEED SHRIMPS	-	-	-	-	-	-	-
Cl. Ostracoda	-	-	-	-	-	-	-
SPRINGTAILS	-	-	-	-	-	-	-
Cl. Entognatha	-	-	-	-	-	-	-
O. Collembola	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
INSECTS	-	-	-	-	-	-	-
Cl. Insecta	-	-	-	-	-	-	-
BEETLES	-	-	-	-	-	-	-
O. Coleoptera	-	-	-	-	-	-	-
F. Staphylinidae	-	-	-	-	-	-	-
MAYFLIES	-	-	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-	-	-
F. Baetidae	-	-	-	-	-	-	-
Acentrella feropagus	-	3.60	3.60	-	-	-	3.6
STONEFLIES	-	-	-	-	-	-	-
O. Plecoptera	-	-	-	-	-	-	-
F. Capniidae	-	-	-	-	-	-	-
immature	-	-	-	-	-	-	-
TRUE FLIES	-	-	-	-	-	-	-
O. Diptera	-	-	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-	-	-
indeterminate	-	-	-	3.60	-	3.60	-
MIDGES	-	-	-	-	-	-	-
F. Chironomidae	-	-	-	-	-	-	-
chironomid pupae	-	**7.17**	**14.33**	**7.17**	-	**7.17**	**10.75**
S.F. Diamesinae	-	-	-	-	-	-	-
Diamesa	14.33	7.17	64.50	-	10.7	-	32.25
Pseudokiefferiella	-	-	10.75	3.6	3.6	-	14.3
S.F. Orthocladiinae	-	-	-	-	-	-	-
Cardiocladius	7.17	7.17	43.00	3.60	-	-	10.75
Chaetocladius	-	-	-	-	-	-	-
Cricotopus	-	3.60	3.60	-	7.17	-	-
Cricotopus/Orthocladius	-	-	3.60	-	-	-	7.17
Diplocladius	-	-	-	-	-	-	3.60
Eukiefferiella	3.58	10.75	14.33	-	-	-	-
Hydrobaenus	-	-	-	-	-	-	-
Hydrosmittia	-	-	-	-	-	-	-
Krenosmittia	-	-	-	-	-	-	7.17
Limnophyes	-	-	-	-	-	-	-
Metriocnemus	-	-	-	-	-	-	-
Orthocladius (Euorthocladius)	3.60	3.60	7.17	-	-	-	3.60
Parakiefferiella	-	-	-	-	-	-	-
Paraphaenocladius	-	-	-	-	-	-	-
Rheocricotopus	-	-	-	-	-	-	-
Tokunagaia	7.2	-	-	-	3.6	-	-
Tvetenia	-	-	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-
S.F. Podonominae	-	-	-	-	-	-	-
Trichotanypus	-	-	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-	-	-
F. Empididae	-	-	-	-	-	-	-
Clinocera	7.17	14.33	7.17	-	3.60	3.60	3.60
F. Simuliidae	-	-	-	-	-	-	-
Gymnopais	-	-	3.60	-	-	-	-
Helodon irkutensis	-	-	-	-	3.60	-	-
Metacnephia	-	3.60	-	-	-	-	-
Prosimulium	-	-	-	-	-	-	-
indeterminate pupae	3.60	-	-	-	7.17	-	-
F. Limoniidae	-	-	-	-	-	-	-
Erioptera	-	-	-	-	-	-	-
Symplecta =Ormosia	-	-	-	-	-	-	-
F. Tipulidae	-	-	-	-	-	-	-
Tipula	7.17	-	7.17	3.60	3.60	7.17	-
SUMMARY METRICS							
Density (No. organisms per m^2)	60.9	68.1	194	-	50.2	-	96.8
Richness (total number of taxa)[a]	10	9	12	-	8	-	8
Simpson's Evenness (E)	0.969	0.968	0.859	-	0.968	-	0.897
Dominant Group Composition							
% Nemata	5.88	10.5	1.85	-	0	-	0
% Oligochaeta	0	0	0	-	0	-	0
% Acari	5.88	0	3.70	-	14.3	-	0
% Ostracods	0	0	0	-	0	-	0
% Chironomids	58.8	57.9	83.3	-	50.0	-	92.6
% Simuliidae	5.88	5.26	1.85	-	21.4	-	0
% Tipulidae	11.8	0	3.70	-	7.14	-	0
Functional Feeding Group Composition							
% Collector - Gatherers	52.9	54.4	59.9	-	35.7	-	83.7
% Filterers	5.88	0	0	-	21.4	-	0
% Shredders	11.8	6.43	6.41	-	21.4	-	0
Habitat Preference Group Composition							
% Clingers	23.5	32.8	12.0	-	57.1	-	3.70
% Sprawlers	47.1	43.9	58.1	-	35.7	-	83.7
% Burrowers	29.4	23.4	29.9	-	7.14	-	12.6

Note: "-" indicates no taxa present.

[a] Bold entries excluded from taxa count.

Table F.43: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for the Mary River Middle Mine-Exposed (E0-20) Study Area, August 2023

Waterbody	Mary River Middle Mine-Exposed (E0-20)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	3.6	-	-	3.60	17.92
	-	-	-	-	-
ANNELIDS	-	-	-	-	-
P. Annelida	-	-	-	-	-
WORMS	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-
F. Enchytraeidae	-	-	3.60	-	-
	-	-	-	-	-
ARTHROPODS	-	-	-	-	-
P. Arthropoda	-	-	-	-	-
MITES	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-
O. Acarina	-	-	-	-	-
F. Sperchonidae	-	-	-	-	-
Sperchon	-	3.6	-	-	-
SEED SHRIMPS	-	-	-	-	-
Cl. Ostracoda	-	-	-	-	-
SPRINGTAILS	-	-	-	-	-
Cl. Entognatha	-	-	-	-	-
O. Collembola	-	-	-	-	-
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
BEETLES	-	-	-	-	-
O. Coleoptera	-	-	-	-	-
F. Staphylinidae	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
Acentrella feropagus	-	-	-	-	3.60
STONEFLIES	-	-	-	-	-
O. Plecoptera	-	-	-	-	-
F. Capniidae	-	-	-	-	-
immature	-	-	-	-	-
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-
indeterminate	-	-	-	-	3.60
MIDGES	-	-	-	-	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	**61**	**103.9**	**64.5**	**68.1**	**89.6**
S.F. Diamesinae	-	-	-	-	-
Diamesa	7.2	21.50	17.9	3.58	53.7
Pseudokiefferiella	4	-	3.60	3.6	-
S.F. Orthocladiinae	-	-	-	-	-
Cardiocladius	7.17	-	28.67	3.60	25.08
Chaetocladius	-	-	-	-	-
Cricotopus	-	-	3.60	-	3.60
Cricotopus/Orthocladius	57	17.9	7.17	7.2	28.7
Diplocladius	-	-	-	-	-
Eukiefferiella	-	-	-	-	-
Hydrobaenus	-	-	3.60	-	-
Hydrosmittia	-	-	-	-	-
Krenosmittia	3.60	3.60	-	-	-
Limnophyes	-	-	-	-	7.17
Metriocnemus	-	-	-	-	-
Orthocladius (Euorthocladius)	17.92	10.75	-	3.60	17.9
Parakiefferiella	-	-	-	-	-
Paraphaenocladius	-	-	-	-	-
Rheocricotopus	-	-	-	-	-
Tokunagaia	3.6	-	-	-	-
Tvetenia	3.6	3.6	-	-	17.92
indeterminate	-	-	-	-	-
S.F. Podonominae	-	-	-	-	-
Trichotanypus	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-
F. Empididae	-	-	-	-	-
Clinocera	-	-	3.60	7.17	46.58
F. Simuliidae	-	-	-	-	-
Gymnopais	3.60	3.60	3.60	3.60	-
Helodon irkutensis	7.17	28.67	7.17	-	17.92
Metacnephia	-	10.7	-	-	43.00
Prosimulium	-	-	-	-	-
indeterminate pupae	-	-	-	-	3.60
F. Limoniidae	-	-	-	-	-
Erioptera	-	-	-	-	-
Symplecta =Ormosia	-	-	-	-	-
F. Tipulidae	-	-	-	-	-
Tipula	7.17	7.2	7.17	-	14.33
SUMMARY METRICS					
Density (No. organisms per m^2)	186	215	154	104	394
Richness (total number of taxa)[a]	10	7	9	7	12
Simpson's Evenness (E)	0.637	0.857	0.872	0.869	0.942
Dominant Group Composition					
% Nemata	1.92	0	0	3.45	4.55
% Oligochaeta	0	0	2.33	0	0
% Acari	0	1.67	0	0	0
% Ostracods	0	0	0	0	0
% Chironomids	88.5	75.0	83.7	86.2	61.8
% Simuliidae	5.77	20.0	6.98	3.45	16.4
% Tipulidae	3.85	3.33	4.65	0	3.64
Functional Feeding Group Composition					
% Collector - Gatherers	84.3	75.0	34.9	75.3	53.9
% Filterers	0	0	0	0	16.4
% Shredders	3.85	3.33	18.6	0	6.99
Habitat Preference Group Composition					
% Clingers	5.77	21.7	23.3	10.3	31.5
% Sprawlers	82.4	75.0	32.6	71.8	49.3
% Burrowers	11.9	3.33	44.2	17.8	19.1

Note: "-" indicates no taxa present.

[a] Bold entries excluded from taxa count.

Table F.44: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for the Mary River Lower Mine-Exposed (C0-05) Study Area, August 2023

Waterbody	Mary River Lower Mine-Exposed (C0-05)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	3.60	14.33	17.9	10.7	14
	-	-	-	-	-
ANNELIDS	-	-	-	-	-
P. Annelida	-	-	-	-	-
WORMS	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-
F. Enchytraeidae	-	3.6	14.3	10.7	-
	-	-	-	-	-
ARTHROPODS	-	-	-	-	-
P. Arthropoda	-	-	-	-	-
MITES	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-
O. Acarina	-	-	-	-	-
immature	3.60	-	-	-	-
F. Sperchonidae	-	-	-	-	-
Sperchon	3.6	-	7.17	10.75	3.60
SEED SHRIMPS	-	-	-	-	-
Cl. Ostracoda	-	-	3.60	3.60	7.17
SPRINGTAILS	-	-	-	-	-
Cl. Entognatha	-	-	-	-	-
O. Collembola	-	-	-	-	-
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
BEETLES	-	-	-	-	-
O. Coleoptera	-	-	-	-	-
F. Staphylinidae	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
Acentrella feropagus	7.17	14.33	7.17	7.17	7.17
STONEFLIES	-	-	-	-	-
O. Plecoptera	-	-	-	-	-
F. Capniidae	-	-	-	-	-
immature	-	-	-	-	-
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-
indeterminate	-	-	-	-	-
MIDGES	-	-	-	-	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	**14.3**	**7.2**	-	**3.60**	**14.3**
S.F. Diamesinae	-	-	-	-	-
Diamesa	7.17	-	-	3.60	-
Pseudokiefferiella	39.4	258.00	93.2	290.24	698.74
S.F. Orthocladiinae	-	-	-	-	-
Cardiocladius	43.00	21.50	14.33	-	50.17
Chaetocladius	-	-	-	-	-
Cricotopus	7.17	21.50	10.75	60.92	121.83
Cricotopus/Orthocladius	10.7	10.7	10.7	10.70	28.7
Diplocladius	-	-	-	-	-
Eukiefferiella	-	-	-	3.60	-
Hydrobaenus	-	-	10.7	43.00	-
Hydrosmittia	-	3.6	-	28.7	-
Krenosmittia	-	-	-	-	-
Limnophyes	-	-	-	3.60	-
Metriocnemus	-	-	-	-	-
Orthocladius (Euorthocladius)	-	-	3.60	3.60	7.17
Parakiefferiella	-	-	-	7.17	-
Paraphaenocladius	-	-	4	10.7	-
Thienemanniella	-	-	-	-	7
Rheocricotopus	-	-	-	-	-
Tokunagaia	-	3.60	-	-	-
Tvetenia	7.2	43.0	93.2	60.92	57.33
indeterminate	-	-	-	-	-
S.F. Podonominae	-	-	-	-	-
Trichotanypus	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-
Thienemannimyia complex	-	3.60	3.60	-	7.17
F. Empididae	-	-	-	-	-
Clinocera	3.60	10.75	7.17	-	3.60
F. Simuliidae	-	-	-	-	-
Gymnopais	3.60	-	3.60	-	3.60
Helodon irkutensis	10.70	3.60	3.60	3.60	75.25
Metacnephia	7.17	-	-	3.60	7.17
Prosimulium	-	-	-	3.60	-
indeterminate pupae	7.17	-	10.75	-	35.83
F. Limoniidae	-	-	-	-	-
Erioptera	-	-	-	-	-
Symplecta =Ormosia	-	-	-	-	-
F. Tipulidae	-	-	-	-	-
Tipula	-	14.33	-	7.17	7.17
SUMMARY METRICS					
Density (No. organisms per m^2)	179	434	319	591	1,158
Richness (total number of taxa)[a]	11	12	16	17	15
Simpson's Evenness (E)	0.914	0.663	0.867	0.758	0.636
Dominant Group Composition					
% Nemata	2.00	3.31	5.62	1.82	1.24
% Oligochaeta	0	0.826	4.49	1.82	0
% Acari	4.00	0	2.25	1.82	0.310
% Ostracods	0	0	1.12	0.606	0.619
% Chironomids	72.0	86.0	76.4	89.7	85.8
% Simuliidae	16.0	0.826	5.62	1.82	10.5
% Tipulidae	0	3.31	0	1.21	0.619
Functional Feeding Group Composition					
% Collector - Gatherers	39.8	79.5	78.4	81.3	70.2
% Filterers	10.7	0	4.21	1.82	9.57
% Shredders	11.2	11.2	5.90	15.0	13.7
Habitat Preference Group Composition					
% Clingers	33.2	11.2	16.0	17.4	24.2
% Sprawlers	37.8	76.2	69.4	77.7	69.5
% Burrowers	29.0	12.7	14.6	4.85	6.26

Note: **"-"** indicates no taxa present.

[a] Bold entries excluded from taxa count.

Table F.45: Benthic Invertebrate Community Summary Statistics for Mary River, Mary River Project CREMP, August 2023

Metric	Area	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
Density (org/m^2)	G0-09 Reference Area	434	212	94.7	208	387	670
	G0-03 Upstream Area	266	143	64.0	176	215	520
	E0-01 Upper Mine-Exposed Area	93.9	58.3	26.1	50.2	68.1	194
	E0-20 Middle Mine-Exposed Area	211	111	49.5	104	186	394
	C0-05 Lower Mine-Exposed Area	536	379	169	179	434	1,158
Richness (#Taxa)	G0-09 Reference Area	9.00	3.16	1.41	5.00	9.00	13.0
	G0-03 Upstream Area	7.40	0.894	0.400	6.00	8.00	8.00
	E0-01 Upper Mine-Exposed Area	9.40	1.67	0.748	8.00	9.00	12.0
	E0-20 Middle Mine-Exposed Area	9.00	2.12	0.949	7.00	9.00	12.0
	C0-05 Lower Mine-Exposed Area	14.2	2.59	1.16	11.0	15.0	17.0
Simpson's E (Krebs)	G0-09 Reference Area	0.727	0.0740	0.0331	0.650	0.734	0.831
	G0-03 Upstream Area	0.751	0.161	0.0721	0.566	0.762	0.913
	E0-01 Upper Mine-Exposed Area	0.932	0.0512	0.0229	0.859	0.968	0.969
	E0-20 Middle Mine-Exposed Area	0.836	0.116	0.0519	0.637	0.869	0.942
	C0-05 Lower Mine-Exposed Area	0.768	0.122	0.0547	0.636	0.758	0.914
% Nemata (% of community)	G0-09 Reference Area	0.292	0.423	0.189	0	0	0.926
	G0-03 Upstream Area	0.635	1.42	0.635	0	0	3.17
	E0-01 Upper Mine-Exposed Area	3.65	4.53	2.03	0	1.85	10.5
	E0-20 Middle Mine-Exposed Area	1.98	2.04	0.911	0	1.92	4.55
	C0-05 Lower Mine-Exposed Area	2.80	1.75	0.782	1.24	2.00	5.62
% Hydracarina (% of community)	G0-09 Reference Area	0.404	0.400	0.179	0	0.535	0.926
	G0-03 Upstream Area	0.317	0.710	0.317	0	0	1.59
	E0-01 Upper Mine-Exposed Area	4.77	5.88	2.63	0	3.70	14.3
	E0-20 Middle Mine-Exposed Area	0.333	0.745	0.333	0	0	1.67
	C0-05 Lower Mine-Exposed Area	1.67	1.61	0.722	0	1.82	4.00
% Chironomidae (% of community)	G0-09 Reference Area	56.3	10.9	4.90	41.9	59.3	69.5
	G0-03 Upstream Area	85.7	3.40	1.52	80.0	87.3	88.3
	E0-01 Upper Mine-Exposed Area	68.5	18.4	8.21	50.0	58.8	92.6
	E0-20 Middle Mine-Exposed Area	79.0	10.9	4.87	61.8	83.7	88.5
	C0-05 Lower Mine-Exposed Area	82.0	7.42	3.32	72.0	85.8	89.7
% Metal Sensitive Chironomidae (% of community)	G0-09 Reference Area	12.5	13.0	5.82	3.81	8.83	35.4
	G0-03 Upstream Area	25.8	16.8	7.51	6.75	34.3	42.6
	E0-01 Upper Mine-Exposed Area	32.5	16.4	7.34	12.9	28.6	54.7
	E0-20 Middle Mine-Exposed Area	23.1	8.32	3.72	9.15	27.9	28.7
	C0-05 Lower Mine-Exposed Area	46.1	16.0	7.16	29.2	50.0	61.3
% Tipulidae (% of community)	G0-09 Reference Area	0.517	0.517	0.231	0	0.535	1.12
	G0-03 Upstream Area	1.39	0.813	0.364	0	1.67	2.04
	E0-01 Upper Mine-Exposed Area	4.52	5.02	2.25	0	3.70	11.8
	E0-20 Middle Mine-Exposed Area	3.09	1.80	0.804	0	3.64	4.65
	C0-05 Lower Mine-Exposed Area	1.03	1.37	0.612	0	0.619	3.31
% Collector Gatherers FFG (% of community)	G0-09 Reference Area	54.8	9.15	4.09	41.9	58.9	64.5
	G0-03 Upstream Area	72.2	20.8	9.29	42.6	81.0	90.5
	E0-01 Upper Mine-Exposed Area	57.3	17.3	7.73	35.7	54.4	83.7
	E0-20 Middle Mine-Exposed Area	64.7	20.1	8.97	34.9	75.0	84.3
	C0-05 Lower Mine-Exposed Area	69.8	17.3	7.76	39.8	78.4	81.3
% Filterers FFG (% of community)	G0-09 Reference Area	0	0	0	0	0	0
	G0-03 Upstream Area	0.747	1.02	0.457	0	0	1.88
	E0-01 Upper Mine-Exposed Area	5.46	9.28	4.15	0	0	21.4
	E0-20 Middle Mine-Exposed Area	3.27	7.32	3.27	0	0	16.4
	C0-05 Lower Mine-Exposed Area	5.25	4.70	2.10	0	4.21	10.7
% Shredders FFG (% of community)	G0-09 Reference Area	1.03	1.28	0.570	0	0.926	3.12
	G0-03 Upstream Area	5.65	9.81	4.39	0	1.67	23.1
	E0-01 Upper Mine-Exposed Area	9.21	8.00	3.58	0	6.43	21.4
	E0-20 Middle Mine-Exposed Area	6.55	7.18	3.21	0	3.85	18.6
	C0-05 Lower Mine-Exposed Area	11.4	3.48	1.56	5.90	11.2	15.0
% Clingers HPG (% of community)	G0-09 Reference Area	43.4	10.5	4.69	32.0	38.9	58.1
	G0-03 Upstream Area	15.9	10.8	4.82	7.94	10.3	34.3
	E0-01 Upper Mine-Exposed Area	25.8	20.7	9.26	3.70	23.5	57.1
	E0-20 Middle Mine-Exposed Area	18.5	10.4	4.64	5.77	21.7	31.5
	C0-05 Lower Mine-Exposed Area	20.4	8.56	3.83	11.2	17.4	33.2
% Sprawlers HPG (% of community)	G0-09 Reference Area	54.5	8.91	3.99	41.9	58.0	63.9
	G0-03 Upstream Area	71.3	20.4	9.12	42.6	81.0	88.3
	E0-01 Upper Mine-Exposed Area	53.7	18.6	8.31	35.7	47.1	83.7
	E0-20 Middle Mine-Exposed Area	62.2	20.7	9.24	32.6	71.8	82.4
	C0-05 Lower Mine-Exposed Area	66.1	16.3	7.29	37.8	69.5	77.7
% Burrowers HPG (% of community)	G0-09 Reference Area	2.16	1.61	0.721	0	2.48	4.07
	G0-03 Upstream Area	12.8	11.2	4.99	1.38	8.79	26.2
	E0-01 Upper Mine-Exposed Area	20.5	10.2	4.57	7.14	23.4	29.9
	E0-20 Middle Mine-Exposed Area	19.3	15.3	6.83	3.33	17.8	44.2
	C0-05 Lower Mine-Exposed Area	13.5	9.61	4.30	4.85	12.7	29.0

Note: Sample size equals five for all study areas.

Table F.46: Statistical Comparison of Bray-Curtis Index for the Mary River Mine-exposed Areas Compared to the Upstream Reference Area, Mary River Project CREMP, August 2023

Comparison	Betadisper P-Value	Mantel Test			dbRDA			
		r	R^2	P-Value	F-Value	R^2	R^2_{adj}	P-Value
G0-03 vs G0-09	0.225	0.164	0.0270	0.095	1.63	0.169	0.0651	0.205
E0-01 vs G0-09	0.198	0.632	0.399	0.008	5.82	0.421	0.349	0.008
E0-20 vs G0-09	0.054	0.239	0.0573	0.015	2.55	0.242	0.147	0.015
C0-05 vs G0-09	0.697	0.874	0.764	0.008	15.2	0.656	0.613	<0.001

Highlighted values indicate significant difference between study areas based on statistical test p-value less than 0.10.

Note: Sample size was five for all study areas.

Table F.47: Statistical Comparison of Benthic Metrics at the Mary River Reference Area (G0-09) Among Years of Mine Operation (2015 to 2023) and Baseline (2006, 2007) for the Mary River Project CREMP

Metric	Overall 11-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2006	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
Density (org/m^2)	ANOVA	log10	YES	<0.001	2006	3	404	149	nc	nc	BC
					2007	3	739	83.8	1.7	nc	AB
					2015	5	472	255	0.19	-4.9	BC
					2016	5	662	320	1.2	-1.7	AB
					2017	5	410	313	-0.32	-6.6	BC
					2018	5	194	112	-2.2	-13	C
					2019	5	1,623	700	3.6	6.0	A
					2020	5	886	831	1.3	-1.3	AB
					2021	5	471	219	0.22	-4.9	BC
					2022	5	452	331	0.020	-5.5	BC
					2023	5	434	212	0.037	-5.4	BC
Richness (#Taxa)	ANOVA	none	YES	<0.001	2006	3	7.33	2.89	nc	nc	C
					2007	3	13.3	0.577	2.1	nc	AB
					2015	5	11.4	3.21	1.4	-3.3	ABC
					2016	5	14.0	1.58	2.3	1.2	A
					2017	5	11.2	2.95	1.3	-3.7	ABC
					2018	5	11.8	2.28	1.5	-2.7	ABC
					2019	5	11.4	1.52	1.4	-3.3	ABC
					2020	5	14.2	1.64	2.4	1.5	A
					2021	5	14.8	2.49	2.6	2.5	A
					2022	5	13.8	1.10	2.2	0.81	A
					2023	5	9.00	3.16	0.58	-7.5	BC
Simpson's E (Krebs)	ANOVA	none	YES	<0.001	2006	3	0.324	0.0953	nc	nc	E
					2007	3	0.655	0.0386	3.5	nc	D
					2015	5	0.878	0.0493	5.8	5.8	AB
					2016	5	0.907	0.0227	6.1	6.5	A
					2017	5	0.769	0.0973	4.7	3.0	ABCD
					2018	5	0.907	0.0300	6.1	6.5	A
					2019	5	0.687	0.0953	3.8	0.82	CD
					2020	5	0.828	0.153	5.3	4.5	ABCD
					2021	5	0.860	0.108	5.6	5.3	ABC
					2022	5	0.887	0.103	5.9	6.0	AB
					2023	5	0.727	0.0740	4.2	1.9	BCD
% Nemata (% of community)	K-W	rank	NO	0.509	2006	3	0.667	0.577	nc	nc	A
					2007	3	0.333	0.577	nm	nc	A
					2015	5	0.400	0.548	nm	nm	A
					2016	5	1.60	1.14	nm	nm	A
					2017	5	0.400	0.894	nm	nm	A
					2018	5	1.80	2.49	nm	nm	A
					2019	5	0.600	0.548	nm	nm	A
					2020	5	0.505	0.562	nm	nm	A
					2021	5	1.17	1.74	nm	nm	A
					2022	5	2.05	1.69	nm	nm	A
					2023	5	0.292	0.423	nm	nm	A
% Hydracarina (% of community)	K-W	rank	YES	0.001	2006	3	0.333	0.577	nc	nc	DE
					2007	3	0.333	0.577	nm	nc	DE
					2015	5	4.20	3.11	nm	nm	AB
					2016	5	4.60	2.30	nm	nm	A
					2017	5	0	0	nm	nm	E
					2018	5	0.400	0.894	nm	nm	DE
					2019	5	0.800	1.30	nm	nm	DE
					2020	5	1.10	1.31	nm	nm	CDE
					2021	5	1.11	0.852	nm	nm	BCD
					2022	5	2.03	1.40	nm	nm	ABC
					2023	5	0.404	0.400	nm	nm	DE

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.47: Statistical Comparison of Benthic Metrics at the Mary River Reference Area (G0-09) Among Years of Mine Operation (2015 to 2023) and Baseline (2006, 2007) for the Mary River Project CREMP

Metric	Overall 11-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2006	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
% Chironomidae (% of community)	ANOVA	none	YES	<0.001	2006	3	98.7	0.577	nc	nc	A
					2007	3	97.3	1.15	-2.3	nc	A
					2015	5	88.0	2.74	-18	-8.1	AB
					2016	5	84.0	4.64	-25	-12	AB
					2017	5	79.2	6.46	-34	-16	B
					2018	5	78.8	12.3	-34	-16	B
					2019	5	97.0	2.35	-2.9	-0.29	A
					2020	5	89.6	5.11	-16	-6.7	AB
					2021	5	1.11	0.852	nm	nm	BCD
					2022	5	86.4	6.85	-21	-9.4	AB
					2023	5	56.3	10.9	-73	-36	C
% Metal Sensitive Chironomidae (% of community)	ANOVA	none	YES	<0.001	2006	3	62.0	3.46	nc	nc	AB
					2007	3	31.0	17.6	-8.9	nc	ABCD
					2015	5	13.0	14.0	-14	-1.0	D
					2016	5	23.2	12.3	-11	-0.44	CD
					2017	5	59.8	13.1	-0.64	1.6	A
					2018	5	31.0	10.6	-8.9	0	ABCD
					2019	5	51.6	21.5	-3.0	1.2	ABC
					2020	5	32.0	23.7	-8.6	0.060	ABCD
					2021	5	23.7	22.3	-11	-0.42	BCD
					2022	5	31.2	19.0	-8.9	0.014	ABCD
					2023	5	12.5	13.0	-14	-1.1	D
% Tipulidae (% of community)	K-W	rank	NO	0.152	2006	3	0.333	0.577	nc	nc	A
					2007	3	1.67	2.08	nm	nc	A
					2015	5	4.40	2.97	nm	2.0	A
					2016	5	1.80	1.48	nm	0.67	A
					2017	5	1.40	1.14	nm	0	A
					2018	5	3.20	4.09	nm	1.3	A
					2019	5	0.600	0.548	nm	0	A
					2020	5	1.22	0.469	nm	0.035	A
					2021	5	23.7	22.3	-11	-0.42	BCD
					2022	5	0.688	1.06	nm	-0.67	A
					2023	5	0.517	0.517	nm	-0.31	A
% Collector Gatherers FFG (% of community)	ANOVA	none	YES	<0.001	2006	3	98.7	1.15	nc	nc	A
					2007	3	94.7	1.15	-3.5	nc	AB
					2015	5	78.0	12.2	-18	-14	BC
					2016	5	75.4	8.99	-20	-17	C
					2017	5	74.6	6.88	-21	-17	C
					2018	5	80.8	11.4	-16	-12	ABC
					2019	5	92.6	5.03	-5.3	-1.8	AB
					2020	5	80.0	4.02	-16	-13	BC
					2021	5	85.8	4.15	-11	-7.7	ABC
					2022	5	75.0	9.43	-20	-17	C
					2023	5	54.8	9.15	-38	-35	D
% Filterers FFG (% of community)	K-W	rank	YES	<0.001	2006	3	0	0	nc	nc	CD
					2007	3	0	0	nm	nc	CD
					2015	5	2.00	1.87	nm	nm	BD
					2016	5	7.20	4.15	nm	nm	AB
					2017	5	19.0	5.43	nm	nm	A
					2018	5	14.2	9.98	nm	nm	A
					2019	5	0	0	nm	nm	C
					2020	5	1.32	1.61	nm	nm	BCD
					2021	5	0.456	0.625	nm	nm	CD
					2022	5	0.206	0.461	nm	nm	CD
					2023	5	0	0	nm	nm	C

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.47: Statistical Comparison of Benthic Metrics at the Mary River Reference Area (G0-09) Among Years of Mine Operation (2015 to 2023) and Baseline (2006, 2007) for the Mary River Project CREMP

Metric	Overall 11-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2006	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
% Shredders FFG (% of community)	K-W	rank	YES	<0.001	2006	3	0.333	0.577	nc	nc	E
					2007	3	4.33	0.577	nm	nc	BCDE
					2015	5	16.0	11.3	nm	nm	AB
					2016	5	11.8	3.56	nm	nm	AB
					2017	5	5.60	2.30	nm	nm	BCD
					2018	5	4.80	6.22	nm	nm	DE
					2019	5	5.00	2.83	nm	nm	CDE
					2020	5	11.4	7.26	nm	nm	ABC
					2021	5	0.456	0.625	nm	nm	CD
					2022	5	17.7	7.34	nm	nm	A
					2023	5	1.03	1.28	nm	nm	E

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.48: Statistical Comparison of Benthic Invertebrate Community Metrics at Mary River Upstream of the Mine (G0-03) Among Years of Mine Operation (2015 to 2023) and Baseline (2007) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
Density (org/m^2)	K-W	log10	YES	0.002	2007	3	136	29.3	nc	BC
					2015	5	169	122	0.13	BC
					2016	5	287	92.1	3.1	ABC
					2017	5	282	172	2.4	ABC
					2018	5	165	53.9	0.71	BC
					2019	5	634	315	6.3	A
					2020	5	196	95.3	1.2	BC
					2021	5	468	275	4.7	AB
					2022	5	151	73.1	-0.042	C
					2023	5	266	143	2.6	ABC
Richness (#Taxa)	ANOVA	none	YES	<0.001	2007	3	6.33	1.15	nc	C
					2015	5	9.40	3.51	2.7	BC
					2016	5	14.4	1.82	7.0	AB
					2017	5	13.6	3.91	6.3	AB
					2018	5	12.2	3.49	5.1	ABC
					2019	5	11.2	1.64	4.2	ABC
					2020	5	12.6	3.13	5.4	ABC
					2021	5	16.8	4.87	9.1	A
					2022	5	10.8	3.90	3.9	ABC
					2023	5	7.40	0.894	0.92	C
Simpson's E (Krebs)	K-W	rank	YES	0.009	2007	3	0.591	0.00289	nc	E
					2015	5	0.921	0.0450	nm	AB
					2016	5	0.899	0.0407	nm	BCD
					2017	5	0.873	0.142	nm	ABC
					2018	5	0.868	0.119	nm	ABCD
					2019	5	0.858	0.0485	nm	CDE
					2020	5	0.915	0.0256	nm	BCD
					2021	5	0.913	0.0559	nm	ABC
					2022	5	0.951	0.0108	nm	A
					2023	5	0.751	0.161	nm	DE
% Nemata (% of community)	K-W	rank	YES	0.008	2007	3	0	0	nc	D
					2015	5	0	0	nm	D
					2016	5	2.60	0.548	nm	AB
					2017	5	1.40	1.34	nm	BCD
					2018	5	4.40	1.95	nm	A
					2019	5	0.800	1.30	nm	CD
					2020	5	2.38	2.85	nm	ABC
					2021	5	2.60	2.20	nm	ABC
					2022	5	1.11	1.04	nm	BCD
					2023	5	0.635	1.42	nm	CD
% Hydracarina (% of community)	K-W	rank	YES	0.003	2007	3	0.667	1.15	nc	D
					2015	5	7.20	2.59	nm	A
					2016	5	9.80	4.71	nm	A
					2017	5	2.00	1.87	nm	CD
					2018	5	3.40	4.22	nm	BCD
					2019	5	2.20	1.79	nm	BCD
					2020	5	4.25	3.13	nm	ABC
					2021	5	2.20	1.05	nm	BCD
					2022	5	10.2	11.2	nm	AB
					2023	5	0.317	0.710	nm	D

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.48: Statistical Comparison of Benthic Invertebrate Community Metrics at Mary River Upstream of the Mine (G0-03) Among Years of Mine Operation (2015 to 2023) and Baseline (2007) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
% Chironomidae (% of community)	ANOVA	none	YES	<0.001	2007	3	97.0	1.00	nc	A
					2015	5	72.2	8.64	-25	C
					2016	5	77.6	7.20	-19	ABC
					2017	5	75.4	10.4	-22	BC
					2018	5	83.4	9.26	-14	ABC
					2019	5	93.0	7.07	-4.0	AB
					2020	5	69.9	13.6	-27	C
					2021	5	79.8	9.63	-17	ABC
					2022	5	71.5	13.2	-26	C
					2023	5	85.7	3.40	-11	ABC
% Metal Sensitive Chironomidae (% of community)	ANOVA	log10(x+1)	YES	<0.001	2007	3	5.33	1.15	nc	B
					2015	5	8.20	5.07	2.4	B
					2016	5	8.60	6.07	2.7	B
					2017	5	47.0	12.6	30	A
					2018	5	32.4	21.2	20	AC
					2019	5	17.4	11.0	9.5	BC
					2020	5	12.3	5.84	5.7	BC
					2021	5	79.8	9.63	-17	ABC
					2022	5	29.4	9.84	18	ABC
					2023	5	25.8	16.8	16	ABC
% Tipulidae (% of community)	K-W	rank	YES	0.002	2007	3	2.33	2.08	nc	BCD
					2015	5	19.0	6.12	13	A
					2016	5	8.60	7.02	2.0	AB
					2017	5	3.00	2.00	0.67	BCD
					2018	5	1.80	1.64	0	CD
					2019	5	2.60	3.78	-1.3	CD
					2020	5	6.18	5.08	0.79	ABC
					2021	5	1.60	1.04	-0.89	D
					2022	5	9.42	7.21	3.1	AB
					2023	5	1.39	0.813	-0.90	D
% Collector Gatherers FFG (% of community)	ANOVA	none	YES	0.007	2007	3	94.3	2.08	nc	A
					2015	5	60.8	9.23	-16	BC
					2016	5	64.0	6.04	-15	BC
					2017	5	74.4	10.6	-9.6	ABC
					2018	5	80.8	11.3	-6.5	AB
					2019	5	68.8	10.7	-12	ABC
					2020	5	63.1	14.7	-15	BC
					2021	5	71.9	14.0	-11	ABC
					2022	5	57.0	9.81	-18	C
					2023	5	72.2	20.8	-11	ABC
% Filterers FFG (% of community)	K-W	rank	YES	0.007	2007	3	0	0	nc	BD
					2015	5	1.00	1.41	nm	BCD
					2016	5	0.800	1.10	nm	BCD
					2017	5	15.4	5.41	nm	A
					2018	5	3.80	5.31	nm	BCD
					2019	5	0	0	nm	D
					2020	5	3.10	2.84	nm	BC
					2021	5	6.41	8.76	nm	AC
					2022	5	1.21	2.71	nm	BCD
					2023	5	0.747	1.02	nm	BCD

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.48: Statistical Comparison of Benthic Invertebrate Community Metrics at Mary River Upstream of the Mine (G0-03) Among Years of Mine Operation (2015 to 2023) and Baseline (2007) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
% Shredders FFG (% of community)	ANOVA	log10(x+1)	YES	<0.001	2007	3	5.00	1.00	nc	CD
					2015	5	29.6	8.59	22	A
					2016	5	20.8	5.26	15	ABC
					2017	5	5.80	2.17	0.78	D
					2018	5	11.8	8.35	6.4	BCD
					2019	5	22.2	6.02	16	AB
					2020	5	16.6	4.69	11	ABCD
					2021	5	6.41	8.76	nm	AC
					2022	5	17.4	9.83	12	ABCD
					2023	5	5.65	9.81	0.31	D

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.49: Statistical Comparison of Benthic Invertebrate Community Metrics at the Mary River Upper Mine-Exposed Area (E0-01) Among Years of Mine Operation (2015 to 2023) and Baseline (2007) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
Density (org/m^2)	ANOVA	log10	YES	0.005	2007	3	797	648	nc	AB
					2015	5	116	96.5	-1.0	AB
					2016	5	230	109	-0.47	AB
					2017	5	126	106	-1.0	AB
					2018	5	119	164	-1.2	A
					2019	5	312	115	-0.25	AB
					2020	5	513	420	-0.039	B
					2021	5	173	140	-0.73	AB
					2022	5	107	96.6	-1.1	A
					2023	5	93.9	58.3	-1.0	AB
Richness (#Taxa)	ANOVA	none	YES	0.065	2007	3	16.3	8.14	nc	A
					2015	5	7.80	2.68	-1.0	A
					2016	5	13.2	4.15	-0.38	A
					2017	5	10.6	5.32	-0.70	A
					2018	5	7.80	4.87	-1.0	A
					2019	5	11.0	0.707	-0.65	A
					2020	5	14.8	1.64	-0.19	A
					2021	5	13.2	4.60	-0.38	A
					2022	5	11.2	5.45	-0.63	A
					2023	5	9.40	1.67	-0.85	A
Simpson's E (Krebs)	ANOVA	log10	YES	<0.001	2007	3	0.667	0.0577	nc	C
					2015	5	0.880	0.0837	3.1	AB
					2016	5	0.860	0.0548	2.9	B
					2017	5	0.940	0.0548	3.9	AB
					2018	5	0.940	0.0548	3.9	AB
					2019	5	0.900	0	3.4	AB
					2020	5	0.910	0.0165	3.5	AB
					2021	5	0.949	0.0194	4.0	AB
					2022	5	0.960	0.0254	4.1	A
					2023	5	0.932	0.0512	3.8	AB
% Nemata (% of community)	K-W	rank	NO	0.705	2007	3	2.67	3.06	nc	A
					2015	5	1.20	2.68	-0.67	A
					2016	5	2.00	1.58	0	A
					2017	5	0.800	1.79	-0.67	A
					2018	5	7.80	10.7	1.3	A
					2019	5	1.40	1.67	-0.34	A
					2020	5	0.773	1.21	-0.67	A
					2021	5	1.77	1.85	-0.038	A
					2022	5	2.32	2.90	-0.22	A
					2023	5	3.65	4.53	-0.050	A
% Hydracarina (% of community)	ANOVA	log10(x+1)	NO	0.443	2007	3	2.00	3.46	nc	A
					2015	5	2.00	2.83	0.0022	A
					2016	5	7.20	4.66	1.5	A
					2017	5	2.20	2.05	0.065	A
					2018	5	4.60	5.27	0.73	A
					2019	5	4.00	2.35	0.58	A
					2020	5	3.13	2.91	0.33	A
					2021	5	1.16	1.30	-0.24	A
					2022	5	4.25	5.16	0.63	A
					2023	5	4.77	5.88	0.77	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) post hoc tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.49: Statistical Comparison of Benthic Invertebrate Community Metrics at the Mary River Upper Mine-Exposed Area (E0-01) Among Years of Mine Operation (2015 to 2023) and Baseline (2007) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
% Chironomidae (% of community)	ANOVA	none	YES	<0.001	2007	3	89.0	3.61	nc	AB
					2015	5	82.8	5.85	-1.7	AB
					2016	5	82.8	6.87	-1.7	AB
					2017	5	78.0	7.07	-3.1	AB
					2018	5	72.2	16.0	-4.7	ABC
					2019	5	93.8	3.27	1.3	A
					2020	5	88.2	9.20	-0.21	AB
					2021	5	72.0	4.74	-4.7	ABC
					2022	5	54.3	23.8	-9.6	C
					2023	5	68.5	18.4	-5.7	BC
% Metal Sensitive Chironomidae (% of community)	K-W	rank	YES	0.008	2007	3	36.3	31.9	nc	ABC
					2015	5	6.60	5.68	-2.7	DE
					2016	5	5.60	4.72	-2.8	E
					2017	5	28.8	7.95	-0.98	AB
					2018	5	35.2	20.2	-0.55	AB
					2019	5	5.20	4.09	-2.8	E
					2020	5	11.0	2.53	-2.2	ACDE
					2021	5	18.2	7.42	-1.9	ABCD
					2022	5	11.8	15.5	-2.9	CDE
					2023	5	32.5	16.4	-1.3	B
% Tipulidae (% of community)	K-W	rank	YES	0.038	2007	3	3.67	4.62	nc	ABCD
					2015	5	7.60	5.37	nm	A
					2016	5	3.20	2.17	nm	AB
					2017	5	0.200	0.447	nm	C
					2018	5	0.400	0.894	nm	CD
					2019	5	0.800	1.10	nm	BCD
					2020	5	5.66	4.26	nm	A
					2021	5	3.03	2.80	nm	ABCD
					2022	5	4.57	6.30	nm	ABCD
					2023	5	4.52	5.02	nm	ABD
% Collector Gatherers FFG (% of community)	K-W	rank	YES	0.058	2007	3	43.7	26.6	nc	B
					2015	5	71.4	16.9	3.4	ABC
					2016	5	77.6	6.66	3.4	A
					2017	5	80.4	8.32	3.8	A
					2018	5	62.6	37.3	3.0	ABC
					2019	5	64.0	2.12	2.3	BC
					2020	5	59.5	8.05	1.8	BC
					2021	5	71.6	14.8	3.1	AC
					2022	5	59.3	13.2	2.2	BC
					2023	5	57.3	17.3	1.6	BC
% Filterers FFG (% of community)	K-W	rank	YES	0.024	2007	3	36.0	31.6	nc	AB
					2015	5	0	0	-3.3	E
					2016	5	0.800	0.837	-3.2	CDE
					2017	5	14.0	11.0	-2.5	A
					2018	5	7.00	8.57	-2.8	ABCD
					2019	5	0.400	0.894	-3.3	DE
					2020	5	4.97	3.79	-2.9	ABC
					2021	5	4.25	4.05	-3.1	ABC
					2022	5	4.87	5.22	-3.0	ABCD
					2023	5	5.46	9.28	-3.3	BCDE

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) post hoc tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.49: Statistical Comparison of Benthic Invertebrate Community Metrics at the Mary River Upper Mine-Exposed Area (E0-01) Among Years of Mine Operation (2015 to 2023) and Baseline (2007) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Pairwise Comparison
% Shredders FFG (% of community)	K-W	rank	YES	0.011	2007	3	8.00	7.94	nc	BC
					2015	5	20.0	18.3	2.0	AB
					2016	5	8.40	6.80	0.45	BC
					2017	5	2.40	5.37	-1.1	C
					2018	5	15.4	13.6	1.1	AB
					2019	5	24.2	3.42	4.5	A
					2020	5	27.8	7.45	5.6	A
					2021	5	4.25	4.05	-3.1	ABC
					2022	5	12.8	11.2	1.7	B
					2023	5	9.21	8.00	0.32	BC

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) post hoc tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.50: Statistical Comparison of Benthic Invertebrate Community Metrics at the Mary River Middle Mine-Exposed Area (E0-20) Among Years of Mine Operation (2015 to 2022) and Baseline (2011) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
Density (org/m2)	K-W	rank	YES	<0.001	2011	3	854	348	nc	AB
					2015	5	278	146	-2.8	BC
					2016	5	283	118	-2.9	BC
					2017	5	382	665	-3.5	CD
					2018	5	60.6	22.9	-3.6	D
					2019	5	2,939	3,175	-0.14	A
					2020	5	1,441	553	0.88	A
					2021	5	304	158	-2.7	BC
					2022	5	503	671	-2.9	BC
					2023	5	211	111	-3.1	CD
Richness (#Taxa)	ANOVA	none	YES	0.002	2011	3	14.0	2.65	nc	AB
					2015	5	11.6	2.19	-0.91	ABC
					2016	5	13.6	3.13	-0.15	AB
					2017	5	12.4	5.03	-0.60	AB
					2018	5	6.80	1.92	-2.7	C
					2019	5	14.8	2.05	0.30	A
					2020	5	13.2	2.28	-0.30	AB
					2021	5	12.8	3.03	-0.45	AB
					2022	5	14.4	2.70	0.15	AB
					2023	5	9.00	2.12	-1.9	BC
Simpson's E (Krebs)	K-W	rank	YES	0.031	2011	3	0.483	0.247	nc	D
					2015	5	0.726	0.140	8.1	CD
					2016	5	0.835	0.0383	11	BCD
					2017	5	0.902	0.103	13	A
					2018	5	0.895	0.0472	12	AB
					2019	5	0.863	0.0489	12	ABC
					2020	5	0.872	0.0455	12	ABC
					2021	5	0.915	0.0134	12	A
					2022	5	0.859	0.106	13	AB
					2023	5	0.836	0.116	12	ABC
% Nemata (% of community)	K-W	rank	NO	0.266	2011	3	0.667	0.577	nc	A
					2015	5	0.200	0.447	nm	A
					2016	5	1.60	1.14	nm	A
					2017	5	0.600	1.34	nm	A
					2018	5	1.60	3.58	nm	A
					2019	5	1.00	1.22	nm	A
					2020	5	0.0437	0.0976	nm	A
					2021	5	1.31	0.954	nm	A
					2022	5	1.18	1.11	nm	A
					2023	5	1.98	2.04	nm	A
% Hydracarina (% of community)	K-W	rank	YES	0.008	2011	3	1.00	1.00	nc	BCD
					2015	5	3.80	1.30	1.3	AC
					2016	5	6.40	2.88	3.4	A
					2017	5	4.00	2.92	2.0	ABC
					2018	5	0.800	1.79	-0.67	D
					2019	5	1.00	1.22	0	D
					2020	5	0.804	0.426	-0.15	BD
					2021	5	1.25	1.60	0.014	BD
					2022	5	2.14	2.90	-0.25	BCD
					2023	5	0.333	0.745	-0.67	D

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.50: Statistical Comparison of Benthic Invertebrate Community Metrics at the Mary River Middle Mine-Exposed Area (E0-20) Among Years of Mine Operation (2015 to 2022) and Baseline (2011) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
% Chironomidae (% of community)	ANOVA	none	YES	<0.001	2011	3	95.0	4.36	nc	AB
					2015	5	87.6	5.27	-1.7	ABC
					2016	5	86.2	6.26	-2.0	ABC
					2017	5	71.6	11.7	-5.4	D
					2018	5	81.4	7.83	-3.1	ACD
					2019	5	96.4	1.67	0.32	B
					2020	5	95.5	2.47	0.11	B
					2021	5	71.9	3.56	-5.3	D
					2022	5	86.0	5.77	-2.1	ABC
					2023	5	79.0	10.9	-3.7	CD
% Metal Sensitive Chironomidae (% of community)	ANOVA	log10(x+1)	YES	<0.001	2011	3	3.00	5.20	nc	B
					2015	5	3.60	1.82	0.13	B
					2016	5	4.40	2.88	0.28	B
					2017	5	31.4	22.6	4.7	AC
					2018	5	49.0	12.9	7.4	A
					2019	5	20.0	20.1	2.9	BC
					2020	5	9.44	9.07	1.2	BC
					2021	5	22.6	5.65	3.5	BC
					2022	5	16.9	8.19	2.5	BC
					2023	5	23.1	8.32	3.6	BC
% Tipulidae (% of community)	K-W	rank	NO	0.110	2011	3	2.00	1.73	nc	A
					2015	5	4.40	2.51	nm	A
					2016	5	4.20	4.60	nm	A
					2017	5	2.60	3.44	nm	A
					2018	5	2.00	2.83	nm	A
					2019	5	0.400	0.548	nm	A
					2020	5	0.561	0.886	nm	A
					2021	5	3.43	2.96	nm	A
					2022	5	2.87	1.85	nm	A
					2023	5	3.09	1.80	nm	A
% Collector Gatherers FFG (% of community)	ANOVA	none	YES	<0.001	2011	3	22.0	16.0	nc	C
					2015	5	77.0	6.20	3.4	AB
					2016	5	70.4	7.40	3.0	AB
					2017	5	68.0	5.15	2.9	AB
					2018	5	78.2	6.53	3.5	A
					2019	5	63.6	8.96	2.6	AB
					2020	5	54.6	13.2	2.0	B
					2021	5	56.5	9.34	2.2	AB
					2022	5	59.3	16.0	2.3	AB
					2023	5	64.7	20.1	2.7	AB
% Filterers FFG (% of community)	K-W	rank	YES	0.002	2011	3	3.00	5.20	nc	CD
					2015	5	0.600	0.894	nm	D
					2016	5	0.400	0.894	nm	D
					2017	5	16.8	7.05	nm	A
					2018	5	9.00	8.43	nm	ABC
					2019	5	0.800	0.837	nm	D
					2020	5	4.38	4.30	nm	BCD
					2021	5	8.51	4.91	nm	AB
					2022	5	0.455	1.02	nm	D
					2023	5	3.27	7.32	nm	D

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.50: Statistical Comparison of Benthic Invertebrate Community Metrics at the Mary River Middle Mine-Exposed Area (E0-20) Among Years of Mine Operation (2015 to 2022) and Baseline (2011) for the Mary River Project CREMP

Metric	Overall 10-Year Comparison [a]				Pair-wise, *post hoc* comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
% Shredders FFG (% of community)	ANOVA	log10(x+1)	YES	<0.001	2011	3	6.33	7.51	nc	C
					2015	5	13.0	3.74	0.90	BC
					2016	5	8.60	5.41	0.31	C
					2017	5	7.20	4.15	0.13	C
					2018	5	11.6	8.32	0.69	BC
					2019	5	32.4	5.50	3.2	A
					2020	5	15.8	9.41	1.2	ABC
					2021	5	4.60	2.81	-0.22	C
					2022	5	28.6	21.4	2.6	AB
					2023	5	6.55	7.18	0.028	C

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.51: Statistical Comparison of Benthic Metrics at the Mary River Lower Mine-Exposed Area (C0-05) Among Years of Mine Operation (2015 to 2022) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall 9-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
Density (org/m^2)	ANOVA	none	YES	0.016	2007	3	311	230	nc	nc	A
					2011	3	491	455	0.78	nc	A
					2015	5	234	168	-0.33	-0.56	A
					2016	5	1,161	584	3.7	1.5	A
					2017	5	1,214	654	3.9	1.6	A
					2018	5	1,391	1,083	4.7	2.0	A
					2019	5	1,470	693	5.0	2.2	A
					2020	5	906	818	2.6	0.91	A
					2021	5	1,458	885	5.0	2.1	A
					2022	5	398	238	0.38	-0.20	A
					2023	5	536	379	0.98	0.099	A
Richness (#Taxa)	ANOVA	none	YES	<0.001	2007	3	10.7	3.79	nc	nc	D
					2011	3	19.0	4.00	2.2	nc	ABC
					2015	5	13.2	2.68	0.67	-1.4	BD
					2016	5	19.6	3.29	2.4	0.15	AC
					2017	5	22.0	3.16	3.0	0.75	A
					2018	5	18.6	0.894	2.1	-0.100	ABC
					2019	5	15.8	2.86	1.4	-0.80	BCD
					2020	5	13.0	1.87	0.62	-1.5	BD
					2021	5	16.8	3.77	1.6	-0.55	ABCD
					2022	5	14.2	4.09	0.93	-1.2	BCD
					2023	5	14.2	2.59	0.93	-1.2	BCD
Simpson's E (Krebs)	ANOVA	none	YES	<0.001	2007	3	0.668	0.0216	nc	nc	BC
					2011	3	0.879	0.0786	9.8	nc	ABCD
					2015	5	0.923	0.0382	12	0.56	A
					2016	5	0.849	0.0148	8.4	-0.39	ABCD
					2017	5	0.798	0.161	6.0	-1.0	ABCD
					2018	5	0.675	0.149	0.35	-2.6	C
					2019	5	0.716	0.0924	2.3	-2.1	BCD
					2020	5	0.821	0.0585	7.1	-0.73	ABCD
					2021	5	0.879	0.0554	9.8	-0.0043	ABD
					2022	5	0.884	0.0679	10	0.068	AD
					2023	5	0.768	0.122	4.6	-1.4	ABCD
% Nemata (% of community)	K-W	rank	YES	0.004	2007	3	0.333	0.577	nc	nc	C
					2011	3	3.67	1.53	nm	nc	AB
					2015	5	3.00	2.24	nm	-0.67	B
					2016	5	1.60	0.894	nm	-2.0	BC
					2017	5	2.20	1.64	nm	-1.3	B
					2018	5	2.20	1.79	nm	-2.0	BC
					2019	5	0.600	0.548	nm	-2.0	C
					2020	5	1.54	0.572	nm	-1.8	BC
					2021	5	15.3	12.2	nm	4.2	A
					2022	5	7.18	8.18	nm	-0.88	B
					2023	5	2.80	1.75	nm	-1.3	AB
% Hydracarina (% of community)	K-W	rank	YES	0.007	2007	3	0.667	0.577	nc	nc	CD
					2011	3	0.667	0.577	nm	nc	CD
					2015	5	2.20	2.95	nm	nm	CD
					2016	5	6.40	2.61	nm	nm	A
					2017	5	3.80	4.82	nm	nm	ABC
					2018	5	1.60	2.51	nm	nm	CD
					2019	5	2.00	1.00	nm	nm	BC
					2020	5	6.04	4.89	nm	nm	AB
					2021	5	0.0862	0.193	nm	nm	D
					2022	5	1.40	1.75	nm	nm	CD
					2023	5	1.67	1.61	nm	nm	C

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.51: Statistical Comparison of Benthic Metrics at the Mary River Lower Mine-Exposed Area (C0-05) Among Years of Mine Operation (2015 to 2022) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall 9-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
% Chironomidae (% of community)	K-W	rank	YES	<0.001	2007	3	99.3	0.577	nc	nc	A
					2011	3	90.0	4.58	nm	nc	AB
					2015	5	78.0	9.85	nm	-2.2	BCD
					2016	5	88.0	3.08	nm	-0.22	AB
					2017	5	63.6	12.6	nm	-5.4	C
					2018	5	85.6	6.88	nm	-0.22	B
					2019	5	95.0	1.87	nm	1.3	A
					2020	5	84.8	8.02	nm	-1.4	BD
					2021	5	63.9	22.9	nm	-4.8	CD
					2022	5	68.6	14.9	nm	-3.2	C
					2023	5	82.0	7.42	nm	-0.73	BCD
% Metal Sensitive Chironomidae (% of community)	ANOVA	none	YES	<0.001	2007	3	37.0	16.1	nc	nc	ABCDE
					2011	3	14.3	10.7	-1.4	nc	DEF
					2015	5	17.0	10.7	-1.2	0.25	DEF
					2016	5	29.0	13.9	-0.50	1.4	BCDEF
					2017	5	39.0	23.5	0.12	2.3	ABCD
					2018	5	59.6	11.5	1.4	4.2	A
					2019	5	49.2	16.6	0.76	3.3	AB
					2020	5	19.4	9.57	-1.1	0.48	CDEF
					2021	5	7.04	5.06	-1.9	-0.68	EF
					2022	5	4.64	4.93	-2.0	-0.91	F
					2023	5	46.1	16.0	0.56	3.0	ABC
% Tipulidae (% of community)	K-W	rank	NO	0.187	2007	3	0	0	nc	nc	A
					2011	3	2.00	2.65	nm	nc	A
					2015	5	5.20	8.11	nm	0	A
					2016	5	1.80	0.837	nm	0.67	A
					2017	5	1.20	1.64	nm	0	A
					2018	5	0.400	0.548	nm	-0.67	A
					2019	5	0.400	0.548	nm	-0.67	A
					2020	5	1.37	0.898	nm	0.22	A
					2021	5	0.323	0.372	nm	-0.49	A
					2022	5	0.875	0.907	nm	-0.067	A
					2023	5	1.03	1.37	nm	-0.26	A
% Collector Gatherers FFG (% of community)	ANOVA	none	YES	<0.001	2007	3	35.0	15.4	nc	nc	E
					2011	3	66.3	16.3	2.0	nc	BCD
					2015	5	80.6	13.0	3.0	0.88	ABCD
					2016	5	59.8	10.5	1.6	-0.40	DE
					2017	5	64.0	13.5	1.9	-0.14	CD
					2018	5	83.6	8.26	3.2	1.1	ABC
					2019	5	67.0	15.6	2.1	0.041	CD
					2020	5	69.8	6.66	2.3	0.21	BCD
					2021	5	97.0	3.29	4.0	1.9	A
					2022	5	90.7	5.74	3.6	1.5	AB
					2023	5	69.8	17.3	2.3	0.21	BCD
% Filterers FFG (% of community)	K-W	rank	YES	<0.001	2007	3	21.0	28.8	nc	nc	ABC
					2011	3	14.3	10.7	1.2	nc	AB
					2015	5	0.800	1.30	-0.77	-14	DE
					2016	5	0.600	0.548	-0.67	-13	DE
					2017	5	20.0	10.4	0.48	-4.7	A
					2018	5	6.20	4.09	-0.096	-8.8	ABC
					2019	5	1.00	0.707	-0.67	-13	CDE
					2020	5	4.12	5.14	-0.66	-13	BCDE
					2021	5	0.179	0.399	-0.77	-14	E
					2022	5	0.211	0.471	-0.77	-14	E
					2023	5	5.25	4.70	-0.36	-11	BCD

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.51: Statistical Comparison of Benthic Metrics at the Mary River Lower Mine-Exposed Area (C0-05) Among Years of Mine Operation (2015 to 2022) and Baseline (2007, 2011) for the Mary River Project CREMP

Metric	Overall 9-Year Comparison [a]				Pair-wise, *post hoc* comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Magnitude of Difference[b] vs. Baseline Year 2007	Magnitude of Difference[b] vs. Baseline Year 2011	Pairwise Comparison
% Shredders FFG (% of community)	K-W	rank	YES	0.002	2007	3	40.3	20.7	nc	nc	A
					2011	3	7.00	6.00	-1.7	nc	CD
					2015	5	15.8	9.98	-1.3	0.90	ABC
					2016	5	10.0	5.39	-1.6	0.22	BC
					2017	5	6.80	3.11	-1.7	-0.11	CD
					2018	5	4.00	2.55	-1.8	-0.34	D
					2019	5	18.0	3.54	-1.2	1.1	AB
					2020	5	14.5	9.99	-1.4	0.55	ABC
					2021	5	3.94	3.23	-1.7	-0.13	D
					2022	5	6.37	2.55	-1.7	0.0032	CD
					2023	5	11.4	3.48	-1.5	0.48	ABC

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: nc= no comparison; nm=MOD could not be calculated due to SD = 0

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Magnitude of Difference = $(MCT_{Year} - MCT_{Base\ Year})/SD_{Base\ Year}$. MCT = Measure of Central Tendency; MCT reported as geometric mean for log10-transformed data, median for rank-transformed data, back-transformed means for untransformed data.

Table F.52: Benthic Invertebrate Community Data, Expressed in Number of Organisms per Square Metre, for Mary Lake Study Areas, Mary River Project CREMP, August 2023

Lake	Mary Lake (BL0)								
Station Type	Littoral			Profundal					
Station	11	7	6	3	15	14	5	13	4
ROUNDWORMS									
P. Nemata	34.4	8.61	310	51.7	-	25.8	-	-	8.61
ANNELIDS									
P. Annelida									
WORMS									
Cl. Oligochaeta									
F. Enchytraeidae	34.4	-	-	-	-	-	-	-	-
F. Lumbriculidae									
Lumbriculus	-	-	-	17.2	-	-	-	-	-
ARTHROPODS									
P. Arthropoda									
MITES									
Cl. Arachnida									
O. Acarina									
Acalyptonotidae									
Acalyptonotus	-	86.1	121	-	-	-	-	17.2	8.61
F. Aturidae									
?Axonopsella	-	-	-	-	-	-	-	-	-
F. Hygrobatidae									
Hygrobates	68.9	-	34.4	34.4	-	-	-	8.61	-
F. Lebertiidae									
Lebertia	-	-	-	-	-	-	-	-	17.2
HARPACTICOIDS									
O. Harpacticoida	34.4	-	-	-	-	-	-	-	-
SEED SHRIMPS									
Cl. Ostracoda	103	17.2	293	34.4	577	34.4	-	-	-
INSECTS									
Cl. Insecta									
CADDISFLIES									
O. Trichoptera									
immature	-	-	-	-	-	-	-	-	-
F. Apataniidae									
Apatania	68.9	-	-	-	-	-	-	-	-
TRUE FLIES									
O. Diptera									
MIDGES									
F. Chironomidae									
chironomid pupae	-	8.61	-	17.2	-	-	34.4	8.61	-
S.F. Chironominae									
Chironomus	34.4	-	-	-	-	-	68.9	-	-
Micropsectra	241	8.61	301	86.1	-	-	103	-	8.61
Paratanytarsus	-	-	-	-	-	-	-	-	-
Polypedilum	34.4	-	-	-	-	-	-	-	-
Sergentia	3,410	-	-	-	-	-	896	8.61	-
Stictochironomus	689	-	-	103	-	-	276	-	17.2
Tanytarsus	-	-	-	-	-	-	-	-	-
S.F. Diamesinae									
Protanypus	-	51.7	34.4	-	8.61	8.61	34.4	-	8.61
Pseudodiamesa	-	-	43.1	-	-	-	-	-	-
S.F. Orthocladiinae									
Abiskomyia	1,240	-	129	103	-	-	-	-	-
Eukiefferiella	-	-	-	-	-	-	-	-	-
Heterotrissocladius	68.9	138	456	17.2	-	284	68.9	551	586
Limnophyes	34.4	-	-	-	-	-	-	-	-
Mesocricotopus	34.4	-	-	-	-	34.4	-	34.4	51.7
Paracladius	34.4	-	8.61	-	-	-	-	-	-
Parakiefferiella	-	-	17.2	-	-	-	-	-	-
Psectrocladius	-	-	-	-	-	-	-	-	-
Zalutschia	-	-	34.4	-	-	-	34.4	-	-
indeterminate	-	-	-	-	-	-	-	-	-
S.F. Tanypodinae									
Arctopelopia	-	-	-	-	-	-	-	-	-
Procladius	-	86.1	103	17.2	68.9	25.8	-	8.61	86.1
SUMMARY METRICS									
Density (No. organisms per m^2)	6166	405	1886	482	654	413	1516	637	792
Richness (total number of taxa)[a]	16	7	13	9	3	6	7	6	9
Simpson's Evenness (E)	0.681	0.891	0.922	0.942	0.317	0.606	0.688	0.271	0.491
Shannon-Wiener Diversity	2.12	2.3	3.05	2.84	0.584	1.59	1.82	0.79	1.45
Dominant Taxonomic Group Composition									
% Nemata	0.559	2.13	16.4	10.7	0	6.25	0	0	1.09
% Hydracarina	1.12	21.3	8.22	7.14	0	0	0	4.05	3.26
% Ostracods	1.68	4.26	15.5	7.14	88.2	8.33	0	0	0
% Chironomids	94.4	72.3	59.8	71.4	11.8	85.4	100	96	95.7
Functional Feeding Group Composition									
% Collector - Gatherers	93.3	54.6	68.5	70.3	89.5	93.8	90.7	94.6	84.8
% Filterers	3.91	2.19	16	18.8	0	0	6.98	0	1.09
% Shredders	0.559	0	1.83	0	0	0	2.33	0	0
Habitat Preference Group Composition									
% Clingers	61.5	23.5	24.2	25.9	0	0	67.4	5.42	4.35
% Sprawlers	25.7	61.2	57.5	37.2	98.7	91.7	6.98	94.6	91.3
% Burrowers	12.8	15.3	18.3	36.8	1.32	8.33	25.6	0	4.35

Note: "-" indicates no taxa present.

[a] Bold entries excluded from taxa count.

Table F.53: Statistical Comparison of Benthic Invertebrate Community Metrics at Mary Lake (BL0) Littoral (Shallow) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2007	Pairwise Comparison
Density (Individuals/m^2)	ANOVA	none	NO	0.929	2007	3	2,667	1,454	-	A
					2015	4	2,453	2,186	-0.15	A
					2016	6	1,946	1,591	-0.50	A
					2017	4	1,839	1,853	-0.57	A
					2018	4	1,718	1,418	-0.65	A
					2019	4	2,448	2,313	-0.15	A
					2020	4	4,086	3,955	0.98	A
					2021	4	2,685	1,758	0.012	A
					2022	4	2,202	1,373	-0.32	A
					2023	3	2,819	2,992	0.10	A
Richness (Number of Taxa)	ANOVA	none	NO	0.429	2007	3	8.00	2.00	-	A
					2015	4	9.00	1.83	0.50	A
					2016	6	8.67	0.516	0.33	A
					2017	4	9.50	2.08	0.75	A
					2018	4	9.25	2.22	0.62	A
					2019	4	11.5	5.00	1.8	A
					2020	4	11.5	4.20	1.8	A
					2021	4	12.5	3.42	2.2	A
					2022	4	10.8	2.63	1.4	A
					2023	3	12.0	4.58	2.0	A
Simpson's Evenness (E)	ANOVA	none	NO	0.321	2007	3	0.718	0.0411	-	A
					2015	4	0.761	0.0583	1.1	A
					2016	6	0.574	0.299	-3.5	A
					2017	4	0.818	0.110	2.4	A
					2018	4	0.575	0.293	-3.5	A
					2019	4	0.663	0.169	-1.3	A
					2020	4	0.765	0.0409	1.1	A
					2021	4	0.783	0.0708	1.6	A
					2022	4	0.726	0.0312	0.20	A
					2023	3	0.832	0.131	2.8	A
Nemata (%)	K-W	rank	NO	0.699	2007	3	7.29	11.2	-	A
					2015	4	5.64	6.29	1.2	A
					2016	6	3.64	7.47	-0.47	A
					2017	4	3.50	6.25	-0.44	A
					2018	4	3.50	6.41	-0.51	A
					2019	4	2.38	2.40	-0.14	A
					2020	4	1.12	1.69	-0.50	A
					2021	4	1.56	2.46	-0.48	A
					2022	4	1.46	2.54	-0.57	A
					2023	3	6.37	8.75	0.25	A
Ostracoda (%)	K-W	rank	YES	0.022	2007	3	0.218	0.378	-	C
					2015	4	1.86	2.20	-[b]	BC
					2016	6	2.29	2.22	-[b]	BC
					2017	4	2.11	2.17	-[b]	BC
					2018	4	8.86	10.9	-[b]	AB
					2019	4	2.02	1.14	-[b]	BC
					2020	4	42.7	12.7	-[b]	A
					2021	4	10.8	6.78	-[b]	AB
					2022	4	10.6	17.7	-[b]	B
					2023	3	7.15	7.37	-[b]	AB

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Contrast MODs could not be calculated because the MAD=0.

Table F.53: Statistical Comparison of Benthic Invertebrate Community Metrics at Mary Lake (BL0) Littoral (Shallow) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007), Mary River Project CREMP

Metric	Overall 9-Year Comparison				Pair-wise, *post hoc* comparisons[a]					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2007	Pairwise Comparison
Chironomidae (%)	ANOVA	log10	YES	0.003	2007	3	90.8	11.8	-	A
					2015	4	91.0	7.74	0.045	A
					2016	6	90.6	12.2	-0.039	A
					2017	4	85.7	13.1	-0.45	A
					2018	4	86.2	18.7	-0.50	A
					2019	4	93.4	3.97	0.25	A
					2020	4	52.5	14.7	-4.2	B
					2021	4	84.1	9.23	-0.55	A
					2022	4	86.6	19.9	-0.48	A
					2023	3	75.5	17.5	-1.4	AB
Metal Sensitive Chironomidae (%)	ANOVA	log10	NO	0.784	2007	3	22.4	13.8	-	A
					2015	4	15.8	14.6	-0.76	A
					2016	6	19.2	13.3	-0.39	A
					2017	4	21.3	7.70	0.12	A
					2018	4	11.6	9.83	-0.98	A
					2019	4	14.2	12.2	-0.85	A
					2020	4	8.05	6.63	-1.2	A
					2021	4	10.8	9.07	-0.88	A
					2022	4	9.49	6.99	-1.1	A
					2023	3	13.1	8.32	-0.66	A
Collector Gatherers (%)	K-W	rank	NO	0.908	2007	3	66.0	26.7	-	A
					2015	4	72.8	23.1	0.24	A
					2016	6	73.5	24.7	0.44	A
					2017	4	52.2	23.6	-0.33	A
					2018	4	76.1	36.4	0.69	A
					2019	4	65.1	24.9	0.22	A
					2020	4	68.8	24.9	0.14	A
					2021	4	60.9	35.6	-0.021	A
					2022	4	61.3	35.5	-0.16	A
					2023	3	72.1	19.6	0.0064	A
Filterers (%)	K-W	rank	NO	0.732	2007	3	22.0	14.5	-	A
					2015	4	14.4	16.2	-1.1	A
					2016	6	12.4	13.2	-1.5	A
					2017	4	13.3	16.0	-1.3	A
					2018	4	4.06	7.31	-2.1	A
					2019	4	11.5	13.8	-1.4	A
					2020	4	5.46	8.33	-2.0	A
					2021	4	7.62	11.4	-1.9	A
					2022	4	6.97	8.83	-1.8	A
					2023	3	7.36	7.51	-1.8	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

[b] Contrast MODs could not be calculated because the MAD=0.

Table F.54: Statistical Comparison of Benthic Invertebrate Community Metrics at Mary Lake (BL0) Profundal (Deep) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007), Mary River Project CREMP

Metric	Overall 8-Year Comparison				Pair-wise, *post hoc* comparisons[a]					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2007	Pairwise Comparison
Density (Individuals/m^2)	ANOVA	log10	YES	0.004	2007	4	3,512	3,257	-	A
					2015	6	775	748	-1.2	BC
					2017	6	536	497	-1.5	B
					2018	6	1,520	599	-0.38	AC
					2019	6	1,428	506	-0.42	AC
					2020	6	779	452	-1.0	ABC
					2021	6	1,318	666	-0.59	ABC
					2022	6	993	364	-0.75	ABC
					2023	6	749	399	-1.0	ABC
Richness (Number of Taxa)	ANOVA	log10	NO	0.997	2007	4	7.96	6.17	-	A
					2015	6	7.67	4.08	0.14	A
					2017	6	7.00	1.55	0.16	A
					2018	6	8.17	4.36	0.21	A
					2019	6	8.17	4.49	0.21	A
					2020	6	7.50	2.81	0.20	A
					2021	6	8.50	5.01	0.26	A
					2022	6	6.83	2.99	0.080	A
					2023	6	6.67	2.25	0.074	A
Simpson's Evenness (E)	ANOVA	log10	NO	0.243	2007	4	0.453	0.268	-	A
					2015	6	0.696	0.142	0.63	A
					2017	6	0.604	0.236	0.48	A
					2018	6	0.387	0.359	-0.23	A
					2019	6	0.479	0.273	0.19	A
					2020	6	0.586	0.201	0.46	A
					2021	6	0.497	0.334	0.16	A
					2022	6	0.378	0.282	-0.070	A
					2023	6	0.553	0.249	0.38	A
Nemata (%)	K-W	rank	NO	0.362	2007	4	1.30	1.80	-	A
					2015	6	1.97	2.60	0.14	A
					2017	6	2.40	1.89	1.7	A
					2018	6	1.65	1.94	0.61	A
					2019	6	0.693	0.917	-0.24	A
					2020	6	0.607	1.04	-0.77	A
					2021	6	0.690	1.10	-0.77	A
					2022	6	0.242	0.592	-0.77	A
					2023	6	3.01	4.49	-0.13	A
Ostracoda (%)	K-W	rank	NO	0.484	2007	4	1.60	2.19	-	A
					2015	6	11.1	10.9	7.9	A
					2017	6	3.18	6.16	-0.67	A
					2018	6	3.52	3.22	1.5	A
					2019	6	10.9	17.4	2.6	A
					2020	6	23.4	28.9	10	A
					2021	6	6.43	6.41	2.6	A
					2022	6	5.89	10.0	1.0	A
					2023	6	17.3	34.9	2.1	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

Table F.54: Statistical Comparison of Benthic Invertebrate Community Metrics at Mary Lake (BL0) Profundal (Deep) Stations Among Years of Mine Operation (2015 to 2023) and Baseline (2007), Mary River Project CREMP

Metric	Overall 8-Year Comparison				Pair-wise, *post hoc* comparisons[a]					
	Statistical Test[a]	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2007	Pairwise Comparison
Chironomidae (%)	K-W	rank	NO	0.378	2007	4	96.3	4.66	-	A
					2015	6	83.8	12.2	-5.2	A
					2017	6	84.9	13.8	-3.4	A
					2018	6	93.8	4.13	-2.2	A
					2019	6	86.7	17.4	-2.4	A
					2020	6	71.3	30.2	-7.6	A
					2021	6	86.4	10.1	-5.0	A
					2022	6	91.9	9.31	-1.2	A
					2023	6	76.7	33.4	-3.2	A
Metal Sensitive Chironomidae (%)	K-W	rank	NO	0.775	2007	4	33.7	27.9	-	A
					2015	6	9.54	8.16	-1.00	A
					2017	6	5.57	3.20	-1.1	A
					2018	6	8.63	11.2	-1.2	A
					2019	6	4.46	4.55	-1.2	A
					2020	6	5.60	5.22	-1.1	A
					2021	6	8.34	9.71	-1.2	A
					2022	6	4.22	3.49	-1.2	A
					2023	6	5.61	7.23	-1.2	A
Collector Gatherers (%)	K-W	rank	NO	0.190	2007	4	64.5	27.7	-	A
					2015	6	82.7	5.91	0.90	A
					2017	6	80.7	18.2	1.1	A
					2018	6	90.0	13.2	1.4	A
					2019	6	92.3	4.19	1.3	A
					2020	6	86.6	5.88	1.1	A
					2021	6	83.8	16.5	1.2	A
					2022	6	93.4	4.32	1.3	A
					2023	6	87.3	9.01	1.2	A
Filterers (%)	K-W	rank	NO	0.381	2007	4	33.1	27.8	-	A
					2015	6	9.41	7.87	-0.96	A
					2017	6	3.78	2.69	-1.1	A
					2018	6	7.80	11.4	-1.2	A
					2019	6	2.94	4.05	-1.2	A
					2020	6	3.15	5.34	-1.2	A
					2021	6	5.89	9.24	-1.2	A
					2022	6	2.81	3.39	-1.2	A
					2023	6	4.48	7.52	-1.2	A

Indicates a statistically significant difference for respective comparison (p-value ≤ 0.1).

Indicates a statistically significant difference with a magnitude of difference outside of the Critical Effect Size of ± 2 SD of respective baseline year mean, suggesting an ecologically meaningful difference in endpoint values between study years.

Notes: '-' indicates not applicable; MOD = Magnitude of Difference = (MCTyear1 - MCTBaseline)/SDBaseline; MCT = Measure of Central Tendency; SD = Standard Deviation. MCT and SD reported as median and MAD (Median Absolute Deviation) for rank-transformed data, as transformed means and SD for log transformed data, and as untransformed means and SD for untransformed data.

[a] Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

APPENDIX G

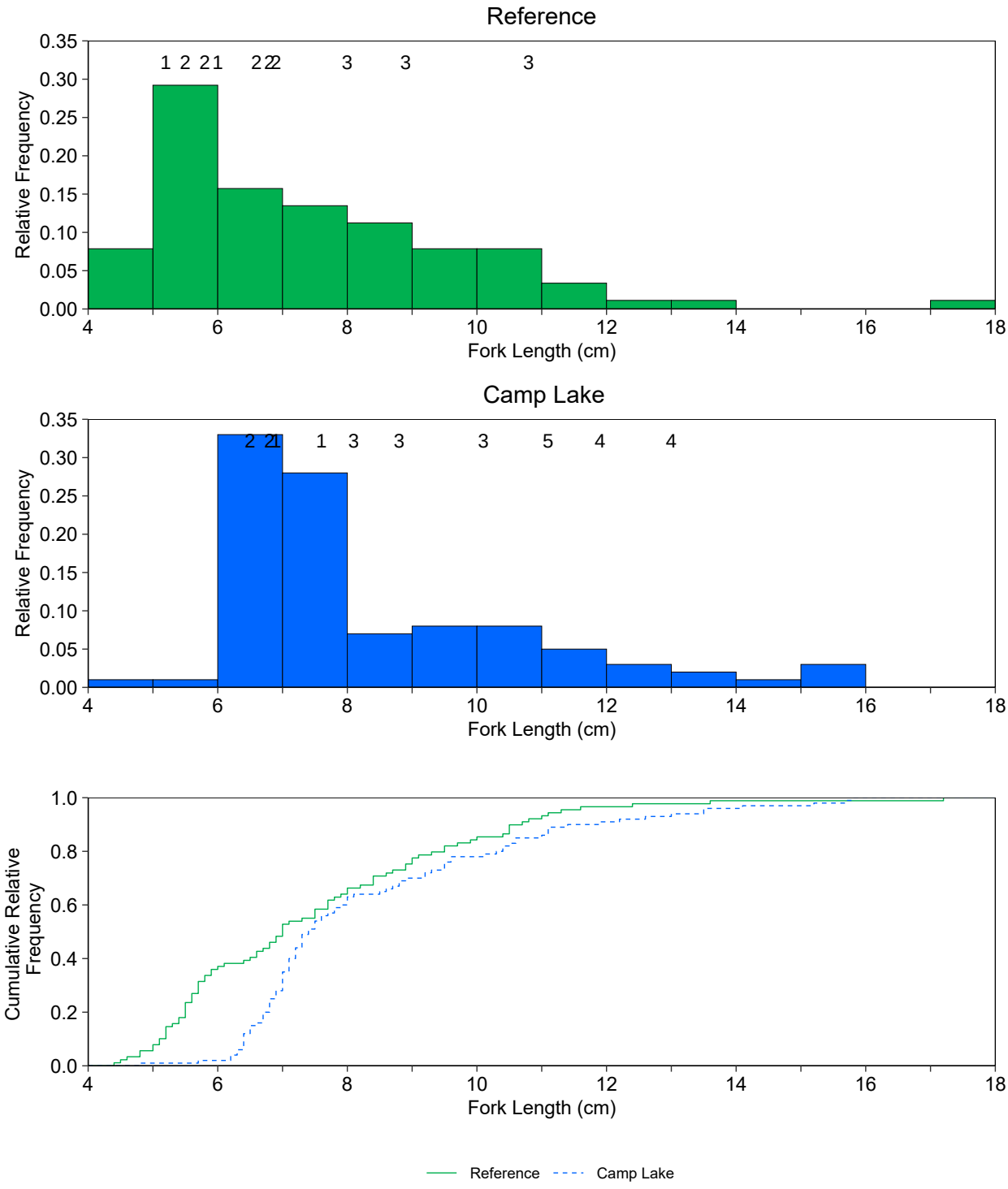


Figure G.1: Relative Length-Frequency and Cumulative Length-Frequency Distributions for Non-Young-of-the-Year (YOY) Arctic Charr Captured by Backpack Electrofishing at Camp Lake (JL0) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Fish ages are shown above the bars, where available. Camp Lake n = 100; Reference Lake 3 n = 89.

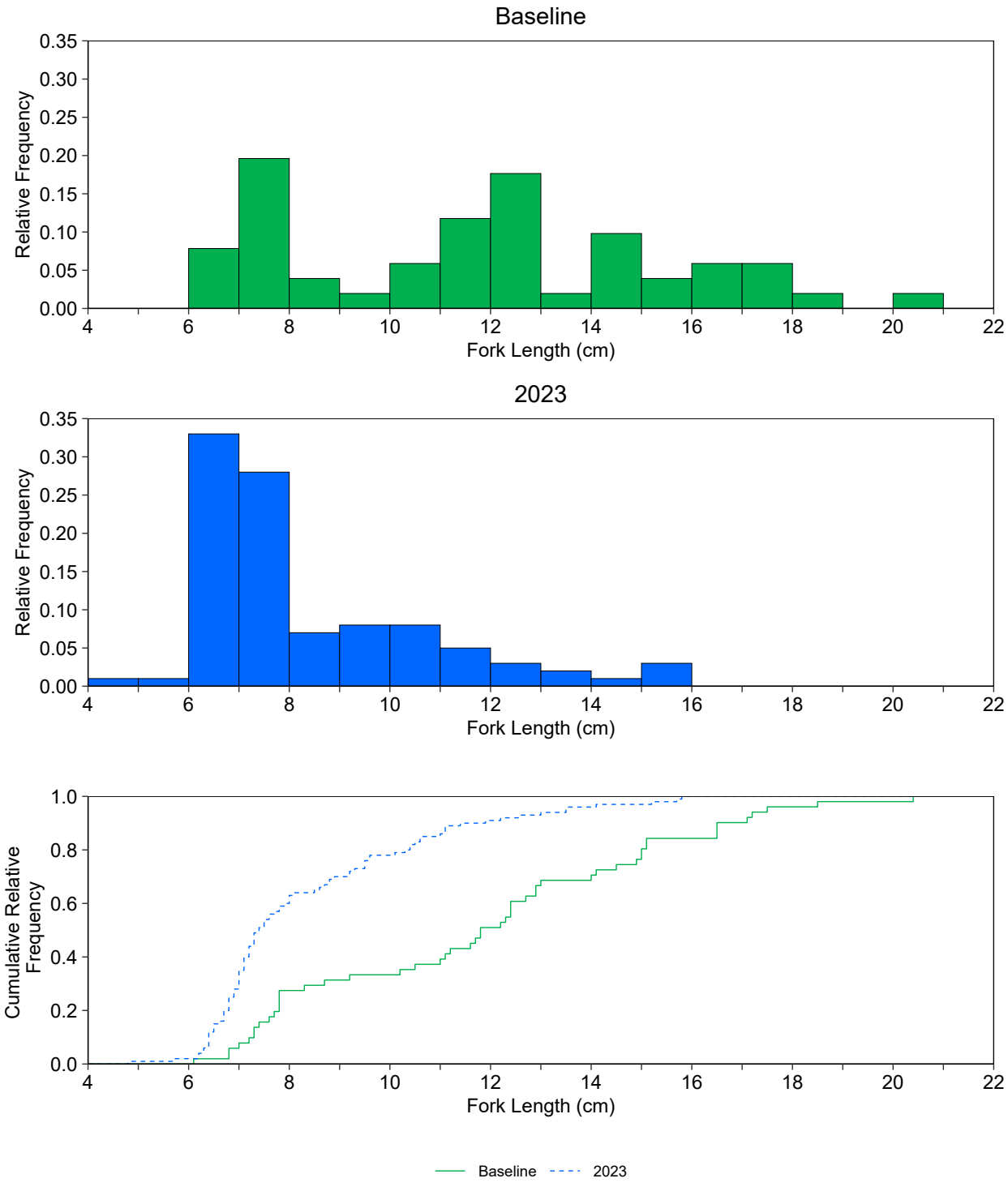


Figure G.2: Relative Length-Frequency and Cumulative Length-Frequency Distributions for Arctic Charr Captured by Backpack Electrofishing at Camp Lake (JL0) in 2023 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Note: Camp Lake 2023 n = 100; Baseline n = 100.

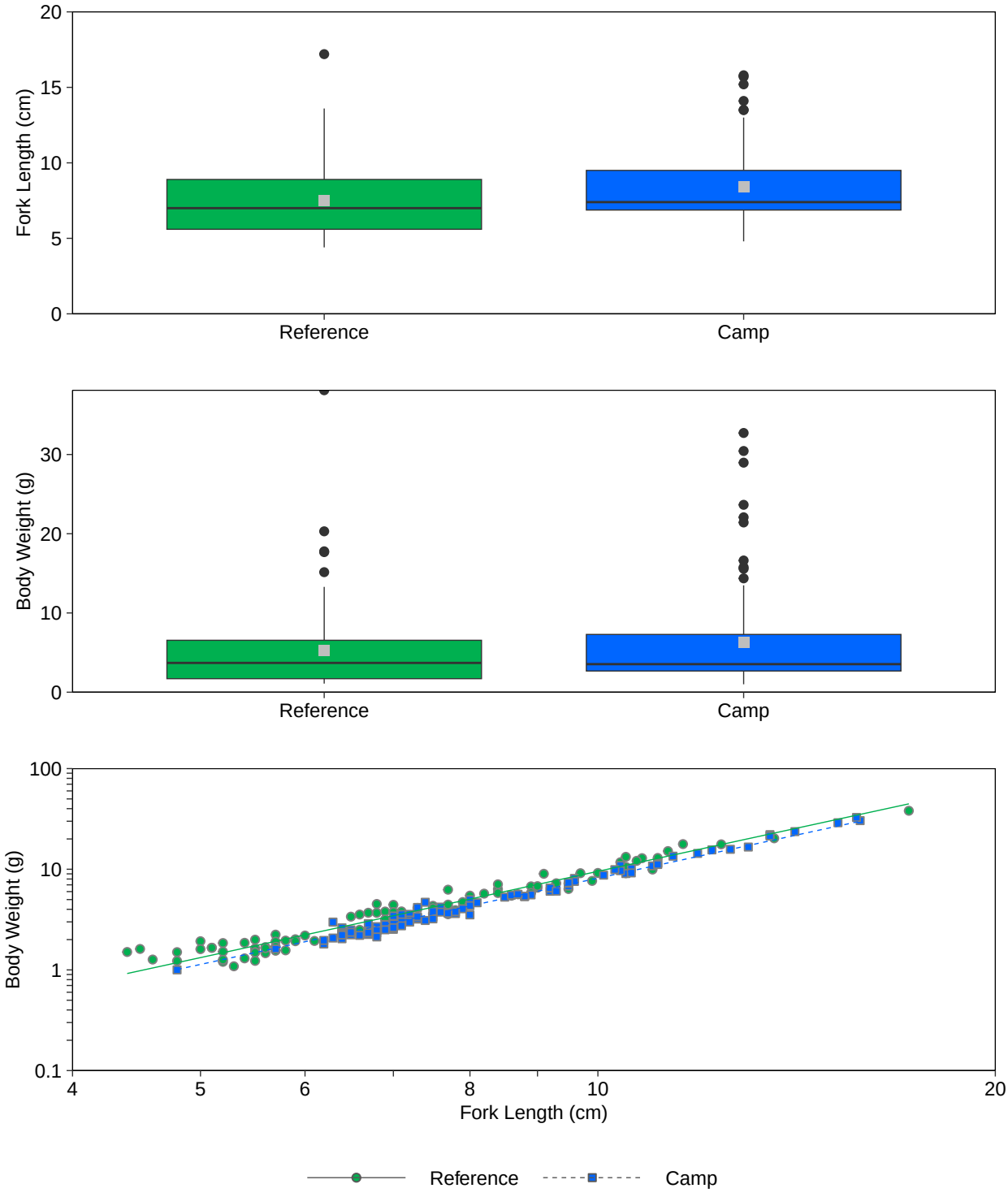


Figure G.3: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Non-Young-of-the-Year (YOY) Arctic Charr Captured by Backpack Electrofishing at Camp Lake (JL0) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

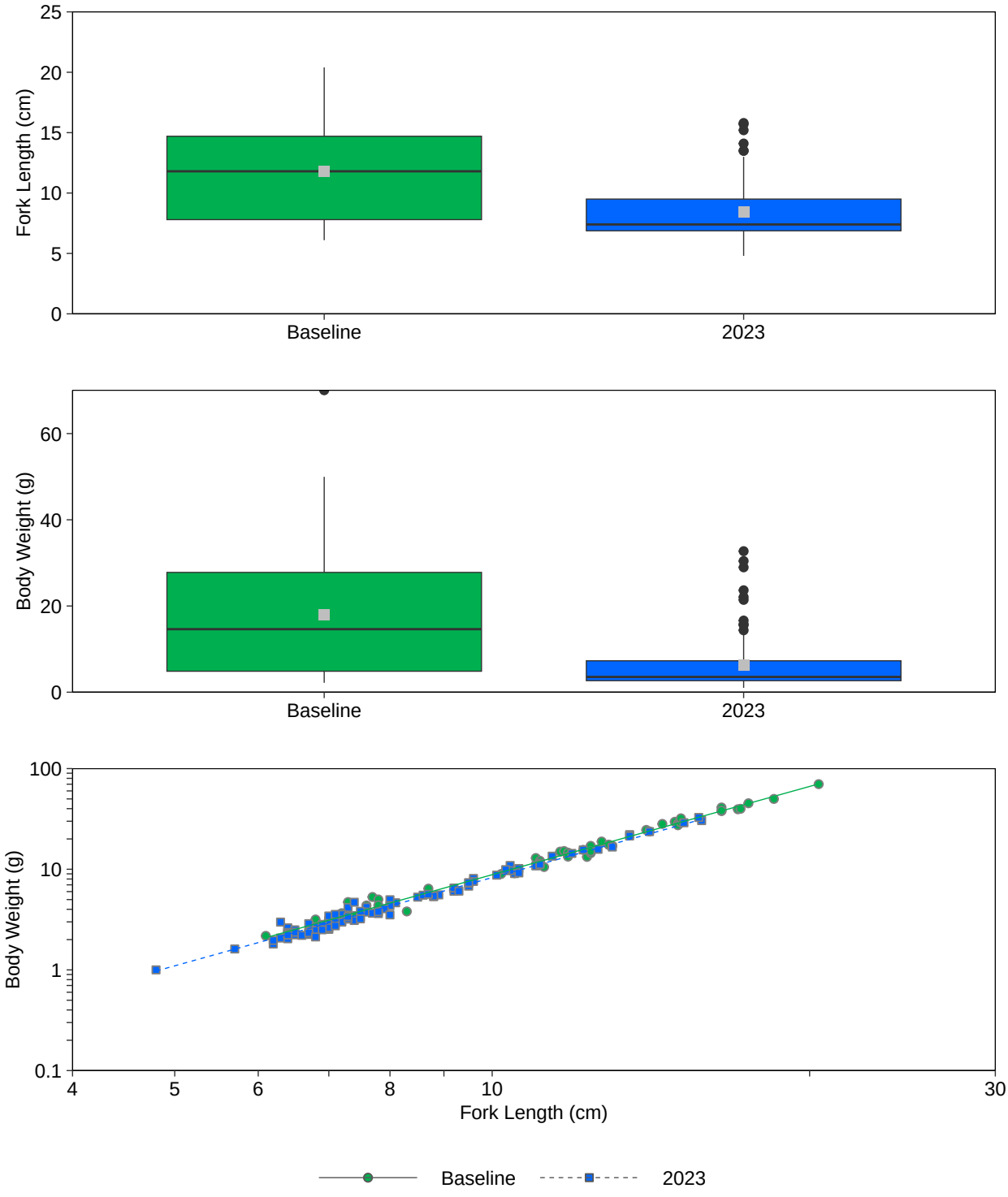


Figure G.4: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Arctic Charr Captured by Backpack Electrofishing at Camp Lake (JL0) in 2023 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

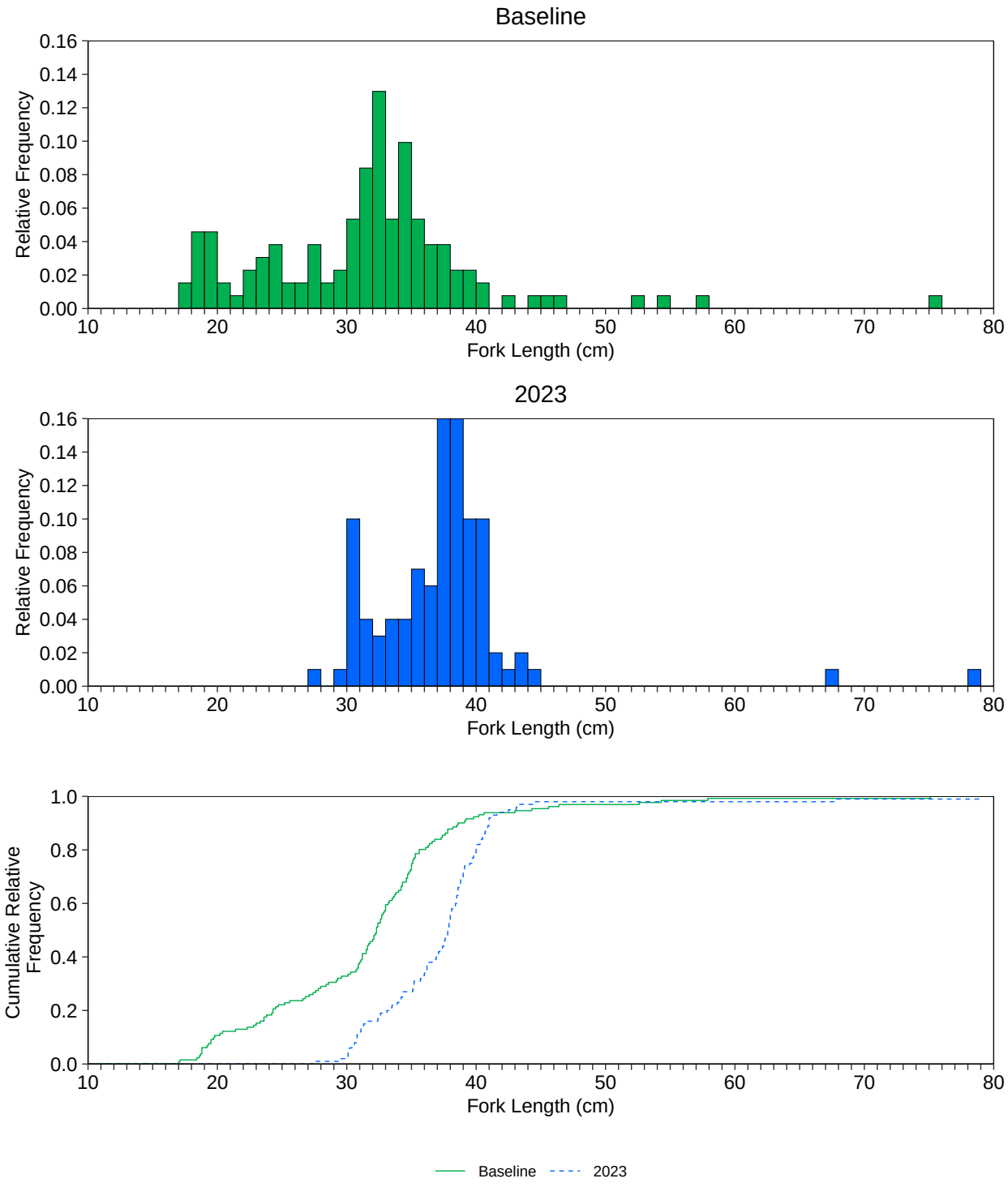


Figure G.5: Relative Length-Frequency and Cumulative Length-Frequency Distributions for Arctic Charr Captured by Gill Netting at Camp lake (JL0) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Notes: Camp Lake n = 100; Baseline n = 131.

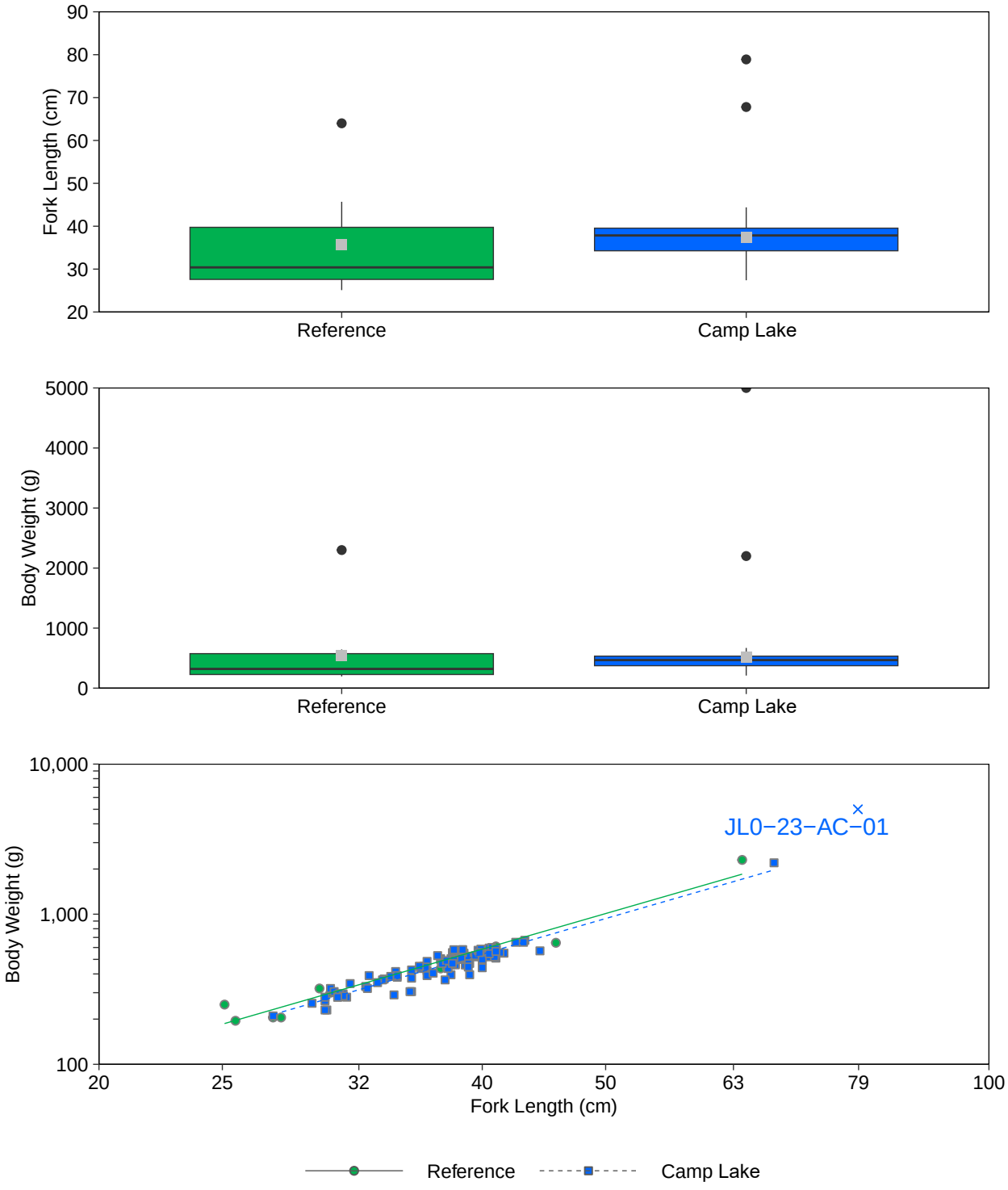


Figure G.6: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Arctic Charr Captured by Gill Netting at Camp Lake (JL0) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

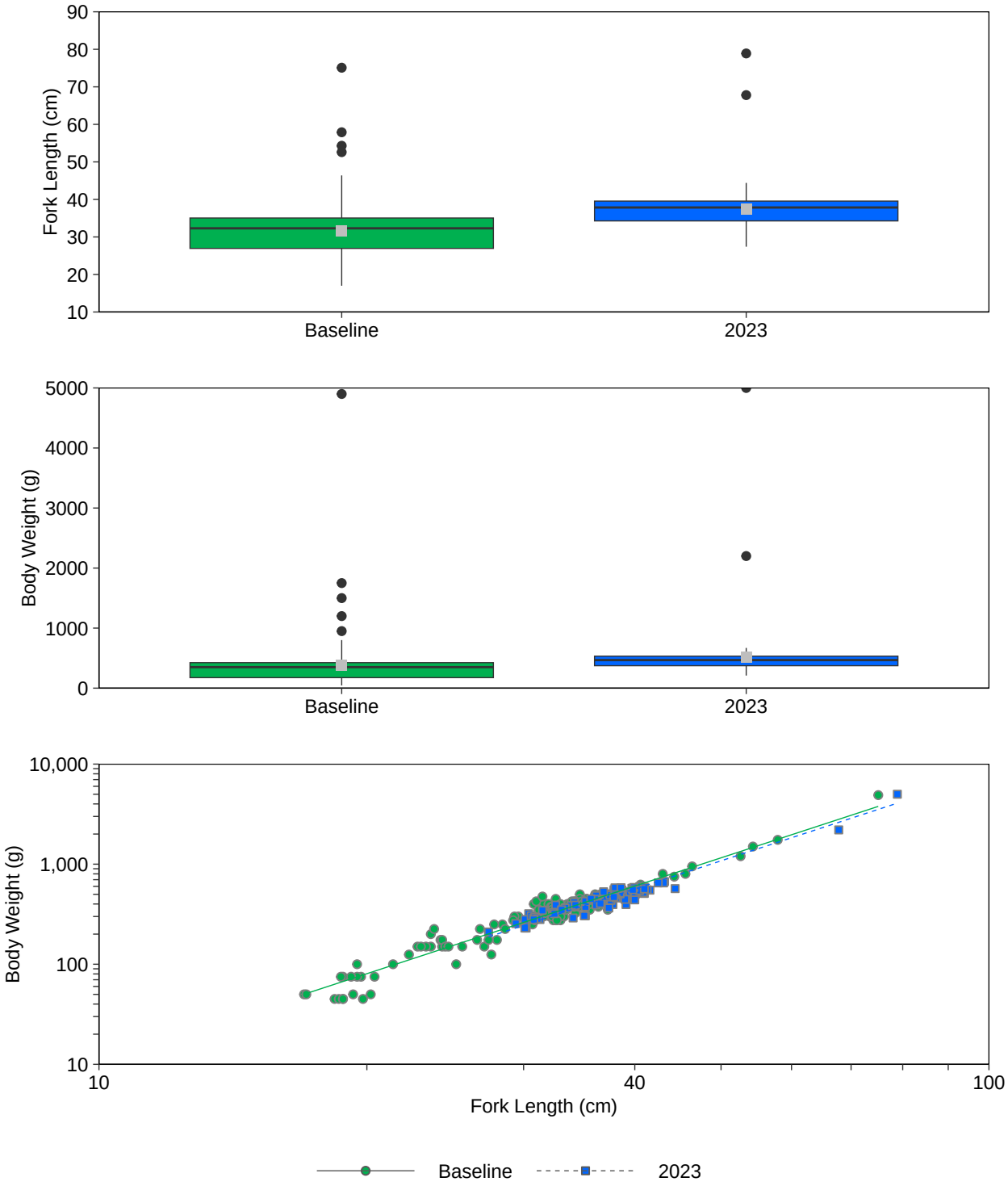


Figure G.7: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Arctic Charr Captured by Gill Netting at Camp Lake (JL0) in 2023 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

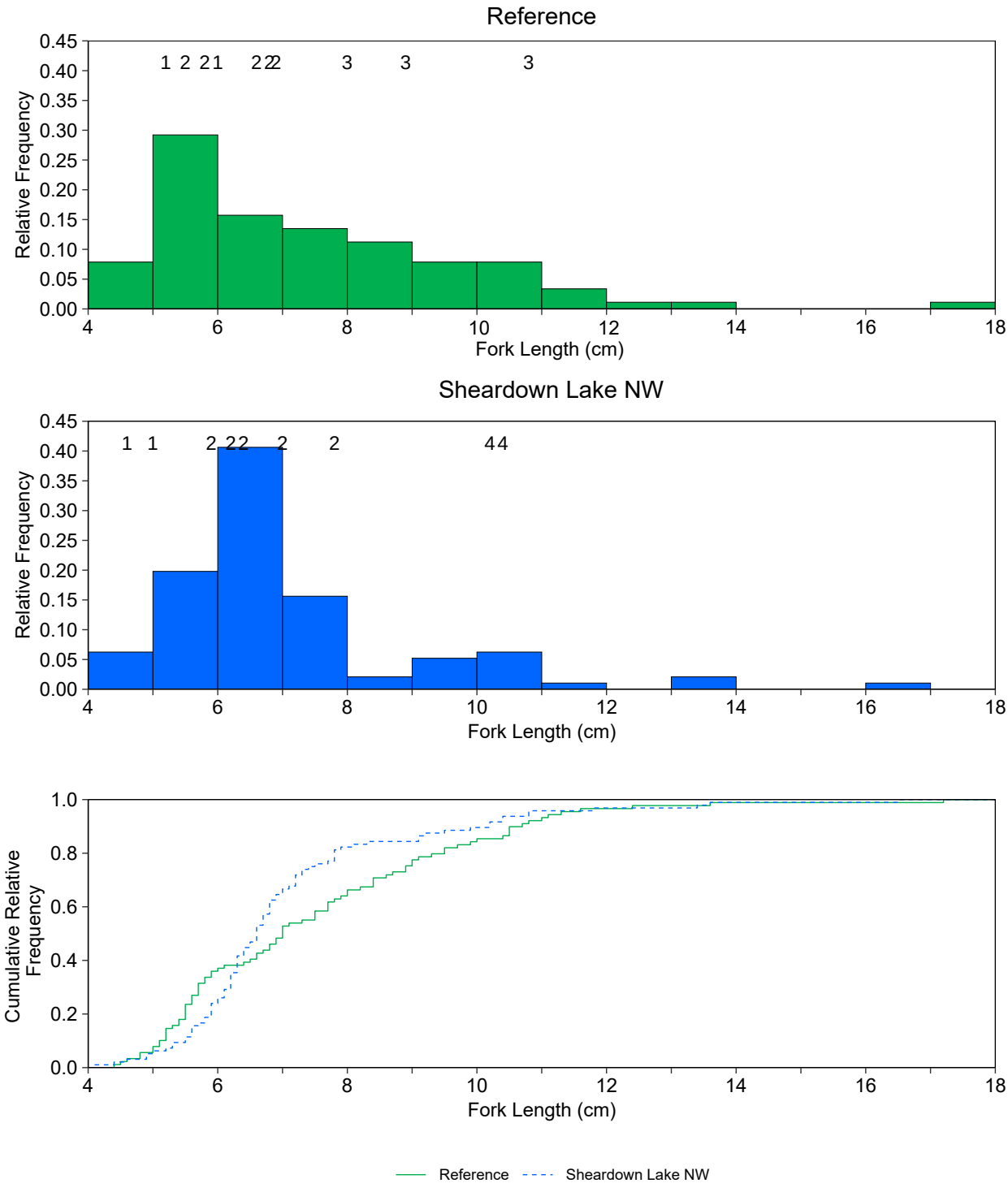


Figure G.8: Relative Length-Frequency Distributions for Non-Young-of-the-Year (YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Northwest (DL0-01) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Fish ages are shown above the bars, where available. Sheardown Lake Northwest n = 96; Reference Lake 3 n = 89.

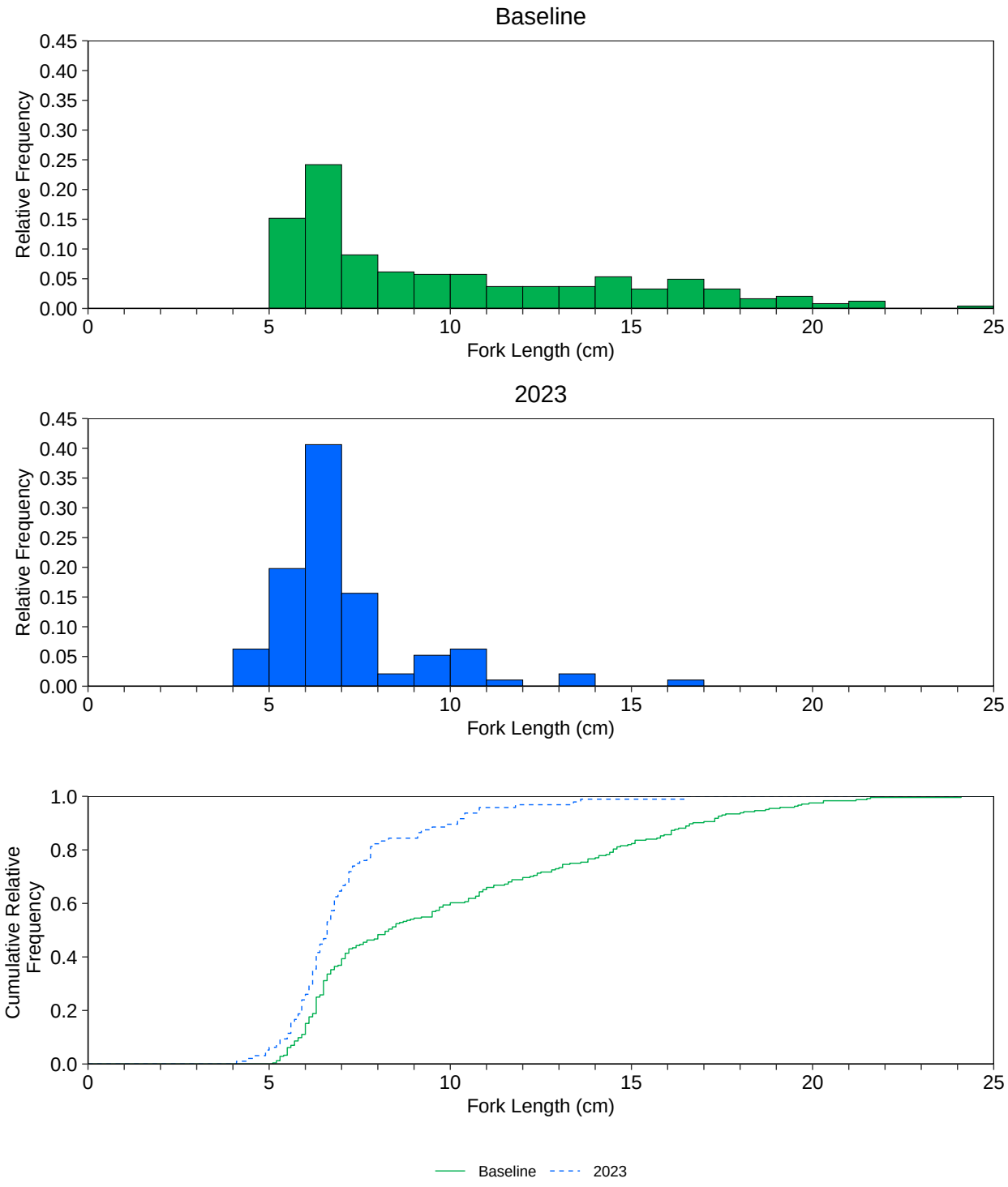


Figure G.9: Relative Length-Frequency and Cumulative Length-Frequency Distributions for Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Northwest (DL0-01) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Note: Sheardown Lake Northwest 2023 n = 96; Baseline n = 244.

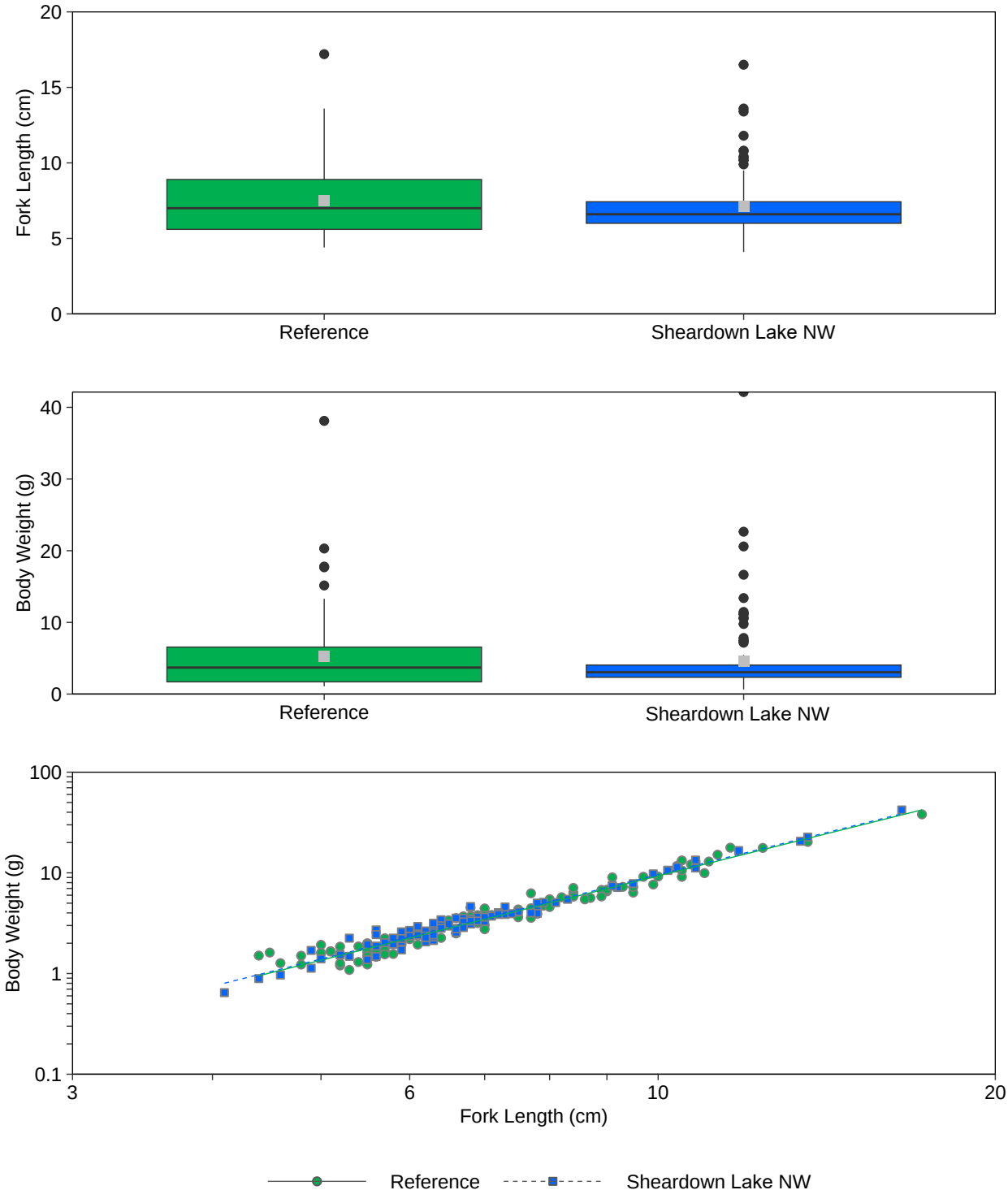


Figure G.10: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Non-Young-of-the Year (YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Northwest (DL0-01) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

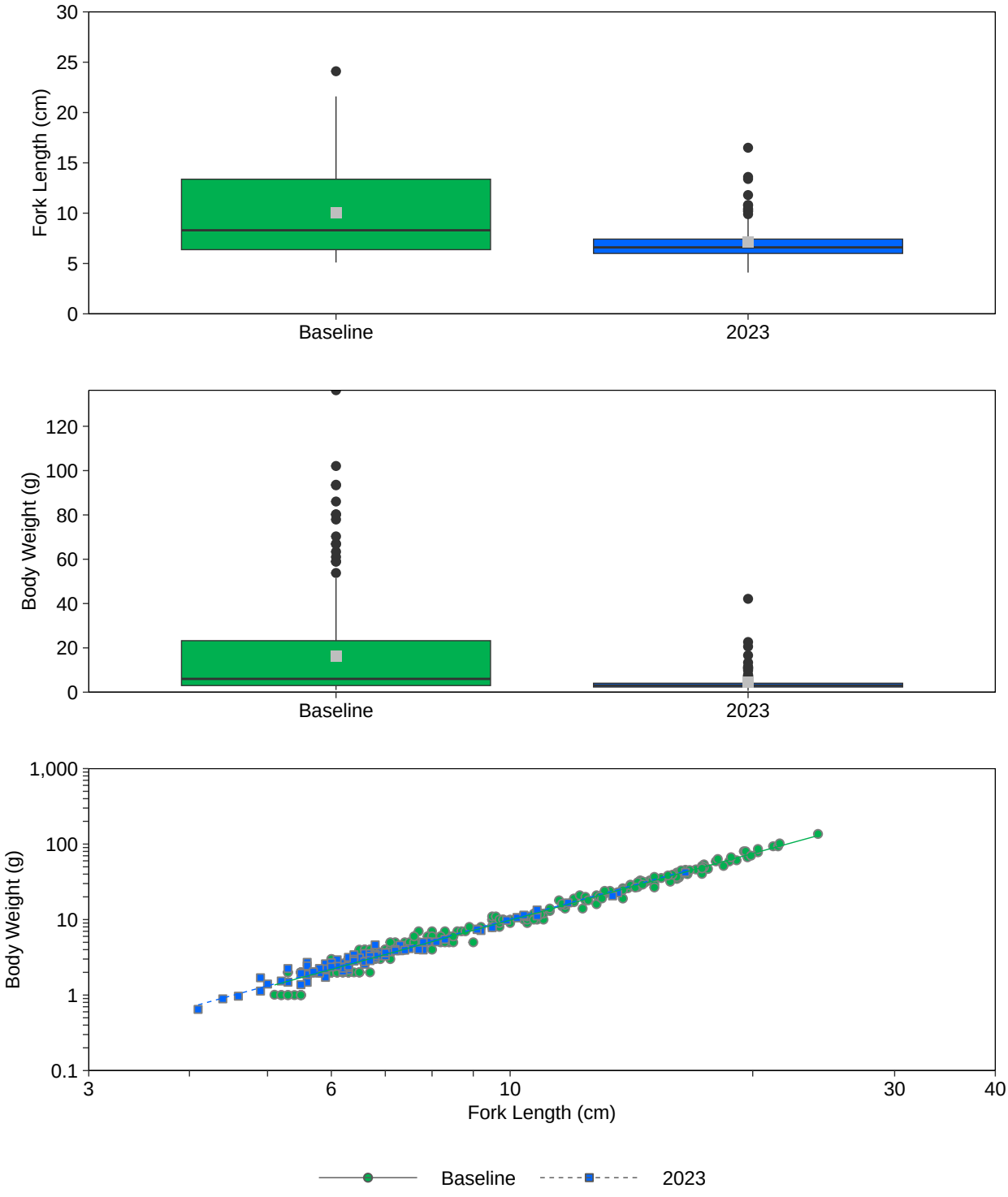


Figure G.11: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Northwest (DL0-01) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

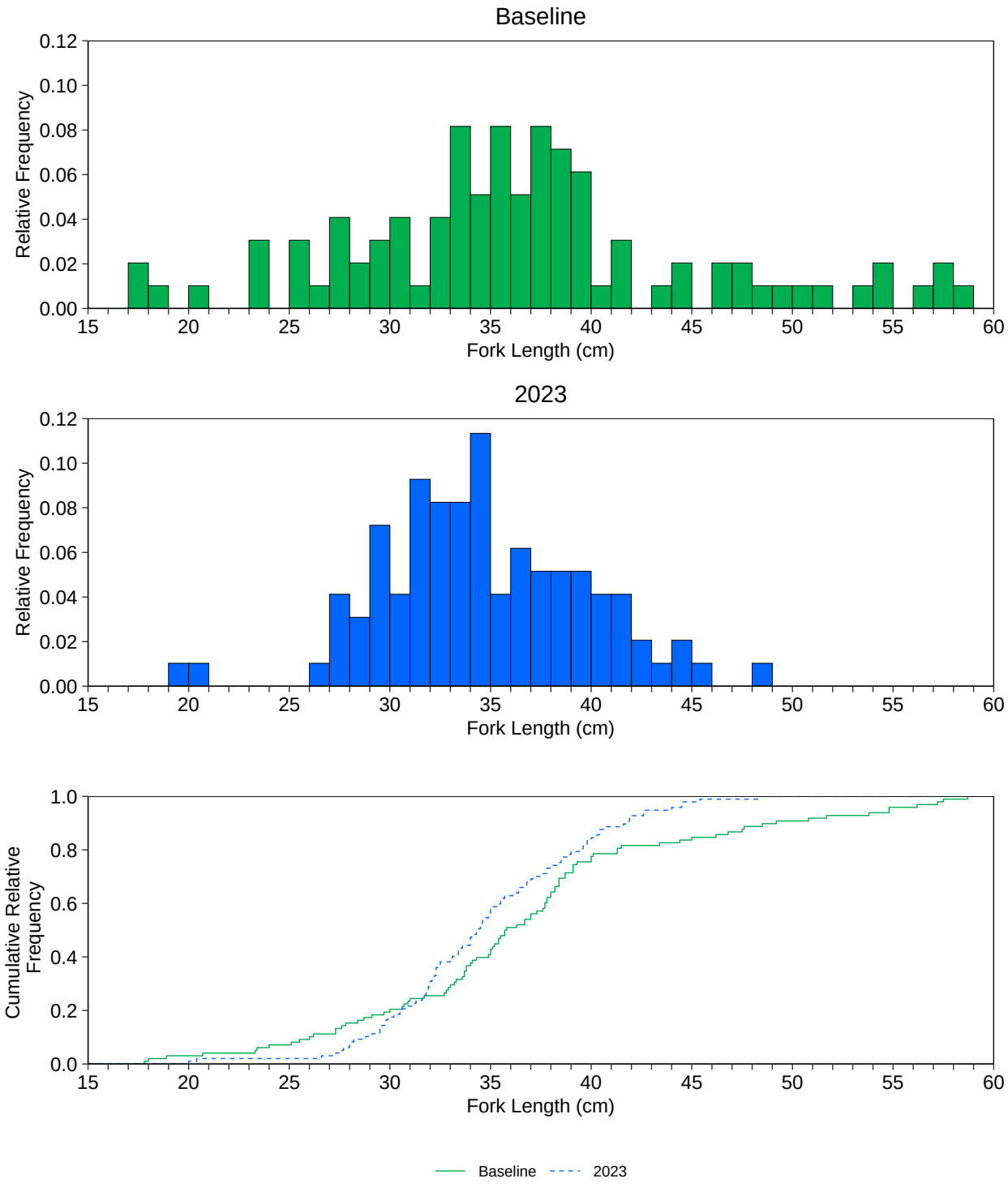


Figure G.12: Relative Length-Frequency and Cumulative Length-Frequency Distributions for Arctic Charr Captured by Gill Netting at Sheardown Lake Northwest (DL0-01) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Notes: Sheardown Lake Northwest n = 97 ; Baseline n = 98.

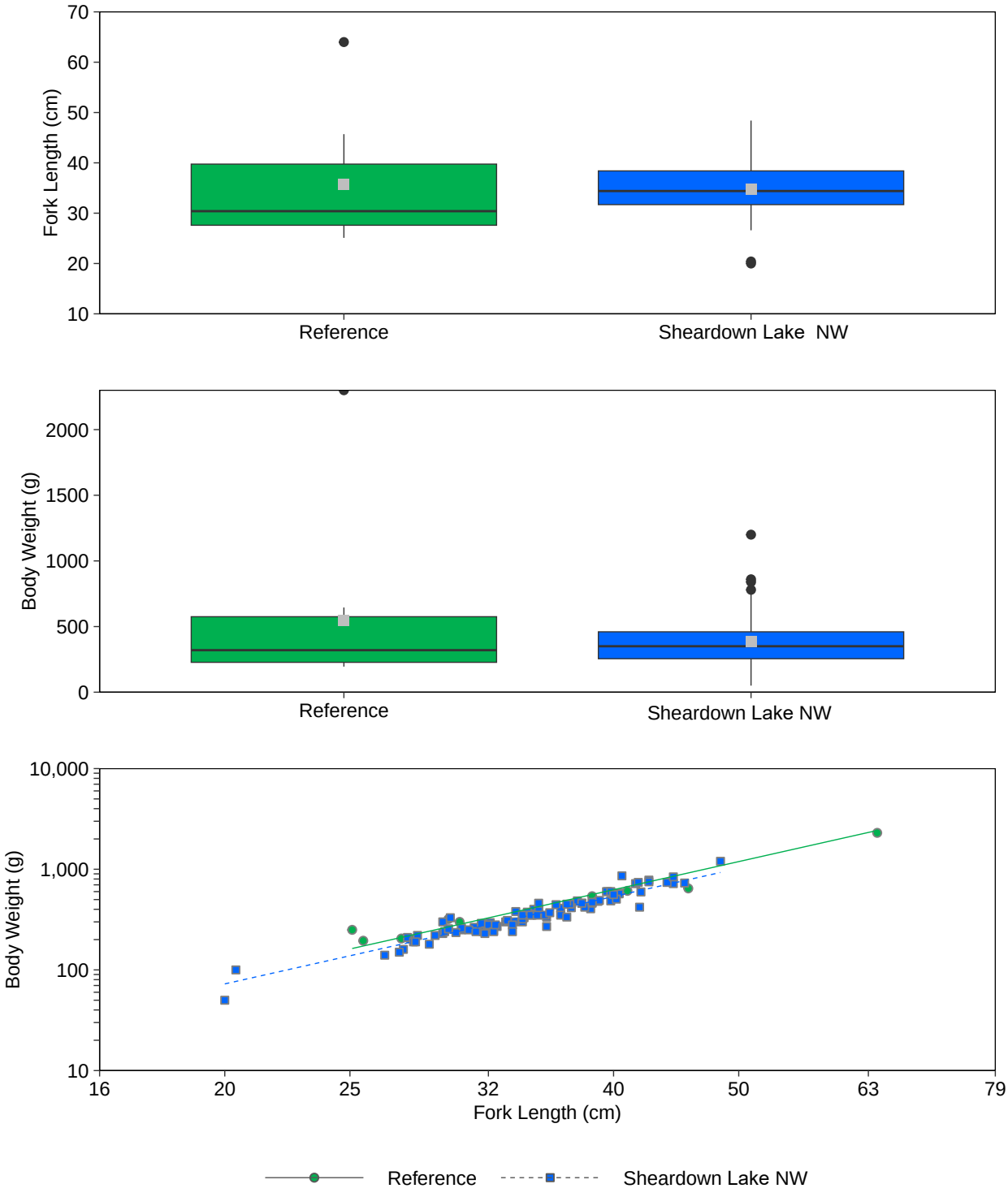


Figure G.13: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Arctic Charr Captured by Gill Netting at Sheardown Lake Northwest (DL0-01) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

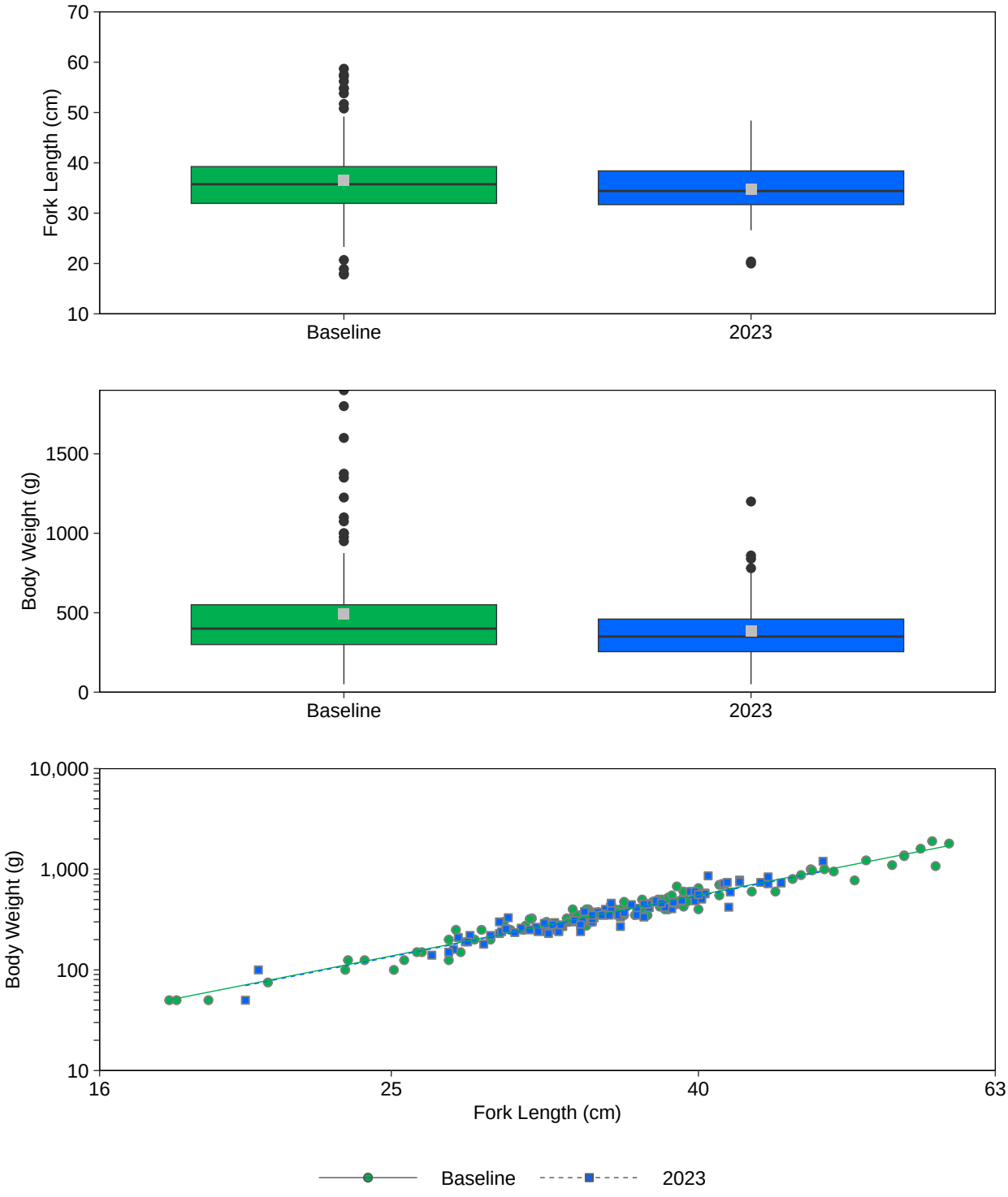


Figure G.14: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Arctic Charr Captured by Gill Netting at Sheardown Lake Northwest (DL0-01) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

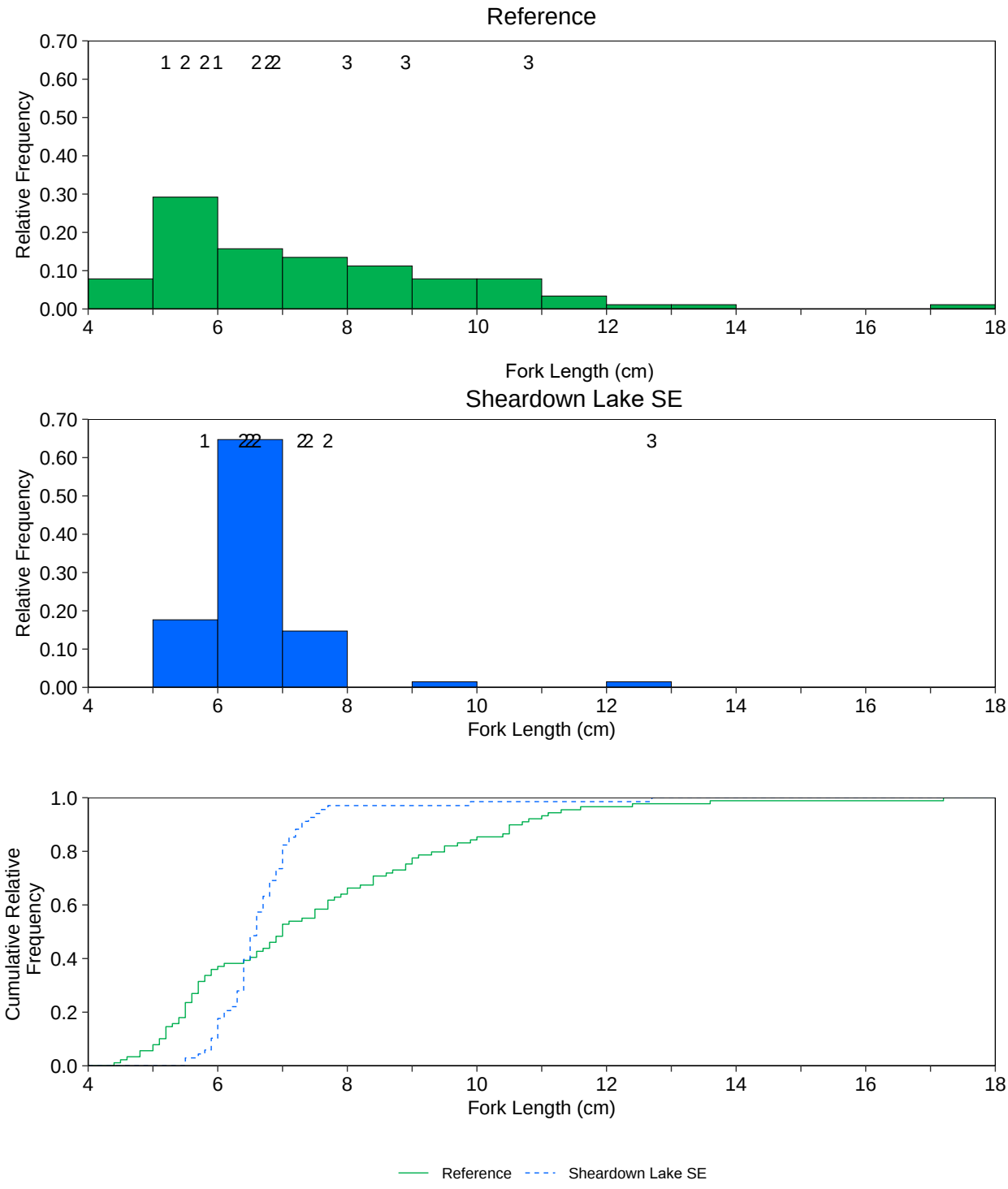


Figure G.15: Relative Length-Frequency and Cumulative Length-Frequency Distributions for Non-Young-of-the-Year (YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Southeast (DL0-02) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Fish ages are shown above the bars, where available. Sheardown Lake Southeast n = 68; Reference Lake 3 n = 89.

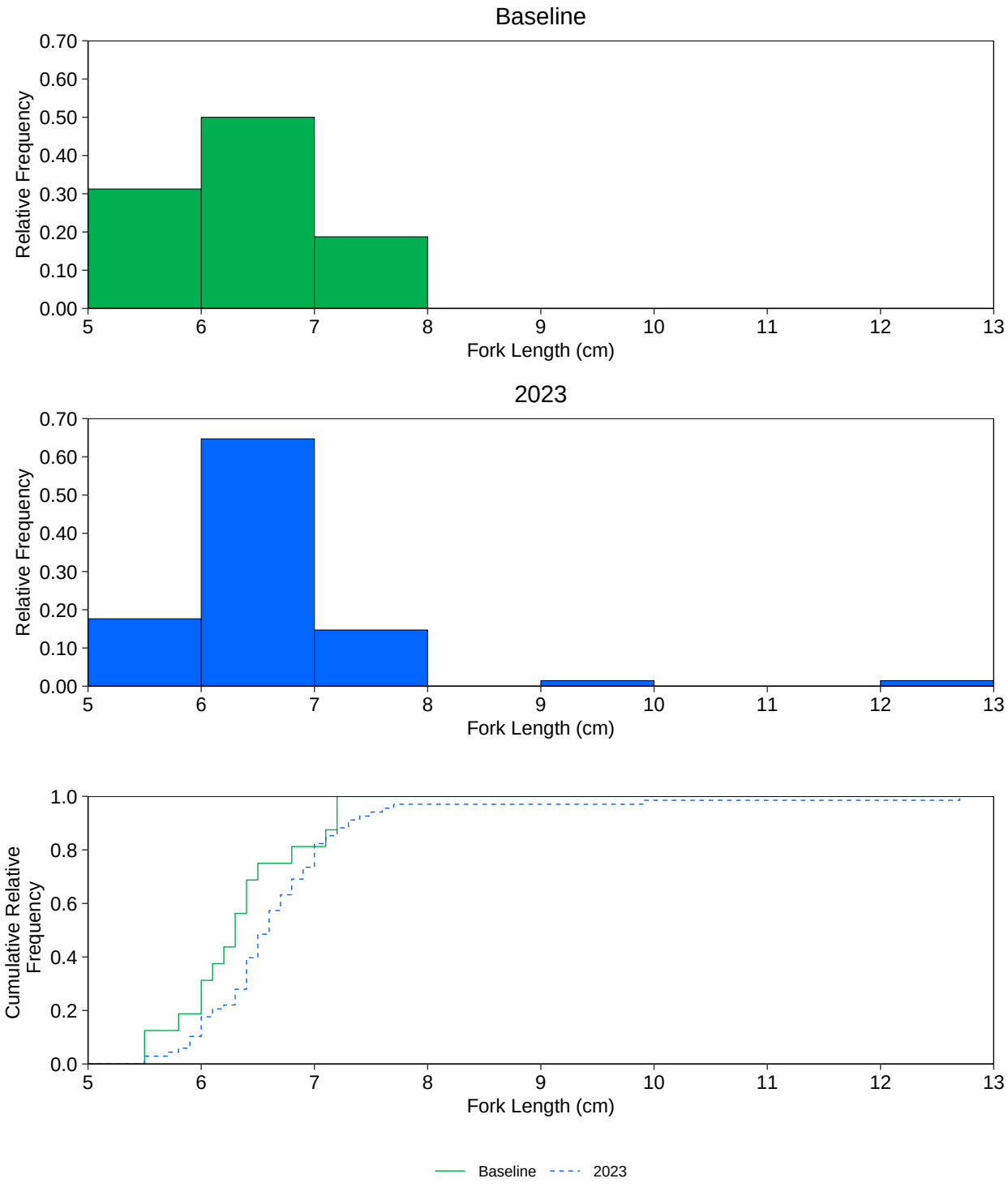


Figure G.16: Relative Length-Frequency and Cumulative Length-Frequency Distributions for Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Southeast (DL0-02) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Note: Sheardown Lake Southeast n = 68; Baseline n = 16.

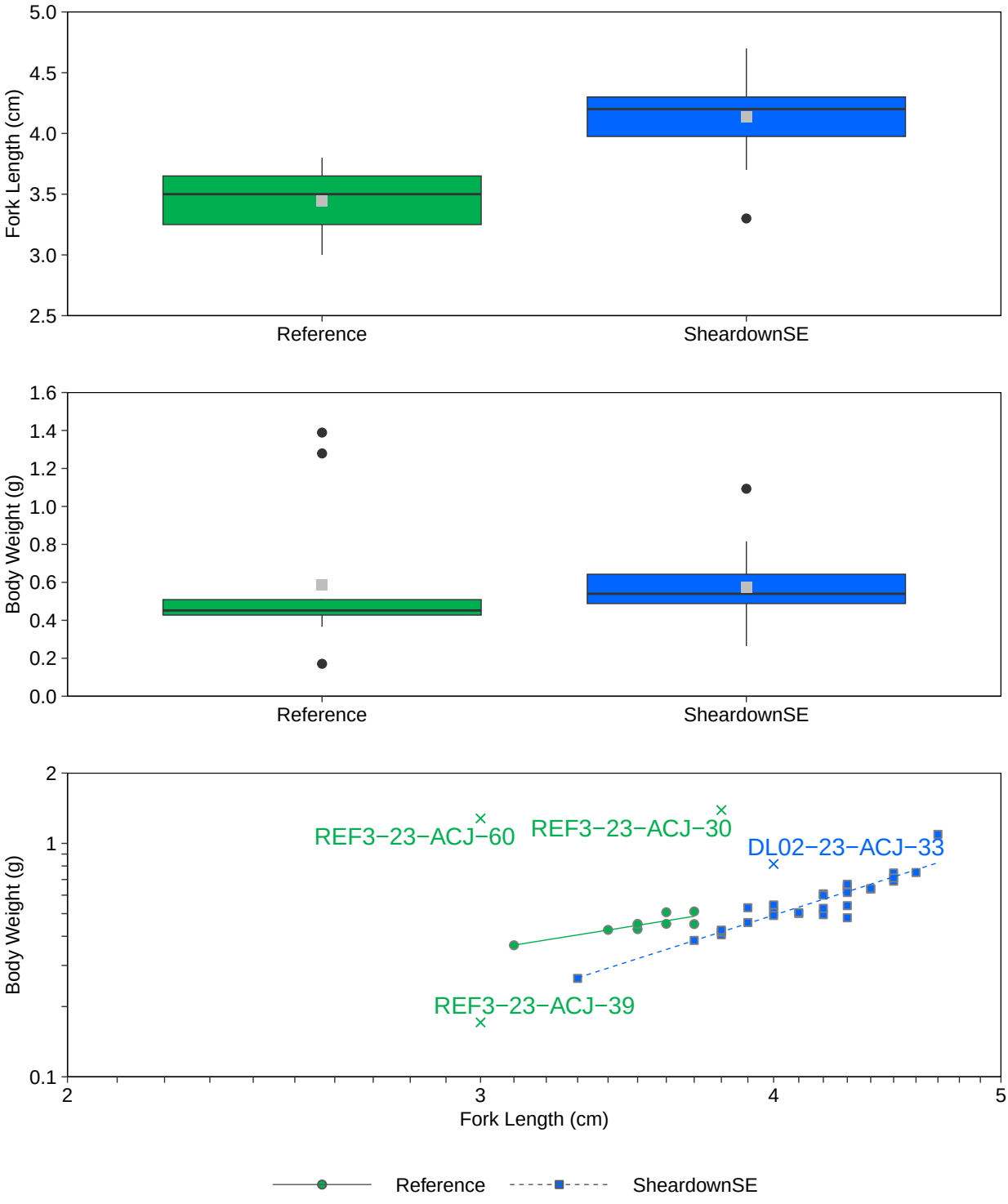


Figure G.17: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Young-of-the-Year (YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Southeast (DL0-02) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

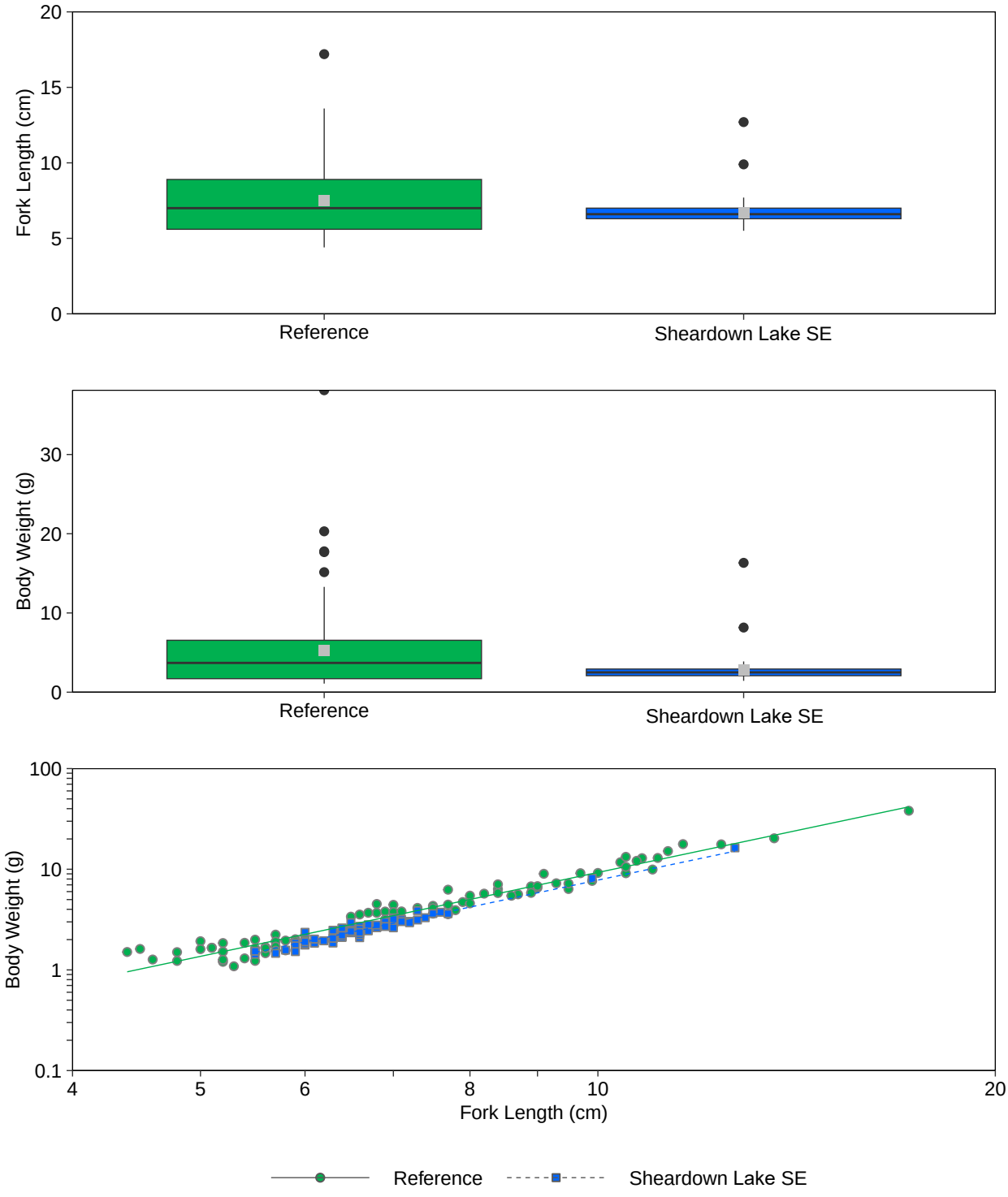


Figure G.18: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Non-Young-of-the-Year (YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Southeast (DL0-02) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

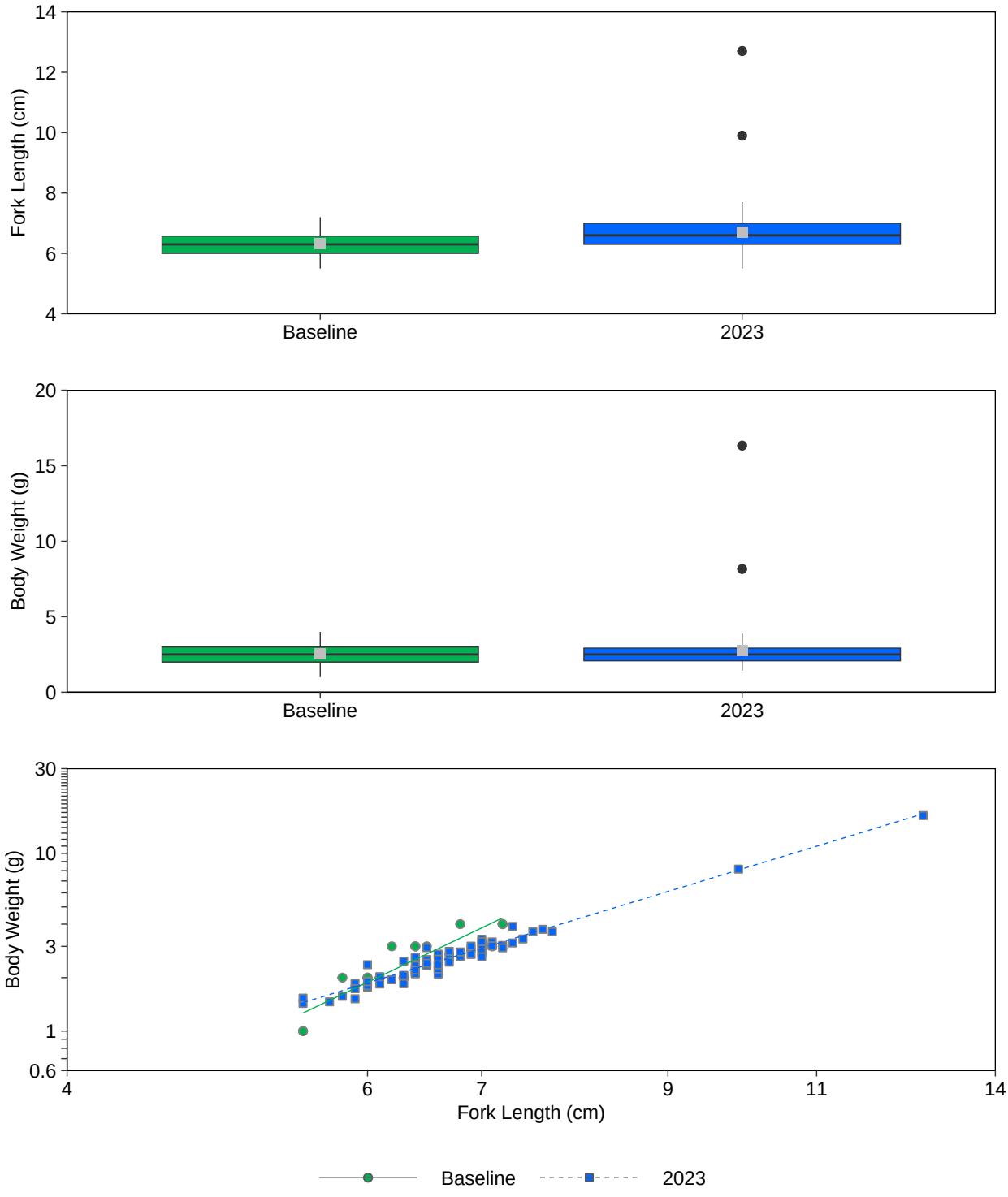


Figure G.19: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Southeast (DL0-02) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

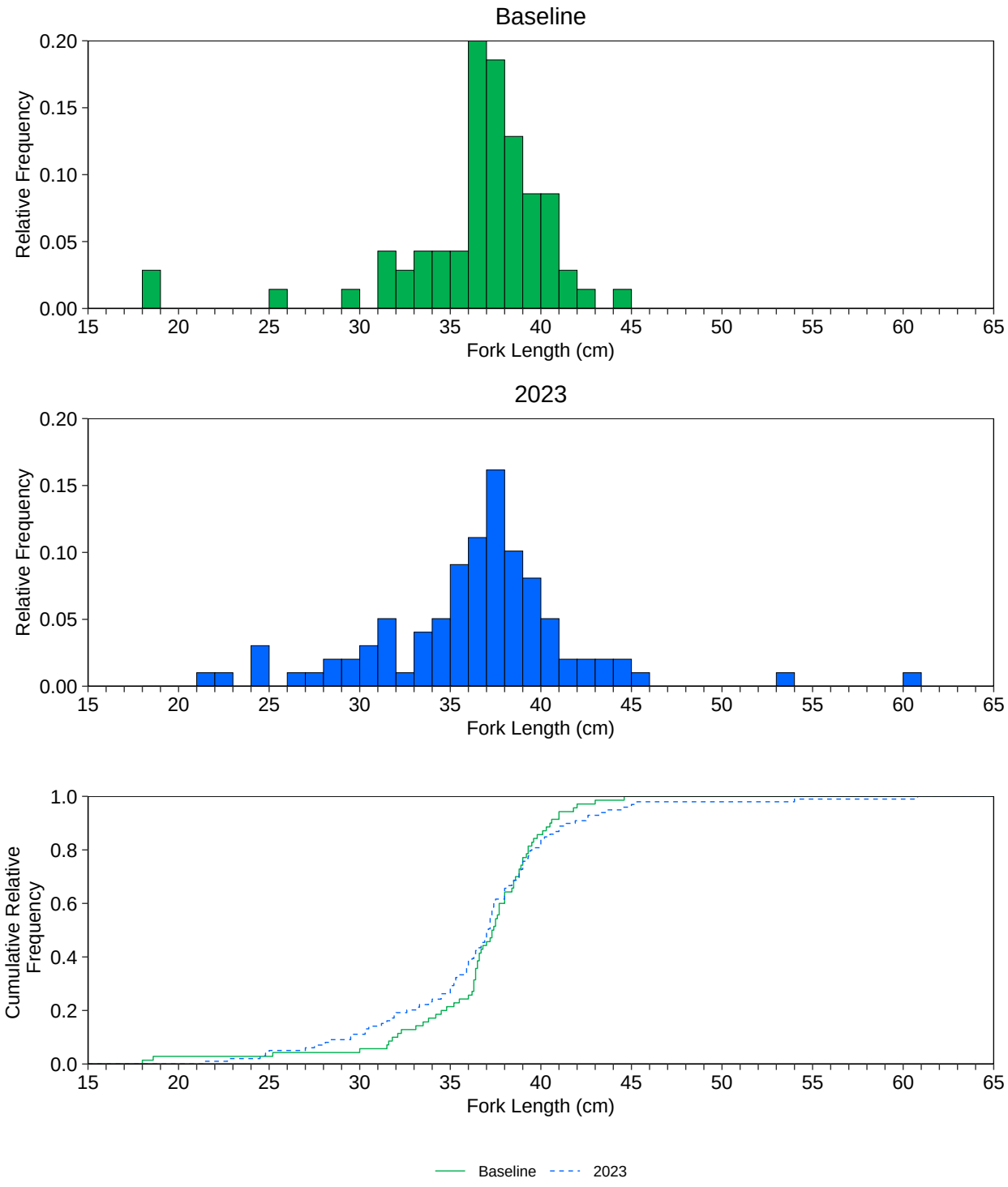


Figure G.20: Relative Length-Frequency and Cumulative Length-Frequency Distributions for Arctic Charr Captured by Gill Netting at Sheardown Lake Southeast (DL0-02) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Notes: Sheardown Lake Southeast 2023 n = 99; Baseline n = 70.

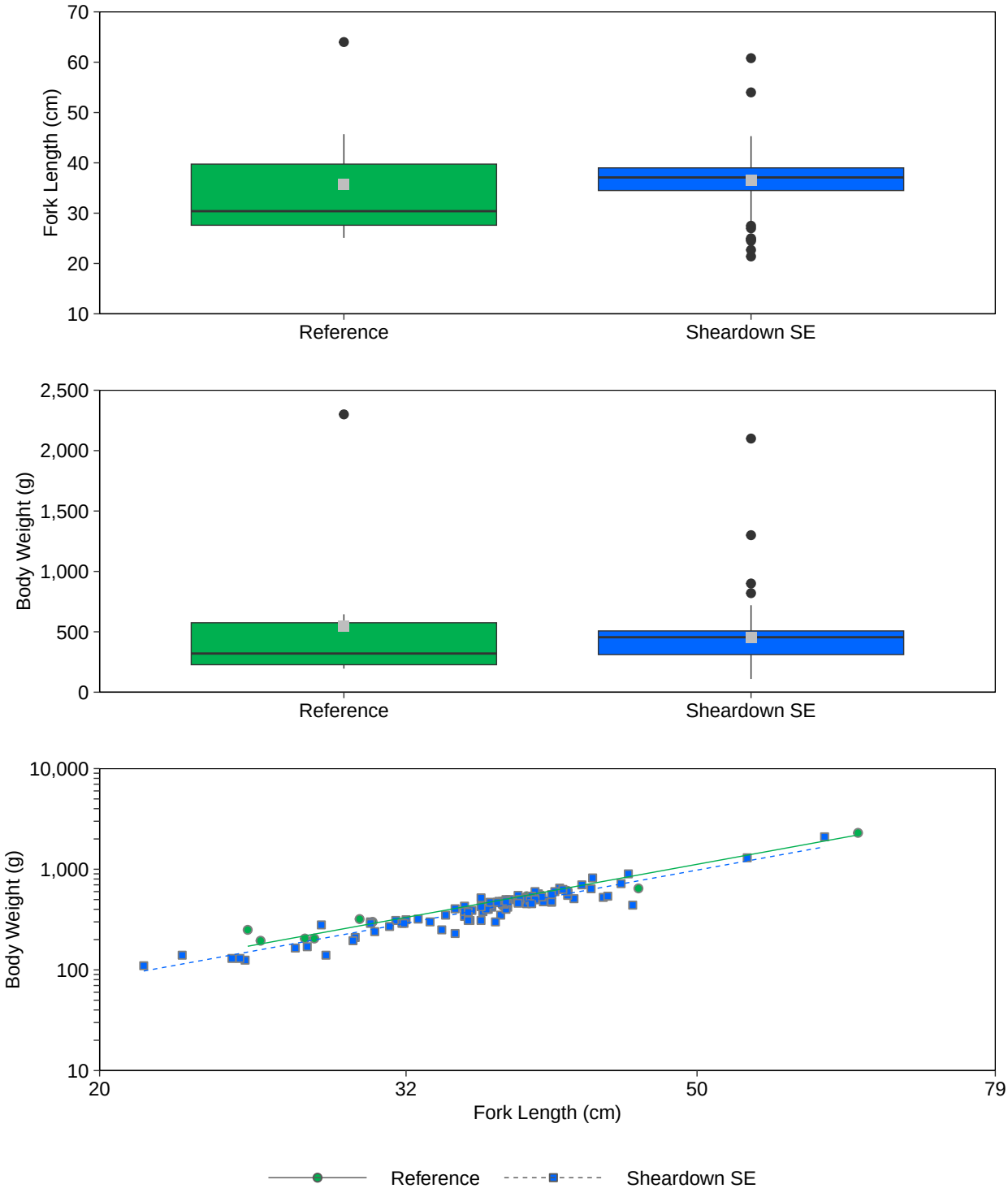


Figure G.21: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Arctic Charr Captured by Gill Netting at Sheardown Lake Southeast (DL0-02) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

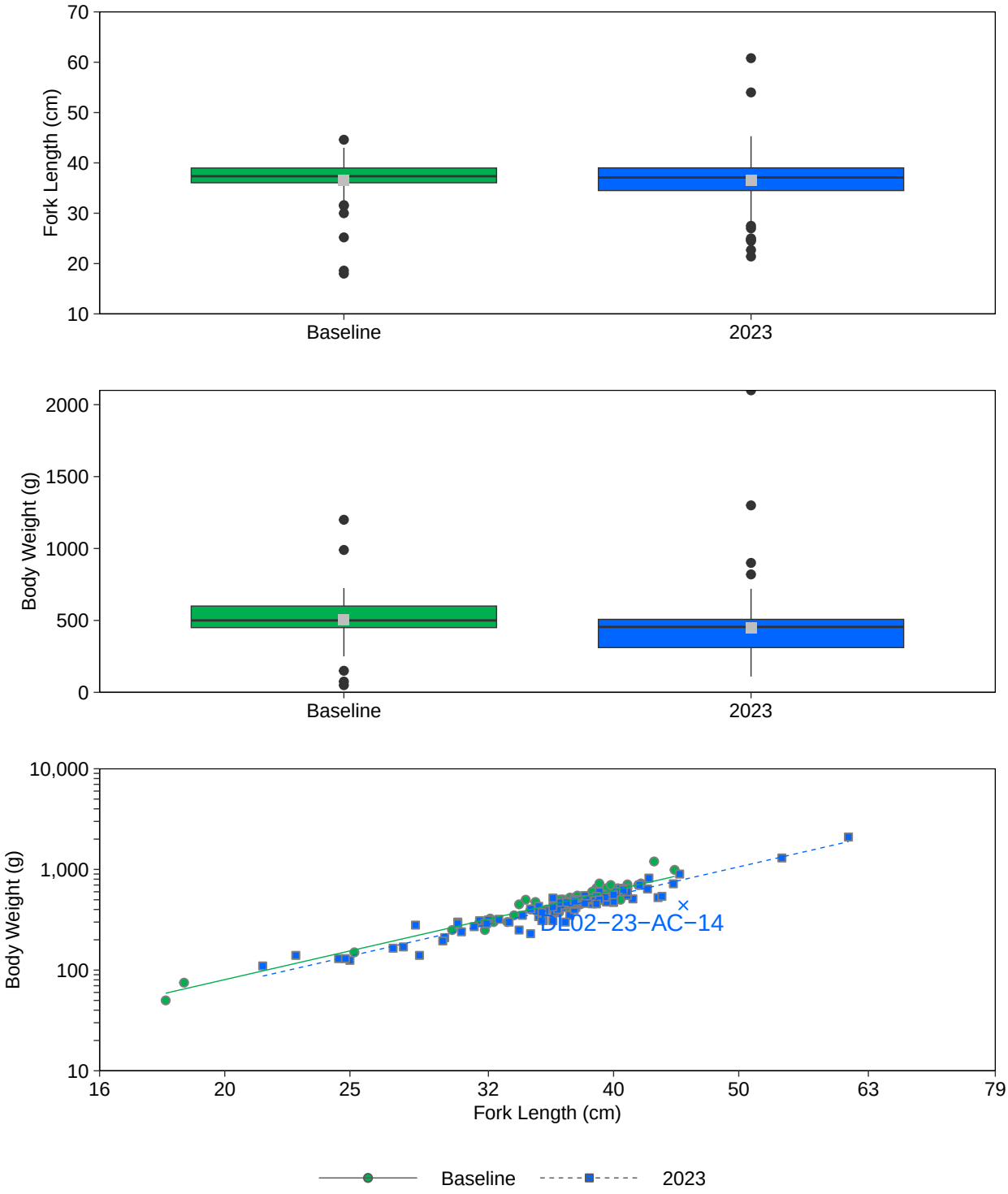


Figure G.22: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Arctic Charr Captured by Gill Netting at Sheardown Lake Southeast (DL0-02) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

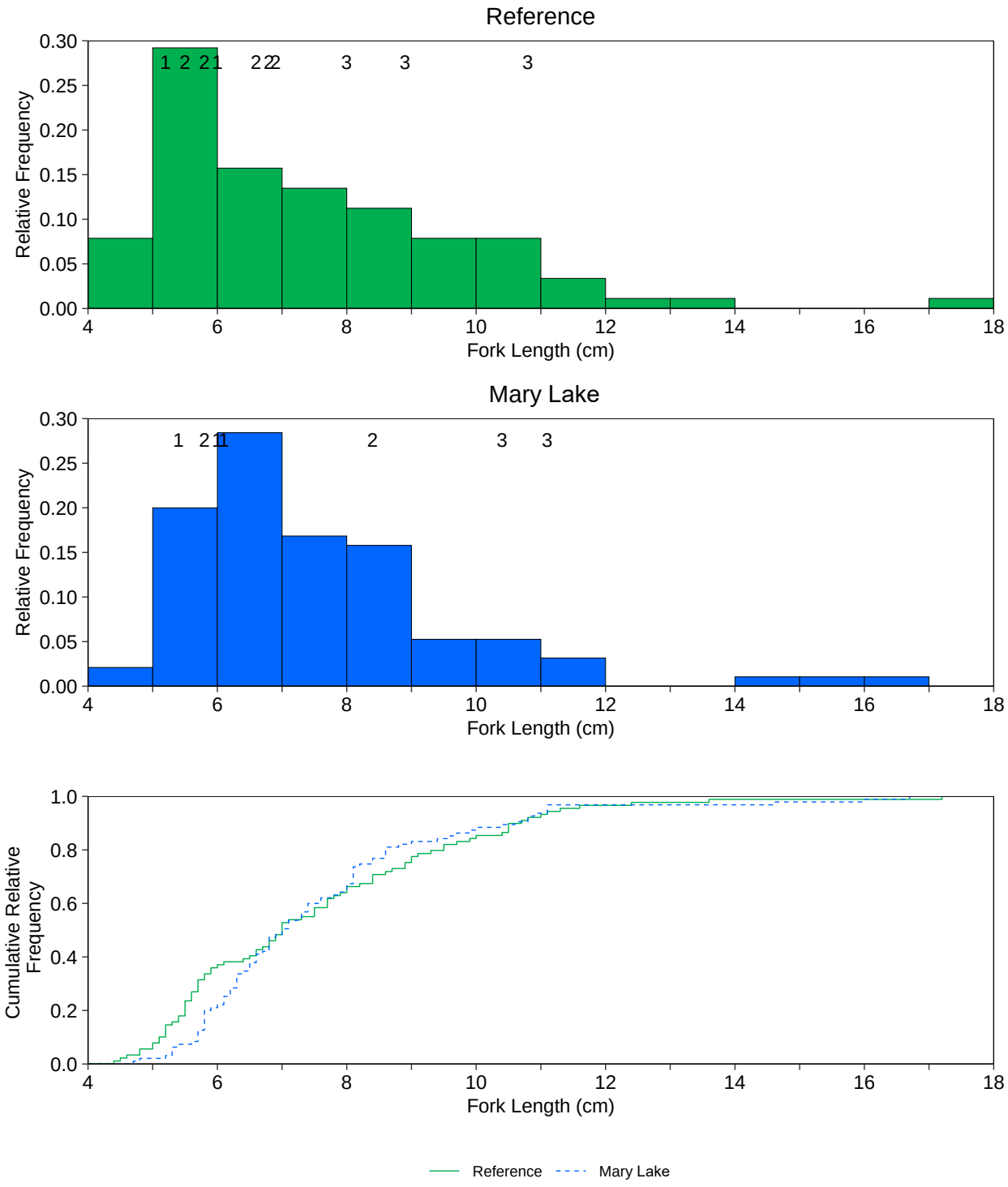


Figure G.23: Relative Length-Frequency and Cumulative Length-Frequency Distributions for Non-Young-of-the-Year (YOY) Arctic Charr Captured by Backpack Electrofishing at Mary Lake (BL0) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Fish ages are shown above the bars, where available. Mary Lake n = 95; Reference Lake 3 n = 89.

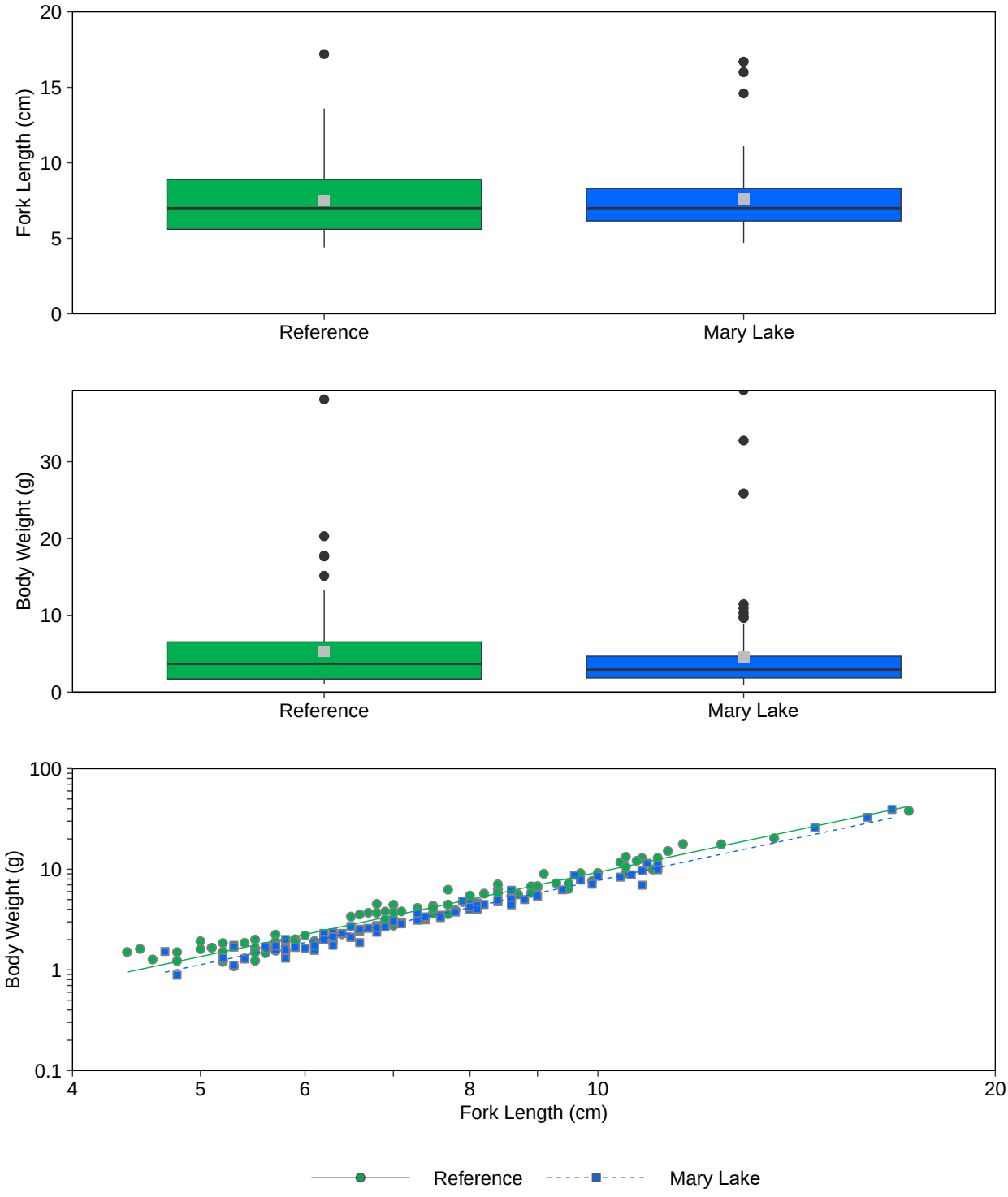


Figure G.24: LComparison of Body Condition (Weight-at-Fork-Length Relationship) for Non-Young-of-the-Year (YOY) Arctic Charr Captured by Backpack Electrofishing at Mary Lake (BL0) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

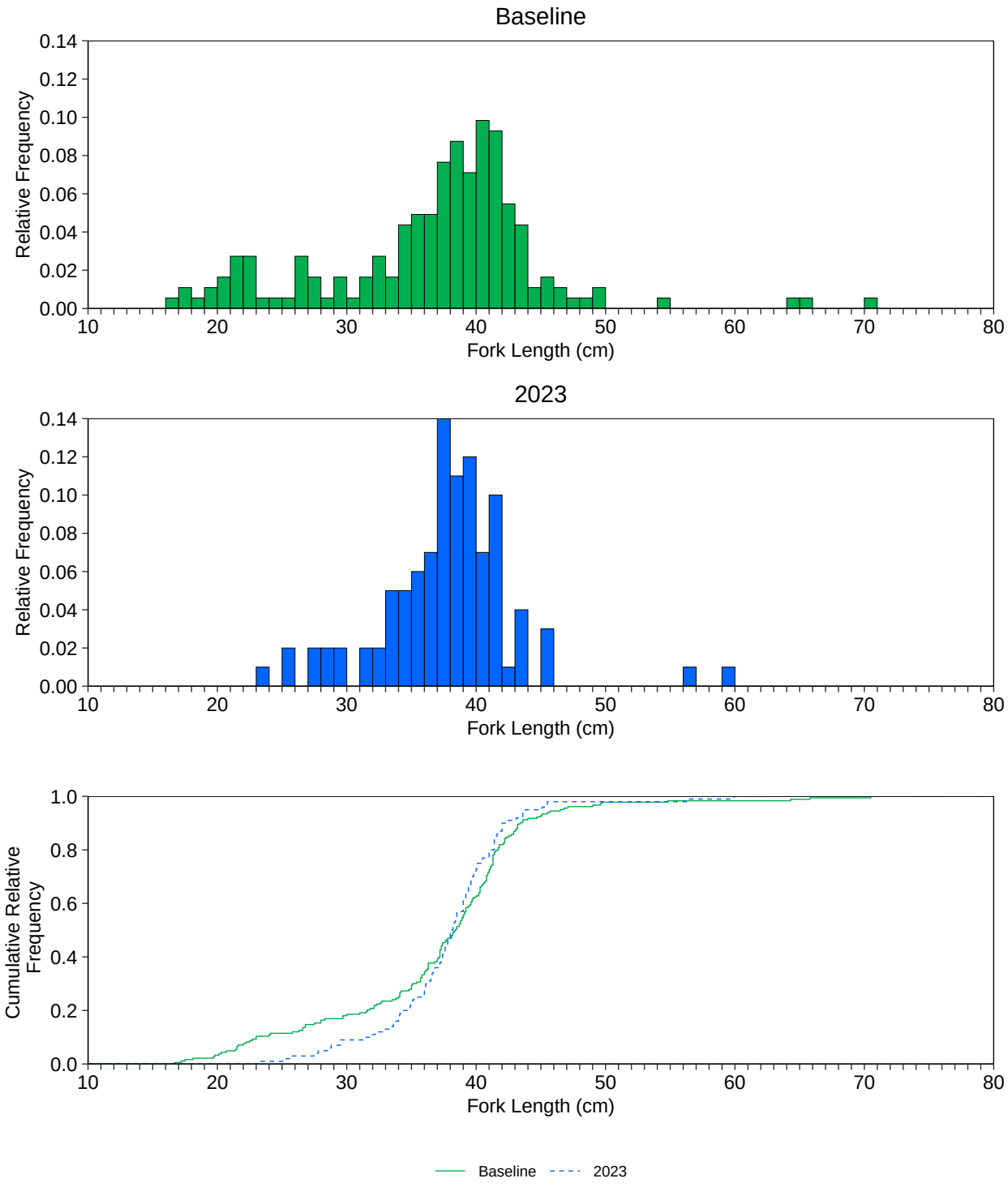


Figure G.25: Relative Length-Frequency and Cumulative Length-Frequency Distributions for Arctic Charr Captured by Gill Netting at Mary Lake (BL0) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Notes: Mary Lake 2023 n = 100; Baseline n = 183.

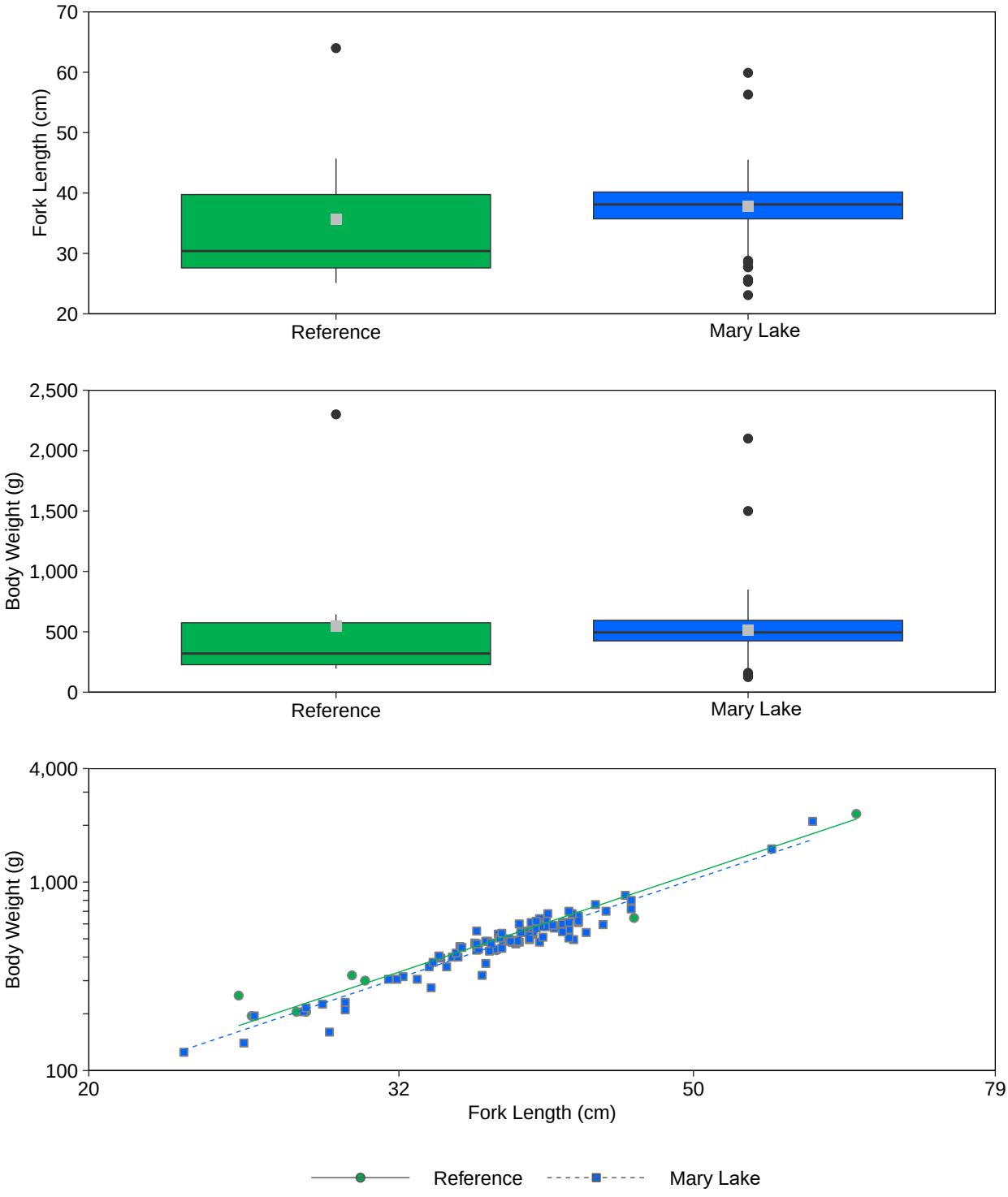


Figure G.26: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Arctic Charr Captured by Gill Netting at Mary Lake (BL0) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

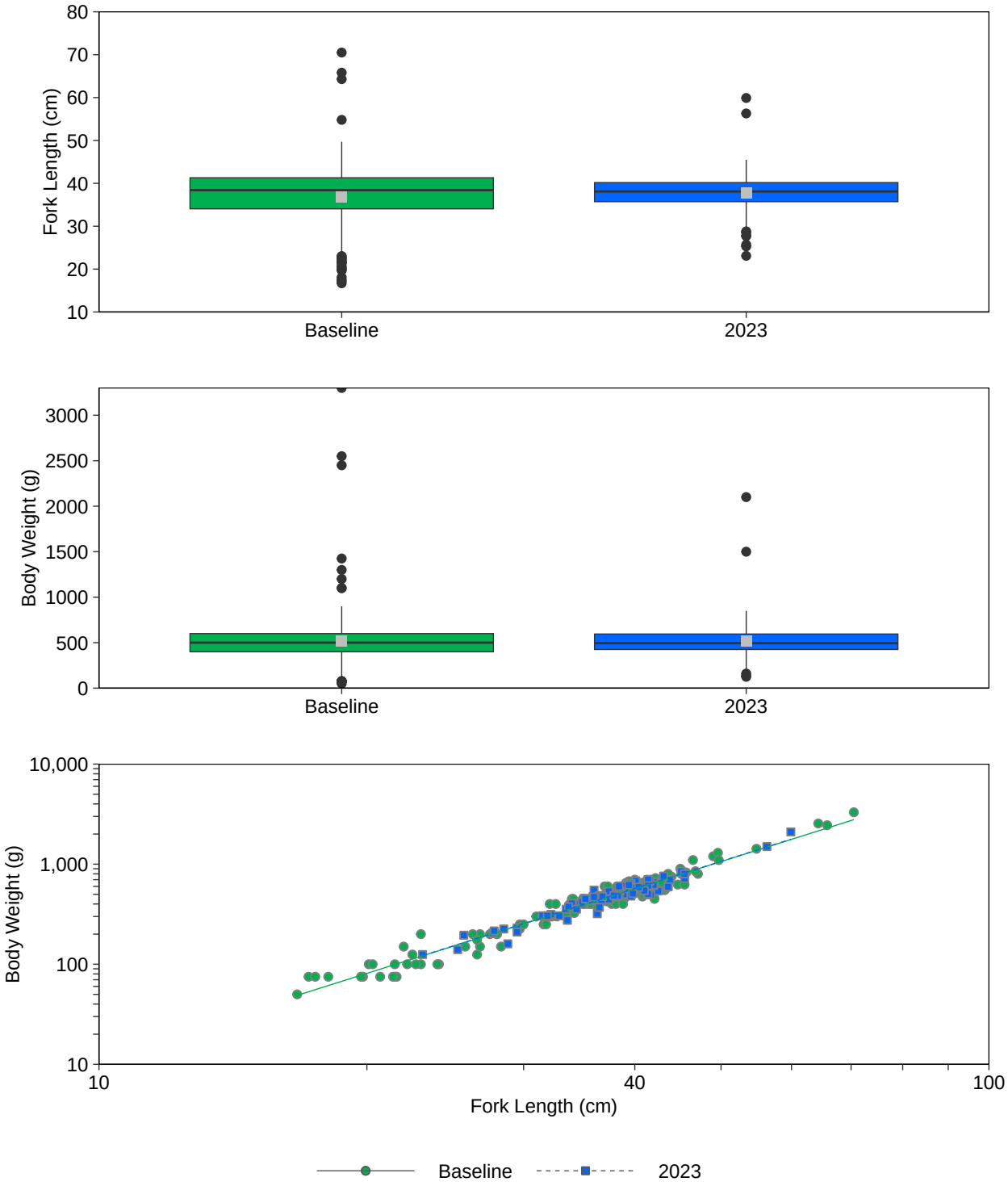


Figure G.27: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Arctic Charr Captured by Gill Netting at Mary Lake (BL0) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2023

Notes: Outliers are marked with an 'X'.

Table G.1: Electrofishing Catch Records, Mary River Project CREMP, August 2023

Waterbody	Sample Station Identifier	Location (NAD83, UTM Zone 17W)				Fishing Date	Electrofisher Settings			No. of Passes	Effort (seconds)	Fish Species						Total (all species)	
		Start		Finish								Arctic charr			Ninespine Stickleback				
		Easting	Northing	Easting	Northing		Output Voltage (volts)	Cycle Freq. (Hz)	Duty Cycle (%)			No. Captured	No. Mortalities / Retained	CPUE	No. Captured	No. Mortalities / Retained	CPUE	Total Catch	CPUE
Reference Lake 3	REF	575387	7853015	574813	7853075	20-Aug-23	600	30	12	1	7,067	104	12	0.88	1	0	0.01	105	0.89
Camp Lake	JL0	557803	7914690	557803	7914600	16-Aug-23	500	30	12	1	908	111	12	7.33	3	0	0.20	114	7.53
Sheardown Lake NW	DL0-01	560413	7913369	560205	7913496	13-Aug-23	500	30	12	1	2,882	106	10	2.21	2	2	0.04	108	2.25
Sheardown Lake SE	DL0-02	561650	7911773	561651	7911851	17-Aug-23	500	30	12	1	1027	115	10	6.72	16	0	0.93	131	7.65
Mary Lake	BL0	555436	7905183	555550	7904960	12-Aug-23	500	30	12	1	5,065	114	11	1.35	5	0	0.06	119	1.41

Note: No. = number; Catch-per-unit-effort (CPUE) represents the number of fish captured per electrofishing minute.

Table G.2: Gill Netting Catch Records for Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Gill Net Set ID	Location (NAD83, UTM Zone 17N)		Length (m)	Set Date	Lift Date	Set Time	Lift Time	Fishing Hours	Effort (m*hrs/100 m)	Arctic Charr Catch Per Mesh Size			Total Catch	CPUE
	Easting	Northing								1½"	2"	3"		
REF-23-GN-01	574904	7852873	91.4	23-Aug-23	23-Aug-23	10:30	11:35	1.08	0.99	0	3	0	3	3.03
REF-23-GN-02	575798	7852824	91.4	23-Aug-23	23-Aug-23	11:03	12:03	1.00	0.91	0	0	0	0	0
REF-23-GN-03	575328	7853036	91.4	23-Aug-23	23-Aug-23	11:43	12:40	0.95	0.87	0	1	0	1	1.15
REF-23-GN-04	574594	7852942	91.4	23-Aug-23	23-Aug-23	13:00	13:54	0.90	0.82	0	0	0	0	0
REF-23-GN-05	574370	7852261	91.4	23-Aug-23	23-Aug-23	13:20	14:20	1.00	0.914	0	0	0	0	0
REF-23-GN-06	574904	7852873	91.4	23-Aug-23	23-Aug-23	14:10	15:00	0.83	0.762	3	1	0	4	5.25
REF-23-GN-07	575024	7852926	91.4	23-Aug-23	23-Aug-23	14:46	15:15	0.48	0.442	0	0	0	0	0
REF-23-GN-10	574517	7852522	91.4	28-Aug-23	28-Aug-23	10:45	11:46	1.02	0.93	0	1	1	2	2.15
REF-23-GN-11	574240	7852695	91.4	28-Aug-23	28-Aug-23	11:05	12:11	1.10	1.01	0	0	0	0	0
REF-23-GN-12	574468	7853128	91.4	28-Aug-23	28-Aug-23	12:02	13:13	1.18	1.08	0	0	0	0	0
REF-23-GN-13	574353	7853612	91.4	28-Aug-23	28-Aug-23	13:02	14:08	1.10	1.01	0	0	0	0	0
REF-23-GN-14	573804	7853790	91.4	28-Aug-23	28-Aug-23	13:25	14:39	1.23	1.13	0	0	1	1	0.89
REF-23-GN-15	575782	7852533	91.4	28-Aug-23	28-Aug-23	8:20	9:20	1.00	0.91	0	0	0	0	0
REF-23-GN-16	574502	7852320	91.4	28-Aug-23	28-Aug-23	8:45	9:45	1.00	0.91	0	0	0	0	0
REF-23-GN-17	575374	7852894	91.4	28-Aug-23	28-Aug-23	9:40	10:40	1.00	0.91	0	0	0	0	0
REF-23-GN-18	573937	7853779	91.4	28-Aug-23	28-Aug-23	10:05	11:00	0.92	0.84	0	0	0	0	0
REF-23-GN-19	575088	7852588	91.4	28-Aug-23	28-Aug-23	11:00	12:00	1.00	0.91	0	0	0	0	0
REF-23-GN-20	574065	7852779	91.4	28-Aug-23	28-Aug-23	11:25	12:20	0.92	0.84	0	0	0	0	0
REF-23-GN-21	574665	7852566	91.4	28-Aug-23	28-Aug-23	12:20	13:15	0.92	0.84	1	0	0	1	1.19
REF-23-GN-22	574260	7852334	91.4	28-Aug-23	28-Aug-23	12:51	13:51	1.00	0.91	0	0	0	0	0
REF-23-GN-23	574320	7852620	91.4	28-Aug-23	28-Aug-23	13:45	14:45	1.00	0.91	0	0	0	0	0
REF-23-GN-24	574658	7852897	91.4	28-Aug-23	28-Aug-23	14:10	15:10	1.00	0.91	0	0	0	0	0
								Total	**19.8**	**4**	**6**	**2**	**12**	**0.62**

Note: Catch-per-unit-effort (CPUE) represents the number of fish captured per 100 m·hours of net.

Table G.3: Summary of Arctic Charr Gill Net Catches by Mesh Size, Mary River Project CREMP, August 2023

Waterbody	Effort (m*hrs/100 m)	Arctic Charr Catch Per Mesh Size			Total Catch	CPUE	Mortalities
		1½"	2"	3"			
Reference Lake 3	19.8	4	6	2	12	0.6	0
Camp Lake	5.1	16	47	39	102	20.0	9
Sheardown Lake NW	15.3	17	52	31	100	5.8	14
Sheardown Lake SE	4.3	21	33	46	100	23.6	10
Mary Lake	7.1	23	35	54	112	17.3	5
Total	**51.6**	**81**	**173**	**172**	**426**	**13.5**	**38**

Note: Catch-per-unit-effort (CPUE) represents the number of fish captured per 100 m hours of net.

Table G.4: Arctic Charr Measurements from Fish Captured at Reference Lake 3 (REF3) by Electrofishing, Mary River Project CREMP, August 2023

Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
REF3-23-ACJ-01	9.0	9.7	6.555	-	0.899
REF3-23-ACJ-02	5.9	6.3	2.017	-	0.982
REF3-23-ACJ-03	5.9	6.4	1.928	-	0.939
REF3-23-ACJ-04	7.3	8.1	4.129	-	1.061
REF3-23-ACJ-05	5.5	5.9	1.634	2	0.982
REF3-23-ACJ-06	10.8	11.5	12.889	3	1.023
REF3-23-ACJ-07	10.4	11.6	11.733	-	1.043
REF3-23-ACJ-08	4.4	5.5	1.507	-	1.769
REF3-23-ACJ-09	6.0	6.7	2.196	1	1.017
REF3-23-ACJ-10	6.6	7.6	3.551	2	1.235
REF3-23-ACJ-11	3.6	4.3	0.507	0	1.087
REF3-23-ACJ-12	3.5	4.2	0.429	-	1.001
REF3-23-ACJ-13	4.8	5.7	1.502	-	1.358
REF3-23-ACJ-14	3.4	3.7	0.426	0	1.084
REF3-23-ACJ-15	8.9	10.3	6.762	3	0.959
REF3-23-ACJ-16	8.0	9.2	5.467	3	1.068
REF3-23-ACJ-17	9.7	11.4	9.138	-	1.001
REF3-23-ACJ-18	8.4	9.6	6.352	-	1.072
REF3-23-ACJ-19	8.4	9.7	7.086	-	1.196
REF3-23-ACJ-20	6.9	8.1	3.801	2	1.157
REF3-23-ACJ-21	7.7	9.0	6.265	-	1.372
REF3-23-ACJ-22	7.9	8.6	4.722	-	0.958
REF3-23-ACJ-23	8.2	9.4	5.723	-	1.038
REF3-23-ACJ-24	6.8	8.0	4.520	-	1.438
REF3-23-ACJ-25	3.6	3.9	0.452	-	0.969
REF3-23-ACJ-26	6.7	7.6	3.696	-	1.229
REF3-23-ACJ-27	6.5	7.8	3.379	-	1.230
REF3-23-ACJ-28	5.7	6.5	2.241	-	1.210
REF3-23-ACJ-29	3.1	3.5	0.366	-	1.229
REF3-23-ACJ-30	3.8	4.8	1.389	-	2.531
REF3-23-ACJ-31	6.8	7.9	3.690	2	1.174
REF3-23-ACJ-32	5.2	6.0	1.849	1	1.315
REF3-23-ACJ-33	9.1	10.6	9.014	-	1.196
REF3-23-ACJ-34	5.5	6.2	1.998	-	1.201
REF3-23-ACJ-35	7.0	8.1	4.434	-	1.293
REF3-23-ACJ-36	5.8	6.6	1.957	-	1.003
REF3-23-ACJ-37	4.8	5.4	1.228	-	1.110
REF3-23-ACJ-38	5.0	5.9	1.928	-	1.542
REF3-23-ACJ-39	3.0	3.5	0.171	-	0.633
REF3-23-ACJ-40	11.1	12.7	12.953	-	0.947
REF3-23-ACJ-41	7.7	9.0	4.453	-	0.975
REF3-23-ACJ-42	7.5	8.6	4.333	-	1.027
REF3-23-ACJ-43	5.4	6.3	1.858	-	1.180
REF3-23-ACJ-44	7.0	8.1	3.757	-	1.095
REF3-23-ACJ-45	5.1	6.0	1.659	-	1.251
REF3-23-ACJ-46	4.6	5.4	1.268	-	1.303
REF3-23-ACJ-47	5.1	5.9	1.660	-	1.251
REF3-23-ACJ-48	5.0	5.5	1.608	-	1.286
REF3-23-ACJ-49	5.2	5.8	1.518	-	1.080
REF3-23-ACJ-50	8.7	9.6	5.638	-	0.856
REF3-23-ACJ-51	10.5	11.5	13.291	-	1.148
REF3-23-ACJ-52	11.3	12.0	15.150	-	1.050
REF3-23-ACJ-53	7.0	7.5	3.023	-	0.881
REF3-23-ACJ-54	7.5	8.2	3.623	-	0.859
REF3-23-ACJ-55	7.1	7.5	3.811	-	1.065
REF3-23-ACJ-56	3.7	4.0	0.511	-	1.009
REF3-23-ACJ-57	5.5	5.8	1.230	-	0.739
REF3-23-ACJ-58	5.2	5.4	1.203	-	0.856
REF3-23-ACJ-59	3.5	4.0	0.452	-	1.054
REF3-23-ACJ-60	3.0	3.3	1.279	-	4.737
REF3-23-ACJ-61	4.5	5.3	1.615	-	1.772
REF3-23-ACJ-62	13.6	14.5	20.304	-	0.807
REF3-23-ACJ-63	12.4	13.1	17.681	-	0.927
REF3-23-ACJ-64	10.0	10.9	9.188	-	0.919

Notes: "-" indicates measurement not taken or fish not submitted for aging. YOY indicates Young-of-the-Year.

Table G.4: Arctic Charr Measurements from Fish Captured at Reference Lake 3 (REF3) by Electrofishing, Mary River Project CREMP, August 2023

	Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
	REF3-23-ACJ-65	10.5	11.2	9.133	-	0.789
	REF3-23-ACJ-66	10.5	11.3	10.560	-	0.912
	REF3-23-ACJ-67	5.7	6.1	1.911	-	1.032
	REF3-23-ACJ-68	5.7	6.0	1.705	-	0.921
	REF3-23-ACJ-69	8.9	9.5	5.828	-	0.827
	REF3-23-ACJ-70	7.0	7.5	2.755	-	0.803
	REF3-23-ACJ-71	5.4	5.9	1.302	-	0.827
	REF3-23-ACJ-72	5.6	6.0	1.684	-	0.959
	REF3-23-ACJ-73	6.1	6.5	1.939	-	0.854
	REF3-23-ACJ-74	5.6	6.0	1.466	-	0.835
	REF3-23-ACJ-75	5.5	6.0	1.504	-	0.904
	REF3-23-ACJ-76	5.3	5.6	1.086	-	0.729
	REF3-23-ACJ-77	9.3	10.0	7.256	-	0.902
	REF3-23-ACJ-78	17.2	18.5	38.111	-	0.749
	REF3-23-ACJ-79	6.6	7.0	2.502	-	0.870
	REF3-23-ACJ-80	11.0	11.7	9.935	-	0.746
	REF3-23-ACJ-81	5.5	5.9	1.489	-	0.895
	REF3-23-ACJ-82	11.6	12.4	17.779	-	1.139
	REF3-23-ACJ-83	8.4	9.0	5.804	-	0.979
	REF3-23-ACJ-84	9.5	10.3	6.365	-	0.742
	REF3-23-ACJ-85	8.0	8.4	4.580	-	0.895
	REF3-23-ACJ-86	5.2	5.5	1.261	-	0.897
	REF3-23-ACJ-87	7.8	8.3	3.921	-	0.826
	REF3-23-ACJ-88	5.7	6.0	1.550	-	0.837
	REF3-23-ACJ-89	5.6	6.1	1.645	-	0.937
	REF3-23-ACJ-90	6.4	6.7	2.259	-	0.862
	REF3-23-ACJ-91	9.5	10.0	7.222	-	0.842
	REF3-23-ACJ-92	8.6	9.3	5.455	-	0.858
	REF3-23-ACJ-93	9.9	10.5	7.660	-	0.789
	REF3-23-ACJ-94	7.7	8.1	3.573	-	0.783
	REF3-23-ACJ-95	9.0	9.5	6.793	-	0.932
	REF3-23-ACJ-96	7.5	7.9	4.108	-	0.974
	REF3-23-ACJ-97	10.7	11.5	12.126	-	0.990
	REF3-23-ACJ-98	3.7	3.9	0.451	-	0.890
	REF3-23-ACJ-99	6.9	7.2	3.173	-	0.966
	REF3-23-ACJ-100	5.8	6.1	1.565	2	0.802
Overall Catch Summary	Sample Size (N)	100	100	100	13	100
	Mean	7.1	7.8	4.792	2.1	1.072
	Median	6.8	7.5	3.276	2	0.982
	Standard Deviation	2.5	2.7	5.370	0.7	0.449
	Standard Error	0.25	0.27	0.537	0.20	0.045
	Minimum	3.0	3.3	0.171	1	0.633
	Maximum	17.2	18.5	38.111	3	4.737
Young-of-the-Year Catch Summary	Proportion of YOY	**11%**				
	Sample Size (N)	11	11	11	-	11
	Mean	3.4	3.9	0.585	-	1.475
	Median	3.5	3.9	0.452	-	1.054
	Standard Deviation	0.3	0.4	0.382	-	1.185
	Standard Error	0.1	0.1	0.115	-	0.357
	Minimum	3.0	3.3	0.171	-	0.633
	Maximum	3.8	4.8	1.389	-	4.737

Notes: "-" indicates measurement not taken or fish not submitted for aging. YOY indicates Young-of-the-Year.

Table G.5: Arctic Charr Measurements from Fish Captured at Camp Lake (JL0) by Electrofishing, Mary River Project CREMP, August 2023

Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
JL0-23-ACJ-01	11.9	12.9	14.371	4	0.853
JL0-23-ACJ-02	7.3	7.7	3.199	-	0.822
JL0-23-ACJ-03	11.1	11.8	11.473	-	0.839
JL0-23-ACJ-04	8.9	9.6	5.565	-	0.789
JL0-23-ACJ-05	14.1	15.3	23.650	-	0.844
JL0-23-ACJ-06	6.4	6.7	2.503	-	0.955
JL0-23-ACJ-07	6.4	6.8	2.619	-	0.999
JL0-23-ACJ-08	7.3	7.9	4.173	-	1.073
JL0-23-ACJ-09	9.2	9.8	6.047	-	0.777
JL0-23-ACJ-10	6.9	7.4	2.831	-	0.862
JL0-23-ACJ-11	11.0	11.7	10.797	-	0.811
JL0-23-ACJ-12	11.4	12.3	13.485	-	0.910
JL0-23-ACJ-13	11.1	11.9	11.438	-	0.836
JL0-23-ACJ-14	15.2	16.6	28.970	-	0.825
JL0-23-ACJ-15	12.6	13.5	15.782	-	0.789
JL0-23-ACJ-16	8.5	8.9	5.285	-	0.861
JL0-23-ACJ-17	7.0	7.4	3.120	-	0.910
JL0-23-ACJ-18	8.6	9.1	5.524	-	0.868
JL0-23-ACJ-19	8.1	8.6	4.648	3	0.875
JL0-23-ACJ-20	6.3	6.6	2.073	-	0.829
JL0-23-ACJ-22	7.5	7.8	3.361	-	0.797
JL0-23-ACJ-22	9.2	9.8	6.506	-	0.836
JL0-23-ACJ-23	9.5	10.1	6.797	-	0.793
JL0-23-ACJ-24	7.0	7.4	3.433	-	1.001
JL0-23-ACJ-25	7.2	7.4	2.993	-	0.802
JL0-23-ACJ-26	15.8	17.1	30.440	-	0.772
JL0-23-ACJ-27	8.8	9.3	5.343	-	0.784
JL0-23-ACJ-28	13.5	14.7	22.076	-	0.897
JL0-23-ACJ-29	7.2	7.6	3.565	-	0.955
JL0-23-ACJ-30	7.1	7.5	3.044	-	0.850
JL0-23-ACJ-31	6.5	6.8	2.500	-	0.910
JL0-23-ACJ-32	15.7	17.2	32.718	-	0.845
JL0-23-ACJ-33	9.6	10.3	8.104	-	0.916
JL0-23-ACJ-34	10.6	11.3	10.170	-	0.854
JL0-23-ACJ-35	7.2	7.7	3.125	-	0.837
JL0-23-ACJ-36	13.5	14.5	21.422	-	0.871
JL0-23-ACJ-37	6.5	6.8	2.231	2	0.812
JL0-23-ACJ-38	10.5	11.3	9.064	-	0.783
JL0-23-ACJ-39	12.2	13.0	15.575	-	0.858
JL0-23-ACJ-40	7.6	8.1	4.205	-	0.958
JL0-23-ACJ-41	8.0	8.5	4.981	-	0.973
JL0-23-ACJ-42	9.5	10.2	7.266	-	0.847
JL0-23-ACJ-43	9.6	10.4	7.574	-	0.856
JL0-23-ACJ-44	10.4	11.5	10.903	-	0.969
JL0-23-ACJ-45	7.0	7.3	2.813	-	0.820
JL0-23-ACJ-46	6.4	6.8	2.355	-	0.898
JL0-23-ACJ-47	7.1	7.5	2.892	-	0.808
JL0-23-ACJ-48	8.0	8.5	4.350	-	0.850
JL0-23-ACJ-49	6.8	7.3	2.690	-	0.856
JL0-23-ACJ-50	7.2	7.5	2.989	-	0.801
JL0-23-ACJ-51	7.6	8.0	3.752	1	0.855
JL0-23-ACJ-52	5.7	5.9	1.614	-	0.872
JL0-23-ACJ-53	10.4	11.2	9.681	-	0.861
JL0-23-ACJ-54	6.8	7.0	2.455	-	0.781
JL0-23-ACJ-55	9.5	10.2	7.362	-	0.859
JL0-23-ACJ-56	7.0	7.3	2.696	-	0.786
JL0-23-ACJ-57	7.9	8.3	4.049	-	0.821
JL0-23-ACJ-58	6.2	6.5	1.809	-	0.759
JL0-23-ACJ-59	9.3	9.7	6.062	-	0.754
JL0-23-ACJ-60	10.3	11.0	9.912	-	0.907
JL0-23-ACJ-61	6.7	7.1	2.251	-	0.748
JL0-23-ACJ-62	7.0	7.3	2.860	-	0.834
JL0-23-ACJ-63	6.4	6.6	2.040	-	0.778
JL0-23-ACJ-64	7.0	7.4	2.530	-	0.738

Notes: "-" indicates measurement not taken or fish not submitted for aging. YOY indicates Young-of-the-Year.

Table G.5: Arctic Charr Measurements from Fish Captured at Camp Lake (JL0) by Electrofishing, Mary River Project CREMP, August 2023

	Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
	JL0-23-ACJ-65	6.7	7.0	2.361	-	0.785
	JL0-23-ACJ-66	6.8	7.1	2.331	-	0.741
	JL0-23-ACJ-67	8.8	9.3	5.397	3	0.79
	JL0-23-ACJ-68	10.6	11.2	9.202	-	0.773
	JL0-23-ACJ-69	13.0	14.1	16.623	4	0.757
	JL0-23-ACJ-70	7.7	8.1	3.657	-	0.801
	JL0-23-ACJ-71	7.1	7.5	3.213	-	0.898
	JL0-23-ACJ-72	6.5	6.8	2.365	-	0.861
	JL0-23-ACJ-73	8.7	9.3	5.641	-	0.857
	JL0-23-ACJ-74	8.0	8.5	3.521	-	0.688
	JL0-23-ACJ-75	7.1	7.5	3.560	-	0.995
	JL0-23-ACJ-76	7.3	7.7	3.305	-	0.850
	JL0-23-ACJ-77	6.8	7.4	2.476	-	0.787
	JL0-23-ACJ-78	11.1	11.9	11.157	5	0.816
	JL0-23-ACJ-79	7.4	8.6	4.702	-	1.160
	JL0-23-ACJ-80	6.2	6.5	1.963	-	0.824
	JL0-23-ACJ-81	6.7	7.2	2.881	-	0.958
	JL0-23-ACJ-82	6.4	6.7	2.289	-	0.873
	JL0-23-ACJ-83	7.8	8.1	3.629	-	0.765
	JL0-23-ACJ-84	7.5	7.9	3.820	-	0.905
	JL0-23-ACJ-85	4.8	5.1	1.001	-	0.905
	JL0-23-ACJ-86	6.3	6.5	2.987	-	1.195
	JL0-23-ACJ-87	7.0	7.4	2.625	-	0.765
	JL0-23-ACJ-88	6.9	7.2	2.813	1	0.856
	JL0-23-ACJ-89	6.6	6.9	2.204	-	0.767
	JL0-23-ACJ-90	7.4	7.7	3.098	-	0.765
	JL0-23-ACJ-91	6.7	7.1	2.339	-	0.778
	JL0-23-ACJ-92	10.1	10.7	8.742	3	0.848
	JL0-23-ACJ-93	7.1	7.4	2.743	-	0.766
	JL0-23-ACJ-94	7.8	8.3	3.787	-	0.798
	JL0-23-ACJ-95	7.3	7.8	3.224	-	0.829
	JL0-23-ACJ-96	6.4	6.5	2.221	-	0.847
	JL0-23-ACJ-97	7.5	7.9	3.216	-	0.762
	JL0-23-ACJ-98	7.3	7.8	3.381	-	0.869
	JL0-23-ACJ-99	6.9	7.2	2.504	-	0.762
	JL0-23-ACJ-100	6.8	7.2	2.126	2	0.676
Overall Catch Summary	Sample Size (N)	100	100	100	10	100
	Average	8.4	8.9	6.252	2.8	0.846
	Median	7.4	7.9	3.541	3	0.838
	Standard Deviation	2.3	2.6	6.291	1.3	0.084
	Standard Error	0.23	0.26	0.629	0.42	0.008
	Minimum	4.8	5.1	1.001	1	0.676
	Maximum	15.8	17.2	32.718	5	1.195
Young-of-the-Year Catch Summary	Proportion of YOY	**0%**				
	Sample Size (N)	0	0	0	0	0
	Average	-	-	-	-	-
	Median	-	-	-	-	-
	Standard Deviation	-	-	-	-	-
	Standard Error	-	-	-	-	-
	Minimum	-	-	-	-	-
	Maximum	-	-	-	-	-

Notes: "-" indicates measurement not taken or fish not submitted for aging. YOY indicates Young-of-the-Year.

Table G.6: Results of Nearshore Arctic Charr Non-Young-of-the-Year (YOY) Health Endpoint Statistical Comparisons between Camp Lake (JL0) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Group	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics[b]			Test P-value	Magnitude of Difference (%)[c]
			Response	Covariate	REF	JL0		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]	Statistic	REF	JL0		
								Interaction P-value	Covariate P-value						
All Fish	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	100	100	K-S	-	-	-	-	-	-	<0.001	-
Non-YOY	Survival	Length Frequency Distribution	Fork Length (cm)	-	89	100	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	89	100	M-W	-	-	-	Median	7.00	7.40	0.003	5.7
		Body Weight	Body Weight (g)	-	89	100	M-W	-	-	-	Median	3.70	3.54	0.075	-4.2
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	89	100	ANCOVA	0.005[d]	<0.001	7.68	Adjusted Mean	4.49	3.85	<0.001	-14

Area P-value < 0.1 or Interaction P-value < 0.05.

Absolute Magnitude of Difference ≥ 10% for Condition (EEM effect endpoint).

Notes: YOY indicates Young-of-Year. "-" indicates no available data.

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for $\log_{10}$-transformed variables), and adjusted mean are reported for Mann-Whitney, t-test and ANCOVA, respectively, and the predicted mean values from the regression line equations for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVAs where a significant interaction was detected.

[c] The magnitude of difference calculated as: [(exposed area mean - reference area mean) / reference area mean] x 100. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as : [(exposed area predicted mean - reference area predicted mean) / reference area predicted mean] x 100.

[d] ANCOVA proceeded under the assumption that the slopes are practically parallel (R^2 of interaction model = 0.9680 and R^2 of parallel slope model = 0.9666; a difference < 0.02) following Environment Canada (2012).

Table G.7: Results of Nearshore Arctic Charr Non-Young-of-the-Year (Non-YOY) Health Endpoint Statistical Comparisons between Samples Collected in 2023 and the Baseline Period at Individual Mine-Exposed Lakes, Mary River Project 2023 CREMP

Lake	Group	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics[b]			Test P-value	Magnitude of Difference (%)[c]
				Response	Covariate	Baseline	2023		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]	Statistic	Baseline	2023		
									Interaction P-value	Covariate P-value						
Camp (JL0)	Non-YOY	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	51	100	K-S	-	-	-	-	-	-	<0.001	-
		Body Size	Fork Length	Fork Length (cm)	-	51	100	M-W	-	-	-	Median	11.8	7.40	<0.001	-37
			Body Weight	log[Body Weight (g)]	-	51	100	M-W	-	-	-	Median	14.6	3.54	<0.001	-76
		Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	51	100	ANCOVA	0.040[d]	<0.001	9.07	Adjusted Mean	6.64	6.22	<0.001	-6.3
Sheardown NW (DL0-01)	Non-YOY	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	244	96	K-S	-	-	-	-	-	-	<0.001	-
		Body Size	Fork Length	Fork Length (cm)	-	244	96	M-W	-	-	-	Median	8.30	6.60	<0.001	-20
			Body Weight	Body Weight (g)	-	244	96	M-W	-	-	-	Median	6.00	3.04	<0.001	-49
		Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	244	96	ANCOVA	0.101	<0.001	8.49	Adjusted Mean	6.08	6.28	0.115	3.3
Sheardown SE (DL0-02)	Non-YOY	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	16	68	K-S	-	-	-	-	-	-	0.112	-
		Body Size	Fork Length	log[Fork Length (cm)]	-	16	68	M-W	-	-	-	Median	6.30	6.60	0.065	4.8
			Body Weight	Body Weight(g)	-	16	68	M-W	-	-	-	Median	2.50	2.50	0.977	0.10
		Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	16	68	ANCOVA	<0.001	<0.001	5.50	Predicted Mean	1.26	1.45	0.002	14
											7.20		4.33	3.18		-27

Area P-value < 0.1 or Interaction P-value < 0.05.

Absolute Magnitude of Difference ≥ 10% for Condition (EEM effect endpoint).

Notes: YOY indicates Young-of-Year. "-" indicates no available data.

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for log $_{10}$-transformed variables), and adjusted mean are reported for Mann-Whitney, t-test and ANCOVA, respectively, and the predicted mean values from the regression line equations for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVAs where a significant interaction was detected.

[c] The magnitude of difference calculated as: [(2018 mean - baseline mean) / baseline area mean] x 100. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as: [(2018 predicted mean - baseline predicted mean) / baseline predicted mean] x 100.

[d] ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9893 and R2 of parallel slope model = 0.989; a difference < 0.02) following Environment Canada (2012).

Table G.8: Arctic Charr Estimated Sample Sizes to Detect Various Effect Sizes as a Percentage Change in Respective Fish Health Endpoints at Camp Lake Using 2023 Data Relative to Reference Lake 3 Data (2023) or Camp Lake Baseline Data (2006 to 2013) with α=β=0.1, Mary River Project 2023 CREMP

Comparison	Group	Indicator	Endpoint	Variables		Test [a]	S[b]	COV (%)[c]	Minimum Sample Size to Detect an Effect Size (% Increase/Decrease Relative to Reference) with α=β=0.1									
				Response	Covariate				log(Response)	5%	10%	20%	25%	30%	33%	40%	50%	100%
										-5%	-9%	-17%	-20%	-23%	-25%	-29%	-33%	-50%
									Response	±5%	±10%	±20%	±25%	±30%	±33%	±40%	±50%	±100%
Nearshore Arctic Charr (Electrofishing) versus Ref. Lake 3, 2023 Data	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.116	31.0	Response	595	158	44	31	22	19	14	10	4
			Body Weight	Body Weight (g)	-	M-W	0.336	111	Response	4,980	1,306	358	240	174	145	107	73	26
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0621	-	log(Response)	149	41	13	9	7	7	6	5	3
Nearshore Arctic Charr (Electrofishing) 2023 versus Baseline	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.119	24.1	Response	462	117	31	20	14	12	10	6	4
			Body Weight	Body Weight (g)	-	M-W	0.349	56.3	log(Response)	2,519	631	159	102	72	58	41	27	9
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0426	-	log(Response)	71	20	7	6	5	5	4	4	3
Littoral/Profundal Arctic Charr (Gill Netting) versus Ref. Lake 3, 2023 Data	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0701	19.7	Response	219	58	18	12	10	9	6	5	3
			Body Weight	Body Weight (g)	-	M-W	0.189	93.2	Response	1,584	416	115	78	56	48	35	25	10
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0519	-	log(Response)	105	29	10	7	6	5	5	4	3
			Condition[d]	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0478	-	log(Response)	89	25	9	7	5	5	4	4	3
Littoral/Profundal Arctic Charr (Gill Netting) 2023 versus Baseline	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0933	23.8	Response	387	102	29	20	14	12	9	6	4
			Body Weight	Body Weight (g)	-	M-W	0.281	127	Response	3,482	914	250	168	122	102	75	53	19
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0713	-	log(Response)	196	53	16	12	9	8	6	5	4

Note: "-" indicates not applicable.

[a] Sample size estimates for the M-W test were estimated based for a two-sample t-test using sample sizes multiplied by 0.864. The 0.864 is the lower bound of the asymptotic relative efficiency of the Mann-Whitney test and the two-sample t-test (Hodges and Lehmann 1956). Estimates were generated for the response variable on the untransformed and $\log_{10}$-transformed scales and the lowest sample size is reported.

[b] Pooled standard deviation of the regression residuals.

[c] Coefficient of variation (pooled standard deviation/reference mean)×100%.

[d] Outliers removed from analysis.

Table G.9: Arctic Charr Measurements from Fish Captured at Reference Lake 3 (REF3) by Gill Netting, Mary River Project CREMP, August 2023

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
REF3-23-AC-01	REF-23-GN-01	2	45.7	47.2	645	-	0.676
REF3-23-AC-02	REF-23-GN-01	2	38.5	41.7	540	-	0.946
REF3-23-AC-03	REF-23-GN-01	2	37.1	40.2	435	-	0.852
REF3-23-AC-04	REF-23-GN-03	2	27.8	30.2	205	-	0.954
REF3-23-AC-05	REF-23-GN-06	1.5	25.6	28.5	195	-	1.162
REF3-23-AC-06	REF-23-GN-06	1.5	41.0	44.7	610	-	0.885
REF3-23-AC-07	REF-23-GN-06	1.5	27.4	29.8	205	-	0.997
REF3-23-AC-08	REF-23-GN-06	2	30.4	32.4	300	-	1.068
REF3-23-AC-09	REF-23-GN-010	2	25.1	27.6	250	-	1.581
REF3-23-AC-10	REF-23-GN-10	3	29.8	33.4	320	-	1.209
REF3-23-AC-11[a]	REF-23-GN-14	3	13.7	12.4	200	-	7.778
REF3-23-AC-12	REF-23-GN-21	1.5	64.0	67.5	2,300	-	0.877
Overall Catch Summary	**Sample Size (N)**		**11**	**11**	**11**	**-**	**11**
	Average		**35.7**	**38.5**	**546**	**-**	**1.019**
	Median		**30.4**	**33.4**	**320**	**-**	**0.954**
	Standard Deviation		**11.6**	**13.5**	**585**	**-**	**1.964**
	Standard Error		**3.5**	**4.1**	**176**	**-**	**0.592**
	Minimum		**25.1**	**27.6**	**195**	**-**	**0.676**
	Maximum		**64.0**	**67.5**	**2,300**	**-**	**1.581**

Note: "-" indicates measurement not taken or no comment.

[a] Fish length or weight values were deemed erroneous, with error likely resulting from instrumentation or recording error during field data collection. These individuals have been removed from all calculations of summary statistics and statistical analysis but length and weight values, as they were recorded on field data sheets, have been presented here for transparency.

Table G.10: Gill Netting Catch Records for Camp Lake (JL0), Mary River Project CREMP, August 2023

Gill Net Set ID	Location (NAD83, UTM Zone 17N)		Length (m)	Set Date	Lift Date	Set Time	Lift Time	Fishing Hours	Effort (m*hrs/ 100 m)	Arctic Charr Catch Per Mesh Size			Total Catch	CPUE
	Easting	Northing								1½"	2"	3"		
JL0-23-GN-01	557808	7914598	91.4	15-Aug-23	15-Aug-23	9:55	10:50	0.92	0.838	5	9	15	29	34.6
JL0-23-GN-02	557781	7914603	91.4	16-Aug-23	16-Aug-23	8:30	9:25	0.92	0.84	7	8	10	25	29.8
JL0-23-GN-03	557716	7914508	91.4	16-Aug-23	16-Aug-23	9:24	10:24	1.00	0.91	1	8	1	10	10.9
JL0-23-GN-04	557781	7914603	91.4	16-Aug-23	16-Aug-23	10:55	11:46	0.85	0.78	2	8	5	15	19.3
JL0-23-GN-05	557685	7914424	91.4	16-Aug-23	16-Aug-23	11:42	12:40	0.97	0.88	1	9	4	14	15.8
JL0-23-GN-06	557781	7914603	91.4	16-Aug-23	16-Aug-23	13:35	14:30	0.92	0.84	0	5	4	9	10.7
								Total	**5.09**	**16**	**47**	**39**	**102**	**20.2**

Note: Catch-per-unit-effort (CPUE) represents the number of fish captured per 100 m·hours of net.

Table G.11: Arctic Charr Measurements from Fish Captured at Camp Lake (JL0) by Gill Netting, Mary River Project CREMP, August 2023

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities / Comments	Fulton's Condition Factor (K)
JL0-23-AC-01	JL0-23-GN-01	1.5	78.9	83.5	5,000	-	1.018
JL0-23-AC-02	JL0-23-GN-01	1.5	39.1	42.4	395	-	0.661
JL0-23-AC-03	JL0-23-GN-01	1.5	30.2	33.0	230	-	0.835
JL0-23-AC-04	JL0-23-GN-01	1.5	34.1	36.7	290	-	0.731
JL0-23-AC-05	JL0-23-GN-01	1.5	38.8	42.0	460	-	0.788
JL0-23-AC-06	JL0-23-GN-01	2	37.8	41.1	395	-	0.731
JL0-23-AC-07	JL0-23-GN-01	2	30.4	33.3	320	-	1.139
JL0-23-AC-08	JL0-23-GN-01	2	32.6	35.3	390	-	1.126
JL0-23-AC-09	JL0-23-GN-01	2	32.4	35.0	330	-	0.970
JL0-23-AC-10	JL0-23-GN-01	2	39.1	42.5	470	-	0.786
JL0-23-AC-11	JL0-23-GN-01	2	30.1	32.5	265	-	0.972
JL0-23-AC-12	JL0-23-GN-01	2	35.8	38.9	435	-	0.948
JL0-23-AC-13	JL0-23-GN-01	2	31.1	33.9	295	-	0.981
JL0-23-AC-14	JL0-23-GN-01	2	30.1	34.1	280	-	1.027
JL0-23-AC-15	JL0-23-GN-01	3	40.0	43.4	490	-	0.766
JL0-23-AC-16	JL0-23-GN-01	3	37.5	41.2	450	-	0.853
JL0-23-AC-17	JL0-23-GN-01	3	36.0	39.2	450	-	0.965
JL0-23-AC-18	JL0-23-GN-01	3	37.1	40.0	505	-	0.989
JL0-23-AC-19	JL0-23-GN-01	3	37.9	40.9	530	-	0.974
JL0-23-AC-20	JL0-23-GN-01	3	41.6	44.7	550	-	0.764
JL0-23-AC-21	JL0-23-GN-01	3	38.1	41.4	465	-	0.841
JL0-23-AC-22	JL0-23-GN-01	3	40.3	44.1	530	-	0.810
JL0-23-AC-23	JL0-23-GN-01	3	38.0	41.0	495	-	0.902
JL0-23-AC-24	JL0-23-GN-01	3	40.4	44.0	520	-	0.789
JL0-23-AC-25	JL0-23-GN-01	3	41.3	45.0	555	Lesions on side	0.788
JL0-23-AC-26	JL0-23-GN-01	3	37.4	40.8	365	-	0.698
JL0-23-AC-27	JL0-23-GN-01	3	35.2	38.4	305	-	0.699
JL0-23-AC-28	JL0-23-GN-01	3	40.5	44.1	595	-	0.896
JL0-23-AC-29	JL0-23-GN-01	3	38.8	42.2	460	-	0.788
JL0-23-AC-30	JL0-23-GN-02	1.5	39.7	42.6	520	-	0.831
JL0-23-AC-31	JL0-23-GN-02	1.5	39.0	42.5	470	Pit tagged	0.792
JL0-23-AC-32	JL0-23-GN-02	1.5	38.7	42.4	550	-	0.949
JL0-23-AC-33	JL0-23-GN-02	1.5	43.2	46.5	670	-	0.831
JL0-23-AC-34	JL0-23-GN-02	1.5	36.2	39.4	485	-	1.022
JL0-23-AC-35	JL0-23-GN-02	1.5	34.2	37.3	415	-	1.037
JL0-23-AC-36	JL0-23-GN-02	1.5	27.4	29.6	210	-	1.021
JL0-23-AC-37	JL0-23-GN-02	2	30.6	33.0	305	-	1.064
JL0-23-AC-38	JL0-23-GN-02	2	33.5	36.2	370	-	0.984
JL0-23-AC-39	JL0-23-GN-02	2	33.9	36.8	385	-	0.988
JL0-23-AC-40	JL0-23-GN-02	2	35.2	38.2	375	-	0.860
JL0-23-AC-41	JL0-23-GN-02	2	36.2	39.4	420	-	0.885
JL0-23-AC-42	JL0-23-GN-02	2	33.4	36.0	365	-	0.980
JL0-23-AC-43	JL0-23-GN-02	2	36.1	39.3	445	-	0.946
JL0-23-AC-44	JL0-23-GN-02	2	37.8	41.0	460	-	0.852
JL0-23-AC-45	JL0-23-GN-02	3	38.4	41.9	500	-	0.883
JL0-23-AC-46	JL0-23-GN-02	3	40.8	44.0	565	-	0.832
JL0-23-AC-47	JL0-23-GN-02	3	38.9	42.2	525	Red spots on side of body	0.892
JL0-23-AC-48	JL0-23-GN-02	3	39.0	42.6	445	-	0.750
JL0-23-AC-49	JL0-23-GN-02	3	39.5	42.7	530	-	0.860
JL0-23-AC-50	JL0-23-GN-02	3	35.2	37.9	425	-	0.974
JL0-23-AC-51	JL0-23-GN-02	3	40.7	44.3	600	-	0.890
JL0-23-AC-52	JL0-23-GN-02	3	44.4	45.1	570	Lots of gill lice	0.651
JL0-23-AC-53	JL0-23-GN-02	3	67.8	71.5	2,200	-	0.706
JL0-23-AC-54	JL0-23-GN-02	3	37.1	40.2	495	-	0.969
JL0-23-AC-55	JL0-23-GN-03	1.5	29.4	31.8	255	-	1.003
JL0-23-AC-56	JL0-23-GN-03	2	30.1	33.0	230	-	0.843
JL0-23-AC-57	JL0-23-GN-03	2	31.3	34.1	280	-	0.913
JL0-23-AC-58	JL0-23-GN-03	2	35.1	37.9	305	-	0.705
JL0-23-AC-59	JL0-23-GN-03	2	34.3	37.1	380	-	0.942
JL0-23-AC-60	JL0-23-GN-03	2	40.0	43.7	500	-	0.781
JL0-23-AC-61	JL0-23-GN-03	2	40.0	43.3	440	-	0.688
JL0-23-AC-62	JL0-23-GN-03	2	38.6	41.9	555	-	0.965
JL0-23-AC-63	JL0-23-GN-03	2	38.3	41.6	540	-	0.961
JL0-23-AC-64	JL0-23-GN-03	3	37.6	40.9	435	-	0.818
JL0-23-AC-65	JL0-23-GN-04	1.5	30.8	33.0	290	-	0.993
JL0-23-AC-66	JL0-23-GN-04	1.5	38.5	41.6	505	-	0.885
JL0-23-AC-67	JL0-23-GN-04	2	41.0	44.9	510	-	0.740
JL0-23-AC-68	JL0-23-GN-04	2	30.8	33.2	280	-	0.958
JL0-23-AC-69	JL0-23-GN-04	2	32.5	35.0	320	-	0.932

Note: "-" indicates measurement not taken or no comment.

Table G.11: Arctic Charr Measurements from Fish Captured at Camp Lake (JL0) by Gill Netting, Mary River Project CREMP, August 2023

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities / Comments	Fulton's Condition Factor (K)
JL0-23-AC-70	JL0-23-GN-04	2	33.1	35.9	350	-	0.965
JL0-23-AC-71	JL0-23-GN-04	2	40.9	44.7	520	-	0.760
JL0-23-AC-72	JL0-23-GN-04	2	31.5	34.3	345	-	1.104
JL0-23-AC-73	JL0-23-GN-04	2	30.9	33.5	295	-	1.000
JL0-23-AC-74	JL0-23-GN-04	2	38.5	41.8	515	-	0.902
JL0-23-AC-75	JL0-23-GN-04	3	43.1	47.0	650	-	0.812
JL0-23-AC-76	JL0-23-GN-04	3	38.1	41.0	460	-	0.832
JL0-23-AC-77	JL0-23-GN-04	3	37.9	41.0	555	-	1.019
JL0-23-AC-78	JL0-23-GN-04	3	39.7	44.3	575	Red markings on caudal fin	0.919
JL0-23-AC-79	JL0-23-GN-04	3	41.0	44.2	590	-	0.856
JL0-23-AC-80	JL0-23-GN-05	3	37.2	40.2	470	-	0.913
JL0-23-AC-81	JL0-23-GN-05	3	42.5	47.5	650	Red spots on side	0.847
JL0-23-AC-82	JL0-23-GN-05	3	40.5	43.5	545	Red spots on side	0.820
JL0-23-AC-83	JL0-23-GN-05	3	37.8	40.5	505	-	0.935
JL0-23-AC-84	JL0-23-GN-05	2	36.2	39.0	390	-	0.822
JL0-23-AC-85	JL0-23-GN-05	2	39.9	43.1	585	-	0.921
JL0-23-AC-86	JL0-23-GN-05	2	31.1	34.0	285	-	0.947
JL0-23-AC-87	JL0-23-GN-05	2	38.6	41.6	580	-	1.008
JL0-23-AC-88	JL0-23-GN-05	2	38.5	41.8	570	-	0.999
JL0-23-AC-89	JL0-23-GN-05	2	36.6	38.6	405	-	0.826
JL0-23-AC-90	JL0-23-GN-05	2	37.5	40.4	490	-	0.929
JL0-23-AC-91	JL0-23-GN-05	2	30.8	33.2	280	-	0.958
JL0-23-AC-92	JL0-23-GN-05	2	38.0	41.5	580	-	1.057
JL0-23-AC-93	JL0-23-GN-05	1.5	41.0	43.7	565	-	0.820
JL0-23-AC-94	JL0-23-GN-06	3	38.6	41.9	580	-	1.008
JL0-23-AC-95	JL0-23-GN-06	3	38.0	41.3	495	-	0.902
JL0-23-AC-96	JL0-23-GN-06	3	36.9	39.9	530	-	1.055
JL0-23-AC-97	JL0-23-GN-06	3	39.8	43.8	555	Red spot on caudal peduncle	0.880
JL0-23-AC-98	JL0-23-GN-06	2	34.3	37.0	390	-	0.966
JL0-23-AC-99	JL0-23-GN-06	2	37.9	41.0	470	-	0.863
JL0-23-AC-100	JL0-23-GN-06	2	35.7	38.4	450	-	0.989
Overall Catch Summary	**Sample Size (N)**		**100**	**100**	**100**	**-**	**100**
	Average		**37.5**	**40.6**	**512**	**-**	**0.894**
	Median		**37.9**	**41.0**	**468**	**-**	**0.902**
	Standard Deviation		**6.4**	**6.7**	**498**	**-**	**0.108**
	Standard Error		**0.64**	**0.67**	**50**	**-**	**0.011**
	Minimum		**27.4**	**29.6**	**210**	**-**	**0.651**
	Maximum		**78.9**	**83.5**	**5,000**	**-**	**1.139**

Note: "-" indicates measurement not taken or no comment.

Table G.12: Results of Littoral/Profundal Arctic Charr Health Endpoint Statistical Comparisons between 2023 Camp Lake (JLO) and 2023 Reference Lake 3 (REF) Data, and for Camp Lake between 2023 and the Mine Baseline Period (2005 to 2013), Mary River Project 2023 CREMP

Comparison	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics[b]			Test P-value	Magnitude of Difference (%)[c]
			Response	Covariate	REF 2023 or JLO Base	JLO 2023		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]	Statistic	REF 2023 or JLO Base	JLO 2023		
								Interaction P-value	Covariate P-value						
Camp Lake versus Reference Lake 3, 2023	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	11	100	K-S	-	-	-	-	-	-	0.012	-
	Body Size	Fork Length	Fork Length (cm)	-	11	100	M-W	-	-	-	Median	30.4	37.9	0.137	24
		Body Weight	Body Weight (g)	-	11	100	M-W	-	-	-	Median	320	468	0.269	46
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	11	100	ANCOVA	0.234	<0.001	36.8	Adjusted Mean	481	443	0.033	-7.9
			log[Body Weight (g)]	log[Fork Length (cm)]	11	99[d]	ANCOVA	0.855	<0.001	36.5	Adjusted Mean	468	434	0.032	-7.4
Camp Lake 2023 versus Baseline	Survival	Length Frequency Distribution	Fork Length (cm)	-	131	100	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	131	100	M-W	-	-	-	Median	32.3	37.9	<0.001	17
		Body Weight	Body Weight (g)	-	131	100	M-W	-	-	-	Median	350	468	<0.001	34
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	131	100	ANCOVA	0.013[e]	<0.001	33.3	Adjusted Mean	354	330	0.004	-6.6

Area P-value < 0.1 or Interaction P-value < 0.05.

Absolute Magnitude of Difference ≥ 10% for Condition (EEM effect endpoint).

Note: "-" means not applicable.

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for $\log_{10}$-transformed variables), and adjusted mean are reported for Mann-Whitney, t-test and ANCOVA, respectively, and the predicted mean values from the regression line equations for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVAs where a significant interaction was detected.

[c] The magnitude of difference calculated as: [(exposed area mean - reference area mean) / reference area mean] x 100. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as : [(exposed area predicted mean - reference area predicted mean) / reference area predicted mean] x 100.

[d] One outlier (JL0-23-AC-01 Stdnt resid: 4.312) was removed from the analysis.

[e] ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9451 and R2 of parallel slope model = 0.9436; a difference < 0.02) following Environment Canada (2012).

Table G.13: Arctic Charr Measurements from Fish Captured at Sheardown Lake NW (DL0-01) by Electrofishing, Mary River Project CREMP, August 2023

Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
DL01-23-ACJ-01	6.7	7.0	3.278	-	1.090
DL01-23-ACJ-02	6.3	6.5	2.679	-	1.071
DL01-23-ACJ-03	13.6	14.6	22.646	-	0.900
DL01-23-ACJ-04	7.5	8.0	4.125	-	0.978
DL01-23-ACJ-05	6.9	7.4	3.662	-	1.115
DL01-23-ACJ-06	5.6	5.8	1.476	-	0.840
DL01-23-ACJ-07	8.1	8.8	5.069	-	0.954
DL01-23-ACJ-08	6.6	7.0	2.793	-	0.971
DL01-23-ACJ-09	7.8	8.4	4.832	-	1.018
DL01-23-ACJ-10	5.0	5.2	1.400	1	1.120
DL01-23-ACJ-11	10.8	11.6	11.184	-	0.888
DL01-23-ACJ-12	6.2	6.5	2.573	-	1.080
DL01-23-ACJ-13	7.2	7.6	4.001	-	1.072
DL01-23-ACJ-14	6.5	6.9	2.965	-	1.080
DL01-23-ACJ-15	6.6	6.9	3.555	-	1.237
DL01-23-ACJ-16	7.3	7.6	3.866	-	0.994
DL01-23-ACJ-17	16.5	17.9	42.135	-	0.938
DL01-23-ACJ-18	6.6	6.9	2.795	-	0.972
DL01-23-ACJ-19	9.9	10.8	9.777	-	1.008
DL01-23-ACJ-20	5.9	6.3	2.091	2	1.018
DL01-23-ACJ-21	7.8	8.2	4.336	-	0.914
DL01-23-ACJ-22	6.8	7.2	3.152	-	1.002
DL01-23-ACJ-23	6.7	7.0	3.535	-	1.175
DL01-23-ACJ-24	9.1	9.7	7.481	-	0.993
DL01-23-ACJ-25	5.9	6.1	2.595	-	1.264
DL01-23-ACJ-26	6.1	6.4	2.511	-	1.106
DL01-23-ACJ-27	6.8	7.3	3.465	-	1.102
DL01-23-ACJ-28	5.6	5.9	1.874	-	1.067
DL01-23-ACJ-29	6.3	6.5	2.129	-	0.851
DL01-23-ACJ-30	5.9	6.1	2.068	-	1.007
DL01-23-ACJ-31	3.6	3.7	0.845	2	1.811
DL01-23-ACJ-32	5.9	6.1	1.717	-	0.836
DL01-23-ACJ-33	6.8	7.0	3.104	-	0.987
DL01-23-ACJ-34	6.2	6.4	2.478	-	1.040
DL01-23-ACJ-35	7.9	8.4	5.098	-	1.034
DL01-23-ACJ-36	3.8	3.9	0.619	-	1.128
DL01-23-ACJ-37	6.9	7.2	3.322	-	1.011
DL01-23-ACJ-38	7.3	7.7	4.580	-	1.177
DL01-23-ACJ-39	10.4	11.1	11.147	4	0.991
DL01-23-ACJ-40	7.2	7.6	3.990	-	1.069
DL01-23-ACJ-41	5.3	5.5	1.482	-	0.995
DL01-23-ACJ-42	7.8	8.3	3.959	-	0.834
DL01-23-ACJ-43	6.5	6.8	3.114	-	1.134
DL01-23-ACJ-44	7.1	7.5	3.719	-	1.039
DL01-23-ACJ-45	11.8	12.4	16.642	-	1.013
DL01-23-ACJ-46	5.8	6.0	1.954	-	1.001
DL01-23-ACJ-47	3.8	3.9	0.537	-	0.979
DL01-23-ACJ-48	7.4	7.9	3.933	-	0.971
DL01-23-ACJ-49	4.1	4.2	0.646	-	0.937
DL01-23-ACJ-50	10.2	11.1	10.627	4	1.001
DL01-23-ACJ-51	9.2	9.9	7.165	-	0.920
DL01-23-ACJ-52	5.6	5.8	2.712	-	1.544
DL01-23-ACJ-53	6.3	6.7	2.305	-	0.922
DL01-23-ACJ-54	9.5	10.1	7.825	-	0.913
DL01-23-ACJ-55	6.2	6.6	2.647	-	1.111
DL01-23-ACJ-56	6.8	7.1	3.323	-	1.057
DL01-23-ACJ-57	4.4	4.7	0.891	-	1.046
DL01-23-ACJ-58	10.2	10.9	10.572	-	0.996
DL01-23-ACJ-59	5.9	6.2	2.224	-	1.083
DL01-23-ACJ-60	6.2	6.6	2.356	2	0.989
DL01-23-ACJ-61	10.4	11.1	11.456	-	1.018
DL01-23-ACJ-62	5.5	5.8	1.373	-	0.825
DL01-23-ACJ-63	6.8	7.3	4.626	-	1.471
DL01-23-ACJ-64	13.4	14.5	20.593	-	0.856

Notes: "-" indicates measurement not taken or fish not submitted for aging. YOY indicates Young-of-the-Year.

Table G.13: Arctic Charr Measurements from Fish Captured at Sheardown Lake NW (DL0-01) by Electrofishing, Mary River Project CREMP, August 2023

	Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
	DL01-23-ACJ-65	10.8	11.6	13.392	-	1.063
	DL01-23-ACJ-66	6.2	6.6	2.064	-	0.866
	DL01-23-ACJ-67	5.8	6.0	2.248	-	1.152
	DL01-23-ACJ-68	4.9	5.1	1.130	-	0.960
	DL01-23-ACJ-69	6.6	6.9	2.656	-	0.924
	DL01-23-ACJ-70	7.8	8.3	5.011	2	1.056
	DL01-23-ACJ-71	8.3	8.8	5.463	-	0.955
	DL01-23-ACJ-72	6.3	6.7	2.543	-	1.017
	DL01-23-ACJ-73	5.6	5.9	2.436	-	1.387
	DL01-23-ACJ-74	6.6	7.1	2.560	-	0.890
	DL01-23-ACJ-75	6.3	6.6	3.157	-	1.263
	DL01-23-ACJ-76	7.2	7.5	4.017	-	1.076
	DL01-23-ACJ-77	7.0	7.2	3.290	-	0.959
	DL01-23-ACJ-78	6.7	7.1	3.262	-	1.085
	DL01-23-ACJ-79	4.9	5.3	1.696	-	1.442
	DL01-23-ACJ-80	4.6	4.8	0.967	1	0.993
	DL01-23-ACJ-81	5.3	5.6	2.246	-	1.509
	DL01-23-ACJ-82	6.6	6.9	2.778	-	0.966
	DL01-23-ACJ-83	6.4	6.7	3.421	-	1.305
	DL01-23-ACJ-84	2.6	2.7	0.361	-	2.054
	DL01-23-ACJ-85	7.7	8.1	4.001	-	0.876
	DL01-23-ACJ-86	6.1	6.6	2.935	-	1.293
	DL01-23-ACJ-87	9.1	9.6	7.387	-	0.980
	DL01-23-ACJ-88	6.2	6.6	2.274	-	0.954
	DL01-23-ACJ-89	6.0	6.4	2.682	-	1.242
	DL01-23-ACJ-90	7.0	7.3	3.630	2	1.058
	DL01-23-ACJ-91	6.3	6.6	2.416	-	0.966
	DL01-23-ACJ-92	6.4	6.8	2.982	-	1.138
	DL01-23-ACJ-93	6.1	6.4	2.403	-	1.059
	DL01-23-ACJ-94	7.2	7.7	3.865	-	1.036
	DL01-23-ACJ-95	5.2	5.4	1.536	-	1.092
	DL01-23-ACJ-96	5.7	5.9	2.029	-	1.096
	DL01-23-ACJ-97	6.0	6.4	2.350	-	1.088
	DL01-23-ACJ-98	6.7	7.0	2.860	-	0.951
	DL01-23-ACJ-99	5.5	5.7	1.942	-	1.167
	DL01-23-ACJ-100	6.4	6.7	2.818	2	1.075
Overall Catch Summary	Sample Size (N)	100	100	100	10	100
	Average	7.0	7	4.464	2.2	1.066
	Median	6.6	6.9	2.950	2	1.018
	Standard Deviation	2.1	2.3	5.379	1.0	0.189
	Standard Error	0.21	0.23	0.538	0.33	0.019
	Minimum	2.6	2.7	0.361	1	0.825
	Maximum	16.5	17.9	42.135	4	2.054
Young-of-the-Year Catch Summary	Proportion of YOY	**4%**				
	Sample Size (N)	4	4	4	-	4
	Average	3.5	3.6	0.591	-	1.493
	Median	3.7	3.8	0.578	-	1.470
	Standard Deviation	0.6	0.6	0.201	-	0.521
	Standard Error	0.3	0.3	0.100	-	0.260
	Minimum	2.6	2.7	0.361	-	0.979
	Maximum	3.8	3.9	0.845	-	2.054

Notes: "-" indicates measurement not taken or fish not submitted for aging. YOY indicates Young-of-the-Year.

Table G.14: Results of Nearshore Arctic Charr Non-Young-of-the-Year (YOY) Health Endpoint Statistical Comparisons between Sheardown Lake NW (DL0-01) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Group	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics[b]			Test P-value	Magnitude of Difference (%)[c]
			Response	Covariate	REF	DL0-01		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]	Statistic	REF	DL0-01		
								Interaction P-value	Covariate P-value						
All Fish	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	100	100	K-S	-	-	-	-	-	-	0.054	-
Non-YOY	Survival	Length Frequency Distribution	Fork Length (cm)	-	89	96	K-S	-	-	-	-	-	-	0.032	-
	Body Size	Fork Length	Fork Length (cm)	-	89	96	M-W	-	-	-	Median	7.00	6.60	0.423	-5.7
		Body Weight	Body Weight (g)	-	89	96	M-W	-	-	-	Median	3.70	3.04	0.619	-18
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	89	96	ANCOVA	0.341	<0.001	7.03	Adjusted Mean	3.51	3.60	0.239	2.7

Area P-value < 0.1 or Interaction P-value < 0.05.

Absolute Magnitude of Difference ≥ 10% for Condition (EEM effect endpoint).

Notes: YOY = Young-of-the-Year. "-" indicates no data available.

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for $\log_{10}$-transformed variables), and adjusted mean are reported for Mann-Whitney, t-test and ANCOVA, respectively, and the predicted mean values from the regression line equations for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVAs where a significant interaction was detected.

[c] The magnitude of difference calculated as: [(exposed area mean - reference area mean) / reference area mean] x 100. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as : [(exposed area predicted mean - reference area predicted mean) / reference area predicted mean] x 100.

Table G.15: Arctic Charr Estimated Sample Sizes to Detect Various Effect Sizes as a Percentage Change in Respective Fish Health Endpoints at Sheardown Lake NW (DLO1) Using 2023 Data Relative to Reference Lake 3 Data (2023) or Sheardown Lake NW Baseline Data (2006 to 2013) with α=β=0.1, Mary River Project 2023 CREMP

Comparison	Group	Indicator	Endpoint	Variables		Test [a]	S[b]	COV (%)[c]	Minimum Sample Size to Detect an Effect Size (% Increase/Decrease Relative to Reference) with α=β=0.1									
				Response	Covariate				log(Response)	5%	10%	20%	25%	30%	33%	40%	50%	100%
										-5%	-9%	-17%	-20%	-23%	-25%	-29%	-33%	-50%
									Response	±5%	±10%	±20%	±25%	±30%	±33%	±40%	±50%	±100%
Nearshore Arctic Charr (Electrofishing) versus Ref. Lake 3, 2023 Data	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.115	29.0	Response	590	156	43	28	20	17	12	9	4
			Body Weight	Body Weight (g)	-	M-W	0.328	103	Response	4,748	1,246	342	229	166	138	101	71	22
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0658	-	log(Response)	167	46	14	10	8	7	6	5	4
Nearshore Arctic Charr (Electrofishing) 2023 versus Baseline	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.162	38.9	Response	1,165	301	77	50	35	29	20	14	5
			Body Weight	Body Weight (g)	-	M-W	0.481	113	Response	10,120	2,532	635	407	283	230	160	104	27
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0700	-	log(Response)	189	51	16	11	9	8	6	5	4
Littoral/Profundal Arctic Charr (Gill Netting) versus Ref. Lake 3, 2023 Data	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0738	16.9	Response	229	58	16	11	9	7	5	4	3
			Body Weight	Body Weight (g)	-	M-W	0.222	47.4	Response	1,782	447	113	73	51	42	29	20	6
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0642	-	log(Response)	160	43	14	10	8	7	6	5	4
Littoral/Profundal Arctic Charr (Gill Netting) 2023 versus Baseline	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0885	19.6	Response	305	78	21	14	11	9	6	5	3
			Body Weight	Body Weight (g)	-	M-W	0.269	57.8	Response	2,653	665	167	108	76	62	43	28	9
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0625	-	log(Response)	151	41	13	9	7	7	6	5	3

Note: "-" indicates not applicable.

[a] Sample size estimates for the M-W test were estimated based for a two-sample t-test using sample sizes multiplied by 0.864. The 0.864 is the lower bound of the asymptotic relative efficiency of the Mann-Whitney test and the two-sample t-test (Hodges and Lehmann 1956). Estimates were generated for the response variable on the untransformed and log $_{10}$-transformed scales and the lowest sample size is reported.

[b] Pooled standard deviation of the regression residuals

[c] Coefficient of variation (pooled standard deviation/reference mean)×100%

Table G.16: Gill Netting Catch Records for Sheardown Lake NW (DL0-01), Mary River Project CREMP, August 2023

Gill Net Set ID	Location (NAD83, UTM Zone 17N)		Length (m)	Set Date	Lift Date	Set Time	Lift Time	Fishing Hours	Effort (m*hrs/100 m)	Arctic Charr Catch Per Mesh Size			Total Catch	CPUE
	Easting	Northing								1½"	2"	3"		
DL01-23-GN-01	559817	7913697	91.4	19-Aug-23	19-Aug-23	13:40	14:40	1.00	0.91	0	5	4	9	9.84
DL01-23-GN-02	560306	7913410	91.4	19-Aug-23	19-Aug-23	14:11	15:10	0.98	0.90	1	2	1	4	4.45
DL01-23-GN-03	560430	7912550	91.4	19-Aug-23	19-Aug-23	15:42	16:36	0.90	0.82	3	4	3	10	12.15
DL01-23-GN-04	560430	7912550	91.4	20-Aug-23	20-Aug-23	7:55	8:55	1.00	0.914	0	1	4	5	5.47
DL01-23-GN-05	560810	7913087	91.4	20-Aug-23	20-Aug-23	8:30	9:30	1.00	0.91	1	4	1	6	6.56
DL01-23-GN-06	560799	7913027	91.4	20-Aug-23	20-Aug-23	10:00	11:00	1.00	0.91	0	0	2	2	2.19
DL01-23-GN-07	560493	7912572	91.4	20-Aug-23	20-Aug-23	10:40	11:35	0.92	0.84	1	3	0	4	4.77
DL01-23-GN-08	560462	7912777	91.4	20-Aug-23	20-Aug-23	11:18	12:15	0.95	0.87	1	7	0	8	9.209
DL01-23-GN-09	559886	7913532	91.4	20-Aug-23	20-Aug-23	12:20	13:15	0.92	0.84	2	0	1	3	3.58
DL01-23-GN-10	560462	7912777	91.4	20-Aug-23	20-Aug-23	13:50	14:45	0.92	0.84	2	1	0	3	3.58
DL01-23-GN-11	560505	7912550	91.4	20-Aug-23	20-Aug-23	14:24	15:20	0.93	0.85	0	3	0	3	3.52
DL01-23-GN-12	560607	7912614	91.4	21-Aug-23	21-Aug-23	15:06	16:10	1.07	0.98	0	5	0	5	5.13
DL01-23-GN-13	560493	7912572	91.4	20-Aug-23	20-Aug-23	15:50	16:30	0.67	0.61	4	0	0	4	6.6
DL01-23-GN-14	559688	7913607	91.4	21-Aug-23	21-Aug-23	11:15	12:55	1.67	1.52	1	6	14	21	13.8
DL01-23-GN-15	559734	7913343	91.4	22-Aug-23	22-Aug-23	8:45	9:40	0.92	0.84	1	4	1	6	7.2
DL01-23-GN-16	559940	7913185	91.4	22-Aug-23	22-Aug-23	9:15	10:13	0.97	0.88	0	4	0	4	4.5
DL01-23-GN-17	560058	7913293	91.4	22-Aug-23	22-Aug-23	10:40	11:38	0.97	0.88	0	3	0	3	3.4
								Total	**15.3**	**17**	**52**	**31**	**100**	**6.23**

Note: Catch-per-unit-effort (CPUE) represents the number of fish captured per 100 m·hours of net.

Table G.17: Arctic Charr Measurements from Fish Captured at Sheardown Lake NW (DL0-01) by Gill Netting, Mary River Project CREMP, August 2023

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
DL01-23-AC-01	DL01-23-GN-01	2	31.7	34.1	240	-	0.753
DL01-23-AC-02	DL01-23-GN-01	2	27.7	30.1	210	-	0.988
DL01-23-AC-03	DL01-23-GN-01	2	32.3	35.1	245	-	0.727
DL01-23-AC-04	DL01-23-GN-01	2	37.5	40.5	485	-	0.920
DL01-23-AC-05	DL01-23-GN-01	2	33.0	35.4	300	-	0.835
DL01-23-AC-06	DL01-23-GN-01	3	40.4	43.5	580	-	0.880
DL01-23-AC-07	DL01-23-GN-01	3	39.8	42.3	485	-	0.769
DL01-23-AC-08	DL01-23-GN-01	3	35.0	37.9	400	-	0.933
DL01-23-AC-09	DL01-23-GN-01	3	37.8	40.3	460	-	0.852
DL01-23-AC-10	DL01-23-GN-02	1	34.7	37.8	400	-	0.957
DL01-23-AC-11	DL01-23-GN-02	2	34.5	37.5	360	-	0.877
DL01-23-AC-12	DL01-23-GN-02	2	32.3	35.0	275	-	0.816
DL01-23-AC-13	DL01-23-GN-02	3	28.8	31.7	180	-	0.754
DL01-23-AC-14	DL01-23-GN-03	1	29.5	32.0	300	-	1.169
DL01-23-AC-15	DL01-23-GN-03	1	30.5	33.0	250	-	0.881
DL01-23-AC-16	DL01-23-GN-03	1	27.5	29.0	160	-	0.769
DL01-23-AC-17	DL01-23-GN-03	2	33.5	36.0	300	-	0.798
DL01-23-AC-18	DL01-23-GN-03	2	32.5	35.0	270	-	0.787
DL01-23-AC-19	DL01-23-GN-03	2	29.5	32.0	230	-	0.896
DL01-23-AC-20	DL01-23-GN-03	2	30.5	33.0	260	-	0.916
DL01-23-AC-21	DL01-23-GN-03	3	40.4	43.2	570	-	0.864
DL01-23-AC-22	DL01-23-GN-03	3	39.6	42.5	600	-	0.966
DL01-23-AC-23[a]	DL01-23-GN-03	3	20.5	22.1	210	-	2.438
DL01-23-AC-24	DL01-23-GN-04	2	32.1	34.8	295	-	0.892
DL01-23-AC-25	DL01-23-GN-04	3	42.0	45.6	595	-	0.803
DL01-23-AC-26	DL01-23-GN-04	3	39.5	42.2	600	-	0.974
DL01-23-AC-27	DL01-23-GN-04	3	48.4	51.5	1,200	-	1.058
DL01-23-AC-28[a]	DL01-23-GN-04	3	34.6	37.9	805	-	1.943
DL01-23-AC-29	DL01-23-GN-05	1	29.1	32.0	220	-	0.893
DL01-23-AC-30	DL01-23-GN-05	2	38.4	38.7	405	-	0.715
DL01-23-AC-31	DL01-23-GN-05	2	40.6	43.6	860	-	1.285
DL01-23-AC-32	DL01-23-GN-05	2	31.2	33.9	265	-	0.873
DL01-23-AC-33	DL01-23-GN-05	2	34.1	37.5	330	-	0.832
DL01-23-AC-34	DL01-23-GN-05	3	42.6	45.7	780	-	1.009
DL01-23-AC-35	DL01-23-GN-06	3	36.4	39.9	410	-	0.850
DL01-23-AC-36	DL01-23-GN-06	3	37.1	39.6	415	-	0.813
DL01-23-AC-37	DL01-23-GN-07	1	30.9	34.5	250	Missing half of caudal fin	0.847
DL01-23-AC-38	DL01-23-GN-07	2	35.5	38.5	335	-	0.749
DL01-23-AC-39	DL01-23-GN-07	2	42.6	45.9	750	-	0.970
DL01-23-AC-40	DL01-23-GN-07	2	31.8	34.1	250	-	0.777
DL01-23-AC-41	DL01-23-GN-08	1	36.4	39.3	350	-	0.726
DL01-23-AC-42	DL01-23-GN-08	2	32.0	34.8	270	-	0.824
DL01-23-AC-43	DL01-23-GN-08	2	30.2	33.0	235	-	0.853

Note: "-" indicates measurement not taken or no comment.

[a] Fish length or weight values were deemed erroneous, with error likely resulting from instrumentation or recording error during field data collection. These individuals have been removed from all calculations of summary statistics and statistical analysis but length and weight values, as they were recorded on field data sheets, have been presented here for transparency.

Table G.17: Arctic Charr Measurements from Fish Captured at Sheardown Lake NW (DL0-01) by Gill Netting, Mary River Project CREMP, August 2023

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
DL01-23-AC-44	DL01-23-GN-08	2	28.0	30.5	190	-	0.866
DL01-23-AC-45	DL01-23-GN-08	2	33.6	36.5	380	-	1.002
DL01-23-AC-46	DL01-23-GN-08	2	40.2	43.6	505	-	0.777
DL01-23-AC-47	DL01-23-GN-08	2	32.2	35.3	250	Caught dead	0.749
DL01-23-AC-48	DL01-23-GN-08	2	45.4	49.5	730	-	0.780
DL01-23-AC-49	DL01-23-GN-09	1	34.4	37.5	355	-	0.872
DL01-23-AC-50	DL01-23-GN-09	1	34.3	37.2	375	-	0.929
DL01-23-AC-51	DL01-23-GN-09	3	31.9	34.5	280	-	0.863
DL01-23-AC-52	DL01-23-GN-10	1	33.1	36.1	310	-	0.855
DL01-23-AC-53	DL01-23-GN-10	1	33.4	35.9	280	-	0.751
DL01-23-AC-54	DL01-23-GN-10	2	29.8	32.0	255	-	0.964
DL01-23-AC-55	DL01-23-GN-11	2	36.1	38.9	445	Parasite	0.946
DL01-23-AC-56	DL01-23-GN-11	2	28.2	30.1	220	-	0.981
DL01-23-AC-57	DL01-23-GN-11	2	31.6	34.0	290	-	0.919
DL01-23-AC-58	DL01-23-GN-12	2	29.6	32.7	240	-	0.925
DL01-23-AC-59	DL01-23-GN-12	2	35.0	38.1	395	-	0.921
DL01-23-AC-60	DL01-23-GN-12	2	29.8	32.0	255	-	0.964
DL01-23-AC-61	DL01-23-GN-12	2	36.8	38.5	335	-	0.672
DL01-23-AC-62	DL01-23-GN-12	2	35.0	38.2	460	-	1.073
DL01-23-AC-63	DL01-23-GN-13	1	37.0	40.6	450	-	0.888
DL01-23-AC-64	DL01-23-GN-13	1	29.9	33.0	330	-	1.235
DL01-23-AC-65	DL01-23-GN-13	1	26.6	29.0	140	-	0.744
DL01-23-AC-66	DL01-23-GN-13	1	28.1	30.8	190	-	0.856
DL01-23-AC-67[a]	DL01-23-GN-14	3	17.0	18.5	550	-	11.195
DL01-23-AC-68	DL01-23-GN-14	3	39.8	43.3	600	-	0.952
DL01-23-AC-69	DL01-23-GN-14	3	41.9	45.0	420	-	0.571
DL01-23-AC-70	DL01-23-GN-14	3	44.5	48.0	720	-	0.817
DL01-23-AC-71	DL01-23-GN-14	3	38.9	41.5	480	-	0.815
DL01-23-AC-72	DL01-23-GN-14	3	41.6	45.2	720	-	1.000
DL01-23-AC-73	DL01-23-GN-14	3	40.0	43.5	560	-	0.875
DL01-23-AC-74	DL01-23-GN-14	3	39.0	42.2	490	-	0.826
DL01-23-AC-75	DL01-23-GN-14	3	38.0	41.0	420	-	0.765
DL01-23-AC-76	DL01-23-GN-14	3	36.8	39.6	450	-	0.903
DL01-23-AC-77	DL01-23-GN-14	3	35.4	39.1	350	-	0.789
DL01-23-AC-78	DL01-23-GN-14	3	32.0	34.6	280	-	0.854
DL01-23-AC-79	DL01-23-GN-14	3	41.8	45.5	740	-	1.013
DL01-23-AC-80	DL01-23-GN-14	3	44.0	47.2	740	-	0.869
DL01-23-AC-81	DL01-23-GN-14	2	34.0	36.8	300	-	0.763
DL01-23-AC-82	DL01-23-GN-14	2	38.5	41.8	460	-	0.806
DL01-23-AC-83	DL01-23-GN-14	2	32.3	35.1	240	-	0.712
DL01-23-AC-84	DL01-23-GN-14	2	35.7	39.6	370	-	0.813
DL01-23-AC-85	DL01-23-GN-14	2	34.0	37.5	320	-	0.814
DL01-23-AC-86	DL01-23-GN-14	2	31.8	34.2	230	-	0.715

Note: "-" indicates measurement not taken or no comment.

[a] Fish length or weight values were deemed erroneous, with error likely resulting from instrumentation or recording error during field data collection. These individuals have been removed from all calculations of summary statistics and statistical analysis but length and weight values, as they were recorded on field data sheets, have been presented here for transparency.

Table G.17: Arctic Charr Measurements from Fish Captured at Sheardown Lake NW (DL0-01) by Gill Netting, Mary River Project CREMP, August 2023

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
DL01-23-AC-87	DL01-23-GN-14	1.5	20.4	22.0	100	-	1.178
DL01-23-AC-88	DL01-23-GN-15	1.5	34.6	37.5	350	-	0.845
DL01-23-AC-89	DL01-23-GN-15	2	35.5	32.4	270	-	0.604
DL01-23-AC-90	DL01-23-GN-15	2	32.4	35.4	280	-	0.823
DL01-23-AC-91	DL01-23-GN-15	2	38.5	42.0	470	-	0.824
DL01-23-AC-92	DL01-23-GN-15	2	27.3	29.9	150	-	0.737
DL01-23-AC-93	DL01-23-GN-15	3	37.8	41.3	460	-	0.852
DL01-23-AC-94	DL01-23-GN-16	2	20.0	22.1	50	-	0.625
DL01-23-AC-95	DL01-23-GN-16	2	33.4	36.5	240	-	0.644
DL01-23-AC-96	DL01-23-GN-16	2	34.5	37.3	350	-	0.852
DL01-23-AC-97	DL01-23-GN-16	2	34.9	38.5	350	-	0.823
DL01-23-AC-98	DL01-23-GN-17	2	31.3	34.7	240	-	0.783
DL01-23-AC-99	DL01-23-GN-17	2	44.5	47.4	840	-	0.953
DL01-23-AC-100	DL01-23-GN-17	2	34.0	37.1	350	-	0.890
Overall Catch Summary	**Sample Size (N)**		**97**	**97**	**97**	**-**	**97**
	Mean		**34.7**	**37.5**	**386**	**-**	**0.861**
	Median		**34.4**	**37.5**	**350**	**-**	**0.852**
	Standard Deviation		**5.52**	**5.9**	**192**	**-**	**1.055**
	Standard Error		**0.560**	**0.60**	**20**	**-**	**0.107**
	Minimum		**20.0**	**22.0**	**50**	**-**	**0.571**
	Maximum		**48.4**	**51.5**	**1,200**	**-**	**1.285**

Note: "-" indicates measurement not taken or no comment.

[a] Fish length or weight values were deemed erroneous, with error likely resulting from instrumentation or recording error during field data collection. These individuals have been removed from all calculations of summary statistics and statistical analysis but length and weight values, as they were recorded on field data sheets, have been presented here for transparency.

Table G.18: Results of Littoral/Profundal Arctic Charr Health Endpoint Statistical Comparisons between 2023 Sheardown Lake NW (DL0-01) and 2023 Reference Lake 3 (REF3) Data, and for Sheardown Lake NW between 2023 and the Mine Baseline Period (2006 to 2013), Mary River Project 2023 CREMP

Comparison	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics[b]			Test P-value	Magnitude of Difference (%)[c]
			Response	Covariate	REF 2023 or DL0-01 Base	DL0-01 2023		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]	Statistic	REF 2023 or DL0-01 Base	DL0-01 2023		
								Interaction P-value	Covariate P-value						
Sheardown Lake NW versus Reference Lake 3, 2023	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	11	97	K-S	-	-	-	-	-	-	0.116	-
	Body Size	Fork Length	Fork Length (cm)	-	11	97	M-W	-	-	-	Median	30.4	34.4	0.506	13
		Body Weight	Body Weight (g)	-	11	97	M-W	-	-	-	Median	320	350	0.891	9.4
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	11	97	ANCOVA	0.002[d]	<0.001	34.3	Adjusted Mean	403	345	0.001	-14
Sheardown Lake NW 2023 versus Baseline	Survival	Length Frequency Distribution	Fork Length (cm)	-	98	97	K-S	-	-	-	-	-	-	0.134	-
	Body Size	Fork Length	Fork Length (cm)	-	98	97	M-W	-	-	-	Median	35.8	34.4	0.131	-3.8
		Body Weight	Body Weight (g)	-	98	97	M-W	-	-	-	Median	400	350	0.027	-12
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	98	97	ANCOVA	0.313	<0.001	35.0	Adjusted Mean	371	364	0.363	-1.9

Area P-value < 0.1 or Interaction P-value < 0.05.

Absolute Magnitude of Difference ≥ 10% for Condition (EEM effect endpoint).

Notes: "-" indicates no available data.

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for $\log_{10}$-transformed variables), and adjusted mean are reported for Mann-Whitney, t-test and ANCOVA, respectively, and the predicted mean values from the regression line equations for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVAs where a significant interaction was detected.

[c] The magnitude of difference calculated as: [(exposed area mean - reference area mean) / reference area mean] x 100. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as : [(exposed area predicted mean - reference area predicted mean) / reference area predicted mean] x 100.

[d] ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9250 and R2 of parallel slope model = 0.9179; a difference < 0.02) following Environment Canada (2012).

Table G.19: Arctic Charr Measurements from Fish Captured at Sheardown Lake SE (DL0-02) by Electrofishing, Mary River Project CREMP, August 2023

Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
DL02-23-ACJ-01	6.5	6.9	2.429	-	0.884
DL02-23-ACJ-02	7.0	7.6	3.017	-	0.880
DL02-23-ACJ-03	6.0	6.9	2.364	-	1.094
DL02-23-ACJ-04	6.4	6.7	2.139	-	0.816
DL02-23-ACJ-05	6.5	7.0	2.345	2	0.854
DL02-23-ACJ-06	7.4	7.9	3.300	2	0.814
DL02-23-ACJ-07	6.6	7.9	2.712	-	0.943
DL02-23-ACJ-08	7.0	7.5	2.915	-	0.850
DL02-23-ACJ-09	4.1	4.4	0.501	0	0.727
DL02-23-ACJ-10	3.8	3.9	0.419	-	0.764
DL02-23-ACJ-11	6.4	6.8	2.117	-	0.808
DL02-23-ACJ-12	4.0	4.3	0.539	-	0.842
DL02-23-ACJ-13	7.0	7.5	2.778	-	0.810
DL02-23-ACJ-14	12.7	13.6	16.328	3	0.797
DL02-23-ACJ-15	6.0	6.3	1.766	-	0.818
DL02-23-ACJ-16	7.0	7.5	3.290	-	0.959
DL02-23-ACJ-17	4.3	4.5	0.640	-	0.805
DL02-23-ACJ-18	7.6	8.1	3.740	-	0.852
DL02-23-ACJ-19	6.6	7.0	2.317	2	0.806
DL02-23-ACJ-20	7.0	7.4	3.192	-	0.931
DL02-23-ACJ-21	6.3	6.6	2.050	-	0.820
DL02-23-ACJ-22	6.4	6.8	2.576	-	0.983
DL02-23-ACJ-23	6.1	6.4	1.843	-	0.812
DL02-23-ACJ-24	6.3	6.6	1.849	-	0.739
DL02-23-ACJ-25	7.3	7.8	3.134	-	0.806
DL02-23-ACJ-26	7.2	7.7	3.034	-	0.813
DL02-23-ACJ-27	9.9	10.6	8.160	-	0.841
DL02-23-ACJ-28	6.3	6.7	2.059	-	0.823
DL02-23-ACJ-29	3.8	4.0	0.406	-	0.740
DL02-23-ACJ-30	5.8	6.1	1.571	1	0.805
DL02-23-ACJ-31	6.6	6.9	2.091	-	0.727
DL02-23-ACJ-32	4.2	4.4	0.495	-	0.668
DL02-23-ACJ-33	4.0	4.9	0.816	-	1.275
DL02-23-ACJ-34	7.1	7.4	3.178	-	0.888
DL02-23-ACJ-35	6.7	7.1	2.596	-	0.863
DL02-23-ACJ-36	5.7	6.2	1.462	-	0.789
DL02-23-ACJ-37	6.6	6.9	2.233	-	0.777
DL02-23-ACJ-38	4.2	4.4	0.608	-	0.821
DL02-23-ACJ-39	3.8	3.9	0.417	-	0.760
DL02-23-ACJ-40	7.7	8.2	3.621	2	0.793
DL02-23-ACJ-41	4.4	4.6	0.637	-	0.748
DL02-23-ACJ-42	7.0	7.5	2.620	-	0.764
DL02-23-ACJ-43	4.3	4.4	0.480	-	0.604
DL02-23-ACJ-44	6.6	6.9	2.540	-	0.883
DL02-23-ACJ-45	6.4	6.7	2.223	-	0.848
DL02-23-ACJ-46	4.3	4.4	0.541	-	0.680
DL02-23-ACJ-47	4.2	4.3	0.527	-	0.711
DL02-23-ACJ-48	6.9	7.2	2.894	-	0.881
DL02-23-ACJ-49	3.7	3.8	0.384	-	0.758
DL02-23-ACJ-50	6.8	7.1	2.663	-	0.847
DL02-23-ACJ-51	6.5	6.9	2.527	-	0.920
DL02-23-ACJ-52	6.8	7.3	2.663	-	0.847
DL02-23-ACJ-53	7.5	7.9	3.631	-	0.861
DL02-23-ACJ-54	6.5	6.9	2.949	-	1.074
DL02-23-ACJ-55	5.9	6.3	1.856	-	0.904
DL02-23-ACJ-56	6.5	6.9	2.341	-	0.852
DL02-23-ACJ-57	6.7	7.2	2.641	-	0.878
DL02-23-ACJ-58	6.8	7.3	2.628	-	0.836
DL02-23-ACJ-59	6.7	7.2	2.445	-	0.813
DL02-23-ACJ-60	5.9	6.2	1.734	-	0.844
DL02-23-ACJ-61	7.2	7.7	2.943	-	0.788
DL02-23-ACJ-62	5.5	6.0	1.432	-	0.861
DL02-23-ACJ-63	6.0	6.4	1.912	-	0.885
DL02-23-ACJ-64	6.2	6.6	1.947	-	0.817

Notes: "-" indicates measurement not taken, summary statistic not applicable, or fish not submitted for aging. YOY indicates Young-of-the-Year.

Table G.19: Arctic Charr Measurements from Fish Captured at Sheardown Lake SE (DL0-02) by Electrofishing, Mary River Project CREMP, August 2023

	Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
	DL02-23-ACJ-65	7.3	7.8	3.881	2	0.998
	DL02-23-ACJ-66	6.9	7.2	3.008	-	0.916
	DL02-23-ACJ-67	6.4	6.7	2.340	-	0.893
	DL02-23-ACJ-68	6.9	7.3	2.701	-	0.822
	DL02-23-ACJ-69	4.0	4.2	0.506	-	0.791
	DL02-23-ACJ-70	7.1	7.5	3.021	-	0.844
	DL02-23-ACJ-71	6.7	7.2	2.813	-	0.935
	DL02-23-ACJ-72	6.8	7.2	2.790	-	0.887
	DL02-23-ACJ-73	6.0	6.3	1.802	-	0.834
	DL02-23-ACJ-74	6.1	6.4	2.024	-	0.892
	DL02-23-ACJ-75	6.3	6.6	2.478	-	0.991
	DL02-23-ACJ-76	6.6	6.9	2.360	-	0.821
	DL02-23-ACJ-77	5.5	5.8	1.534	-	0.922
	DL02-23-ACJ-78	4.1	4.3	0.505	-	0.733
	DL02-23-ACJ-79	6.4	6.8	2.102	-	0.802
	DL02-23-ACJ-80	4.5	4.8	0.689	-	0.756
	DL02-23-ACJ-81	4.6	4.8	0.750	-	0.771
	DL02-23-ACJ-82	6.0	6.4	1.899	-	0.879
	DL02-23-ACJ-83	4.0	4.3	0.491	-	0.767
	DL02-23-ACJ-84	6.5	6.8	2.410	-	0.878
	DL02-23-ACJ-85	4.5	4.7	0.747	-	0.820
	DL02-23-ACJ-86	4.3	4.4	0.651	-	0.819
	DL02-23-ACJ-87	4.7	4.9	1.093	-	1.053
	DL02-23-ACJ-88	3.9	4.1	0.530	0	0.893
	DL02-23-ACJ-89	4.3	4.5	0.668	-	0.840
	DL02-23-ACJ-90	5.9	6.2	1.520	-	0.740
	DL02-23-ACJ-91	6.4	6.7	2.206	2	0.842
	DL02-23-ACJ-92	6.4	6.6	2.612	-	0.996
	DL02-23-ACJ-93	3.9	4.1	0.458	-	0.772
	DL02-23-ACJ-94	4.4	4.5	0.640	-	0.751
	DL02-23-ACJ-95	4.0	4.3	0.545	-	0.852
	DL02-23-ACJ-96	3.3	3.4	0.264	-	0.735
	DL02-23-ACJ-97	3.8	3.9	0.425	-	0.775
	DL02-23-ACJ-98	4.3	4.4	0.616	-	0.775
	DL02-23-ACJ-99	4.5	4.6	0.711	-	0.780
	DL02-23-ACJ-100	4.2	4.3	0.600	-	0.810
Overall Catch Summary	Sample Size (N)	100	100	100	11	100
	Mean	5.9	6.2	2.066	1.5	0.839
	Median	6.3	6.7	2.097	2	0.822
	Standard Deviation	1.5	1.6	1.868	1.0	0.093
	Standard Error	0.15	0.16	0.187	0.31	0.009
	Minimum	3.3	3.4	0.264	0	0.604
	Maximum	12.7	13.6	16.328	3	1.275
Young-of-the-Year Catch Summary	Proportion of YOY	**32%**				
	Sample Size (N)	32	32	32	-	32
	Mean	4.1	4.3	0.572	-	0.794
	Median	4.2	4.4	0.540	-	0.771
	Standard Deviation	0.3	0.3	0.155	-	0.116
	Standard Error	0.1	0.1	0.027	-	0.020
	Minimum	3.3	3.4	0.264	-	0.604
	Maximum	4.7	4.9	1.093	-	1.275

Notes: "-" indicates measurement not taken, summary statistic not applicable, or fish not submitted for aging. YOY indicates Young-of-the-Year.

Table G.20: Results of Nearshore Arctic Charr Non-Young-of-the-Year (YOY) Health Endpoint Statistical Comparisons between Sheardown Lake SE (DL0-02) and Reference Lake 3 (REF3), Mary River Project CREMP, August 2023

Group	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics[b]			Test P-value	Magnitude of Difference (%)[c]
			Response	Covariate	REF	DL0-02		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]	Statistic	REF	DL0-02		
								Interaction P-value	Covariate P-value						
All Fish	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	100	100	K-S	-	-	-	-	-	-	<0.001	-
YOY	Body Size	Fork Length	Fork Length (cm)	-	11	32	tequal	-	-	-	Mean	3.45	4.14	<0.001	20
		Body Weight	Body Weight (g)	-	11	32	M-W	-	-	-	Median	0.452	0.540	0.129	20
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	11	32	ANCOVA	0.363	<0.001	3.94	Adjusted Mean	0.728	0.486	0.011	-33
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	8[d]	31[e]	ANCOVA	0.016	<0.001	3.30	Predicted Mean	0.405	0.266	<0.001	-34
										3.70		0.487	0.383		-21
Non-YOY	Survival	Length Frequency Distribution	Fork Length (cm)	-	89	68	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	89	68	M-W	-	-	-	Median	7.00	6.60	0.195	-5.7
		Body Weight	Body Weight (g)	-	89	68	M-W	-	-	-	Median	3.70	2.50	0.012	-32
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	89	68	ANCOVA	0.265	<0.001	6.95	Adjusted Mean	3.40	2.85	<0.001	-16

Area P-value < 0.1 or Interaction P-value < 0.05.
Absolute Magnitude of Difference ≥ 10% for Condition (EEM effect endpoint).

Notes: YOY indicates Young-of-the-Year. "-" indicates no available data.

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for $\log_{10}$-transformed variables), and adjusted mean are reported for Mann-Whitney, t-test and ANCOVA, respectively, and the predicted mean values from the regression line equations for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVAs where a significant interaction was detected.

[c] The magnitude of difference calculated as: [(exposed area mean - reference area mean) / reference area mean] x 100. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as : [(exposed area predicted mean - reference area predicted mean) / reference area predicted mean] x 100.

[d] Three outliers (REF3-23-ACJ-60 Stdnt resid: 7.852; REF3-23-ACJ-30, Stdnt resid: 5.271; REF3-23-ACJ-39, Stdnt resid: -5.335) removed from analysis.

[e] One outlier (DL02-23-ACJ-33, Stdnt resid: 4.137) removed from analysis.

Table G.21: Arctic Charr Estimated Sample Sizes to Detect Various Effect Sizes as a Percentage Change in Respective Fish Health Endpoints at Sheardown Lake SE (DL0-02) Using 2023 Data Relative to Reference Lake 3 Data (2023) or Sheardown Lake SE Baseline Data (2006 to 2013) with α=β=0.1, Mary River Project 2023 CREMP

Comparison	Group	Indicator	Endpoint	Variables		Test [a]	S[b]	COV (%)[c]	Minimum Sample Size to Detect an Effect Size (% Increase/Decrease Relative to Reference) with α=β=0.1									
				Response	Covariate				log(Response)	5%	10%	20%	25%	30%	33%	40%	50%	100%
										-5%	-9%	-17%	-20%	-23%	-25%	-29%	-33%	-50%
									Response	±5%	±10%	±20%	±25%	±30%	±33%	±40%	±50%	±100%
Nearshore Arctic Charr (Electrofishing) versus Ref. Lake 3, 2022 Data	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.101	25.0	Response	448	119	33	21	16	13	10	7	4
									Response									
			Body Weight	Body Weight (g)	-	M-W	0.285	81.1	Response	3,598	944	260	174	127	106	78	54	14
									Response									
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0627	-	log(Response)	152	42	13	9	8	7	6	5	4
									log(Response)									
Nearshore Arctic Charr (Electrofishing) 2023 versus Baseline	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0495	14.3	Response	110	31	10	7	6	5	4	4	3
									Response									
			Body Weight	Body Weight (g)	-	M-W	0.162	68.6	Response	1,158	305	85	57	42	35	26	19	7
									Response									
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0473	-	log(Response)	88	25	8	6	5	5	4	4	3
									log(Response)									
Littoral/Profundal Arctic Charr (Gill Netting) versus Ref. Lake 3, 2023 Data	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0757	18.0	Response	255	66	18	12	9	7	6	5	3
									Response									
			Body Weight	Body Weight (g)	-	M-W	0.217	54.0	Response	2,083	547	146	94	66	54	38	25	7
									Response									
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0662	-	log(Response)	170	46	14	10	8	7	6	5	4
									log(Response)									
Littoral/Profundal Arctic Charr (Gill Netting) 2023 versus Baseline	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0669	14.1	Response	160	41	12	9	6	5	5	4	3
									Response									
			Body Weight	Body Weight (g)	-	M-W	0.204	43.0	Response	1467	369	93	61	42	35	25	17	6
									Response									
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0601	-	log(Response)	140	38	12	9	7	6	5	5	3
									log(Response)									
			Condition[d]	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0570	-	log(Response)	126	35	11	8	7	6	5	4	3
									log(Response)									

Note: "-" indicates not applicable.

[a] Sample size estimates for the M-W test were estimated based for a two-sample t-test using sample sizes multiplied by 0.864. The 0.864 is the lower bound of the asymptotic relative efficiency of the Mann-Whitney test and the two-sample t-test (Hodges and Lehmann 1956). Estimates were generated for the response variable on the untransformed and $\log_{10}$-transformed scales and the lowest sample size is reported.

[b] Pooled standard deviation of the regression residuals.

[c] Coefficient of variation (pooled standard deviation/reference mean)×100%

[d] Outliers removed from analysis.

Table G.22: Gill Netting Catch Records for Sheardown Lake SE (DL0-01), Mary River Project CREMP, August 2023

Gill Net Set ID	Location (NAD83, UTM Zone 17N)		Length (m)	Set Date	Lift Date	Set Time	Lift Time	Fishing Hours	Effort (m*hrs/100 m)	Arctic Charr Catch Per Mesh Size			Total Catch	CPUE
	Easting	Northing								1½"	2"	3"		
DL02-23-GN-01	560738	7912159	91.4	22-Aug-23	22-Aug-23	9:17	10:10	0.88	0.81	7	8	15	30	37.14
DL02-23-GN-02	560827	7912102	91.4	22-Aug-23	22-Aug-23	11:43	12:40	0.95	0.87	3	5	13	21	24.17
DL02-23-GN-03	561210	7911791	91.4	22-Aug-23	22-Aug-23	13:43	14:43	1.00	0.91	5	6	4	15	16.40
DL02-23-GN-11	560683	7912117	91.4	22-Aug-23	22-Aug-23	11:15	12:12	0.95	0.87	4	9	8	21	24.17
DL02-23-GN-12	560968	7911917	91.4	23-Aug-23	23-Aug-23	13:15	14:08	0.88	0.81	2	5	6	13	16.09
								Total	**4.3**	**21**	**33**	**46**	**100**	**23.60**

Note: Catch-per-unit-effort (CPUE) represents the number of fish captured per 100 m·hours of net.

Table G.23: Arctic Charr Measurements from Fish Captured at Sheardown Lake SE (DL0-01) by Gill Netting, Mary River Project CREMP, August 2023

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
DL02-23-AC-01	DL02-23-GN-01	1.5	35.0	37.7	340	-	0.793
DL02-23-AC-02	DL02-23-GN-01	1.5	29.6	31.9	210	-	0.810
DL02-23-AC-03	DL02-23-GN-01	1.5	39.2	42.5	570	-	0.946
DL02-23-AC-04	DL02-23-GN-01	1.5	60.8	64.1	2,100	-	0.934
DL02-23-AC-05	DL02-23-GN-01	1.5	25.0	26.7	125	-	0.800
DL02-23-AC-06[a]	DL02-23-GN-01	1.5	21.1	22.8	450	-	4.790
DL02-23-AC-07	DL02-23-GN-01	1.5	21.4	23.1	110	-	1.122
DL02-23-AC-08	DL02-23-GN-01	2	31.5	34.3	310	-	0.992
DL02-23-AC-09	DL02-23-GN-01	2	30.3	32.5	300	-	1.078
DL02-23-AC-10	DL02-23-GN-01	2	28.3	30.5	140	-	0.618
DL02-23-AC-11	DL02-23-GN-01	2	33.8	36.5	250	-	0.647
DL02-23-AC-12	DL02-23-GN-01	2	29.5	31.5	195	-	0.760
DL02-23-AC-13	DL02-23-GN-01	2	34.5	37.5	230	-	0.560
DL02-23-AC-14	DL02-23-GN-01	2	45.3	48.0	440	-	0.473
DL02-23-AC-15	DL02-23-GN-01	2	39.0	42.1	500	-	0.843
DL02-23-AC-16	DL02-23-GN-01	3	41.4	44.2	510	-	0.719
DL02-23-AC-17	DL02-23-GN-01	3	39.4	42.2	510	-	0.834
DL02-23-AC-18	DL02-23-GN-01	3	43.3	46.2	525	-	0.647
DL02-23-AC-19	DL02-23-GN-01	3	34.0	37.1	350	-	0.890
DL02-23-AC-20	DL02-23-GN-01	3	38.5	41.5	455	-	0.797
DL02-23-AC-21	DL02-23-GN-01	3	37.5	40.4	500	-	0.948
DL02-23-AC-22	DL02-23-GN-01	3	40.5	43.5	650	-	0.978
DL02-23-AC-23	DL02-23-GN-01	3	54.0	57.5	1,300	Gill lice in mouth	0.826
DL02-23-AC-24	DL02-23-GN-01	3	37.2	40.5	455	-	0.884
DL02-23-AC-25	DL02-23-GN-01	3	38.9	41.5	500	-	0.849
DL02-23-AC-26	DL02-23-GN-01	3	37.0	39.5	350	-	0.691
DL02-23-AC-27	DL02-23-GN-01	3	37.3	39.8	450	-	0.867
DL02-23-AC-28	DL02-23-GN-01	3	39.3	42.5	550	-	0.906
DL02-23-AC-29	DL02-23-GN-01	3	45.0	48.0	900	-	0.988
DL02-23-AC-30	DL02-23-GN-01	3	39.0	42.5	600	-	1.011
DL02-23-AC-31	DL02-23-GN-02	1.5	22.7	24.1	140	-	1.197
DL02-23-AC-32	DL02-23-GN-02	1.5	24.5	25.9	130	-	0.884
DL02-23-AC-33	DL02-23-GN-02	1.5	32.0	34.5	315	-	0.961
DL02-23-AC-34	DL02-23-GN-02	2	36.0	37.5	380	-	0.814
DL02-23-AC-35	DL02-23-GN-02	2	27.5	29.6	170	-	0.817
DL02-23-AC-36	DL02-23-GN-02	2	37.0	39.5	465	-	0.918
DL02-23-AC-37	DL02-23-GN-02	2	27.0	29.0	165	-	0.838
DL02-23-AC-38	DL02-23-GN-02	2	24.8	26.6	130	-	0.852
DL02-23-AC-39	DL02-23-GN-02	3	41.0	44.0	550	-	0.798
DL02-23-AC-40	DL02-23-GN-02	3	38.4	41.5	520	-	0.918
DL02-23-AC-41	DL02-23-GN-02	3	36.0	38.8	380	-	0.814
DL02-23-AC-42	DL02-23-GN-02	3	38.0	41.6	550	-	1.002
DL02-23-AC-43	DL02-23-GN-02	3	41.0	44.0	600	Red blotch	0.871
DL02-23-AC-44	DL02-23-GN-02	3	40.0	43.1	470	-	0.734
DL02-23-AC-45	DL02-23-GN-02	3	37.0	39.5	470	-	0.928
DL02-23-AC-46	DL02-23-GN-02	3	40.0	43.1	480	Underdeveloped/broken pectoral fin	0.750
DL02-23-AC-47	DL02-23-GN-02	3	35.0	38.1	430	-	1.003
DL02-23-AC-48	DL02-23-GN-02	3	39.5	43.1	475	-	0.771
DL02-23-AC-49	DL02-23-GN-02	3	37.2	40.0	480	-	0.932
DL02-23-AC-50	DL02-23-GN-02	3	38.0	41.5	480	-	0.875
DL02-23-AC-51	DL02-23-GN-02	3	38.0	41.0	480	-	0.875
DL02-23-AC-52	DL02-23-GN-03	1.5	33.3	35.8	-	-	-
DL02-23-AC-53	DL02-23-GN-03	1.5	36.3	38.9	400	-	0.836

Note: "-" indicates measurement not taken or no comment.

[a] Fish length or weight values were deemed erroneous, with error likely resulting from instrumentation or recording error during field data collection. These individuals have been removed from all calculations of summary statistics and statistical analysis but length and weight values, as they were recorded on field data sheets, have been presented here for transparency.

Table G.23: Arctic Charr Measurements from Fish Captured at Sheardown Lake SE (DL0-01) by Gill Netting, Mary River Project CREMP, August 2023

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
DL02-23-AC-54	DL02-23-GN-03	1.5	38.8	42.0	540	Grey lesion on side	0.924
DL02-23-AC-55	DL02-23-GN-03	1.5	37.4	40.5	420	-	0.803
DL02-23-AC-56	DL02-23-GN-03	1.5	34.5	37.2	405	-	0.986
DL02-23-AC-57	DL02-23-GN-03	2	31.8	34.0	290	-	0.902
DL02-23-AC-58	DL02-23-GN-03	2	42.6	46.0	820	-	1.061
DL02-23-AC-59	DL02-23-GN-03	2	36.9	40.0	480	-	0.955
DL02-23-AC-60	DL02-23-GN-03	2	30.3	33.1	290	-	1.042
DL02-23-AC-61	DL02-23-GN-11	1.5	33.2	35.9	300	-	0.820
DL02-23-AC-62	DL02-23-GN-11	1.5	36.5	39.2	420	-	0.864
DL02-23-AC-63	DL02-23-GN-11	1.5	39.4	42.7	530	-	0.867
DL02-23-AC-64	DL02-23-GN-11	1.5	28.1	30.4	280	-	1.262
DL02-23-AC-65	DL02-23-GN-11	2	31.2	34.0	270	Right pectoral fin malformed	0.889
DL02-23-AC-66	DL02-23-GN-11	2	35.3	38.1	310	-	0.705
DL02-23-AC-67	DL02-23-GN-11	2	30.5	33.1	240	-	0.846
DL02-23-AC-68	DL02-23-GN-11	2	35.2	37.1	310	-	0.711
DL02-23-AC-69	DL02-23-GN-11	2	32.6	35.6	320	-	0.924
DL02-23-AC-70	DL02-23-GN-11	2	38.1	41.3	500	-	0.904
DL02-23-AC-71	DL02-23-GN-11	2	36.4	39.2	440	-	0.912
DL02-23-AC-72	DL02-23-GN-11	2	37.4	40.7	460	-	0.879
DL02-23-AC-73	DL02-23-GN-11	2	37.3	40.2	400	-	0.771
DL02-23-AC-74	DL02-23-GN-11	3	37.2	41.1	450	-	0.874
DL02-23-AC-75	DL02-23-GN-11	3	37.2	40.1	460	-	0.894
DL02-23-AC-76	DL02-23-GN-11	3	37.1	40.1	480	-	0.940
DL02-23-AC-77	DL02-23-GN-11	3	37.3	40.2	500	-	0.963
DL02-23-AC-78	DL02-23-GN-11	3	38.7	41.7	490	-	0.845
DL02-23-AC-79	DL02-23-GN-11	3	37.3	40.2	480	-	0.925
DL02-23-AC-80	DL02-23-GN-11	3	40.2	43.1	600	-	0.924
DL02-23-AC-81	DL02-23-GN-11	3	40.7	44.1	630	-	0.934
DL02-23-AC-82	DL02-23-GN-12	1.5	35.0	37.8	380	-	0.886
DL02-23-AC-83	DL02-23-GN-12	1.5	35.4	38.0	390	-	0.879
DL02-23-AC-84	DL02-23-GN-12	2	36.7	39.7	300	-	0.607
DL02-23-AC-85	DL02-23-GN-12	2	35.9	38.2	310	-	0.670
DL02-23-AC-86	DL02-23-GN-12	2	31.9	34.3	290	-	0.893
DL02-23-AC-87	DL02-23-GN-12	2	36.2	39.2	400	-	0.843
DL02-23-AC-88	DL02-23-GN-12	2	36.4	39.5	470	-	0.975
DL02-23-AC-89	DL02-23-GN-12	3	40.0	43.4	560	-	0.875
DL02-23-AC-90	DL02-23-GN-12	3	43.6	46.8	540	-	0.652
DL02-23-AC-91	DL02-23-GN-12	3	42.5	45.7	640	-	0.834
DL02-23-AC-92	DL02-23-GN-12	3	41.9	45.5	700	-	0.952
DL02-23-AC-93	DL02-23-GN-12	3	39.0	41.8	500	-	0.843
DL02-23-AC-94	DL02-23-GN-12	3	38.0	41.0	460	-	0.838
DL02-23-AC-95	DL02-23-GN-03	2	35.2	38.0	375	-	0.860
DL02-23-AC-96	DL02-23-GN-03	2	38.8	42.2	455	-	0.779
DL02-23-AC-97	DL02-23-GN-03	3	44.5	47.5	720	-	0.817
DL02-23-AC-98	DL02-23-GN-03	3	36.8	40.2	470	-	0.943
DL02-23-AC-99	DL02-23-GN-03	3	35.9	38.9	520	-	1.124
DL02-23-AC-100	DL02-23-GN-03	3	35.9	38.5	425	-	0.919
Overall Catch Summary	**Sample Size (N)**		**99**	**99**	**98**	**-**	**98**
	Average		**36.5**	**39.3**	**450**	**-**	**0.869**
	Median		**37.1**	**40.0**	**455**	**-**	**0.875**
	Standard Deviation		**5.8**	**6.2**	**240**	**-**	**0.413**
	Standard Error		**0.58**	**0.62**	**24.2**	**-**	**0.042**
	Minimum		**21.4**	**23.1**	**110**	**-**	**0.473**
	Maximum		**60.8**	**64.1**	**2,100**	**-**	**1.262**

Note: "-" indicates measurement not taken or no comment.

[a] Fish length or weight values were deemed erroneous, with error likely resulting from instrumentation or recording error during field data collection. These individuals have been removed from all calculations of summary statistics and statistical analysis but length and weight values, as they were recorded on field data sheets, have been presented here for transparency.

Table G.24: Results of Littoral/Profundal Arctic Charr Health Endpoint Statistical Comparisons between 2023 Sheardown Lake SE (DL0-02) and 2023 Reference Lake 3 (REF3) Data, and for Sheardown Lake SE between 2023 and the Mine Baseline Period (2006 to 2013), Mary River Project 2023 CREMP

Comparison	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics[b]			Test P-value	Magnitude of Difference (%)[c]
			Response	Covariate	REF 2023 or DL0-02 Baseline	DL0-02 2023		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]	Statistic	REF 2023 or DL0-02 Baseline	DL0-02 2023		
								Interaction P-value	Covariate P-value						
Sheardown Lake SE versus Reference Lake 3, 2023	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	11	99	K-S	-	-	-	-	-	-	0.047	-
	Body Size	Fork Length	Fork Length (cm)	-	11	99	M-W	-	-	-	Median	30.4	37.1	0.334	22
		Body Weight	Body Weight (g)	-	11	98	M-W	-	-	-	Median	320	455	0.597	42
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	11	98	ANCOVA	0.076	<0.001	35.9	Adjusted Mean	455	398	0.007	-12
Sheardown Lake SE 2023 versus Baseline	Survival	Length Frequency Distribution	Fork Length (cm)	-	70	99	K-S	-	-	-	-	-	-	0.429	-
	Body Size	Fork Length	Fork Length (cm)	-	70	99	M-W	-	-	-	Median	37.4	37.1	0.499	-0.67
		Body Weight	Body Weight (g)	-	70	98	M-W	-	-	-	Median	500	455	0.002	-9.0
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	70	98	ANCOVA	0.062	<0.001	36.2	Adjusted Mean	460	406	<0.001	-12
					70	97[g]	ANCOVA	0.116	<0.001	36.1	Adjusted Mean	458	407	<0.001	-11

Area P-value < 0.1 or Interaction P-value < 0.05.
Absolute Magnitude of Difference ≥ 10% for Condition (EEM effect endpoint).

Notes: "-" indicates no available data.

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for $\log_{10}$-transformed variables), and adjusted mean are reported for Mann-Whitney, t-test and ANCOVA, respectively, and the predicted mean values from the regression line equations for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVAs where a significant interaction was detected.

[c] The magnitude of difference calculated as: [(exposed area mean - reference area mean) / reference area mean] x 100. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as : [(exposed area predicted mean - reference area predicted mean) / reference area predicted mean] x 100.

[e] One outlier (DL02-23-AC-14, Stdnt resid: -4.301) was removed from the analysis.

Table G.25: Arctic Charr Measurements from Fish Captured at Mary Lake (BL0) by Electrofishing, Mary River Project CREMP, August 2023

Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
BL0-23-ACJ-01	6.5	7.1	2.699	-	0.983
BL0-23-ACJ-02	7.4	7.9	3.146	-	0.776
BL0-23-ACJ-03	7.4	7.7	3.245	-	0.801
BL0-23-ACJ-04	9.4	9.9	6.244	-	0.752
BL0-23-ACJ-05	8.4	8.7	4.754	2	0.802
BL0-23-ACJ-06	5.8	6.6	1.537	-	0.788
BL0-23-ACJ-07	11.1	11.9	10.315	3	0.754
BL0-23-ACJ-08	5.3	6.1	1.754	-	1.178
BL0-23-ACJ-09	7.1	7.6	2.940	-	0.821
BL0-23-ACJ-10	8.6	9.2	4.768	-	0.750
BL0-23-ACJ-11	8.0	8.5	3.987	-	0.779
BL0-23-ACJ-12	7.1	7.5	2.977	-	0.832
BL0-23-ACJ-13	6.1	6.5	1.564	1	0.689
BL0-23-ACJ-14	9.7	10.4	7.829	-	0.858
BL0-23-ACJ-15	16.7	17.9	39.307	-	0.844
BL0-23-ACJ-16	6.8	7.1	2.755	-	0.876
BL0-23-ACJ-17	4.8	5.1	0.887	-	0.802
BL0-23-ACJ-18	6.2	6.7	2.306	-	0.968
BL0-23-ACJ-19	6.8	7.3	2.369	-	0.753
BL0-23-ACJ-20	4.3	4.5	0.712	0	0.896
BL0-23-ACJ-21	5.7	5.9	1.683	-	0.909
BL0-23-ACJ-22	6.2	6.5	2.015	-	0.845
BL0-23-ACJ-23	5.6	5.9	1.699	-	0.967
BL0-23-ACJ-24	5.3	6.1	1.683	-	1.130
BL0-23-ACJ-25	5.8	6.2	1.648	-	0.845
BL0-23-ACJ-26	5.9	6.1	1.670	-	0.813
BL0-23-ACJ-27	7.3	7.6	3.323	-	0.854
BL0-23-ACJ-28	7.3	7.5	3.117	-	0.801
BL0-23-ACJ-29	6.8	7.3	2.723	-	0.866
BL0-23-ACJ-30	6.8	7.0	2.656	-	0.845
BL0-23-ACJ-31	6.7	7.1	2.591	-	0.861
BL0-23-ACJ-32	6.0	6.3	1.640	1	0.759
BL0-23-ACJ-33	8.2	8.3	4.464	-	0.810
BL0-23-ACJ-34	6.6	7.0	2.437	-	0.848
BL0-23-ACJ-35	9.6	10.5	8.711	-	0.985
BL0-23-ACJ-36	5.2	5.6	1.321	-	0.939
BL0-23-ACJ-37	6.9	7.3	2.669	-	0.812
BL0-23-ACJ-38	6.6	7.0	2.535	-	0.882
BL0-23-ACJ-39	8.1	8.6	4.628	-	0.871
BL0-23-ACJ-40	7.0	7.4	3.125	-	0.911
BL0-23-ACJ-41	6.3	6.7	1.925	-	0.770
BL0-23-ACJ-42	7.0	7.5	3.024	-	0.882
BL0-23-ACJ-43	4.0	4.2	0.615	-	0.961
BL0-23-ACJ-44	4.7	4.8	1.524	-	1.468
BL0-23-ACJ-45	14.6	15.6	25.870	-	0.831
BL0-23-ACJ-46	8.1	8.5	4.473	-	0.842
BL0-23-ACJ-47	10.9	11.8	11.451	-	0.884
BL0-23-ACJ-48	7.9	8.4	4.833	-	0.980
BL0-23-ACJ-49	6.3	6.8	1.992	-	0.797
BL0-23-ACJ-50	6.2	6.5	1.996	-	0.838
BL0-23-ACJ-51	8.1	8.6	4.132	-	0.778
BL0-23-ACJ-52	8.6	9.3	6.186	-	0.973
BL0-23-ACJ-53	7.6	7.9	3.493	-	0.796
BL0-23-ACJ-54	5.7	5.9	1.769	-	0.955
BL0-23-ACJ-55	11.1	11.9	10.925	-	0.799
BL0-23-ACJ-56	8.0	8.5	4.585	-	0.896
BL0-23-ACJ-57	6.8	7.0	2.628	-	0.836
BL0-23-ACJ-58	5.7	6.0	1.586	-	0.856
BL0-23-ACJ-59	8.6	9.1	5.079	-	0.799
BL0-23-ACJ-60	9.0	9.4	5.392	-	0.740
BL0-23-ACJ-61	3.7	3.8	0.388	0	0.766
BL0-23-ACJ-62	7.3	7.7	3.647	-	0.937
BL0-23-ACJ-63	8.4	8.9	4.917	-	0.830
BL0-23-ACJ-64	8.1	8.8	4.066	-	0.765

Notes: "-" indicates measurement not taken or not applicable, or fish not submitted for aging. YOY indicates Young-of-the-Year.

Table G.25: Arctic Charr Measurements from Fish Captured at Mary Lake (BL0) by Electrofishing, Mary River Project CREMP, August 2023

	Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
	BL0-23-ACJ-65	6.3	6.5	1.756	-	0.702
	BL0-23-ACJ-66	6.3	6.7	2.345	-	0.938
	BL0-23-ACJ-67	6.4	6.8	2.306	-	0.880
	BL0-23-ACJ-68	4.0	4.1	0.533	1	0.833
	BL0-23-ACJ-69	6.1	6.5	1.826	-	0.804
	BL0-23-ACJ-70	6.1	6.5	1.754	-	0.773
	BL0-23-ACJ-71	7.4	7.8	3.363	-	0.830
	BL0-23-ACJ-72	5.8	6.0	1.307	-	0.670
	BL0-23-ACJ-73	10.8	11.5	6.943	-	0.551
	BL0-23-ACJ-74	9.9	10.5	7.103	-	0.732
	BL0-23-ACJ-75	8.1	8.9	4.365	-	0.821
	BL0-23-ACJ-76	8.6	9.2	4.429	-	0.696
	BL0-23-ACJ-77	8.0	8.6	4.222	-	0.825
	BL0-23-ACJ-78	5.7	6.1	1.733	-	0.936
	BL0-23-ACJ-79	7.1	7.5	2.873	-	0.803
	BL0-23-ACJ-80	5.4	5.7	1.284	1	0.815
	BL0-23-ACJ-81	10.4	11.2	8.345	3	0.742
	BL0-23-ACJ-82	6.6	6.9	1.868	-	0.650
	BL0-23-ACJ-83	5.8	6.1	1.736	-	0.890
	BL0-23-ACJ-84	5.8	6.4	2.007	-	1.029
	BL0-23-ACJ-85	7.8	8.2	3.755	-	0.791
	BL0-23-ACJ-86	11.1	11.8	9.887	-	0.723
	BL0-23-ACJ-87	8.8	9.4	4.992	-	0.733
	BL0-23-ACJ-88	8.1	8.6	4.022	-	0.757
	BL0-23-ACJ-89	6.5	6.9	2.114	-	0.770
	BL0-23-ACJ-90	7.6	8.0	3.309	-	0.754
	BL0-23-ACJ-91	16.0	17.4	32.759	-	0.800
	BL0-23-ACJ-92	10.8	11.7	9.654	-	0.766
	BL0-23-ACJ-93	5.8	6.1	1.626	-	0.833
	BL0-23-ACJ-94	6.3	6.8	2.133	-	0.853
	BL0-23-ACJ-95	10.6	11.3	8.824	-	0.741
	BL0-23-ACJ-96	10.0	10.7	8.537	-	0.854
	BL0-23-ACJ-97	6.5	6.9	2.105	-	0.766
	BL0-23-ACJ-98	5.3	5.5	1.112	-	0.747
	BL0-23-ACJ-99	5.8	6.0	1.574	2	0.807
	BL0-23-ACJ-100	4.5	4.7	0.865	1	0.949
Overall Catch Summary	Sample Size (N)	100	100	100	12	100
	Mean	7.4	7.9	4.383	1.3	0.838
	Median	6.9	7.3	2.739	1	0.823
	Standard Deviation	2.3	2.4	5.646	1.1	0.113
	Standard Error	0.23	0.24	0.565	0.30	0.011
	Minimum	3.7	3.8	0.388	0	0.551
	Maximum	16.7	17.9	39.307	3	1.468
Young-of-the-Year Catch Summary	proportion of YOY	**5%**				
	Sample Size (N)	5	5	5	-	5
	Mean	4.1	4.3	0.623	-	0.881
	Median	4.0	4.2	0.615	-	0.896
	Standard Deviation	0.3	0.4	0.180	-	0.082
	Standard Error	0.1	0.2	0.081	-	0.037
	Minimum	3.7	3.8	0.388	-	0.766
	Maximum	4.5	4.7	0.865	-	0.961

Notes: "-" indicates measurement not taken or not applicable, or fish not submitted for aging. YOY indicates Young-of-the-Year.

Table G.26: Results of Nearshore Arctic Charr Non-Young-of-the-Year (YOY) Health Endpoint Statistical Comparisons between Mary Lake (BL0) and Reference Lake 3 (REF), Mary River Project CREMP, August 2023

Group	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics[b]			Test P-value	Magnitude of Difference (%)[c]
			Response	Covariate	REF	BL0		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]	Statistic	REF	BL0		
								Interaction P-value	Covariate P-value						
All Fish	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	100	100	K-S	-	-	-	-	-	-	0.016	-
Non-YOY	Survival	Length Frequency Distribution	Fork Length (cm)	-	89	95	K-S	-	-	-	-	-	-	0.051	-
	Body Size	Fork Length	Fork Length (cm)	-	89	95	M-W	-	-	-	Median	7.00	7.00	0.462	0
		Body Weight	Body Weight (g)	-	89	95	M-W	-	-	-	Median	3.70	2.94	0.407	-20
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	89	95	ANCOVA	0.327	<0.001	7.27	Adjusted Mean	3.84	3.19	<0.001	-17

Area P-value < 0.1 or Interaction P-value < 0.05.
Absolute Magnitude of Difference ≥ 10% for Condition (EEM effect endpoint).

Notes: YOY indicates Young-of-the-Year. "-" indicates no available data.

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for $\log_{10}$-transformed variables), and adjusted mean are reported for Mann-Whitney, t-test and ANCOVA, respectively, and the predicted mean values from the regression line equations for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVAs where a significant interaction was detected.

[c] The magnitude of difference calculated as: [(exposed area mean - reference area mean) / reference area mean] x 100. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as : [(exposed area predicted mean - reference area predicted mean) / reference area predicted mean] x 100.

Table G.27: Arctic Charr Estimated Sample Sizes to Detect Various Effect Sizes as a Percentage Change in Respective Fish Health Endpoints at Mary Lake (BL0) Using 2023 Data Relative to Reference Lake 3 (REF3) Data (2023) or Camp Lake Baseline Data (2006 to 2013) with α=β=0.1, Mary River Project 2023 CREMP

Comparison	Group	Indicator	Endpoint	Variables		Test [a]	S[b]	COV (%)[c]	Minimum Sample Size to Detect an Effect Size (% Increase/Decrease Relative to Reference) with α=β=0.1									
				Response	Covariate				log(Response)	5%	10%	20%	25%	30%	33%	40%	50%	100%
										-5%	-9%	-17%	-20%	-23%	-25%	-29%	-33%	-50%
									Response	±5%	±10%	±20%	±25%	±30%	±33%	±40%	±50%	±100%
Nearshore Arctic Charr (Electrofishing) versus Ref. Lake 3, 2023 Data	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.117	30.1	Response	607	160	46	31	21	18	13	9	4
			Body Weight	Body Weight (g)	-	M-W	0.332	106	Response	4,875	1,279	351	235	171	142	105	72	24
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0654	-	log(Response)	165	45	14	10	8	7	6	5	4
Littoral/Profundal Arctic Charr (Gill Netting) versus Ref. Lake 3, 2023 Data	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0783	18.9	Response	272	73	20	13	10	9	6	5	3
			Body Weight	Body Weight (g)	-	M-W	0.197	56.5	Response	1,711	450	124	84	61	51	38	27	9
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0677	-	log(Response)	177	48	15	11	8	7	6	5	4
			Condition[d]	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0515	-	log(Response)	103	29	10	7	6	5	5	4	3
Littoral/Profundal Arctic Charr (Gill Netting) 2023 versus Baseline	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0936	19.9	Response	316	80	21	14	11	9	7	5	3
			Body Weight	Body Weight (g)	-	M-W	0.269	64.6	Response	3,208	829	209	135	94	77	54	35	10
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0581	-	log(Response)	131	36	11	8	7	6	5	4	3

Notes: YOY indicates Young-of-Year. "-" indicates no available data.

[a] Sample size estimates for the M-W test were estimated based for a two-sample t-test using sample sizes multiplied by 0.864. The 0.864 is the lower bound of the asymptotic relative efficiency of the Mann-Whitney test and the two-sample t-test (Hodges and Lehmann 1956). Estimates were generated for the response variable on the untransformed and $\log_{10}$-transformed scales and the lowest sample size is reported.

[b] Pooled standard deviation of the regression residuals.

[c] Coefficient of variation (pooled standard deviation/reference mean)×100%.

[d] Outliers removed from analysis.

Table G.27: Arctic Charr Estimated Sample Sizes to Detect Various Effect Sizes as a Percentage Change in Respective Fish Health Endpoints at Mary Lake Using 2023 Data Relative to Reference Lake 3 Data (2023) or Camp Lake Baseline Data (2006 to 2013) with α=β=0.1, Mary River Project 2023 CREMP

Comparison	Group	Indicator	Endpoint	Variables		Test [a]	S[b]	COV (%)[c]	Minimum Sample Size to Detect an Effect Size (% Increase/Decrease Relative to Reference) with α=β=0.1									
				Response	Covariate				log(Response)	5%	10%	20%	25%	30%	33%	40%	50%	100%
										-5%	-9%	-17%	-20%	-23%	-25%	-29%	-33%	-50%
									Response	±5%	±10%	±20%	±25%	±30%	±33%	±40%	±50%	±100%
Nearshore Arctic Charr (Electrofishing) versus Ref. Lake 3, 2023 Data	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.117	30.1	Response	607	160	46	31	21	18	13	9	4
			Body Weight	Body Weight (g)	-	M-W	0.332	106	Response	4,875	1,279	351	235	171	142	105	72	24
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0654	-	log(Response)	165	45	14	10	8	7	6	5	4
Littoral/Profundal Arctic Charr (Gill Netting) versus Ref. Lake 3, 2023 Data	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0697	17.1	Response	217	58	17	11	9	7	6	5	3
			Body Weight	Body Weight (g)	-	M-W	0.196	53.5	Response	1,693	445	123	83	61	50	38	25	7
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0513	-	log(Response)	103	29	9	7	6	5	5	4	3
Littoral/Profundal Arctic Charr (Gill Netting) 2023 versus Baseline	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0936	19.9	Response	316	80	21	14	11	9	7	5	3
			Body Weight	Body Weight (g)	-	M-W	0.269	64.6	Response	3,208	829	209	135	94	77	54	35	10
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0581	-	log(Response)	131	36	11	8	7	6	5	4	3

Note: "-" indicates not applicable.

[a] Sample size estimates for the M-W test were estimated based for a two-sample t-test using sample sizes multiplied by 0.864. The 0.864 is the lower bound of the asymptotic relative efficiency of the Mann-Whitney test and the two-sample t-test (Hodges and Lehmann 1956). Estimates were generated for the response variable on the untransformed and $\log_{10}$-transformed scales and the lowest sample size is reported.

[b] Pooled standard deviation of the regression residuals.

[c] Coefficient of variation (pooled standard deviation/reference mean)×100%.

Table G.28: Gill Netting Catch Records for Mary Lake (BL0), Mary River Project CREMP, August 2023

Gill Net Set ID	Location (NAD83, UTM Zone 17N)		Length (m)	Set Date	Lift Date	Set Time	Lift Time	Fishing Hours	Effort (m*hrs/100 m)	Arctic Charr Catch per Mesh Size			Total Catch	CPUE
	Easting	Northing								1½"	2"	3"		
BL0-23-GN-01	554972	7905979	91.4	13-Aug-23	13-Aug-23	9:14	10:00	0.767	0.701	1	0	13	14	19.97
BL0-23-GN-02	552679	7906820	91.4	13-Aug-23	13-Aug-23	9:43	10:40	0.950	0.869	0	0	10	10	11.51
BL0-23-GN-03	555195	7905890	91.4	13-Aug-23	13-Aug-23	10:33	11:30	0.95	0.87	5	5	4	14	16.12
BL0-23-GN-04	552747	7906698	91.4	13-Aug-23	13-Aug-23	11:11	12:05	0.900	0.823	1	9	10	20	24.30
BL0-23-GN-05	554972	7905979	91.4	13-Aug-23	13-Aug-23	12:00	12:55	0.917	0.838	0	12	7	19	22.67
BL0-23-GN-06	552747	7906698	91.4	13-Aug-23	13-Aug-23	12:46	13:40	0.900	0.823	4	2	1	7	8.51
BL0-23-GN-07	552209	7905083	91.4	13-Aug-23	13-Aug-23	13:43	14:40	0.950	0.869	1	1	2	4	4.6
BL0-23-GN-08	553235	7905461	91.4	13-Aug-23	13-Aug-23	14:11	15:05	0.90	0.82	2	3	0	5	6.08
BL0-23-GN-09	554681	7906184	91.4	13-Aug-23	13-Aug-23	15:15	15:45	0.50	0.46	9	3	7	19	41.56
								Total	**7.1**	**23**	**35**	**54**	**112**	**17.26**

Note: Catch-per-unit-effort (CPUE) represents the number of fish captured per 100 m·hours of net.

Table G.29: Arctic Charr Measurements from Fish Captured at Mary Lake (BL0) by Gill Netting, Mary River Project CREMP, August 2023

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
BL0-23-AC-01	BL0-23-GN-01	1.5	25.3	27.1	140	-	0.865
BL0-23-AC-02	BL0-23-GN-01	3	38.5	41.2	550	-	0.964
BL0-23-AC-03	BL0-23-GN-01	3	39.0	41.5	495	-	0.834
BL0-23-AC-04	BL0-23-GN-01	3	38.0	41.0	490	-	0.893
BL0-23-AC-05	BL0-23-GN-01	3	45.1	48.2	850	-	0.927
BL0-23-AC-06	BL0-23-GN-01	3	38.0	41.4	480	-	0.875
BL0-23-AC-07	BL0-23-GN-01	3	39.0	41.8	550	-	0.927
BL0-23-AC-08	BL0-23-GN-01	3	37.1	40.0	440	-	0.862
BL0-23-AC-09	BL0-23-GN-01	3	45.5	48.5	720	-	0.764
BL0-23-AC-10	BL0-23-GN-01	3	43.6	46.7	595	-	0.718
BL0-23-AC-11	BL0-23-GN-01	3	39.2	42.1	530	-	0.880
BL0-23-AC-12	BL0-23-GN-01	3	37.5	41.0	490	-	0.929
BL0-23-AC-13	BL0-23-GN-01	3	39.2	42.8	540	-	0.896
BL0-23-AC-14	BL0-23-GN-01	3	38.2	41.0	470	-	0.843
BL0-23-AC-15	BL0-23-GN-02	3	41.4	45.0	610	-	0.860
BL0-23-AC-16	BL0-23-GN-02	3	36.0	39.4	435	-	0.932
BL0-23-AC-17	BL0-23-GN-02	3	34.1	36.9	395	-	0.996
BL0-23-AC-18	BL0-23-GN-02	3	42.5	46.0	540	-	0.703
BL0-23-AC-19	BL0-23-GN-02	3	36.1	39.2	440	-	0.935
BL0-23-AC-20	BL0-23-GN-02	3	43.8	46.9	700	-	0.833
BL0-23-AC-21	BL0-23-GN-02	3	41.0	44.7	600	-	0.871
BL0-23-AC-22	BL0-23-GN-02	3	39.1	42.3	610	-	1.020
BL0-23-AC-23	BL0-23-GN-02	3	45.5	48.5	800	-	0.849
BL0-23-AC-24	BL0-23-GN-02	3	41.7	45.0	495	-	0.683
BL0-23-AC-25	BL0-23-GN-03	3	34.7	37.0	400	-	0.957
BL0-23-AC-26	BL0-23-GN-03	3	41.4	44.0	560	-	0.789
BL0-23-AC-27	BL0-23-GN-03	3	40.0	42.9	630	-	0.984
BL0-23-AC-28	BL0-23-GN-03	3	37.2	40.5	530	-	1.030
BL0-23-AC-29	BL0-23-GN-03	2	39.0	43.3	520	-	0.877
BL0-23-AC-30	BL0-23-GN-03	2	23.1	25.1	125	-	1.014
BL0-23-AC-31	BL0-23-GN-03	2	31.5	35.2	305	-	0.976
BL0-23-AC-32	BL0-23-GN-03	2	29.5	32.1	230	-	0.896
BL0-23-AC-33	BL0-23-GN-03	2	42.0	44.9	610	-	0.823
BL0-23-AC-34	BL0-23-GN-03	1.5	32.2	35.1	315	-	0.944
BL0-23-AC-35	BL0-23-GN-03	1.5	39.0	42.1	500	-	0.843
BL0-23-AC-36	BL0-23-GN-03	1.5	28.5	31.3	225	-	0.972
BL0-23-AC-37	BL0-23-GN-03	1.5	34.0	36.6	405	-	1.030
BL0-23-AC-38	BL0-23-GN-03	1.5	33.5	36.8	355	-	0.944
BL0-23-AC-39	BL0-23-GN-04	3	35.9	39.0	475	-	1.027
BL0-23-AC-40	BL0-23-GN-04	3	35.0	38.2	400	-	0.933
BL0-23-AC-41	BL0-23-GN-04	3	35.1	37.9	455	-	1.052
BL0-23-AC-42	BL0-23-GN-04	3	42.0	45.4	660	-	0.891
BL0-23-AC-43	BL0-23-GN-04	3	36.6	40.0	485	-	0.989
BL0-23-AC-44	BL0-23-GN-04	3	36.0	39.4	550	-	1.179
BL0-23-AC-45	BL0-23-GN-04	3	43.1	46.4	760	-	0.949
BL0-23-AC-46	BL0-23-GN-04	3	37.6	41.2	495	-	0.931
BL0-23-AC-47	BL0-23-GN-04	3	40.5	44.0	570	-	0.858
BL0-23-AC-48	BL0-23-GN-04	3	34.0	36.9	405	-	1.030
BL0-23-AC-49	BL0-23-GN-04	2	40.1	44.0	680	-	1.055
BL0-23-AC-50	BL0-23-GN-04	2	29.5	31.8	210	-	0.818
BL0-23-AC-51	BL0-23-GN-04	2	27.7	30.1	205	-	0.965
BL0-23-AC-52	BL0-23-GN-04	2	39.6	43.0	640	-	1.031
BL0-23-AC-53	BL0-23-GN-04	2	27.8	30.1	215	-	1.001

Note: "-" indicates measurement not taken or no comment.

Table G.29: Arctic Charr Measurements from Fish Captured at Mary Lake (BL0) by Gill Netting, Mary River Project CREMP, August 2023

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
BL0-23-AC-54	BL0-23-GN-04	2	25.7	28.2	195	-	1.149
BL0-23-AC-55	BL0-23-GN-04	2	38.5	42.0	540	-	0.946
BL0-23-AC-56	BL0-23-GN-04	2	31.9	35.0	305	-	0.940
BL0-23-AC-57	BL0-23-GN-04	2	39.6	43.1	610	-	0.982
BL0-23-AC-58	BL0-23-GN-04	1.5	41.0	44.4	600	-	0.871
BL0-23-AC-59	BL0-23-GN-05	3	34.9	37.9	420	-	0.988
BL0-23-AC-60	BL0-23-GN-05	3	39.6	42.8	595	-	0.958
BL0-23-AC-61	BL0-23-GN-05	3	37.6	40.9	495	-	0.931
BL0-23-AC-62	BL0-23-GN-05	3	38.4	41.6	600	-	1.060
BL0-23-AC-63	BL0-23-GN-05	3	42.0	46.1	620	-	0.837
BL0-23-AC-64	BL0-23-GN-05	3	41.4	45.0	505	-	0.712
BL0-23-AC-65	BL0-23-GN-05	3	41.6	44.9	680	-	0.945
BL0-23-AC-66	BL0-23-GN-05	2	41.4	45.2	700	-	0.986
BL0-23-AC-67	BL0-23-GN-05	2	39.4	42.5	570	-	0.932
BL0-23-AC-68	BL0-23-GN-05	2	37.3	40.6	505	-	0.973
BL0-23-AC-69	BL0-23-GN-05	2	36.5	39.3	485	-	0.997
BL0-23-AC-70	BL0-23-GN-05	2	38.4	41.2	480	-	0.848
BL0-23-AC-71	BL0-23-GN-05	2	36.0	39.3	470	-	1.007
BL0-23-AC-72	BL0-23-GN-05	2	56.3	60.0	1,500	-	0.841
BL0-23-AC-73	BL0-23-GN-05	2	38.0	41.0	480	-	0.875
BL0-23-AC-74	BL0-23-GN-05	2	36.7	39.2	430	-	0.870
BL0-23-AC-75	BL0-23-GN-05	2	39.6	42.5	480	-	0.773
BL0-23-AC-76	BL0-23-GN-05	2	59.9	64.5	2,100	-	0.977
BL0-23-AC-77	BL0-23-GN-05	2	38.3	41.2	490	-	0.872
BL0-23-AC-78	BL0-23-GN-06	3	39.8	43.0	580	-	0.920
BL0-23-AC-79	BL0-23-GN-06	2	33.7	36.4	375	-	0.980
BL0-23-AC-80	BL0-23-GN-06	2	37.8	40.6	500	-	0.926
BL0-23-AC-81	BL0-23-GN-06	1.5	35.2	37.8	450	-	1.032
BL0-23-AC-82	BL0-23-GN-06	1.5	33.6	36.3	275	-	0.725
BL0-23-AC-83	BL0-23-GN-06	1.5	38.3	43.0	485	-	0.863
BL0-23-AC-84	BL0-23-GN-06	1.5	40.1	43.0	580	-	0.899
BL0-23-AC-85	BL0-23-GN-07	3	37.4	40.2	445	-	0.851
BL0-23-AC-86	BL0-23-GN-07	3	37.8	40.5		-	-
BL0-23-AC-87	BL0-23-GN-07	2	37.4	40.5	535	-	1.023
BL0-23-AC-88	BL0-23-GN-07	1.5	43.6	46.8	595	-	0.718
BL0-23-AC-89	BL0-23-GN-08	2	39.4	43.5	620	-	1.014
BL0-23-AC-90	BL0-23-GN-08	2	41.4	45.8	610	-	0.860
BL0-23-AC-91	BL0-23-GN-08	2	36.3	39.2	320	-	0.669
BL0-23-AC-92	BL0-23-GN-08	1.5	37.9	41.1	485	-	0.891
BL0-23-AC-93	BL0-23-GN-08	1.5	41.0	44.9	545	-	0.791
BL0-23-AC-94	BL0-23-GN-09	1.5	40.4	43.5	590	-	0.895
BL0-23-AC-95	BL0-23-GN-09	1.5	36.5	39.5	370	-	0.761
BL0-23-AC-96	BL0-23-GN-09	1.5	28.8	31.2	160	-	0.670
BL0-23-AC-97	BL0-23-GN-09	1.5	36.8	40.4	475	-	0.953
BL0-23-AC-98	BL0-23-GN-09	1.5	34.4	37.0	355	-	0.872
BL0-23-AC-99	BL0-23-GN-09	1.5	39.8	43.0	510	-	0.809
BL0-23-AC-100	BL0-23-GN-09	1.5	32.9	36.2	305	-	0.856
Overall Catch Summary	Sample Size (N)		100	100	99	-	99
	Average		37.8	40.9	514	-	0.908
	Median		38.1	41.2	495	-	0.926
	Standard Deviation		5.3	5.6	238	-	0.100
	Standard Error		0.53	0.56	24	-	0.010
	Minimum		23.1	25.1	125	-	0.669
	Maximum		59.9	64.5	2,100	-	1.179

Note: "-" indicates measurement not taken or no comment.

Table G.30: Results of Littoral/Profundal Arctic Charr Health Endpoint Statistical Comparisons between 2023 Mary Lake (BL0) and 2023 Reference Lake 3 (REF3) Data, and for Camp Lake between 2023 and the Mine Baseline Period (2005 to 2013), Mary River Project 2023 CREMP

Comparison	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics[b]			Test P-value	Magnitude of Difference (%)[c]
			Response	Covariate	REF 2023 or BL0 Base	BL0 2023		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]	Statistic	REF 2023 or BL0 Base	BL0 2023		
								Interaction P-value	Covariate P-value						
Mary Lake versus Reference Lake 3, 2023	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	11	100	K-S	-	-	-	-	-	-	0.019	-
	Body Size	Fork Length	Fork Length (cm)	-	11	100	M-W	-	-	-	Median	30.4	38.1	0.134	25
		Body Weight	Body Weight (g)	-	11	99	M-W	-	-	-	Median	320	495	0.158	55
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	11	99	ANCOVA	0.032[d]	<0.001	37.1	Adjusted Mean	497	462	0.063	-6.9
Mary Lake 2023 versus Baseline	Survival	Length Frequency Distribution	Fork Length (cm)	-	183	100	K-S	-	-	-	-	-	-	0.282	-
	Body Size	Fork Length	Fork Length (cm)	-	183	100	M-W	-	-	-	Median	38.4	38.1	0.898	-0.78
		Body Weight	Body Weight (g)	-	183	99	M-W	-	-	-	Median	500	495	0.776	-1.0
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	183	99	ANCOVA	0.881	<0.001	36.4	Adjusted Mean	435	437	0.773	0.48

Area P-value < 0.1 or Interaction P-value < 0.05.
Absolute Magnitude of Difference ≥ 10% for Condition (EEM effect endpoint).

Notes: "-" indicates no available data.

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for $\log_{10}$-transformed variables), and adjusted mean are reported for Mann-Whitney, t-test and ANCOVA, respectively, and the predicted mean values from the regression line equations for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVAs where a significant interaction was detected.

[c] The magnitude of difference calculated as: [(exposed area mean - reference area mean) / reference area mean] x 100. When there is a significant interaction in the ANCOVA, the magnitude of difference is calculated at the minimum and maximum values of overlap in covariate values as : [(exposed area predicted mean - reference area predicted mean) / reference area predicted mean] x 100.

[d] ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9356 and R2 of parallel slope model = 0.9328; a difference < 0.02) following Environment Canada (2012).

APPENDIX H

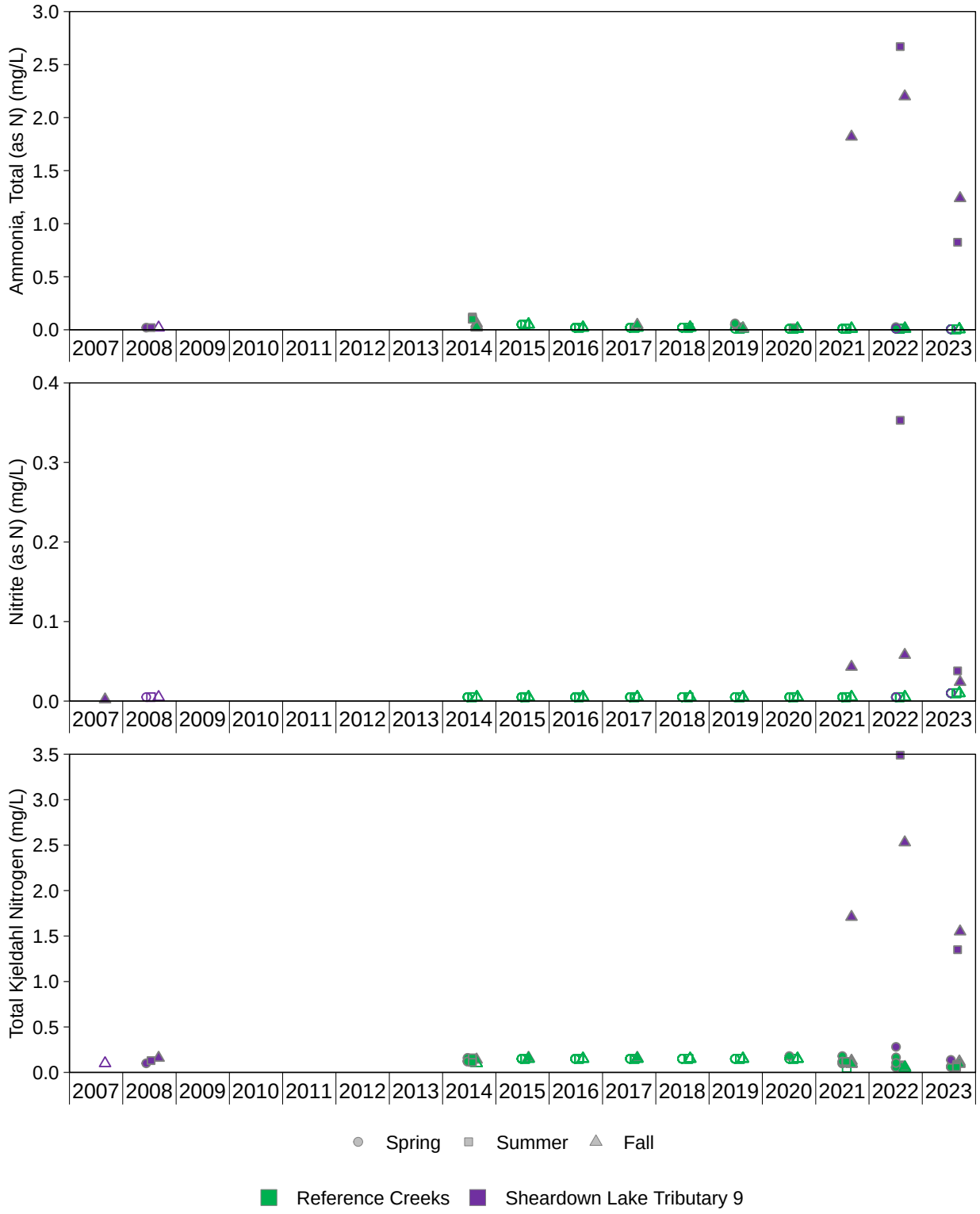


Figure H.1: Temporal Comparison of Total Ammonia, Nitrite, and Total Kjeldahl Nitrogen Concentrations at Sheardown Lake Tributary 9 (SDLT9) Over Mine Baseline (2006 to 2013), Construction (2014), and Operations (2015 to 2023) Periods, Mary River Project CREMP

Notes: Values at the Laboratory Reporting Limit (LRL) are plotted as open symbols at the LRL.

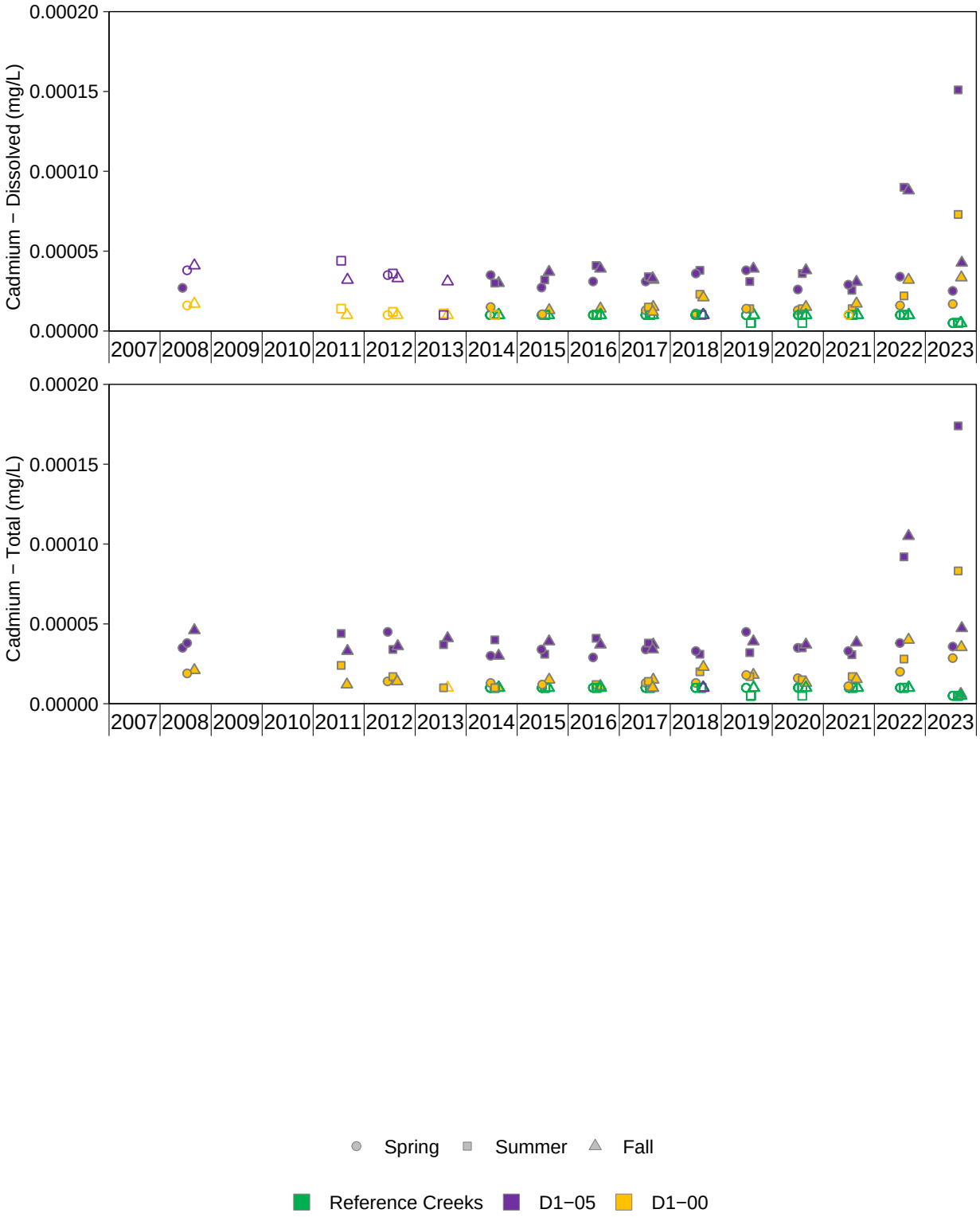


Figure H.2: Temporal Comparison of Dissolved and Total Cadmium at Sheardown Lake Tributary 1 (SDLT1) Stations D1-05 (upper) and D1-00 (lower) Over Mine Baseline (2006 to 2013), Construction (2014), and Operations (2015 to 2023) Periods, Mary River Project CREMP

Notes: Values at the Laboratory Reporting Limit (LRL) are plotted as open symbols at the LRL.

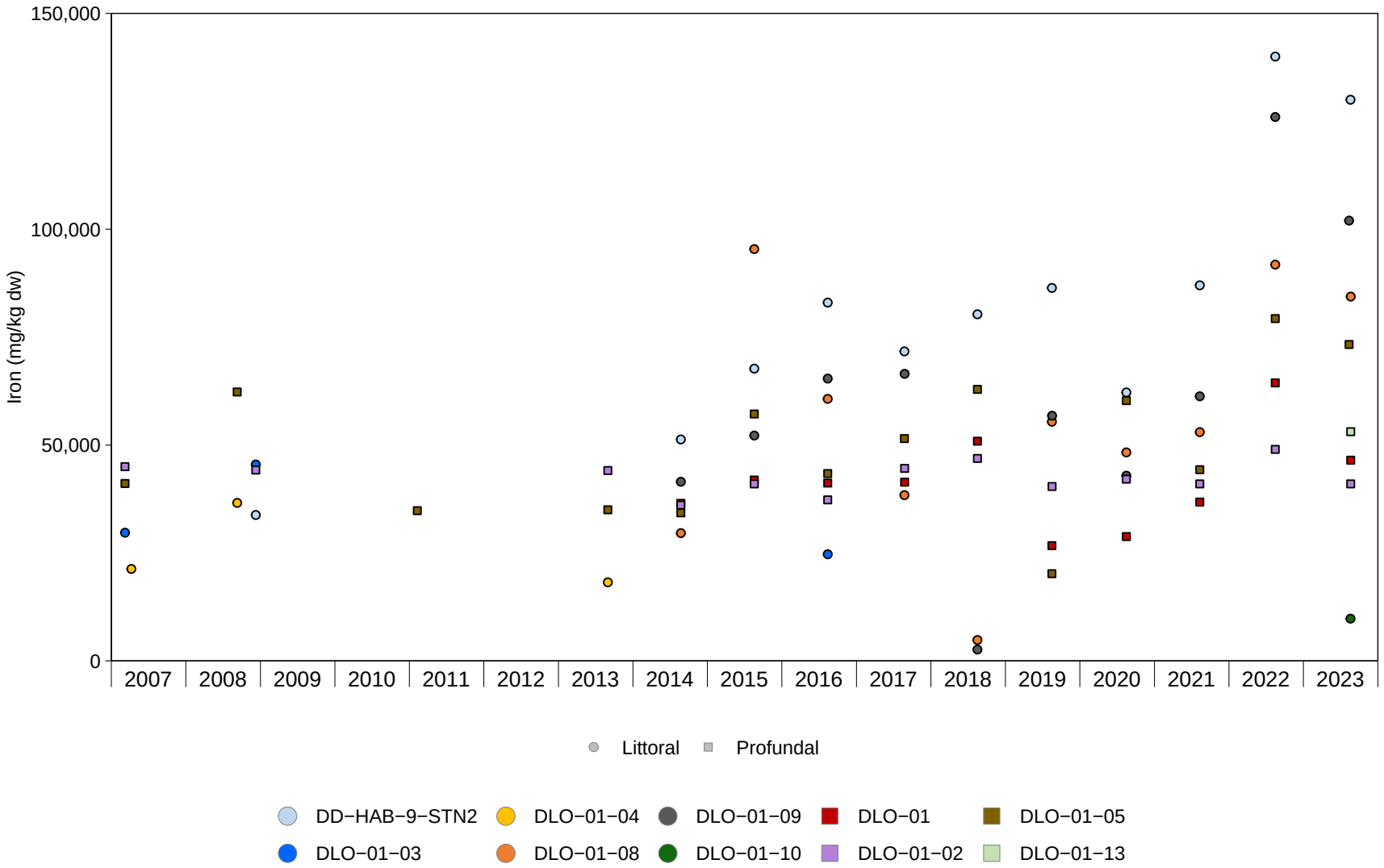


Figure H.3: Temporal Comparison of Sediment Iron Concentrations at Sheardown Lake NW (DL0−01) for Mine Baseline (2005 to 2013), Construction (2014), and Operations (2015 to 2023) Periods, Mary River Project CREMP

Notes: Values at the Laboratory Reporting Limit (LRL) are plotted as open symbols at the LRL.

Table H.1: Seasonal Kendall Trend Analysis for Cadmium Concentrations from Surface Water Quality Monitoring Data, Sheardown Lake Tributary 1 Stations (D1-05, D1-00) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), 2005 to 2023

Status	Station	Range of Years	Seasonal Kendall Trend			
			Total Cadmium		Dissolved Cadmium	
			Slope	P-Value	Slope	P-Value
Reference	CLT-REF3	(2014 - 2023)	LRL	LRL	LRL	LRL
	CLT-REF4	(2014 - 2023)	LRL	LRL	LRL	LRL
	MRY-REF2	(2014 - 2023)	LRL	LRL	LRL	LRL
	MRY-REF3	(2014 - 2023)	LRL	LRL	LRL	LRL
Mine-Exposed	D1-05	(2005 - 2023)	2.1	0.050	4.3	<0.001
	D1-00	(2008 - 2023)	5.8	0.004	7.7	<0.001

P-value < 0.05

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

Table H.2: Seasonal Kendall Trend Analysis for Cadmium Concentrations from Surface Water Quality Monitoring Data, Sheardown Lake Tributary 1 Stations (D1-05, D1-00) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), during Years of Mine Operation (2015 to 2023)

Status	Station	Range of Years	Seasonal Kendall Trend			
			Total Cadmium		Dissolved Cadmium	
			Slope	P-Value	Slope	P-Value
Reference	CLT-REF3	(2015 - 2023)	LRL	LRL	LRL	LRL
	CLT-REF4	(2015 - 2023)	LRL	LRL	LRL	LRL
	MRY-REF2	(2015 - 2023)	LRL	LRL	LRL	LRL
	MRY-REF3	(2015 - 2023)	LRL	LRL	LRL	LRL
Mine-Exposed	D1-05	(2015 - 2023)	2.7	0.038	2.0	0.432
	D1-00	(2015 - 2023)	13	<0.001	8.4	<0.001

P-value < 0.05

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

Table H.3: Seasonal Kendall Trend Analysis for Total Ammonia, Nitrate, and Nitrite Concentrations from Surface Water Quality Monitoring Data, Sheardown Lake Tributary 9 Station (MS-C-G) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), 2007 to 2023

Status	Station	Range of Years	Seasonal Kendall Trend					
			Total Ammonia		Nitrate		Nitrite	
			Slope	P-Value	Slope	P-Value	Slope	P-Value
Reference	CLT-REF3	(2014 - 2023)	LRL	LRL	15	0.081	LRL	LRL
	CLT-REF4	(2014 - 2023)	LRL	LRL	9.5	0.180	LRL	LRL
	MRY-REF2	(2014 - 2023)	LRL	LRL	LRL	LRL	LRL	LRL
	MRY-REF3	(2014 - 2023)	LRL	LRL	18	0.143	LRL	LRL
Mine-Exposed	MS-C-G	(2007 - 2023)	6.5	NS	24	NS	51	NS

P-value < 0.05

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

Table H.4: Seasonal Kendall Trend Analysis for Total Ammonia, Nitrate, and Nitrite Concentrations from Surface Water Quality Monitoring Data, Sheardown Lake Tributary 9 Station (MS-C-G) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), during Years of Mine Operation

Status	Station	Range of Years	Seasonal Kendall Trend					
			Total Ammonia		Nitrate		Nitrite	
			Slope	P-Value	Slope	P-Value	Slope	P-Value
Reference	CLT-REF3	(2015 - 2023)	LRL	LRL	15	0.055	LRL	LRL
	CLT-REF4	(2015 - 2023)	LRL	LRL	9.5	0.110	LRL	LRL
	MRY-REF2	(2015 - 2023)	LRL	LRL	LRL	LRL	LRL	LRL
	MRY-REF3	(2015 - 2023)	LRL	LRL	15	0.109	LRL	LRL
Mine-Exposed	MS-C-G	(2021 - 2023)	ND	ND	ND	ND	ND	ND

P-value < 0.05

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit. "ND" = not enough data for a robust analysis.

Table H.5: **Seasonal Kendall Trend Analysis for Nitrate, Chloride, Sulphate, Molybdenum, and Uranium Concentrations from Surface Water Quality Monitoring Data, Sheardown Lake Northwest and Reference Lake 3 Stations, 2005 to 2023**

Status	Station	Range of Years	Seasonal Kendall Trend													
			Nitrate		Chloride		Sulphate		Total Molybdenum		Dissolved Molybdenum		Total Uranium		Dissolved Uranium	
			Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value
Reference	REF3-01	(2015 - 2023)	LRL	LRL	0.46	0.335	-3.3	<0.001	2.2	0.033	1.8	0.122	2.9	0.122	1.5	0.183
	REF3-02	(2015 - 2023)	LRL	LRL	-0.076	NS	-4.1	<0.001	1.1	0.183	1.0	0.338	2.2	0.161	2.0	0.122
	REF3-03	(2015 - 2023)	LRL	LRL	0.096	NS	-4.0	<0.001	1.2	0.055	2.4	0.015	3.4	0.076	2.3	0.122
Mine-Exposed	DL0-01-2	(2007 - 2023)	38	<0.001	8.3	<0.001	27	<0.001	6.5	<0.001	6.6	<0.001	8.3	<0.001	8.0	<0.001
	DL0-01-7	(2007 - 2023)	33	<0.001	7.0	<0.001	25	<0.001	6.5	<0.001	6.4	<0.001	7.9	<0.001	8.2	<0.001
	DL0-01-1	(2006 - 2023)	27	<0.001	7.2	<0.001	28	<0.001	6.1	<0.001	5.6	<0.001	6.8	<0.001	6.6	<0.001
	DL0-01-4	(2007 - 2023)	39	<0.001	7.3	<0.001	24	<0.001	6.8	<0.001	6.8	<0.001	8.5	<0.001	8.4	<0.001
	DL0-01-5	(2007 - 2023)	26	<0.001	7.0	<0.001	28	<0.001	5.8	<0.001	5.7	<0.001	6.6	<0.001	6.8	<0.001
	DD-Hab9-Stn1	(2011 - 2023)	32	<0.001	7.6	<0.001	23	<0.001	7.2	<0.001	7.3	<0.001	9.8	<0.001	9.1	<0.001

P-value < 0.05

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

Table H.6: **Seasonal Kendall Trend Analysis for Nitrate, Chloride, Sulphate, Molybdenum, and Uranium Concentrations from Surface Water Quality Monitoring Data, Sheardown Lake Northwest and Reference Lake 3 Stations, during Years of Mine Operation (2015 to 2023)**

Status	Station	Range of Years	Seasonal Kendall Trend													
			Nitrate		Chloride		Sulphate		Total Molybdenum		Dissolved Molybdenum		Total Uranium		Dissolved Uranium	
			Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value
Reference	REF3-01	(2015 - 2023)	LRL	LRL	0.46	0.335	-3.3	<0.001	2.2	0.033	1.8	0.122	2.9	0.122	1.5	0.183
	REF3-02	(2015 - 2023)	LRL	LRL	-0.076	NS	-4.1	<0.001	1.1	0.183	1.0	0.338	2.2	0.161	2.0	0.122
	REF3-03	(2015 - 2023)	LRL	LRL	0.096	NS	-4.0	<0.001	1.2	0.055	2.4	0.015	3.4	0.076	2.3	0.122
Mine-Exposed	DL0-01-2	(2015 - 2023)	30	<0.001	9.8	<0.001	18	<0.001	9.7	<0.001	9.1	<0.001	14	<0.001	13	<0.001
	DL0-01-7	(2015 - 2023)	23	<0.001	10	<0.001	17	<0.001	9.1	<0.001	9.2	<0.001	13	<0.001	14	<0.001
	DL0-01-1	(2015 - 2023)	30	<0.001	9.6	<0.001	18	<0.001	9.3	<0.001	9.3	<0.001	15	<0.001	14	<0.001
	DL0-01-4	(2015 - 2023)	26	<0.001	10	<0.001	17	<0.001	9.0	<0.001	9.2	<0.001	15	<0.001	14	<0.001
	DL0-01-5	(2015 - 2023)	31	<0.001	9.5	<0.001	18	<0.001	8.9	<0.001	9.0	<0.001	15	<0.001	15	<0.001
	DD-Hab9-Stn1	(2015 - 2023)	23	<0.001	10	<0.001	15	<0.001	8.9	<0.001	8.8	<0.001	14	<0.001	14	<0.001

P-value < 0.05

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

Table H.7: **Seasonal Kendall Trend Analysis for Nitrate, Sulphate, Molybdenum, and Uranium Concentrations from Surface Water Quality Monitoring Data, Sheardown Lake Southeast and Reference Lake 3 Stations, 2005 to 2023**

Status	Station	Range of Years	Seasonal Kendall Trend											
			Nitrate		Sulphate		Total Molybdenum		Dissolved Molybdenum		Total Uranium		Dissolved Uranium	
			Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value
Reference	REF3-01	(2015 - 2023)	LRL	LRL	-3.3	<0.001	2.2	0.033	1.8	0.122	2.9	0.122	1.5	0.183
	REF3-02	(2015 - 2023)	LRL	LRL	-4.1	<0.001	1.1	0.183	1.0	0.338	2.2	0.161	2.0	0.122
	REF3-03	(2015 - 2023)	LRL	LRL	-4.0	<0.001	1.2	0.055	2.4	0.015	3.4	0.076	2.3	0.122
Mine-Exposed	DL0-02-3	(2007 - 2023)	29	<0.001	18	<0.001	5.1	<0.001	4.9	<0.001	4.6	<0.001	5.0	<0.001
	DL0-02-4	(2007 - 2023)	38	<0.001	18	<0.001	5.8	<0.001	5.3	<0.001	6.2	<0.001	6.1	<0.001
	DL0-02-7	(2014 - 2023)	27	<0.001	18	<0.001	8.0	<0.001	7.6	<0.001	9.4	<0.001	9.1	<0.001
	DL0-02-8	(2014 - 2023)	30	<0.001	19	<0.001	7.4	<0.001	7.2	<0.001	8.7	<0.001	8.1	<0.001

P-value < 0.05

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

Table H.7: **Seasonal Kendall Trend Analysis for Nitrate, Sulphate, Molybdenum, and Uranium Concentrations from Surface Water Quality Monitoring Data, Sheardown Lake Southeast and Reference Lake 3 Stations, 2005 to 2023**

Status	Station	Range of Years	Seasonal Kendall Trend											
			Nitrate		Sulphate		Total Molybdenum		Dissolved Molybdenum		Total Uranium		Dissolved Uranium	
			Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value
Reference	REF3-01	(2015 - 2023)	LRL	LRL	-3.3	<0.001	2.2	0.033	1.8	0.122	2.9	0.122	1.5	0.183
	REF3-02	(2015 - 2023)	LRL	LRL	-4.1	<0.001	1.1	0.183	1.0	0.338	2.2	0.161	2.0	0.122
	REF3-03	(2015 - 2023)	LRL	LRL	-4.0	<0.001	1.2	0.055	2.4	0.015	3.4	0.076	2.3	0.122
Mine-Exposed	DL0-02-3	(2007 - 2023)	29	<0.001	18	<0.001	5.1	<0.001	4.9	<0.001	4.6	<0.001	5.0	<0.001
	DL0-02-4	(2007 - 2023)	38	<0.001	18	<0.001	5.8	<0.001	5.3	<0.001	6.2	<0.001	6.1	<0.001
	DL0-02-6	(2007 - 2023)	26	<0.001	21	<0.001	8.1	<0.001	7.8	<0.001	9.4	<0.001	9.1	<0.001
	DL0-02-7	(2014 - 2023)	27	<0.001	18	<0.001	8.0	<0.001	7.6	<0.001	9.4	<0.001	9.1	<0.001
	DL0-02-8	(2014 - 2023)	30	<0.001	19	<0.001	7.4	<0.001	7.2	<0.001	8.7	<0.001	8.1	<0.001

P-value < 0.05

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

Table H.8: **Seasonal Kendall Trend Analysis for Nitrate, Sulphate, Molybdenum, and Uranium Concentrations from Surface Water Quality Monitoring Data, Sheardown Lake Southeast and Reference Lake 3 Stations, during Years of Mine Operations (2015 to 2023)**

Status	Station	Range of Years	Seasonal Kendall Trend											
			Nitrate		Sulphate		Total Molybdenum		Dissolved Molybdenum		Total Uranium		Dissolved Uranium	
			Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value
Reference	REF3-01	(2015 - 2023)	LRL	LRL	-3.3	<0.001	2.2	0.033	1.8	0.122	2.9	0.122	1.5	0.183
	REF3-02	(2015 - 2023)	LRL	LRL	-4.1	<0.001	1.1	0.183	1.0	0.338	2.2	0.161	2.0	0.122
	REF3-03	(2015 - 2023)	LRL	LRL	-4.0	<0.001	1.2	0.055	2.4	0.015	3.4	0.076	2.3	0.122
Mine-Exposed	DL0-02-3	(2015 - 2023)	28	<0.001	17	<0.001	9.1	<0.001	8.5	<0.001	11	<0.001	11	<0.001
	DL0-02-4	(2015 - 2023)	34	<0.001	16	<0.001	7.6	<0.001	8.2	<0.001	10	<0.001	11	<0.001
	DL0-02-6	(2015 - 2023)	28	<0.001	17	<0.001	8.4	<0.001	8.4	<0.001	10	<0.001	11	<0.001
	DL0-02-7	(2015 - 2023)	30	<0.001	17	<0.001	7.6	<0.001	7.6	<0.001	11	<0.001	11	<0.001
	DL0-02-8	(2015 - 2023)	33	<0.001	16	<0.001	7.7	<0.001	7.7	<0.001	9.6	<0.001	9.9	<0.001

P-value < 0.05

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

Table H.9: Seasonal Kendall Trend Analysis for Nitrate and Sulphate Concentrations from Surface Water Quality Monitoring Data, Mary River Tributary-F Station (F0-01) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), 2005 to 2023

Status	Station	Range of Years	Seasonal Kendall Trend			
			Nitrate		Sulphate	
			Slope	P-Value	Slope	P-Value
Reference	CLT-REF3	(2014 - 2023)	15	0.081	6.4	0.074
	CLT-REF4	(2014 - 2023)	9.5	0.180	7.9	0.102
	MRY-REF2	(2014 - 2023)	LRL	LRL	1.5	0.600
	MRY-REF3	(2014 - 2023)	18	0.143	2.7	0.178
	G0-09	(2014 - 2023)	7.1	0.111	9.6	0.051
Mine-Exposed	F0-01	(2005 - 2023)	11	<0.001	31	<0.001

P-value < 0.05

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

Table H.10: Seasonal Kendall Trend Analysis for Nitrate and Sulphate Concentrations from Surface Water Quality Monitoring Data, Mary River Tributary-F Station (F0-01) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), during Years of Mine Operation (2015 to 2023)

Status	Station	Range of Years	Seasonal Kendall Trend			
			Nitrate		Sulphate	
			Slope	P-Value	Slope	P-Value
Reference	CLT-REF3	(2015 - 2023)	15	0.055	6.0	0.183
	CLT-REF4	(2015 - 2023)	9.5	0.110	9.2	0.126
	MRY-REF2	(2015 - 2023)	LRL	LRL	2.3	0.398
	MRY-REF3	(2015 - 2023)	15	0.109	1.2	0.673
	G0-09	(2015 - 2023)	7.1	0.079	8.7	0.057
Mine-Exposed	F0-01	(2015 - 2023)	19	0.007	22	0.010

P-value < 0.05

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

Table H.11: **Trend Analysis for Arsenic, Barium, Chromium, Copper, Iron, Manganese, Molybdenum, Nickel, Phosphorus, and Strontium Concentrations from Sediment Quality Monitoring Data, Sheardown Lake Northwest and Reference Lake 3 Stations, during Years of Mine Operation (2015 to 2023)**

Status	Station	Type	Range of Years	Trend Analysis																	
				Arsenic		Barium		Chromium		Copper		Iron		Manganese		Molybdenum		Nickel		Phosphorus		Strontium	
				Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value
Reference	REF-03-1	Littoral	(2015 - 2023)	6.1	NS	4.1	NS	3.0	NS	5.1	NS	7.1	NS	19	NS	8.7	NS	2.7	NS	5.0	NS	3.7	NS
	REF-03-2	Littoral	(2015 - 2023)	-0.75	NS	-0.24	NS	1.6	NS	-0.35	NS	-0.95	NS	-9.5	NS	-0.80	NS	-0.12	NS	0.47	NS	1.3	NS
	REF-03-3	Littoral	(2015 - 2023)	1.1	NS	-3.7	NS	-1.9	NS	-7.5	NS	-0.10	NS	-11	NS	-1.0	NS	-5.9	<0.001	-0.15	NS	-0.32	NS
	REF-03-4	Littoral	(2015 - 2023)	-0.99	NS	-1.1	NS	-1.3	NS	-2.2	NS	-2.0	NS	-1.7	NS	0.46	NS	0.88	NS	-2.6	NS	-0.72	NS
	REF-03-5	Littoral	(2015 - 2023)	-0.42	NS	0.41	NS	0.58	NS	-0.22	NS	-1.2	NS	5.7	NS	1.4	NS	1.2	NS	-2.5	NS	-0.020	NS
Mine-Exposed	DD-HAB-9-STN2	Littoral	(2015 - 2023)	1.8	NS	-7.0	NS	0.069	NS	-0.45	NS	7.7	<0.001	-5.6	NS	2.5	NS	-1.4	NS	-2.3	NS	1.8	NS
	DLO-01-03	Littoral	(2016 - 2016)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	DLO-01-04	Littoral	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	DLO-01-08	Littoral	(2015 - 2023)	7.3	NS	2.9	NS	2.0	NS	2.8	NS	6.0	NS	-4.5	NS	2.5	NS	2.5	NS	4.4	NS	2.3	NS
	DLO-01-08	Littoral	(2015 - 2023)	7.3	NS	2.9	NS	2.0	NS	2.8	NS	6.0	NS	-4.5	NS	2.5	NS	2.5	NS	4.4	NS	2.3	NS
	DLO-01-09	Littoral	(2015 - 2023)	7.6	NS	3.8	NS	1.1	NS	0.78	NS	9.9	NS	1.8	NS	0.99	NS	-0.27	NS	2.3	NS	1.3	NS
	DLO-01-10	Littoral	(2023 - 2023)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	DLO-01	Profundal	(2015 - 2023)	1.5	NS	1.1	NS	1.6	NS	2.3	NS	1.6	NS	-0.54	NS	1.3	NS	1.6	NS	1.5	NS	0.51	NS
	DLO-01-02	Profundal	(2015 - 2023)	-0.62	NS	-4.0	NS	0.92	NS	1.2	NS	1.3	NS	-16	NS	-12	NS	0.66	NS	0.090	NS	-0.42	NS
	DLO-01-05	Profundal	(2015 - 2023)	-0.12	NS	7.6	NS	1.3	NS	1.6	NS	5.3	NS	7.8	NS	21	NS	1.4	NS	0.066	NS	1.7	NS
	DLO-01-13	Profundal	(2023 - 2023)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

P-value < 0.05

Significant decreasing temporal trend (Mann Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Mann Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Mann Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit. "ND" = not enough data for a robust analysis.

Table H.12: **Trend Analysis for Arsenic, Barium, Chromium, Copper, Iron, Manganese, Molybdenum, Nickel, Phosphorus, and Strontium Concentrations from Sediment Quality Monitoring Data, Sheardown Lake Northwest and Reference Lake 3 Stations, 2005 to 2023**

Status	Station	Type	Range of Years	Trend Analysis																	
				Arsenic		Barium		Chromium		Copper		Iron		Manganese		Molybdenum		Nickel		Phosphorus		Strontium	
				Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value
Reference	REF-03-1	Littoral	(2015 - 2023)	6.1	NS	4.1	NS	3.0	NS	5.1	NS	7.1	NS	19	NS	8.7	NS	2.7	NS	5.0	NS	3.7	NS
	REF-03-2	Littoral	(2015 - 2023)	-0.75	NS	-0.24	NS	1.6	NS	-0.35	NS	-0.95	NS	-9.5	NS	-0.80	NS	-0.12	NS	0.47	NS	1.3	NS
	REF-03-3	Littoral	(2015 - 2023)	1.1	NS	-3.7	NS	-1.9	NS	-7.5	NS	-0.10	NS	-11	NS	-1.0	NS	-5.9	<0.001	-0.15	NS	-0.32	NS
	REF-03-4	Littoral	(2015 - 2023)	-0.99	NS	-1.1	NS	-1.3	NS	-2.2	NS	-2.0	NS	-1.7	NS	0.46	NS	0.88	NS	-2.6	NS	-0.72	NS
	REF-03-5	Littoral	(2015 - 2023)	-0.42	NS	0.41	NS	0.58	NS	-0.22	NS	-1.2	NS	5.7	NS	1.4	NS	1.2	NS	-2.5	NS	-0.020	NS
Mine-Exposed	DD-HAB-9-STN2	Littoral	(2008 - 2023)	6.7	0.062	-0.39	NS	-0.33	0.755	0.52	0.436	7.7	0.003	-0.17	NS	2.0	0.533	-0.14	0.876	1.8	0.858	2.6	0.072
	DLO-01-03	Littoral	(2007 - 2016)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	DLO-01-04	Littoral	(2007 - 2013)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	DLO-01-08	Littoral	(2014 - 2023)	9.9	0.210	5.2	0.283	0.19	NS	0.61	0.721	6.2	0.474	0.15	NS	8.4	0.474	0.73	0.858	4.4	NS	3.0	0.107
	DLO-01-08	Littoral	(2014 - 2023)	9.9	0.210	5.2	0.283	0.19	NS	0.61	0.721	6.2	0.474	0.15	NS	8.4	0.474	0.73	0.858	4.4	NS	3.0	0.107
	DLO-01-09	Littoral	(2014 - 2023)	9.3	0.152	3.6	0.243	0.81	0.592	1.3	0.474	11	0.107	3.8	0.210	5.8	0.474	0.24	0.721	2.3	NS	2.0	0.243
	DLO-01-10	Littoral	(2023 - 2023)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	DLO-01	Profundal	(2014 - 2023)	3.0	0.371	1.3	0.371	0.59	0.858	2.0	0.243	2.1	0.474	0.61	0.928	0.55	0.788	0.57	NS	1.5	NS	1.4	0.653
	DLO-01-02	Profundal	(2007 - 2023)	2.6	0.077	0.36	0.951	0.46	0.583	0.80	0.161	-0.048	NS	-3.3	0.428	-4.4	0.300	0.62	0.360	-1.2	0.213	1.6	0.075
	DLO-01-05	Profundal	(2007 - 2023)	4.6	0.111	2.7	0.101	0.37	0.743	0.60	0.827	4.1	0.101	4.3	0.189	4.3	0.409	1.3	0.324	-1.2	0.755	2.0	0.032
	DLO-01-13	Profundal	(2023 - 2023)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

P-value < 0.05

Significant decreasing temporal trend (Mann Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Mann Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: "NS" = no significant temporal trend (Mann Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit. "ND" = not enough data for a robust analysis.

Table H.13: Trend Analysis for Arsenic, Chromium, Copper, Iron, Nickel, and Phosphorus Concentrations from Sediment Quality Monitoring Data, Sheardown Lake Northwest and Reference Lake 3 Stations, during Years of Mine Operation (2015 to 2023)

Status	Station	Type	Range of Years	Trend Analysis											
				Arsenic		Chromium		Copper		Iron		Nickel		Phosphorus	
				Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value
Reference	Reference Lake 3	Littoral	(2015 - 2023)	1.4	0.575	0.19	NS	-0.51	0.608	0.25	0.816	-0.21	0.815	-0.83	0.779
Mine-Exposed	Sheardown Lake Northwest	Littoral	(2007 - 2023)	9.6	0.009	0.017	NS	0.80	0.284	9.2	0.002	0.019	NS	2.8	0.366
	Sheardown Lake Northwest	Profundal	(2007 - 2023)	3.2	0.009	0.43	0.481	0.74	0.119	1.3	0.158	0.73	0.194	-1.1	0.408

P-value < 0.05.

Significant decreasing temporal trend (Mann Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Mann Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Mann Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit. "ND" = not enough data for a robust analysis.

Table H.14: Trend Analysis for Arsenic, Chromium, Copper, Iron, Nickel, and Phosphorus Concentrations from Sediment Quality Monitoring Data, Sheardown Lake Northwest and Reference Lake 3 Stations, during Years of Mine Operation (2015 to 2023)

Status	Station	Type	Range of Years	Trend Analysis											
				Arsenic		Chromium		Copper		Iron		Nickel		Phosphorus	
				Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value	Slope	P-Value
Reference	Reference Lake 3	Littoral	(2015 - 2023)	1.4	0.575	0.19	NS	-0.51	0.608	0.25	0.816	-0.21	0.815	-0.83	0.779
Mine-Exposed	Sheardown Lake Northwest	Littoral	(2015 - 2023)	5.0	0.166	1.0	0.253	0.87	0.508	7.6	0.047	-0.31	0.952	1.9	0.588
	Sheardown Lake Northwest	Profundal	(2015 - 2023)	0.43	0.857	1.2	0.306	1.4	0.148	1.9	0.183	1.1	0.306	0.83	0.857

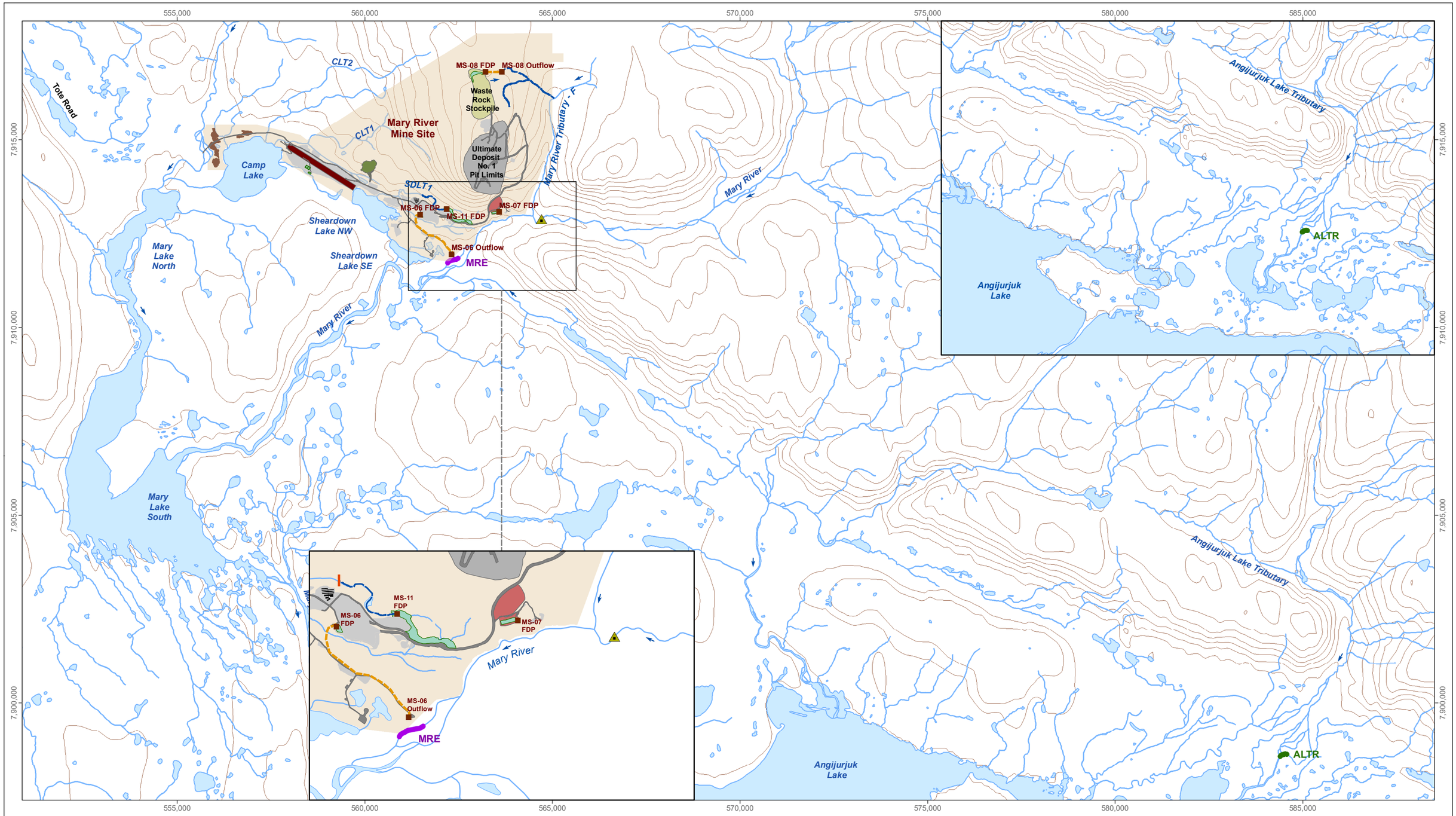
P-value < 0.05.

Significant decreasing temporal trend (Mann Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as percentage of the median concentration or value.

Significant increasing temporal trend (Mann Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: '"NS" = no significant temporal trend (Mann Kendall test for monotonic trend at α = 0.05), but exact p-value not determined because of low sample sizes. "LRL" indicates analyses not conducted because > 75% of data is below the detection limit. "ND" = not enough data for a robust analysis.

APPENDIX I



LEGEND

Fish Survey Sampling Location
- Effluent-Exposed
- Reference
- Final Discharge Point (FDP)
- Mary River Cascade Barrier
- Overland Surface Water Flow
- HDPE Pipe
- Contours (20 m)
- Project Development Area
- Infrastructure
- Airstrip
- Mine Site Complex
- Pond
- ROM Stockpile
- Road
- Open Pit
- Waste Rock Facility
- Borrow Pit
- Quarry

0 1.5 3 6
km

N W E S

Map Projection: UTM Zone 17 W NAD 1983
Data Source: Reproduced under licence from His Majesty the King in Right of Canada, Department of Natural Resources Canada. All rights reserved.

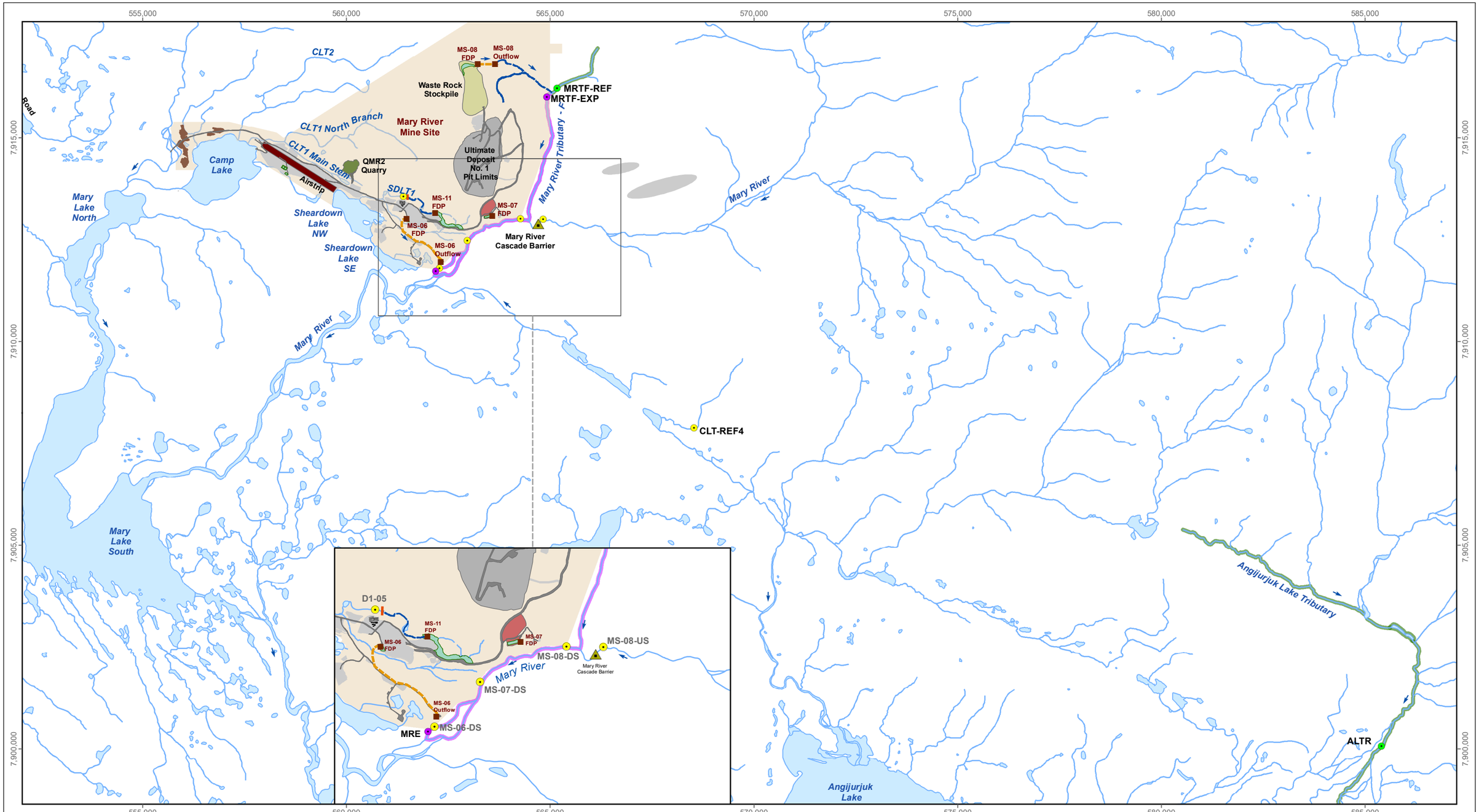
Fish Population Study Area Locations, Mary River Project, Third EEM Study, August 2023

Date: December 2023
Project 237202.0084

minnow environmental inc.

Figure I.1

Document Path: C:\Users\mlapalme\Trinity Consultants, Inc\Baffinland Iron Mines - 237202.0084 - Phase 3 EEM Implementation\D - GIS\Phase 3 EEM\23-84 Figure 2.3 Fish Population Study Area Locations, Third EEM Study, August 2023.mxd



LEGEND

- Final Discharge Point (FDP)
- EEM Effluent-Exposed Area
- EEM Reference Area

Water Quality Monitoring Station

- Effluent-Exposed
- Reference
- EEM Water Quality Monitoring Station
- Mary River Cascade Barrier
- Fish Barrier
- Overland Surface Water Flow
- HDPE Pipe
- Project Development Area
- Infrastructure
- Airstrip
- Mine Site Complex
- Pond
- ROM Stockpile
- Road
- Open Pit
- Waste Rock Facility
- Borrow Pit
- Quarry

0 1.5 3 6
km

Map Projection: UTM Zone 17N NAD 1983

N
W E
S

Water Quality Monitoring Station Locations, Mary River Project, Third EEM Study, 2021 to 2023

Date: January 2024
Project 237202.0084

minnow environmental inc.

Figure I.2

Document Path: C:\Users\mlapalme\Trinity Consultants, Inc\Baffinland Iron Mines - 237202.0084 - Phase 3 EEM Implementation\D - GIS\Phase 3 EEM\23-84 Figure 2.1 Water Quality Monitoring Station Locations, Mary River Project, Third EEM Study, 2021 to 2023.mxd

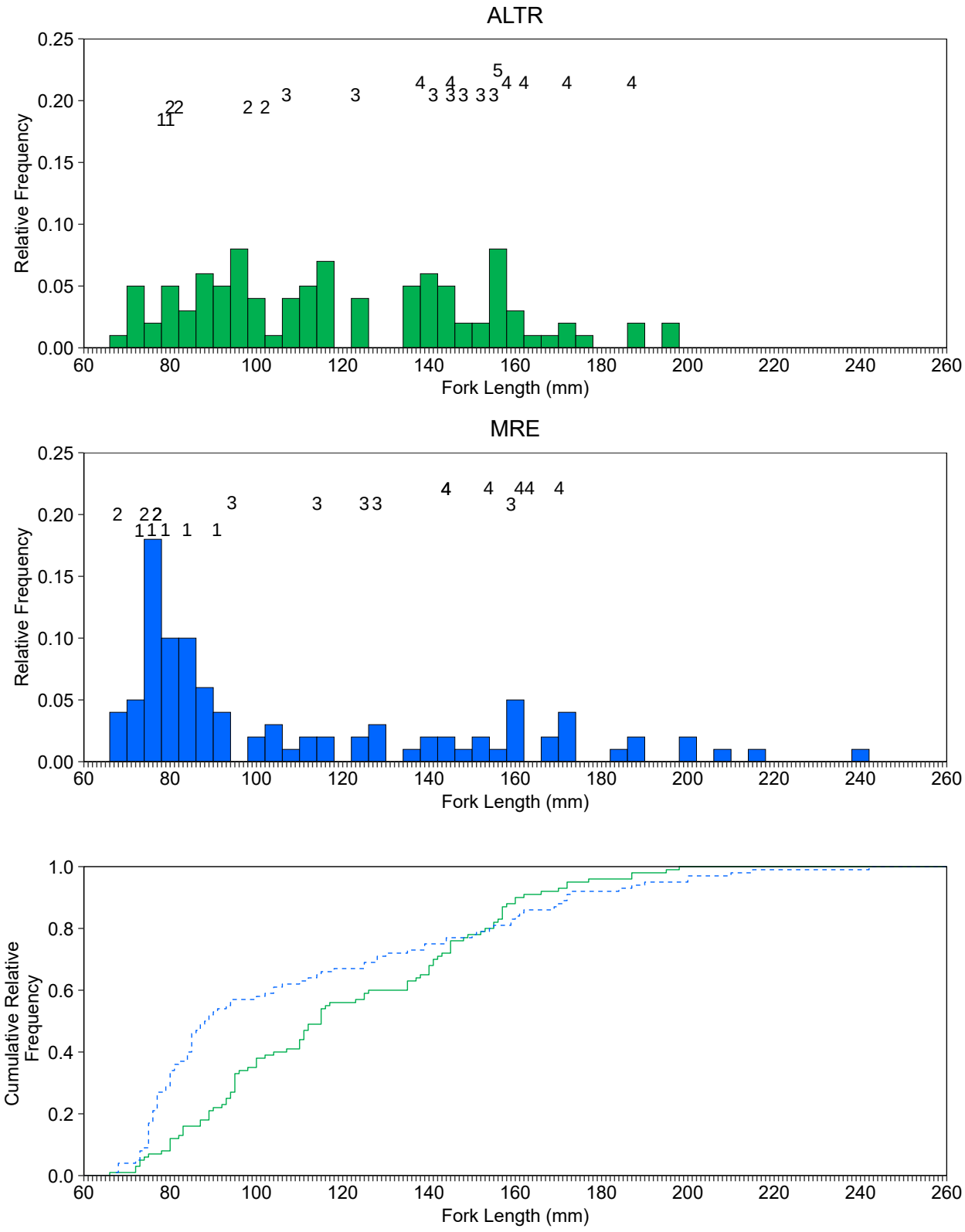


Figure I.3: Length−frequency Distributions for Arctic Charr from Effluent-Exposed (MRE) and Reference (ALTR) Fish Population Study Areas, Mary River Project, Third EEM Study, August 2023

Notes: ALTR = Angijurjuk Lake Tributary Reference; MRE = Mary River Effluent-Exposed. Lengths are from lethally and non-lethally sampled fish (n_{ALTR} = 100; n_{MRE} = 98). Numbers above bars represent individual fish ages, where determined (n_{ALTR} = 20; n_{MRE} = 19).

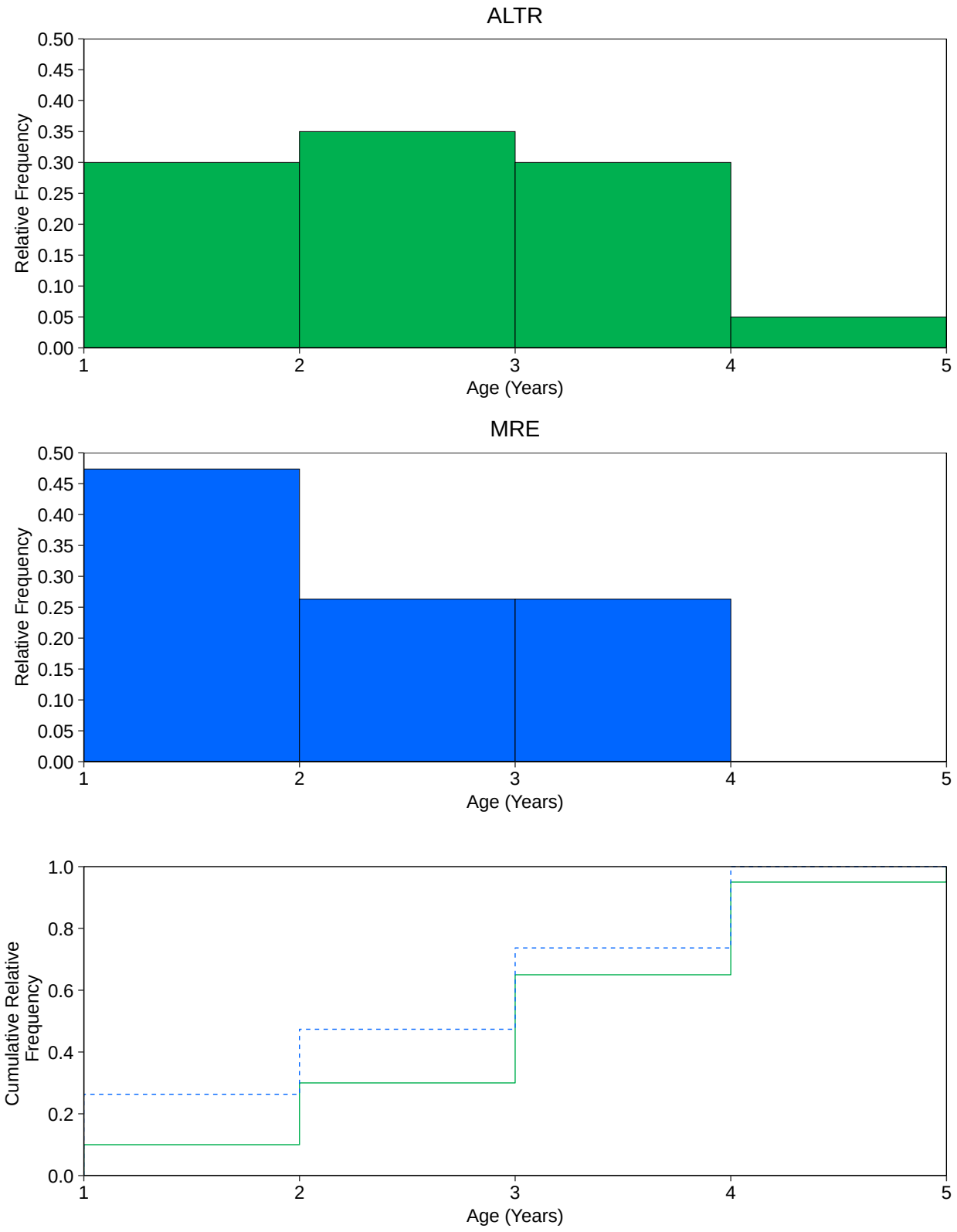


Figure I.4: Age−frequency Distributions for Arctic Charr from Effluent−Exposed (MRE) and Reference (ALTR) Fish Population Study Areas, Mary River Project, Third EEM Study, August 2023

Notes: ALTR = Angijurjuk Lake Tributary Reference; MRE = Mary River Effluent-Exposed. Ages are from lethally sampled fish (n_{ALTR} = 20; n_{MRE} = 19).

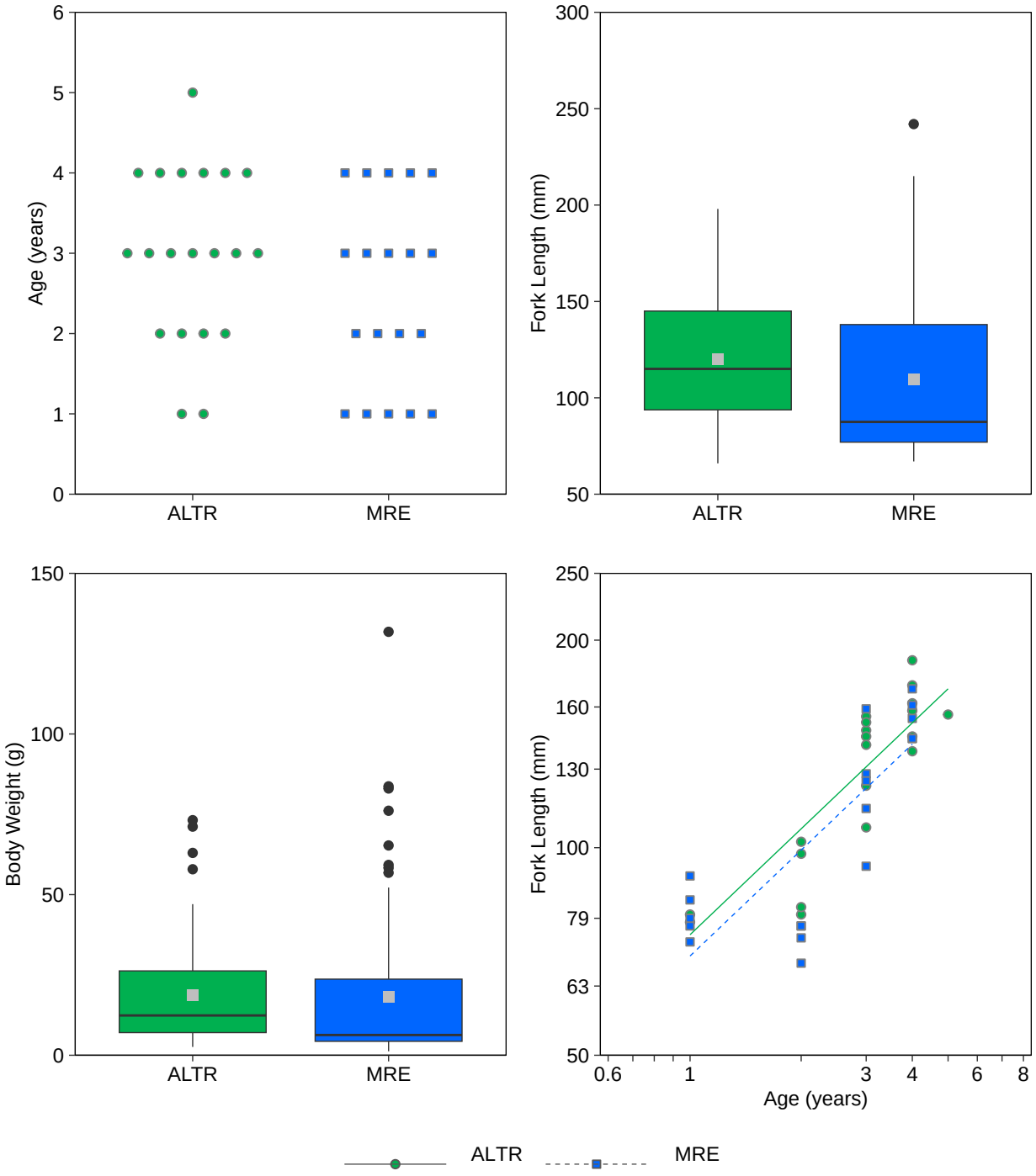


Figure I.5: Fish Health Endpoints for Arctic Charr from Effluent-Exposed (MRE) and Reference (ALTR) Fish Population Study Areas, Mary River Project, Third EEM Study August 2023

Notes: ALTR = Angijurjuk Lake Tributary Reference; MRE = Mary River Effluent-Exposed.Outliers are marked with an 'x'.

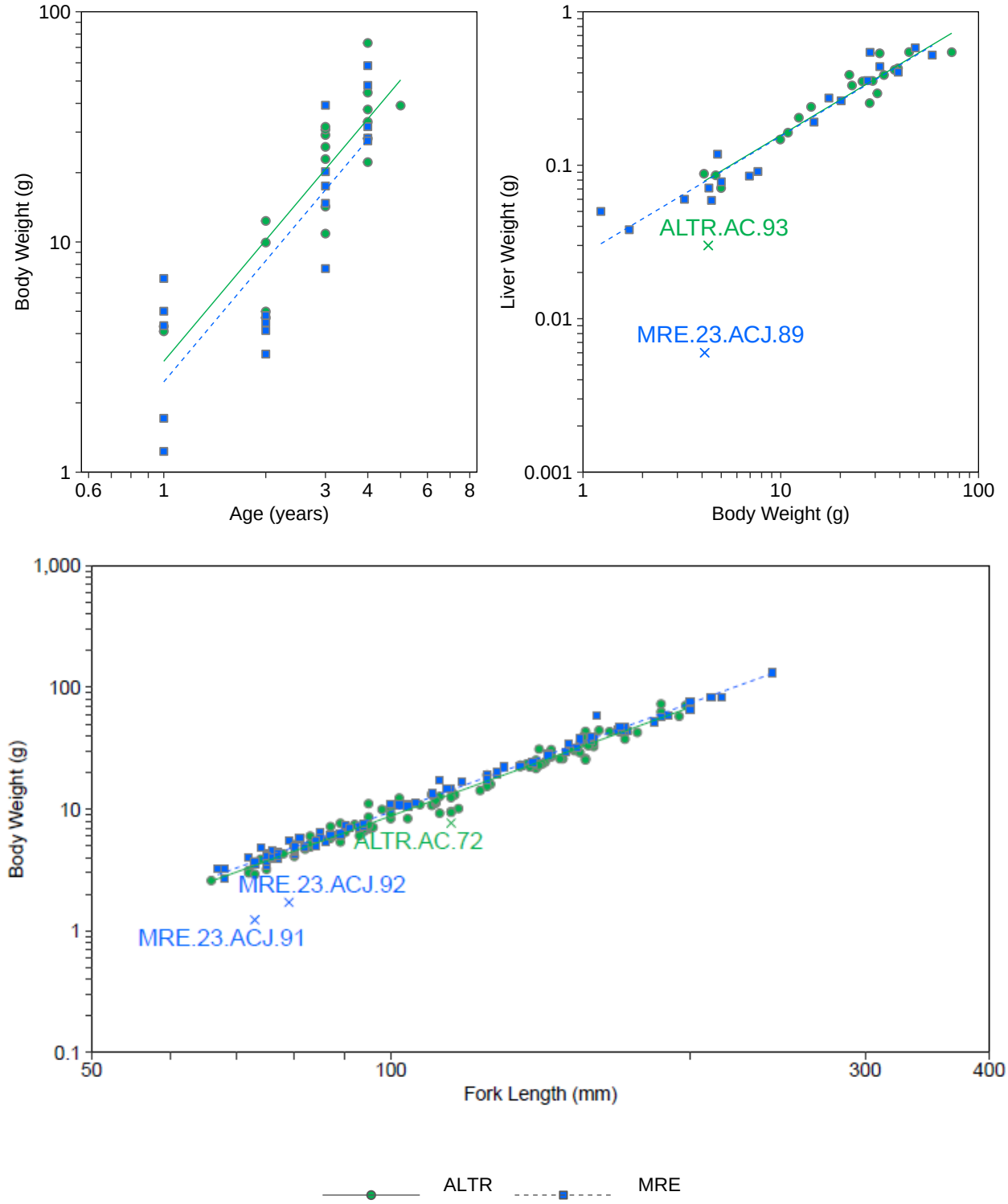


Figure I.5: Fish Health Endpoints for Arctic Charr from Effluent-Exposed (MRE) and Reference (ALTR) Fish Study Areas, Mary River Project, Third EEM Study August 2023

Notes: ALTR = Angijurjuk Lake Tributary Reference; MRE = Mary River Effluent-Exposed.Outliers are marked with an 'x'.

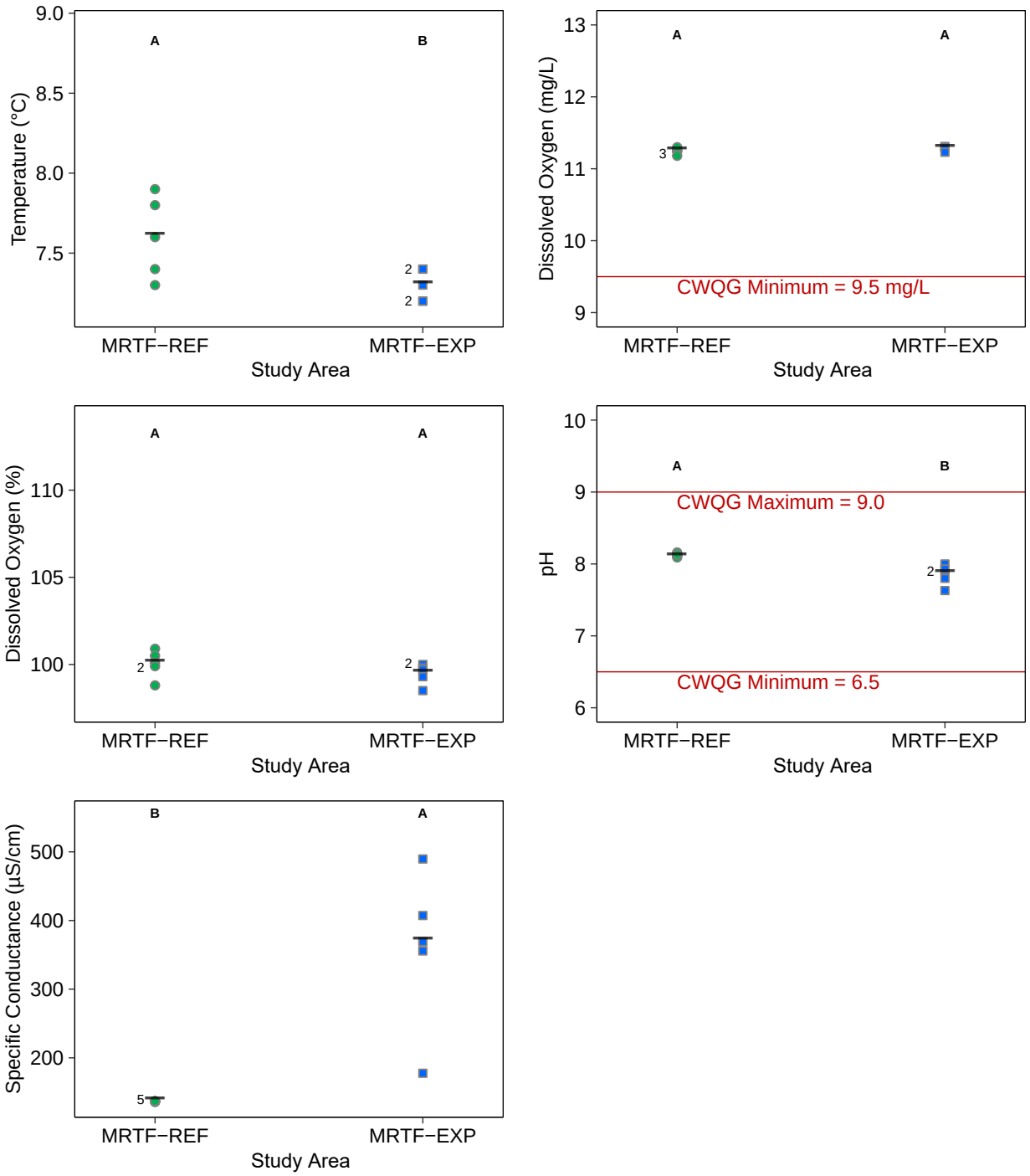


Figure I.6: Comparisons of *In Situ* Water Quality Measured at Mary River Tributary−F Effluent−Exposed (MRTF−EXP) and Reference (MRTF−REF) Benthic Invertebrate Community Study Areas, Mary River Project, Third EEM Study, August 2023

Notes: CWQG = Canadian Water Quality Guideline.
Horizontal bars indicate measures of central tendency (i.e., mean for untransformed data, geometric mean for log10 transformed data, and median for rank transformed data). Areas that share a letter do not differ significantly.
Numbers indicate the number of overlapping points.

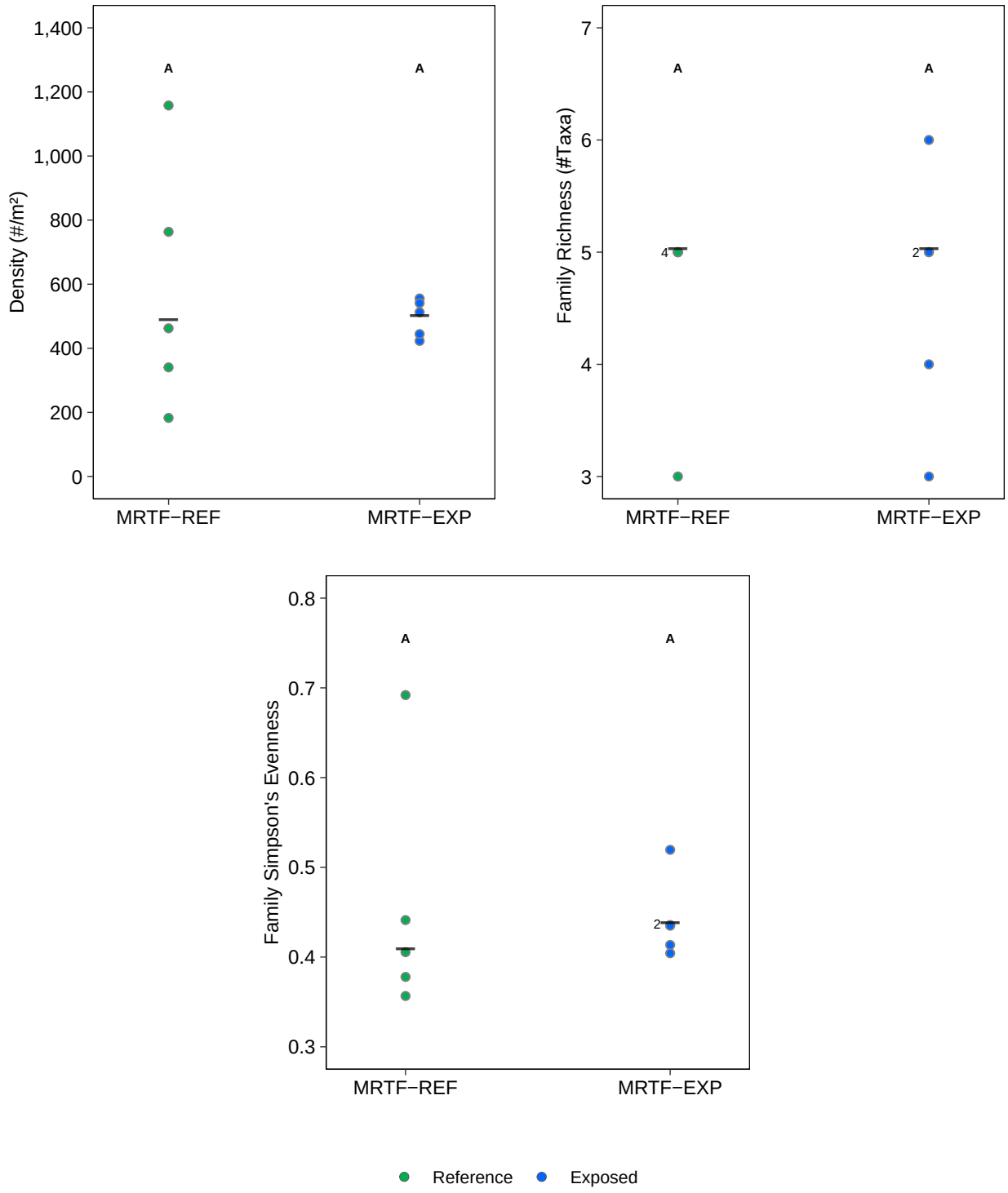


Figure I.7: Benthic Invertebrate Community Primary EEM Endpoint Comparisons for Mary River Tributary−F Effluent−Exposed (MRTF−EXP) and Reference (MRTF−REF) Areas, Mary River Project Third EEM Study, August 2023

Notes: Samples that share a letter are not significantly different ($p < 0.1$) using a t−test. Numbers next to symbols indicate the number of overlapping points. Black bars show measures of central tendency.

Table I.1: Electrofishing Catch Record, Mary River Project, Third EEM Study, August 2023

Watercourse	Station ID	Date	GPS Coordinates[a]					Pass	Effort (seconds)	Fish Species				Total (all species)	
			Start		End		Station Length (m)			Arctic Charr		Ninespine Stickleback			
			Latitude	Longitude	Latitude	Longitude				Catch	CPUE	Catch	CPUE	Total Catch	CPUE
Angijurjuk Lake Tributary Reference (ALTR)	ALTR-F1	23-Aug-23	71.17516327	-78.65591431	71.17554474	-78.65142822	200	1	11,763	104	0.53	0	0.00	104	0.53
Mary River Effluent-Exposed (MRE)	MRE-F1	17-Aug-23	71.29977417	-79.26173401	71.30073547	-79.25337219	300	1	6,297	49	0.47	0	0.00	49	0.47
							100	2	2,941	53	1.08	1	0.02	54	1.10

Note: Catch-per-unit-effort (CPUE) represents the number of fish captured per electrofishing minute. GPS = global positioning system.

[a] Coordinates presented as decimal degrees using 1983 North American Datum (NAD 83).

Table I.2: Summary of Arctic Charr Catches at Effluent-Exposed (MRE) and Reference (ALTR) Fish Population Study Areas, Mary River Project, Third EEM Study, August 2023

Study Area	Total Effort		Summary Statistic Endpoint	Arctic Charr	
	Distance Sampled (m)	Electrofishing Seconds		YOY [b]	Non-YOY [b]
Angijurjuk Lake Tributary Reference (ALTR)	200	11,763	Total No. Caught	0	104
			CPUE[a]	0	0.53
Mary River Effluent-Exposed (MRE)	400	9,238	Total No. Caught	0	102
			CPUE[a]	0	0.66

[a] Electrofishing catch-per-unit-effort (CPUE) represents number of fish captured per minute of electrofishing.

[b] Young-of-the-year (YOY).

Table I.3: Statistical Comparisons For Arctic Charr Lethal and Non-Lethal Endpoints Between Effluent-Exposed (MRE) and Reference (ALTR) Fish Population Study Areas, Mary River Project, Third EEM Study, August 2023

Indicator	Endpoint	Variables		Sample Size		Test			ANCOVA Statistics			Summary Statistics[b]			Test *P*-value (Location)	Magnitude of Difference (%)[c]	Estimated Power to Detect Effect Size[d]		Estimated Minimum Detectable Difference with α=β=0.1[e]	
						Statistical Test	Shapiro Wilk's P-Value	Levene's Test P-Value	Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]						Increase	Decrease	Increase	Decrease
		Response	Covariate	ALTR	MRE				Interaction *p*-value	Covariate *p*-value		Statistic	ALTR (REF)	MRE (EXP)						
Survival/Recruitment	Length-Frequency Distribution	Fork Length (mm)	-	100	98	K-S	-	-	-	-	-	-	-	-	<0.001	-	-	-	-	-
	Age-Frequency Distribution	**Age (Years)**	**-**	**20**	**19**	**K-S**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.522**	**ns**	**-**	**-**	**-**	**-**
Survival	**Age**	**Age (years)**	**-**	**20**	**19**	**tequal**	**0.076**	**0.39**	**-**	**-**	**-**	**Mean**	**3.00**	**2.53**	**0.196**	**ns**	**0.68**	**0.68**	**35**	**-35**
Body Size	Fork Length	Fork Length (mm)	-	100	98	M-W	0.0010[f]	0.36[f]	-	-	-	Median	115	87.5	0.002	-24	1.00	1.00	15	-13
	Body Weight	Body Weight (g)	-	100	98	M-W	0.0010f	0.38[f]	-	-	-	Median	12.4	6.30	0.009	-49	0.47	0.63	53	-34
Energy Usage	Length-at-age	log10[Fork Length (mm)]	log10[Age (years)]	20	19	ANCOVA	-	-	0.452	<0.001	2.49	Adjusted Mean	119	111	0.217	ns	0.99	1.00	17	-15
	Weight-at-age	**log10[Body Weight (g)]**	**log10[Age (years)]**	**20**	**19**	**ANCOVA**	**-**	**-**	**0.828**	**<0.001**	**2.49**	**Adjusted Mean**	**14.9**	**12.2**	**0.245**	**ns**	**0.36**	**0.51**	**64**	**-39**
Energy Storage	**Relative Liver Weight**	**log10[Liver Weight (g)]**	**log10[Body Weight (g)]**	**20**	**19**	**ANCOVA**	**-**	**-**	**0.929**	**<0.001**	**13.5**	**Adjusted Mean**	**0.183**	**0.175**	**0.803**	**ns**	**0.41**	**0.57**	**57**	**-36**
				19[g]	**18[g]**	**ANCOVA**	**-**	**-**	**0.755**	**<0.001**	**14.4**	**Adjusted Mean**	**0.207**	**0.205**	**0.861**	**ns**	**0.41**	**0.57**	**23**	**-19**
	Condition	**log10[Body Weight (g)]**	**log10[Fork Length (mm)]**	**100**	**98**	**ANCOVA**	**-**	**-**	**0.624**	**<0.001**	**109**	**Adjusted Mean**	**11.3**	**12.1**	**0.005**	**6.7**	**1.0**	**1.0**	**6.9**	**-6.4**
				99[h]	**96[h]**	**ANCOVA**	**-**	**-**	**0.724**	**<0.001**	**110**	**Adjusted Mean**	**11.5**	**12.4**	**<0.001**	**8.0**	**1.0**	**1.0**	**4.9**	**-4.7**

Shading indicates an area p-value less than 0.1 or an interaction p-value less than 0.05.

Indicates a Magnitude of Difference (MOD) outside of applicable Critical Effect Size (i.e., ±25% for all endpoints with the exception of ±10% for condition).

Covariate P-value > 0.05.

Notes: ns = non-significant. "-" indicates the value is not applicable, ALTR = Angijurjuk Lake Tributary Reference, MRE = Mary River Effluent-Exposed, REF = Reference, EXP = Exposed. **Bold = EEM effect endpoint.**

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for log_{10}-transformed variables), and adjusted mean are reported for Mann-Whitney, t-test and ANCOVA, respectively, and the predicted means of the regression line equations for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVAs where a significant interaction (i.e., different slopes) occurs.

[c] Calculated as the difference in measure of central tendency (MCT) between areas (mine-exposed minus reference), expressed as a percentage of the reference area MCT.

[d] Effect size was set to critical effect size for bolded endpoints and 25% for all endpoints without defined critical effective sizes.

[e] Minimum detectable effect size (see methods section of report for formula).

[f] When a non-parametric test was selected only untransformed results are displayed. Results were qualitatively similar when log-10 transformed.

[g] Outliers (MRE-23-ACJ-89, Stdnt resid: -9.147; ALTR-AC-93, Stdnt resid: -4.197) were removed from analysis.

[h] Outliers (MRE-23-ACJ-91, Stdnt resid: -7.66; MRE-23-ACJ-92, Stdnt resid: -6.807; ALTR-AC-72, Stdnt resid: -4.72) were removed from analysis.

Table I.4: ***In Situ*** **Water Quality Measurements Collected at Benthic Invertebrate Community Study Stations and Fish Population Study Areas, Mary River Project, Third EEM Study, August 2023**

Study Area		Station	Date	Time	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	pH (pH units)	Specific Conductance (µS/cm)
Mary River Tributary-F	Reference	MRTF-REF1	14-Aug-23	15:33	7.9	11.24	100.9	8.12	137.1
		MRTF-REF2	14-Aug-23	15:18	7.8	11.25	100.5	8.11	136.3
		MRTF-REF3	14-Aug-23	14:52	7.6	11.26	100.1	8.16	135.6
		MRTF-REF4	14-Aug-23	14:40	7.3	11.18	98.8	8.09	136.8
		MRTF-REF5	14-Aug-23	14:07	7.4	11.30	99.9	8.13	136.8
	Effluent-exposed	MRTF-EXP1	14-Aug-23	13:52	7.4	11.30	100.0	8.00	177.5
		MRTF-EXP2	14-Aug-23	13:03	7.4	11.28	99.8	7.91	355.7
		MRTF-EXP3	14-Aug-23	-	7.3	11.31	99.7	7.93	369.1
		MRTF-EXP4	14-Aug-23	12:07	7.2	11.29	99.3	7.80	407.3
		MRTF-EXP5	14-Aug-23	11:15	7.2	11.23	98.5	7.63	489.6
Angijurjuk Lake Tributary Reference		ALTR	28-Aug-23	7:25	0.6	13.06	93.6	7.64	72.4
Mary River Effluent-Exposed		MRE	26-Aug-23	12:35	3.5	12.87	101.1	8.17	161.5

Note: "-" indicates that data are not available.

Table I.5: ***In Situ*** **Water Quality Data Summary and Statistical Comparison Results Between Mary River Tributary-F Effluent-Exposed (MRTF-EXP) and Reference (MRTF-REF) Benthic Invertebrate Community Study Areas, Mary River Project, Third EEM Study, August 2023**

System	Water Quality Parameter	Two-Area Comparison						Study Area	n	Mean	SD	SE	Minimum	Median	Maximum
		Data Transformation	Test	Test P-value	MCT[a]		MOD (%)								
					MRTF-REF	MRTF-EXP									
Mary River Tributary-F	Temperature (°C)	none	tequal	0.0400	7.60	7.30	-3.95	MRTF-REF	5	7.60	0.255	0.102	7.30	7.60	7.90
								MRTF-EXP	5	7.30	0.100	0.0400	7.20	7.30	7.40
	Dissolved Oxygen (mg/L)	none	tequal	0.170	11.2	11.3	ns	MRTF-REF	5	11.2	0.0434	0.0173	11.2	11.2	11.3
								MRTF-EXP	5	11.3	0.0311	0.0125	11.2	11.3	11.3
	Dissolved Oxygen (% Saturation)	none	tequal	0.227	100	99.5	ns	MRTF-REF	5	100	0.792	0.317	98.8	100	101
								MRTF-EXP	5	99.5	0.594	0.238	98.5	99.7	100
	pH	none	tequal	0.00350	8.12	7.85	-3.30	MRTF-REF	5	8.12	0.0259	0.0104	8.09	8.12	8.16
								MRTF-EXP	5	7.85	0.144	0.0577	7.63	7.91	8.00
	Specific Conductance (µS/cm)	rank	M-W	0.0119	137	369	170	MRTF-REF	5	137	0.589	0.236	136	137	137
								MRTF-EXP	5	360	114	45.8	178	369	490

Indicates significant difference between study areas based on a p-value less than 0.05.
P-value < 0.05 and negative MOD.
P-value < 0.05 and positive MOD.

Note: "ns"= not significant, n = number of stations MOD = Magnitude of Difference = $(MCT_{Exp} - MCT_{Ref})/MCT_{Ref}$.

[a] MCT = Measure of Central Tendency; MCT reported as median for rank-transformed data and back-transformed mean in all other cases.

Table I.6: Water Chemistry at Benthic Invertebrate Community and Fish Population Study Areas during Biological Studies, Mary River Project, Third EEM Study, August 2023

	Parameters	Units	Water Quality Guideline[a]	Benthic Invertebrate Community Study Areas		Fish Population Study Areas	
				Mary River Tributary-F		Angijurjuk Lake Tributary	Mary River
				Reference	Effluent-Exposed	Reference	Effluent-Exposed
			Long-term Chronic	MRTF-REF	MRTF-EXP	ALTR	MRE
				26-Aug-23	26-Aug-23	28-Aug-23	26-Aug-23
Deleterious Substances and pH[b]	pH (field)	pH	6.5 - 9.0	8.19	8.05	7.64	8.17
	Total Suspended Solids	mg/L	-	<1	<1	4.5	<1
	Arsenic (As)	mg/L	0.00500	<0.0001	<0.0001	0.0001	<0.0001
	Copper (Cu)	mg/L	0.00200 to 0.00376	<0.0005	<0.0005	0.00171	0.00097
	Lead (Pb)	mg/L	0.00100 to 0.00635	<0.00005	<0.00005	0.000345	0.000085
	Nickel (Ni)	mg/L	0.0250 to 0.144	<0.0005	0.00069	0.00073	<0.0005
	Unionized Ammonia	mg/L	0.0190	<0.001	<0.001	<0.001	<0.001
	Zinc (Zn)	mg/L	-	<0.003	<0.003	<0.003	<0.003
Receiver Water Characterization[c]	Conductivity (lab)	µmho/cm	-	177	325	72.8	165
	Hardness (as $CaCO_3$)	mg/L	-	96.8	172	29.6	75.8
	Alkalinity (as $CaCO_3$)	mg/L	-	92.4	83.2	23.7	71.9
	Ammonia (NH_4^+)	mg/L	0.502 to 0.749	<0.005	<0.005	<0.005	<0.005
	Nitrate (NO_3)	mg/L	3.00	<0.02	1.58	<0.02	0.409
	Total Phosphorus	mg/L	-	0.0022	<0.002	0.0077	0.018
	Chloride (Cl)	mg/L	120	<0.5	2.29	4.53	4.75
	Sulphate (SO_4)	mg/L	128 to 309	2.5	71.9	5.56	4.81
	Aluminum (Al)	mg/L	0.100	0.0129	0.0068	0.386	0.0862
	Cadmium (Cd)	mg/L	0.0000577 to 0.000249	<0.000005	<0.000005	<0.000005	<0.000005
	Chromium (Cr)	mg/L	0.001	<0.0005	<0.0005	0.00097	<0.0005
	Cobalt (Co)	mg/L	0.00400	<0.0001	0.0002	0.00021	<0.0001
	Iron (Fe)	mg/L	0.300	0.014	<0.01	0.474	0.088
	Manganese (Mn)	mg/L	0.768 to 1.36	0.00028	0.00577	0.00601	0.00123
	Mercury (Hg)	mg/L	0.0000260	<0.000005	<0.000005	<0.000005	<0.000005
	Molybdenum (Mo)	mg/L	0.0730	0.000163	0.000216	0.000357	0.000398
	Selenium (Se)	mg/L	0.00100	<0.00005	0.000624	<0.00005	<0.00005
	Thallium (Tl)	mg/L	0.000800	<0.00001	<0.00001	<0.00001	<0.00001
	Uranium (U)	mg/L	0.0150	0.00287	0.00194	0.00089	0.00257

Indicates value above applicable long-term Water Quality Guideline for the protection of aquatic life.

Indicates value above applicable short-term Water Quality Guideline for the protection of aquatic life.

Note: "-" indicates guideline not available or not applicable. For metals, all values are total concentrations.

[a] Canadian Water Quality Guideline for the protection of aquatic life (CWQG; CCME Website) or British Columbia Water Quality Guidelines (BCWQG; BCMOE 2017; BCMOECCS 2019, BCMOE 2023).

[b] As defined under Schedule 4 of the MDMER (Government of Canada 2023).

[c] As defined under Schedule 5 of the MDMER (Government of Canada 2023).

Table I.7: Summary of Habitat Features at Mary River Tributary-F Benthic Invertebrate Community Study Stations, Mary River Project, Third EEM Study, August 2023

Habitat Characteristic		Mary River Tributary-F Reference					Mary River Tributary-F Effluent-Exposed				
		MRTF-REF1	MRTF-REF2	MRTF-REF3	MRTF-REF4	MRTF-REF5	MRTF-EXP1	MRTF-EXP2	MRTF-EXP3	MRTF-EXP4	MRTF-EXP5
Width (m)	Wetted	17.7	12.17	-	12.27	16.60	10.20	13.90	9.51	13.45	5.63
	Bankfull	27.51	15.89	-	13.42	18.62	24.20	23.25	18.51	25.84	13.00
Max Depth (cm)	-	27.0	35.0	25.0	30.0	20.0	34.0	30.0	30.0	26.0	37.5
Stream Morphology	% Pool	15	15	15	15	15	10	10	10	10	15
	% Rapid	0	0	0	0	0	0	0	0	0	0
	% Riffle	70	70	65	70	65	80	85	80	80	75
	% Run	15	15	20	15	20	10	5	10	10	10
Substrate (% areal coverage)		0% bedrock 35% boulder 30% cobble 30% gravel 5% sand	0% bedrock 20% boulder 50% cobble 20% gravel 10% sand	0% bedrock 25% boulder 50% cobble 15% gravel 10% sand	0% bedrock 30% boulder 40% cobble 20% gravel 10% sand	0% bedrock 20% boulder 50% cobble 20% gravel 10% sand	0% bedrock 20% boulder 60% cobble 10% gravel 10% sand	0% bedrock 15% boulder 65% cobble 10% gravel 10% sand	0% bedrock 30% boulder 40% cobble 20% gravel 10% sand	0% bedrock 10% boulder 60% cobble 20% gravel 10% sand	0% bedrock 60% boulder 30% cobble 5% gravel 5% sand
Substrate Size (cm)	Average	7.6	7.4	7.5	7.6	6.2	7.6	7.7	7.2	9.4	7.7
Aquatic Vegetation (% areal coverage)	Periphyton Description	None observed	Sparse coverage (25-50%)	None observed	Sparse coverage (25-50%)	None observed	None observed	None observed	Sparse coverage (25-50%)	None observed	Sparse coverage (25-50%)
	Macrophyte Coverage	None observed	None observed	None observed	None observed	None observed	None observed	None observed	None observed	None observed	None observed

Notes: "-" = not measured.
Substrate particle size diameters: sand = < 2 mm, gravel = 2 - 64 mm, cobble = 64 - 256 mm, boulder = 256 - 4000 mm, bedrock = > 4000 mm.

Table I.8: Habitat Features Summary and Statistical Comparison Results between Mary River Tributary-F Benthic Invertebrate Community Effluent-Exposed (MRTF-EXP) and Reference (MRTF-REF) Study Areas, Mary River Project, Third EEM Study, August 2023

Channel Feature	Two-Area Comparison			Study Area	n	Mean	SD	SE	Median	Minimum	Maximum
	Significant difference between areas?[a]	p-value	Statistical Test								
Wetted Width (m)	No	0.116	tequal	MRTF-REF	4	14.7	2.87	1.43	14.4	12.2	17.7
				MRTF-EXP	5	10.5	3.36	1.50	10.2	5.63	13.9
Bankfull Width (m)	No	0.596	tequal	MRTF-REF	4	18.9	6.15	3.07	17.2	13.4	27.5
				MRTF-EXP	5	21.0	5.22	2.33	23.2	13.0	25.8
Max Water Depth (cm)	No	0.221	tequal	MRTF-REF	5	27.4	5.59	2.50	27.0	20.0	35.0
				MRTF-EXP	5	31.5	4.39	1.96	30.0	26.0	37.5
Substrate Size (cm)	No	0.203	tequal	MRTF-REF	5	7.27	0.618	0.277	7.54	6.18	7.62
				MRTF-EXP	5	7.92	0.847	0.379	7.68	7.18	9.39

Notes: n = sample size; SD = standard deviation; SE = standard error.

[a] Indicates a significant difference between study areas based on ANOVA p-value less than 0.1.

Table I.9: Benthic Invertebrate Community Primary EEM Endpoint Statistical Comparisons Between Mary River Tributary-F Effluent-Exposed (MRTF-EXP) and Reference (MRTF-REF) Areas, Mary River Project, Third EEM Study, August 2023

Endpoint	Data Transformation	Test	Test P-value	MCT[a]		MOD
				MRTF-REF	MRTF-EXP	
Density (No./m²)	log10	tunequal	0.940	480	492	ns
FL Richness (No. of Taxa)	rank	M-W	1.000	5.00	5.00	ns
FL Simpson's Evenness	rank	M-W	0.690	0.405	0.435	ns
FL Bray-Curtis Index	ln(x+1)	Mantel	0.697	-	-	-
	ln(x+1)	dbRDA	0.808	-	-	-

P-value < 0.1.
P-value < 0.1 and MOD < -2.
P-value < 0.1 and MOD > 2.

Notes: "-" indicates not applicable; No. = number; FL = family level; ns = not significant; MOD = Magnitude of Difference = (MCT_{Exp} - MCT_{Ref})/SD_{Ref}).

[a] MCT = Measure of Central Tendency; MCT reported as median for rank-transformed data and as back-transformed mean for all other cases.

Table I.10: Statistical Comparison of Bray-Curtis Index Between Mary River Tributary-F Effluent-Exposed (MRTF-EXP) and Reference (MRTF-REF) Benthic Invertebrate Community Study Areas at Family-Level and Lowest-Practical-Level Taxonomy, Mary River Project, Third EEM Study, August 2023

Taxonomic Resolution	Comparison	n		Betadisper P-Value	Mantel Test			dbRDA			
		MRTF-REF	MRTF-EXP		r	R^2	P-Value	F-Value	R^2	R^2_{adj}	P-Value
Family	MRTF-REF vs. MRTF-EXP	5	5	0.109	-0.0495	0.00245	0.697	0.502	0.0590	-0.0586	0.808
Lowest-Practical-Level	MRTF-REF vs. MRTF-EXP	5	5	0.508	-0.0507	0.00257	0.629	0.789	0.0898	-0.0240	0.599

Indicates significant difference between areas using a p-value of 0.1.

Notes: n = sample size; dbRDA = distance based Redundancy Analysis.

Table I.11: Replicate Habitat Measurements at Mary River Tributary-F Benthic Invertebrate Community Study Stations, Mary River Project, Third EEM Study, August 2023

Study Area	Station	Water Depth (cm)			Water Velocity (m/s)			Embeddedness (%)		
		Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3	Replicate Grab 1	Replicate Grab 2	Replicate Grab 3
Mary River Tributary-F Reference	MRTF-REF1	25	21	19	0.50	0.39	0.49	75%	50%	75%
	MRTF-REF2	24	17	15	0.45	0.40	0.47	50%	25%	25%
	MRTF-REF3	19	18	20	0.40	0.46	0.36	50%	50%	50%
	MRTF-REF4	16	24	16	0.35	0.33	0.34	0%	100%	50%
	MRTF-REF5	17	17	15	0.50	0.31	0.38	50%	50%	50%
Mary River Tributary-F Effluent-Exposed	MRTF-EXP1	22	22	22	0.43	0.45	0.41	50%	50%	50%
	MRTF-EXP2	21	20	18	0.44	0.49	0.36	25%	50%	50%
	MRTF-EXP3	16	19	16	0.31	0.37	0.36	25%	25%	50%
	MRTF-EXP4	17	17	16	0.46	0.49	0.45	50%	50%	75%
	MRTF-EXP5	20	23.5	21	0.40	0.28	0.34	0%	50%	25%

Table I.12: Habitat Characteristic Summary and Statistical Comparison Results Between Mary River Tributary-F Effluent-Exposed (MRTF-EXP) and Reference (MRTF-REF) Benthic Invertebrate Community Study Areas, Mary River Project, Third EEM Study, August 2023

Replicate Feature	Two-Area Comparison				Study Area	n	Mean	SD	SE	Median	Minimum	Maximum
	Data Transformation	Test	Test P-value	MOD (%)								
Embeddedness (%)	log10	tequal	0.310	ns	MRTF-REF	5	50	11.8	5.27	50	33.3	66.7
					MRTF-EXP	5	41.7	13.2	5.89	41.7	25	58.3
Water Depth (cm)	none	tequal	0.729	ns	MRTF-REF	5	18.9	1.89	0.847	18.7	16.3	21.7
					MRTF-EXP	5	19.4	2.47	1.11	19.7	16.7	22.0
Water Velocity (m/s)	none	tequal	0.858	ns	MRTF-REF	5	0.409	0.0460	0.0206	0.407	0.340	0.460
					MRTF-EXP	5	0.403	0.0562	0.0252	0.430	0.340	0.467

P-value < 0.1.

Notes: ns = not significant; MOD = Magnitude of Difference = (MCTRef - MCTExp)/SDRef; n = sample size; SD = standard deviation; SE = standard error of the mean.