



POLARIS MINE
POST-RECLAMATION MONITORING REPORT
2010 4th QUARTER and 2010 ANNUAL REPORT
FOR THE NUNAVUT WATER BOARD
&
INDIAN AND NORTHERN AFFAIRS CANADA

March 13, 2011

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March 13, 2011

Nunavut Water Board
Box 119
Gjoa Haven, NU
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Attention: Phyllis Beaulieu, Manager of Licensing

Indian and Northern Affairs Canada
969 Qimugjuk Building, 2nd Floor
Iqaluit, Nunavut
X0A 0H0

Attention: Jeff Mercer, Manager, Lands Administration

Dear Ms. Beaulieu and Mr. Mercer;

Re: Polaris Mine Water Licence NWB1POL0311 – 2010 4th Quarter and Annual Water Licence and Decommissioning and Reclamation Plan Reports

Please find attached the Polaris Mine 2010 4th Quarter and 2010 Annual Reports required under Polaris's Water Licence and Decommissioning and Reclamation Plan (DRP). I have attached paper copies of this report to this letter in addition to an electronic copy (pdf format on CD).

There were no activities or sampling done at the Polaris Mine site during the 4th Quarter of 2010 as the site was snow covered and there were no effluent discharges due to the freezing temperatures. Apart from the sampling of Garrow Lake in the 2nd Quarter of 2010, all monitoring was conducted during the 3rd Quarter of 2010 which was previously reported.

If you have any questions regarding this report, please do not hesitate to contact me.

Yours truly,

A handwritten signature in black ink, appearing to read "B. J. Donald".

Bruce J. Donald
Manager, Dormant Properties
Environment
Teck Resources Limited



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1. INTRODUCTION

The Polaris Mine ceased operation in September of 2002. Immediately upon mine closure, reclamation activities commenced in accordance with the Decommissioning and Reclamation Plan (DRP) approved by the Nunavut Water Board and Indian and Northern Affairs Canada. The DRP as well as the Water Licence requires reporting of work and monitoring activities on both a quarterly and an annual basis. This document includes both the 2010 4th Quarter and the 2010 Annual Report for the Polaris Mine site.

An executive summary of this report translated into Inuktitut is included as Appendix 1.

2. 2010 4th QUARTER REPORT

2.1. Reclamation Activities

During the entire 4th Quarter of 2010, the Polaris Mine remained unoccupied by personnel. No reclamation activities were undertaken.

2.2. Site Monitoring

During the entire 4th Quarter of 2010, the Polaris Mine remained unoccupied by personnel and no monitoring events occurred as all surface waters were frozen. As a result there is no effluent water quality data to report.

2.3. Financial Reporting

2.3.1. Updated Financial Report

The 2010 reclamation and monitoring costs were \$460,000 and are presented in the prescribed manner in Appendix 2. They are unchanged from the costs reported at the end of the 3rd Quarter as there were no activities related to the Polaris site in the 4th Quarter of the year.

2.3.2. Request for Security Adjustments

In 2009 after substantial effort and time, a major reduction in reclamation security was obtained. It is not simple nor timely to obtain security reductions so further reductions will not be pursued until work and monitoring committed to in the DRP have been completed and expiry of site licenses has occurred.

3. 2010 ANNUAL REPORT

Part B, Section 6 of the Water Licence requires that an Annual Report be filed that includes the following topics.

3.1. Unauthorized Discharges

The Polaris Mine had no unauthorized discharges to report.

3.2. Progress Report of Studies and Plans

There were no revisions to any studies or plans requested by the Board to comment on.

3.3. Executive Summary of Report Translated into Inuktitut

Included in Appendix 1 is an executive summary of both the 2010 4th Quarter Report and the 2010 Annual Report translated into Inuktitut.

3.4. Summary of Closure and/or Reclamation Work Undertaken

The following is a summary of work conducted at the site and as previously reported in the 3rd Quarter report.

In preparation for the end of the post-reclamation monitoring program (as per the approved Detailed Decommissioning and Reclamation Plan for the site), Teck contracted the dismantling of the temporary site camp and facilities, and the moving of those facilities to a staging area so they would be ready for removal from the site (in late August or early September of 2011). An AECOM environmental technician remained on site at all times during this work to ensure that work conducted would comply with requirements contained in the DRP as well as the Water Licence. Appendix 10 has a series of photographs documenting some of the work completed.

Work conducted to ensure the site is left in compliance with the original reclamation plans included:

- Dismantling and clean-up of the temporary fuel storage area
As part of this work, the fuel storage facilities were dismantled, excess fuel burnt, and the empty fuel tanks cut open and cleaned. Hydrocarbon contaminated soils and the liner from the fuel tank containment area were recovered, packaged, and will be shipped off site to a southern disposal facility as part of the 2011 sealift.
- All hazardous materials / chemicals on site have been packaged and will be properly manifested before being removed from site. The types of materials include hydrocarbon contaminated materials, solvents, cleaners, waste oils, etc. that would normally be associated with a temporary camp and mobile equipment.
- Additional Site Clean-up
During annual site inspection visits to the site since 2004, at least one of the group (and often two people) have been tasked with searching for and collecting debris that was previously missed. In addition to this being done during the 2010 July inspection trip, additional attention to this task was done by the contractors during August 2010. This work was in addition to the clean-up work conducted around the camp site during and after its relocation to the staging area.
- Burial of non-hazardous wastes.
As seen during previous inspections, LRD Quarry landfill had a pile of debris collected each summer. During the removal and clean-up of the camp area, additional debris was taken to LRD Quarry landfill. The majority of flammable materials were burned and the remaining debris was buried in the landfill. The burial of residual debris was accomplished by digging a shallow hole with the 235 Cat excavator, into the cover cap of the landfill (not exceeding 1m in depth) in one area up against the pit east wall. Debris was consolidated into this area and then capped with clean fill sourced from just outside the entrance to the pit. Initially fine cover materials were used to ensure that voids spaces within the debris pile were minimized to prevent long term settlement. The AECOM technician diligently monitored this activity and ensured that the debris was adequately capped (the approved cover design is 1.8m thick). To verify that an adequate cover was placed over and around the debris, grade stakes were placed on top of the initial fine cover material to visually monitor the thickness of the cover

material being placed. To be conservative, a minimum of 2.5m thick final cover was placed. Appendix 10 has photographs of the burial process including photographs of the grade stakes used to monitor and document the cap thickness.

- **Final grading of camp area**

Once the camp had been removed and cleaned-up, the area was graded to be consistent with surrounding terrain to minimize the visual disturbance to the area. As noted in the DDRP, in this environment, it is only possible to minimize, not eliminate visual signs of surface disturbances.

Photographs of the work done, are in Appendix 10 of the 2010 3rd Quarter report. It is planned that during the final site inspection in July 2011, the contractor will have an equipment operator present, in case any minor site issues are identified. Teck will ensure that INAC has adequate notice of the dates of the planned inspection visit so that INAC has the opportunity to be on site at the same time to conduct a final inspection. As previously stated, it is planned to bring a ship into the site in late August or early September 2011 to remove all remaining equipment and materials from the site.

3.5. Estimate of the Total Mine Closure Cost

The 2010 reclamation and monitoring costs were \$460,000 and are presented in the prescribed manner in Appendix 2. They are unchanged from the costs reported at the end of the 3rd Quarter as there were no activities related to the Polaris site in the 4th Quarter of the year. Apart from the scheduled annual monitoring of the Polaris site in 2011, the only abnormal costs will relate to the removal by ship of all materials and equipment from the site in late August or early September of 2011.

3.6. Public consultation / Participation

- No public consultations were conducted as the site is basically dormant other than for monitoring.
- During the annual inspection, an Inuit resident from Resolute assists with at the site. In addition to providing local employment, the local knowledge for the safety of workers on site is important. Having a local Inuit resident involved with monitoring of the site has the benefit of ensuring that the nearest community is aware of site activities and site conditions.

3.7. Work Conducted in Response to Inspection or Compliance Reports

There was no abnormal work conducted in response to any inspection or compliance reports.

3.8. Effluent and Water Quality Studies Conducted

3.8.1. Quantities of Fresh Water Pumped From Frustration Lake

The water licence requires the monthly and annual quantities (in cubic metres) of water pumped from Frustration Lake to be reported.

- No water was pumped as the site's freshwater system was demolished and reclaimed in 2004.

3.8.2. Garrow Lake Water Column Monitoring

During 2010, the Water Licence required three monitoring events (at mid-winter, at maximum ice thickness, and at maximum ice melt) in two separate locations of the Garrow Lake water column stratigraphy. The mid-winter monitoring event was not conducted as charter aircraft will

not fly to this isolated, abandoned site in the dark. The maximum ice thickness and maximum melt monitoring events took place as required and were reported in the 2nd and 3rd Quarter monitoring reports.

Zinc concentrations in the water column of Garrow Lake are primary metal of concern and so the trend of zinc concentrations over time at varying depths in the lake water column are monitored. Appendix 3 contains the zinc data and associated graphs. It is important to note that some erroneous data has not been displayed in the graphs for the sake of clarity. The data tables at the end of Appendix 3 have highlighted the data points where data was not graphed below the chart, the data is presented along with a brief note of explanation why the data is viewed as incorrect.

Appendix 3 contains four figures:

- a. Figure 1A – Spring data from the station in the centre of the lake (Sta. 262-3) representing the Maximum ice thickness condition. Data from March 2002 through to May 2010 was graphed to show the trend in zinc concentrations starting from when the operation was operating (the last year) through until the spring of 2010.
- b. Figure 1B – Summer data from the station in the centre of the lake (Sta. 262-3) representing the Minimum ice conditions (i.e. largely ice free). Data from 2005 onward is graphed to reduce clutter in the figure.
- c. Figure 2A – Spring data from the south station near the outlet of the lake (Sta. 262-3A). Data from 2005 onward is graphed to reduce clutter in the figure.
- d. Figure 2B – Summer data from the south station near the outlet of the lake (Sta. 262-3A). Data from 2005 onward is graphed to reduce clutter in the figure.

The data for the graphs is also included in Appendix 3 in Table 1 (Station 262-3) and Table 2 (Station 262-3A).

Important conclusions related to lake chemistry demonstrated by the graphs include:

- In the first three years (2003 to 2005) after cessation of tailings deposition into the lake bottom, Total zinc concentrations in the water column from the base of the Mixolimnion to the bottom of the lake decreased rapidly.
- In subsequent years, the concentrations have continued to generally decrease somewhat further from their already low concentrations.
- Concentrations in the surface layer (the Mixolimnion) decreased initially, but then have not changed substantially over time and remains within a narrow range around 0.25 mg/L of Total zinc.
- Total zinc concentrations in the Mixolimnion during the summer when the lake is discharging into Garrow Creek are lower than at the Maximum Ice Thickness conditions in the early spring. This is due to the lake ice melting, and surface run-off from snow melt and rain in the catchment area of the lake. The melt waters and precipitation have a lower density than the surface layer of lake water (less salt) and remains floating on top of the more brackish Mixolimnion water.

Appendix 4 contains the Hydrolab data collected at the same time as the water quality samples from both Stations 262-3 and 262-3A. The plots, Figure 1 (Maximum ice thickness sampling event) and Figure 2 (Minimum ice thickness sampling event) clearly show the distinct density changes vertically through the water column. The density changes demonstrate that the intense stratification of the lake remains intact.

3.8.3. Garrow Lake Effluent Monitoring

The Water Licence and the DRP requires sampling of the Final Discharge Point from Garrow Lake during periods of effluent discharge. All water quality results were compliant with the parameters specified in the Water Licence. In addition there was no acute toxicity in either the Rainbow Trout or the *Daphnia magna*. The details of the monitoring results can be found in the previously submitted 3rd Quarter Report.

3.9. Details of Water Use or Waste Disposal Requested By the Board

- There is no fresh water use at the site. No details of water use have been requested by the board.
- As the camp and site equipment and materials were prepared for final demobilization from the site, some additional debris was disposed of in LRD Quarry Landfill. Details of the disposal were reported in the 2010 3rd Quarter monitoring report. Hazardous materials remaining on site will be manifested and removed from site by sea lift in late August or early September 2011. Documentation of the hazardous materials shipped from site in 2011 will be provided as part of the routine 2011 reporting.

APPENDIX 1

Executive Summary

Translated into Inuktitut

[illegible]

- [illegible]

- [illegible]

[illegible][illegible]

APPENDIX 2

2010 Update of Reclamation and Monitoring Costs

TABLE 1

POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING - ACTUAL EXPENDITURES AND ESTIMATED REMAINING LIABILITY

	APPROVED CLOSURE PLAN BUDGET		ACTUAL EXPENDITURES TO DATE						FORECAST OUTSTANDING RECLAMATION LIABILITIES			
			Expended To December 31, 2009		Expended January 1, 2010 To December 31, 2010		Project Total To Date		2011 Forecast		Total Forecast Remaining to Dec 31 2011	
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals
DEMOLITION & RECLAMATION (BARE COSTS)												
MINE EQUIPMENT REMOVAL												
Hazardous Materials Removal	35,845		853				853				-	
Mine Refrigeration Plant	145,525		25,639				25,639				-	
Mobile & Mine Equipment	2,919		12,981				12,981				-	
Remove Salvaged Mine Equipment	20,754		-				-				-	
Misc Sub Contract Costs	45,957		28,540				28,540				-	
		\$ 251,000		\$ 68,013		\$ -		\$ 68,013		\$ -		\$ -
MINE ACCESS SEALING												
Seal Mine Portals	60,000		20,992				20,992				-	
		\$ 60,000		\$ 20,992		\$ -		\$ 20,992		\$ -		\$ -
CONCENTRATOR BUILDING												
Miscellaneous Materials	22,092		-				-				-	
Mill Equipment Clean-Up - Fuels	16,398		-				-				-	
Mill Equipment Clean-Up	99,900		40,613				40,613				-	
Hazardous Materials Removal	151,117		94,553				94,553				-	
Barge Demolition	608,592		443,526				443,526				-	
Misc Process Equipment Demolition & Removal	197,432		183,317				183,317				-	
Misc Sub Contract Costs	88,469		84,794				84,794				-	
		\$ 1,184,000		\$ 846,803		\$ -		\$ 846,803		\$ -		\$ -
CONCENTRATE STORAGE STRUCTURE & EQUIPMENT												
Concentrate Storage Equipment Clean-Up	26,117		1,905				1,905				-	
Conveyors	67,600		8,421				8,421				-	
Concentrate Storage Structure & Equipment	555,283		93,654				93,654				-	
		\$ 649,000		\$ 103,980		\$ -		\$ 103,980		\$ -		\$ -
SHIP LOADER & CONVEYOR												
Conveyors	50,000		24,592				24,592				-	
		\$ 50,000		\$ 24,592		\$ -		\$ 24,592		\$ -		\$ -
DOCK & SHORELINE												
Dock & Shoreline Reclamation	869,000		837,739				837,739				-	
		\$ 869,000		\$ 837,739		\$ -		\$ 837,739		\$ -		\$ -
THICKENER & TAILINGS LINES												
Hazardous Materials Removal	22,577		16,452				16,452				-	
Tailings Thickener	377,423		106,677				106,677				-	
		\$ 400,000		\$ 123,129		\$ -		\$ 123,129		\$ -		\$ -
GARROW LAKE												
Garrow Lake Siphons & Lake Drawdown	120,391		195,965				195,965				-	
Dam/Spillway Modifications	95,467		269,662				269,662				-	
Escalation Allowance	3,142		-				-				-	
		\$ 219,000		\$ 465,627		\$ -		\$ 465,627		\$ -		\$ -
CRF PLANT STRUCTURE & EQUIPMENT												
CRF Plant Equipment Clean-Up	7,002		1,040				1,040				-	
CRF Plant Equipment Removal	17,533		9,406				9,406				-	
CRF Plant Buildings Demolition	130,455		23,497				23,497				-	
Misc Sub Contract Costs	11,010		46,766				46,766				-	
		\$ 166,000		\$ 80,709		\$ -		\$ 80,709		\$ -		\$ -
ACCOMMODATION COMPLEX STRUCTURE & EQUIPMENT												
Accommodation Complex Building Demolition	249,000		72,318				72,318				-	
		\$ 249,000		\$ 72,318		\$ -		\$ 72,318		\$ -		\$ -
FUEL STORAGE & HANDLING EQUIPMENT												
Miscellaneous Materials	3,681		4,904				4,904				-	
Purge & Decommission Fuel Tanks	53,404		341,959				341,959				-	
Hazardous Materials Removal	50,645		547,319				547,319				-	
Fuel Pumping & Distribution Systems	87,270		11,173				11,173				-	
		\$ 195,000		\$ 905,355		\$ -		\$ 905,355		\$ -		\$ -
BUILDINGS & CONTAINERS												
Miscellaneous Materials	1,323		-				-				-	
Misc Warehouse / Shipping Equipment	1,221		3,292				3,292				-	
Misc Buildings Demolition	250,456		100,053				100,053				-	
		\$ 253,000		\$ 103,345		\$ -		\$ 103,345		\$ -		\$ -
MISC CONTRACTOR LABOUR												
Unallocated Labour	133,000		2,310				2,310				-	
		\$ 133,000		\$ 2,310		\$ -		\$ 2,310		\$ -		\$ -
GENERAL SITE GRADING												
Hazardous Materials Removal	44,719		90,114				90,114				-	
General Site Grading & Reclamation	7,129		828,869				828,869		50,000		50,000	
Escalation Allowance	4,152		-				0				-	
		\$ 56,000		\$ 918,983		\$ -		\$ 918,983		\$ 50,000		\$ 50,000
LANDFILL RECLAMATION												
Landfill Reclamation	432,000		821,746				821,746				-	
		\$ 432,000		\$ 821,746		\$ -		\$ 821,746		\$ -		\$ -
CONTAMINATED SOILS - CLEANUP												
Metals & Hydrocarbon Contaminated Soils Cleanup & Disposal	366,623		2,627,104				2,627,104				-	
Hydrocarbon Contaminated Soils (By Polaris)	6,097		13,131				13,131				-	
Metals Contaminated Soils (By Polaris)	173,605		52,382				52,382				-	
U/G Handling & Disposal Of Contaminated Soils	48,675		1,012,154				1,012,154				-	
		\$ 595,000		\$ 3,704,771		\$ -		\$ 3,704,771		\$ -		\$ -
QUARRIES & MINE SURFACE RECLAMATION (EARTHWORK)												
Backfill & Re-Contouring	263,000		273,711				273,711				-	
		\$ 263,000		\$ 273,711		\$ -		\$ 273,711		\$ -		\$ -
MISC. DEMOLITION & CLEAN-UP												
Misc Unallocated Clean-Up / Demo	380,000		-		159,775		159,775		185,000		185,000	
		\$ 380,000		\$ -	\$ 159,775		\$ 159,775					

POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING - ACTUAL EXPENDITURES AND ESTIMATED REMAINING LIABILITY								
	APPROVED CLOSURE PLAN BUDGET		ACTUAL EXPENDITURES TO DATE				FORECAST OUTSTANDING RECLAMATION LIABILITIES	
			Expended To December 31, 2009		Expended January 1, 2010 To December 31, 2010		Project Total To Date	
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals
ENGINEERING / SPECIAL CONSULTANTS								
Design Consultants - Dock / Loadout	1,316		1,320			1,320		
Design Consultants - Tailings / Garrow Lake	3,520		3,515			3,515		
Design Consultants - Dock / Loadout	79,684		65,354			65,354		
Design Consultants - Tailings / Garrow Lake	54,780		45,328			45,328		
Sitework & Demolition Procedures - Design Services	18,300		46,825			46,825		
Escalation Allowance	2,400		-			-		
		\$ 160,000		\$ 162,342		\$ 162,342		
PROJECT MANAGEMENT CONSULTANT (HO STAFF)								
Project Management - Salaries	411,069		1,289,847			1,289,847		
Project Management - Reimb Expenses	100,000		85,492			85,492		
Escalation Allowance	31,931		-			-		
		\$ 543,000		\$ 1,375,339		\$ 1,375,339		
CONSTRUCTION MANAGEMENT (FIELD STAFF)								
Construction Management - Salaries	2,142,878		1,915,004			1,915,004		
Escalation Allowance	179,122		-			-		
		\$ 2,322,000		\$ 1,915,004		\$ 1,915,004		
ENVIRONMENTAL TESTING AND SAMPLING								
Environmental Reclamation Supervision - Staff	337,123		1,038,747			1,038,747		
Escalation Allowance	29,550		-			-		
Environmental Reclamation Supervision - Testing	330,000		171,498			171,498		
Additional Sampling and Consultant Services (MMER)	0		354,386			354,386		
Escalation Allowance	26,327		-			-		
		\$ 723,000		\$ 1,564,631		\$ 1,564,631		
OWNER'S COSTS								
SALARIES & EXPENSES								
Teck HO Proj Mgmnt (Staff Lab)	374,631		476,911			476,911		
Teck HO Proj Mgmnt (Misc Material & Exp)	199,149		221,031			221,031		
Escalation Allowance	34,220		-			-		
		\$ 608,000		\$ 697,942		\$ 697,942		
OVERHEAD / HO SUPPORT								
Land Leases, Licences	175,000		96,979			96,979		
Miscellaneous Permits	45,000		16,889			16,889		
Insurance	445,900		319,459			319,459		
Property Taxes	495,000		180,412			180,412		
Home Office General Admin (Labour & Exp)	722,384		16,700			16,700		
Public Relations	74,292		58,718			58,718		
Legal	57,540		48,421			48,421		
Escalation Allowance	168,560		-			-		
Misc Owner's Overhead	6,324		13,882			13,882		
		\$ 2,190,000		\$ 751,460		\$ 751,460		
GENERAL ADMIN								
Closure Management - Polaris Personnel	54,000		-			-		
Escalation Allowance	2,880		-			-		
Closure Wrap Up	5,120		-			-		
		\$ 62,000		\$ -		\$ -		
POST RECLAMATION COSTS (2005 - 2011)								
SITE MONITORING AND HOLDING COSTS								
Annual Post Closure Environmental Monitoring (2005 to 2011)	510,000		1,123,300		300,364	1,423,664		248,500
Final Sampling Program, Data Evaluation and Reporting in 2011	160,000		-			-		248,500
Land Lease/Licence costs from 2005 to 2011	126,000		-			-		-
Property Taxes - 2005 to 2011	70,000		-			-		-
Escalation Allowance	135,000		-			-		-
		\$ 1,001,000		\$ 1,123,300		\$ 1,423,664		\$ 248,500
TOTAL DECOMMISSIONING / RECLAMATION & MONITORING COSTS		\$ 47,500,000		\$ 69,513,587		\$ 69,973,726		\$ 483,500

Note: For actual and forecast expenditures have not included Land Lease costs, Licence Costs or Property Taxes as these do not represent a potential cost or liability to the government

APPENDIX 3

2010 Garrow Lake Water Column

Monitoring Graphs

and

Associated Data

FIGURE 1A

GARROW LAKE - SPRING SAMPLING EVENTS

Station 262-3 (Lake Centre)

Trend In Zinc Concentrations In The Water Column 2002 to 2010

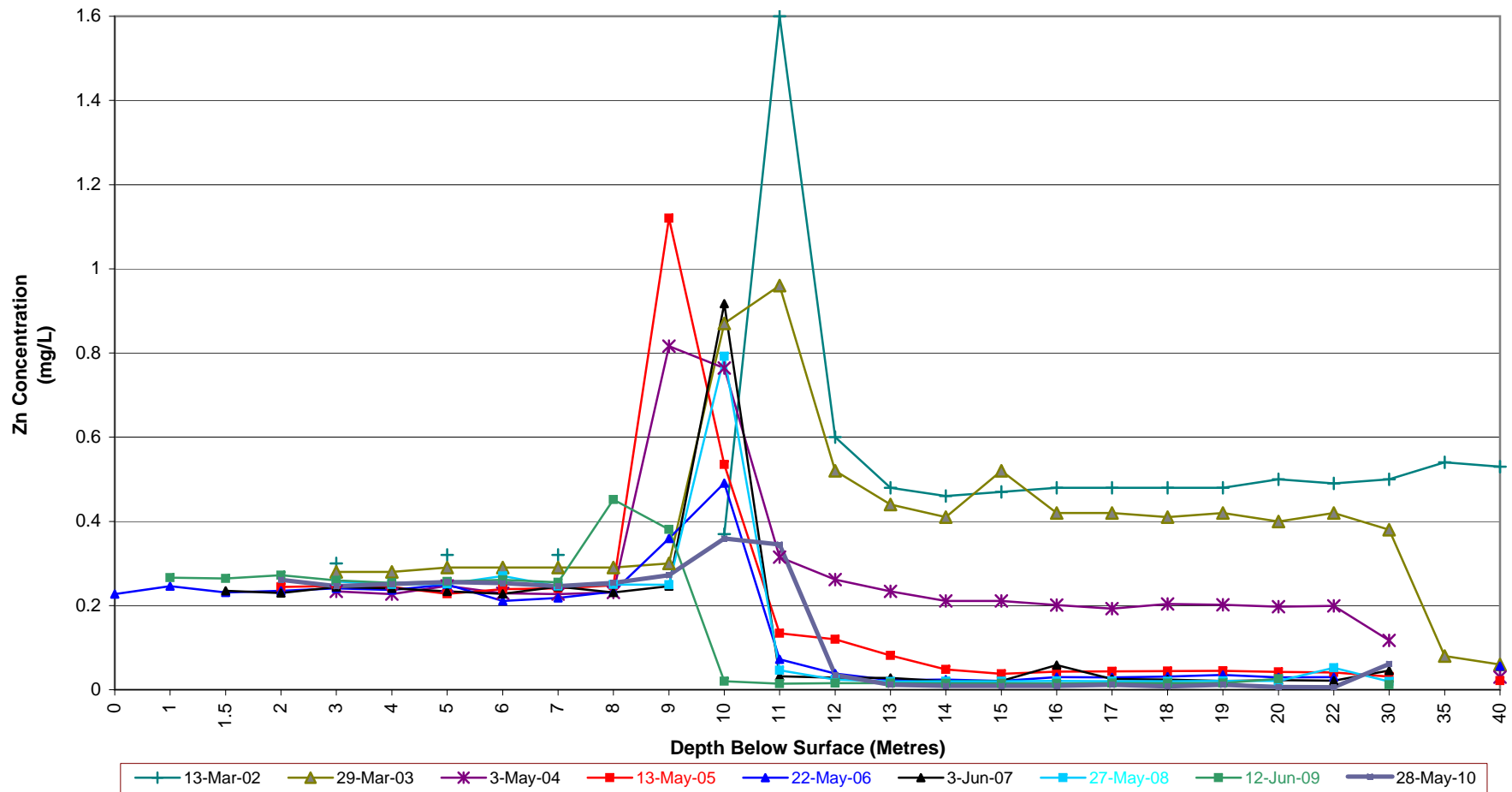


FIGURE 1B

GARROW LAKE - SUMMER SAMPLING EVENTS
Station 262-3 (Lake Centre)
Trends In Zinc Concentrations In The Water Column 2005 to 2010

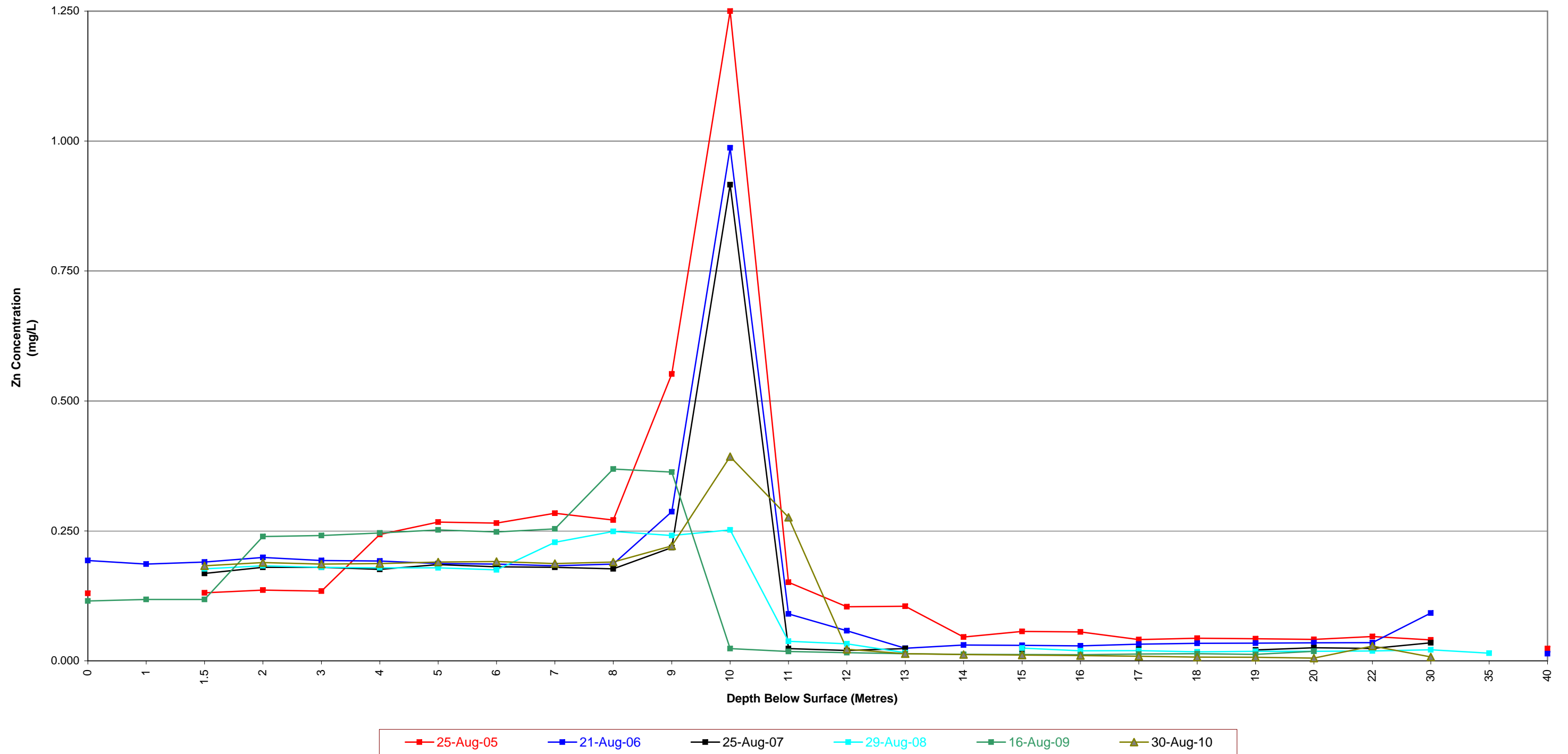


FIGURE 2A

GARROW LAKE - SPRING SAMPLING EVENTS
Station 262-3A (South)

Trends in Zinc Concentrations In The Water Column 2005 to 2010

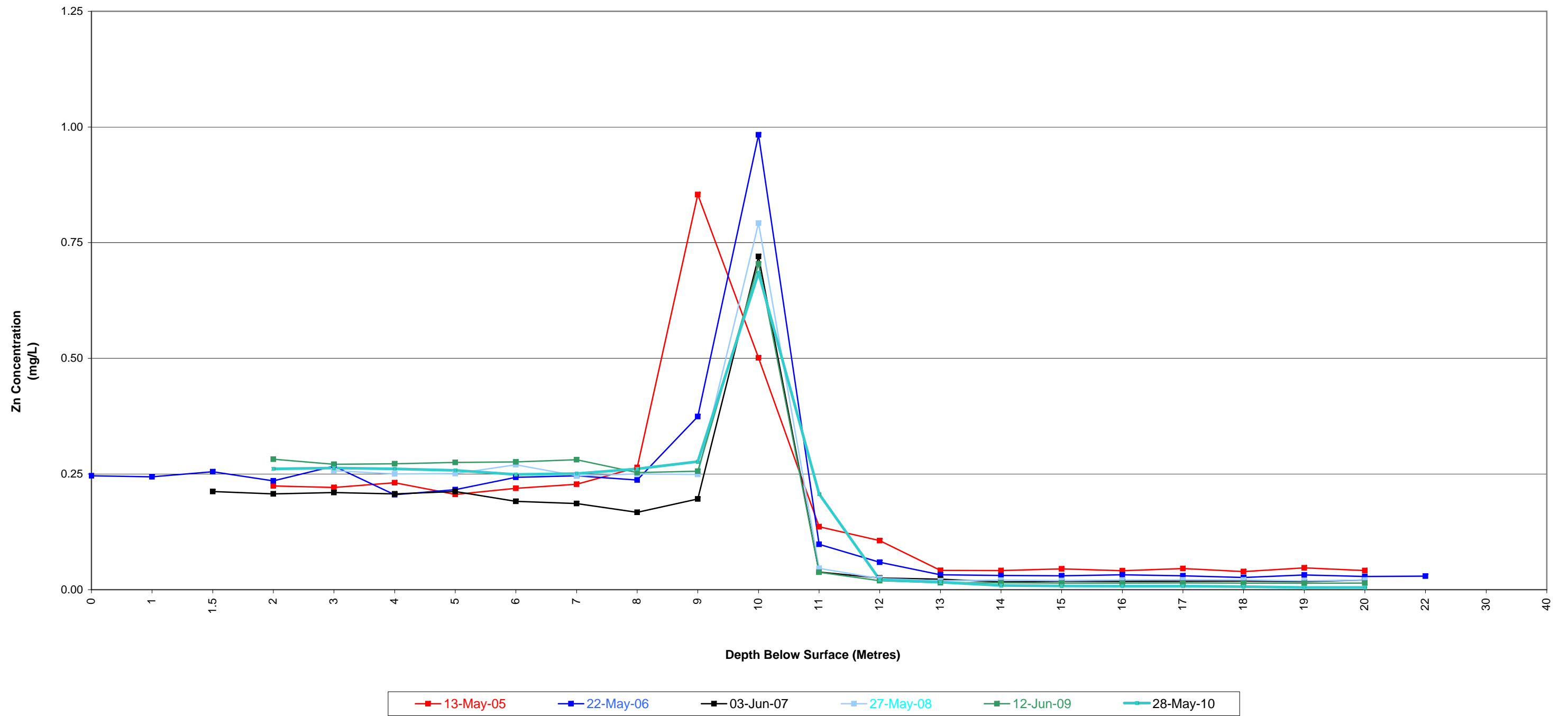


FIGURE 2B

GARROW LAKE - SUMMER SAMPLING EVENTS

Station 262-3A (South)

Trends in Zinc Concentrations In The Water Column 2005 to 2010

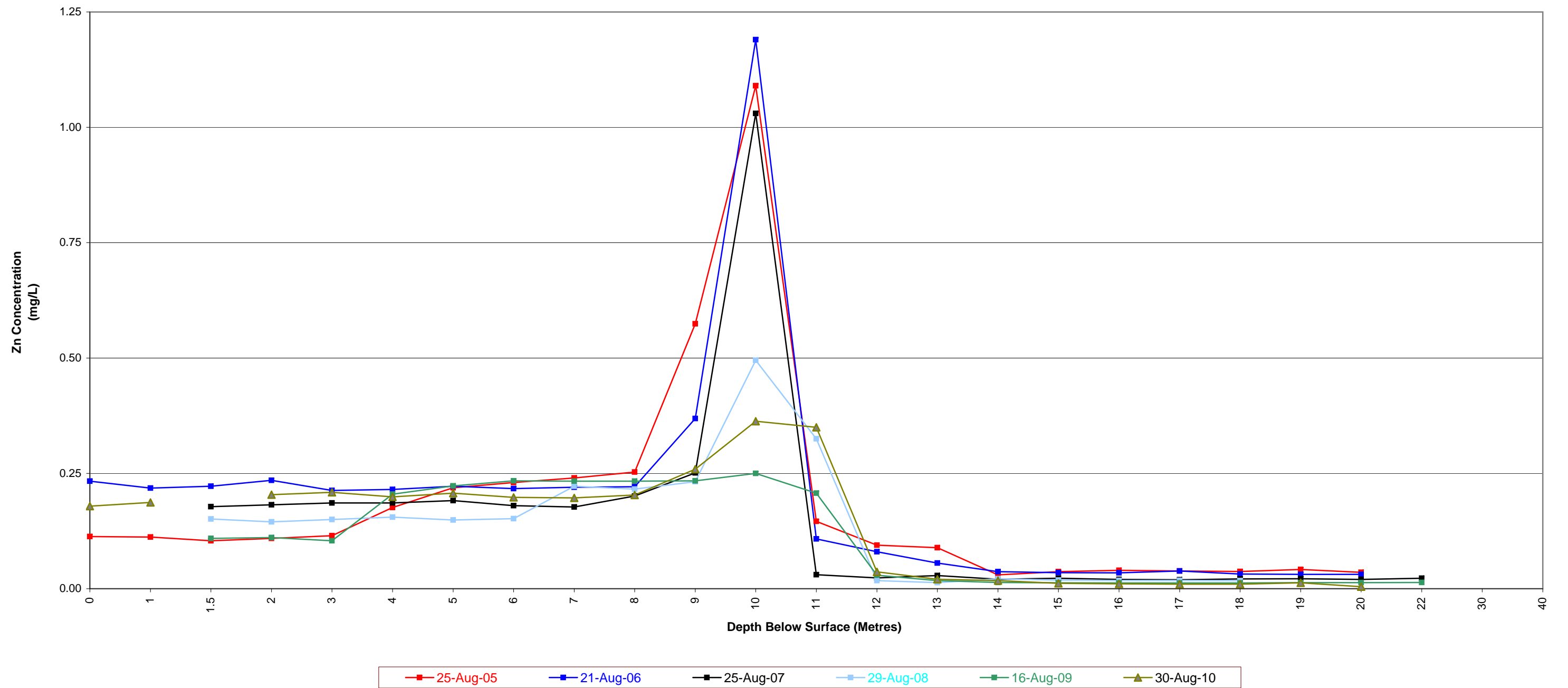


TABLE 1
GARROW LAKE WATER COLUMN MONITORING

STATION 262-3: Garrow Lake at Centre

Depth	Zinc Concentrations (mg/L)																	
	18-Jan-02	13-Mar-02	4-Feb-03	29-Mar-03	1-Jan-04	3-May-04	13-May-05	25-Aug-05	22-May-06	21-Aug-06	3-Jun-07	25-Aug-07	27-May-08	29-Aug-08	12-Jun-09	16-Aug-09	28-May-10	30-Aug-10
0								0.130	0.227	0.193								
1									0.246	0.186								
1.5								0.131	0.231	0.19	0.235	0.168		0.177		0.1150		0.183
2							0.244	0.136	0.235	0.199	0.23	0.180		0.183	0.266	0.1180	0.261	0.189
3	0.26	0.30	0.25	0.28	0.236	0.234	0.247	0.134	0.241	0.193	0.244	0.180	0.257	0.180	0.264	0.1180	0.246	0.186
4				0.28	0.197	0.227	0.244	0.243	0.237	0.192	0.241	0.176	0.250	0.179	0.272	0.2390	0.251	0.187
5		0.32		0.29	0.209	0.247	0.228	0.267	0.25	0.187	0.234	0.185	0.251	0.179	0.260	0.2410	0.256	0.190
6				0.29	0.207	0.229	0.239	0.265	0.211	0.186	0.228	0.181	0.270	0.175	0.254	0.2460	0.253	0.191
7		0.32		0.29	0.197	0.227	0.241	0.284	0.218	0.183	0.245	0.180	0.246	0.228	0.257	0.2520	0.246	0.187
8				0.29	0.189	0.231	0.248	0.271	0.233	0.186	0.231	0.177	0.250	0.249	0.261	0.2480	0.254	0.190
9				0.30	0.702	0.816	1.120	0.552	0.359	0.287	0.246	0.218	0.249	0.241	0.255	0.2540	0.272	0.221
10	0.34	0.37	0.60	0.87	0.932	0.764	0.535	1.250	0.491	0.987	0.917	0.916	0.792	0.252	0.452	0.3690	0.359	0.393
11	1.40	1.6	1.40	0.96	0.279	0.315	0.134	0.151	0.0721	0.0903	0.0319	0.024	0.046	0.038	0.381	0.3630	0.345	0.276
12	0.68	0.60	0.585	0.52	0.27	0.262	0.120	0.104	0.0383	0.0578	0.0288	0.020	0.024	0.033	0.0201	0.0236	0.0349	0.022
13	0.46	0.48	0.70	0.44	0.251	0.234	0.0812	0.105	0.0226	0.0241	0.0279	0.024	0.019	0.016	0.0146	0.0180	0.0115	0.014
14	0.45	0.460	0.52	0.41	0.229	0.211	0.0482	0.0457	0.024	0.0304	0.0204		0.020		0.0153	0.0156	0.0094	0.012
15	0.42	0.47	0.44	0.52	0.256	0.211	0.0378	0.0565	0.021	0.0297	0.0208	0.022	0.020	0.025	0.0153	0.0139	0.0091	0.011
16	0.44	0.48	0.44	0.42	0.265	0.201	0.0429	0.0556	0.03	0.0287	0.0589		0.021	0.019	0.0149	0.0124	0.0093	0.010
17	0.44	0.48	0.44	0.42	0.267	0.193	0.0435	0.0409	0.0294	0.032	0.0252	0.022	0.020	0.020	0.0152	0.0122	0.0114	0.009
18	0.44	0.48	0.44	0.41	0.275	0.204	0.0440	0.0435	0.0314	0.0336	0.0238		0.020	0.017	0.0151	0.0117	0.0075	0.007
19	0.44	0.48	0.45	0.42	0.266	0.202	0.0448	0.0425	0.0351	0.034	0.0208	0.021	0.021	0.018	0.0153	0.0130	0.0118	0.007
20	0.43	0.50	0.46	0.40	0.260	0.197	0.0425	0.0413	0.0293	0.0346	0.0228	0.025	0.021	0.018	0.0154	0.0137	0.0063	0.005
22	0.43	0.49	0.46	0.42	0.260	0.199	0.0407	0.0468	0.0301	0.0351	0.0218	0.024	0.052	0.019	0.0154	0.0124	0.0056	0.029
30	0.43	0.50		0.38	0.0514	0.117	0.0310	0.0404		0.092	0.0453	0.035	0.020	0.021	0.0261	0.0184	0.0614	0.008
35	0.43	0.54		0.08										0.015				
40	0.44	0.53	0.07	0.06		0.0301	0.0214	0.0235	0.0558	0.0139					0.0119			

Notes: For 1-Jan-2004 at 40m depth the zinc concentration was reported to be 0.234 mg/L. The sample must have been miss labeled as salinity was recorded as 7.3 compared to samples just above it with salinity approximately 62 mg/L (i.e. less dense water above it which can not be correct).

For 22-May-2006, did not graph the data from 30m depth as there is must be a data error. The Zn = 0.561 and the TSS was 111 mg/L. The sampler must have been contaminated

For 03-Jun-2007, did not show the 35m depth as the sampler must have disturbed the bottom. The zinc concentrations wer 0.529 mg/L and TSS was 1020 mg/L.

For 27-May-08 did not show the 36m depth sample as zinc was 2.01 mg/L and TSS was 138 mg/L. Believe that the sample was contaminated by hitting the lake bottom and creating turbidity

For 16-Aug-09 data for 39m depth was discarded due to the sample being contaminated. Zinc was 17.6 mg/L and TSS = 698 mg/L indicating the bottom sediments were disturbed.

For both the May and August 2010 sampling events, the samples were analyzed by Maxxam Analytics where as previous data was analyzed by ALS Laboratories.

TABLE 2
GARROW LAKE WATER COLUMN MONONITORING
STATION 262-3A: Garrow Lake Near Discharge

Depth	Zinc Concentrations mg/L													
	27-Jan-04	3-May-04	13-May-05	25-Aug-05	22-May-06	21-Aug-06	3-Jun-07	25-Aug-07	27-May-08	29-Aug-08	12-Jun-09	16-Aug-09	28-May-10	30-Aug-10
0				0.113	0.246	0.233								0.179
1				0.112	0.244	0.218								0.187
1.5				0.104	0.255	0.222	0.212	0.178		0.151		0.1090		
2			0.224	0.109	0.235	0.235	0.207	0.182		0.145	0.2820	0.1110	0.2610	0.204
3	0.223	0.232	0.221	0.115	0.267	0.213	0.210	0.186	0.257	0.150	0.271	0.104	0.263	0.209
4	0.211	0.230	0.231	0.176	0.205	0.215	0.207	0.186	0.250	0.155	0.272	0.205	0.261	0.199
5	0.223	0.250	0.206	0.219	0.216	0.222	0.212	0.191	0.251	0.149	0.275	0.223	0.258	0.207
6	0.202	0.240	0.219	0.230	0.243	0.217	0.191	0.180	0.270	0.152	0.276	0.234	0.249	0.198
7	0.208	0.252	0.228	0.240	0.246	0.220	0.186	0.177	0.246	0.222	0.281	0.233	0.251	0.197
8	0.223	0.228	0.264	0.253	0.237	0.221	0.167	0.201	0.250	0.216	0.253	0.233	0.261	0.203
9	1.000	0.916	0.854	0.574	0.374	0.369	0.196	0.251	0.249	0.232	0.256	0.234	0.277	0.259
10	0.423	0.496	0.501	1.090	0.983	1.190	0.720	1.030	0.792	0.495	0.704	0.250	0.685	0.363
11	0.308	0.300	0.136	0.146	0.098	0.108	0.038	0.030	0.046	0.325	0.038	0.207	0.207	0.350
12	0.297	0.283	0.106	0.094	0.059	0.080	0.025	0.023	0.024	0.018	0.020	0.029	0.022	0.037
13	0.238	0.250	0.042	0.089	0.032	0.056	0.023	0.028	0.019	0.013	0.015	0.018	0.016	0.020
14	0.241	0.203	0.041	0.030	0.031	0.037	0.017	0.021	0.020	0.022	0.015	0.014	0.009	0.018
15	0.261	0.211	0.045	0.037	0.030	0.035	0.018	0.023	0.020	0.019	0.014	0.013	0.008	0.012
16	0.270	0.193	0.041	0.040	0.032	0.034	0.018	0.020	0.021	0.018	0.014	0.013	0.008	0.011
17	0.272	0.198	0.046	0.038	0.030	0.038	0.018	0.019	0.021	0.018	0.015	0.012	0.008	0.010
18	0.265	0.198	0.039	0.037	0.026	0.032	0.019	0.021	0.021	0.018	0.014	0.013	0.007	0.010
19	0.263	0.201	0.047	0.042	0.032	0.031	0.018	0.022	0.019		0.014	0.013	0.005	0.0129
20	0.266	0.206	0.042	0.035	0.029	0.031	0.021	0.020	0.021		0.014	0.013	0.005	0.0045
22	0.267				0.029			0.023				0.0135		
30	0.076													
40	0.075													

Note - The Water Licence did not require sampling of this station prior to 2004

APPENDIX 4

Garrow Lake Hydrolab Data and Graphs

Figure 1
Garrow Lake May 28th 2010
Centre (262-3) and South (262-3A) Stations - Minimum Ice Thickness Limnology

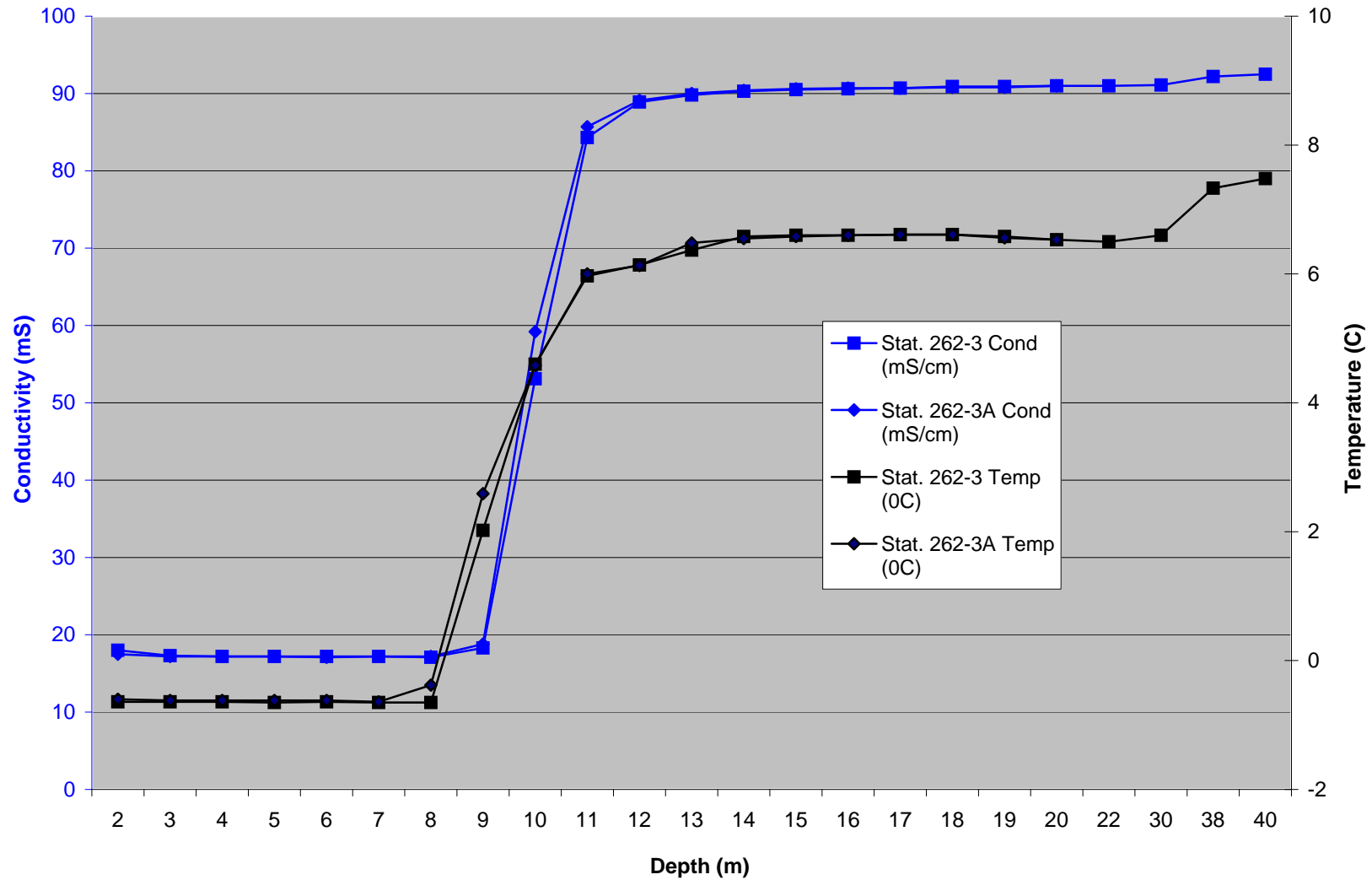


Figure 2
Garrow Lake August 30th 2010
Centre (262-3) and South (262-3A) Stations - Minimum Ice Thickness Limnology

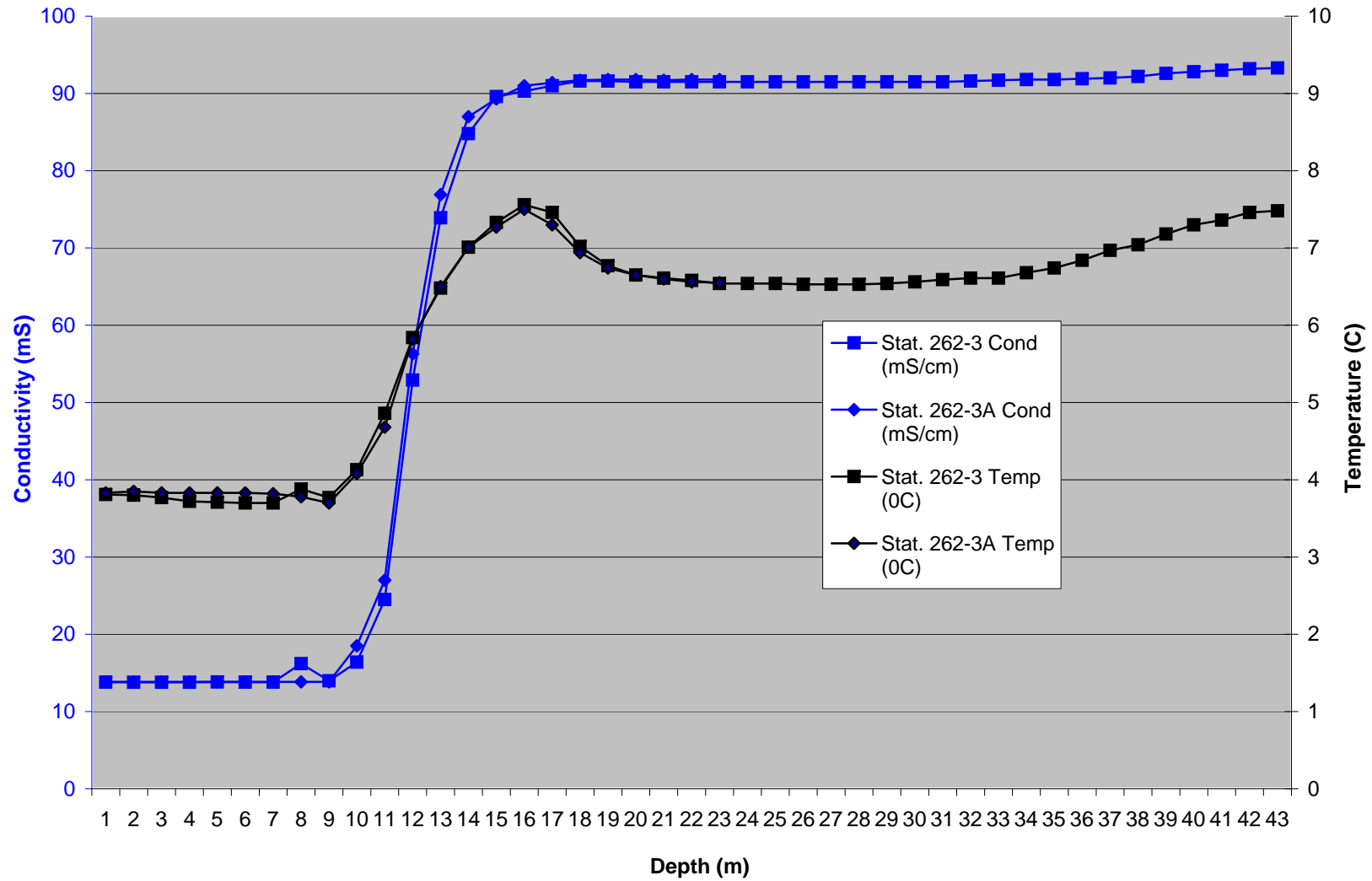


TABLE 1
2010 HYDROLAB RESULTS - GARROW LAKE - May 28th
STATION 262-3 (Centre Station)

Depth	Stat. 262-3 Temp (°C)	Stat. 262-3 DO (mg/L)	Stat. 262-3 Cond (mS/cm)	Stat. 262-3 pH	Stat. 262-3 Redox (mV)	Comments
2	-0.64	17.73	18	7.94	318	
3	-0.64	17.09	17.3	8.18	312	
4	-0.64	16.55	17.2	8.38	309	
5	-0.65	16.16	17.2	8.45	307	
6	-0.64	16.00	17.2	8.50	305	
7	-0.65	15.80	17.2	8.54	304	
8	-0.65	15.80	17.1	8.57	302	
9	2.02	13.86	18.3	8.49	302	
10	4.60	9.39	53.1	7.82	316	
11	5.97	5.37	84.3	7.83	305	
12	6.14	1.99	88.9	7.86	299	
13	6.37	1.24	89.8	7.87	252	
14	6.58	0.92	90.3	7.87	214	
15	6.60	0.69	90.5	7.88	186	
16	6.60	0.57	90.6	7.89	162	
17	6.61	0.51	90.7	7.89	140	
18	6.61	0.46	90.9	7.90	90	
19	6.58	0.43	90.9	7.90	52	
20	6.53	0.41	91	7.90	20	
22	6.50	0.39	91	7.90	-13	
30	6.60	0.34	91.1	7.87	-72	Hydrolab not working
38	7.33	0.34	92.2	7.69	-106	
40	7.48	0.35	92.5	7.66	-118	Hydrolab not working

Ice Thickness - 3.0m

TABLE 2
2010 HYDROLAB RESULTS - GARROW LAKE - May 28th
STATION 262-3A (South Station)

Depth	Stat. 262-3A Temp (°C)	Stat. 262-3A DO (mg/L)	Stat. 262-3A Cond (mS/cm)	Stat. 262-3A pH	Stat. 262-3A Redox (mV)	Comments
2	-0.60	19.69	17.5	8.53	307	
3	-0.62	19.54	17.2	8.57	305	
4	-0.62	19.46	17.2	8.59	303	
5	-0.62	19.41	17.2	8.61	301	
6	-0.62	19.33	17.1	8.62	300	
7	-0.64	19.31	17.2	8.63	299	
8	-0.38	19.07	17.2	8.63	298	
9	2.59	15.56	18.8	8.48	298	
10	4.58	1.41	59.2	7.78	305	
11	6.00	0.74	85.7	7.84	292	
12	6.13	0.57	89.1	7.88	268	
13	6.48	0.47	90	7.89	196	
14	6.55	0.42	90.4	7.89	173	
15	6.58	0.38	90.6	7.90	120	
16	6.60	0.35	90.7	7.90	73	
17	6.61	0.32	90.7	7.90	37	
18	6.61	0.3	90.8	7.90	-8	
19	6.56	0.28	90.8	7.91	-35	
20	6.53	0.28	91	7.91	-53	
22						
30						
40						

Ice Thickness - 3.0m

TABLE 3
2010 HYDROLAB RESULTS - GARROW LAKE - August 30th
STATION 262-3 (Centre Station)

Depth	Stat. 262-3 Temp (°C)	Stat. 262-3 DO (mg/L)	Stat. 262-3 Cond (mS/cm)	Stat. 262-3 pH	Stat. 262-3 Redox (mV)	Comments
0	3.81	12.9	13.81	8.62	279	
1	3.8	12.86	13.79	8.64	277	
2	3.77	12.85	13.79	8.66	275	
3	3.72	12.82	13.79	8.67	273	
4	3.71	12.8	13.82	8.68	272	
5	3.7	12.77	13.81	8.68	270	
6	3.7	12.78	13.81	8.69	269	
7	3.88	15.32	16.2	8.62	270	
8	3.77	13.38	13.98	8.67	264	
9	4.13	13.65	16.4	8.59	268	
9.5	4.86	9.69	24.5	8.27	279	
10	5.84	1.38	52.9	7.8	290	
10.5	6.48	0.87	73.9	7.81	283	
11	7.01	0.78	84.8	7.84	279	
12	7.33	0.72	89.6	7.85	272	
13	7.56	0.44	90.3	7.83	261	
14	7.46	0.2	91	7.83	222	
15	7.02	0.19	91.6	7.85	182	
16	6.77	0.17	91.6	7.88	160	
17	6.65	0.17	91.5	7.89	153	
18	6.61	0.17	91.5	7.89	148	
19	6.58	0.16	91.5	7.90	118	
20	6.54	0.15	91.5	7.91	46	
21	6.54	0.15	91.5	7.92	6	
22	6.54	0.15	91.5	7.92	-20	
23	6.53	0.14	91.5	7.92	-46	
24	6.53	0.14	91.5	7.92	-64	
25	6.53	0.14	91.5	7.92	-85	
26	6.54	0.14	91.5	7.92	-103	
27	6.56	0.13	91.5	7.91	-119	
28	6.59	0.13	91.5	7.90	-134	
29	6.61	0.12	91.6	7.89	-147	
30	6.61	0.13	91.7	7.88	-157	
31	6.68	0.12	91.8	7.87	-167	
32	6.74	0.12	91.8	7.84	-178	
33	6.84	0.12	91.9	7.82	-187	
34	6.97	0.12	92	7.79	-194	
35	7.04	0.13	92.2	7.77	-199	
36	7.18	0.12	92.6	7.74	-202	
37	7.30	0.12	92.8	7.71	-204	
38	7.36	0.11	93	7.70	-205	
39	7.46	0.12	93.2	7.68	-205	
40	7.48	0.12	93.3	7.68	-205	

Ice Thickness - 0m

TABLE 4
2010 HYDROLAB RESULTS - GARROW LAKE - August 30th
STATION 262-3A (South Station)

Depth	Stat. 262-3A Temp (°C)	Stat. 262-3A DO (mg/L)	Stat. 262-3A Cond (mS/cm)	Stat. 262-3A pH	Stat. 262-3A Redox (mV)	Comments
0	3.83	13.27	13.85	8.37	194	
1	3.85	12.08	13.84	8.63	190	
2	3.83	12.74	13.84	8.65	190	
3	3.83	12.7	13.84	8.65	189	
4	3.83	12.63	13.85	8.66	189	
5	3.83	12.56	13.84	8.67	190	
6	3.82	12.53	13.84	8.67	191	
7	3.78	12.51	13.85	8.68	191	
8	3.7	12.49	13.85	8.68	192	
9	4.08	13.08	18.5	8.51	200	
9.5	4.68	7.7	27	8.08	212	
10	5.82	1.34	56.3	7.71	217	
10.5	6.50	0.88	76.9	7.81	212	
11	7.01	1.89	87	7.85	205	
12	7.27	1.5	89.3	7.85	200	
13	7.5	0.6	91	7.82	192	
14	7.3	0.25	91.4	7.83	169	
15	6.94	0.2	91.7	7.84	152	
16	6.74	0.2	91.8	7.85	143	
17	6.65	0.18	91.8	7.86	137	
18	6.6	0.18	91.7	7.87	120	
19	6.56	0.18	91.8	7.87	20	
20	6.55	0.16	91.8	7.88	-14	
21						
22						
23						
24						
25						
26						
27						
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35						
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Ice Thickness - 0m

APPENDIX 5

Electronic Copy of Report on CD