



**Mary River Project 2024
Core Receiving Environment Monitoring
Program Report**

**Part 3 of 3
(Appendices F to I)**

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Georgetown, Ontario

March 2025

APPENDIX F
BENTHIC INVERTEBRATE COMMUNITY DATA

APPENDIX F

FIGURES

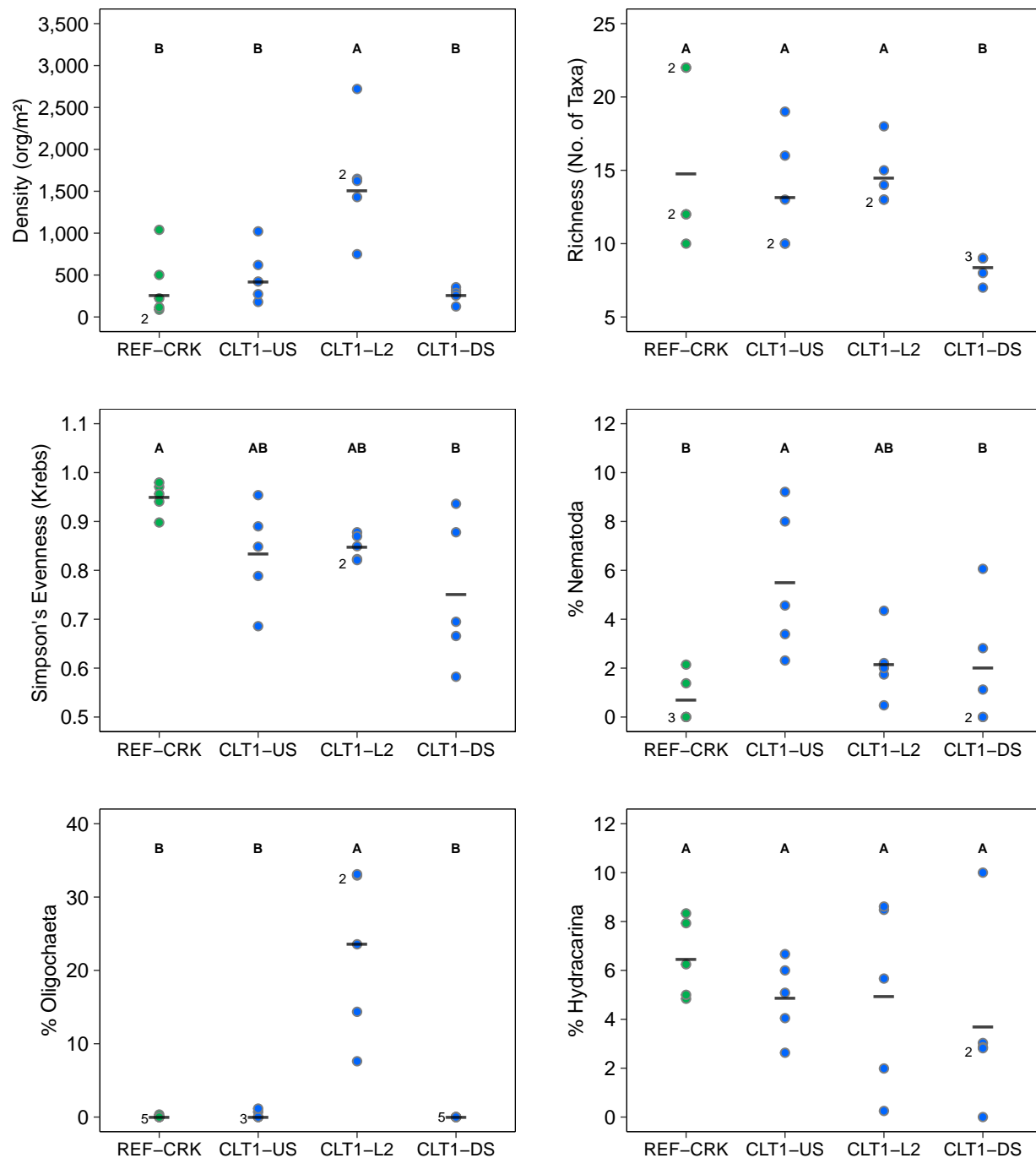


Figure F.1: Benthic Invertebrate Community Endpoints at Camp Lake Tributary 1 (CLT1; Stations CLT1-US, CLT1-L2, CLT1-DS) and Unnamed Reference Creek (REF-CRK) Areas, Mary River Project CREMP, August 2024

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.

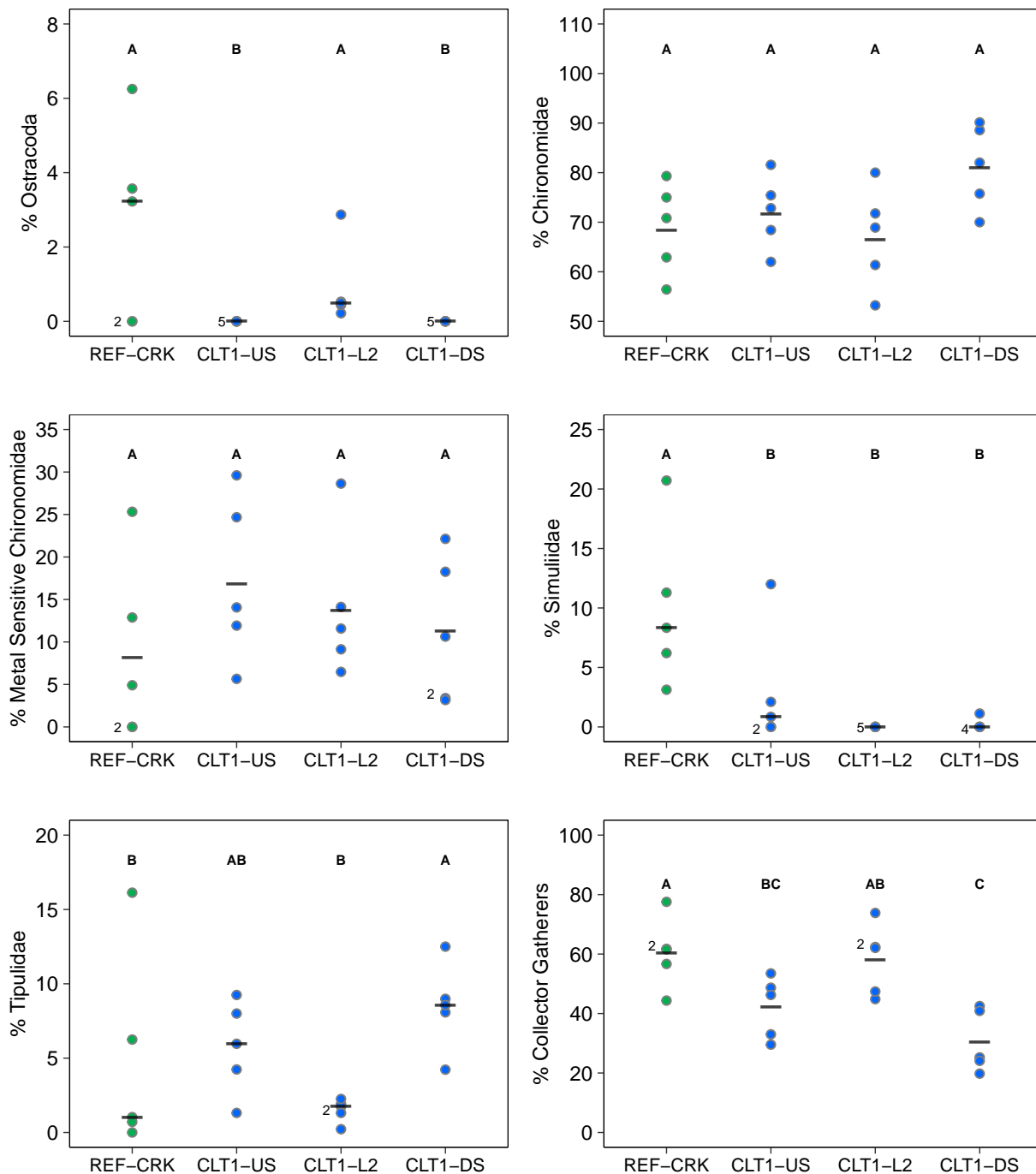


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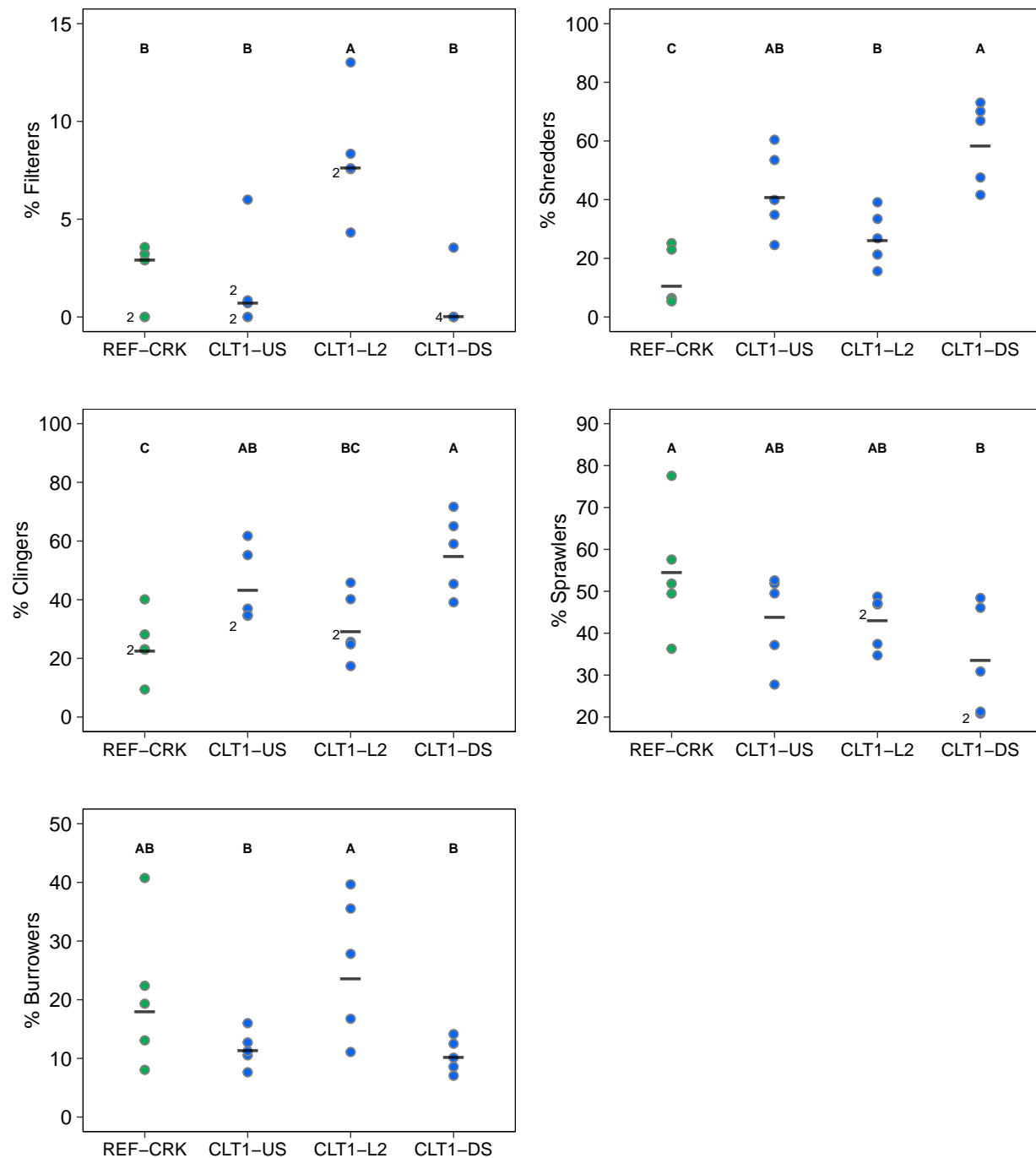


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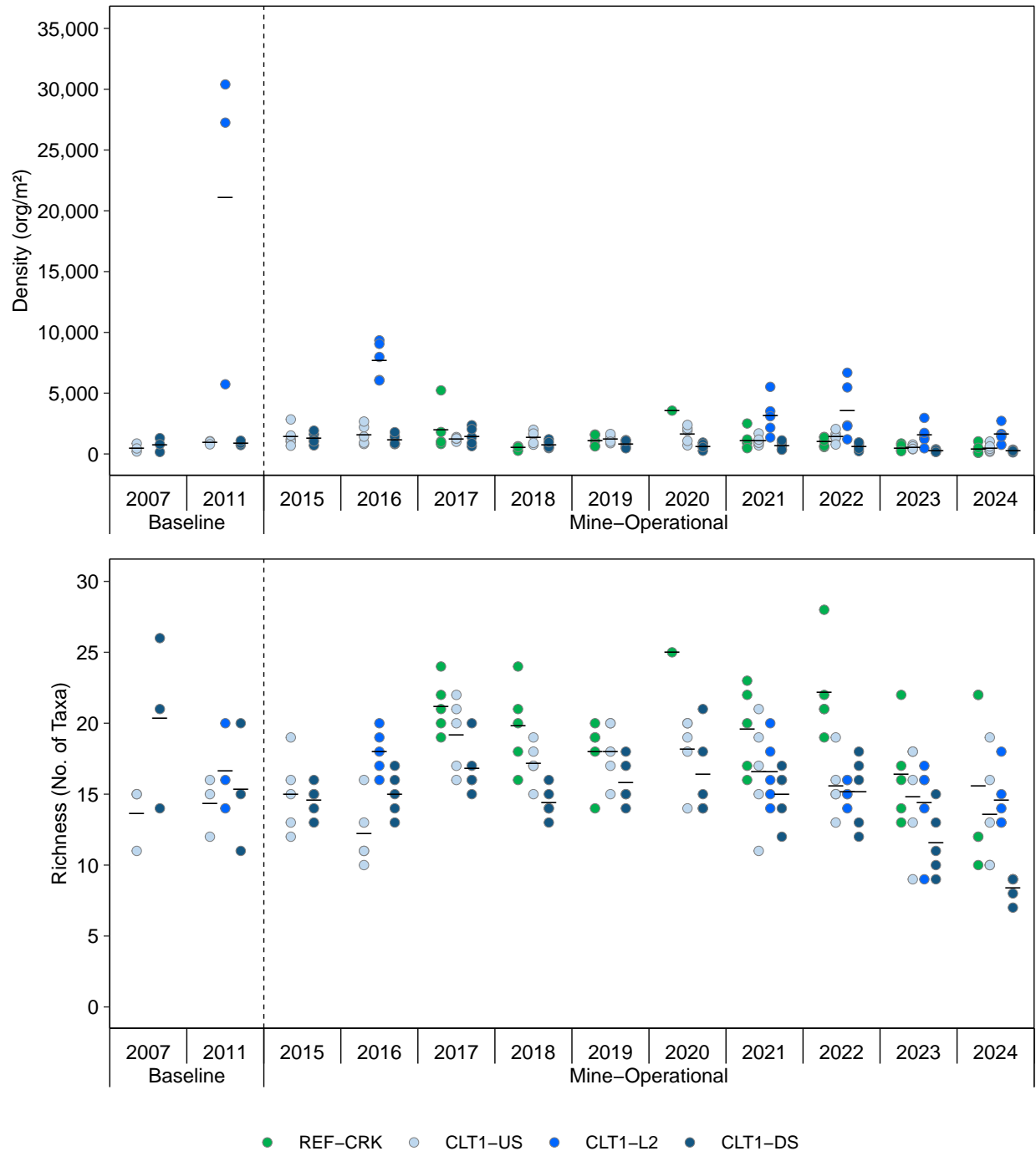


Figure F.2: Benthic Invertebrate Community Endpoints at Camp Lake Tributary 1 (CLT1; Stations CLT1-US, CLT1-L2, CLT1-DS) and Unnamed Reference Creek (REF-CRK) Areas among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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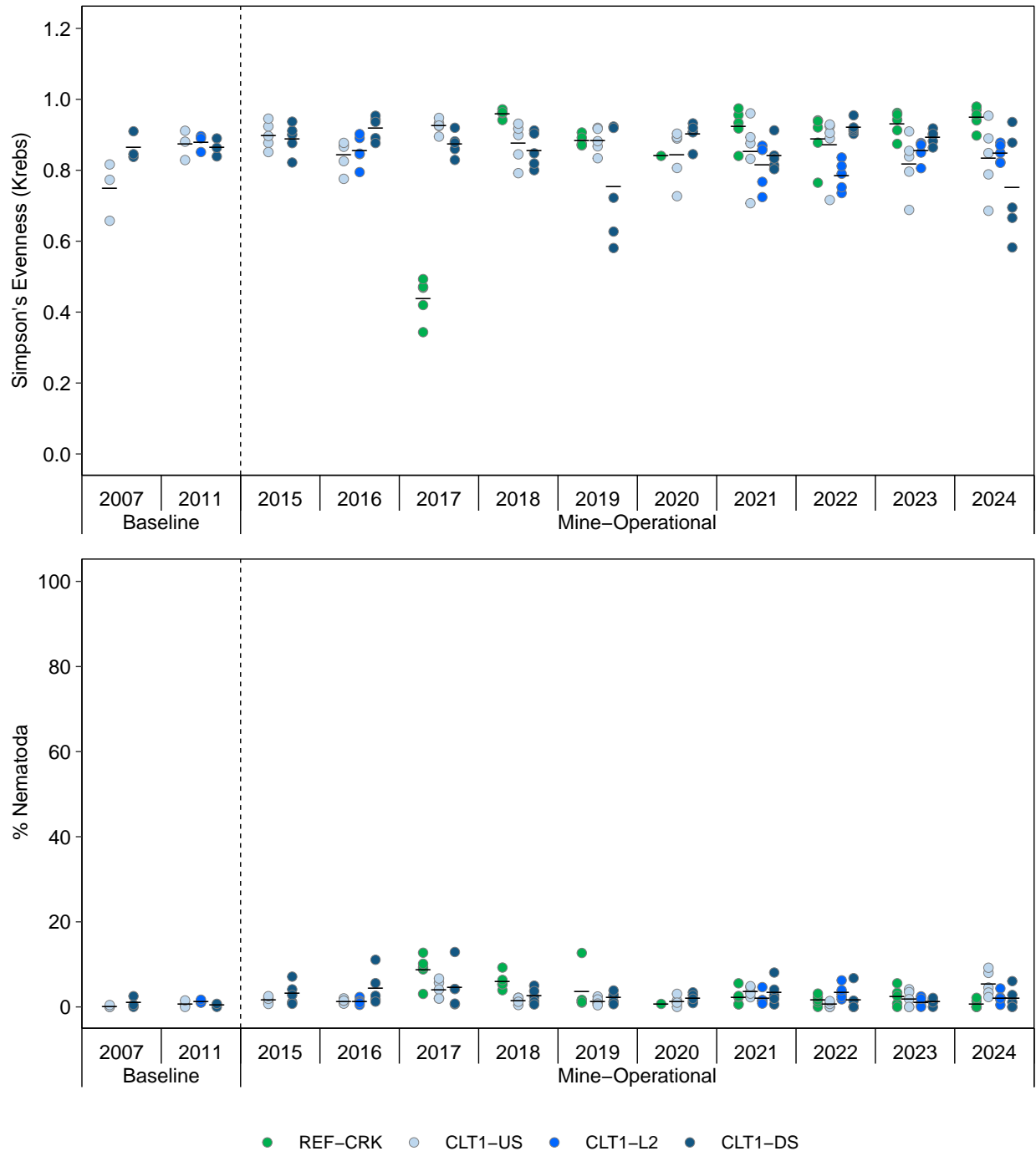


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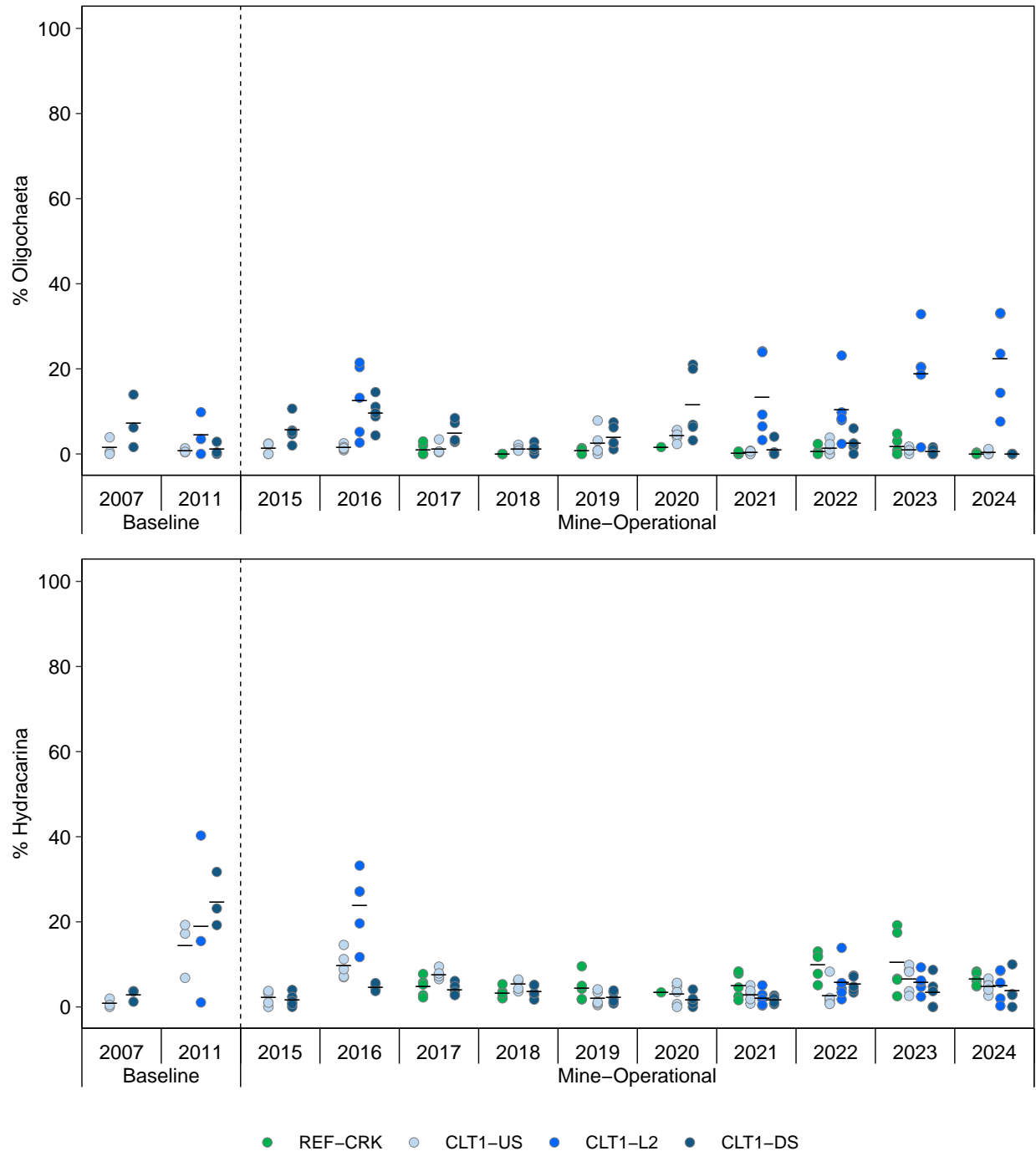


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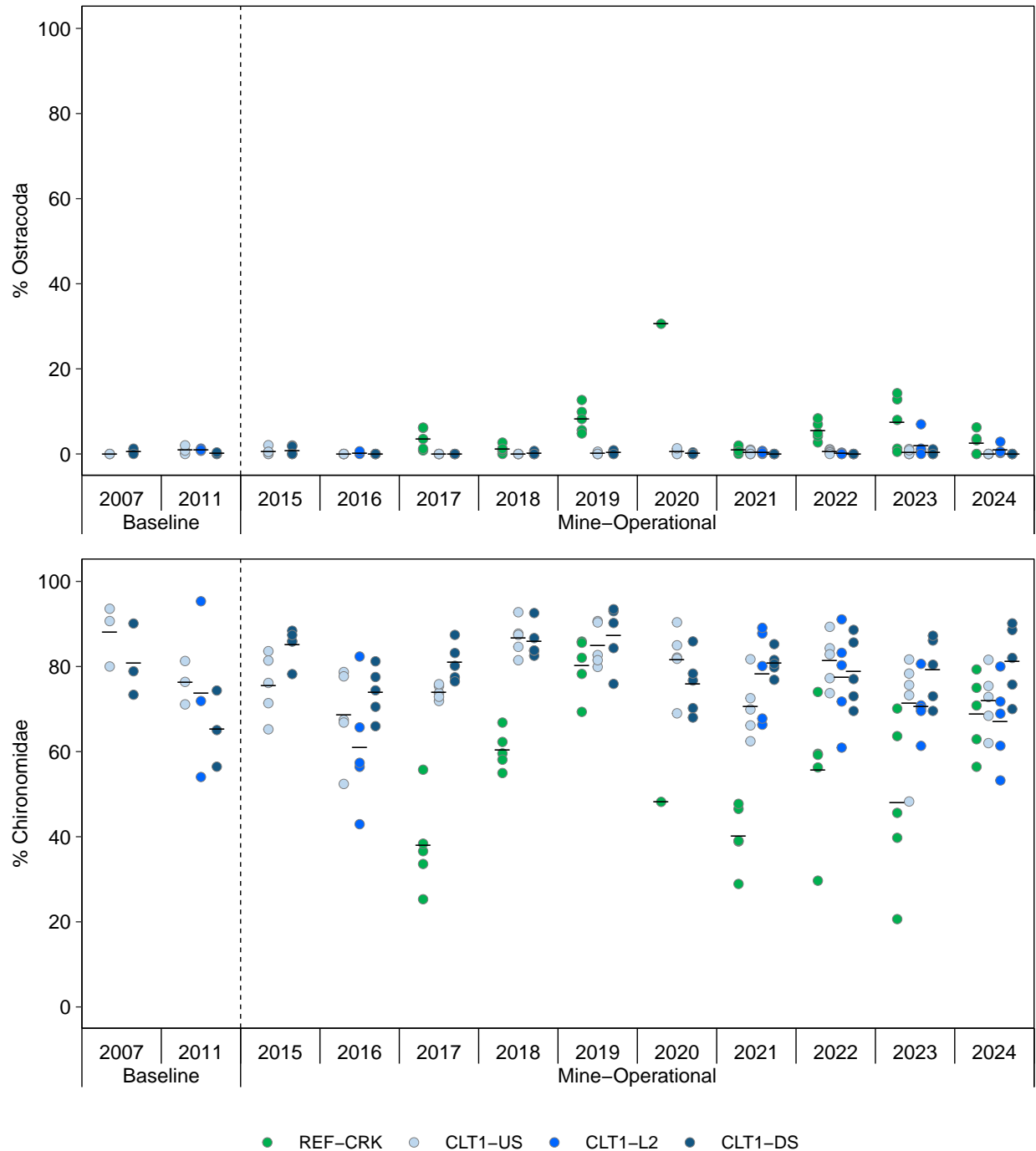


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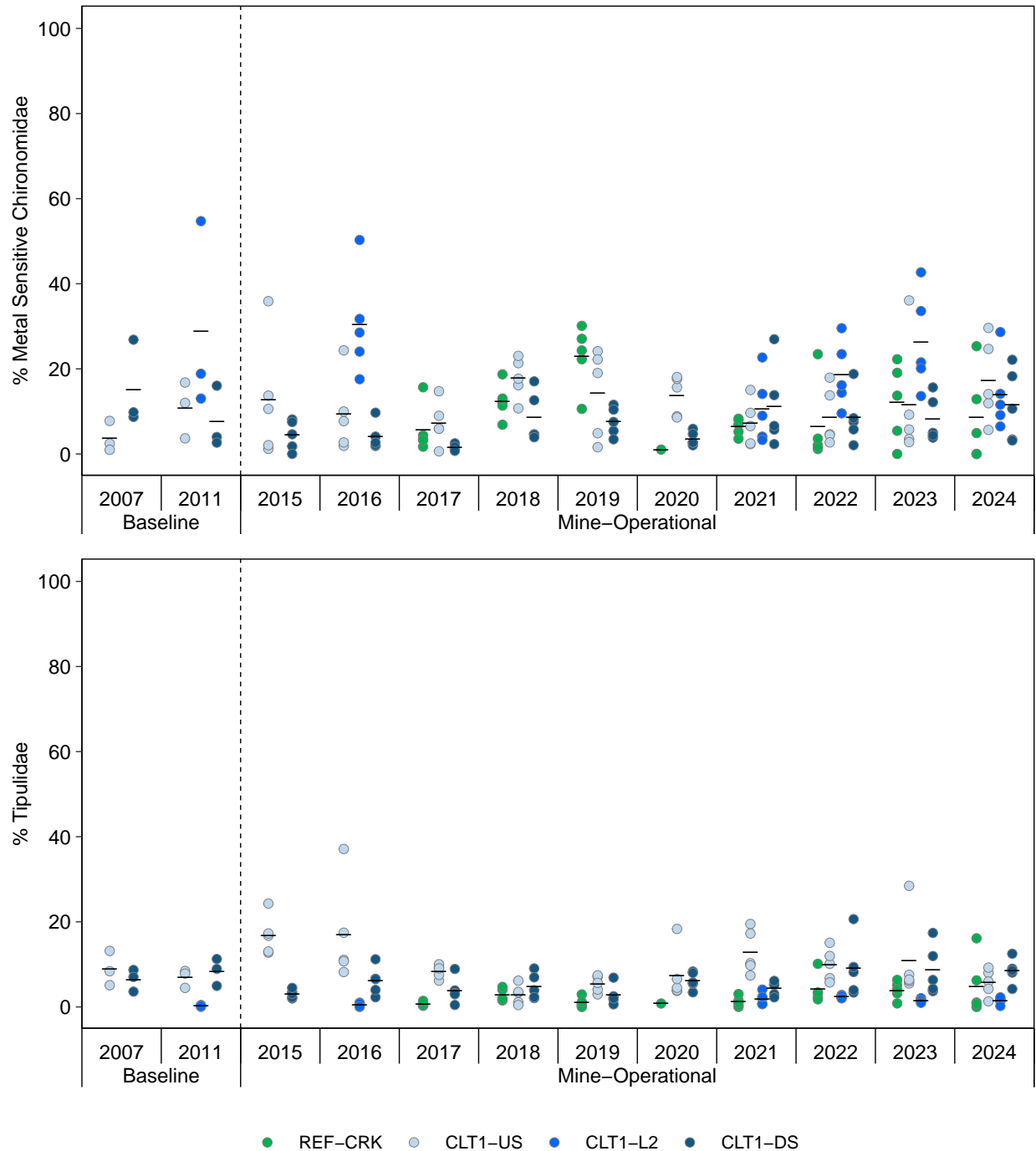


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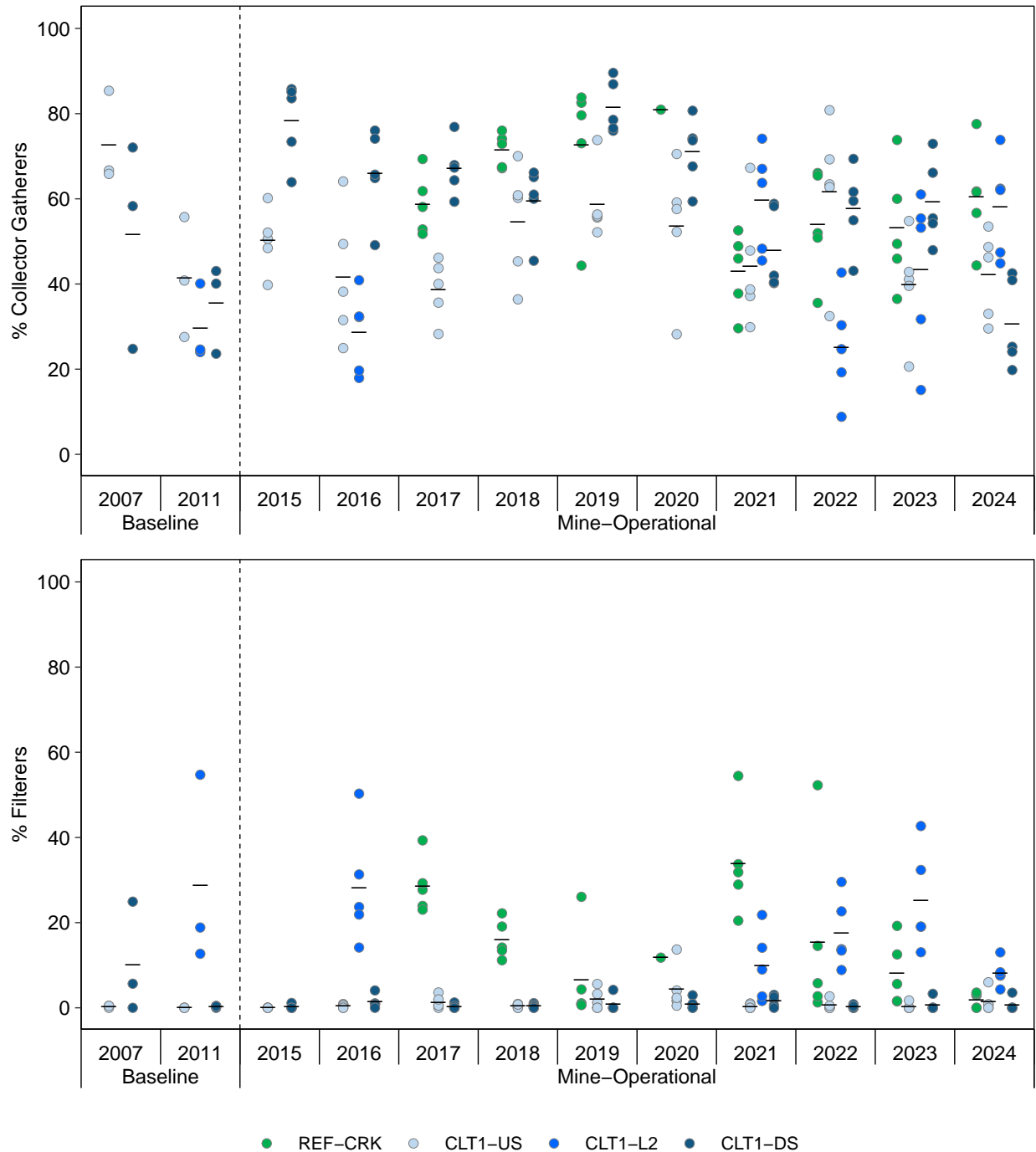


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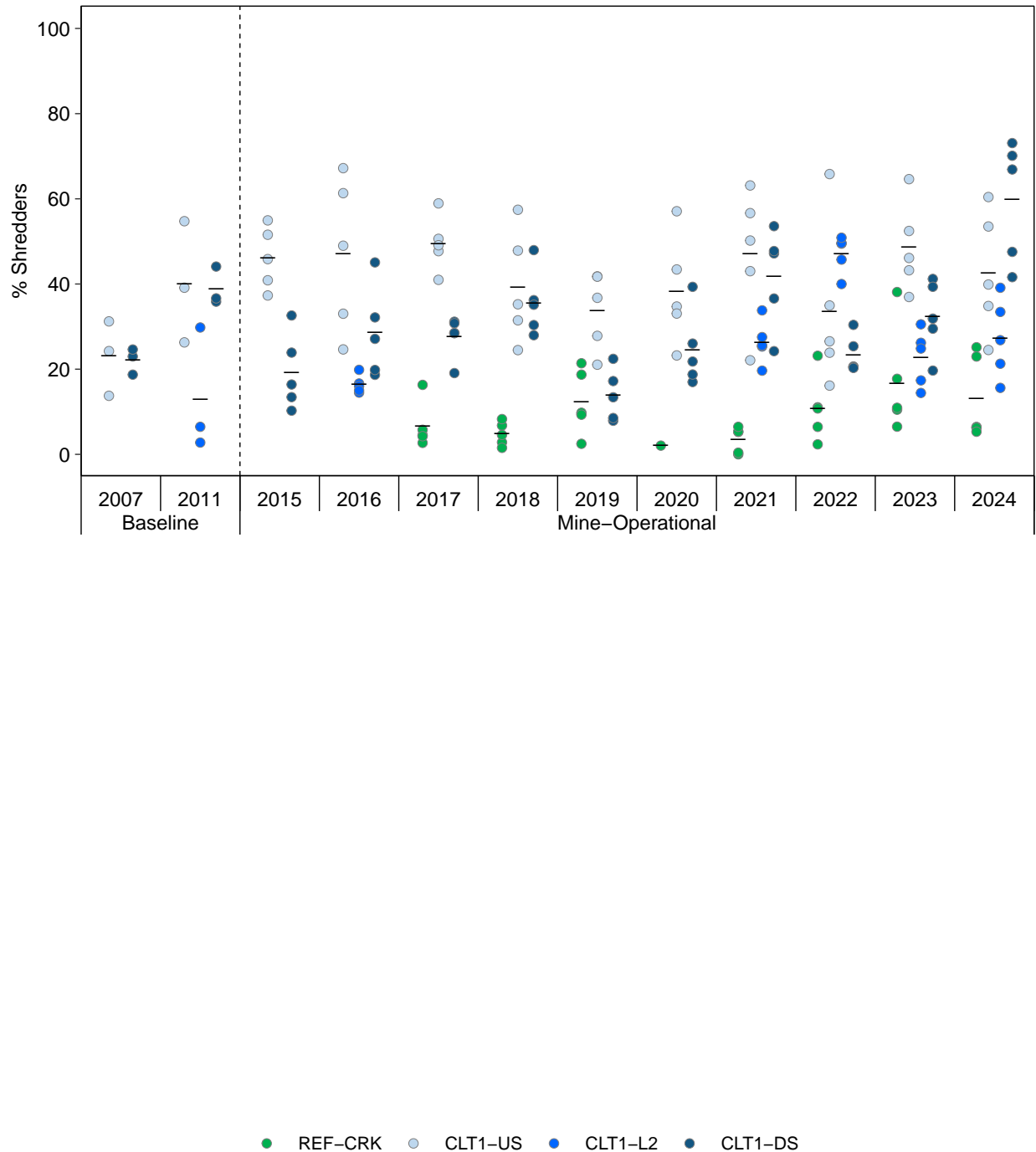


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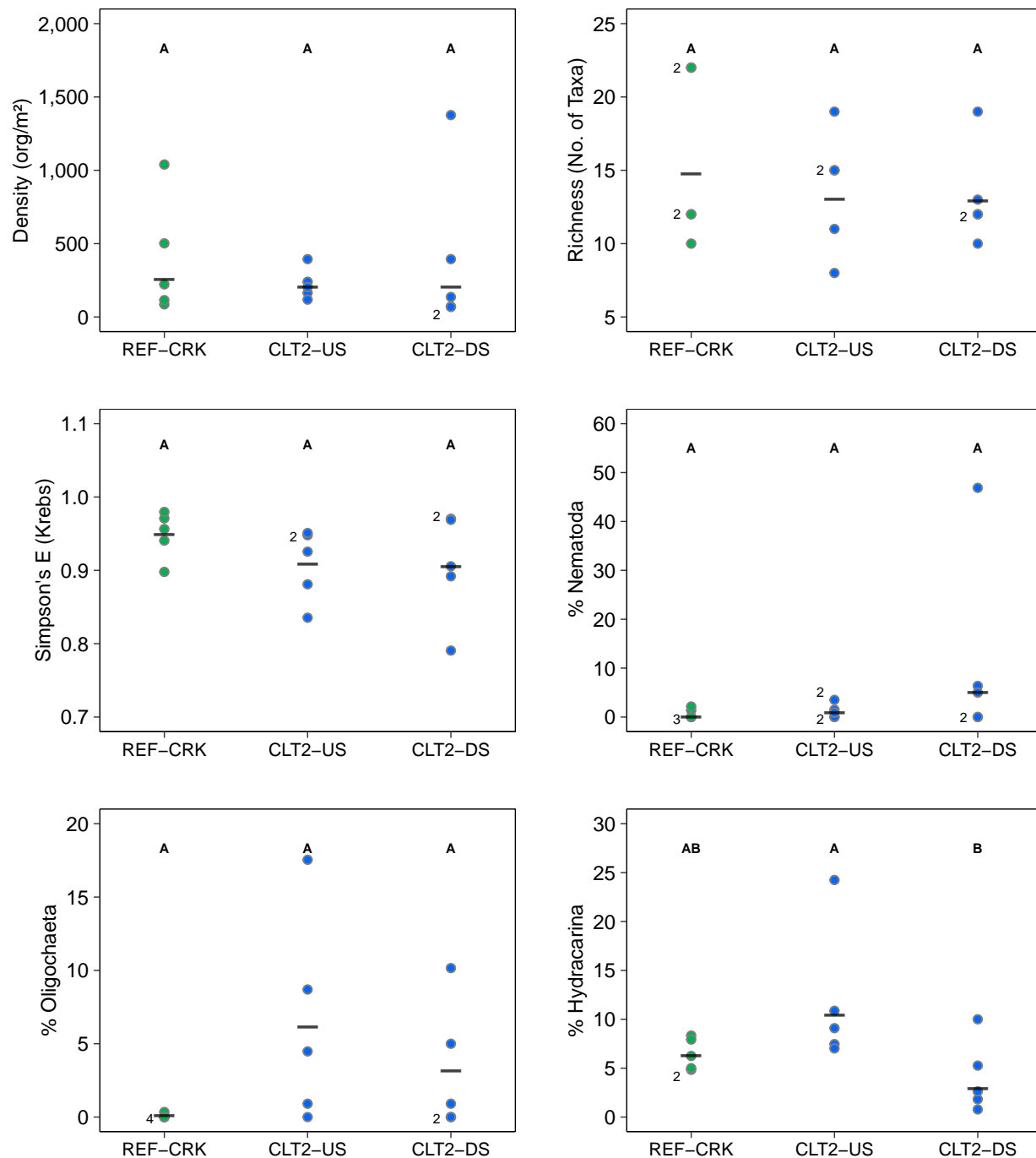


Figure F.3: Benthic Invertebrate Community Endpoints at Camp Lake Tributary 2 (CLT2; Stations CLT2-US and CLT2-DS) and Unnamed Reference Creek Areas (REF-CRK), Mary River Project CREMP, August 2024

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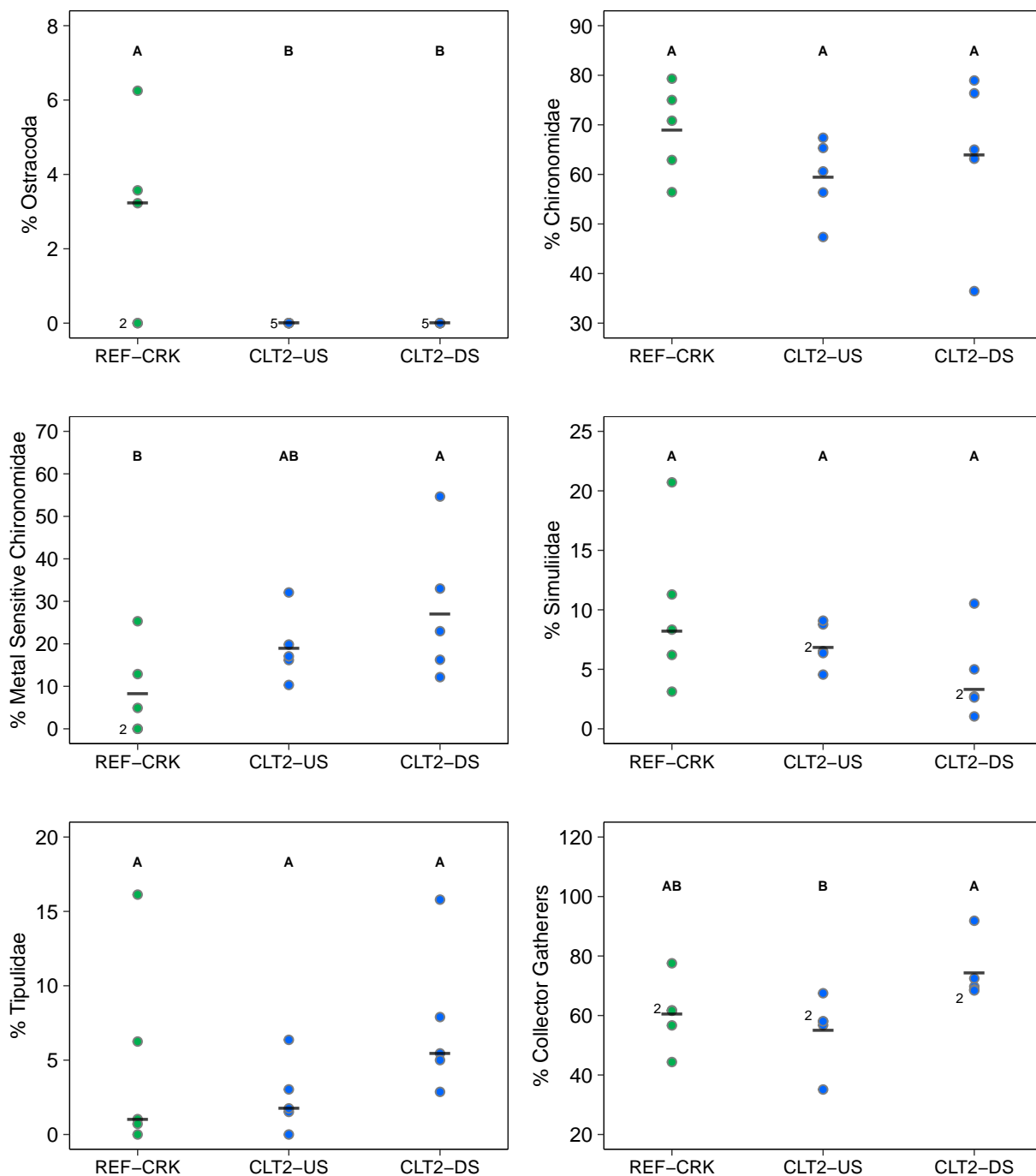


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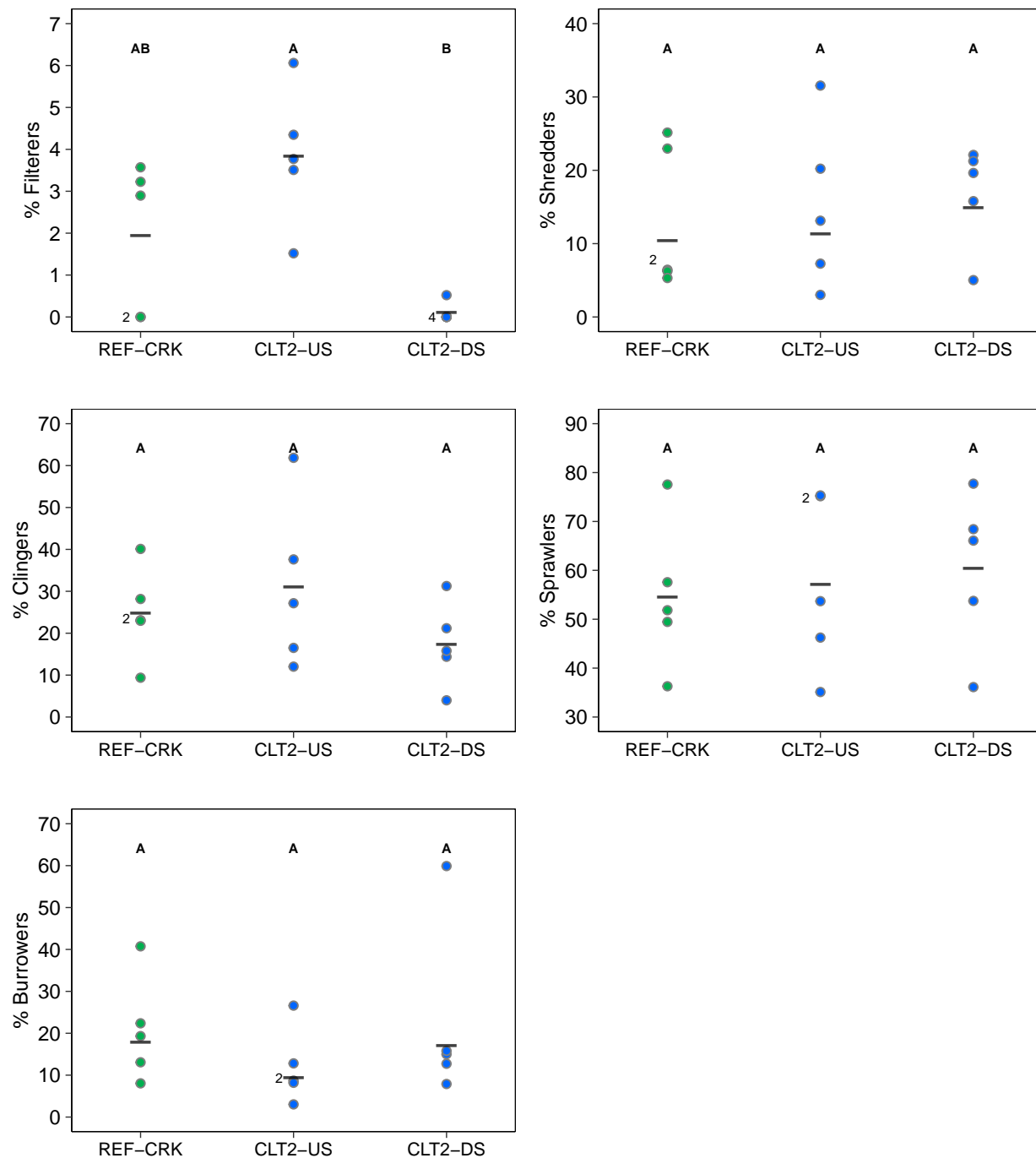


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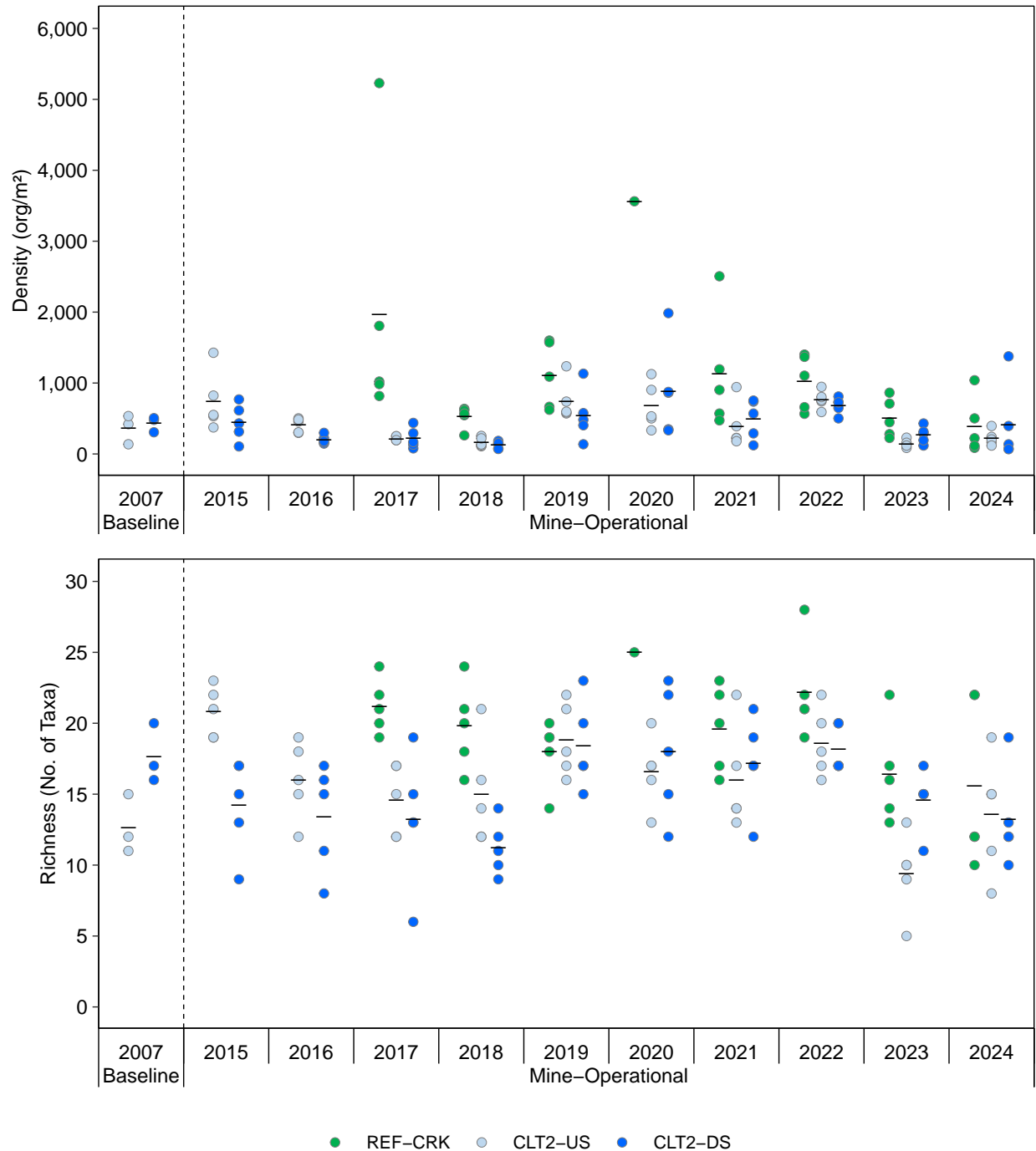


Figure F.4: Benthic Invertebrate Community Endpoints at Camp Lake Tributary 2 (CLT2; Stations CLT2-US and CLT2-DS) and Unnamed Reference Creek (REF-CRK) Areas among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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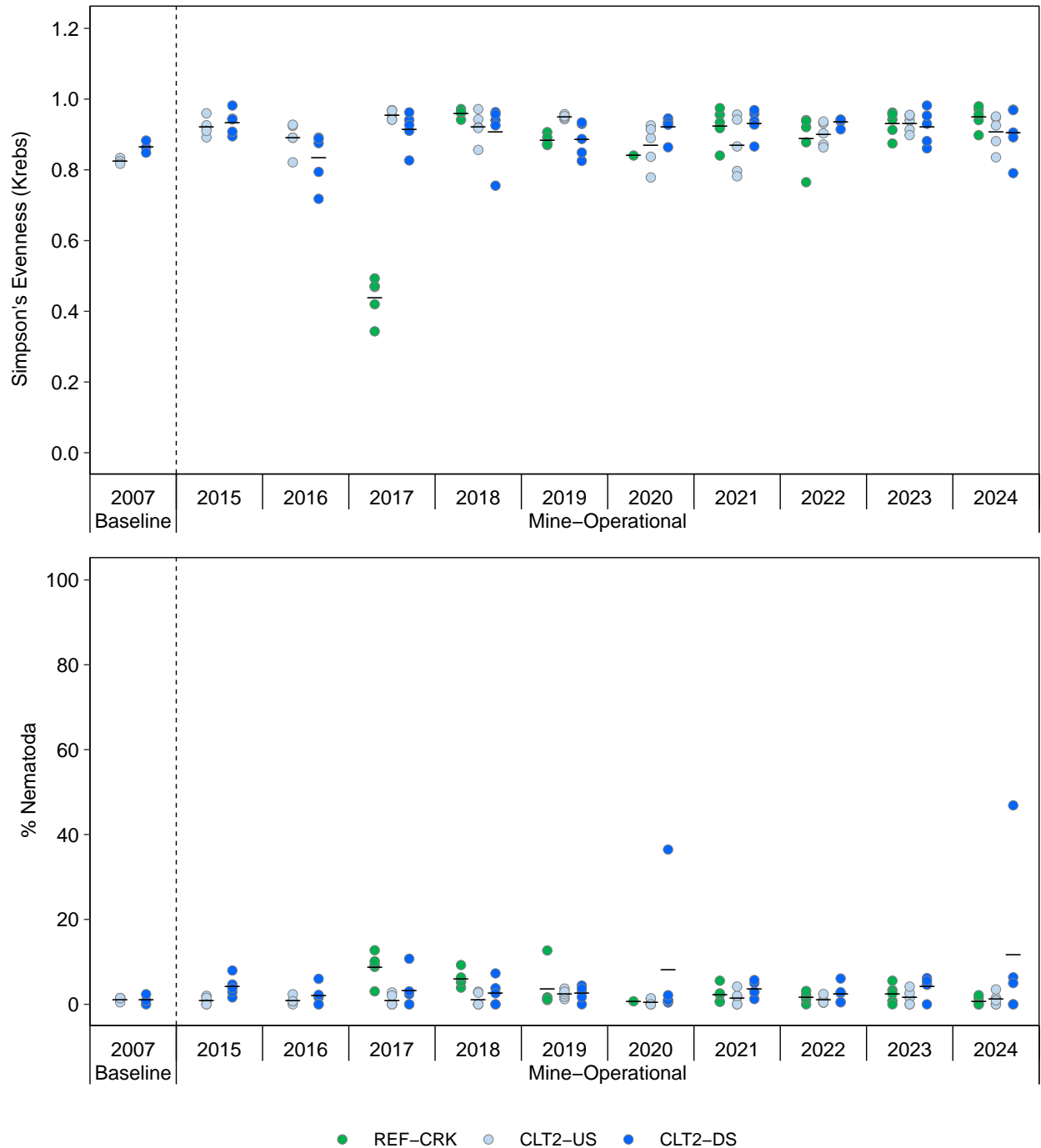


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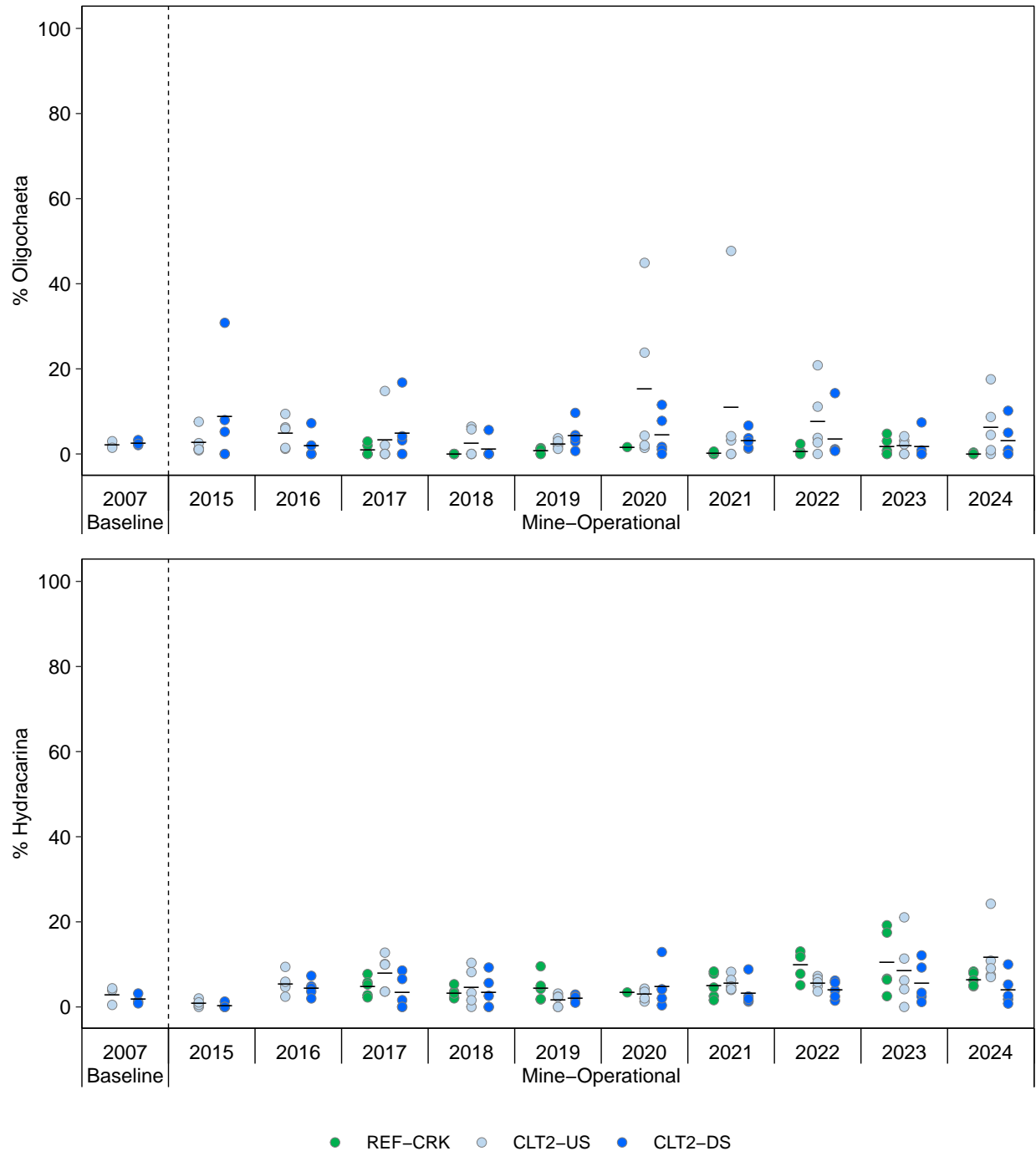


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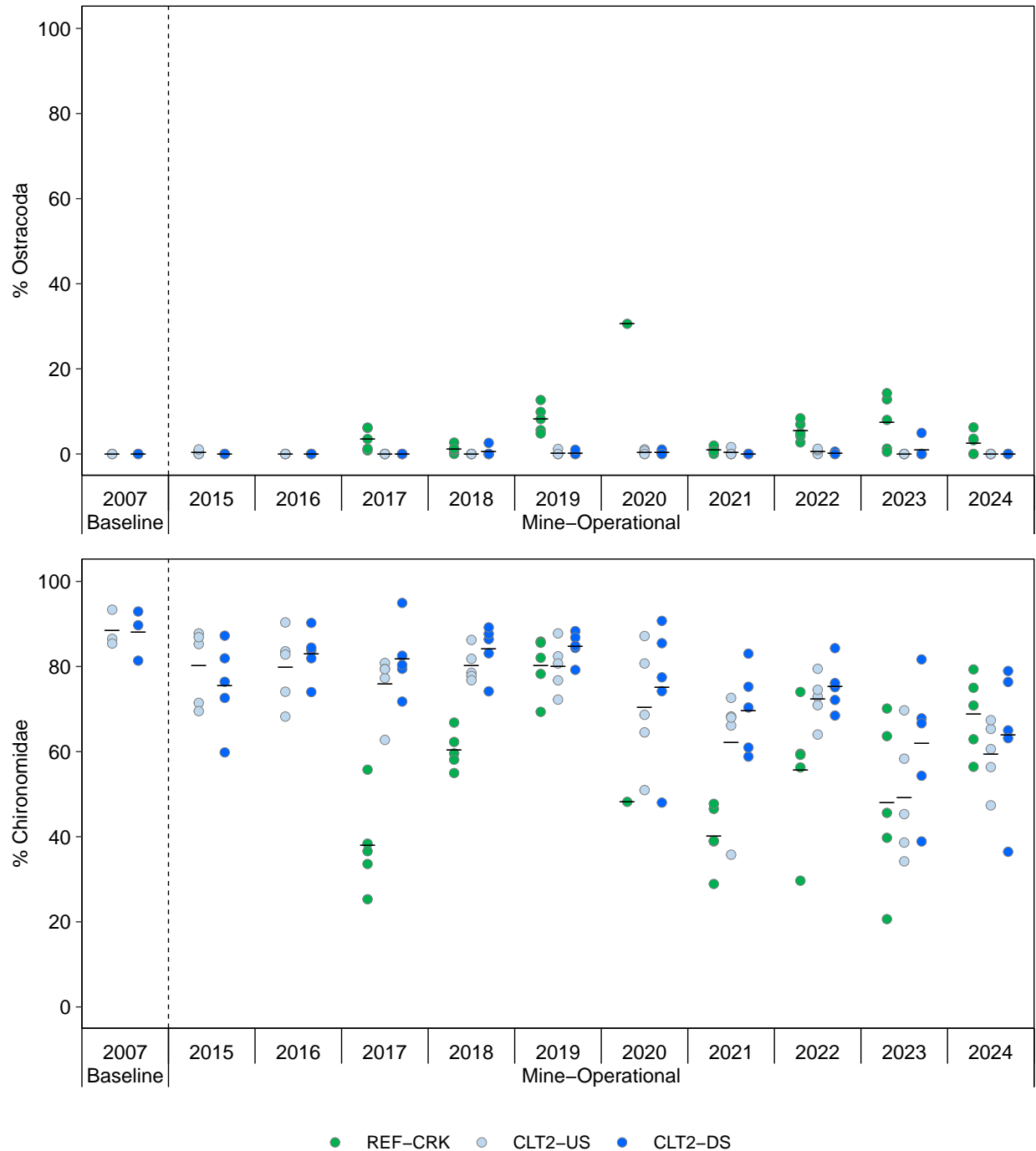


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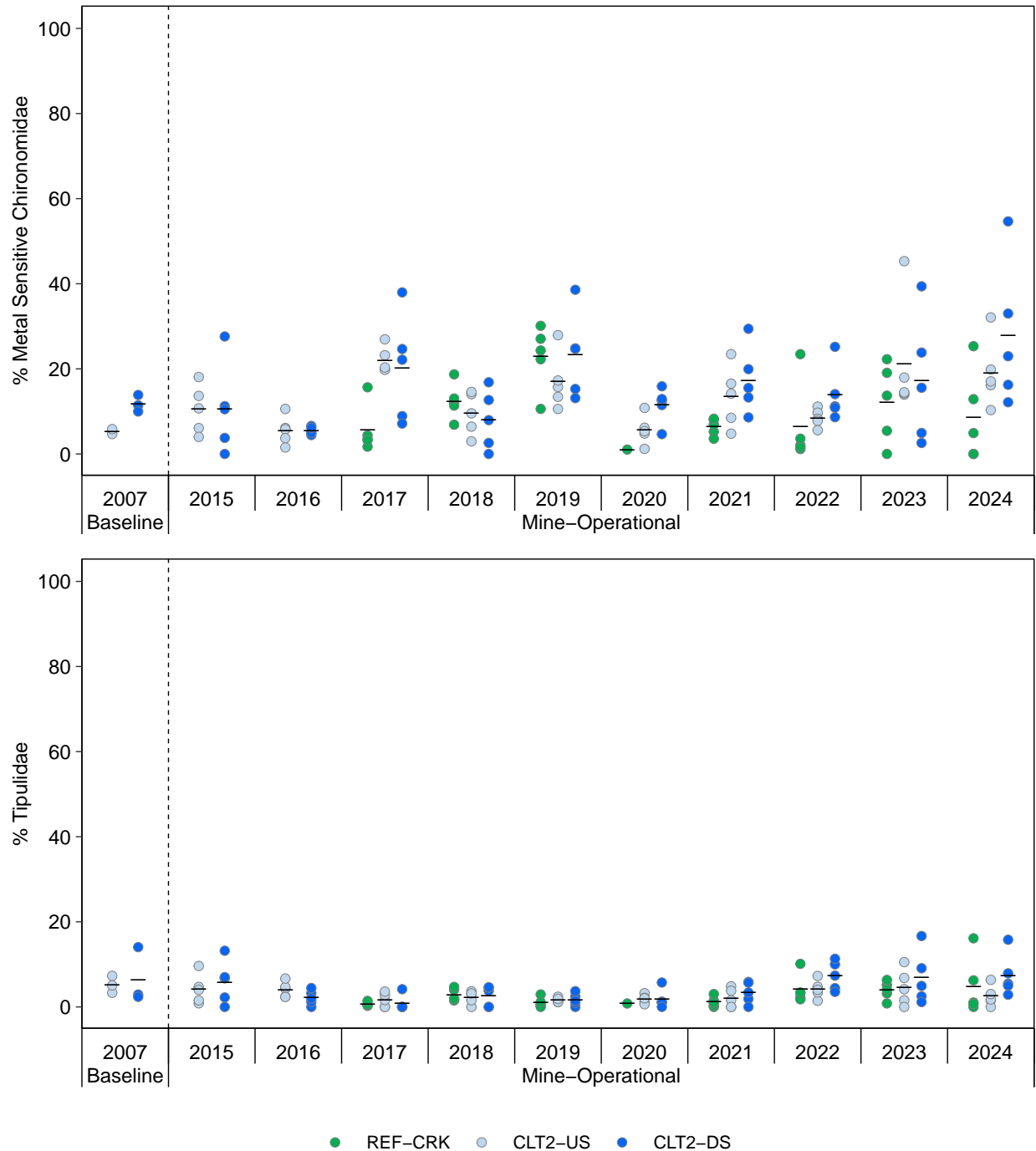


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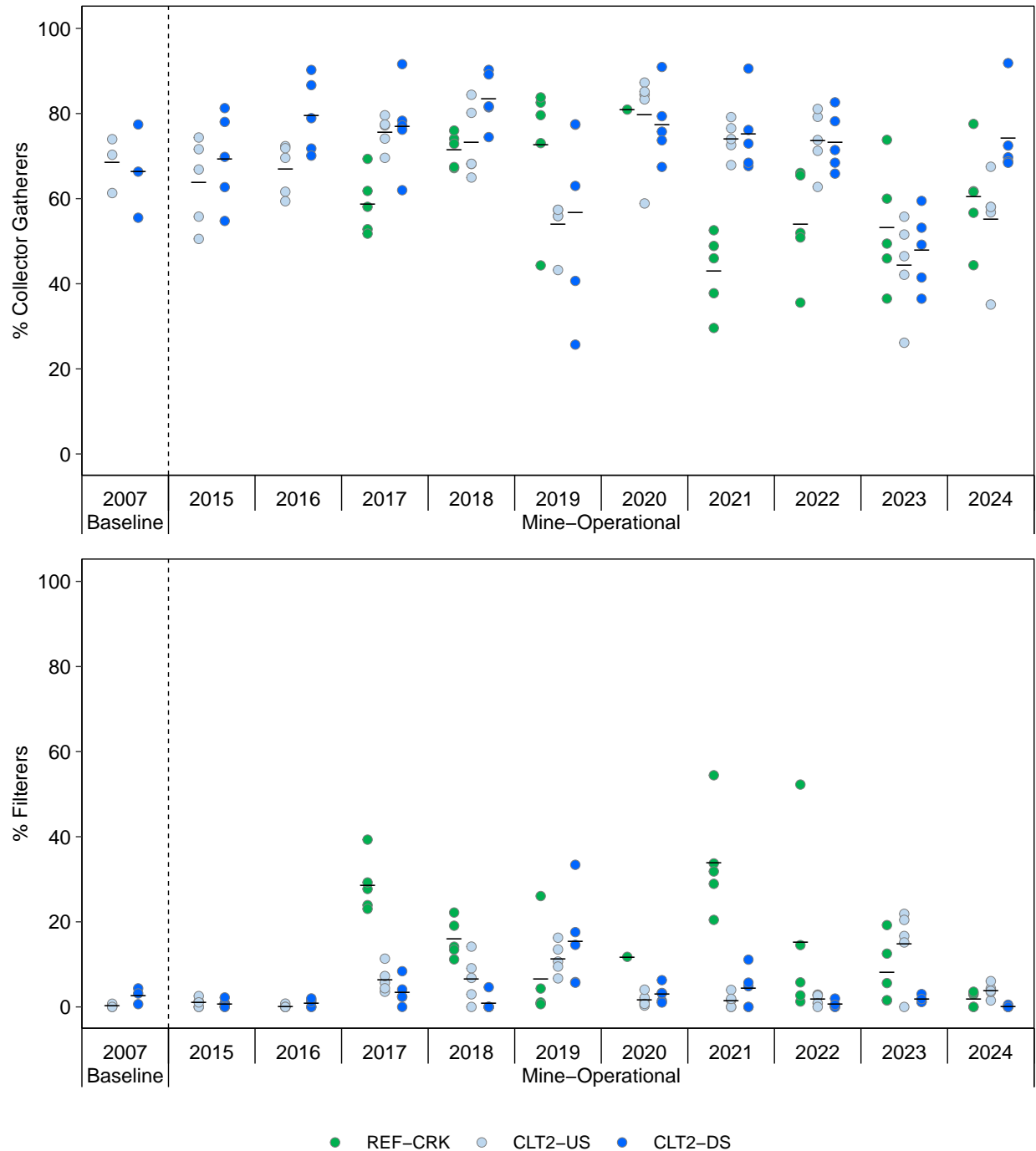


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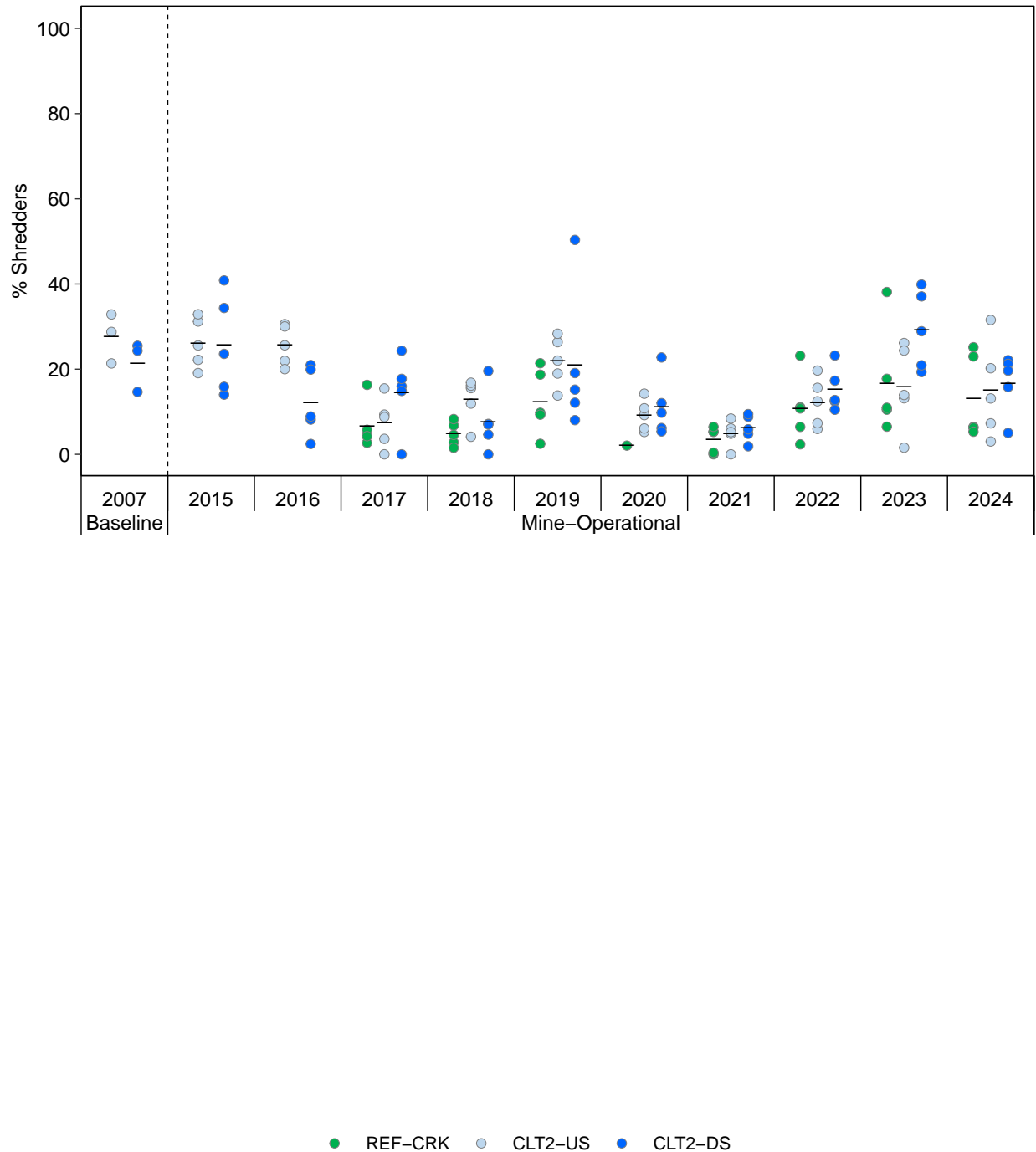


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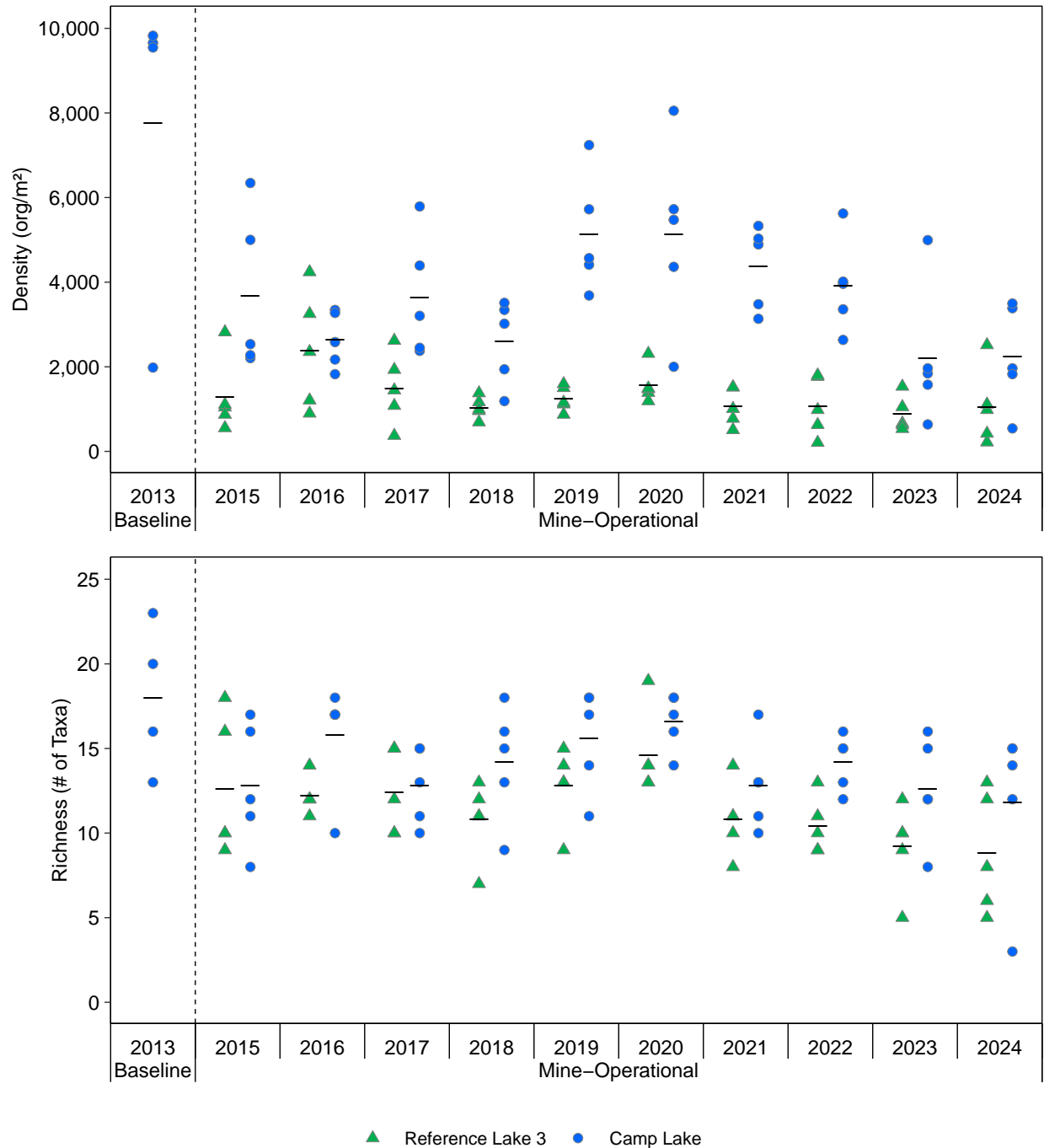


Figure F.5: Benthic Invertebrate Community Endpoints at Camp Lake (JL0) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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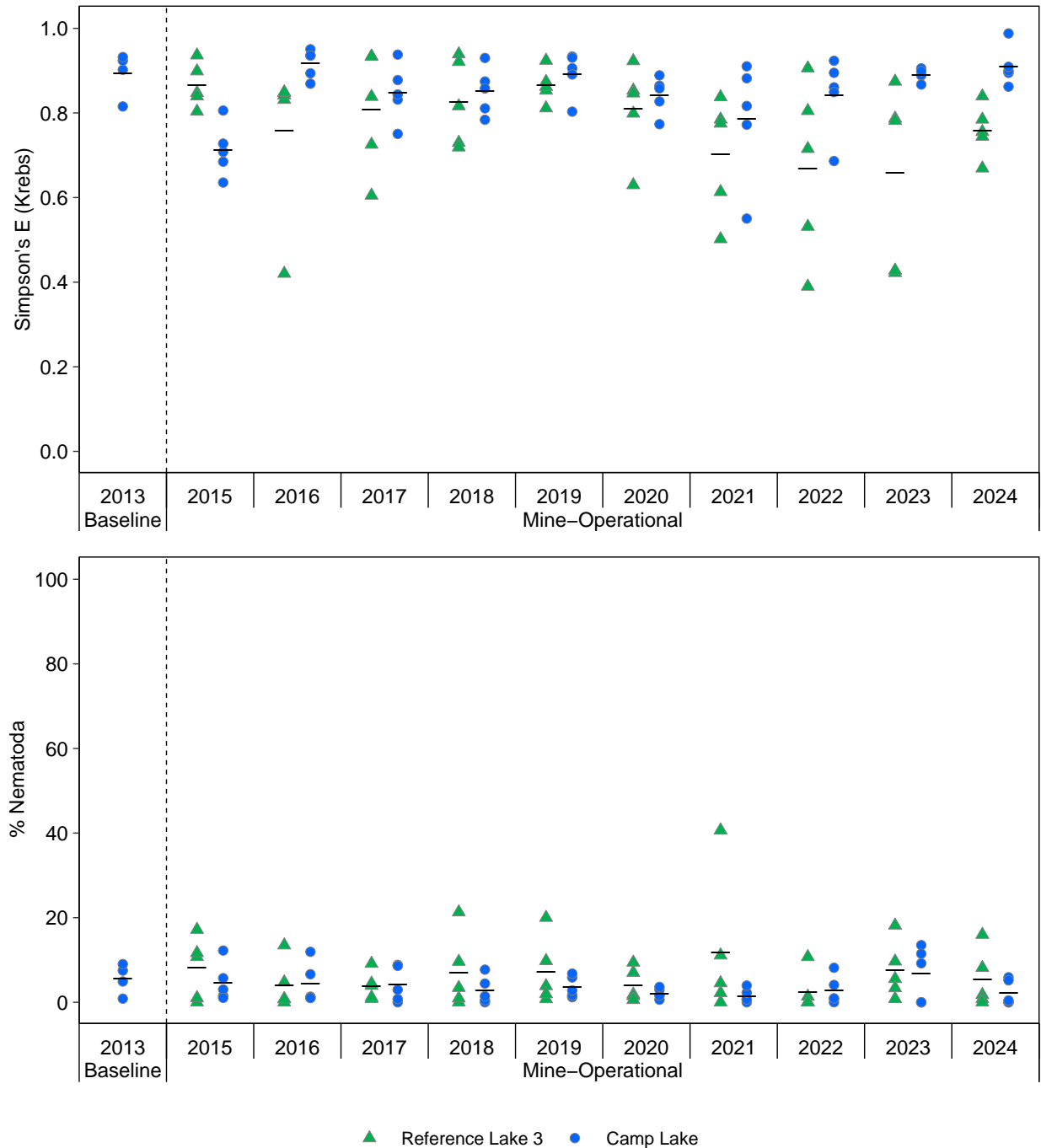


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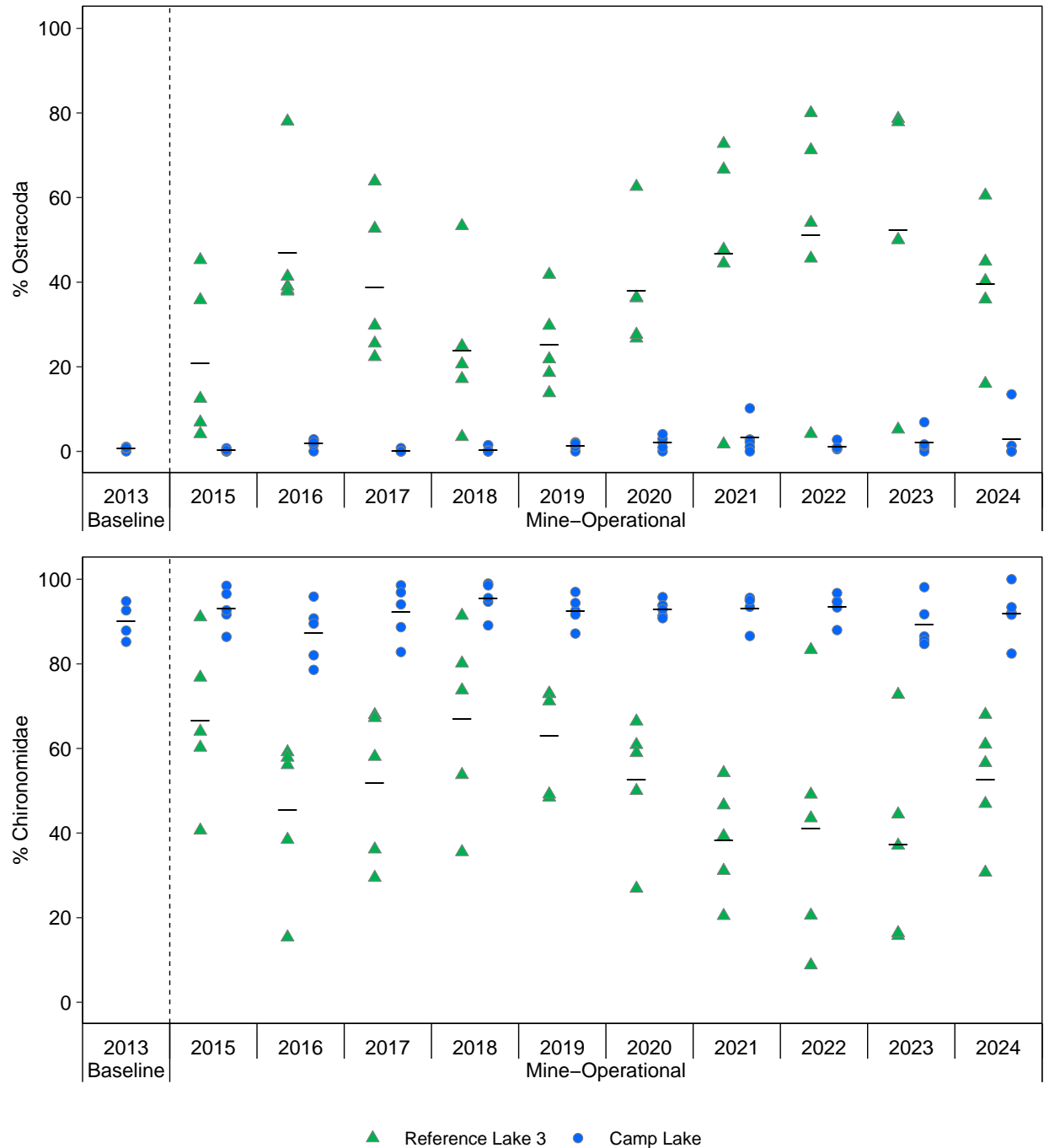


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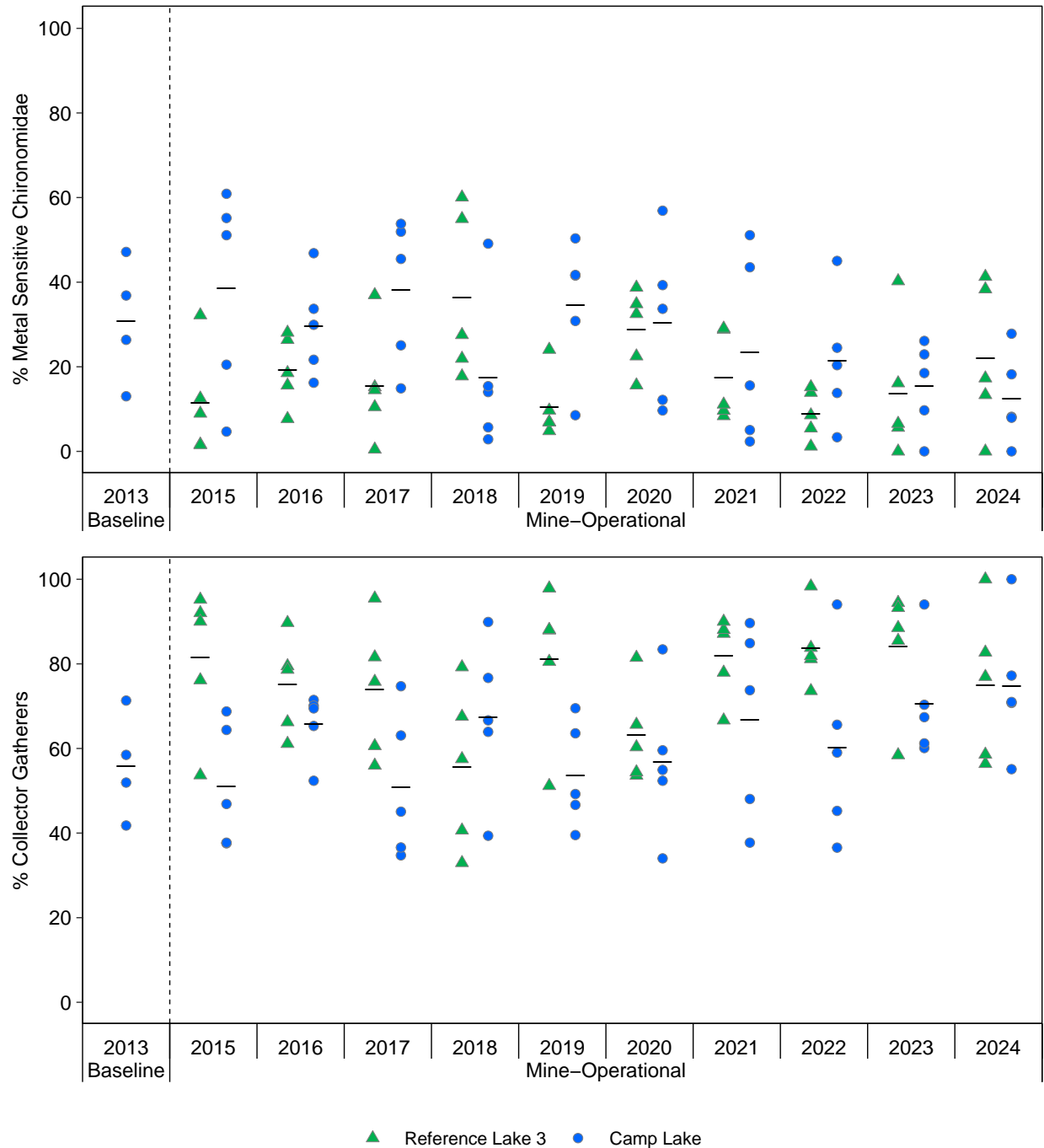
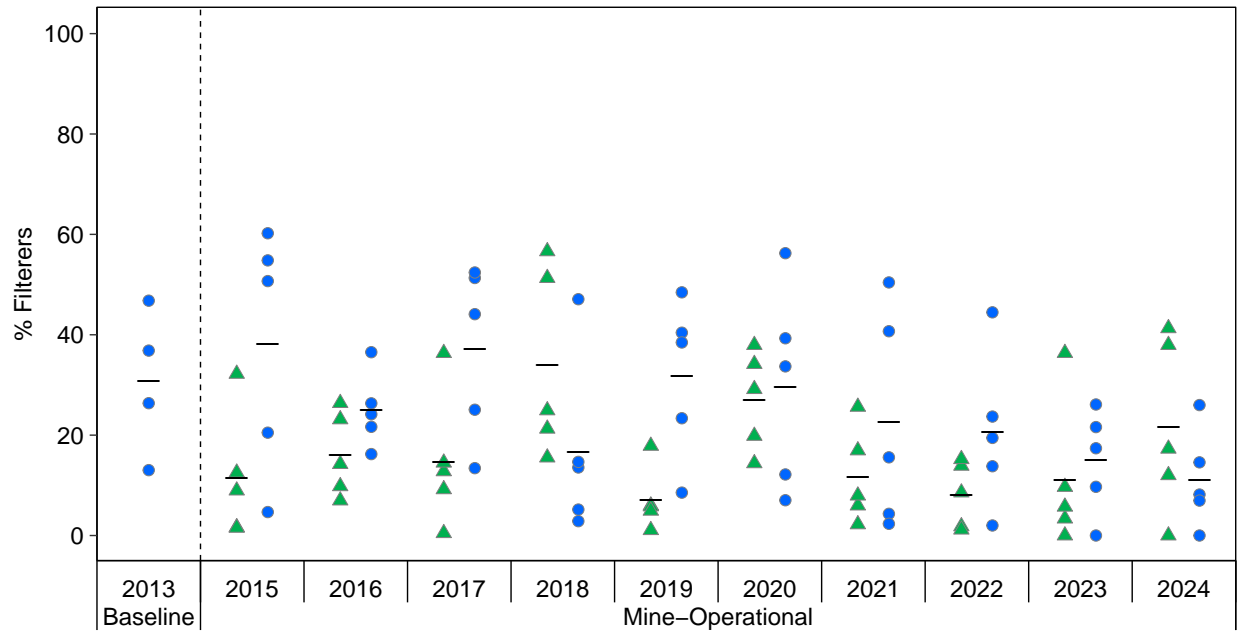


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▲ Reference Lake 3 ● Camp Lake

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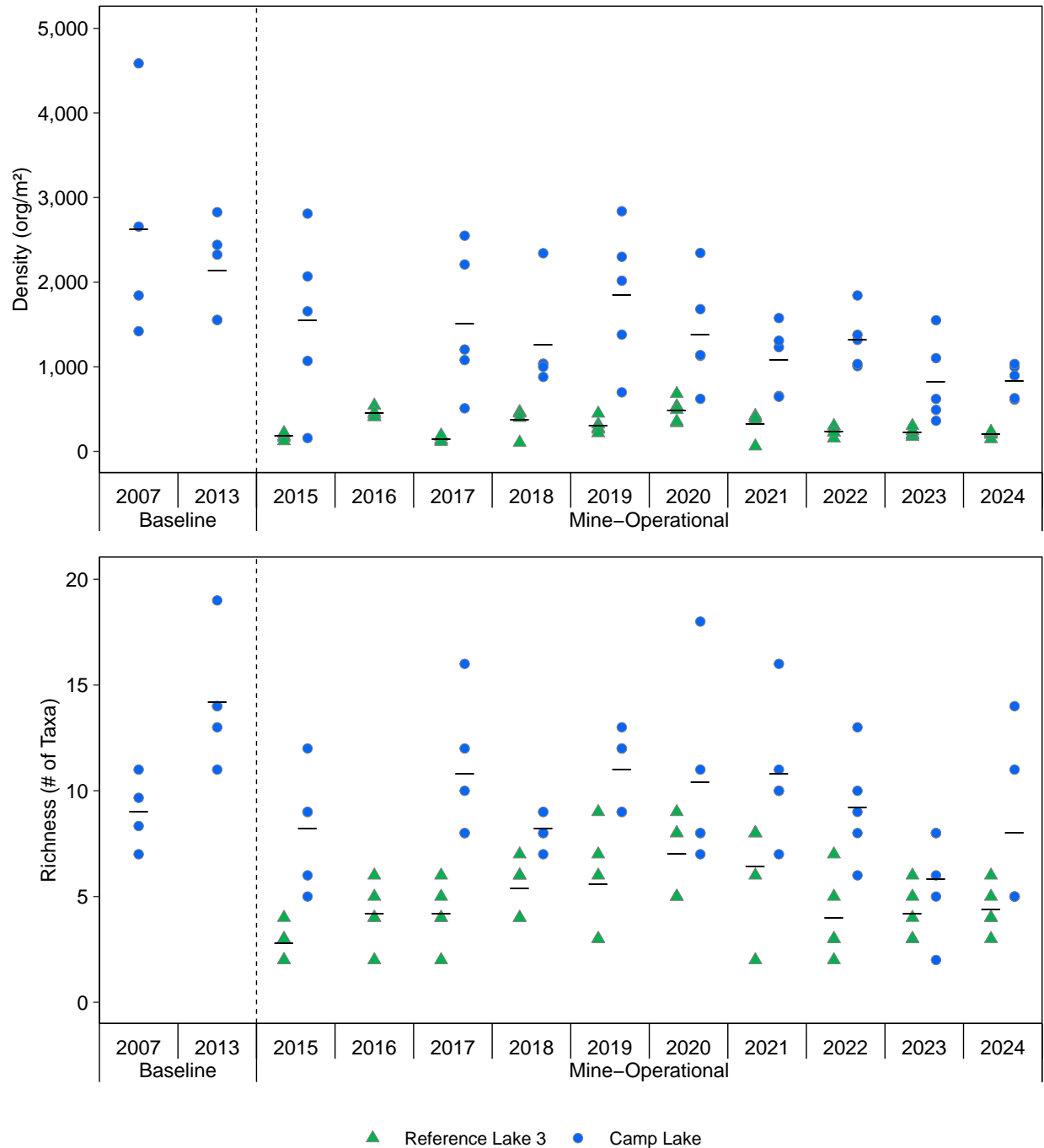


Figure F.6: Benthic Invertebrate Community Endpoints at Camp Lake (JL0) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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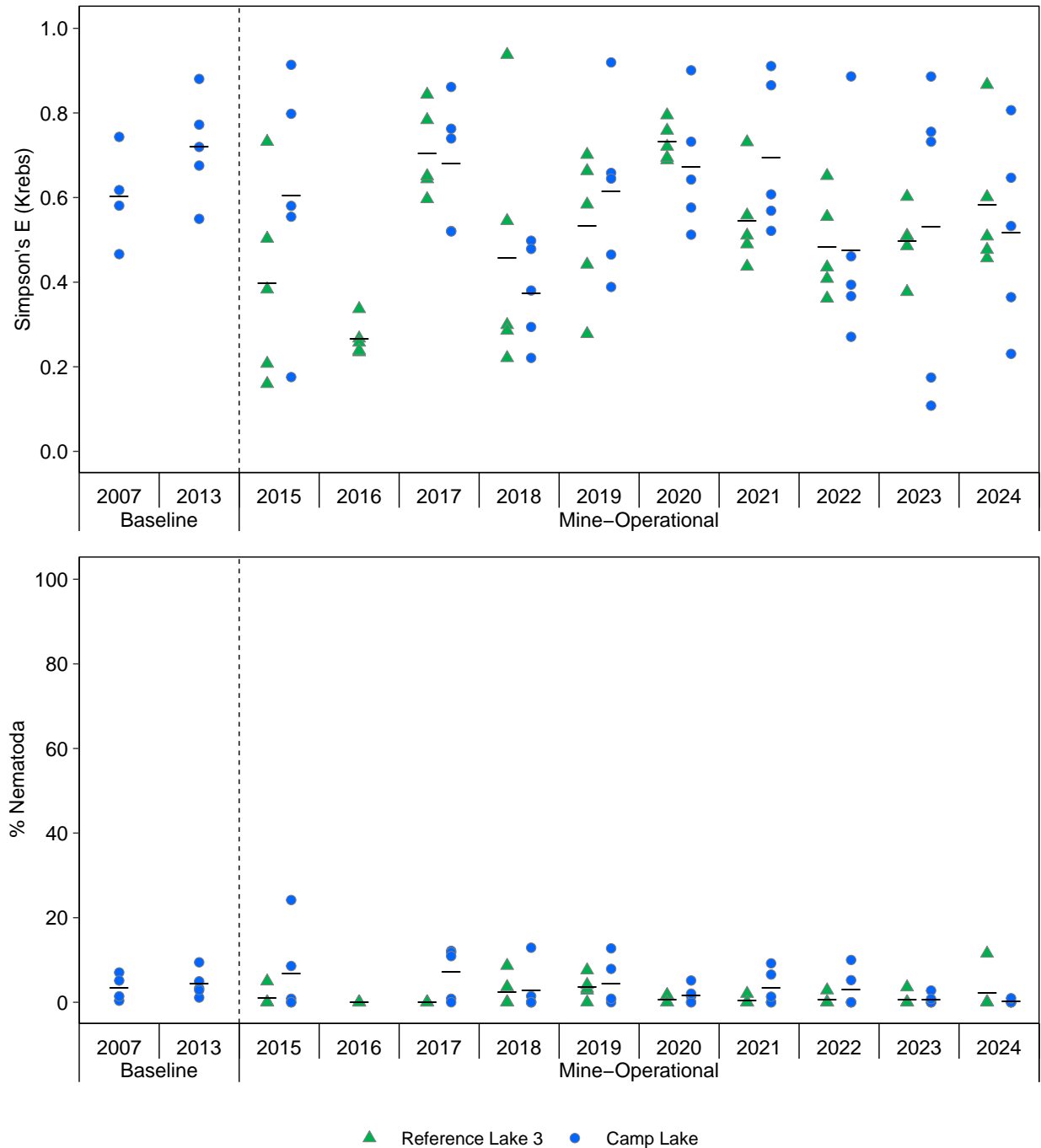


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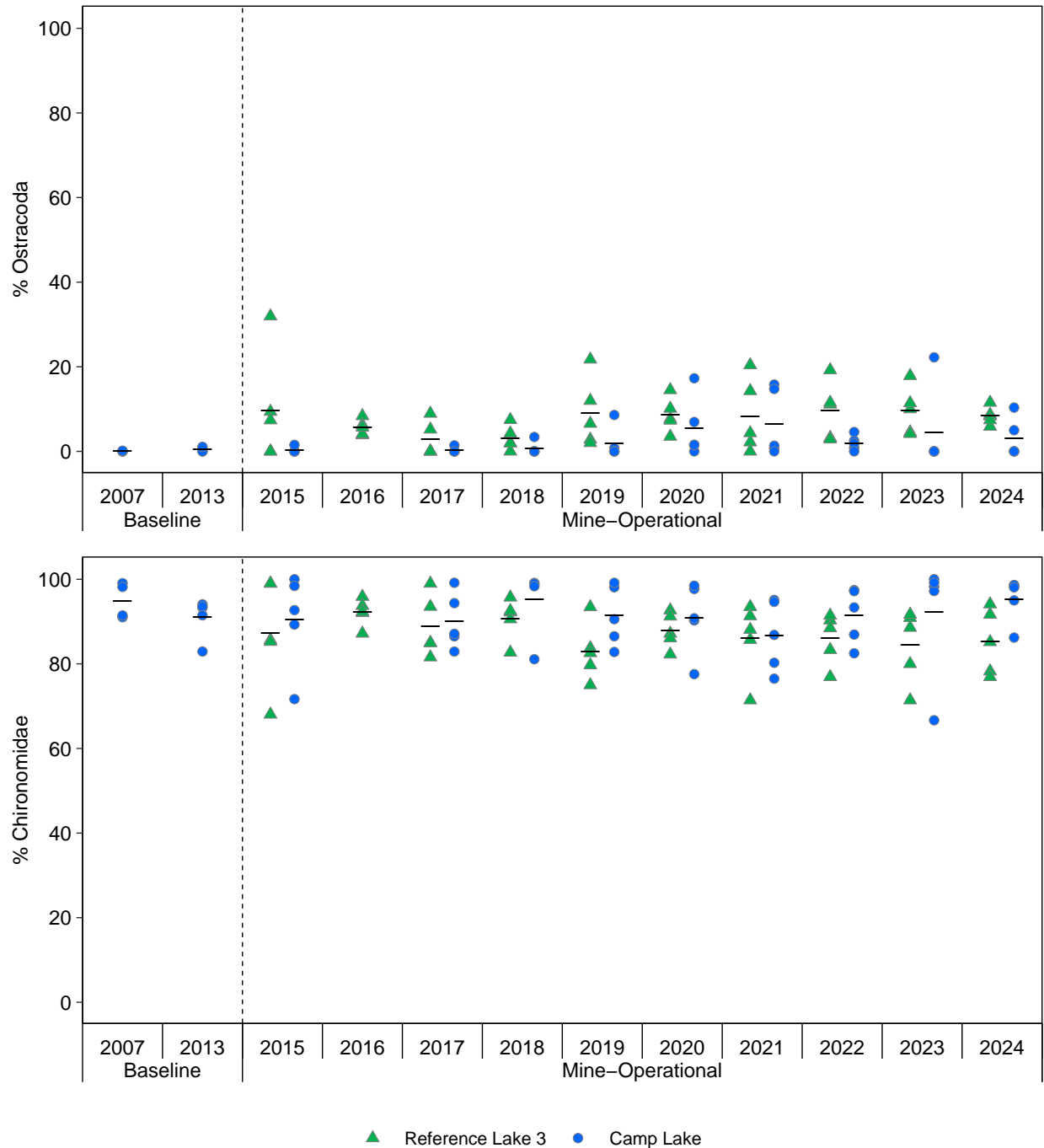


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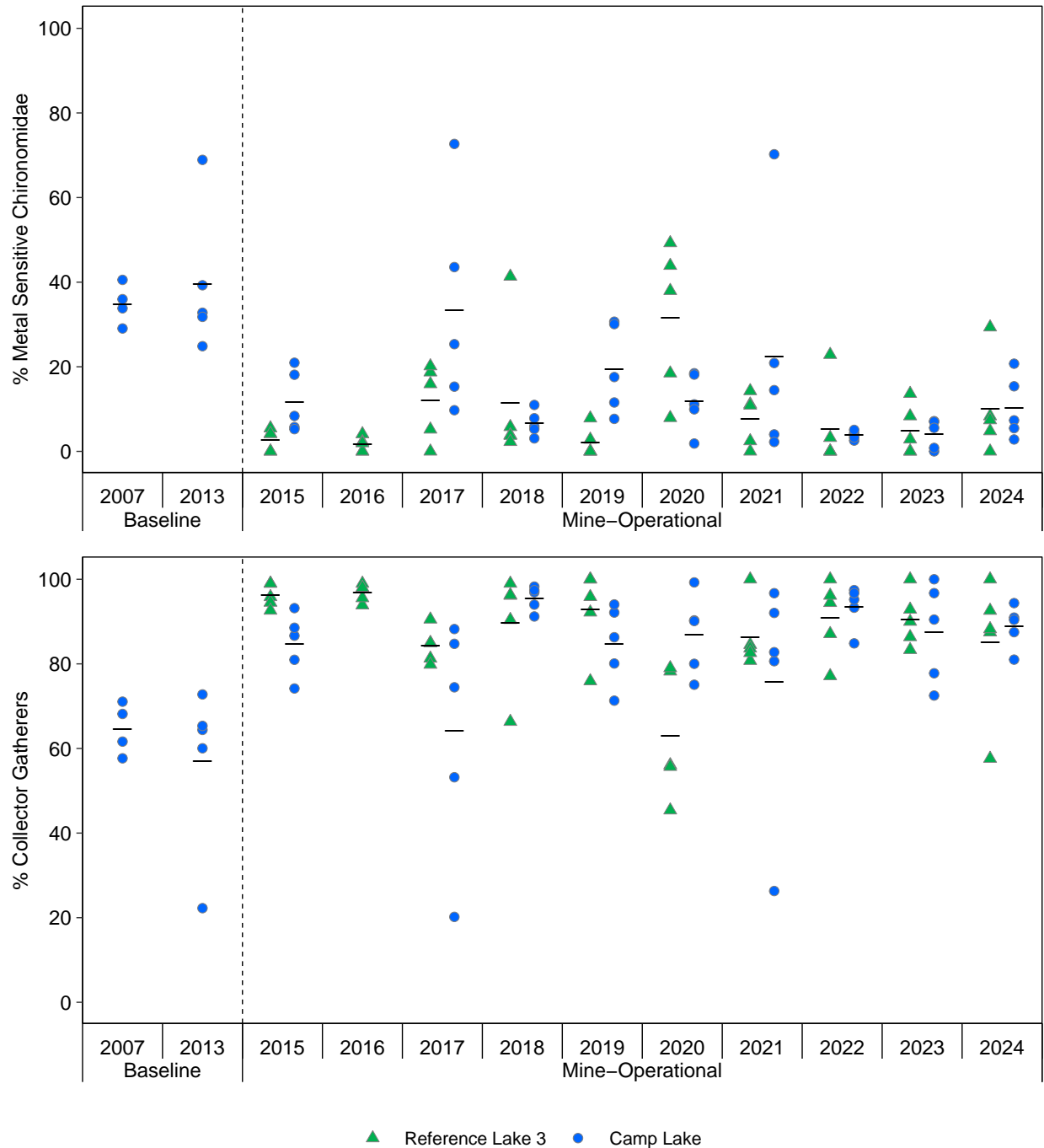


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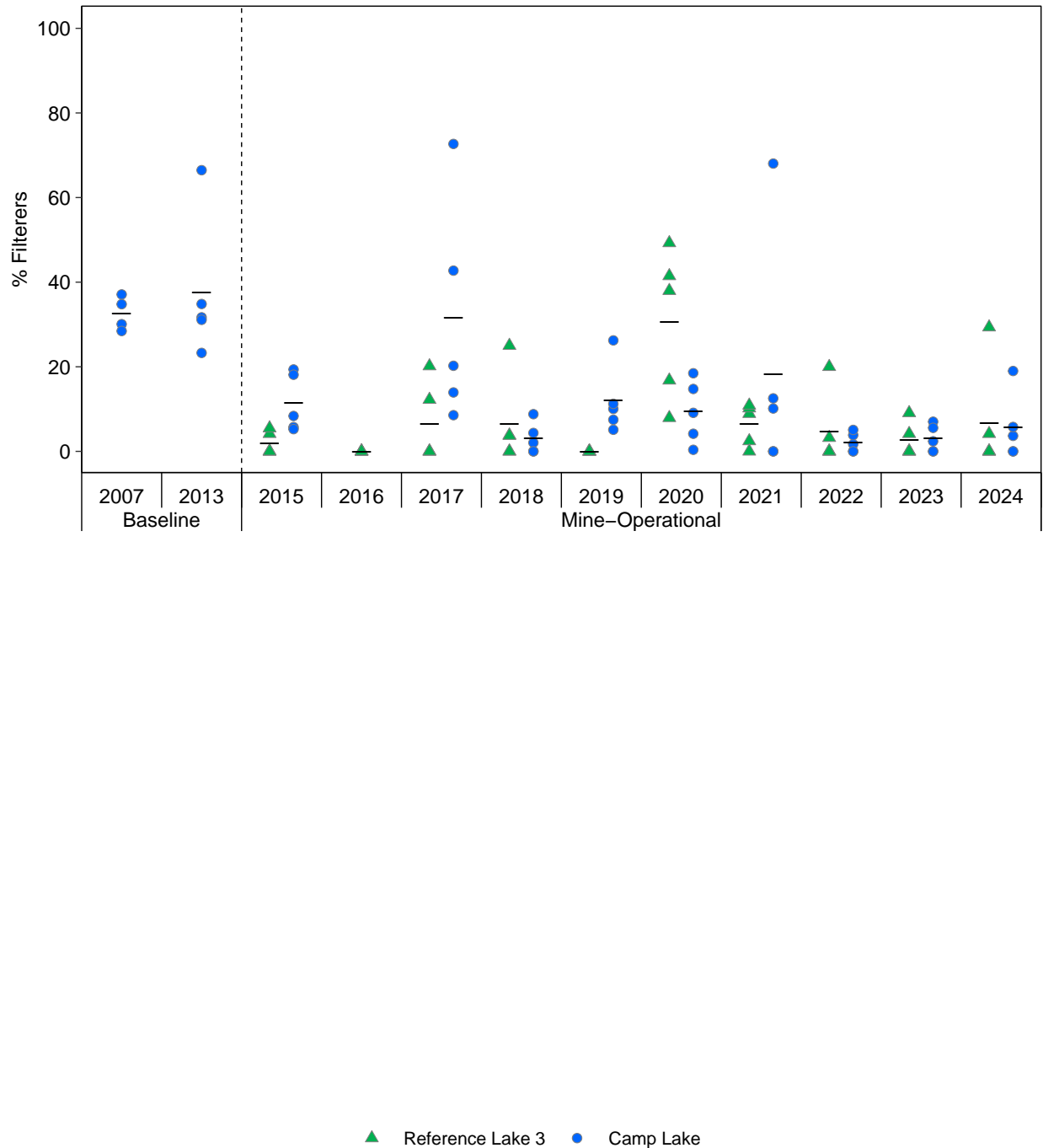


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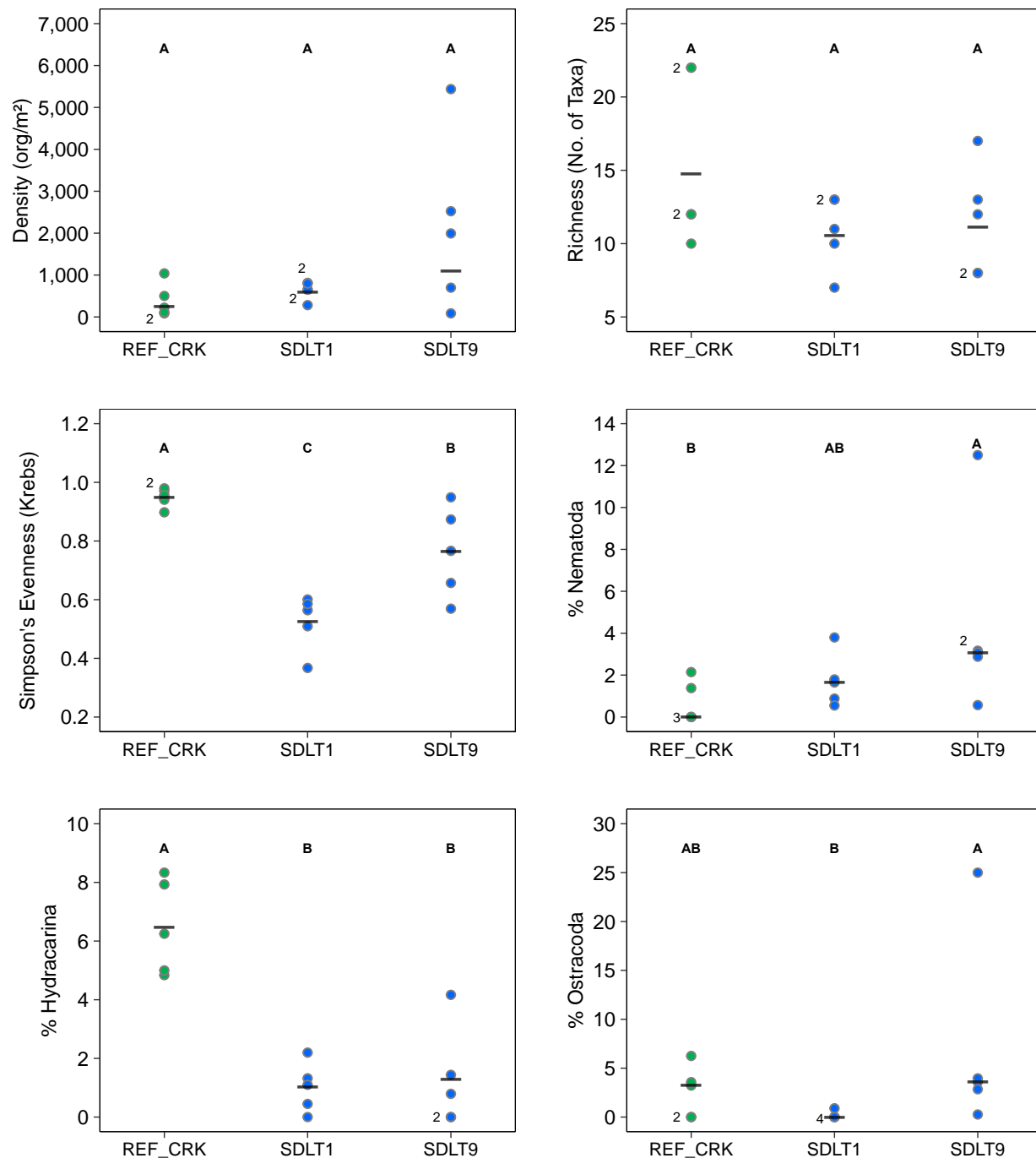


Figure F.7: Benthic Invertebrate Community Endpoints at Sheardown Lake Tributary 1 (SDLT1), Sheardown Lake Tributary 9 (SDLT9), and Unnamed Reference Creek (REF-CRK) Study Areas, Mary River Project CREMP, August 2024

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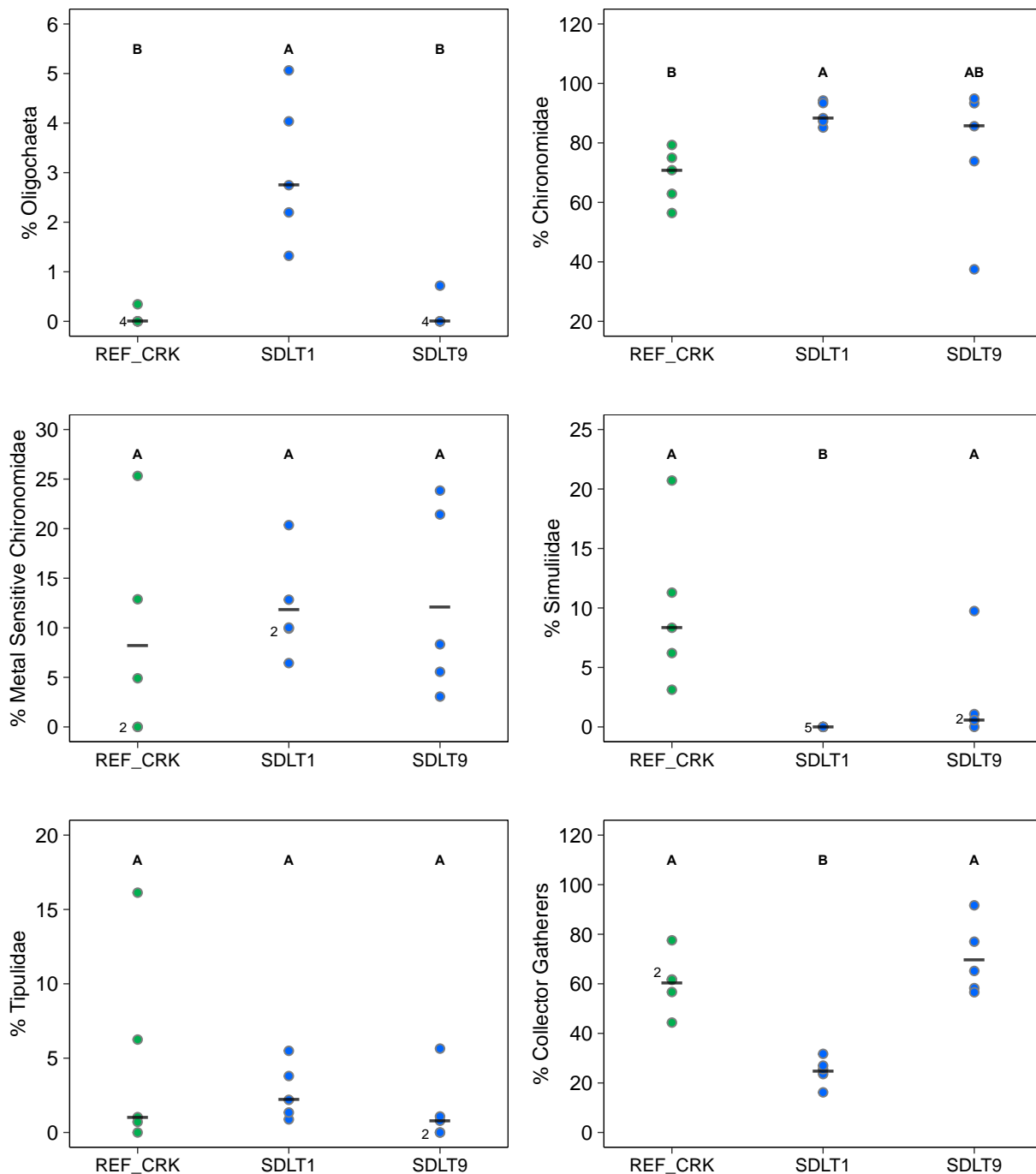


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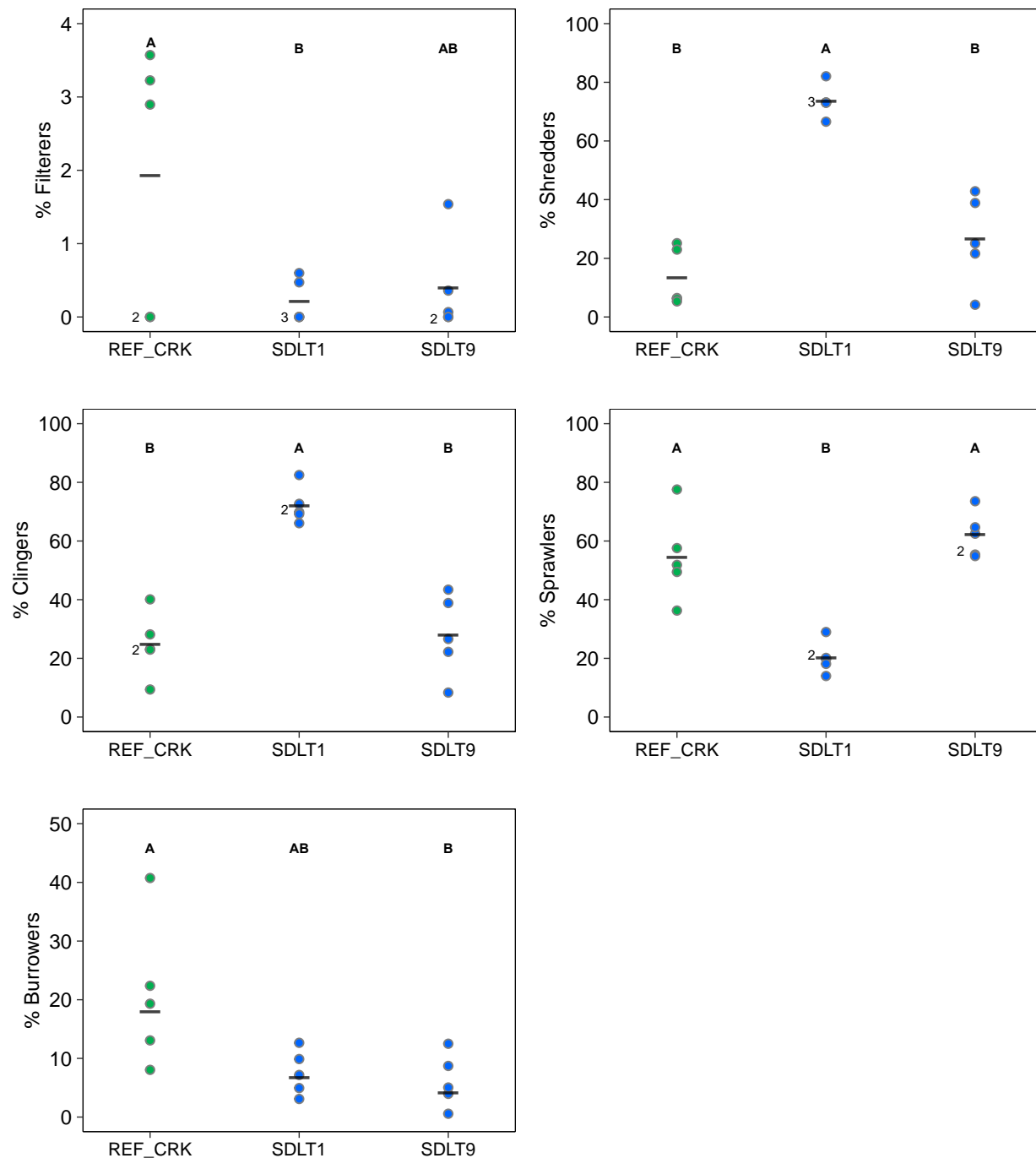


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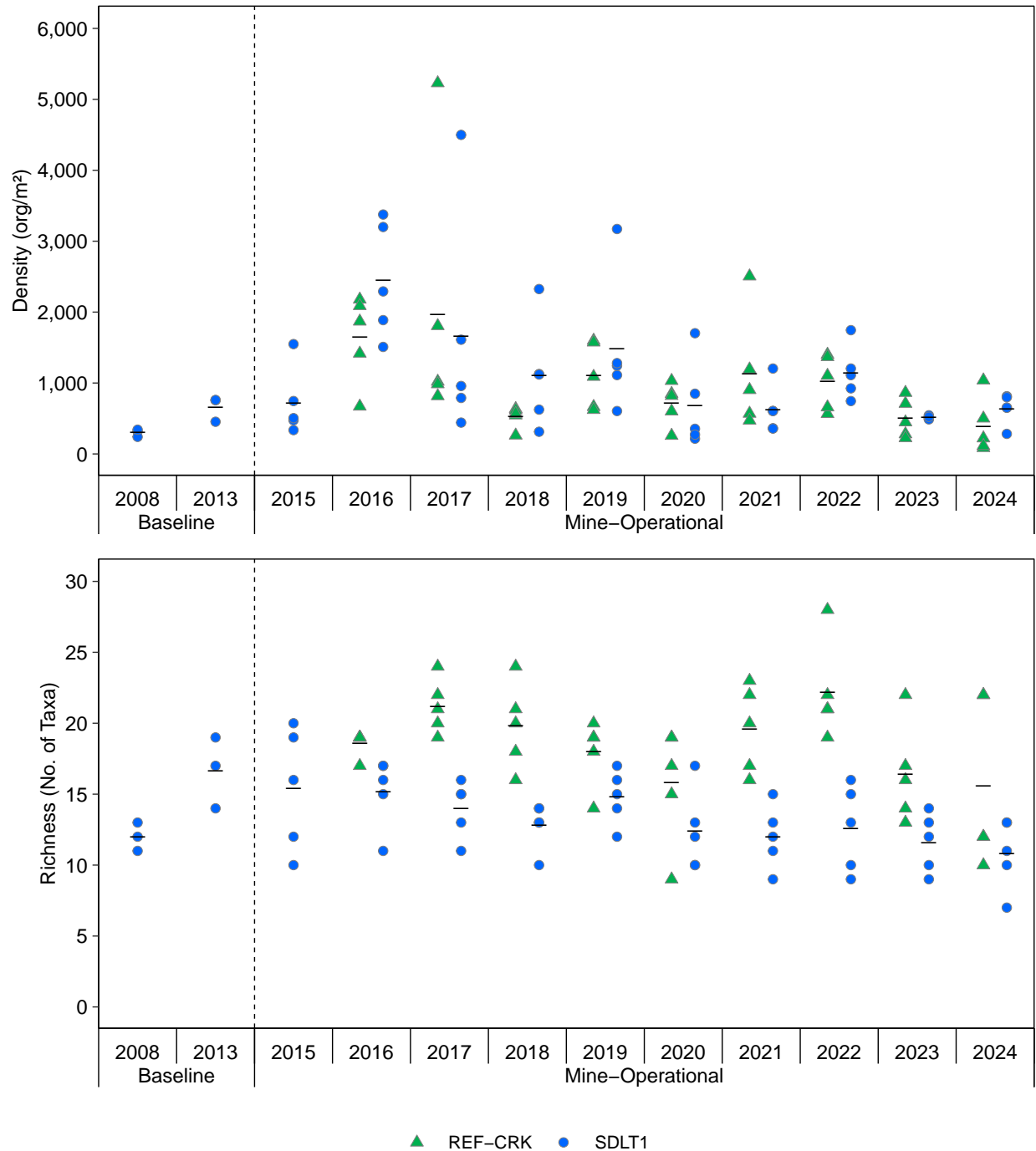


Figure F.8: Benthic Invertebrate Community Endpoints at Sheardown Lake Tributary 1 (SDLT1) and Unnamed Reference Creek (REF-CRK) among Mine Baseline (2008 and 2013) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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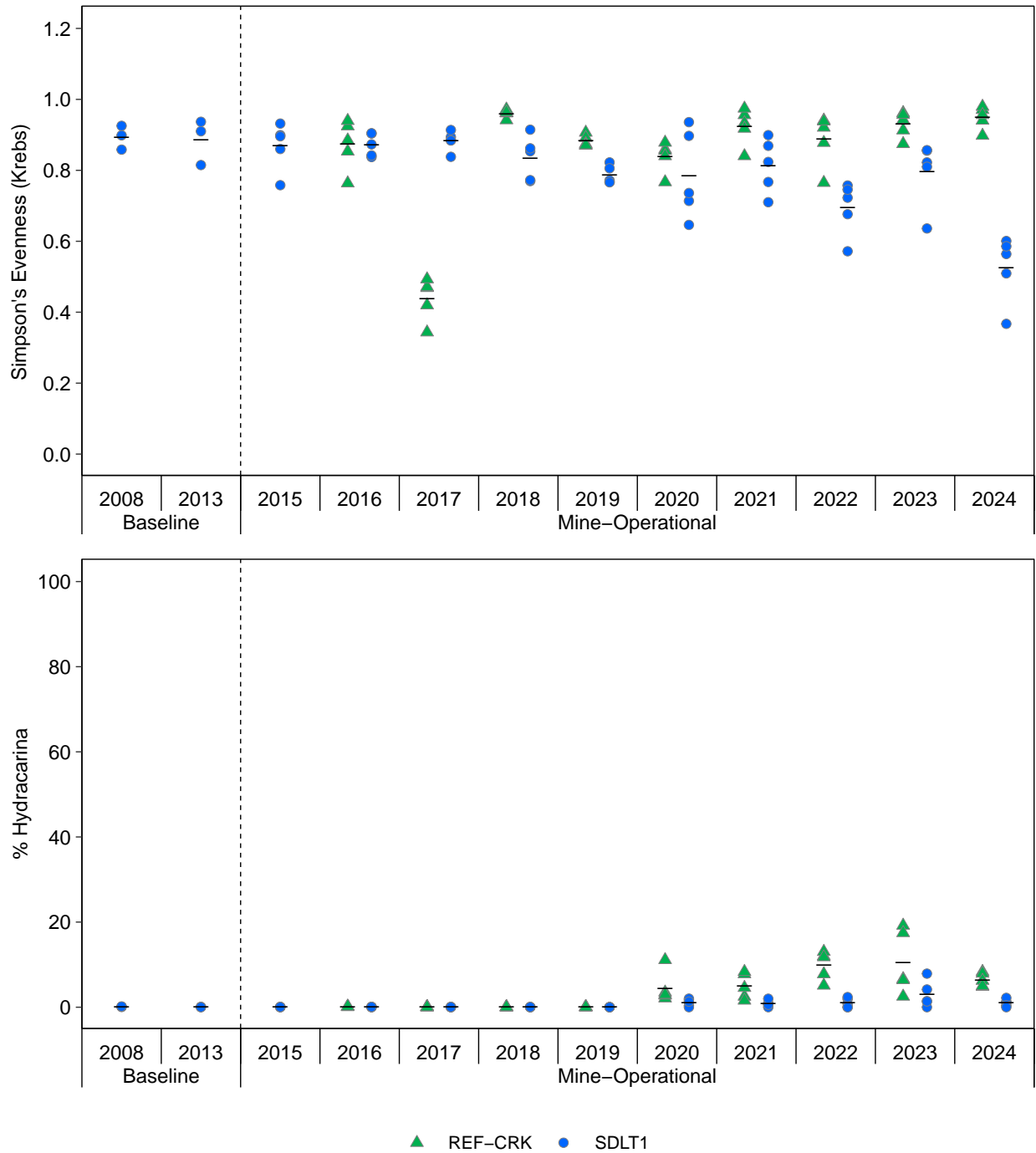


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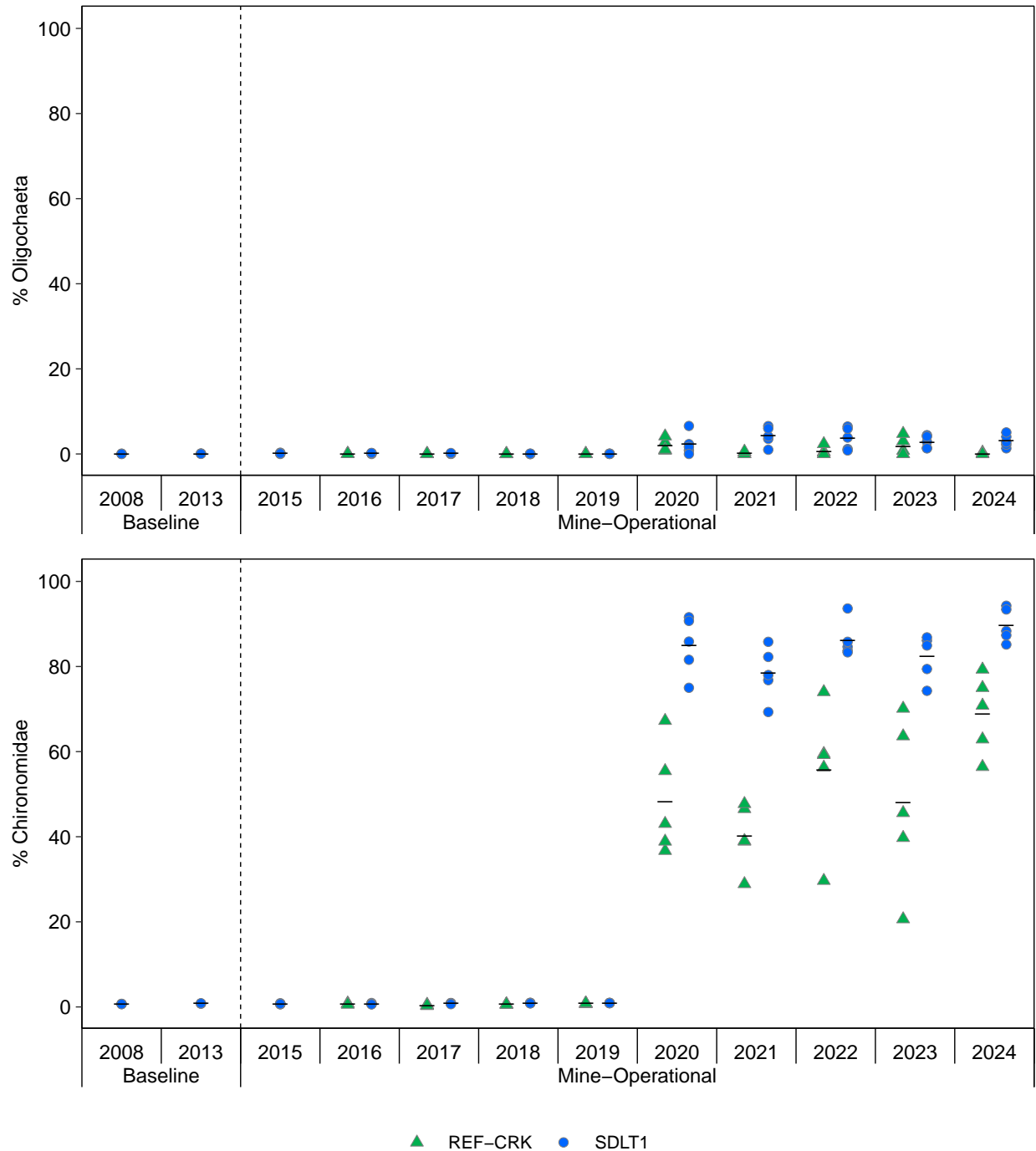


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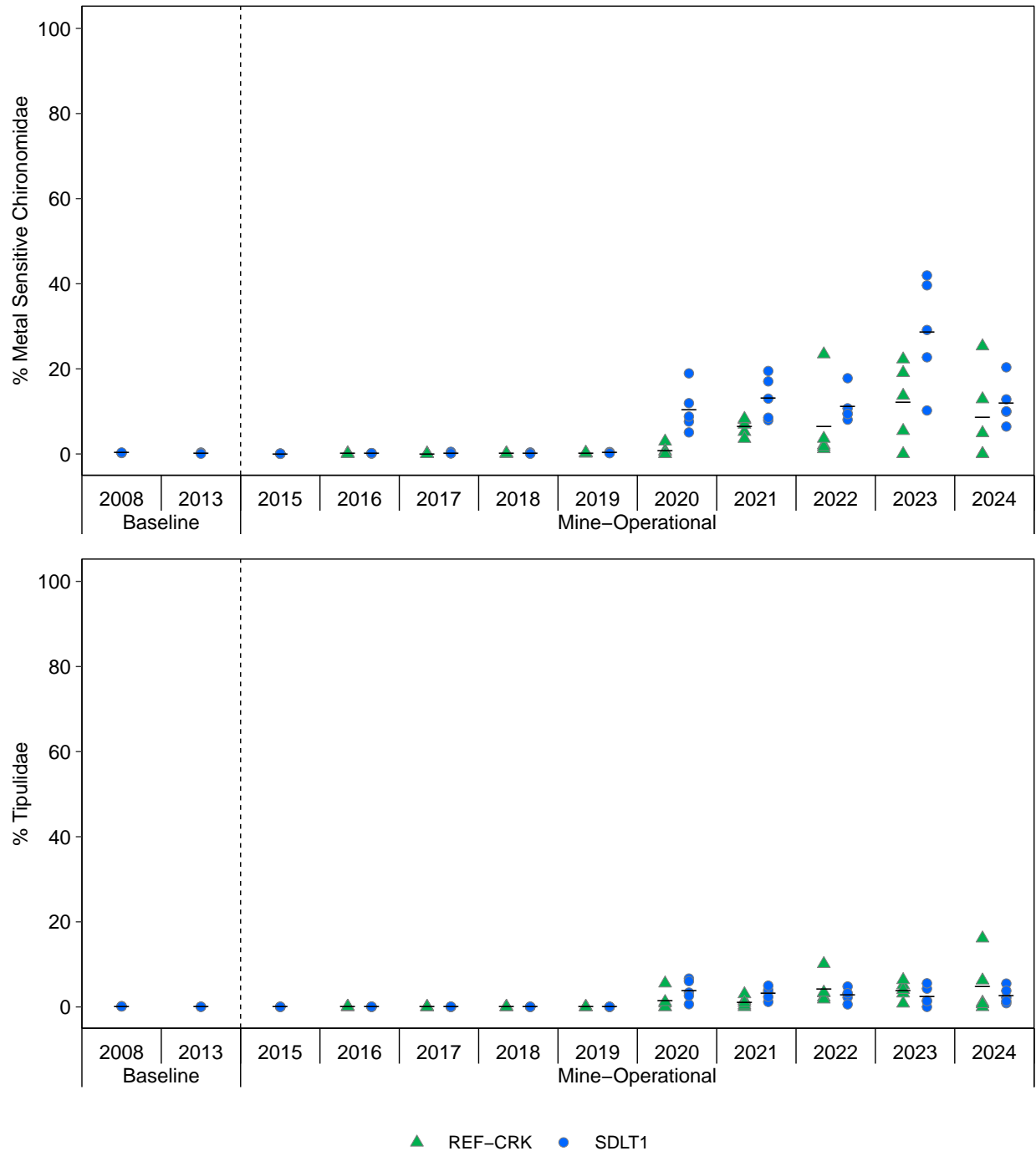


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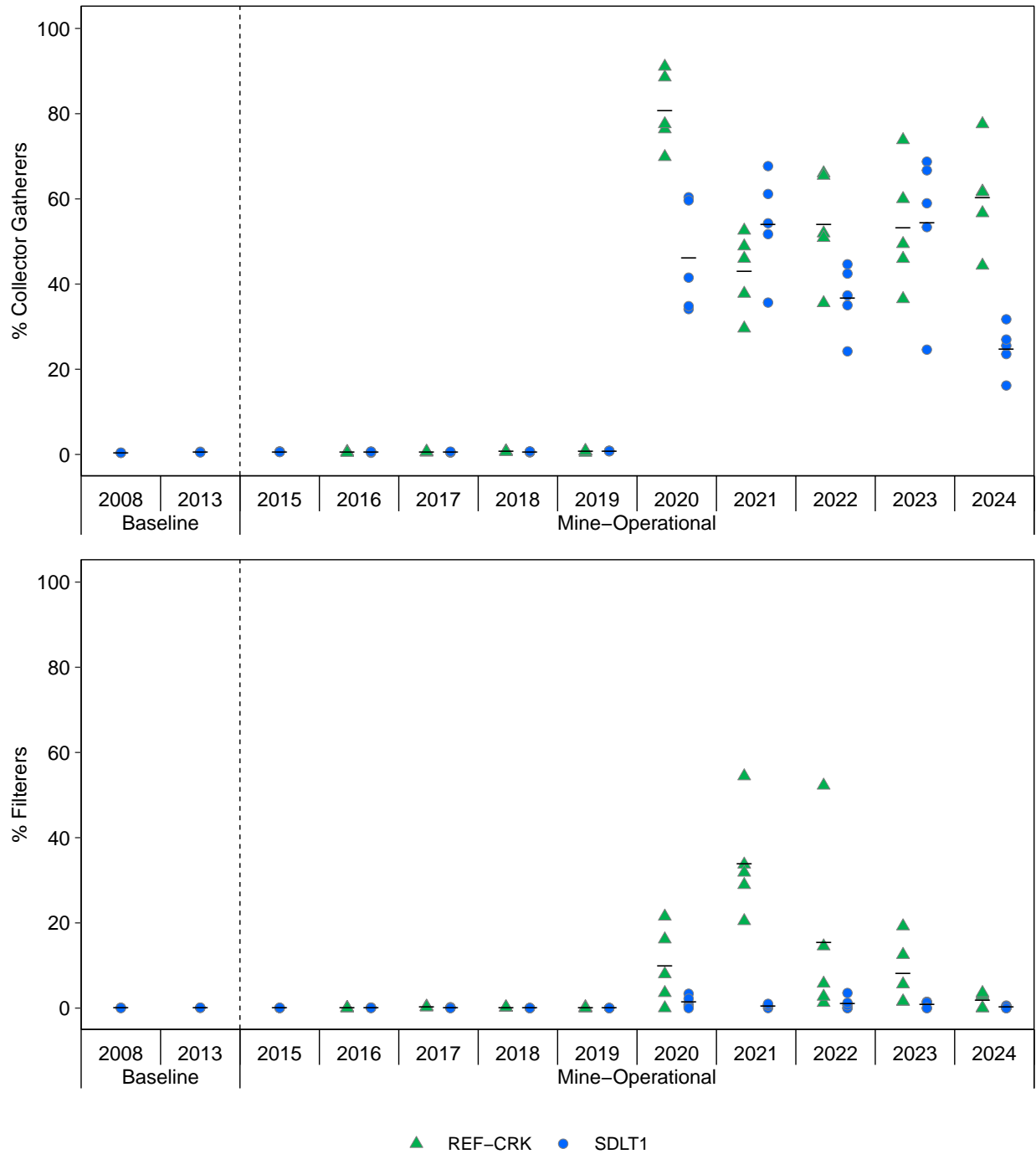


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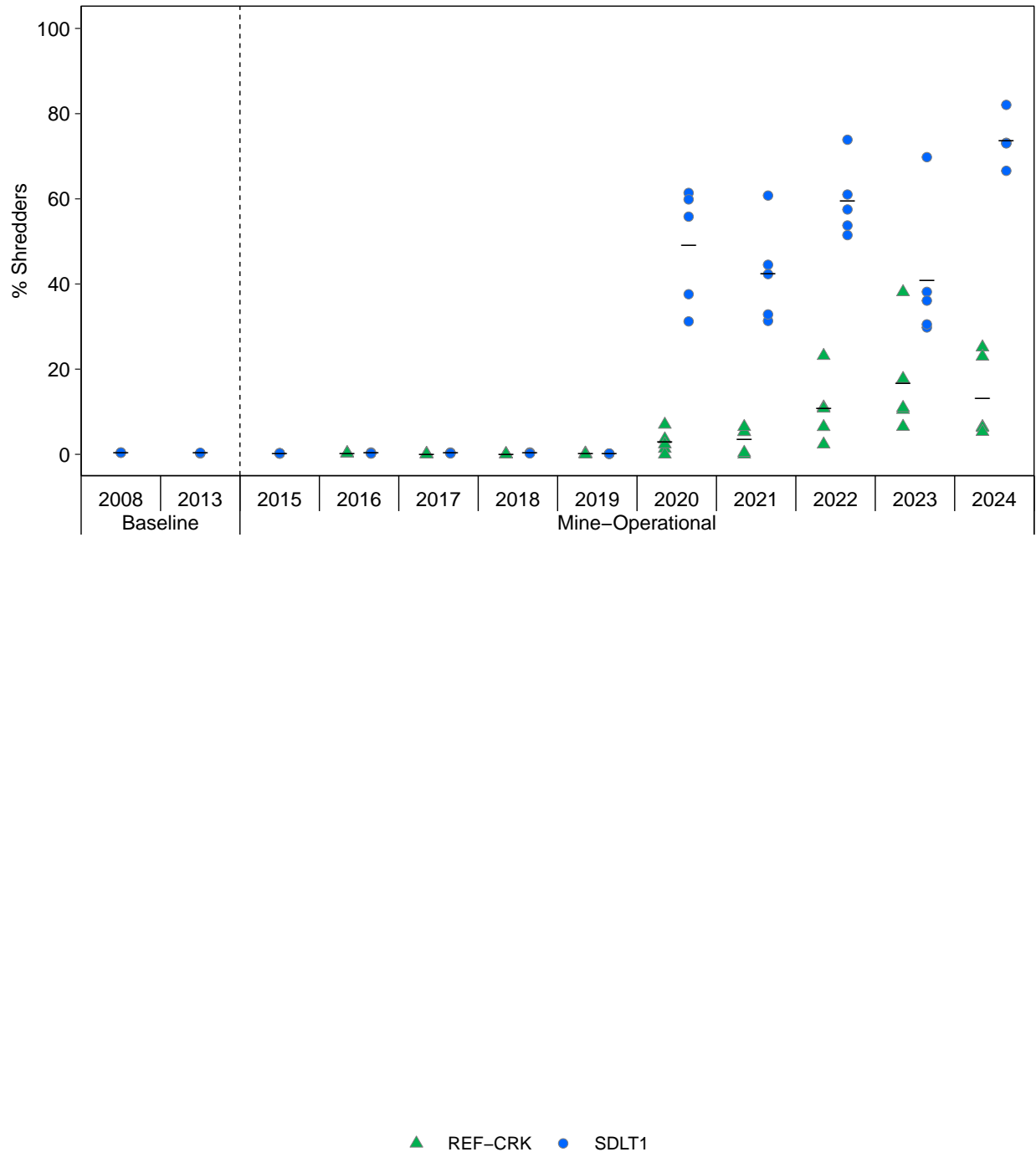


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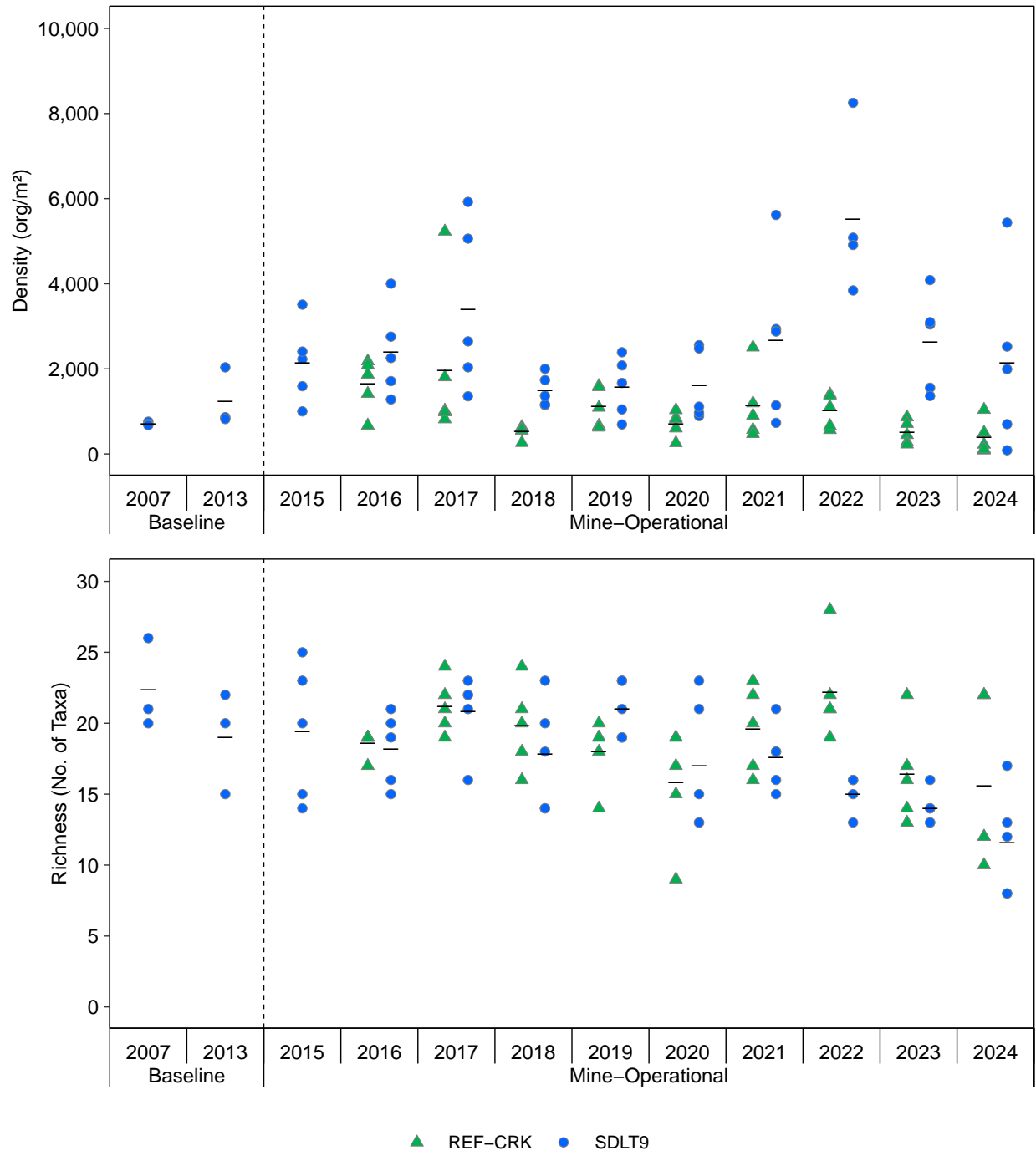


Figure F.9: Benthic Invertebrate Community Endpoints at Sheardown Lake Tributary 9 (SDLT9) and Unnamed Reference Creek (REF-CRK) among Mine Baseline (2007 and 2013) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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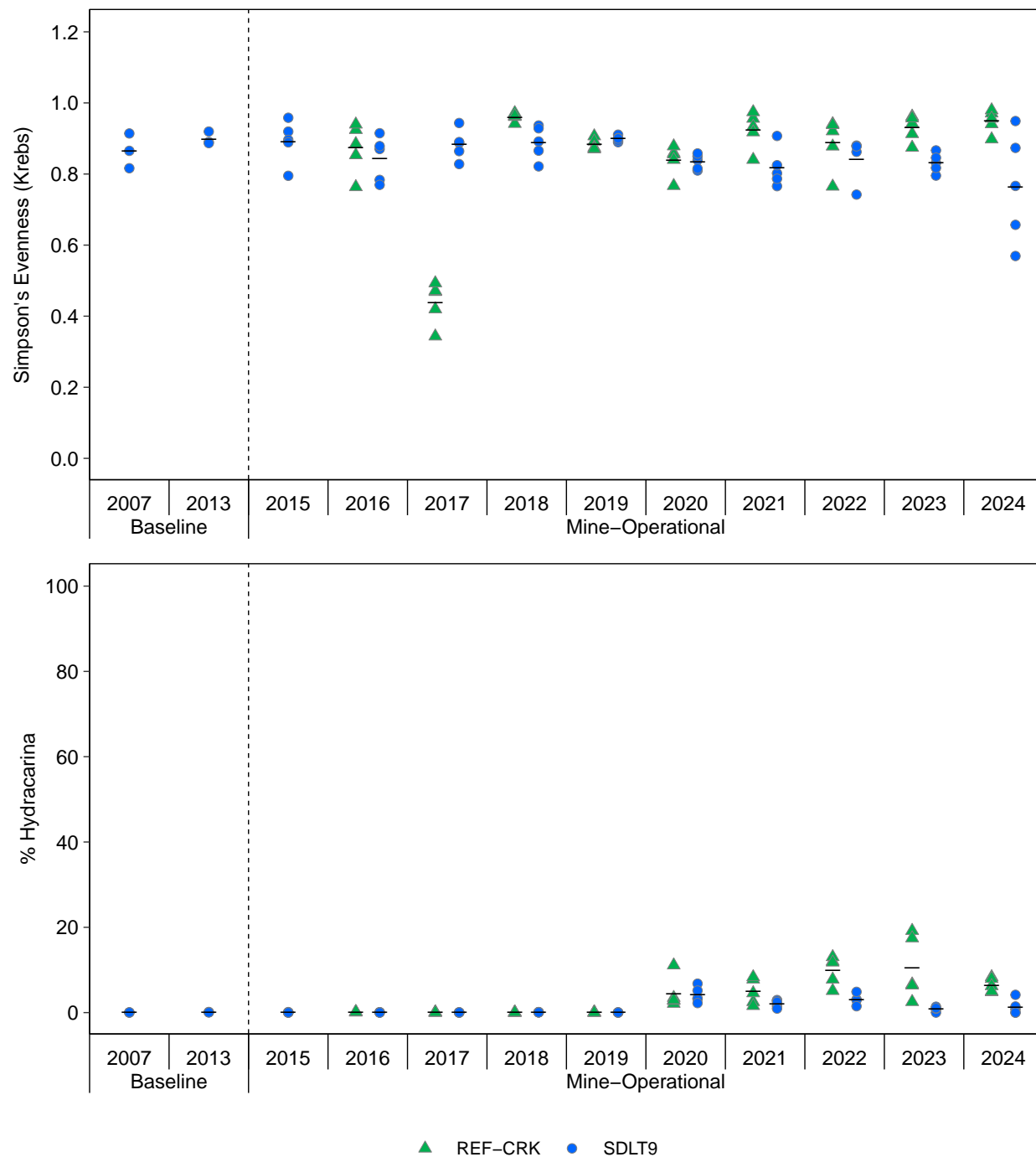


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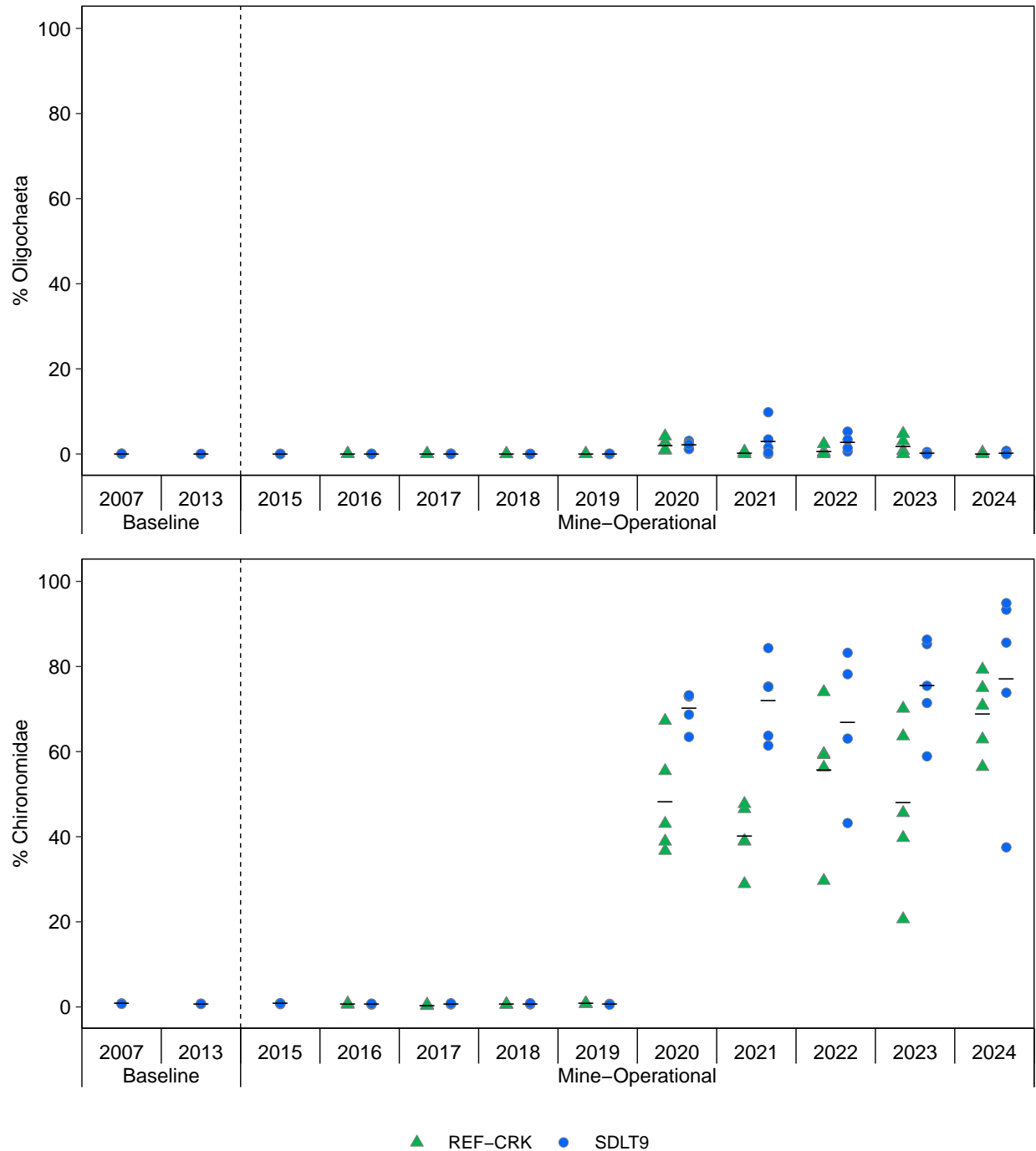


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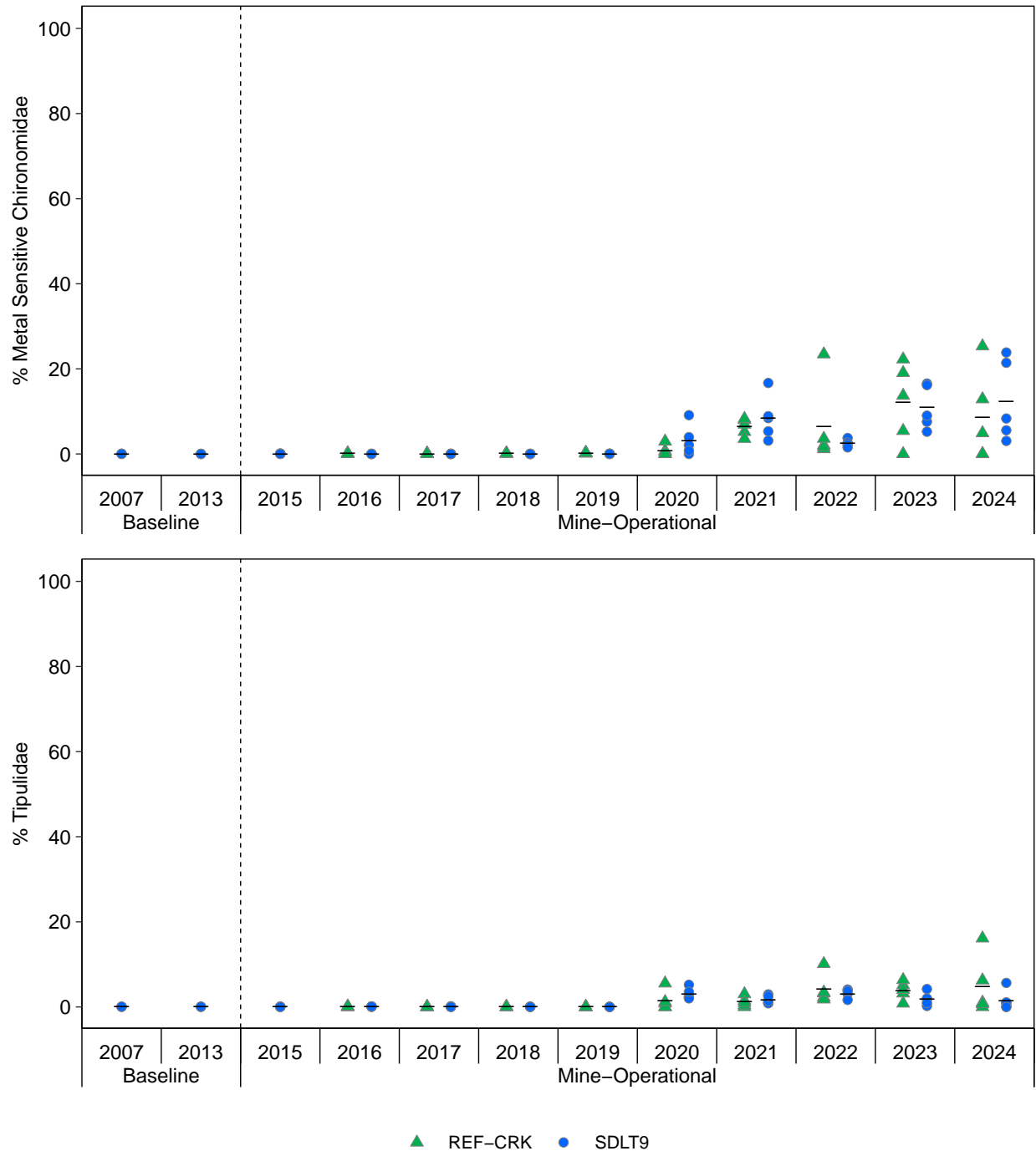


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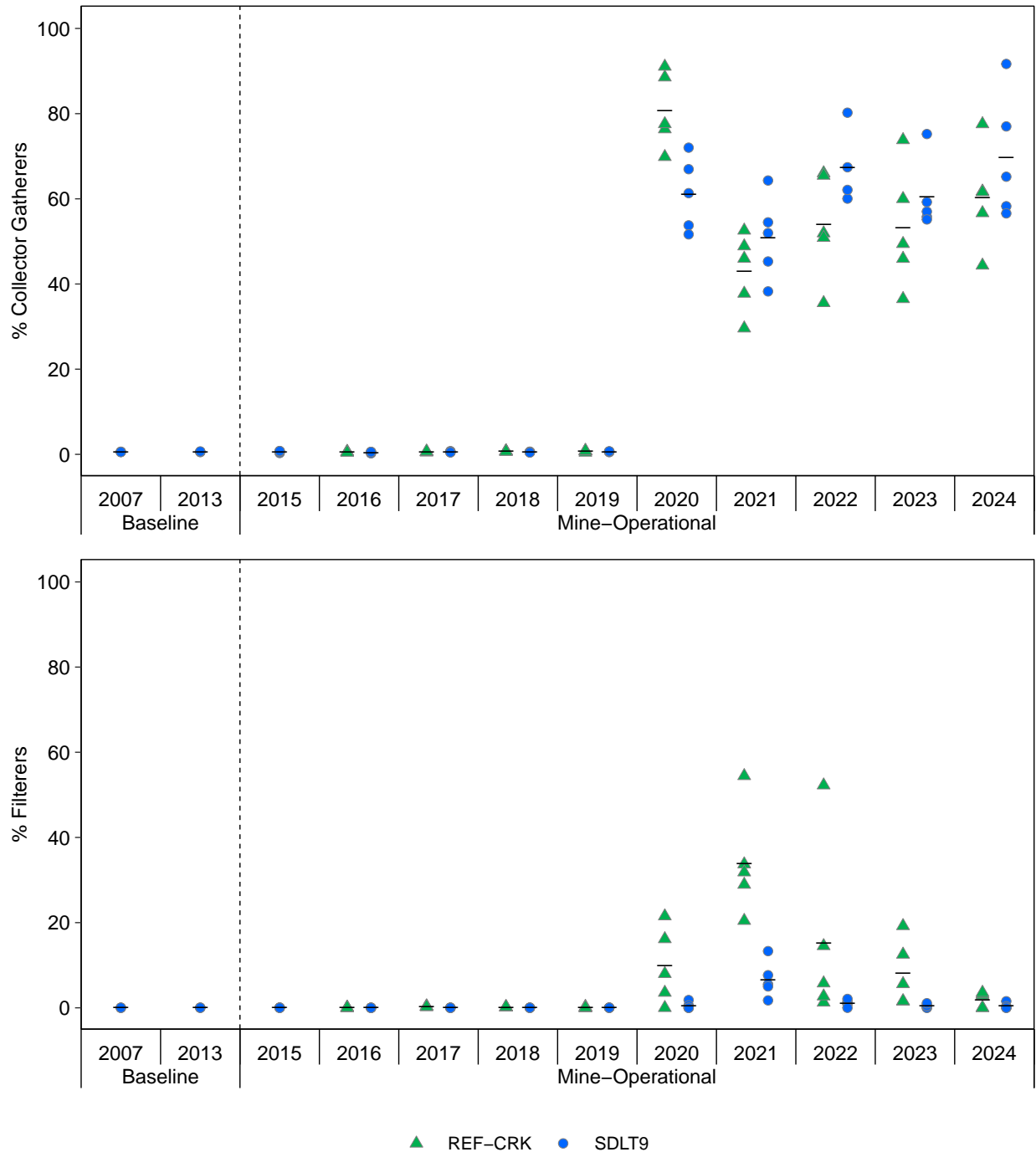


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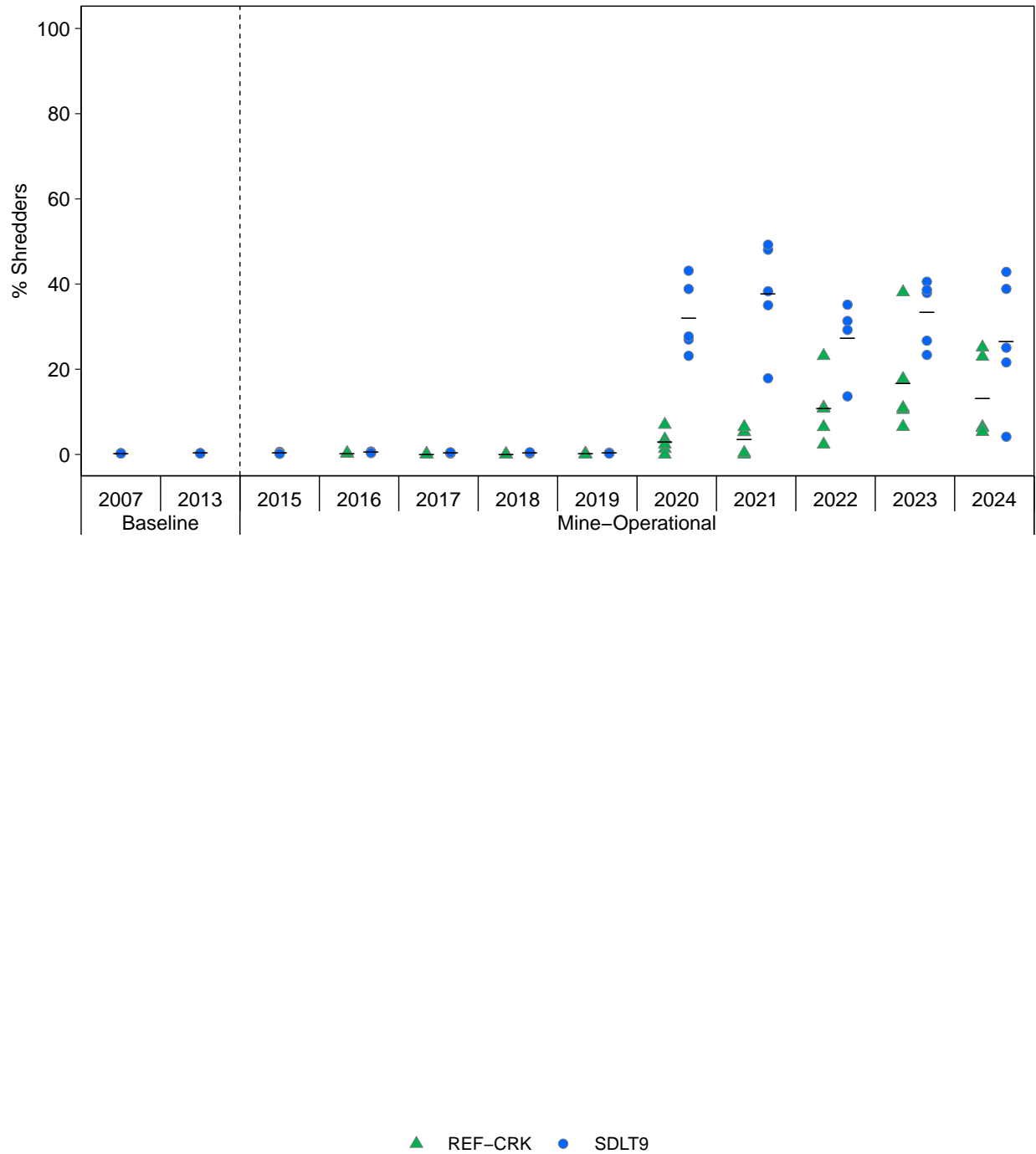


Figure F.9: Benthic Invertebrate Community Endpoints at Sheardown Lake Tributary 9 (SDLT9) and Unnamed Reference Creek (REF-CRK) among Mine Baseline (2007 and 2013) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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

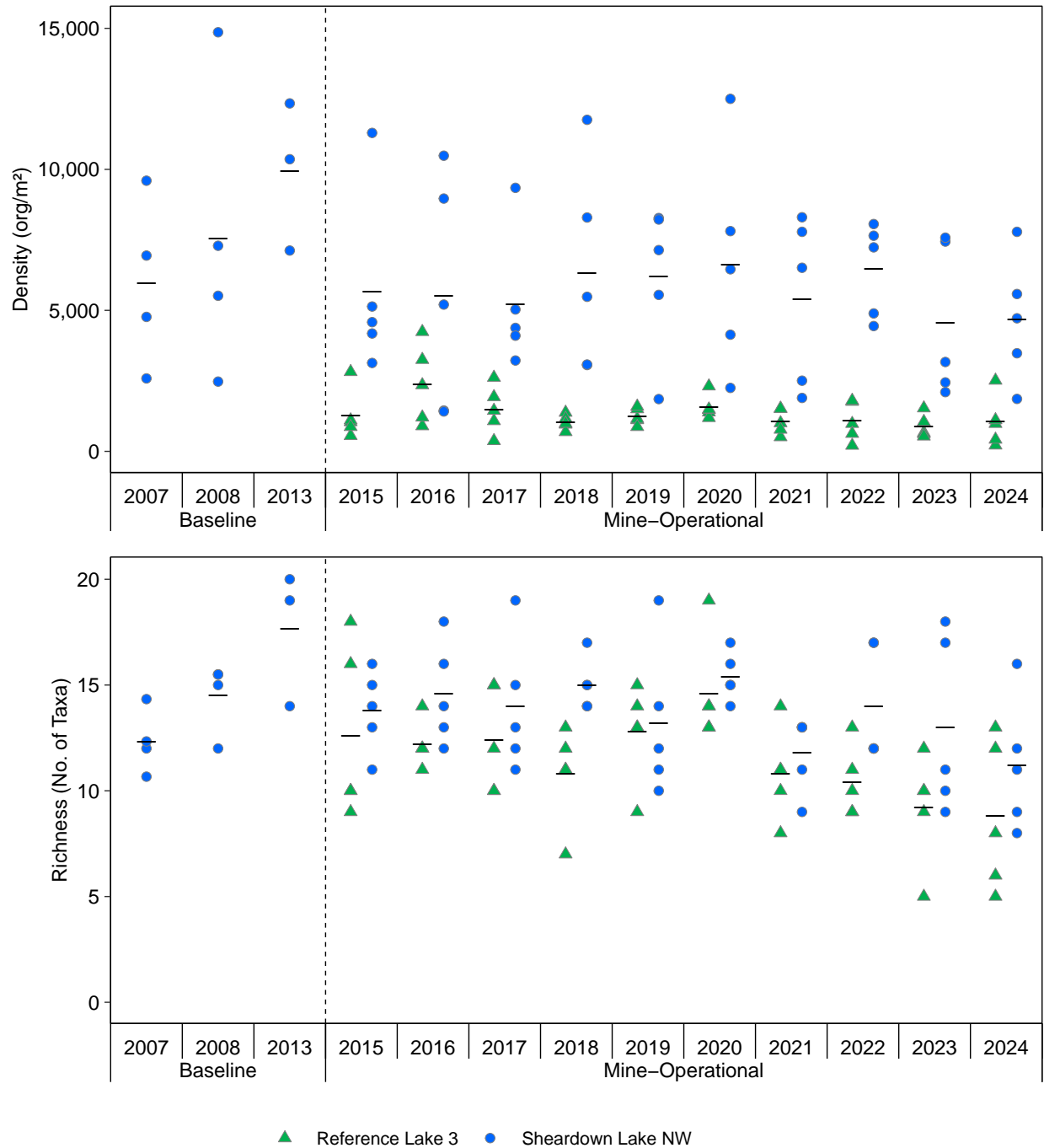


Figure F.10: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

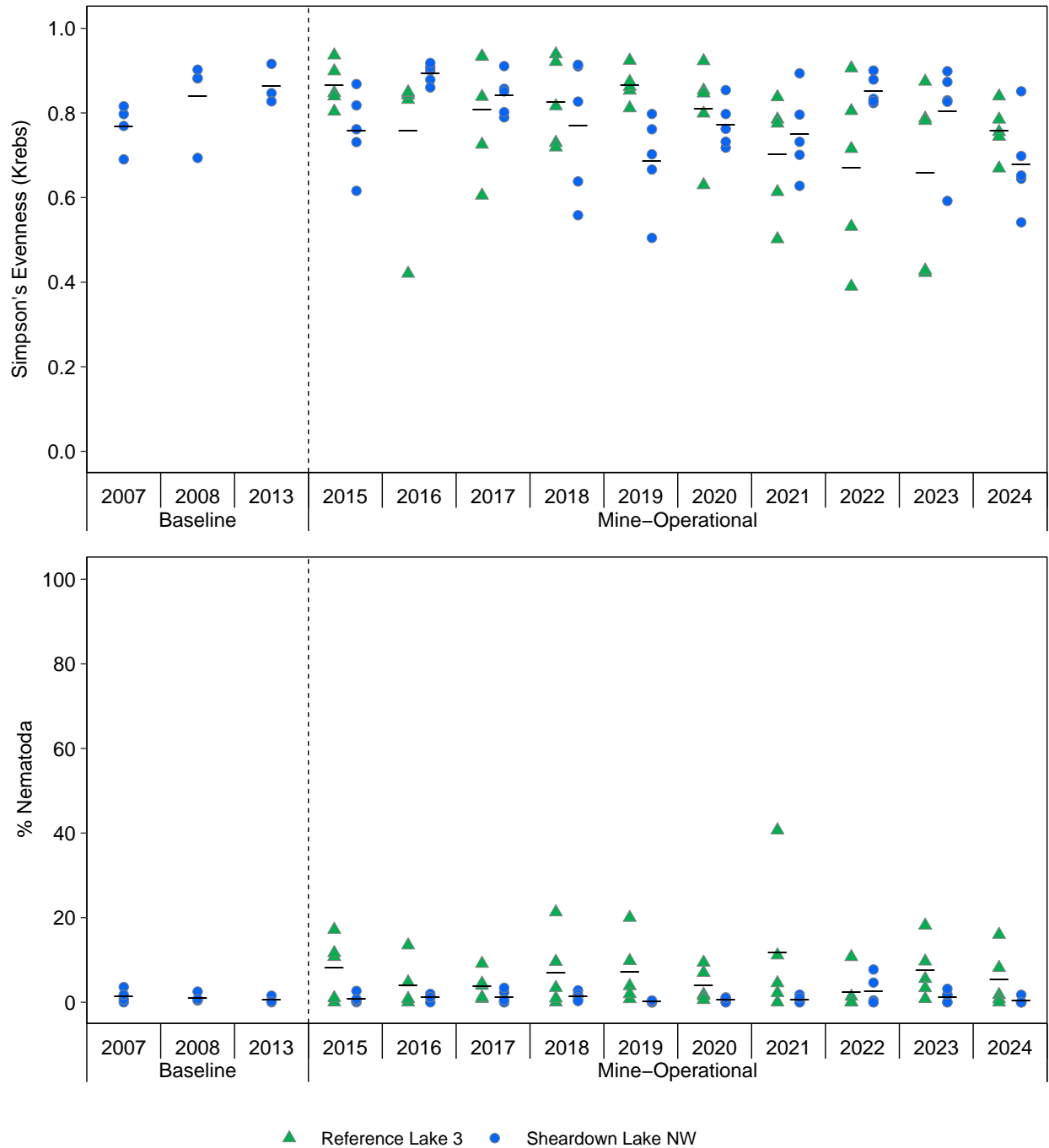


Figure F.10: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

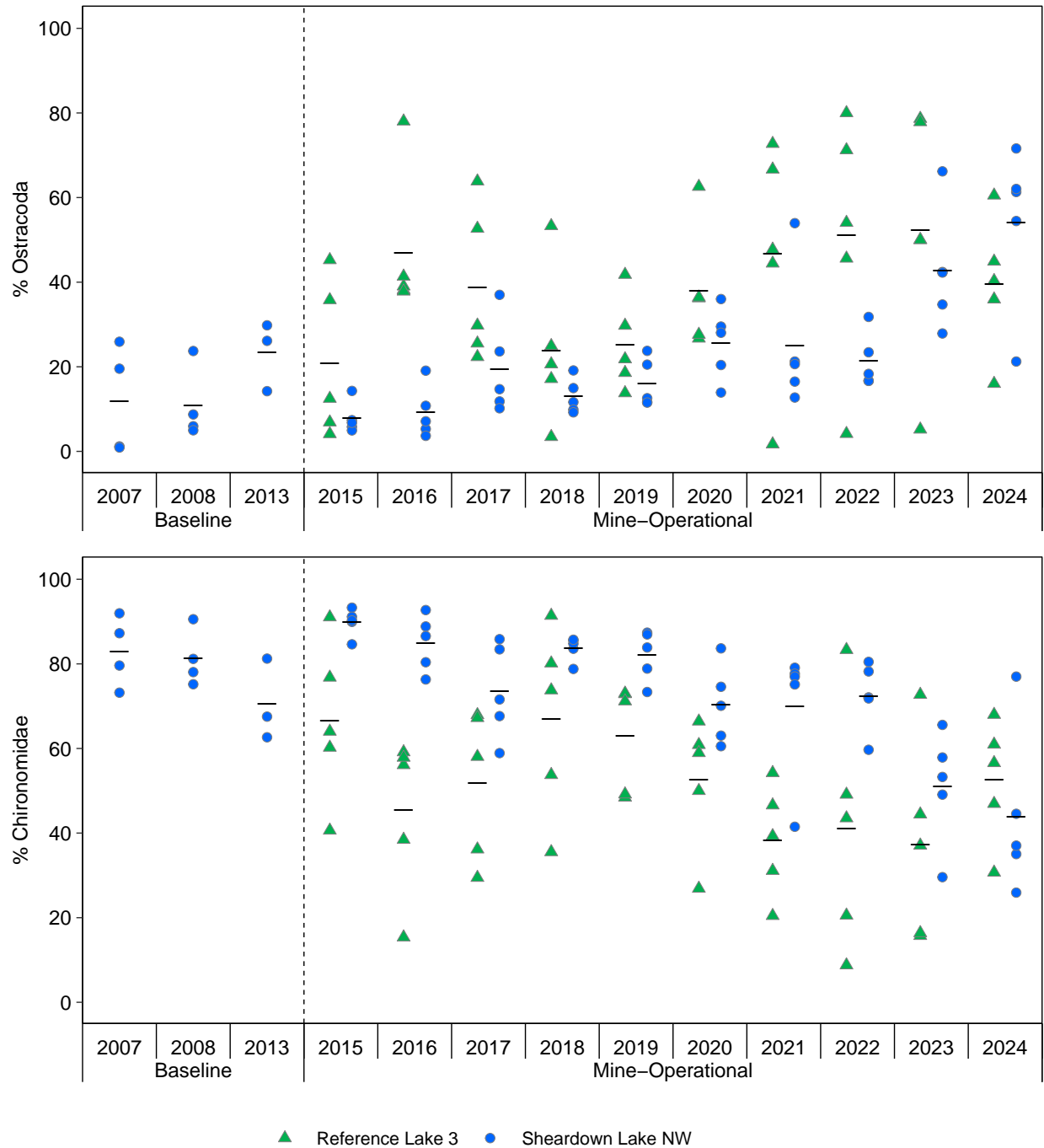


Figure F.10: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

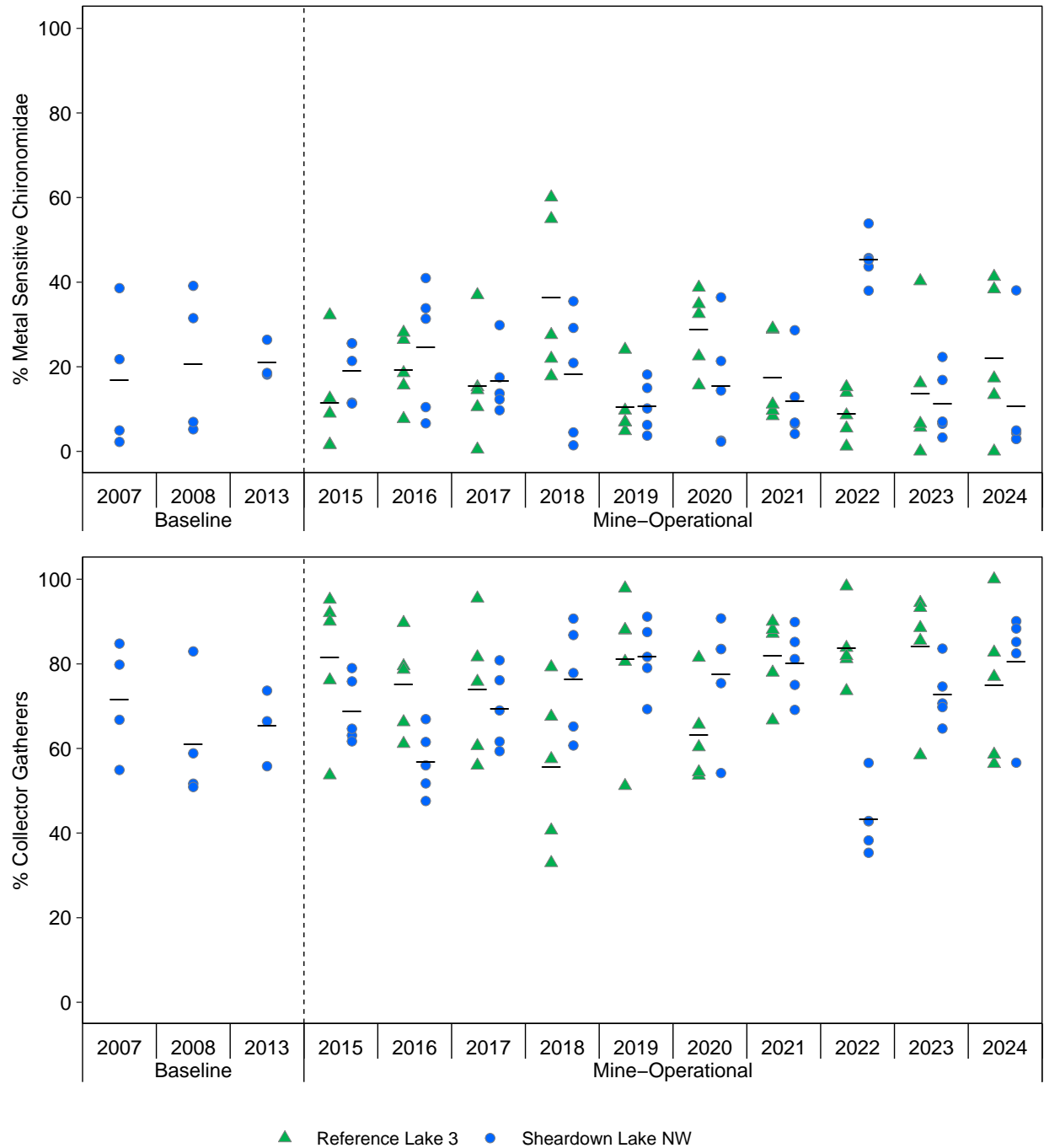


Figure F.10: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

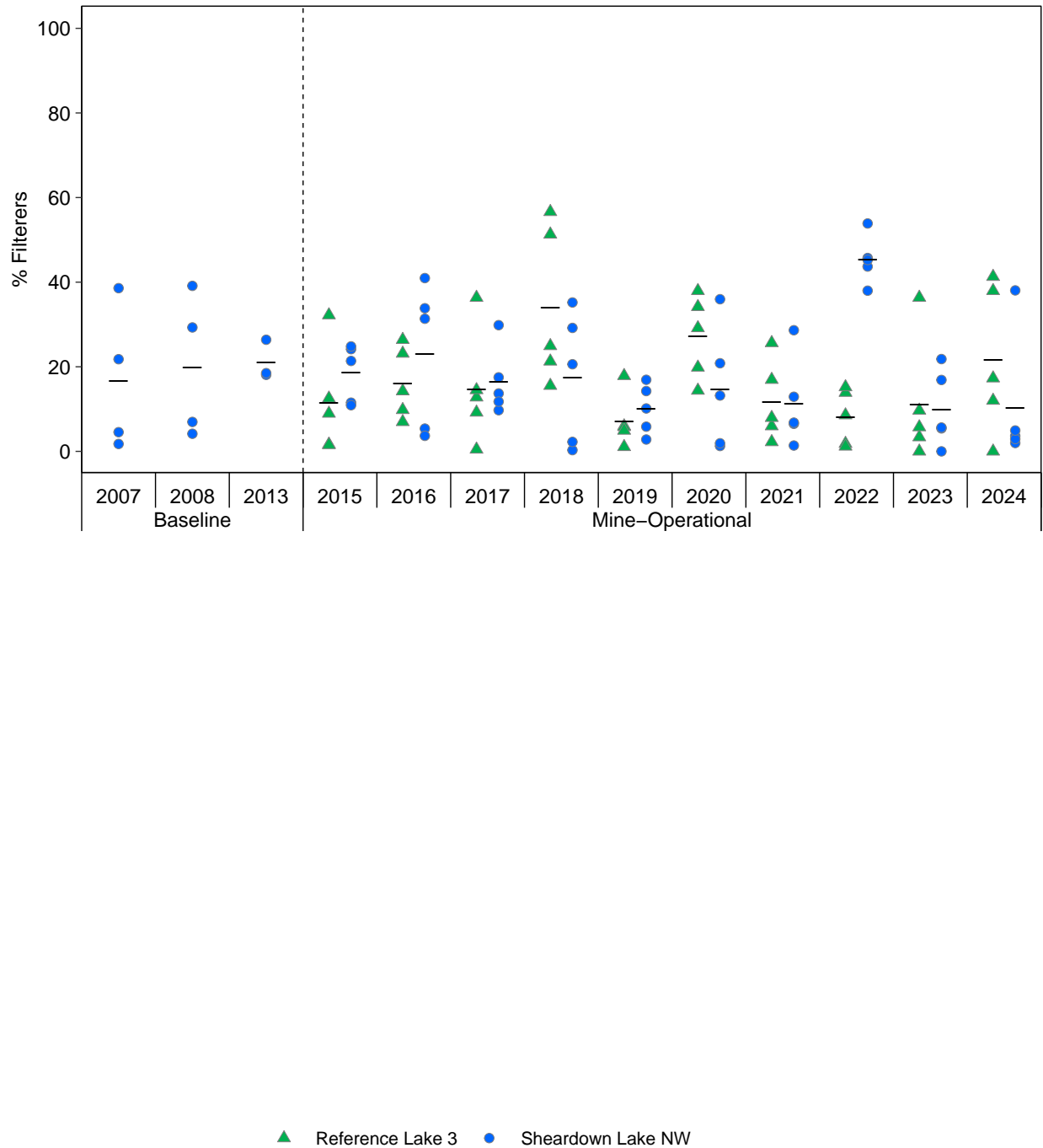


Figure F.10: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

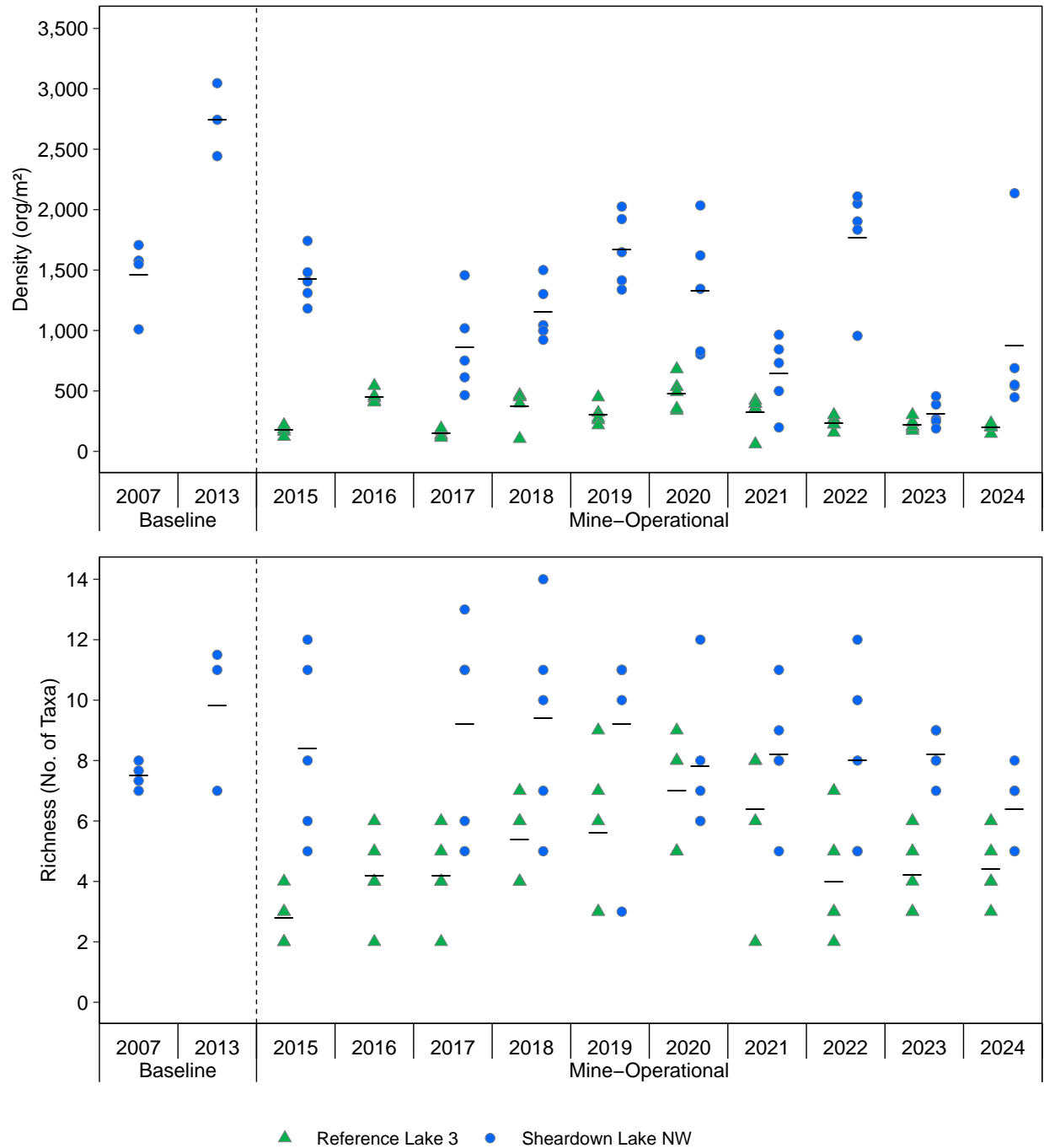


Figure F.11: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

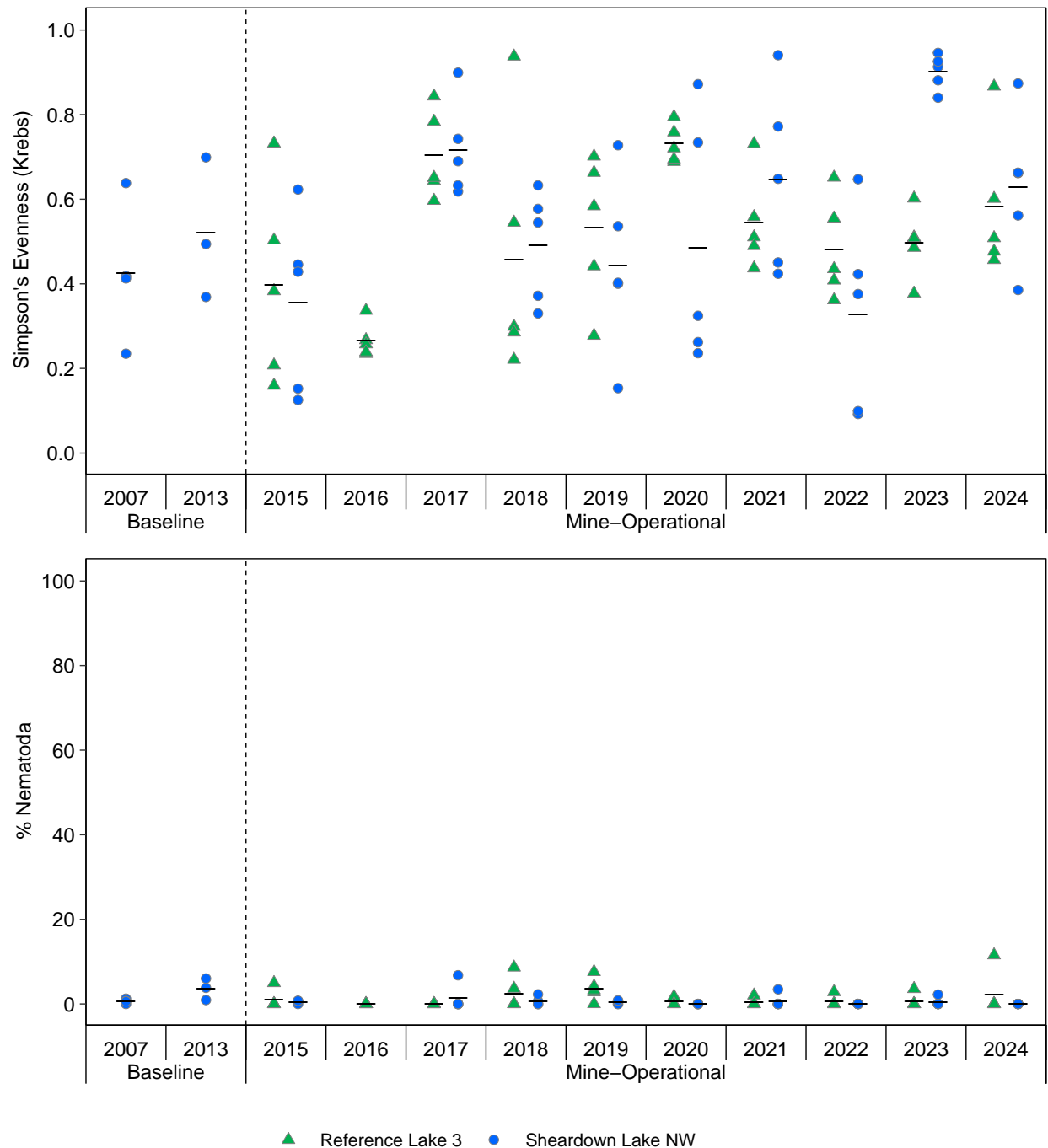


Figure F.11: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

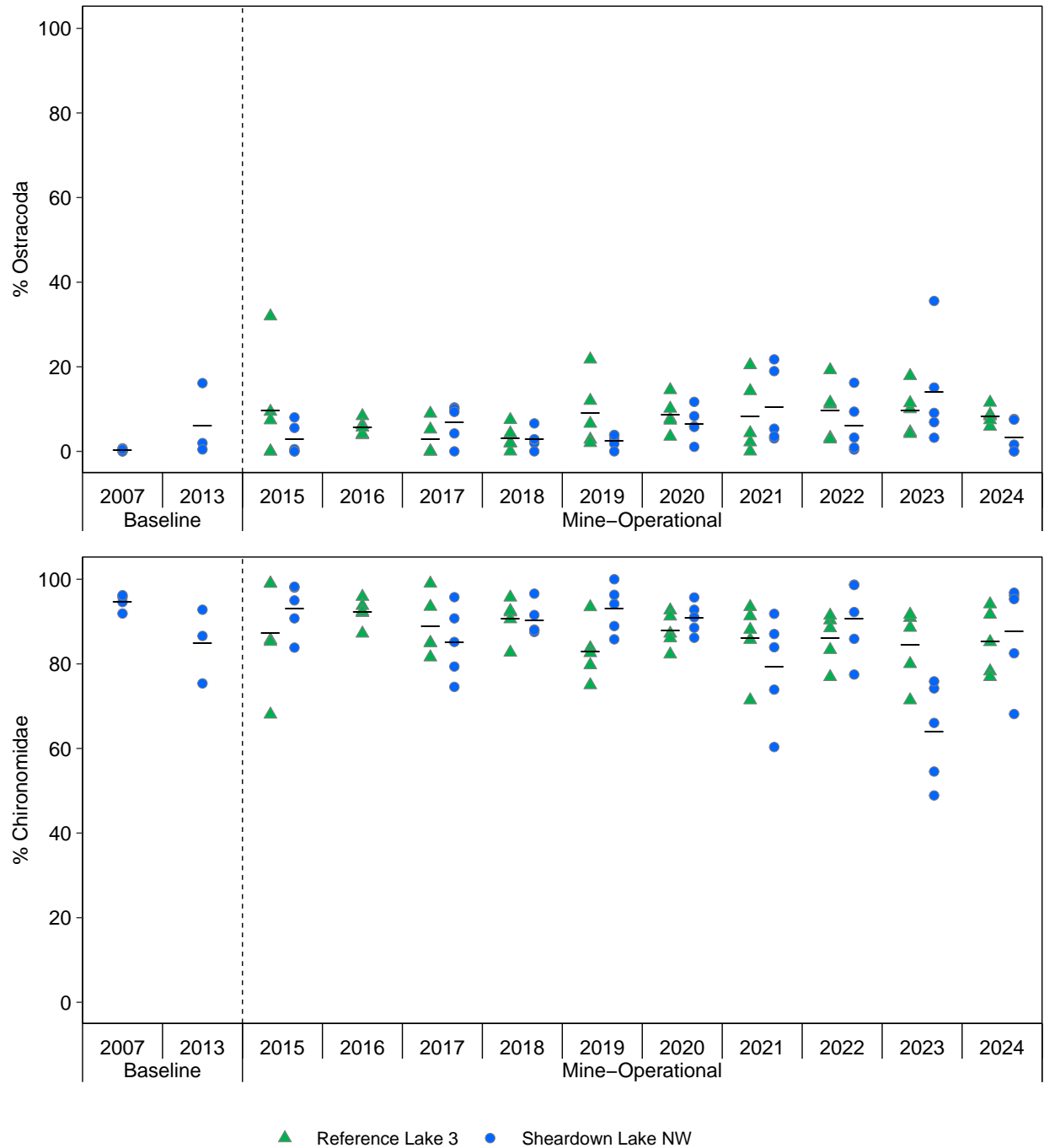


Figure F.11: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

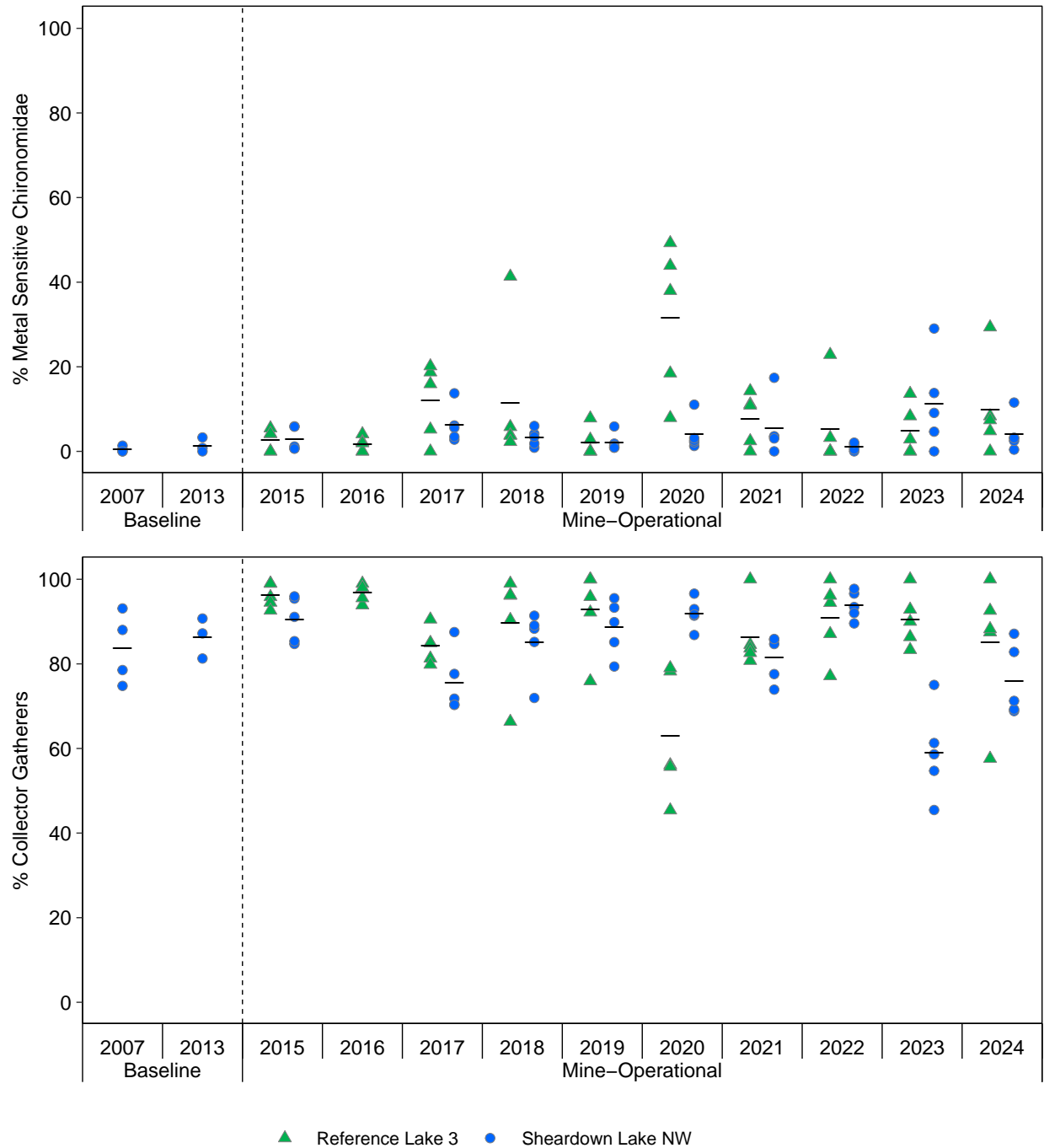


Figure F.11: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

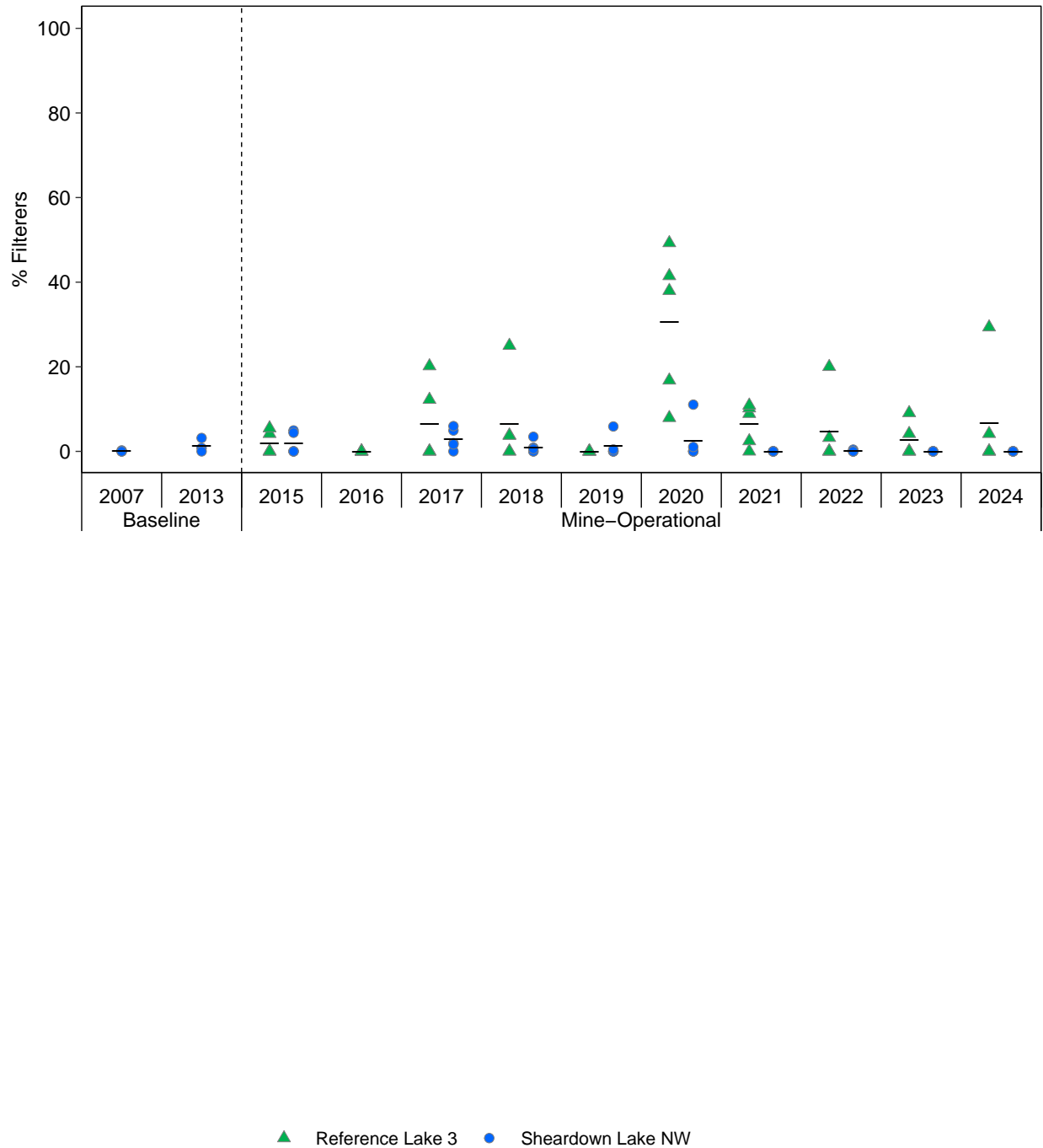


Figure F.11: Benthic Invertebrate Community Endpoints at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

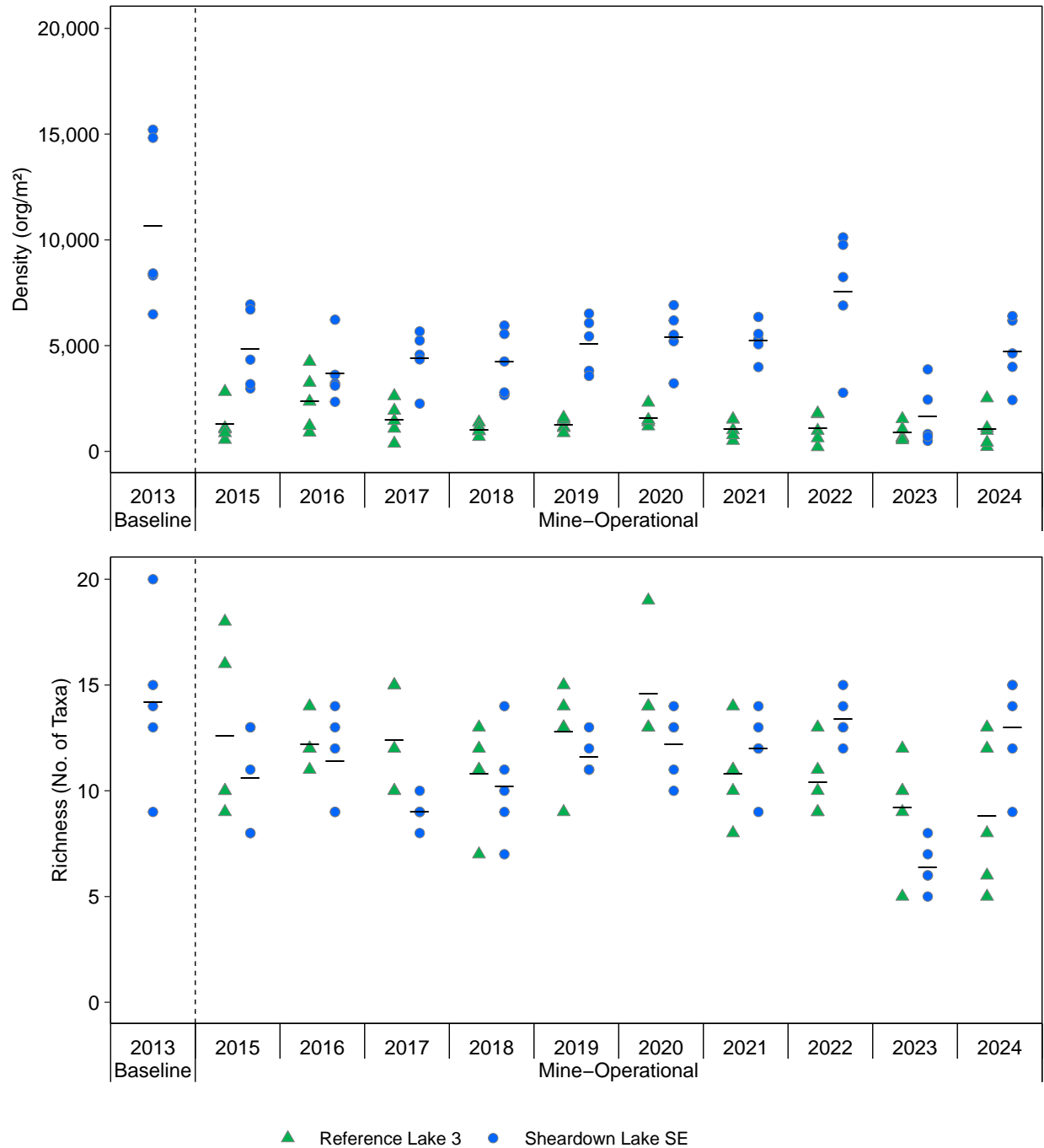


Figure F.12: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

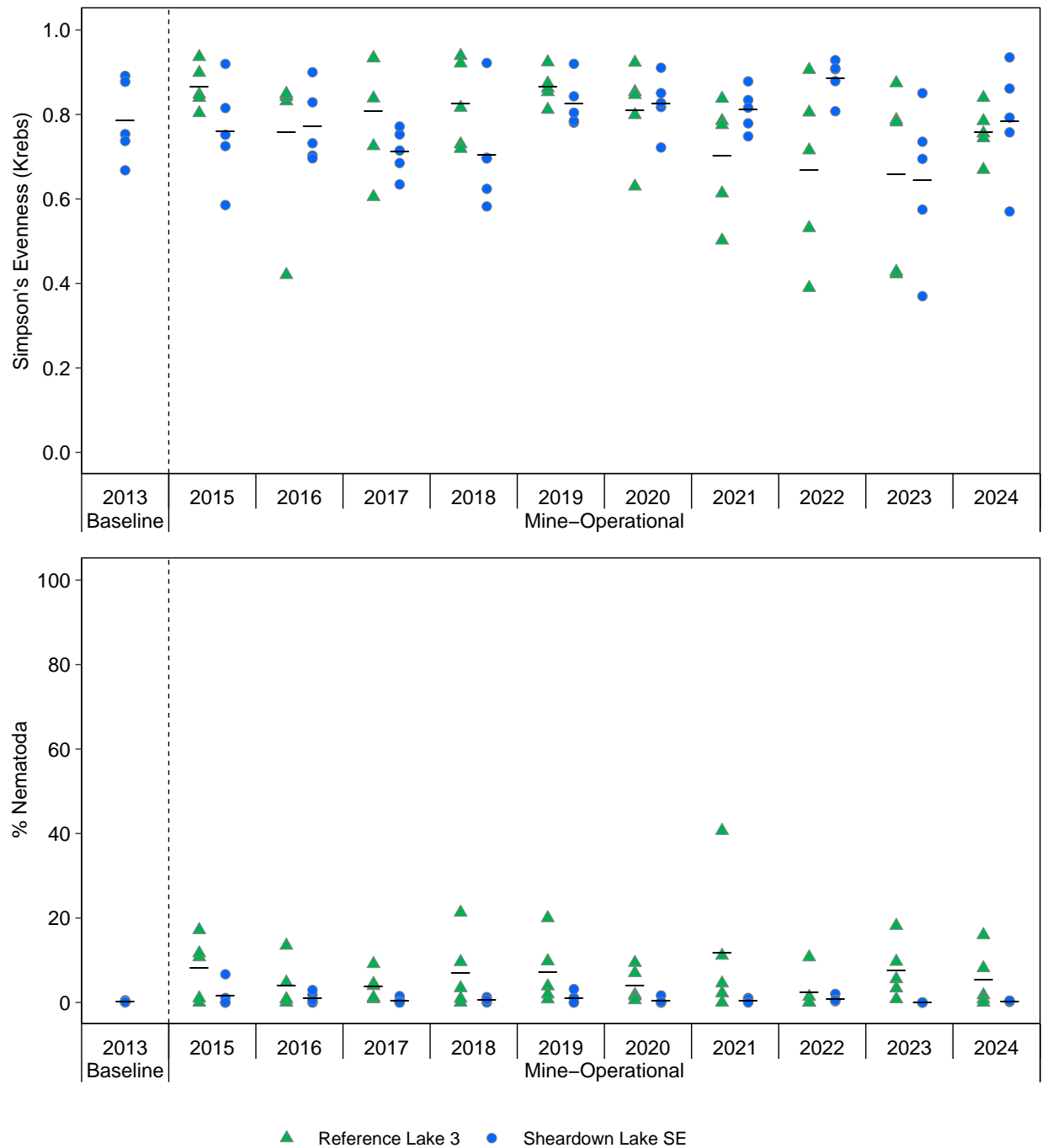


Figure F.12: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

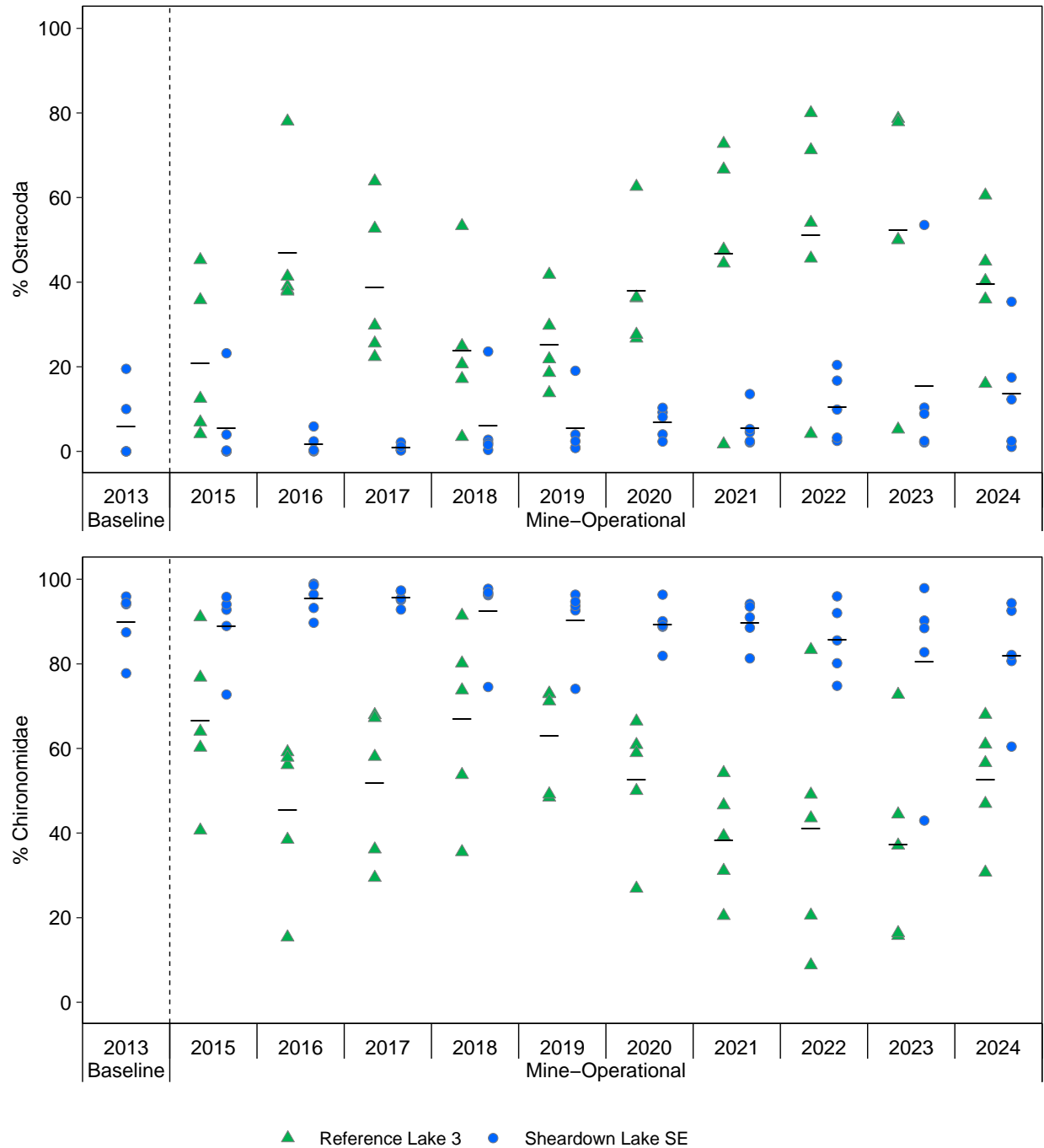


Figure F.12: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

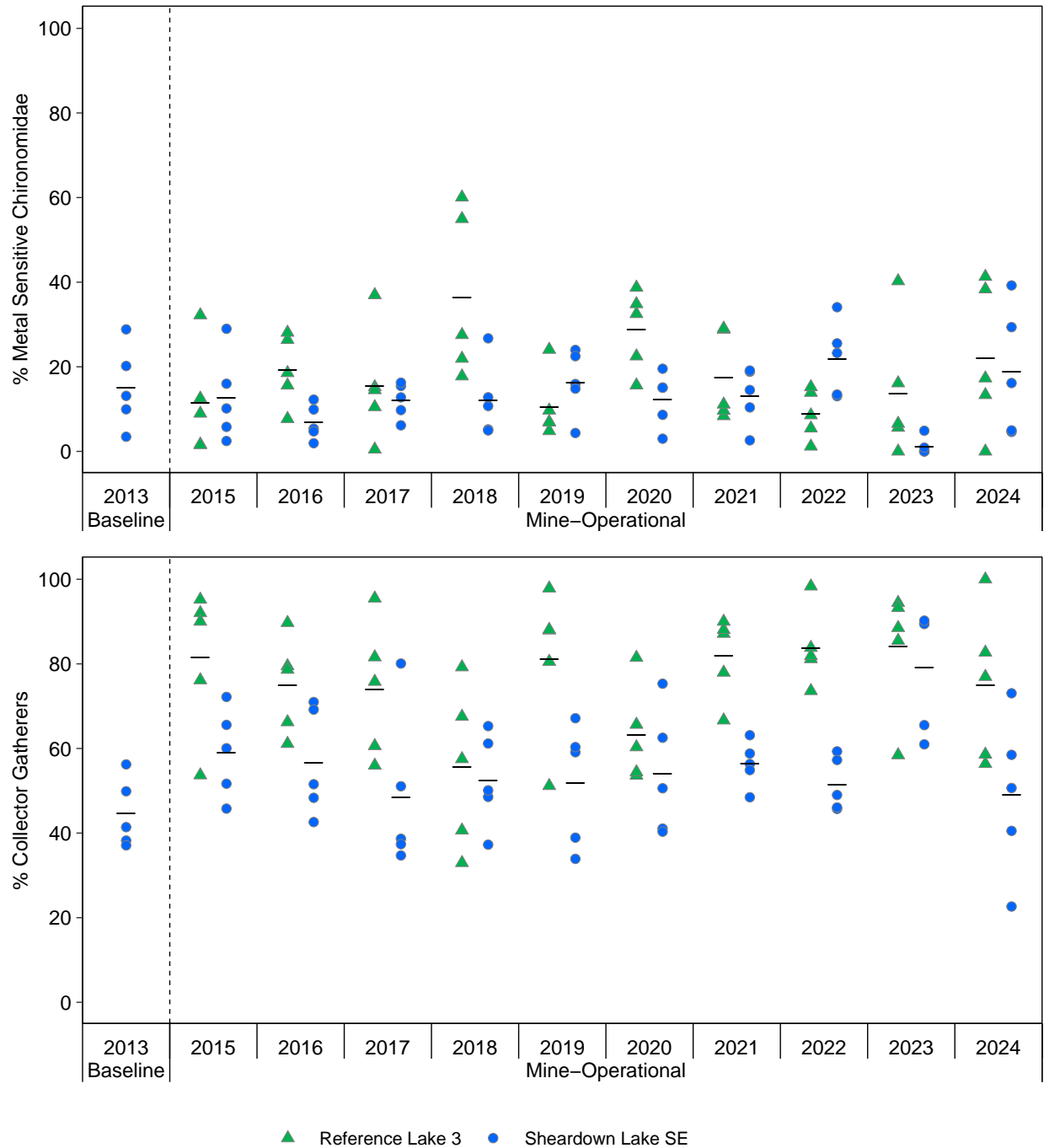


Figure F.12: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

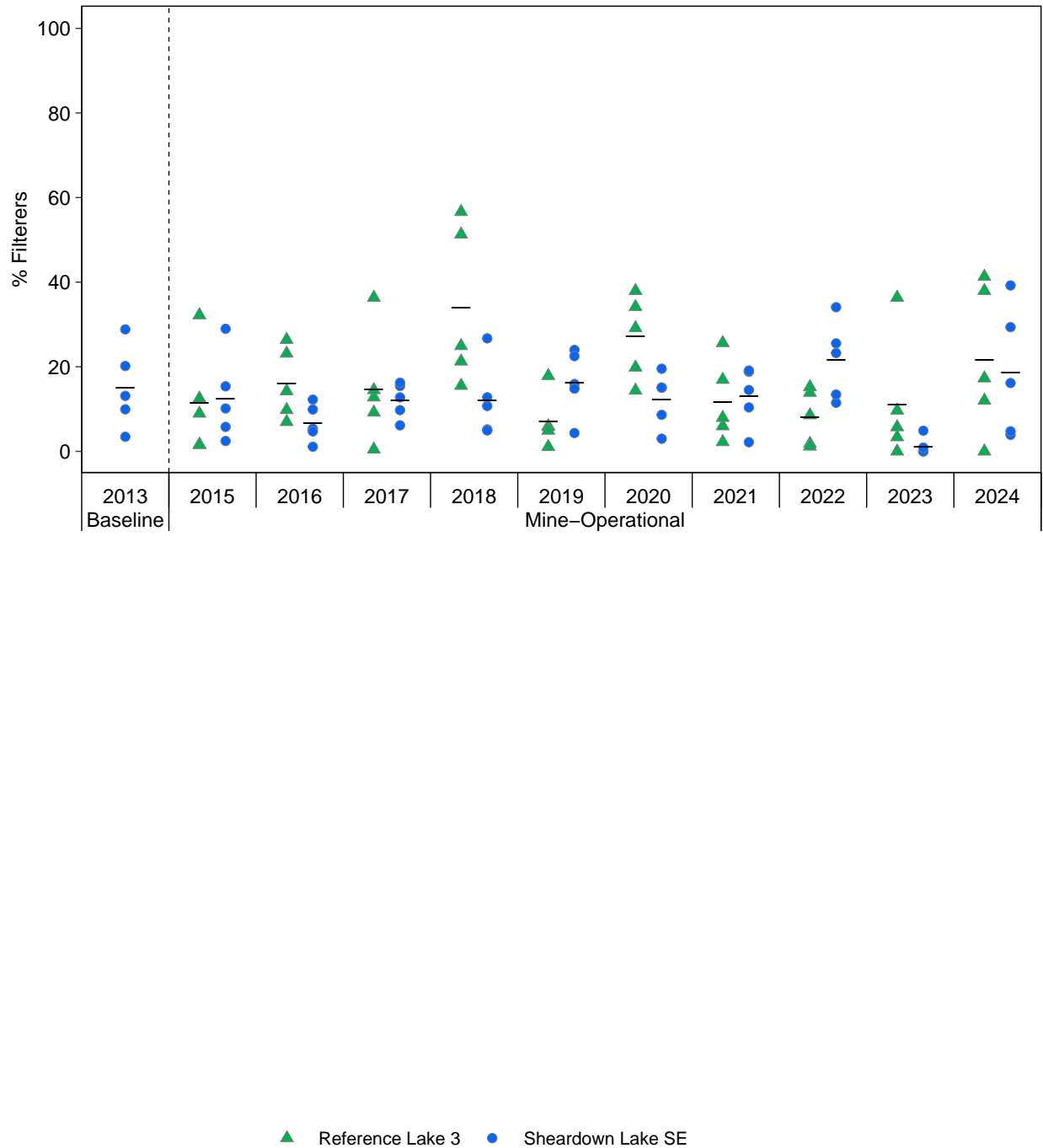


Figure F.12: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

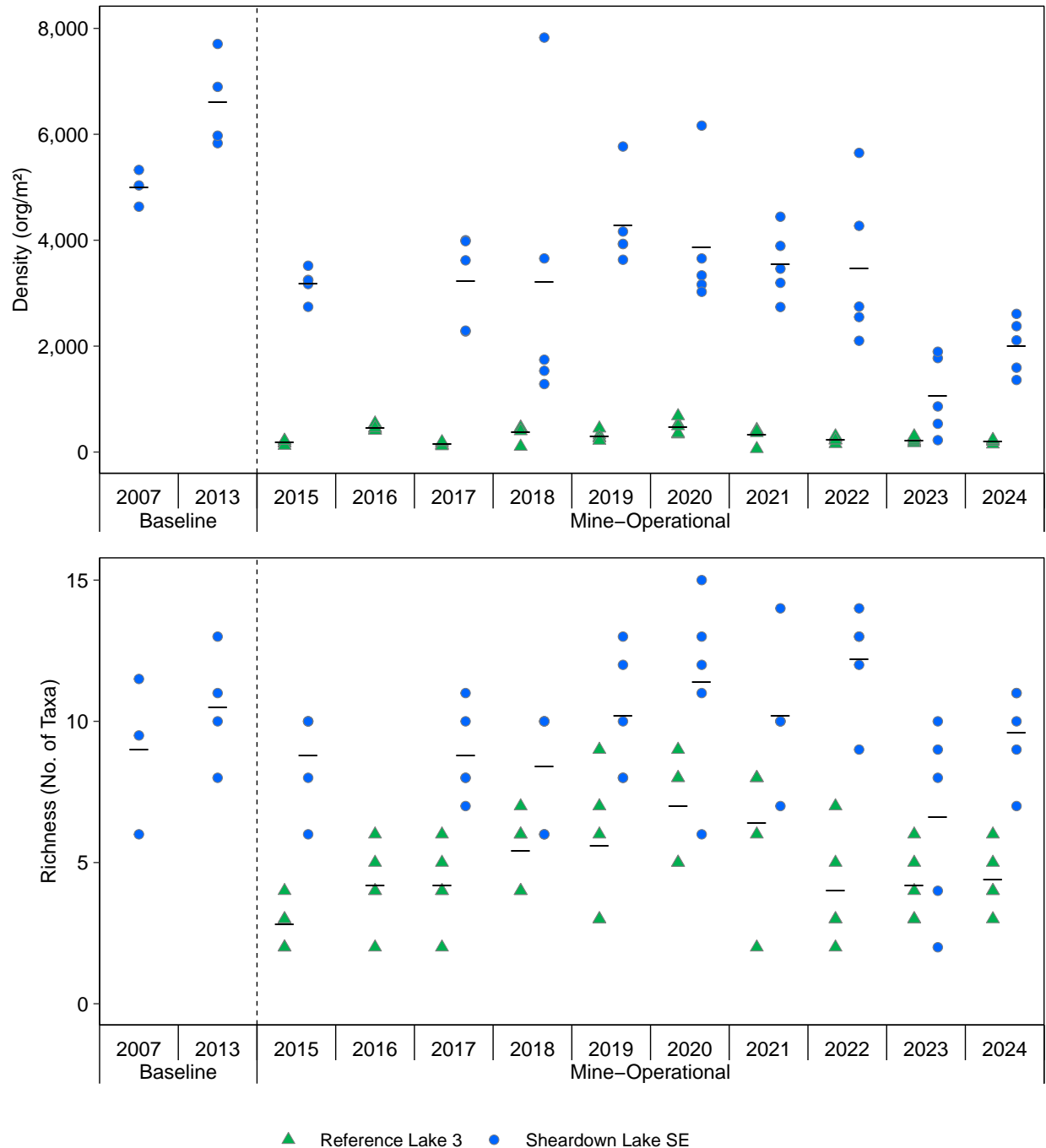


Figure F.13: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

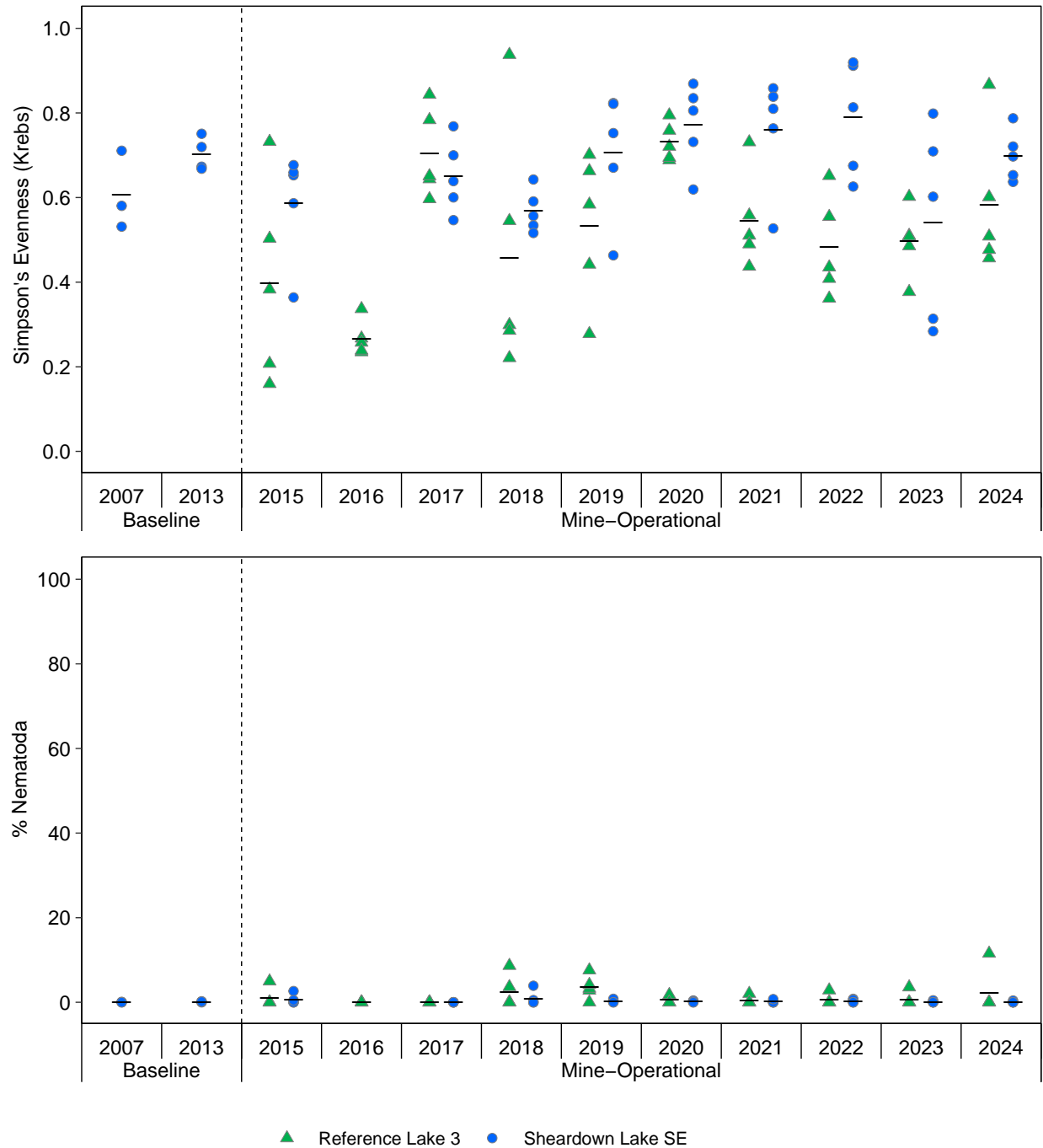


Figure F.13: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

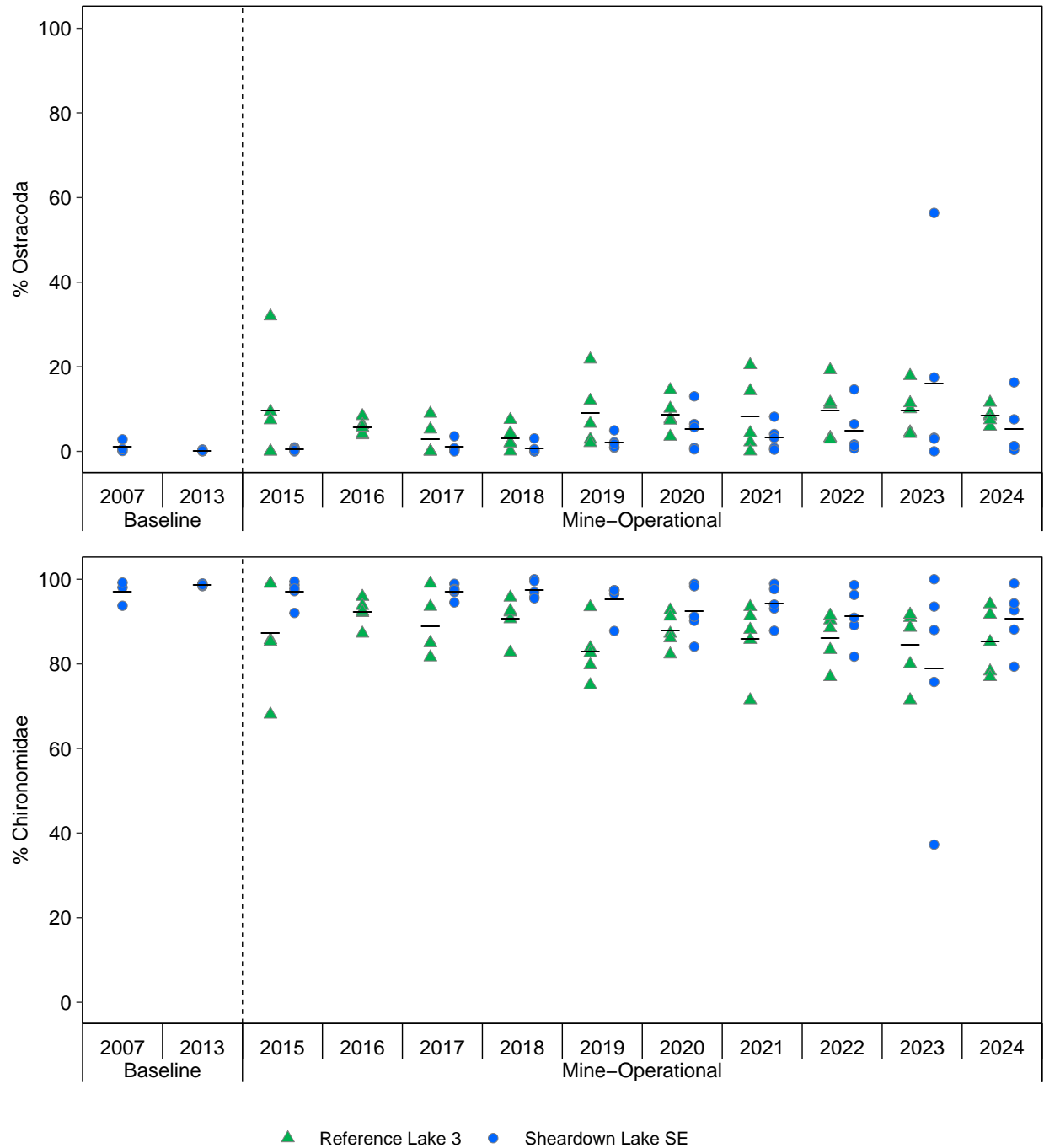


Figure F.13: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

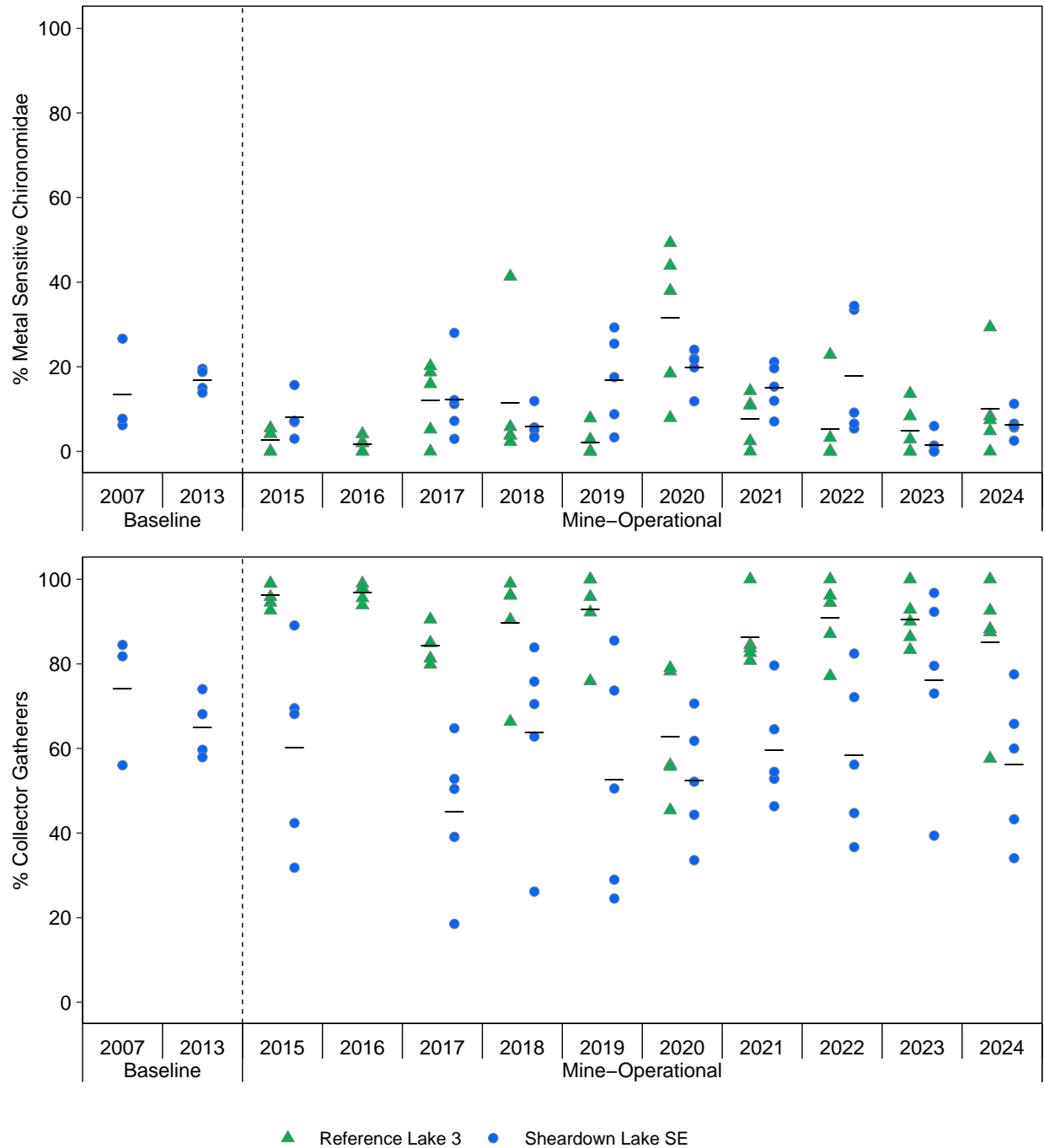
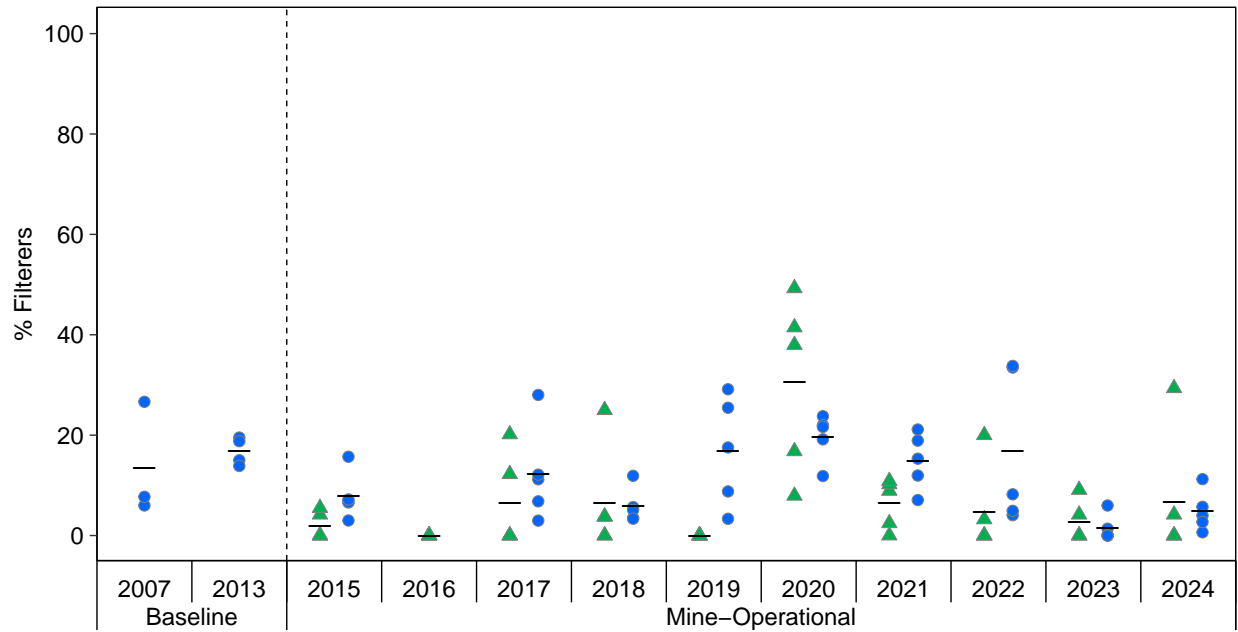


Figure F.13: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.



▲ Reference Lake 3 ● Sheardown Lake SE

Figure F.13: Benthic Invertebrate Community Endpoints at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

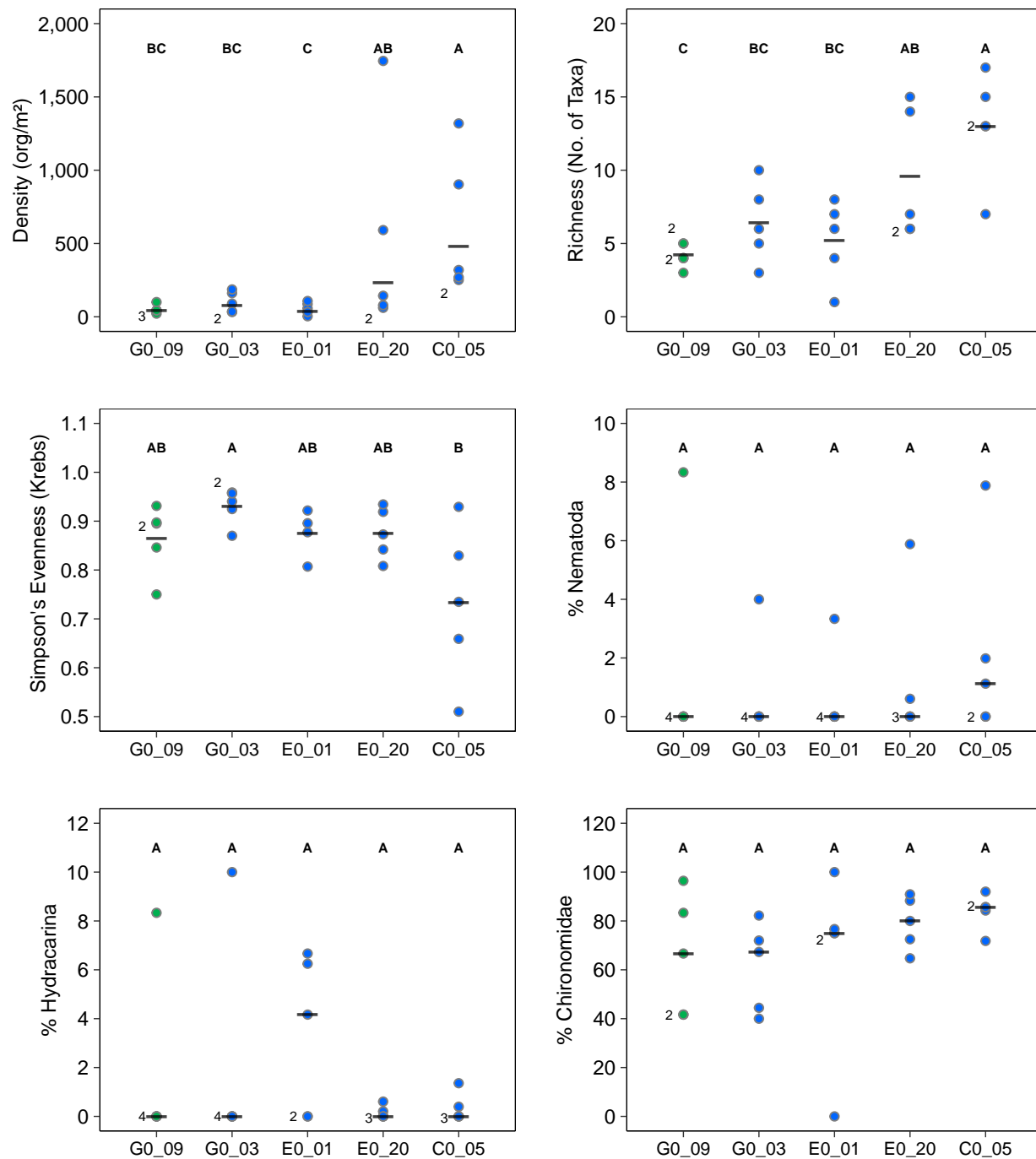


Figure F.14: Benthic Invertebrate Community Endpoints at Mary River Reference (G0-09), Upstream (G0-03), and Downstream (E0-01, E0-20, C0-05) Areas, Mary River Project CREMP, August 2024

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.

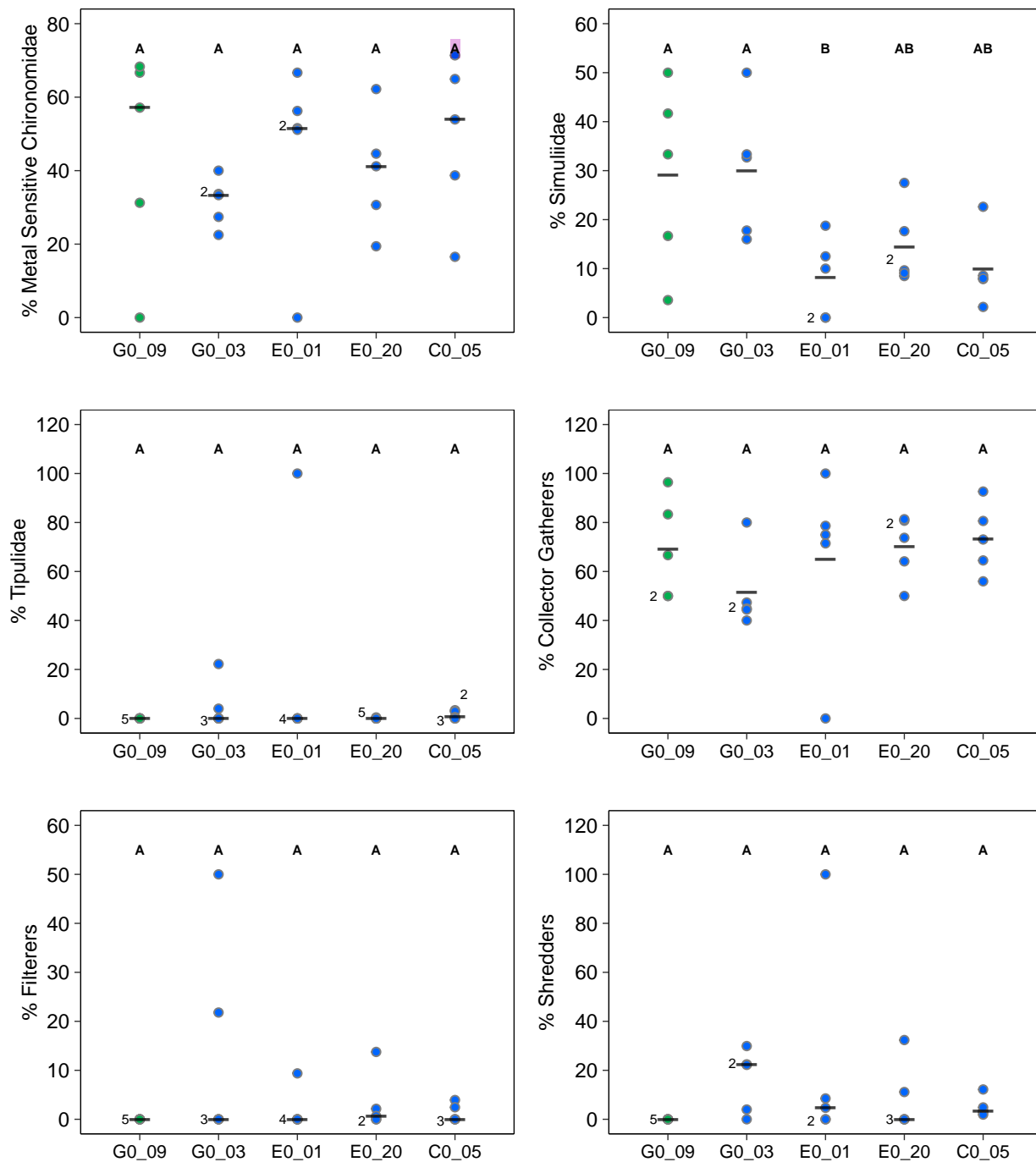


Figure F.14: Benthic Invertebrate Community Endpoints at Mary River Reference (G0-09), Upstream (G0-03), and Downstream (E0-01, E0-20, C0-05) Areas, Mary River Project CREMP, August 2024

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.

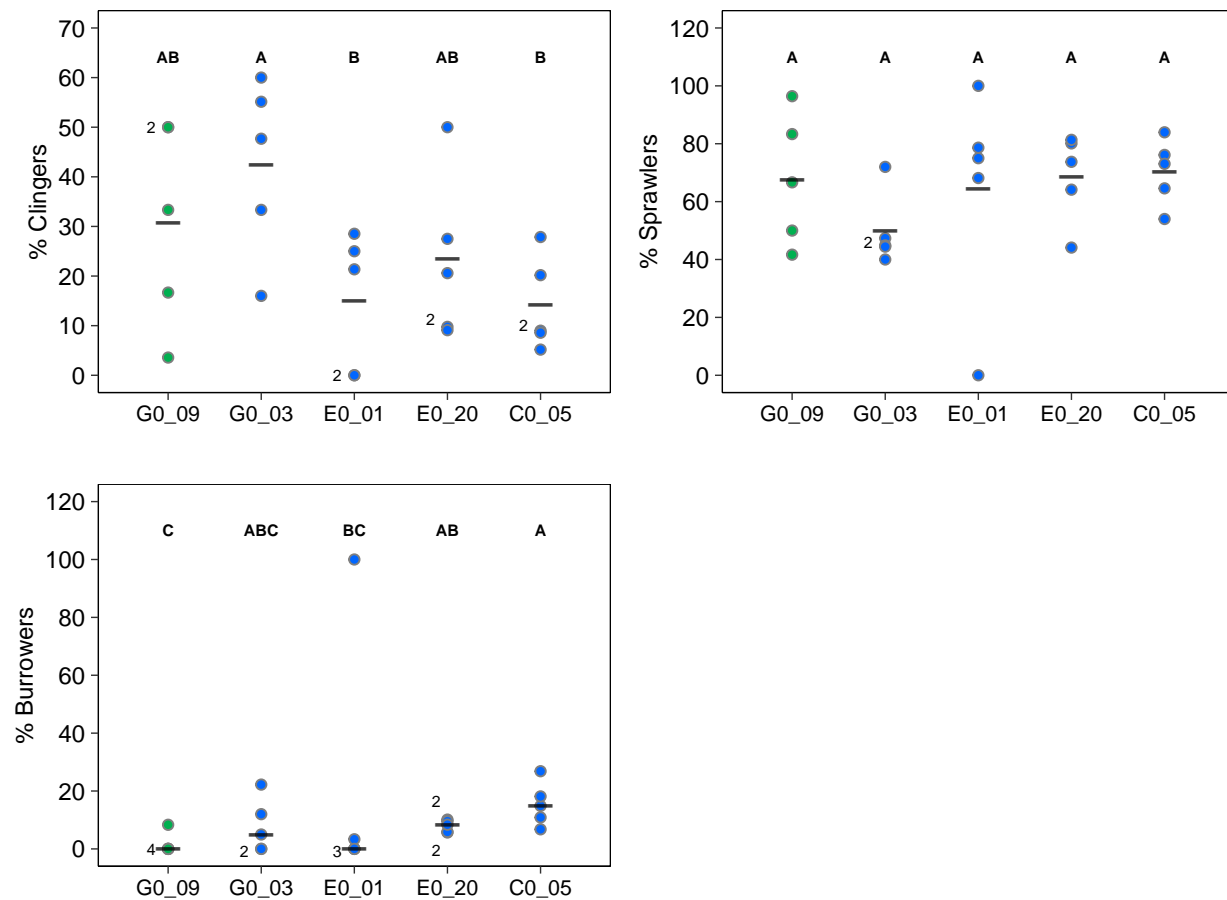


Figure F.14: Benthic Invertebrate Community Endpoints at Mary River Reference (G0-09), Upstream (G0-03), and Downstream (E0-01, E0-20, C0-05) Areas, Mary River Project CREMP, August 2024

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.

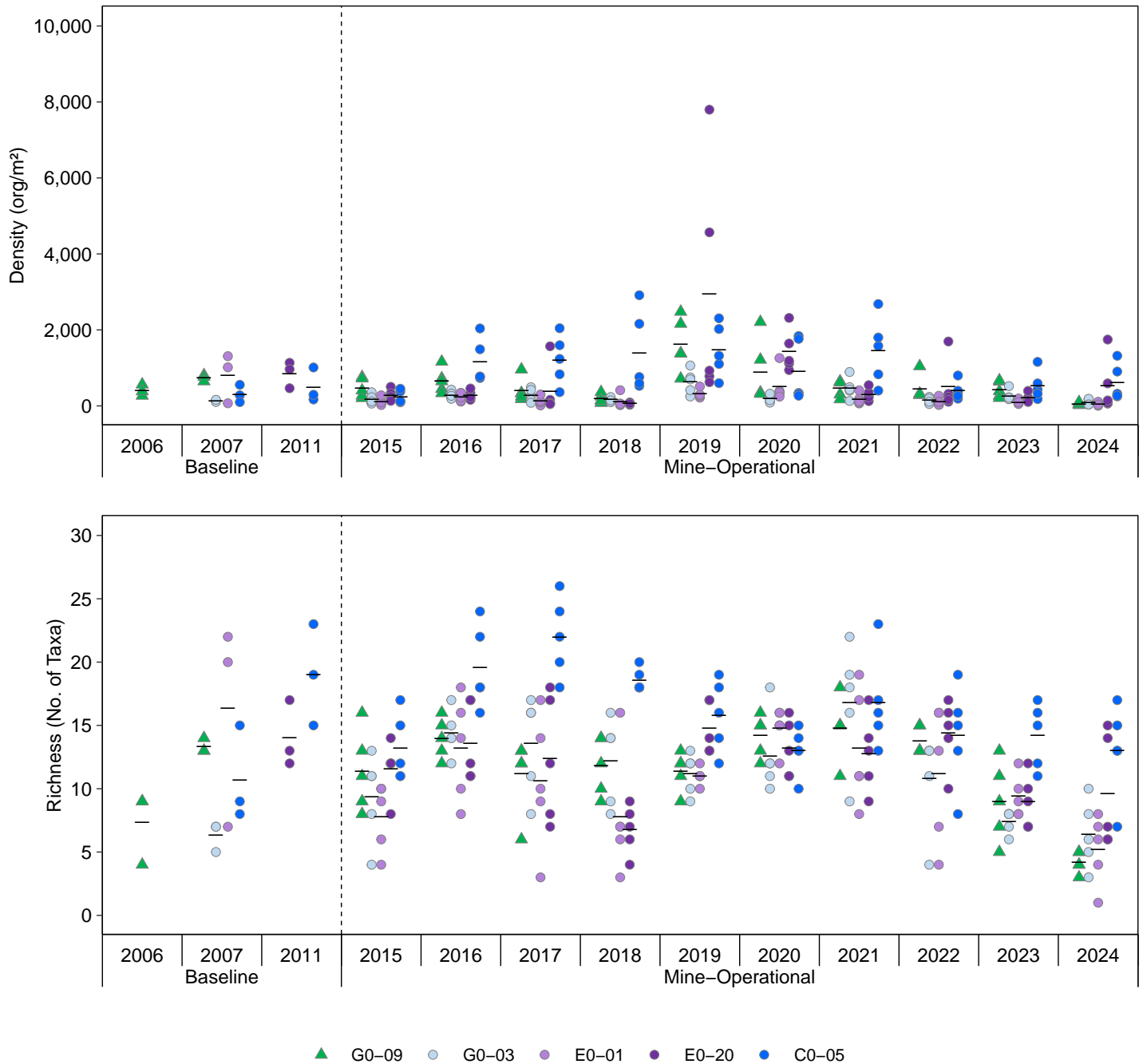


Figure F.15: Benthic Invertebrate Community Endpoints at Mary River Reference (G0-09), Upstream (G0-03), and Downstream (E0-01, E0-20, C0-05) Areas, among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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

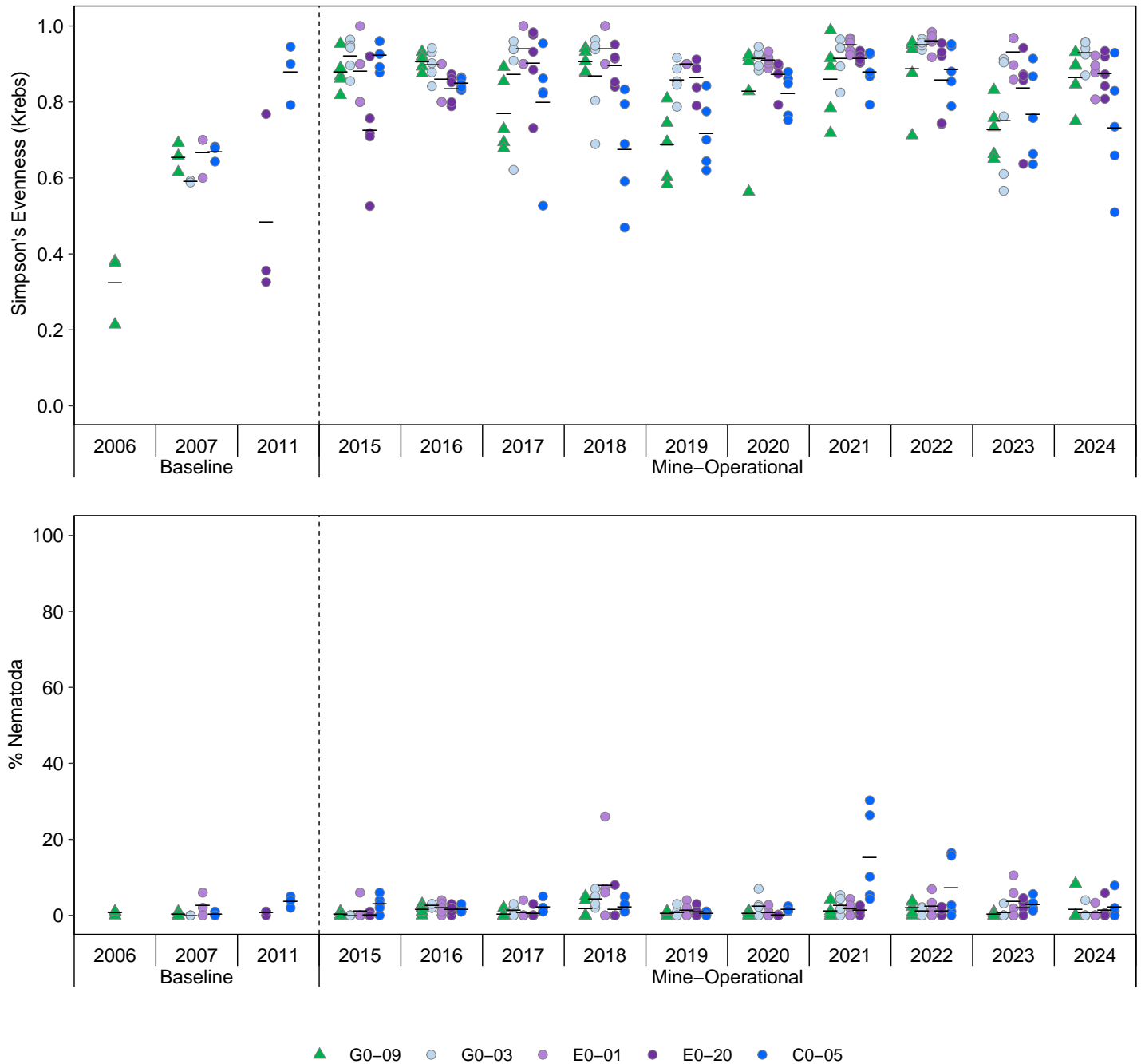


Figure F.15: Benthic Invertebrate Community Endpoints at Mary River Reference (G0-09), Upstream (G0-03), and Downstream (E0-01, E0-20, C0-05) Areas, among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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

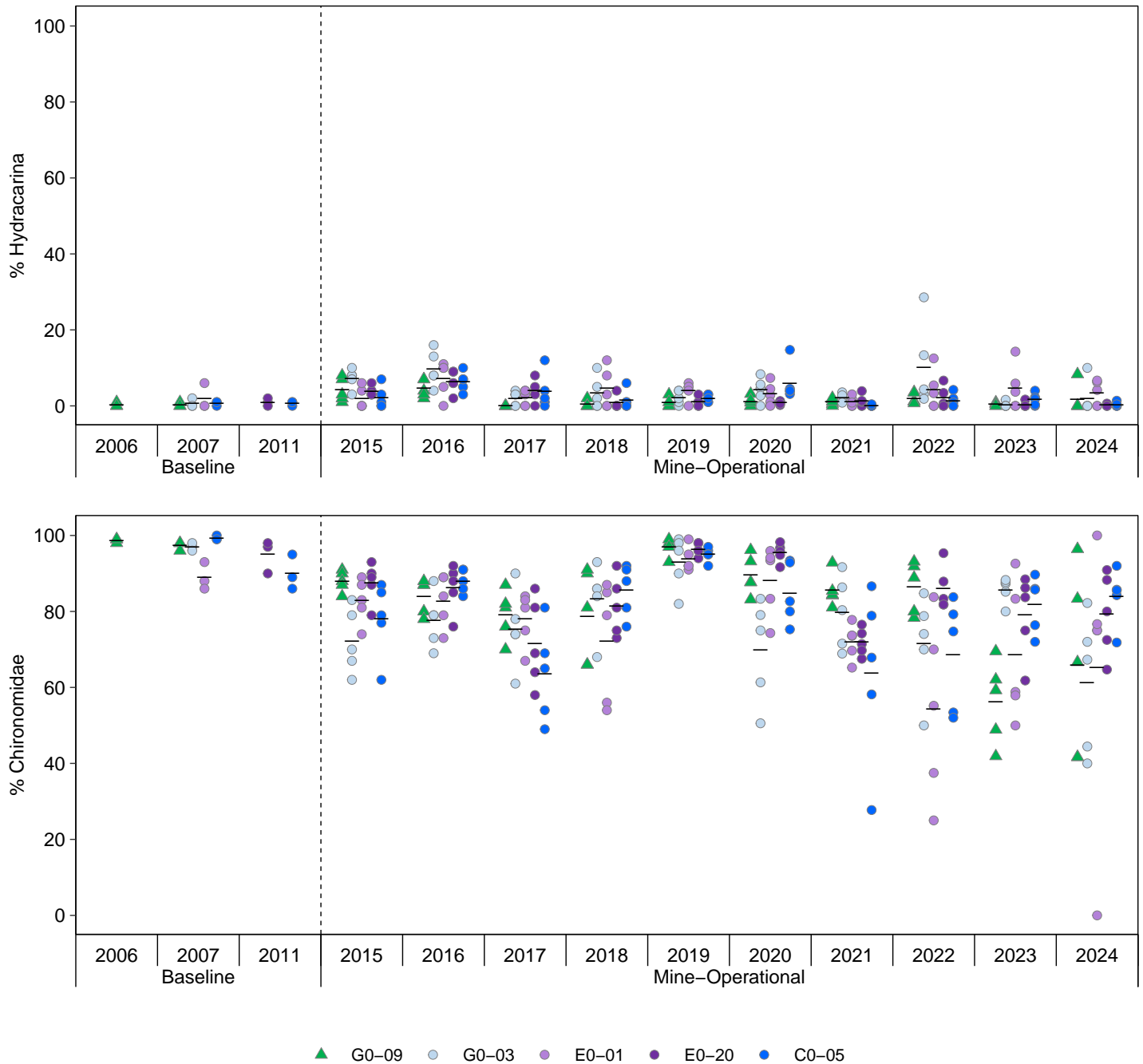


Figure F.15: Benthic Invertebrate Community Endpoints at Mary River Reference (G0-09), Upstream (G0-03), and Downstream (E0-01, E0-20, C0-05) Areas, among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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

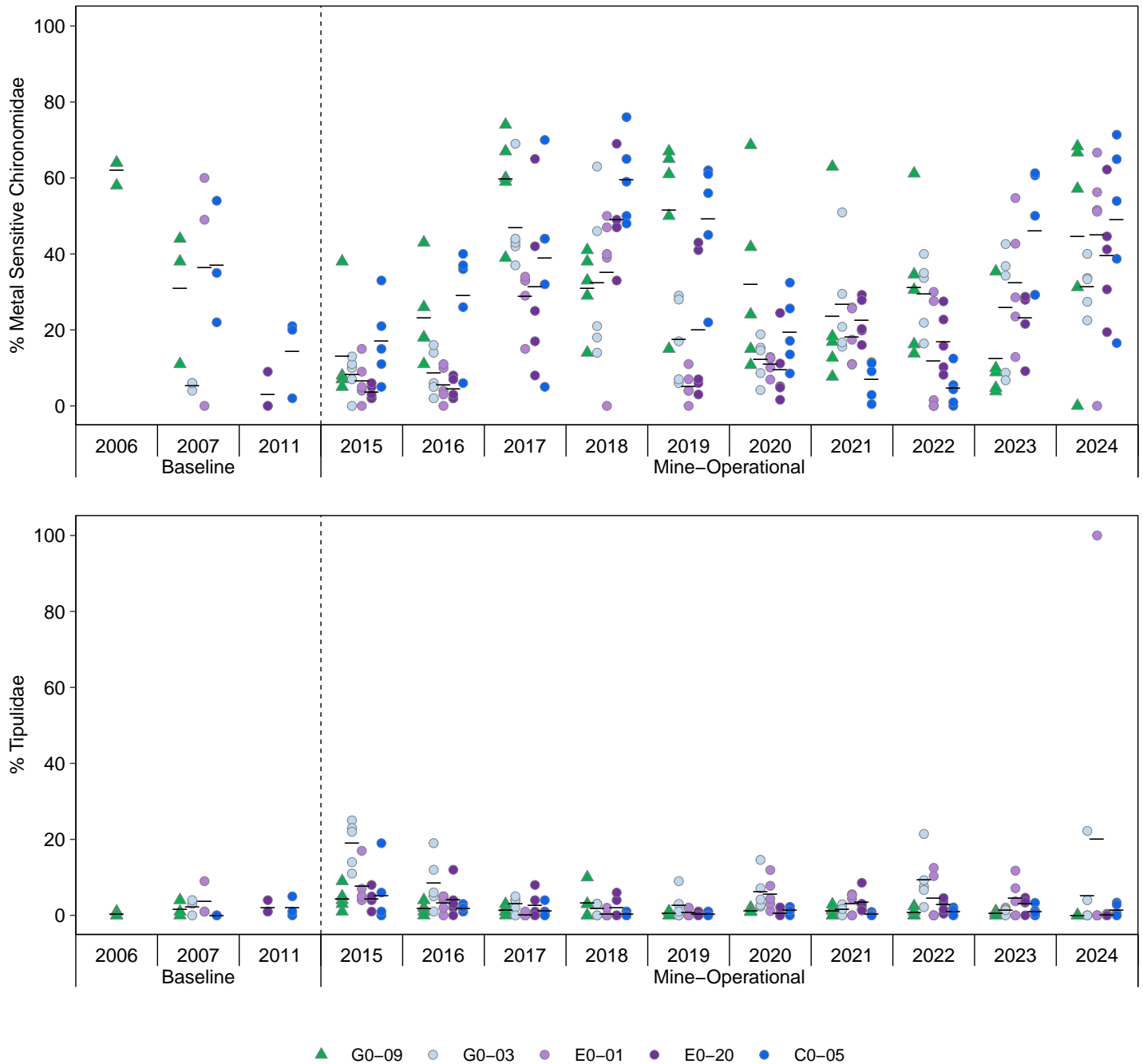


Figure F.15: Benthic Invertebrate Community Endpoints at Mary River Reference (G0-09), Upstream (G0-03), and Downstream (E0-01, E0-20, C0-05) Areas, among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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

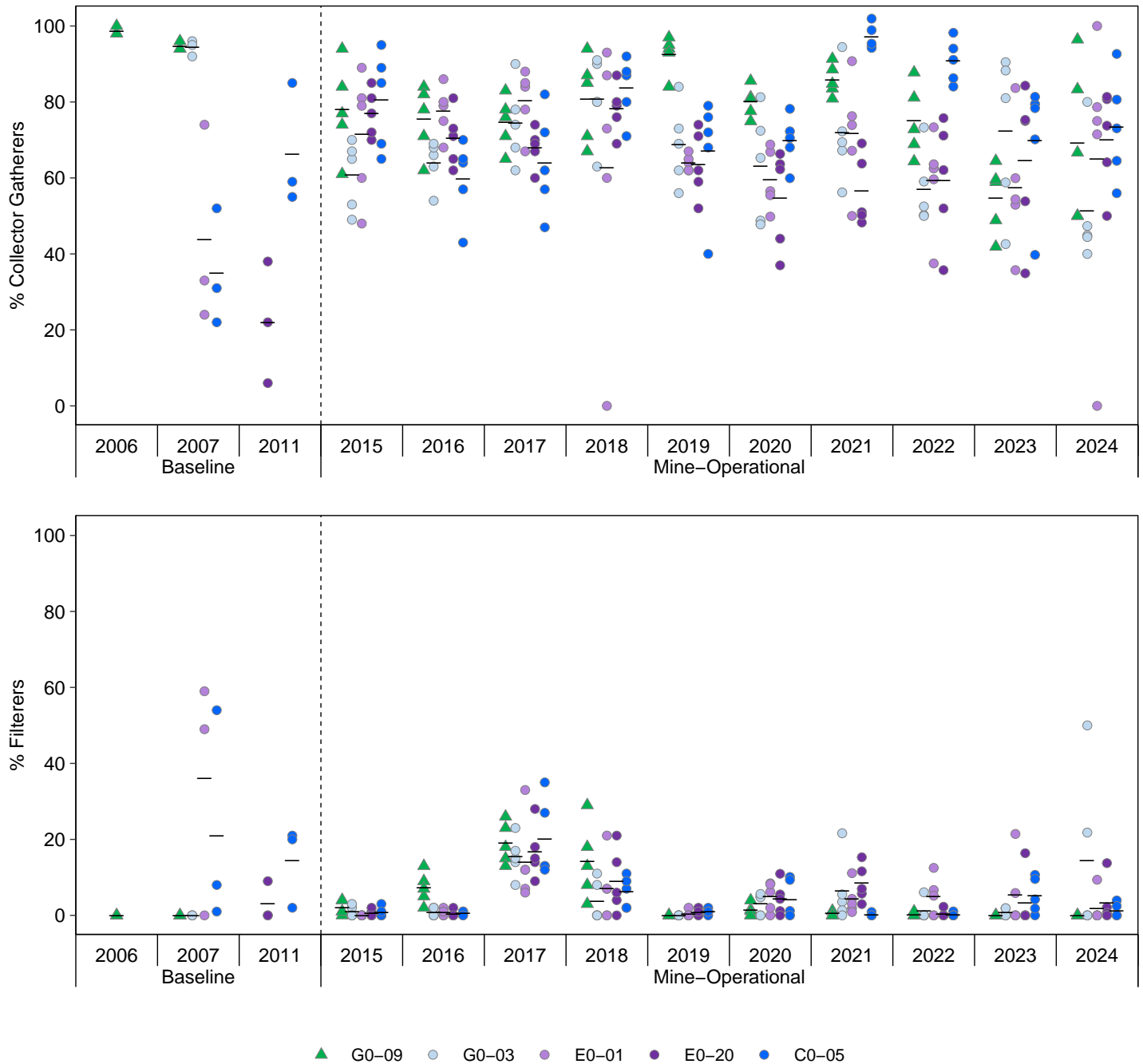


Figure F.15: Benthic Invertebrate Community Endpoints at Mary River Reference (G0-09), Upstream (G0-03), and Downstream (E0-01, E0-20, C0-05) Areas, among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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

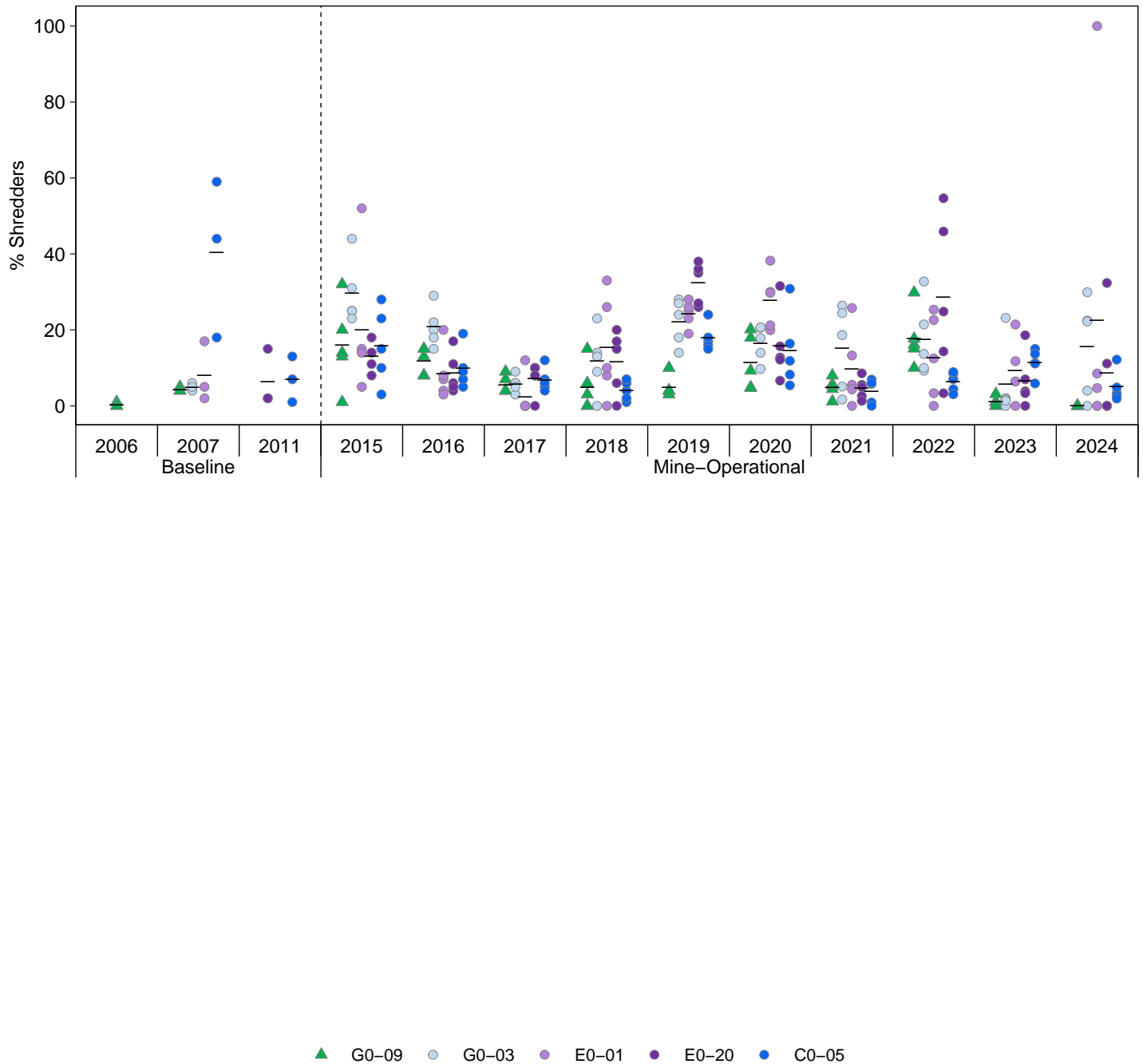


Figure F.15: Benthic Invertebrate Community Endpoints at Mary River Reference (G0-09), Upstream (G0-03), and Downstream (E0-01, E0-20, C0-05) Areas, among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

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

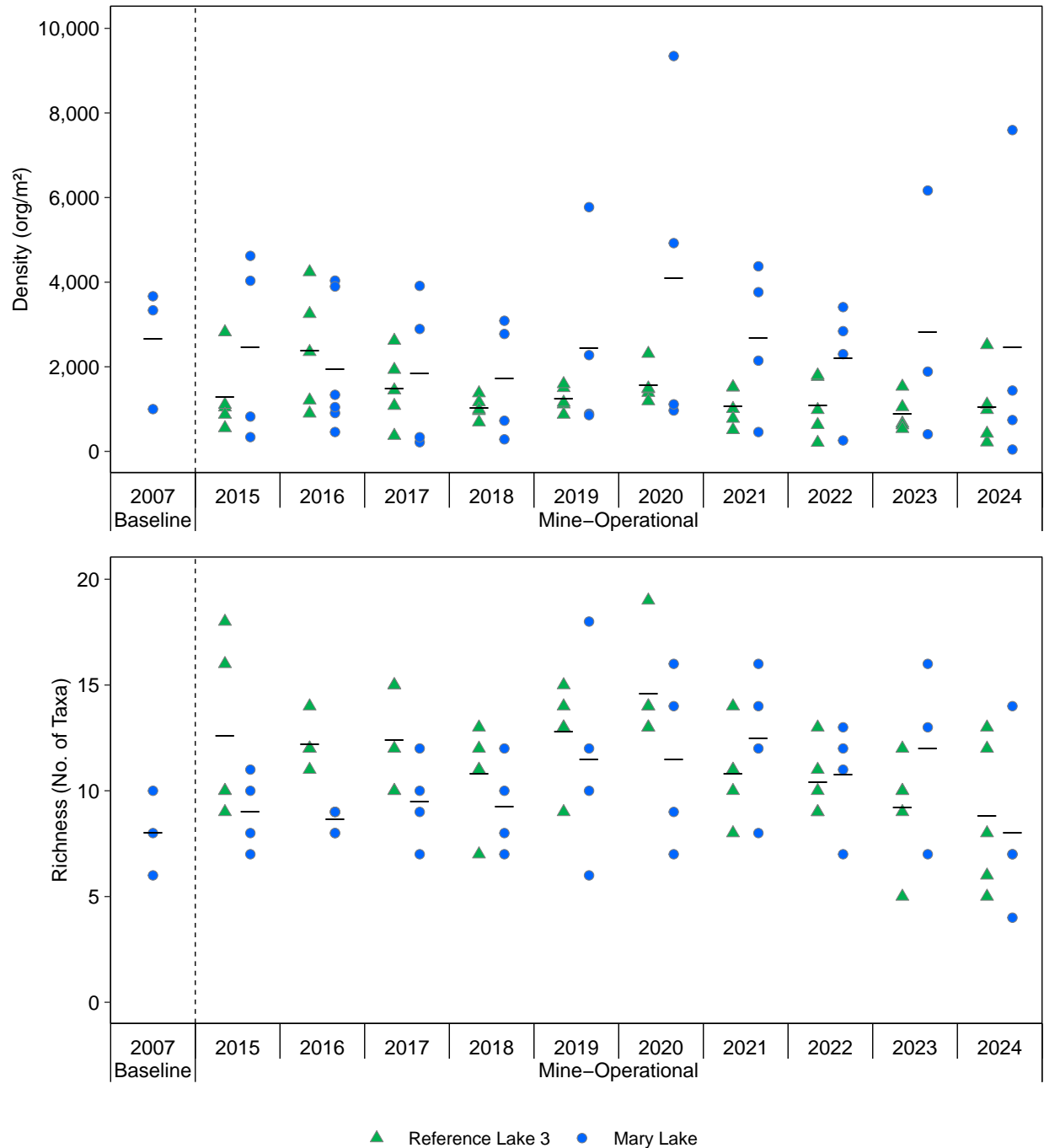


Figure F.16: Benthic Invertebrate Community Endpoints at Mary Lake (BL0) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

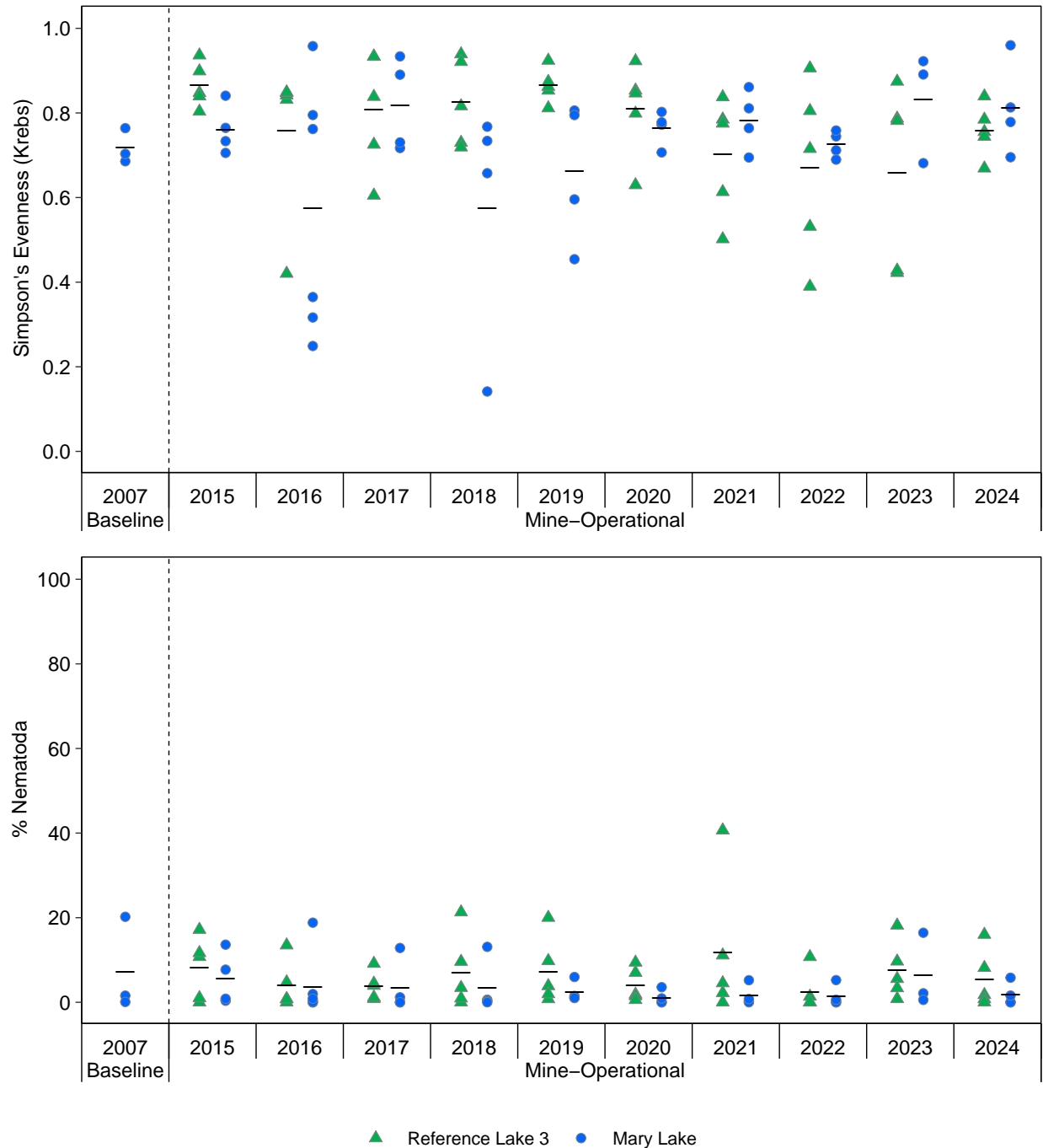


Figure F.16: Benthic Invertebrate Community Endpoints at Mary Lake (BL0) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

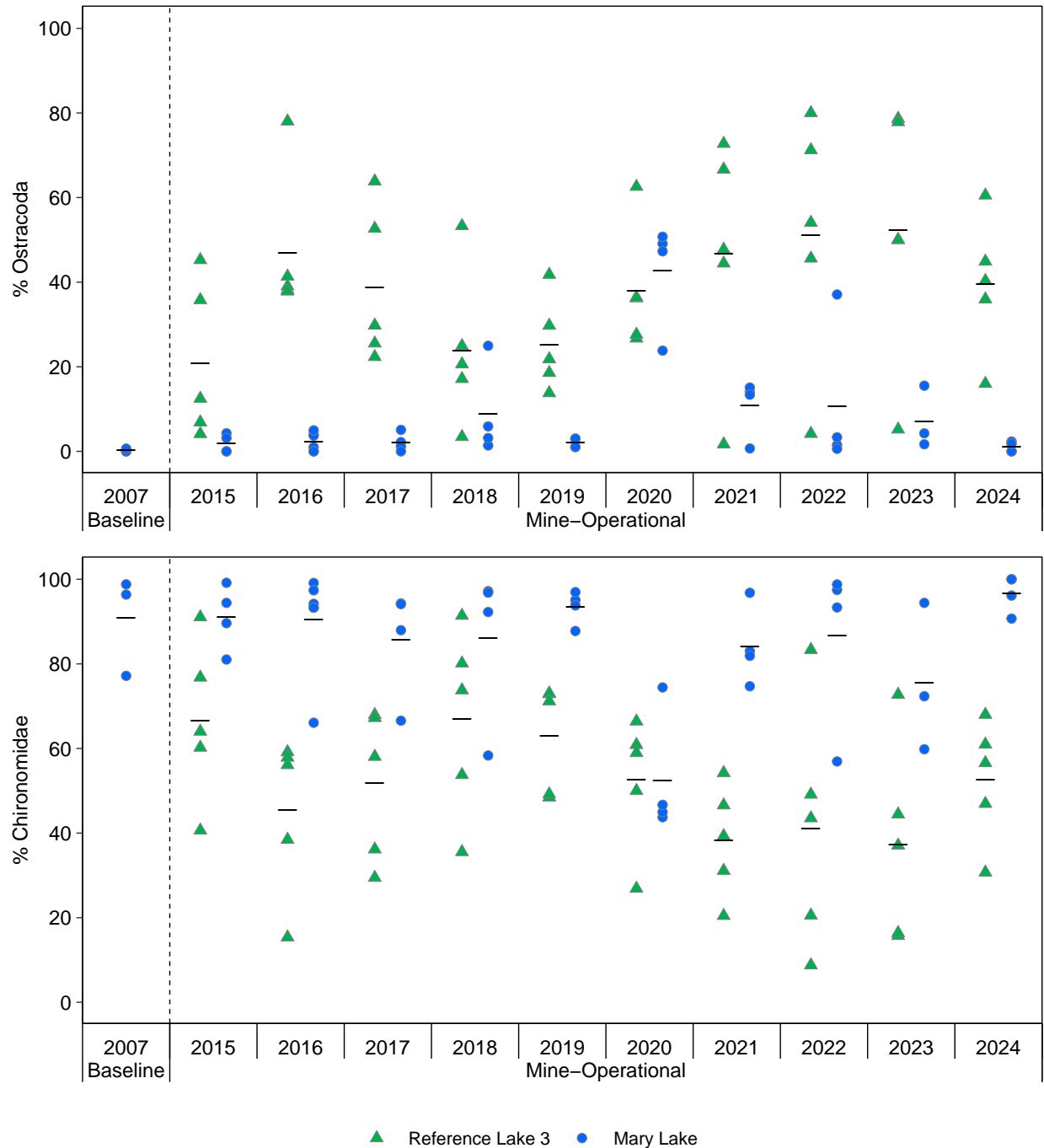


Figure F.16: Benthic Invertebrate Community Endpoints at Mary Lake (BL0) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

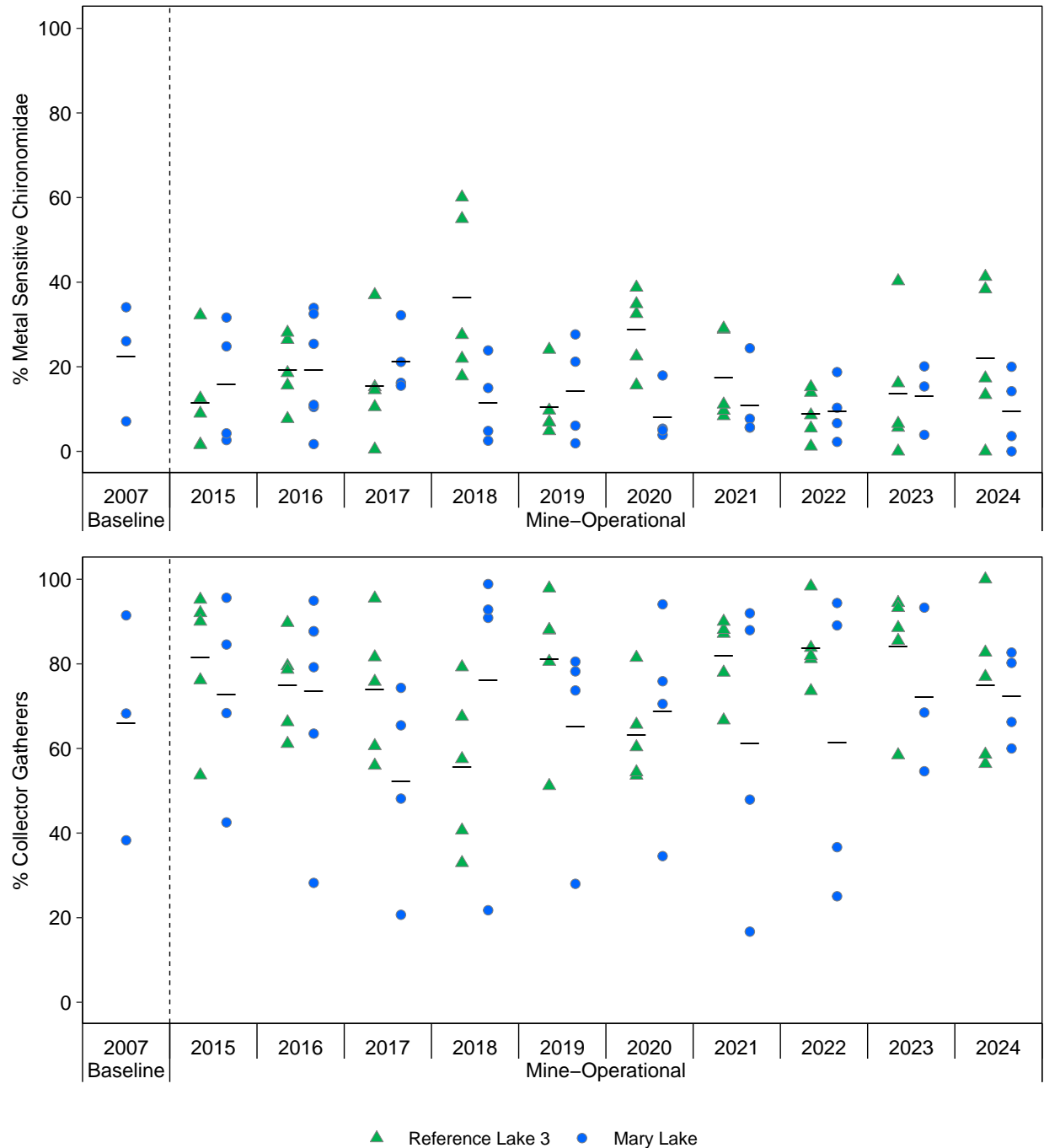
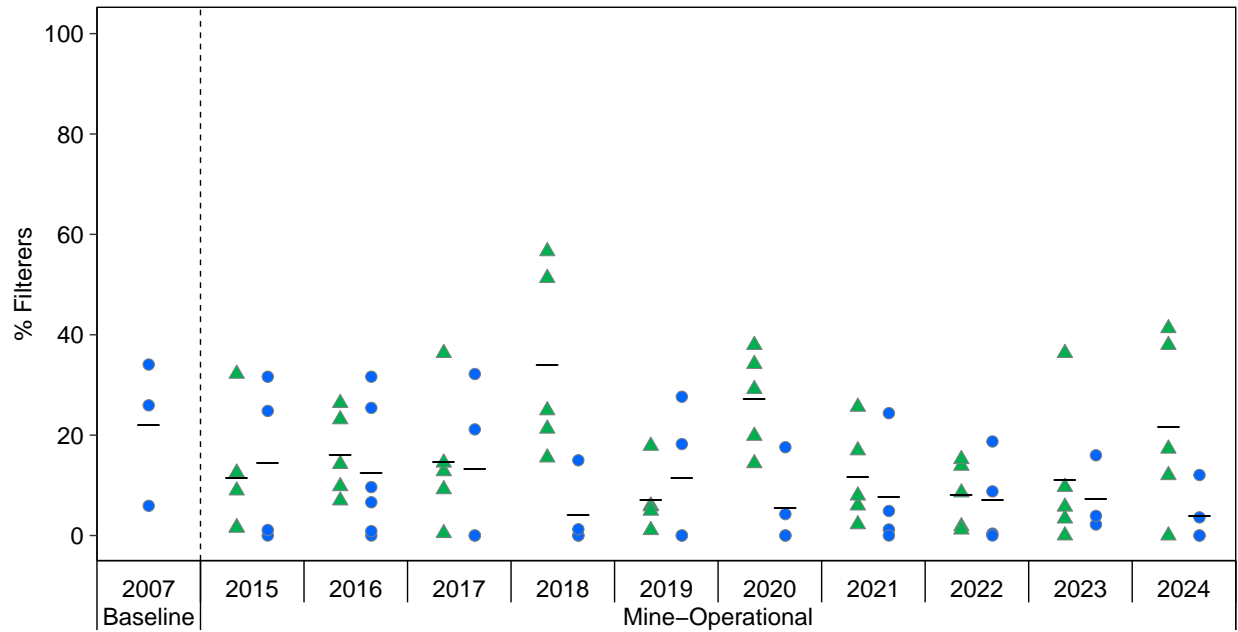


Figure F.16: Benthic Invertebrate Community Endpoints at Mary Lake (BL0) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.



▲ Reference Lake 3 ● Mary Lake

Figure F.16: Benthic Invertebrate Community Endpoints at Mary Lake (BL0) and Reference Lake 3 (REF-03) Littoral Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

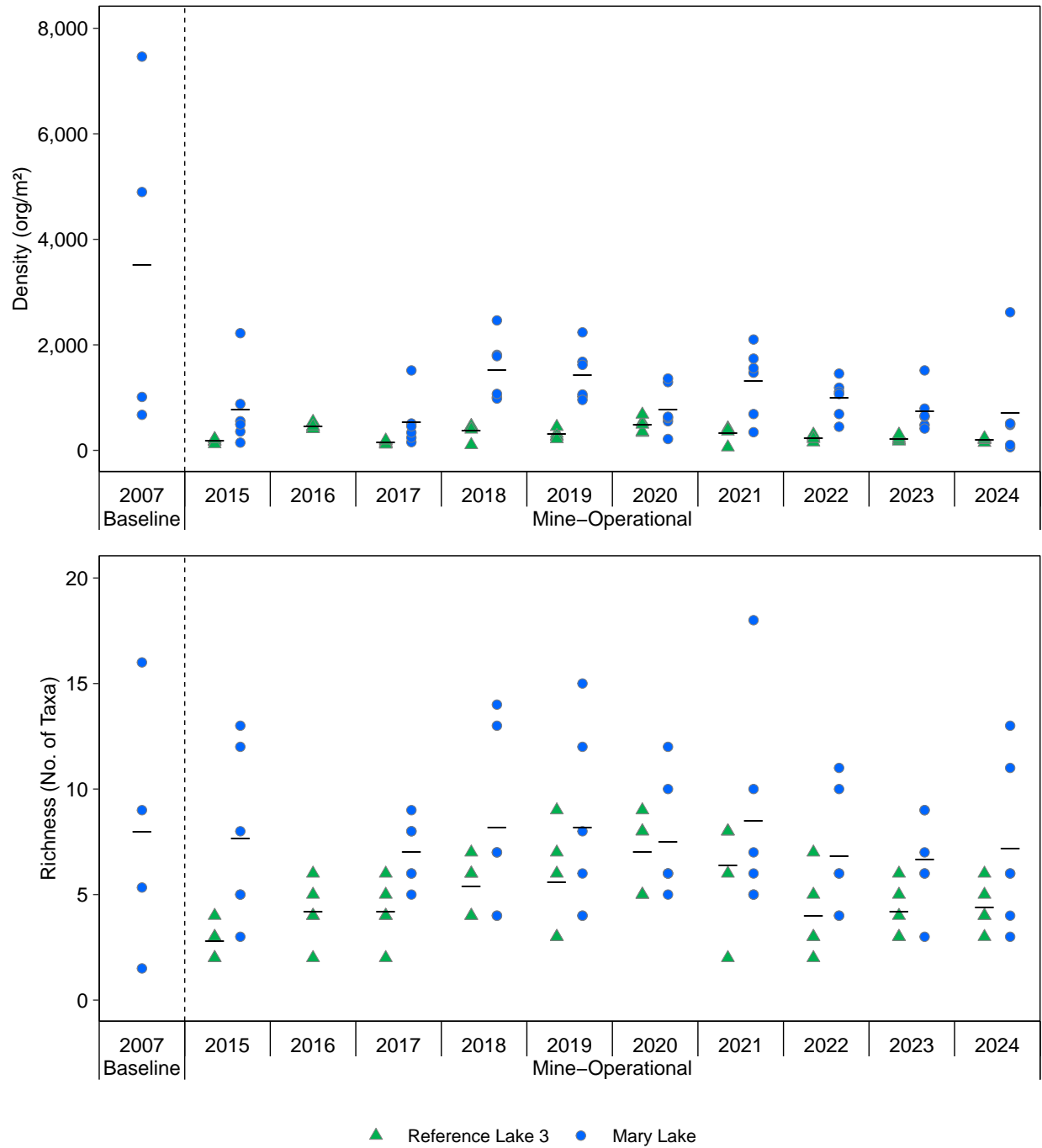


Figure F.17: Benthic Invertebrate Community Endpoints at Mary Lake (BL0) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

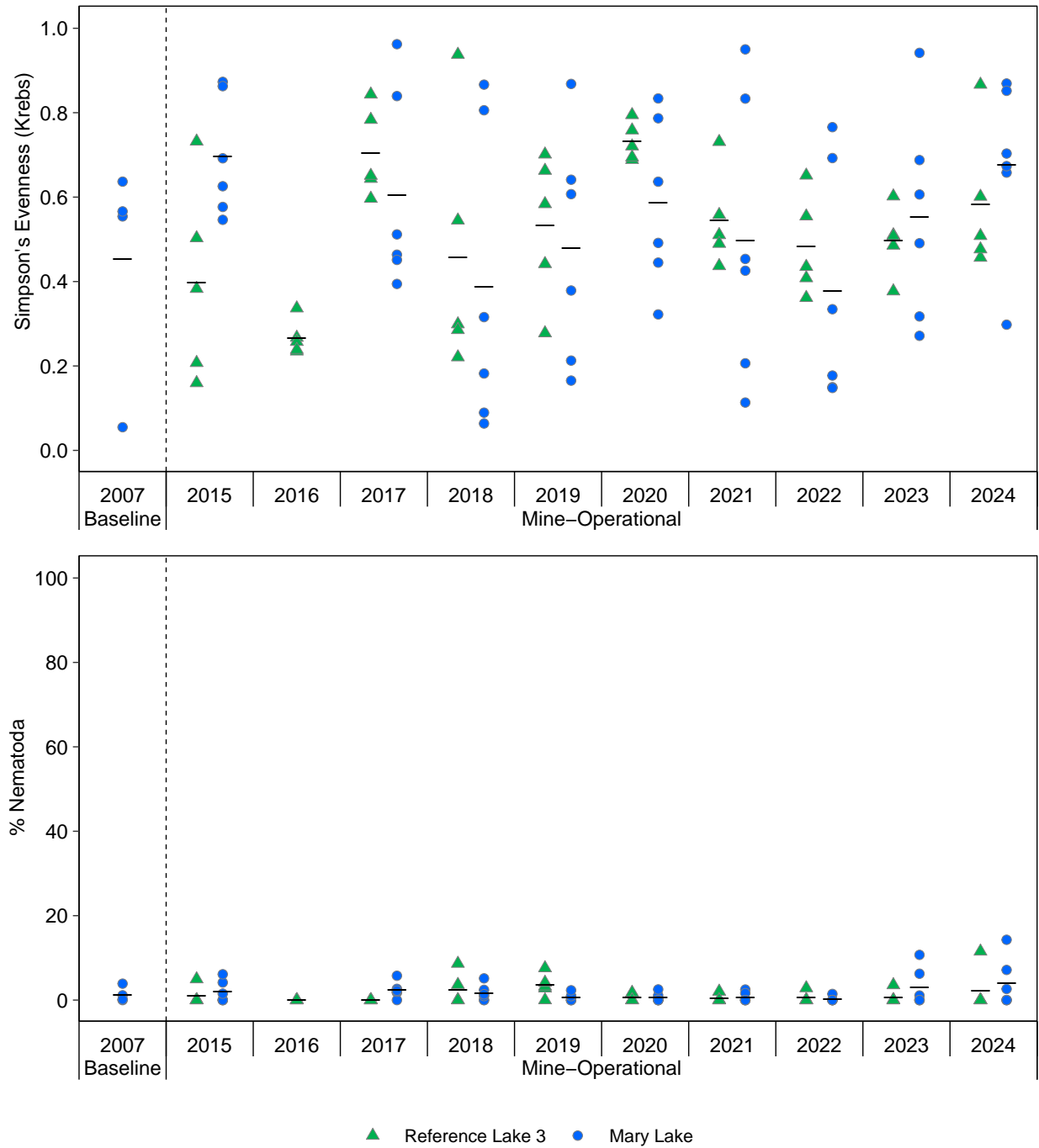


Figure F.17: Benthic Invertebrate Community Endpoints at Mary Lake (BL0) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

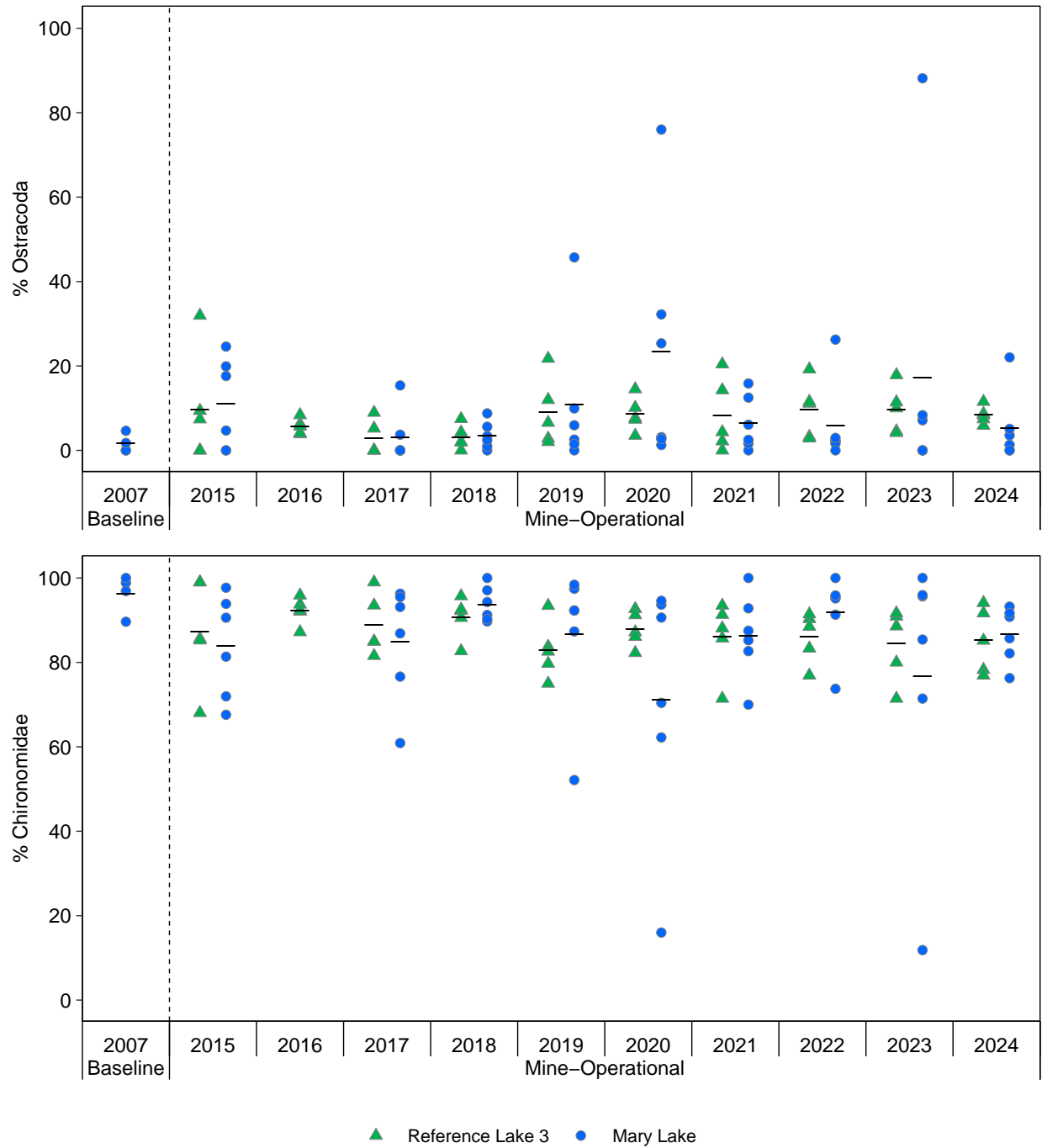


Figure F.17: Benthic Invertebrate Community Endpoints at Mary Lake (BL0) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

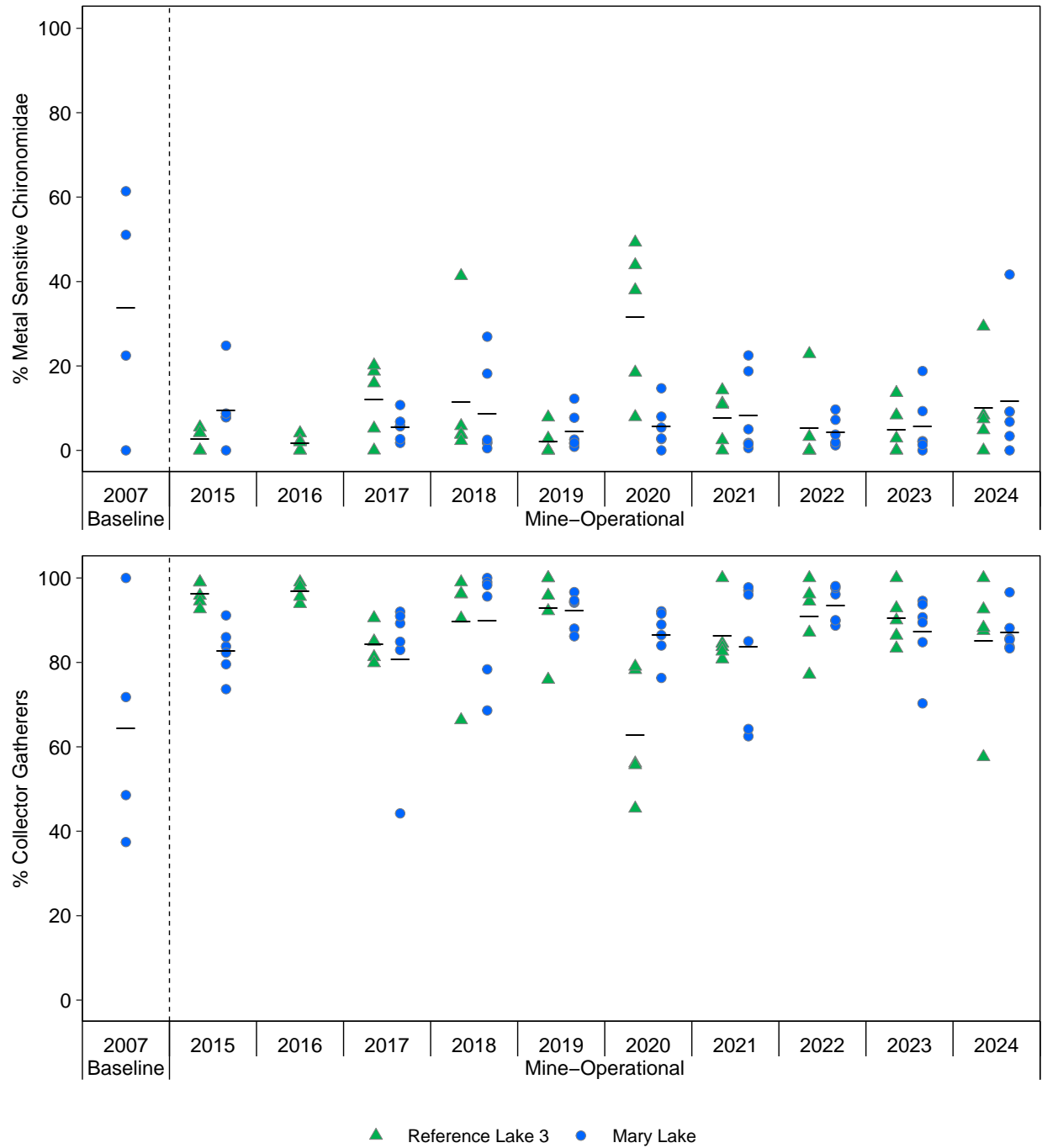
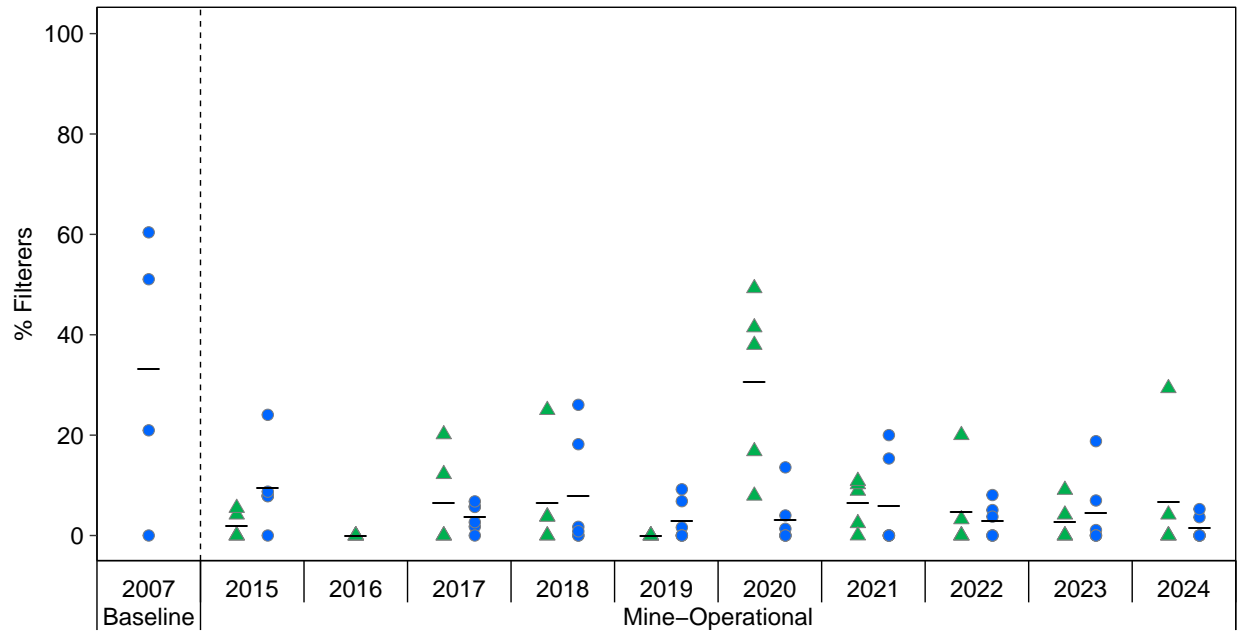


Figure F.17: Benthic Invertebrate Community Endpoints at Mary Lake (BL0) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.



▲ Reference Lake 3 ● Mary Lake

Figure F.17: Benthic Invertebrate Community Endpoints at Mary Lake (BL0) and Reference Lake 3 (REF-03) Profundal Habitat Stations Among Mine Baseline (2007) and Operational (2015 to 2024) Periods, Mary River Project CREMP, 2024

Notes: Bars indicate means of replicates.

APPENDIX F

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 2024

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	12	12	14	0.46	0.43	0.40	0%	25%	0%	None	None	None	None	None	None
	REF-CRK-B2	11	16	14	0.40	0.37	0.44	0%	0%	0%	Common Bryophytes	None	Sparse Bryophytes	Sparse	Sparse	Common
	REF-CRK-B3	12	12	14	0.39	0.39	0.35	0%	0%	0%	None	None	None	None	Sparse	Sparse
	REF-CRK-B4	11	12	16	0.37	0.34	0.39	0%	-	-	None	-	-	None	-	-
	REF-CRK-B5	12	14	12	0.40	0.46	0.40	0%	0%	-	None	None	-	None	None	-
Camp Lake Tributary 1 Upstream North Branch	CLT-1-US-B1	15	16	18	0.36	0.34	0.41	25%	50%	25%	None	None	None	Sparse	Sparse	Sparse
	CLT-1-US-B2	15	14	13	0.32	0.31	0.32	25%	25%	25%	None	Sparse bryophytes	None	Sparse	Sparse	Sparse
	CLT-1-US-B3	12	14	14	0.35	0.33	0.38	25%	25%	-	Sparse bryophytes	Sparse bryophytes	-	Sparse	Sparse	-
	CLT-1-US-B4	17	18	18	0.33	0.37	0.41	50%	25%	25%	None	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	Common
	CLT-1-US-B5	16	14	12	0.42	0.40	0.36	50%	0%	0%	Sparse bryophytes	None	Sparse bryophytes	Sparse	Sparse	Sparse
Camp Lake Tributary 1 Upper Main Stem	CLT-1-L2-B1	14	10	10	0.33	0.45	0.40	25%	25%	0%	None	Sparse bryophytes	Common bryophytes	Sparse	Sparse	Sparse
	CLT-1-L2-B2	10	11	14	0.46	0.34	0.33	25%	0%	25%	None	None	Sparse bryophytes	Sparse	Sparse	Sparse
	CLT-1-L2-B3	0	0	0	0.30	0.40	0.34	25%	25%	25%	Common bryophytes	None	Common bryophytes	Common	Common	Common
	CLT-1-L2-B4	10	14	14	0.34	0.56	0.41	25%	50%	25%	Sparse bryophytes	Sparse bryophytes	Common bryophytes	Common	Common	Common
	CLT-1-L2-B5	18	13	15	0.32	0.40	0.36	50%	75%	25%	Abundant bryophytes	Sparse bryophytes	None	Sparse	Sparse	Sparse
Camp Lake Tributary 1 Lower Main Stem	CLT-1-DS-B1	17	13	15	0.28	0.25	0.39	25%	25%	25%	Sparse bryophytes	Common bryophytes	Common bryophytes	Sparse	Sparse	None
	CLT-1-DS-B2	12	15	18	0.48	0.30	0.31	75%	75%	50%	None	None	None	Sparse	Sparse	Common
	CLT-1-DS-B3	18	14	14	0.29	0.40	0.32	25%	75%	50%	None	None	None	None	None	Sparse
	CLT-1-DS-B4	16	16	15	0.45	0.36	0.33	50%	50%	25%	None	None	None	None	Sparse	Sparse
	CLT-1-DS-B5	18	17	15	0.40	0.43	0.38	25%	0%	25%	None	None	None	None	Sparse	None


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 2024

Metric	Study Area	Sample Size	Mean	Median	Standard Deviation	Standard Error	Minimum	Maximum
Water Depth (cm)	Unnamed Reference Creek	5	12.9	12.7	0.435	0.194	12.7	13.7
	CLT1-US North Branch	5	15.1	14.0	1.85	0.826	13.3	17.7
	CLT1-L2 Upper Main Stem	5	10.2	11.7	5.87	2.62	0.103	15.3
	CLT1-DS Lower Main Stem	5	15.3	15.0	0.667	0.298	14.7	16.3
	CLT2-US Upstream	5	16.6	17.3	1.36	0.609	14.7	17.7
	CLT2-DS Downstream	5	14.1	13.0	2.70	1.21	11.7	17.7
Water Velocity (m/s)	Unnamed Reference Creek	5	0.399	0.403	0.0272	0.0122	0.367	0.430
	CLT1-US North Branch	5	0.361	0.370	0.0284	0.0127	0.317	0.393
	CLT1-L2 Upper Main Stem	5	0.383	0.377	0.0349	0.0156	0.347	0.437
	CLT1-DS Lower Main Stem	5	0.358	0.363	0.0376	0.0168	0.307	0.403
	CLT2-US Upstream	5	0.403	0.383	0.0485	0.0217	0.363	0.483
	CLT2-DS Downstream	5	0.381	0.383	0.00365	0.00163	0.377	0.383
Substrate Embeddedness (%)	Unnamed Reference Creek	5	2%	0%	4%	2%	0%	8%
	CLT1-US North Branch	5	27%	25%	7%	3%	17%	33%
	CLT1-L2 Upper Main Stem	5	28%	25%	14%	6%	17%	50%
	CLT1-DS Lower Main Stem	5	40%	42%	20%	9%	17%	67%
	CLT2-US Upstream	5	30%	17%	19%	9%	17%	58%
	CLT2-DS Downstream	5	16%	8%	15%	7%	0%	38%

Table F.3: Benthic Station Habitat Feature Statistical Comparisons among Camp Lake Tributary 1 (CLT1) and Unnamed Reference Creek (REF-CRK) Study Areas, Mary River Project CREMP, August 2024

Metric	Overall 4-group Comparison				Pair-wise, <i>post hoc</i> comparisons			
	Statistical Test ^a	Transformation	Significant Difference between Areas?	P-value	Area		Significant Difference Between Areas?	P-value
Water Depth (cm)	K-W	rank	YES	0.012	Unnamed Reference Creek	CLT1 North Branch	NO	0.053
					Unnamed Reference Creek	CLT1 Upper Main Stem	NO	0.707
					Unnamed Reference Creek	CLT1 Lower Main Stem	YES	0.021
					CLT1 North Branch	CLT1 Upper Main Stem	YES	0.021
					CLT1 North Branch	CLT1 Lower Main Stem	NO	0.707
					CLT1 Upper Main Stem	CLT1 Lower Main Stem	YES	0.007
Water Velocity (cm/s)	ANOVA	none	NO	0.183	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 (%)	ANOVA	none	YES	0.002	Unnamed Reference Creek	CLT1 North Branch	YES	0.032
					Unnamed Reference Creek	CLT1 Upper Main Stem	YES	0.021
					Unnamed Reference Creek	CLT1 Lower Main Stem	YES	0.001
					CLT1 North Branch	CLT1 Upper Main Stem	NO	0.997
					CLT1 North Branch	CLT1 Lower Main Stem	NO	0.380
					CLT1 Upper Main Stem	CLT1 Lower Main Stem	NO	0.492

 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 (REF-CRK) Study Area, Mary River Project CREMP, August 2024

Waterbody Station	Unnamed Reference Creek (REF-CRK)				
	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	-	14.3	-	-	10.7
	-	-	-	-	-
ANNELIDS	-	-	-	-	-
P. Annelida	-	-	-	-	-
WORMS	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-
F. Enchytraeidae	-	3.58	-	-	-
F. Lumbriculidae	-	-	-	-	-
<i>Lumbriculus</i>	-	-	-	-	-
	-	-	-	-	-
ARTHROPODS	-	-	-	-	-
P. Arthropoda	-	-	-	-	-
MITES	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-
O. Acarina	-	-	-	-	-
immature	-	-	-	-	-
indeterminate	-	-	-	-	-
F. Lebertiidae	-	-	-	-	-
<i>Lebertia</i>	-	-	-	-	-
F. Pionidae	-	-	-	-	-
indeterminate	-	-	-	-	-
F. Sperchonidae	-	-	-	-	-
<i>Sperchon</i>	7.17	82.4	10.7	7.17	25.1
SEED SHRIMPS	-	-	-	-	-
Cl. Ostracoda	-	-	7.17	7.17	17.9
SPRINGTAILS	-	-	-	-	-
Cl. Entognatha	-	-	-	-	-
O. Collembola	-	-	-	-	-
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
<i>Acentrella feropagus</i>	7.17	25.1	3.58	-	7.17
STONEFLIES	-	-	-	-	-
O. Plecoptera	-	-	-	-	-
F. Capniidae	-	-	-	-	-
immature	-	-	-	-	10.7
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
indeterminate	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-
<i>Culicoides</i>	-	3.58	-	-	17.9
MIDGES	-	-	-	-	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	21.5	60.9	57.3	46.6	118
S.F. Chironominae	-	-	-	-	-
<i>Paratanytarsus</i>	-	-	-	-	-
<i>Rheotanytarsus</i>	-	17.9	-	-	-
<i>Tanytarsus</i>	-	-	-	-	-
S.F. Diamesinae	-	-	-	-	-
<i>Diamesa</i>	3.58	-	-	-	-
<i>Pseudokiefferiella</i>	3.58	226	-	-	14.3
S.F. Orthoclaadiinae	-	-	-	-	-
<i>Cardiocladius</i>	10.7	46.6	32.2	3.58	46.6
<i>Chaetocladius</i>	-	-	-	-	-
<i>Cricotopus</i>	-	190	7.17	-	-
<i>Cricotopus/Orthocladius</i>	3.58	39.4	3.58	3.58	7.17
<i>Eukiefferiella</i>	-	-	-	-	-
<i>Hydrobaenus</i>	-	-	-	3.6	-
<i>Hydrosmittia</i>	-	10.7	-	-	-
<i>Krenosmittia</i>	-	3.58	-	-	3.58
<i>Limnophyes</i>	-	-	-	7.17	21.50
<i>Orthocladius (Euorthocladius)</i>	-	10.7	7.17	3.58	-
<i>Parakiefferiella</i>	-	-	-	-	-
<i>Parametriocnemus</i>	-	10.7	3.58	3.6	10.7
<i>Paraphaenocladius</i>	-	10.7	-	-	3.58
<i>Synorthocladius</i>	-	3.58	-	-	-
<i>Thienemanniella</i>	-	21.5	-	-	7.17
<i>Tokunagaia</i>	10.7	93.2	7.17	7.17	28.7
<i>Tvetenia</i>	7.17	78.8	21.5	7.17	21.5
S.F. Tanypodinae	-	-	-	-	-
<i>Procladius</i>	-	-	-	-	-
<i>Thienemannimyia</i> complex	-	-	-	-	-
F. Empididae	-	-	-	-	-
<i>Clinocera</i>	3.58	10.7	-	3.58	21.5
F. Muscidae	-	-	-	-	-
F. Simuliidae	-	-	-	-	-
<i>Gymnopais</i>	-	10.7	-	-	3.58
<i>Helodon irkutensis</i>	7.17	43.0	17.92	3.58	82.4
<i>Metacnephia</i>	-	10.7	-	-	14.3
<i>Prosimulium ursinum</i>	-	-	7.2	-	3.58
pupae	-	-	-	-	-
F. Tipulidae	-	-	-	-	-
<i>Tipula</i>	-	10.7	35.8	7.17	3.58
	-	-	-	-	-
CLAMS	-	-	-	-	-
Cl. Bivalvia	-	-	-	-	-
F. Sphaeriidae	-	-	-	-	-
<i>Pisidium (Cyclocalyx)</i>	-	-	-	-	-
SUMMARY METRICS					
Density (No. organisms per m ²)	86.0	1,039	222	115	502
Richness (total number of taxa) ^a	10	24	13	13	22
Simpson's Evenness (E)	0.971	0.898	0.941	0.980	0.956
Dominant Group Composition					
% Nemata	0	1.38	0	0	2.14
% Oligochaeta	0	0.345	0	0	0
% Acari	8.33	7.93	4.84	6.25	5.00
% Ostracods	0	0	3.23	6.25	3.57
% Chironomids	70.8	79.3	62.9	75.0	56.4
% Metal Sensitive Chironmids	12.9	25.3	0	0	4.91
% Simuliidae	8.33	6.21	11.3	3.12	20.7
% Tipulidae	0	1.03	16.1	6.25	0.714
Functional Feeding Group Composition					
% Collector - Gatherers	61.7	56.7	44.4	77.6	61.6
% Filterers	0	2.90	3.23	0	3.57
% Shredders	6.44	25.1	23.0	6.25	5.31
Habitat Preference Group Composition					
% Clingers	23.1	40.1	23.0	9.4	28.2
% Sprawlers	57.6	51.8	36.3	77.6	49.5
% Burrowers	19.3	8.05	40.7	13.1	22.4

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 (CLT1) Study Areas, August 2024

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	14.3	25.1	46.6	14.3	14.3	28.7	118	3.6	35.8	28.7	3.58	21.5	-	-	7.17
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANNELIDS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P. Annelida	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WORMS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Enchytraeidae	-	-	7.17	-	7.17	118	892	107	537	301	-	-	-	-	-
F. Lumbriculidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbriculus	-	-	-	-	-	7.17	3.58	-	-	35.8	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARTHROPODS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P. Arthropoda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MITES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O. Acarina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immature	-	-	3.58	-	-	-	-	-	-	-	-	-	-	-	-
indeterminate	-	-	-	-	-	3.58	-	-	-	-	-	-	-	-	-
F. Lebertiidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lebertia	-	-	-	-	-	21.5	75.2	21.5	17.9	-	-	3.58	-	-	-
F. Pionidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-	3.58	-	-	-	-	-	3.58	-
F. Sperchonidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sperchon	10.7	7.17	64.5	21.5	25.1	114.7	78.8	39.4	14.3	3.58	-	7.17	3.58	25.1	7.17
SEED SHRIMPS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl. Ostracoda	-	-	-	-	-	3.58	14.3	21.5	7.17	7.17	-	-	-	-	-
SPRINGTAILS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl. Entognatha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O. Collembola	-	-	-	-	-	-	-	-	3.58	3.58	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INSECTS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl. Insecta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAYFLIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Baetidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acentrella feropagus	-	3.58	28.7	-	3.58	-	3.58	-	-	-	-	-	-	-	-
STONEFLIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O. Plecoptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Capniidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immature	-	-	7.17	-	-	-	-	-	-	-	-	-	-	-	-
TRUE FLIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O. Diptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Culicoides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MIDGES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Chironomidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
chironomid pupae	17.9	14.3	43.0	32.2	10.7	107	236	60.9	186	68.1	35.8	28.7	21.5	35.8	25.1
S.F. Chironominae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	-	-	-	-	-	197	172	28.7	100	111	-	-	-	-	-
Rheotanytarsus	-	-	-	-	-	-	-	-	-	-	-	-	3.58	-	-
Tanytarsus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S.F. Diamesinae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diamesa	17.92	-	17.9	-	-	-	-	-	-	-	3.58	-	7.17	-	-
Pseudokiefferiella	-	35.8	219	21.5	179	236	35.8	14.3	86.0	43.0	57.3	10.7	-	43.0	7.17
S.F. Orthoclaadiinae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cardiocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaetocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cricotopus	17.9	111	82.4	125	125	455	380	215	179	279	50.2	25.1	7.17	10.7	39.4
Cricotopus/Orthoclaadius	17.9	28.7	143	28.7	25.1	7.17	57.3	17.9	21.5	35.8	53.7	60.9	28.7	39.4	28.7
Eukiefferiella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrobaenus	-	-	7.17	7.17	7.17	-	-	-	-	-	-	10.7	-	-	3.58
Hydrosmittia	-	14.3	115	50.2	50.2	28.7	35.8	25.1	7.2	28.7	57.3	129	25.1	50.2	111
Krenosmittia	-	-	7.17	7.17	7.17	-	7.17	-	-	-	-	-	-	-	-
Limnophyes	-	-	7.17	-	7.17	-	-	-	-	-	-	-	-	-	-
Orthoclaadius (Euorthoclaadius)	28.7	7.17	21.5	10.7	3.58	-	-	3.58	-	7.17	-	-	3.58	3.58	-
Parakiefferiella	-	-	-	-	-	7.17	35.83	3.58	-	68.1	-	-	-	-	-
Parametrioctenemus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paraphaenoclaadius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Synorthoclaadius	-	3.58	-	3.58	3.58	-	-	-	-	-	-	-	-	-	-
Thienemanniella	-	-	-	-	3.58	-	-	-	-	-	-	-	-	-	-
Tokunagaia	-	7.17	28.7	17.9	14.3	-	-	-	-	-	-	-	3.58	3.58	-
Tvetenia	10.7	-	7.17	14.3	14.3	279	437	165	408	340	3.58	3.58	7.17	14.33	14.33
S.F. Tanypodinae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Procladius	-	-	-	-	-	-	-	-	-	3.58	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-	-	50.2	3.58	7.17	-	-	-	3.58	-	-
F. Empididae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clinocera	7.17	10.7	82.4	46.6	60.9	3.58	21.5	-	7.17	32.2	21.5	25.1	-	21.5	-
F. Muscidae	-	-	-	-	-	-	3.58	-	-	-	-	-	-	-	-
F. Simuliidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gymnopaïs	10.7	-	10.7	-	-	-	-	-	-	-	3.58	-	-	-	-
Helodon irkutensis	-	-	3.58	-	-	-	-	-	-	-	-	-	-	-	-
Metacnephia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prosimulium ursinum	10.7	-	7.17	3.58	-	-	-	-	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Tipulidae	-	-	-	-	-	-	-	-	-	-					

Table F.6: Benthic Invertebrate Community Summary Statistics for Camp Lake Tributary 1 (CLT1) Study Areas, Mary River Project CREMP, August 2024

Endpoint	Study Area	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
Density (No. per m ²)	Reference Creek (REF-CRK)	393	397	178	86.0	222	1,039
	CLT1 North Branch (CLT1-US)	503	334	149	179	423	1,022
	CLT1 Upper Main Stem (CLT1-L2)	1,634	708	317	749	1,624	2,720
	CLT1 Lower Main Stem (CLT1-DS)	268	88.0	39.4	125	287	355
Richness (No. of Taxa)	Reference Creek (REF-CRK)	15.6	5.90	2.64	10.0	12.0	22.0
	CLT1 North Branch (CLT1-US)	13.6	3.91	1.75	10.0	13.0	19.0
	CLT1 Upper Main Stem (CLT1-L2)	14.6	2.07	0.927	13.0	14.0	18.0
	CLT1 Lower Main Stem (CLT1-DS)	8.40	0.894	0.400	7.00	9.00	9.00
Simpson's Evenness	Reference Creek (REF-CRK)	0.949	0.0322	0.0144	0.898	0.956	0.980
	CLT1 North Branch (CLT1-US)	0.833	0.102	0.0457	0.686	0.848	0.954
	CLT1 Upper Main Stem (CLT1-L2)	0.848	0.0261	0.0117	0.821	0.849	0.878
	CLT1 Lower Main Stem (CLT1-DS)	0.751	0.149	0.0668	0.582	0.695	0.936
% Nematoda	Reference Creek (REF-CRK)	0.704	1.00	0.448	0	0	2.14
	CLT1 North Branch (CLT1-US)	5.49	2.98	1.33	2.31	4.56	9.21
	CLT1 Upper Main Stem (CLT1-L2)	2.16	1.40	0.625	0.478	2.01	4.35
	CLT1 Lower Main Stem (CLT1-DS)	2.00	2.55	1.14	0	1.12	6.06
% Oligochaeta	Reference Creek (REF-CRK)	0.0690	0.154	0.0690	0	0	0.345
	CLT1 North Branch (CLT1-US)	0.372	0.534	0.239	0	0	1.16
	CLT1 Upper Main Stem (CLT1-L2)	22.3	11.3	5.05	7.61	23.6	33.1
	CLT1 Lower Main Stem (CLT1-DS)	0	0	0	0	0	0
% Hydracarina	Reference Creek (REF-CRK)	6.47	1.62	0.724	4.84	6.25	8.33
	CLT1 North Branch (CLT1-US)	4.89	1.60	0.716	2.63	5.08	6.67
	CLT1 Upper Main Stem (CLT1-L2)	5.00	3.78	1.69	0.251	5.67	8.61
	CLT1 Lower Main Stem (CLT1-DS)	3.74	3.72	1.66	0	2.86	10.0
% Ostracoda	Reference Creek (REF-CRK)	2.61	2.65	1.19	0	3.23	6.25
	CLT1 North Branch (CLT1-US)	0	0	0	0	0	0
	CLT1 Upper Main Stem (CLT1-L2)	0.912	1.10	0.493	0.217	0.501	2.87
	CLT1 Lower Main Stem (CLT1-DS)	0	0	0	0	0	0
% Chironomidae	Reference Creek (REF-CRK)	68.9	9.23	4.13	56.4	70.8	79.3
	CLT1 North Branch (CLT1-US)	72.0	7.36	3.29	62.0	72.8	81.6
	CLT1 Upper Main Stem (CLT1-L2)	67.1	10.2	4.57	53.2	68.9	80.0
	CLT1 Lower Main Stem (CLT1-DS)	81.3	8.51	3.81	70.0	82.0	90.1
% Metal Sensitive Chironomidae	Reference Creek (REF-CRK)	8.62	10.7	4.79	0	4.91	25.3
	CLT1 North Branch (CLT1-US)	17.2	9.76	4.36	5.66	14.1	29.6
	CLT1 Upper Main Stem (CLT1-L2)	14.0	8.67	3.88	6.48	11.6	28.6
	CLT1 Lower Main Stem (CLT1-DS)	11.5	8.58	3.84	3.16	10.6	22.1
% Simuliidae	Reference Creek (REF-CRK)	9.93	6.72	3.01	3.12	8.33	20.7
	CLT1 North Branch (CLT1-US)	2.99	5.11	2.29	0	0.847	12.0
	CLT1 Upper Main Stem (CLT1-L2)	0	0	0	0	0	0
	CLT1 Lower Main Stem (CLT1-DS)	0.225	0.502	0.225	0	0	1.12
% Tipulidae	Reference Creek (REF-CRK)	4.83	6.79	3.04	0	1.03	16.1
	CLT1 North Branch (CLT1-US)	5.75	3.13	1.40	1.32	5.96	9.25
	CLT1 Upper Main Stem (CLT1-L2)	1.49	0.786	0.351	0.221	1.74	2.26
	CLT1 Lower Main Stem (CLT1-DS)	8.47	2.94	1.32	4.23	8.57	12.5
% Collector-Gatherer FFG	Reference Creek (REF-CRK)	60.4	11.9	5.33	44.4	61.6	77.6
	CLT1 North Branch (CLT1-US)	42.2	10.4	4.64	29.6	46.2	53.5
	CLT1 Upper Main Stem (CLT1-L2)	58.1	11.9	5.34	44.9	62.1	73.8
	CLT1 Lower Main Stem (CLT1-DS)	30.5	10.4	4.67	19.8	25.2	42.5
% Filterer FFG	Reference Creek (REF-CRK)	1.94	1.79	0.799	0	2.90	3.57
	CLT1 North Branch (CLT1-US)	1.51	2.54	1.14	0	0.702	6.00
	CLT1 Upper Main Stem (CLT1-L2)	8.17	3.13	1.40	4.32	7.60	13.0
	CLT1 Lower Main Stem (CLT1-DS)	0.709	1.58	0.709	0	0	3.54
% Shredder FFG	Reference Creek (REF-CRK)	13.2	9.93	4.44	5.31	6.44	25.1
	CLT1 North Branch (CLT1-US)	42.6	14.4	6.45	24.5	39.9	60.4
	CLT1 Upper Main Stem (CLT1-L2)	27.2	9.36	4.19	15.6	26.8	39.1
	CLT1 Lower Main Stem (CLT1-DS)	59.8	14.3	6.38	41.6	66.9	73.1
% Clinger HPG	Reference Creek (REF-CRK)	24.7	11.1	4.95	9.38	23.1	40.1
	CLT1 North Branch (CLT1-US)	44.6	12.9	5.77	34.5	36.9	61.7
	CLT1 Upper Main Stem (CLT1-L2)	30.8	11.8	5.27	17.4	25.6	45.8
	CLT1 Lower Main Stem (CLT1-DS)	56.0	13.6	6.06	39.1	59.0	71.7
% Sprawler HPG	Reference Creek (REF-CRK)	54.5	15.0	6.73	36.3	51.8	77.6
	CLT1 North Branch (CLT1-US)	43.8	10.9	4.88	27.7	49.5	52.6
	CLT1 Upper Main Stem (CLT1-L2)	43.0	6.41	2.87	34.7	46.9	48.7
	CLT1 Lower Main Stem (CLT1-DS)	33.5	13.2	5.90	20.8	30.9	48.4
% Burrower HPG	Reference Creek (REF-CRK)	20.7	12.5	5.59	8.05	19.3	40.7
	CLT1 North Branch (CLT1-US)	11.6	3.07	1.37	7.63	11.2	16.0
	CLT1 Upper Main Stem (CLT1-L2)	26.2	12.1	5.43	11.1	27.8	39.7
	CLT1 Lower Main Stem (CLT1-DS)	10.5	2.88	1.29	7.04	10.1	14.1

Note: Sample size was five for all study areas. FFG = Functional Feeding Group; HPG = Habitat Preference Group.

Table F.7: Statistical Comparison of Bray-Curtis Indices for Camp Lake Tributary 1 (CLT1) and Camp Lake Tributary 2 (CLT2) Relative to Unnamed Reference Creek (REF-CRK), Mary River Project CREMP, August 2024

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	0.193	0.523	0.273	0.008	3.88	0.326	0.242	0.008
	CLT1-L2 vs REF-CRK	5	5	0.002	0.835	0.697	0.008	11.8	0.595	0.545	0.005
	CLT1-DS vs REF-CRK	5	5	0.403	0.676	0.457	0.008	5.30	0.398	0.323	0.008
Camp Lake Tributary 2	CLT2-US vs REF-CRK	5	5	0.474	0.597	0.357	0.008	4.14	0.341	0.259	0.007
	CLT2-DS vs REF-CRK	5	5	0.627	0.567	0.321	0.008	3.73	0.318	0.233	0.006

 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 Invertebrate Community Endpoints at Camp Lake Tributary 1 North Branch (CLT1-US) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2011	
Density (org/m ²)	ANOVA	log10	YES	<0.001	2007	3	505	330	nc	nc	BC
					2011	3	949	139	1.1	nc	ABC
					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	0.7	AC
					2022	5	1,430	468	1.6	2.4	A
					2023	5	523	170	0.2	-4.1	BC
					2024	5	503	334	0.0	-5.3	B
Richness (No. Taxa)	ANOVA	none	YES	0.008	2007	3	14	2	nc	nc	AB
					2011	3	14	2	0.3	nc	AB
					2015	5	15	3	0.6	0.3	AB
					2016	5	12	2	-0.6	-1.0	B
					2017	5	19	3	2.4	2.3	A
					2018	5	17	1	1.5	1.4	AB
					2019	5	18	2	1.9	1.8	A
					2020	5	18	2	2.0	1.9	A
					2021	5	17	4	1.3	1.1	AB
					2022	5	16	2	0.8	0.6	AB
					2023	5	15	4	0.5	0.2	AB
					2024	5	14	4	0.0	-0.4	AB
Simpson's Evenness (Krebs)	K-W	rank	YES	0.067	2007	3	1	0	nc	nc	D
					2011	3	1	0	1.7	nc	ABCD
					2015	5	1	0	1.9	0.4	AB
					2016	5	1	0	1.5	-0.3	CD
					2017	5	1	0	2.4	1.0	A
					2018	5	1	0	2.0	0.4	ABC
					2019	5	1	0	1.7	0.0	ABC
					2020	5	1	0	1.8	0.2	BCD
					2021	5	1	0	1.6	-0.1	BC
					2022	5	1	0	2.1	0.5	ABC
					2023	5	1	0	1.0	-0.9	CD
					2024	5	1	0	1.2	-0.7	BCD
% Nematoda	ANOVA	log10(x+1)	YES	<0.001	2007	3	0	0	nc	nc	D
					2011	3	1	1	2.1	nc	CD
					2015	5	2	1	5.9	1.3	BCD
					2016	5	1	1	4.6	0.8	BCD
					2017	5	4	2	15.0	4.3	AB
					2018	5	2	1	5.5	1.1	BCD
					2019	5	1	1	4.4	0.8	BCD
					2020	5	1	1	4.4	0.8	BCD
					2021	5	4	1	14.0	3.9	ABC
					2022	5	1	1	1.9	-0.1	D
					2023	5	2	2	6.7	1.5	BCD
					2024	5	5	3	20.0	6.1	A
% Oligochaeta	K-W	rank	YES	0.044	2007	3	1	2	nc	nc	BCD
					2011	3	1	1	0.1	nc	BCD
					2015	5	1	1	2.5	10.0	BCD
					2016	5	2	1	1.3	5.2	AD
					2017	5	1	1	0.1	0.2	BCD
					2018	5	1	1	0.7	2.6	BD
					2019	5	3	3	0.5	2.1	D
					2020	5	4	1	5.9	25.0	A
					2021	5	0	0	0.1	0.0	BC
					2022	5	1	2	0.8	3.4	BCD
					2023	5	1	1	0.6	2.3	BCD
					2024	5	0	1	-0.7	-3.1	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: MOD =Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.

^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 Invertebrate Community Endpoints at Camp Lake Tributary 1 North Branch (CLT1-US) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2011	
% Hydracarina	ANOVA	log10(x+1)	YES	<0.001	2007	3	1	1	nc	nc	E
					2011	3	14	7	12.0	nc	A
					2015	5	2	2	1.5	-1.9	CE
					2016	5	10	3	8.4	-0.7	AB
					2017	5	8	1	6.5	-1.0	BD
					2018	5	5	1	4.4	-1.4	BCDE
					2019	5	2	2	1.1	-1.9	CE
					2020	5	3	3	2.1	-1.8	CDE
					2021	5	3	2	2.0	-1.8	CDE
					2022	5	3	3	1.8	-1.8	CDE
					2023	5	7	3	5.5	-1.2	BCD
					2024	5	5	2	3.9	-1.5	BCDE
% Ostracoda	K-W	rank	YES	0.032	2007	3	0	0	nc	nc	C
					2011	3	1	1	nm	nc	AB
					2015	5	1	1	nm	-0.3	AB
					2016	5	0	0	nm	-0.7	C
					2017	5	0	0	nm	-0.7	C
					2018	5	0	0	nm	-0.7	C
					2019	5	0	0	nm	-0.7	BC
					2020	5	1	1	nm	-0.4	AB
					2021	5	0	0	nm	-0.7	ABC
					2022	5	1	0	nm	-0.2	A
					2023	5	0	1	nm	-0.7	ABC
					2024	5	0	0	nm	-0.7	C
% Chironomidae	K-W	rank	YES	0.002	2007	3	88	7	nc	nc	A
					2011	3	76	5	-3.3	nc	BCD
					2015	5	76	7	-3.4	0.0	CD
					2016	5	69	11	-5.4	-1.2	D
					2017	5	74	2	-3.9	-0.4	D
					2018	5	87	4	-0.8	1.5	A
					2019	5	85	5	-1.9	0.9	AB
					2020	5	82	8	-2.0	0.8	ABC
					2021	5	71	7	-4.8	-0.9	D
					2022	5	82	6	-1.8	0.9	ABC
					2023	5	71	13	-3.5	-0.1	CD
					2024	5	72	7	-4.2	-0.5	D
% Metal Sensitive Chironomidae	ANOVA	log10	NO	0.281	2007	3	4	4	nc	nc	A
					2011	3	11	7	1.2	nc	A
					2015	5	13	14	0.9	-0.4	A
					2016	5	9	9	0.8	-0.5	A
					2017	5	7	5	0.6	-0.8	A
					2018	5	18	5	1.8	0.8	A
					2019	5	14	10	1.2	0.1	A
					2020	5	14	5	1.5	0.5	A
					2021	5	7	5	0.7	-0.6	A
					2022	5	9	7	0.9	-0.4	A
					2023	5	12	14	1.0	-0.3	A
					2024	5	17	10	1.7	0.6	A
% Tipulidae	ANOVA	log10	YES	<0.001	2007	3	9	4	nc	nc	AB
					2011	3	7	2	-0.5	nc	ABC
					2015	5	17	5	1.4	2.6	A
					2016	5	17	12	1.2	2.2	AB
					2017	5	8	2	0.0	0.6	AB
					2018	5	3	2	-2.9	-3.4	C
					2019	5	5	2	-1.0	-0.8	ABC
					2020	5	7	6	-0.7	-0.3	ABC
					2021	5	13	5	0.8	1.7	AB
					2022	5	10	4	0.3	1.0	AB
					2023	5	11	10	0.1	0.7	AB
					2024	5	6	3	-1.2	-1.0	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: MOD =Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.

^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 Invertebrate Community Endpoints at Camp Lake Tributary 1 North Branch (CLT1-US) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2011	
% Collector Gatherers FFG	ANOVA	none	YES	0.008	2007	3	73	11	nc	nc	A
					2011	3	41	14	-2.8	nc	AB
					2015	5	50	7	-2.0	0.6	AB
					2016	5	42	16	-2.8	0.0	B
					2017	5	39	7	-3.1	-0.2	B
					2018	5	55	14	-1.6	0.9	AB
					2019	5	59	9	-1.3	1.2	AB
					2020	5	54	16	-1.7	0.9	AB
					2021	5	44	14	-2.6	0.2	AB
					2022	5	62	18	-1.0	1.4	AB
					2023	5	40	12	-3.0	-0.1	B
					2024	5	42	10	-2.8	0.1	B
% Filterers FFG	K-W	rank	YES	0.056	2007	3	0	0	nc	nc	BCD
					2011	3	0	0	-13.0	nc	CD
					2015	5	0	0	-13.0	nm	D
					2016	5	0	0	1.8	nm	BCD
					2017	5	1	1	3.4	nm	AB
					2018	5	1	0	9.7	nm	BCD
					2019	5	2	2	24.0	nm	AB
					2020	5	4	5	56.0	nm	A
					2021	5	0	0	-13.0	nm	BCD
					2022	5	1	1	-13.0	nm	BCD
					2023	5	0	1	-13.0	nm	BCD
					2024	5	2	3	7.7	nm	ABC
% Shredders FFG	ANOVA	none	NO	0.203	2007	3	23	9	nc	nc	A
					2011	3	40	14	1.9	nc	A
					2015	5	46	7	2.6	0.4	A
					2016	5	47	18	2.7	0.5	A
					2017	5	50	6	3.0	0.7	A
					2018	5	39	13	1.8	-0.1	A
					2019	5	34	9	1.2	-0.4	A
					2020	5	38	13	1.7	-0.1	A
					2021	5	47	16	2.7	0.5	A
					2022	5	34	19	1.2	-0.5	A
					2023	5	49	11	2.9	0.6	A
					2024	5	43	14	2.2	0.2	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: MOD =Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.


^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 Invertebrate Community Endpoints at Camp Lake Tributary 1 Upper Main Stem (CLT1-L2) Among Years of Mine Operation (2016 to 2024) and Baseline (2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons					
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b	Pairwise Comparison
									vs. Baseline Year 2011	
Density (org/m ²)	ANOVA	log10	YES	<0.001	2011	3	21,125	13,424	nc	A
					2016	5	7,701	1,580	-0.9	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
					2024	5	1,634	708	-2.6	C
Richness (No. Taxa)	ANOVA	none	NO	0.139	2011	3	17	3	nc	A
					2016	5	18	2	0.4	A
					2021	5	17	2	0.0	A
					2022	5	15	1	-0.5	A
					2023	5	14	3	-0.7	A
					2024	5	15	2	-0.7	A
Simpson's Evenness (Krebs)	ANOVA	log10	YES	0.040	2011	3	1	0	nc	A
					2016	5	1	0	-1.0	AB
					2021	5	1	0	-2.8	AB
					2022	5	1	0	-4.1	B
					2023	5	1	0	-1.0	AB
					2024	5	1	0	-1.3	AB
% Nematoda	K-W	rank	NO	0.100	2011	3	1	0	nc	A
					2016	5	1	1	2.3	A
					2021	5	2	2	7.1	A
					2022	5	3	2	26.0	A
					2023	5	1	1	0.0	A
					2024	5	2	1	12.0	A
% Oligochaeta	ANOVA	none	NO	0.155	2011	3	4	5	nc	A
					2016	5	13	9	1.6	A
					2021	5	13	10	1.8	A
					2022	5	10	8	1.2	A
					2023	5	19	11	2.9	A
					2024	5	22	11	3.6	A
% Hydracarina	ANOVA	log10	YES	0.012	2011	3	19	20	nc	AB
					2016	5	24	8	0.5	A
					2021	5	2	2	-1.0	B
					2022	5	6	5	-0.3	AB
					2023	5	6	3	-0.3	AB
					2024	5	5	4	-0.6	B
% Ostracoda	K-W	rank	YES	0.029	2011	3	1	0	nc	A
					2016	5	0	0	-2.5	BC
					2021	5	0	0	-2.4	ABC
					2022	5	0	0	-3.3	C
					2023	5	2	3	0.4	A
					2024	5	1	1	-1.5	AB
% Chironomidae	ANOVA	log10	NO	0.224	2011	3	74	21	nc	A
					2016	5	61	15	-0.7	A
					2021	5	78	11	0.3	A
					2022	5	78	12	0.2	A
					2023	5	71	7	-0.1	A
					2024	5	67	10	-0.3	A
% Metal Sensitive Chironomidae	ANOVA	log10	YES	0.021	2011	3	29	23	nc	AB
					2016	5	30	12	0.3	A
					2021	5	11	8	-1.4	B
					2022	5	19	8	-0.4	AB
					2023	5	26	12	0.0	A
					2024	5	14	9	-0.9	AB
% Tipulidae	K-W	rank	YES	0.004	2011	3	0	0	nc	C
					2016	5	0	0	0.7	C
					2021	5	2	1	6.9	AB
					2022	5	2	0	9.1	A
					2023	5	1	0	5.2	B
					2024	5	1	1	6.4	B
% Collector Gatherers FFG	ANOVA	none	YES	<0.001	2011	3	30	9	nc	B
					2016	5	29	10	-0.1	B
					2021	5	60	12	3.3	A
					2022	5	25	13	-0.5	B
					2023	5	43	19	1.5	AB
					2024	5	58	12	3.1	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: MOD = Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.

^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 Invertebrate Community Endpoints at Camp Lake Tributary 1 Upper Main Stem (CLT1-L2) Among Years of Mine Operation (2016 to 2024) and Baseline (2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons					
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b	Pairwise Comparison
									vs. Baseline Year 2011	
% Filterers FFG	ANOVA	log10	YES	0.009	2011	3	29	23	nc	ABC
					2016	5	28	14	0.1	A
					2021	5	10	8	-1.7	C
					2022	5	18	8	-0.5	ABC
					2023	5	25	12	0.0	AB
					2024	5	8	3	-1.5	BC
% Shredders FFG	ANOVA	none	YES	<0.001	2011	3	13	15	nc	B
					2016	5	16	2	0.2	B
					2021	5	26	5	0.9	B
					2022	5	47	4	2.3	A
					2023	5	23	7	0.7	B
					2024	5	27	9	1.0	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: MOD = Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.

^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 Invertebrate Community Endpoints at Camp Lake Tributary 1 Lower Main Stem (CLT1-DS) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test ^a	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2011	
Density (org/m ²)	ANOVA	none	YES	<0.001	2007	3	754	573	nc	nc	ABC
					2011	3	898	183	0.3	nc	ABC
					2015	5	1,301	479	1.0	2.2	AB
					2016	5	1,143	444	0.7	1.3	AB
					2017	5	1,465	735	1.2	3.1	A
					2018	5	771	309	0.0	-0.7	ABC
					2019	5	843	293	0.2	-0.3	ABC
					2020	5	626	261	-0.2	-1.5	BC
					2021	5	675	344	-0.1	-1.2	BC
					2022	5	638	301	-0.2	-1.4	BC
					2023	5	255	99	-0.9	-3.5	C
					2024	5	268	88	-0.9	-3.4	C
Richness (No. Taxa)	ANOVA	log10	YES	<0.001	2007	3	20	6	nc	nc	A
					2011	3	15	5	-0.9	nc	AB
					2015	5	15	1	-1.0	-0.1	AB
					2016	5	15	2	-0.9	0.0	AB
					2017	5	17	2	-0.5	0.4	A
					2018	5	14	1	-1.0	-0.1	AB
					2019	5	16	2	-0.7	0.2	A
					2020	5	16	3	-0.6	0.3	A
					2021	5	15	2	-0.9	0.0	AB
					2022	5	15	3	-0.9	0.0	AB
					2023	5	12	2	-1.7	-0.9	BC
					2024	5	8	1	-2.7	-1.9	C
Simpson's Evenness (Krebs)	K-W	rank	YES	0.097	2007	3	1	0	nc	nc	CD
					2011	3	1	0	1.5	nc	CD
					2015	5	1	0	4.6	1.0	ABCD
					2016	5	1	0	7.6	2.0	AB
					2017	5	1	0	2.7	0.4	BCD
					2018	5	1	0	0.2	-0.4	CD
					2019	5	1	0	-10.0	-3.9	CD
					2020	5	1	0	5.3	1.2	ABC
					2021	5	1	0	-1.0	-0.8	D
					2022	5	1	0	5.9	1.5	A
					2023	5	1	0	4.6	1.0	ABCD
					2024	5	1	0	-13.0	-4.7	D
% Nematoda	K-W	rank	NO	0.249	2007	3	1	1	nc	nc	A
					2011	3	0	0	0.1	nc	A
					2015	5	3	3	3.1	8.3	A
					2016	5	4	4	2.8	7.6	A
					2017	5	5	5	5.0	14.0	A
					2018	5	3	2	2.4	6.5	A
					2019	5	2	1	2.7	7.2	A
					2020	5	2	1	1.9	5.0	A
					2021	5	3	3	2.9	7.9	A
					2022	5	2	3	-0.7	-2.0	A
					2023	5	1	1	1.5	3.8	A
					2024	5	2	3	0.8	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: MOD = Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.

^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 Invertebrate Community Endpoints at Camp Lake Tributary 1 Lower Main Stem (CLT1-DS) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test ^a	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2011	
% Oligochaeta	K-W	rank	YES	<0.001	2007	3	7	6	nc	nc	ABC
					2011	3	1	2	-0.9	nc	BDEF
					2015	5	6	3	-0.2	8.9	AC
					2016	5	10	4	0.5	17.0	A
					2017	5	5	3	-0.4	5.3	AC
					2018	5	1	1	-0.8	1.0	DEF
					2019	5	4	3	-0.5	4.2	ABCD
					2020	5	12	8	0.1	12.0	A
					2021	5	1	2	-0.9	-0.1	EF
					2022	5	3	2	-0.6	3.9	BCDE
					2023	5	1	1	-0.9	-0.7	EF
					2024	5	0	0	-0.9	-0.7	F
% Hydracarina	K-W	rank	YES	0.006	2007	3	3	1	nc	nc	BCDE
					2011	3	25	6	157.0	nc	A
					2015	5	2	2	-18.0	-3.8	CE
					2016	5	5	1	5.8	-3.2	AB
					2017	5	4	1	-0.3	-3.4	BD
					2018	5	4	2	-3.4	-3.4	BDE
					2019	5	2	1	-14.0	-3.7	CDE
					2020	5	2	2	-20.0	-3.8	CE
					2021	5	2	1	-13.0	-3.6	C
					2022	5	5	2	9.0	-3.2	AB
					2023	5	3	4	0.5	-3.4	BCDE
					2024	5	4	4	-6.4	-3.5	BCDE
% Ostracoda	K-W	rank	NO	0.107	2007	3	1	1	nc	nc	A
					2011	3	0	0	-0.7	nc	A
					2015	5	1	1	-0.7	nm	A
					2016	5	0	0	-0.7	nm	A
					2017	5	0	0	-0.7	nm	A
					2018	5	0	0	-0.7	nm	A
					2019	5	0	0	-0.3	nm	A
					2020	5	0	0	-0.7	nm	A
					2021	5	0	0	-0.7	nm	A
					2022	5	0	0	-0.7	nm	A
					2023	5	0	1	-0.7	nm	A
					2024	5	0	0	-0.7	nm	A
% Chironomidae	ANOVA	log10	YES	0.002	2007	3	81	9	nc	nc	AB
					2011	3	65	9	-2.1	nc	B
					2015	5	85	4	0.5	2.0	A
					2016	5	74	6	-0.8	0.9	AB
					2017	5	81	4	0.0	1.6	A
					2018	5	86	4	0.6	2.0	A
					2019	5	87	7	0.8	2.1	A
					2020	5	76	7	-0.6	1.1	AB
					2021	5	81	3	0.0	1.6	A
					2022	5	79	8	-0.3	1.4	AB
					2023	5	79	8	-0.2	1.4	A
					2024	5	81	9	0.1	1.6	A
% Metal Sensitive Chironomidae	K-W	rank	YES	0.022	2007	3	15	10	nc	nc	A
					2011	3	8	7	-3.6	nc	ABCD
					2015	5	4	4	-3.2	0.3	BCDE
					2016	5	4	3	-4.4	-0.7	DE
					2017	5	1	1	-5.2	-1.3	E
					2018	5	9	6	-3.2	0.3	ABCD
					2019	5	8	3	-1.4	1.8	ABCD
					2020	5	4	2	-4.4	-0.7	CDE
					2021	5	11	10	-2.0	1.3	ABC
					2022	5	9	6	-1.4	1.8	ABCD
					2023	5	8	5	-3.0	0.5	ABCD
					2024	5	12	9	0.5	3.4	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: MOD = Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.

^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 Invertebrate Community Endpoints at Camp Lake Tributary 1 Lower Main Stem (CLT1-DS) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test ^a	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2011	
% Tipulidae	ANOVA	log10	YES	0.018	2007	3	6	3	nc	nc	AB
					2011	3	8	3	0.6	nc	AB
					2015	5	3	1	-1.6	-2.3	AB
					2016	5	6	3	-0.3	-0.9	AB
					2017	5	4	3	-1.7	-2.5	AB
					2018	5	5	3	-0.8	-1.6	AB
					2019	5	3	2	-2.3	-3.2	A
					2020	5	6	2	0.0	-0.7	AB
					2021	5	4	2	-0.8	-1.5	AB
					2022	5	9	7	0.4	-0.2	AB
					2023	5	9	6	0.4	-0.2	AB
					2024	5	8	3	0.6	0.0	B
% Collector Gatherers FFG	ANOVA	none	YES	<0.001	2007	3	52	24	nc	nc	CDEF
					2011	3	36	11	-0.7	nc	EF
					2015	5	78	10	1.1	4.1	AB
					2016	5	66	11	0.6	2.9	ABCD
					2017	5	67	6	0.6	3.0	ABCD
					2018	5	60	8	0.3	2.3	BCD
					2019	5	82	6	1.2	4.4	A
					2020	5	71	8	0.8	3.4	ABC
					2021	5	48	10	-0.2	1.2	DEF
					2022	5	58	10	0.3	2.1	CDE
					2023	5	59	10	0.3	2.3	BCDE
					2024	5	31	10	-0.9	-0.5	F
% Filterers FFG	K-W	rank	NO	0.408	2007	3	10	13	nc	nc	A
					2011	3	0	0	-0.6	nc	A
					2015	5	0	1	-0.7	-2.7	A
					2016	5	1	2	-0.6	4.2	A
					2017	5	0	1	-0.7	-2.7	A
					2018	5	0	0	-0.6	-0.3	A
					2019	5	1	2	-0.7	-2.7	A
					2020	5	1	1	-0.6	3.3	A
					2021	5	2	1	-0.5	11.0	A
					2022	5	0	0	-0.7	-2.7	A
					2023	5	1	1	-0.7	-2.7	A
					2024	5	1	2	-0.7	-2.7	A
% Shredders FFG	ANOVA	none	YES	<0.001	2007	3	22	3	nc	nc	BCD
					2011	3	39	5	5.5	nc	BC
					2015	5	19	9	-0.9	-4.3	CD
					2016	5	29	11	2.1	-2.3	BCD
					2017	5	28	5	1.8	-2.5	BCD
					2018	5	36	8	4.4	-0.7	BC
					2019	5	14	6	-2.7	-5.5	D
					2020	5	25	9	0.8	-3.1	BCD
					2021	5	42	12	6.5	0.7	B
					2022	5	23	4	0.4	-3.4	CD
					2023	5	32	9	3.3	-1.4	BC
					2024	5	60	14	12.0	4.6	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: MOD = Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.

^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 2024

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	12	12	14	0.46	0.43	0.4	0	0.25	0	None	None	None	None	None	None
	REF-CRK-B2	11	16	14	0.4	0.37	0.44	0	0	0	Common Bryophytes	None	Sparse Bryophytes	Sparse	Sparse	Common
	REF-CRK-B3	12	12	14	0.39	0.39	0.35	0	0	0	None	None	None	None	Sparse	Sparse
	REF-CRK-B4	11	12	16	0.37	0.34	0.39	0	-	-	None	-	-	None	-	-
	REF-CRK-B5	12	14	12	0.4	0.46	0.4	0	0	-	None	None	-	None	None	-
Camp Lake Tributary 2 Upstream	CLT-2-US-B1	17	16	19	0.33	0.37	0.39	25%	25%	75%	None	None	None	Sparse	None	Sparse
	CLT-2-US-B2	18	16	19	0.36	0.39	0.40	50%	75%	50%	Common Bryophytes	Sparse Bryophytes	None	None	None	None
	CLT-2-US-B3	14	18	12	0.42	0.47	0.56	0%	0%	50%	None	None	None	None	None	None
	CLT-2-US-B4	17	19	17	0.38	0.36	0.38	0%	0%	50%	None	Sparse Bryophytes	None	None	None	None
	CLT-2-US-B5	17	17	13	0.44	0.42	0.38	0%	25%	25%	None	Sparse Bryophytes	Sparse Bryophytes	Sparse	Sparse	Sparse
Camp Lake Tributary 2 Downstream	CLT-2-DS-B1	18	16	19	0.38	0.35	0.40	-	25%	50%	None	None	Sparse Bryophytes	None	None	Sparse
	CLT-2-DS-B2	16	16	17	0.40	0.36	0.39	0%	25%	50%	Sparse Bryophytes	Sparse Bryophytes	None	None	None	Sparse
	CLT-2-DS-B3	12	12	11	0.39	0.40	0.36	0%	0%	25%	Sparse Bryophytes	None	None	None	None	None
	CLT-2-DS-B4	13	11	12	0.41	0.35	0.37	0%	0%	25%	None	None	None	Sparse	None	Sparse
	CLT-2-DS-B5	12	12	15	0.42	0.38	0.35	0%	0%	0%	None	None	None	None	None	None

Note: "-" = data not available.

Table F.12: Benthic Station Habitat Feature Statistical Comparisons among Camp Lake Tributary 2 (CLT2) and Unnamed Reference Creek (REF-CRK) Study Areas, Mary River Project CREMP, August 2024

Metric	Overall 3-group Comparison				Pair-wise, <i>post hoc</i> comparisons			
	Statistical Test ^a	Transformation	Significant Difference between Areas?	P-value	Area	Area	Significant Difference Between Areas?	P-value
Water Depth (cm)	ANOVA	none	YES	0.019	Unnamed Reference Creek	CLT2 Upstream	YES	0.017
					Unnamed Reference Creek	CLT2 Downstream	NO	0.547
					CLT2 Upstream	CLT2 Downstream	NO	0.110
Water Velocity (cm/s)	ANOVA	none	NO	0.512	Unnamed Reference Creek	CLT2 Upstream	NO	ns
					Unnamed Reference Creek	CLT2 Downstream	NO	ns
					CLT2 Upstream	CLT2 Downstream	NO	ns
Substrate Embeddedness (%)	ANOVA	none	YES	0.027	Unnamed Reference Creek	CLT2 Upstream	YES	0.022
					Unnamed Reference Creek	CLT2 Downstream	NO	0.296
					CLT2 Upstream	CLT2 Downstream	NO	0.296

 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 (CLT2) Study Areas, August 2024

Waterbody	Upstream (CLT2-US)					Downstream (CLT2-DS)				
Station	B1	B2	B3	B4	B5	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-	-	-	-	-	-
P. Nemata	3.58	-	7.17	-	3.58	25.1	3.58	-	645	-
	-	-	-	-	-	-	-	-	-	-
ANNELIDS	-	-	-	-	-	-	-	-	-	-
P. Annelida	-	-	-	-	-	-	-	-	-	-
WORMS	-	-	-	-	-	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-	-	-	-	-	-
F. Enchytraeidae	10.7	14.3	35.83	-	3.58	3.58	3.58	-	140	-
F. Lumbriculidae	-	-	-	-	-	-	-	-	-	-
Lumbriculus	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
ARTHROPODS	-	-	-	-	-	-	-	-	-	-
P. Arthropoda	-	-	-	-	-	-	-	-	-	-
MITES	-	-	-	-	-	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-	-	-	-	-	-
O. Acarina	-	-	-	-	-	-	-	-	-	-
immature	-	-	-	-	-	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
F. Lebertiidae	-	-	-	-	-	-	-	-	-	-
Lebertia	-	-	-	-	-	-	-	-	-	-
F. Pionidae	-	-	-	-	-	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
F. Sperchonidae	-	-	-	-	-	-	-	-	-	-
Sperchon	17.9	17.9	14.3	28.7	35.8	7.17	7.17	3.58	10.7	3.58
SEED SHRIMPS	-	-	-	-	-	-	-	-	-	-
Cl. Ostracoda	-	-	-	-	-	-	-	-	-	-
SPRINGTAILS	-	-	-	-	-	-	-	-	-	-
Cl. Entognatha	-	-	-	-	-	-	-	-	-	-
O. Collembola	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
INSECTS	-	-	-	-	-	-	-	-	-	-
Cl. Insecta	-	-	-	-	-	-	-	-	-	-
MAYFLIES	-	-	-	-	-	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-	-	-	-	-	-
F. Baetidae	-	-	-	-	-	-	-	-	-	-
Acentrella feropagus	-	-	3.58	-	-	-	3.58	-	-	-
STONEFLIES	-	-	-	-	-	-	-	-	-	-
O. Plecoptera	-	-	-	-	-	-	-	-	-	-
F. Capniidae	-	-	-	-	-	-	-	-	-	-
immature	3.58	-	-	-	3.58	-	-	3.58	-	-
TRUE FLIES	-	-	-	-	-	-	-	-	-	-
O. Diptera	-	-	-	-	-	-	-	-	-	-
indeterminate	3.58	-	-	-	-	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-	-	-	-	-	-
Culicoides	-	-	-	-	-	-	-	-	-	-
MIDGES	-	-	-	-	-	-	-	-	-	-
F. Chironomidae	-	-	-	-	-	-	-	-	-	-
chironomid pupae	17.9	21.5	7.2	10.7	28.7	10.7	3.58	14.3	17.9	3.58
S.F. Chironominae	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	-	-	-	-	-	-	-	-	-	-
Rheotanytarsus	-	-	-	-	-	-	-	-	-	-
Tanytarsus	-	-	-	-	3.58	-	-	-	-	-
S.F. Diamesinae	-	-	-	-	-	-	-	-	-	-
Diamesa	7.17	21.5	32.2	28.7	39.4	10.7	-	21.5	28.7	10.7
Pseudokiefferiella	14.3	-	-	3.58	25.1	115	10.7	43.0	133	3.58
S.F. Orthoclaadiinae	-	-	-	-	-	-	-	-	-	-
Cardiocladius	10.7	-	7.17	-	-	-	-	-	-	-
Chaetocladius	-	-	-	-	-	-	-	-	14.33	-
Cricotopus	-	7.17	3.58	-	-	14.3	3.58	-	3.58	-
Cricotopus/Orthocladius	68.1	39.4	35.8	28.7	68.1	89.6	14.3	10.7	100	-
Eukiefferiella	-	7.17	-	-	14.3	21.5	3.6	10.7	60.9	10.7
Hydrobaenus	-	-	-	-	-	-	-	-	3.58	-
Hydrosmittia	3.58	-	-	-	-	10.7	-	-	-	-
Krenosmittia	-	3.58	3.58	-	21.5	3.58	-	-	14.3	3.58
Limnophyes	-	-	3.58	-	3.58	-	-	-	14.3	3.58
Orthocladius (Euorthocladius)	17.9	7.17	3.58	-	7.17	14.3	3.58	-	10.7	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Parametriocnemus	-	-	-	-	-	-	-	-	-	-
Paraphaenocladius	-	-	-	-	-	-	-	-	17.9	-
Synorthocladius	-	-	-	-	-	-	-	-	-	-
Thienemanniella	-	-	-	-	-	-	-	-	-	-
Tokunagaia	7.17	3.58	-	-	7.17	10.7	3.58	-	39.4	3.58
Tvetenia	7.17	-	-	-	3.58	-	3.58	7.17	43.0	3.58
S.F. Tanypodinae	-	-	-	-	-	-	-	-	-	-
Procladius	-	-	-	-	-	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-	-	-	-	-	-
F. Empididae	-	-	-	-	-	-	-	-	-	-
Clinocera	32.2	10.7	25.1	3.58	75.2	25.1	-	7.17	25.1	3.58
F. Muscidae	-	-	-	-	-	-	-	-	-	-
F. Simuliidae	-	-	-	-	-	-	-	-	-	-
Gymnopsais	3.58	-	7.17	-	10.7	-	-	-	-	3.6
Helodon irkutensis	3.58	3.58	3.58	3.58	3.58	10.7	3.58	3.58	7.17	3.6
Metacnephia	3.58	-	7.17	-	3.58	-	-	-	7.17	-
Prosimulium ursinum	-	7.17	-	3.58	7.17	-	-	-	-	-
pupae	-	-	-	3.58	-	-	-	-	-	-
F. Tipulidae	-	-	-	-	-	-	-	-	-	-
Tipula	3.58	-	3.58	3.58	25.1	21.5	3.58	10.7	39.4	10.7
	-	-	-	-	-	-	-	-	-	-
CLAMS	-	-	-	-	-	-	-	-	-	-
Cl. Bivalvia	-	-	-	-	-	-	-	-	-	-
F. Sphaeriidae	-	-	-	-	-	-	-	-	-	-
Psidium (Cyclocalyx)	-	-	-	-	-	-	-	-	-	-
SUMMARY METRICS										
Density (No. organisms per m ²)	240	165	204	118	394	394	71.7	136	1,376	68
Richness (total number of taxa) ^a	18	12	16	8	20	15	13	10	20	12
Simpson's Evenness (E)	0.835	0.948	0.951	0.881	0.925	0.906	0.970	0.892	0.791	0.969
Dominant Group Composition										
% Nemata	1.49	0	3.51	0	0.909	6.36	5	0	46.9	0
% Oligochaeta	4.48	8.70	17.5	0	0.909	0.909	5.00	0	10.2	0
% Acari	7.46	10.9	7.02	24.2	9.09	1.82	10.0	2.63	0.781	5.26
% Ostracods	0	0	0	0	0	0	0	0	0	0
% Chironomids	65.3	67.4	47.4	60.6	56.4	76.4	65.0	79.0	36.5	63.2
% Metal Sensitive Chironmids	10.3	16.2	17.1	32.1	19.8	33.0	16.2	54.7	12.2	23.0
% Simuliidae	4.56	6.52	8.77	9.09	6.36	2.73	5.00	2.63	1.04	10.5
% Tipulidae	1.52	0	1.75	3.03	6.36	5.45	5.00	7.89	2.86	15.8
Functional Feeding Group Composition										
% Collector - Gatherers	67.5	58.0	56.8	35.1	58.0	69.7	68.8	72.5	91.8	68.4
% Filterers	1.52	4.35	3.51	6.06	3.77	0	0	0	0.521	0
% Shredders	3.01	20.2	13.1	31.6	7.27	22.1	21.2	19.6	5.03	15.8
Habitat Preference Group Composition										
% Clingers	12.0	37.6	27.2	61.9	16.5	21.2	31.2	14.4	3.98	15.8
% Sprawlers	75.2	53.7	46.2	35.1	75.3	66.1	53.8	77.7	36.1	68.4
% Burrowers	12.8	8.7	26.6	3.03	8.18	12.7	15.0	7.89	59.9	15.8

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 (CLT2) Study Areas, Mary River Project CREMP, August 2024


Endpoint	Study Area	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
Density (No. per m ²)	Reference Creek (REF-CRK)	393	397	178	86.0	222	1,039
	CLT2 Upstream (CLT2-US)	224	105	47.1	118	204	394
	CLT2 Downstream (CLT2-DS)	409	557	249	68.1	136	1,376
Richness (No. of Taxa)	Reference Creek (REF-CRK)	15.6	5.90	2.64	10.0	12.0	22.0
	CLT2 Upstream (CLT2-US)	13.6	4.22	1.89	8.00	15.0	19.0
	CLT2 Downstream (CLT2-DS)	13.2	3.42	1.53	10.0	12.0	19.0
Simpson's Evenness	Reference Creek (REF-CRK)	0.949	0.0322	0.0144	0.898	0.956	0.980
	CLT2 Upstream (CLT2-US)	0.908	0.0493	0.0221	0.835	0.925	0.951
	CLT2 Downstream (CLT2-DS)	0.905	0.0735	0.0329	0.791	0.906	0.970
% Nematoda	Reference Creek (REF-CRK)	0.704	1.00	0.448	0	0	2.14
	CLT2 Upstream (CLT2-US)	1.18	1.45	0.647	0	0.909	3.51
	CLT2 Downstream (CLT2-DS)	11.6	19.9	8.90	0	5.00	46.9
% Oligochaeta	Reference Creek (REF-CRK)	0.0690	0.154	0.0690	0	0	0.345
	CLT2 Upstream (CLT2-US)	6.33	7.15	3.20	0	4.48	17.5
	CLT2 Downstream (CLT2-DS)	3.21	4.40	1.97	0	0.909	10.2
% Hydracarina	Reference Creek (REF-CRK)	6.47	1.62	0.724	4.84	6.25	8.33
	CLT2 Upstream (CLT2-US)	11.7	7.15	3.20	7.02	9.09	24.2
	CLT2 Downstream (CLT2-DS)	4.10	3.69	1.65	0.781	2.63	10.0
% Ostracoda	Reference Creek (REF-CRK)	2.61	2.65	1.19	0	3.23	6.25
	CLT2 Upstream (CLT2-US)	0	0	0	0	0	0
	CLT2 Downstream (CLT2-DS)	0	0	0	0	0	0
% Chironomidae	Reference Creek (REF-CRK)	68.9	9.23	4.13	56.4	70.8	79.3
	CLT2 Upstream (CLT2-US)	59.4	7.97	3.57	47.4	60.6	67.4
	CLT2 Downstream (CLT2-DS)	64.0	16.9	7.54	36.5	65.0	79.0
% Metal Sensitive Chironomidae	Reference Creek (REF-CRK)	8.62	10.7	4.79	0	4.91	25.3
	CLT2 Upstream (CLT2-US)	19.1	8.05	3.60	10.3	17.1	32.1
	CLT2 Downstream (CLT2-DS)	27.8	16.9	7.58	12.2	23.0	54.7
% Simuliidae	Reference Creek (REF-CRK)	9.93	6.72	3.01	3.12	8.33	20.7
	CLT2 Upstream (CLT2-US)	7.06	1.88	0.839	4.56	6.52	9.09
	CLT2 Downstream (CLT2-DS)	4.39	3.71	1.66	1.04	2.73	10.5
% Tipulidae	Reference Creek (REF-CRK)	4.83	6.79	3.04	0	1.03	16.1
	CLT2 Upstream (CLT2-US)	2.53	2.40	1.07	0	1.75	6.36
	CLT2 Downstream (CLT2-DS)	7.40	5.02	2.24	2.86	5.45	15.8
% Collector-Gatherer FFG	Reference Creek (REF-CRK)	60.4	11.9	5.33	44.4	61.6	77.6
	CLT2 Upstream (CLT2-US)	55.1	12.0	5.35	35.1	58.0	67.5
	CLT2 Downstream (CLT2-DS)	74.2	9.97	4.46	68.4	69.7	91.8
% Filterer FFG	Reference Creek (REF-CRK)	1.94	1.79	0.799	0	2.90	3.57
	CLT2 Upstream (CLT2-US)	3.84	1.63	0.731	1.52	3.77	6.06
	CLT2 Downstream (CLT2-DS)	0.104	0.233	0.104	0	0	0.521
% Shredder FFG	Reference Creek (REF-CRK)	13.2	9.93	4.44	5.31	6.44	25.1
	CLT2 Upstream (CLT2-US)	15.0	11.3	5.04	3.01	13.1	31.6
	CLT2 Downstream (CLT2-DS)	16.8	6.99	3.13	5.03	19.6	22.1
% Clinger HPG	Reference Creek (REF-CRK)	24.7	11.1	4.95	9.38	23.1	40.1
	CLT2 Upstream (CLT2-US)	31.0	19.9	8.89	12.0	27.2	61.9
	CLT2 Downstream (CLT2-DS)	17.3	9.97	4.46	3.98	15.8	31.2
% Sprawler HPG	Reference Creek (REF-CRK)	54.5	15.0	6.73	36.3	51.8	77.6
	CLT2 Upstream (CLT2-US)	57.1	17.8	7.97	35.1	53.7	75.3
	CLT2 Downstream (CLT2-DS)	60.4	16.1	7.18	36.1	66.1	77.7
% Burrower HPG	Reference Creek (REF-CRK)	20.7	12.5	5.59	8.05	19.3	40.7
	CLT2 Upstream (CLT2-US)	11.9	8.94	4.00	3.03	8.70	26.6
	CLT2 Downstream (CLT2-DS)	22.3	21.3	9.51	7.89	15.0	59.9

Notes: Sample size was five for all study areas. FFG = Functional Feeding Group; HPG = Habitat Preference Group.

Table F.15: Statistical Comparison of Benthic Invertebrate Community Endpoints at Camp Lake Tributary 2 Upstream (CLT2-US) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons					
	Statistical Test ^a	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b	Pairwise Comparison
									vs. Baseline Year 2007	
Density (org/m ²)	ANOVA	log10	YES	<0.001	2007	3	364	205	nc	ABCD
					2015	5	741	416	1.0	AB
					2016	5	409	100	0.3	ABC
					2017	5	216	30	-0.5	CD
					2018	5	168	65	-0.9	D
					2019	5	745	282	1.1	AB
					2020	5	679	325	0.9	AB
					2021	5	392	318	0.0	BCD
					2022	5	768	127	1.2	A
					2023	5	146	54	-1.1	D
					2024	5	224	105	-0.6	CD
Richness (No. Taxa)	ANOVA	none	YES	<0.001	2007	3	13	2	nc	BC
					2015	5	21	2	3.9	A
					2016	5	16	3	1.6	AB
					2017	5	15	3	0.9	BC
					2018	5	15	4	1.1	ABC
					2019	5	19	3	2.9	AB
					2020	5	17	3	1.9	AB
					2021	5	16	4	1.6	AB
					2022	5	19	2	2.9	AB
					2023	5	9	3	-1.6	C
					2024	5	14	4	0.5	BC
Simpson's Evenness (Krebs)	ANOVA	none	YES	0.002	2007	3	1	0	nc	C
					2015	5	1	0	12.0	AB
					2016	5	1	0	8.0	ABC
					2017	5	1	0	16.0	A
					2018	5	1	0	12.0	AB
					2019	5	1	0	15.0	AB
					2020	5	1	0	5.4	BC
					2021	5	1	0	5.3	BC
					2022	5	1	0	9.3	ABC
					2023	5	1	0	13.0	AB
					2024	5	1	0	10.0	ABC
% Nematoda	K-W	rank	NO	0.620	2007	3	1	1	nc	A
					2015	5	1	1	-11.0	A
					2016	5	1	1	-13.0	A
					2017	5	1	1	-26.0	A
					2018	5	1	2	-26.0	A
					2019	5	2	1	16.0	A
					2020	5	1	1	-26.0	A
					2021	5	2	2	2.2	A
					2022	5	1	1	-9.1	A
					2023	5	2	2	1.8	A
					2024	5	1	1	-9.7	A
% Oligochaeta	K-W	rank	NO	0.679	2007	3	2	1	nc	A
					2015	5	3	3	-0.9	A
					2016	5	5	4	6.2	A
					2017	5	3	6	-2.9	A
					2018	5	2	3	-2.9	A
					2019	5	2	1	0.7	A
					2020	5	15	19	3.7	A
					2021	5	11	21	2.0	A
					2022	5	8	8	2.9	A
					2023	5	2	2	0.6	A
					2024	5	6	7	3.9	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: MOD = Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.


^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 Invertebrate Community Endpoints at Camp Lake Tributary 2 Upstream (CLT2-US) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons					
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b	Pairwise Comparison
									vs. Baseline Year 2007	
% Hydracarina	K-W	rank	YES	0.002	2007	3	3	2	nc	BCDE
					2015	5	1	1	-4.7	E
					2016	5	5	3	1.6	ABC
					2017	5	8	4	9.1	AB
					2018	5	5	4	-1.0	BCD
					2019	5	2	1	-2.4	DE
					2020	5	3	1	-0.5	CDE
					2021	5	6	2	1.4	ABC
					2022	5	6	1	2.8	ABC
					2023	5	9	8	3.5	ABC
					2024	5	12	7	7.8	A
% Ostracoda	K-W	rank	NO	0.137	2007	3	0	0	nc	A
					2015	5	0	1	nm	A
					2016	5	0	0	nm	A
					2017	5	0	0	nm	A
					2018	5	0	0	nm	A
					2019	5	0	1	nm	A
					2020	5	0	1	nm	A
					2021	5	0	1	nm	A
					2022	5	1	1	nm	A
					2023	5	0	0	nm	A
					2024	5	0	0	nm	A
% Chironomidae	ANOVA	none	YES	<0.001	2007	3	88	4	nc	A
					2015	5	80	9	-1.9	AB
					2016	5	80	9	-2.0	AB
					2017	5	76	7	-2.9	ABC
					2018	5	80	4	-1.9	AB
					2019	5	80	6	-2.0	AB
					2020	5	70	14	-4.2	ABC
					2021	5	62	15	-6.1	BCD
					2022	5	72	6	-3.7	ABC
					2023	5	49	15	-9.1	D
					2024	5	59	8	-6.7	CD
% Metal Sensitive Chironomidae	ANOVA	log10	YES	<0.001	2007	3	5	1	nc	BC
					2015	5	11	6	4.8	ABC
					2016	5	6	3	-1.2	C
					2017	5	22	3	12.0	A
					2018	5	10	5	3.8	ABC
					2019	5	17	7	9.8	AB
					2020	5	6	3	-1.3	C
					2021	5	14	7	7.0	ABC
					2022	5	8	2	3.9	ABC
					2023	5	21	14	11.0	A
					2024	5	19	8	11.0	AB
% Tipulidae	ANOVA	log10(x+1)	NO	0.159	2007	3	5	2	nc	A
					2015	5	4	3	-0.6	A
					2016	5	4	2	-0.6	A
					2017	5	2	2	-1.9	A
					2018	5	2	1	-1.5	A
					2019	5	2	1	-1.9	A
					2020	5	2	1	-1.7	A
					2021	5	2	2	-1.6	A
					2022	5	4	2	-0.5	A
					2023	5	5	4	-0.3	A
					2024	5	3	2	-1.4	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: MOD = Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.

^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 Invertebrate Community Endpoints at Camp Lake Tributary 2 Upstream (CLT2-US) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons					
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b	Pairwise Comparison
									vs. Baseline Year 2007	
% Collector Gatherers FFG	K-W	rank	YES	<0.001	2007	3	69	7	nc	ABCDE
					2015	5	64	10	-0.6	CDE
					2016	5	67	6	-0.1	BCD
					2017	5	76	4	1.3	AB
					2018	5	73	9	-0.4	ABC
					2019	5	54	6	-2.7	EF
					2020	5	80	12	2.6	A
					2021	5	74	4	0.7	ABC
					2022	5	74	7	0.6	ABC
					2023	5	44	11	-4.4	F
% Filterers FFG	K-W	rank	YES	<0.001	2007	3	0	0	nc	C
					2015	5	1	1	nm	C
					2016	5	0	0	nm	C
					2017	5	6	3	nm	A
					2018	5	7	5	nm	AB
					2019	5	11	4	nm	A
					2020	5	2	1	nm	BC
					2021	5	2	2	nm	BC
					2022	5	2	1	nm	BC
					2023	5	15	9	nm	A
% Shredders FFG	ANOVA	log10(x+1)	YES	<0.001	2007	3	28	6	nc	A
					2015	5	26	6	-0.3	A
					2016	5	26	5	-0.3	A
					2017	5	7	6	-3.8	C
					2018	5	13	5	-2.7	ABC
					2019	5	22	6	-1.0	AB
					2020	5	9	4	-3.4	BC
					2021	5	5	3	-4.3	C
					2022	5	12	6	-2.8	BC
					2023	5	16	10	-2.2	ABC
					2024	5	15	11	-2.3	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: MOD = Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.


^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 Invertebrate Community Endpoints at Camp Lake Tributary 2 Downstream (CLT2-DS) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons					
	Statistical Test ^a	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b	Pairwise Comparison
									vs. Baseline Year 2007	
Density (org/m ²)	ANOVA	log10	YES	0.003	2007	3	431	109	nc	AB
					2015	5	447	258	-0.5	AB
					2016	5	201	61	-2.8	AB
					2017	5	222	144	-3.0	AB
					2018	5	127	51	-4.6	B
					2019	5	546	366	0.2	AB
					2020	5	881	672	1.9	A
					2021	5	495	279	-0.1	AB
					2022	5	684	117	1.7	A
					2023	5	269	119	-1.9	AB
					2024	5	409	557	-2.6	AB
Richness (No. Taxa)	ANOVA	none	YES	0.008	2007	3	18	2	nc	AB
					2015	5	14	3	-1.7	AB
					2016	5	13	4	-2.0	AB
					2017	5	13	5	-2.1	AB
					2018	5	11	2	-3.1	B
					2019	5	18	3	0.4	A
					2020	5	18	5	0.2	A
					2021	5	17	3	-0.2	AB
					2022	5	18	2	0.3	A
					2023	5	15	2	-1.5	AB
					2024	5	13	3	-2.1	AB
Simpson's Evenness (Krebs)	K-W	rank	NO	0.121	2007	3	1	0	nc	A
					2015	5	1	0	3.8	A
					2016	5	1	0	0.6	A
					2017	5	1	0	3.0	A
					2018	5	1	0	3.7	A
					2019	5	1	0	1.2	A
					2020	5	1	0	3.4	A
					2021	5	1	0	3.6	A
					2022	5	1	0	3.6	A
					2023	5	1	0	3.2	A
					2024	5	1	0	2.0	A
% Nematoda	K-W	rank	NO	0.708	2007	3	1	1	nc	A
					2015	5	4	2	2.4	A
					2016	5	2	2	0.6	A
					2017	5	3	4	1.3	A
					2018	5	3	3	1.4	A
					2019	5	3	2	1.7	A
					2020	5	8	16	0.2	A
					2021	5	4	2	1.7	A
					2022	5	3	2	1.5	A
					2023	5	4	2	3.4	A
					2024	5	12	20	3.4	A
% Oligochaeta	K-W	rank	NO	0.540	2007	3	3	1	nc	A
					2015	5	9	13	6.4	A
					2016	5	2	3	-5.4	A
					2017	5	5	7	1.9	A
					2018	5	1	3	-5.4	A
					2019	5	4	3	3.1	A
					2020	5	4	5	-1.6	A
					2021	5	3	2	1.3	A
					2022	5	4	6	-3.2	A
					2023	5	2	3	-5.4	A
					2024	5	3	4	-3.3	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: MOD = Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Groups.

^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 Invertebrate Community Endpoints at Camp Lake Tributary 2 Downstream (CLT2-DS) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons					
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b	Pairwise Comparison
									vs. Baseline Year 2007	
% Hydracarina	K-W	rank	NO	0.131	2007	3	2	1	nc	A
					2015	5	0	1	-1.9	A
					2016	5	4	2	4.4	A
					2017	5	3	4	0.4	A
					2018	5	4	4	1.8	A
					2019	5	2	1	1.4	A
					2020	5	5	5	4.0	A
					2021	5	3	3	0.9	A
					2022	5	4	2	3.6	A
					2023	5	6	5	2.9	A
					2024	5	4	4	1.9	A
% Ostracoda	K-W	rank	NO	0.560	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	1	1	nm	A
					2019	5	0	0	nm	A
					2020	5	0	0	nm	A
					2021	5	0	0	nm	A
					2022	5	0	0	nm	A
					2023	5	1	2	nm	A
					2024	5	0	0	nm	A
% Chironomidae	K-W	rank	YES	0.009	2007	3	88	6	nc	A
					2015	5	76	10	-2.8	BCDEF
					2016	5	83	6	-1.2	ABC
					2017	5	82	8	-2.0	ABCD
					2018	5	84	6	-0.7	AB
					2019	5	85	3	-1.0	AB
					2020	5	75	17	-2.6	ABCDE
					2021	5	70	10	-4.0	DEF
					2022	5	75	6	-3.0	CDEF
					2023	5	62	16	-4.8	F
					2024	5	64	17	-5.2	EF
% Metal Sensitive Chironomidae	K-W	rank	YES	0.033	2007	3	12	2	nc	ABCD
					2015	5	11	11	-0.4	BCD
					2016	5	5	1	-3.0	D
					2017	5	20	13	4.9	ABC
					2018	5	8	7	-1.6	BD
					2019	5	23	10	6.1	A
					2020	5	12	4	0.5	BCD
					2021	5	17	8	1.9	AC
					2022	5	14	7	-0.1	ABC
					2023	5	17	15	1.9	ABC
					2024	5	28	17	5.3	A
% Tipulidae	K-W	rank	YES	0.028	2007	3	6	7	nc	ABC
					2015	5	6	5	4.8	ABC
					2016	5	2	2	-1.1	BCD
					2017	5	1	2	-3.7	D
					2018	5	3	2	1.1	BCD
					2019	5	2	1	-1.8	CD
					2020	5	2	2	-2.3	CD
					2021	5	3	3	0.6	ABCD
					2022	5	7	3	5.6	A
					2023	5	7	6	2.6	AB
					2024	5	7	5	3.2	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: MOD = Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Groups.

^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 Invertebrate Community Endpoints at Camp Lake Tributary 2 Downstream (CLT2-DS) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Year Comparison				Pair-wise, <i>post hoc</i> comparisons					
	Statistical Test ^a	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b	Pairwise Comparison
									vs. Baseline Year 2007	
% Collector Gatherers FFG	ANOVA	none	YES	<0.001	2007	3	66	11	nc	ABC
					2015	5	69	11	0.3	ABC
					2016	5	80	9	1.2	A
					2017	5	77	11	1.0	AB
					2018	5	83	6	1.5	A
					2019	5	57	23	-0.9	BC
					2020	5	77	9	1.0	AB
					2021	5	75	9	0.8	AB
					2022	5	73	7	0.6	AB
					2023	5	48	9	-1.7	C
					2024	5	74	10	0.7	AB
% Filterers FFG	K-W	rank	YES	0.002	2007	3	3	2	nc	ABCDE
					2015	5	1	1	-1.4	CDEF
					2016	5	1	1	-1.1	BCDEF
					2017	5	3	3	-0.4	ABE
					2018	5	1	2	-1.8	CF
					2019	5	15	11	6.4	A
					2020	5	3	2	0.0	AB
					2021	5	4	5	1.0	BDE
					2022	5	1	1	-1.5	CDF
					2023	5	2	1	-0.9	BCDE
					2024	5	0	0	-1.8	F
% Shredders FFG	ANOVA	log10(x+1)	YES	0.003	2007	3	22	6	nc	ABC
					2015	5	26	12	0.6	AB
					2016	5	12	8	-1.7	ABC
					2017	5	15	9	-1.2	ABC
					2018	5	8	7	-2.4	C
					2019	5	21	17	-0.2	ABC
					2020	5	11	7	-1.8	BC
					2021	5	6	3	-2.7	C
					2022	5	15	5	-1.1	ABC
					2023	5	29	9	1.2	A
					2024	5	17	7	-0.8	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: MOD = Magnitude of Difference. '-' indicates not applicable. nc = no comparison. nm = MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Groups.

^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-03) Study Areas, August 2024

Lake	Reference Lake 3 (REF-03)									
Station Type	Littoral					Profundal				
Station	1	2	3	4	5	6	7	8	9	10
ROUNDWORMS	-	-	-	-	-	-	-	-	-	-
P. Nemata	34.4	17.2	8.61	34.4	-	-	-	25.8	-	-
	-	-	-	-	-	-	-	-	-	-
ANNELIDS	-	-	-	-	-	-	-	-	-	-
P. Annelida	-	-	-	-	-	-	-	-	-	-
WORMS	-	-	-	-	-	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-	-	-	-	-	-
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae	-	-	-	-	-	-	-	-	-	-
Lumbriculus	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
ARTHROPODS	-	-	-	-	-	-	-	-	-	-
P. Arthropoda	-	-	-	-	-	-	-	-	-	-
MITES	-	-	-	-	-	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-	-	-	-	-	-
O. Acarina	-	-	-	-	-	-	-	-	-	-
F. Acalyptonotidae	-	-	-	-	-	-	-	-	-	-
Acalyptonotus	-	25.8	17.2	-	34.4	-	25.8	-	17.2	-
F. Hygrobatidae	-	-	-	-	-	-	-	-	-	-
Hygrobates	-	-	-	-	-	-	-	-	-	-
F. Lebertiidae	-	-	-	-	-	-	-	-	-	-
Lebertia	-	43.1	8.61	-	43.1	-	-	-	-	-
F. Sperchontidae	-	-	-	-	-	-	-	-	-	-
Sperchon	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS	-	-	-	-	-	-	-	-	-	-
Cl. Ostracoda	34.4	594	448	189	904	8.61	17.2	25.8	17.2	17.2
	-	-	-	-	-	-	-	-	-	-
INSECTS	-	-	-	-	-	-	-	-	-	-
Cl. Insecta	-	-	-	-	-	-	-	-	-	-
CADDISFLIES	-	-	-	-	-	-	-	-	-	-
O. Trichoptera	-	-	-	-	-	-	-	-	-	-
F. Apataniidae	-	-	-	-	-	-	-	-	-	-
Apatania	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
TRUE FLIES	-	-	-	-	-	-	-	-	-	-
O. Diptera	-	-	-	-	-	-	-	-	-	-
MIDGES	-	-	-	-	-	-	-	-	-	-
F. Chironomidae	-	-	-	-	-	-	-	-	-	-
chironomid pupae	25.8	103	310	34.4	164	-	17.2	34.4	-	-
S.F. Chironominae	-	-	-	-	-	-	-	-	-	-
Chironomus	-	-	-	-	-	-	-	-	-	-
Lipiniella	-	-	-	-	-	-	-	-	-	-
Micropsectra	-	51.7	233	60.3	766	-	51.7	-	-	-
Parachironomus	-	17.2	-	-	-	-	-	-	-	-
Paratanytarsus	-	-	-	-	25.8	-	-	-	-	8.61
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	-	-	-	-	-
Stictochironomus	-	25.8	8.61	-	370	-	-	-	-	-
Tanytarsus	-	25.8	-	-	60.3	-	-	-	-	-
S.F. Diamesinae	-	-	-	-	-	-	-	-	-	-
Protanypus	-	-	-	-	8.6	-	-	-	8.61	8.61
Pseudodiamesa	-	8.61	-	-	-	-	-	8.61	8.61	-
Pseudokiefferiella	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae	-	-	-	-	-	-	-	-	-	-
Abiskomyia	8.61	51.7	-	8.61	25.8	-	-	-	-	-
Cardiocladius	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	103	8.61	68.9	86.1	17.2	121	86.1	129	181	155
Hydrosmittia	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	8.61	-	8.61	8.61	77.5	-	-	-	-	-
Parakiefferiella	-	-	-	-	8.61	-	-	-	-	-
Zalutschia	-	8.61	-	-	8.61	-	-	-	-	8.61
indeterminate	-	-	-	-	-	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-	-	-	-	-	-
Arctopelopia	-	-	-	-	-	-	-	-	-	-
Procladius	-	-	-	-	-	17.2	-	-	-	8.61
SUMMARY METRICS										
Density (No. organisms per m ²)	215	982	1,111	422	2,514	146	198	224	233	207
Richness (total number of taxa) ^a	5	12	8	6	13	3	4	4	5	6
Simpson's Evenness (E)	0.755	0.669	0.744	0.840	0.785	0.508	0.457	0.867	0.601	0.477
Dominant Taxonomic Group Composition										
% Nemata	16.0	1.75	0.775	8.16	0	0	0	0	11.5	0
% Hydracarina	0	7.02	2.33	0	3.08	0	0	13.0	0	7.41
% Ostracods	16.0	60.5	40.3	44.9	36.0	8.33	5.88	8.70	11.5	7.41
% Chironomids	68.0	30.7	56.6	46.9	61.0	91.7	94.1	78.3	76.9	85.2
% Metal Sensitive Chironomids	0	13.3	41.3	17.3	38.3	8.33	0	29.4	4.81	7.41
Functional Feeding Group Composition										
% Collector - Gatherers	100	77.0	56.4	82.7	58.6	87.5	88.2	57.6	100	92.6
% Filterers	0	12.0	41.3	17.3	38.0	4.17	0	29.4	0	0
% Shredders	0	1.33	0	0	0.383	4.17	0	0	0	0
Habitat Preference Group Composition										
% Clingers	0	19.0	43.6	17.3	39.9	0	0	42.4	0	7.41
% Sprawlers	84.0	75.2	54.1	74.5	43.2	95.8	100	57.6	88.5	88.9
% Burrowers	16.0	5.76	2.30	8.16	16.9	4.17	0	0	11.5	3.70

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 2024

Lake	Camp Lake (JL0)									
Station Type	Littoral					Profundal				
Station	2	21	20	19	18	1	7	16	11	12
ROUNDWORMS	-	-	-	-	-	-	-	-	-	-
P. Nemata	-	94.7	207	8.61	-	-	-	8.61	-	-
	-	-	-	-	-	-	-	-	-	-
ANNELIDS	-	-	-	-	-	-	-	-	-	-
P. Annelida	-	-	-	-	-	-	-	-	-	-
WORMS	-	-	-	-	-	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-	-	-	-	-	-
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae	-	-	-	-	-	-	-	-	-	-
Lumbriculus	129	-	-	-	-	-	17.2	-	-	-
	-	-	-	-	-	-	-	-	-	-
ARTHROPODS	-	-	-	-	-	-	-	-	-	-
P. Arthropoda	-	-	-	-	-	-	-	-	-	-
MITES	-	-	-	-	-	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-	-	-	-	-	-
O. Acarina	-	-	-	-	-	-	-	-	-	-
F. Acalyptonotidae	-	-	-	-	-	-	-	-	-	-
Acalyptonotus	-	17.2	-	77.5	-	-	17.2	8.61	-	8.61
F. Hygrobatidae	-	-	-	-	-	-	-	-	-	-
Hygrobates	-	-	-	-	-	8.61	-	-	-	-
F. Lebertiidae	-	-	-	-	-	-	-	-	-	-
Lebertia	-	-	34.4	-	-	-	-	-	-	-
F. Sperchontidae	-	-	-	-	-	-	-	-	-	-
Sperchon	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS	-	-	-	-	-	-	-	-	-	-
Cl. Ostracoda	456	-	-	25.8	-	-	103	-	51.7	-
	-	-	-	-	-	-	-	-	-	-
INSECTS	-	-	-	-	-	-	-	-	-	-
Cl. Insecta	-	-	-	-	-	-	-	-	-	-
CADDISFLIES	-	-	-	-	-	-	-	-	-	-
O. Trichoptera	-	-	-	-	-	-	-	-	-	-
F. Apataniidae	-	-	-	-	-	-	-	-	-	-
Apatania	8.61	8.61	51.7	43.1	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
TRUE FLIES	-	-	-	-	-	-	-	-	-	-
O. Diptera	-	-	-	-	-	-	-	-	-	-
MIDGES	-	-	-	-	-	-	-	-	-	-
F. Chironomidae	-	-	-	-	-	-	-	-	-	-
chironomid pupae	94.7	86.1	172	68.9	-	-	51.7	-	34.4	-
S.F. Chironominae	-	-	-	-	-	-	-	-	-	-
Chironomus	-	-	-	-	215	-	586	17.2	741	-
Lipiniella	-	-	-	-	-	-	-	-	-	-
Micropsectra	-	17.2	68.9	17.2	-	-	-	34.4	-	-
Parachironomus	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	233	51.7	121	379	-	-	-	8.61	121	-
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	8.61	-	-	-	-	77.5	34.4	-	-
Stictochironomus	947	603	930	379	146	8.61	8.6	405	-	-
Tanytarsus	34.4	51.7	293	94.7	-	-	34.4	8.61	68.9	-
S.F. Diamesinae	-	-	-	-	-	-	-	-	-	-
Protanypus	-	17.2	121	34.4	-	17.2	34.4	77.5	-	34.4
Pseudodiamesa	-	-	-	-	-	-	-	8.61	17.2	-
Pseudokiefferiella	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae	-	-	-	-	-	-	-	-	-	-
Abiskomyia	129	293	706	465	181	-	34.4	121	-	8.61
Cardiocladius	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	654	310	310	112	-	551	-	112	-	525
Hydrosmittia	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	17.2	86.1	17.2	-	-	-	-	-	-
Parakiefferiella	17.2	-	-	-	-	-	-	-	-	-
Zalutschia	34.4	43.1	51.7	25.8	-	-	-	17.2	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-	-	-	-	-	-
Arctopelopia	551	60.3	86.1	25.8	-	-	8.61	-	-	-
Procladius	94.7	146	258	189	-	25.8	25.8	34.4	-	51.7
SUMMARY METRICS										
Density (No. organisms per m ²)	3,384	1,826	3,496	1,963	543	611	999	896	1,033	629
Richness (total number of taxa) ^a	12	15	14	15	3	5	11	14	5	5
Simpson's Evenness (E)	0.895	0.862	0.909	0.900	0.988	0.732	0.886	0.175	0.756	0.108
Dominant Taxonomic Group Composition										
% Nemata	0	5.19	5.91	0.439	0	0	0	0.962	0	0
% Hydracarina	0	0.943	0.985	3.95	0	1.41	1.72	0.962	0	1.37
% Ostracods	13.5	0	0	1.32	0	0	10.3	0	5.00	0
% Chironomids	82.4	93.4	91.6	92.1	100	98.6	86.2	98.1	95.0	98.6
% Metal Sensitive Chironomids	8.17	7.95	18.2	27.8	0	2.82	7.34	15.4	20.7	5.48
Functional Feeding Group Composition										
% Collector - Gatherers	70.8	77.2	71.0	55.1	100	94.4	90.9	87.5	81.0	90.4
% Filterers	8.17	6.96	14.6	26.0	0	0	3.67	5.77	19.0	0
% Shredders	1.05	2.48	1.56	1.37	0	0	0	1.92	0	0
Habitat Preference Group Composition										
% Clingers	1.31	5.89	13.4	12.1	0	1.41	13.6	9.62	6.91	1.37
% Sprawlers	65.9	53.2	48.9	65.6	33.3	94.4	17.7	33.6	18.8	93.2
% Burrowers	32.8	41.0	37.7	22.3	66.7	4.23	68.7	56.7	74.3	5.48

Note: "-" indicates no taxa present.
^a Bold entries excluded from taxa count.

Table F.19: Statistical Comparisons of Bray-Curtis Indices for Benthic Invertebrate Communities in Mine-Exposed Lakes and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024


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	0.856	0.534	0.285	0.008	5.53	0.409	0.335	0.016
Camp Lake (JL0)	Littoral Habitat, vs Reference Lake 3	5	5	0.937	0.454	0.206	0.008	4.53	0.361	0.282	0.005
	Profundal Habitat, vs Reference Lake 3	5	5	0.097	0.368	0.135	0.008	3.14	0.282	0.192	0.007
Sheardown Lake Northwest (DL0-1)	Littoral Habitat, vs Reference Lake 3	5	5	0.338	0.600	0.360	0.008	6.03	0.430	0.359	0.008
	Profundal Habitat, vs Reference Lake 3	5	5	0.043	0.612	0.374	0.008	6.82	0.460	0.393	0.006
Sheardown Lake Southeast (DL0-2)	Littoral Habitat, vs Reference Lake 3	5	5	0.033	0.534	0.285	0.008	7.01	0.467	0.400	0.008
	Profundal Habitat, vs Reference Lake 3	5	5	0.071	0.914	0.836	0.008	19.5	0.709	0.673	0.005
Mary Lake (BL0)	Littoral Habitat, vs Reference Lake 3	4	5	0.136	0.373	0.139	0.008	3.01	0.300	0.200	0.016
	Profundal Habitat, vs Reference Lake 3	6	5	0.333	0.0686	0.00471	0.236	1.63	0.153	0.0594	0.154


 Highlighted values indicate significant differences 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 Endpoints Among Years for Littoral (Shallow) Habitats in Camp Lake (JL0), Mine Operation (2015 to 2024) and Baseline (2013), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a					
	Statistical Test ^a	Data Transformation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2013	Pairwise Comparison
Density (Individuals/m ²)	K-W	rank	YES	0.012	2013	4	7,752	3,849	-	A
					2015	5	3,671	1,891	-34	ABC
					2016	5	2,639	668	-34	BC
					2017	5	3,642	1,449	-31	ABC
					2018	5	2,600	998	-32	BC
					2019	5	5,126	1,390	-24	A
					2020	5	5,122	2,202	-20	A
					2021	5	4,373	994	-23	A
					2022	5	3,918	1,104	-27	AB
					2023	5	2,203	1,645	-38	C
					2024	5	2,242	1,226	-37	C
Richness (Number of Taxa)	K-W	rank	NO	0.108	2013	4	18.0	4.40	-	A
					2015	5	12.8	3.70	-1.2	A
					2016	5	15.8	3.27	-0.19	A
					2017	5	12.8	2.28	-0.96	A
					2018	5	14.2	3.42	-0.58	A
					2019	5	15.6	3.05	-0.19	A
					2020	5	16.6	1.67	-0.19	A
					2021	5	12.8	2.68	-0.96	A
					2022	5	14.2	1.64	-0.58	A
					2023	5	12.6	3.13	-1.2	A
					2024	5	11.8	5.07	-0.77	A
Simpson's Evenness (E)	K-W	rank	YES	0.009	2013	4	0.893	0.0535	-	ABCD
					2015	5	0.712	0.0625	-9.2	E
					2016	5	0.917	0.0341	1.0	A
					2017	5	0.848	0.0685	-3.1	BCD
					2018	5	0.851	0.0569	-2.5	BCD
					2019	5	0.893	0.0532	-0.32	ABC
					2020	5	0.842	0.0443	-2.5	BDE
					2021	5	0.786	0.143	-4.3	DE
					2022	5	0.843	0.0922	-2.4	BCD
					2023	5	0.890	0.0145	-1.0	ABCD
					2024	5	0.911	0.0466	-0.60	AC
Nematoda (%)	ANOVA	none	NO	0.558	2013	4	5.58	3.57	-	A
					2015	5	4.71	4.58	-0.24	A
					2016	5	4.39	4.85	-0.33	A
					2017	5	4.24	4.24	-0.37	A
					2018	5	2.81	3.24	-0.77	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	-0.77	A
					2023	5	6.84	6.43	0.35	A
					2024	5	2.31	2.98	-0.91	A
Ostracoda (%)	K-W	rank	YES	0.061	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	AB
					2024	5	2.96	5.91	-2.8	ABCD

 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 Endpoints Among Years for Littoral (Shallow) Habitats in Camp Lake (JL0), Mine Operation (2015 to 2024) and Baseline (2013), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a					
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD) vs. Baseline Year 2013	Pairwise Comparison
Chironomidae (%)	ANOVA	none	NO	0.434	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
					2024	5	91.9	6.27	0.41	A
Metal Sensitive Chironomidae (%)	ANOVA	none	NO	0.213	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
					2024	5	12.4	10.8	-1.3	A
Collector Gatherers (%)	ANOVA	none	NO	0.311	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	66.8	22.9	0.88	A
					2022	5	60.1	22.1	0.34	A
					2023	5	70.6	13.8	1.2	A
					2024	5	74.8	16.3	1.5	A
Filterers (%)	ANOVA	none	NO	0.194	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
					2024	5	11.1	9.78	-1.4	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 = (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 Invertebrate Community Endpoints Among Years for Profundal (Deep) Habitats in Camp Lake (JL0), Mine Operation (2015 to 2024) and Baseline (2007, 2013), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a						
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD)		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2013	
Density (Individuals/m ²)	ANOVA	none	YES	0.014	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	B
					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	0.007	2007	4	9.00	1.72	-	-	ABC
					2013	5	14.2	2.95	2.3	-	A
					2015	5	8.20	2.77	-0.65	-2.9	ABC
					2017	5	10.8	3.35	0.83	-1.5	AB
					2018	5	8.20	0.837	-0.43	-2.7	ABC
					2019	5	11.0	1.87	1.0	-1.3	AB
					2020	5	10.4	4.51	0.49	-1.8	ABC
					2021	5	10.8	3.27	0.83	-1.5	AB
					2022	5	9.20	2.59	0.021	-2.3	ABC
					2023	5	5.80	2.49	-2.7	-5.0	C
Simpson's Evenness (E)	ANOVA	none	NO	0.284	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
Nematoda (%)	K-W	rank	NO	0.334	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	0.186	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
					2024	5	3.07	4.61	- ^b	-0.67	A

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

 Indicates a statistically significant difference with a MOD 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).

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

Table F.21: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Profundal (Deep) Habitats in Camp Lake (JL0), Mine Operation (2015 to 2024) and Baseline (2007, 2013), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a						
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD)		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2013	
Chironomidae (%)	K-W	rank	NO	0.577	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
					2022	5	91.5	6.58	-0.28	0.027	A
					2023	5	92.3	14.3	0.65	4.4	A
					2024	5	95.3	5.30	0.61	4.2	A
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	BCD
					2017	5	33.3	25.5	-1.9	-0.77	AB
					2018	5	6.61	2.97	-5.8	-2.8	DE
					2019	5	19.5	10.5	-3.5	-1.6	ABC
					2020	5	11.9	6.85	-4.8	-2.3	BCD
					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
					2024	5	10.3	7.46	-5.5	-2.6	CDE
Collector Gatherers (%)	K-W	rank	YES	<0.001	2007	4	64.6	6.09	-	-	D
					2013	5	57.0	19.9	-0.072	-	D
					2015	5	84.7	7.33	3.1	3.5	BC
					2017	5	64.2	28.1	1.4	1.6	CD
					2018	5	95.6	2.91	4.6	5.0	A
					2019	5	84.8	9.30	3.1	3.4	BC
					2020	5	87.0	9.51	3.6	4.0	ABC
					2021	5	75.7	28.4	2.6	2.8	BC
					2022	5	93.5	5.09	4.3	4.8	AB
					2023	5	87.5	11.9	3.7	4.0	AB
					2024	5	88.8	5.02	3.6	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	BCDE
					2017	5	31.6	26.4	-2.6	-2.4	ABC
					2018	5	3.04	3.69	-6.5	-6.3	DF
					2019	5	12.0	8.29	-4.8	-4.6	BCE
					2020	5	9.37	7.41	-5.0	-4.8	CDEF
					2021	5	18.1	28.5	-4.7	-4.6	CDEF
					2022	5	2.12	2.29	-6.5	-6.4	F
					2023	5	2.99	3.20	-6.4	-6.3	DEF
					2024	5	5.69	7.84	-6.1	-6.0	DEF

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

 Indicates a statistically significant difference with a MOD 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).

^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 2024

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	12	12	14	0.46	0.43	0.4	0	-	0	None	None	None	None	None	None
	REF-CRK-B2	11	16	14	0.4	0.37	0.44	0	0	0	Common bryophytes	None	Sparse	Sparse	Sparse	Common
	REF-CRK-B3	12	12	14	0.39	0.39	0.35	0	0	0	None	None	None	None	Sparse	Sparse
	REF-CRK-B4	11	12	16	0.37	0.34	0.39	0	-	-	None	-	-	None	-	-
	REF-CRK-B5	12	14	12	0.4	0.46	0.4	0	0	-	None	None	-	None	None	-
Sheardown Lake Tributary 1	SDTL1-R1-B1	13	14	12	0.55	0.40	0.37	50%	25%	25%	Common bryophytes	Common bryophytes	Common bryophytes	None	None	None
	SDTL1-R1-B2	14	16	18	0.34	0.41	0.33	25%	25%	0%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	None
	SDTL1-R1-B3	21	18	12	0.43	0.35	0.32	75%	25%	25%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	None	None	None
	SDTL1-R1-B4	14	13	15	0.32	0.33	0.37	0%	0%	0%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	None	None	None
	SDTL1-R1-B5	12	13	18	0.35	0.33	0.32	0%	50%	25%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	None	None	Sparse
Sheardown Lake Tributary 9	SDLT9-DS-B1	4	5	3	0.08	0.16	0.21	25%	25%	25%	None	None	None	Sparse	Sparse	Sparse
	SDLT9-DS-B2	6	6	10	0.16	0.18	0.27	0%	0%	25%	None	None	None	Common	Common	Common
	SDLT9-DS-B3	5	6	6	0.32	0.25	0.22	0%	0%	0%	None	Sparse bryophytes	None	Common	Common	Common
	SDLT9-DS-B4	9	12	6	0.27	0.21	0.17	0%	0%	0%	Common bryophytes	None	None	Abundant	Abundant	Abundant
	SDLT9-DS-B5	6	12	9	0.28	0.32	0.26	0%	0%	0%	Common bryophytes	Common bryophytes	Sparse bryophytes	Abundant	Abundant	Abundant

Notes: "-" 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 2024

Metric	Study Area	Sample Size (n)	Mean	Median	Standard Deviation	Standard Error	Minimum	Maximum
Water Depth (cm)	Unnamed Reference Creek	5	12.9	12.7	0.435	0.194	12.7	13.7
	Sheardown Tributary 1 (SDLT1)	5	14.8	14.3	1.63	0.730	13.0	17.0
	Sheardown Tributary 9 (SDLT9)	5	7.00	7.33	2.17	0.972	4.00	9.00
Water Velocity (m/s)	Unnamed Reference Creek	5	0.399	0.403	0.0272	0.0122	0.367	0.430
	Sheardown Tributary 1 (SDLT1)	5	0.368	0.360	0.0425	0.0190	0.333	0.440
	Sheardown Tributary 9 (SDLT9)	5	0.224	0.217	0.0535	0.0239	0.150	0.287
Substrate Embeddedness (%)	Unnamed Reference Creek	5	2%	0%	4%	2%	0%	8%
	Sheardown Tributary 1 (SDLT1)	5	23%	25%	16%	7%	0%	42%
	Sheardown Tributary 9 (SDLT9)	5	7%	0%	11%	5%	0%	25%

Note: Due to limited availability of appropriate habitat (i.e., the stream was not flowing), area SDLT12 could not be sampled in 2024. Therefore no data are presented for this area.

Table F.24: Benthic Station Habitat Feature Statistical Comparisons Between Individual Sheardown Lake Tributaries (SDLT1 and SDLT9) and Unnamed Reference Creek (REF-CRK) Study Areas, Mary River Project CREMP, August 2024

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	YES	0.036
	Unnamed Reference Creek	SDLT9	tunequal	none	YES	0.003
Water Velocity (m/s)	Unnamed Reference Creek	SDLT1	tequal	none	NO	0.203
	Unnamed Reference Creek	SDLT9	tequal	none	YES	<0.001
Substrate Embeddedness (%)	Unnamed Reference Creek	SDLT1	tunequal	none	YES	0.031
	Unnamed Reference Creek	SDLT9	M-W	rank	NO	0.180

 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 2024

Waterbody	Sheardown Lake Tributary 1 (SDLT1-R1)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	7.17	3.58	10.7	14.3	10.7
	-	-	-	-	-
ANNELIDS	-	-	-	-	-
P. Annelida	-	-	-	-	-
WORMS	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-
F. Enchytraeidae	10.7	14.3	17.9	32.2	14.3
	-	-	-	-	-
ARTHROPODS	-	-	-	-	-
P. Arthropoda	-	-	-	-	-
MITES	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-
O. Trombidiformes	-	-	-	-	-
F. Sperchonidae	-	-	-	-	-
Sperchon	10.7	7.17	14.3	3.58	-
immature	-	-	-	-	-
SEED SHRIMPS	-	-	-	-	-
Cl. Ostracoda	-	-	-	7.17	-
SPRINGTAILS	-	-	-	-	-
Cl. Entognatha	-	-	-	-	-
O. Collembola	3.58	-	3.58	-	-
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
Acentrella feropagus	3.58	3.58	7.17	21.5	-
STONEFLIES	-	-	-	-	-
O. Plecoptera	-	-	-	-	-
F. Capniidae	-	-	-	-	-
immature	-	-	-	-	-
CADDISFLIES	-	-	-	-	-
O. Trichoptera	-	-	-	-	-
F. Limnephilidae	-	-	-	-	-
immature	-	-	-	-	-
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
MIDGES	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-
indeterminate	-	-	-	-	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	32.2	50.2	32.2	35.8	28.7
S.F. Chironominae	-	-	-	-	-
Rheotanytarsus	-	3.58	-	3.58	-
S.F. Diamesinae	-	-	-	-	-
Diamesa	-	-	-	-	-
Pseudokiefferiella	50.2	118	78.8	71.7	25.1
S.F. Orthocladiinae	-	-	-	-	-
Cricotopus	373	143	265	236	57.3
Cricotopus/Orthocladius	71.7	183	75.2	193	78.8
Eukiefferiella	-	-	-	-	-
Hydrosmittia	208	86.0	82.4	140	46.6
Krenosmittia	-	-	-	-	-
Limnophyes	-	-	3.58	-	-
Orthocladius (Euorthocladius)	21.5	14.3	7.17	17.9	3.58
Parakiefferiella	10.7	10.7	3.58	3.58	-
Tvetenia	-	-	7.17	3.58	7.17
indeterminate	-	-	-	-	-
F. Empididae	-	-	-	-	-
Clinocera	3.58	-	3.58	3.58	-
Empididae pupa	-	-	3.58	-	-
F. Simuliidae	-	-	-	-	-
Gymnopaïs sp.	-	-	-	-	-
Metacnephia	-	-	-	-	-
Prosimulium ursinum	-	-	-	-	-
F. Tipulidae	-	-	-	-	-
Tipula	7.17	14.3	35.8	10.7	10.7
SUMMARY METRICS					
Density (No. organisms per m²)	813	652	652	799	283
Richness (total number of taxa) ^a	13	12	15	15	9
Simpson's Evenness (E)	0.367	0.601	0.564	0.509	0.586
Dominant Group Composition					
% Nemata	0.881	0.549	1.65	1.79	3.80
% Acari	1.32	1.10	2.20	0.448	0
% Ostracods	0	0	0	0.897	0
% Oligochaeta	1.32	2.20	2.75	4.04	5.06
% Chironomids	94.3	93.4	85.2	88.3	87.3
% Metal Sensitive Chironmids	6.44	20.4	12.8	9.92	10.0
% Simuliidae	0	0	0	0	0
% Tipulidae	0.881	2.20	5.49	1.35	3.80
Functional Feeding Group Composition					
% Collector - Gatherers	16.2	31.7	23.6	25.5	27.0
% Filterers	0	0.599	0	0.472	0
% Shredders	82.0	66.6	73.1	73.1	73.0
Habitat Preference Group Composition					
% Clingers	82.5	66.1	69.8	72.7	69.2
% Sprawlers	14.0	29.0	19.7	20.1	18.1
% Burrowers	3.08	4.95	9.89	7.17	12.7

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 Tributary 1 (SDLT1), Sheardown Lake Tributary 9 (SDLT9), and Unnamed Reference Creek (REF-CRK), Mary River Project CREMP, August 2024

Endpoint	Area	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
Density (org/m²)	Reference Creek	393	397	178	86.0	222	1,039
	SDLT1	640	214	95.7	283	652	814
	SDLT9	2,148	2,082	931	86.0	1,993	5,437
Richness (No. Taxa)	Reference Creek	15.6	5.90	2.64	10.0	12.0	22.0
	SDLT1	10.8	2.49	1.11	7.00	11.0	13.0
	SDLT9	11.6	3.78	1.69	8.00	12.0	17.0
Simpson's Evenness (Krebs)	Reference Creek	0.949	0.0322	0.0144	0.898	0.956	0.980
	SDLT1	0.525	0.0950	0.0425	0.367	0.564	0.601
	SDLT9	0.763	0.155	0.0691	0.569	0.766	0.949
% Nematoda	Reference Creek	0.704	1.00	0.448	0	0	2.14
	SDLT1	1.73	1.26	0.566	0.549	1.65	3.80
	SDLT9	4.44	4.63	2.07	0.568	3.08	12.5
% Hydracarina	Reference Creek	6.47	1.62	0.724	4.84	6.25	8.33
	SDLT1	1.01	0.844	0.378	0	1.10	2.20
	SDLT9	1.28	1.72	0.771	0	0.791	4.17
% Ostracoda	Reference Creek	2.61	2.65	1.19	0	3.23	6.25
	SDLT1	0.179	0.401	0.179	0	0	0.897
	SDLT9	7.13	10.1	4.51	0.264	3.59	25.0
% Oligochaeta	Reference Creek	0.0690	0.154	0.0690	0	0	0.345
	SDLT1	3.07	1.49	0.664	1.32	2.75	5.06
	SDLT9	0.144	0.322	0.144	0	0	0.719
% Chironomidae	Reference Creek	68.9	9.23	4.13	56.4	70.8	79.3
	SDLT1	89.7	3.96	1.77	85.2	88.3	94.3
	SDLT9	77.0	23.6	10.6	37.5	85.6	94.9
% Metal Sensitive Chironomidae	Reference Creek	8.62	10.7	4.79	0	4.91	25.3
	SDLT1	11.9	5.24	2.34	6.44	10.0	20.4
	SDLT9	12.4	9.52	4.26	3.06	8.33	23.8
% Simuliidae	Reference Creek	9.93	6.72	3.01	3.12	8.33	20.7
	SDLT1	0	0	0	0	0	0
	SDLT9	2.40	4.12	1.84	0	0.593	9.74
% Tipulidae	Reference Creek	4.83	6.79	3.04	0	1.03	16.1
	SDLT1	2.74	1.90	0.849	0.881	2.20	5.49
	SDLT9	1.50	2.36	1.06	0	0.791	5.64
% Collector Gatherers FFG	Reference Creek	60.4	11.9	5.33	44.4	61.6	77.6
	SDLT1	24.8	5.68	2.54	16.2	25.5	31.7
	SDLT9	69.7	14.7	6.55	56.6	65.2	91.7
% Filterers FFG	Reference Creek	1.94	1.79	0.799	0	2.90	3.57
	SDLT1	0.214	0.297	0.133	0	0	0.599
	SDLT9	0.393	0.657	0.294	0	0.0659	1.54
% Shredders FFG	Reference Creek	13.2	9.93	4.44	5.31	6.44	25.1
	SDLT1	73.6	5.51	2.47	66.6	73.1	82.0
	SDLT9	26.5	15.4	6.87	4.17	25.1	42.9
% Clingers HPG	Reference Creek	24.7	11.1	4.95	9.38	23.1	40.1
	SDLT1	72.1	6.29	2.81	66.1	69.8	82.5
	SDLT9	27.9	13.9	6.24	8.33	26.6	43.4
% Sprawlers HPG	Reference Creek	54.5	15.0	6.73	36.3	51.8	77.6
	SDLT1	20.2	5.48	2.45	14.0	19.7	29.0
	SDLT9	62.2	7.68	3.43	54.9	62.5	73.6
% Burrowers HPG	Reference Creek	20.7	12.5	5.59	8.05	19.3	40.7
	SDLT1	7.55	3.82	1.71	3.08	7.17	12.7
	SDLT9	6.16	4.59	2.05	0.568	5.04	12.5

Notes: Sample size equals five for Unnamed Reference Creek and SDLT1, and four for SDLT9. FFG = Functional Feeding Group. HPG = Habitat Preference Group.

Table F.27: Statistical Comparison of Bray-Curtis Indices for Sheardown Lake Tributary 1 (SDLT1) and Sheardown Lake Tributary 9 (SDLT9) Relative to Unnamed Reference Creek (REF-CRK), Mary River Project CREMP, August 2024

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	0.002	0.779	0.607	0.008	10.3	0.563	0.508	0.002
SDLT9 vs Reference Creek	0.595	0.732	0.536	0.008	7.44	0.482	0.417	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.28: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years at Sheardown Lake Tributary 1 (SDLT1), Mine Operation (2015 to 2024) and Baseline (2008, 2013), Mary River Project CREMP, 2024

Endpoint	Overall Twelve-Year Comparison ^a				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2008	vs. Baseline Year 2013	
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
					2024	5	640	214	3.8	-0.21	BC
Richness (No. Taxa)	ANOVA	none	YES	0.037	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
					2024	5	10.8	2.49	-1.2	-2.3	A
Simpson's Evenness (Krebs)	ANOVA	none	YES	<0.001	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	AB
					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
					2024	5	0.525	0.0950	-11	-5.6	C
% Hydracarina	K-W	rank	YES	0.080	2008	3	0.121	0.0473	nc	nc	ABCD
					2013	3	0.0458	0.0294	-9.5	nc	ABCDE
					2015	5	0.0463	0.0160	-9.5	-0.00075	BCDE
					2016	5	0.0529	0.0128	-6.4	0.45	ABCDE
					2017	5	0.0386	0.0199	-12	-0.31	CDE
					2018	5	0.0306	0.0169	-11	-0.17	DE
					2019	5	0.0129	0.00909	-14	-0.67	E
					2020	5	1.09	0.852	225	33	AB
					2021	5	0.835	0.741	92	14	ABC
					2022	5	1.02	1.10	125	19	ABCD
					2023	5	2.97	3.14	245	36	A
					2024	5	1.01	0.844	185	27	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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.

^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 Invertebrate Community Endpoints Among Years at Sheardown Lake Tributary 1 (SDLT1), Mine Operation (2015 to 2024) and Baseline (2008, 2013), Mary River Project CREMP, 2024

Endpoint	Overall Twelve-Year Comparison ^a				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2008	vs. Baseline Year 2013	
% Oligochaeta	K-W	rank	YES	<0.001	2008	3	0.0296	0.0249	nc	nc	C
					2013	3	0.0732	0.0333	6.3	nc	BC
					2015	5	0.144	0.108	9.4	2.3	BC
					2016	5	0.141	0.0877	13	5.0	BC
					2017	5	0.0861	0.0739	4.1	-1.6	BC
					2018	5	0.0224	0.0275	-0.60	-5.0	C
					2019	5	0.0326	0.0104	1.6	-3.4	C
					2020	5	2.28	2.56	152	106	AB
					2021	5	4.25	2.21	381	272	A
					2022	5	3.65	2.62	354	252	A
					2023	5	2.82	1.46	263	186	A
					2024	5	3.07	1.49	252	178	A
% Chironomidae	ANOVA	log10	YES	<0.001	2008	3	0.692	0.0197	nc	nc	C
					2013	3	0.811	0.0391	5.5	nc	BC
					2015	5	0.720	0.0901	1.2	-2.5	C
					2016	5	0.731	0.119	1.6	-2.3	C
					2017	5	0.824	0.101	5.9	0.22	BC
					2018	5	0.907	0.0442	9.4	2.3	B
					2019	5	0.916	0.0160	9.8	2.5	B
					2020	5	85.0	6.86	168	96	A
					2021	5	78.4	6.22	165	94	A
					2022	5	86.2	4.25	168	96	A
					2023	5	82.3	5.35	167	95	A
					2024	5	89.7	3.96	170	97	A
% Metal Sensitive Chironomidae	ANOVA	log10	YES	<0.001	2008	3	0.275	0.0545	nc	nc	B
					2013	3	0.199	0.143	-2.8	nc	BC
					2015	5	0.0609	0.0291	-7.9	-1.1	C
					2016	5	0.156	0.0439	-3.0	-0.032	BC
					2017	5	0.261	0.156	-0.86	0.41	B
					2018	5	0.198	0.124	-2.5	0.060	B
					2019	5	0.312	0.110	0.42	0.67	B
					2020	5	10.5	5.34	18	4.3	A
					2021	5	13.2	5.11	19	4.6	A
					2022	5	11.1	3.86	18	4.4	A
					2023	5	28.7	13.0	23	5.3	A
					2024	5	11.9	5.24	18	4.4	A
% Tipulidae	K-W	rank	YES	<0.001	2008	3	0.147	0.0271	nc	nc	ABC
					2013	3	0.0381	0.00475	-6.1	nc	BC
					2015	5	0.0206	0.0133	-6.6	-22	C
					2016	5	0.0351	0.0187	-5.8	14	BC
					2017	5	0.0279	0.0273	-7.1	-44	C
					2018	5	0.0192	0.0134	-7.5	-64	C
					2019	5	0.0211	0.0162	-7.3	-55	C
					2020	5	3.87	2.49	195	9,492	A
					2021	5	3.22	1.48	207	10,049	A
					2022	5	2.80	1.54	179	8,711	A
					2023	5	2.54	2.30	80	4,078	AB
					2024	5	2.74	1.90	124	6,145	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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.

^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 Invertebrate Community Endpoints Among Years at Sheardown Lake Tributary 1 (SDLT1), Mine Operation (2015 to 2024) and Baseline (2008, 2013), Mary River Project CREMP, 2024

Endpoint	Overall Twelve-Year Comparison ^a				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2008	vs. Baseline Year 2013	
% Collector Gatherers FFG	K-W	rank	YES	<0.001	2008	3	0.403	0.0291	nc	nc	E
					2013	3	0.555	0.0746	2.6	nc	DE
					2015	5	0.642	0.0520	4.9	19	CDE
					2016	5	0.586	0.107	5.2	21	DE
					2017	5	0.553	0.0801	3.3	5.6	E
					2018	5	0.622	0.0928	6.6	33	DE
					2019	5	0.816	0.0489	10	62	BCD
					2020	5	46.1	13.0	989	8,227	AB
					2021	5	54.1	12.0	1,296	10,790	A
					2022	5	36.7	7.99	889	7,392	AB
					2023	5	54.5	17.8	1,409	11,732	A
					2024	5	24.8	5.68	605	5,022	ABC
% Filterers FFG	K-W	rank	NO	0.220	2008	3	0.0518	0.0348	nc	nc	A
					2013	3	0.0845	0.0164	0.81	nc	A
					2015	5	0.0446	0.0140	-0.085	-4.3	A
					2016	5	0.0756	0.0329	0.36	-2.2	A
					2017	5	0.0886	0.0796	-0.052	-4.1	A
					2018	5	0.0156	0.0139	-0.87	-8.0	A
					2019	5	0.0126	0.00922	-0.81	-7.7	A
					2020	5	1.38	1.38	17	76	A
					2021	5	0.565	0.359	11	50	A
					2022	5	1.09	1.47	13	56	A
					2023	5	0.850	0.778	26	121	A
					2024	5	0.214	0.297	-1.0	-8.8	A
% Shredders FFG	ANOVA	log10	YES	<0.001	2008	3	0.406	0.0423	nc	nc	C
					2013	3	0.287	0.0738	-3.5	nc	C
					2015	5	0.229	0.0453	-5.7	-0.90	CD
					2016	5	0.274	0.0944	-4.2	-0.27	C
					2017	5	0.316	0.0768	-2.7	0.37	C
					2018	5	0.328	0.0815	-2.3	0.52	C
					2019	5	0.150	0.0426	-10	-2.7	D
					2020	5	49.2	13.8	46	21	AB
					2021	5	42.4	11.8	45	20	B
					2022	5	59.5	8.81	48	22	AB
					2023	5	40.9	16.6	44	20	B
					2024	5	73.6	5.51	50	22	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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group.

^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 2024

Waterbody	Sheardown Lake Tributary 9 (SDLT9-DS)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	10.7	172	21.5	57.3	14.3
	-	-	-	-	-
ANNELIDS	-	-	-	-	-
P. Annelida	-	-	-	-	-
WORMS	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-
F. Enchytraeidae	-	-	-	14.3	-
	-	-	-	-	-
ARTHROPODS	-	-	-	-	-
P. Arthropoda	-	-	-	-	-
MITES	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-
O. Trombidiformes	-	-	-	-	-
F. Sperchonidae	-	-	-	-	-
Sperchon	3.58	43.0	-	21.5	-
immature	-	-	-	7.17	-
SEED SHRIMPS	-	-	-	-	-
Cl. Ostracoda	21.5	14.3	25.1	78.8	71.7
SPRINGTAILS	-	-	-	-	-
Cl. Entognatha	-	-	-	-	-
O. Collembola	14.3	14.3	-	14.3	28.7
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
Acentrella feropagus	-	43.0	10.7	7.17	-
STONEFLIES	-	-	-	-	-
O. Plecoptera	-	-	-	-	-
F. Capniidae	-	-	-	-	-
immature	-	-	17.92	28.67	-
CADDISFLIES	-	-	-	-	-
O. Trichoptera	-	-	-	-	-
F. Limnephilidae	-	-	-	-	-
immature	3.58	-	-	7.17	-
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
MIDGES	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-
indeterminate	-	-	-	7.17	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	7.17	143	60.9	86.0	172
S.F. Chironominae	-	-	-	-	-
Rheotanytarsus	-	-	-	-	-
S.F. Diamesinae	-	-	-	-	-
Diamesa	14.3	294	147	107	57.3
Pseudokiefferiella	-	-	-	50.2	14.3
S.F. Orthoclaadiinae	-	-	-	-	-
Cricotopus	-	183	28.7	201	115
Cricotopus/Orthocladius	-	917	75.2	480	889
Eukiefferiella	-	-	10.7	-	-
Hydrosmittia	-	-	-	-	-
Krenosmittia	-	71.7	3.58	71.7	-
Limnophyes	3.58	-	-	-	-
Orthocladius (Euorthocladius)	-	-	-	-	-
Parakiefferiella	-	-	-	-	-
Tvetenia	3.58	71.7	71.7	208	115
indeterminate	3.58	3,393	118	502	1,032
F. Empididae	-	-	-	-	-
Clinocera	-	-	-	-	-
Empididae pupa	-	-	-	-	-
F. Simuliidae	-	-	-	-	-
Gymnopais sp.	-	28.7	57.3	14.3	14.3
Metacnephia	-	3.58	7.17	7.17	-
Prosimulium ursinum	-	-	3.58	-	-
F. Tipulidae	-	-	-	-	-
Tipula	-	43.0	39.4	21.5	-
SUMMARY METRICS					
Density (No. organisms per m ²)	86	5,436	699	1,992	2,523
Richness (total number of taxa) ^a	9	14	15	19	10
Simpson's Evenness (E)	0.949	0.569	0.873	0.766	0.657
Dominant Group Composition					
% Nemata	12.5	3.16	3.08	2.88	0.568
% Acari	4.17	0.791	0	1.44	0
% Ostracods	25.0	0.264	3.59	3.96	2.84
% Oligochaeta	0	0	0	0.719	0
% Chironomids	37.5	93.3	73.8	85.6	94.9
% Metal Sensitive Chironomids	21.4	5.56	23.8	8.33	3.06
% Simuliidae	0	0.593	9.74	1.08	0.568
% Tipulidae	0	0.791	5.64	1.08	0
Functional Feeding Group Composition					
% Collector - Gatherers	91.7	77.0	65.2	58.3	56.6
% Filters	0	0.0659	1.54	0.360	0
% Shredders	4.17	21.6	25.1	38.9	42.9
Habitat Preference Group Composition					
% Clingers	8.33	22.2	26.6	38.9	43.4
% Sprawlers	62.5	73.6	64.7	55.4	54.9
% Burrowers	12.5	3.96	8.72	5.04	0.568

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

^a Bold entries excluded from taxa count.

Table F.30: Statistical Comparison of Benthic Invertebrate Community Endpoints at Sheardown Lake Tributary 9 (SDLT9) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2013), Mary River Project CREMP , 2024

Endpoint	Overall 12-Year Comparison ^a				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2013	
Density (org/m ²)	K-W	rank	YES	0.021	2007	3	712	41.9	nc	nc	E
					2013	3	1,240	690	4.2	nc	BE
					2015	5	2,147	942	40	21	BCD
					2016	5	2,401	1,054	40	22	ABCD
					2017	5	3,404	1,983	50	28	AC
					2018	5	1,482	375	17	7.9	BDE
					2019	5	1,575	705	25	13	BDE
					2020	5	1,601	841	11	3.9	BCDE
					2021	5	2,661	1,929	56	32	BCD
					2022	4	5,522	1,900	111	65	A
					2023	5	2,629	1,148	61	34	ACD
					2024	5	2,148	2,082	34	18	BCD
Richness (No. Taxa)	ANOVA	log10	YES	<0.001	2007	3	22.3	3.21	nc	nc	A
					2013	3	19.0	3.61	-1.2	nc	AB
					2015	5	19.4	4.83	-1.1	0.039	AB
					2016	5	18.2	2.59	-1.5	-0.19	AB
					2017	5	20.8	2.77	-0.52	0.48	A
					2018	5	17.8	3.90	-1.7	-0.36	AB
					2019	5	21.0	2.00	-0.42	0.55	A
					2020	5	17.0	4.69	-2.1	-0.64	AB
					2021	5	17.6	2.30	-1.7	-0.35	AB
					2022	4	15.0	1.41	-2.8	-1.1	ABC
					2023	5	14.0	1.22	-3.3	-1.5	BC
					2024	5	11.6	3.78	-5.0	-2.6	C
Simpson's Evenness (Krebs)	K-W	rank	YES	0.066	2007	3	0.865	0.0490	nc	nc	ABCD
					2013	3	0.899	0.0180	0.34	nc	AB
					2015	5	0.892	0.0604	0.42	1.4	AB
					2016	5	0.843	0.0635	0.070	-4.4	BCD
					2017	5	0.883	0.0422	0.31	-0.49	ABC
					2018	5	0.889	0.0473	0.36	0.36	AB
					2019	5	0.899	0.00797	0.48	2.3	A
					2020	5	0.834	0.0212	-0.36	-11	CD
					2021	5	0.817	0.0546	-0.87	-20	D
					2022	4	0.841	0.0661	0.068	-4.4	BCD
					2023	5	0.831	0.0270	-0.47	-13	CD
					2024	5	0.763	0.155	-1.4	-28	CD
% Hydracarina	K-W	rank	YES	<0.001	2007	3	0.0335	0.0200	nc	nc	DE
					2013	3	0.0898	0.0419	7.0	nc	BCDE
					2015	5	0.0420	0.0411	-3.2	-1.2	DE
					2016	5	0.0461	0.0324	1.2	-0.67	DE
					2017	5	0.0325	0.0201	-0.50	-0.87	DE
					2018	5	0.0847	0.0232	6.6	-0.052	CDE
					2019	5	0.0272	0.0113	-2.5	-1.1	E
					2020	5	4.15	1.82	545	62	A
					2021	5	2.15	0.859	402	45	ABC
					2022	4	3.10	1.38	487	55	AB
					2023	5	0.813	0.517	145	16	BCD
					2024	5	1.28	1.72	123	13	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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group

^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 Invertebrate Community Endpoints at Sheardown Lake Tributary 9 (SDLT9) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2013), Mary River Project CREMP , 2024

Endpoint	Overall 12-Year Comparison ^a				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2013	
% Oligochaeta	K-W	rank	YES	<0.001	2007	3	0.0592	0.0406	nc	nc	ABC
					2013	3	0.00650	0.0113	-1.2	nc	D
					2015	5	0.00837	0.00429	-1.0	nm	CD
					2016	5	0.0154	0.0101	-0.95	nm	BCD
					2017	5	0.0295	0.0277	-0.70	nm	BCD
					2018	5	0.00941	0.00972	-1.0	nm	CD
					2019	5	0.0208	0.0172	-0.88	nm	BCD
					2020	5	2.06	0.856	51	nm	A
					2021	5	3.01	4.03	34	nm	AB
					2022	4	2.64	2.10	54	nm	A
					2023	5	0.0942	0.211	-1.2	nm	D
					2024	5	0.144	0.322	-1.2	nm	D
% Chironomidae	K-W	rank	YES	<0.001	2007	3	0.775	0.0581	nc	nc	B
					2013	3	0.733	0.0444	-0.80	nc	B
					2015	5	0.787	0.0866	0.43	2.7	B
					2016	5	0.671	0.0879	-1.3	-1.1	B
					2017	5	0.734	0.101	-0.13	1.5	B
					2018	5	0.758	0.111	0.66	3.2	B
					2019	5	0.637	0.0693	-1.8	-2.3	B
					2020	5	70.3	4.27	958	2,099	A
					2021	5	72.0	9.40	988	2,165	A
					2022	4	66.9	18.0	927	2,032	A
					2023	5	75.5	11.2	992	2,172	A
					2024	5	77.0	23.6	1,126	2,467	A
% Metal Sensitive Chironomidae	K-W	rank	YES	<0.001	2007	3	0.0256	0.00872	nc	nc	BCDE
					2013	3	0.00996	0.00545	-3.2	nc	CDE
					2015	5	0.0501	0.0252	1.7	4.6	BCD
					2016	5	0.00756	0.0123	-4.2	-0.89	E
					2017	5	0.0112	0.0130	-2.8	0.37	DE
					2018	5	0.00815	0.00648	-3.3	-0.096	E
					2019	5	0.0251	0.0113	-0.18	2.8	BCDE
					2020	5	3.19	3.64	341	318	ABC
					2021	5	8.48	5.15	1,395	1,291	A
					2022	4	2.52	0.930	396	369	AB
					2023	5	10.9	5.17	1,494	1,382	A
					2024	5	12.4	9.52	1,382	1,278	A
% Tipulidae	K-W	rank	YES	<0.001	2007	3	0.0461	0.0186	nc	nc	CD
					2013	3	0.0443	0.0208	0.38	nc	CD
					2015	5	0.0392	0.0342	-1.0	-0.95	CD
					2016	5	0.0803	0.0330	3.0	1.8	BC
					2017	5	0.0584	0.0558	-1.0	-0.97	CD
					2018	5	0.0361	0.0227	-0.26	-0.44	CD
					2019	5	0.0141	0.00780	-1.7	-1.5	D
					2020	5	3.12	1.30	153	105	A
					2021	5	1.73	0.944	82	56	AB
					2022	4	3.13	1.08	206	142	A
					2023	5	1.82	1.51	105	72	AB
					2024	5	1.50	2.36	46	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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group

^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 Invertebrate Community Endpoints at Sheardown Lake Tributary 9 (SDLT9) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2013), Mary River Project CREMP , 2024

Endpoint	Overall 12-Year Comparison ^a				Pair-wise, <i>post hoc</i> comparisons						
	Statistical Test	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2013	
% Collector Gatherers FFG	K-W	rank	YES	<0.001	2007	3	0.578	0.0309	nc	nc	C
					2013	3	0.606	0.0691	-0.48	nc	BC
					2015	5	0.607	0.205	7.3	3.1	C
					2016	5	0.446	0.157	-2.7	-0.87	C
					2017	5	0.575	0.117	-5.0	-1.8	C
					2018	5	0.526	0.0732	-4.4	-1.6	C
					2019	5	0.625	0.0651	3.2	1.5	BC
					2020	5	61.1	8.61	3,584	1,422	A
					2021	5	50.9	9.81	3,032	1,203	AB
					2022	4	67.4	9.07	3,786	1,502	A
					2023	5	60.5	8.38	3,329	1,321	A
					2024	5	69.7	14.7	3,812	1,513	A
% Filterers FFG	K-W	rank	YES	0.051	2007	3	0.0134	0.00937	nc	nc	BC
					2013	3	0.0193	0.00880	0.63	nc	BC
					2015	5	0.0203	0.0180	0.20	-0.50	BC
					2016	5	0.00482	0.00406	-0.87	-1.7	C
					2017	5	0.00817	0.00689	-0.67	-1.5	C
					2018	5	0.0142	0.0140	0.074	-0.64	BC
					2019	5	0.0201	0.00992	1.1	0.58	BC
					2020	5	0.480	0.791	-1.3	-2.2	BC
					2021	5	6.65	4.28	606	701	A
					2022	4	1.10	0.890	126	145	AB
					2023	5	0.403	0.445	50	57	BC
					2024	5	0.393	0.657	6.0	6.2	BC
% Shredders FFG	K-W	rank	YES	<0.001	2007	3	0.268	0.0391	nc	nc	C
					2013	3	0.283	0.0437	1.4	nc	C
					2015	5	0.320	0.182	-0.62	-0.92	C
					2016	5	0.491	0.150	12	5.1	BC
					2017	5	0.377	0.107	14	5.9	C
					2018	5	0.372	0.0972	7.7	2.8	C
					2019	5	0.320	0.0721	5.0	1.6	C
					2020	5	32.0	8.55	2,000	908	A
					2021	5	37.7	12.7	2,773	1,260	A
					2022	4	27.4	9.46	2,188	994	AB
					2023	5	33.4	7.81	2,743	1,246	A
					2024	5	26.5	15.4	1,808	821	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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to Mean Absolute Deviation = 0. FFG = Functional Feeding Group

^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 Northwest (NW; DL0-01) Study Areas, Mary River Project CREMP, August 2024


Lake	Sheardown Lake NW (DL0-01)									
Station Type	Littoral					Profundal				
Station	9	4	3	11	10	5	14	15	2	12
ROUNDWORMS	-	-	-	-	-	-	-	-	-	-
P. Nemata	-	-	138	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
ANNELIDS	-	-	-	-	-	-	-	-	-	-
P. Annelida	-	-	-	-	-	-	-	-	-	-
WORMS	-	-	-	-	-	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-	-	-	-	-	-
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae	-	-	-	-	-	-	-	-	-	-
Lumbriculus	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
ARTHROPODS	-	-	-	-	-	-	-	-	-	-
P. Arthropoda	-	-	-	-	-	-	-	-	-	-
MITES	-	-	-	-	-	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-	-	-	-	-	-
O. Acarina	-	-	-	-	-	-	-	-	-	-
F. Acalyptonotidae	-	-	-	-	-	-	-	-	-	-
Acalyptonotus	138	17.2	-	68.9	-	8.61	-	-	17.2	8.61
F. Hygrobatidae	-	-	-	-	-	-	-	-	-	-
Hygrobates	-	-	-	34.4	34.4	17.2	17.2	8.61	34.4	491
F. Lebertiidae	-	-	-	-	-	-	-	-	-	-
Lebertia	-	-	-	34.4	-	-	-	-	17.2	17.2
F. Sperchontidae	-	-	-	-	-	-	-	-	-	-
Sperchon	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS	-	-	-	-	-	-	-	-	-	-
Cl. Ostracoda	3,996	1,154	1,653	2,893	1,894	-	-	8.61	51.7	164
	-	-	-	-	-	-	-	-	-	-
INSECTS	-	-	-	-	-	-	-	-	-	-
Cl. Insecta	-	-	-	-	-	-	-	-	-	-
CADDISFLIES	-	-	-	-	-	-	-	-	-	-
O. Trichoptera	-	-	-	-	-	-	-	-	-	-
F. Apataniidae	-	-	-	-	-	-	-	-	-	-
Apatania	-	-	-	34.4	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
TRUE FLIES	-	-	-	-	-	-	-	-	-	-
O. Diptera	-	-	-	-	-	-	-	-	-	-
MIDGES	-	-	-	-	-	-	-	-	-	-
F. Chironomidae	-	-	-	-	-	-	-	-	-	-
chironomid pupae	-	34.4	-	-	-	-	-	8.61	-	25.8
S.F. Chironominae	-	-	-	-	-	-	-	-	-	-
Chironomus	-	103	-	-	-	-	-	-	-	-
Lipiniella	-	-	-	-	-	-	-	-	-	-
Micropsectra	-	-	-	34.4	-	-	-	-	-	-
Parachironomus	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	138	34.4	2,962	68.9	34.4	-	-	-	-	-
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	207	34.4	276	-	-	-	-	-	-	-
Stictochironomus	276	276	826.7	482	827	43.1	60.3	-	-	-
Tanytarsus	137.8	17.2	-	68.9	34.4	-	-	-	-	-
S.F. Diamesinae	-	-	-	-	-	-	-	-	-	-
Protanypus	-	-	-	-	34.4	17.2	51.7	17.2	8.61	8.61
Pseudodiamesa	-	-	-	34.4	-	-	-	-	8.61	-
Pseudokiefferiella	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae	-	-	-	-	-	-	-	-	-	-
Abiskomyia	-	-	344.4	172	34.4	-	-	-	-	-
Cardiocladius	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	276	51.7	1,102	276	172	388	198	439	422	1,274
Hydrosmittia	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	8.61	-	-	-	-
Paracladius	-	-	68.9	34.4	172	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Zalutschia	-	-	68.9	103	68.9	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-	-	-	-	-	-
Arctopelopia	413	138	276	207	68.9	-	-	-	-	-
Procladius	-	-	68.9	172	103	68.9	121	60.3	129	146
SUMMARY METRICS										
Density (No. organisms per m ²)	5,580	1,860	7,784	4,719	3,479	551	448	543	689	2,136
Richness (total number of taxa) ^a	8	9	11	16	12	7	5	5	8	7
Simpson's Evenness (E)	0.541	0.652	0.851	0.644	0.698	0.562	0.874	0.385	0.663	0.662
Dominant Taxonomic Group Composition										
% Nemata	0	0	1.77	0	0	0	0	0	0	0
% Hydracarina	2.47	0.926	0	2.92	0.990	4.69	3.85	10.0	10.0	24.2
% Ostracods	71.6	62.0	21.2	61.3	54.5	0	0	7.50	7.50	7.66
% Chironomids	25.9	37.0	77.0	35.0	44.5	95.3	96.2	82.5	82.5	68.2
% Metal Sensitive Chironomids	4.94	2.92	38.0	4.38	2.97	3.12	11.5	2.50	2.50	0.411
Functional Feeding Group Composition										
% Collector - Gatherers	85.2	88.3	56.6	82.5	90.1	82.8	69.2	71.2	71.2	68.8
% Filterers	4.94	2.92	38.0	3.65	1.98	0	0	0	0	0
% Shredders	0	0	0.885	2.19	1.98	0	0	0	0	0
Habitat Preference Group Composition										
% Clingers	8.64	3.85	3.54	5.84	1.98	4.69	3.85	10.0	10.0	24.2
% Sprawlers	86.4	74.7	84.1	83.9	73.3	84.4	71.2	88.8	88.8	75.4
% Burrowers	4.94	21.4	12.4	10.2	24.8	10.9	25.0	1.25	1.25	0.411

Note: "-" indicates no taxa present.
^a Bold entries excluded from taxa count.

Table F.32: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Littoral (Shallow) Habitats in Sheardown Lake Northwest (NW; DL0-01), Mine Operation (2015 to 2024) and Baseline (2007, 2008, 2013), Mary River Project CREMP, 2024

Endpoint	Overall 11-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a							
	Statistical Test ^a	Data Transformation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD)			Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2008	vs. Baseline Year 2013	
Density (Individuals/m ²)	ANOVA	none	NO	0.758	2007	4	5,974	3,000	-	-	-	A
					2008	4	7,536	5,273	0.52	-	-	A
					2013	3	9,940	2,634	1.3	0.46	-	A
					2015	5	5,665	3,230	-0.10	-0.35	-1.6	A
					2016	5	5,503	4,184	-0.16	-0.39	-1.7	A
					2017	5	5,216	2,398	-0.25	-0.44	-1.8	A
					2018	5	6,334	3,717	0.12	-0.23	-1.4	A
					2019	5	6,207	2,673	0.078	-0.25	-1.4	A
					2020	5	6,631	3,914	0.22	-0.17	-1.3	A
					2021	5	5,399	3,000	-0.19	-0.41	-1.7	A
					2022	5	6,455	1,665	0.16	-0.20	-1.3	A
					2023	5	4,547	2,732	-0.48	-0.57	-2.0	A
					2024	5	4,684	2,227	-0.43	-0.54	-2.0	A
Richness (Number of Taxa)	ANOVA	log10	YES	0.076	2007	4	12.3	1.52	-	-	-	AB
					2008	4	14.5	1.68	1.3	-	-	AB
					2013	3	17.7	3.21	2.9	1.5	-	A
					2015	5	13.8	1.92	0.90	-0.42	-1.3	AB
					2016	5	14.6	2.41	1.3	0.014	-0.98	AB
					2017	5	14.0	3.16	0.93	-0.39	-1.2	AB
					2018	5	15.0	1.22	1.6	0.30	-0.80	AB
					2019	5	13.2	3.56	0.39	-0.93	-1.6	AB
					2020	5	15.4	1.14	1.9	0.51	-0.66	AB
					2021	5	11.8	1.79	-0.40	-1.7	-2.1	AB
					2022	5	14.0	2.74	0.97	-0.36	-1.2	AB
					2023	5	13.0	4.18	0.14	-1.2	-1.7	AB
					2024	5	11.2	3.11	-0.99	-2.3	-2.5	B
Simpson's Evenness (E)	K-W	rank	YES	0.014	2007	4	0.768	0.0553	-	-	-	BCD
					2008	4	0.840	0.0980	2.9	-	-	ABC
					2013	3	0.863	0.0466	1.8	-2.3	-	AC
					2015	5	0.759	0.0957	-0.63	-7.9	-3.0	BCD
					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	ABC
					2018	5	0.769	0.163	1.3	-3.6	-0.70	BCD
					2019	5	0.686	0.114	-2.3	-12	-5.0	D
					2020	5	0.773	0.0548	-0.61	-7.9	-2.9	BCD
					2021	5	0.750	0.101	-1.5	-9.9	-4.0	BD
					2022	5	0.853	0.0347	1.5	-3.2	-0.47	AC
					2023	5	0.804	0.122	1.4	-3.4	-0.59	ABC
					2024	5	0.677	0.113	-3.8	-15	-6.8	D
Nematoda (%)	K-W	rank	NO	0.553	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
					2024	5	0.354	0.792	-0.93	-3.3	-0.67	A
Ostracoda (%)	K-W	rank	YES	<0.001	2007	4	11.9	12.8	-	-	-	DEFG
					2008	4	10.8	8.73	-0.22	-	-	EFG
					2013	3	23.4	8.14	1.1	6.8	-	ABCD
					2015	5	7.84	3.72	-0.26	-0.20	-3.6	G
					2016	5	9.19	6.13	-0.23	-0.079	-3.5	FG
					2017	5	19.5	11.1	0.31	2.7	-2.1	CDEF
					2018	5	13.0	4.10	0.093	1.6	-2.7	DEFG
					2019	5	16.0	5.73	0.16	1.9	-2.5	CDEFG
					2020	5	25.6	8.56	1.3	7.5	0.35	ABC
					2021	5	25.0	16.5	0.74	4.8	-1.0	ABCDE
					2022	5	21.4	6.45	0.58	4.0	-1.4	BCDE
					2023	5	42.7	14.5	2.3	13	3.0	AB
					2024	5	54.1	19.4	3.7	20	6.5	A

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


 Indicates a statistically significant difference with a MOD 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.32: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Littoral (Shallow) Habitats in Sheardown Lake Northwest (NW; DL0-01), Mine Operation (2015 to 2024) and Baseline (2007, 2008, 2013), Mary River Project CREMP, 2024

Endpoint	Overall 11-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a							
	Statistical Test ^a	Data Transformation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD)			Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2008	vs. Baseline Year 2013	
Chironomidae (%)	K-W	rank	YES	<0.001	2007	4	83.0	8.28	-	-	-	ABCD
					2008	4	81.2	6.67	-0.42	-	-	ABCDE
					2013	3	70.5	9.64	-1.7	-2.7	-	CDEF
					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	AB
					2017	5	73.5	11.2	-1.3	-1.8	0.56	BCDE
					2018	5	83.7	2.85	0.15	1.2	2.4	ABC
					2019	5	82.1	5.95	0.049	0.96	2.3	ABCD
					2020	5	70.4	9.29	-1.5	-2.1	0.35	EF
					2021	5	70.1	16.0	-0.70	-0.59	1.3	DEF
					2022	5	72.5	8.08	-1.2	-1.7	0.63	DEF
					2023	5	51.1	13.5	-3.3	-5.9	-2.0	F
					2024	5	43.9	19.6	-5.1	-9.6	-4.2	F
Metal Sensitive Chironomidae (%)	ANOVA	log10	YES	0.093	2007	4	16.9	16.9	-	-	-	AB
					2008	4	20.7	17.2	0.30	-	-	AB
					2013	3	21.0	4.65	0.57	0.34	-	AB
					2015	5	19.1	7.18	0.46	0.20	-0.70	AB
					2016	5	24.6	15.2	0.53	0.30	-0.22	AB
					2017	5	16.6	7.91	0.34	0.053	-1.4	AB
					2018	5	18.3	15.0	0.064	-0.30	-3.1	AB
					2019	5	10.6	5.98	-0.054	-0.45	-3.9	AB
					2020	5	15.4	14.3	-0.051	-0.45	-3.9	AB
					2021	5	11.8	9.95	-0.046	-0.44	-3.8	AB
					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	AB
					2024	5	10.6	15.3	-0.39	-0.88	-6.0	B
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	BC
					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	A
					2020	5	77.5	14.1	0.40	1.1	1.2	AB
					2021	5	80.1	8.20	0.62	1.3	1.5	A
					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
					2024	5	80.5	13.7	0.61	1.2	1.4	A
Filterers (%)	ANOVA	log10(x+1)	YES	0.011	2007	4	16.7	17.1	-	-	-	B
					2008	4	19.9	17.1	0.19	-	-	AB
					2013	3	21.0	4.68	0.30	0.11	-	AB
					2015	5	18.6	6.83	0.16	-0.035	-0.55	AB
					2016	5	23.0	17.3	0.37	0.18	0.24	AB
					2017	5	16.5	7.99	0.033	-0.16	-1.0	B
					2018	5	17.5	15.7	0.054	-0.14	-0.94	B
					2019	5	9.99	5.81	-0.36	-0.56	-2.5	B
					2020	5	14.6	14.5	-0.11	-0.31	-1.6	B
					2021	5	11.2	10.5	-0.30	-0.50	-2.3	B
					2022	5	45.3	5.70	1.6	1.4	4.8	A
					2023	5	9.95	9.04	-0.38	-0.57	-2.6	B
					2024	5	10.3	15.6	-0.38	-0.58	-2.6	B

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


 Indicates a statistically significant difference with a MODoutside 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.33: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Profundal (Deep) Habitats in Sheardown Lake Northwest (NW; DL0-01) Profundal (Deep), Mine Operation (2015 to 2024) and Baseline (2007, 2013), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a						
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD)		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2013	
Density (Individuals/m ²)	ANOVA	log10	YES	<0.001	2007	4	1,461	308	-	-	ABC
					2013	3	2,744	302	2.7	-	A
					2015	5	1,425	210	-0.060	-6.0	ABC
					2017	5	861	391	-2.5	-11	BCD
					2018	5	1,154	240	-0.99	-8.0	ABCD
					2019	5	1,670	302	0.59	-4.6	AB
					2020	5	1,326	527	-0.61	-7.1	ABC
					2021	5	648	304	-3.9	-14	DE
					2022	5	1,770	469	0.74	-4.3	A
					2023	5	310	109	-6.7	-20	E
					2024	5	873	711	-2.9	-12	CD
Richness (Number of Taxa)	ANOVA	none	NO	0.788	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
					2024	5	6.40	1.34	-2.6	-1.4	A
Simpson's Evenness (E)	ANOVA	log10	YES	0.008	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
					2024	5	0.629	0.177	1.0	0.59	ABC
Nematoda (%)	K-W	rank	YES	0.017	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	0.065	2007	4	0.297	0.359	-	-	D
					2013	3	6.18	8.65	5.0	-	ABCD
					2015	5	2.82	3.74	0.82	-0.65	BD
					2017	5	6.81	4.55	26	3.3	ABC
					2018	5	2.86	2.40	7.5	0.39	BD
					2019	5	2.55	1.65	8.5	0.54	BCD
					2020	5	6.56	3.90	16	1.8	ABC
					2021	5	10.5	9.06	15	1.5	AC
					2022	5	6.04	6.72	8.8	0.59	ABC
					2023	5	14.0	12.8	26	3.2	A
					2024	5	3.35	3.92	3.9	-0.17	BD
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	AB
					2022	5	90.6	9.05	-2.1	0.64	A
					2023	5	63.9	11.9	-16	-2.4	B
					2024	5	87.8	12.5	-3.5	0.32	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).

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

Table F.33: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Profundal (Deep) Habitats in Sheardown Lake Northwest (NW; DL0-01) Profundal (Deep), Mine Operation (2015 to 2024) and Baseline (2007, 2013), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a						
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD)		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2013	
Metal Sensitive Chironomidae (%)	K-W	rank	YES	0.056	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	AB
					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	YES	0.067	2007	4	0.0543	0.109	-	-	BC
					2013	3	1.32	1.65	_ ^b	-	AB
					2015	5	1.87	2.56	_ ^b	-0.67	ABC
					2017	5	2.90	2.47	_ ^b	0.99	A
					2018	5	0.984	1.43	_ ^b	-0.16	AB
					2019	5	1.27	2.59	_ ^b	-0.67	ABC
					2020	5	2.42	4.85	_ ^b	-0.67	ABC
					2021	5	0	0	_ ^b	-0.67	C
					2022	5	0.0824	0.184	_ ^b	-0.67	BC
					2023	5	0	0	_ ^b	-0.67	C
					2024	5	0	0	_ ^b	-0.67	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 = (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).

^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 Southeast (SE; DL0-02) Study Areas, August 2024


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	17.2	17.2	8.61	17.2	-	-	8.61	-	-
	-	-	-	-	-	-	-	-	-	-
ANNELIDS	-	-	-	-	-	-	-	-	-	-
P. Annelida	-	-	-	-	-	-	-	-	-	-
WORMS	-	-	-	-	-	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-	-	-	-	-	-
F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae	-	-	-	-	-	-	-	-	-	-
Lumbriculus	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
ARTHROPODS	-	-	-	-	-	-	-	-	-	-
P. Arthropoda	-	-	-	-	-	-	-	-	-	-
MITES	-	-	-	-	-	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-	-	-	-	-	-
O. Acarina	-	-	-	-	-	-	-	-	-	-
F. Acalyptonotidae	-	-	-	-	-	-	-	-	-	-
Acalyptonotus	43.1	-	17.2	172.2	68.9	51.7	25.8	68.9	8.61	34.4
F. Hygrobatidae	-	-	-	-	-	-	-	-	-	-
Hygrobates	77.5	34.4	103	25.8	121	34.4	17.2	34.4	-	8.61
F. Lebertiidae	-	-	-	-	-	-	-	-	-	-
Lebertia	25.8	34.4	68.9	-	17.2	17.2	25.8	17.2	8.61	17.2
F. Sperchontidae	-	-	-	-	-	-	-	-	-	-
Sperchon	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS	-	-	-	-	-	-	-	-	-	-
Cl. Ostracoda	25.8	809	2,187	155	491	388	121	25.8	8.61	17.2
	-	-	-	-	-	-	-	-	-	-
INSECTS	-	-	-	-	-	-	-	-	-	-
Cl. Insecta	-	-	-	-	-	-	-	-	-	-
CADDISFLIES	-	-	-	-	-	-	-	-	-	-
O. Trichoptera	-	-	-	-	-	-	-	-	-	-
F. Apataniidae	-	-	-	-	-	-	-	-	-	-
Apatania	-	-	51.7	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
TRUE FLIES	-	-	-	-	-	-	-	-	-	-
O. Diptera	-	-	-	-	-	-	-	-	-	-
MIDGES	-	-	-	-	-	-	-	-	-	-
F. Chironomidae	-	-	-	-	-	-	-	-	-	-
chironomid pupae	-	-	-	8.61	-	-	-	-	-	-
S.F. Chironominae	-	-	-	-	-	-	-	-	-	-
Chironomus	-	-	-	-	17.2	-	8.61	-	336	34.4
Lipiniella	-	-	-	-	-	-	-	-	17.2	-
Micropsectra	60.3	637	121	94.7	60.3	-	43.1	17.2	103	8.61
Parachironomus	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	17.2	276	482	-	-	-	-	-	-	-
Polypedilum	-	-	-	-	-	-	-	-	-	-
Sergentia	-	-	-	-	-	-	-	-	-	-
Stictochironomus	1,610	603	689	1,059	1,421	422	766	835	1,602	775
Tanytarsus	17.2	448	396	2,411	129	267	-	103	-	-
S.F. Diamesinae	-	-	-	-	-	-	-	-	-	-
Protanypus	17.2	-	-	-	8.61	-	51.7	17.2	43.1	25.8
Pseudodiamesa	-	-	-	-	-	-	-	-	-	-
Pseudokiefferiella	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae	-	-	-	-	-	-	-	-	-	-
Abiskomyia	77.5	447.8	706.1	224	60.3	-	8.6	25.8	17.2	43.1
Cardiocladius	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	17.2	-	17.2	-	8.61	-	-	-	-	-
Hydrosmittia	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	17.2	-	-	-	-	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Zalutschia	34.4	34.4	17.2	-	17.2	-	8.61	-	-	-
indeterminate	-	-	17.2	-	-	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-	-	-	-	-	-
Arctopelopia	-	241	155	-	-	-	-	-	-	-
Procladius	379	1,051	1,137	2,239	1,559	1,197	517	956	465	396
SUMMARY METRICS										
Density (No. organisms per m ²)	2,428	4,633	6,183	6,398	3,996	2,377	1,593	2,110	2,609	1,361
Richness (total number of taxa) ^a	15	12	16	9	14	7	11	11	10	10
Simpson's Evenness (E)	0.570	0.935	0.861	0.793	0.758	0.787	0.721	0.697	0.637	0.653
Dominant Taxonomic Group Composition										
% Nemata	0.355	0.372	0.279	0.135	0.431	0	0	0.408	0	0
% Hydracarina	6.03	1.49	3.06	3.10	5.17	4.35	4.32	5.71	0.660	4.43
% Ostracods	1.06	17.5	35.4	2.42	12.3	16.3	7.57	1.22	0.330	1.27
% Chironomids	92.5	80.7	60.5	94.3	82.1	79.3	88.1	92.7	99.0	94.3
% Metal Sensitive Chironomids	4.61	29.4	16.2	39.2	4.96	11.2	5.95	6.53	5.64	2.53
Functional Feeding Group Composition										
% Collector - Gatherers	73.0	40.5	58.5	22.6	50.6	34.1	60.0	43.3	77.5	65.8
% Filterers	3.90	29.4	16.2	39.2	4.74	11.2	2.70	5.71	3.99	0.633
% Shredders	1.42	0.743	0.557	0	0.431	0	0.541	0	0	0
Habitat Preference Group Composition										
% Clingers	9.22	24.9	12.3	42.3	9.91	15.6	7.03	11.4	4.65	5.06
% Sprawlers	23.4	61.7	76.3	41.0	53.5	66.7	41.1	47.8	18.8	33.5
% Burrowers	67.4	13.4	11.4	16.7	36.6	17.8	51.9	40.8	76.5	61.4

Note: "-" indicates no taxa present.
^a Bold entries excluded from taxa count.

Table F.35: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Littoral (Shallow) Habitats in Sheardown Lake Southeast (SE; DL0-02), Mine Operation (2015 to 2024) and Baseline (2013), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a					
	Statistical Test ^a	Data Transformation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD)	Pairwise Comparison
									vs. Baseline Year 2013	
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
					2024	5	4,728	1,639	-1.5	BC
Richness (Number of Taxa)	ANOVA	none	YES	<0.001	2013	5	14.2	3.96	-	A
					2015	5	10.6	2.51	-0.91	ABC
					2016	5	11.4	2.30	-0.71	AB
					2017	5	9.00	0.707	-1.3	BC
					2018	5	10.2	2.59	-1.0	ABC
					2019	5	11.6	0.894	-0.66	AB
					2020	5	12.2	1.64	-0.50	AB
					2021	5	12.0	1.87	-0.56	AB
					2022	5	13.4	1.14	-0.20	A
					2023	5	6.40	1.14	-2.0	C
					2024	5	13.0	2.55	-0.30	AB
Simpson's Evenness (E)	ANOVA	none	YES	0.043	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
					2024	5	0.783	0.137	-0.022	AB
Nematoda (%)	K-W	rank	NO	0.313	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
					2024	5	0.314	0.114	1.6	A
Ostracoda (%)	K-W	rank	YES	0.084	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
					2024	5	13.7	13.9	_ ^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 = (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).

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

Table F.35: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Littoral (Shallow) Habitats in Sheardown Lake Southeast (SE; DL0-02), Mine Operation (2015 to 2024) and Baseline (2013), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a					
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD)	Pairwise Comparison
									vs. Baseline Year 2013	
Chironomidae (%)	K-W	rank	NO	0.108	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
					2024	5	82.0	13.5	-4.5	A
Metal Sensitive Chironomidae (%)	ANOVA	log10(x+1)	YES	0.029	2013	5	15.1	9.76	-	AB
					2015	5	12.7	10.4	-0.26	AB
					2016	5	6.83	4.16	-0.86	AB
					2017	5	12.1	4.18	-0.29	AB
					2018	5	12.1	8.87	-0.31	AB
					2019	5	16.3	7.79	0.14	AB
					2020	5	12.3	6.48	-0.28	AB
					2021	5	13.1	6.86	-0.19	AB
					2022	5	21.9	8.85	0.69	A
					2023	5	1.15	2.12	-1.5	B
					2024	5	18.9	15.2	0.34	A
Collector Gatherers (%)	ANOVA	none	YES	0.024	2013	5	44.6	8.22	-	B
					2015	5	59.0	10.6	1.8	AB
					2016	5	56.5	12.8	1.5	AB
					2017	5	48.4	18.8	0.46	B
					2018	5	52.5	11.1	0.96	B
					2019	5	51.9	14.6	0.89	B
					2020	5	54.0	14.9	1.1	AB
					2021	5	56.3	5.39	1.4	AB
					2022	5	51.5	6.40	0.84	B
					2023	5	79.1	14.6	4.2	A
					2024	5	49.1	19.0	0.55	B
Filterers (%)	ANOVA	log10(x+1)	YES	0.036	2013	5	15.1	9.76	-	AB
					2015	5	12.6	10.4	-0.27	AB
					2016	5	6.66	4.42	-0.88	AB
					2017	5	12.1	4.18	-0.29	AB
					2018	5	12.1	8.87	-0.31	AB
					2019	5	16.3	7.79	0.14	AB
					2020	5	12.3	6.48	-0.28	AB
					2021	5	13.0	7.03	-0.20	AB
					2022	5	21.6	9.26	0.65	A
					2023	5	1.15	2.12	-1.5	B
					2024	5	18.7	15.4	0.32	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).

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

Table F.36: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Profundal (Deep) Habitats in Sheardown Lake Southeast (SE; DL0-02), Mine Operation (2015 to 2024) and Baseline (2007, 2013), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a						
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD)		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2013	
Density (Individuals/m ²)	K-W	rank	YES	<0.001	2007	3	4,998	348	-	-	AB
					2013	4	6,602	874	3.2	-	A
					2015	5	3,185	281	-4.1	-4.0	CDE
					2017	5	3,234	880	-3.3	-3.6	BCDE
					2018	5	3,209	2,747	-7.6	-5.9	DEF
					2019	5	4,284	851	-2.5	-3.2	ABC
					2020	5	3,869	1,304	-3.9	-3.9	BCE
					2021	5	3,546	653	-3.6	-3.8	BCE
					2022	5	3,463	1,469	-5.3	-4.7	BCDE
					2023	5	1,057	745	-9.6	-7.1	F
					2024	5	2,010	524	-6.7	-5.5	DF
Richness (Number of Taxa)	ANOVA	none	YES	0.055	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
					2024	5	9.60	1.67	0.22	-0.43	AB
Simpson's Evenness (E)	K-W	rank	YES	0.039	2007	3	0.607	0.0927	-	-	CD
					2013	4	0.703	0.0395	1.6	-	ABC
					2015	5	0.588	0.130	0.99	-1.1	CD
					2017	5	0.651	0.0862	0.80	-1.5	BCD
					2018	5	0.568	0.0501	-0.33	-3.7	D
					2019	5	0.706	0.149	2.4	1.5	ABC
					2020	5	0.772	0.0994	3.1	2.9	A
					2021	5	0.759	0.135	3.1	3.0	AB
					2022	5	0.789	0.134	3.2	3.1	A
					2023	5	0.541	0.232	0.30	-2.5	CD
					2024	5	0.699	0.0597	1.6	0.025	ABC
Nematoda (%)	K-W	rank	NO	0.687	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
					2024	5	0.0816	0.183	- ^b	-1.1	A
Ostracoda (%)	K-W	rank	YES	0.027	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
					2024	5	5.34	6.78	1.1	10	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 = (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.

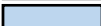
^a Statistical tests include Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) *post hoc* tests, or Kruskal-Wallis H-test (K-W) followed by Mann-Whitney U-test (M-W).

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

Table F.36: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Profundal (Deep) Habitats in Sheardown Lake Southeast (SE; DL0-02), Mine Operation (2015 to 2024) and Baseline (2007, 2013), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a						
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	Effect Size (MOD)		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2013	
Chironomidae (%)	K-W	rank	NO	0.191	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
					2024	5	90.7	7.44	-3.2	-25	A
Metal Sensitive Chironomidae (%)	ANOVA	log10(x+1)	YES	0.005	2007	3	13.5	11.4	-	-	AB
					2013	4	16.8	2.78	0.32	-	A
					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
					2024	5	6.38	3.13	-0.63	-3.9	AB
Collector Gatherers (%)	ANOVA	none	NO	0.430	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	59.6	13.0	-0.93	-0.72	A
					2022	5	58.4	18.9	-1.00	-0.87	A
					2023	5	76.2	22.7	0.13	1.5	A
					2023	5	56.1	17.5	-1.1	-1.2	A
Filterers (%)	ANOVA	log10(x+1)	YES	0.006	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	A
					2023	5	1.47	2.59	-1.1	-5.9	B
					2024	5	4.86	4.02	-0.77	-4.5	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 = (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).

^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 2024

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	16	16	19	0.40	0.33	0.32	50%	25%	25%	None	None	Sparse bryophytes	None	Sparse	Sparse
	G0-09-B2	19	19	18	0.31	0.37	0.30	75%	75%	25%	Sparse bryophytes	Sparse bryophytes	None	Sparse	Common	None
	G0-09-B3	15	19	19	0.57	0.44	0.37	25%	50%	25%	None	Common bryophytes	None	None	Common	None
	G0-09-B4	17	18	18	0.31	0.37	0.43	50%	75%	50%	Sparse bryophytes	None	None	None	None	None
	G0-09-B5	16	18	20	0.46	0.56	0.41	25%	75%	75%	Sparse bryophytes	None	Sparse bryophytes	Sparse	None	Sparse
Mary River Upstream (G0-03)	G0-03-B1	17	16	17	0.43	0.46	0.35	50%	25%	25%	Sparse bryophytes	Common bryophytes	Sparse bryophytes	Sparse	Common	Common
	G0-03-B2	12	18	21	0.39	0.46	0.51	25%	25%	25%	None	None	None	None	Sparse	Sparse
	G0-03-B3	14	16	12	0.38	0.40	0.52	25%	50%	50%	None	Common bryophytes	Sparse bryophytes	Sparse	Abundant	Common
	G0-03-B4	14	13	16	0.38	0.51	0.57	75%	75%	75%	None	None	None	Sparse	None	None
	G0-03-B5	11	16	11	0.37	0.35	0.34	50%	75%	75%	None	None	None	None	None	None
Mary River Upper Mine-Exposed (E0-01)	E0-01-B1	14	14	15	0.40	0.47	0.52	75%	25%	75%	None	None	None	None	None	None
	E0-01-B2	12	18	16	0.36	0.39	0.35	75%	100%	50%	None	None	None	None	None	None
	E0-01-B3	13	16	14	0.57	0.60	0.37	75%	50%	75%	None	None	None	None	None	None
	E0-01-B4	12	18	16	0.54	0.57	0.51	75%	75%	25%	None	None	None	None	None	None
	E0-01-B5	11	17	14	0.58	0.50	0.55	75%	75%	75%	None	None	None	Sparse	None	None
Mary River Middle Mine-Exposed (E0-20)	E0-20-B1	18	16	18	0.49	0.45	0.52	75%	100%	50%	Common Bryophytes	None	None	Abundant	Abundant	Abundant
	E0-20-B2	18	18	14	0.50	0.42	0.57	25%	25%	25%	None	None	None	None	Sparse	None
	E0-20-B3	12	16	12	0.31	0.35	0.41	0%	25%	-	None	None	-	None	None	-
	E0-20-B4	16	19	13	0.51	0.49	0.37	0%	25%	25%	None	None	None	None	None	None
	E0-20-B5	19	19	14	0.57	0.53	0.47	25%	25%	0%	None	None	None	None	None	None
Mary River Lower Mine-Exposed (C0-05)	C0-05-B1	13	15	12	0.42	0.35	0.46	25%	0%	25%	Sparse bryophytes	None	None	None	None	None
	C0-05-B2	18	14	17	0.55	0.36	0.41	25%	0%	0%	None	Sparse bryophytes	Sparse bryophytes	None	None	None
	C0-05-B3	13	12	14	0.37	0.34	0.44	25%	50%	25%	Common Bryophytes	Sparse bryophytes	Abundant bryophytes	Sparse	Sparse	Sparse
	C0-05-B4	12	12	10	0.50	0.44	0.40	25%	75%	75%	Sparse bryophytes	Sparse bryophytes	Sparse bryophytes	Sparse	Sparse	None
	C0-05-B5	16	19	19	0.35	0.40	0.44	50%	25%	75%	None	Sparse bryophytes	Sparse bryophytes	None	Common	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 2024

Metric	Study Area	Sample Size (n)	Mean	Median	Standard Deviation	Standard Error	Minimum	Maximum
Water Depth (cm)	G0-09 Reference Area	5	17.8	17.7	0.606	0.271	17.0	18.7
	G0-03 Upstream Area	5	14.9	14.3	1.85	0.826	12.7	17.0
	E0-01 Upper Mine-Exposed Area	5	14.7	14.3	0.624	0.279	14.0	15.3
	E0-20 Middle Mine-Exposed Area	5	16.1	16.7	1.66	0.742	13.3	17.3
	C0-05 Lower Mine-Exposed Area	5	14.4	13.3	2.70	1.21	11.3	18.0
Water Velocity (m/s)	G0-09 Reference Area	5	0.397	0.370	0.0675	0.0302	0.327	0.477
	G0-03 Upstream Area	5	0.428	0.433	0.0498	0.0223	0.353	0.487
	E0-01 Upper Mine-Exposed Area	5	0.485	0.513	0.0737	0.0329	0.367	0.543
	E0-20 Middle Mine-Exposed Area	5	0.464	0.487	0.0646	0.0289	0.357	0.523
	C0-05 Lower Mine-Exposed Area	5	0.415	0.410	0.0273	0.0122	0.383	0.447
Substrate Embeddedness (%)	G0-09 Reference Area	5	48%	58%	14%	6%	33%	58%
	G0-03 Upstream Area	5	48%	42%	22%	10%	25%	75%
	E0-01 Upper Mine-Exposed Area	5	67%	67%	8%	4%	58%	75%
	E0-20 Middle Mine-Exposed Area	5	29%	17%	26%	12%	13%	75%
	C0-05 Lower Mine-Exposed Area	5	33%	33%	21%	10%	8%	58%

Table F.39: Benthic Station Habitat Feature Statistical Comparisons Among Mary River Reference (G0-09) and Mine-Exposed (G0-03, E0, C0) Study Areas, Mary River Project CREMP, August 2024

Metric	Overall 5-Area Comparison				Pair-wise, <i>post hoc</i> comparisons			
	Statistical Test ^a	Transformation	Significant Difference between Areas?	p-value	Study Area	Mean	Standard Deviation	Pairwise Comparison
Water Depth (cm)	ANOVA	none	YES	0.026	G0-09	17.8	0.606	A
					G0-03	14.9	1.85	AB
					E0-01	14.7	0.624	AB
					E0-20	16.1	1.66	AB
					C0-05	14.4	2.70	B
Water Velocity (m/s)	ANOVA	none	NO	0.152	G0-09	0.397	0.0675	A
					G0-03	0.428	0.0498	A
					E0-01	0.485	0.0737	A
					E0-20	0.464	0.0646	A
					C0-05	0.415	0.0273	A
Substrate Embeddedness (%)	ANOVA	none	YES	0.045	G0-09	48%	14%	AB
					G0-03	48%	22%	AB
					E0-01	67%	8%	A
					E0-20	29%	26%	B
					C0-05	33%	21%	AB

 Indicates a significant difference for respective comparison (p-values ≤ 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 2024

Waterbody	Mary River Upstream Reference (G0-09)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	3.58	-	-	-	-
	-	-	-	-	-
ANNELIDS	-	-	-	-	-
P. Annelida	-	-	-	-	-
WORMS	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-
F. Enchytraeidae	-	-	-	-	-
	-	-	-	-	-
ARTHROPODS	-	-	-	-	-
P. Arthropoda	-	-	-	-	-
MITES	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-
O. Acarina	-	-	-	-	-
F. Sperchonidae	-	-	-	-	-
Sperchon	-	3.58	-	-	-
SEED SHRIMPS	-	-	-	-	-
Cl. Ostracoda	-	-	-	-	-
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
Acentrella feropagus	-	3.58	-	-	-
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-
indeterminate	-	-	-	-	-
MIDGES	-	-	-	-	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	3.58	7.17	-	3.58	10.7
S.F. Chironominae	-	-	-	-	-
Micropsectra	-	-	-	-	-
Stictochironomus	-	-	-	-	-
S.F. Diamesinae	-	-	-	-	-
Diamesa	10.7	-	14.3	14.3	28.7
Pseudokiefferiella	-	-	-	7.17	32.25
S.F. Orthocladiinae	-	-	-	-	-
Cardiocladius	-	-	-	-	-
Cricotopus	-	-	-	-	-
Cricotopus/Orthocladius	-	-	-	-	7.17
Diplocladius	-	-	-	-	-
Eukiefferiella	-	7.17	-	3.58	7.17
Hydrobaenus	-	-	-	-	-
Hydrosmittia	-	-	-	-	-
Krenosmittia	-	-	-	-	-
Limnophyes	-	-	-	-	-
Orthocladius (Euorthocladius)	3.58	-	-	-	10.75
Parakiefferiella	-	-	-	-	-
Paraphaenocladius	-	-	-	-	-
Rheocricotopus	-	-	-	-	-
Thienemanniella	-	-	-	-	-
Tokunagaia	-	3.58	3.58	-	-
Tvetenia	-	-	-	-	-
indeterminate	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-
F. Empididae	-	-	-	-	-
Clinocera	-	-	-	-	-
F. Simuliidae	-	-	-	-	-
Gymnopais	17.9	17.9	3.58	10.7	-
Helodon irkutensis	-	-	-	3.58	3.58
Metacnephia	3.58	-	-	-	-
Prosimulium ursinum	-	-	-	-	-
F. Tipulidae	-	-	-	-	-
Tipula	-	-	-	-	-
SUMMARY METRICS					
Density (No. organisms per m²)	43.0	43.0	21.5	43.0	100
Richness (total number of taxa) ^a	5	5	3	5	6
Simpson's Evenness (E)	0.846	0.895	0.750	0.931	0.897
Dominant Group Composition					
% Nemata	8.33	0	0	0	0
% Acari	0	8.33	0	0	0
% Chironomids	41.7	41.7	83.3	66.7	96.4
% Metal Sensitive Chironmids	31.2	0	66.7	57.1	68.3
% Simuliidae	50.0	41.7	16.7	33.3	3.57
% Tipulidae	0	0	0	0	0
Functional Feeding Group Composition					
% Collector - Gatherers	50.0	50.0	83.3	66.7	96.4
% Filterers	0	0	0	0	0
% Shredders	0	0	0	0	0
Habitat Preference Group Composition					
% Clingers	50.0	50.0	16.7	33.3	3.57
% Sprawlers	41.7	50.0	83.3	66.7	96.4
% Burrowers	8.33	0	0	0	0

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 2024

Waterbody	Mary River Upstream Reference (G0-03)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	-	3.58	-	-	-
	-	-	-	-	-
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	-	-	-	-	-
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
Acentrella feropagus	-	-	-	-	-
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-
indeterminate	-	-	-	-	-
MIDGES	-	-	-	-	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	14.3	7.17	17.9	-	3.58
S.F. Chironominae	-	-	-	-	-
Micropsectra	-	-	-	-	-
Stictochironomus	-	-	-	-	-
S.F. Diamesinae	-	-	-	-	-
Diamesa	21.5	3.58	35.8	3.58	-
Pseudokiefferiella	17.9	14.3	17.9	7.17	10.7
S.F. Orthocladiinae	-	-	-	-	-
Cardiocladius	7.17	-	-	-	-
Cricotopus	-	-	3.58	-	-
Cricotopus/Orthocladius	43.0	10.7	32.2	-	-
Diplocladius	-	-	-	-	-
Eukiefferiella	-	3.58	7.17	-	-
Hydrobaenus	-	-	-	-	-
Hydrosmittia	-	3.58	-	-	-
Krenosmittia	-	-	-	-	-
Limnophyes	-	-	-	-	-
Orthocladius (Euorthocladius)	-	10.7	-	-	-
Parakiefferiella	-	3.6	-	-	-
Paraphaenocladius	-	-	-	-	-
Rheocricotopus	-	-	-	-	-
Thienemanniella	-	-	-	-	-
Tokunagaia	28.7	7.17	3.58	-	-
Tvetenia	-	-	3.58	-	-
indeterminate	-	-	3.58	3.58	-
S.F. Tanypodinae	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-
F. Empididae	-	-	-	-	-
Clinocera	-	-	-	-	-
F. Simuliidae	-	-	-	-	-
Gymnopais	-	-	3.58	3.58	-
Helodon irkutensis	3.58	3.58	7.17	-	-
Metacnephia	25.1	10.7	43.0	7.17	10.7
Prosimulium ursinum	-	-	7.17	-	7.17
F. Tipulidae	-	-	-	-	-
Tipula	-	3.58	-	7.17	-
SUMMARY METRICS					
Density (No. organisms per m ²)	161	89.6	186	32.2	35.8
Richness (total number of taxa) ^a	7	13	12	6	4
Simpson's Evenness (E)	0.959	0.925	0.940	0.957	0.870
Dominant Group Composition					
% Nemata	0	4.00	0	0	0
% Acari	0	0	0	0	10.0
% Chironomids	82.2	72.0	67.3	44.4	40.0
% Metal Sensitive Chironmids	27.4	22.5	33.6	33.3	40.0
% Simuliidae	17.8	16.0	32.7	33.3	50.0
% Tipulidae	0	4.00	0	22.2	0
Functional Feeding Group Composition					
% Collector - Gatherers	47.3	80.0	44.9	44.4	40.0
% Filterers	0	0	21.8	0	50.0
% Shredders	29.9	4.00	22.4	22.2	0
Habitat Preference Group Composition					
% Clingers	47.7	16.0	55.1	33.3	60.0
% Sprawlers	47.3	72.0	44.9	44.4	40.0
% Burrowers	4.98	12.0	0	22.2	0

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 2024

Waterbody	Mary River Upper Mine-Exposed (E0-01)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	-	-	-	3.58	-
	-	-	-	-	-
ANNELIDS	-	-	-	-	-
P. Annelida	-	-	-	-	-
WORMS	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-
F. Enchytraeidae	-	-	-	-	-
F. Lumbriculidae	-	-	-	-	-
Lumbriculus	-	-	-	-	-
	-	-	-	-	-
ARTHROPODS	-	-	-	-	-
P. Arthropoda	-	-	-	-	-
MITES	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-
O. Acarina	-	-	-	-	-
immature	-	-	-	-	-
indeterminate	-	-	-	-	-
F. Lebertiidae	-	-	-	-	-
Lebertia	-	-	-	-	-
F. Pionidae	-	-	-	-	-
indeterminate	-	-	-	-	-
F. Sperchonidae	-	-	-	-	-
Sperchon	3.58	3.58	-	7.17	-
SEED SHRIMPS	-	-	-	-	-
Cl. Ostracoda	-	-	-	-	-
SPRINGTAILS	-	-	-	-	-
Cl. Entognatha	-	-	-	-	-
O. Collembola	-	-	-	-	-
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
Acentrella feropagus	7.17	-	-	-	-
STONEFLIES	-	-	-	-	-
O. Plecoptera	-	-	-	-	-
F. Capniidae	-	-	-	-	-
immature	-	-	-	-	-
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
indeterminate	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-
Culicoides	-	-	-	-	-
MIDGES	-	-	-	-	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	7.17	-	-	17.9	-
S.F. Chironominae	-	-	-	-	-
Paratanytarsus	-	-	-	-	-
Rheotanytarsus	-	-	-	-	-
Tanytarsus	-	-	-	-	-
S.F. Diamesinae	-	-	-	-	-
Diamesa	39.4	25.1	-	32.2	14.3
Pseudokiefferiella	-	7.17	-	10.7	7.17
S.F. Orthoclaadiinae	-	-	-	-	-
Cardiocladius	-	-	-	-	-
Chaetocladius	-	-	-	-	-
Cricotopus	-	-	-	-	-
Cricotopus/Orthocladius	3.58	-	-	7.17	-
Eukiefferiella	-	-	-	-	-
Hydrobaenus	-	-	-	-	-
Hydrosmittia	-	-	-	-	-
Krenosmittia	-	7.17	-	-	-
Limnophyes	-	-	-	-	-
Orthocladius (Euorthocladius)	-	-	-	-	3.58
Parakiefferiella	-	-	-	-	-
Parametriocnemus	-	-	-	-	-
Paraphaenocladius	-	-	-	-	-
Synorthocladius	-	-	-	-	-
Thienemanniella	-	-	-	-	-
Tokunagaia	14.3	3.58	-	14.3	7.17
Tvetenia	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-
Procladius	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-
F. Empididae	-	-	-	-	-
Clinocera	-	-	-	3.58	-
F. Muscidae	-	-	-	-	-
F. Simuliidae	-	-	-	-	-
Gymnopais	-	3.58	-	3.58	-
Helodon irkutensis	-	-	-	3.58	-
Metacnephia	10.7	3.58	-	3.58	-
Prosimulium ursinum	-	3.58	-	-	-
pupae	-	-	-	-	-
F. Tipulidae	-	-	-	-	-
Tipula	-	-	3.58	-	-
	-	-	-	-	-
CLAMS	-	-	-	-	-
Cl. Bivalvia	-	-	-	-	-
F. Sphaeriidae	-	-	-	-	-
Pisidium (Cyclocalyx)	-	-	-	-	-
SUMMARY METRICS					
Density (No. organisms per m ²)	86.0	57.3	3.58	107	32.2
Richness (total number of taxa) ^a	6	8	1	10	4
Simpson's Evenness (E)	0.807	0.877	-	0.896	0.922
Dominant Group Composition					
% Nemata	0	0	0	3.33	0
% Acari	4.17	6.25	0	6.67	0
% Chironomids	75.0	75.0	0	76.7	100
% Metal Sensitive Chironmids	51.6	56.2	0	51.1	66.7
% Simuliidae	12.5	18.8	0	10.0	0
% Tipulidae	0	0	100	0	0
Functional Feeding Group Composition					
% Collector - Gatherers	78.7	75.0	0	71.5	100
% Filterers	0	9.38	0	0	0
% Shredders	4.69	0	100	8.52	0
Habitat Preference Group Composition					
% Clingers	21.4	25.0	0	28.5	0
% Sprawlers	78.7	75.0	0	68.2	100
% Burrowers	0	0	100	3.33	0

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 2024

Waterbody	Mary River Middle Mine-Exposed (E0-20)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	-	3.58	3.58	-	-
	-	-	-	-	-
ANNELIDS	-	-	-	-	-
P. Annelida	-	-	-	-	-
WORMS	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-
F. Enchytraeidae	-	-	-	-	-
	-	-	-	-	-
ARTHROPODS	-	-	-	-	-
P. Arthropoda	-	-	-	-	-
MITES	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-
O. Acarina	-	-	-	-	-
F. Sperchonidae	-	-	-	-	-
Sperchon	3.58	3.58	-	-	-
SEED SHRIMPS	-	-	-	-	-
Cl. Ostracoda	-	-	-	-	-
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
Acentrella feropagus	25.1	32.2	7.17	-	-
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-
indeterminate	-	28.7	-	-	-
MIDGES	-	-	-	-	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	96.7	43.0	3.58	3.58	10.7
S.F. Chironominae	-	-	-	-	-
Micropsectra	-	3.58	-	-	-
Stictoichironomus	-	-	-	-	-
S.F. Diamesinae	-	-	-	-	-
Diamesa	32.2	89.6	10.7	39.4	57.3
Pseudokiefferiella	641	71.7	-	7.17	-
S.F. Orthoclaadiinae	-	-	-	-	-
Cardiocladius	86.0	25.1	-	7.17	10.7
Cricotopus	46.6	-	-	-	-
Cricotopus/Orthocladus	297	46.6	17.9	-	10.7
Diplocladius	-	-	-	-	-
Eukiefferiella	35.8	10.7	-	3.58	-
Hydrobaenus	-	-	-	-	-
Hydrosmittia	-	-	-	-	-
Krenosmittia	-	-	3.58	-	-
Limnophyes	3.58	3.6	-	-	-
Orthocladus (Euorthocladus)	61	57.3	-	-	10.7
Parakiefferiella	-	-	-	-	-
Paraphaenocladus	-	-	-	-	-
Rheocricotopus	3.6	-	-	-	-
Thienemanniella	10.7	-	-	-	-
Tokunagaia	226	118	3.58	10.7	3.58
Tvetenia	-	3.58	-	-	-
indeterminate	-	-	-	-	-
S.F. Tanypodinae	-	-	-	-	-
Thienemannimyia complex	-	-	-	-	-
F. Empididae	-	-	-	-	-
Clinocera	-	-	-	-	-
F. Simuliidae	-	-	-	-	-
Gymnopais	25.1	10.7	-	-	7.17
Helodon irkutensis	46.6	10.7	-	3.58	14.3
Metacnephia	89.6	28.7	10.7	3.58	10.7
Prosimulium ursinum	7.17	-	-	-	7.17
F. Tipulidae	-	-	-	-	-
Tipula	7.17	-	-	-	-
SUMMARY METRICS					
Density (No. organisms per m ²)	1,745	591	60.9	78.8	143
Richness (total number of taxa) ^a	18	17	7	7	9
Simpson's Evenness (E)	0.842	0.919	0.934	0.808	0.873
Dominant Group Composition					
% Nemata	0	0.606	5.88	0	0
% Acari	0.205	0.606	0	0	0
% Chironomids	88.3	80.0	64.7	90.9	72.5
% Metal Sensitive Chironomids	41.2	30.7	19.4	62.2	44.6
% Simuliidae	9.65	8.48	17.6	9.09	27.5
% Tipulidae	0.411	0	0	0	0
Functional Feeding Group Composition					
% Collector - Gatherers	73.8	80.7	50.0	81.3	64.1
% Filterers	2.14	0.667	0	0	13.8
% Shredders	11.1	0	32.4	0	0
Habitat Preference Group Composition					
% Clingers	20.6	9.76	50.0	9.09	27.5
% Sprawlers	73.8	80.1	44.1	81.3	64.1
% Burrowers	5.67	10.1	5.88	9.57	8.37

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 2024

Waterbody	Mary River Lower Mine-Exposed (C0-05)				
Station	B1	B2	B3	B4	B5
ROUNDWORMS	-	-	-	-	-
P. Nemata	3.58	-	104	-	17.9
	-	-	-	-	-
ANNELIDS	-	-	-	-	-
P. Annelida	-	-	-	-	-
WORMS	-	-	-	-	-
Cl. Oligochaeta	-	-	-	-	-
F. Enchytraeidae	7.17	3.58	17.9	-	-
	-	-	-	-	-
ARTHROPODS	-	-	-	-	-
P. Arthropoda	-	-	-	-	-
MITES	-	-	-	-	-
Cl. Arachnida	-	-	-	-	-
O. Acarina	-	-	-	-	-
F. Sperchonidae	-	-	-	-	-
Sperchon	-	-	17.92	-	3.58
SEED SHRIMPS	-	-	-	-	-
Cl. Ostracoda	-	3.58	-	-	14.3
	-	-	-	-	-
INSECTS	-	-	-	-	-
Cl. Insecta	-	-	-	-	-
MAYFLIES	-	-	-	-	-
O. Ephemeroptera	-	-	-	-	-
F. Baetidae	-	-	-	-	-
Acentrella feropagus	-	-	10.7	-	14.3
TRUE FLIES	-	-	-	-	-
O. Diptera	-	-	-	-	-
BITING-MIDGE	-	-	-	-	-
F. Ceratopogonidae	-	-	-	-	-
indeterminate	-	-	3.58	-	-
MIDGES	-	-	-	-	-
F. Chironomidae	-	-	-	-	-
chironomid pupae	-	10.75	7.17	3.58	3.58
S.F. Chironominae	-	-	-	-	-
Micropsectra	-	-	3.58	-	-
Stictochironomus	3.58	-	-	-	-
S.F. Diamesinae	-	-	-	-	-
Diamesa	-	3.58	-	3.58	-
Pseudokiefferiella	172	35.8	932	168	348
S.F. Orthoclaadiinae	-	-	-	-	-
Cardiocladius	21.5	53.7	10.7	17.9	143
Cricotopus	-	-	3.58	14.3	10.7
Cricotopus/Orthocladius	7.17	43.0	14.3	17.9	53.7
Diplocladius	-	-	3.58	-	-
Eukiefferiella	-	-	-	-	7.17
Hydrobaenus	3.58	-	-	-	-
Hydrosmittia	3.58	-	-	-	3.58
Krenosmittia	3.58	10.75	-	-	-
Limnophyes	3.58	-	-	-	-
Orthocladius (Euorthocladius)	3.58	3.58	-	-	7.17
Parakiefferiella	-	-	3.58	-	-
Paraphaenocladius	-	-	10.7	-	-
Rheocricotopus	-	-	-	-	-
Thienemanniella	-	3.58	-	-	39.4
Tokunagaia	21.5	21.5	28.7	3.58	7.17
Tvetenia	25.1	25.1	103.9	17.9	21.5
indeterminate	-	-	-	-	3.58
S.F. Tanypodinae	-	-	-	-	-
Thienemannimyia complex	-	3.58	7.17	-	-
F. Empididae	-	-	-	-	-
Clinocera	3.58	-	-	-	-
F. Simuliidae	-	-	-	-	-
Gymnopais	3.58	-	-	-	-
Helodon irkutensis	7.17	3.58	17.9	10.7	104
Metacnephia	10.7	17.9	7.17	10.7	100
Prosimulium ursinum	3.58	-	3.58	-	-
F. Tipulidae	-	-	-	-	-
Tipula	10.7	7.17	7.17	-	-
SUMMARY METRICS					
Density (No. organisms per m²)	319	251	1,319	269	903
Richness (total number of taxa) ^a	19	15	20	9	17
Simpson's Evenness (E)	0.735	0.929	0.510	0.659	0.830
Dominant Group Composition					
% Nemata	1.12	0	7.88	0	1.98
% Acari	0	0	1.36	0	0.397
% Chironomids	84.3	85.7	85.6	92.0	71.8
% Metal Sensitive Chironomids	53.9	16.5	71.4	64.9	38.7
% Simuliidae	7.87	8.57	2.17	8.00	22.6
% Tipulidae	3.37	2.86	0.543	0	0
Functional Feeding Group Composition					
% Collector - Gatherers	80.6	64.5	92.6	73.1	56.0
% Filterers	3.93	0	2.45	0	0
% Shredders	3.37	2.86	1.91	12.2	4.85
Habitat Preference Group Composition					
% Clingers	8.99	8.57	5.17	20.2	27.9
% Sprawlers	76.1	64.6	84.0	73.1	54.0
% Burrowers	14.9	26.8	10.9	6.76	18.1

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 2024

Endpoint	Area	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
Density (org/m ²)	G0-09 Reference Area	50.2	29.6	13.2	21.5	43.0	100
	G0-03 Upstream Area	101	70.8	31.6	32.3	89.6	186
	E0-01 Upper Mine-Exposed Area	57.4	41.4	18.5	3.58	57.4	108
	E0-20 Middle Mine-Exposed Area	524	717	320	60.9	143	1,746
	C0-05 Lower Mine-Exposed Area	612	479	214	251	319	1,319
Richness (No. Taxa)	G0-09 Reference Area	4.20	0.837	0.374	3.00	4.00	5.00
	G0-03 Upstream Area	6.40	2.70	1.21	3.00	6.00	10.0
	E0-01 Upper Mine-Exposed Area	5.20	2.77	1.24	1.00	6.00	8.00
	E0-20 Middle Mine-Exposed Area	9.60	4.51	2.01	6.00	7.00	15.0
	C0-05 Lower Mine-Exposed Area	13.0	3.74	1.67	7.00	13.0	17.0
Simpson's Evenness (Krebs)	G0-09 Reference Area	0.864	0.0705	0.0316	0.750	0.895	0.931
	G0-03 Upstream Area	0.930	0.0363	0.0162	0.870	0.940	0.959
	E0-01 Upper Mine-Exposed Area	0.875	0.0492	0.0246	0.807	0.887	0.922
	E0-20 Middle Mine-Exposed Area	0.875	0.0524	0.0235	0.808	0.873	0.934
	C0-05 Lower Mine-Exposed Area	0.733	0.160	0.0718	0.510	0.735	0.929
% Nemata	G0-09 Reference Area	1.67	3.73	1.67	0	0	8.33
	G0-03 Upstream Area	0.800	1.79	0.800	0	0	4.00
	E0-01 Upper Mine-Exposed Area	0.667	1.49	0.667	0	0	3.33
	E0-20 Middle Mine-Exposed Area	1.30	2.58	1.15	0	0	5.88
	C0-05 Lower Mine-Exposed Area	2.20	3.28	1.47	0	1.12	7.88
% Hydracarina	G0-09 Reference Area	1.67	3.73	1.67	0	0	8.33
	G0-03 Upstream Area	2.00	4.47	2.00	0	0	10.0
	E0-01 Upper Mine-Exposed Area	3.42	3.26	1.46	0	4.17	6.67
	E0-20 Middle Mine-Exposed Area	0.162	0.264	0.118	0	0	0.606
	C0-05 Lower Mine-Exposed Area	0.351	0.589	0.263	0	0	1.36
% Chironomidae	G0-09 Reference Area	66.0	24.6	11.0	41.7	66.7	96.4
	G0-03 Upstream Area	61.2	18.2	8.14	40.0	67.3	82.2
	E0-01 Upper Mine-Exposed Area	65.3	38.0	17.0	0	75.0	100
	E0-20 Middle Mine-Exposed Area	79.3	10.9	4.88	64.7	80.0	90.9
	C0-05 Lower Mine-Exposed Area	83.9	7.38	3.30	71.8	85.6	92.0
% Metal Sensitive Chironomidae	G0-09 Reference Area	44.7	29.0	13.0	0	57.1	68.3
	G0-03 Upstream Area	31.4	6.67	2.98	22.5	33.3	40.0
	E0-01 Upper Mine-Exposed Area	45.1	26.0	11.6	0	51.6	66.7
	E0-20 Middle Mine-Exposed Area	39.6	16.0	7.16	19.4	41.2	62.2
	C0-05 Lower Mine-Exposed Area	49.1	22.0	9.85	16.5	53.9	71.4
% Simuliidae	G0-09 Reference Area	29.1	18.8	8.42	3.57	33.3	50.0
	G0-03 Upstream Area	30.0	13.8	6.18	16.0	32.7	50.0
	E0-01 Upper Mine-Exposed Area	8.25	8.18	3.66	0	10.0	18.8
	E0-20 Middle Mine-Exposed Area	14.5	8.18	3.66	8.48	9.65	27.5
	C0-05 Lower Mine-Exposed Area	9.85	7.60	3.40	2.17	8.00	22.6
% Tipulidae	G0-09 Reference Area	0	0	0	0	0	0
	G0-03 Upstream Area	5.24	9.65	4.31	0	0	22.2
	E0-01 Upper Mine-Exposed Area	20.0	44.7	20.0	0	0	100
	E0-20 Middle Mine-Exposed Area	0.0821	0.184	0.0821	0	0	0.411
	C0-05 Lower Mine-Exposed Area	1.35	1.63	0.730	0	0.543	3.37
% Collector Gatherers FFG	G0-09 Reference Area	69.3	20.5	9.18	50.0	66.7	96.4
	G0-03 Upstream Area	51.3	16.2	7.26	40.0	44.9	80.0
	E0-01 Upper Mine-Exposed Area	65.0	38.0	17.0	0	75.0	100
	E0-20 Middle Mine-Exposed Area	70.0	13.2	5.88	50.0	73.8	81.3
	C0-05 Lower Mine-Exposed Area	73.4	14.2	6.34	56.0	73.1	92.6

Note: Sample size equals five for all study areas.

Table F.45: Benthic Invertebrate Community Summary Statistics for Mary River, Mary River Project CREMP, August 2024

Endpoint	Area	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
% Filterers FFG	G0-09 Reference Area	0	0	0	0	0	0
	G0-03 Upstream Area	14.4	22.1	9.86	0	0	50.0
	E0-01 Upper Mine-Exposed Area	1.88	4.19	1.88	0	0	9.38
	E0-20 Middle Mine-Exposed Area	3.31	5.90	2.64	0	0.667	13.8
	C0-05 Lower Mine-Exposed Area	1.28	1.82	0.816	0	0	3.93
% Shredders FFG	G0-09 Reference Area	0	0	0	0	0	0
	G0-03 Upstream Area	15.7	13.0	5.80	0	22.2	29.9
	E0-01 Upper Mine-Exposed Area	22.6	43.4	19.4	0	4.69	100
	E0-20 Middle Mine-Exposed Area	8.70	14.1	6.29	0	0	32.4
	C0-05 Lower Mine-Exposed Area	5.03	4.13	1.85	1.91	3.37	12.2
% Clingers HPG	G0-09 Reference Area	30.7	20.5	9.18	3.57	33.3	50.0
	G0-03 Upstream Area	42.4	17.9	8.00	16.0	47.7	60.0
	E0-01 Upper Mine-Exposed Area	15.0	13.9	6.22	0	21.4	28.5
	E0-20 Middle Mine-Exposed Area	23.4	16.8	7.49	9.09	20.6	50.0
	C0-05 Lower Mine-Exposed Area	14.2	9.52	4.26	5.17	8.99	27.9
% Sprawlers HPG	G0-09 Reference Area	67.6	22.7	10.2	41.7	66.7	96.4
	G0-03 Upstream Area	49.7	12.7	5.69	40.0	44.9	72.0
	E0-01 Upper Mine-Exposed Area	64.4	37.9	16.9	0	75.0	100
	E0-20 Middle Mine-Exposed Area	68.7	15.3	6.86	44.1	73.8	81.3
	C0-05 Lower Mine-Exposed Area	70.3	11.5	5.13	54.0	73.1	84.0
% Burrowers HPG	G0-09 Reference Area	1.67	3.73	1.67	0	0	8.33
	G0-03 Upstream Area	7.84	9.42	4.21	0	4.98	22.2
	E0-01 Upper Mine-Exposed Area	20.7	44.4	19.8	0	0	100
	E0-20 Middle Mine-Exposed Area	7.92	2.06	0.921	5.67	8.37	10.1
	C0-05 Lower Mine-Exposed Area	15.5	7.64	3.42	6.76	14.9	26.8

Note: Sample size equals five for all study areas.

Table F.46: Statistical Comparison of Bray-Curtis Indices for the Mary River Mine-Exposed Areas (G0, E0, C0 Series Stations) Compared to the Upstream Reference Area (G0-09), Mary River Project CREMP, August 2024

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	0.599	0.163	0.0267	0.048	2.00	0.200	0.100	0.044
E0-01 vs G0-09	0.607	0.0599	0.00359	0.128	1.28	0.138	0.0301	0.188
E0-20 vs G0-09	0.822	0.194	0.0377	0.121	1.99	0.200	0.0995	0.110
C0-05 vs G0-09	0.767	0.773	0.598	0.008	7.41	0.481	0.416	0.008

 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 Invertebrate Community Endpoints at the Mary River Reference Area (G0-09) Among Years of Mine Operation (2015 to 2024) and Baseline (2006, 2007), Mary River Project CREMP, 2024

Endpoint	Overall Twelve-Year Comparison ^a				Pair-wise, <i>post-hoc</i> comparisons						
	Statistical Test	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2006	vs. Baseline Year 2007	
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
					2024	5	50.2	29.6	-5.8	-24	D
Richness (No. Taxa)	ANOVA	none	YES	<0.001	2006	3	7.33	2.89	nc	nc	CD
					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
					2024	5	4.20	0.837	-1.1	-16	D
Simpson's Evenness (Krebs)	K-W	rank	YES	<0.001	2006	3	0.324	0.0953	nc	nc	D
					2007	3	0.655	0.0386	47	nc	D
					2015	5	0.878	0.0493	83	4.2	AB
					2016	5	0.907	0.0227	91	5.1	A
					2017	5	0.769	0.0973	59	1.4	BCD
					2018	5	0.907	0.0300	89	4.9	A
					2019	5	0.687	0.0953	54	0.73	D
					2020	5	0.828	0.153	89	4.9	ABC
					2021	5	0.860	0.108	87	4.7	AB
					2022	5	0.887	0.103	95	5.6	A
					2023	5	0.727	0.0740	60	1.5	CD
					2024	5	0.864	0.0705	87	4.7	AB
% Nematoda	K-W	rank	NO	0.573	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
					2024	5	1.67	3.73	nm	nm	A

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

Indicates 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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to SD = 0. FFG = Funticonal Feeding Group.

^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

^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 Invertebrate Community Endpoints at the Mary River Reference Area (G0-09) Among Years of Mine Operation (2015 to 2024) and Baseline (2006, 2007), Mary River Project CREMP, 2024

Endpoint	Overall Twelve-Year Comparison ^a				Pair-wise, <i>post-hoc</i> comparisons						
	Statistical Test	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2006	vs. Baseline Year 2007	
% Hydracarina	K-W	rank	YES	0.002	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
					2024	5	1.67	3.73	nm	nm	DE
% Chironomidae	K-W	rank	YES	<0.001	2006	3	98.7	0.577	nc	nc	A
					2007	3	97.3	1.15	nm	nc	AB
					2015	5	88.0	2.74	nm	nm	BCD
					2016	5	84.0	4.64	nm	nm	CD
					2017	5	79.2	6.46	nm	nm	CE
					2018	5	78.8	12.3	nm	nm	CDE
					2019	5	97.0	2.35	nm	nm	A
					2020	5	89.6	5.11	nm	nm	ABD
					2021	5	85.6	4.38	nm	nm	CD
					2022	5	86.4	6.85	nm	nm	BCD
					2023	5	56.3	10.9	nm	nm	E
					2024	5	66.0	24.6	nm	nm	CE
% Metal Sensitive Chironomidae	ANOVA	log10(x+1)	YES	0.001	2006	3	62.0	3.46	nc	nc	A
					2007	3	31.0	17.6	-10	nc	AB
					2015	5	13.0	14.0	-17	-1.1	B
					2016	5	23.2	12.3	-13	-0.42	AB
					2017	5	59.8	13.1	-0.76	1.4	A
					2018	5	31.0	10.6	-10.0	0.026	AB
					2019	5	51.6	21.5	-3.5	1.0	A
					2020	5	32.0	23.7	-10	0.016	AB
					2021	5	23.7	22.3	-13	-0.45	AB
					2022	5	31.2	19.0	-10	0.0022	AB
					2023	5	12.5	13.0	-17	-1.1	B
					2024	5	44.7	29.0	-6.1	0.63	AB
% Tipulidae	K-W	rank	YES	0.042	2006	3	0.333	0.577	nc	nc	BC
					2007	3	1.67	2.08	nm	nc	AB
					2015	5	4.40	2.97	nm	2.0	A
					2016	5	1.80	1.48	nm	0.67	AB
					2017	5	1.40	1.14	nm	0	AB
					2018	5	3.20	4.09	nm	1.3	AB
					2019	5	0.600	0.548	nm	0	BC
					2020	5	1.22	0.469	nm	0.035	AB
					2021	5	1.14	1.21	nm	0.11	B
					2022	5	0.688	1.06	nm	-0.67	BC
					2023	5	0.517	0.517	nm	-0.31	BC
					2024	5	0	0	nm	-0.67	C

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

Indicates 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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to SD = 0. FFG = Funticonal Feeding Group.

^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

^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 Invertebrate Community Endpoints at the Mary River Reference Area (G0-09) Among Years of Mine Operation (2015 to 2024) and Baseline (2006, 2007), Mary River Project CREMP, 2024

Endpoint	Overall Twelve-Year Comparison ^a				Pair-wise, <i>post-hoc</i> comparisons						
	Statistical Test	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2006	vs. Baseline Year 2007	
% Collector Gatherers FFG	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	ABC
					2016	5	75.4	8.99	-20	-17	BC
					2017	5	74.6	6.88	-21	-17	BC
					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	ABC
					2021	5	85.8	4.15	-11	-7.7	ABC
					2022	5	75.0	9.43	-20	-17	BC
					2023	5	54.8	9.15	-38	-35	D
					2024	5	69.3	20.5	-25	-22	CD
% Filterers FFG	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
					2024	5	0	0	nm	nm	C
% Shredders FFG	K-W	rank	YES	<0.001	2006	3	0.333	0.577	nc	nc	DE
					2007	3	4.33	0.577	nm	nc	BCD
					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	BC
					2018	5	4.80	6.22	nm	nm	CDE
					2019	5	5.00	2.83	nm	nm	BCD
					2020	5	11.4	7.26	nm	nm	AB
					2021	5	4.93	2.48	nm	nm	BC
					2022	5	17.7	7.34	nm	nm	A
					2023	5	1.03	1.28	nm	nm	DE
					2024	5	0	0	nm	nm	E

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

Indicates 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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to SD = 0. FFG = Funtional Feeding Group.

^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

^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 Endpoints at Mary River Upstream from the Mine (G0-03) Among Years of Mine Operation (2015 to 2024) and Baseline (2007), Mary River Project CREMP, 2024

Endpoint	Overall Eleven-Year Comparison ^a				Pair-wise, <i>post-hoc</i> comparisons					
	Statistical Test	Data Transformation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b vs. Baseline Year 2007	Pairwise Comparison
Density (org/m ²)	ANOVA	log10	YES	<0.001	2007	3	136	29.3	nc	BC
					2015	5	169	122	0.13	BC
					2016	5	287	92.1	3.1	AB
					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	BC
					2023	5	266	143	2.6	ABC
					2024	5	101	70.8	-2.3	C
Richness (No. Taxa)	ANOVA	none	YES	<0.001	2007	3	6.33	1.15	nc	CD
					2015	5	9.40	3.51	2.7	BCD
					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	ABCD
					2019	5	11.2	1.64	4.2	ABCD
					2020	5	12.6	3.13	5.4	ABD
					2021	5	16.8	4.87	9.1	A
					2022	5	10.8	3.90	3.9	ABCD
					2023	5	7.40	0.894	0.92	CD
					2024	5	6.40	2.70	0.058	C
Simpson's Evenness (Krebs)	K-W	rank	YES	0.010	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
					2024	5	0.930	0.0363	nm	AB
% Nematoda	K-W	rank	YES	0.009	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
					2024	5	0.800	1.79	nm	CD
% Hydracarina	K-W	rank	YES	0.004	2007	3	0.667	1.15	nc	E
					2015	5	7.20	2.59	nm	AB
					2016	5	9.80	4.71	nm	A
					2017	5	2.00	1.87	nm	DE
					2018	5	3.40	4.22	nm	BCDE
					2019	5	2.20	1.79	nm	CDE
					2020	5	4.25	3.13	nm	ABCD
					2021	5	2.20	1.05	nm	CDE
					2022	5	10.2	11.2	nm	ABC
					2023	5	0.317	0.710	nm	E
					2024	5	2.00	4.47	nm	DE
% Chironomidae	ANOVA	none	YES	<0.001	2007	3	97.0	1.00	nc	A
					2015	5	72.2	8.64	-25	BC
					2016	5	77.6	7.20	-19	ABC
					2017	5	75.4	10.4	-22	ABC
					2018	5	83.4	9.26	-14	AB
					2019	5	93.0	7.07	-4.0	A
					2020	5	69.9	13.6	-27	BC
					2021	5	79.8	9.63	-17	ABC
					2022	5	71.5	13.2	-26	BC
					2023	5	85.7	3.40	-11	AB
					2024	5	61.2	18.2	-36	C

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

Indicates 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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to SD = 0. FFG = Functional Feeding Group.

^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 Endpoints at Mary River Upstream from the Mine (G0-03) Among Years of Mine Operation (2015 to 2024) and Baseline (2007), Mary River Project CREMP, 2024

Endpoint	Overall Eleven-Year Comparison ^a				Pair-wise, <i>post-hoc</i> comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b vs. Baseline Year 2007	Pairwise Comparison
% Metal Sensitive Chironomidae	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	26.7	14.6	16	ABC
					2022	5	29.4	9.84	18	ABC
					2023	5	25.8	16.8	16	ABC
					2024	5	31.4	6.67	20	AC
% Tipulidae	K-W	rank	YES	0.005	2007	3	2.33	2.08	nc	BCDE
					2015	5	19.0	6.12	13	A
					2016	5	8.60	7.02	2.0	ABC
					2017	5	3.00	2.00	0.67	BCDE
					2018	5	1.80	1.64	0	DE
					2019	5	2.60	3.78	-1.3	DE
					2020	5	6.18	5.08	0.79	ABCD
					2021	5	1.60	1.04	-0.89	E
					2022	5	9.42	7.21	3.1	AB
					2023	5	1.39	0.813	-0.90	E
					2024	5	5.24	9.65	-2.0	CDE
% Collector Gatherers FFG	ANOVA	none	YES	0.002	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	BC
					2023	5	72.2	20.8	-11	ABC
					2024	5	51.3	16.2	-21	C
% Filterers FFG	K-W	rank	YES	0.020	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
					2024	5	14.4	22.1	nm	BC
% Shredders FFG	ANOVA	log10(x+1)	YES	<0.001	2007	3	5.00	1.00	nc	BC
					2015	5	29.6	8.59	22	A
					2016	5	20.8	5.26	15	ABC
					2017	5	5.80	2.17	0.78	C
					2018	5	11.8	8.35	6.4	BC
					2019	5	22.2	6.02	16	AB
					2020	5	16.6	4.69	11	ABC
					2021	5	15.2	11.3	9.4	ABC
					2022	5	17.4	9.83	12	ABC
					2023	5	5.65	9.81	0.31	C
					2024	5	15.7	13.0	9.7	ABC

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

Indicates 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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to SD = 0. FFG = Functional Feeding Group.

^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 Endpoint at the Mary River Upper Mine-Exposed Area (E0-01) Among Years of Mine Operation (2015 to 2024) and Baseline (2007), Mary River Project CREMP, 2024

Endpoint	Overall Eleven-Year Comparison ^a				Pair-wise, <i>post-hoc</i> comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b vs. Baseline Year 2007	Pairwise Comparison
Density (org/m ²)	ANOVA	log10	YES	0.002	2007	3	797	648	nc	AB
					2015	5	116	96.5	-1.0	ABC
					2016	5	230	109	-0.47	ABC
					2017	5	126	106	-1.0	ABC
					2018	5	119	164	-1.2	AC
					2019	5	312	115	-0.25	AB
					2020	5	513	420	-0.039	B
					2021	5	173	140	-0.73	ABC
					2022	5	107	96.6	-1.1	ABC
					2023	5	93.9	58.3	-1.0	ABC
Richness (No. Taxa)	ANOVA	none	YES	0.007	2007	3	16.3	8.14	nc	A
					2015	5	7.80	2.68	-1.0	AB
					2016	5	13.2	4.15	-0.38	AB
					2017	5	10.6	5.32	-0.70	AB
					2018	5	7.80	4.87	-1.0	AB
					2019	5	11.0	0.707	-0.65	AB
					2020	5	14.8	1.64	-0.19	A
					2021	5	13.2	4.60	-0.38	AB
					2022	5	11.2	5.45	-0.63	AB
					2023	5	9.40	1.67	-0.85	AB
Simpson's Evenness (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
% Nematoda	K-W	rank	NO	0.634	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	ANOVA	log10(x+1)	NO	0.507	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
% Chironomidae	K-W	rank	YES	0.006	2007	3	89.0	3.61	nc	ABC
					2015	5	82.8	5.85	-1.7	ACD
					2016	5	82.8	6.87	-1.3	ABCD
					2017	5	78.0	7.07	-2.4	ACDE
					2018	5	72.2	16.0	-3.0	DE
					2019	5	93.8	3.27	1.3	B
					2020	5	88.2	9.20	1.8	AB
					2021	5	72.0	4.74	-4.9	DE
					2022	5	54.3	23.8	-11	E
					2023	5	68.5	18.4	-9.8	DE
					2024	5	65.3	38.0	-4.4	CDE

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

Indicates 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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to SD = 0. FFG = Functional Feeding Group.

^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 Endpoint at the Mary River Upper Mine-Exposed Area (E0-01) Among Years of Mine Operation (2015 to 2024) and Baseline (2007), Mary River Project CREMP, 2024

Endpoint	Overall Eleven-Year Comparison ^a				Pair-wise, <i>post-hoc</i> comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b vs. Baseline Year 2007	Pairwise Comparison
% Metal Sensitive Chironomidae	K-W	rank	YES	0.009	2007	3	36.3	31.9	nc	ABC
					2015	5	6.60	5.68	-2.7	CD
					2016	5	5.60	4.72	-2.8	D
					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	D
					2020	5	11.0	2.53	-2.2	BCD
					2021	5	18.2	7.42	-1.9	ABCD
					2022	5	11.8	15.5	-2.9	CD
					2023	5	32.5	16.4	-1.3	AB
2024	5	45.1	26.0	0.16	A					
% Tipulidae	K-W	rank	YES	0.052	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
2024	5	20.0	44.7	nm	BCD					
% Collector Gatherers FFG	K-W	rank	YES	0.082	2007	3	43.7	26.6	nc	B
					2015	5	71.4	16.9	3.4	AB
					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	AB
					2019	5	64.0	2.12	2.3	B
					2020	5	59.5	8.05	1.8	B
					2021	5	71.6	14.8	3.1	AB
					2022	5	59.3	13.2	2.2	B
					2023	5	57.3	17.3	1.6	B
2024	5	65.0	38.0	3.1	AB					
% Filterers FFG	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	ACDE
					2017	5	14.0	11.0	-2.5	B
					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	ACDE
2024	5	1.88	4.19	-3.3	CDE					
% Shredders FFG	K-W	rank	YES	0.021	2007	3	8.00	7.94	nc	CD
					2015	5	20.0	18.3	2.0	ABC
					2016	5	8.40	6.80	0.45	CD
					2017	5	2.40	5.37	-1.1	D
					2018	5	15.4	13.6	1.1	ABC
					2019	5	24.2	3.42	4.5	AB
					2020	5	27.8	7.45	5.6	A
					2021	5	9.79	10.1	0.12	CD
					2022	5	12.8	11.2	1.7	BC
					2023	5	9.21	8.00	0.32	CD
2024	5	22.6	43.4	-0.070	CD					

Table F.50: Statistical Comparison of Benthic Invertebrate Community Endpoints at the Mary River Middle Mine-Exposed Area (E0-20) Among Years of Mine Operation (2015 to 2024) and Baseline (2011), Mary River Project CREMP, 2024

Endpoint	Overall Eleven-Year Comparison ^a				Pair-wise, <i>post-hoc</i> comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b	Pairwise Comparison
									vs. Baseline Year 2011	
Density (org/m ²)	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
					2024	5	524	717	-3.2	BC
Richness (No. Taxa)	ANOVA	log10	YES	<0.001	2011	3	14.0	2.65	nc	A
					2015	5	11.6	2.19	-1.1	A
					2016	5	13.6	3.13	-0.21	A
					2017	5	12.4	5.03	-0.99	A
					2018	5	6.80	1.92	-4.1	B
					2019	5	14.8	2.05	0.33	A
					2020	5	13.2	2.28	-0.33	A
					2021	5	12.8	3.03	-0.55	A
					2022	5	14.4	2.70	0.13	A
					2023	5	9.00	2.12	-2.5	AB
					2024	5	9.60	4.51	-2.5	AB
Simpson's Evenness (Krebs)	K-W	rank	YES	0.042	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
					2024	5	0.875	0.0524	12	AB
% Nematoda	K-W	rank	NO	0.346	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
					2024	5	1.30	2.58	nm	A
% Hydracarina	K-W	rank	YES	0.004	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	BD
					2020	5	0.804	0.426	-0.15	BCD
					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
					2024	5	0.162	0.264	-0.67	D
% Chironomidae	ANOVA	none	YES	<0.001	2011	3	95.0	4.36	nc	ABC
					2015	5	87.6	5.27	-1.7	ABC
					2016	5	86.2	6.26	-2.0	ABCD
					2017	5	71.6	11.7	-5.4	E
					2018	5	81.4	7.83	-3.1	ABDE
					2019	5	96.4	1.67	0.32	C
					2020	5	95.5	2.47	0.11	AC
					2021	5	71.9	3.56	-5.3	DE
					2022	5	86.0	5.77	-2.1	ABCDE
					2023	5	79.0	10.9	-3.7	BDE
					2024	5	79.3	10.9	-3.6	BDE

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

Indicates 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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to SD = 0. FFG = Functional Feeding Group.


^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.

Page 1 of 2

Table F.50: Statistical Comparison of Benthic Invertebrate Community Endpoints at the Mary River Middle Mine-Exposed Area (E0-20) Among Years of Mine Operation (2015 to 2024) and Baseline (2011), Mary River Project CREMP, 2024

Endpoint	Overall Eleven-Year Comparison ^a				Pair-wise, <i>post-hoc</i> comparisons					
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b	Pairwise Comparison
									vs. Baseline Year 2011	
% Metal Sensitive Chironomidae	ANOVA	log10(x+1)	YES	<0.001	2011	3	3.00	5.20	nc	D
					2015	5	3.60	1.82	0.13	D
					2016	5	4.40	2.88	0.28	D
					2017	5	31.4	22.6	4.7	ABC
					2018	5	49.0	12.9	7.4	A
					2019	5	20.0	20.1	2.9	BCD
					2020	5	9.44	9.07	1.2	CD
					2021	5	22.6	5.65	3.5	BCD
					2022	5	16.9	8.19	2.5	BCD
					2023	5	23.1	8.32	3.6	BCD
					2024	5	39.6	16.0	6.0	AB
% Tipulidae	K-W	rank	YES	0.025	2011	3	2.00	1.73	nc	ABC
					2015	5	4.40	2.51	nm	A
					2016	5	4.20	4.60	nm	AB
					2017	5	2.60	3.44	nm	ABC
					2018	5	2.00	2.83	nm	BCD
					2019	5	0.400	0.548	nm	CD
					2020	5	0.561	0.886	nm	CD
					2021	5	3.43	2.96	nm	AB
					2022	5	2.87	1.85	nm	AB
					2023	5	3.09	1.80	nm	AB
					2024	5	0.0821	0.184	nm	D
% Collector Gatherers FFG	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
					2024	5	70.0	13.2	3.0	AB
% Filterers FFG	K-W	rank	YES	0.003	2011	3	3.00	5.20	nc	CDE
					2015	5	0.600	0.894	nm	DE
					2016	5	0.400	0.894	nm	E
					2017	5	16.8	7.05	nm	A
					2018	5	9.00	8.43	nm	ABC
					2019	5	0.800	0.837	nm	DE
					2020	5	4.38	4.30	nm	BCD
					2021	5	8.51	4.91	nm	AB
					2022	5	0.455	1.02	nm	DE
					2023	5	3.27	7.32	nm	DE
					2024	5	3.31	5.90	nm	CDE
% Shredders FFG	K-W	rank	YES	0.012	2011	3	6.33	7.51	nc	CD
					2015	5	13.0	3.74	nm	BD
					2016	5	8.60	5.41	nm	BCD
					2017	5	7.20	4.15	nm	CD
					2018	5	11.6	8.32	nm	BCD
					2019	5	32.4	5.50	nm	A
					2020	5	15.8	9.41	nm	ABD
					2021	5	4.60	2.81	nm	C
					2022	5	28.6	21.4	nm	AB
					2023	5	6.55	7.18	nm	CD
					2024	5	8.70	14.1	nm	CD

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

 Indicates 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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to SD = 0. FFG = Functional Feeding Group.


^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 Invertebrate Community Endpoints at the Mary River Lower Mine-Exposed Area (C0-05) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Ten-Year Comparison ^a				Pair-wise, <i>post-hoc</i> comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2011	
Density (org/m ²)	ANOVA	none	YES	0.014	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
					2024	5	612	479	1.3	0.27	A
Richness (No. 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	ABCD
					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
					2024	5	13.0	3.74	0.62	-1.5	BD
Simpson's Evenness (Krebs)	ANOVA	none	YES	0.003	2007	3	0.668	0.0216	nc	nc	BC
					2011	3	0.879	0.0786	9.8	nc	ABC
					2015	5	0.923	0.0382	12	0.56	A
					2016	5	0.849	0.0148	8.4	-0.39	ABC
					2017	5	0.798	0.161	6.0	-1.0	ABC
					2018	5	0.675	0.149	0.35	-2.6	C
					2019	5	0.716	0.0924	2.3	-2.1	BC
					2020	5	0.821	0.0585	7.1	-0.73	ABC
					2021	5	0.879	0.0554	9.8	-0.0043	AB
					2022	5	0.884	0.0679	10	0.068	AB
					2023	5	0.768	0.122	4.6	-1.4	ABC
					2024	5	0.733	0.160	3.0	-1.9	ABC
% Nematoda	K-W	rank	YES	0.007	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
					2024	5	2.20	3.28	nm	-1.9	BC
% Hydracarina	K-W	rank	YES	0.004	2007	3	0.667	0.577	nc	nc	BCD
					2011	3	0.667	0.577	nm	nc	BCD
					2015	5	2.20	2.95	nm	nm	BCD
					2016	5	6.40	2.61	nm	nm	A
					2017	5	3.80	4.82	nm	nm	AB
					2018	5	1.60	2.51	nm	nm	BCD
					2019	5	2.00	1.00	nm	nm	AB
					2020	5	6.04	4.89	nm	nm	A
					2021	5	0.0862	0.193	nm	nm	D
					2022	5	1.40	1.75	nm	nm	BCD
					2023	5	1.67	1.61	nm	nm	BC
					2024	5	0.351	0.589	nm	nm	CD
% Chironomidae	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	B
					2021	5	63.9	22.9	nm	-4.8	CD
					2022	5	68.6	14.9	nm	-3.2	CD
					2023	5	82.0	7.42	nm	-0.73	BCD
					2024	5	83.9	7.38	nm	-0.76	BD

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

 Indicates 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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to SD = 0. FFG = Functional Feeding Group.

^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

^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 Invertebrate Community Endpoints at the Mary River Lower Mine-Exposed Area (C0-05) Among Years of Mine Operation (2015 to 2024) and Baseline (2007, 2011), Mary River Project CREMP, 2024

Endpoint	Overall Ten-Year Comparison ^a				Pair-wise, <i>post-hoc</i> comparisons						
	Statistical Test	Data Transform-ation	Significant Difference Among Areas?	P-value	Year	Sample Size (n)	Mean	Standard Deviation	MOD ^b		Pairwise Comparison
									vs. Baseline Year 2007	vs. Baseline Year 2011	
% Metal Sensitive Chironomidae	ANOVA	none	YES	<0.001	2007	3	37.0	16.1	nc	nc	ABCD
					2011	3	14.3	10.7	-1.4	nc	CD
					2015	5	17.0	10.7	-1.2	0.25	CD
					2016	5	29.0	13.9	-0.50	1.4	BCD
					2017	5	39.0	23.5	0.12	2.3	ABC
					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	CD
					2021	5	7.04	5.06	-1.9	-0.68	D
					2022	5	4.64	4.93	-2.0	-0.91	D
					2023	5	46.1	16.0	0.56	3.0	ABC
					2024	5	49.1	22.0	0.75	3.3	AB
% Tipulidae	K-W	rank	NO	0.282	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
					2024	5	1.35	1.63	nm	-0.31	A
% Collector Gatherers FFG	ANOVA	none	YES	<0.001	2007	3	35.0	15.4	nc	nc	D
					2011	3	66.3	16.3	2.0	nc	BC
					2015	5	80.6	13.0	3.0	0.88	ABC
					2016	5	59.8	10.5	1.6	-0.40	CD
					2017	5	64.0	13.5	1.9	-0.14	C
					2018	5	83.6	8.26	3.2	1.1	ABC
					2019	5	67.0	15.6	2.1	0.041	BC
					2020	5	69.8	6.66	2.3	0.21	BC
					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	BC
					2024	5	73.4	14.2	2.5	0.43	ABC
% Filterers FFG	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
					2024	5	1.28	1.82	-0.77	-14	DE
% Shredders FFG	K-W	rank	YES	0.001	2007	3	40.3	20.7	nc	nc	A
					2011	3	7.00	6.00	-1.7	nc	CDE
					2015	5	15.8	9.98	-1.3	0.90	ABC
					2016	5	10.0	5.39	-1.6	0.22	BCD
					2017	5	6.80	3.11	-1.7	-0.11	CDE
					2018	5	4.00	2.55	-1.8	-0.34	E
					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	E
					2022	5	6.37	2.55	-1.7	0.0032	CDE
					2023	5	11.4	3.48	-1.5	0.48	ABC
					2024	5	5.03	4.13	-1.8	-0.41	DE

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

Indicates 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: MOD = Magnitude of Difference. nc= no comparison. nm=MOD could not be calculated due to SD = 0. FFG = Functional Feeding Group.

^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

^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 (North Basin [BL0-01]; South Basin [BL0]) Study Areas, Mary River Project CREMP, August 2024


Lake	Mary Lake (BL0)									
Station Type	Littoral				Profundal					
Station	1	11	7	6	3	15	14	5	13	4
ROUNDWORMS										
P. Nemata	-	120.6	-	43.1	34.4	-	-	68.9	-	8.61
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Enchytraeidae	-	-	-	-	-	-	-	34.4	-	-
F. Lumbriculidae										
Lumbriculus	-	-	-	-	-	-	-	-	-	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
F. Acalyptonotidae										
Acalyptonotus	-	17.2	-	8.61	-	8.61	8.61	-	8.61	-
F. Hygrobatidae										
Hygrobates	-	-	-	-	17.2	-	-	-	-	-
F. Lebertiidae										
Lebertia	-	17.2	-	-	17.2	-	-	-	-	-
F. Sperchontidae										
Sperchon	-	-	-	-	-	-	-	103	-	-
SEED SHRIMPS										
Cl. Ostracoda	-	138	-	17.2	17.2	111.9	-	34.4	25.8	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	8.61	17.2	-	-	8.61	-	-	-	-	-
S.F. Chironominae										
Chironomus	241	-	-	-	-	-	-	-	-	-
Lipiniella	-	43.1	-	-	-	-	-	-	-	-
Micropsectra	43.1	784	-	-	17.2	-	-	138	-	-
Parachironomus	-	-	-	-	-	-	-	-	-	-
Paratanytarsus	-	-	-	-	-	-	-	-	-	-
Polypedilum	-	319	-	-	-	-	-	-	-	-
Sergentia	-	319	-	-	8.61	-	-	758	-	-
Stictochironomus	663	2,626	8.61	8.61	17.2	-	-	551	-	-
Tanytarsus	8.61	121	-	-	-	-	-	-	-	-
S.F. Diamesinae										
Protanypus	-	-	-	-	17.2	25.8	43.1	-	17.2	-
Pseudodiamesa	-	121	8.61	-	8.61	8.61	-	-	-	-
Pseudokiefferiella	-	43.1	-	-	-	-	-	103	-	-
S.F. Orthocladiinae										
Abiskomyia	43.1	2,437	-	86.1	-	-	-	34.4	8.61	-
Cardiocladius	-	-	-	-	-	-	-	34.4	-	-
Heterotrissocladius	-	431	8.61	439	293	301	43.1	620	439	43.1
Hydrosmittia	-	-	-	-	-	-	-	34.4	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	-	-	-	-	-	-	-	-
Parakiefferiella	-	-	-	-	-	-	-	-	-	-
Zalutschia	8.61	-	-	-	-	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-	68.9	-	-
S.F. Tanypodinae										
Arctopelopia	-	-	-	-	-	-	-	-	-	-
Procladius	422	43.1	17.2	138	25.8	51.7	8.61	34.4	8.61	8.61
SUMMARY METRICS										
Density (No. organisms per m ²)	1,438	7,595	43.1	741	482	508	103	2,618	508	60.3
Richness (total number of taxa) ^a	7	15	4	7	11	6	4	14	6	3
Simpson's Evenness (E)	0.779	0.813	0.960	0.695	0.658	0.703	0.852	0.869	0.298	0.673
Dominant Taxonomic Group Composition										
% Nemata	0	1.59	0	5.81	7.14	0	0	2.63	0	14.3
% Hydracarina	0	0.454	0	1.16	7.14	1.69	8.33	3.95	1.69	0
% Ostracods	0	1.81	0	2.33	3.57	22.0	0	1.32	5.08	0
% Chironomids	100	96.2	100	90.7	82.1	76.3	91.7	90.8	93.2	85.7
% Metal Sensitive Chironomids	3.61	14.2	20.0	0	9.13	6.78	41.7	9.21	3.39	0
Functional Feeding Group Composition										
% Collector - Gatherers	66.3	82.7	60.0	80.2	83.7	88.1	83.3	85.3	96.6	85.7
% Filterers	3.61	12.1	0	0	3.65	0	0	5.26	0	0
% Shredders	0.602	4.25	0	0	0	0	0	2.75	0	0
Habitat Preference Group Composition										
% Clingers	3.61	16.8	0	1.16	12.6	1.69	8.33	38.2	1.69	0
% Sprawlers	33.1	46.6	80.0	91.9	72.9	93.2	50.0	35.5	94.9	85.7
% Burrowers	63.2	36.6	20.0	6.98	14.4	5.08	41.7	26.4	3.39	14.3

Note: "-" indicates no taxa present.
^a Bold entries excluded from taxa count.

Table F.53: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Littoral (Shallow) Habitats in Mary Lake (BL0), Mine Operation (2015 to 2024) and Baseline (2007), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a					
	Statistical Test ^a	Data Transformation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD)	Pairwise Comparison
									vs. Baseline Year 2007	
Density (Individuals/m ²)	ANOVA	log10	NO	0.964	2007	3	2,667	1,454	-	A
					2015	4	2,453	2,186	-0.58	A
					2016	6	1,946	1,591	-0.64	A
					2017	4	1,839	1,853	-1.2	A
					2018	4	1,718	1,418	-0.95	A
					2019	4	2,448	2,313	-0.36	A
					2020	4	4,086	3,955	0.19	A
					2021	4	2,685	1,758	-0.19	A
					2022	4	2,202	1,373	-0.55	A
					2023	3	2,819	2,992	-0.44	A
Richness (Number of Taxa)	ANOVA	none	NO	0.432	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	0.277	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
Nematoda (%)	K-W	rank	NO	0.771	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	0.020	2007	3	0.218	0.378	-	D
					2015	4	1.86	2.20	_ ^b	BCD
					2016	6	2.29	2.22	_ ^b	BCD
					2017	4	2.11	2.17	_ ^b	BCD
					2018	4	8.86	10.9	_ ^b	AB
					2019	4	2.02	1.14	_ ^b	BCD
					2020	4	42.7	12.7	_ ^b	A
					2021	4	10.8	6.78	_ ^b	AB
					2022	4	10.6	17.7	_ ^b	BC
					2023	3	7.15	7.37	_ ^b	ABC
					2024	4	1.03	1.21	_ ^b	CD

 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).

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

Table F.53: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Littoral (Shallow) Habitats in Mary Lake (BL0), Mine Operation (2015 to 2024) and Baseline (2007), Mary River Project CREMP, 2024

Endpoint	Overall 10-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a					
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD)	Pairwise Comparison
									vs. Baseline Year 2007	
Chironomidae (%)	K-W	rank	NO	0.119	2007	3	90.8	11.8	-	A
					2015	4	91.0	7.74	-1.2	A
					2016	6	90.6	12.2	-0.73	A
					2017	4	85.7	13.1	-1.5	A
					2018	4	86.2	18.7	-0.51	A
					2019	4	93.4	3.97	-0.54	A
					2020	4	52.5	14.7	-14	A
					2021	4	84.1	9.23	-3.9	A
					2022	4	86.6	19.9	-0.27	A
					2023	3	75.5	17.5	-6.7	A
Metal Sensitive Chironomidae (%)	K-W	rank	NO	0.554	2007	3	22.4	13.8	-	A
					2015	4	15.8	14.6	-0.97	A
					2016	6	19.2	13.3	-0.66	A
					2017	4	21.3	7.70	-0.62	A
					2018	4	11.6	9.83	-1.4	A
					2019	4	14.2	12.2	-1.0	A
					2020	4	8.05	6.63	-1.8	A
					2021	4	10.8	9.07	-1.6	A
					2022	4	9.49	6.99	-1.5	A
					2023	3	13.1	8.32	-0.90	A
Collector Gatherers (%)	K-W	rank	NO	0.932	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	61.1	35.7	-0.0096	A
					2022	4	61.3	35.5	-0.16	A
					2023	3	72.1	19.6	0.0064	A
Filterers (%)	K-W	rank	NO	0.722	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
					2024	4	3.92	5.69	-2.0	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).

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

Table F.54: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Profundal (Deep) Habitats in Mary Lake (BL0), Mine Operation (2015 to 2024) and Baseline (2007), Mary River Project CREMP, 2024

Endpoint	Overall 9-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a					
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD)	Pairwise Comparison
									vs. Baseline Year 2007	
Density (Individuals/m ²)	ANOVA	log10	YES	0.005	2007	4	3,512	3,257	-	A
					2015	6	775	748	-1.2	ABC
					2017	6	536	497	-1.5	BC
					2018	6	1,520	599	-0.38	AB
					2019	6	1,428	506	-0.42	ABC
					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
					2024	6	713	955	-1.6	C
Richness (Number of Taxa)	ANOVA	log10	NO	0.999	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
					2024	6	7.17	3.97	0.075	A
Simpson's Evenness (E)	ANOVA	log10	NO	0.169	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
					2024	6	0.676	0.206	0.58	A
Nematoda (%)	K-W	rank	NO	0.457	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
					2024	6	4.01	5.75	0.79	A
Ostracoda (%)	K-W	rank	NO	0.568	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
					2024	6	5.33	8.43	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).

Table F.54: Statistical Comparison of Benthic Invertebrate Community Endpoints Among Years for Profundal (Deep) Habitats in Mary Lake (BL0), Mine Operation (2015 to 2024) and Baseline (2007), Mary River Project CREMP, 2024

Endpoint	Overall 9-Year Comparison				Pair-wise, <i>post hoc</i> comparisons ^a					
	Statistical Test ^a	Data Transform-ation	Significant Difference Among Years?	P-value	Year	Sample Size (n)	MCT	Standard Deviation	Effect Size (MOD)	Pairwise Comparison
									vs. Baseline Year 2007	
Chironomidae (%)	K-W	rank	NO	0.363	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
					2024	6	86.6	6.55	-4.2	A
Metal Sensitive Chironomidae (%)	K-W	rank	NO	0.804	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
					2024	6	11.7	15.1	-1.00	A
Collector Gatherers (%)	K-W	rank	NO	0.195	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
					2024	6	87.2	4.94	1.00	A
Filterers (%)	K-W	rank	NO	0.299	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
					2024	6	1.49	2.36	-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

FISH DATA

APPENDIX G

FIGURES

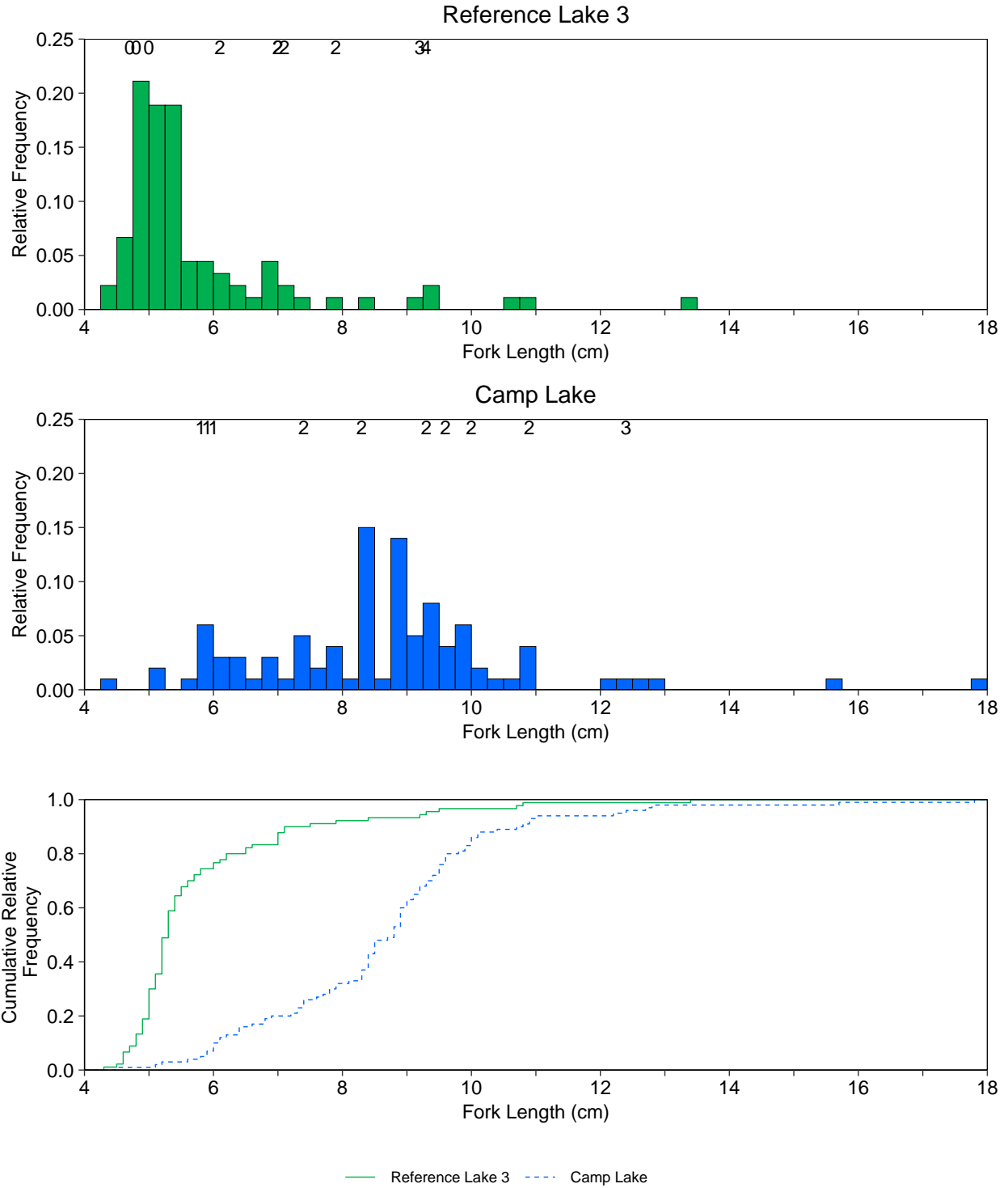


Figure G.1: Relative Length–Frequency and Cumulative Length–Frequency Distributions for Non–Young-of-the-Year (Non-YOY) Arctic Charr Captured by Backpack Electrofishing at Camp Lake (JL0) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Fish ages are shown above the bars, where available. Camp Lake n = 100; Reference Lake 3 n = 90.

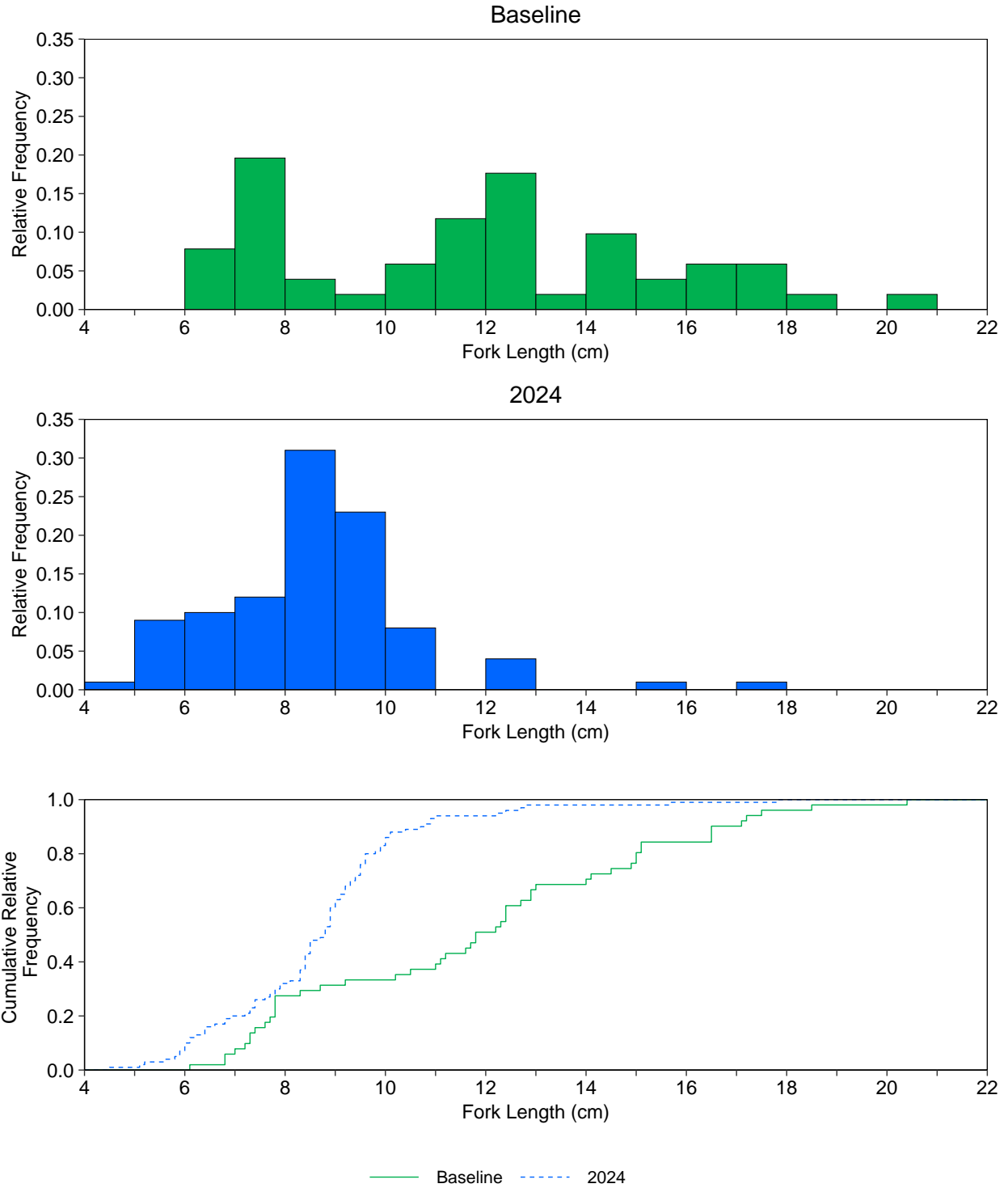


Figure G.2: Relative Length-Frequency and Cumulative Length-Frequency Distributions for Non-Young-of-the-Year (Non-YOY) Arctic Charr Captured by Backpack Electrofishing at Camp Lake (JL0) in 2024 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Camp n = 100; Baseline n = 51.

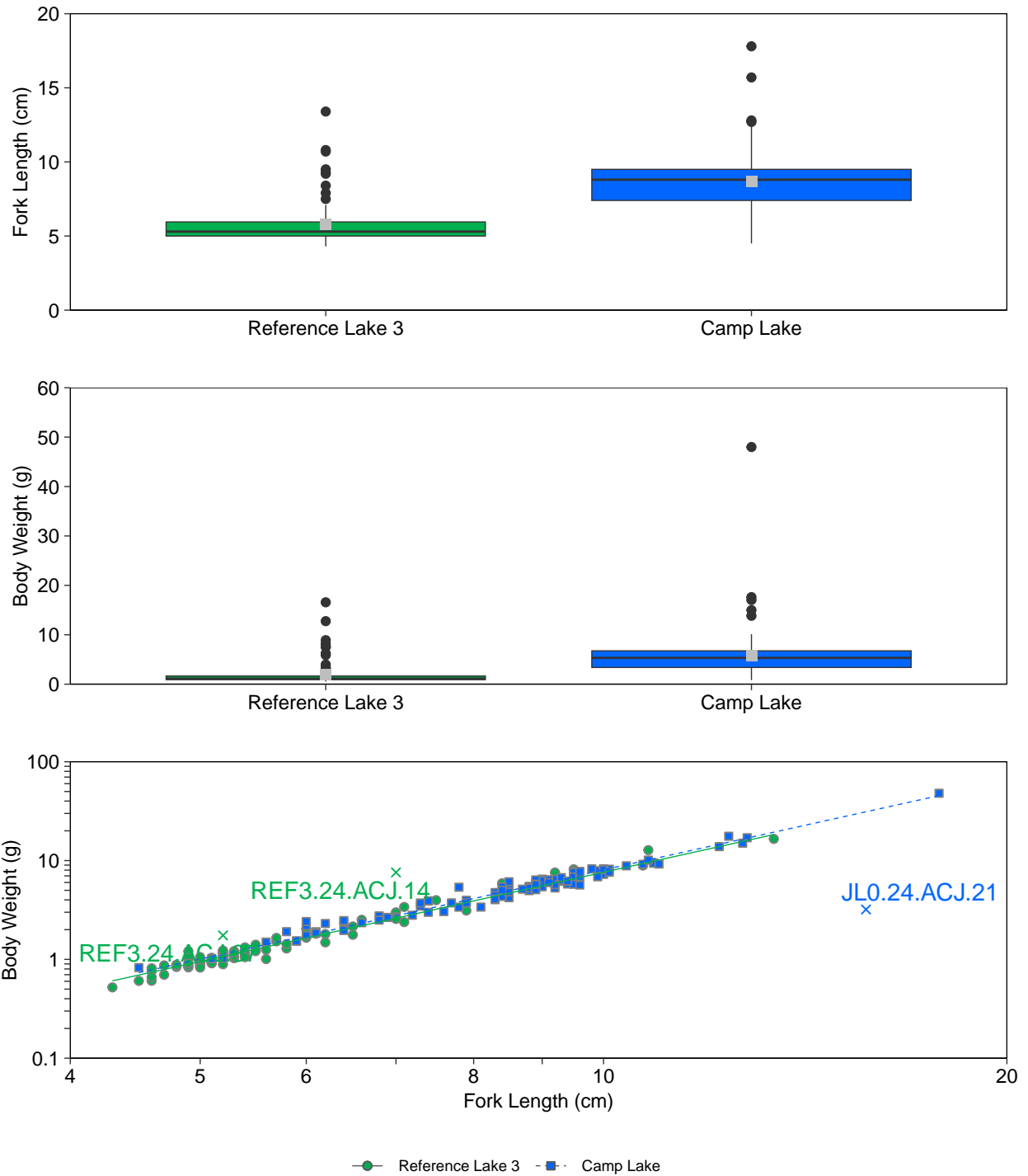


Figure G.3: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Non-Young-of-the-Year (Non-YOY) Arctic Charr Captured by Backpack Electrofishing at Camp Lake (JL0) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

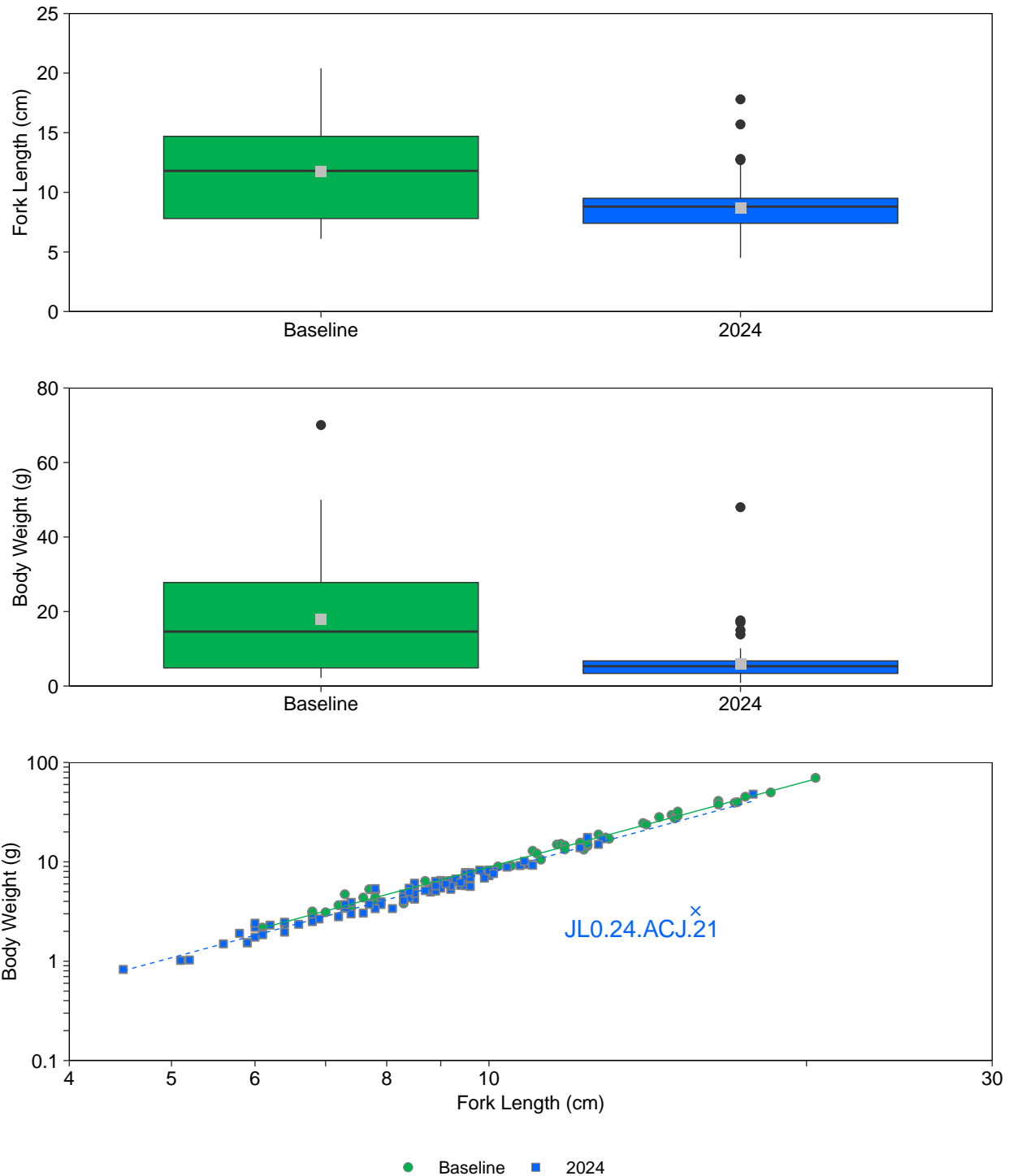


Figure G.4: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Non-Young-of-the-Year (Non-YOY) Arctic Charr Captured by Backpack Electrofishing at Camp Lake (JL0) in 2024 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

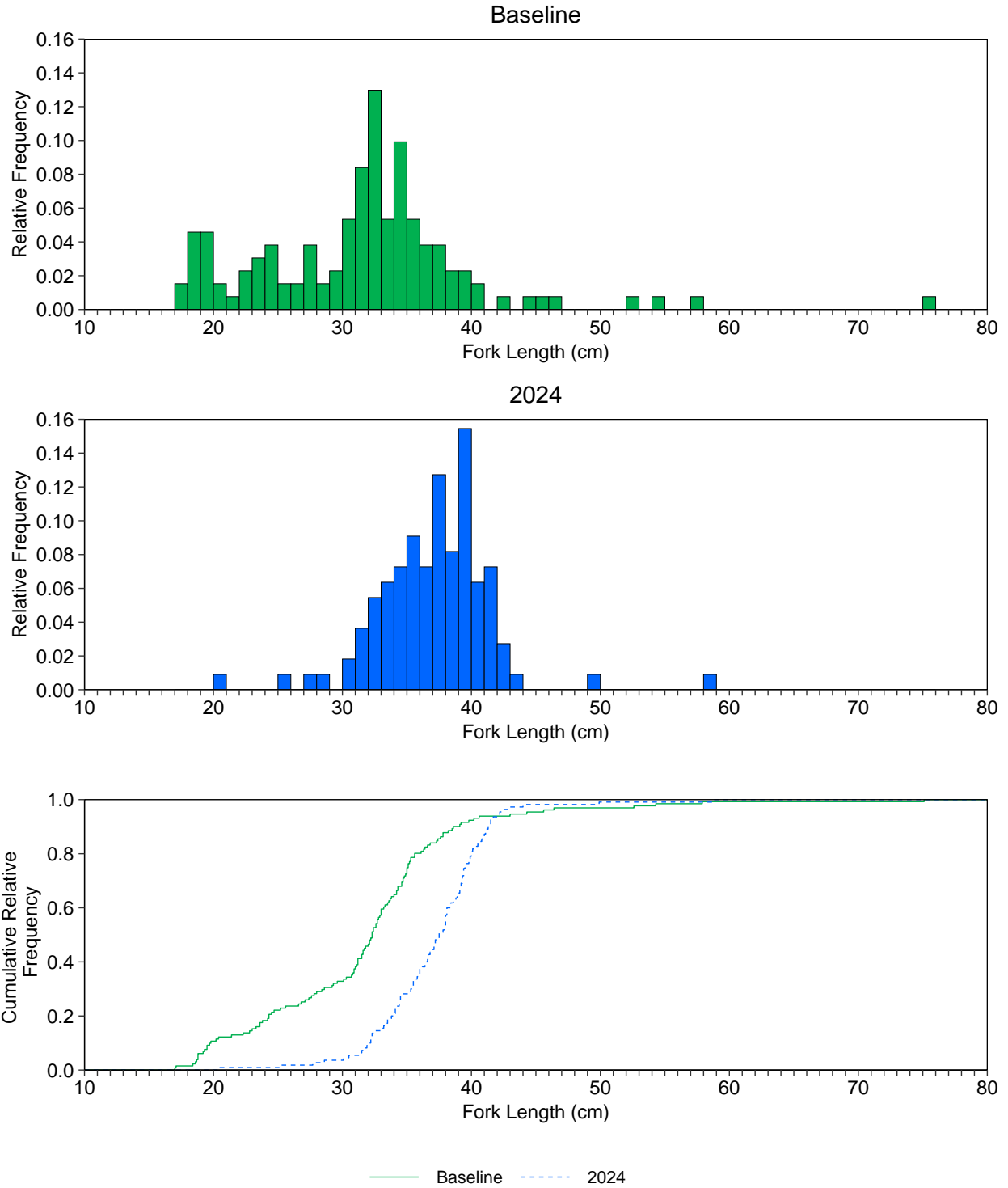


Figure G.5: Relative Length–Frequency and Cumulative Length–Frequency Distributions for Arctic Charr Captured by Gill Netting at Camp Lake (JL0) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Camp Lake n = 110; Baseline n = 131.

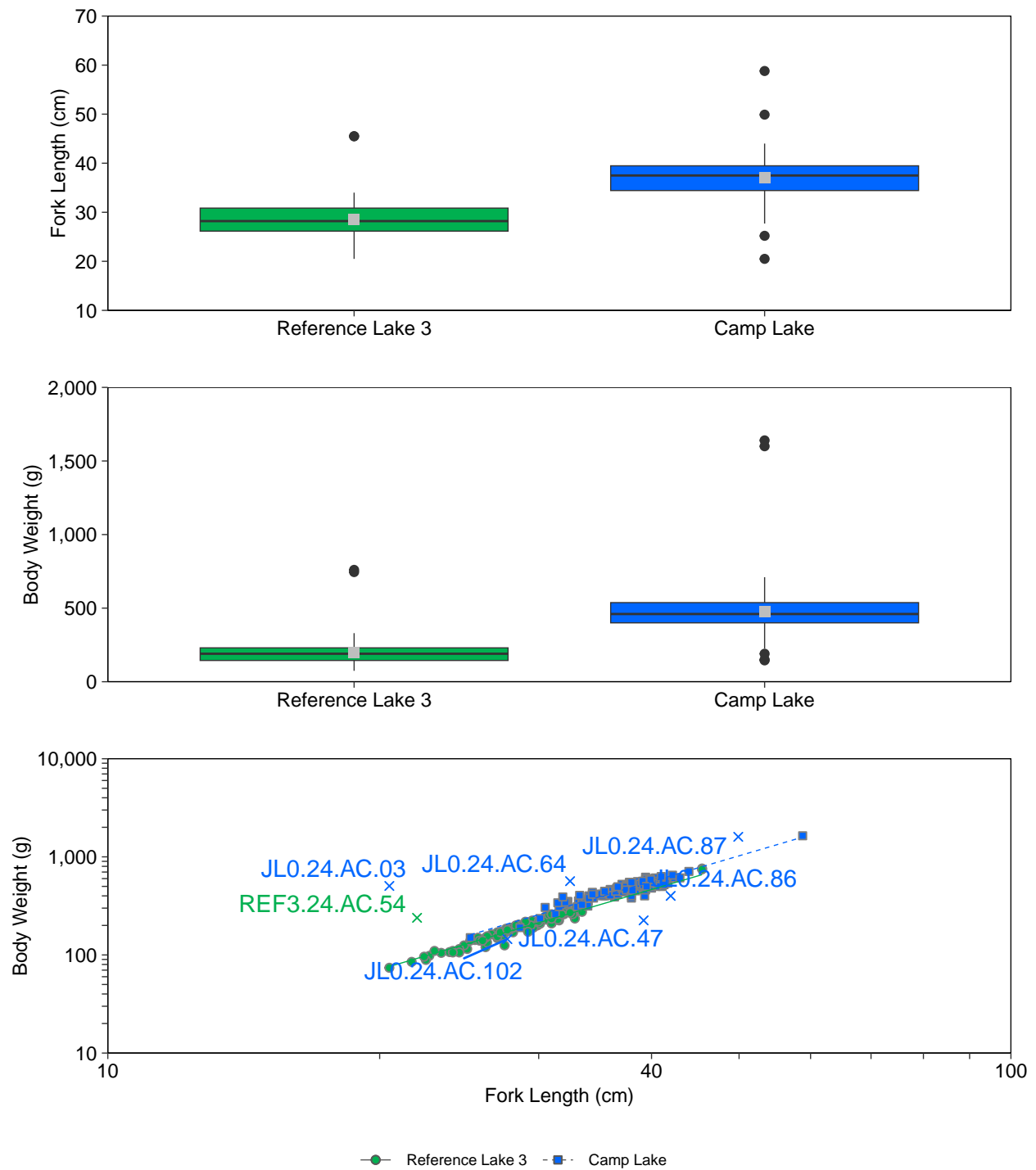


Figure G.6: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Arctic Charr Captured by Gill Netting at Camp Lake (JL0) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

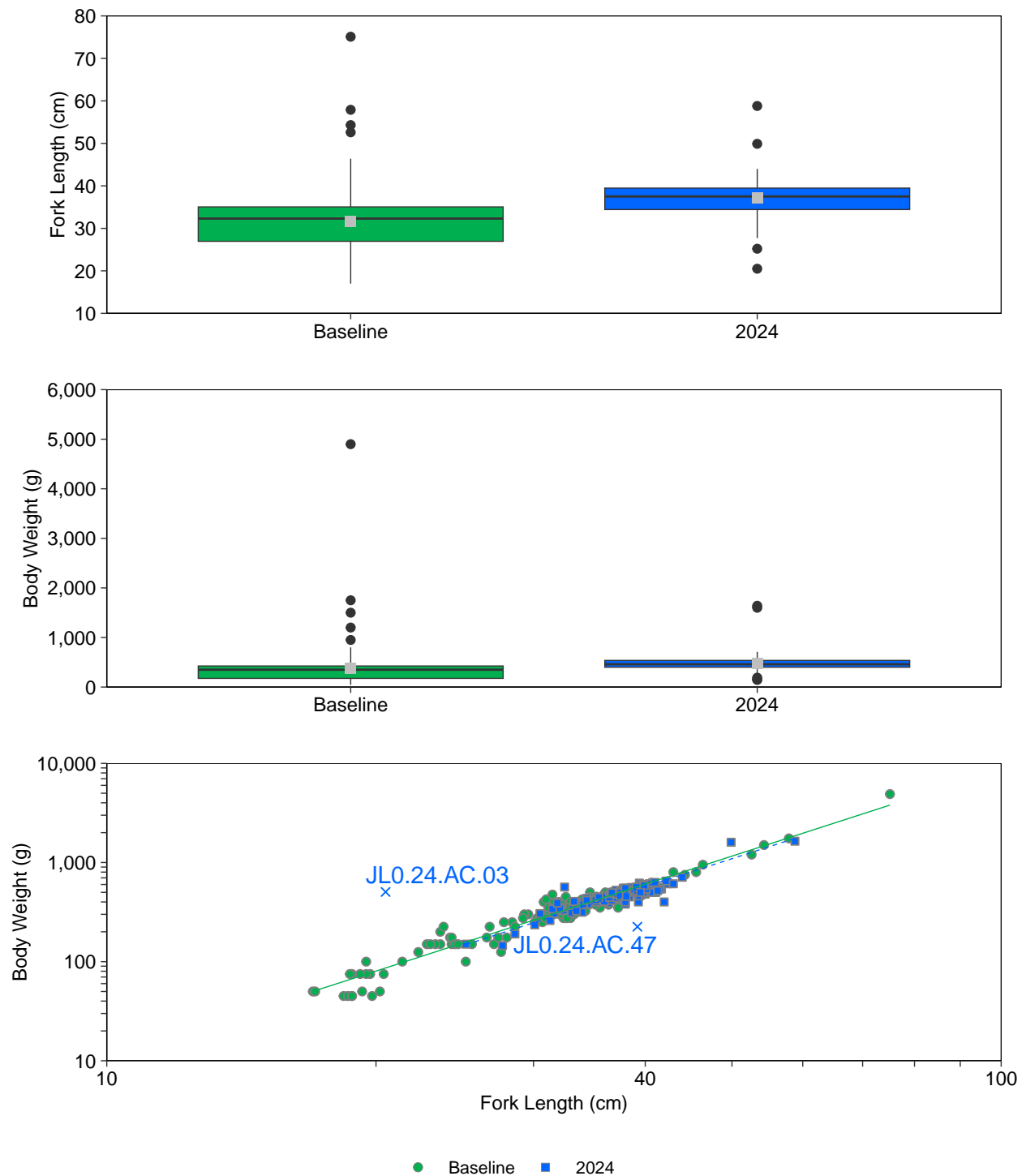


Figure G.7: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Arctic Charr Captured by Gill Netting at Camp Lake (JL0) in 2024 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

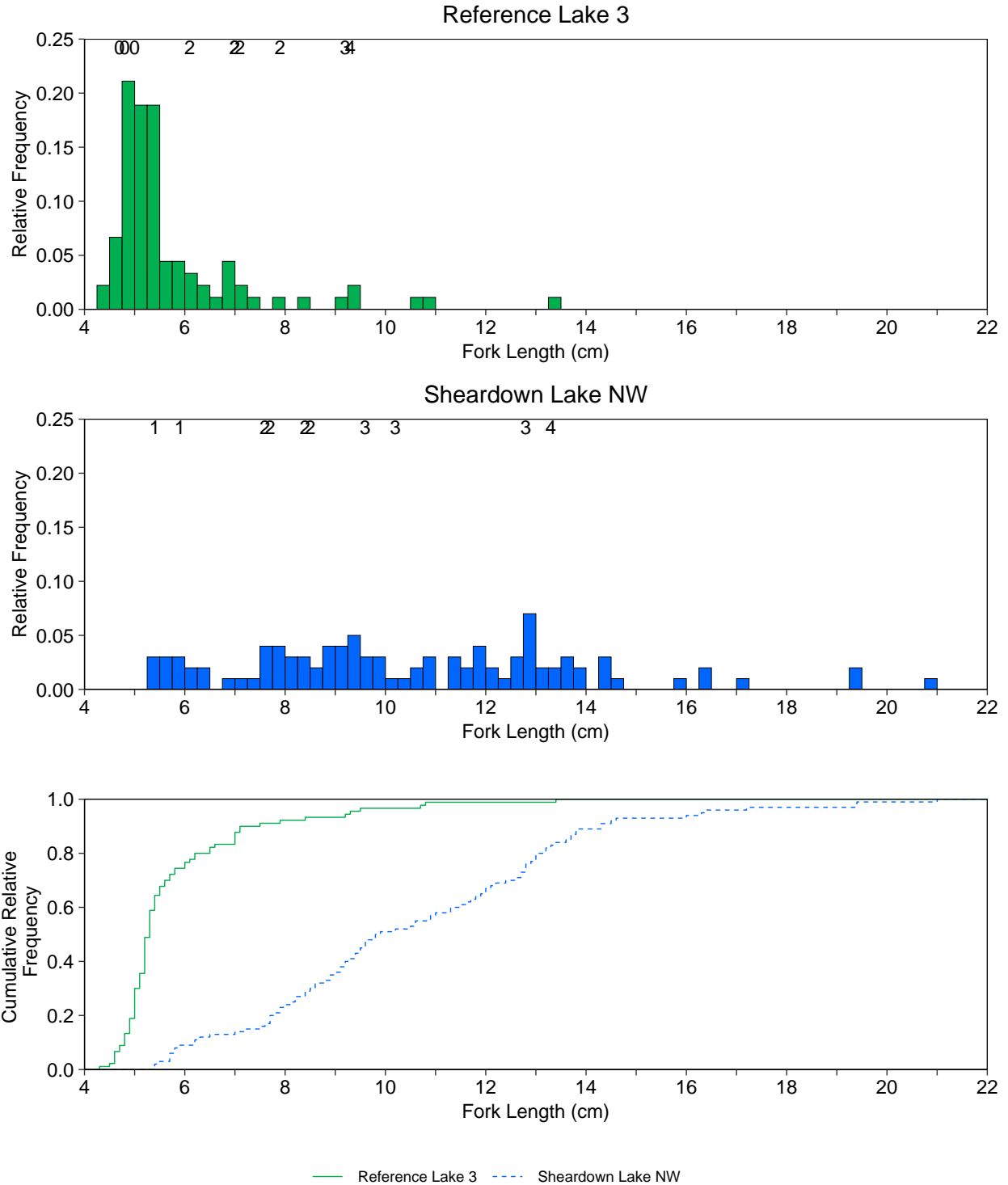


Figure G.8: Relative Length–Frequency and Cumulative Length–Frequency Distributions for Non–Young–of–the–Year (Non–YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Fish ages are shown above the bars, where available. Sheardown Lake NW n = 100; Reference Lake 3 n = 90.

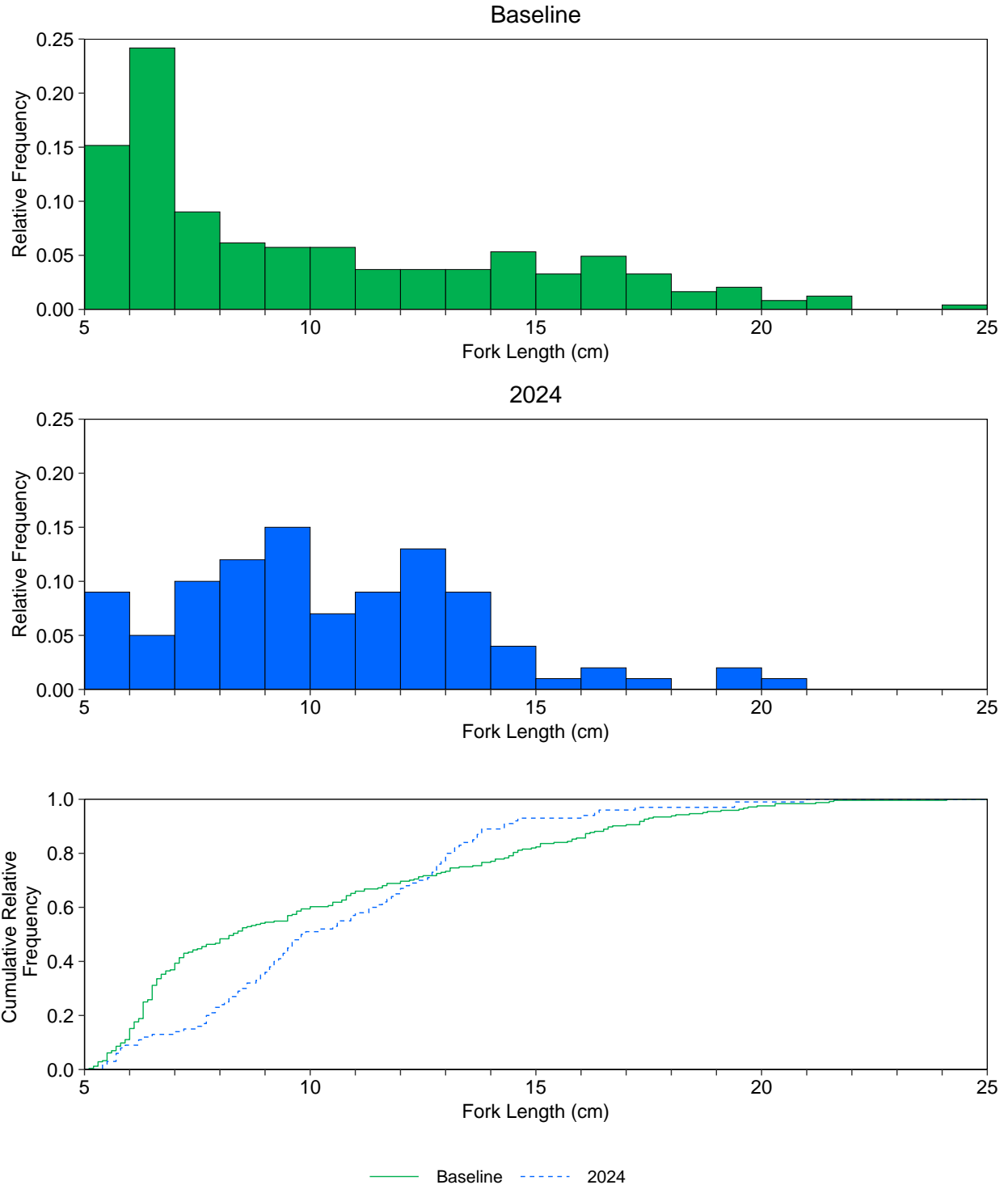


Figure G.9: Relative Length–Frequency and Cumulative Length–Frequency Distributions for Non-Young-of-the-Year (Non-YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Northwest (NW; DL0-01) in 2024 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Sheardown Lake NW n = 100; Baseline n = 244.

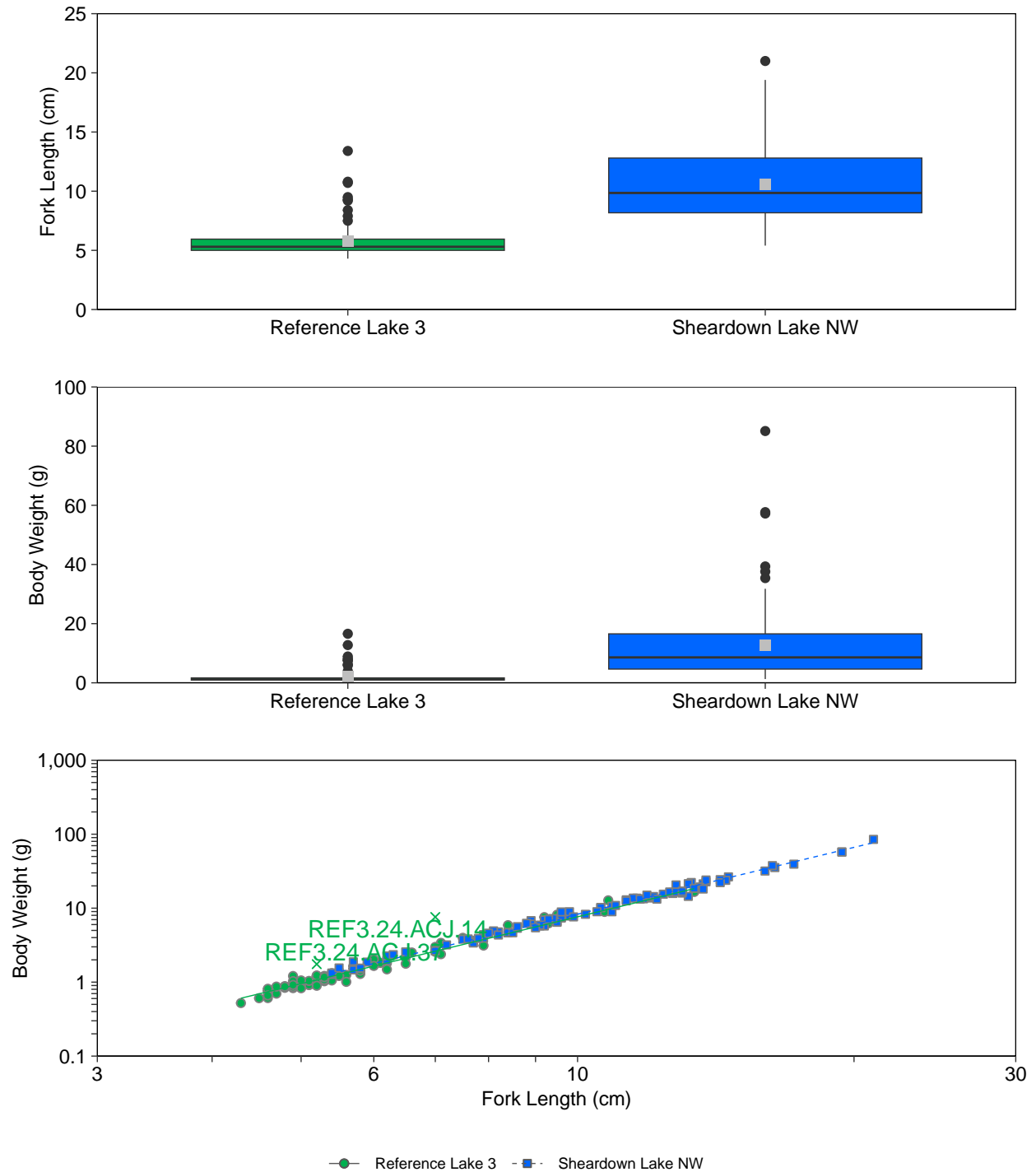


Figure G.10: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Non – Young-of-the-Year (Non-YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

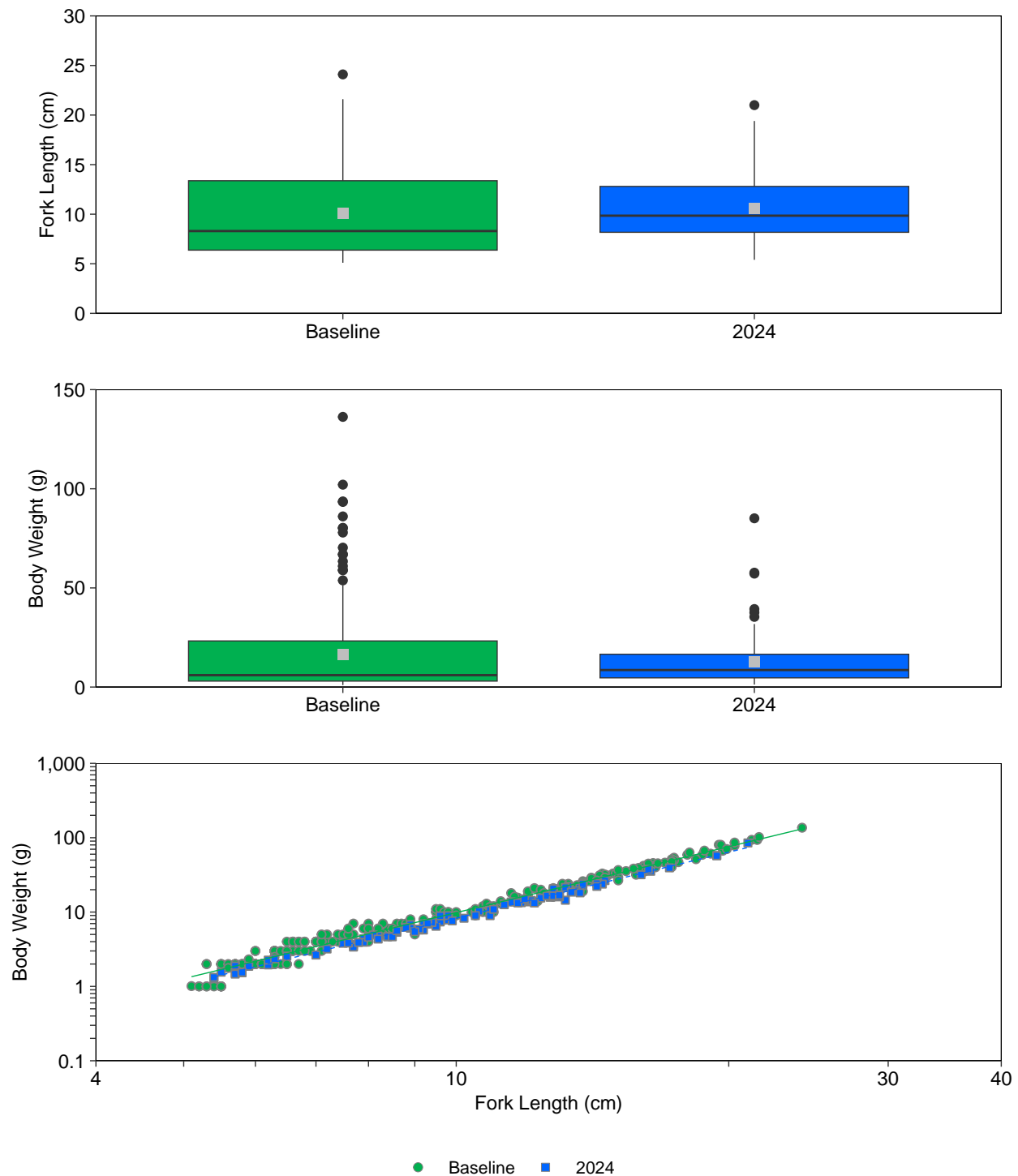


Figure G.11: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Non-Young-of-the-Year (Non-YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Northwest (NW; DL0-01) in 2024 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

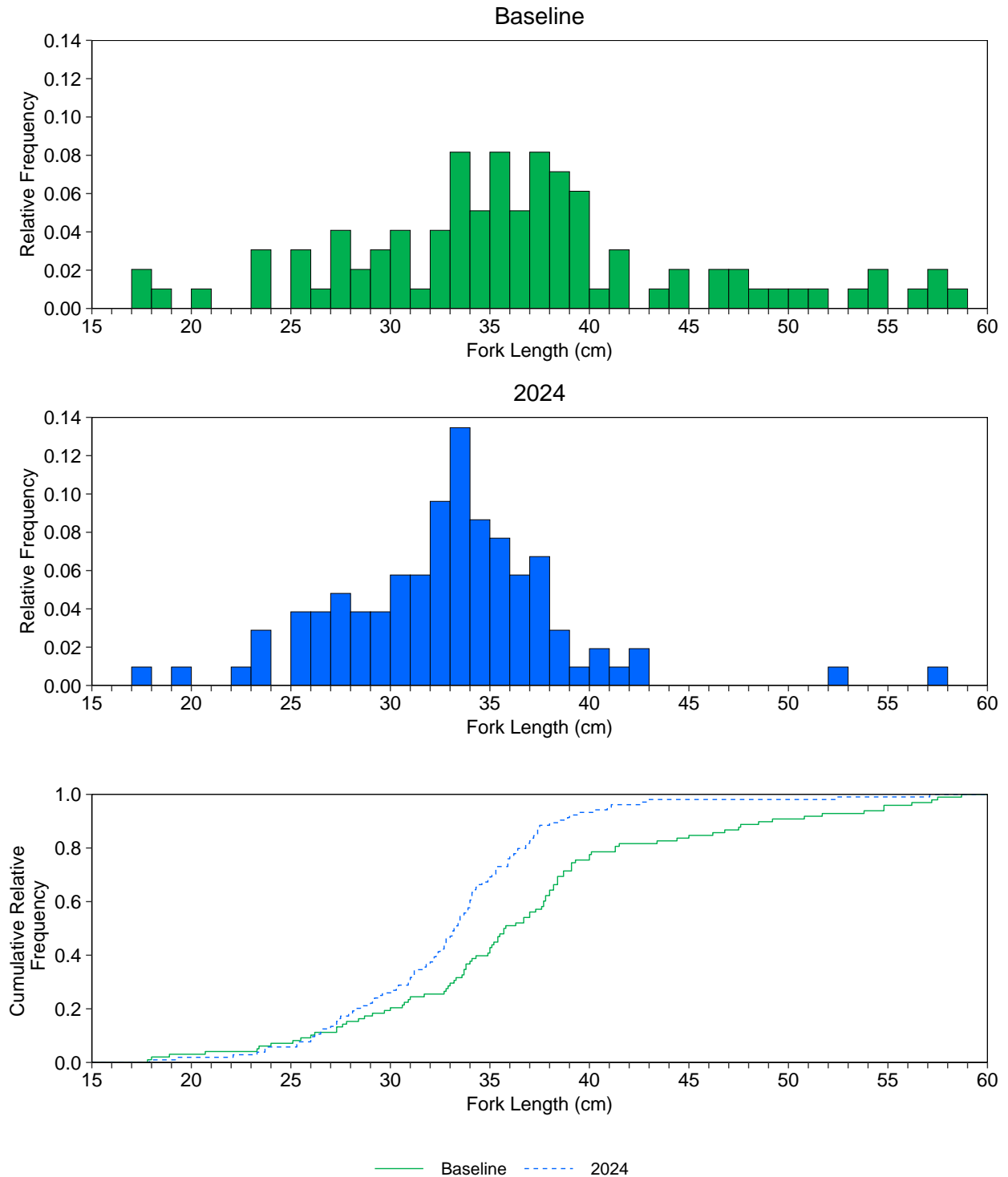


Figure G.12: Relative Length–Frequency and Cumulative Length–Frequency Distributions for Arctic Charr Captured by Gill Netting at Sheardown Lake Northwest (NW; DL0-01) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Sheardown Lake NW n = 104; Baseline n = 98.

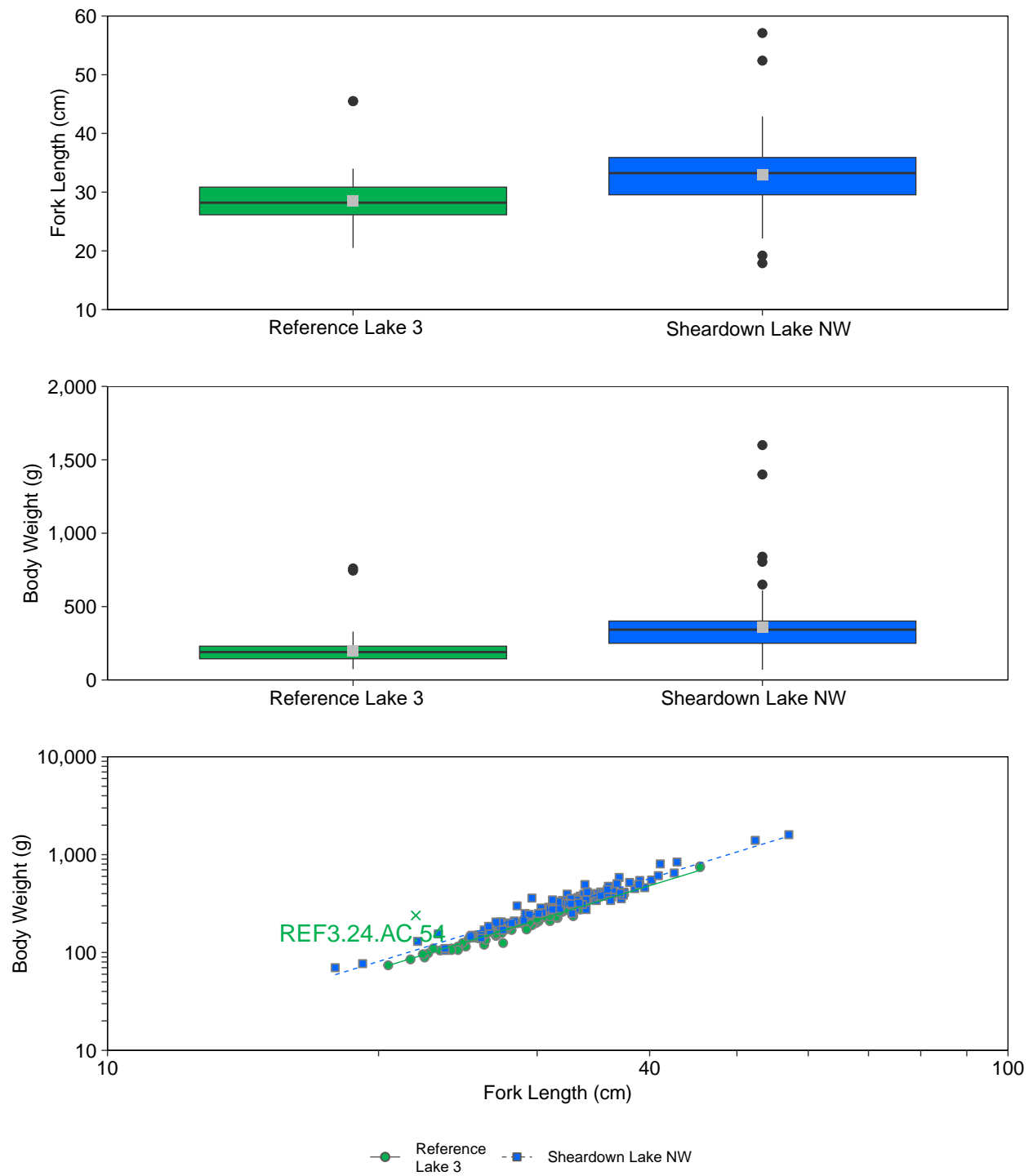


Figure G.13: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Arctic Charr Captured by Gill Netting at Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

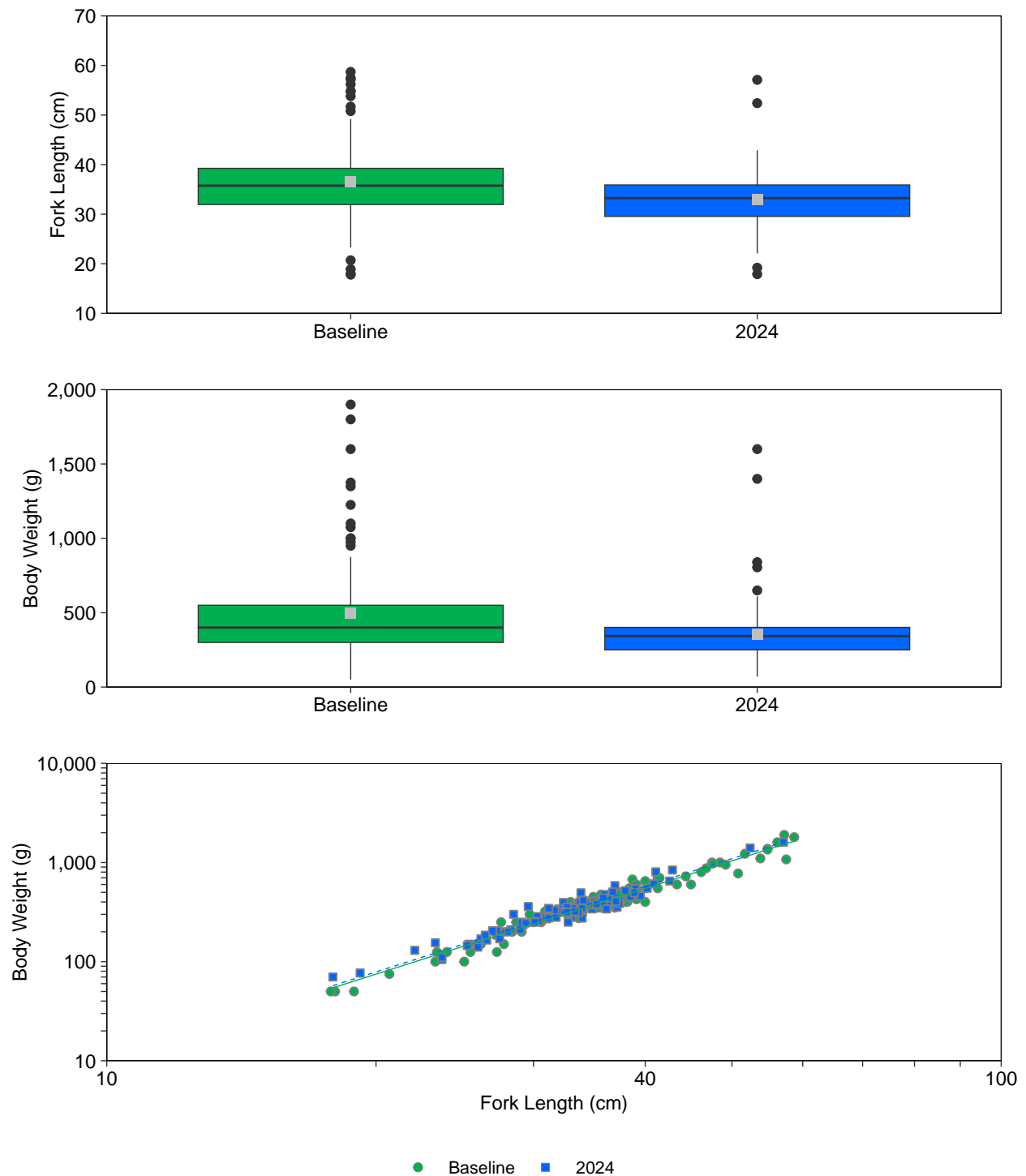


Figure G.14: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Arctic Charr Captured by Gill Netting at Sheardown Lake Northwest (NW; DL0-01) in 2024 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

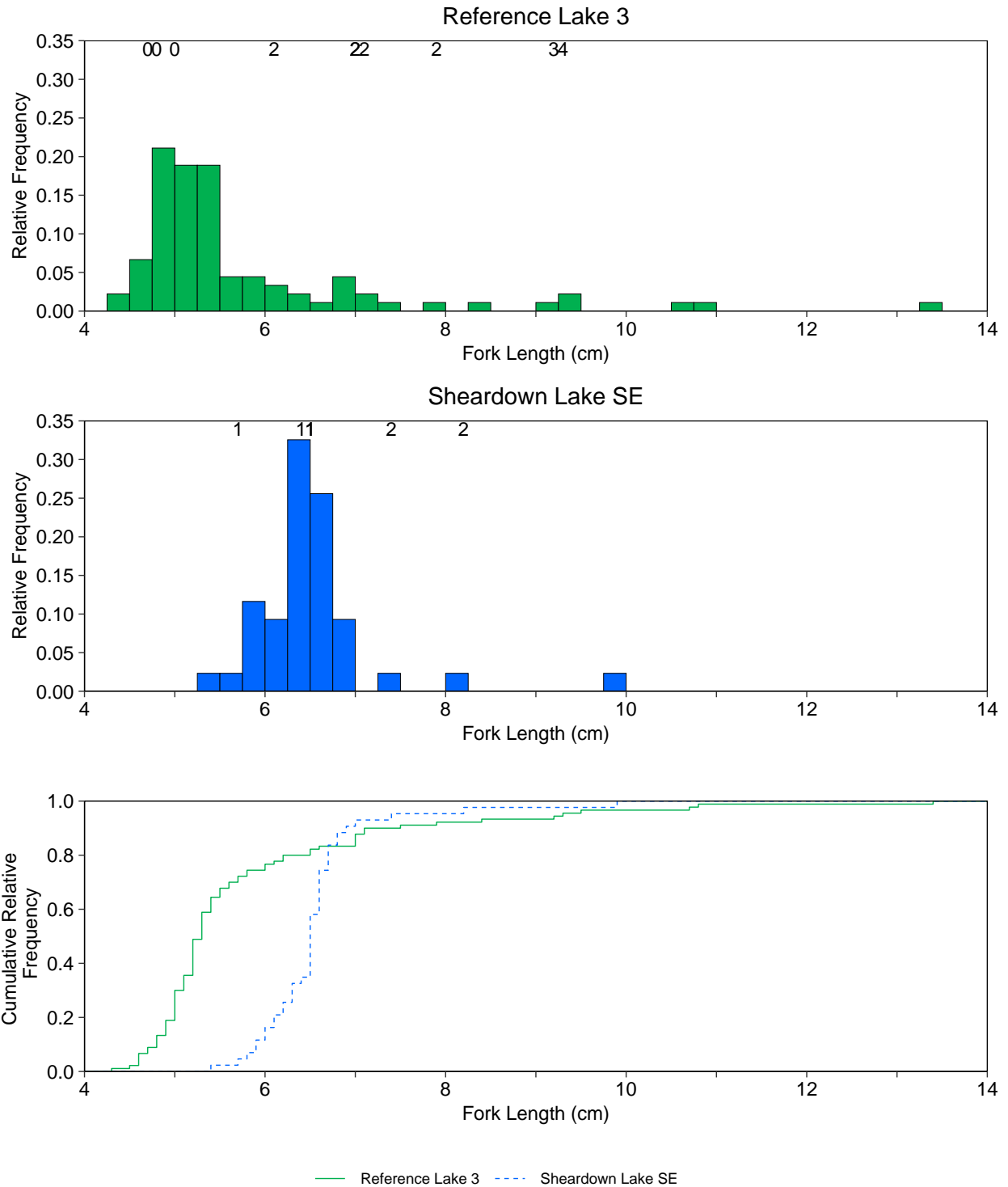


Figure G.15: Relative Length–Frequency and Cumulative Length–Frequency Distributions for Non–Young–of–the–Year (NYOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Fish ages are shown above the bars, where available. Sheardown Lake SE n = 43; Reference Lake 3 n = 90.

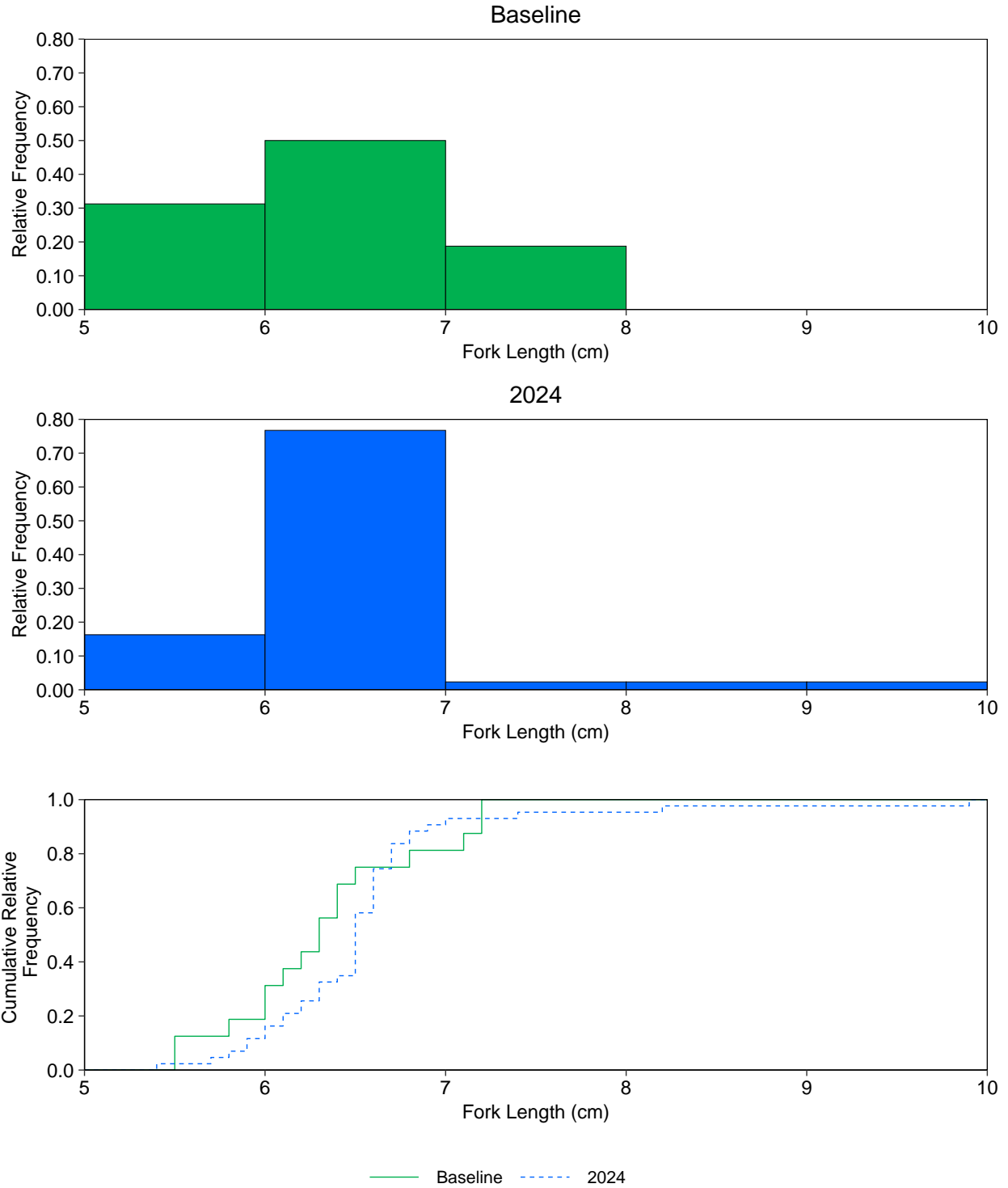


Figure G.16: Relative Length–Frequency and Cumulative Length–Frequency Distributions for Non-Young-of-the-Year (Non-YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Southeast (SE; DL0-02) in 2024 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Sheardown Lake SE n = 43; Baseline n = 16.

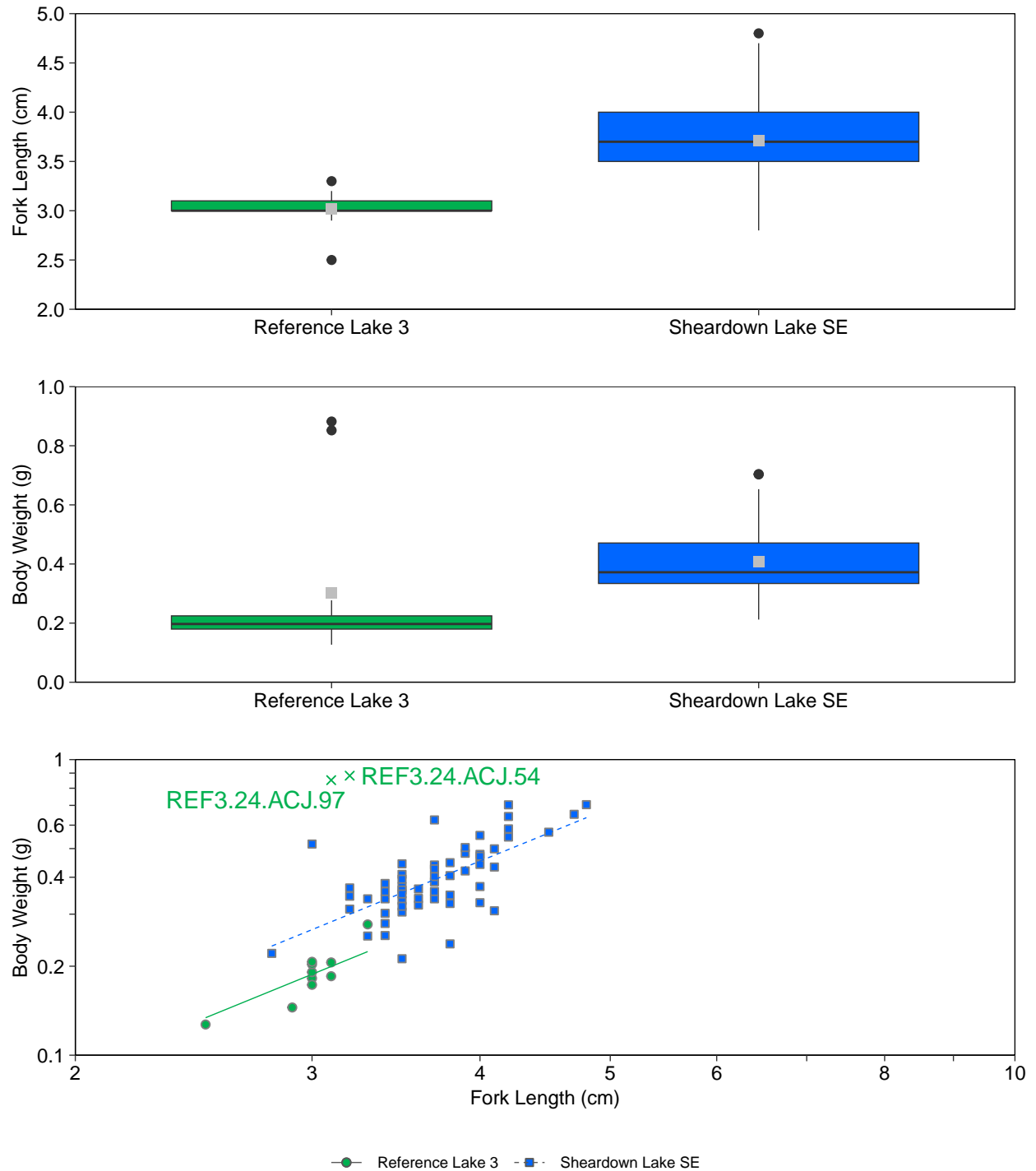


Figure G.17: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Young-of-the-Year (YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

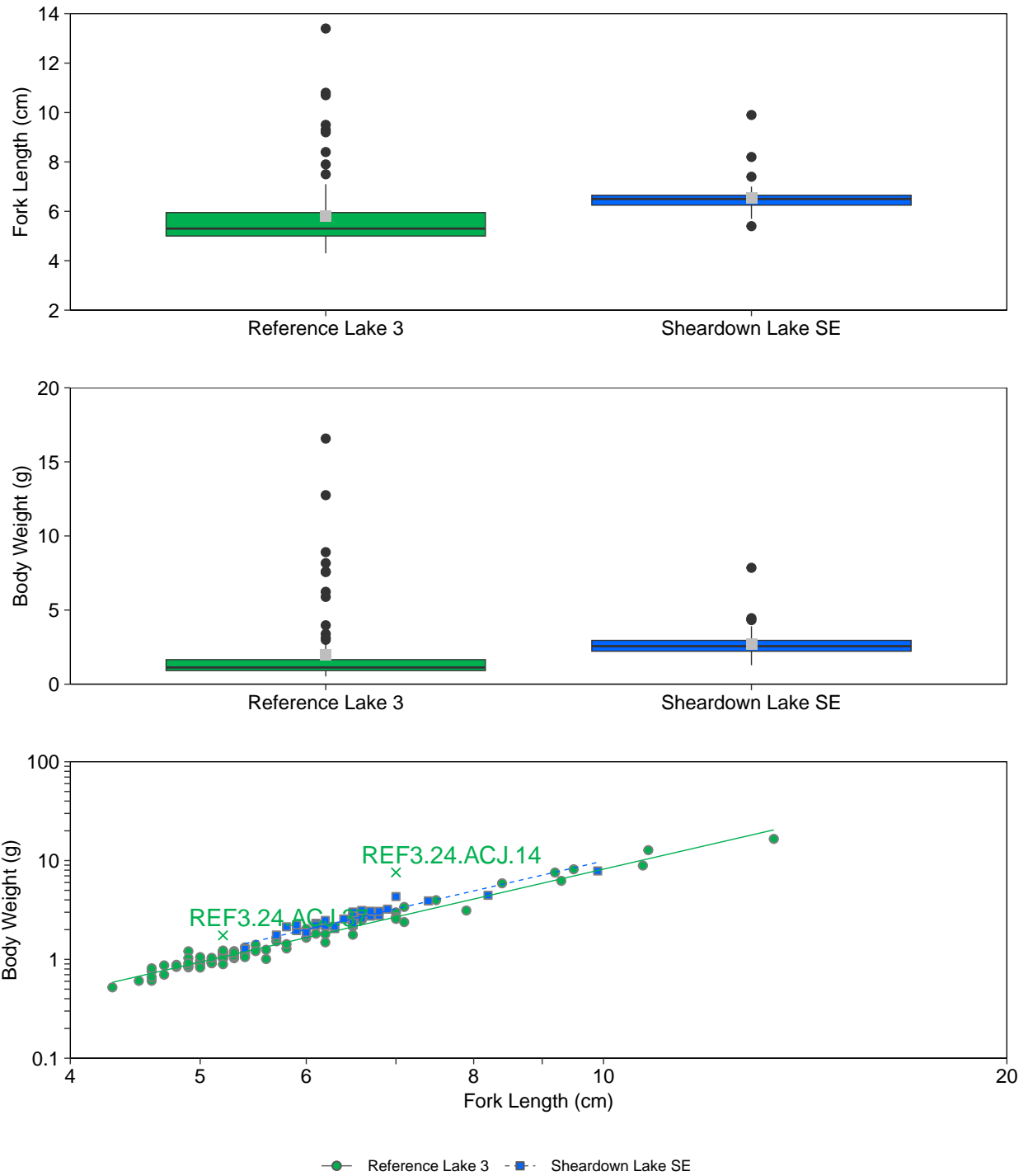


Figure G.18: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Non – Young-of-the-Year (Non-YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

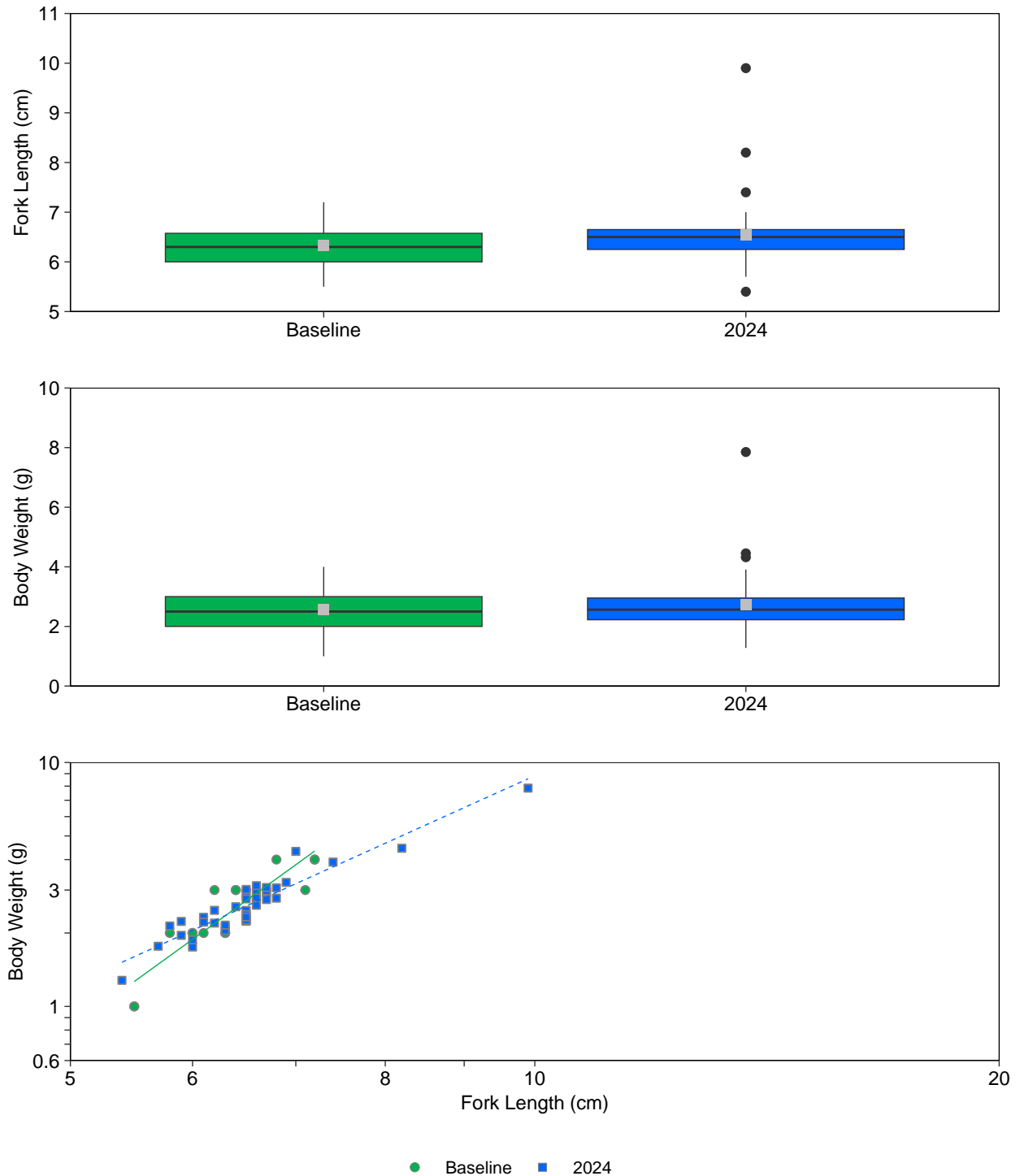


Figure G.19: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Non-Young-of-the-Year (Non-YOY) Arctic Charr Captured by Backpack Electrofishing at Sheardown Lake Southeast (SE; DL0-02) in 2024 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

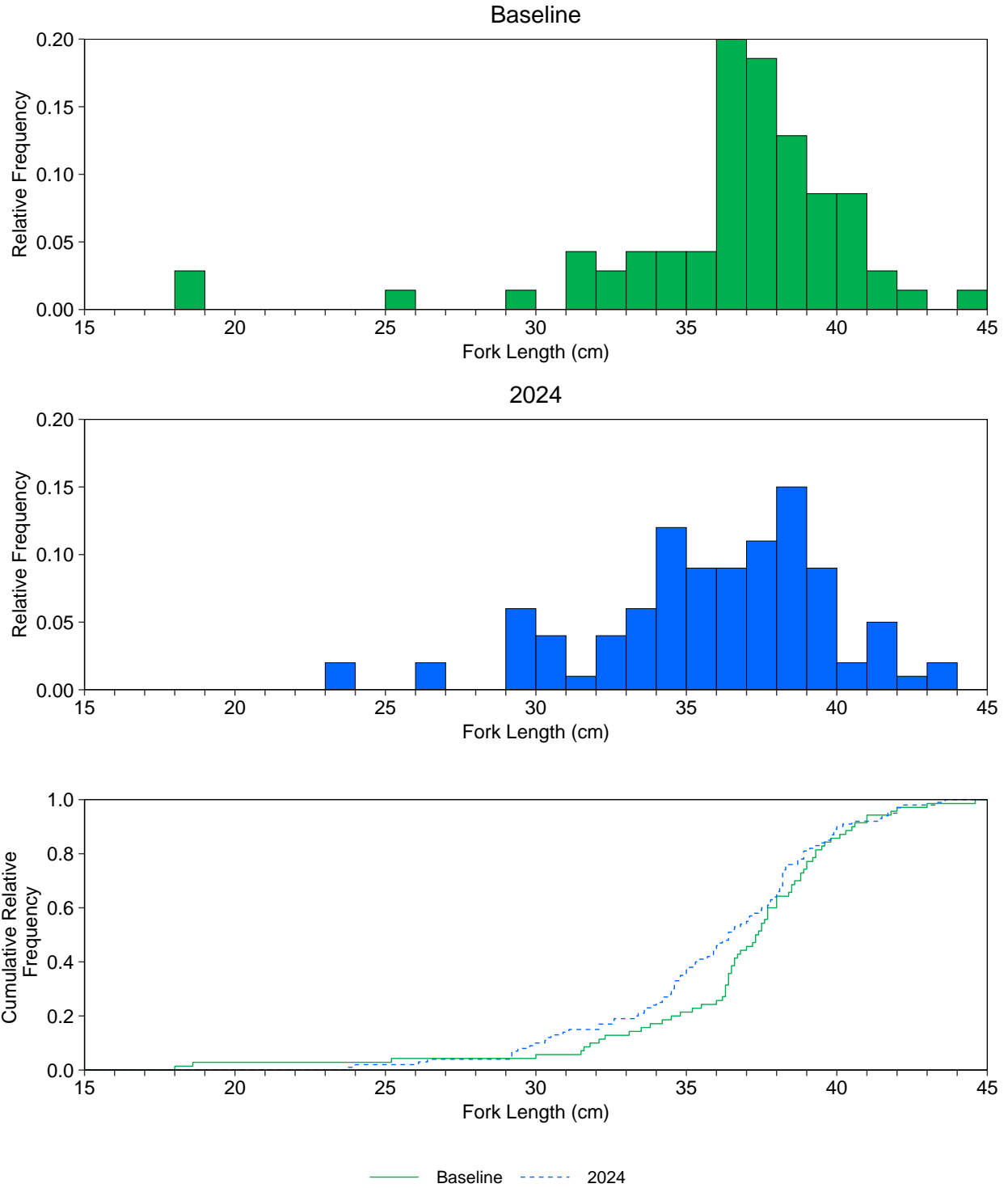


Figure G.20: Relative Length–Frequency and Cumulative Length–Frequency Distributions for Arctic Charr Captured by Gill Netting at Sheardown Lake Southeast (SE; DL0-02) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Sheardown Lake SE n = 100; Baseline n = 70.

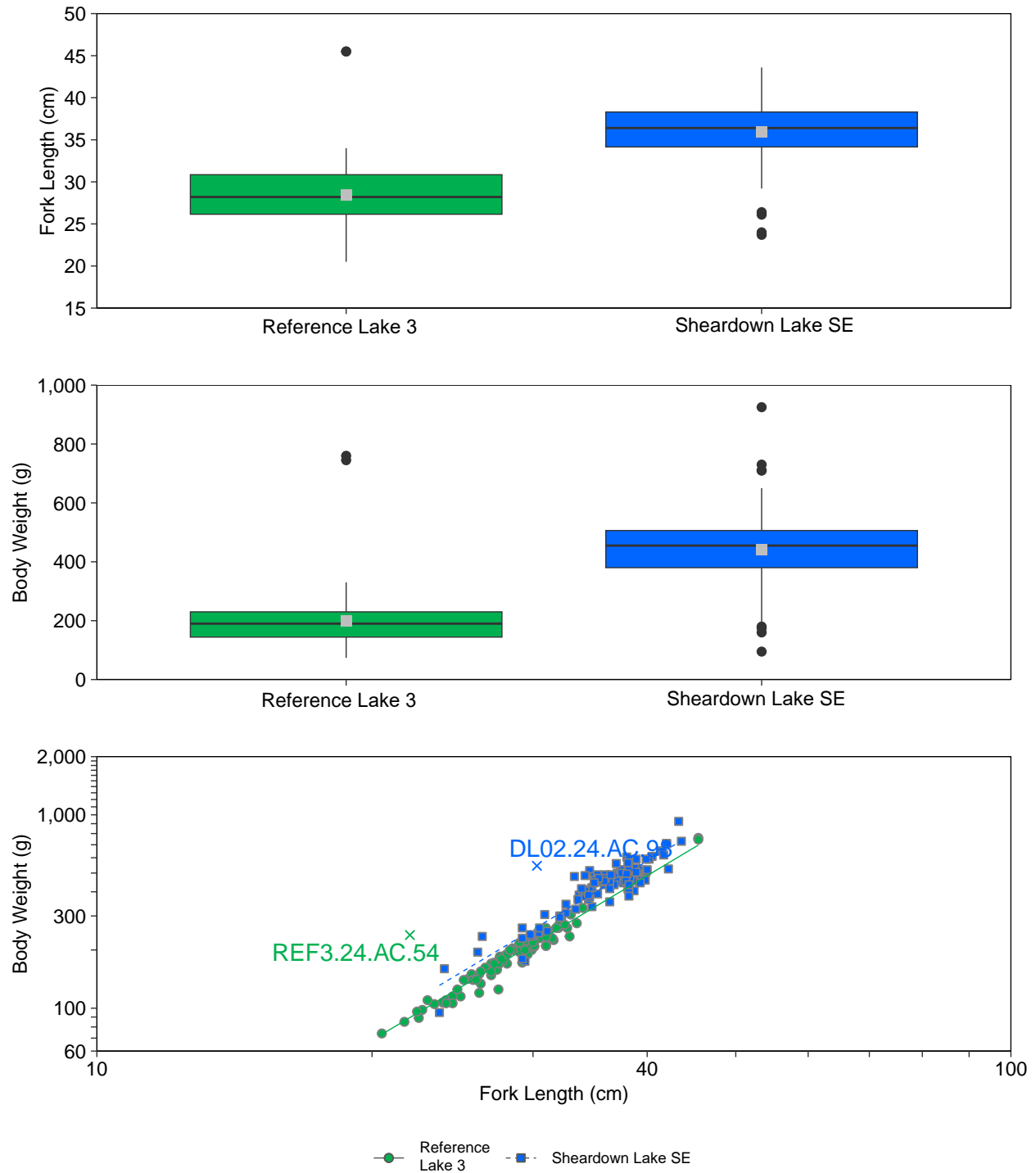


Figure G.21: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Arctic Charr Captured by Gill Netting at Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

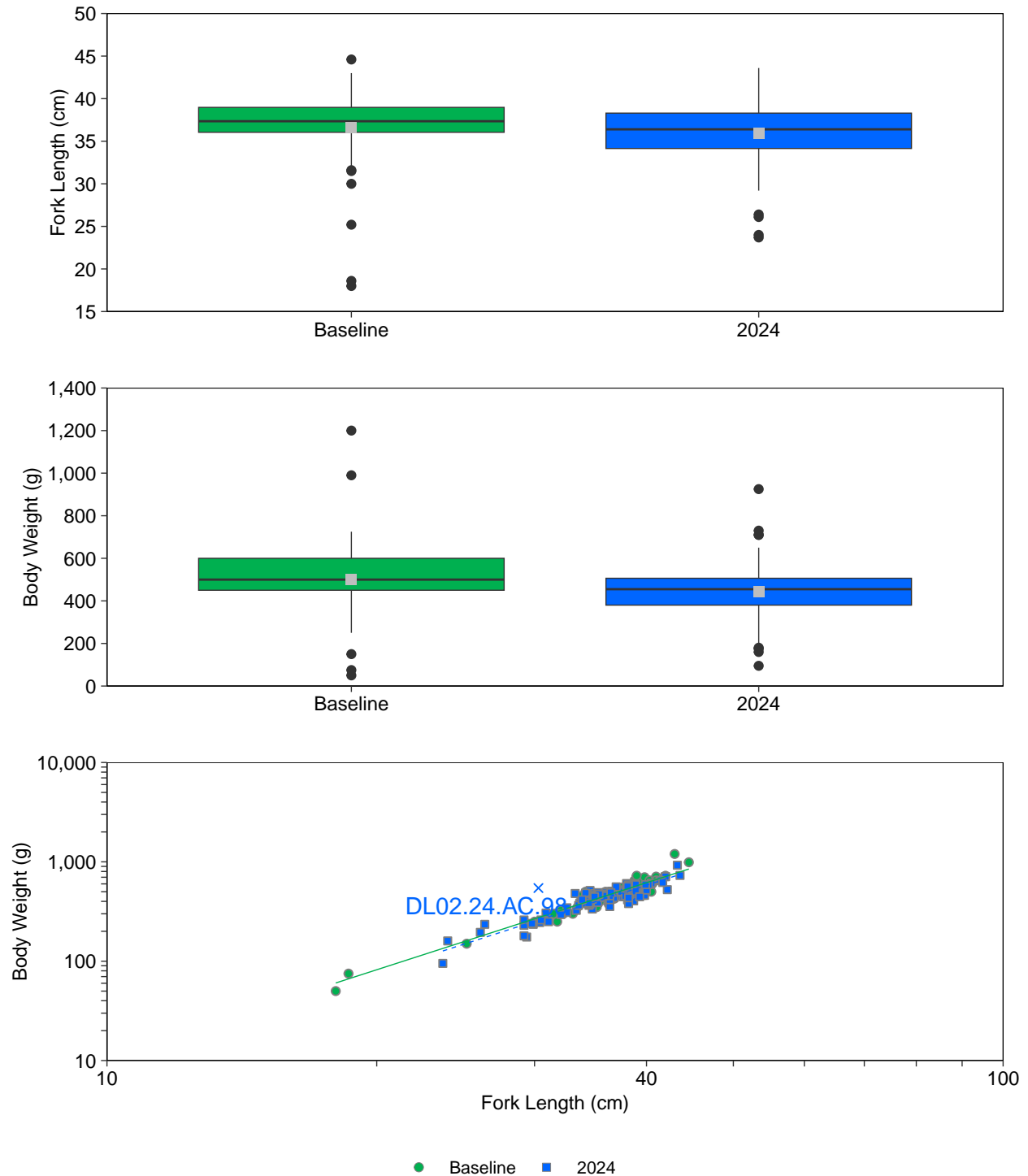


Figure G.22: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Arctic Charr Captured by Gill Netting at Sheardown Lake Southeast (SE; DL0-02) in 2024 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

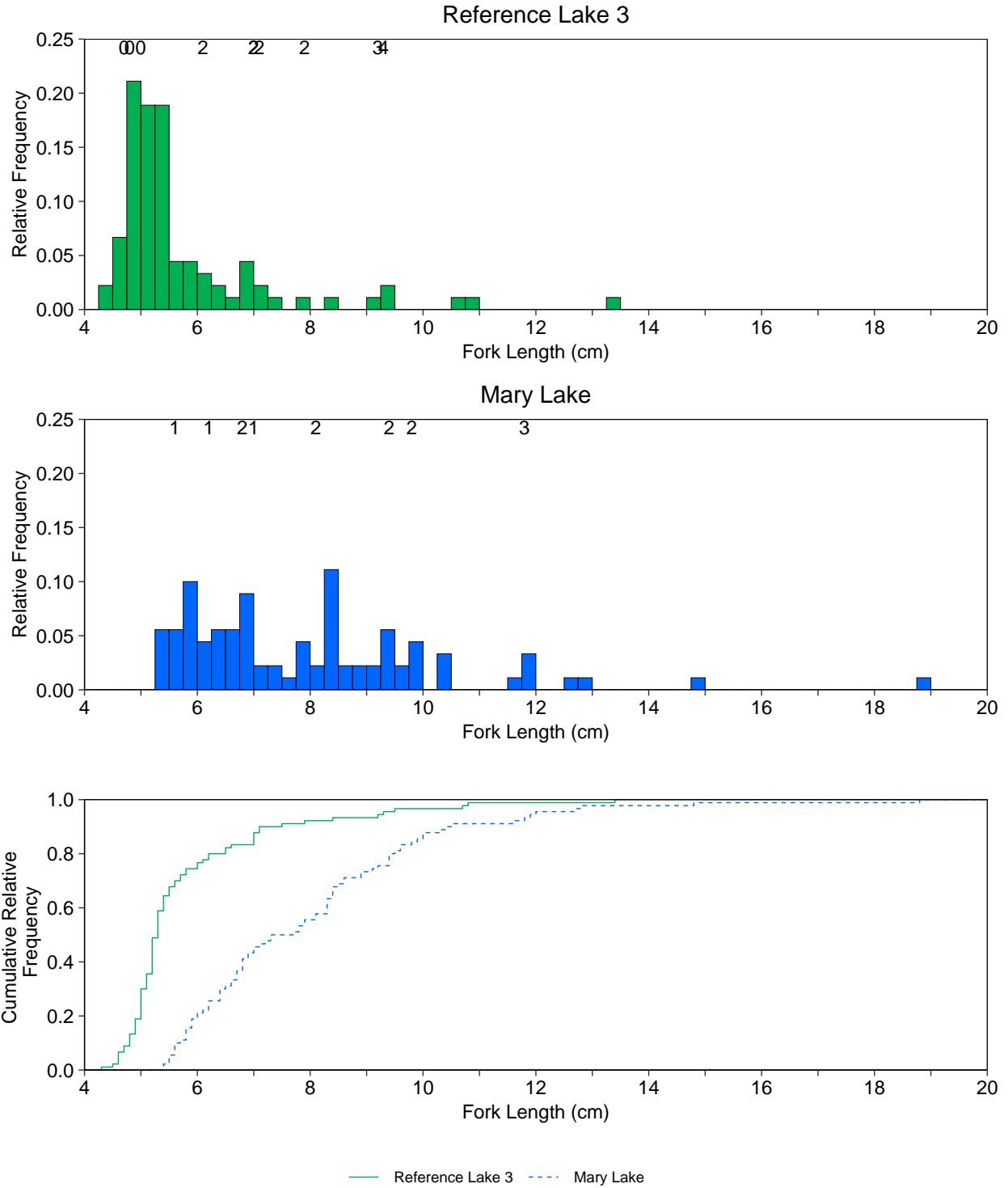


Figure G.23: Relative Length–Frequency and Cumulative Length–Frequency Distributions for Non–Young–of–the–Year (Non–YOY) Arctic Charr Captured by Backpack Electrofishing at Mary Lake (BL0) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Fish ages are shown above the bars, where available. Mary Lake n = 90; Reference Lake 3 n = 90.

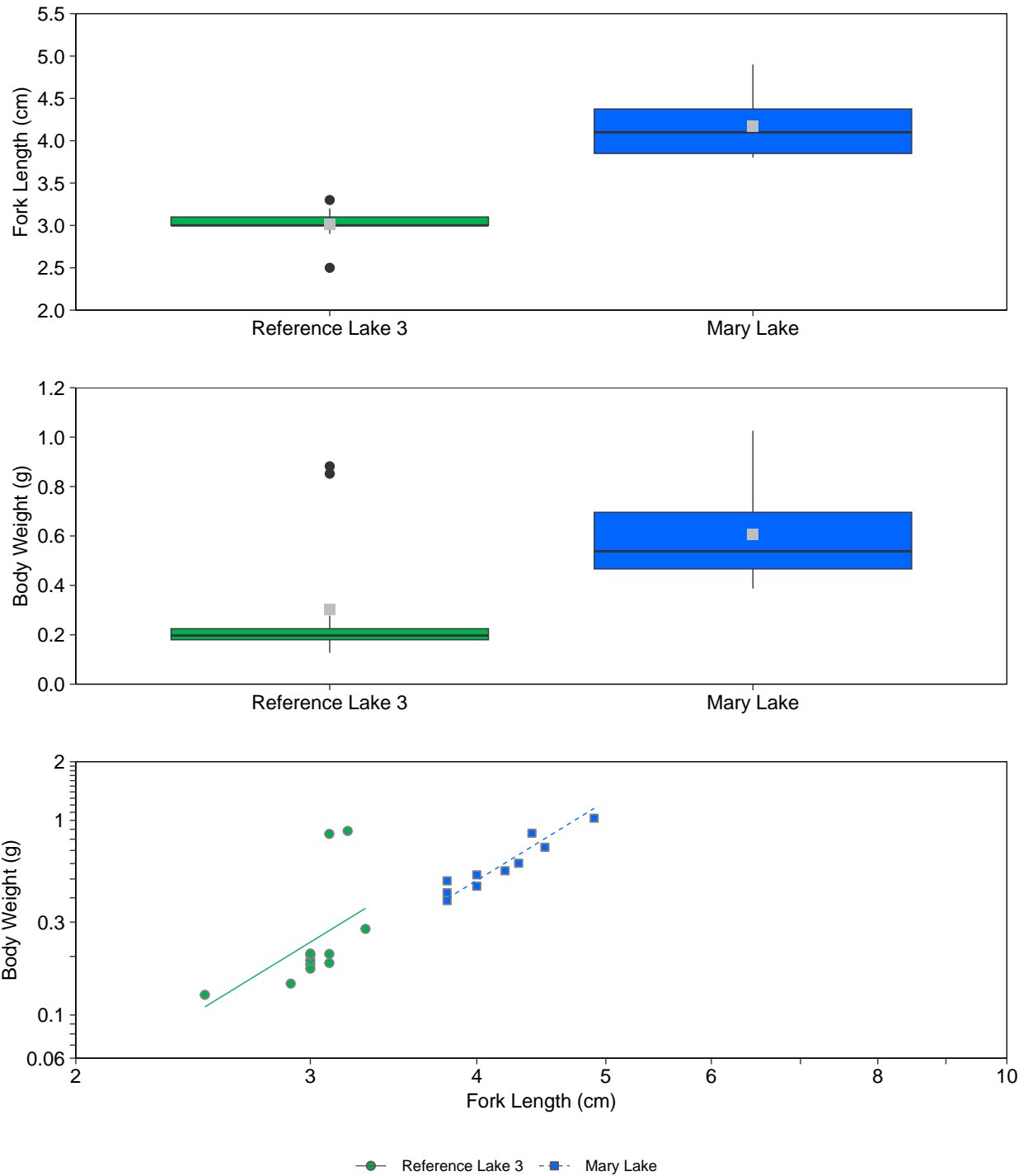


Figure G.24: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Young-of-the-Year (YOY) Arctic Charr Captured by Backpack Electrofishing at Mary Lake (BL0) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

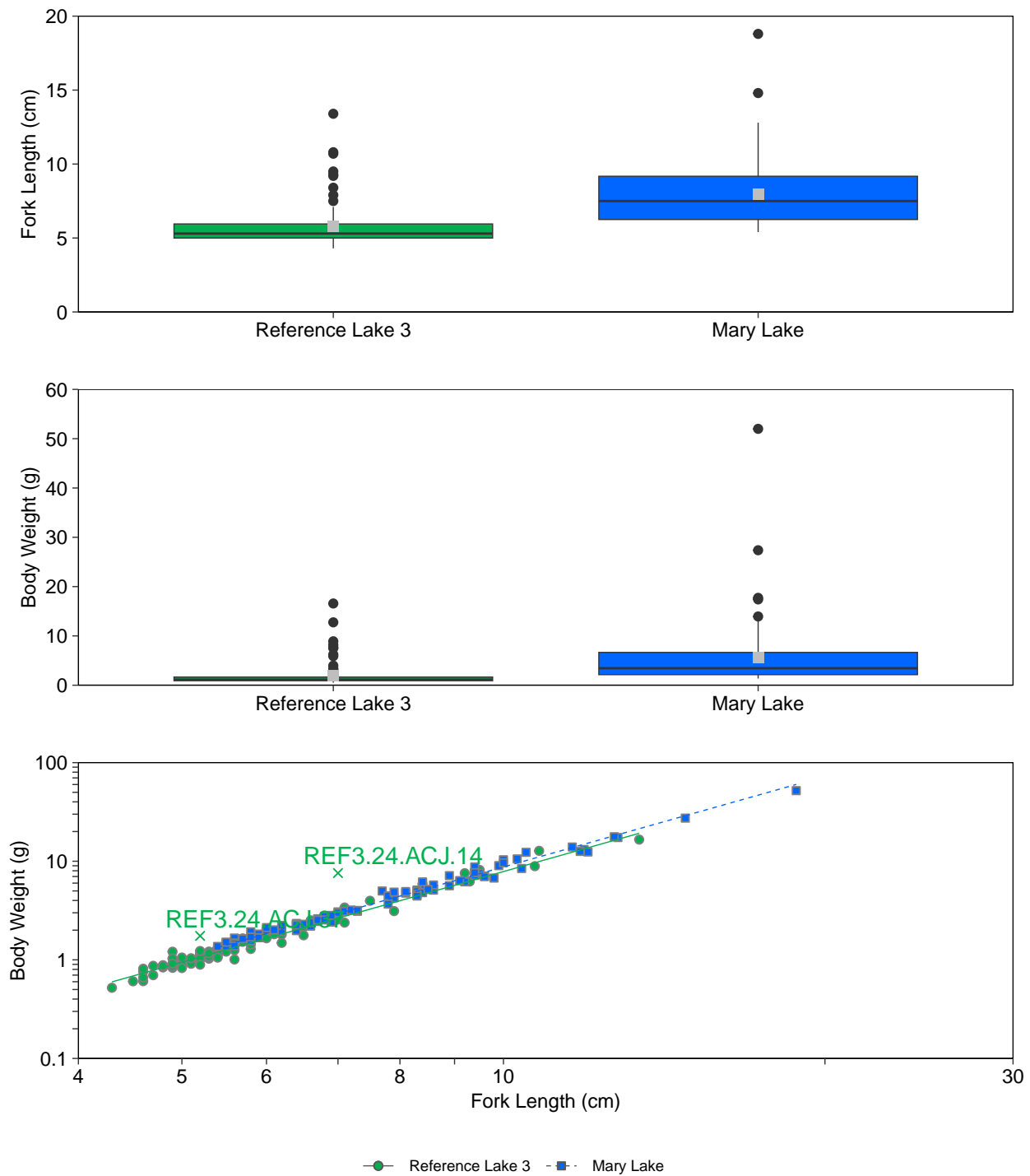


Figure G.25: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Non – Young-of-the-Year (Non-YOY) Arctic Charr Captured by Backpack Electrofishing at Mary Lake (BL0) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

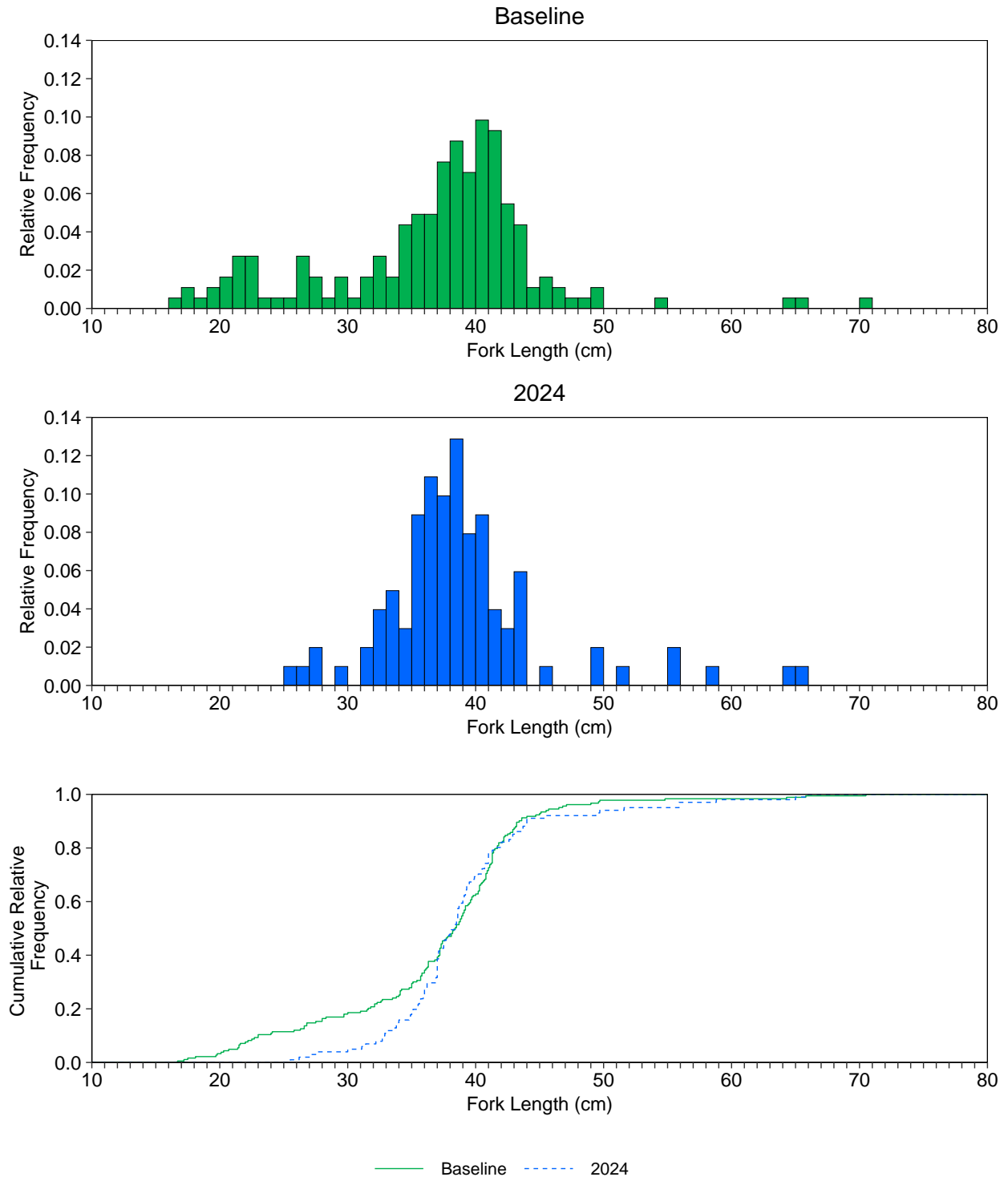


Figure G.26: Relative Length–Frequency and Cumulative Length–Frequency Distributions for Arctic Charr Captured by Gill Netting at Mary Lake (BL0) and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Mary Lake n = 101; Baseline n = 183.

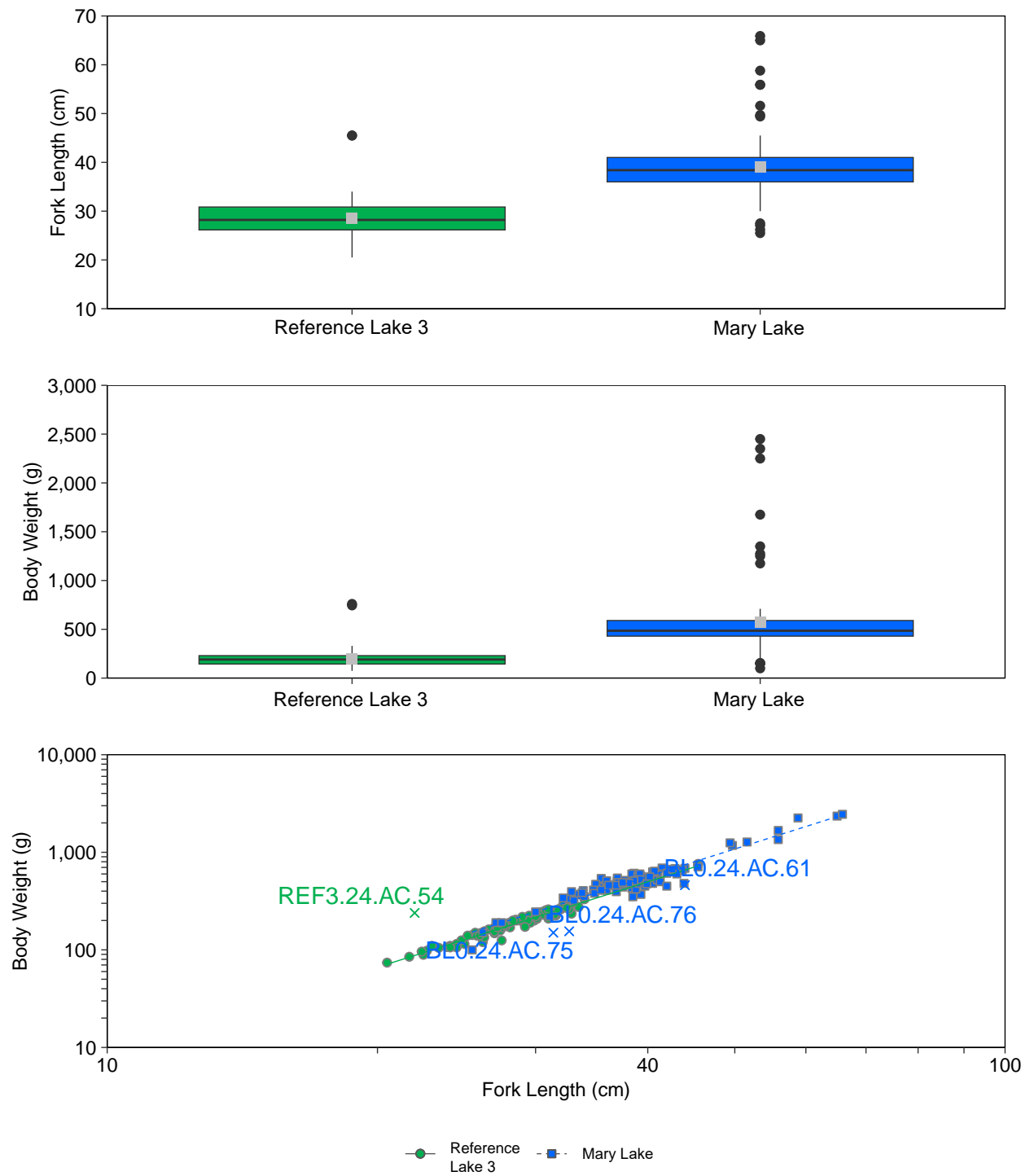


Figure G.27: Comparison of Body Condition (Weight-at-Fork-Length Relationship) for Arctic Charr Captured by Gill Netting at Mary Lake (BL0) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

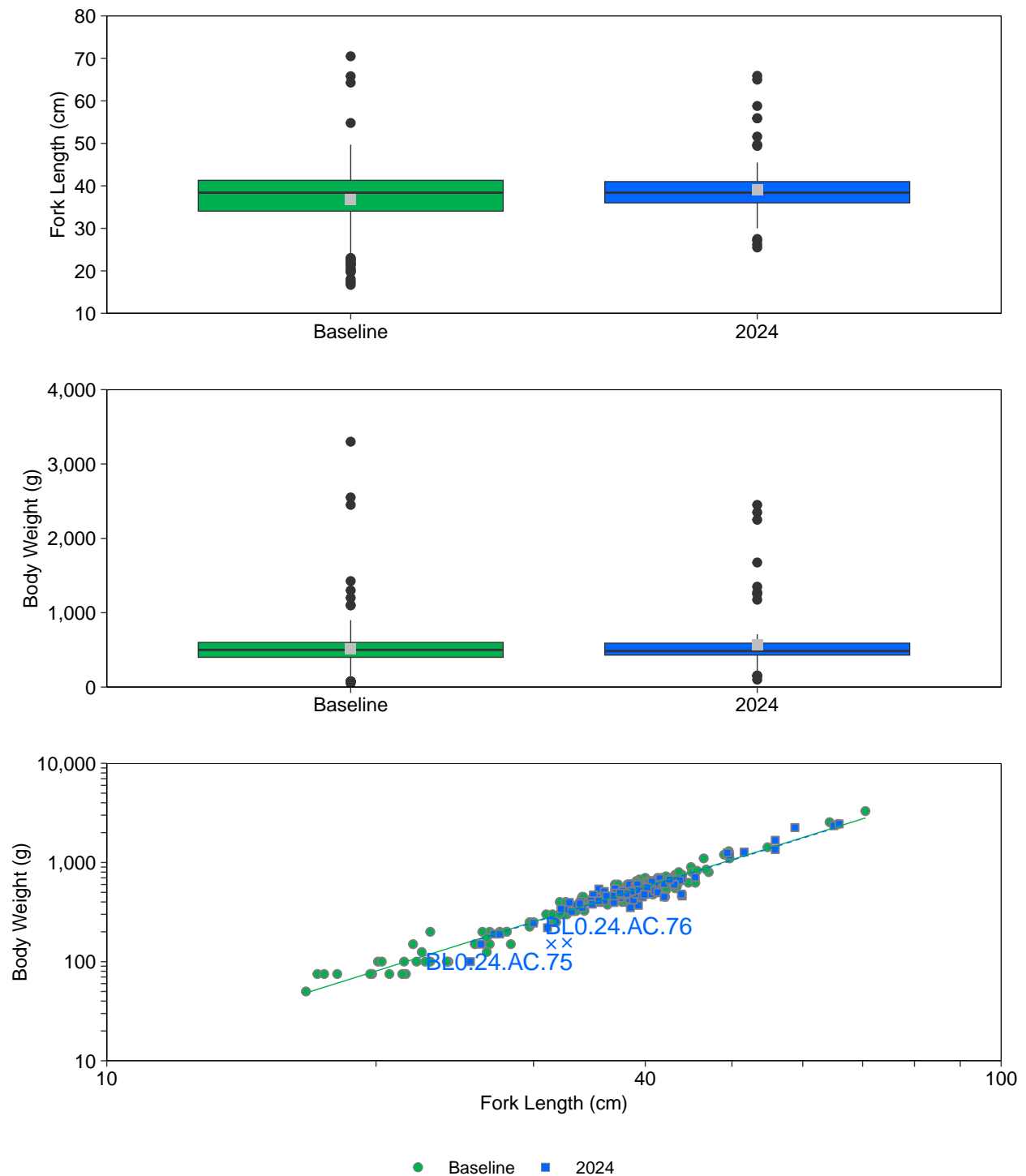


Figure G.28: Comparison of Body Condition (Weight-at-Fork Length Relationship) for Arctic Charr Captured by Gill Netting at Mary Lake (BL0) in 2024 and During the Mine Baseline Period (2013), Mary River Project CREMP, August 2024

Notes: Outliers are marked with an 'X'.

APPENDIX G

TABLES

Table G.1: Backpack Electrofishing Catch Records at Study Lakes, Mary River Project CREMP, August 2024

Waterbody	Sample Station Identifier	Location (NAD83, UTM Zone 17W)				Fishing Date	Electrofisher Settings			No. of Passes	Effort (seconds)	Fish Species						Total (all species)	
												Arctic Charr			Ninespine Stickleback				
		Start		Finish			Output Voltage (volts)	Cycle Freq. (Hz)	Duty Cycle (%)			No. Captured	No. Mortalities / Retained	CPUE	No. Captured	No. Mortalities / Retained	CPUE	Total Catch	CPUE
		Easting	Northing	Easting	Northing														
Reference Lake 3	REF-24-EF-1	574914	7853024	574682	7853033	10-Aug-24	500	45	12	1	5,611	105	13	1.12	15	0	0.16	120	1.28
Camp Lake	JL0-24-EF-1	557810	7914661	557811	7914600	07-Aug-24	500	30	12	1	821	60	10	4.38	0	0	0.00	60	4.38
	JL0-24-EF-2	557810	7914661	557811	7914600	07-Aug-24	500	30	12	2	- ^a	45	0	-	0	0	-	45	-
Sheardown Lake Northwest	DL0-01-24-EF-1	560368	7913401	560329	7913457	08-Aug-24	300	30	12	1	863	58	8	4.03	0	0	0.00	58	4.03
	DL0-01-24-EF-2	560382	7913384	560329	7913457	08-Aug-24	300-400	30-35	12	2	940	51	2	3.26	0	0	0.00	51	3.26
Sheardown Lake Southeast	DL0-02-24-EF-1	561707	7911833	561656	7911769	09-Aug-24	400-500	35-45	12	1	1,156	38	6	1.97	11	0	0.57	49	2.54
	DL0-02-24-EF-2	561656	7911769	561725	7911748	09-Aug-24	400-500	35-45	12	2	583	44	1	4.53	9	0	0.93	53	5.45
	DL0-02-24-EF-3	561735	7911820	561671	7911847	09-Aug-24	500	45	12	3	756	23	3	1.83	6	0	0.48	29	2.30
Mary Lake	BL0-24-EF-1	555423	7905147	555479	7905057	08-Aug-24	500-550	30-40	12	1	1,814	61	7	2.02	0	0	0.00	61	2.02
	BL0-24-EF-2	555479	7905057	555563	7904948	08-Aug-24	525	40	12	2	2,124	50	3	1.41	0	0	0.00	50	1.41

Notes: No. = number; Catch-per-unit-effort (CPUE) represents the number of fish captured per electrofishing minute. "-" indicates no available data.

^a The electrofishing seconds for this pass were not recorded during field collection.

Table G.2: Gill Netting Catch Records for Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

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-24-GN-01	574583	7852944	91.0	15-Aug-24	15-Aug-24	10:38	11:30	0.87	0.79	0	1	0	1	1.27
REF-24-GN-02	575514	7852875	91.0	15-Aug-24	15-Aug-24	11:15	12:25	1.17	1.06	1	0	0	1	0.94
REF-24-GN-03	575604	7852497	91.0	15-Aug-24	15-Aug-24	11:53	13:00	1.12	1.02	3	4	0	7	6.89
REF-24-GN-04	574343	7852369	91.0	15-Aug-24	15-Aug-24	13:30	14:30	1.00	0.91	3	1	0	4	4.40
REF-24-GN-05	574125	7852299	91.0	15-Aug-24	15-Aug-24	13:55	14:58	1.05	0.956	5	5	0	10	10.47
REF-24-GN-06	574382	7852248	91.0	15-Aug-24	15-Aug-24	14:52	15:30	0.63	0.576	0	1	0	1	1.74
REF-24-GN-07	574348	7852266	91.0	16-Aug-24	16-Aug-24	10:48	11:45	0.95	0.865	4	1	0	5	5.78
REF-24-GN-08	574343	7852369	91.0	16-Aug-24	16-Aug-24	11:15	12:15	1.00	0.91	1	1	0	2	2.20
REF-24-GN-09	574529	7852463	91.0	16-Aug-24	16-Aug-24	12:17	13:15	0.97	0.88	5	3	0	8	9.09
REF-24-GN-10	574345	7852252	91.0	16-Aug-24	16-Aug-24	12:33	13:45	1.20	1.09	1	6	0	7	6.41
REF-24-GN-11	574684	7852481	91.0	16-Aug-24	16-Aug-24	13:38	14:40	1.03	0.94	1	0	0	1	1.06
REF-24-GN-12	574125	7852299	91.0	16-Aug-24	16-Aug-24	14:06	15:06	1.00	0.91	0	5	0	5	5.49
REF-24-GN-13	574517	7852327	91.0	16-Aug-24	16-Aug-24	15:38	16:35	0.95	0.86	3	3	0	6	6.94
REF-24-GN-14	574571	7853425	45.0	16-Aug-24	16-Aug-24	10:45	11:45	1.00	0.45	2	2	1	5	11.11
REF-24-GN-15	575330	7852865	45.0	16-Aug-24	16-Aug-24	11:02	12:26	1.40	0.63	0	0	0	0	0
REF-24-GN-16	574755	7853344	91.0	16-Aug-24	16-Aug-24	12:18	13:18	1.00	0.91	0	0	0	0	0
REF-24-GN-17	574950	7853990	91.0	16-Aug-24	16-Aug-24	12:45	13:40	0.92	0.83	0	0	0	0	0
REF-24-GN-18	574909	7853509	91.0	16-Aug-24	16-Aug-24	13:33	14:20	0.78	0.71	1	0	0	1	1.40
REF-24-GN-19	575622	7852443	91.0	16-Aug-24	16-Aug-24	14:05	15:58	1.88	1.71	2	5	0	7	4.08
REF-24-GN-20	574539	7853124	91.0	16-Aug-24	16-Aug-24	14:39	15:35	0.93	0.85	1	1	0	2	2.35
REF-24-GN-21	574965	7852894	91.0	19-Aug-24	19-Aug-24	10:00	11:00	1.00	0.91	0	4	0	4	4.40
REF-24-GN-22	574260	7852334	91.0	19-Aug-24	19-Aug-24	10:45	12:00	1.25	1.14	0	3	0	3	2.64
REF-24-GN-23	575461	7852778	91.0	19-Aug-24	19-Aug-24	11:12	12:20	1.13	1.03	0	0	0	0	0
REF-24-GN-24	575558	7853047	91.0	19-Aug-24	19-Aug-24	12:25	13:50	1.42	1.29	0	1	0	1	0.78
REF-24-GN-25	575587	7853112	91.0	19-Aug-24	19-Aug-24	12:30	13:30	1.00	0.91	0	1	0	1	1.10
REF-24-GN-26	574421	7852270	91.0	19-Aug-24	19-Aug-24	14:15	15:35	1.33	1.21	0	2	0	2	1.65
REF-24-GN-27	574443	7852417	91.0	19-Aug-24	19-Aug-24	14:47	16:00	1.22	1.11	0	0	0	0	0
Total									25.5	33	50	1	84	3.30

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 2024

Waterbody	Effort (m*hrs/100 m)	Arctic Charr Catch Per Mesh Size			Total Catch	CPUE	Mortalities
		1½"	2"	3"			
Reference Lake 3	25.5	33	50	1	84	3.30	4
Camp Lake	3.6	42	42	28	112	31.0	2
Sheardown Lake Northwest	50.8	28	71	10	109	2.15	10
Sheardown Lake Southeast	12.5	31	44	27	102	8.17	5
Mary Lake	15.9	43	50	33	126	7.91	6
Total	108.3	177	257	99	533	4.92	27

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 (REF-03) by Backpack Electrofishing, Mary River Project CREMP, August 2024

Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
REF3-24-ACJ-01	9.5	10.2	8.167	-	0.953
REF3-24-ACJ-02	5.0	5.2	0.902	2	0.722
REF3-24-ACJ-03	5.6	5.8	1.252	-	0.713
REF3-24-ACJ-04	9.2	9.8	7.566	3	0.972
REF3-24-ACJ-05	4.8	5.1	0.882	-	0.798
REF3-24-ACJ-06	5.8	6.0	1.289	-	0.661
REF3-24-ACJ-07	5.7	6.0	1.523	-	0.822
REF3-24ACJ-08	10.7	11.2	8.907	-	0.727
REF3-24-ACJ-09	8.4	9.0	5.889	-	0.994
REF3-24-ACJ-10	7.1	7.5	3.393	2	0.948
REF3-24-ACJ-11	4.7	4.9	0.699	0	0.673
REF3-24-ACJ-12	10.8	11.6	12.753	-	1.012
REF3-24-ACJ-13	5.3	5.5	1.057	-	0.710
REF3-24-ACJ-14	7.0	7.5	7.586	-	2.212
REF3-24-ACJ-15	13.4	14.6	16.572	-	0.689
REF3-24-ACJ-16	6.1	6.4	1.818	2	0.801
REF3-24-ACJ-17	7.0	7.9	2.993	2	0.873
REF3-24-ACJ-18	7.5	8.0	3.974	-	0.942
REF3-24-ACJ-19	9.3	9.8	6.233	4	0.775
REF3-24-ACJ-20	5.0	5.2	0.847	-	0.678
REF3-24-ACJ-21	4.9	5.1	1.209	-	1.028
REF3-24-ACJ-22	5.0	5.3	0.979	-	0.783
REF3-24-ACJ-23	4.6	4.8	0.608	-	0.625
REF3-24-ACJ-24	5.4	5.7	1.126	-	0.715
REF3-24-ACJ-25	7.9	8.4	3.121	2	0.633
REF3-24-ACJ-26	5.5	5.8	1.231	-	0.740
REF3-24-ACJ-27	5.7	6.0	1.651	-	0.892
REF3-24-ACJ-28	5.4	5.6	1.077	-	0.684
REF3-24-ACJ-29	6.0	6.4	2.031	-	0.940
REF3-24-ACJ-30	6.2	6.5	1.804	-	0.757
REF3-24-ACJ-31	4.6	4.8	0.761	-	0.782
REF3-24-ACJ-32	5.2	5.5	1.092	-	0.777
REF3-24-ACJ-33	6.5	6.8	2.155	-	0.785
REF3-24-ACJ-34	7.0	7.4	2.691	-	0.785
REF3-24-ACJ-35	6.2	6.4	1.487	-	0.624
REF3-24-ACJ-36	3.1	3.2	0.185	-	0.621
REF3-24-ACJ-37	5.2	5.5	1.750	-	1.245
REF3-24-ACJ-38	5.2	5.4	1.018	-	0.724
REF3-24-ACJ-39	5.0	5.2	0.892	-	0.714
REF3-24-ACJ-40	5.3	5.5	1.189	-	0.799
REF3-24-ACJ-41	5.1	5.3	0.913	-	0.688
REF3-24-ACJ-42	5.1	5.4	0.992	-	0.748
REF3-24-ACJ-43	6.0	6.3	1.655	-	0.766
REF3-24-ACJ-44	5.1	5.4	0.927	-	0.699
REF3-24-ACJ-45	5.3	5.6	1.143	-	0.768
REF3-24-ACJ-46	5.2	5.5	1.132	-	0.805
REF3-24-ACJ-47	3.0	3.1	0.182	na	0.674
REF3-24-ACJ-48	2.9	3.0	0.145	-	0.595
REF3-24-ACJ-49	5.3	5.6	1.028	-	0.691
REF3-24-ACJ-50	6.6	7.0	2.516	-	0.875
REF3-24-ACJ-51	2.5	2.6	0.127	-	0.813
REF3-24-ACJ-52	5.2	5.4	1.017	-	0.723
REF3-24-ACJ-53	5.0	5.2	0.888	-	0.710
REF3-24-ACJ-54	3.2	3.3	0.882	-	2.692
REF3-24-ACJ-55	5.4	5.6	1.170	-	0.743
REF3-24-ACJ-56	4.9	5.1	0.830	-	0.705
REF3-24-ACJ-57	5.0	5.2	0.945	-	0.756
REF3-24-ACJ-58	5.2	5.5	1.162	-	0.826
REF3-24-ACJ-59	4.8	5.1	0.856	-	0.774
REF3-24-ACJ-60	5.3	5.5	1.167	-	0.784
REF3-24-ACJ-61	5.1	5.3	0.918	-	0.692
REF3-24-ACJ-62	3.3	3.4	0.277	-	0.771
REF3-24-ACJ-63	5.2	5.5	1.192	-	0.848
REF3-24-ACJ-64	5.5	5.8	1.408	-	0.846

Notes: "-" indicates measurement not taken or fish not submitted for ageing. "na" indicates otoliths were not found, and ageing data is unavailable

Table G.4: Arctic Charr Measurements from Fish Captured at Reference Lake 3 (REF-03) by Backpack Electrofishing, Mary River Project CREMP, August 2024

Specimen ID		Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
REF3-24-ACJ-65		5.2	5.5	1.087	-	0.773
REF3-24-ACJ-66		5.4	5.6	1.323	-	0.840
REF3-24-ACJ-67		7.0	7.5	2.567	2	0.748
REF3-24-ACJ-68		5.5	5.8	1.212	-	0.728
REF3-24-ACJ-69		4.9	5.1	0.862	-	0.733
REF3-24-ACJ-70		4.9	5.1	1.031	-	0.876
REF3-24-ACJ-71		4.9	5.1	0.916	-	0.779
REF3-24-ACJ-72		5.1	5.4	1.038	-	0.783
REF3-24-ACJ-73		5.8	6.0	1.428	-	0.732
REF3-24-ACJ-74		4.8	5.0	0.838	0	0.758
REF3-24-ACJ-75		5.4	5.6	1.053	-	0.669
REF3-24-ACJ-76		5.3	5.6	1.064	-	0.715
REF3-24-ACJ-77		5.2	5.5	1.214	-	0.863
REF3-24-ACJ-78		7.1	7.5	2.385	-	0.666
REF3-24-ACJ-79		5.0	5.2	0.918	-	0.734
REF3-24-ACJ-80		5.3	5.5	1.213	-	0.815
REF3-24-ACJ-81		4.8	5.0	0.869	-	0.786
REF3-24-ACJ-82		5.0	5.2	0.912	-	0.730
REF3-23-ACJ-83		5.2	5.4	1.032	-	0.734
REF3-24-ACJ-84		4.3	4.4	0.521	-	0.655
REF3-24-ACJ-85		4.6	4.8	0.813	-	0.835
REF3-24-ACJ-86		5.6	5.9	1.008	-	0.574
REF3-24-ACJ-87		4.6	4.8	0.661	-	0.679
REF3-24-ACJ-88		5.0	5.2	1.055	-	0.844
REF3-24-ACJ-89		6.5	6.7	1.774	-	0.646
REF3-24-ACJ-90		5.3	5.5	1.081	-	0.726
REF3-24-ACJ-91		3.0	3.1	0.173	-	0.641
REF3-24-ACJ-92		5.2	5.5	1.230	-	0.875
REF3-24-ACJ-93		5.2	5.5	0.893	-	0.635
REF3-24-ACJ-94		5.0	5.2	0.826	-	0.661
REF3-24-ACJ-95		4.7	4.9	0.870	-	0.838
REF3-24-ACJ-96		5.3	5.6	1.167	-	0.784
REF3-24-ACJ-97		3.1	5.3	0.852	-	2.860
REF3-24-ACJ-98		4.5	4.7	0.606	-	0.665
REF3-24-ACJ-99		3.0	3.1	0.191	-	0.707
REF3-24-ACJ-100		3.1	3.2	0.206	-	0.691
REF3-24-ACJ-101		3.0	3.1	0.203	-	0.752
REF3-24-ACJ-102		3.0	3.1	0.207	-	0.767
Overall Catch Summary	Sample Size (N)	102	102	102	10	102
	Mean	5.5	5.778	1.795	1.9	0.820
	Median	5.2	5.500	1.061	2.0	0.756
	Standard Deviation	1.7	1.828	2.469	1.197219	0.330
	Standard Error	0.17	0.18	0.244	0.379	0.033
	Minimum	2.5	2.6	0.127	0	0.574
	Maximum	13.4	14.6	16.572	4	2.860
Young-of-the-Year Catch Summary	Proportion of YOY	12%				
	Sample Size (N)	12	12	12	-	12
	Mean	3.0	3.3	0.303	-	1.049
	Median	3.0	3.1	0.197	-	0.730
	Standard Deviation	0.2	0.7	0.266	-	0.810
	Standard Error	0.1	0.2	0.077	-	0.234
	Minimum	2.5	2.6	0.127	-	0.595
	Maximum	3.3	5.3	0.882	-	2.860

Notes: "-" indicates measurement not taken or fish not submitted for ageing. "na" indicates otoliths were not found, and ageing data is unavailable

Table G.5: Arctic Charr Measurements from Fish Captured at Camp Lake (JL0) by Backpack Electrofishing, Mary River Project CREMP, August 2024

Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
JL0-24-ACJ-01	9.2	9.8	6.471	-	0.831
JL0-24-ACJ-02	10.0	10.7	7.252	-	0.725
JL0-24-ACJ-03	9.9	10.6	7.906	-	0.815
JL0-24-ACJ-04	9.3	10.6	6.336	2	0.788
JL0-24-ACJ-05	8.5	9.1	5.755	-	0.937
JL0-24-ACJ-06	9.6	10.3	7.740	-	0.875
JL0-24-ACJ-07	8.9	9.4	5.858	-	0.831
JL0-24-ACJ-08	5.9	6.3	1.538	1	0.749
JL0-24-ACJ-09	9.0	9.5	6.493	-	0.891
JL0-24-ACJ-10	6.4	6.9	2.402	-	0.916
JL0-24-ACJ-11	7.4	7.8	3.890	2	0.960
JL0-24-ACJ-12	9.5	10.2	7.813	-	0.911
JL0-24-ACJ-13	9.0	9.7	6.288	-	0.863
JL0-24-ACJ-14	10.1	10.7	8.177	-	0.794
JL0-24-ACJ-15	8.5	9.9	6.104	-	0.994
JL0-24-ACJ-16	9.5	10.2	7.608	-	0.887
JL0-24-ACJ-17	8.4	9.0	5.430	-	0.916
JL0-24-ACJ-18	10.0	10.9	8.263	2	0.826
JL0-24-ACJ-19	6.8	7.1	2.755	-	0.876
JL0-24-ACJ-20	9.5	10.3	6.838	-	0.798
JL0-24-ACJ-21	15.7	17.0	3.200	-	0.083
JL0-24-ACJ-22	8.8	9.9	5.481	-	0.804
JL0-24-ACJ-23	8.9	9.4	6.371	-	0.904
JL0-24-ACJ-24	8.4	9.0	4.627	-	0.781
JL0-24-ACJ-25	9.1	9.7	6.401	-	0.849
JL0-24-ACJ-26	6.0	6.4	2.188	-	1.013
JL0-24-ACJ-27	5.8	6.2	1.909	1	0.978
JL0-24-ACJ-28	10.0	10.6	8.113	-	0.811
JL0-24-ACJ-29	6.0	6.4	2.414	1	1.118
JL0-24-ACJ-30	12.4	13.5	17.624	3	0.924
JL0-24-ACJ-31	8.3	8.8	4.744	-	0.830
JL0-24-ACJ-32	8.8	9.3	5.344	-	0.784
JL0-24-ACJ-33	5.9	6.2	1.528	-	0.744
JL0-24-ACJ-34	6.0	6.3	1.745	-	0.808
JL0-24-ACJ-35	8.3	8.8	4.018	-	0.703
JL0-24-ACJ-36	6.4	6.6	1.961	-	0.748
JL0-24-ACJ-37	9.6	10.1	6.878	-	0.777
JL0-24-ACJ-38	7.4	7.8	3.911	-	0.965
JL0-24-ACJ-39	6.9	7.3	2.661	-	0.810
JL0-24-ACJ-40	17.8	19.4	48.000	-	0.851
JL0-24-ACJ-41	9.3	9.8	6.722	-	0.836
JL0-24-ACJ-42	10.9	11.6	9.483	2	0.732
JL0-24-ACJ-43	8.3	8.7	4.431	2	0.775
JL0-24-ACJ-44	6.1	6.4	1.905	-	0.839
JL0-24-ACJ-45	9.6	10.5	7.743	2	0.875
JL0-24-ACJ-46	10.9	11.4	9.403	-	0.726
JL0-24-ACJ-47	8.5	9.1	4.392	-	0.715
JL0-24-ACJ-48	8.4	8.9	4.944	-	0.834
JL0-24-ACJ-49	10.4	11.3	8.851	-	0.787
JL0-24-ACJ-50	9.2	9.6	5.287	-	0.679
JL0-24-ACJ-51	8.5	8.9	4.210	-	0.686
JL0-24-ACJ-52	12.2	13.2	13.845	-	0.762
JL0-24-ACJ-53	7.4	7.9	2.995	-	0.739
JL0-24-ACJ-54	9.9	10.9	6.852	-	0.706
JL0-24-ACJ-55	9.8	10.3	8.256	-	0.877
JL0-24-ACJ-56	8.9	9.4	5.777	-	0.819
JL0-24-ACJ-57	6.1	6.4	1.844	-	0.812
JL0-24-ACJ-58	9.2	9.8	5.712	-	0.734
JL0-24-ACJ-59	7.8	8.3	5.374	-	1.132
JL0-24-ACJ-60	8.4	8.8	4.504	-	0.760
JL0-24-ACJ-61	5.6	6.0	1.495	-	0.851
JL0-24-ACJ-62	9.4	9.9	5.793	-	0.697
JL0-24-ACJ-63	9.5	9.9	5.755	-	0.671
JL0-24-ACJ-64	8.9	9.6	5.544	-	0.786

Notes: "-" indicates measurement not taken or fish not submitted for ageing.


Table G.5: Arctic Charr Measurements from Fish Captured at Camp Lake (JL0) by Backpack Electrofishing, Mary River Project CREMP, August 2024


Specimen ID		Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
JL0-24-ACJ-65		10.1	10.5	7.620	-	0.740
JL0-24-ACJ-66		8.8	9.4	4.963	-	0.728
JL0-24-ACJ-67		8.8	9.3	5.289	-	0.78
JL0-24-ACJ-68		9.6	9.9	5.656	-	0.639
JL0-24-ACJ-69		7.3	7.8	3.466	-	0.891
JL0-24-ACJ-70		5.1	5.3	1.018	-	0.767
JL0-24-ACJ-71		9.4	10.0	6.187	-	0.745
JL0-24-ACJ-72		7.2	7.5	2.799	-	0.750
JL0-24-ACJ-73		8.4	8.9	4.336	-	0.732
JL0-24-ACJ-74		8.3	8.8	4.073	-	0.712
JL0-24-ACJ-75		12.8	13.7	17.034	-	0.812
JL0-24-ACJ-76		8.5	9.0	4.820	-	0.785
JL0-24-ACJ-77		11.0	11.8	9.225	-	0.693
JL0-24-ACJ-78		8.4	9.0	5.013	-	0.846
JL0-24-ACJ-79		7.9	8.4	3.966	-	0.804
JL0-24-ACJ-80		9.0	9.6	5.433	-	0.745
JL0-24-ACJ-81		8.7	9.3	5.137	-	0.780
JL0-24-ACJ-82		10.7	11.4	9.177	-	0.749
JL0-24-ACJ-83		6.4	6.8	2.469	-	0.942
JL0-24-ACJ-84		8.9	9.4	5.358	-	0.760
JL0-24-ACJ-85		5.2	5.4	1.028	-	0.731
JL0-24-ACJ-86		6.2	6.4	2.308	-	0.968
JL0-24-ACJ-87		7.3	7.7	3.722	-	0.957
JL0-24-ACJ-88		12.7	13.4	14.992	-	0.732
JL0-24-ACJ-89		8.9	9.4	5.078	-	0.720
JL0-24-ACJ-90		7.6	8.0	3.046	-	0.694
JL0-24-ACJ-91		7.9	8.3	3.718	-	0.754
JL0-24-ACJ-92		10.8	11.5	10.118	-	0.803
JL0-24-ACJ-93		6.8	7.1	2.501	-	0.795
JL0-24-ACJ-94		8.9	9.5	5.723	-	0.812
JL0-24-ACJ-95		8.1	8.6	3.385	-	0.637
JL0-24-ACJ-96		6.6	6.9	2.352	-	0.818
JL0-24-ACJ-97		9.1	9.7	5.993	-	0.795
JL0-24-ACJ-98		7.8	8.2	3.379	-	0.712
JL0-24-ACJ-99		7.7	8.2	3.734	-	0.818
JL0-24-ACJ-100		4.5	4.8	0.826	-	0.906
Overall Catch Summary	Sample Size (N)	100	100	100	10	100
	Average	8.7	9.2	5.861	1.8	0.804
	Median	8.8	9.4	5.317	2.0	0.796
	Standard Deviation	2.0	2.2	5.249	0.632	0.118
	Standard Error	0.20	0.22	0.525	0.2	0.012
	Minimum	4.5	4.8	0.826	1	0.083
	Maximum	17.8	19.4	48.000	3	1.132

Notes: "-" indicates measurement not taken or fish not submitted for ageing.

Table G.6: Results of Nearshore Arctic Charr Non-Young-of-the-Year (Non-YOY) Health Endpoint Statistical Comparisons between Camp Lake (JL0) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

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					
								Interaction P-value	Covariate P-value		Statistic	REF	JL0		
All Fish	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	102	100	K-S	-	-	-	-	-	-	<0.001	-
Non-YOY	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	90	100	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	90	100	M-W	-	-	-	Median	5.30	8.80	<0.001	66
		Body Weight	Body Weight (g)	-	90	100	M-W	-	-	-	Median	1.13	5.32	<0.001	371
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	90	100	ANCOVA	<0.001 ^f	<0.001	6.99	Adjusted Mean	2.57	2.76	0.104	7.2
			log[Body Weight (g)]	log[Fork Length (cm)]	88 ^d	99 ^e	ANCOVA	<0.001 ^g	<0.001	6.97	Adjusted Mean	2.58	2.73	0.017	5.7

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

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

Notes: YOY indicates Young-of-Year. "-" indicates no available data. K-S = Kolmogorov-Smirnov. M-W = Mann-Whitney.

^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 log₁₀-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 Removed outliers: REF3-24-ACJ-14 (Studentized residual:5.251) and REF3-24-ACJ-37 (Studentized residual:4.471)

^e Removed outlier: JL0-24-ACJ-21 (Studentized residual:-15.124)

^f Analysis of covariance (ANCOVA) proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9481 and R2 of parallel slope model = 0.9458; a difference < 0.02) following Environment Canada (2012).

^g Analysis of variance (ANCOVA) proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9891 and R2 of parallel slope model = 0.9882; 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 2024 and the Baseline Period at Individual Mine-Exposed Lakes, Mary River Project CREMP, 2024

Lake	Group	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics ^b			Test P-value	Magnitude of Difference (%) ^c
				Response	Covariate	Baseline	2024		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons ^a					
									Interaction P-value	Covariate P-value		Statistic	Baseline	2024		
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	8.80	<0.001	-25
			Body Weight	log[Body Weight (g)]	-	51	100	M-W	-	-	-	Median	14.6	5.32	<0.001	-64
		Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	51	100	ANCOVA	0.056	<0.001	9.29	Adjusted Mean	7.38	6.16	<0.001	-17
				log[Body Weight (g)]	log[Fork Length (cm)]	51	99 ^d	ANCOVA	0.724	<0.001	9.26	Adjusted Mean	7.13	6.31	<0.001	-12
Sheardown NW (DL0-01)	Non-YOY	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	244	100	K-S	-	-	-	-	-	-	<0.001	-
		Body Size	Fork Length	Fork Length (cm)	-	244	100	M-W	-	-	-	Median	8.30	9.85	0.033	19
			Body Weight	Body Weight (g)	-	244	100	M-W	-	-	-	Median	6.00	8.58	0.336	43
		Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	244	100	ANCOVA	0.930	<0.001	9.46	Adjusted Mean	8.33	7.02	<0.001	-16
Sheardown SE (DL0-02)	Non-YOY	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	16	43	K-S	-	-	-	-	-	-	0.075	-
		Body Size	Fork Length	log[Fork Length (cm)]	-	16	43	M-W	-	-	-	Median	6.30	6.50	0.181	3.2
			Body Weight	Body Weight(g)	-	16	43	M-W	-	-	-	Median	2.50	2.56	0.688	2.5
		Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	16	43	ANCOVA	<0.001	<0.001	5.50 7.20	Predicted Mean	1.26 4.33	1.60 3.45	0.735	26 -20

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

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

Notes: YOY indicates Young-of-Year. "-" indicates no available data. K-S = Kolmogorov-Smirnov. M-W = Mann-Whitney. ANCOVA = analysis of covariance. ANOVA = analysis of variance.

^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 log₁₀-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: [(2024 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: [(2024 predicted mean - baseline predicted mean) / baseline predicted mean] x 100.

^d One outlier (JL0-24-ACJ-21 Studentized residual: -19.738) removed from analysis.

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 (JL0) Using 2024 Data Relative to Reference Lake 3 (REF-03) Data or Camp Lake Baseline Data (2006 to 2013) with $\alpha=\beta=0.1$, Mary River Project CREMP, 2024

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%
Nearshore Arctic Charr (Electrofishing) versus Ref. Lake 3, 2023 Data	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0953	31.1	Response	402	107	31	21	16	13	11	7	4
			Body Weight	Body Weight (g)	-	M-W	0.289	210	Response	3,678	965	266	178	129	108	79	55	20
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0940	-	log(Response)	339	91	26	18	14	12	9	7	4
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0501	-	log(Response)	98	27	9	7	6	5	5	4	3
Nearshore Arctic Charr (Electrofishing) 2023 versus Baseline	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.114	22.8	Response	415	105	27	18	13	11	9	6	4
			Body Weight	Body Weight (g)	-	M-W	0.324	54.1	Response	2,321	582	146	94	66	54	39	25	7
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0890	-	log(Response)	305	81	24	17	13	11	9	7	4
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0461	-	log(Response)	83	23	8	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	0.0564	15.2	Response	143	39	12	9	7	6	5	4	3
			Body Weight	Body Weight (g)	-	M-W	0.155	78.8	Response	1,057	278	77	53	39	32	24	17	7
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0807	-	log(Response)	251	67	20	14	11	9	8	6	4
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0409	-	log(Response)	66	19	7	5	5	4	4	4	3
Littoral/Profundal Arctic Charr (Gill Netting) 2023 versus Baseline	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0901	21.6	Response	360	94	25	17	12	10	7	6	4
			Body Weight	Body Weight (g)	-	M-W	0.269	96.6	Response	3,197	840	231	154	113	94	69	48	18
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0925	-	log(Response)	329	88	26	18	14	12	9	7	4
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0740	-	log(Response)	211	57	17	12	9	8	7	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 log₁₀-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 (REF-03) by Gill Netting, Mary River Project CREMP, August 2024

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
REF3-24-AC-01	REF-24-GN-01	2	25.0	27.0	115	-	0.736
REF3-24-AC-02	REF-24-GN-02	1.5	24.8	27.0	125	-	0.820
REF3-24-AC-03	REF-24-GN-03	1.5	29.0	31.3	195	-	0.800
REF3-24-AC-04	REF-24-GN-03	1.5	31.0	33.7	245	-	0.822
REF3-24-AC-05	REF-24-GN-03	2	30.5	32.5	245	-	0.864
REF3-24-AC-06	REF-24-GN-03	2	29.9	31.5	200	-	0.748
REF3-24-AC-07	REF-24-GN-03	2	33.5	36.0	275	-	0.731
REF3-24-AC-08	REF-24-GN-03	2	31.2	34.0	250	-	0.823
REF3-24-AC-09	REF-24-GN-03	1.5	24.1	26.1	110	-	0.786
REF3-24-AC-10	REF-24-GN-04	1.5	23.4	25.5	105	-	0.819
REF3-24-AC-11	REF-24-GN-04	1.5	21.7	23.6	85	-	0.832
REF3-24-AC-12	REF-24-GN-04	1.5	23.9	26.0	107	-	0.784
REF3-24-AC-13	REF-24-GN-04	2	29.4	32.0	215	-	0.846
REF3-24-AC-14	REF-24-GN-05	2	25.8	27.6	145	-	0.844
REF3-24-AC-15	REF-24-GN-05	2	27.6	29.5	185	-	0.880
REF3-24-AC-16	REF-24-GN-05	2	28.1	30.0	170	-	0.766
REF3-24-AC-17	REF-24-GN-05	2	25.5	27.8	142	-	0.856
REF3-24-AC-18	REF-24-GN-05	2	31.0	33.6	210	-	0.705
REF3-24-AC-19	REF-24-GN-05	1.5	25.7	27.9	150	-	0.884
REF3-24-AC-20	REF-24-GN-05	1.5	25.2	27.5	140	-	0.875
REF3-24-AC-21	REF-24-GN-05	1.5	27.2	29.6	172	-	0.855
REF3-24-AC-22	REF-24-GN-05	1.5	24.5	26.8	115	-	0.782
REF3-24-AC-23	REF-24-GN-05	1.5	26.2	28.3	120	-	0.667
REF3-24-AC-24	REF-24-GN-06	2	27.5	29.0	125	-	0.601
REF3-24-AC-25	REF-24-GN-07	1.5	32.9	35.8	235	-	0.660
REF3-24-AC-26	REF-24-GN-07	1.5	27.8	30.3	175	-	0.815
REF3-24-AC-27	REF-24-GN-07	1.5	33.0	35.8	305	-	0.849
REF3-24-AC-28	REF-24-GN-07	1.5	31.6	34.4	225	-	0.713
REF3-24-AC-29	REF-24-GN-07	2	28.6	31.2	200	-	0.855
REF3-24-AC-30	REF-24-GN-08	1.5	25.8	28.0	140	-	0.815
REF3-24-AC-31	REF-24-GN-08	2	31.0	33.6	210	-	0.705
REF3-24-AC-32	REF-24-GN-09	2	27.0	29.5	170	-	0.864
REF3-24-AC-33	REF-24-GN-09	2	31.2	34.3	245	-	0.807
REF3-24-AC-34	REF-24-GN-09	2	30.5	32.5	230	-	0.811
REF3-24-AC-35	REF-24-GN-09	1.5	22.7	24.9	98	-	0.838
REF3-24-AC-36	REF-24-GN-09	1.5	20.5	22.2	74	-	0.859
REF3-24-AC-37	REF-24-GN-09	1.5	22.5	24.6	89	-	0.781
REF3-24-AC-38	REF-24-GN-09	1.5	22.4	24.4	96	-	0.854
REF3-24-AC-39	REF-24-GN-09	1.5	29.6	32.3	200	-	0.771
REF3-24-AC-40	REF-24-GN-10	2	29.0	31.5	205	-	0.841
REF3-24-AC-41	REF-24-GN-10	2	32.0	34.5	260	-	0.793
REF3-24-AC-42	REF-24-GN-10	2	31.5	34.0	230	-	0.736
REF3-24-AC-43	REF-24-GN-10	2	30.1	32.9	222	-	0.814
REF3-24-AC-44	REF-24-GN-10	2	29.6	32.5	190	-	0.733
REF3-24-AC-45	REF-24-GN-10	2	28.0	30.5	188	-	0.856
REF3-24-AC-46	REF-24-GN-10	1.5	24.5	26.5	106	-	0.721
REF3-24-AC-47	REF-24-GN-11	1.5	28.5	31.0	204	-	0.881
REF3-24-AC-48	REF-24-GN-12	2	26.3	28.5	134	-	0.737
REF3-24-AC-49	REF-24-GN-12	2	30.1	32.5	208	-	0.763
REF3-24-AC-50	REF-24-GN-12	2	26.6	28.8	162	-	0.861
REF3-24-AC-51	REF-24-GN-12	2	28.0	30.3	188	-	0.856
REF3-24-AC-52	REF-24-GN-12	2	27.5	29.9	168	-	0.808
REF3-24-AC-53	REF-24-GN-13	1.5	29.5	32.2	224	-	0.873
REF3-24-AC-54	REF-24-GN-13	1.5	22.0	24.1	239	-	2.245
REF3-24-AC-55	REF-24-GN-13	1.5	24.1	26.1	106	-	0.757
REF3-24-AC-56	REF-24-GN-13	2	32.2	35.1	290	-	0.869
REF3-24-AC-57	REF-24-GN-13	2	27.0	29.2	148	-	0.752
REF3-24-AC-58	REF-24-GN-13	2	29.4	31.9	200	-	0.787
REF3-24-AC-59	REF-24-GN-21	2	27.4	29.5	158	-	0.768
REF3-24-AC-60	REF-24-GN-21	2	29.2	31.6	172	-	0.691
REF3-24-AC-61	REF-24-GN-21	2	29.0	31.8	218	-	0.894
REF3-24-AC-62	REF-24-GN-21	2	32.0	34.8	268	-	0.818
REF3-24-AC-63	REF-24-GN-22	2	32.7	35.0	260	-	0.744
REF3-24-AC-64	REF-24-GN-22	2	31.0	33.6	234	-	0.785
REF3-24-AC-65	REF-24-GN-22	2	27.5	29.7	170	-	0.817
REF3-24-AC-66	REF-24-GN-24	2	27.0	29.2	154	-	0.782
REF3-24-AC-67	REF-24-GN-25	2	30.1	33.0	210	-	0.770
REF3-24-AC-68	REF-24-GN-26	2	32.5	35.4	270	-	0.787
REF3-24-AC-69	REF-24-GN-26	2	31.8	34.7	260	-	0.809
REF3-24-AC-70	REF-24-GN-14	3	45.5	48.2	760	-	0.807
REF3-24-AC-71	REF-24-GN-14	2	30.8	33.5	255	-	0.873
REF3-24-AC-72	REF-24-GN-14	2	28.1	31.0	190	-	0.856
REF3-24-AC-73	REF-24-GN-14	1.5	26.2	28.9	150	-	0.834
REF3-24-AC-74	REF-24-GN-14	1.5	26.3	28.8	155	-	0.852
REF3-24-AC-75	REF-24-GN-18	1.5	26.0	28.4	140	-	0.797
REF3-24-AC-76	REF-24-GN-19	2	34.0	36.5	330	-	0.840
REF3-24-AC-77	REF-24-GN-19	2	27.2	29.4	170	-	0.845
REF3-24-AC-78	REF-24-GN-19	2	30.0	32.4	220	-	0.815
REF3-24-AC-79	REF-24-GN-19	2	28.5	31.2	200	-	0.864
REF3-24-AC-80	REF-24-GN-19	2	28.3	31.1	200	-	0.882
REF3-24-AC-81	REF-24-GN-19	1.5	23.0	25.3	110	-	0.904
REF3-24-AC-82	REF-24-GN-19	1.5	27.7	30.2	180	-	0.847
REF3-24-AC-83	REF-24-GN-20	2	31.0	34.0	260	-	0.873
REF3-24-AC-84	REF-24-GN-20	1.5	45.5	48.1	745	-	0.791
Overall Catch Summary	Sample Size (N)		84	84	84	-	84
	Average		28.5	30.9	199	-	0.823
	Median		28.2	31.0	190	-	0.815
	Standard Deviation		4.1	4.3	103	-	0.168
	Standard Error		0.4	0.5	11	-	0.018
	Minimum		20.5	22.2	74	-	0.601
	Maximum		45.5	48.2	760	-	2.245

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

Table G.10: Gill Netting Catch Records for Camp Lake (JL0), Mary River Project CREMP, August 2024

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"		
JL0-24-GN-01	557647	7914457	91.0	10-Aug-24	10-Aug-24	16:00	16:33	0.55	0.501	5	13	13	31	61.9
JL0-24-GN-02	557314	7914836	91.0	12-Aug-24	12-Aug-24	9:45	10:30	0.75	0.68	10	12	7	29	42.5
JL0-24-GN-03	557297	7914926	91.0	12-Aug-24	12-Aug-24	11:57	12:42	0.75	0.68	10	5	6	21	30.8
JL0-24-GN-04	557647	7914457	91.0	12-Aug-24	12-Aug-24	13:40	14:20	0.67	0.61	11	3	0	14	23.1
JL0-24-GN-05	557445	7914008	91.0	12-Aug-24	12-Aug-24	14:58	15:13	0.25	0.23	0	3	0	3	13.2
JL0-24-GN-06	557647	7914457	91.0	12-Aug-24	12-Aug-24	15:35	16:05	0.50	0.46	4	5	2	11	24.2
JL0-24-GN-07	557647	7914457	91.0	12-Aug-24	12-Aug-24	16:15	16:45	0.50	0.45	2	1	0	3	6.6
Total									3.61	42	42	28	112	31.0

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 2024

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities / Comments	Fulton's Condition Factor (K)
JL0-24-AC-01	JL0-24-GN-01	1	41.5	44.0	540	-	0.756
JL0-24-AC-02	JL0-24-GN-01	1	37.1	41.7	525	-	1.028
JL0-24-AC-03	JL0-24-GN-01	1	20.5	22.4	505	-	5.862
JL0-24-AC-04	JL0-24-GN-01	1	38.1	41.9	500	-	0.904
JL0-24-AC-05	JL0-24-GN-01	1	39.3	44.2	400	-	0.659
JL0-24-AC-06	JL0-24-GN-01	2	41.0	45.3	500	-	0.725
JL0-24-AC-07	JL0-24-GN-01	2	35.5	36.6	400	-	0.894
JL0-24-AC-08	JL0-24-GN-01	2	35.3	39.5	400	-	0.909
JL0-24-AC-09	JL0-24-GN-01	2	33.2	36.2	355	-	0.970
JL0-24-AC-10	JL0-24-GN-01	2	39.1	44.2	490	-	0.820
JL0-24-AC-11	JL0-24-GN-01	2	36.8	39.9	460	-	0.923
JL0-24-AC-12	JL0-24-GN-01	2	34.5	37.5	400	-	0.974
JL0-24-AC-13	JL0-24-GN-01	2	30.1	32.6	235	-	0.862
JL0-24-AC-14	JL0-24-GN-01	2	36.0	39.0	465	-	0.997
JL0-24-AC-15	JL0-24-GN-01	2	33.5	36.5	365	-	0.971
JL0-24-AC-16	JL0-24-GN-01	2	38.4	42.2	530	-	0.936
JL0-24-AC-17	JL0-24-GN-01	3	32.3	35.5	350	-	1.039
JL0-24-AC-18	JL0-24-GN-01	3	39.3	42.5	520	-	0.857
JL0-24-AC-19	JL0-24-GN-01	3	40.8	44.4	585	-	0.861
JL0-24-AC-20	JL0-24-GN-01	3	41.7	45.4	540	-	0.745
JL0-24-AC-21	JL0-24-GN-01	3	36.2	39.5	440	-	0.928
JL0-24-AC-22	JL0-24-GN-01	3	40.4	43.5	610	-	0.925
JL0-24-AC-23	JL0-24-GN-01	3	39.4	42.9	590	-	0.965
JL0-24-AC-24	JL0-24-GN-01	3	35.8	39.1	445	-	0.970
JL0-24-AC-25	JL0-24-GN-01	3	38.0	41.1	460	-	0.838
JL0-24-AC-26	JL0-24-GN-01	3	39.4	42.9	620	-	1.014
JL0-24-AC-27	JL0-24-GN-01	3	34.4	37.7	435	-	1.069
JL0-24-AC-28	JL0-24-GN-01	3	37.8	41.7	550	-	1.018
JL0-24-AC-29	JL0-24-GN-01	3	40.6	45.3	565	-	0.844
JL0-24-AC-30	JL0-24-GN-02	3	41.1	46.0	500	-	0.720
JL0-24-AC-31	JL0-24-GN-02	3	37.9	40.9	550	-	1.010
JL0-24-AC-32	JL0-24-GN-02	3	41.1	44.0	545	-	0.785
JL0-24-AC-33	JL0-24-GN-02	3	37.5	41.2	510	-	0.967
JL0-24-AC-34	JL0-24-GN-02	3	34.5	37.9	410	-	0.998
JL0-24-AC-35	JL0-24-GN-02	3	38.4	42.0	450	red spots on body	0.795
JL0-24-AC-36	JL0-24-GN-02	3	37.9	41.8	460	-	0.845
JL0-24-AC-37	JL0-24-GN-02	3	41.5	45.1	560	-	0.784
JL0-24-AC-38	JL0-24-GN-02	2	31.6	34.4	310	-	0.982
JL0-24-AC-39	JL0-24-GN-02	2	38.8	42.0	530	-	0.907
JL0-24-AC-40	JL0-24-GN-02	2	25.2	27.6	150	-	0.937
JL0-24-AC-41	JL0-24-GN-02	2	31.3	33.9	260	-	0.848
JL0-24-AC-42	JL0-24-GN-02	2	38.1	42.0	500	-	0.904
JL0-24-AC-43	JL0-24-GN-02	2	32.2	34.9	330	-	0.988
JL0-24-AC-44	JL0-24-GN-02	2	33.1	35.1	310	-	0.855
JL0-24-AC-45	JL0-24-GN-02	2	41.5	44.9	540	-	0.756
JL0-24-AC-46	JL0-24-GN-02	2	39.0	42.2	500	-	0.843
JL0-24-AC-47	JL0-24-GN-02	2	39.2	39.4	225	-	0.374
JL0-24-AC-48	JL0-24-GN-02	2	36.0	38.6	450	-	0.965
JL0-24-AC-49	JL0-24-GN-02	2	37.1	40.0	440	-	0.862
JL0-24-AC-50	JL0-24-GN-02	1	35.5	38.2	430	-	0.961
JL0-24-AC-51	JL0-24-GN-02	1	41.0	45.1	630	-	0.914
JL0-24-AC-52	JL0-24-GN-02	1	44.0	47.9	710	-	0.833
JL0-24-AC-53	JL0-24-GN-02	1	36.4	38.2	390	-	0.809
JL0-24-AC-54	JL0-24-GN-02	1	34.5	37.0	380	-	0.925
JL0-24-AC-55	JL0-24-GN-02	1	39.4	42.5	460	-	0.752
JL0-24-AC-56	JL0-24-GN-02	1	38.6	41.9	560	-	0.974
JL0-24-AC-57	JL0-24-GN-02	1	40.0	43.3	480	-	0.750
JL0-24-AC-58	JL0-24-GN-02	1	37.0	40.2	450	-	0.888
JL0-24-AC-59	JL0-24-GN-02	1	40.5	44.0	500	-	0.753
JL0-24-AC-60	JL0-24-GN-03	3	35.5	38.6	445	-	0.995
JL0-24-AC-61	JL0-24-GN-03	3	38.9	42.0	530	-	0.900
JL0-24-AC-62	JL0-24-GN-03	3	40.0	43.2	500	-	0.781
JL0-24-AC-63	JL0-24-GN-03	3	33.8	36.5	360	-	0.932
JL0-24-AC-64	JL0-24-GN-03	3	32.5	39.5	565	-	1.646
JL0-24-AC-65	JL0-24-GN-03	3	36.7	48.5	415	-	0.840
JL0-24-AC-66	JL0-24-GN-03	2	34.1	36.9	395	-	0.996
JL0-24-AC-67	JL0-24-GN-03	2	36.0	38.4	405	-	0.868
JL0-24-AC-68	JL0-24-GN-03	2	41.3	43.5	520	-	0.738
JL0-24-AC-69	JL0-24-GN-03	2	37.2	40.4	440	-	0.855

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 2024

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities / Comments	Fulton's Condition Factor (K)
JL0-24-AC-70	JL0-24-GN-03	2	34.0	37.1	315	-	0.801
JL0-24-AC-71	JL0-24-GN-03	2	37.2	39.5	480	-	0.932
JL0-24-AC-72	JL0-24-GN-03	1	42.4	45.3	610	-	0.800
JL0-24-AC-73	JL0-24-GN-03	1	39.8	43.0	500	-	0.793
JL0-24-AC-74	JL0-24-GN-03	1	33.3	35.2	405	-	1.097
JL0-24-AC-75	JL0-24-GN-03	1	37.5	40.5	495	-	0.939
JL0-24-AC-76	JL0-24-GN-03	1	38.0	41.2	550	-	1.002
JL0-24-AC-77	JL0-24-GN-03	1	39.5	43.1	595	-	0.965
JL0-24-AC-78	JL0-24-GN-03	1	40.1	44.0	540	-	0.837
JL0-24-AC-79	JL0-24-GN-03	1	42.2	46.1	650	-	0.865
JL0-24-AC-80	JL0-24-GN-03	1	36.5	39.5	445	-	0.915
JL0-24-AC-81	JL0-24-GN-03	1	34.1	36.5	400	-	1.009
JL0-24-AC-82	JL0-24-GN-04	2	39.3	42.5	550	-	0.906
JL0-24-AC-83	JL0-24-GN-04	2	39.2	42.4	515	-	0.855
JL0-24-AC-84	JL0-24-GN-04	2	39.8	43.0	600	-	0.952
JL0-24-AC-85	JL0-24-GN-04	1	36.6	39.5	480	-	0.979
JL0-24-AC-86	JL0-24-GN-04	1	42.0	45.3	400	-	0.540
JL0-24-AC-87	JL0-24-GN-04	1	49.9	53.3	1,600	-	1.288
JL0-24-AC-88	JL0-24-GN-04	1	32.3	35.1	350	-	1.039
JL0-24-AC-89	JL0-24-GN-04	1	35.2	37.8	418	-	0.958
JL0-24-AC-90	JL0-24-GN-04	1	39.1	42.6	565	-	0.945
JL0-24-AC-91	JL0-24-GN-04	1	32.2	34.5	345	-	1.033
JL0-24-AC-92	JL0-24-GN-04	1	36.7	39.7	495	-	1.001
JL0-24-AC-93	JL0-24-GN-04	1	37.5	40.5	460	-	0.872
JL0-24-AC-94	JL0-24-GN-04	1	32.1	34.6	345	-	1.043
JL0-24-AC-95	JL0-24-GN-04	1	58.8	63.3	1,640	-	0.807
JL0-24-AC-96	JL0-24-GN-05	2	31.5	34.3	340	-	1.088
JL0-24-AC-97	JL0-24-GN-05	2	34.1	37.5	380	-	0.958
JL0-24-AC-98	JL0-24-GN-05	2	39.9	42.8	585	-	0.921
JL0-24-AC-99	JL0-24-GN-06	3	38.0	42.5	380	-	0.693
JL0-24-AC-100	JL0-24-GN-06	3	35.5	38.4	445	-	0.995
JL0-24-AC-101	JL0-24-GN-06	2	43.0	46.6	610	-	0.767
JL0-24-AC-102	JL0-24-GN-06	2	27.7	29.8	145	-	0.682
JL0-24-AC-103	JL0-24-GN-06	2	34.4	37.0	415	-	1.019
JL0-24-AC-104	JL0-24-GN-06	2	31.9	34.5	390	-	1.201
JL0-24-AC-105	JL0-24-GN-06	2	30.5	35.9	305	-	1.075
JL0-24-AC-106	JL0-24-GN-06	1	39.5	42.5	500	-	0.811
JL0-24-AC-107	JL0-24-GN-06	1	38.0	39.9	400	-	0.729
JL0-24-AC-108	JL0-24-GN-06	1	38.1	40.0	455	-	0.823
JL0-24-AC-109	JL0-24-GN-06	1	33.5	36.6	325	-	0.864
JL0-24-AC-110	JL0-24-GN-07	2	28.6	30.9	190	-	0.812
Overall Catch Summary	Sample Size (N)		110	110	110	-	110
	Average		37.1	40.4	477	-	0.946
	Median		37.5	40.5	460	-	0.908
	Standard Deviation		4.5	4.9	188	-	0.494
	Standard Error		0.43	0.47	18	-	0.047
	Minimum		20.5	22.4	145	-	0.374
	Maximum		58.8	63.3	1,640	-	5.862

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

Table G.12: Results of Littoral/Profundal Arctic Charr Health Endpoint Statistical Comparisons between 2024 Camp Lake (JL0) and 2024 Reference Lake 3 (REF) Data, and for Camp Lake between 2024 and the Mine Baseline Period (2005 to 2013), Mary River Project CREMP, 2024

Comparison	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics ^b			Test P-value	Magnitude of Difference (%) ^c
			Response	Covariate	REF 2024 or JL0 Base	JL0 2024		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons ^a					
								Interaction P-value	Covariate P-value		Statistic	REF 2024 or JL0 Base	JL0 2024		
Camp Lake versus Reference Lake 3, 2024	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	84	110	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	84	110	M-W	-	-	-	Median	28.2	37.5	<0.001	33
		Body Weight	Body Weight (g)	-	84	110	M-W	-	-	-	Median	190	460	<0.001	142
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	84	110	ANCOVA	<0.001 ^g	<0.001	32.8	Adjusted Mean	260	345	<0.001	33
			log[Body Weight (g)]	log[Fork Length (cm)]	83 ^d	104 ^e	ANCOVA	<0.001 ^h	<0.001	32.9	Adjusted Mean	273	329	<0.001	20
Camp Lake 2024 versus Baseline	Survival	Length Frequency Distribution	Fork Length (cm)	-	131	110	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	131	110	M-W	-	-	-	Median	32.3	37.5	<0.001	16
		Body Weight	Body Weight (g)	-	131	110	M-W	-	-	-	Median	350	460	<0.001	31
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	131	110	ANCOVA	<0.001 ⁱ	<0.001	33.3	Adjusted Mean	352	342	0.310	-3.0
			log[Body Weight (g)]	log[Fork Length (cm)]	131	108 ^f	ANCOVA	0.008 ^j	<0.001	33.4	Adjusted Mean	357	336	0.015	-5.8

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

Absolute Magnitude of Difference ≥ 10% for Condition (CREMP 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 log₁₀-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 (REF3-24-AC-54 Studentized residual:5.926) was removed from the analysis.

^e Six outliers (JL0-24-AC-03 Studentized residual: 9.698; JL0-24-AC-47 Studentized residual: -4.869; JL0-24-AC-64 Studentized residual: 5.226; JL0-24-AC-86 Studentized residual: -4.193; JL0-24-AC-87 Studentized residual: 4.779; JL0-24-AC-102 Studentized residual:-4.631) were removed from the analysis.

^f Two outliers (JL0-24-AC-03 Studentized residual: 8.074; JL0-24-AC-47 Studentized residual: -4.298) were removed from the analysis.

^g ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9033 and R2 of parallel slope model = 0.8957; a difference < 0.02) following Environment Canada (2012).

^h ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9749 and R2 of parallel slope model = 0.9724; a difference < 0.02) following Environment Canada (2012).

ⁱ ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9112 and R2 of parallel slope model = 0.8978; a difference < 0.02) following Environment Canada (2012).

^j ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9370 and R2 of parallel slope model = 0.935; a difference < 0.02) following Environment Canada (2012).

Table G.13: Arctic Charr Measurements from Fish Captured at Sheardown Lake Northwest (NW; DL0-01) by Backpack Electrofishing, Mary River Project CREMP, August 2024

Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
DL01-24-ACJ-01	5.7	5.9	1.883	-	1.017
DL01-24-ACJ-02	5.7	6.1	1.518	-	0.820
DL01-24-ACJ-03	13.7	14.7	21.318	-	0.829
DL01-24-ACJ-04	13.6	14.7	19.348	-	0.769
DL01-24-ACJ-05	9.6	10.2	7.366	-	0.833
DL01-24-ACJ-06	7.7	8.2	3.678	-	0.806
DL01-24-ACJ-07	10.2	10.9	8.264	3	0.779
DL01-24-ACJ-08	6.2	6.4	1.948	-	0.817
DL01-24-ACJ-09	9.2	9.7	6.947	-	0.892
DL01-24-ACJ-10	5.4	5.6	1.268	1	0.805
DL01-24-ACJ-11	7.7	8.1	3.487	-	0.764
DL01-24-ACJ-12	12.9	14.1	16.868	-	0.786
DL01-24-ACJ-13	9.8	10.6	7.832	-	0.832
DL01-24-ACJ-14	12.7	13.7	16.310	-	0.796
DL01-24-ACJ-15	12.8	14.0	18.373	3	0.876
DL01-24-ACJ-16	11.3	12.2	12.966	-	0.899
DL01-24-ACJ-17	8.2	8.9	4.771	-	0.865
DL01-24-ACJ-18	5.9	6.3	1.864	1	0.908
DL01-24-ACJ-19	8.6	9.1	5.350	-	0.841
DL01-24-ACJ-20	12.4	13.4	15.448	-	0.810
DL01-24-ACJ-21	7.9	8.6	4.378	-	0.888
DL01-24-ACJ-22	12.0	13.0	13.720	-	0.794
DL01-24-ACJ-23	8.4	8.9	4.649	2	0.784
DL01-24-ACJ-24	10.9	11.8	10.614	-	0.820
DL01-24-ACJ-25	16.4	17.9	35.398	-	0.803
DL01-24-ACJ-26	12.7	13.8	15.815	-	0.772
DL01-24-ACJ-27	9.5	10.1	6.628	-	0.773
DL01-24-ACJ-28	12.8	13.9	20.620	-	0.983
DL01-24-ACJ-29	8.9	9.7	6.782	-	0.962
DL01-24-ACJ-30	5.7	6.0	1.465	-	0.791
DL01-24-ACJ-31	9.8	10.6	8.954	-	0.951
DL01-24-ACJ-32	12.0	12.9	14.222	-	0.823
DL01-24-ACJ-33	13.3	14.4	22.222	4	0.945
DL01-24-ACJ-34	12.1	13.1	14.349	-	0.810
DL01-24-ACJ-35	11.6	12.7	13.652	-	0.875
DL01-24-ACJ-36	7.7	8.1	3.384	2	0.741
DL01-24-ACJ-37	6.2	6.5	2.259	-	0.948
DL01-24-ACJ-38	7.9	8.4	3.929	-	0.797
DL01-24-ACJ-39	10.6	11.3	10.143	-	0.852
DL01-24-ACJ-40	5.8	6.1	1.526	-	0.782
DL01-24-ACJ-41	11.5	12.6	13.669	-	0.899
DL01-24-ACJ-42	9.1	9.6	5.754	-	0.764
DL01-24-ACJ-43	13.2	14.3	21.446	-	0.932
DL01-24-ACJ-44	14.6	16.0	26.497	-	0.851
DL01-24-ACJ-45	9.4	10.1	6.900	-	0.831
DL01-24-ACJ-46	12.2	13.1	13.256	-	0.730
DL01-24-ACJ-47	9.6	10.3	7.442	3	0.841
DL01-24-ACJ-48	11.8	12.7	13.383	-	0.815
DL01-24-ACJ-49	8.4	8.9	4.683	-	0.790
DL01-24-ACJ-50	8.1	8.7	4.926	-	0.927
DL01-24-ACJ-51	10.6	11.1	10.218	-	0.858
DL01-24-ACJ-52	13.4	14.6	18.532	-	0.770
DL01-24-ACJ-53	13.8	15.0	22.728	-	0.865
DL01-24-ACJ-54	16.0	17.3	31.768	-	0.776
DL01-24-ACJ-55	14.5	15.6	23.792	-	0.780
DL01-24-ACJ-56	17.2	18.6	39.336	-	0.773
DL01-24-ACJ-57	19.4	21.1	57.685	-	0.790
DL01-24-ACJ-58	21.0	22.1	85.100	-	0.919
DL01-24-ACJ-59	14.3	15.7	24.306	-	0.831
DL01-24-ACJ-60	10.9	11.4	8.947	-	0.691
DL01-24-ACJ-61	9.9	10.7	7.626	-	0.786
DL01-24-ACJ-62	9.2	9.7	5.740	-	0.737

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 Northwest (NW; DL0-01) by Backpack Electrofishing, Mary River Project CREMP, August 2024

Specimen ID		Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
DL01-24-ACJ-63		8.5	9.0	4.649	2	0.757
DL01-24-ACJ-64		8.2	8.8	4.336	-	0.786
DL01-24-ACJ-65		11.0	11.9	10.886	-	0.818
DL01-24-ACJ-66		13.0	14.1	16.911	-	0.770
DL01-24-ACJ-67		13.2	14.5	14.431	-	0.627
DL01-24-ACJ-68		8.9	9.3	6.071	-	0.861
DL01-24-ACJ-69		13.0	13.7	16.015	-	0.729
DL01-24-ACJ-70		9.1	9.4	5.896	-	0.782
DL01-24-ACJ-71		13.8	14.9	24.028	-	0.914
DL01-24-ACJ-72		7.5	8.0	3.803	-	0.901
DL01-24-ACJ-73		9.6	10.5	8.893	-	1.005
DL01-24-ACJ-74		5.4	5.6	1.327	-	0.843
DL01-24-ACJ-75		12.6	13.6	16.560	-	0.828
DL01-24-ACJ-76		5.8	6.1	1.545	-	0.792
DL01-24-ACJ-77		16.3	17.5	37.603	-	0.868
DL01-24-ACJ-78		8.0	8.5	4.589	-	0.896
DL01-24-ACJ-79		9.0	9.7	5.433	-	0.745
DL01-24-ACJ-80		19.4	20.4	57.211	-	0.784
DL01-24-ACJ-81		6.3	6.5	2.351	-	0.940
DL01-24-ACJ-82		13.7	14.2	18.143	-	0.706
DL01-24-ACJ-83		7.0	7.3	2.644	-	0.771
DL01-24-ACJ-84		14.3	15.0	22.150	-	0.757
DL01-24-ACJ-85		12.8	13.6	16.541	-	0.789
DL01-24-ACJ-86		9.5	10.0	6.446	-	0.752
DL01-24-ACJ-87		11.7	12.3	13.266	-	0.828
DL01-24-ACJ-88		10.5	11.3	8.957	-	0.774
DL01-24-ACJ-89		7.8	8.1	3.903	-	0.822
DL01-24-ACJ-90		9.4	10.0	7.239	-	0.872
DL01-24-ACJ-91		6.5	6.8	2.560	-	0.932
DL01-24-ACJ-92		11.9	12.7	15.004	-	0.890
DL01-24-ACJ-93		9.3	10.1	7.051	-	0.877
DL01-24-ACJ-94		11.3	12.1	12.561	-	0.871
DL01-24-ACJ-95		7.6	8.1	3.835	2	0.874
DL01-24-ACJ-96		5.5	5.7	1.555	-	0.935
DL01-24-ACJ-97		8.6	9.2	5.621	-	0.884
DL01-24-ACJ-98		7.2	7.8	3.188	-	0.854
DL01-24-ACJ-99		8.8	9.4	6.239	-	0.916
DL01-24-ACJ-100		13.0	14.1	16.844	-	0.767
Overall Catch Summary	Sample Size (N)	100	100	100	10	100
	Average	10.5	11	12.615	2.3	0.831
	Median	9.9	10.7	8.579	2	0.821
	Standard Deviation	3.3	3.6	12.896	0.9	0.071
	Standard Error	0.33	0.36	1.290	0.30	0.007
	Minimum	5.4	5.6	1.268	1	0.627
	Maximum	21.0	22.1	85.100	4	1.017

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 (Non-YOY) Health Endpoint Statistical Comparisons between Sheardown Lake Northwest (NW; DL0-01) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

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					
								Interaction P-value	Covariate P-value		Statistic	REF	DL0-01		
All Fish	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	102	100	K-S	-	-	-	-	-	-	<0.001	-
Non-YOY	Survival	Length Frequency Distribution	Fork Length (cm)	-	90	100	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	90	100	M-W	-	-	-	Median	5.30	9.85	<0.001	86
		Body Weight	Body Weight (g)	-	90	100	M-W	-	-	-	Median	1.13	8.58	<0.001	660
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	90	100	ANCOVA	<0.001 ^e	<0.001	7.66	Adjusted Mean	3.50	3.70	0.049	5.7
			log[Body Weight (g)]	log[Fork Length (cm)]	88 ^d	100	ANCOVA	<0.001 ^f	<0.001	7.68	Adjusted Mean	3.45	3.75	<0.001	8.4

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

Absolute Magnitude of Difference ≥ 10% for Condition (CREMP 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 log₁₀-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 Two outliers removed (REF3-24-ACJ-14 Studentized Residual: 9.618; REF3-24-ACJ-37 Studentized Residual:5.021).

^e ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9889 and R2 of parallel slope model = 0.9882; a difference < 0.02) following Environment Canada (2012).

^f ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9935 and R2 of parallel slope model = 0.993; a difference < 0.02) following Environment Canada (2012).

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 Northwest (NW; DL0-01) Using 2024 Data Relative to Reference Lake 3 (REF-03) Data or Sheardown Lake Northwest Baseline Data (2006 to 2013) with $\alpha=\beta=0.1$, Mary River Project CREMP, 2024

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%
Nearshore Arctic Charr (Electrofishing) versus Ref. Lake 3, 2024 Data	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.117	44.9	Response	610	161	46	31	22	19	14	11	5
			Body Weight	Body Weight (g)	-	M-W	0.359	477	Response	5,681	1,490	409	274	198	165	121	84	31
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0576	-	log(Response)	129	35	11	8	7	6	5	4	3
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0445	-	log(Response)	78	22	8	6	5	5	4	4	3
Nearshore Arctic Charr (Electrofishing) 2024 versus Baseline	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.168	41.1	Response	1,254	330	86	56	39	32	22	16	5
			Body Weight	Body Weight (g)	-	M-W	0.501	119	Response	11,070	2,798	701	450	313	254	176	114	29
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0664	-	log(Response)	170	46	14	10	8	7	6	5	4
Littoral/Profundal Arctic Charr (Gill Netting) versus Ref. Lake 3, 2024 Data	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0683	17.6	Response	208	56	17	12	9	7	6	5	3
			Body Weight	Body Weight (g)	-	M-W	0.197	85.6	Response	1,710	450	124	84	61	51	38	27	11
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0569	-	log(Response)	126	35	11	8	7	6	5	4	3
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0479	-	log(Response)	90	25	9	7	5	5	4	4	3
Littoral/Profundal Arctic Charr (Gill Netting) 2024 versus Baseline	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0915	19.9	Response	318	80	21	14	11	9	7	5	3
			Body Weight	Body Weight (g)	-	M-W	0.269	58.8	Response	2,739	686	173	112	78	63	44	29	9
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0608	-	log(Response)	143	39	12	9	7	6	5	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 log₁₀-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.16: Gill Netting Catch Records for Sheardown Lake Northwest (NW; DL0-01), Mary River Project CREMP, August 2024

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"		
DL01-24-GN-01	559676	7913315	91.0	12-Aug-24	12-Aug-24	11:55	12:38	0.72	0.65	1	1	0	2	3.07
DL01-24-GN-02	559670	7913531	91.0	12-Aug-24	12-Aug-24	12:53	13:55	1.03	0.94	2	2	0	4	4.25
DL01-24-GN-03	559871	7913680	91.0	12-Aug-24	12-Aug-24	13:27	14:30	1.05	0.96	2	3	0	5	5.23
DL01-24-GN-04	559670	7913531	91.0	12-Aug-24	12-Aug-24	14:08	14:57	0.82	0.743	0	0	0	0	0
DL01-24-GN-05	559858	7913597	91.0	12-Aug-24	12-Aug-24	14:50	15:40	0.83	0.76	1	1	0	2	2.64
DL01-24-GN-06	559823	7913708	91.0	12-Aug-24	12-Aug-24	15:30	16:35	1.08	0.99	1	0	0	1	1.01
DL01-24-GN-07	559842	7913245	91.0	12-Aug-24	12-Aug-24	16:04	17:10	1.10	1.00	1	1	1	3	3.00
DL01-24-GN-08	560088	7913488	91.0	12-Aug-24	12-Aug-24	16:45	17:15	0.50	0.46	1	1	0	2	4.40
DL01-24-GN-09	560551	7912774	91.0	13-Aug-24	13-Aug-24	11:30	12:25	0.92	0.83	1	2	0	3	3.60
DL01-24-GN-10	560437	7912682	91.0	13-Aug-24	13-Aug-24	12:03	13:15	1.20	1.09	1	2	1	4	3.66
DL01-24-GN-11	560589	7912691	91.0	13-Aug-24	13-Aug-24	12:37	13:20	0.72	0.65	0	3	0	3	4.60
DL01-24-GN-12	560366	7912605	91.0	13-Aug-24	13-Aug-24	13:30	14:38	1.13	1.03	1	3	1	5	4.85
DL01-24-GN-13	560517	7912867	91.0	13-Aug-24	13-Aug-24	14:01	15:00	0.98	0.89	0	3	0	3	3.35
DL01-24-GN-14	560366	7912605	91.0	13-Aug-24	13-Aug-24	14:53	15:50	0.95	0.86	1	1	0	2	2.31
DL01-24-GN-15	560517	7912867	91.0	13-Aug-24	13-Aug-24	15:13	16:22	1.15	1.05	3	6	0	9	8.60
DL01-24-GN-16	560482	7912522	91.0	13-Aug-24	13-Aug-24	16:04	17:04	1.00	0.91	2	1	0	3	3.30
DL01-24-GN-17	560339	7913441	91.0	13-Aug-24	13-Aug-24	16:33	17:15	0.70	0.64	0	0	0	0	0
DL01-24-GN-18	560600	7913200	91.0	14-Aug-24	14-Aug-24	9:37	10:35	0.97	0.88	0	2	0	2	2.27
DL01-24-GN-19	560523	7913010	91.0	14-Aug-24	14-Aug-24	10:08	10:58	0.83	0.76	1	1	0	2	2.64
DL01-24-GN-20	560517	7912867	91.0	14-Aug-24	14-Aug-24	10:50	11:43	0.88	0.80	0	2	0	2	2.49
DL01-24-GN-22	559720	7913364	91.0	20-Aug-24	20-Aug-24	9:25	10:25	1.00	0.91	0	0	0	0	0
DL01-24-GN-23	560000	7913102	91.0	20-Aug-24	20-Aug-24	9:35	10:48	1.22	1.11	2	0	1	3	2.71
DL01-24-GN-24	560437	7913236	91.0	20-Aug-24	20-Aug-24	10:45	11:30	0.75	0.68	0	1	1	2	2.93
DL01-24-GN-25	559889	7913632	91.0	20-Aug-24	20-Aug-24	11:18	12:14	0.93	0.85	1	1	0	2	2.35
DL01-24-GN-26	560092	7913481	91.0	20-Aug-24	20-Aug-24	12:08	13:14	1.10	1.00	1	0	1	2	2.00
DL01-24-GN-27	-	-	91.0	20-Aug-24	20-Aug-24	12:31	13:40	1.15	1.05	0	1	0	1	0.96
DL01-24-GN-28	560845	7913059	91.0	20-Aug-24	20-Aug-24	13:35	14:38	1.05	0.96	0	0	0	0	0
DL01-24-GN-29	560542	7913250	91.0	20-Aug-24	20-Aug-24	13:51	14:52	1.02	0.93	0	2	1	3	3.24
DL01-24-GN-30	560575	7912803	91.0	20-Aug-24	20-Aug-24	14:47	16:05	1.30	1.18	0	1	0	1	0.85
DL01-24-GN-31	560575	7912803	91.0	20-Aug-24	20-Aug-24	15:09	16:18	1.15	1.05	0	4	0	4	3.82
DL01-24-GN-32	560326	7913434	91.0	21-Aug-24	21-Aug-24	9:00	10:35	1.58	1.44	0	2	1	3	2.08
DL01-24-GN-33	560248	7913397	91.0	21-Aug-24	21-Aug-24	9:05	10:15	1.17	1.06	1	0	0	1	0.94
DL01-24-GN-34	560081	7912857	91.0	21-Aug-24	21-Aug-24	10:33	12:00	1.45	1.32	0	8	0	8	6.06
DL01-24-GN-35	560411	7912565	91.0	21-Aug-24	21-Aug-24	12:42	14:05	1.38	1.26	0	1	0	1	0.79
DL01-24-GN-36	560081	7912857	91.0	21-Aug-24	21-Aug-24	12:30	13:50	1.33	1.21	0	1	0	1	0.82
DL01-24-GN-37	560471	7912529	91.0	21-Aug-24	21-Aug-24	12:42	14:05	1.38	1.26	1	1	1	3	2.38
DL01-24-GN-A	560346	7912879	91.0	20-Aug-24	20-Aug-24	9:25	10:54	1.48	1.35	0	1	0	1	0.74
DL01-24-GN-B	560453	7912812	91.0	20-Aug-24	20-Aug-24	10:40	11:45	1.08	0.99	0	1	0	1	1.01
DL01-24-GN-C	560354	7912719	91.0	20-Aug-24	20-Aug-24	11:02	12:15	1.22	1.11	0	0	0	0	0
DL01-24-GN-D	560141	7912936	91.0	20-Aug-24	20-Aug-24	12:08	13:20	1.20	1.09	2	1	0	3	2.75
DL01-24-GN-E	560537	7912611	91.0	20-Aug-24	20-Aug-24	12:25	13:40	1.25	1.14	1	0	0	1	0.88
DL01-24-GN-F	559823	7913658	91.0	20-Aug-24	20-Aug-24	13:44	14:35	0.85	0.77	0	0	0	0	0
DL01-24-GN-G	559933	7913601	91.0	20-Aug-24	20-Aug-24	13:50	14:55	1.08	0.99	0	0	0	0	0
DL01-24-GN-H	559846	7913282	91.0	20-Aug-24	20-Aug-24	14:53	16:00	1.12	1.02	0	4	1	5	4.92
DL01-24-GN-I	559685	7913466	91.0	20-Aug-24	20-Aug-24	15:09	16:10	1.02	0.93	0	0	0	0	0
DL01-24-GN-J	559992	7913443	91.0	21-Aug-24	21-Aug-24	9:04	10:19	1.25	1.14	0	0	0	0	0
DL01-24-GN-K	559874	7913228	91.0	21-Aug-24	21-Aug-24	9:11	10:46	1.58	1.44	0	1	0	1	0.69
DL01-24-GN-L	560447	7913184	91.0	21-Aug-24	21-Aug-24	10:37	12:03	1.43	1.30	0	0	0	0	0
DL01-24-GN-M	560386	7912805	91.0	21-Aug-24	21-Aug-24	11:12	12:22	1.17	1.06	0	2	0	2	1.88
DL01-24-GN-N	560679	7913024	91.0	21-Aug-24	21-Aug-24	12:17	13:41	1.40	1.27	0	1	0	1	0.78
DL01-24-GN-O	560531	7912814	91.0	21-Aug-24	21-Aug-24	12:39	13:49	1.17	1.06	0	2	0	2	1.88
Total									50.8	28	71	10	109	2.15

Note: Catch-per-unit-effort (CPUE) represents the number of fish captured per 100 m·hours of net. "-" indicates no data.

Table G.17: Arctic Charr Measurements from Fish Captured at Sheardown Lake Northwest (NW; DL0-01) by Gill Netting, Mary River Project CREMP, August 2024

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
DL01-24-AC-01	DL01-24-GN-01	2	32.2	34.2	327	-	0.979
DL01-24-AC-02	DL01-24-GN-01	1.5	23.7	26.2	105	-	0.789
DL01-24-AC-03	DL01-24-GN-02	1.5	33.3	36.0	365	-	0.988
DL01-24-AC-04	DL01-24-GN-02	1.5	34.0	36.8	330	-	0.840
DL01-24-AC-05	DL01-24-GN-02	2	33.1	36.0	355	-	0.979
DL01-24-AC-06	DL01-24-GN-02	2	40.2	44.2	550	small lesion	0.847
DL01-24-AC-07	DL01-24-GN-03	2	37.4	40.7	410	-	0.784
DL01-24-AC-08	DL01-24-GN-03	2	33.5	36.5	377	-	1.003
DL01-24-AC-09	DL01-24-GN-03	2	32.2	35.0	315	-	0.944
DL01-24-AC-10	DL01-24-GN-03	1.5	19.2	21.0	77	-	1.088
DL01-24-AC-11	DL01-24-GN-03	1.5	17.9	19.2	70	-	1.221
DL01-24-AC-12	DL01-24-GN-05	1.5	39.5	42.3	460	-	0.746
DL01-24-AC-13	DL01-24-GN-05	2	35.9	38.9	375	-	0.810
DL01-24-AC-14	DL01-24-GN-07	1.5	36.8	42.0	405	-	0.813
DL01-24-AC-15	DL01-24-GN-07	2	37.4	46.0	415	-	0.793
DL01-24-AC-16	DL01-24-GN-07	3	35.3	38.3	415	lesion left side	0.943
DL01-24-AC-17	DL01-24-GN-08	1.5	36.3	37.8	370	-	0.774
DL01-24-AC-18	DL01-24-GN-08	2	34.6	36.9	363	-	0.876
DL01-24-AC-19	DL01-24-GN-09	1.5	33.5	36.0	367	-	0.976
DL01-24-AC-20	DL01-24-GN-09	2	33.1	35.7	280	-	0.772
DL01-24-AC-21	DL01-24-GN-09	2	29.2	31.8	235	-	0.944
DL01-24-AC-22	DL01-24-GN-10	3	34.2	37.2	345	-	0.862
DL01-24-AC-23	DL01-24-GN-10	2	37.5	40.6	410	-	0.777
DL01-24-AC-24	DL01-24-GN-10	2	29.1	32.3	250	-	1.015
DL01-24-AC-25	DL01-24-GN-10	1.5	37.2	40.3	354	-	0.688
DL01-24-AC-26	DL01-24-GN-11	2	35.3	38.1	405	-	0.921
DL01-24-AC-27	DL01-24-GN-11	2	34.9	36.6	340	-	0.800
DL01-24-AC-28	DL01-24-GN-11	2	30.9	33.3	290	-	0.983
DL01-24-AC-29	DL01-24-GN-12	1.5	28.3	30.9	210	-	1.279
DL01-24-AC-30	DL01-24-GN-12	2	34.1	36.9	350	-	0.530
DL01-24-AC-31	DL01-24-GN-12	2	33.4	36.2	335	-	0.939
DL01-24-AC-32	DL01-24-GN-12	2	29.4	32.1	245	-	1.318
DL01-24-AC-33	DL01-24-GN-12	3	35.0	38.1	400	-	0.571
DL01-24-AC-34	DL01-24-GN-13	2	35.9	37.9	385	-	0.865
DL01-24-AC-35	DL01-24-GN-13	2	30.3	32.5	285	-	1.384
DL01-24-AC-36	DL01-24-GN-13	2	29.0	30.6	210	-	1.169
DL01-24-AC-37	DL01-24-GN-14	2	31.8	34.1	280	-	0.653
DL01-24-AC-38	DL01-24-GN-14	1.5	27.3	29.0	185	-	1.376
DL01-24-AC-39	DL01-24-GN-15	2	27.9	30.2	200	-	0.852
DL01-24-AC-40	DL01-24-GN-15	2	25.4	27.5	150	-	1.220
DL01-24-AC-41	DL01-24-GN-15	2	26.2	28.4	170	-	0.834
DL01-24-AC-42	DL01-24-GN-15	2	31.0	33.3	270	-	0.571
DL01-24-AC-43	DL01-24-GN-15	2	30.4	32.7	255	-	0.908

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

Table G.17: Arctic Charr Measurements from Fish Captured at Sheardown Lake Northwest (NW; DL0-01) by Gill Netting, Mary River Project CREMP, August 2024

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
DL01-24-AC-44	DL01-24-GN-15	2	25.3	27.4	145	-	0.895
DL01-24-AC-45	DL01-24-GN-15	1.5	37.4	39.4	385	-	0.736
DL01-24-AC-46	DL01-24-GN-15	1.5	26.6	28.9	165	-	0.877
DL01-24-AC-47	DL01-24-GN-15	1.5	26.0	28.0	150	-	0.853
DL01-24-AC-48	DL01-24-GN-16	1.5	31.0	33.9	280	-	0.940
DL01-24-AC-49	DL01-24-GN-16	1.5	34.1	36.8	345	-	0.870
DL01-24-AC-50	DL01-24-GN-16	2	30.1	32.5	250	-	0.917
DL01-24-AC-51	DL01-24-GN-18	2	38.5	41.6	450	-	0.789
DL01-24-AC-52	DL01-24-GN-18	2	28.1	31.0	200	-	0.901
DL01-24-AC-53	DL01-24-GN-19	1.5	23.7	25.6	110	-	0.826
DL01-24-AC-54	DL01-24-GN-19	2	36.4	40.0	440	-	0.912
DL01-24-AC-55	DL01-24-GN-20	2	34.0	36.7	275	-	0.700
DL01-24-AC-56	DL01-24-GN-20	2	32.8	33.7	250	-	0.708
DL01-24-AC-57	DL01-24-GN-23	1	32.4	37.5	395	-	1.161
DL01-24-AC-58	DL01-24-GN-23	1	32.0	34.7	340	-	1.038
DL01-24-AC-59	DL01-24-GN-23	3	37.0	40.5	585	-	1.155
DL01-24-AC-60	DL01-24-GN-24	2	33.0	36.1	355	-	0.988
DL01-24-AC-61	DL01-24-GN-24	3	36.0	39.1	475	-	1.018
DL01-24-AC-62	DL01-24-GN-25	1	22.1	24.0	130	-	1.204
DL01-24-AC-63	DL01-24-GN-25	2	36.8	40.1	505	-	1.013
DL01-24-AC-64	DL01-24-GN-26	3	39.0	42.5	545	-	0.919
DL01-24-AC-65	DL01-24-GN-26	1	57.1	62.0	1,600	-	0.859
DL01-24-AC-66	DL01-24-GN-27	2	31.7	34.6	330	-	1.036
DL01-24-AC-67	DL01-24-GN-29	2	35.1	37.5	370	-	0.856
DL01-24-AC-68	DL01-24-GN-29	2	33.8	36.9	395	-	1.023
DL01-24-AC-69	DL01-24-GN-29	3	42.6	45.8	650	-	0.841
DL01-24-AC-70	DL01-24-GN-30	2	31.2	34.8	340	-	1.119
DL01-24-AC-71	DL01-24-GN-31	2	33.2	35.7	345	-	0.943
DL01-24-AC-72	DL01-24-GN-31	2	32.7	36.0	355	Recapture	1.015
DL01-24-AC-73	DL01-24-GN-31	2	33.9	36.8	495	-	1.271
DL01-24-AC-74	DL01-24-GN-31	2	26.5	28.6	185	-	0.994
DL01-24-AC-75	DL01-24-GN-33	1.5	32.3	34.7	320	-	0.950
DL01-24-AC-76	DL01-24-GN-32	3	40.9	44.6	610	-	0.892
DL01-24-AC-77	DL01-24-GN-34	2	27.4	29.5	205	-	0.997
DL01-24-AC-78	DL01-24-GN-34	2	29.6	32.0	360	-	1.388
DL01-24-AC-79	DL01-24-GN-34	2	32.5	35.4	315	-	0.918
DL01-24-AC-80	DL01-24-GN-34	2	34.4	37.1	400	-	0.983
DL01-24-AC-81	DL01-24-GN-34	2	27.3	29.2	205	-	1.008
DL01-24-AC-82	DL01-24-GN-34	2	31.2	34.1	345	-	1.136
DL01-24-AC-83	DL01-24-GN-34	2	27.0	29.2	205	-	1.042
DL01-24-AC-84	DL01-24-GN-34	2	38.9	42.4	495	-	0.841
DL01-24-AC-85	DL01-24-GN-35	2	52.4	56.1	1,400	-	0.973
DL01-24-AC-86	DL01-24-GN-36	2	31.2	34.1	275	-	0.905

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


Table G.17: Arctic Charr Measurements from Fish Captured at Sheardown Lake Northwest (NW; DL0-01) by Gill Netting, Mary River Project CREMP, August 2024


Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
DL01-24-AC-87	DL01-24-GN-37	1	23.3	25.5	155	-	1.225
DL01-24-AC-88	DL01-24-GN-37	2	34.3	36.6	395	-	0.979
DL01-24-AC-89	DL01-24-GN-37	3	42.9	45.0	840	-	1.064
DL01-24-AC-90	DL01-24-GN-A	2	32.8	33.7	305	-	0.864
DL01-24-AC-91	DL01-24-GN-B	2	32.7	35.4	315	-	0.901
DL01-24-AC-92	DL01-24-GN-D	2	34.0	37.1	345	-	0.878
DL01-24-AC-93	DL01-24-GN-D	1.5	34.1	37.2	415	-	1.047
DL01-24-AC-94	DL01-24-GN-D	1.5	37.1	40.4	405	-	0.793
DL01-24-AC-95	DL01-24-GN-E	1.5	38.0	41.0	520	-	0.948
DL01-24-AC-96	DL01-24-GN-H	2	35.3	38.3	380	-	0.864
DL01-24-AC-97	DL01-24-GN-H	2	28.5	30.9	300	-	1.296
DL01-24-AC-98	DL01-24-GN-H	2	27.5	29.1	170	lower caudal cut off	0.817
DL01-24-AC-99	DL01-24-GN-H	2	26.0	28.2	140	-	0.797
DL01-24-AC-100	DL01-24-GN-H	3	35.9	38.9	440	-	0.951
DL01-24-AC-101	DL01-24-GN-K	2	36.2	39.3	340	-	0.717
DL01-24-AC-102	DL01-24-GN-M	2	33.7	36.5	310	-	0.810
DL01-24-AC-103	DL01-24-GN-M	2	33.4	36.5	320	-	0.859
DL01-24-AC-104	DL01-24-GN-N	2	41.1	44.0	805	-	1.159
Overall Catch Summary	Sample Size (N)	104	104	104	104	-	104
	Mean	32.9	35.7	357	357	-	0.940
	Median	33.3	36.1	343	343	-	0.918
	Standard Deviation	5.65	6.2	210	210	-	0.173
	Standard Error	0.554	0.60	21	21	-	0.017
	Minimum	17.9	19.2	70	70	-	0.530
	Maximum	57.1	62.0	1,600	1,600	-	1.388

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

Table G.18: Results of Littoral/Profundal Arctic Charr Health Endpoint Statistical Comparisons between 2024 Sheardown Lake Northwest (NW; DL0-01) and 2024 Reference Lake 3 (REF-03) Data, and for Sheardown Lake Northwest between 2024 and the Mine Baseline Period (2006 to 2013), Mary River Project CREMP, 2024

Comparison	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics ^b			Test P-value	Magnitude of Difference (%) ^c
			Response	Covariate	REF 2024 or DL0-01 Base	DL0-01 2024		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons ^a					
											Interaction P-value	Covariate P-value	Statistic		
Sheardown Lake NW versus Reference Lake 3, 2024	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	84	104	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	84	104	M-W	-	-	-	Median	28.2	33.2	<0.001	18
		Body Weight	Body Weight (g)	-	84	104	M-W	-	-	-	Median	190	342	<0.001	80
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	84	104	ANCOVA	0.941	<0.001	30.5	Adjusted Mean	226	266	<0.001	18
			log[Body Weight (g)]	log[Fork Length (cm)]	83 ^d	104	ANCOVA	0.162	<0.001	30.5	Adjusted Mean	226	266	<0.001	18
Sheardown Lake NW 2024 versus Baseline	Survival	Length Frequency Distribution	Fork Length (cm)	-	98	104	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	98	104	M-W	-	-	-	Median	35.8	33.2	<0.001	-7.0
		Body Weight	Body Weight (g)	-	98	104	M-W	-	-	-	Median	400	342	<0.001	-14
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	98	104	ANCOVA	0.094	<0.001	33.9	Adjusted Mean	341	359	0.012	5.3

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

 Absolute Magnitude of Difference ≥ 10% for Condition (CREMP 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 log₁₀-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 removed (REF3-24-AC-54 Studentized Residual: 8.895).

Table G.19: Arctic Charr Measurements from Fish Captured at Sheardown Lake Southeast (SE; DL0-02) by Backpack Electrofishing, Mary River Project CREMP, August 2024

Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
DL02-24-ACJ-01	6.9	7.2	3.224	-	0.981
DL02-24-ACJ-02	9.9	10.6	7.852	-	0.809
DL02-24-ACJ-03	3.5	3.7	0.372	-	0.868
DL02-24-ACJ-04	3.5	3.6	0.305	-	0.711
DL02-24-ACJ-05	6.7	7.2	2.933	-	0.975
DL02-24-ACJ-06	6.5	6.9	2.849	1	1.037
DL02-24-ACJ-07	4.8	5.0	0.704	1	0.637
DL02-24-ACJ-08	6.3	6.6	2.117	-	0.847
DL02-24-ACJ-09	6.5	7.0	3.017	-	1.099
DL02-24-ACJ-10	6.5	6.8	2.245	-	0.817
DL02-24-ACJ-11	6.5	6.8	2.236	1	0.814
DL02-24-ACJ-12	6.0	6.2	1.752	-	0.811
DL02-24-ACJ-13	6.2	6.4	2.197	-	0.922
DL02-24-ACJ-14	6.6	6.9	2.810	-	0.977
DL02-24-ACJ-15	6.5	6.8	2.760	-	1.005
DL02-24-ACJ-16	5.8	6.1	2.137	-	1.095
DL02-24-ACJ-17	6.5	6.7	2.318	-	0.844
DL02-24-ACJ-18	6.6	6.9	2.743	-	0.954
DL02-24-ACJ-19	2.8	2.9	0.221	1	1.007
DL02-24-ACJ-20	3.5	3.6	0.409	-	0.954
DL02-24-ACJ-21	3.6	3.7	0.322	-	0.690
DL02-24-ACJ-22	3.9	4.0	0.420	-	0.708
DL02-24-ACJ-23	5.4	5.7	1.279	-	0.812
DL02-24-ACJ-24	6.5	6.8	2.473	-	0.901
DL02-24-ACJ-25	4.7	4.9	0.653	-	0.629
DL02-24-ACJ-26	3.2	3.3	0.368	-	1.123
DL02-24-ACJ-27	4.2	4.4	0.547	-	0.738
DL02-24-ACJ-28	4.0	4.1	0.372	-	0.581
DL02-24-ACJ-29	3.8	3.9	0.348	-	0.634
DL02-24-ACJ-30	4.5	4.7	0.568	-	0.623
DL02-24-ACJ-31	4.2	4.3	0.703	-	0.949
DL02-24-ACJ-32	3.7	3.9	0.625	-	1.234
DL02-24-ACJ-33	6.6	7.2	2.762	-	0.961
DL02-24-ACJ-34	4.0	4.1	0.478	0	0.747
DL02-24-ACJ-35	3.8	3.9	0.326	0	0.594
DL02-24-ACJ-36	6.3	6.6	2.048	-	0.819
DL02-24-ACJ-37	6.5	6.8	2.379	-	0.866
DL02-24-ACJ-38	3.7	3.8	0.386	-	0.762
DL02-24-ACJ-39	3.7	3.9	0.338	-	0.667
DL02-24-ACJ-40	6.7	7.1	2.977	-	0.990
DL02-24-ACJ-41	6.5	6.7	2.255	-	0.821
DL02-24-ACJ-42	3.2	3.3	0.345	-	1.053
DL02-24-ACJ-43	3.7	3.8	0.440	-	0.869
DL02-24-ACJ-44	6.5	6.7	2.326	-	0.847
DL02-24-ACJ-45	3.7	3.8	0.402	-	0.794
DL02-24-ACJ-46	3.5	3.6	0.212	-	0.494
DL02-24-ACJ-47	6.3	6.6	2.154	-	0.861
DL02-24-ACJ-48	4.2	4.4	0.583	-	0.787
DL02-24-ACJ-49	4.1	4.2	0.308	-	0.447
DL02-24-ACJ-50	8.2	8.6	4.452	2	0.807
DL02-24-ACJ-51	3.8	3.9	0.238	-	0.434
DL02-24-ACJ-52	3.5	3.6	0.444	-	1.036
DL02-24-ACJ-53	3.5	3.7	-	-	0.000
DL02-24-ACJ-54	4.0	4.1	0.471	-	0.736
DL02-24-ACJ-55	3.9	4.0	0.482	-	0.813
DL02-24-ACJ-56	4.0	4.2	0.554	-	0.866
DL02-24-ACJ-57	3.7	3.9	0.358	-	0.707
DL02-24-ACJ-58	3.3	3.4	0.253	-	0.704
DL02-24-ACJ-59	4.1	4.2	0.499	-	0.724
DL02-24-ACJ-60	4.1	4.2	0.433	-	0.628
DL02-24-ACJ-61	3.6	3.7	0.339	-	0.727
DL02-24-ACJ-62	3.4	3.5	0.302	-	0.768
DL02-24-ACJ-63	3.2	3.3	0.312	-	0.952
DL02-24-ACJ-64	3.7	3.9	0.427	-	0.843

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 Southeast (SE; DL0-02) by Backpack Electrofishing, Mary River Project CREMP, August 2024

Specimen ID		Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
DL02-24-ACJ-65		4.0	4.2	0.328	-	0.513
DL02-24-ACJ-66		4.2	4.4	0.642	-	0.867
DL02-24-ACJ-67		3.9	4.2	0.504	-	0.850
DL02-24-ACJ-68		3.5	3.6	0.362	-	0.844
DL02-24-ACJ-69		3.5	3.7	0.334	-	0.779
DL02-24-ACJ-70		3.8	4.0	0.448	-	0.816
DL02-24-ACJ-71		3.8	4.0	0.405	-	0.738
DL02-24-ACJ-72		3.4	3.6	0.254	-	0.646
DL02-24-ACJ-73		3.5	3.7	0.319	-	0.744
DL02-24-ACJ-74		3.4	3.6	0.279	-	0.710
DL02-24-ACJ-75		3.3	3.5	0.338	-	0.941
DL02-24-ACJ-76		3.5	3.7	0.351	-	0.819
DL02-24-ACJ-77		3.6	3.8	0.365	-	0.782
DL02-24-ACJ-78		3.4	3.6	0.338	-	0.860
DL02-24-ACJ-79		3.0	3.1	0.518	-	1.919
DL02-24-ACJ-80		4.0	4.2	0.442	-	0.691
DL02-24-ACJ-81		3.4	3.6	0.381	-	0.969
DL02-24-ACJ-82		6.1	6.4	2.320	-	1.022
DL02-24-ACJ-83		6.8	7.1	2.779	-	0.884
DL02-24-ACJ-84		6.2	6.5	2.477	-	1.039
DL02-24-ACJ-85		6.6	7.0	2.974	-	1.034
DL02-24-ACJ-86		7.4	8.0	3.907	2	0.964
DL02-24-ACJ-87		6.4	6.7	2.563	1	0.978
DL02-24-ACJ-88		5.9	6.2	1.956	-	0.952
DL02-24-ACJ-89		5.7	6.0	1.765	1	0.953
DL02-24-ACJ-90		6.7	7.1	2.743	-	0.912
DL02-24-ACJ-91		6.1	6.3	2.217	-	0.977
DL02-24-ACJ-92		6.7	7.2	3.072	-	1.021
DL02-24-ACJ-93		3.5	3.7	0.394	-	0.919
DL02-24-ACJ-94		6.6	6.9	2.784	-	0.968
DL02-24-ACJ-95		3.4	3.6	0.358	-	0.911
DL02-24-ACJ-96		6.8	7.1	3.063	-	0.974
DL02-24-ACJ-97		7.0	7.3	4.322	-	1.260
DL02-24-ACJ-98		6.6	6.9	3.127	-	1.088
DL02-24-ACJ-99		5.9	6.1	2.231	-	1.086
DL02-24-ACJ-100		6.0	6.2	1.874	-	0.868
DL02-24-ACJ-101		6.6	6.9	2.599	-	0.904
Overall Catch Summary	Sample Size (N)	101	101	100	11	101
	Mean	4.9	5.1	1.403	1	0.853
	Median	4.1	4.2	0.561	1	0.850
	Standard Deviation	1.5	1.6	1.331	0.7	0.209
	Standard Error	0.15	0.16	0.133	0.21	0.021
	Minimum	2.8	2.9	0.212	0	0.000
	Maximum	9.9	10.6	7.852	2	1.919
Young-of-the-Year Catch Summary	Proportion of YOY	58%				
	Sample Size (N)	58	58	58	-	58
	Mean	3.7	3.9	0.407	-	0.785
	Median	3.7	3.8	0.372	-	0.765
	Standard Deviation	0.4	0.4	0.117	-	0.241
	Standard Error	0.1	0.1	0.015	-	0.032
	Minimum	2.8	2.9	0.212	-	0.000
	Maximum	4.8	5.0	0.704	-	1.919

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 (Non-YOY) Health Endpoint Statistical Comparisons between Sheardown Lake Southeast (SE; DL0-02) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

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					
								Interaction P-value	Covariate P-value		Statistic	REF	DL0-02		
All Fish	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	102	101	K-S	-	-	-	-	-	-	<0.001	-
YOY	Body Size	Fork Length	Fork Length (cm)	-	12	58	tunequal	-	-	-	Mean	3.02	3.71	<0.001	23
		Body Weight	Body Weight (g)	-	12	57	M-W	-	-	-	Median	0.197	0.372	<0.001	89
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	12	57	ANCOVA	0.017	<0.001	2.80	Predicted Mean	0.166	0.238	0.575	43
						3.30				0.384		0.319	-17		
			log[Body Weight (g)]	log[Fork Length (cm)]	10 ^d	57	ANCOVA	0.398	<0.001	3.58	Adjusted Mean	0.261	0.369	<0.001	42
Non-YOY	Survival	Length Frequency Distribution	Fork Length (cm)	-	90	43	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	90	43	M-W	-	-	-	Median	5.30	6.50	<0.001	23
		Body Weight	Body Weight (g)	-	90	43	M-W	-	-	-	Median	1.13	2.56	<0.001	127
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	90	43	ANCOVA	0.185	<0.001	5.93	Adjusted Mean	1.63	1.92	<0.001	18
			log[Body Weight (g)]	log[Fork Length (cm)]	88 ^e	43	ANCOVA	0.126	<0.001	5.92	Adjusted Mean	1.59	1.93	<0.001	21

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

Absolute Magnitude of Difference ≥ 10% for Condition (CREMP 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 log₁₀-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 Two outliers (REF3-24-ACJ-54 Studentized Residual: 7.793; REF3-24-ACJ-97 Studentized Residual:4.653) removed from analysis.

^e Two outliers (REF3-24-ACJ-14 Studentized Residual: 8.476; REF3-24-ACJ-37 Studentized Residual: 4.457) 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 2024 Data Relative to Reference Lake 3 Data (2024) or Sheardown Lake SE Baseline Data (2006 to 2013) with $\alpha=\beta=0.1$, Mary River Project 2024 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%
Nearshore Arctic Charr (Electrofishing) versus Ref. Lake 3, 2022 Data	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0791	22.6	Response	278	75	21	16	12	10	7	6	4
			Body Weight	Body Weight (g)	-	M-W	0.259	110	Response	2,958	776	213	143	105	87	64	44	17
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0651	-	log(Response)	164	45	14	10	8	7	6	5	4
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0489	-	log(Response)	94	26	9	7	6	5	4	4	3
Nearshore Arctic Charr (Electrofishing) 2024 versus Baseline	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0401	10.3	Response	72	20	7	5	5	4	4	3	3
			Body Weight	Body Weight (g)	-	M-W	0.144	39.1	Response	923	244	68	46	34	28	21	14	5
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0580	-	log(Response)	131	36	11	8	7	6	5	4	3
Littoral/Profundal Arctic Charr (Gill Netting) versus Ref. Lake 3, 2024 Data	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0550	14.2	Response	136	36	12	9	6	6	5	4	3
			Body Weight	Body Weight (g)	-	M-W	0.161	60.2	Response	1,151	303	84	57	42	35	26	19	7
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0629	-	log(Response)	153	42	13	9	8	7	6	5	4
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0499	-	log(Response)	97	27	9	7	6	5	5	4	3
Littoral/Profundal Arctic Charr (Gill Netting) 2024 versus Baseline	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0572	11.5	Response	106	28	9	6	5	5	4	4	3
			Body Weight	Body Weight (g)	-	M-W	0.175	30.1	Response	718	181	47	31	21	18	13	9	4
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0623	-	log(Response)	150	41	13	9	7	7	6	5	3
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0573	-	log(Response)	127	35	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 log₁₀-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 Southeast (SE; DL0-02), Mary River Project CREMP, August 2024

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"		
DL02-24-GN-01	560955	7912059	91.0	12-Aug-24	12-Aug-24	11:22	12:30	1.13	1.03	4	4	4	12	11.64
DL02-24-GN-02	561265	7911774	91.0	12-Aug-24	12-Aug-24	13:16	14:15	0.98	0.89	2	2	1	5	5.59
DL02-24-GN-03	560973	7911934	91.0	12-Aug-24	12-Aug-24	13:45	14:45	1.00	0.91	1	3	5	9	9.89
DL02-24-GN-04	560733	7912224	91.0	12-Aug-24	12-Aug-24	14:36	15:30	0.90	0.82	3	2	1	6	7.33
DL02-24-GN-05	561136	7911973	91.0	12-Aug-24	12-Aug-24	15:16	16:15	0.98	0.89	7	11	4	22	24.59
DL02-24-GN-06	560955	7912059	91.0	12-Aug-24	12-Aug-24	16:00	17:00	1.00	0.91	0	4	2	6	6.59
DL02-24-GN-06A	560959	7911986	91.0	18-Aug-24	18-Aug-24	15:15	15:45	0.50	0.46	2	1	0	3	6.59
DL02-24-GN-07	560739	7912260	91.0	18-Aug-24	18-Aug-24	16:06	16:40	0.57	0.52	0	1	0	1	1.94
DL02-24-GN-08	560985	7911961	91.0	19-Aug-24	19-Aug-24	12:50	13:50	1.00	0.91	1	4	1	6	6.59
DL02-24-GN-09	560950	7911931	91.0	19-Aug-24	19-Aug-24	13:00	14:25	1.42	1.29	2	4	3	9	6.98
DL02-24-GN-10	561293	7911782	91.0	19-Aug-24	19-Aug-24	14:07	15:04	0.95	0.86	5	2	1	8	9.25
DL02-24-GN-11	560980	7911837	91.0	19-Aug-24	19-Aug-24	14:52	15:48	0.93	0.85	2	0	1	3	3.53
DL02-24-GN-12	561444	7911784	91.0	19-Aug-24	19-Aug-24	15:29	16:20	0.85	0.77	0	4	1	5	6.46
DL02-24-GN-13	560943	7911912	91.0	19-Aug-24	19-Aug-24	16:03	16:53	0.83	0.76	0	0	3	3	3.96
DL02-24-GN-14	561012	7911911	91.0	20-Aug-24	20-Aug-24	9:45	10:25	0.67	0.61	2	2	0	4	6.59
Total									12.5	31	44	27	102	8.17

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 Southeast (SE; DL0-02) by Gill Netting, Mary River Project CREMP, August 2024

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
DL02-24-AC-01	DL02-24-GN-01	3	34.6	38.7	515	-	1.243
DL02-24-AC-02	DL02-24-GN-01	3	40.5	43.5	610	-	0.918
DL02-24-AC-03	DL02-24-GN-01	3	34.4	37.0	390	-	0.958
DL02-24-AC-04	DL02-24-GN-01	3	38.3	41.4	475	-	0.845
DL02-24-AC-05	DL02-24-GN-01	2	34.8	37.5	335	-	0.795
DL02-24-AC-06	DL02-24-GN-01	2	33.4	36.0	325	-	0.872
DL02-24-AC-07	DL02-24-GN-01	2	37.8	40.7	480	-	0.889
DL02-24-AC-08	DL02-24-GN-01	1	37.8	40.8	520	-	0.963
DL02-24-AC-09	DL02-24-GN-01	1	30.4	33.2	245	-	0.872
DL02-24-AC-10	DL02-24-GN-01	1	35.3	38.0	390	-	0.887
DL02-24-AC-11	DL02-24-GN-01	1	23.7	25.8	95	half eaten by bird	0.714
DL02-24-AC-12	DL02-24-GN-01	2	39.6	42.6	460	previous mortality (not by program) drifted into net	0.741
DL02-24-AC-13	DL02-24-GN-02	3	39.1	42.3	460	-	0.770
DL02-24-AC-14	DL02-24-GN-02	2	29.2	31.8	230	-	0.924
DL02-24-AC-15	DL02-24-GN-02	2	36.1	38.7	470	-	0.999
DL02-24-AC-16	DL02-24-GN-02	1	35.9	38.8	435	-	0.940
DL02-24-AC-17	DL02-24-GN-02	1	43.6	46.8	730	-	0.881
DL02-24-AC-18	DL02-24-GN-03	3	37.1	40.0	450	-	0.881
DL02-24-AC-19	DL02-24-GN-03	3	38.7	41.9	455	-	0.785
DL02-24-AC-20	DL02-24-GN-03	3	38.2	42.5	525	-	0.942
DL02-24-AC-21	DL02-24-GN-03	3	42.0	45.1	710	-	0.958
DL02-24-AC-22	DL02-24-GN-03	3	36.6	39.9	460	-	0.938
DL02-24-AC-23	DL02-24-GN-03	2	31.1	33.5	250	-	0.831
DL02-24-AC-24	DL02-24-GN-03	2	38.9	41.7	530	-	0.900
DL02-24-AC-25	DL02-24-GN-03	2	37.7	39.9	445	-	0.830
DL02-24-AC-26	DL02-24-GN-03	1	35.7	38.4	450	-	0.989
DL02-24-AC-27	DL02-24-GN-04	3	39.5	42.5	520	-	0.844
DL02-24-AC-28	DL02-24-GN-04	2	36.4	39.4	355	-	0.736
DL02-24-AC-29	DL02-24-GN-04	2	29.9	32.2	235	-	0.879
DL02-24-AC-30	DL02-24-GN-04	1	38.2	41.1	430	-	0.771
DL02-24-AC-31	DL02-24-GN-04	1	32.6	35.5	345	-	0.996
DL02-24-AC-32	DL02-24-GN-04	1	33.7	36.1	385	-	1.006
DL02-24-AC-33	DL02-24-GN-05	3	39.8	40.5	495	-	0.785
DL02-24-AC-34	DL02-24-GN-05	3	34.0	36.7	380	-	0.967
DL02-24-AC-35	DL02-24-GN-05	3	34.2	37.1	485	-	1.212
DL02-24-AC-36	DL02-24-GN-05	3	36.2	39.0	450	-	0.949
DL02-24-AC-37	DL02-24-GN-05	2	41.4	44.8	650	-	0.916
DL02-24-AC-38	DL02-24-GN-05	2	32.6	35.0	310	-	0.895
DL02-24-AC-39	DL02-24-GN-05	2	30.5	33.0	260	-	0.916
DL02-24-AC-40	DL02-24-GN-05	2	34.8	37.3	420	-	0.997
DL02-24-AC-41	DL02-24-GN-05	2	38.1	41.3	415	-	0.750
DL02-24-AC-42	DL02-24-GN-05	2	38.7	41.4	405	-	0.699
DL02-24-AC-43	DL02-24-GN-05	2	38.2	40.9	405	-	0.727
DL02-24-AC-44	DL02-24-GN-05	2	36.8	39.7	435	-	0.873
DL02-24-AC-45	DL02-24-GN-05	2	34.5	36.7	365	-	0.889
DL02-24-AC-46	DL02-24-GN-05	2	36.4	39.4	415	-	0.860
DL02-24-AC-47	DL02-24-GN-05	2	34.6	37.7	410	-	0.990
DL02-24-AC-48	DL02-24-GN-05	1	29.4	31.6	175	-	0.689
DL02-24-AC-49	DL02-24-GN-05	1	29.2	31.4	180	-	0.723
DL02-24-AC-50	DL02-24-GN-05	1	38.3	41.1	470	-	0.837
DL02-24-AC-51	DL02-24-GN-05	1	34.2	37.4	405	-	1.012
DL02-24-AC-52	DL02-24-GN-05	1	34.6	37.1	375	-	0.905
DL02-24-AC-53	DL02-24-GN-05	1	39.9	43.5	510	-	0.803

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

Table G.23: Arctic Charr Measurements from Fish Captured at Sheardown Lake Southeast (SE; DL0-02) by Gill Netting, Mary River Project CREMP, August 2024

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
DL02-24-AC-54	DL02-24-GN-05	1	33.6	36.1	365	-	0.962
DL02-24-AC-55	DL02-24-GN-06	3	42.0	45.2	710	-	0.958
DL02-24-AC-56	DL02-24-GN-06	3	34.5	37.6	385	-	0.938
DL02-24-AC-57	DL02-24-GN-06	2	39.8	43.2	460	-	0.730
DL02-24-AC-58	DL02-24-GN-06	2	32.1	34.3	300	-	0.907
DL02-24-AC-59	DL02-24-GN-06	2	29.8	32.2	240	-	0.907
DL02-24-AC-60	DL02-24-GN-06	2	38.2	41.2	380	-	0.682
DL02-24-AC-61	DL02-24-GN-06A	2	35.0	38.0	480	-	1.120
DL02-24-AC-62	DL02-24-GN-06A	1.5	41.5	45.5	650	-	0.909
DL02-24-AC-63	DL02-24-GN-06A	1.5	24.0	26.0	160	-	1.157
DL02-24-AC-64	DL02-24-GN-07	2	37.1	40.0	500	potential recapture - lesion	0.979
DL02-24-AC-65	DL02-24-GN-08	3	35.3	38.1	490	-	1.114
DL02-24-AC-66	DL02-24-GN-08	2	40.0	43.4	520	potential recapture	0.813
DL02-24-AC-67	DL02-24-GN-08	2	42.2	45.6	525	-	0.699
DL02-24-AC-68	DL02-24-GN-08	2	36.4	39.5	455	-	0.943
DL02-24-AC-69	DL02-24-GN-08	2	26.4	28.1	235	-	1.277
DL02-24-AC-70	DL02-24-GN-08	1.5	36.0	38.7	490	-	1.050
DL02-24-AC-71	DL02-24-GN-09	3	37.2	40.5	495	-	0.962
DL02-24-AC-72	DL02-24-GN-09	3	37.4	40.2	520	-	0.994
DL02-24-AC-73	DL02-24-GN-09	3	38.9	42.5	590	-	1.002
DL02-24-AC-74	DL02-24-GN-09	2	37.5	40.6	500	-	0.948
DL02-24-AC-75	DL02-24-GN-09	2	40.2	43.1	590	-	0.908
DL02-24-AC-76	DL02-24-GN-09	2	30.9	33.5	305	-	1.034
DL02-24-AC-77	DL02-24-GN-09	2	29.2	31.8	260	-	1.044
DL02-24-AC-78	DL02-24-GN-09	1.5	38.0	41.1	605	-	1.103
DL02-24-AC-79	DL02-24-GN-09	1.5	26.1	28.2	195	-	1.097
DL02-24-AC-80	DL02-24-GN-10	3	36.0	38.9	470	-	1.007
DL02-24-AC-81	DL02-24-GN-10	2	33.3	38.0	480	-	1.300
DL02-24-AC-82	DL02-24-GN-10	2	41.7	45.0	620	-	0.855
DL02-24-AC-83	DL02-24-GN-10	1.5	38.9	42.6	505	-	0.858
DL02-24-AC-84	DL02-24-GN-10	1.5	38.0	40.7	495	-	0.902
DL02-24-AC-85	DL02-24-GN-10	1.5	38.2	41.5	585	-	1.049
DL02-24-AC-86	DL02-24-GN-10	1.5	35.1	38.2	460	-	1.064
DL02-24-AC-87	DL02-24-GN-10	1.5	35.9	39.0	455	-	0.983
DL02-24-AC-88	DL02-24-GN-11	3	35.4	38.4	470	-	1.059
DL02-24-AC-89	DL02-24-GN-11	1.5	39.3	40.9	445	-	0.733
DL02-24-AC-90	DL02-24-GN-11	2	43.3	46.7	925	-	1.139
DL02-24-AC-91	DL02-24-GN-12	2	37.0	40.1	560	-	1.106
DL02-24-AC-92	DL02-24-GN-12	2	33.9	37.2	415	-	1.065
DL02-24-AC-93	DL02-24-GN-12	2	37.9	40.8	455	-	0.836
DL02-24-AC-94	DL02-24-GN-12	2	39.9	43.1	590	-	0.929
DL02-24-AC-95	DL02-24-GN-12	1.5	38.1	40.3	565	-	1.022
DL02-24-AC-96	DL02-24-GN-13	3	36.5	39.6	490	-	1.008
DL02-24-AC-97	DL02-24-GN-13	3	35.0	37.9	445	-	1.038
DL02-24-AC-98	DL02-24-GN-13	3	30.3	41.5	545	-	1.959
DL02-24-AC-99	DL02-24-GN-13	3	38.2	42.0	435	-	0.780
DL02-24-AC-100	DL02-24-GN-13	2	32.1	34.7	295	-	0.892
Overall Catch Summary	Sample Size (N)		100	100	100	-	100
	Average		35.9	38.9	442.4	-	0.937
	Median		36.4	39.6	455.0	-	0.921
	Standard Deviation		4.0	4.3	132	-	0.166
	Standard Error		0.40	0.43	13.2	-	0.017
	Minimum		23.7	25.8	95.0	-	0.682
	Maximum		43.6	46.8	925	-	1.959

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

Table G.24: Results of Littoral/Profundal Arctic Charr Health Endpoint Statistical Comparisons between 2024 Sheardown Lake Southeast (SE; DL0-02) and 2024 Reference Lake 3 (REF-03) Data, and for Sheardown Lake Southeast between 2024 and the Mine Baseline Period (2006 to 2013), Mary River Project CREMP, 2024

Comparison	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics ^b			Test P-value	Magnitude of Difference (%) ^c
			Response	Covariate	REF 2024 or DL0-02 Baseline	DL0-02 2024		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons ^a	Statistic	REF 2024 or DL0-02 Baseline	DL0-02 2024		
								Interaction P-value	Covariate P-value						
Sheardown Lake SE versus Reference Lake 3, 2024	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	84	100	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	84	100	M-W	-	-	-	Median	28.2	36.4	<0.001	29
		Body Weight	Body Weight (g)	-	84	100	M-W	-	-	-	Median	190	455	<0.001	139
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	84	100	ANCOVA	0.547	<0.001	32.0	Adjusted Mean	258	314	<0.001	22
			log[Body Weight (g)]	log[Fork Length (cm)]	83 ^d	99 ^e	ANCOVA	0.177	<0.001	32.1	Adjusted Mean	261	310	<0.001	19
Sheardown Lake SE 2024 versus Baseline	Survival	Length Frequency Distribution	Fork Length (cm)	-	70	100	K-S	-	-	-	-	-	-	0.034	-
	Body Size	Fork Length	Fork Length (cm)	-	70	100	M-W	-	-	-	Median	37.4	36.4	0.112	-2.5
		Body Weight	Body Weight (g)	-	70	100	M-W	-	-	-	Median	500	455	0.002	-9.0
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	70	100	ANCOVA	0.011 ^g	<0.001	35.9	Adjusted Mean	451	428	0.020	-5.1
			log[Body Weight (g)]	log[Fork Length (cm)]	70	99 ^f	ANCOVA	0.027 ^h	<0.001	35.9	Adjusted Mean	452	426	0.005	-5.7

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

Absolute Magnitude of Difference ≥ 10% for Condition (CREMP 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 log₁₀-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 (REF3-24-AC-54 Studentized Residual: 7.786) was removed from the analysis.

^e One outlier (DL02-24-AC-98 Studentized Residual: 5.189) was removed from the analysis.

^f One outlier (DL02-24-AC-98 Studentized Residual: 5.398) was removed from the analysis.

^g ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.8813 and R2 of parallel slope model = 0.8765; a difference < 0.02) following Environment Canada (2012).

^h ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.8989 and R2 of parallel slope model = 0.8959; a difference < 0.02) following Environment Canada (2012).

Table G.25: Arctic Charr Measurements from Fish Captured at Mary Lake (BL0) by Backpack Electrofishing, Mary River Project CREMP, August 2024

Specimen ID	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
BL0-24-ACJ-01	5.8	6.0	1.579	-	0.809
BL0-24-ACJ-02	6.6	7.0	2.198	-	0.765
BL0-24-ACJ-03	12.8	13.7	17.398	-	0.830
BL0-24-ACJ-04	6.2	6.6	2.001	-	0.840
BL0-24-ACJ-05	7.9	8.4	4.261	-	0.864
BL0-24-ACJ-06	9.4	10.1	8.745	-	1.053
BL0-24-ACJ-07	6.2	6.6	1.941	1	0.814
BL0-24-ACJ-08	8.3	8.7	4.715	-	0.825
BL0-24-ACJ-09	6.8	7.2	2.659	-	0.846
BL0-24-ACJ-10	8.1	8.6	4.752	2	0.894
BL0-24-ACJ-11	9.5	10.0	7.573	-	0.883
BL0-24-ACJ-12	5.4	5.6	1.356	-	0.861
BL0-24-ACJ-13	8.6	9.1	5.094	-	0.801
BL0-24-ACJ-14	7.0	7.4	3.063	1	0.893
BL0-24-ACJ-15	5.5	5.7	1.485	-	0.893
BL0-24-ACJ-16	10.0	10.8	10.350	-	1.035
BL0-24-ACJ-17	8.4	8.9	5.973	-	1.008
BL0-24-ACJ-18	9.8	10.3	6.749	2	0.717
BL0-24-ACJ-19	6.5	6.8	2.293	-	0.835
BL0-24-ACJ-20	7.0	7.6	3.003	-	0.876
BL0-24-ACJ-21	11.9	12.5	13.143	-	0.780
BL0-24-ACJ-22	10.5	11.2	12.314	-	1.064
BL0-24-ACJ-23	8.4	8.9	5.252	-	0.886
BL0-24-ACJ-24	9.6	10.2	7.084	-	0.801
BL0-24-ACJ-25	5.6	6.0	1.664	1	0.948
BL0-24-ACJ-26	5.6	5.9	1.485	-	0.846
BL0-24-ACJ-27	5.6	5.9	1.454	-	0.828
BL0-24-ACJ-28	11.8	12.4	12.576	3	0.765
BL0-24-ACJ-29	8.4	9.0	6.173	-	1.041
BL0-24-ACJ-30	7.1	7.5	3.107	-	0.868
BL0-24-ACJ-31	9.2	9.7	6.178	-	0.793
BL0-24-ACJ-32	10.3	10.9	10.562	-	0.967
BL0-24-ACJ-33	6.0	6.4	1.996	-	0.924
BL0-24-ACJ-34	8.3	8.9	5.104	-	0.893
BL0-24-ACJ-35	4.0	4.2	0.525	0	0.820
BL0-24-ACJ-36	6.6	6.9	2.391	-	0.832
BL0-24-ACJ-37	6.0	6.4	2.122	-	0.982
BL0-24-ACJ-38	8.6	9.0	5.744	-	0.903
BL0-24-ACJ-39	7.7	8.1	4.993	-	1.094
BL0-24-ACJ-40	9.4	9.7	7.651	-	0.921
BL0-24-ACJ-41	6.7	7.0	2.609	-	0.867
BL0-24-ACJ-42	7.8	8.2	4.453	-	0.938
BL0-24-ACJ-43	8.1	8.4	4.927	-	0.927
BL0-24-ACJ-44	5.4	5.7	1.365	-	0.867
BL0-24-ACJ-45	6.8	7.2	2.736	-	0.870
BL0-24-ACJ-46	4.5	4.7	0.727	-	0.798
BL0-24-ACJ-47	5.9	6.2	1.824	-	0.888
BL0-24-ACJ-48	6.4	6.7	2.339	-	0.892
BL0-24-ACJ-49	5.9	6.1	1.678	-	0.817
BL0-24-ACJ-50	7.9	8.5	4.863	-	0.986
BL0-24-ACJ-51	6.7	7.0	2.454	-	0.816
BL0-24-ACJ-52	5.5	5.7	1.371	-	0.824
BL0-24-ACJ-53	7.8	8.2	3.679	-	0.775
BL0-24-ACJ-54	6.8	7.1	2.765	-	0.879
BL0-24-ACJ-55	6.4	6.7	1.980	-	0.755
BL0-24-ACJ-56	5.7	6.1	1.634	-	0.882
BL0-24-ACJ-57	4.3	4.4	0.602	-	0.757
BL0-24-ACJ-58	5.9	6.2	1.676	-	0.816
BL0-24-ACJ-59	3.8	3.9	0.387	-	0.705
BL0-24-ACJ-60	9.9	10.4	9.026	-	0.930
BL0-24-ACJ-61	6.4	6.8	2.284	-	0.871
BL0-24-ACJ-62	9.6	10.1	6.975	-	0.788
BL0-24-ACJ-63	9.1	9.7	6.361	-	0.844
BL0-24-ACJ-64	8.9	9.6	7.143	-	1.013

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 Backpack Electrofishing, Mary River Project CREMP, August 2024


Specimen ID		Fork Length (cm)	Total Length (cm)	Body Weight (g)	Age (years)	Fulton's Condition Factor (K)
BL0-24-ACJ-65		8.9	9.3	5.641	-	0.800
BL0-24-ACJ-66		5.6	5.9	1.382	-	0.787
BL0-24-ACJ-67		6.7	6.9	2.534	-	0.843
BL0-24-ACJ-68		9.4	10.0	7.198	-	0.867
BL0-24-ACJ-69		12.0	12.8	12.409	-	0.718
BL0-24-ACJ-70		7.3	7.6	3.109	-	0.799
BL0-24-ACJ-71		8.3	8.7	4.964	-	0.868
BL0-24-ACJ-72		6.9	7.3	2.416	-	0.735
BL0-24-ACJ-73		7.2	7.6	3.199	-	0.857
BL0-24-ACJ-74		6.8	7.2	2.541	2	0.808
BL0-24-ACJ-75		5.8	6.2	1.924	-	0.986
BL0-24-ACJ-76		10.4	11.0	8.442	-	0.750
BL0-24-ACJ-77		8.4	8.9	4.806	-	0.811
BL0-24-ACJ-78		3.8	3.9	0.425	0	0.775
BL0-24-ACJ-79		5.8	6.2	1.561	-	0.800
BL0-24-ACJ-80		10.0	10.7	9.644	-	0.964
BL0-24-ACJ-81		4.9	5.0	1.026	-	0.872
BL0-24-ACJ-82		9.4	10.0	7.661	2	0.922
BL0-24-ACJ-83		8.3	8.8	4.582	-	0.801
BL0-24-ACJ-84		6.9	7.2	2.820	-	0.858
BL0-24-ACJ-85		3.8	4.1	0.489	-	0.891
BL0-24-ACJ-86		4.4	4.6	0.859	-	1.008
BL0-24-ACJ-87		6.4	6.8	2.256	-	0.861
BL0-24-ACJ-88		5.5	5.8	1.512	-	0.909
BL0-24-ACJ-89		8.5	9.0	5.174	-	0.842
BL0-24-ACJ-90		11.6	12.5	13.941	-	0.893
BL0-24-ACJ-91		12.7	14.6	17.721	-	0.865
BL0-24-ACJ-92		14.8	16.0	27.373	-	0.844
BL0-24-ACJ-93		7.3	7.7	3.169	-	0.815
BL0-24-ACJ-94		4.0	4.1	0.459	-	0.717
BL0-24-ACJ-95		6.2	6.5	2.231	-	0.936
BL0-24-ACJ-96		8.3	8.8	4.442	-	0.777
BL0-24-ACJ-97		4.2	4.3	0.551	-	0.744
BL0-24-ACJ-98		5.8	6.1	1.703	-	0.873
BL0-24-ACJ-99		6.1	6.5	2.011	-	0.886
BL0-24-ACJ-100		18.8	20.6	52.000	-	0.783
Overall Catch Summary	Sample Size (N)	100	100	100	10	100
	Mean	7.6	8.0	5.087	1.4	0.861
	Median	7.0	7.5	3.033	2	0.860
	Standard Deviation	2.5	2.7	6.422	1.0	0.081
	Standard Error	0.25	0.27	0.642	0.31	0.008
	Minimum	3.8	3.9	0.387	0	0.705
	Maximum	18.8	20.6	52.000	3	1.094
Young-of-the-Year Catch Summary	proportion of YOY	10%				
	Sample Size (N)	10	10	10	-	10
	Mean	4.2	4.3	0.605	-	0.809
	Median	4.1	4.3	0.538	-	0.786
	Standard Deviation	0.4	0.4	0.206	-	0.093
	Standard Error	0.1	0.1	0.065	-	0.029
	Minimum	3.8	3.9	0.387	-	0.705
	Maximum	4.9	5.0	1.026	-	1.008

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 (Non-YOY) Health Endpoint Statistical Comparisons between Mary Lake (BL0) and Reference Lake 3 (REF-03), Mary River Project CREMP, August 2024

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					
								Interaction P-value	Covariate P-value		Statistic	REF	BL0		
All Fish	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	102	100	K-S	-	-	-	-	-	-	<0.001	-
YOY	Body Size	Fork Length	Fork Length (cm)	-	12	10	tunequal	-	-	-	Mean	3.02	4.17	<0.001	38
		Body Weight	Body Weight (g)	-	12	10	M-W	-	-	-	Median	0.197	0.538	0.003	173
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	12	10	ANCOVA	0.524	0.003	3.49	Adjusted Mean	0.445	0.276	0.277	ns
Non-YOY	Survival	Length Frequency Distribution	Fork Length (cm)	-	90	90	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	90	90	M-W	-	-	-	Median	5.30	7.50	<0.001	42
		Body Weight	Body Weight (g)	-	90	90	M-W	-	-	-	Median	1.13	3.44	<0.001	205
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	90	90	ANCOVA	0.016 ^e	<0.001	6.61	Adjusted Mean	2.26	2.46	<0.001	8.8
			log[Body Weight (g)]	log[Fork Length (cm)]	88 ^d	90	ANCOVA	0.014 ^f	<0.001	6.61	Adjusted Mean	2.22	2.48	<0.001	11

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

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

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

^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 log₁₀-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 Two outliers (REF3-24-ACJ-14 Studentized Residual: 9.321; REF3-24-ACJ-37 Studentized Residual: 4.863) removed from analysis.

^e ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9740 and R2 of parallel slope model = 0.9729; a difference < 0.02) following Environment Canada (2012).

^f ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9838 and R2 of parallel slope model = 0.983; a difference < 0.02) following Environment Canada (2012).

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 2024 Data Relative to Reference Lake 3 (REF-03) Data or Camp Lake Baseline Data (2006 to 2013) with $\alpha=\beta=0.1$, Mary River Project CREMP, 2024

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%
Nearshore Arctic Charr (Electrofishing) versus Ref. Lake 3, 2024 Data	Non-YOY	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.102	33.5	Response	460	122	35	24	18	16	12	9	4
			Body Weight	Body Weight (g)	-	M-W	0.318	251	Response	4,477	1,174	322	216	157	130	95	66	24
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0586	-	log(Response)	133	37	12	9	7	6	5	4	3
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0453	-	log(Response)	80	23	8	6	5	5	4	4	3
Littoral/Profundal Arctic Charr (Gill Netting) versus Ref. Lake 3, 2024 Data	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0641	19.7	Response	183	49	14	11	9	7	6	5	3
			Body Weight	Body Weight (g)	-	M-W	0.197	148	Response	1,723	453	125	84	62	51	38	27	11
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0681	-	log(Response)	179	49	15	11	8	7	6	5	4
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0504	-	log(Response)	99	28	9	7	6	5	5	4	3
Littoral/Profundal Arctic Charr (Gill Netting) 2024 versus Baseline	All fish	Body Size	Fork Length	Fork Length (cm)	-	M-W	0.0951	20.9	Response	350	88	24	16	12	10	7	5	4
			Body Weight	Body Weight (g)	-	M-W	0.279	73.6	Response	3,429	900	247	166	121	99	69	44	13
		Energy Storage	Condition	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0679	-	log(Response)	178	48	15	11	8	7	6	5	4
			Condition ^d	log10[Body Weight (g)]	log10[Fork Length (cm)]	ANCOVA	0.0635	-	log(Response)	156	43	13	10	8	7	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 log₁₀-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.28: Gill Netting Catch Records for Mary Lake (BL0), Mary River Project CREMP, August 2024

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"		
BL0-24-GN-01	555670	7904464	91.0	17-Aug-24	17-Aug-24	10:15	11:00	0.750	0.683	0	5	0	5	7.33
BL0-24-GN-02	553219	7905408	91.0	17-Aug-24	17-Aug-24	11:37	12:35	0.967	0.880	2	1	0	3	3.41
BL0-24-GN-03	552686	7906689	91.0	17-Aug-24	17-Aug-24	11:50	12:55	1.08	0.99	1	3	6	10	10.14
BL0-24-GN-04	552686	7906689	91.0	17-Aug-24	17-Aug-24	13:53	14:40	0.783	0.713	5	0	0	5	7.01
BL0-24-GN-05	554826	7906029	90.0	17-Aug-24	17-Aug-24	15:05	15:35	0.500	0.450	1	2	3	6	13.33
BL0-24-GN-06	555276	7905437	91.0	17-Aug-24	17-Aug-24	15:09	15:55	0.767	0.698	0	7	0	7	10.03
BL0-24-GN-07	552686	7906689	91.0	18-Aug-24	18-Aug-24	9:45	10:35	0.833	0.758	4	3	0	7	9.2
BL0-24-GN-08	552961	7906940	90.0	18-Aug-24	18-Aug-24	10:15	11:00	0.75	0.68	0	1	2	3	4.44
BL0-24-GN-09	552706	7906753	91.0	18-Aug-24	18-Aug-24	11:20	11:55	0.58	0.53	5	0	1	6	11.30
BL0-24-GN-10	552686	7906689	91.0	18-Aug-24	18-Aug-24	11:35	12:30	0.92	0.83	2	0	1	3	3.60
BL0-24-GN-11	555276	7905437	91.0	18-Aug-24	18-Aug-24	13:00	13:20	0.33	0.30	5	2	1	8	26.37
BL0-24-GN-A	555092	7905931	91.0	17-Aug-24	17-Aug-24	10:15	10:45	0.50	0.45	1	0	0	1	2.20
BL0-24-GN-B	556138	7903817	91.0	17-Aug-24	17-Aug-24	11:25	12:15	0.83	0.76	1	4	4	9	11.87
BL0-24-GN-C	555645	7903545	91.0	17-Aug-24	17-Aug-24	11:55	12:55	1.00	0.91	1	3	1	5	5.49
BL0-24-GN-D	556175	7903774	91.0	17-Aug-24	17-Aug-24	12:45	13:45	1.00	0.91	1	4	5	10	10.99
BL0-24-GN-E	554968	7903673	91.0	17-Aug-24	17-Aug-24	14:20	15:00	0.67	0.61	0	2	1	3	4.95
BL0-24-GN-F	555064	7903387	91.0	17-Aug-24	17-Aug-24	14:45	15:30	0.75	0.68	1	1	2	4	5.86
BL0-24-GN-G	554968	7903673	91.0	17-Aug-24	17-Aug-24	15:20	16:00	0.67	0.61	0	1	0	1	1.65
BL0-24-GN-H	552221	7905424	91.0	18-Aug-24	18-Aug-24	9:45	10:40	0.92	0.83	2	0	0	2	2.40
BL0-24-GN-I	552137	7906167	91.0	18-Aug-24	18-Aug-24	10:15	11:05	0.83	0.76	1	2	0	3	3.96
BL0-24-GN-J	552184	7905845	91.0	18-Aug-24	18-Aug-24	10:50	11:40	0.83	0.76	1	2	1	4	5.27
BL0-24-GN-K	553358	7905334	91.0	18-Aug-24	18-Aug-24	12:05	12:45	0.67	0.61	0	2	1	3	4.95
BL0-24-GN-L	553892	7905696	91.0	18-Aug-24	18-Aug-24	13:00	13:35	0.58	0.53	9	5	4	18	33.91
Total									15.9	43	50	33	126	7.91

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 2024

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
BL0-24-AC-01	BL0-24-GN-A	1.5	40.5	44.1	630	-	0.948
BL0-24-AC-02	BL0-24-GN-B	1.5	41.0	43.7	610	-	0.885
BL0-24-AC-03	BL0-24-GN-B	2	35.1	37.8	440	-	1.017
BL0-24-AC-04	BL0-24-GN-B	2	32.7	35.2	335	-	0.958
BL0-24-AC-05	BL0-24-GN-B	2	38.6	41.7	560	-	0.974
BL0-24-AC-06	BL0-24-GN-B	2	37.3	40.2	495	-	0.954
BL0-24-AC-07	BL0-24-GN-B	3	58.8	62.1	2,250	-	1.107
BL0-24-AC-08	BL0-24-GN-B	3	44.0	47.9	685	-	0.804
BL0-24-AC-09	BL0-24-GN-B	3	37.1	40.0	480	-	0.940
BL0-24-AC-10	BL0-24-GN-B	3	39.3	42.5	570	-	0.939
BL0-24-AC-11	BL0-24-GN-C	3	37.0	40.0	520	-	1.027
BL0-24-AC-12	BL0-24-GN-C	2	38.0	41.2	490	-	0.893
BL0-24-AC-13	BL0-24-GN-C	2	37.5	40.6	440	-	0.834
BL0-24-AC-14	BL0-24-GN-C	2	33.5	35.8	370	-	0.984
BL0-24-AC-15	BL0-24-GN-C	1.5	37.0	40.2	500	-	0.987
BL0-24-AC-16	BL0-24-GN-D	1.5	37.0	41.0	440	-	0.869
BL0-24-AC-17	BL0-24-GN-D	2	38.6	42.0	610	-	1.061
BL0-24-AC-18	BL0-24-GN-D	2	41.5	45.1	690	-	0.965
BL0-24-AC-19	BL0-24-GN-D	2	65	69.5	2,350	-	0.856
BL0-24-AC-20	BL0-24-GN-D	3	37.7	41.1	515	-	0.961
BL0-24-AC-21	BL0-24-GN-D	3	38.4	41.6	600	-	1.060
BL0-24-AC-22	BL0-24-GN-D	3	36.2	39.1	460	-	0.970
BL0-24-AC-23	BL0-24-GN-D	3	37.0	40.2	500	-	0.987
BL0-24-AC-24	BL0-24-GN-D	3	35.5	38.7	540	-	1.207
BL0-24-AC-25	BL0-24-GN-E	3	40.5	43.3	480	3 parasites in mouth	0.723
BL0-24-AC-26	BL0-24-GN-E	2	27.1	29.5	190	-	0.955
BL0-24-AC-27	BL0-24-GN-E	2	37.1	40.3	475	-	0.930
BL0-24-AC-28	BL0-24-GN-F	1.5	38.6	41.5	480	1 parasite in mouth	0.835
BL0-24-AC-29	BL0-24-GN-F	2	30.0	32.3	245	-	0.907
BL0-24-AC-30	BL0-24-GN-F	2	41.0	44.4	600	-	0.871
BL0-24-AC-31	BL0-24-GN-F	2	42.9	45.0	680	-	0.861
BL0-24-AC-32	BL0-24-GN-G	2	34.0	36.7	350	-	0.890
BL0-24-AC-33	BL0-24-GN-H	1.5	45.5	48.9	710	-	0.754
BL0-24-AC-34	BL0-24-GN-H	1.5	39.5	43.0	550	parasite on tongue (1)	0.892
BL0-24-AC-35	BL0-24-GN-I	1.5	35.0	37.5	470	-	1.096
BL0-24-AC-36	BL0-24-GN-I	2	35.9	38.0	430	1 parasite	0.929
BL0-24-AC-37	BL0-24-GN-I	2	39.0	42.5	570	-	0.961
BL0-24-AC-38	BL0-24-GN-J	3	35.7	38.9	440	-	0.967
BL0-24-AC-39	BL0-24-GN-J	2	40.7	43.8	550	-	0.816
BL0-24-AC-40	BL0-24-GN-J	2	37.0	43.0	450	-	0.888
BL0-24-AC-41	BL0-24-GN-J	1.5	34.8	38.0	410	-	0.973
BL0-24-AC-42	BL0-24-GN-K	2	33.1	35.5	320	1 parasite	0.882
BL0-24-AC-43	BL0-24-GN-K	2	27.5	29.5	190	-	0.914
BL0-24-AC-44	BL0-24-GN-K	3	37.0	40.0	490	-	0.967
BL0-24-AC-45	BL0-24-GN-L	3	37.5	41.0	470	-	0.891
BL0-24-AC-46	BL0-24-GN-L	3	41.0	44.5	590	-	0.856
BL0-24-AC-47	BL0-24-GN-L	2	26.2	28.2	150	-	0.834
BL0-24-AC-48	BL0-24-GN-01	2	38.5	41.5	350	-	0.613
BL0-24-AC-49	BL0-24-GN-01	2	35.6	38.8	410	-	0.909
BL0-24-AC-50	BL0-24-GN-01	2	49.7	52.6	1175	-	0.957
BL0-24-AC-51	BL0-24-GN-01	2	55.9	59.1	1675	-	0.959
BL0-24-AC-52	BL0-24-GN-01	2	38.5	41.3	480	-	0.841
BL0-24-AC-53	BL0-24-GN-02	1.5	42.0	45.8	610	-	0.823

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 2024

Specimen ID	Net ID	Net Mesh Size (inches)	Fork Length (cm)	Total Length (cm)	Body Weight (g)	Abnormalities	Fulton's Condition Factor (K)
BL0-24-AC-54	BL0-24-GN-02	1.5	36.9	39.9	395	-	0.786
BL0-24-AC-55	BL0-24-GN-02	2	65.9	70.1	2,450	-	0.856
BL0-24-AC-56	BL0-24-GN-03	3	39.0	42.3	560	-	0.944
BL0-24-AC-57	BL0-24-GN-03	3	49.4	53.1	1,250	-	1.037
BL0-24-AC-58	BL0-24-GN-03	3	38.7	51.6	515	-	0.889
BL0-24-AC-59	BL0-24-GN-03	3	41.0	44.0	520	Damaged dorsal fin	0.754
BL0-24-AC-60	BL0-24-GN-03	3	43.6	47.3	650	-	0.784
BL0-24-AC-61	BL0-24-GN-03	3	44.0	47.1	460	-	0.540
BL0-24-AC-62	BL0-24-GN-03	2	51.6	55.0	1,275	-	0.928
BL0-24-AC-63	BL0-24-GN-03	2	34.9	38.0	380	-	0.894
BL0-24-AC-64	BL0-24-GN-03	2	39.3	43.1	370	-	0.610
BL0-24-AC-65	BL0-24-GN-03	1.5	25.5	27.3	100	-	0.603
BL0-24-AC-66	BL0-24-GN-04	1.5	37.0	40.5	545	-	1.076
BL0-24-AC-67	BL0-24-GN-04	1.5	36.0	39.1	465	-	0.997
BL0-24-AC-68	BL0-24-GN-04	1.5	38.4	41.6	430	-	0.759
BL0-24-AC-69	BL0-24-GN-04	1.5	39.2	42.2	600	-	0.996
BL0-24-AC-70	BL0-24-GN-04	1.5	38.8	41.7	420	-	0.719
BL0-24-AC-71	BL0-24-GN-05	3	41.3	44.7	500	Gill lice	0.710
BL0-24-AC-72	BL0-24-GN-05	3	37.9	41.0	470	-	0.863
BL0-24-AC-73	BL0-24-GN-05	3	39.1	42.5	480	-	0.803
BL0-24-AC-74	BL0-24-GN-05	2	32.9	45.4	395	-	1.109
BL0-24-AC-75	BL0-24-GN-05	2	31.4	33.5	150	-	0.485
BL0-24-AC-76	BL0-24-GN-05	1.5	32.7	35.4	155	-	0.443
BL0-24-AC-77	BL0-24-GN-06	2	31.1	33.8	220	-	0.731
BL0-24-AC-78	BL0-24-GN-06	2	36.0	39.2	510	-	1.093
BL0-24-AC-79	BL0-24-GN-06	2	33.9	36.7	405	-	1.040
BL0-24-AC-80	BL0-24-GN-06	2	42.9	46.0	670	-	0.849
BL0-24-AC-81	BL0-24-GN-06	2	39.2	41.7	525	-	0.872
BL0-24-AC-82	BL0-24-GN-06	2	36.0	38.5	410	-	0.879
BL0-24-AC-83	BL0-24-GN-06	2	32.2	33.7	340	-	1.018
BL0-24-AC-84	BL0-24-GN-07	2	40.7	44.5	640	-	0.949
BL0-24-AC-85	BL0-24-GN-07	2	38.6	40.9	510	-	0.887
BL0-24-AC-86	BL0-24-GN-07	2	35.5	38.3	410	-	0.916
BL0-24-AC-87	BL0-24-GN-07	1.5	40.2	43.2	560	-	0.862
BL0-24-AC-88	BL0-24-GN-07	1.5	42.0	45.9	450	-	0.607
BL0-24-AC-89	BL0-24-GN-07	1.5	37.1	40.4	490	-	0.960
BL0-24-AC-90	BL0-24-GN-07	1.5	39.7	42.3	450	-	0.719
BL0-24-AC-91	BL0-24-GN-08	3	36.9	40.0	460	-	0.916
BL0-24-AC-92	BL0-24-GN-08	3	33.8	36.4	385	-	0.997
BL0-24-AC-93	BL0-24-GN-08	2	36.2	39.6	460	-	0.970
BL0-24-AC-94	BL0-24-GN-09	3	43.7	45.6	660	-	0.791
BL0-24-AC-95	BL0-24-GN-09	1.5	38.1	40.9	485	-	0.877
BL0-24-AC-96	BL0-24-GN-09	1.5	43.1	46.5	600	-	0.749
BL0-24-AC-97	BL0-24-GN-09	1.5	43.9	49.3	480	-	0.567
BL0-24-AC-98	BL0-24-GN-09	1.5	37.5	41.0	490	-	0.929
BL0-24-AC-99	BL0-24-GN-10	3	55.9	60.7	1,350	-	0.773
BL0-24-AC-100	BL0-24-GN-10	1.5	42.6	45.2	670	-	0.867
BL0-24-AC-101	BL0-24-GN-11	2	39.9	43.8	475	-	0.748
Overall Catch Summary	Sample Size (N)		101	101	101	-	101
	Average		39.0	42.3	571	-	0.882
	Median		38.4	41.5	485	-	0.892
	Standard Deviation		6.6	7.0	388	-	0.137
	Standard Error		0.66	0.70	39	-	0.014
	Minimum		25.5	27.3	100	-	0.443
	Maximum		65.9	70.1	2,450	-	1.207

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

Table G.30: Results of Littoral/Profundal Arctic Charr Health Endpoint Statistical Comparisons between 2024 Mary Lake (BL0) and 2024 Reference Lake 3 (REF-03) Data, and for Mary Lake between 2024 and the Mine Baseline Period (2005 to 2013), Mary River Project CREMP, 2024

Comparison	Indicator	Endpoint	Variables		Sample Size		Test	ANCOVA Model Statistics			Summary Statistics ^b			Test P-value	Magnitude of Difference (%) ^c
			Response	Covariate	REF 2024 or BL0 Base	BL0 2024		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons ^a					
								Interaction P-value	Covariate P-value		Statistic	REF 2024 or BL0 Base	BL0 2024		
Mary Lake versus Reference Lake 3, 2024	Recruitment/ Survival	Length Frequency Distribution	Fork Length (cm)	-	84	101	K-S	-	-	-	-	-	-	<0.001	-
	Body Size	Fork Length	Fork Length (cm)	-	84	101	M-W	-	-	-	Median	28.2	38.4	<0.001	36
		Body Weight	Body Weight (g)	-	84	101	M-W	-	-	-	Median	190	485	<0.001	155
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	84	101	ANCOVA	0.163	<0.001	33.5	Adjusted Mean	299	331	0.003	10
			log[Body Weight (g)]	log[Fork Length (cm)]	83 ^d	98 ^e	ANCOVA	0.922	<0.001	33.5	Adjusted Mean	298	337	<0.001	13
Mary Lake 2024 versus Baseline	Survival	Length Frequency Distribution	Fork Length (cm)	-	183	101	K-S	-	-	-	-	-	-	0.106	-
	Body Size	Fork Length	Fork Length (cm)	-	183	101	M-W	-	-	-	Median	38.4	38.4	0.463	0
		Body Weight	Body Weight (g)	-	183	101	M-W	-	-	-	Median	500	485	0.726	-3.0
	Energy Storage	Condition	log[Body Weight (g)]	log[Fork Length (cm)]	183	101	ANCOVA	0.128	<0.001	36.8	Adjusted Mean	449	436	0.140	ns
			log[Body Weight (g)]	log[Fork Length (cm)]	183	99 ^f	ANCOVA	0.510	<0.001	36.8	Adjusted Mean	450	443	0.439	ns

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

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

Notes: "-" indicates no available data. "ns" = non-significant.

^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 log₁₀-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 (REF3-24-AC-54 Studentized Residual: 7.049) removed from analysis.

^e Three outliers (BL0-24-AC-76 Studentized Residual: -4.614; BL0-24-AC-75 Studentized Residual: -5.057; BL0-24-AC-61 Studentized Residual: -4.103) removed from analysis.

^f Two outliers (BL0-24-AC-76 Studentized Residual: -4.543; BL0-24-AC-75 Studentized Residual: -4.196) removed from analysis.

APPENDIX H
SPECIAL INVESTIGATIONS

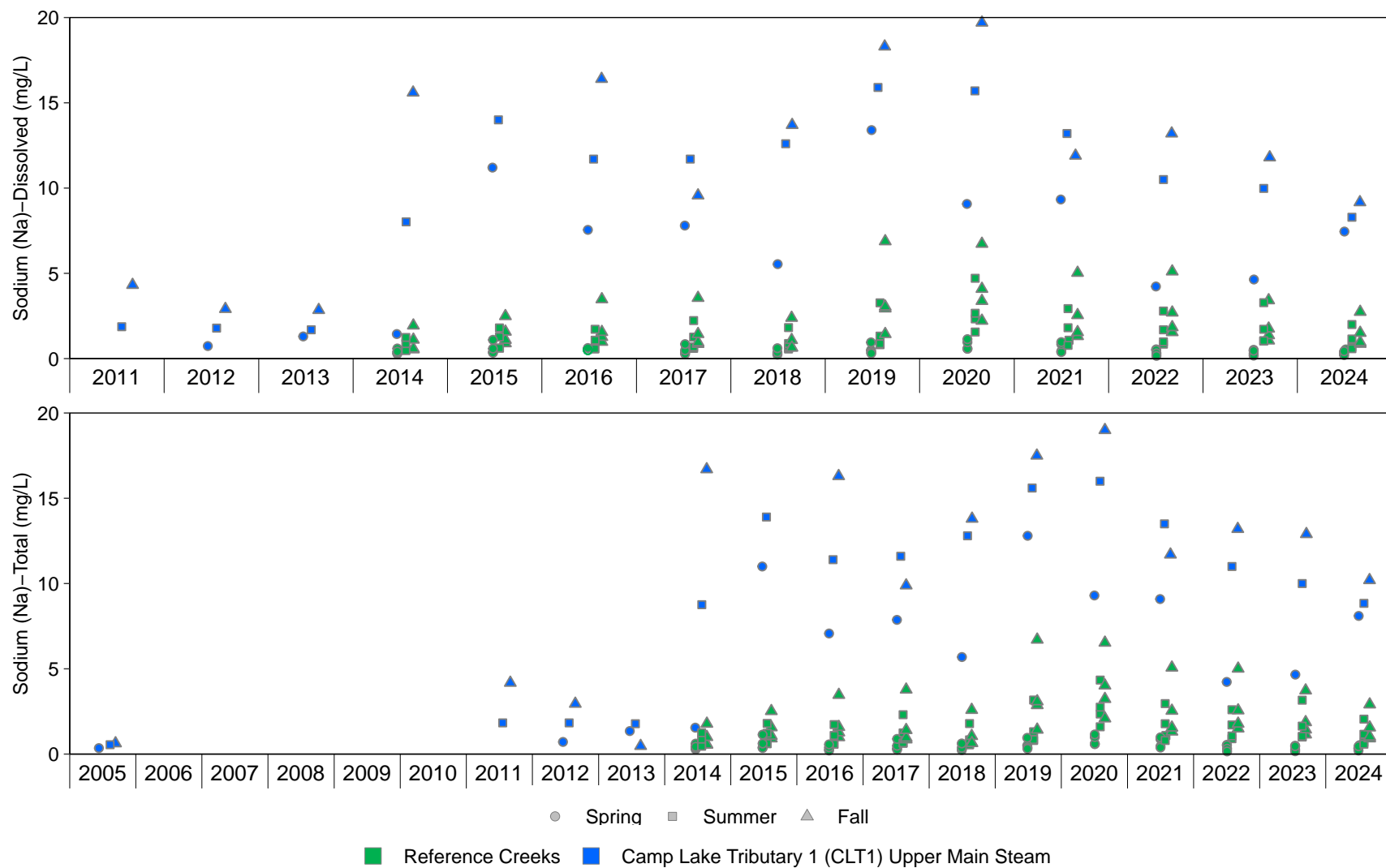


Figure H.1: Temporal Comparison of Total and Dissolved Sodium at Camp Lake Tributary 1 (CLT1) Upper Main Stem (L2-03) Over Mine Baseline (2005 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Means were plotted. Reference creeks stations included CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3.

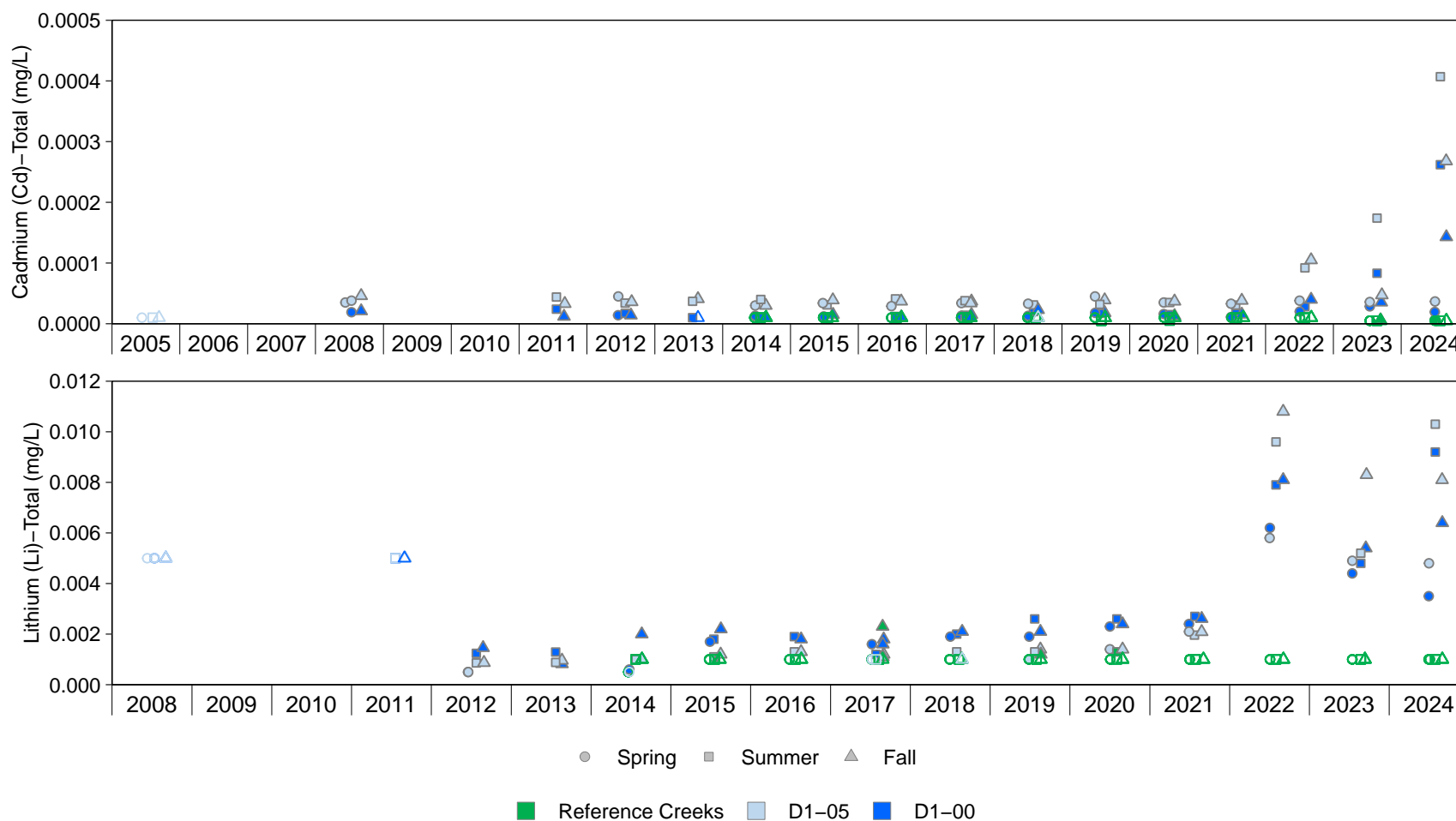


Figure H.2: Temporal Comparison of Total and Dissolved Cadmium, Lithium, Magnesium, Postassium and Strontium at Sheardown Lake Tributary 1 (SDLT1) Over Mine Baseline (2005 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Monthly means were plotted. When all values within a month in a given year are at the Laboratory Reporting Limit (LRL), the monthly mean is identified as a LRL and plotted as an open symbol. Reference creeks stations included CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3.

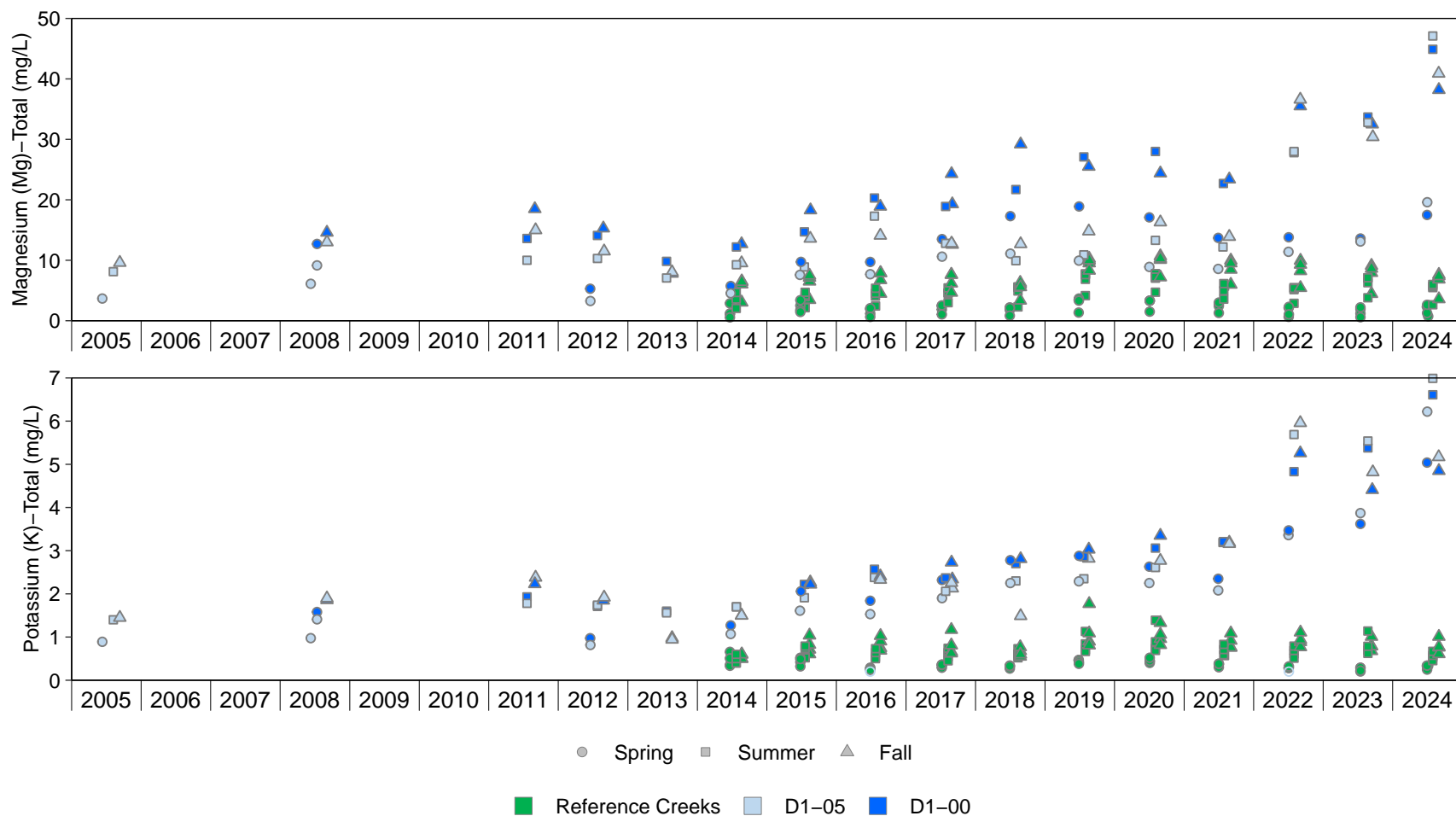


Figure H.2: Temporal Comparison of Total and Dissolved Cadmium, Lithium, Magnesium, Postassium and Strontium at Sheardown Lake Tributary 1 (SDLT1) Over Mine Baseline (2005 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Monthly means were plotted. When all values within a month in a given year are at the Laboratory Reporting Limit (LRL), the monthly mean is identified as a LRL and plotted as an open symbol. Reference creeks stations included CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3.

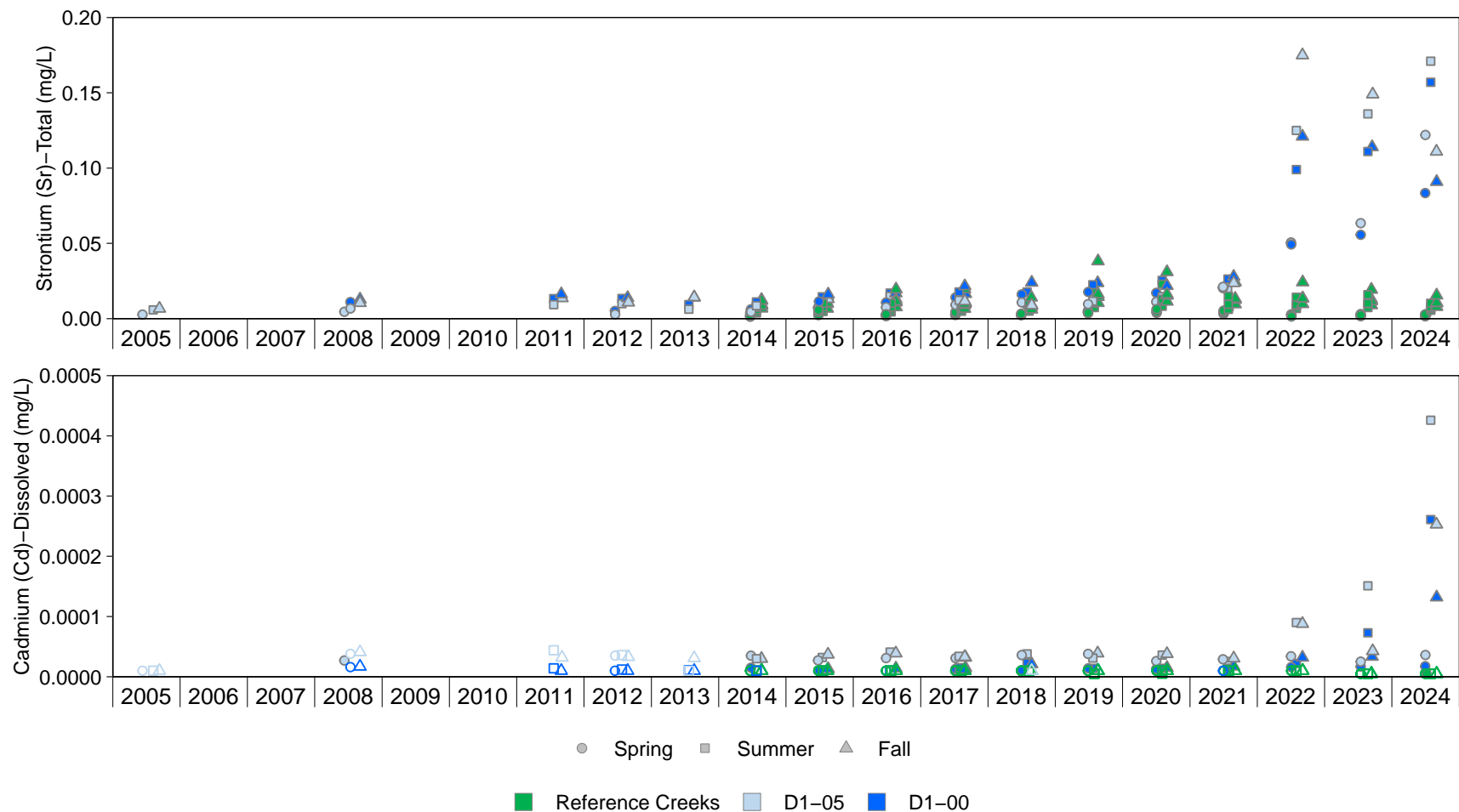


Figure H.2: Temporal Comparison of Total and Dissolved Cadmium, Lithium, Magnesium, Potassium and Strontium at Sheardown Lake Tributary 1 (SDLT1) Over Mine Baseline (2005 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Monthly means were plotted. When all values within a month in a given year are at the Laboratory Reporting Limit (LRL), the monthly mean is identified as a LRL and plotted as an open symbol. Reference creeks stations included CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3.

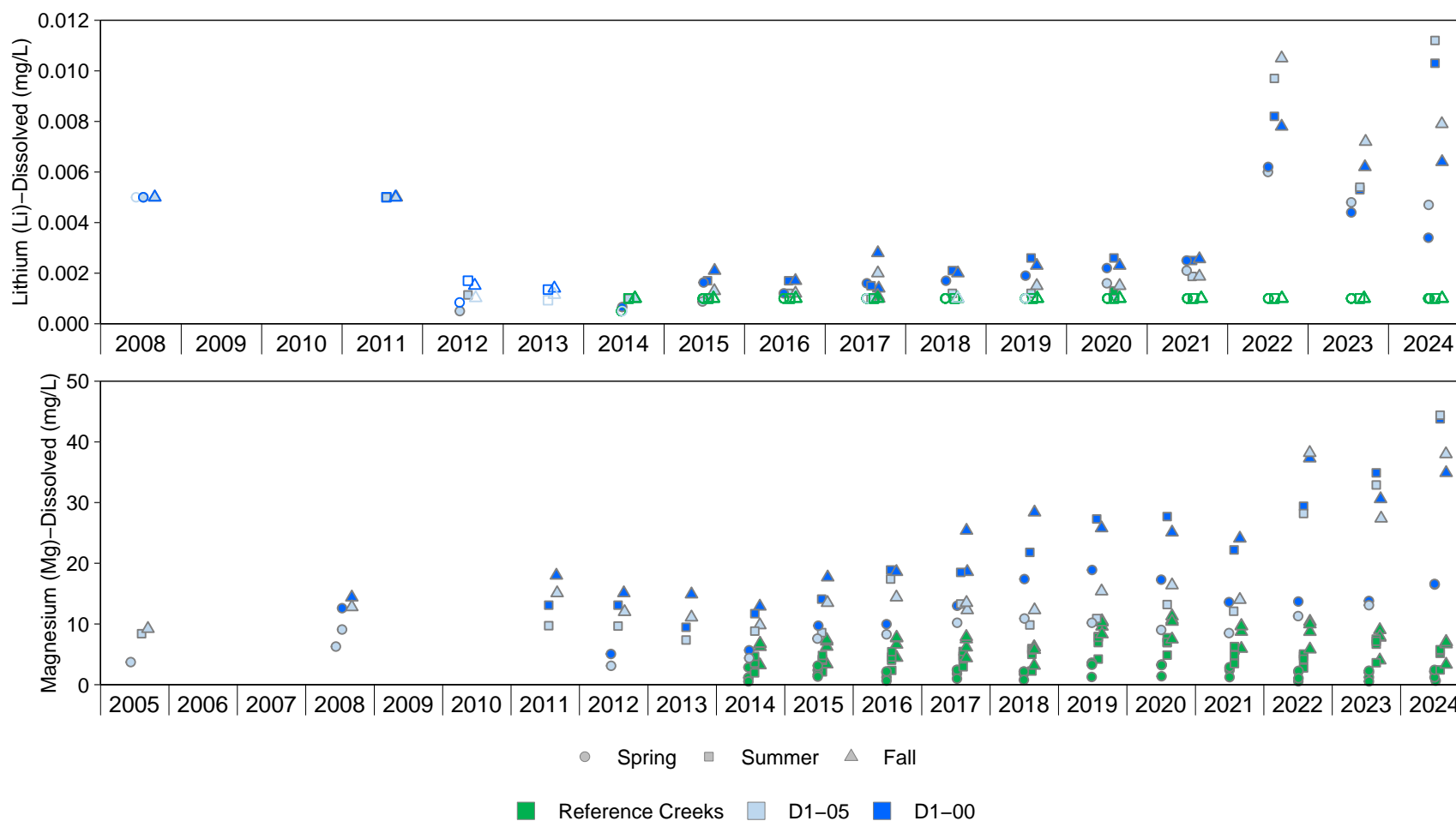


Figure H.2: Temporal Comparison of Total and Dissolved Cadmium, Lithium, Magnesium, Postassium and Strontium at Sheardown Lake Tributary 1 (SDLT1) Over Mine Baseline (2005 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Monthly means were plotted. When all values within a month in a given year are at the Laboratory Reporting Limit (LRL), the monthly mean is identified as a LRL and plotted as an open symbol. Reference creeks stations included CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3.

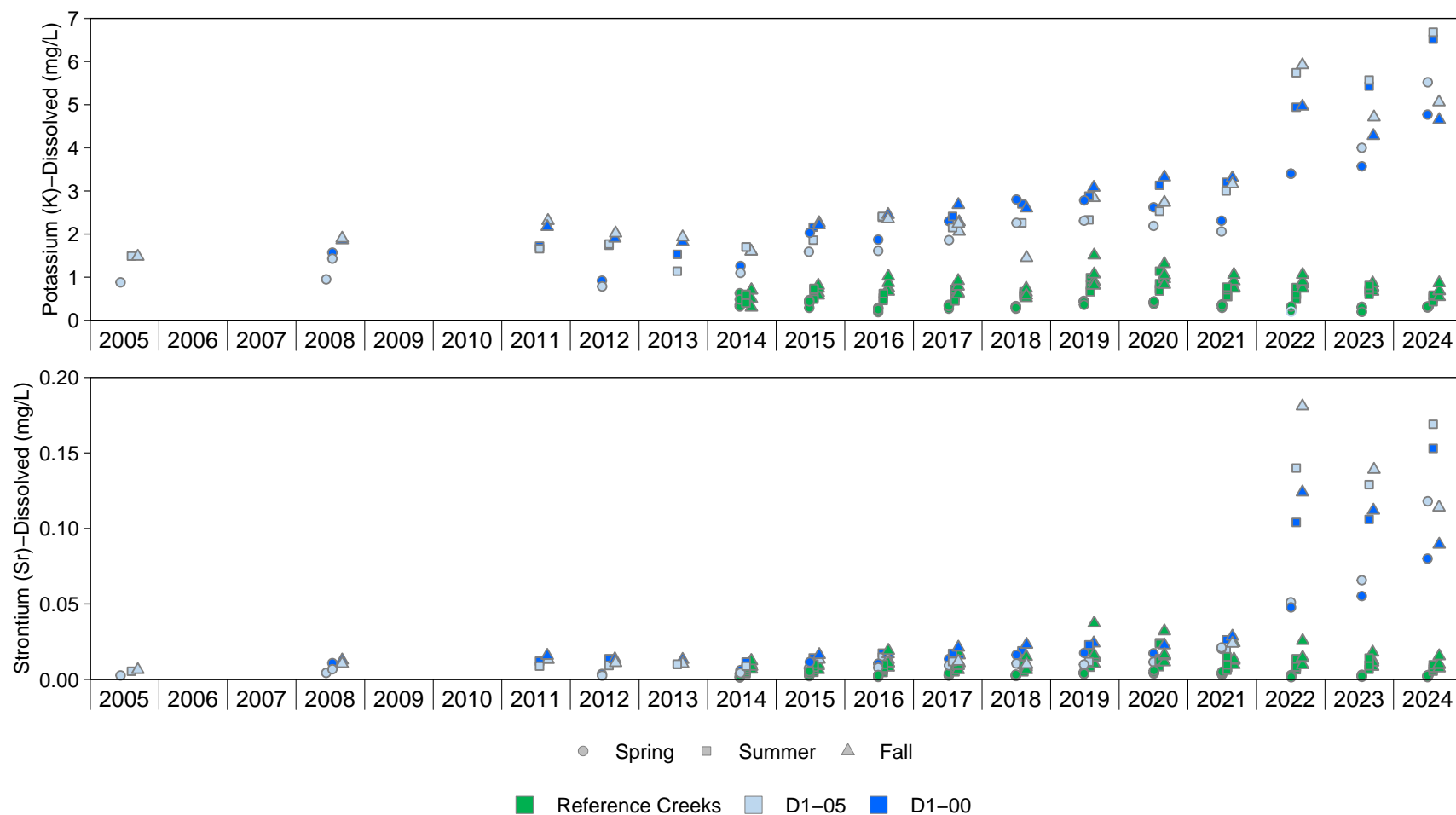


Figure H.2: Temporal Comparison of Total and Dissolved Cadmium, Lithium, Magnesium, Postassium and Strontium at Sheardown Lake Tributary 1 (SDLT1) Over Mine Baseline (2005 to 2013), Construction (2014), and Operations (2015 to 2024) Periods, Mary River Project CREMP

Notes: Monthly means were plotted. When all values within a month in a given year are at the Laboratory Reporting Limit (LRL), the monthly mean is identified as a LRL and plotted as an open symbol. Reference creeks stations included CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3.

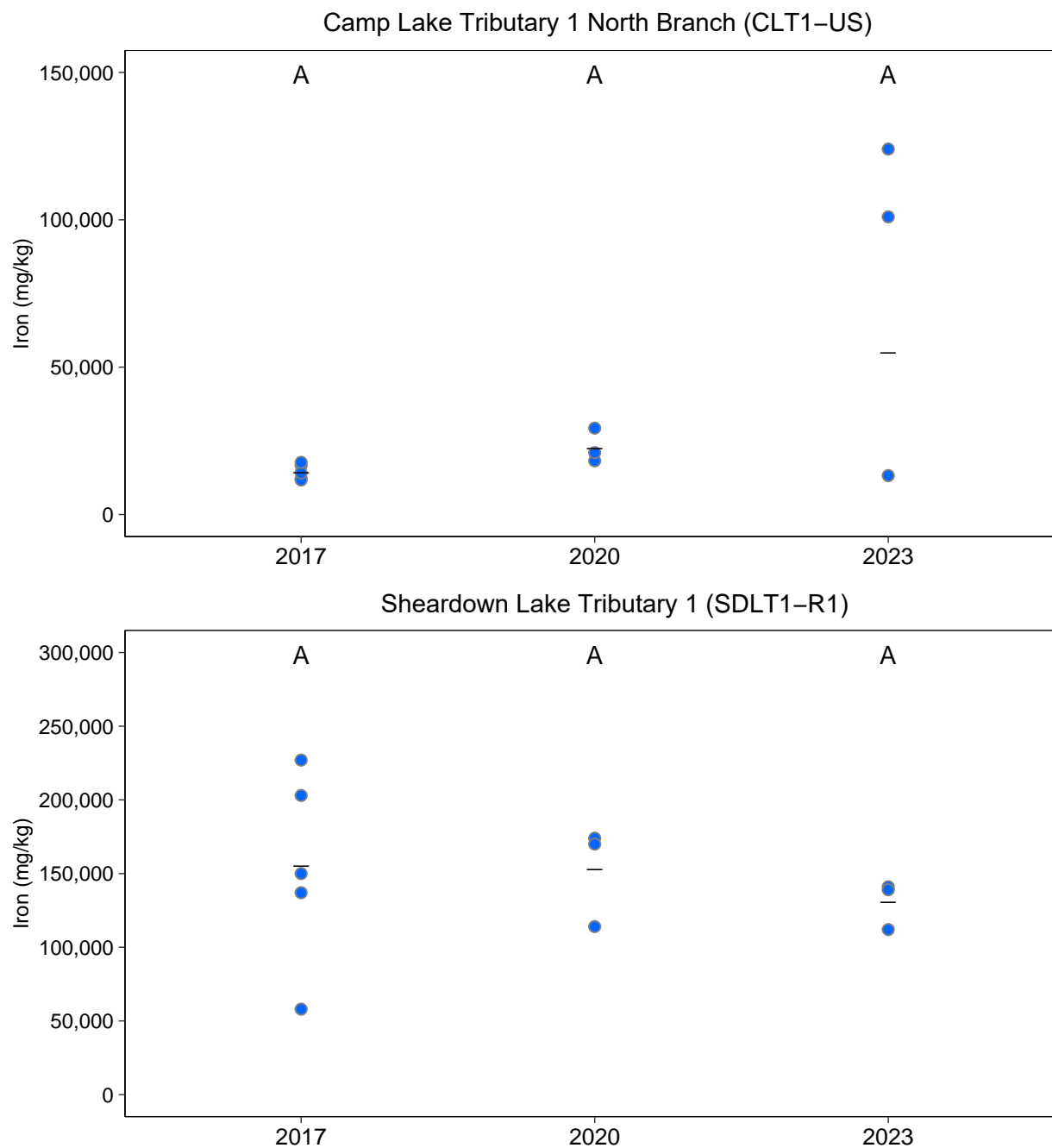


Figure H.3: Temporal Comparison of Sediment Iron (mg/kg) Concentration at Camp Lake Tributary 1 North Branch (CLT1-US) and Sheardown Lake Tributary 1 (SDLT1-R1), 2017 to 2023, Mary River Project CREMP

Notes: Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Years that do not share a letter (e.g. a,b,c) are significantly different ($\alpha = 0.05$) in a Tukey's HSD test following an ANOVA by year. Black bars represent Measure of Central Tendency (MCT) for each year.

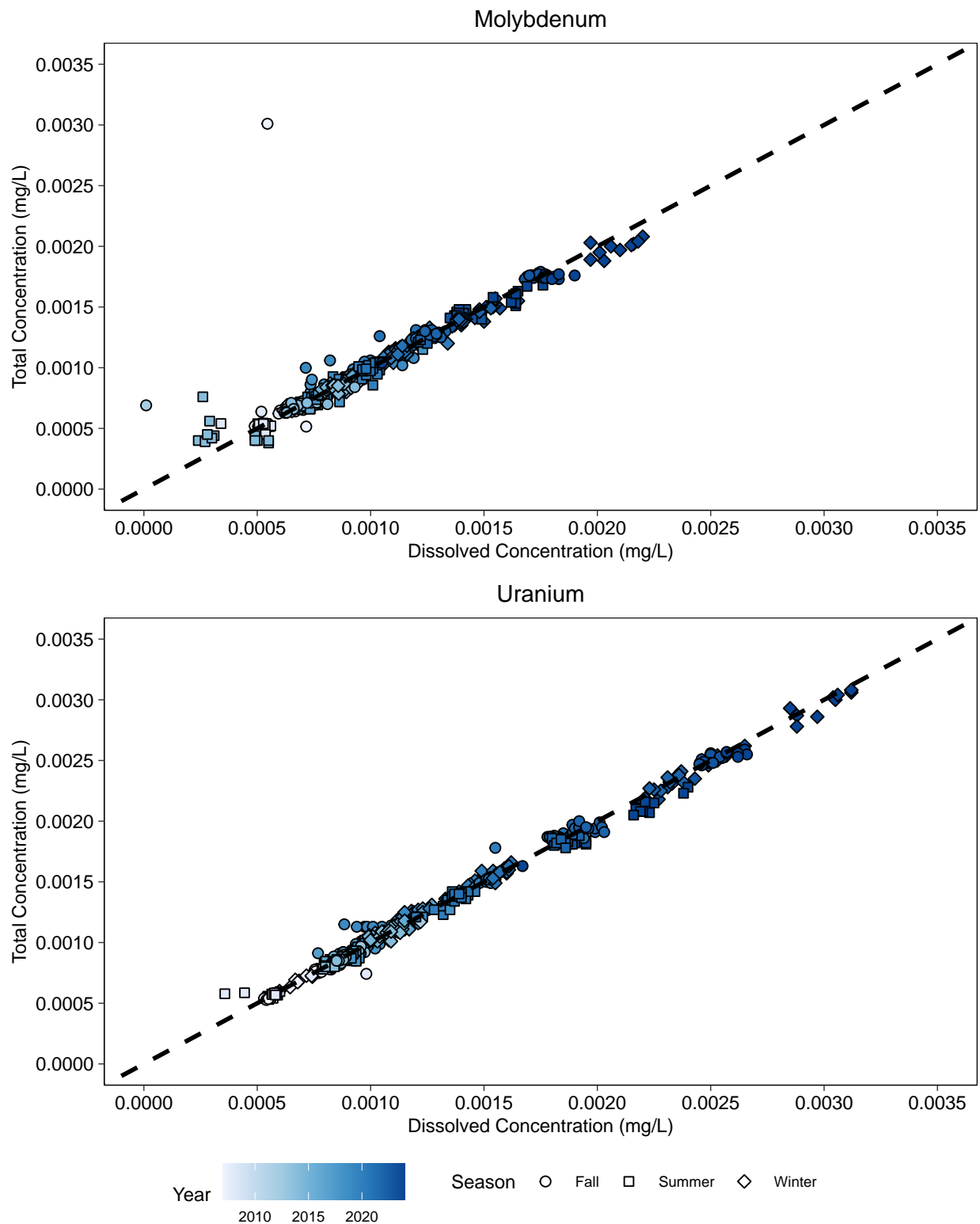


Figure H.4: Total:Dissolved Concentration Ratio for Molybdenum and Uranium at ShearNw 2006 to 2024

Notes: For each station, a concentration was collected at the surface and bottom of the water column. Values at the Laboratory Reporting Limit (LRL) were replaced with with the LRL. Black dashed line represents a 1:1 relationship.

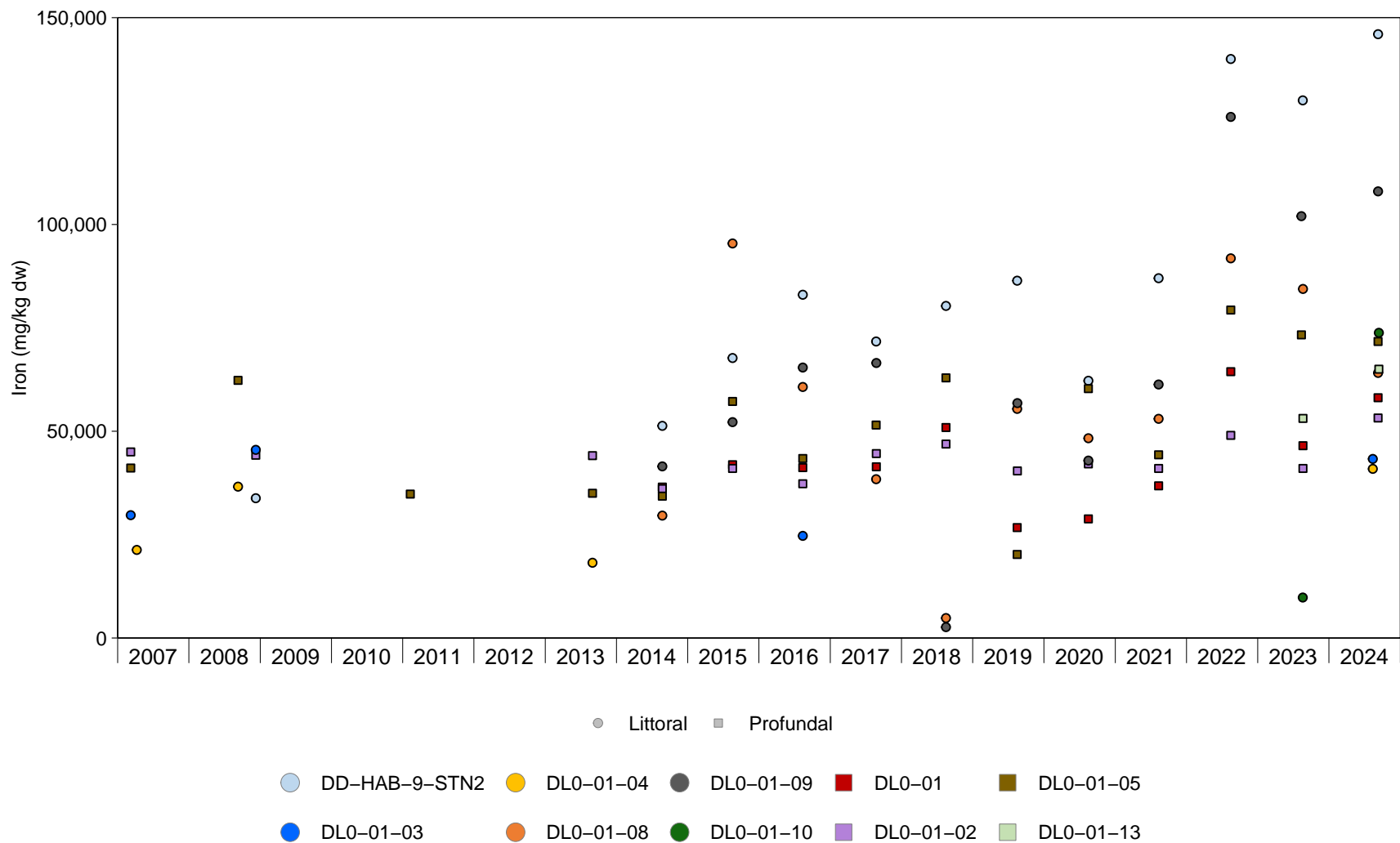


Figure H.5: Temporal Comparison of Sediment Iron Concentrations at Sheardown Lake Northwest (NW; DL0-01) Sediment Sampling Stations for Mine Baseline (2005 to 2013), Construction (2014), and Operation (2015 to 2024) Periods, Mary River Project CREMP

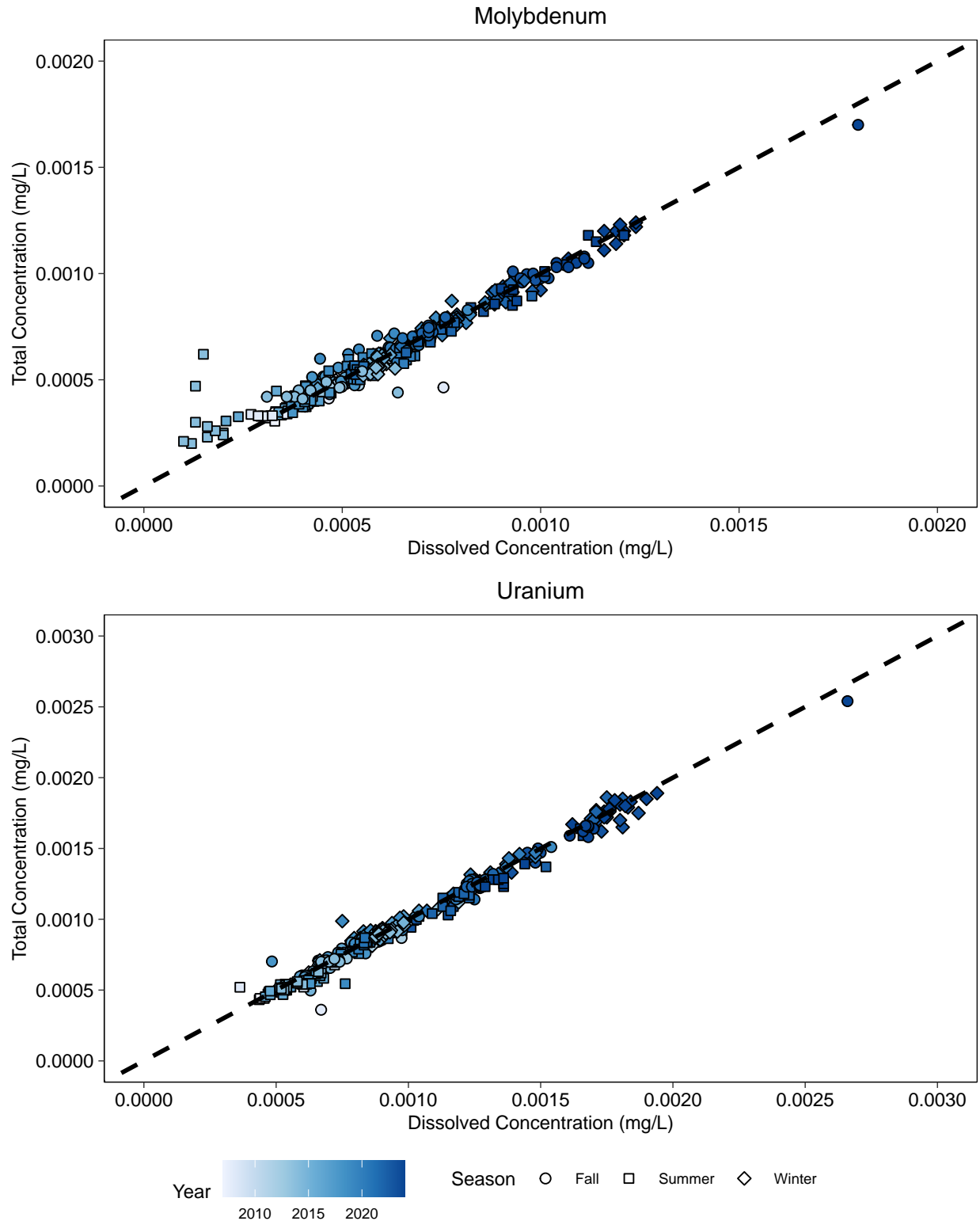


Figure H.6: Total:Dissolved Concentration Ratio for Molybdenum and Uranium at ShearSe 2006 to 2024

Notes: For each station, a concentration was collected at the surface and bottom of the water column. Values at the Laboratory Reporting Limit (LRL) were replaced with with the LRL. Black dashed line represents a 1:1 relationship.

Table H.1: Seasonal Kendall Trend Analysis for Surface Water Quality Monitoring Data, Camp Lake Tributary 1 (CLT1) Upper Main Stem and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), 2005 to 2024

Status	Station	Range of Years ^a	Season	Seasonal Kendall Trend																	
				Sulphate		Iron (Fe)-Total		Molybdenum (Mo)-Total		Sodium (Na)-Total		Uranium (U)-Total		Iron (Fe)-Dissolved		Molybdenum (Mo)-Dissolved		Sodium (Na)-Dissolved		Uranium (U)-Dissolved	
				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	CLT-REF3	(2014 - 2024)	Combined	NS	0.121	NS	0.650	3.19	0.048	4.25	0.017	NS	0.106	<LRL	<LRL	3.43	0.048	3.56	0.033	NS	0.150
		(2014 - 2024)	Spring	NS	0.685	NS	0.300	NS	0.876	NS	0.755	NS	0.640	<LRL	<LRL	NS	0.350	NS	0.810	NS	0.640
		(2014 - 2024)	Summer	6.43	0.013	NS	0.574	NS	0.161	6.76	0.024	11.9	0.029	<LRL	<LRL	NS	0.350	6.22	0.043	NS	0.062
		(2014 - 2024)	Fall	NS	0.585	NS	0.619	NS	0.087	NS	0.161	NS	0.276	<LRL	<LRL	NS	0.161	NS	0.213	NS	0.276
	CLT-REF4	(2014 - 2024)	Combined	NS	0.601	NS	0.775	NS	0.060	NS	0.369	NS	0.150	<LRL	<LRL	6.79	0.036	NS	0.257	NS	0.150
		(2014 - 2024)	Spring	NS	0.778	NS	0.300	NS	1.000	NS	0.276	NS	0.436	<LRL	<LRL	NS	0.702	NS	0.378	NS	0.350
		(2014 - 2024)	Summer	NS	0.436	NS	0.353	NS	0.087	NS	0.119	13.7	0.043	<LRL	<LRL	NS	0.119	NS	0.087	13.3	0.043
		(2014 - 2024)	Fall	NS	0.755	NS	0.610	NS	0.161	NS	0.276	NS	0.213	<LRL	<LRL	NS	0.161	NS	0.276	NS	0.161
	MRY-REF2	(2014 - 2024)	Combined	NS	0.750	NS	1.000	NS	0.147	NS	0.178	3.12	0.031	<LRL	<LRL	NS	0.416	NS	0.241	NS	0.106
		(2014 - 2024)	Spring	NS	0.747	NS	0.632	NS	1.000	NS	0.876	NS	0.755	<LRL	<LRL	NS	0.581	NS	0.753	NS	1.000
		(2014 - 2024)	Summer	NS	0.876	NS	0.688	NS	0.184	NS	0.161	7.49	0.043	<LRL	<LRL	NS	0.276	NS	0.119	NS	0.087
		(2014 - 2024)	Fall	NS	1.000	NS	1.000	NS	0.276	NS	0.276	NS	0.213	<LRL	<LRL	NS	0.390	NS	0.436	NS	0.276
	MRY-REF3	(2014 - 2024)	Combined	NS	0.964	8.66	0.003	NS	0.106	NS	0.126	3.72	0.025	NS	0.078	NS	0.163	NS	0.126	NS	0.589
		(2014 - 2024)	Spring	NS	0.694	14.4	0.001	NS	0.436	NS	0.876	NS	0.436	NS	1.000	NS	1.000	NS	0.755	NS	0.159
		(2014 - 2024)	Summer	NS	0.755	NS	0.276	NS	0.119	NS	0.087	NS	0.062	NS	0.062	NS	0.276	8.00	0.043	NS	0.119
		(2014 - 2024)	Fall	NS	0.876	NS	0.533	4.30	0.043	NS	0.276	NS	0.276	NS	0.338	NS	0.213	NS	0.350	NS	0.436
Mine-Exposed	L2-03	(2005 - 2024)	Combined	7.21	<0.001	5.66	<0.001	12.9	<0.001	6.14	0.003	18.8	<0.001	NS	0.946	11.6	<0.001	NS	0.072	20.6	<0.001
		(2005 - 2024)	Spring	NS	0.205	7.86	0.012	11.7	0.001	NS	0.063	14.7	0.004	NS	0.854	15.3	0.004	NS	0.246	14.4	0.006
		(2005 - 2024)	Summer	NS	0.053	NS	0.075	10.0	<0.001	NS	0.053	13.9	<0.001	NS	0.381	10.6	0.002	NS	0.250	14.4	<0.001
		(2005 - 2024)	Fall	6.29	0.010	6.16	0.029	7.72	0.008	NS	0.189	11.6	0.003	NS	0.582	NS	0.059	NS	0.502	11.1	0.004

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). "<LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

^a Range of years represents the range for all analytes in the table. The actual range may differ for any particular analyte.

Table H.2: Seasonal Kendall Trend Analysis for Surface Water Quality Monitoring Data, Camp Lake Tributary 1 (CLT1) Upper Main Stem and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), Operation Period (2015 to 2024)

Status	Station	Range of Years ^a	Season	Seasonal Kendall Trend																	
				Sulphate		Iron (Fe)-Total		Molybdenum (Mo)-Total		Sodium (Na)-Total		Uranium (U)-Total		Iron (Fe)-Dissolved		Molybdenum (Mo)-Dissolved		Sodium (Na)-Dissolved		Uranium (U)-Dissolved	
				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	CLT-REF3	(2015 - 2024)	Combined	NS	0.253	NS	0.591	NS	0.470	NS	0.163	NS	0.121	<LRL	<LRL	NS	0.409	NS	0.347	NS	0.256
		(2015 - 2024)	Spring	NS	0.651	NS	1.000	NS	0.592	NS	1.000	NS	1.000	<LRL	<LRL	NS	0.858	NS	0.712	NS	0.721
		(2015 - 2024)	Summer	6.13	0.032	NS	0.781	NS	0.474	NS	0.088	NS	0.074	<LRL	<LRL	NS	0.858	NS	0.152	NS	0.152
		(2015 - 2024)	Fall	NS	0.788	NS	0.257	NS	0.283	NS	0.474	NS	0.371	<LRL	<LRL	NS	0.371	NS	0.592	NS	0.371
	CLT-REF4	(2015 - 2024)	Combined	NS	0.701	NS	0.451	NS	0.154	NS	0.757	NS	0.215	<LRL	<LRL	NS	0.208	NS	0.676	NS	0.215
		(2015 - 2024)	Spring	NS	0.742	NS	1.000	NS	0.825	NS	0.474	NS	0.858	<LRL	<LRL	NS	0.913	NS	0.460	NS	0.721
		(2015 - 2024)	Summer	NS	0.283	NS	0.458	NS	0.283	NS	0.371	NS	0.152	<LRL	<LRL	NS	0.371	NS	0.283	NS	0.152
		(2015 - 2024)	Fall	NS	1.000	NS	0.635	NS	0.371	NS	0.721	NS	0.371	<LRL	<LRL	NS	0.371	NS	0.721	NS	0.283
	MRY-REF2	(2015 - 2024)	Combined	NS	0.959	NS	0.909	NS	0.404	NS	0.409	2.02	0.050	<LRL	<LRL	NS	0.755	NS	0.468	NS	0.179
		(2015 - 2024)	Spring	NS	0.719	NS	0.718	NS	0.783	NS	1.000	NS	0.283	<LRL	<LRL	NS	0.928	NS	1.000	NS	0.592
		(2015 - 2024)	Summer	NS	0.721	NS	1.000	NS	0.530	NS	0.371	NS	0.152	<LRL	<LRL	NS	0.721	NS	0.371	NS	0.283
		(2015 - 2024)	Fall	NS	0.928	NS	0.647	NS	0.721	NS	0.721	NS	0.474	<LRL	<LRL	NS	0.788	NS	0.858	NS	0.592
	MRY-REF3	(2015 - 2024)	Combined	NS	0.470	9.42	0.005	NS	0.535	NS	0.836	NS	0.302	NS	0.150	NS	0.877	NS	0.836	NS	0.717
		(2015 - 2024)	Spring	NS	0.283	14.1	0.004	NS	0.210	NS	0.283	NS	1.000	NS	0.909	NS	0.530	NS	0.210	NS	0.059
		(2015 - 2024)	Summer	NS	1.000	NS	0.152	NS	0.371	NS	0.283	NS	0.210	NS	0.141	NS	0.721	NS	0.152	NS	0.371
		(2015 - 2024)	Fall	NS	0.858	NS	0.721	NS	0.152	NS	0.721	NS	0.721	NS	0.323	NS	0.592	NS	0.858	NS	0.858
Mine-Exposed	L2-03	(2015 - 2024)	Combined	NS	0.066	NS	0.705	NS	0.051	NS	0.074	8.60	0.004	NS	0.255	NS	0.176	-4.16	0.023	7.99	0.011
		(2015 - 2024)	Spring	NS	0.178	NS	0.371	NS	0.152	NS	0.371	NS	0.210	NS	0.127	NS	0.152	NS	0.283	NS	0.283
		(2015 - 2024)	Summer	NS	0.152	NS	0.592	NS	0.059	NS	0.210	9.79	0.020	NS	0.592	NS	0.210	NS	0.127	10.3	0.049
		(2015 - 2024)	Fall	NS	>0.05	NS	>0.05	NS	>0.05	NS	>0.05	NS	>0.05	NS	>0.05	NS	>0.05	NS	>0.05	NS	>0.05

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). "<LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

^a Range of years represents the range for all analytes in the table. The actual range may differ for any particular analyte.

Table H.3: Seasonal Kendall Trend Analysis for Surface Water Quality Monitoring Data, Sheardown Lake Tributary 1 (SDLT1) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), 2005 to 2024

Status	Station	Range of Years ^a	Season	Seasonal Kendall Trend																							
				Chloride (Cl)		Nitrate (as N)		Sulphate		Aluminum (Al)-Total		Cadmium (Cd)-Total		Iron (Fe)-Total		Lithium (Li)-Total		Magnesium (Mg)-Total		Manganese (Mn)-Total		Potassium (K)-Total		Strontium (Sr)-Total		Uranium (U)-Total	
				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	Slope	P-Value	Slope	P-Value
Reference	CLT-REF3	(2014 - 2024)	Combined	NS	0.332	NS	0.360	NS	0.121	-4.01	0.039	<LRL	<LRL	NS	0.650	<LRL	<LRL	3.38	0.012	NS	0.590	NS	0.079	NS	0.059	NS	0.106
		(2014 - 2024)	Spring	NS	1.000	NS	1.000	NS	0.685	NS	0.087	<LRL	<LRL	NS	0.300	<LRL	<LRL	NS	0.755	NS	0.640	NS	0.482	NS	1.000	NS	0.640
		(2014 - 2024)	Summer	NS	0.454	NS	0.421	6.43	0.013	NS	0.640	<LRL	<LRL	NS	0.574	<LRL	<LRL	3.56	0.005	NS	0.436	2.98	0.035	6.00	0.020	11.9	0.029
		(2014 - 2024)	Fall	NS	0.509	NS	0.574	NS	0.585	-9.73	0.020	<LRL	<LRL	NS	0.619	<LRL	<LRL	NS	0.276	NS	0.755	NS	0.101	NS	0.350	NS	0.276
	CLT-REF4	(2014 - 2024)	Combined	NS	0.565	NS	0.582	NS	0.601	NS	0.472	<LRL	<LRL	NS	0.775	<LRL	<LRL	3.18	0.027	NS	0.185	NS	0.471	NS	0.059	NS	0.150
		(2014 - 2024)	Spring	NS	1.000	NS	1.000	NS	0.778	NS	0.640	<LRL	<LRL	NS	0.300	<LRL	<LRL	NS	0.754	NS	0.640	NS	0.389	NS	0.876	NS	0.436
		(2014 - 2024)	Summer	NS	0.373	NS	0.925	NS	0.436	NS	0.876	<LRL	<LRL	NS	0.353	<LRL	<LRL	4.53	0.020	NS	0.632	NS	0.310	6.27	0.029	13.7	0.043
		(2014 - 2024)	Fall	NS	1.000	NS	0.330	NS	0.755	NS	0.350	<LRL	<LRL	NS	0.610	<LRL	<LRL	NS	0.310	NS	0.230	NS	0.276	NS	0.213	NS	0.213
	MRY-REF2	(2014 - 2024)	Combined	NS	0.418	<LRL	<LRL	NS	0.750	NS	0.369	<LRL	<LRL	NS	1.000	<LRL	<LRL	NS	0.150	NS	0.529	NS	0.787	NS	0.300	3.12	0.031
		(2014 - 2024)	Spring	NS	0.533	<LRL	<LRL	NS	0.747	NS	0.436	<LRL	<LRL	NS	0.632	<LRL	<LRL	NS	0.876	NS	0.876	NS	0.138	NS	0.482	NS	0.755
		(2014 - 2024)	Summer	NS	0.119	<LRL	<LRL	NS	0.876	NS	0.640	<LRL	<LRL	NS	0.688	<LRL	<LRL	NS	0.062	NS	0.350	NS	0.585	NS	0.184	7.49	0.043
		(2014 - 2024)	Fall	NS	0.640	<LRL	<LRL	NS	1.000	NS	0.876	<LRL	<LRL	NS	1.000	<LRL	<LRL	NS	0.436	NS	0.755	NS	0.755	NS	0.241	NS	0.213
	MRY-REF3	(2014 - 2024)	Combined	NS	0.279	NS	0.213	NS	0.964	5.43	0.048	<LRL	<LRL	8.66	0.003	<LRL	<LRL	NS	0.150	7.41	0.025	NS	0.964	NS	0.177	3.72	0.025
		(2014 - 2024)	Spring	NS	0.753	NS	1.000	NS	0.694	8.12	0.013	<LRL	<LRL	14.4	0.001	<LRL	<LRL	NS	1.000	NS	0.087	NS	0.213	NS	1.000	NS	0.436
		(2014 - 2024)	Summer	NS	0.119	NS	0.075	NS	0.755	NS	0.436	<LRL	<LRL	NS	0.276	<LRL	<LRL	NS	0.087	NS	0.213	NS	0.273	NS	0.138	NS	0.062
		(2014 - 2024)	Fall	NS	0.533	NS	0.870	NS	0.876	NS	1.000	<LRL	<LRL	NS	0.533	<LRL	<LRL	NS	0.436	NS	0.436	NS	0.815	NS	0.390	NS	0.276
Mine-Exposed	D1-05	(2005 - 2024)	Combined	7.27	0.001	18.3	<0.001	15.9	<0.001	6.12	0.006	2.72	0.005	21.7	<0.001	19.0	<0.001	5.79	<0.001	8.08	0.006	7.93	<0.001	11.9	<0.001	10.0	<0.001
		(2005 - 2024)	Spring	20.2	0.012	16.1	<0.001	17.0	<0.001	9.04	0.025	NS	0.270	10.6	0.040	82.2	0.005	6.28	<0.001	9.25	0.006	9.43	<0.001	17.1	<0.001	6.55	<0.001
		(2005 - 2024)	Summer	9.50	0.048	30.9	<0.001	16.1	<0.001	NS	0.322	NS	0.181	NS	0.071	23.1	<0.001	8.17	0.001	NS	0.345	7.61	<0.001	14.4	<0.001	15.3	0.001
		(2005 - 2024)	Fall	NS	0.224	20.5	<0.001	12.5	<0.001	NS	0.126	3.37	0.026	NS	0.058	16.4	<0.001	5.81	0.001	NS	0.257	7.49	<0.001	7.63	0.002	10.4	0.004
	D1-00	(2008 - 2024)	Combined	11.4	<0.001	23.0	<0.001	16.9	<0.001	NS	0.051	6.67	<0.001	4.18	0.022	13.6	<0.001	8.34	<0.001	12.9	<0.001	8.88	<0.001	13.2	<0.001	11.4	<0.001
		(2008 - 2024)	Spring	11.4	0.002	15.3	<0.001	12.9	0.003	NS	0.583	NS	0.220	NS	0.100	15.5	<0.001	4.93	0.017	11.3	<0.001	9.22	<0.001	14.9	<0.001	6.13	0.024
		(2008 - 2024)	Summer	15.4	<0.001	22.8	<0.001	22.3	<0.001	NS	0.298	10.3	0.015	NS	0.351	16.2	<0.001	9.51	<0.001	17.4	<0.001	8.73	<0.001	14.3	<0.001	16.3	<0.001
		(2008 - 2024)	Fall	9.76	0.003	14.1	<0.001	14.9	<0.001	NS	0.113	9.00	0.010	NS	0.181	11.8	<0.001	7.24	<0.001	11.5	<0.001	9.14	<0.001	9.87	<0.001	10.9	<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). "<LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

^a Range of years represents the range for all analytes in the table. The actual range may differ for any particular analyte.

Table H.3: Seasonal Kendall Trend Analysis for Surface Water Quality Monitoring Data, Sheardown Lake Tributary 1 (SDLT1) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), 2005 to 2024

Status	Station	Range of Years ^a	Season	Seasonal Kendall Trend																	
				Aluminum (Al)-Dissolved		Cadmium (Cd)-Dissolved		Iron (Fe)-Dissolved		Lithium (Li)-Dissolved		Magnesium (Mg)-Dissolved		Manganese (Mn)-Dissolved		Potassium (K)-Dissolved		Strontium (Sr)-Dissolved		Uranium (U)-Dissolved	
				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	CLT-REF3	(2014 - 2024)	Combined	NS	0.621	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	2.46	0.034	NS	0.964	NS	0.260	3.30	0.039	NS	0.150
		(2014 - 2024)	Spring	NS	0.436	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.696	NS	0.810	NS	0.390	NS	0.755	NS	0.640
		(2014 - 2024)	Summer	NS	0.533	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	3.03	0.029	NS	1.000	NS	0.159	5.16	0.020	NS	0.062
		(2014 - 2024)	Fall	NS	0.310	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.350	NS	1.000	NS	0.161	NS	0.436	NS	0.276
	CLT-REF4	(2014 - 2024)	Combined	NS	0.279	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.106	4.12	0.021	NS	0.342	3.78	0.027	NS	0.150
		(2014 - 2024)	Spring	NS	0.390	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	1.000	NS	0.296	NS	0.875	NS	1.000	NS	0.350
		(2014 - 2024)	Summer	NS	1.000	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.062	NS	0.461	NS	0.347	5.32	0.020	13.3	0.043
		(2014 - 2024)	Fall	NS	0.387	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.350	4.60	0.038	NS	0.390	NS	0.184	NS	0.161
	MRY-REF2	(2014 - 2024)	Combined	NS	0.529	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.178	NS	0.337	NS	0.345	NS	0.323	NS	0.106
		(2014 - 2024)	Spring	NS	0.640	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.640	NS	1.000	NS	0.087	NS	0.533	NS	1.000
		(2014 - 2024)	Summer	NS	0.876	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.087	NS	0.575	NS	1.000	NS	0.276	NS	0.087
		(2014 - 2024)	Fall	NS	0.436	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.276	NS	0.276	NS	1.000	NS	0.213	NS	0.276
	MRY-REF3	(2014 - 2024)	Combined	NS	0.150	<LRL	<LRL	NS	0.078	<LRL	<LRL	NS	0.301	7.24	0.015	NS	0.928	NS	0.281	NS	0.589
		(2014 - 2024)	Spring	NS	1.000	<LRL	<LRL	NS	1.000	<LRL	<LRL	NS	0.815	NS	0.640	NS	0.099	NS	0.876	NS	0.159
		(2014 - 2024)	Summer	NS	0.119	<LRL	<LRL	NS	0.062	<LRL	<LRL	NS	0.087	NS	0.062	NS	0.350	NS	0.276	NS	0.119
		(2014 - 2024)	Fall	NS	0.436	<LRL	<LRL	NS	0.338	<LRL	<LRL	NS	0.755	NS	0.087	NS	0.390	NS	0.350	NS	0.436
Mine-Exposed	D1-05	(2005 - 2024)	Combined	NS	0.103	5.13	<0.001	NS	0.178	15.4	<0.001	5.40	<0.001	4.79	0.003	7.46	<0.001	12.1	<0.001	8.81	<0.001
		(2005 - 2024)	Spring	NS	0.546	NS	0.234	NS	0.253	41.7	0.043	5.99	<0.001	NS	0.096	9.72	<0.001	17.2	<0.001	5.81	0.001
		(2005 - 2024)	Summer	NS	0.552	16.0	0.006	NS	0.689	10.4	0.015	7.65	0.001	NS	0.142	8.78	<0.001	10.1	<0.001	17.2	0.001
		(2005 - 2024)	Fall	NS	0.147	5.60	0.002	NS	0.469	8.93	0.045	4.44	<0.001	NS	0.062	6.42	<0.001	8.02	<0.001	8.07	0.013
	D1-00	(2008 - 2024)	Combined	NS	0.173	7.45	<0.001	NS	0.727	13.1	<0.001	8.38	<0.001	12.9	<0.001	9.05	<0.001	13.0	<0.001	11.8	<0.001
		(2008 - 2024)	Spring	NS	0.760	4.62	0.038	NS	0.271	15.5	<0.001	4.66	0.012	10.3	<0.001	9.36	<0.001	15.9	<0.001	6.26	0.033
		(2008 - 2024)	Summer	NS	0.701	13.1	0.002	NS	0.578	16.7	<0.001	11.1	<0.001	19.9	0.001	9.26	<0.001	12.4	<0.001	17.0	<0.001
		(2008 - 2024)	Fall	NS	0.145	14.1	<0.001	NS	0.344	12.4	<0.001	6.58	<0.001	12.3	<0.001	8.49	<0.001	10.5	<0.001	10.2	<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). "<LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

^a Range of years represents the range for all analytes in the table. The actual range may differ for any particular analyte.

Table H.4: Seasonal Kendall Trend Analysis for Surface Water Quality Monitoring Data, Sheardown Lake Tributary 1 (SDLT1) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), Operation Period (2015 to 2024)

Status	Station	Range of Years ^a	Season	Seasonal Kendall Trend																							
				Chloride (Cl)		Nitrate (as N)		Sulphate		Aluminum (Al)-Total		Cadmium (Cd)-Total		Iron (Fe)-Total		Lithium (Li)-Total		Magnesium (Mg)-Total		Manganese (Mn)-Total		Potassium (K)-Total		Strontium (Sr)-Total		Uranium (U)-Total	
				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	Slope	P-Value	Slope	P-Value
Reference	CLT-REF3	(2014 - 2024)	Combined	NS	0.332	NS	0.360	NS	0.121	-4.01	0.039	<LRL	<LRL	NS	0.650	<LRL	<LRL	3.38	0.012	NS	0.590	NS	0.079	NS	0.059	NS	0.106
		(2014 - 2024)	Spring	NS	1.000	NS	1.000	NS	0.685	NS	0.087	<LRL	<LRL	NS	0.300	<LRL	<LRL	NS	0.755	NS	0.640	NS	0.482	NS	1.000	NS	0.640
		(2014 - 2024)	Summer	NS	0.454	NS	0.421	6.43	0.013	NS	0.640	<LRL	<LRL	NS	0.574	<LRL	<LRL	3.56	0.005	NS	0.436	2.98	0.035	6.00	0.020	11.9	0.029
		(2014 - 2024)	Fall	NS	0.509	NS	0.574	NS	0.585	-9.73	0.020	<LRL	<LRL	NS	0.619	<LRL	<LRL	NS	0.276	NS	0.755	NS	0.101	NS	0.350	NS	0.276
	CLT-REF4	(2014 - 2024)	Combined	NS	0.565	NS	0.582	NS	0.601	NS	0.472	<LRL	<LRL	NS	0.775	<LRL	<LRL	3.18	0.027	NS	0.185	NS	0.471	NS	0.059	NS	0.150
		(2014 - 2024)	Spring	NS	1.000	NS	1.000	NS	0.778	NS	0.640	<LRL	<LRL	NS	0.300	<LRL	<LRL	NS	0.754	NS	0.640	NS	0.389	NS	0.876	NS	0.436
		(2014 - 2024)	Summer	NS	0.373	NS	0.925	NS	0.436	NS	0.876	<LRL	<LRL	NS	0.353	<LRL	<LRL	4.53	0.020	NS	0.632	NS	0.310	6.27	0.029	13.7	0.043
		(2014 - 2024)	Fall	NS	1.000	NS	0.330	NS	0.755	NS	0.350	<LRL	<LRL	NS	0.610	<LRL	<LRL	NS	0.310	NS	0.230	NS	0.276	NS	0.213	NS	0.213
	MRY-REF2	(2014 - 2024)	Combined	NS	0.418	<LRL	<LRL	NS	0.750	NS	0.369	<LRL	<LRL	NS	1.000	<LRL	<LRL	NS	0.150	NS	0.529	NS	0.787	NS	0.300	3.12	0.031
		(2014 - 2024)	Spring	NS	0.533	<LRL	<LRL	NS	0.747	NS	0.436	<LRL	<LRL	NS	0.632	<LRL	<LRL	NS	0.876	NS	0.876	NS	0.138	NS	0.482	NS	0.755
		(2014 - 2024)	Summer	NS	0.119	<LRL	<LRL	NS	0.876	NS	0.640	<LRL	<LRL	NS	0.688	<LRL	<LRL	NS	0.062	NS	0.350	NS	0.585	NS	0.184	7.49	0.043
		(2014 - 2024)	Fall	NS	0.640	<LRL	<LRL	NS	1.000	NS	0.876	<LRL	<LRL	NS	1.000	<LRL	<LRL	NS	0.436	NS	0.755	NS	0.755	NS	0.241	NS	0.213
	MRY-REF3	(2014 - 2024)	Combined	NS	0.279	NS	0.213	NS	0.964	5.43	0.048	<LRL	<LRL	8.66	0.003	<LRL	<LRL	NS	0.150	7.41	0.025	NS	0.964	NS	0.177	3.72	0.025
		(2014 - 2024)	Spring	NS	0.753	NS	1.000	NS	0.694	8.12	0.013	<LRL	<LRL	14.4	0.001	<LRL	<LRL	NS	1.000	NS	0.087	NS	0.213	NS	1.000	NS	0.436
		(2014 - 2024)	Summer	NS	0.119	NS	0.075	NS	0.755	NS	0.436	<LRL	<LRL	NS	0.276	<LRL	<LRL	NS	0.087	NS	0.213	NS	0.273	NS	0.138	NS	0.062
		(2014 - 2024)	Fall	NS	0.533	NS	0.870	NS	0.876	NS	1.000	<LRL	<LRL	NS	0.533	<LRL	<LRL	NS	0.436	NS	0.436	NS	0.815	NS	0.390	NS	0.276
Mine-Exposed	D1-05	(2005 - 2024)	Combined	7.27	0.001	18.3	<0.001	15.9	<0.001	6.12	0.006	2.72	0.005	21.7	<0.001	19.0	<0.001	5.79	<0.001	8.08	0.006	7.93	<0.001	11.9	<0.001	10.0	<0.001
		(2005 - 2024)	Spring	20.2	0.012	16.1	<0.001	17.0	<0.001	9.04	0.025	NS	0.270	10.6	0.040	82.2	0.005	6.28	<0.001	9.25	0.006	9.43	<0.001	17.1	<0.001	6.55	<0.001
		(2005 - 2024)	Summer	9.50	0.048	30.9	<0.001	16.1	<0.001	NS	0.322	NS	0.181	NS	0.071	23.1	<0.001	8.17	0.001	NS	0.345	7.61	<0.001	14.4	<0.001	15.3	0.001
		(2005 - 2024)	Fall	NS	0.224	20.5	<0.001	12.5	<0.001	NS	0.126	3.37	0.026	NS	0.058	16.4	<0.001	5.81	0.001	NS	0.257	7.49	<0.001	7.63	0.002	10.4	0.004
	D1-00	(2008 - 2024)	Combined	11.4	<0.001	23.0	<0.001	16.9	<0.001	NS	0.051	6.67	<0.001	4.18	0.022	13.6	<0.001	8.34	<0.001	12.9	<0.001	8.88	<0.001	13.2	<0.001	11.4	<0.001
		(2008 - 2024)	Spring	11.4	0.002	15.3	<0.001	12.9	0.003	NS	0.583	NS	0.220	NS	0.100	15.5	<0.001	4.93	0.017	11.3	<0.001	9.22	<0.001	14.9	<0.001	6.13	0.024
		(2008 - 2024)	Summer	15.4	<0.001	22.8	<0.001	22.3	<0.001	NS	0.298	10.3	0.015	NS	0.351	16.2	<0.001	9.51	<0.001	17.4	<0.001	8.73	<0.001	14.3	<0.001	16.3	<0.001
		(2008 - 2024)	Fall	9.76	0.003	14.1	<0.001	14.9	<0.001	NS	0.113	9.00	0.010	NS	0.181	11.8	<0.001	7.24	<0.001	11.5	<0.001	9.14	<0.001	9.87	<0.001	10.9	<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). "<LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

^a Range of years represents the range for all analytes in the table. The actual range may differ for any particular analyte.

Table H.4: Seasonal Kendall Trend Analysis for Surface Water Quality Monitoring Data, Sheardown Lake Tributary 1 (SDLT1) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), Operation Period (2015 to 2024)

Status	Station	Range of Years ^a	Season	Seasonal Kendall Trend																	
				Aluminum (Al)-Dissolved		Cadmium (Cd)-Dissolved		Iron (Fe)-Dissolved		Lithium (Li)-Dissolved		Magnesium (Mg)-Dissolved		Manganese (Mn)-Dissolved		Potassium (K)-Dissolved		Strontium (Sr)-Dissolved		Uranium (U)-Dissolved	
				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	CLT-REF3	(2014 - 2024)	Combined	NS	0.621	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	2.46	0.034	NS	0.964	NS	0.260	3.30	0.039	NS	0.150
		(2014 - 2024)	Spring	NS	0.436	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.696	NS	0.810	NS	0.390	NS	0.755	NS	0.640
		(2014 - 2024)	Summer	NS	0.533	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	3.03	0.029	NS	1.000	NS	0.159	5.16	0.020	NS	0.062
		(2014 - 2024)	Fall	NS	0.310	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.350	NS	1.000	NS	0.161	NS	0.436	NS	0.276
	CLT-REF4	(2014 - 2024)	Combined	NS	0.279	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.106	4.12	0.021	NS	0.342	3.78	0.027	NS	0.150
		(2014 - 2024)	Spring	NS	0.390	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	1.000	NS	0.296	NS	0.875	NS	1.000	NS	0.350
		(2014 - 2024)	Summer	NS	1.000	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.062	NS	0.461	NS	0.347	5.32	0.020	13.3	0.043
		(2014 - 2024)	Fall	NS	0.387	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.350	4.60	0.038	NS	0.390	NS	0.184	NS	0.161
	MRY-REF2	(2014 - 2024)	Combined	NS	0.529	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.178	NS	0.337	NS	0.345	NS	0.323	NS	0.106
		(2014 - 2024)	Spring	NS	0.640	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.640	NS	1.000	NS	0.087	NS	0.533	NS	1.000
		(2014 - 2024)	Summer	NS	0.876	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.087	NS	0.575	NS	1.000	NS	0.276	NS	0.087
		(2014 - 2024)	Fall	NS	0.436	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	NS	0.276	NS	0.276	NS	1.000	NS	0.213	NS	0.276
	MRY-REF3	(2014 - 2024)	Combined	NS	0.150	<LRL	<LRL	NS	0.078	<LRL	<LRL	NS	0.301	7.24	0.015	NS	0.928	NS	0.281	NS	0.589
		(2014 - 2024)	Spring	NS	1.000	<LRL	<LRL	NS	1.000	<LRL	<LRL	NS	0.815	NS	0.640	NS	0.099	NS	0.876	NS	0.159
		(2014 - 2024)	Summer	NS	0.119	<LRL	<LRL	NS	0.062	<LRL	<LRL	NS	0.087	NS	0.062	NS	0.350	NS	0.276	NS	0.119
		(2014 - 2024)	Fall	NS	0.436	<LRL	<LRL	NS	0.338	<LRL	<LRL	NS	0.755	NS	0.087	NS	0.390	NS	0.350	NS	0.436
Mine-Exposed	D1-05	(2005 - 2024)	Combined	NS	0.103	5.13	<0.001	NS	0.178	15.4	<0.001	5.40	<0.001	4.79	0.003	7.46	<0.001	12.1	<0.001	8.81	<0.001
		(2005 - 2024)	Spring	NS	0.546	NS	0.234	NS	0.253	41.7	0.043	5.99	<0.001	NS	0.096	9.72	<0.001	17.2	<0.001	5.81	0.001
		(2005 - 2024)	Summer	NS	0.552	16.0	0.006	NS	0.689	10.4	0.015	7.65	0.001	NS	0.142	8.78	<0.001	10.1	<0.001	17.2	0.001
		(2005 - 2024)	Fall	NS	0.147	5.60	0.002	NS	0.469	8.93	0.045	4.44	<0.001	NS	0.062	6.42	<0.001	8.02	<0.001	8.07	0.013
	D1-00	(2008 - 2024)	Combined	NS	0.173	7.45	<0.001	NS	0.727	13.1	<0.001	8.38	<0.001	12.9	<0.001	9.05	<0.001	13.0	<0.001	11.8	<0.001
		(2008 - 2024)	Spring	NS	0.760	4.62	0.038	NS	0.271	15.5	<0.001	4.66	0.012	10.3	<0.001	9.36	<0.001	15.9	<0.001	6.26	0.033
		(2008 - 2024)	Summer	NS	0.701	13.1	0.002	NS	0.578	16.7	<0.001	11.1	<0.001	19.9	0.001	9.26	<0.001	12.4	<0.001	17.0	<0.001
		(2008 - 2024)	Fall	NS	0.145	14.1	<0.001	NS	0.344	12.4	<0.001	6.58	<0.001	12.3	<0.001	8.49	<0.001	10.5	<0.001	10.2	<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). "<LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

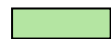
^a Range of years represents the range for all analytes in the table. The actual range may differ for any particular analyte.

Table H.5: Seasonal Kendall Trend Analysis for Sulphate Concentrations from Surface Water Quality Monitoring Data, Sheardown Lake Tributary 12 (SDLT12) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), 2005 to 2024

Status	Station	Range of Years ^a	Season	Seasonal Kendall Trend	
				Sulphate	
				Slope	P-Value
Reference	CLT-REF3	(2014 - 2024)	Combined	NS	0.121
		(2014 - 2024)	Spring	NS	0.685
		(2014 - 2024)	Summer	6.43	0.013
		(2014 - 2024)	Fall	NS	0.585
	CLT-REF4	(2014 - 2024)	Combined	NS	0.601
		(2014 - 2024)	Spring	NS	0.778
		(2014 - 2024)	Summer	NS	0.436
		(2014 - 2024)	Fall	NS	0.755
	MRY-REF2	(2014 - 2024)	Combined	NS	0.750
		(2014 - 2024)	Spring	NS	0.747
		(2014 - 2024)	Summer	NS	0.876
		(2014 - 2024)	Fall	NS	1.000
	MRY-REF3	(2014 - 2024)	Combined	NS	0.964
		(2014 - 2024)	Spring	NS	0.694
		(2014 - 2024)	Summer	NS	0.755
		(2014 - 2024)	Fall	NS	0.876
Mine-Exposed	LDFG-OUT	(2007 - 2024)	Combined	26.5	<0.05
		(2007 - 2024)	Spring	21.8	<0.05
		(2007 - 2024)	Summer	ND	ND
		(2007 - 2024)	Fall	ND	ND



P-value < 0.05



Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at $\alpha = 0.05$). 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 $\alpha = 0.05$). 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 $\alpha = 0.05$). "<LRL" indicates analyses not conducted because > 75% of data is below the detection limit. "ND" indicates analyses not conducted because less than 5 years of data.

^a Range of years represents the range for all analytes in the table. The actual range may differ for any particular analyte.

Table H.6: Seasonal Kendall Trend Analysis for Sulphate Concentrations from Surface Water Quality Monitoring Data, Sheardown Lake Tributary 12 (SDLT12) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), Operation Period (2015 to 2024)

Status	Station	Range of Years ^a	Season	Seasonal Kendall Trend	
				Sulphate	
				Slope	P-Value
Reference	CLT-REF3	(2015 - 2024)	Combined	NS	0.253
		(2015 - 2024)	Spring	NS	0.651
		(2015 - 2024)	Summer	6.13	0.032
		(2015 - 2024)	Fall	NS	0.788
	CLT-REF4	(2015 - 2024)	Combined	NS	0.701
		(2015 - 2024)	Spring	NS	0.742
		(2015 - 2024)	Summer	NS	0.283
		(2015 - 2024)	Fall	NS	1.000
	MRY-REF2	(2015 - 2024)	Combined	NS	0.959
		(2015 - 2024)	Spring	NS	0.719
		(2015 - 2024)	Summer	NS	0.721
		(2015 - 2024)	Fall	NS	0.928
	MRY-REF3	(2015 - 2024)	Combined	NS	0.470
		(2015 - 2024)	Spring	NS	0.283
		(2015 - 2024)	Summer	NS	1.000
		(2015 - 2024)	Fall	NS	0.858
Mine-Exposed	LDFG-OUT	(2017 - 2024)	Combined	NS	>0.05
		(2017 - 2024)	Spring	NS	>0.05



P-value < 0.05



Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at $\alpha = 0.05$). 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 $\alpha = 0.05$). 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 $\alpha = 0.05$). "<LRL" indicates analyses not conducted because > 75% of data is below the detection limit.

^a Range of years represents the range for all analytes in the table. The actual range may differ for any particular analyte.

Table H.7: Statistical Comparison of Iron Concentration Between Years on Camp Lake Tributary 1 North Branch (CLT1-US) and Sheardown Lake Tributary 1 (SDLT1-R1), 2017 to 2024

Station	Statistical Test Results				Pairwise Comparisons			Summary Statistics						
	Statistical Analysis ^a	Transformation	Significant Difference Between Years?	Year P-value	Comparisons	P-value	MOD ^b	Year	Sample Size (n)	Mean	Standard Deviation	Standard Error	Minimum	Maximum
CLT1-US	ANOVA	log10	NO	0.060	2017 vs. 2020	ns	ns	2017	5	14,480	2,663	1,191	11,700	17,700
					2017 vs. 2023	ns	ns	2020	3	22,833	5,773	3,333	18,200	29,300
					2020 vs. 2023	ns	ns	2023	3	79,400	58,473	33,759	13,200	124,000
SDLT1-R1	ANOVA	none	NO	0.791	2017 vs. 2020	ns	ns	2017	5	155,000	65,662	29,365	58,000	227,000
					2017 vs. 2023	ns	ns	2020	3	152,667	33,546	19,368	114,000	174,000
					2020 vs. 2023	ns	ns	2023	3	130,667	16,197	9,351	112,000	141,000



Indicates negative MOD.



Indicates positive MOD.



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

^a Statistical tests included ANOVA (Analysis of Variance, assuming equal variances and normal distribution), and K-W (Kruskal-Wallis, assuming unequal variances and non-normal distribution).

^b MOD is calculated as: $(MCT_{\text{later year}} - MCT_{\text{earlier year}}) / MCT_{\text{earlier year}} \times 100 \%$, where the MCT was the measure of central tendency calculated to match the analysis (mean for untransformed, geometric mean for log10 transformed)

Table H.8: Trend Analysis for Iron Concentrations in Sediments from Littoral and Profundal Stations in Sheardown Lake Northwest and Reference Lake 3, 2007 to 2024

Status	Lake	Station Type	Range of Years Included in Analysis	Trend Analysis Results	
				Iron Concentrations	
				Slope	P-Value
Reference	Reference Lake 3	Littoral	2015 - 2024	NS	0.472
		Profundal	2015 - 2024	NS	0.810
Mine-Exposed	Sheardown Lake Northwest	Littoral	2007 - 2024	9.21	<0.001
		Profundal	2007 - 2024	2.15	0.020



P-value < 0.05.



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



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

Note: "NS" = no significant temporal trend (Mann Kendall test for monotonic trend at $\alpha = 0.05$).

Table H.9: Trend Analysis for Iron Concentrations in Sediments from Littoral and Profundal Stations in Sheardown Lake Northwest and Reference Lake 3 During Mine Operations (2015 to 2024)

Status	Lake	Station Type	Range of Years Included in Analysis	Trend Analysis Results	
				Iron Concentrations	
				Slope	P-Value
Reference	Reference Lake 3	Littoral	2015 - 2024	NS	0.472
		Profundal	2015 - 2024	NS	0.810
Mine-Exposed	Sheardown Lake Northwest	Littoral	2015 - 2024	9.14	0.005
		Profundal	2015 - 2024	3.66	0.023



P-value < 0.05.



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






Significant increasing temporal trend (Mann Kendall test for monotonic trend at $\alpha = 0.05$). 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 $\alpha = 0.05$).

Table H.10: Trend Analysis for Iron Concentrations in Sediments from Littoral and Profundal Stations in Sheardown Lake Northwest and Reference Lake 3 During Mine Operation (2015 to 2024)




Status	Station	Station Type	Range of Years Included in the Analysis	Trend Analysis Results	
				Iron Concentrations	
				Slope	P-Value
Reference	REF-03-1	Littoral	2015 - 2024	NS	0.474
	REF-03-2	Littoral	2015 - 2024	NS	0.474
	REF-03-3	Littoral	2015 - 2024	NS	0.592
	REF-03-4	Littoral	2015 - 2024	NS	0.474
	REF-03-5	Littoral	2015 - 2024	NS	0.858
	REF-03-6	Profundal	2015 - 2024	NS	1.000
	REF-03-7	Profundal	2015 - 2024	NS	1.000
	REF-03-8	Profundal	2015 - 2024	NS	0.178
	REF-03-9	Profundal	2015 - 2024	NS	0.323
	REF-03-10	Profundal	2015 - 2024	NS	0.858
Mine-Exposed	DD-HAB-9-STN2	Littoral	2015 - 2024	9.30	0.012
	DL0-01-3	Littoral	2016 - 2024	ND	ND
	DL0-01-4	Littoral	2024 - 2024	ND	ND
	DL0-01-8	Littoral	2015 - 2024	NS	0.721
	DL0-01-9	Littoral	2015 - 2024	NS	0.107
	DL0-01-10	Littoral	2023 - 2024	ND	ND
	DL0-01	Profundal	2015 - 2024	NS	0.371
	DL0-01-2	Profundal	2015 - 2024	NS	0.174
	DL0-01-5	Profundal	2015 - 2024	NS	0.152
	DL0-01-13	Profundal	2023 - 2024	ND	ND

-  P-value < 0.05.
-  Significant decreasing temporal trend (Mann Kendall test for monotonic trend at $\alpha = 0.05$). 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 $\alpha = 0.05$). 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 $\alpha = 0.05$). "ND" = not enough data for a robust analysis.

Table H.11: Trend Analysis for Iron Concentrations in Sediments from Littoral and Profundal Stations in Sheardown Lake Northwest and Reference Lake 3 Since Baseline (2007 to 2024)


Status	Station	Station Type	Range of Years Included in the Analysis	Trend Analysis Results	
				Iron Concentrations	
				Slope	P-Value
Reference	REF-03-1	Littoral	2015 - 2024	NS	0.474
	REF-03-2	Littoral	2015 - 2024	NS	0.474
	REF-03-3	Littoral	2015 - 2024	NS	0.592
	REF-03-4	Littoral	2015 - 2024	NS	0.474
	REF-03-5	Littoral	2015 - 2024	NS	0.858
	REF-03-6	Profundal	2015 - 2024	NS	1.000
	REF-03-7	Profundal	2015 - 2024	NS	1.000
	REF-03-8	Profundal	2015 - 2024	NS	0.178
	REF-03-9	Profundal	2015 - 2024	NS	0.323
	REF-03-10	Profundal	2015 - 2024	NS	0.858
Mine-Exposed	DD-HAB-9-STN2	Littoral	2008 - 2024	8.59	<0.001
	DL0-01-3	Littoral	2007 - 2024	ND	ND
	DL0-01-4	Littoral	2007 - 2024	ND	ND
	DL0-01-8	Littoral	2014 - 2024	NS	0.350
	DL0-01-9	Littoral	2014 - 2024	10.2	0.043
	DL0-01-10	Littoral	2023 - 2024	ND	ND
	DL0-01	Profundal	2014 - 2024	NS	0.213
	DL0-01-2	Profundal	2007 - 2024	NS	0.545
	DL0-01-5	Profundal	2007 - 2024	3.91	0.048
	DL0-01-13	Profundal	2023 - 2024	ND	ND


-  P-value < 0.05.
-  Significant decreasing temporal trend (Mann Kendall test for monotonic trend at $\alpha = 0.05$). 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 $\alpha = 0.05$). 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 $\alpha = 0.05$). "ND" = not enough data for a robust analysis.

Table H.12: Seasonal Kendall Trend Analysis for Sulphate Concentrations from Surface Water Quality Monitoring Data, Mary River Tributary F (MRTF) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), 2005 to 2024

Status	Station	Range of Years ^a	Season	Seasonal Kendall Trend			
				Nitrate (as N)		Sulphate	
				Slope	P-Value	Slope	P-Value
Reference	CLT-REF3	(2014 - 2024)	Combined	NS	0.360	NS	0.121
		(2014 - 2024)	Spring	NS	1.000	NS	0.685
		(2014 - 2024)	Summer	NS	0.421	6.43	0.013
		(2014 - 2024)	Fall	NS	0.574	NS	0.585
	CLT-REF4	(2014 - 2024)	Combined	NS	0.582	NS	0.601
		(2014 - 2024)	Spring	NS	1.000	NS	0.778
		(2014 - 2024)	Summer	NS	0.925	NS	0.436
		(2014 - 2024)	Fall	NS	0.330	NS	0.755
	MRY-REF2	(2014 - 2024)	Combined	<LRL	<LRL	NS	0.750
		(2014 - 2024)	Spring	<LRL	<LRL	NS	0.747
		(2014 - 2024)	Summer	<LRL	<LRL	NS	0.876
		(2014 - 2024)	Fall	<LRL	<LRL	NS	1.000
	MRY-REF3	(2014 - 2024)	Combined	NS	0.213	NS	0.964
		(2014 - 2024)	Spring	NS	1.000	NS	0.694
		(2014 - 2024)	Summer	NS	0.075	NS	0.755
		(2014 - 2024)	Fall	NS	0.870	NS	0.876
Mine-Exposed	F0-01	(2005 - 2024)	Combined	13.6	<0.001	32.9	<0.001
		(2005 - 2024)	Spring	20.5	0.004	12.8	<0.001
		(2005 - 2024)	Summer	17.6	<0.001	50.0	<0.001
		(2005 - 2024)	Fall	21.9	<0.001	41.7	<0.001

 P-value < 0.05

 Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at $\alpha = 0.05$). 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 $\alpha = 0.05$). 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 $\alpha = 0.05$), 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.

^a Range of years represents the range for all analytes in the table. The actual range may differ for any particular analyte.

Table H.13: Seasonal Kendall Trend Analysis for Sulphate Concentrations from Surface Water Quality Monitoring Data, Mary River Tributary F (MRTF) and Reference Creek Stations (CLT-REF3, CLT-REF4, MRY-REF2, MRY-REF3), Operation Period (2015 to 2024)

Status	Station	Range of Years ^a	Season	Seasonal Kendall Trend			
				Nitrate (as N)		Sulphate	
				Slope	P-Value	Slope	P-Value
Reference	CLT-REF3	(2015 - 2024)	Combined	NS	0.346	NS	0.253
		(2015 - 2024)	Spring	NS	1.000	NS	0.651
		(2015 - 2024)	Summer	NS	0.356	6.13	0.032
		(2015 - 2024)	Fall	NS	0.652	NS	0.788
	CLT-REF4	(2015 - 2024)	Combined	NS	0.519	NS	0.701
		(2015 - 2024)	Spring	NS	1.000	NS	0.742
		(2015 - 2024)	Summer	NS	0.913	NS	0.283
		(2015 - 2024)	Fall	NS	0.277	NS	1.000
	MRY-REF2	(2015 - 2024)	Combined	<LRL	<LRL	NS	0.959
		(2015 - 2024)	Spring	<LRL	<LRL	NS	0.719
		(2015 - 2024)	Summer	<LRL	<LRL	NS	0.721
		(2015 - 2024)	Fall	<LRL	<LRL	NS	0.928
	MRY-REF3	(2015 - 2024)	Combined	NS	0.183	NS	0.470
		(2015 - 2024)	Spring	NS	1.000	NS	0.283
		(2015 - 2024)	Summer	NS	0.051	NS	1.000
		(2015 - 2024)	Fall	NS	0.927	NS	0.858
Mine-Exposed	F0-01	(2015 - 2024)	Combined	17.1	0.001	9.21	0.030
		(2015 - 2024)	Spring	37.7	0.035	NS	0.107
		(2015 - 2024)	Summer	NS	0.107	NS	0.371
		(2015 - 2024)	Fall	NS	0.107	NS	0.283



P-value < 0.05



Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at $\alpha = 0.05$). 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 $\alpha = 0.05$). 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 $\alpha = 0.05$), 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.

^a Range of years represents the range for all analytes in the table. The actual range may differ for any particular analyte.

APPENDIX I
SHEARDOWN LAKE TRIBUTARY 9 (SDL T9)
AQUEOUS NITROGEN COMPOUNDS SPECIAL INVESTIGATION

APPENDIX I SHEARDOWN LAKE TRIBUTARY 9
(SDLT9) AQUEOUS NITROGEN COMPOUNDS SPECIAL
INVESTIGATION

I1 SPECIAL INVESTIGATION 1
 I1.1 Background..... 1
 I1.2 Methodology 1
 I1.3 Results 2
 I1.4 Summary and Recommendations..... 3
 I1.5 References 3
I2 FIGURES AND TABLES..... 4



I1 SPECIAL INVESTIGATION

I1.1 Background

During the Mary River Project's (the Project) 2023 Core Receiving Environment Monitoring Program (CREMP), elevated concentrations of nitrogen compounds were identified in the Sheardown Lake Tributary 9 (SDLT9), which exceeded established Aquatic Effects Monitoring Program (AEMP) benchmarks and Water Quality Guidelines (WQG). Specifically, total ammonia concentrations exceeded the AEMP benchmark of 0.855 mg/L in the fall (1.24 mg/L), while nitrate concentrations exceeded the AEMP benchmark and WQG of 3 mg/L during summer and fall (i.e., 7.08 mg/L and 8.26 mg/L, respectively). Total ammonia, nitrate, and nitrite concentrations were elevated at SDLT9 compared to the CREMP reference streams and to concentrations at SDLT9 during the baseline period during spring, summer, and/or fall 2023 sampling events (Minnow 2024a). These findings suggested mine-related influences on water quality in SDLT9 and triggered a response under the AEMP Management Response Framework. As such, a special investigation was conducted in 2024 to identify the sources of ammonia, nitrate, and Total Kjeldahl Nitrogen (TKN) in SDLT9.

I1.2 Methodology

Ammonium nitrate is used at the Project, and is stored in containers in three locations on the mine site, including the Dyno Nobel Emulsion Plant (Dyno facility; Appendix Figure I.1), which is located upgradient to the SDLT9 station where elevated concentrations of aqueous nitrogen compounds were observed in 2024. Eight stations, both upgradient and downgradient of Baffinland's Dyno facility, were selected to identify potential sources of nitrogen compounds for SDLT9 (Appendix Figure I.1, Appendix Table I.1). While the investigation primarily focused on the Dyno facility as a potential source of nitrogen compounds, sampling stations located north (upstream) of the Dyno facility in the SDLT9 catchment and east of the Dyno facility (MS-C-H) were included to identify or rule out other potential sources (e.g., road runoff).

In September 2024, grab samples were collected just below the surface at each station using sterile sampling equipment. For dissolved analytes, water was field-filtered using a 50 mL sterile syringe fitted with a 0.45 µm filter. All samples were transferred to pre-labelled containers that were pre-conditioned with appropriate preservatives. Samples were placed into a cooler, transported to the mine, and stored at 4°C until shipment to the analytical laboratory. Water chemistry samples were shipped on ice to ALS Canada Ltd. (ALS; Waterloo, Ontario) for analysis of nutrients (ammonia, nitrate, nitrite, TKN, total phosphorus), total organic carbon (TOC), and phenols using standard



laboratory methods¹. The laboratories operated by ALS are accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Total phosphorous (TP), total organic carbon (TOC), and total phenols were analyzed in addition to concentrations of nitrogen compounds (ammonia, nitrate, nitrite, and TKN) at each station as these parameters are often correlated with nitrogen compounds under natural conditions, or through different types of anthropogenic influences on aquatic systems (e.g., wastewater).

I1.3 Results

There was spatial variability in aqueous concentrations of nitrogen compounds (i.e., ammonia, nitrate, TKN, and nitrite) across the sampling stations. Three stations (SDLT9-1, MS-C-H-US1, and MS-C-H-US2) exhibited elevated concentrations of nitrogen compounds compared to the other five stations (Appendix Figure I.1, Appendix Table I.2). Ammonia concentrations were highest at SDLT9-1, approximately three times higher than MS-C-H-US2 and at least an order of magnitude higher than the other stations but all measured concentrations were below the AEMP benchmark (Appendix Figure I.1, Appendix Table I.2). TKN and nitrate concentrations were also highest at SDLT9-1, approximately twice those at MS-C-H-US1 and MS-C-H-US2, and an order of magnitude higher than at the other stations (Appendix Table I.2). The nitrate WQG and AEMP benchmark were both exceeded at SDLT9-1, MS-C-H-US1, and MS-C-H-US2 (Appendix Table I.2). Nitrite concentrations were similarly elevated at SDLT9-1 and MS-C-H-US2, both being an order of magnitude higher than the other stations; however, no WQG or AEMP benchmark exceedances were recorded (Appendix Table I.1). Total phosphorous, TOC, and total phenols had similar, low concentrations across all stations, and there were no WQG exceedances for TP or phenols at any station (Appendix Table I.2).

The three stations that had elevated concentrations of nitrogen compounds are all downstream of the Dyno facility (Appendix Figure I.1), where ammonium nitrate is stored and handled (Baffinland 2021). While there are strict protocols for the storage and handling of explosives on site (see Baffinland 2021), ammonium nitrate is water soluble, so exposure via multiple potential vectors (e.g., wind, rain/runoff, localized activities) could result in elevated nitrate and ammonium ions in adjacent waterbodies.

Given the absence of elevated concentrations of other analytes often associated with nitrogen compounds in aquatic systems that may be affected by anthropogenic influences (e.g., TP, TOC, and phenols), the elevated nitrogen concentrations suggest a mine-related influence,

¹ The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by the United States Environmental Protection Agency, American Public Health Association Standard Methods, ASTM International, International Organization for Standards, Environment Canada, British Columbia Ministry of Environment, and Ontario Ministry of Environment.



likely linked to the transportation, storage and handling of ammonium nitrate, as well as activities occurring in and around the Dyno facility.

I1.4 Summary and Recommendations

Nitrogen compounds were elevated at three stations (i.e., SDLT9-1, MS-C-H-US1, and MS-C-H-US2) downstream of the Dyno facility on the Mary River Mine Site. The WQG and AEMP benchmark for nitrate were exceeded at each of these stations; however, the ammonia benchmark and nitrite WQG were not exceeded.

It is likely that activities occurring at the Dyno facility are the source of the elevated nitrogen compounds, and it is recommended that an activity audit be conducted concerning the transportation, storage, and handling of ammonium nitrate at the Dyno facility to help identify point source(s). Following the activity audit and potential additional sampling to identify point source(s), mitigation measures should be recommended and implemented. The effectiveness of these measures will be captured through annual CREMP water quality sampling at SDLT9 in 2025 which may be supplemented, as necessary, by expanded spatial sampling in fall 2025 as was completed in the fall of 2024.

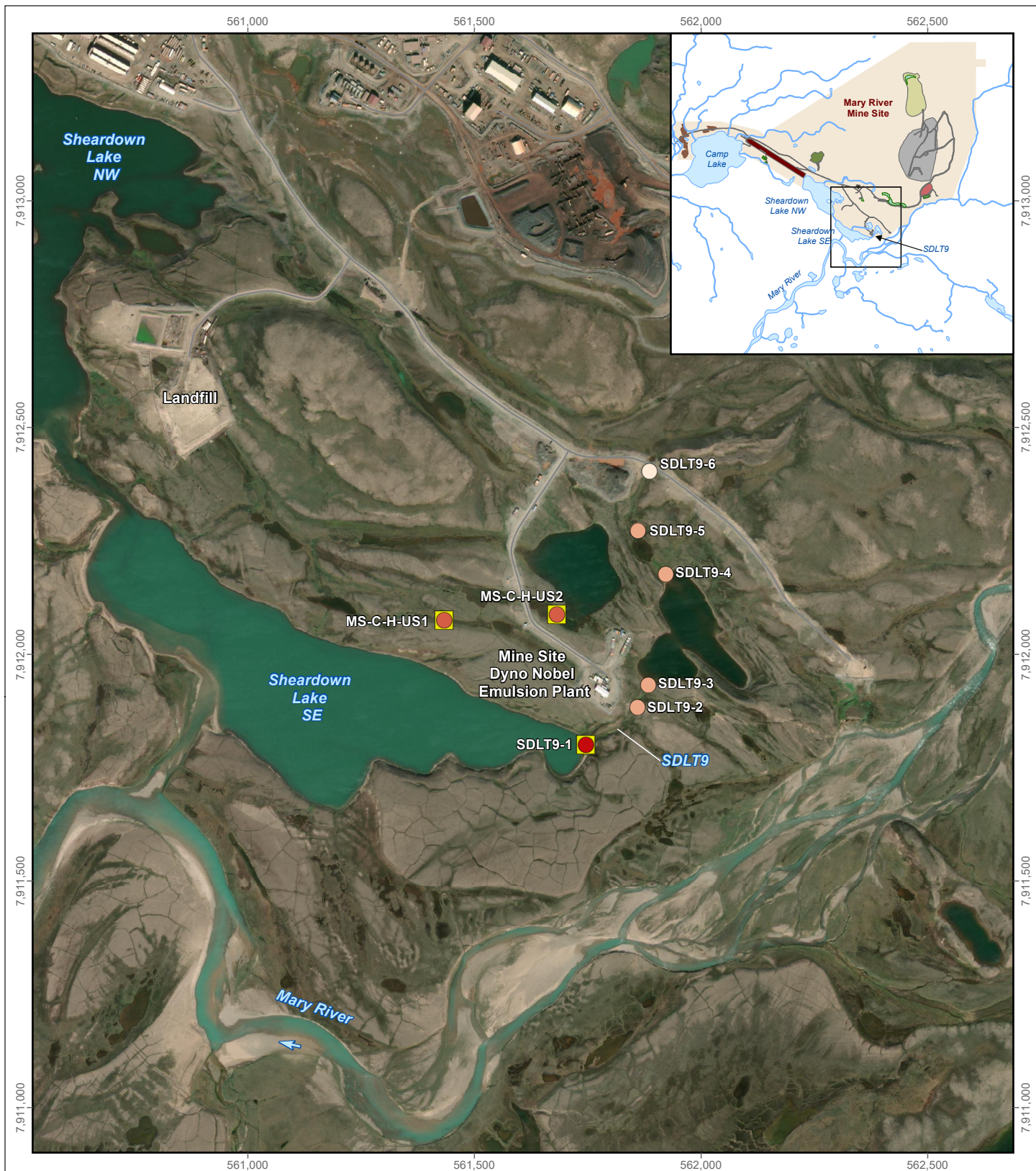
I1.5 References

- Baffinland (Baffinland Iron Mines Corporation). 2021. Spill Contingency Plan Rev. 6.
- Minnow (Minnow Environmental Inc.). 2024a. Mary River Project 2023 Core Receiving Environment Monitoring Program Report. Prepared for Baffinland Iron Mines Corp. March, 2023.



I2 FIGURES AND TABLES





LEGEND

Nitrate Concentration (mg/L)

- < 0.1
- 0.1 - 1.0
- 1.0 - 5.0
- > 5.0

Nitrate values at these stations exceeded the Water Quality Guideline and AEMP Benchmark (i.e., 3mg/L).

Sheardown Lake Tributary 9 (SDLT9) Aqueous Nitrogen Special Investigation Sampling Locations, Mary River Project CREMP, 2024

0 200 400 800 Meters

Map Projection: UTM Zone 17 W NAD 1983
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Figure I.1

Table I.1: Sheardown Lake Tributary 9 (SDLT9) Aqueous Nitrogen Special Investigation Sampling Locations, Mary River Project CREMP, 2024

Station	Location (UTM)		
	Zone	Easting	Northing
SDLT9-1	17N	561746	7911800
SDLT9-2	17N	561860	7911883
SDLT9-3	17N	561884	7911932
SDLT9-4	17N	561922	7912176
SDLT9-5	17N	561861	7912272
SDLT9-6	17N	561886	7912403
MS-C-H-US1	17N	561433	7912074
MS-C-H-US2	17N	561682	7912087
LDFG-OUT-US2	17N	561537	7912436

Table I.2: Water Chemistry Results for Sheardown Lake Tributary 9 (SDLT9) Aqueous Nitrogen Special Investigation, Mary River Project CREMP, 2024

Parameter	Units	Water Quality Guideline (WQG) ^a	AEMP Benchmark ^b	Sample Date	Station								
					SDLT9-1	SDLT9-4	SDLT9-2	SDLT9-3	SDLT9-5	SDLT9-6	MS-C-H-US1	MS-C-H-US2	LDFG-OUT-US2
Total Ammonia	mg/L	-	0.855	19-Sep-24	0.772	0.0323	0.0281	0.0663	<0.0050	0.0164	<0.0050	0.291	0.0207
Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	19-Sep-24	1.18	0.234	0.225	0.283	0.121	0.163	0.507	0.776	0.196
Nitrate	mg/L	3	3	19-Sep-24	6.03	0.229	0.923	0.316	0.250	0.050	3.59	3.81	0.092
Nitrite	mg/L	0.06	0.06	19-Sep-24	0.031	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.034	<0.010
Total Phosphorus	mg/L	0.02	-	19-Sep-24	<0.0020	0.0043	0.0028	0.0033	<0.0020	0.0028	<0.0020	0.0038	0.0036
Total Organic Carbon	mg/L	-	-	19-Sep-24	2.81	3.76	3.40	3.54	3.72	4.82	2.31	3.39	4.57
Phenols	mg/L	0.004	-	19-Sep-24	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

 Indicates parameter concentration above applicable Water Quality Guideline.

BOLD Indicates parameter concentration above AEMP Benchmark.

Note: "-" indicates data not available.

^aCanadian Water Quality Guideline (CCME 2024). See Table 2.2 for information regarding WQG criteria.

^bAEMP Water Quality Benchmarks developed by Intrinsik (2013) using baseline water quality data specific to the Sheardown Lake Tributaries.