

**PRESERVATION OF NINETEEN
HEAVY METALS IN TEN REGIONAL WATERS**

by

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EXECUTIVE SUMMARY

The centralization of the Water Quality Laboratory has involved longer time between sample collection and sample analysis. It is therefore essential that the sample preservation techniques currently in use be thoroughly evaluated and modified where required, if the data generated by the consolidated laboratory are to be reliable.

The study of sample preservation techniques involved several phases. In the first two phases, 16 major ions and 11 nutrients in 18 different waters were studied. This report describes the results of the third phase of the preservation study, the preservation of 19 heavy metals in ten regional waters for a period of up to four months. It was found that 17 metals are stable when preserved in the appropriate containers and preservatives.

This study demonstrates the validity of the existing preservation procedures in different regional waters. The results will enhance the confidence of the data generated by the WQNL for a variety of samples using the described preservation conditions.

RÉSUMÉ ADMINISTRATIF

La centralisation des laboratoires de la Direction des eaux a entraîné des délais plus longs entre le prélèvement et l'analyse des échantillons. Il est donc essentiel que les techniques de conservation des échantillons présentement en usage soient évaluées à fond et modifiées au besoin pour que les services centralisés de laboratoire produisent des données fiables.

L'étude des techniques de conservation des échantillons comportait plusieurs phases. Au cours des deux premières phases, on a étudié 16 ions majeurs et 11 substances nutritives dans 18 eaux différentes. Ce rapport décrit les résultats de la troisième phase de l'étude qui portait sur la conservation de 19 métaux lourds dans des eaux provenant de dix régions, pendant une période allant jusqu'à quatre mois. On a constaté que 17 des métaux étudiés sont stables quand ils sont conservés dans des récipients et des agents de conservation appropriés.

Cette étude montre que les méthodes actuelles de conservation sont utilisables dans l'eau de différentes régions. Les résultats augmenteront la fiabilité des données obtenues par les laboratoires de la Direction de la qualité des eaux avec divers échantillons, à l'aide des méthodes de conservation décrites.

ABSTRACT

The centralization of the Water Quality Branch (WQB) laboratories has involved longer time periods between sample collection and sample analysis. It is therefore essential that the sample preservation techniques currently in use be thoroughly evaluated and modified where required, if the data generated by the consolidated laboratory are to be reliable.

This report describes the results of the third phase of the preservation study. The stability of 19 heavy metals in ten different regional waters was investigated for up to a period of four months. The results of total metal analyses indicate that the preservation techniques currently in use are effective in preserving the following 17 metals: Cd, Co, Cu, Fe, Pb, Ni, Zn, Cr, Al, Mo, Mn, Li, Sr, Ag, As, Se and Hg. Vanadium and Barium need to be reinvestigated due to uncertainty of data.

For comparison the same samples were also analyzed for 'extractable' metals. The results indicated that some metal concentrations increased with storage.

RÉSUMÉ

| La centralisation des laboratoires de la Direction de la qualité des eaux qualité des eaux (DQE) a entraîné des délais plus longs entre le prélèvement et l'analyse des échantillons. Il est donc essentiel que les techniques de conservation des échantillons présentement en usage soient évaluées à fond et modifiées au besoin pour que les services centralisés de laboratoire produisent des données fiables.

Ce rapport décrit les résultats de la troisième phase de l'étude sur la conservation. La stabilité de 19 métaux lourds dans l'eau provenant de dix régions différentes a été étudiée pendant une période allant jusqu'à quatre mois. Selon les résultats des dosages des métaux totaux, les techniques de conservation présentement utilisées sont efficaces dans le cas des 17 métaux suivants : Cd, Co, Cu, Fe, Pb, Ni, Zn, Cr, Al, Mo, Mn, Li, Sr, Ag, As, Se et Hg. Les études sur le vanadium et le baryum devront être reprises, car les résultats obtenus avec ces métaux présentaient des incertitudes.

Pour fins de comparaison, les mêmes échantillons ont aussi été analysés pour déterminer leur teneur en métaux extractibles. Les résultats indiquent que la concentration de certains métaux augmente en cours de stockage.

INTRODUCTION

Due to laboratory centralization, test samples have to be sent from the various regions across Canada to the Water Quality National Laboratory (WQNL) Burlington, for analysis. In order for the analyses to be meaningful, the sample integrity must be demonstrated. For this, Water Quality Branch/Headquarters has requested NWRI to carry out a thorough evaluation of preservation procedures to ensure stability of all parameters.

The objective of the task was to evaluate and improve, where necessary, the existing preservation practices for all parameters that the National Laboratory analyze. These parameters include trace metals, major ions, nutrients, physical parameters and the whole spectrum of organic constituents.

The study of sample preservation techniques involved several phases. In the first two phases, 16 major ions and 11 nutrients in 18 different waters were studied¹⁻². This report describes the third phase of the preservation studies; namely, the evaluation of preservation procedures for 19 heavy metals in water samples - Cd, Co, Cu, Fe, Pb, Ni, Zn, Cr, Al, V, Mo, Mn, Li, Sr, Ba, Ag, As, Se and Hg.

The common procedure to preserve these parameters in water samples is by acidification with 0.2% HNO₃ and 0.2% H₂SO₄. However, there were insufficient data to demonstrate that these preservation procedures are effective for long-term stability in a variety of water matrices, particularly the waters from various regions in Canada.

After reviewing numerous data including interlaboratory data of previous quality control studies and a brief literature survey³⁻¹⁷, we separated the 19 metals into four groups as follows, based on the preservative types:

Group I - trace metals preserved with 0.2% HNO₃

Group II - silver, preserved with 0.4 g EDTA

Group III - mercury, preserved with dilute chromic acid

Group IV - arsenic and selenium, preserved with 0.2% H₂SO₄.

Table 1 lists the four groups of metals with appropriate preservatives and types of sample containers.

EXPERIMENTAL

Study Design and Sample Preparation

In this study, the stability of the above parameters were monitored at several different concentration levels in ten different unfiltered waters from across Canada for periods of at least 12 weeks. This monitoring period was chosen to cover the expected sample storage period from sample collection to analysis.

The initial time for sample stability monitoring is designated as time "0" and is defined as the time when all the waters were subsampled into test bottles. As the regional waters did not

arrive at the same time, and some arrived very late, the true time "0" could not be established. To establish the true time "0", that is the moment the samples are collected in the field, would require analysis in the field and monitoring the samples frequently until received in the laboratory. Resource limitations prevent us from doing this. Furthermore, the subsampling alone took several days before the analysis could begin as over 1000 test samples were prepared. Test bottles and other containers were cleaned with 30% HNO₃, rinsed and soaked with 0.2% HNO₃ for at least one week before use¹⁸.

Table 2 lists the ten different regional waters used in this study. Each water was preanalysed to determine whether spiking was necessary. Some spiking had to be done to bring the concentration levels to about 10 times the detection limit of the metal of interest. After spiking, the waters were subsampled into linear polyethylene test bottles except in the cases for Hg and Ag samples. Amber linear polyethylene bottles were used for Ag samples to avoid photoreaction of the Ag ions and glass bottles were used for Hg samples to prevent its adsorption on container wall³.

Analyses

For the analysis of "total" metals, each water sample was digested as follows. One hundred millilitres of water were acidified with 2 mL of concentrated HNO₃ and boiled to dryness in a 200 mL

volumetric flask. Two millilitres of concentrated HCl were then added to the flask, which was again brought to dryness. Fifty millilitres of deionized distilled water were then added and heated to almost boiling. After the water had cooled an additional 50 millilitres of deionized distilled water were added. The water was now ready for analysis. For the analysis of "extractable" metals, digestion was not needed.

Analyses were performed according to the methods described in the Analytical Methods Manual¹³. These procedures are summarized in Table 3. The analyses were carried out in three to six replicates depending on the metal, and their raw data are given in the appendix. In a few cases, some suspect observations were determined to be outliers (by Grubbs procedures¹⁹ or by past experience) and therefore were not included in the calculations.

RESULTS AND DISCUSSION

"Total" and "Extractable" Metal Content

Analysis of metals in water can be done based on either "total" or "extractable" metal contents. The WQNL generates "total" metal data whereas the Atlantic region generates "extractable" metal data. Sample preservation technique for either analysis is the same, that is, acidification of samples to low pH (~1.5). For "total"

metal content, the samples are further digested with acids before analysis. For "extractable" metal content, no digestion is needed. In either case, with or without digestion, the samples are analyzed by AAS by either direct aspiration or after solvent extraction if the metal concentration is low.

In the current preservation study, the stability of the metals in different natural waters were monitored based on the "total" metal content. However, the same samples were also analyzed for "extractable" metals for comparison.

It has been noted⁶ that for water samples from Fraser River (Pacific Region) which have high concentrations of suspended sediment, there was an increase in eight extractable metals (Cu, Fe, Pb, Zn, Ni, Co, Mn and Cd) after storage of 2-3 weeks. Since the current preservation study involves ten different waters across Canada, it is an opportune time to compare the extractable values with total metal contents, particularly when the Moncton laboratory (Atlantic Region) generates data based on "extractable" metal content of unfiltered water samples.

Criteria for Stability

The following is the working criteria.

For a particular parameter in all the waters studied, if 95% of the data are randomly within 10% of the week "0" mean values, the parameter is considered stable.

Some remarks on the criteria:

- (a) For exceptionally good data, 95% or more were within 5% of week "0" means.
- (b) For data with a few pronounced and uncharacteristic fluctuations, 90% of the total data within the 10% limit was accepted as an indication of stability.
- (c) For very low levels due to analytical variations, the 10% limit was, in general, too restrictive; a limit of 20% was more realistic.
- (d) If there was a general trend (decrease or increase) -- i.e., not a random fluctuation -- the 10% limit was considered to be a significant indication of instability.

Total As, Se and Extractable Hg

The arsenic data are summarized in Table 4 and plotted in Figure 1. The overall behavior indicates stability although there are some large between-run fluctuations. These fluctuations are random and cause 7.5% of the data to be slightly out of the 10% limit of the week "0" mean values. The selenium concentrations are very low, as evidenced by the many less than values (Table 5, Figure 2) and are very imprecise, which make it difficult to interpret. Nevertheless, the data for Hamilton Harbour water, the most concentrated of all

waters and containing a low but analyzable concentration of 1.2 ppb Se, indicate efficiency of the preservative (0.2% H₂SO₄).

The extractable Hg data are presented in Table 6 and in Figure 3 and indicate stability throughout.

Silver

Silver samples were preserved with Na₂EDTA (Table 1). Extractable silver was measured by direct aspiration technique and monitored more frequently than other metals (Table 7). Although Hamilton Harbour water seems to show a decrease after one week of storage (Figure 4), the overall behavior of the figure indicates effectiveness of the preservative. In fact, the calculation indicates that 100% of the data are within the 10% limit.

Al, Li, Sr, Ba, Fe and Mn

These metals were preserved with 0.2% HNO₃ and analysed by direct aspiration technique. Except for Al, all the metals were analysed by both total and extractable techniques. Aluminum was analysed by the extractable technique only, and 98% of the data are within the 10% limit, which indicates stability (Table 8, Figure 5). The total Al data, if generated, would not be reliable, since the digestion utilizes Pyrex flasks, which are known to contain aluminum.

The extractable Li data satisfy the criteria of stability as 100% of the results are within the 10% limit (Table 9, Figure 6). For total Li, the week "0" means tend to be erratic relative to the rest of later analyses. For example the Sumas River data for week "0" are very imprecise and their mean value, 38 ± 13 , is most likely biased low (Table 10, Figure 7). If this mean is discarded, 100% of the remaining data fulfill the stability criteria.

The Mn extractable data are summarized in Table 11 and shown graphically in Figure 8. These data indicate stability as 95% of the results are within the 10% limit or one standard deviation. It is worth noting that in five of eight waters a very slight increase in Mn concentration with time is apparent, but overall it is not considered significant (remark d of criteria). For total Mn, the data indicate stability in all waters except the two waters from Pacific Region -- Fraser and Sumas waters which show increases (Table 12, Figure 9). A repeat study on these two waters is required.

The analyses of Ba had many interferences. The extractable Ba data indicate a slight increase (Table 13, Figure 10), whereas the total Ba data show a slight decrease (Table 14, Figure 11). As the data are generally poor, particularly total Ba, it will be necessary to carry out a repeat study.

The extractable Sr data are presented in Table 15, which shows that the between-run imprecisions are quite high. A repeat study is recommended, even though some waters such as Qu'Appelle River and Rivière St. Louis, show good stability (Figure 12). For total Sr

data, the week "0" values appear to be biased low for the first six waters (Table 16) and there are several pronounced fluctuations throughout (Figure 13). In spite of this, nearly 90% of the data are within the 10% limit of week "0" means, thus stability is concluded.

The extractable Fe data indicate stability throughout (Table 17, Figure 14). The calculation indicates 100% of data are randomly within the 10% limit. For total Fe, the week "0" data tend to be erratic (Figure 15, Table 18). For example, in Thunder Creek water, the week "0" mean is only about 1500 ppm compared to 1900 ppm for the rest of the data, and would be an outlier if statistically treated¹⁷. Ignoring this point, nearly 95% of data could be within the 10% limit, an indication of stability.

Cd, Co, Cu, Pb, Ni, Zn, Cr, V and Mo

The extractable and total data for Cd and Co are summarized in Tables 19 to 22 and shown graphically in Figures 16 to 19. The overall results indicate no trend, although there are some large random fluctuations. In spite of these large fluctuations, 90% of data are within the 10% limit of week "0" means (remark b of criteria).

The data for extractable Cu (Table 23, Figure 20) increase with time for all the waters studied. On the other hand, the data for total Cu (Table 24, Figure 21) do not show any trend with time, and in

spite of a few large fluctuations only 8% of the data are outside the 10% limit of week "0" values.

Lead extractable data are summarized in Table 25. Stability of data was observed in five waters, but a definite increase was observed in Thunder Creek water and a definite decrease in Fraser River water (Figure 22). The total Pb results show stability in all the waters, as 95% of the data are randomly within the 10% limit of the week "0" means (Table 26, Figure 23).

Extractable Ni data are summarized in Table 27 and plotted in Figure 24. Fourteen percent of the data are outside the 10% limit and there seems to be slight increase with time in some waters. The week "0" results of total Ni data are consistently lower than the Week 5 results, whereas the other results are randomly distributed (Table 28, Figure 25). In spite of the low initial values, only 9.7% of data are higher (slightly) than the 10% limit, thus the data indicate stability of total Ni by virtue of the remark (b) of the criteria.

Table 29 and Figure 26 present total Zn data. The calculation indicates stability as only 6% of the data are outside the 10% limit of week "0" means.

Total Cr data are summarized in Table 30 and plotted in Figure 27. The calculation gives 16% of data outside the 10% limit. But 13% of this 16% comes from two waters, Hamilton Harbour and Springfield, which show slight increase with time. Furthermore, a repeat study on Hamilton Harbour water so far indicates no increase,

leaving 9.5% of data outside the 10% limit. Thus the overall consideration suggests stability of total Cr during the study period.

Table 31 summarizes the extractable V results. The week "0" data on Miramichi water appear to be too low in comparison to the rest of V data (Figure 28) and result in 10% of data being outside the 10% limit. However, since the combined data of all eight waters have only 13% outside the limit, it seems reasonable to infer stability for extractable V. On the other hand, the total V data surprisingly indicate decrease for seven of eight waters studied (Figure 29, Table 32). A repeat study on the metal is recommended.

The extractable Mo data indicate increase with time for all waters (Figure 30, Table 33). For total Mo (Figure 31, Table 34), most of week "0" data appear to be low, particularly for Qu'Appelle and Thunder Creek waters, which are responsible for 10% of data being outside the 10% limit. In spite of this, only 10% of the whole data are outside the limit, and by virtue of the remark (b), the data indicate stability.

CONCLUSIONS AND RECOMMENDATIONS

Nineteen metals were investigated using the preservatives and container types given in Table 1. The data for total metals indicate that metals are stable. Only Vanadium and Barium need to be reinvestigated due to uncertainty of data.

Based on extractable metals, a few metals show increase, particularly Ba, Cu, Ni and Mo and perhaps Mn. Strontium data are very imprecise.

The overall consideration, therefore, suggests that it would be more meaningful and reliable to analyze trace metals as total, whenever feasible rather than as extractable metals.

Table 35 summarizes the results of data evaluation for the 19 metals studied.

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Table 1. Metal Grouping and Preservatives

Group	Metals	Preservative (Container)	Analytical Methods
I	Cd,Co,Cu,Fe, Pb,Ni,Zn,Cr, Al,V,Mo,Mn, Li, Sr,Ba	0.2% HNO ₃ (1L plastic, LPE)	AAS
II	Ag	0.4 g Na ₂ EDTA per 100 ML (100 ML amber plastic, LPE)	AAS
III	Hg	1% H ₂ SO ₄ +0.05% K ₂ Cr ₂ O ₇ (100 ML glass)	Cold Vapour AAS
IV	As/Se	0.2% H ₂ SO ₄ (100 ML plastic, LPE)	Hydride Generation ICAP

Table 2. The 10 waters used in the preservation study of heavy metals

No.	Origin and Name	Region
1	Hamilton Harbour	Ontario
2	Muddy Pond in Shubenacadie River Basin (As, Hg)	Atlantic
3	Muddy Pond in Waverly (As/Se)	
4	Little Springfield Lakes (TMs)	
5	N.W. Miramichi River (All metals)	
6	Qu'Appelle River at Hwy #6 on old bridge	Western
7	Thunder Creek at Hwy #2 in Moose Jaw, Saskatchewan	
8	Rivière St. Louis (Mouth)	Québec
9	Sumas River	Pacific
10	Fraser River	

Table 3. Metals and Procedures of Analysis

Elements	Procedures				
Al,Fe,Mn Ag,Sr,Ba Li	Direct Aspiration				
Cd,Co,Cu Pb,Ni,Zn Cr		Solvent Extraction= MIBK+APDC			
V		Solvent Extraction= N-Butylacetate + cup ferron			
Mo				Solvent Extraction= N-Butylacetate + benzoin α -oxime	
As,Se					Hydride Generation
Hg					Cold Vapour

Table 4. Summary of total As (ppb) monitoring

Water Number	Water Name	Storage Time, Week			16
		0	4	8	
1	Hamilton Harbour	0.76 ± 0.05	0.84 ± 0.09	0.82 ± 0.04	0.64 ± 0.05
3	Muddy Pond in Waverly	30.64 ± 0.43	30.88 ± 0.88	32.02 ± 0.79	31.00 ± 0.00
5	N. W. Miramichi	0.58 ± 0.04	0.64 ± 0.11	0.54 ± 0.05	0.48 ± 0.08
6	Qu'Appelle River	2.74 ± 0.11	2.68 ± 0.08	2.82 ± 0.08	2.70 ± 0.12
7	Thunder Creek	3.10 ± 0.29	3.22 ± 0.23	3.02 ± 0.16	3.26 ± 0.15
8	Rivière St. Louis	0.72 ± 0.04	0.70 ± 0.00	0.70 ± 0.00	0.76 ± 0.05
9	Sumas River	1.28 ± 0.23	1.22 ± 0.08	1.26 ± 0.05	1.12 ± 0.04
10	Fraser River	0.88 ± 0.05	0.86 ± 0.05	0.84 ± 0.05	0.88 ± 0.08

Table 5. Summary of total Se (ppb) monitoring

Water Number	Water Name	Storage Time, Week		
		0	4	8
1	Hamilton Harbour	1.28 ± 0.16	1.22 ± 0.08	1.24 ± 0.05
3	Muddy Pond in Waverly	<0.10	<0.10	0.13 ± 0.06
5	N. W. Miramichi	<0.10	<0.10	0.10 ± 0.00
6	Qu'Appelle River	0.30 ± 0.08	0.38 ± 0.04	0.40 ± 0.07
7	Thunder Creek	0.30 ± 0.07	0.40 ± 0.07	0.35 ± 0.06
8	Riviere St. Louis	0.20 ± 0.08	0.22 ± 0.08	0.24 ± 0.05
9	Sumas River	0.10 ± 0.00	0.18 ± 0.08	0.13 ± 0.05
10	Fraser River	0.15 ± 0.07	0.13 ± 0.05	<0.10
				0.18 ± 0.04
				-

Table 6. Summary of Extractable Hg (ppb) monitoring

Water Number	Water Name	Storage Time, Week		
		0	7	16
1	Hamilton Harbour	0.28 ± 0.00	0.28 ± 0.00	0.28 ± 0.00
2	Muddy Pond in Shubenacadie River Basin	0.03 ± 0.00	0.03 ± 0.00	0.03 ± 0.00
5	N. W. Miramichi	<0.02	<0.02	<0.02
6	Qu'Appelle River	<0.02	<0.02	<0.02
7	Thunder Creek	0.25 ± 0.01	0.26 ± 0.02	0.25 ± 0.00
8	Rivière St. Louis	0.536 ± 0.005	0.546 ± 0.005	0.534 ± 0.013
9	Sumas River	<0.02	<0.02	<0.02
10	Fraser River	<0.02	<0.02	<0.02

Table 7. Summary of Extractable Ag (ppb) monitoring

Water Number	Water Name	Storage Time, Week									
		0	1	2	3	4	5	7	9	12	
1	Hamilton Harbour	34.93 ± 0.89	32.50 ± 0.41	31.83 ± 0.67	32.72 ± 1.45	31.97 ± 1.69	32.98 ± 2.81	33.38 ± 1.06	32.70 ± 1.48	32.95 ± 0.77	
3	Muddy Pond in Shubenacadie River Basin	10.0 ± 0.0	10.3 ± 0.6	10.7 ± 1.2	11.0 ± 1.7	10.7 ± 1.2	10.0 ± 0.0	10.5 ± 0.0	-	10.8 ± 0.3	
5	Miramichi River	36.12 ± 1.17	36.03 ± 0.82	35.55 ± 0.77	35.57 ± 1.14	35.32 ± 1.19	36.48 ± 2.58	36.15 ± 1.36	36.23 ± 1.96	37.98 ± 1.33	
6	Qu'Appelle River	36.2 ± 0.27	36.48 ± 0.69	36.22 ± 0.54	36.87 ± 0.66	36.63 ± 2.70	37.53 ± 2.64	36.60 ± 1.36	36.38 ± 1.80	36.42 ± 1.10	
8	Rivière St. Louis	35.11 ± 0.39	35.23 ± 0.82	34.82 ± 0.59	35.28 ± 0.84	35.17 ± 0.76	35.48 ± 2.30	34.83 ± 1.21	36.38 ± 2.31	36.73 ± 0.72	
9	Sumas River (at 10 ppb level)	10.0 ± 0.0	9.7 ± 0.0	9.7 ± 0.6	9.3 ± 0.6	9.3 ± 0.6	9.3 ± 0.6	9.3 ± 0.6	-	10.1 ± 0.9	
9	Sumas River (at higher level)	35.20 ± 0.51	35.63 ± 0.63	34.47 ± 0.42	34.10 ± 0.95	34.22 ± 0.50	34.90 ± 1.44	33.37 ± 0.77	34.78 ± 0.91	36.15 ± 1.06	
	Blank	1.03 ± 0.93	0.97 ± 1.42	1.33 ± 1.05	0.53 ± 1.40	1.05 ± 1.40	0.55 ± 1.04	0.22 ± 0.95	0.12 ± 0.89	0.38 ± 1.10	

Table 8 - Summary of Extractable Al (ppm) Monitoring

Water Number	Water Name	Storage Time, Week				15
		0	3	7	11	
1	Hamilton Harbour	1.8 ± 0.0	1.9 ± 0.0	1.9 ± 0.0	1.9 ± 0.00	1.9 ± 0.0
4	Little Springfield Lakes	4.4 ± 0.0	4.3 ± 0.0	4.43 ± 0.06	4.33 ± 0.06	4.37 ± 0.06
5	Miramichi River	1.8 ± 0.0	1.9 ± 0.0	1.87 ± 0.06	1.9 ± 0.0	1.87 ± 0.06
6	Qu'Appelle River	2.3 ± 0.0	2.17 ± 0.06	2.3 ± 0.0	2.27 ± 0.12	2.37 ± 0.06
7	Thunder Creek	2.5 ± 0.0	2.6 ± 0.0	2.7 ± 0.0	2.6 ± 0.0	2.8 ± 0.0
8	Rivière St. Louis	2.5 ± 0.0	2.4 ± 0.0	2.5 ± 0.0	2.47 ± 0.06	2.6 ± 0.0
9	Sumas River	2.0 ± 0.0	2.0 ± 0.0	2.0 ± 0.0	2.0 ± 0.0	2.0 ± 0.0
10	Fraser River	1.8 ± 0.0	1.97 ± 0.06	1.93 ± 0.06	1.93 ± 0.06	-

Table 9. Summary of Extractable Li (ppm) Monitoring

Water Number	Water Name	Storage Time, Week				15
		0	3	7	11	
1	Hamilton Harbour	0.06 ± 0.00	0.06 ± 0.00	0.06 ± 0.00	0.06 ± 0.00	0.06 ± 0.00
4	Little Springfield Lakes	0.06 ± 0.00	0.06 ± 0.00	0.06 ± 0.00	0.06 ± 0.00	0.06 ± 0.00
5	N.W. Miramichi River	0.06 ± 0.00	0.05 ± 0.00	0.05 ± 0.00	0.05 ± 0.00	0.05 ± 0.00
6	Qu'Appelle River	0.10 ± 0.00	0.09 ± 0.00	0.09 ± 0.00	0.09 ± 0.00	0.09 ± 0.00
7	Thunder Creek	0.19 ± 0.00	0.18 ± 0.00	0.19 ± 0.00	0.17 ± 0.00	0.18 ± 0.00
8	Rivière St. Louis	0.06 ± 0.00	0.05 ± 0.00	0.05 ± 0.00	0.05 ± 0.00	0.06 ± 0.00
9	Sumas River	0.06 ± 0.00	0.05 ± 0.00	0.05 ± 0.00	0.05 ± 0.00	0.05 ± 0.00
10	Fraser River	0.06 ± 0.00	0.06 ± .01	0.06 ± 0.00	0.06 ± 0.01	-

Table 10. Summary of Total Li (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			
		0	5	10	15
1	Hamilton Harbour	62.0 ± 4.5	58.0 ± 4.5	60.0 ± 0.0	60.0 ± 0.0
4	Little Springfield Lakes	62.0 ± 4.5	60.0 ± 0.0	60.0 ± 0.0	60.0 ± 0.0
5	N.W. Miramichi River	50.0 ± 0.0	50.0 ± 0.0	50.0 ± 0.0	50.0 ± 0.0
6	Qu'Appelle River	100.0 ± 0.0	90.0 ± 0.0	90.0 ± 0.0	90.0 ± 0.0
7	Thunder Creek	186.0 ± 11.4	180.0 ± 0.0	180.0 ± 0.0	180.0 ± 0.0
8	Rivière St. Louis	60.0 ± 0.0	58.0 ± 4.5	58.0 ± 4.5	58.0 ± 4.5
9	Sumas River	38.0 ± 13.0	50.0 ± 0.0	50.0 ± 0.0	50.0 ± 0.0
10	Fraser River	70.0 ± 0.0	70.0 ± 0.0	70.0 ± 0.0	-

Table 11. Summary of Extractable Mn (ppm) Monitoring

Water Number	Water Name	Storage Time, Week			15
		0	3	7	
1	Hamilton Harbour	0.04 ± 0.00	0.04 ± 0.00	0.05 ± 0.00	0.04 ± 0.01
4	Little Springfield Lakes	0.23 ± 0.00	0.25 ± 0.00	0.24 ± 0.00	0.26 ± 0.01
5	N.W. Miramichi River	0.05 ± 0.00	0.06 ± 0.00	0.06 ± 0.00	0.05 ± 0.00
6	Qu'Appelle River	0.16 ± 0.00	0.18 ± 0.00	0.18 ± 0.00	0.16 ± 0.00
7	Thunder Creek	0.48 ± 0.00	0.5 ± 0.00	0.49 ± 0.00	0.49 ± 0.00
8	Rivière St. Louis	0.08 ± 0.00	0.08 ± 0.00	0.08 ± 0.01	0.08 ± 0.01
9	Sumas River	0.08 ± 0.00	0.08 ± 0.00	0.08 ± 0.00	0.08 ± 0.00
10	Fraser River	0.04 ± 0.00	0.05 ± 0.01	0.04 ± 0.00	0.04 ± 0.00
					-

Table 12. Summary of Total Mn (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			
		0	5	10	15
1	Hamilton Harbour	52.0 ± 4.5	42.0 ± 4.5	40.0 ± 0.0	50.0 ± 0.0
4	Little Springfield Lakes	230.0 ± 7.1	236.0 ± 5.5	232.0 ± 4.5	224.0 ± 5.5
5	N.W. Miramichi River	62.0 ± 4.5	58.0 ± 4.5	58.0 ± 4.5	66.0 ± 5.5
6	Qu'Appelle River	158.0 ± 8.4	164.0 ± 5.4	162.0 ± 4.5	162.0 ± 4.5
7	Thunder Creek	466.0 ± 18.2	510.0 ± 15.8	482.0 ± 8.3	478.0 ± 8.4
8	Rivière St. Louis	80.0 ± 0.0	96.0 ± 5.5	72.0 ± 4.5	86.0 ± 5.4
9	Sumas River	76.0 ± 5.5	86.0 ± 5.5	92.0 ± 4.5	90.0 ± 0.0
10	Fraser River	36.0 ± 8.9	44.0 ± 5.5	50.0 ± 0.0	-

Table 13. Summary of Extractable Ra (ppm) Monitoring

Water Number	Water Name	Storage Time, Week			15
		0	3	7	
1	Hamilton Harbour	0.95 ± 0.00	0.97 ± 0.00	1.10 ± 0.10	1.03 ± 0.06
4	Little Springfield Lakes	0.95 ± 0.00	0.9 ± 0.0	1.0 ± 0.0	1.07 ± 0.06
5	N.W. Miramichi River	0.95 ± 0.00	0.9 ± 0.0	1.0 ± 0.0	1.0 ± 0.00
6	Qu'Appelle River	-	0.6 ± 0.0	0.63 ± 0.06	0.6 ± 0.00
7	Thunder Creek	-	-	-	-
8	Rivière St. Louis	0.95 ± 0.00	1.0 ± 0.0	1.03 ± 0.06	1.03 ± 0.06
9	Sumas River	1.0 ± 0.0	1.0 ± 0.0	1.1 ± 0.0	1.03 ± 0.06
10	Fraser River	0.7 ± 0.0	0.8 ± 0.0	0.8 ± 0.0	0.75 ± 0.00

Table 14. Summary of Total Ba (ppm) Monitoring

Water Number	Water Name	Storage Time, Week			
		0	5	10	15
1	Hamilton Harbour	0.82 ± 0.04	0.58 ± 0.27	0.70 ± 0.28	0.70 ± 0.25
4	Little Springfield Lakes	0.78 ± 0.08	0.50 ± 0.23	0.54 ± 0.23	0.38 ± 0.08
5	N.W. Miramichi River	0.92 ± 0.08	0.88 ± 0.11	0.74 ± 0.17	0.90 ± 0.12
6	Qu'Appelle River	0.70 ± 0.14	0.46 ± 0.18	0.36 ± 0.13	0.44 ± 0.23
7	Thunder Creek	0.68 ± 0.13	0.43 ± 0.21	0.40 ± 0.22	0.66 ± 0.28
8	Rivière St. Louis	0.72 ± 0.08	0.66 ± 0.32	0.28 ± 0.11	0.64 ± 0.32
9	Sumas River	0.84 ± 0.05	0.98 ± 0.04	0.92 ± 0.04	1.00 ± 0.4
10	Fraser River	0.62 ± 0.04	0.58 ± 0.04	0.54 ± 0.11	-

Table 15. Summary of Extractable Sr (ppm) Monitoring

Water Number	Water Name	Storage Time, Week			15
		0	3	7	
1	Hamilton Harbour	0.35 ± 0.00	0.32 ± 0.00	0.47 ± 0.00	0.40 ± 0.00
4	Little Springfield Lakes	<0.05	<0.05	<0.05	0.12 ± 0.00
5	N.W. Mira-michi River	<0.05	<0.05	<0.05	0.10 ± 0.00
6	Qu'Appelle River	0.35 ± 0.00	0.32 ± 0.00	0.35 ± 0.00	0.33 ± 0.00
7	Thunder Creek	0.68 ± 0.00	0.60 ± 0.00	0.58 ± 0.00	0.60 ± 0.00
8	Rivière St. Louis	0.30 ± 0.00	0.28 ± 0.00	0.35 ± 0.00	0.30 ± 0.00
9	Sumas River	<0.05	0.05 ± 0.00	0.05 ± 0.00	<0.05
10	Fraser River	0.88 ± 0.00	0.83 ± 0.00	0.85 ± 0.00	0.76 ± 0.01
					-

Table 16. Summary of Total Sr (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			
		0	5	10	15
1	Hamilton Harbour	333 ± 6	362 ± 16	386 ± 6	342 ± 8
4	Little Springfield Lakes	76.7 ± 6	84 ± 6	70 ± 0	84 ± 11
5	N.W. Miramichi River	63.6 ± 1.3	74 ± 5	76 ± 5	82 ± 5
6	Qu'Appelle River	332 ± 5	376 ± 9	327 ± 15	352 ± 5
7	Thunder Creek	650 ± 14	690 ± 12	628 ± 16	638 ± 11
8	Rivière St. Louis	327 ± 6	360 ± 10	328 ± 4	332 ± 8
9	Sumas River	153 ± 6	150 ± 0	158 ± 5	162 ± 5
10	Fraser River	1236 ± 11	1122 ± 15	1098 ± 22	-

Table 17. Summary of Extractable Fe (ppm) Monitoring

Water Number	Water Name	Storage Time, Week			15
		0	3	7	
1	Hamilton Harbour	0.11 ± 0.00	0.10 ± 0.00	0.10 ± 0.00	0.11 ± 0.00
4	Little Springfield Lakes	0.80 ± 0.00	0.80 ± 0.00	0.85 ± 0.00	0.80 ± 0.00
5	N.W. Miramichi River	0.12 ± 0.00	0.12 ± 0.00	0.11 ± 0.00	0.12 ± 0.00
6	Qu'Appelle River	0.82 ± 0.00	0.85 ± 0.00	0.85 ± 0.00	0.80 ± 0.00
7	Thunder Creek	1.80 ± 0.00	1.80 ± 0.00	1.77 ± 0.06	1.8 ± 0.0
8	Rivière St. Louis	1.00 ± 0.00	0.93 ± 0.00	1.0 ± 0.0	0.95 ± 0.0
9	Sumas River	1.5 ± 0.0	1.4 ± 0.0	1.5 ± 0.0	1.5 ± 0.0
10	Fraser River	1.2 ± 0.0	1.2 ± 0.0	1.2 ± 0.0	1.3 ± 0.0
					-

Table 18. Summary of Total Fe (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			
		0	5	10	15
1	Hamilton Harbour	120 ± 0	108 ± 5	104 ± 6	112 ± 8
4	Little Springfield Lakes	753 ± 15	798 ± 14	786 ± 11	838 ± 27
5	N.W. Miramichi River	116 ± 9	128 ± 5	116 ± 5	122 ± 8
6	Qu'Appelle River	880 ± 34	828 ± 19	810 ± 0	848 ± 11
7	Thunder Creek	1560 ± 89	1956 ± 45	1894 ± 22	1920 ± 7
8	Rivière St. Louis	1013 ± 6	966 ± 5	978 ± 18	994 ± 21
9	Sumas River	1580 ± 20	1450 ± 40	1542 ± 19	1548 ± 13
10	Fraser River	1256 ± 13	1282 ± 13	1282 ± 4	-

Table 19. Summary of Extractable Cd (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	9.0 ± 0.0	9.5 ± 0.0	9.0 ± 0.5	10.0 ± 0.0	9.5 ± 0.0
4	Little Springfield Lakes	9.5 ± 0.5	9.5 ± 0.5	8.67 ± 0.29	10.0 ± 0.0	9.5 ± 0.0
5	N.W. Miramichi River	9.17 ± 0.29	9.33 ± 0.29	8.83 ± 0.29	10.0 ± 0.0	9.5 ± 0.0
6	Qu'Appelle River	10.0 ± 0.0	9.33 ± 0.29	8.67 ± 0.29	10.0 ± 0.0	9.33 ± 0.29
7	Thunder Creek	9.5 ± 0.5	9.0 ± 0.0	10.33 ± 0.58	10.33 ± 0.58	9.33 ± 0.29
8	Rivière St. Louis	14.33 ± 0.58	14.0 ± 0.0	11.67 ± 0.58	14.33 ± 0.58	12.67 ± 0.58
9	Sumas River	9.0 ± 0.0	9.0 ± 0.0	8.17 ± 0.29	10.0 ± 0.0	9.5 ± 0.0
10	Fraser River	12.33 ± 0.58	9.67 ± 0.29	13.0 ± 0.0	12.0 ± 0.0	-

Table 20. Summary of Total Cd (ppb) Monitoring

Water Number	Water Name				Storage Time, Week		
		0	3	7	11	15	
1	Hamilton Harbour	9.33 ± 0.58	10.0 ± 8.8	9.67 ± 0.58	10.0 ± 0.0	10.0 ± 0.0	
4	Little Springfield Lakes	10.0 ± 0.0	11.0 ± 0.0	10.0 ± 0.0	10.0 ± 0.0	10.0 ± 0.0	
5	N.W. Mira-michi River	9.33 ± 0.58	10.0 ± 0.0	10.33 ± 0.58	9.83 ± 0.29	9.67 ± 0.58	
6	Qu'Appelle River	8.75 ± 0.35	9.83 ± 1.04	10.0 ± 0.0	10.0 ± 0.0	10.0 ± 0.0	
7	Thunder Creek	-	9.83 ± 0.29	10.0 ± 0.0	9.75 ± 0.0	10.0 ± 0.0	
8	Rivière St. Louis	12.40 ± 0.55	14.33 ± 0.58	15.33 ± 0.58	12.33 ± 0.58	14.0 ± 0.0	
9	Sumas River	9.25 ± 0.35	10.33 ± 0.58	10.0 ± 0.0	9.0 ± 0.0	9.0 ± 0.0	
10	Fraser River	12.33 ± 0.58	12.67 ± 0.58	10.0 ± 0.0	12.0 ± 0.0	-	

Table 21. Summary of Extractable Co (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			15
		0	3	7	
1	Hamilton Harbour	10.0 ± 0.0	9.0 ± 0.0	9.17 ± 0.29	10.0 ± 0.0
4	Little Springfield Lakes	28.0 ± 0.0	27.33 ± 0.58	26.33 ± 0.58	29.0 ± 0.0
5	N.W. Mira-michi River	9.83 ± 0.29	9.67 ± 0.29	10.33 ± 0.58	10.0 ± 0.0
6	Qu'Appelle River	10.0 ± 0.0	10.33 ± 0.58	9.83 ± 0.29	10.0 ± 0.0
7	Thunder Creek	12.0 ± 0.0	10.33 ± 0.58	10.67 ± 0.58	10.0 ± 0.0
8	Rivière St. Louis	10.0 ± 0.0	11.33 ± 0.58	10.33 ± 0.58	12.0 ± 0.0
9	Sumas River	10.0 ± 0.0	10.67 ± 0.58	10.67 ± 0.58	10.67 ± 0.58
10	Fraser River	8.0 ± 0.0	7.5 ± 0.0	8.33 ± 0.58	8.33 ± 0.29

Table 22. Summary of Total Co (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			15
		0	3	7	
1	Hamilton Harbour	9.5 ± 0.0	9.67 ± 0.29	9.83 ± 1.04	9.0 ± 1.0
4	Little Springfield Lakes	28.67 ± 0.58	28.33 ± 1.53	27.67 ± 1.53	31.67 ± 0.58
5	N.W. Miramichi River	11.0 ± 0.0	11.33 ± 1.15	10.17 ± 0.76	10.67 ± 0.58
6	Qu'Appelle River	11.33 ± 0.58	12.0 ± 0.0	11.67 ± 0.58	10.0 ± 0.0
7	Thunder Creek	11.6 ± 0.9	12.0 ± 0.0	-	12.2 ± 0.4
8	Rivière St. Louis	10.8 ± 0.8	11.0 ± 0.0	-	11.0 ± 0.0
9	Sumas River	10.6 ± 0.9	11.3 ± 0.6	11.67 ± 0.58	10.0 ± 0.0
10	Fraser River	8.5 ± 0.0	7.67 ± 0.29	8.0 ± 0.0	7.67 ± 0.58
					-

Table 23. Summary of Extractable Cu (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			15
		0	3	7	
1	Hamilton Harbour	7.0 ± 0.0	7.7 ± 0.2	9.23 ± 0.49	8.0 ± 0.5
4	Little Springfield Lakes	19.33 ± 0.58	21.67 ± 0.58	20.67 ± 0.58	21.0 ± 0.0
5	N.W. Miramichi River	8.4 ± 0.66	9.33 ± 0.29	10.33 ± 0.58	10.0 ± 0.0
6	Qu'Appelle River	6.0 ± 0.0	7.63 ± 0.23	9.43 ± 0.23	8.33 ± 0.29
7	Thunder Creek	8.90 ± 0.17	11.33 ± 0.58	14.0 ± 0.0	10.0 ± 0.0
8	Rivière St. Louis	8.80 ± 0.17	9.80 ± 0.17	10.0 ± 0.0	12.0 ± 0.0
9	Sumas River	9.0 ± 0.0	15.33 ± 0.58	12.0 ± 0.0	11.67 ± 0.58
10	Fraser River	71.67 ± 2.89	73.33 ± 2.89	76.67 ± 2.89	80.0 ± 0.0
					-

Table 24. Summary of Total Cu (ppb) Monitoring

Water Number	Water Name				Storage Time, Week		
		0	3	7	11	15	
1	Hamilton Harbour	9.17 ± 0.29	10.67 ± 0.58	10.00 ± 0.87	10.00 ± 0.00	9.83 ± 0.29	
4	Little Springfield Lakes	26.67 ± 0.58	28.67 ± 0.00	23.33 ± 0.58	26.00 ± 1.00	26.30 ± 0.58	
5	N.W. Miramichi River	10.33 ± 0.58	11.00 ± 0.00	11.33 ± 0.58	10.67 ± 0.58	10.67 ± 0.58	
6	Qu'Appelle River	10.33 ± 0.58	10.67 ± 0.58	10.33 ± 0.58	10.50 ± 0.71	9.67 ± 0.58	
7	Thunder Creek	16.00 ± 1.00	16.00 ± 0.00	15.00 ± 0.00	14.67 ± 0.58	16.00 ± 0.00	
8	Rivière St. Louis	13.33 ± 1.53	12.33 ± 0.58	12.00 ± 0.00	12.00 ± 0.00	11.67 ± 0.58	
9	Sumas River	12.3 ± 0.6	13.6 ± 0.5	-	13.6 ± 0.9	13.2 ± 0.4	
10	Fraser River	75.6 ± 1.1	78.0 ± 2.3	-	74.8 ± 1.9	-	

Table 25 Summary of Extractable Pb (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	18.00 ± 0.00	17.00 ± 0.00	18.00 ± 0.00	17.00 ± 0.00	17.0 ± 0.0
4	Little Springfield Lakes	28.00 ± 0.00	25.33 ± 0.00	26.33 ± 0.00	25.33 ± 0.58	27.0 ± 0.0
5	N.W. Mira-michi River	23.00 ± 0.00	21.00 ± 0.00	22.00 ± 0.00	22.00 ± 0.00	22.0 ± 0.0
6	Qu'Appelle River	10.00 ± 0.00	10.00 ± 0.00	10.67 ± 0.58	9.00 ± 0.00	-
7	Thunder Creek	10.00 ± 0.00	11.67 ± 0.58	12.67 ± 0.58	12.33 ± 0.58	-
8	Riviere St. Louis	-	-	-	-	-
9	Sumas River	17.33 ± 1.15	16.00 ± 1.00	17.33 ± 0.58	16.67 ± 0.58	17.0 ± 0.0
10	Fraser River	16.67 ± 1.15	16.33 ± 0.58	14.67 ± 1.15	14.0 ± 1.0	-

Table 26. Summary of Total Pb (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			11	15
		0	3	7		
1	Hamilton Harbour	18.67 ± 0.58	18.67 ± 1.15	17.0 ± 0.0	19.0 ± 0.0	17.0 ± 1.0
4	Little Springfield Lakes	28.0 ± 0.0	25.33 ± 0.58	26.33 ± 0.58	27.33 ± 0.58	25.33 ± 0.0
5	N.W. Miramichi River	21.0 ± 0.0	19.33 ± 0.58	20.33 ± 0.58	21.67 ± 0.58	20.50 ± 2.12
6	Qu'Appelle River	10.0 ± 0.0	9.83 ± 0.29	9.83 ± 0.29	10.0 ± 0.0	9.67 ± 0.58
7	Thunder Creek	14.8 ± 1.1	13.33 ± 0.58	13.67 ± 1.15	13.33 ± 1.53	13.33 ± 1.15
8	Rivière St. Louis	100.2 ± 4.9	104.33 ± 5.13	121.67 ± 2.89	110.0 ± 10.0	110.0 ± 10.0
9	Sumas River	17.67 ± 0.58	16.33 ± 0.58	18.0 ± 0.0	18.0 ± 0.0	18.0 ± 0.0
10	Fraser River	13.0 ± 0.7	15.2 ± 0.4	-	13.0 ± 0.0	-

Table 27. Summary of Extractable Ni (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			15
		0	3	7	
1	Hamilton Harbour	19.33 ± 0.58	18.67 ± 0.58	19.67 ± 0.58	19.33 ± 0.58
4	Little Springfield Lakes	-	-	-	-
5	N.W. Miramichi River	12.67 ± 0.58	13.67 ± 0.58	13.67 ± 0.58	13.67 ± 0.58
6	Qu'Appelle River	19.0 ± 0.0	19.0 ± 0.0	15.33 ± 0.58	18.67 ± 0.58
7	Thunder Creek	18.0 ± 0.0	19.0 ± 0.0	19.00 ± 1.00	19.67 ± 0.58
8	Rivière St. Louis	16.67 ± 0.58	17.67 ± 0.58	13.33 ± 0.58	16.67 ± 0.58
9	Sumas River	-	-	-	-
10	Fraser River	9.67 ± 0.58	9.33 ± 0.58	10.0 ± 0.0	9.67 ± 0.58

Table 28. Summary of Total Ni (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			
		0	5	10	15
1	Hamilton Harbour	21.0 ± 1.0	21.8 ± 1.1	21.8 ± 0.45	22.0 ± 0.0
4	Little Springfield Lakes	59.7 ± 4.2	61.4 ± 1.1	61.4 ± 1.3	62.6 ± 1.1
5	N.W. Miramichi River	15.0 ± 0.0	16.2 ± 0.8	15.4 ± 0.9	16.2 ± 0.4
6	Qu'Appelle River	19.33 ± 0.58	20.4 ± 0.5	20.0 ± 0.7	20.4 ± 1.9
7	Thunder Creek	21.0 ± 0.0	24.0 ± 0.7	23.2 ± 0.5	23.8 ± 1.0
8	Rivière St. Louis	17.7 ± 0.6	18.8 ± 0.0	19.8 ± 0.4	19.0 ± 0.0
9	Sumas River	40.3 ± 1.0	42.2 ± 0.4	42.8 ± 0.8	42.6 ± 0.5
10	Fraser River	11.0 ± 0.0	11.6 ± 0.5	10.8 ± 0.5	-

Table 29. Summary of Total Zn (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			
		0	5	10	15
1	Hamilton Harbour	17.7 ± 1.2	18.0 ± 0.0	18.0 ± 0.0	18.0 ± 0.7
4	Little Springfield Lakes	70.7 ± 2.5	72.2 ± 1.1	70.8 ± 1.1	73.2 ± 1.1
5	N.W. Miramichi River	64.0 ± 2.0	62.8 ± 1.9	60.4 ± 0.9	63.4 ± 1.3
6	Qu'Appelle River	6.0 ± 1.0	5.4 ± 0.5	5.4 ± 0.5	5.2 ± 0.5
7	Thunder Creek	15.0 ± 1.0	15.8 ± 1.3	15.0 ± 0.7	14.6 ± 0.5
8	Rivière St. Louis	12.0 ± 2.7	12.2 ± 0.8	10.0 ± 0.7	12.3 ± 0.6
9	Sumas River	3.0 ± 0.0	3.0 ± 0.0	3.0 ± 0.0	2.8 ± 0.4
10	Fraser River	49.6 ± 1.5	46.8 ± 2.6	46.8 ± 1.3	-

Table 30. Summary of Total Cr (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			
		0	5	10	15
1	Hamilton Harbour	6.3 ± 0.6	6.8 ± 0.4	7.6 ± 0.5	7.2 ± 0.4
4	Little Springfield Lakes	5.6 ± 0.5	6.2 ± 0.4	6.6 ± 0.5	6.8 ± 0.4
5	N.W. Miramichi River	4.7 ± 0.6	5.8 ± 0.8	5.2 ± 0.4	5.0 ± 0.0
6	Qu'Appelle River	6.0 ± 0.0	6.0 ± 0.0	6.4 ± 0.5	6.0 ± 0.0
7	Thunder Creek	7.2 ± 0.4	7.0 ± 1.0	7.6 ± 0.5	7.5 ± 0.6
8	Rivière St. Louis	11.7 ± 1.2	12.8 ± 1.3	12.2 ± 0.4	12.2 ± 0.4
9	Sumas River	8.0 ± 0.0	8.2 ± 1.1	7.8 ± 0.5	7.8 ± 0.4
10	Fraser River	4.3 ± 1.2	4.2 ± 0.4	3.8 ± 0.4	-

Table 31. Summary of Extractable V (ppb) Monitoring

Water Number	Water Name	Storage Time, Week					15
		0	3	7	11		
1	Hamilton Harbour	10.0 ± 0.0	9.3 ± 0.6	-	9.3 ± 0.6	9.3 ± 0.6	
4	Little Springfield Lakes	7.0 ± 0.0	10.0 ± 0.0	-	9.0 ± 0.0	10.0 ± 0.0	
5	N.W. Mira-michi River	9.0 ± 1.7	9.0 ± 0.0	-	9.0 ± 0.0	9.0 ± 0.0	
6	Qu'Appelle River	13.0 ± 0.0	12.3 ± 0.6	-	12.0 ± 0.0	12.7 ± 0.58	
7	Thunder Creek	13.0 ± 0.0	12.3 ± 5.8	-	11.0 ± 0.0	14.0 ± 0.0	
8	Rivière St. Louis	10.7 ± 1.15	11.7 ± 0.6	-	10.0 ± 0.0	10.7 ± 0.5	
9	Sumas River	10.0 ± 0.0	10.0 ± 0.0	-	9.8 ± 0.3	10.0 ± 0.0	
10	Fraser River	5.0 ± 0.0	5.0 ± 0.0	-	4.7 ± 0.5	-	

Table 32. Summary of Total V (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			
		0	5	10	15
1	Hamilton Harbour	12.6 ± 2.4	9.0 ± 0.0	10.4 ± 0.5	8.4 ± 0.9
4	Little Springfield Lakes	12.2 ± 1.8	8.0 ± 0.0	10.6 ± 0.5	7.8 ± 0.8
5	N.W. Miramichi River	13.6 ± 1.5	8.4 ± 0.5	7.4 ± 0.5	8.4 ± 0.5
6	Qu'Appelle River	16.4 ± 1.1	11.6 ± 0.5	10.6 ± 0.5	12.0 ± 1.2
7	Thunder Creek	15.6 ± 1.8	11.8 ± 0.4	12.4 ± 1.1	14.4 ± 0.5
8	Rivière St. Louis	11.8 ± 1.9	11.6 ± 0.5	10.8 ± 0.4	11.8 ± 0.8
9	Sumas River	11.6 ± 1.5	10.4 ± 0.5	9.0 ± 1.6	9.2 ± 1.1
10	Fraser River	7.0 ± 0.0	5.4 ± 0.5	5.8 ± 0.8	-

Table 33. Summary of Extractable No (ppb) Monitoring

Water Number	Water Name				Storage Time, Week		
		0	3	7	11	15	
1	Hamilton Harbour	17.33 ± 0.58	21.33 ± 0.58	20.33 ± 0.58	23.0 ± 0.0	22.33 ± 0.58	
4	Little Springfield Lakes	15.33 ± 0.58	19.33 ± 0.58	17.0 ± 0.0	18.33 ± 0.58	19.0 ± 0.0	
5	N.W. Mira-michi River	15.67 ± 0.58	20.67 ± 1.53	17.33 ± 0.58	19.0 ± 1.7	19.0 ± 0.0	
6	Qu'Appelle River	17.0 ± 0.0	24.67 ± 0.58	20.0 ± 0.0	22.0 ± 2.0	22.4 ± 0.0	
7	Thunder Creek	15.0 ± 0.0	24.0 ± 0.0	19.33 ± 1.15	21.33 ± 1.15	20.33 ± 0.58	
8	Rivière St. Louis	16.0 ± 0.0	24.0 ± 0.0	17.33 ± 1.53	22.0 ± 0.0	22.0 ± 0.0	
9	Sumas River	15.0 ± 0.0	21.0 ± 1.0	19.33 ± 0.58	22.0 ± 0.0	21.67 ± 0.58	
10	Fraser River	8.0 ± 0.0	9.0 ± 0.0	9.5 ± 0.0	9.0 ± 1.0	-	

Table 34. Summary of Total Mo (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				15
		0	3	7	11	
1	Hamilton Harbour	22.33 ± 0.58	23.33 ± 1.15	23.0 ± 1.0	23.0 ± 0.0	24.0 ± 0.0
4	Little Springfield Lakes	20.0 ± 0.0	20.67 ± 0.58	19.0 ± 1.0	19.67 ± 0.58	20.33 ± 0.58
5	N.W. Miramichi River	19.83 ± 0.0	20.67 ± 0.58	19.33 ± 1.15	19.33 ± 0.0	20.0 ± 0.0
6	Qu'Appelle River	20.0 ± 1.0	24.33 ± 0.58	21.33 ± 2.08	21.67 ± 0.58	23.0 ± 1.0
7	Thunder Creek	20.67 ± 1.15	23.67 ± 0.58	22.33 ± 1.53	22.33 ± 1.15	23.0 ± 0.0
8	Rivière St. Louis	22.33 ± 2.52	23.33 ± 0.58	21.33 ± 2.08	22.33 ± 0.58	23.67 ± 0.58
9	Sumas River	20.00 ± 1.73	21.0 ± 1.0	20.0 ± 0.0	21.0 ± 1.0	21.67 ± 1.5
10	Fraser River	12.33 ± 0.58	12.0 ± 1.0	12.33 ± 0.58	12.67 ± 0.58	-

Table 35. Summary of Evaluated Results

Metal	Preservative	Total*	Extractable*
As	0.2% H ₂ SO ₄	OK	-
Se	0.2% H ₂ SO ₄	OK	-
Hg	1% H ₂ SO ₄ + 0.05% K ₂ Cr ₂ O ₇	-	OK
Ag	0.4 g Na ₂ EDTA	-	OK
Al	0.2% HNO ₃	-	OK
Li	0.2% HNO ₃	OK	OK
Mn	0.2% HNO ₃	OK (except for Fraser and Sumas waters)	OK (might be slight increase)
Ba	0.2% HNO ₃	Poor Data Repeat study needed	slight increase
Sr	0.2% HNO ₃	OK	very imprecise
Fe	0.2% HNO ₃	OK	OK
Cd	0.2% HNO ₃	OK	OK
Co	0.2% HNO ₃	OK	OK
Cu	0.2% HNO ₃	OK	increase
Pb	0.2% HNO ₃	OK	-OK
Ni	0.2% HNO ₃	OK	slight increase
Zn	0.2% HNO ₃	OK	-
Cr	0.2% HNO ₃	OK	-
V	0.2% HNO ₃	Repeat study needed	OK
Mo	0.2% HNO ₃	OK (except for Qu'Appelle and Thunder Creek waters)	increase

*The dashes mean no analysis was made.

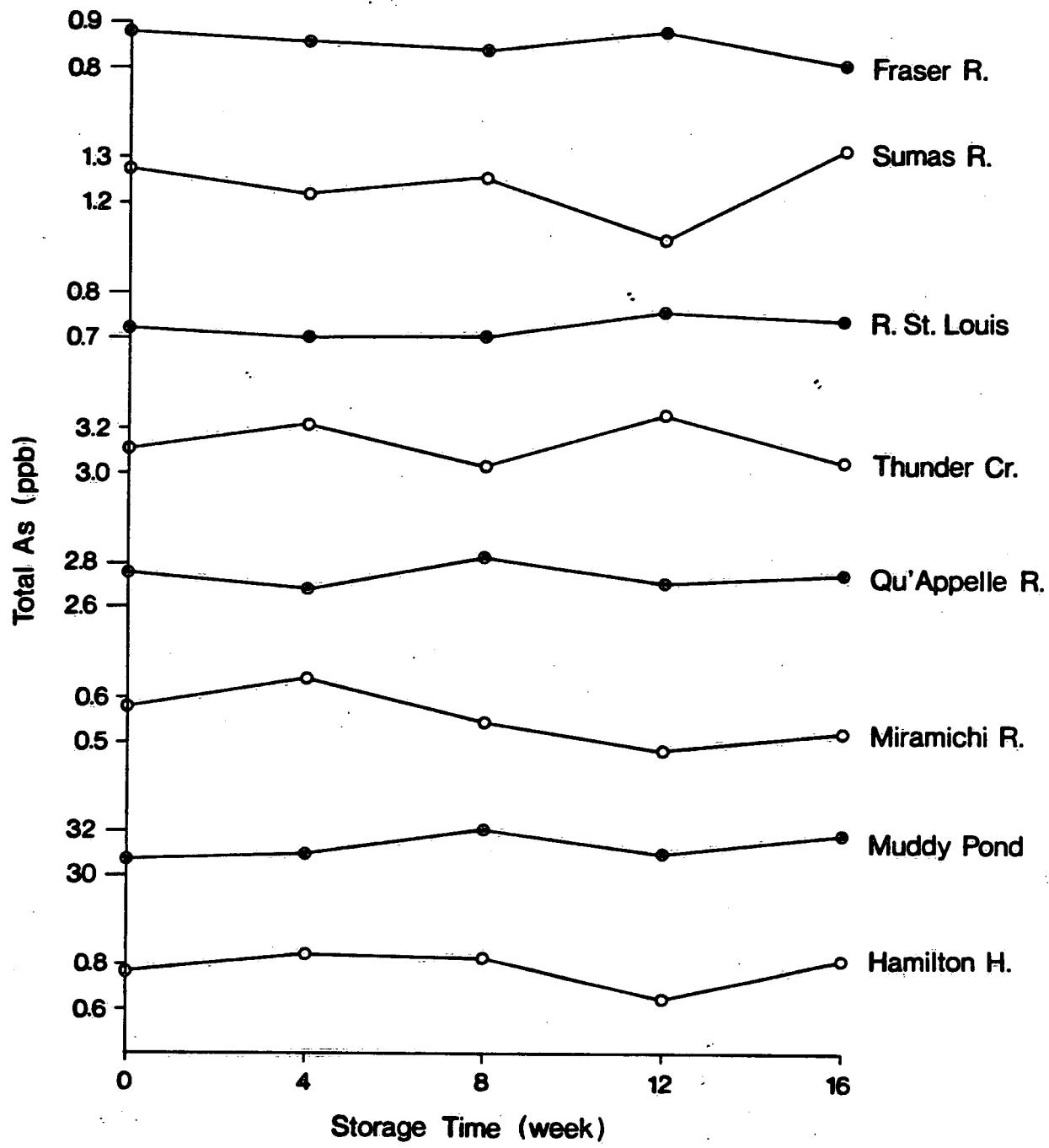


Figure 1. Total As monitoring (each point represents the average of 5 observations)

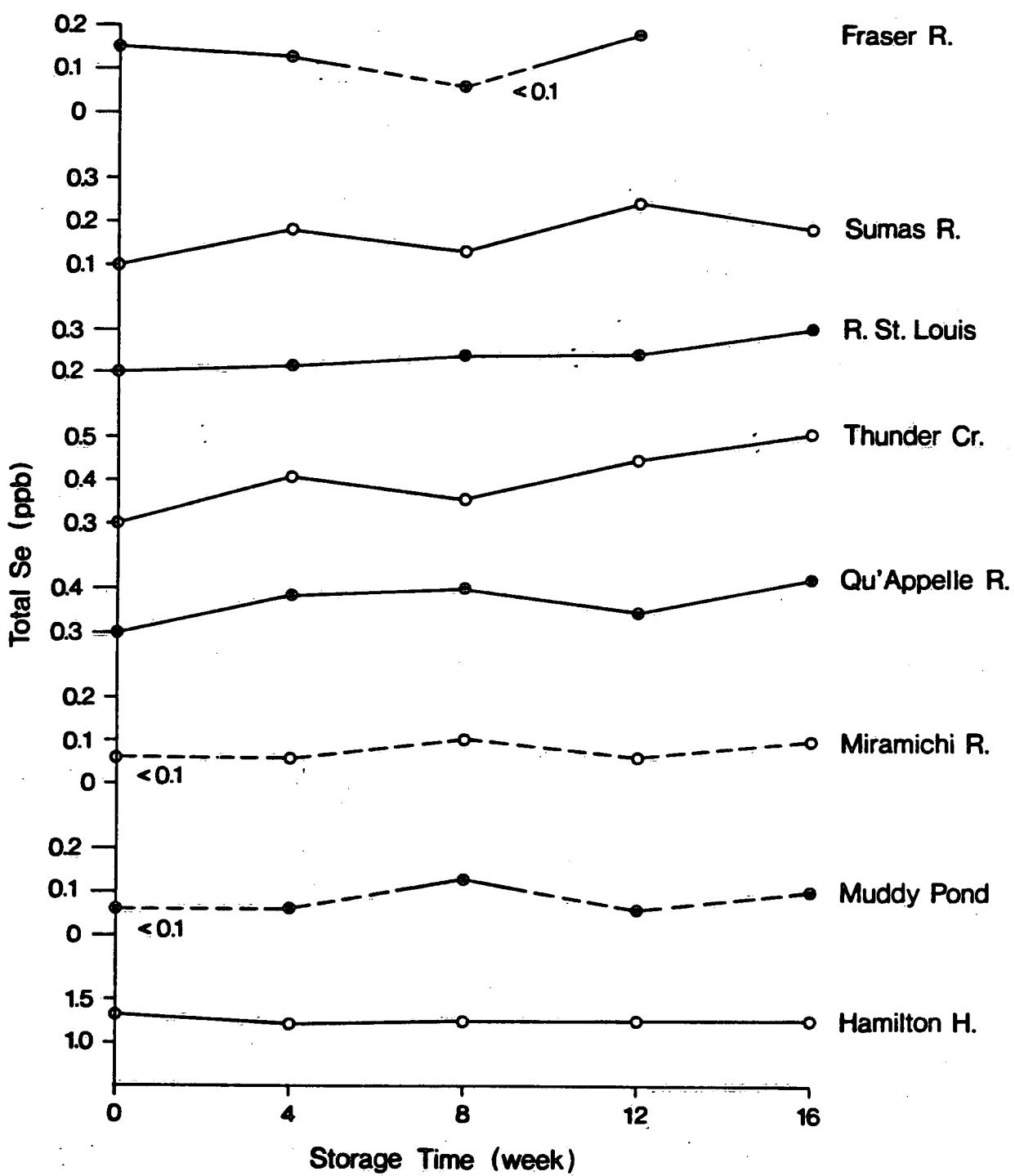


Figure 2. Total Se monitoring (each point represents the average of 5 observations)

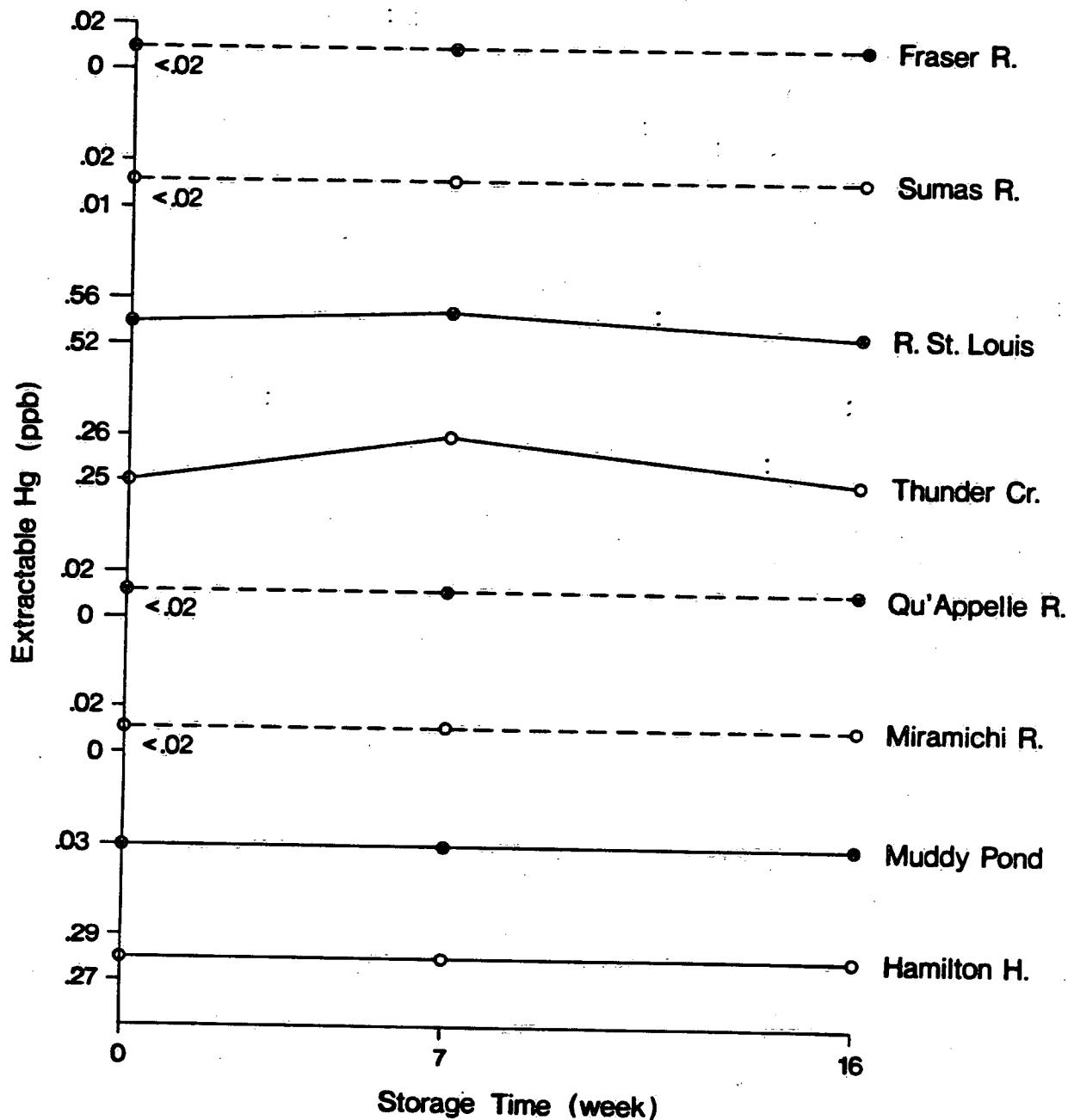


Figure 3. Extractable Hg monitoring (each point represents the average of 5 observations)

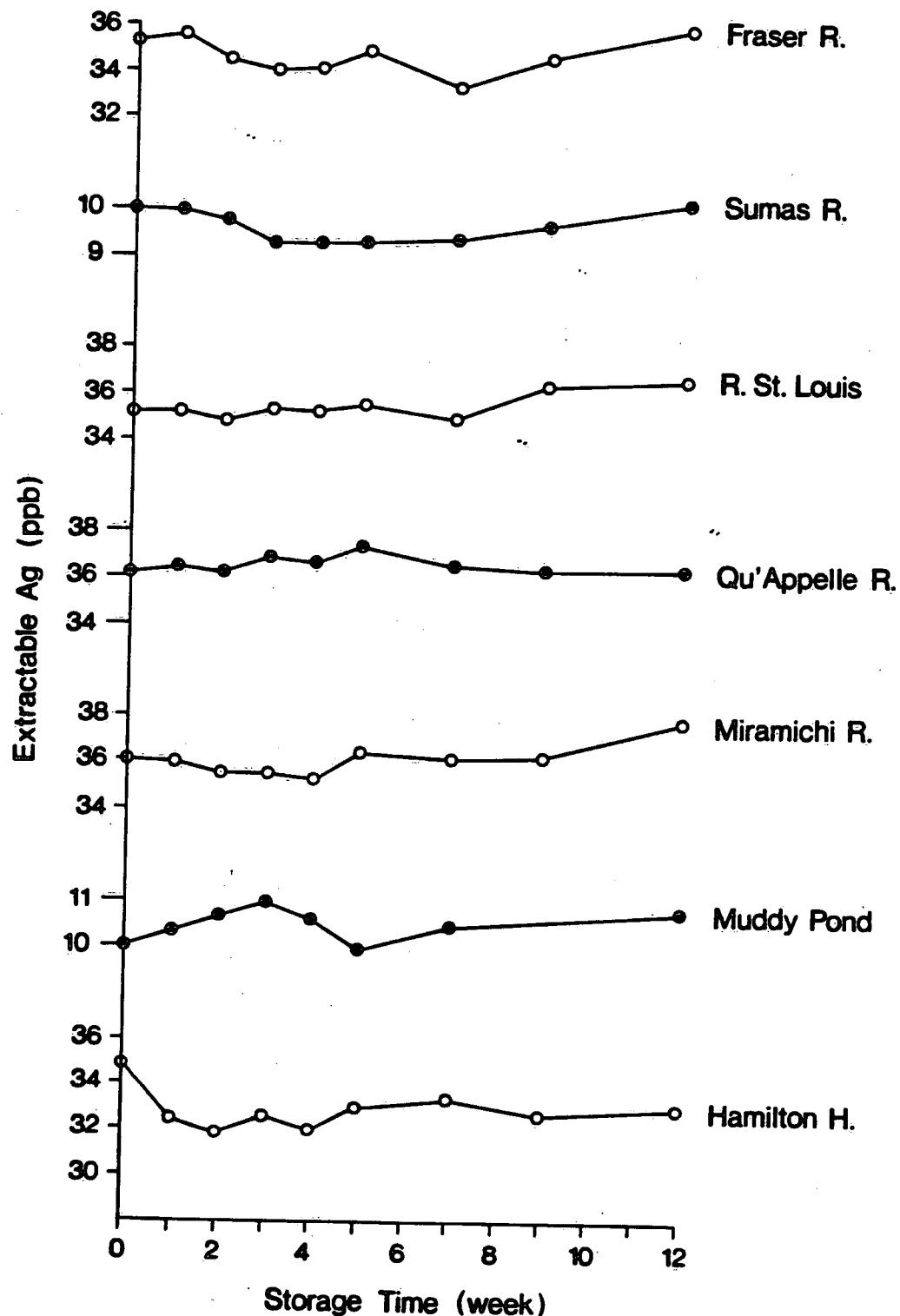


Figure 4. Extractable Ag monitoring (each point represents the average of 6 observations)

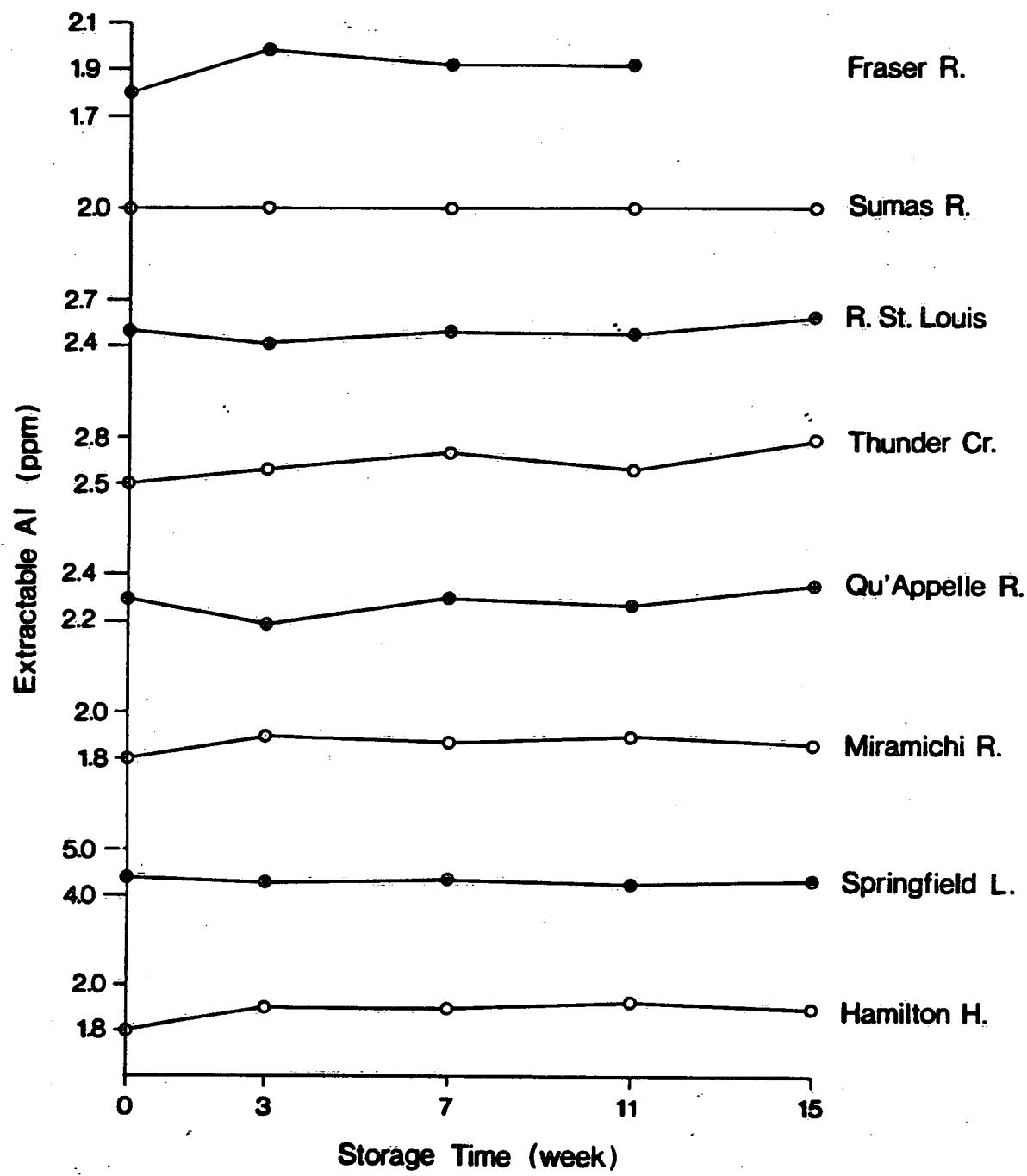


Figure 5. Extractable Al monitoring (each point represents the average of 3 observations)

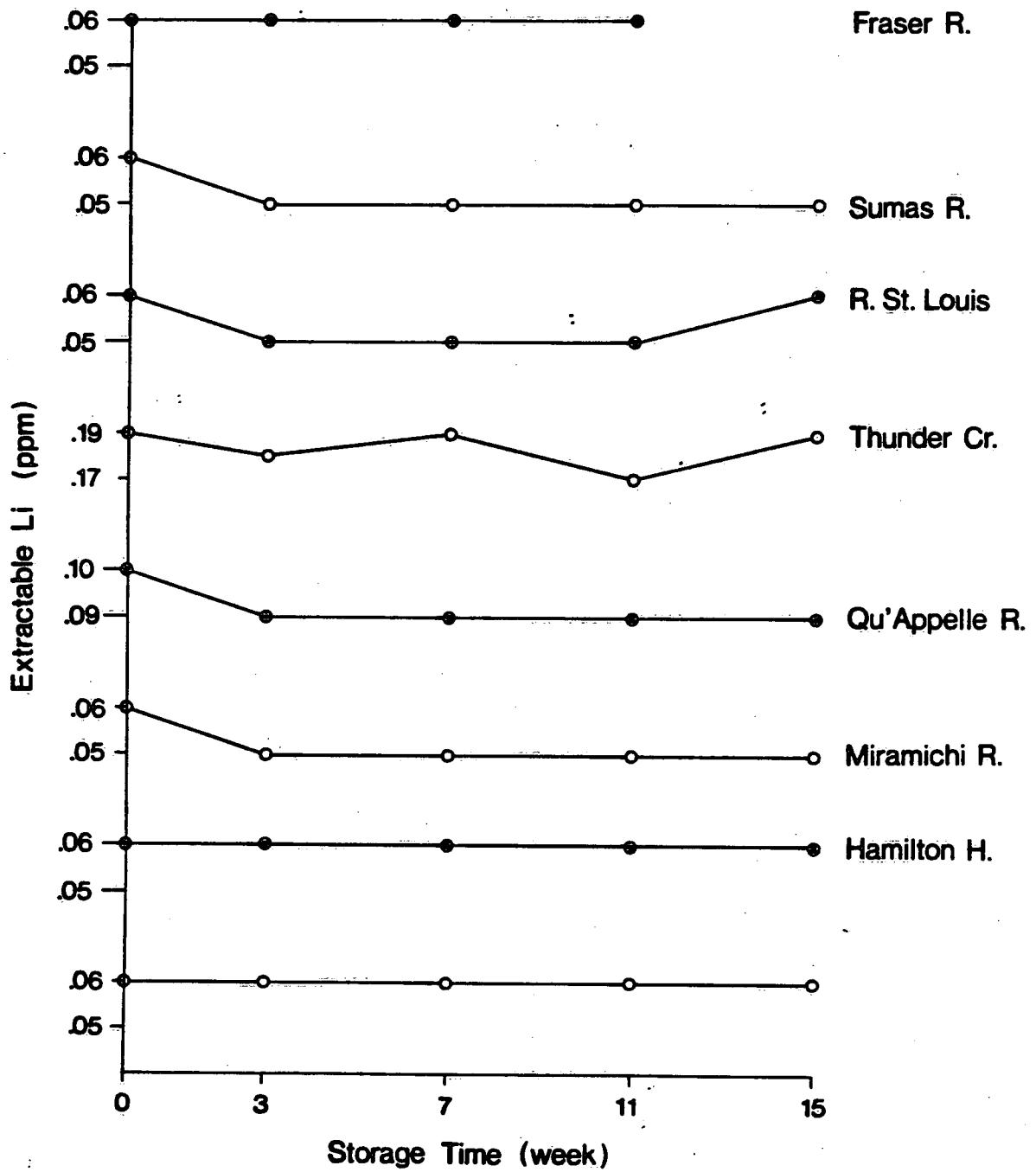


Figure 6. Extractable Li monitoring (each point represents the average of 3 observations)

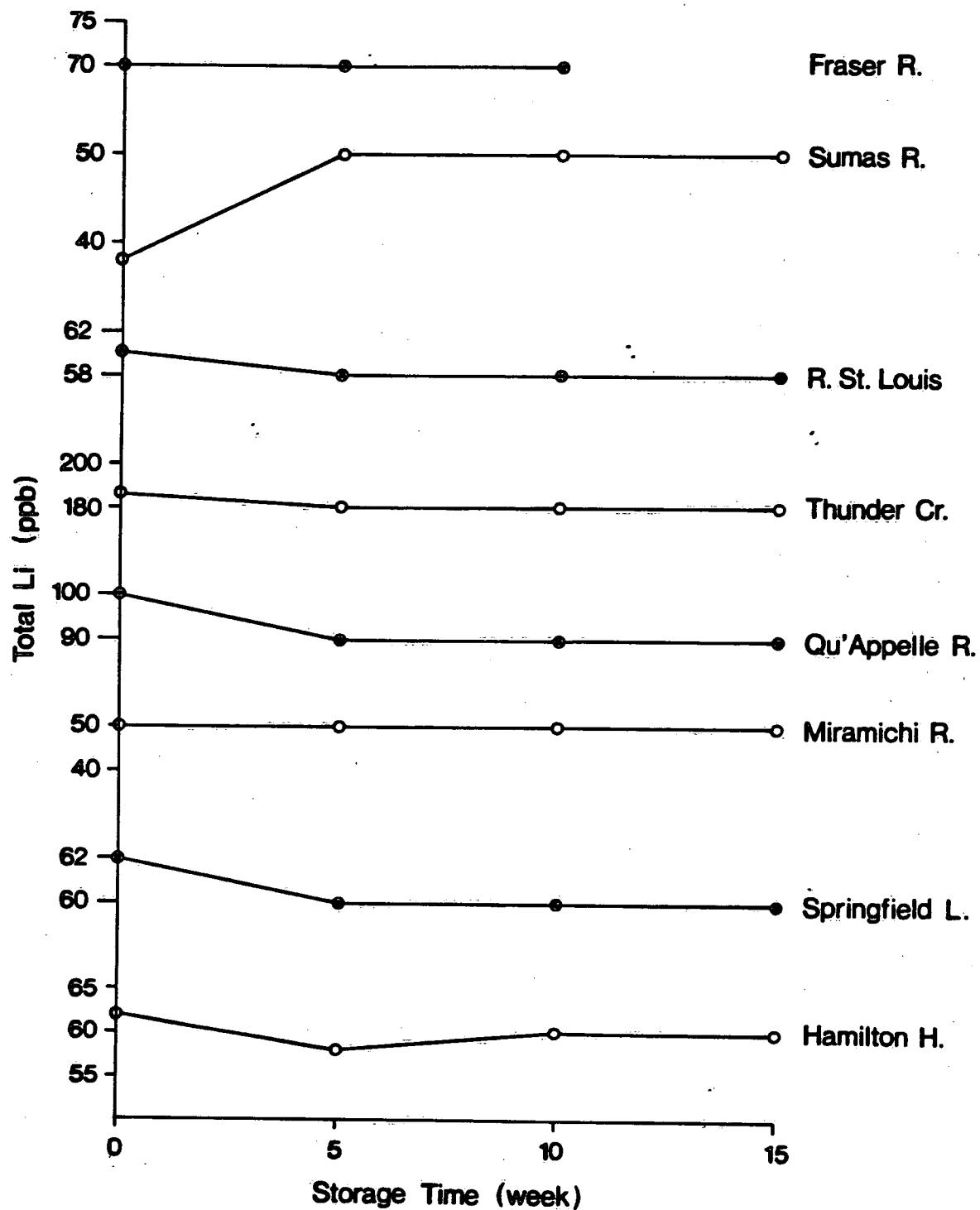


Figure 7. Total Li monitoring (each point represents the average of 5 observations)

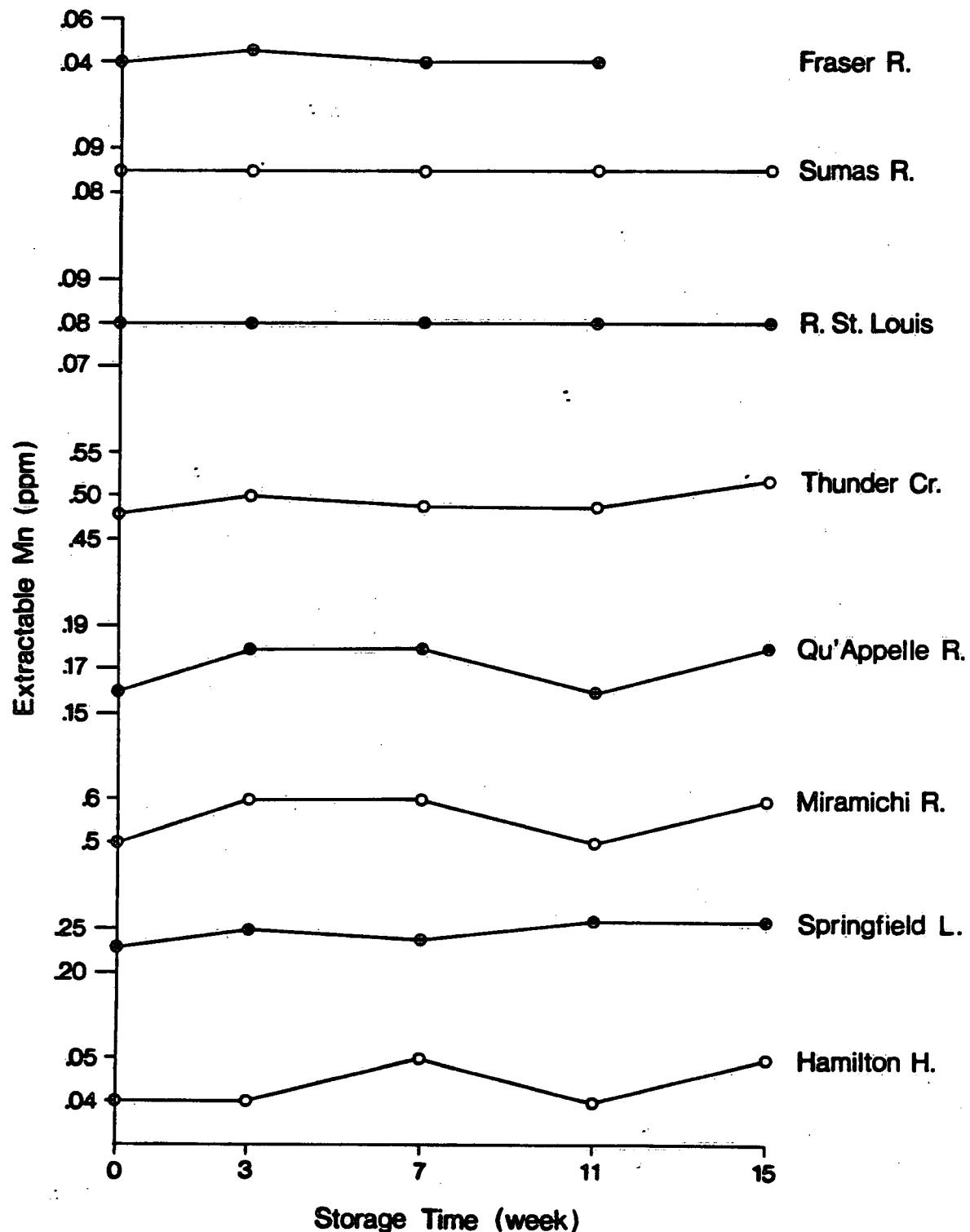


Figure 8. Extractable Mn monitoring (each point represents the average of 3 observations)

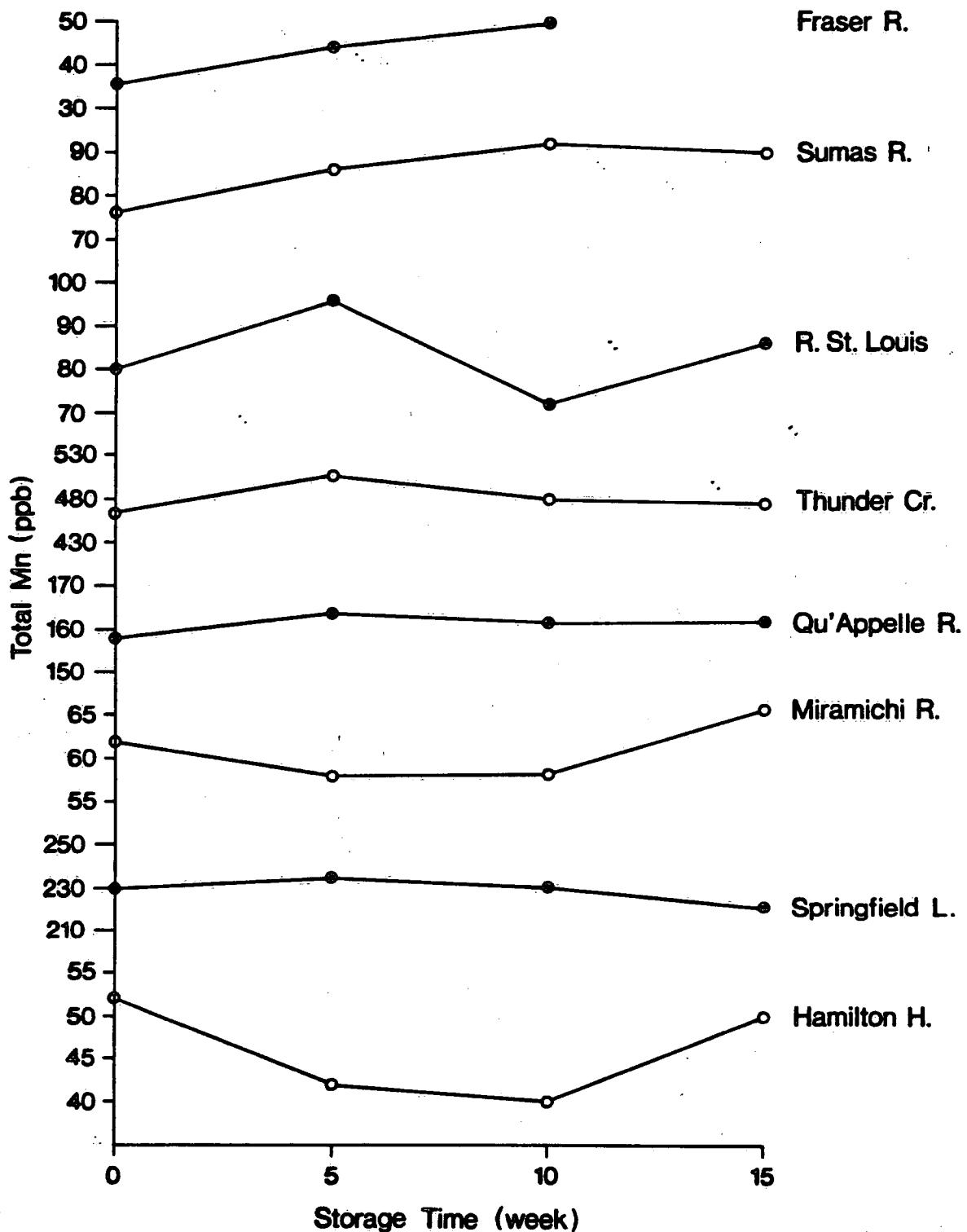


Figure 9. Total Mn monitoring (each point represents the average of 5 observations)

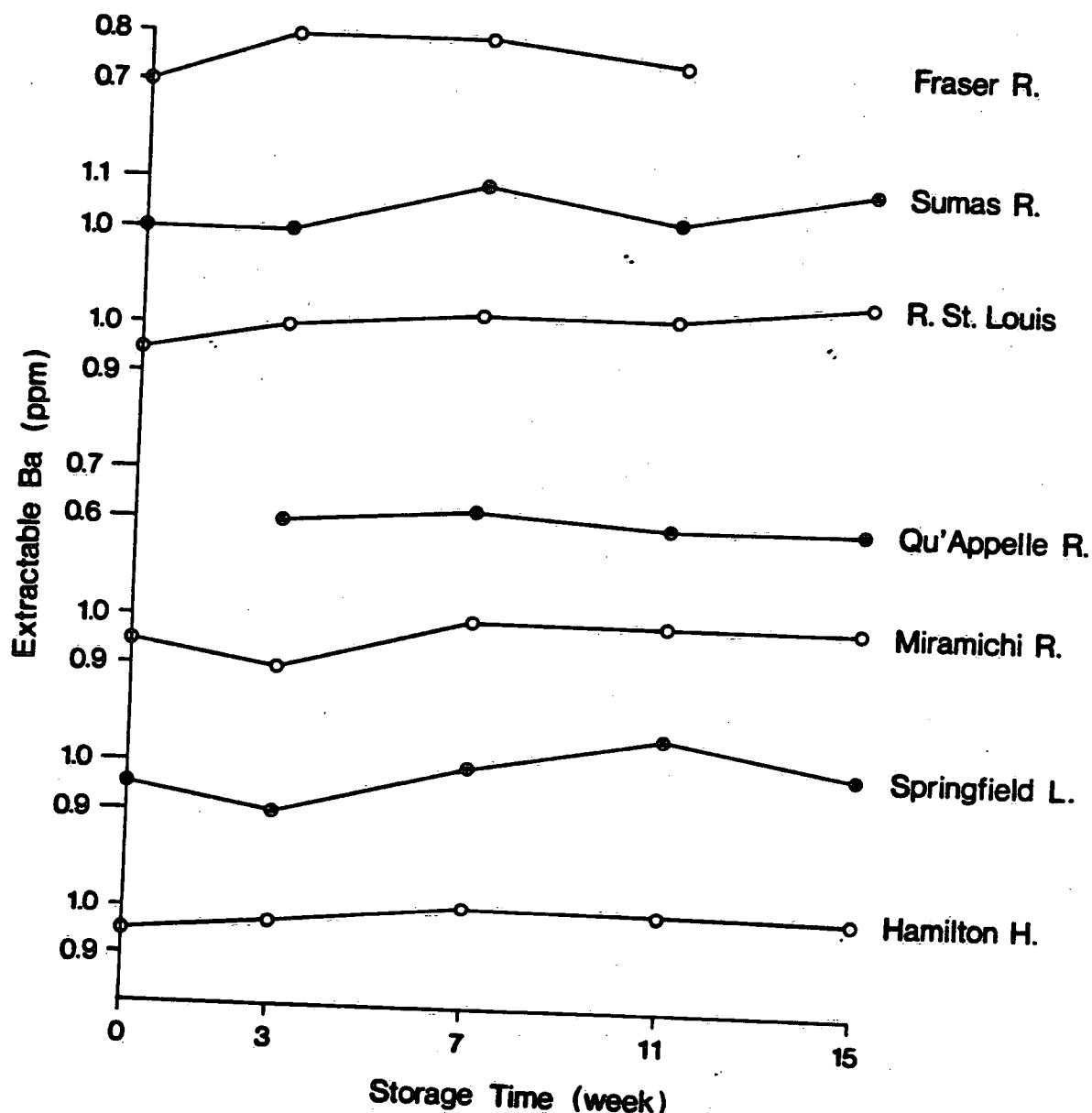


Figure 10. Extractable Ba monitoring (each point represents the average of 3 observations)

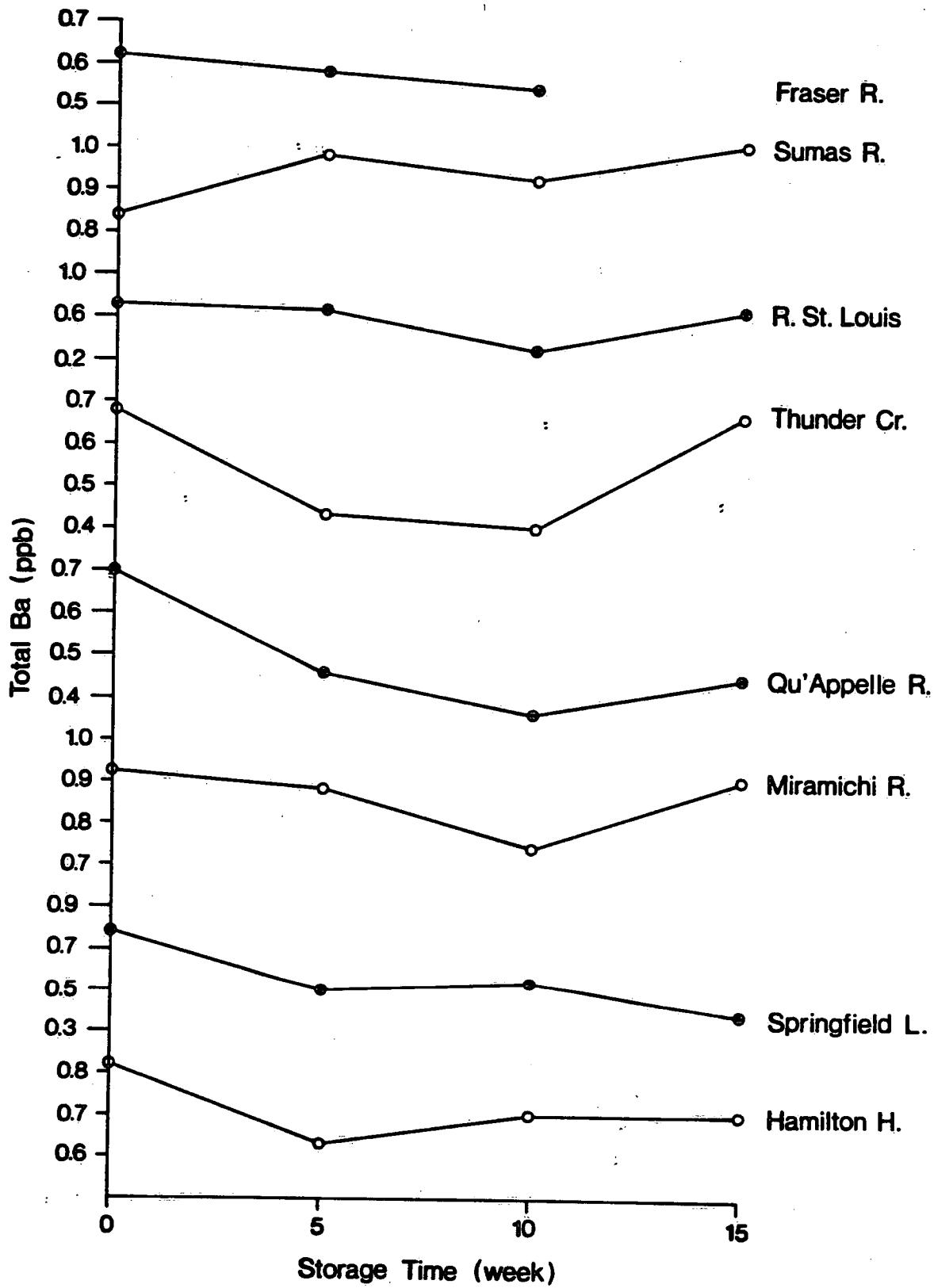


Figure 11. Total Ba monitoring (each point represents the average of 5 observations)

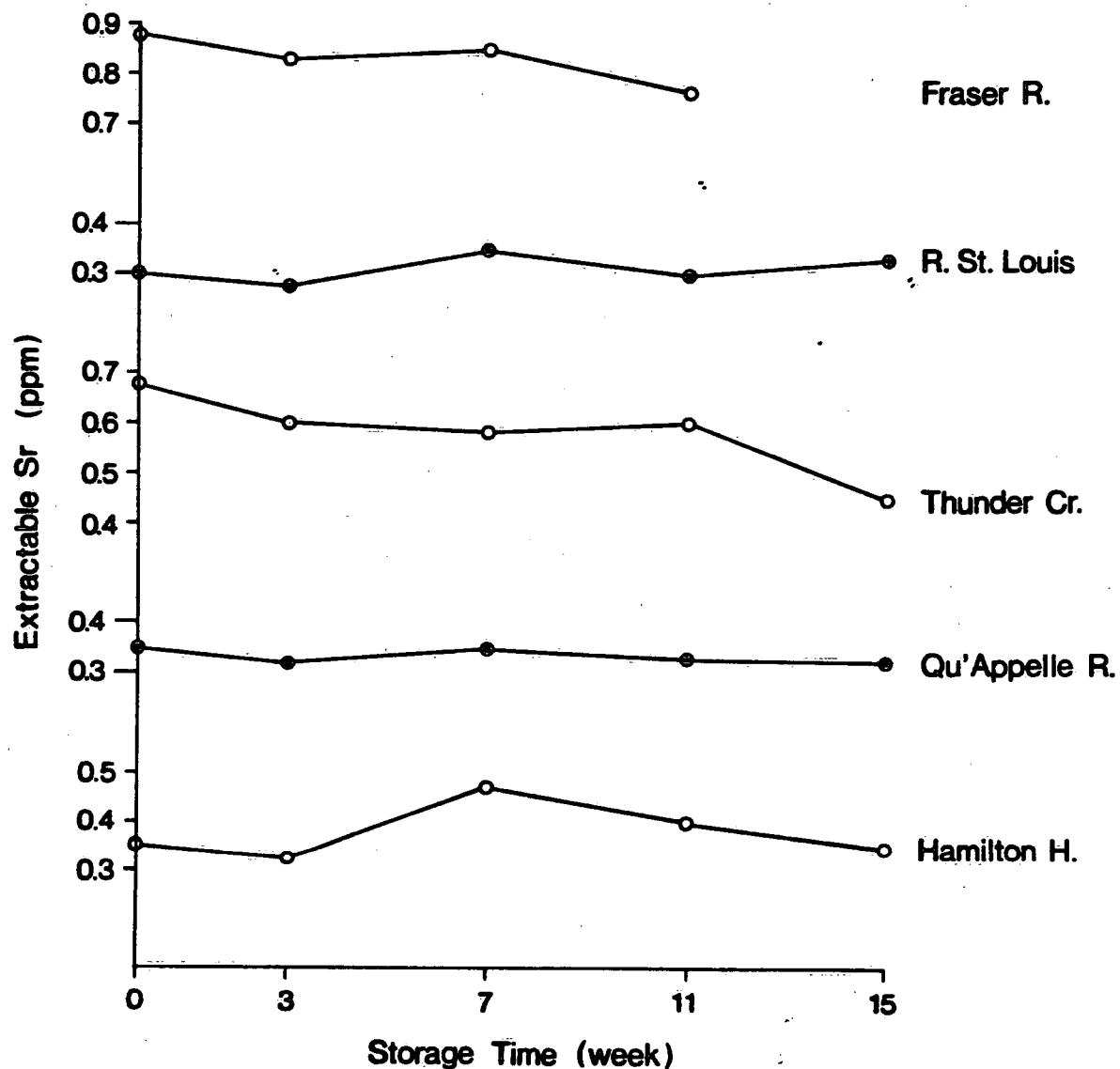


Figure 12. Extractable Sr monitoring (each point represents the average of 3 observations)

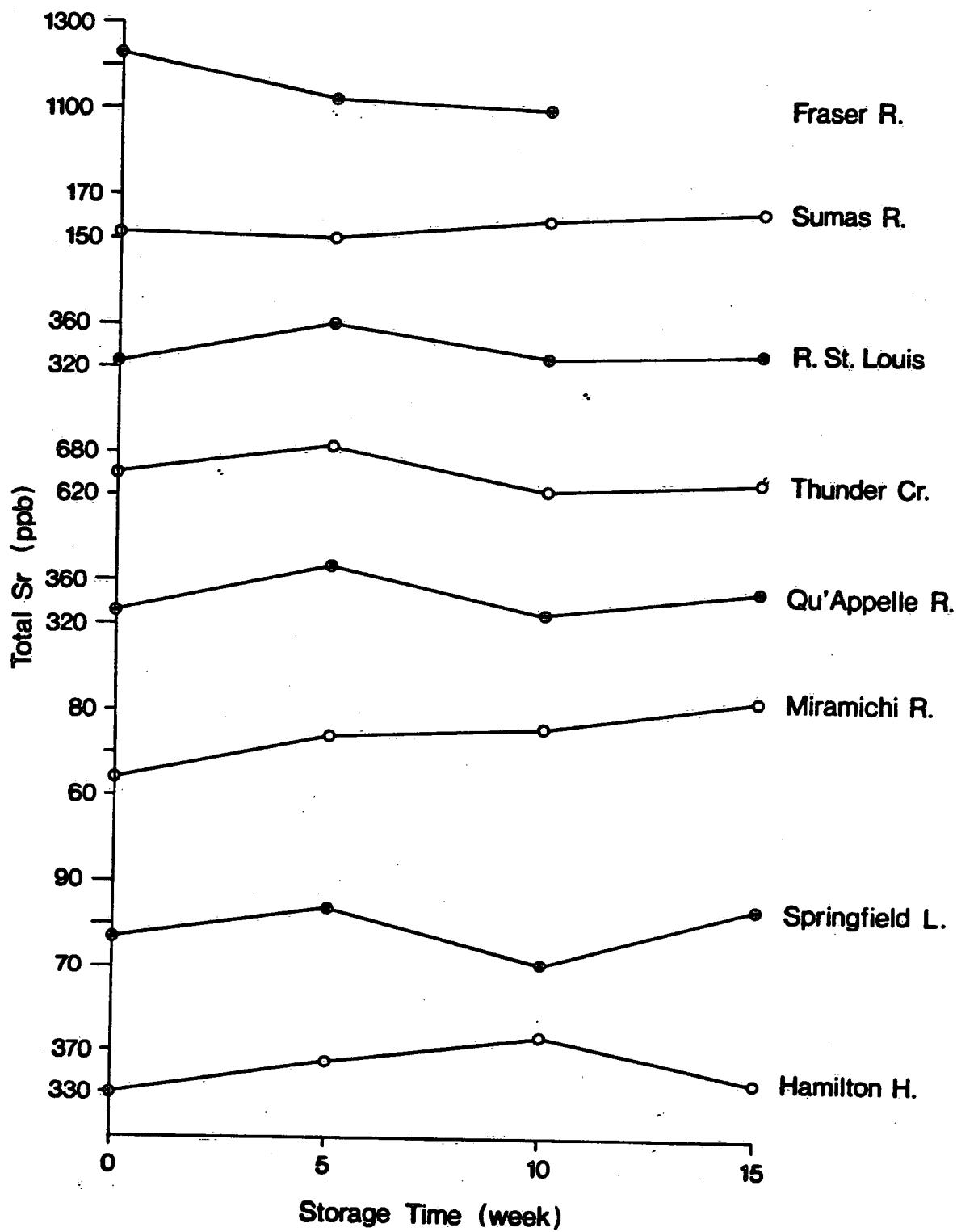


Figure 13. Total Sr monitoring (each point represents the average of 5 observations)

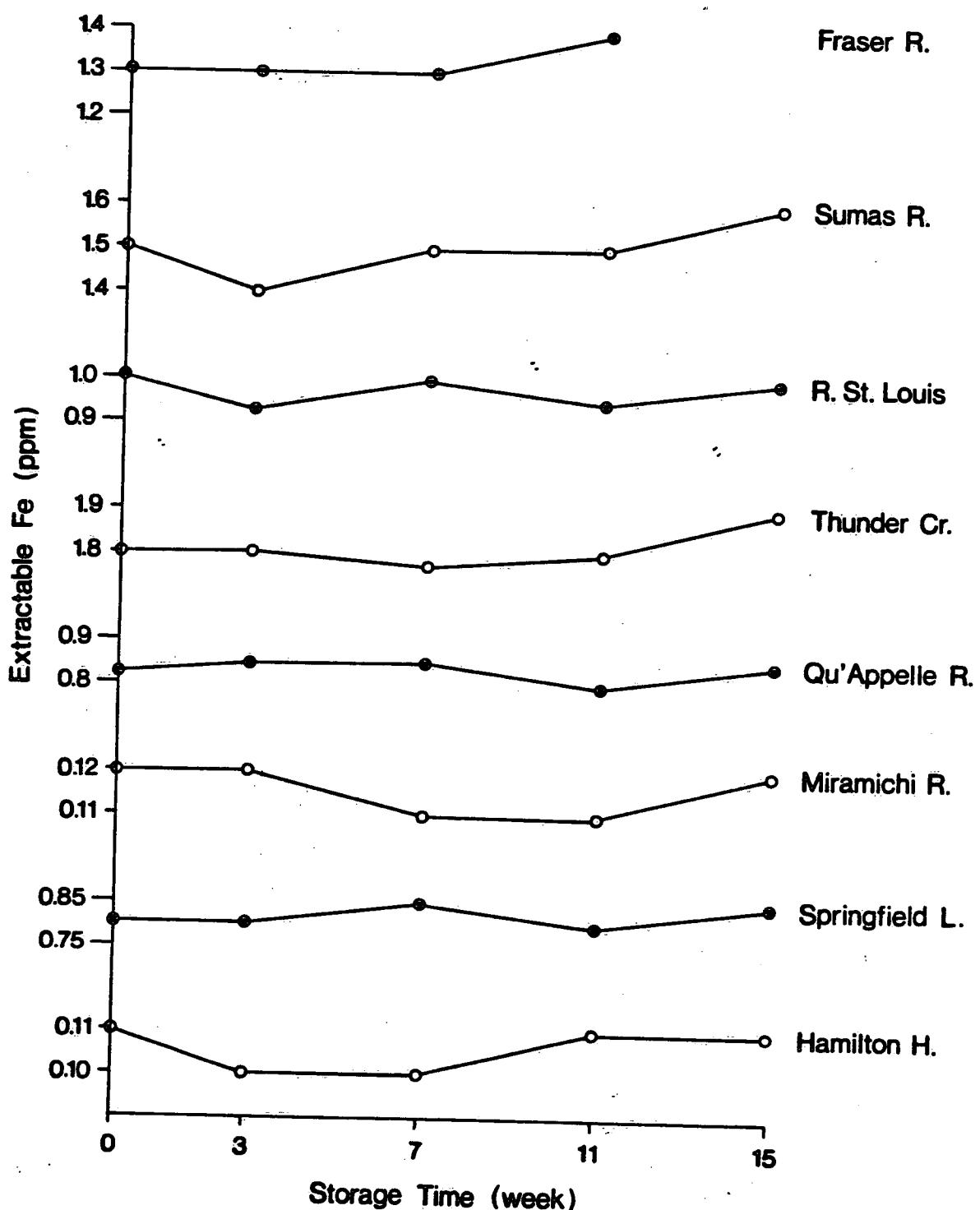


Figure 14. Extractable Fe monitoring (each point represents the average of 3 observations)

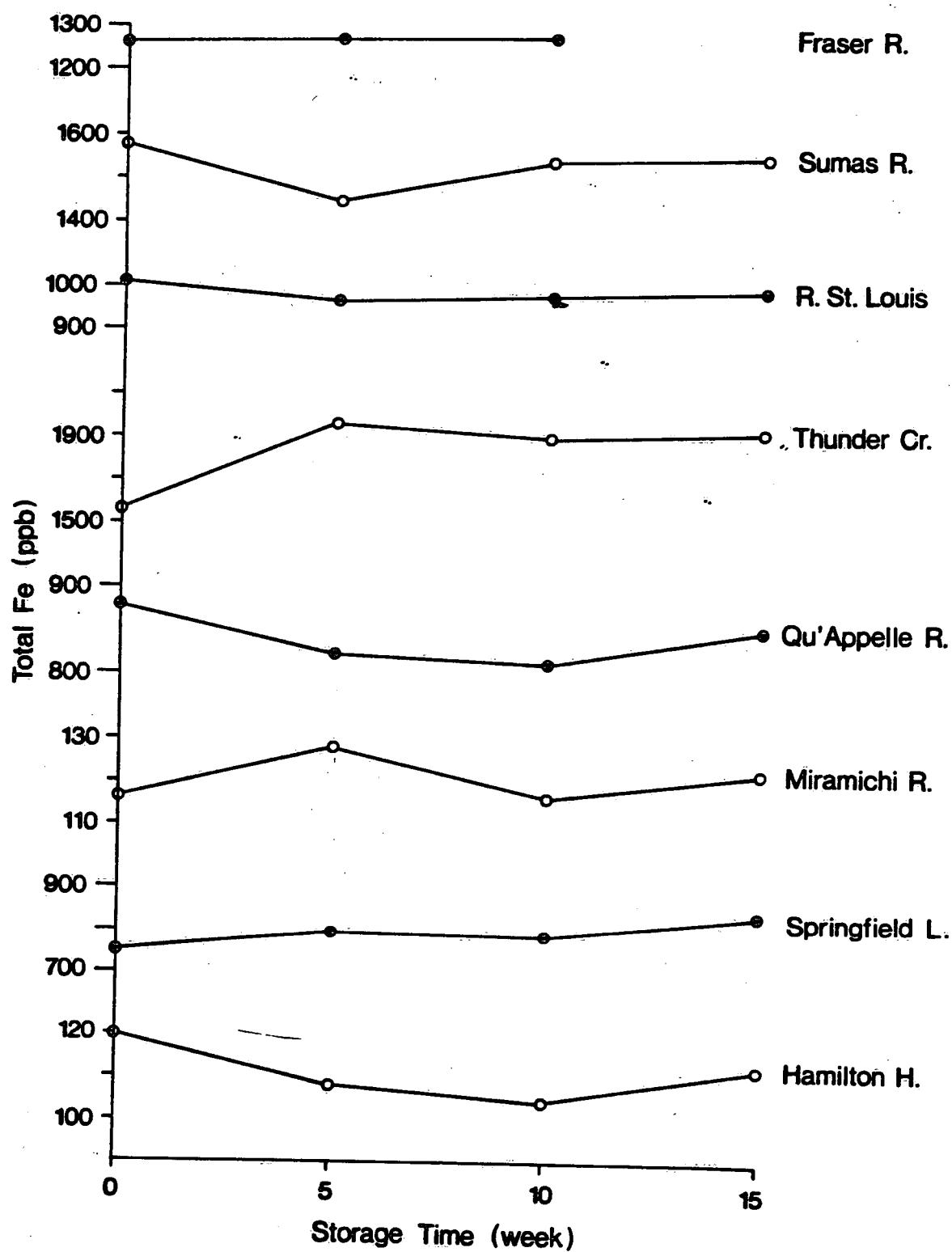


Figure 15. Total Fe monitoring (each point represents the average of 5 observations)

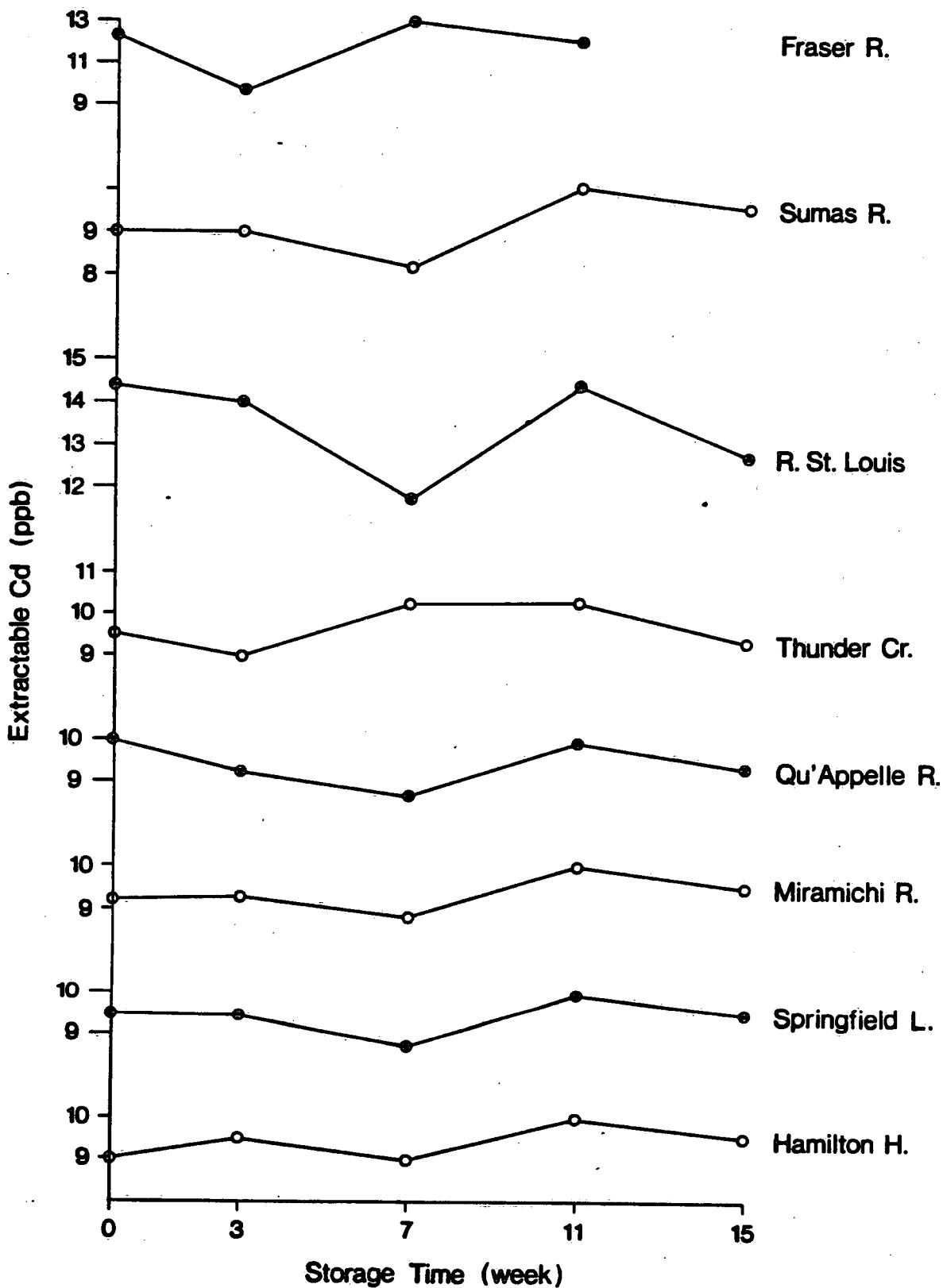


Figure 16. Extractable Cd monitoring (each point represents the average of 3 observations)

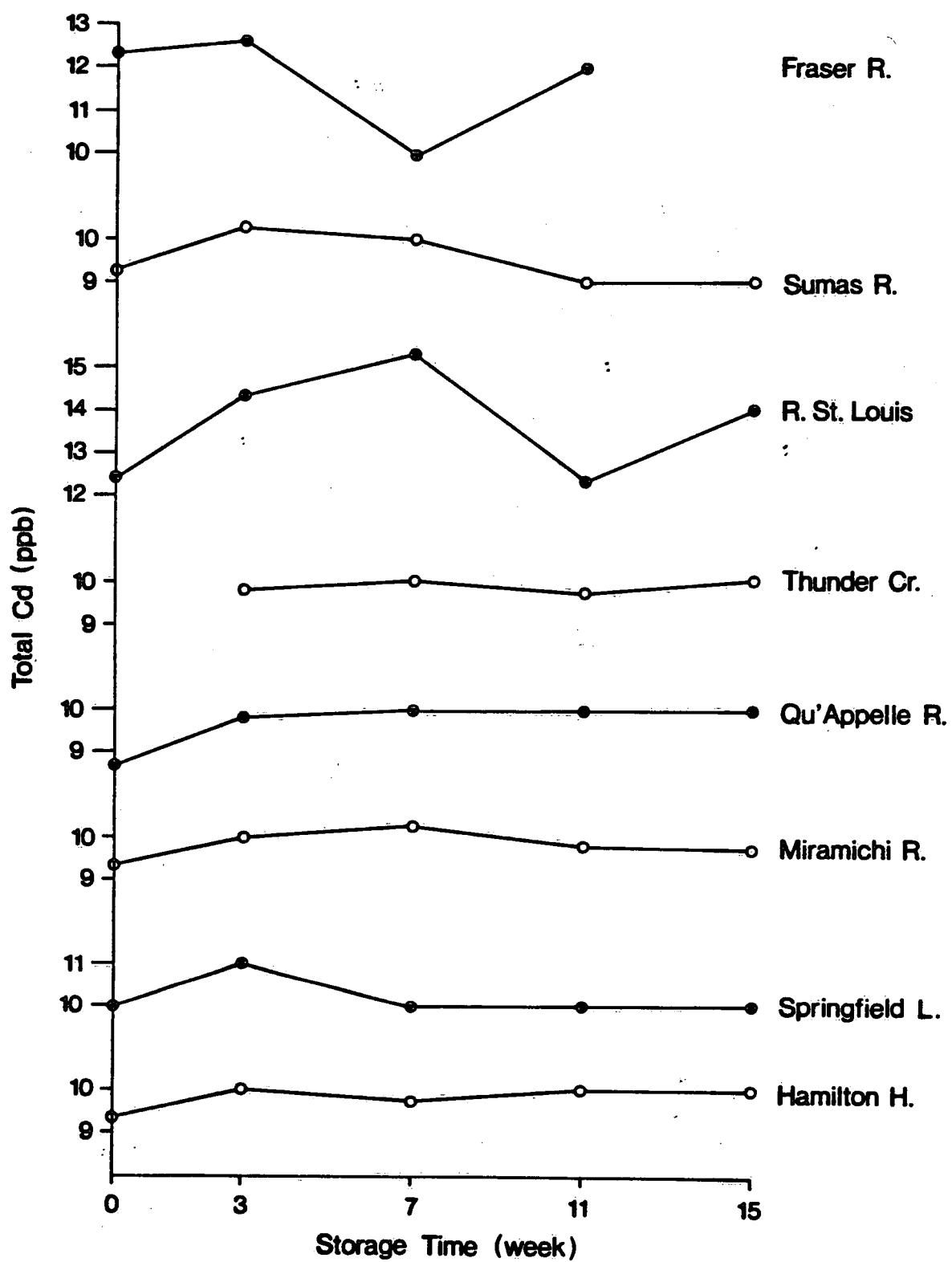


Figure 17. Total Cd monitoring (each point represents the average of 3 observations)

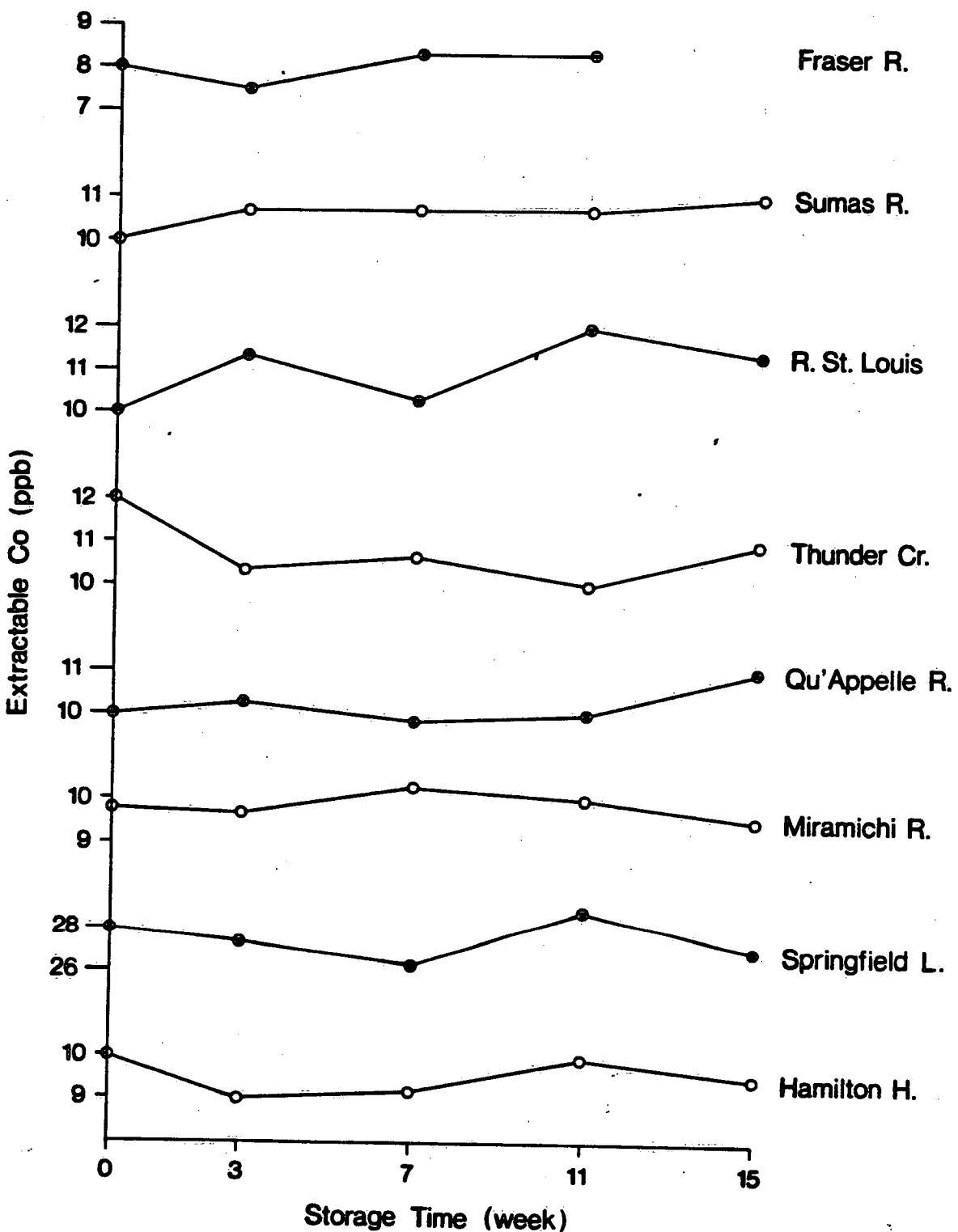


Figure 18. Extractable Co monitoring (each point represents the average of 3 observations)

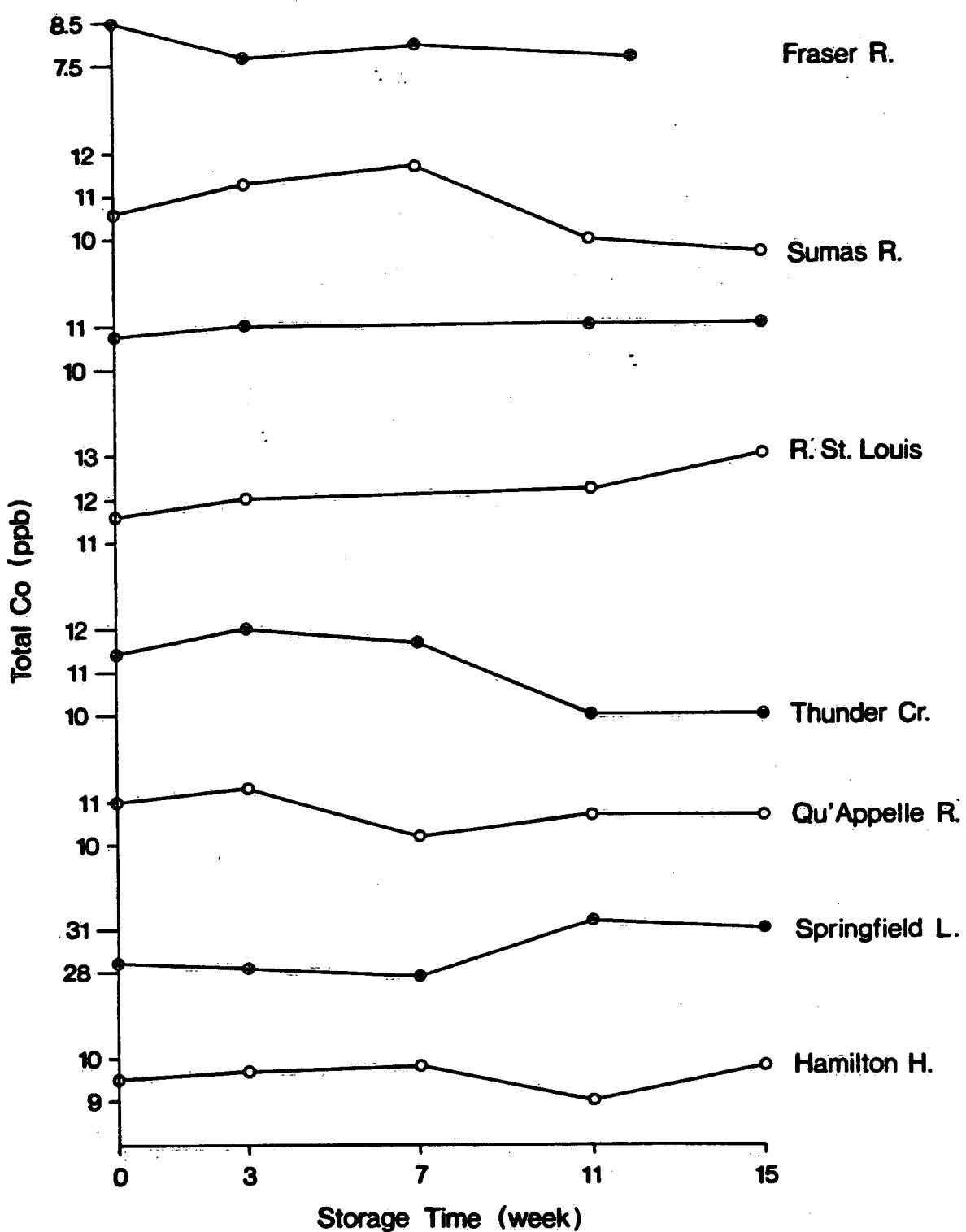


Figure 19. Total Co monitoring (each point represents the average of 3 observations)

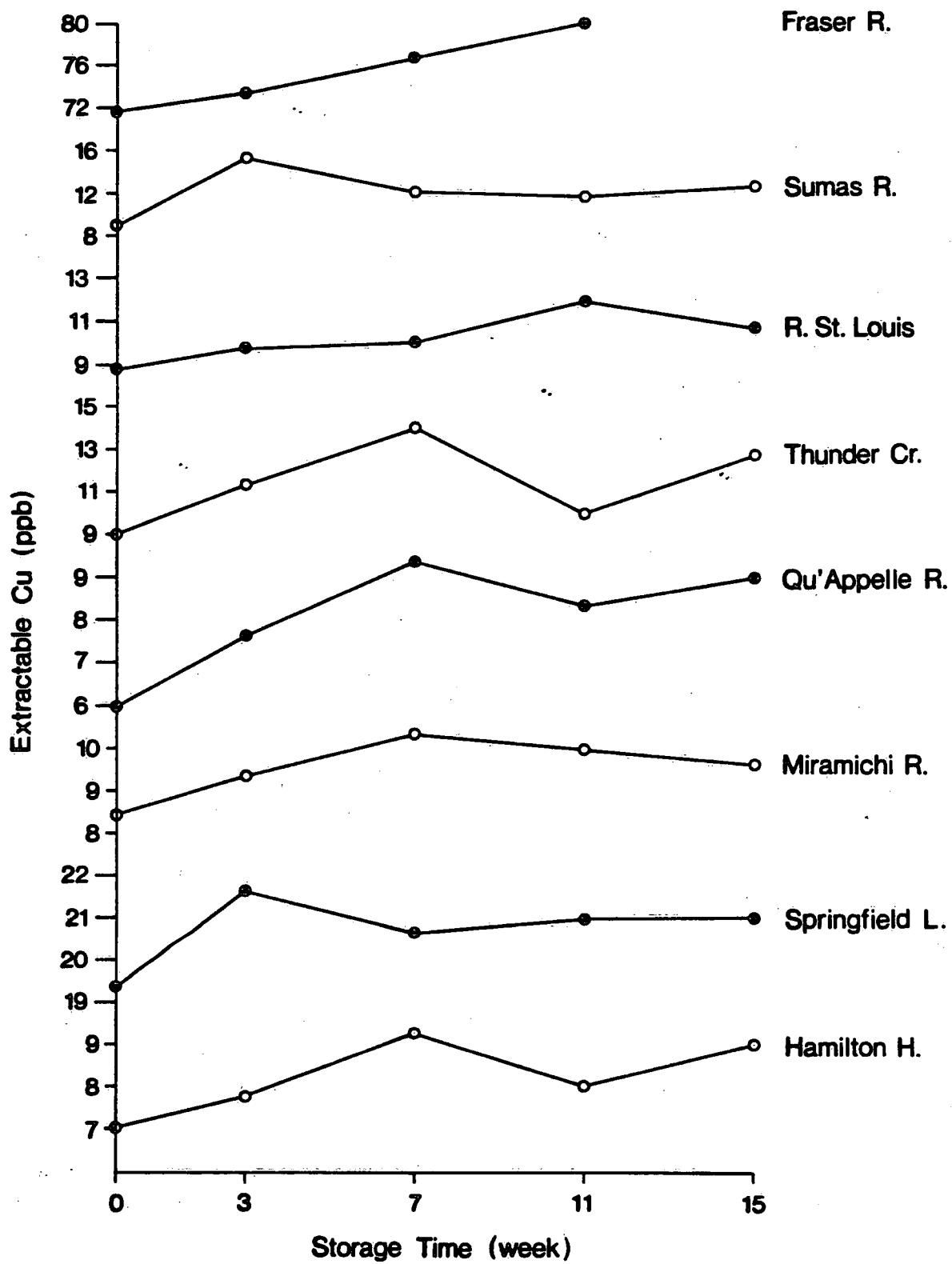


Figure 20. Extractable Cu monitoring (each point represents the average of 3 observations)

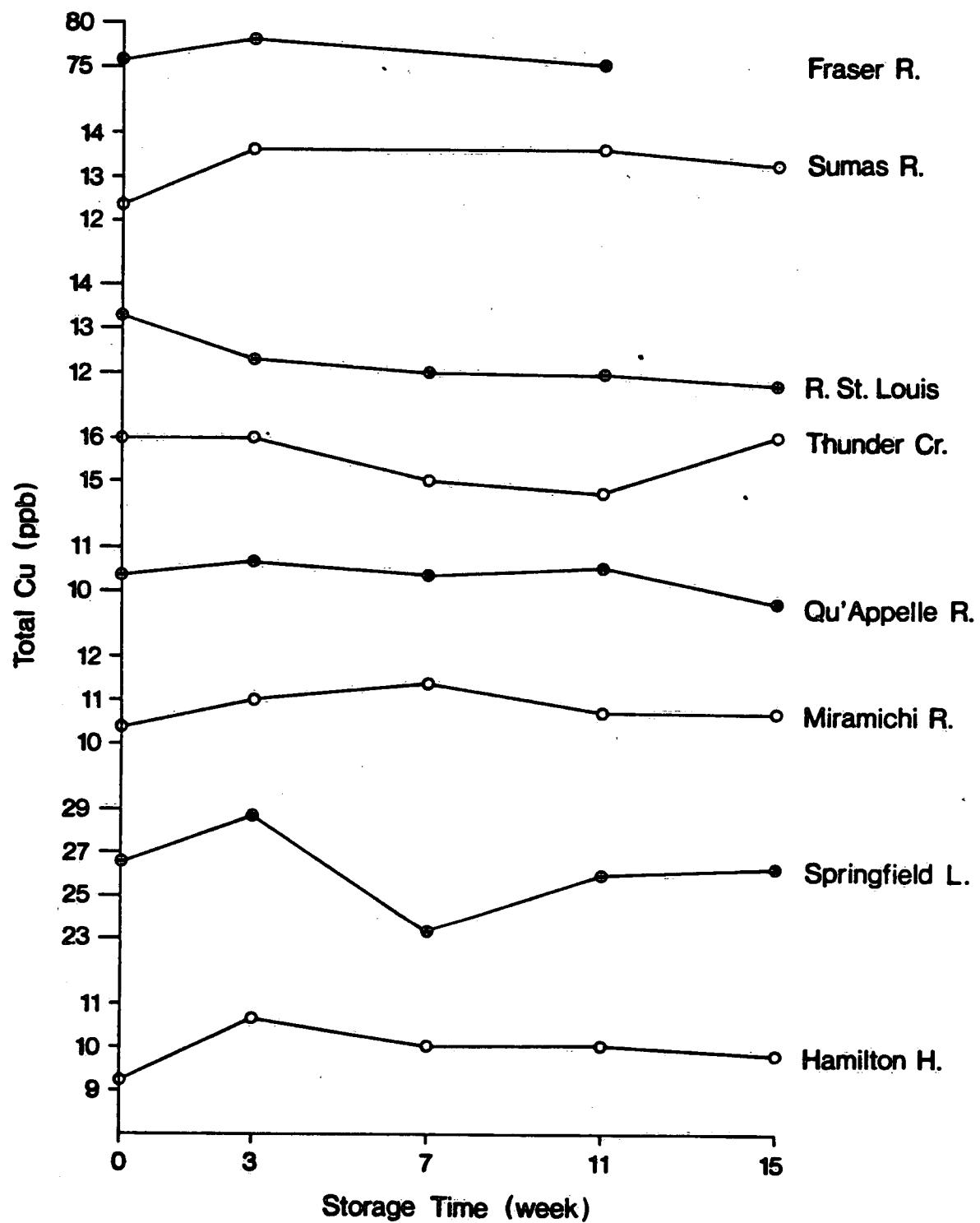


Figure 21. Total Cu monitoring (each point represents the average of 3 observations)

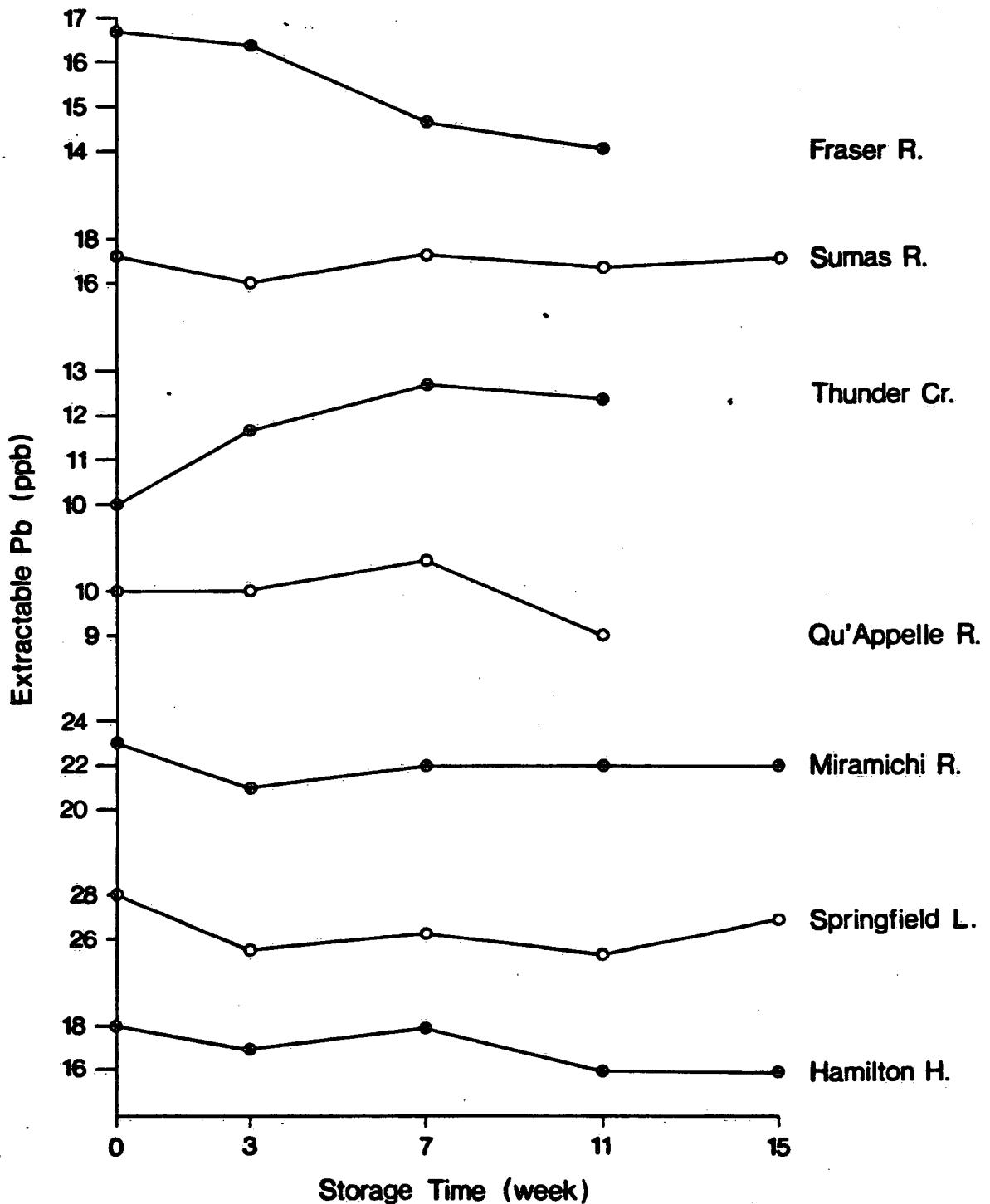


Figure 22. Extractable Pb monitoring (each point represents the average of 3 observations)

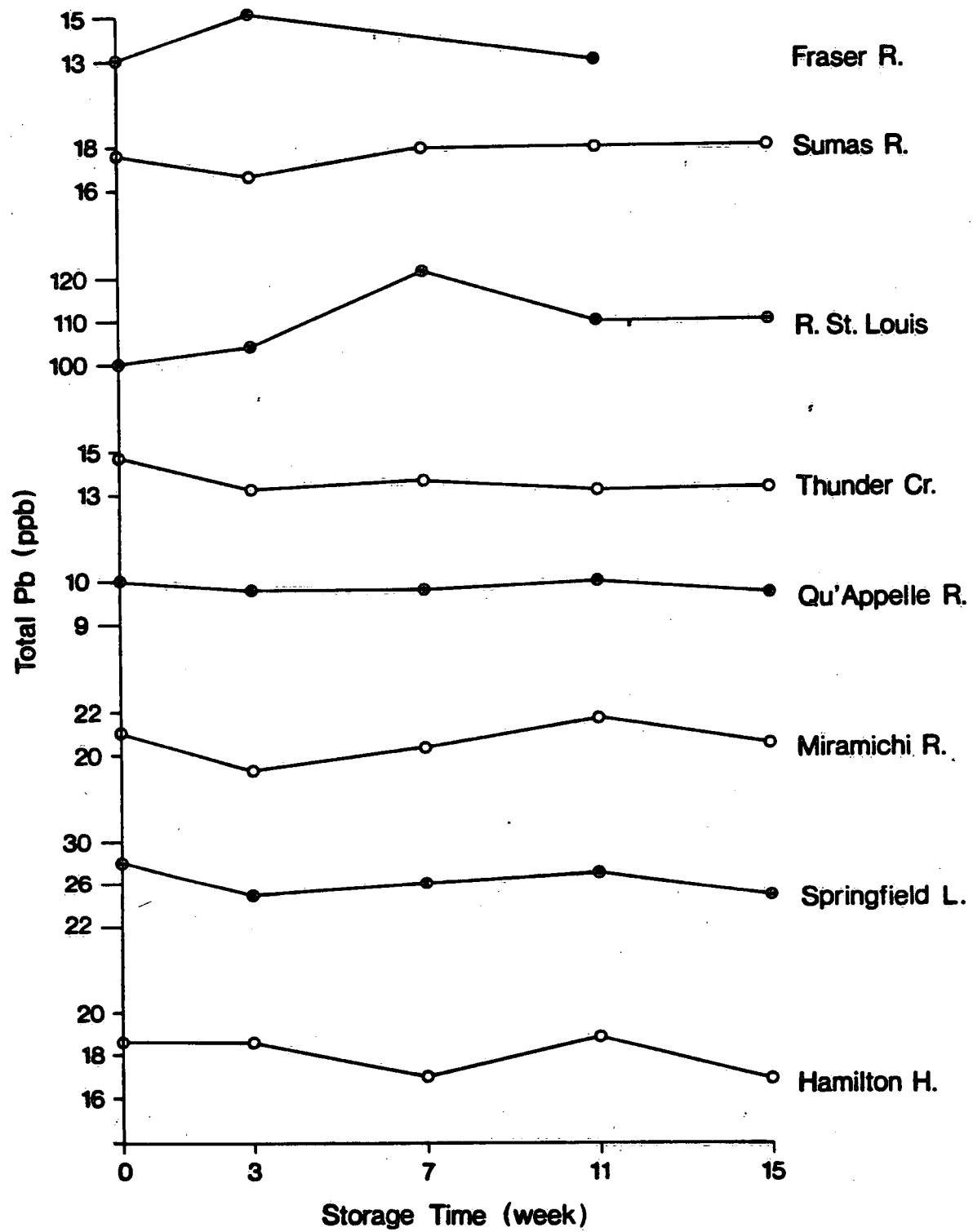


Figure 23. Total Pb monitoring (each point represents the average of 3 observations)

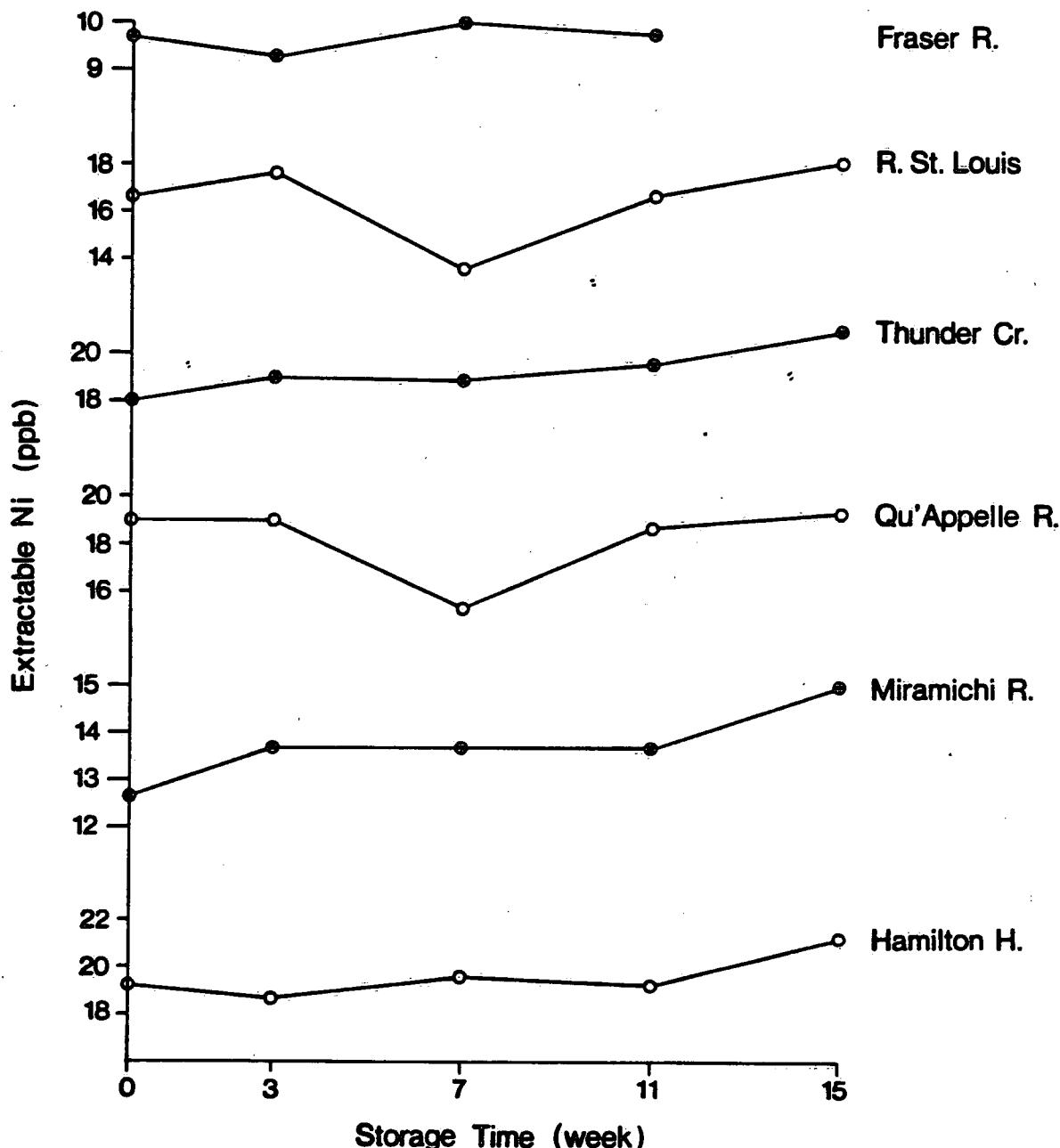


Figure 24. Extractable Ni monitoring (each point represents the average of 3 observations)

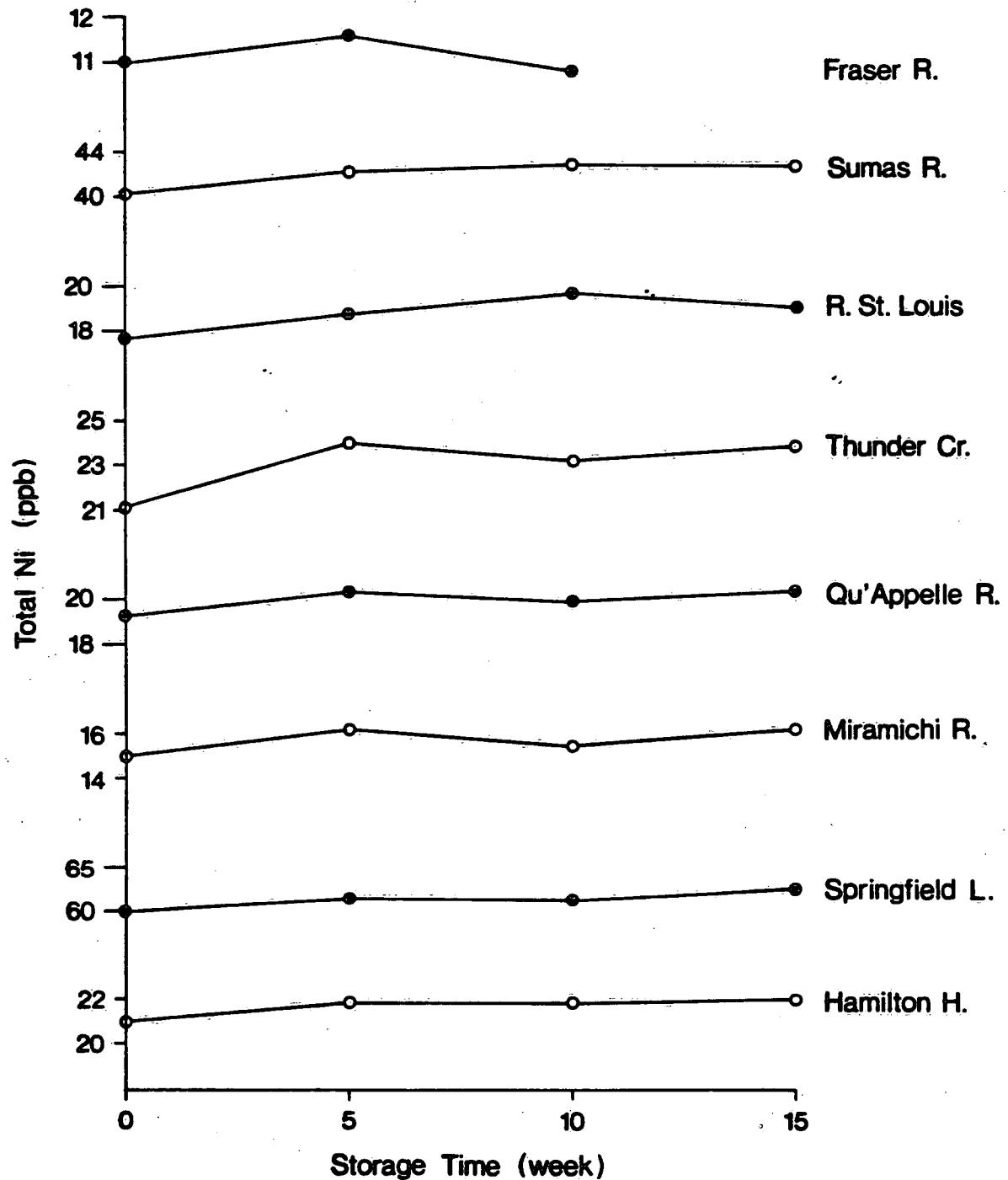


Figure 25. Total Ni monitoring (each point represents the average of 5 observations)

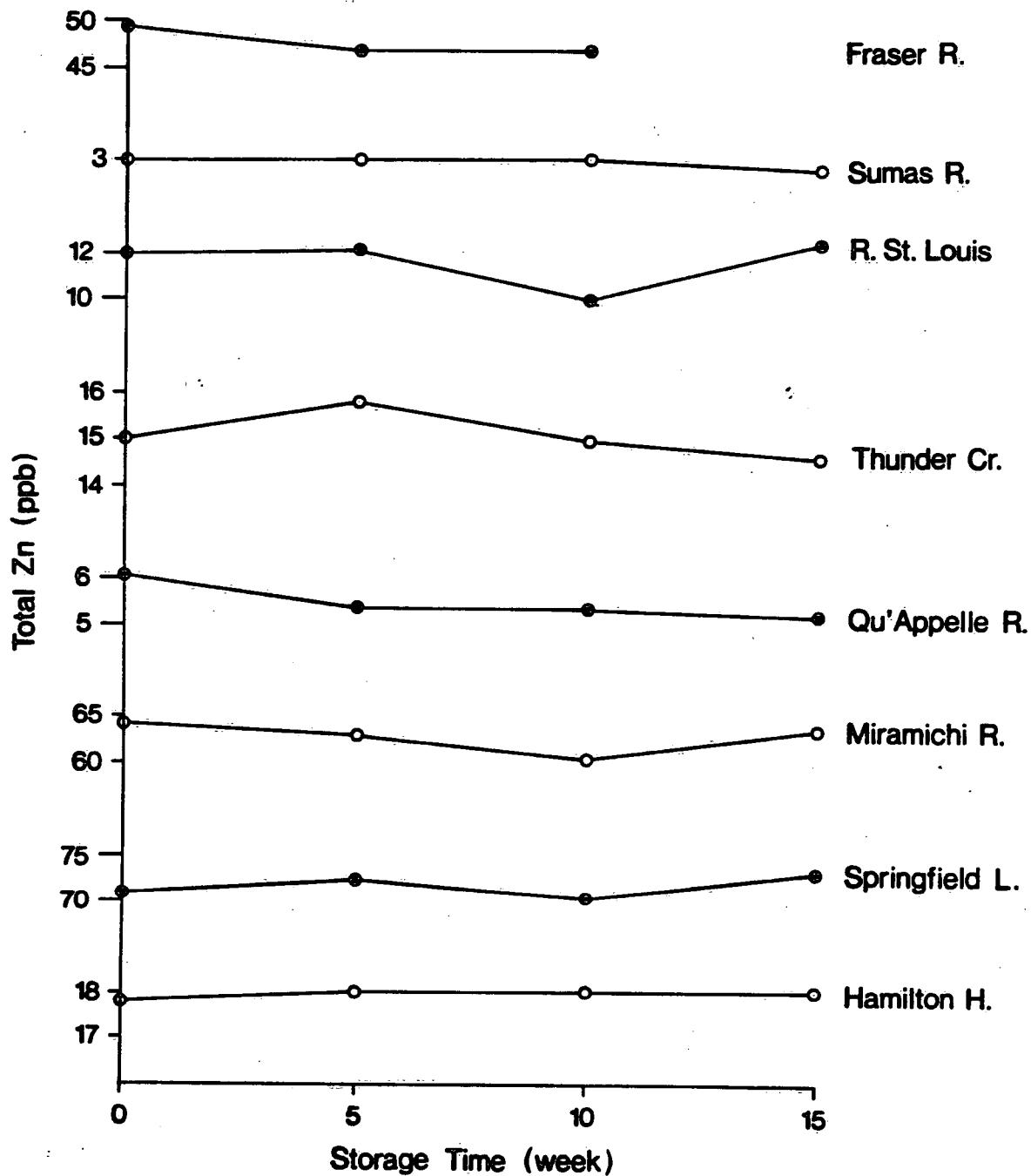


Figure 26. Total Zn monitoring (each point represents the average of 5 observations)

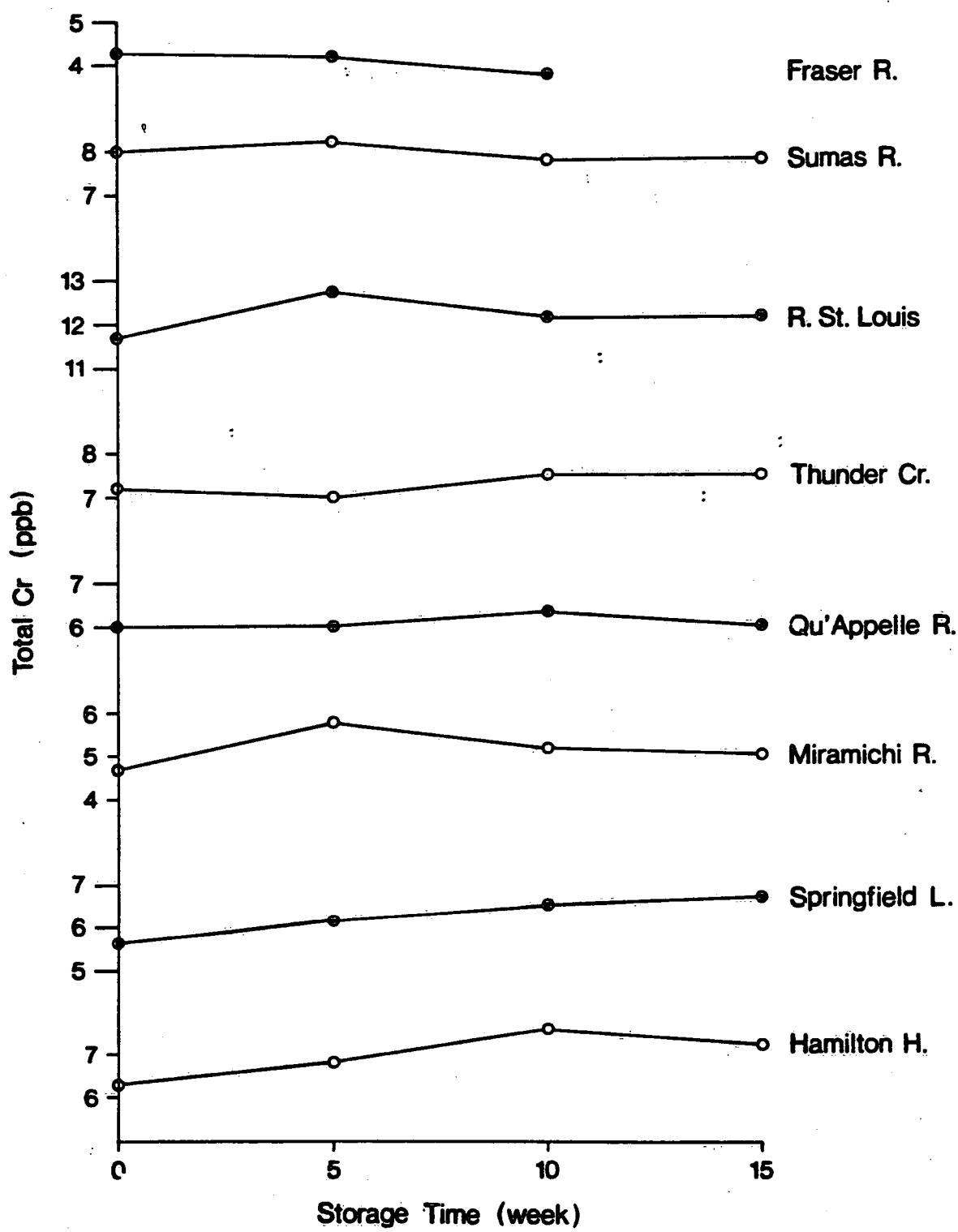


Figure 27. Total Cr monitoring (each point represents the average of 5 observations)

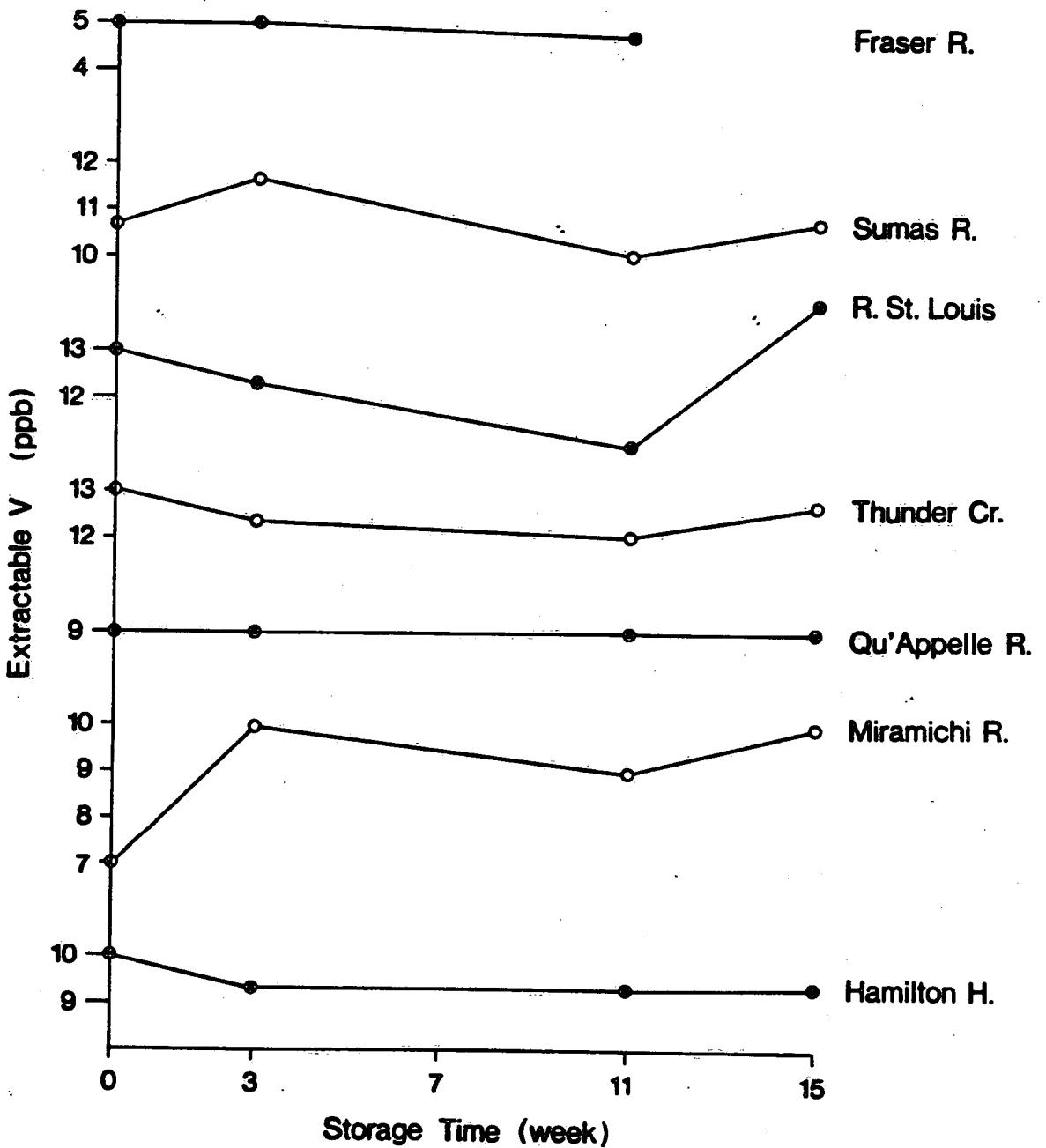


Figure 28. Extractable V monitoring (each point represents the average of 3 observations)

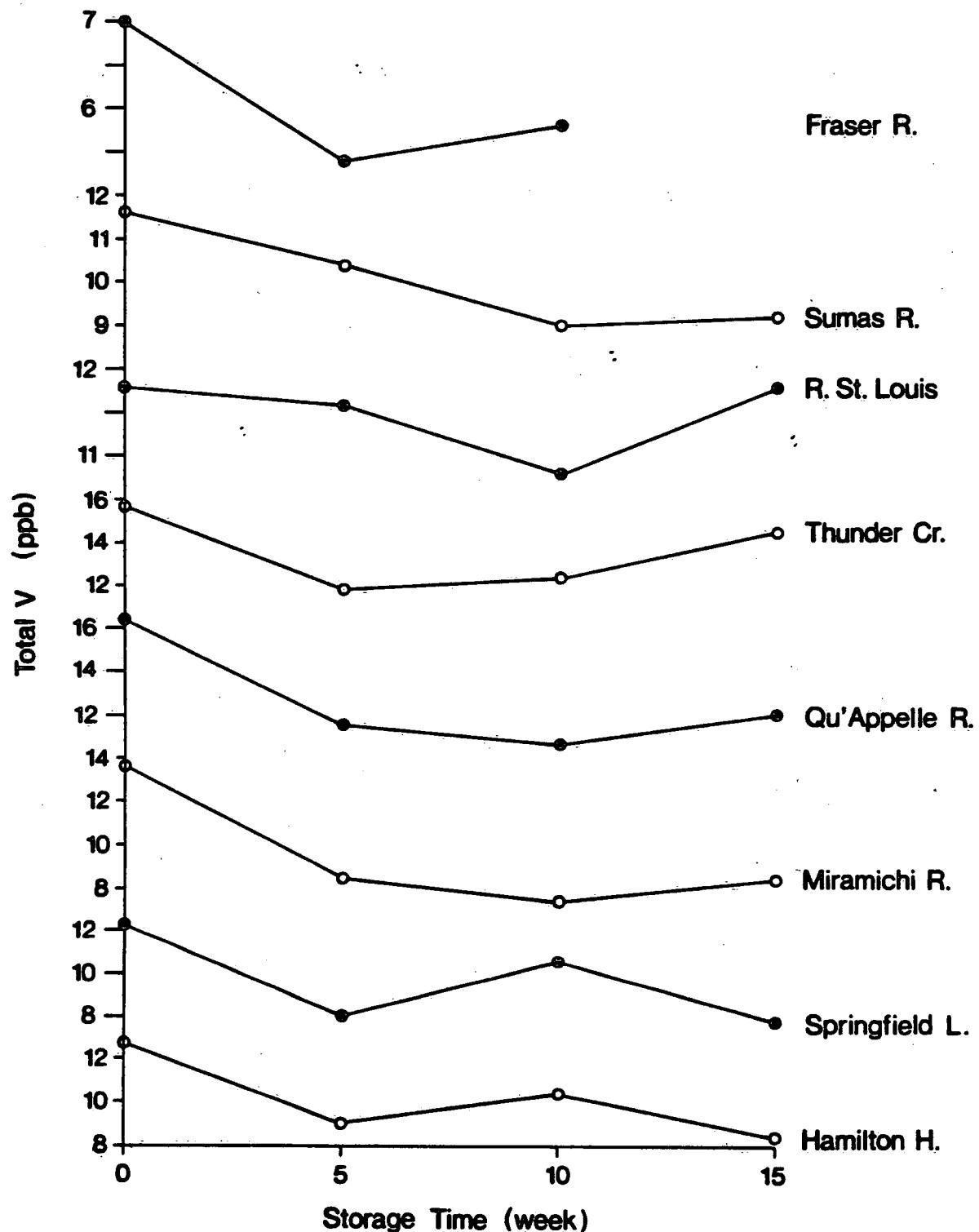


Figure 29. Total V monitoring (each point represents the average of 5 observations)

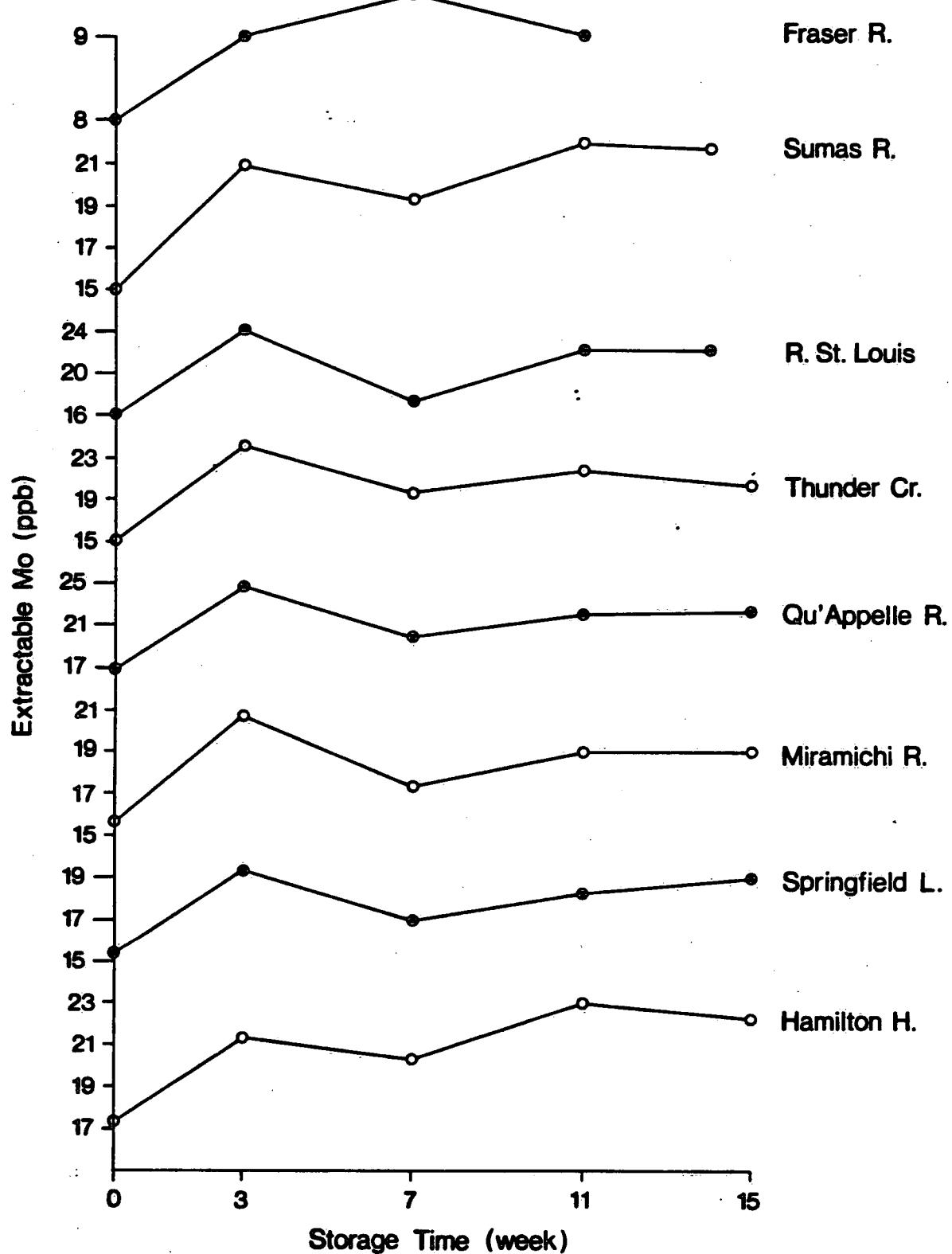


Figure 30. Extractable Mo monitoring (each point represents the average of 3 observations)

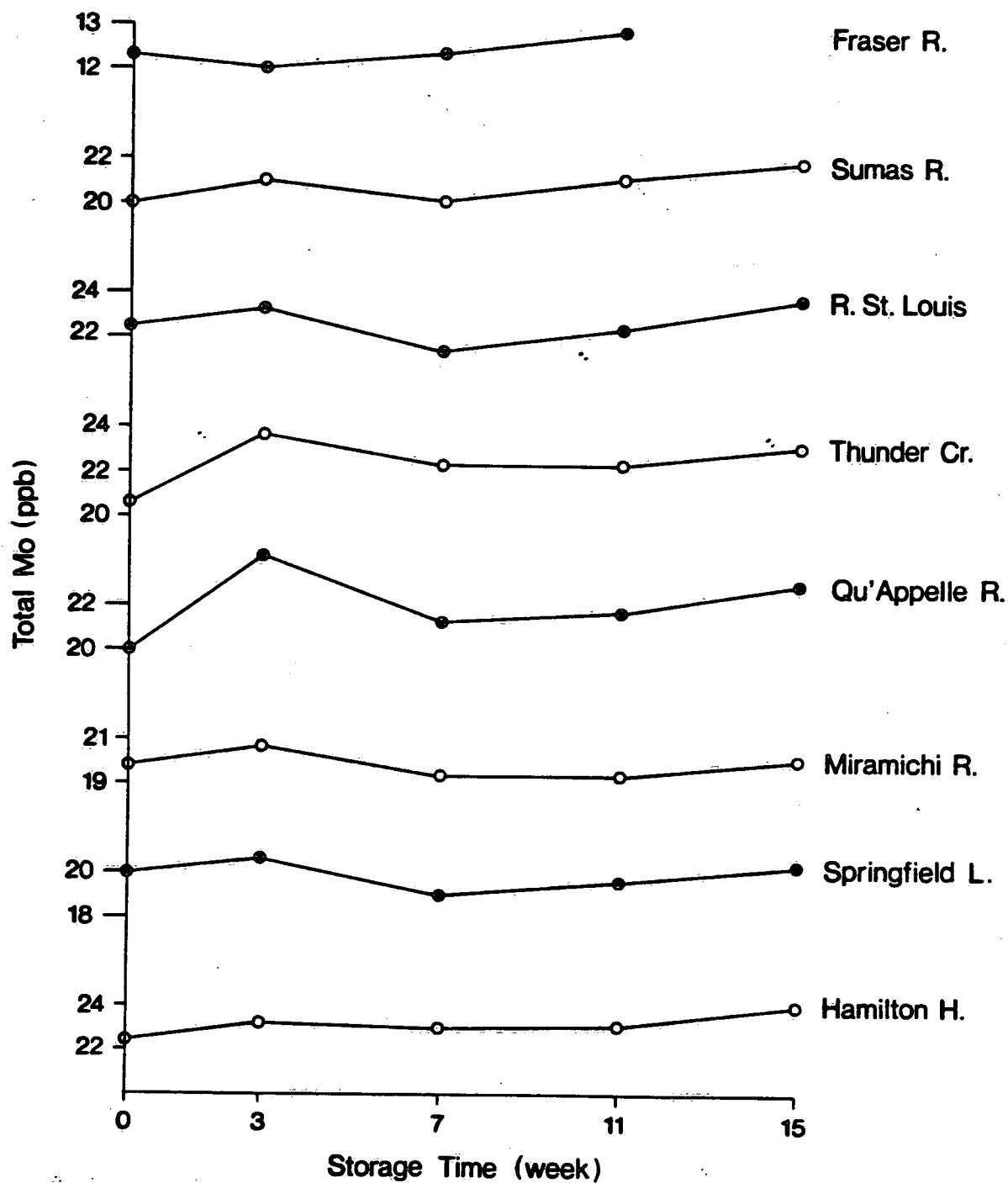


Figure 31. Total Mo monitoring (each point represents the average of 3 observations)

APPENDIX - LIST OF TABLES OF RAW DATA

- TABLE A1 - Raw data of total As
- TABLE A2 - Raw data of total Se
- TABLE A3 - Raw data of extractable Hg
- TABLE A4 - Raw data of extractable Ag
- TABLE A5 - Raw data of extractable Al
- TABLE A6 - Raw data of extractable Li
- TABLE A7 - Raw data of total Li
- TABLE A8 - Raw data of extractable Mn
- TABLE A9 - Raw data of total Mn
- TABLE A10 - Raw data of extractable Ba
- TABLE A11 - Raw data of total Ba
- TABLE A12 - Raw data of extractable Sr
- TABLE A13 - Raw data of total Sr
- TABLE A14 - Raw data of extractable Fe
- TABLE A15 - Raw data of total Fe
- TABLE A16 - Raw data of extractable Cd
- TABLE A17 - Raw data of total Cd
- TABLE A18 - Raw data of extractable Co
- TABLE A19 - Raw data of total Co
- TABLE A20 - Raw data of extractable Cu
- TABLE A21 - Raw data of total Cu
- TABLE A22 - Raw data of extractable Pb
- TABLE A23 - Raw data of total Pb
- TABLE A24 - Raw data of extractable Ni
- TABLE A25 - Raw data of total Ni
- TABLE A26 - Raw data of total Zn
- TABLE A27 - Raw data of total Cr
- TABLE A28 - Raw data of extractable V
- TABLE A29 - Raw data of total V
- TABLE A30 - Raw data of extractable Mo
- TABLE A31 - Raw data of total Mo

Table A1. Raw Data of Total As (ppb) Monitoring

Water Number	Water Name	Storage Time, Week					
		0	4	8	12	16	
1	Hamilton Harbour	.8	.7	.8	.7	.8	.8
		.7	.9	.9	.6	.8	.8
		.8	.9	.8	.6	1.1	.8
		.7	.8	.8	.6	.8	.8
3	Muddy Pond in Waverly	.8	.9	.8	.7	.7	.8
		30.0	30.7	32.5	31.0	28.9	
		31.2	31.9	31.4	31.0	33.6	
		30.8	31.6	31.9	31.0	34.6	
5	Miramichi River	30.6	30.5	33.1	31.0	28.3	
		30.6	29.7	31.2	31.0	33.5	
		.6	.5	.5	.5	.6	
		.6	.6	.6	.4	.6	
6	Qu'Appelle River	.6	.6	.5	.5	.5	
		.5	.7	.6	.6	.4	
		.6	.8	.5	.4	.5	
		2.7	2.6	2.8	2.5	3.0	
7	Thunder Creek	2.8	2.8	2.9	2.8	2.9	
		2.6	2.7	2.7	2.8	2.7	
		2.7	2.7	2.9	2.7	2.4	
		2.9	2.6	2.8	2.7	2.7	

Table A1. Raw Data of Total As (ppb) Monitoring cont'd.

Water Number	Water Name	Storage Time, Week				
		0	4	8	12	16
8	Rivière St. Louis	.8 .7 .7 .7 .7	.7 .7 .7 .7 .7	.7 .7 .7 .7 .7	.8 .7 .7 .8 .8	.8 .7 .6 .7 .9
9	Sumas River	1.4 1.5 1.3 1.3 .9	1.3 1.1 1.3 1.2 1.2	1.3 1.3 1.2 1.2 1.3	1.1 1.2 1.1 1.1 1.1	1.3 1.3 1.3 1.4 1.3
10	Fraser River	.9 .9 1.3 .9 .8	.9 .9 .8 .9 .8	.9 .9 .8 .8 .8	.9 .9 1.0 .8 .8	.8 .8 .7 .8 .9

Table A2. Raw Data of Total Se (ppb) Monitoring

Water Number	Water Name	Storage Time, Week					
		0	4	8	12	16	
1	Hamilton Harbour	1.0 1.3 1.4 1.4 1.3	1.3 1.2 1.3 1.1 1.2	1.2 1.2 1.3 1.2 1.3	1.2 1.2 1.2 1.3 1.3	1.2 1.2 1.2 1.2 1.5	1.2 1.2 1.2 1.2 1.5
3	Muddy Pond in Waverly	<.1 <.1 <.1 <.1 <.1	<.1 <.1 <.1 <.1 <.1	<.1 .1 .2 .1 .1	<.1 <.1 <.1 .1 .1	<.1 <.1 <.1 <.1 <.1	<.1 .1 .1 <.1 <.1
5	N.W. Miramichi River	<.1 <.1 <.1 <.1 <.1	<.1 <.1 <.1 <.1 <.1	<.1 .1 .1 .1 .1	<.1 <.1 <.1 <.1 <.1	<.1 <.1 <.1 <.1 <.1	<.1 .1 .1 <.1 <.1
6	Qu'Appelle River (at Hwy #6 on old bridge)	<.1 .2 .3 .3 .4	.4 .4 .4 .3 .4	.3 .4 .4 .5 .4	.3 .3 .4 .4 .3	.4 .3 .4 .4 .3	.4 .4 .3 .5 .5
7	Thunder Creek (at Hwy #2 in Moose Jaw, Sask.)	<.4 .3 .2 .3 .3	<.4 .4 .4 .5 .3	<.4 .4 .4 .3 .3	<.4 .4 .4 .3 .3	<.5 .4 .5 .3 .5	.5 .5 .5 .5 .5

Table A2. Raw Data of Total Se (ppb) Monitoring cont'd.

Water Number	Water Name	Storage Time, Week			
		0	4	8	12
8	Rivière St. Louis (mouth to Lac St. Louis)	.2 .1 <.1 .2 .3	.2 .3 .3 .2 .1	.2 .3 .2 .2 .3	.3 .2 .2 .2 .3
9	Sumas River	<.1 .1 .1 <.1 .1	.2 .2 .3 .1 .1	.1 .2 .1 <.1 .1	.2 .2 .1 .6 .1
10	Fraser River	.2 <.1 <.1 <.1 <.1	.2 .1 .1 <.1 .1	<.1 <.1 <.1 <.1	.2 .1 .2 .2 .2

Table A3. Raw Data of Extractable Hg (ppb) Monitoring

Water Number	Water Name	Storage Time, Week		
		0	7	16
1	Hamilton Harbour	.28 .28 .28 .28	.28 .28 .28 .28	.28 .28 .28 .28
3	Muddy Pond in Shubenacadie River Basin	.03 .03 .03 .03	.03 .03 .03 .03	.03 .03 .03 .03
5	N.W. Miramichi River	<.02 <.02 <.02 <.02	<.02 <.02 <.02 <.02	<.02 <.02 <.02 <.02
6	Qu'Appelle River	<.02 <.02 <.02 <.02	<.02 <.02 <.02 <.02	<.02 <.02 <.02 <.02
7	Thunder Creek	.24 .25 .25 .25	.27 .24 .27 .24	.25 .25 .25 .25

Table A3. Raw Data of Extractable Hg (ppb) Monitoring cont'd.

Water Number	Water Name	Storage Time, Week		
		0	7	16
8	Rivière St. Louis	.53	.55	.54
		.54	.55	.51
		.54	.54	.54
		.53	.55	.54
9	Sumas River	.54	.54	.54
		<.02	<.02	<.02
		<.02	<.02	<.02
		<.02	<.02	<.02
		<.02	<.02	<.02
10	Fraser River	<.02	<.02	<.02
		<.02	<.02	<.02
		<.02	<.02	<.02
		<.02	<.02	<.02
		<.02	<.02	<.02

Table A4. Raw Data of Extractable Ag (ppb) Monitoring

Water Number	Water Name	Storage Time, Week											
		0	1	2	3	4	5	6	7	8	9	10	11
1	Hamilton Harbour	35.5	32.9	31.7	35.3	33.7	34.4	33.9	31.1	32.3	34.0	33.0	32.9
		35.6	32.9	32.8	33.0	31.9	34.1	31.8	32.3	31.8	32.3		
		34.0	32.0	30.9	32.2	32.5	37.3	32.3	30.9	30.9	30.9		
		35.6	32.6	31.7	32.3	33.5	30.7	33.9	34.2	34.2	33.5		
		33.6	32.0	31.5	32.6	29.2	29.7	34.3	33.7	33.7	32.5		
		35.3	32.6	32.4	30.9	31.0	31.7	34.1	34.0	34.0	31.8		
3	Muddy Pond in Shubena-Macadie River Basin	10.0	11.0	12.0	13.0	12.0	10.0	10.0	10.5	-	-	11.0	10.5
		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.5	-	-		
		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.5	-	-		
5	Miramichi River	37.6	36.2	35.3	36.9	39.6	35.3	35.6	35.6	35.6	35.6	40.0	37.3
		36.4	36.7	36.3	36.0	33.8	36.5	35.0	33.9	33.9	33.9		
		34.3	34.9	34.4	37.6	36.3	39.5	35.9	35.4	35.4	35.4		
		35.4	36.2	34.8	35.0	34.2	35.1	37.0	39.7	39.7	39.7		
		36.0	36.7	35.8	34.3	35.3	33.3	35.2	35.9	35.9	36.4		
		37.0	35.1	35.8	35.2	35.4	34.9	38.5	36.9	36.9	39.0		
6	Qu'Appelle River	36.6	36.8	36.8	37.3	38.3	-	37.5	38.1	38.1	37.4	37.8	35.8
		36.2	36.3	45.9	37.7	37.2	-	35.2	37.0	37.0	37.8		
		35.8	35.3	35.7	36.4	38.1	40.8	35.9	23.0	23.0	35.8		
		36.4	36.3	35.9	37.3	37.8	36.7	38.9	37.5	37.5	36.9		
		36.3	37.3	36.6	36.5	37.2	34.5	35.8	36.7	36.7	35.5		
		36.1	36.9	37.0	36.0	31.2	38.1	36.3	36.0	36.0	35.1		
8	Rivière St. Louis	34.5	36.3	34.1	34.7	35.1	34.7	35.2	33.5	33.5	37.1	35.5	35.5
		34.9	35.4	34.9	36.4	35.4	36.4	32.8	33.6	33.6	35.5		
		35.4	34.0	35.8	35.7	34.6	35.7	34.0	36.4	36.4	36.3		
		35.2	34.8	34.5	35.0	35.5	35.0	35.3	38.5	38.5	37.1		
		35.1	35.9	35.1	34.1	34.1	34.1	36.0	38.2	38.2	37.5		
		35.6	35.0	34.5	35.8	36.3	35.8	35.7	38.1	38.1	36.9		

Table A4. Raw Data of Extractable Ag (ppb) Monitoring cont'd.

Water Number	Water Name	Storage Time, Week									
		0	1	2	3	4	5	7	9	12	
9	Sumas River	10.0 10.0 10.0	10.0 10.0 10.0	10.0 9.0 9.0	9.0 9.0 10.0	10.0 9.0 9.0	10.0 9.0 9.0	-	-	10.6 9.1 10.7	
9	Sumas River (at 40 ppb level)	35.0 35.0 35.1 35.9 35.7 36.1 35.7 34.5	36.6 35.2 34.9 35.7 34.2 34.2 35.3 35.3	34.8 34.2 33.9 34.9 33.7 34.0 34.8 32.6	34.4 34.3 35.5 34.1 33.4 34.0 33.7 34.3	34.9 34.5 34.2 33.4 33.0 33.7 33.6 32.6	34.4 34.3 35.5 34.1 33.7 33.6 33.0 32.6	34.6 33.7 32.9 32.4 33.7 33.6 33.0 33.0	33.8 34.8 33.6 35.1 35.7 35.7 35.7 35.7	34.5 35.8 37.1 37.1 35.5 35.5 36.9 36.9	
	Blank	0.0 1.3 1.1 -0.4 -0.1 0.1 2.3 1.4 1.6	-0.2 3.3 -0.4 1.1 -0.1 0.1 1.4 0.5 2.8	1.0 1.6 1.5 1.8 1.8 1.4 1.8 0.5 0.2	3.7 0.9 -2.1 0.7 1.4 1.0 0.7 0.7 0.2	0.0 0.7 0.7 1.0 1.0 0.7 0.7 0.5 0.2	0.2 0.5 0.1 -0.3 -0.3 -0.2 -0.7 0.4 2.6	-0.4 -0.3 0.3 0.1 -0.2 0.1 -0.7 0.4 2.0	0.2 -0.9 -0.2 0.1 0.1 0.1 0.4 1.7 1.7	0.2 -0.1 -0.4 0.8 0.8 -0.6 -0.6 2.4	

Table A5. Raw Data of Extractable Al (ppm) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	1.8 1.8 1.8	1.9 1.9 1.9	1.9 1.9 1.9	2.0 1.9 1.9	1.9 1.9 1.9
4	Little Springfield Lakes	4.4 4.4 4.4	4.3 4.3 4.3	4.5 4.4 4.4	4.4 4.3 4.3	4.3 4.4 4.4
5	N.W. Miramichi River	1.8 1.8 1.8	1.9 1.9 1.9	1.8 1.9 1.9	1.9 1.9 1.9	1.9 1.8 1.9
6	Qu'Appelle River	2.3 2.3 2.3	2.2 2.2 2.1	2.3 2.3 2.3	2.4 2.2 2.2	2.3 2.4 2.4
7	Thunder Creek	2.5 2.5 2.5	2.6 2.6 2.6	2.7 2.7 2.7	2.6 2.6 2.6	2.8 2.8 2.8
8	Riviere St. Louis	2.5 2.5 2.5	2.4 2.4 2.4	2.5 2.5 2.5	2.5 2.5 2.4	2.6 2.6 2.6
9	Sumas River	2.0 2.0 2.0	2.0 2.0 2.0	2.0 2.0 2.0	2.0 2.0 2.0	2.0 2.0 2.0
10	Fraser River	1.8 1.8 1.8	2.0 2.0 1.9	1.9 2.0 1.9	2.0 1.9 1.9	-

Table A6. Raw Data of Extractable Li (ppm) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	.06 .06 .06	.06 .06 .06	.06 .06 .06	.06 .06 .06	.06 .06 .06
	Little Springfield Lakes	.06 .06 .06	.06 .06 .06	.06 .06 .06	.06 .06 .06	.06 .06 .06
	N.W. Miramichi River	.06 .06 .06	.05 .05 .05	.05 .05 .05	.05 .05 .05	.05 .05 .05
6	Qu'Appelle River	.10 .10 .10	.09 .09 .09	.09 .09 .09	.09 .09 .09	.09 .09 .09
	Thunder Creek	.19 .19 .19	.18 .18 .18	.19 .19 .18	.17 .17 .17	.18 .18 .18
	Rivière St. Louis	.06 .06 .06	.05 .05 .05	.05 .05 .05	.05 .05 .05	.06 .06 .06
9	Sumas River	.06 .06 .06	.05 .05 .05	.05 .05 .05	.05 .05 .05	.06 .05 .05
	Fraser River	.06 .06 .06	.06 .06 .06	.06 .06 .06	.07 .06 .06	-

Table A7. Raw Data of Total Li (ppb) Monitoring

Water Number	Water Name				Storage Time, Week
		0	5	10	
1	Hamilton Harbour	60 60 60 70 60	60 60 60 60 50	60 60 60 60 60	60 60 60 60 60
4	Little Springfield Lakes	60 60 60 70 60	60 60 60 60 60	60 60 60 60 60	60 60 60 60 60
5	N.W. Miramichi River	50 50 50 50 50	50 50 50 50 50	50 50 50 50 50	50 50 50 50 50
6	Qu'Appelle River	100 100 100 100 100	90 90 90 90 90	90 90 90 90 90	90 90 90 90 90
7	Thunder Creek	170 180 190 200 190	180 180 180 180 180	180 180 180 180 180	180 180 180 180 180

Table A7. Raw Data of Total Li (ppb) Monitoring cont'd

Water Number	Water Name	Storage Time, Week		
		0	5	10
8	Riviere St. Louis	60 60 60 60	60 60 60 60	60 60 60 60
9	Sumas River	60 30 40 30 30	50 50 50 50 50	50 50 50 50 50
10	Fraser River	70 70 70 70 70	70 70 70 70 70	70 70 70 70 70

Table A8. Raw Data of Extractable Mn (ppm) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	.04 .04 .04	.04 .04 .04	.05 .05 .05	.05 .04 .04	.05 .05 .04
4	Little Springfield Lakes	.23 .23 -	.25 .25 .25	.24 .24 .24	.27 .26 .25	.25 .25 .27
5	N.W. Miramichi River	.05 .05 .05	.06 .06 .06	.06 .06 .06	.05 .05 .05	.06 .06 .06
6	Qu'Appelle River	.16 .16 .16	.18 .18 .18	.18 .18 .18	.16 .16 .16	.18 .18 .18
7	Thunder Creek	.48 .48 .48	.50 .50 .50	.48 .50 .50	.49 .50 .49	.52 .52 .51
8	Rivière St. Louis	.08 .08 .08	.08 .08 .08	.09 .08 .08	.09 .08 .08	.08 .08 .08
9	Sumas River	.08 .08 .08	.08 .08 .08	.08 .08 .08	.08 .08 .08	.08 .08 .08
10	Fraser River	.04 .04 .04	.05 .04 .05	.04 .04 .04	.04 .04 .04	-

Table A9. Raw Data of Total Mn (ppb) Monitoring

Water Number	Water Name	Storage Time, Week		
		0	5	10
1	Hamilton Harbour	50	40	40
		50	40	40
		50	40	40
		60	40	40
		50	40	40
		50	40	40
4	Little Springfield Lakes	230	230	230
		240	240	230
		230	240	230
		230	240	230
		220	230	240
5	N.W. Miramichi River	70	50	60
		60	60	60
		60	60	50
		60	60	60
		60	60	60
6	Qu'Appelle River	170	160	160
		160	160	160
		150	170	160
		150	160	170
		160	170	160
7	Thunder Creek	480	490	470
		450	510	480
		460	530	490
		490	510	490
		450	500	480

Table A9. Raw Data of Total Mn (ppb) Monitoring cont'd

Water Number	Water Name	Storage Time, Week		
		0	5	10
8	Rivière St. Louis	80	90	70
		80	100	80
		80	100	80
		80	100	80
9	Sunapee River	80	90	90
		70	80	100
		70	90	90
		80	80	90
10	Fraser River	50	40	50
		40	40	50
		30	50	50
		30	50	50

Table A10. Raw Data of Extractable Ba (ppm) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	.95 .95 .95	1.0 1.0 0.9	1.0 1.1 1.2	1.1 1.0 1.0	1.0 1.0 1.0
	Little Springfield Lakes	.95 .95 .95	.9 .9 .9	1.0 1.0 1.0	1.1 1.1 1.0	1.0 1.0 1.0
	N.W. Miramichi River	.95 .95 .95	.9 .9 .9	1.0 1.0 1.0	1.0 1.0 1.0	1.0 1.0 1.0
6	Qu'Appelle River	-	.6 .6 .6	.7 .6 .6	.6 .6 .6	.6 .6 .6
7	Thunder Creek	-	-	-	-	-
8	Rivière St. Louis	.95 .95 .95	1.0 1.0 1.0	1.0 1.0 1.1	1.1 1.0 1.0	1.1 1.1 1.0
9	Sumas River	1.0 1.0 1.0	1.0 1.0 1.0	1.1 1.1 1.1	1.1 1.0 1.0	1.1 1.1 1.1
10	Fraser River	.75 .75 .75	.8 .8 .8	.8 .8 .8	.75 .75 .75	-

Table A11. Raw Data of Total Ba (ppm) Monitoring

Water Number	Water Name	Storage Time, Week		
		0	5	10
1	Hamilton Harbour	.8	1.0	1.0
		.8	.4	.4
		.8	.7	.8
		.9	.4	.9
4	Little Springfield Lakes	.8	.4	.4
		.7	.4	.9
		.8	.3	.5
		.7	.8	.4
5	Miramichi River	.9	.3	.5
		.9	.3	.4
		1.0	1.0	.3
		1.0	.9	.5
6	Qu'Appelle River	.8	.5	.3
		.5	.2	.2
		.6	.7	.5
		.8	.4	.5
7	Thunder Creek	.8	.5	.3
		.6	.6	.4
		.7	.6	.1
		.6	.2	.3
		.6	.3	.7
		-	-	.2

Table All. Raw Data of Total Ba (ppm) Monitoring cont'd.

Water Number	Water Name	Storage Time, Week			
		0	5	10	15
8	Rivière St. Louis	.6	.9	.4	.3
		.8	.9	.2	1.0
		.7	.9	.2	.8
		.7	.3	.4	.3
9		.8	.3	.2	.8
	Sumas River	.8	1.0	.9	1.0
		.8	1.0	1.0	1.0
		.9	1.0	.9	1.0
10		.9	.9	.9	1.1
		.8	1.0	.9	.9
	Fraser River	.6	.6	.4	-
		.6	.6	.5	
		.6	.6	.5	
		.7	.7	.6	

Table A12. Raw Data of Extractable Sr (ppm) Monitoring

Water Number	Water Name	Storage Time, Week			15
		0	3	7	
1	Hamilton Harbour	.35 .35 .35	.32 .32 .32	.45 .45 .50	.40 .40 .40
4	Little Springfield Lakes	<.05	<.05	<.05	<.05
			<.05	<.05	<.05
			<.05	<.05	<.05
5	N.W. Miramichi River	<.05 .05 .05	<.05 .05 .05	<.05 .05 .05	<.05 .05 .05
6	Qu'Appelle River	.35 .35 .35	.32 .32 .32	.35 .35 .35	.33 .33 .33
7	Thunder Creek	.68 .68 .68	.60 .60 .60	.58 .58 .58	.60 .60 .60
8	Rivière St. Louis	.30 .30 .30	.28 .28 .28	.35 .35 .35	.30 .30 .30
9	Sumas River	.05 .05 .05	<.05 .05 .05	<.05 .05 .05	<.05 .05 .05
10	Fraser River	.88 .88 .88	.80 .85 .85	.85 .85 .85	.75 .76 .77

Table A13. Raw Data of Total Sr (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			15
		0	5	10	
1	Hamilton Harbour	340	380	390	340
		330	370	380	330
		330	350	390	350
			370	390	340
4	Little Springfield Lakes		340	380	350
		80	90	70	
		80	80	70	80
		70	90	70	80
5	Miramichi River				
		62	70	80	90
		65	70	70	80
		63	70	70	80
6	Qu'Appelle River				
		63	80	80	80
		65	80	80	80
7	Thunder Creek				
		330	380	340	350
		330	370	330	350
		340	390	310	360
		330	370		350
		330	370		350

Table A13. Raw Data of Total Sr (ppb) Monitoring cont'd.

Water Number	Water Name	Storage Time, Week		
		0	5	10
8	Rivière St. Louis	320 330 330	370 360 370	330 330 320
			350 350	330 330
			340	340
9	Sumas River	160 150 150	150 150 150	150 160 160
				160 160 160
				170
10	Fraser River	1220 1250 1240 1240 1230	1120 1130 1140 1120 1100	1060 1110 1110 1100 1110
				-

Table A14. Raw Data of Extractable Fe (ppm) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	.11 .11 .11	.10 .10 .10	.10 .10 .10	.11 .11 .11	.12 .10 .10
4	Little Springfield Lakes	.80 .80 .80	.80 .80 .80	.85 .85 .85	.80 .80 .80	.85 .85 .85
5	N.W. Miramichi River	.12 .12 .12	.12 .12 .12	.11 .11 .11	.11 .11 .11	.12 .12 .12
6	Qu'Appelle River	.80 .83 .83	.85 .85 .85	.85 .85 .85	.80 .80 .80	.85 .85 .85
7	Thunder Creek	1.8 1.8 1.8	1.8 1.8 1.8	1.7 1.8 1.8	1.8 1.8 1.8	1.9 1.9 1.9
8	Rivière St. Louis	1.0 1.0 1.0	.93 .93 .93	1.0 1.0 1.0	.95 .95 .95	1.0 1.0 1.0
9	Sumas River	1.5 1.5 1.5	1.4 1.4 1.4	1.5 1.5 1.5	1.5 1.5 1.5	1.6 1.6 1.6
10	Fraser River	1.2 1.2 1.2	1.2 1.2 1.2	1.2 1.2 1.2	1.3 1.3 1.3	-

Table A15. Raw Data of Total Fe (ppb) Monitoring

Water Number	Water Name	Storage Time, Week		
		0	5	10
1	Hamilton Harbour	120 120 120	100 110 110	100 110 110
4	Little Springfield Lakes	770 750 740	800 790 800	790 770 790
5	Miramichi River	120 120 120 100	120 130 130 130	120 110 120 110
6	Qu'Appelle River	920 860 860	800 830 840	810 810 810
7	Thunder Creek	1600 1600 1600 1400	1930 1960 2030 1910 1950	1890 1920 1900 1860 1900

Table A15. Raw Data of Total Fe (ppb) Monitoring cont'd.

Water Number	Water Name	Storage Time, Week		
		0	5	10
8	Rivière St. Louis	1010 1010 1020	970 970 960	950 1000 980
			970 960	980 980
				1010 960
9	Sumas River	1600 1580 1560	1470 1470 1480	1550 1510 1550
			1380 1450	1560 1540
				1550 1560 1540
10	Fraser River	1270 1250 1270 1240 1250	1280 1300 1290 1270 1270	1290 1280 1280 1280 1280
				-

Table A16. Raw Data of Extractable Cd (ppb) Monitoring

Water Number	Water Name	Storage Time, Week					
		0	3	7	11	15	
1	Hamilton Harbour	9.0 9.0 9.0	9.5 9.5 9.5	8.5 9.0 9.5	10.0 10.0 10.0	9.5 9.5 9.5	
4	Little Springfield Lakes	10.0 9.5 9.0	9.5 9.5 9.5	8.5 9.0 8.5	10.0 10.0 10.0	9.5 9.5 9.5	
5	N.W. Miramichi River	9.0 9.0 9.5	9.5 9.5 9.0	9.0 9.0 8.5	10.0 10.0 10.0	9.5 9.5 9.5	
6	Qu'Appelle River	10.0 10.0 10.0	9.5 9.5 9.0	8.5 8.5 9.0	10.0 10.0 10.0	9.0 9.5 9.5	
7	Thunder Creek	10.0 9.5 9.0	9.0 9.0 9.0	10.0 11.0 10.0	10.0 10.0 11.0	9.0 9.5 9.5	
8	Rivière St. Louis	15.0 14.0 14.0	14.0 14.0 14.0	12.0 11.0 12.0	15.0 14.0 14.0	13.0 12.0 13.0	
9	Sumas River	9.0 9.0 9.0	9.0 9.0 9.0	8.0 8.5 8.0	10.0 10.0 10.0	9.5 9.5 9.5	
10	Fraser River	12.0 12.0 13.0	9.5 10.0 9.5	13.0 13.0 13.0	12.0 12.0 12.0	-	

Table A17. Raw Data of Total Cd (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	9.0 9.0 10.0	10.0 10.0 10.0	10.0 10.0 9.0	10.0 10.0 10.0	10.0 10.0 10.0
4	Little Springfield Lakes	10.0 10.0 10.0	11.0 11.0 11.0	10.0 10.0 10.0	10.0 10.0 10.0	10.0 10.0 10.0
5	N.W. Miramichi River	9.0 10.0 9.0	10.0 10.0 10.0	11.0 10.0 10.0	10.0 10.0 9.5	10.0 10.0 9.
6	Qu'Appelle River	9.0 - 8.5	9.0 11.0 9.5	10.0 10.0 10.0	10.0 10.0 -	10.0 10.0 10.0
7	Thunder Creek		10.0 10.0 9.5	10.0 10.0 10.0	10.0 9.5 -	10.0 10.0 10.0
8	Rivière St. Louis	13.0 12.0 12.0	15.0 14.0 14.0	15.0 15.0 16.0	13.0 12.0 12.0	14.0 14.0 14.0
9	Sumas River	9.0 - 9.5	10.0 10.0 11.0	10.0 10.0 10.0	9.0 9.0 -	- 9.0 9.0
10	Fraser River	12.0 12.0 13.0	13.0 12.0 13.0	10.0 10.0 10.0	12.0 12.0 12.0	- - 12.0

Table A18. Raw Data of Extractable Co (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	10.0 10.0 10.0	9.0 9.0 9.0	9.0 9.0 9.5	10.0 10.0 10.0	9.5 9.5 9.5
4	Little Springfield Lakes	28.0 28.0 28.0	27.0 27.0 28.0	26.0 27.0 26.0	29.0 29.0 29.0	26.0 27.0 28.0
5	N.W. Miramichi River	10.0 9.5 10.0	10.0 9.5 9.5	10.0 11.0 10.0	10.0 10.0 10.0	9.5 9.5 9.5
6	Qu'Appelle River	10.0 10.0 10.0	10.0 11.0 10.5	9.5 10.0 10.0	10.0 10.0 10.0	11.0 11.0 11.0
7	Thunder Creek	12.0 12.0 12.0	10.0 11.0 10.0	11.0 11.0 10.0	10.0 10.0 10.0	11.0 11.0 11.0
8	Rivière St. Louis	10.0 10.0 10.0	12.0 11.0 11.0	11.0 10.0 10.0	12.0 12.0 12.0	12.0 11.0 11.0
9	Sumas River	10.0 10.0 10.0	10.0 11.0 11.0	11.0 10.0 11.0	10.0 11.0 11.0	11.0 11.0 11.0
10	Fraser River	8.0 8.0 8.0	7.5 7.5 7.5	9.0 8.0 8.0	8.0 8.5 8.5	-

T A19. Raw Data of Total Co (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	9.5 9.5 9.5	9.5 10.0 9.5	9.0 11.0 9.5	8.0 9.0 10.0	10.0 10.0 9.5
4	Little Springfield Lakes	28.0 29.0 29.0	27.0 28.0 30.0	26.0 28.0 29.0	31.0 32.0 32.0	31.0 31.0 31.0
5	N.W. Miramichi River	11.0 11.0 11.0	12.0 12.0 10.0	10.0 11.0 9.5	11.0 11.0 10.0	11.0 11.0 10.0
6	Qu'Appelle River	12.0 11.0 11.0	12.0 12.0 12.0	12.0 12.0 11.0	10.0 10.0 -	10.0 10.0 10.0
7	Thunder Creek	13.0 11.0 11.0 11.0 12.0	12.0 12.0 12.0 -	12.0 12.0 12.0	12.0 12.0 12.0	13.0 13.0 13.0 13.0
8	Rivière St. Louis	12.0 11.0 10.0 11.0 10.0	11.0 11.0 11.0 -	11.0 11.0 11.0	11.0 11.0 11.0	11.0 11.0 11.0
9	Sumas River	10.0 10.0 11.0 10.0 12.0	11.0 11.0 12.0	11.0 12.0 12.0	10.0 10.0 10.0	10.0 9.0 10.0
10	Fraser River	8.5 8.5 8.5	8.0 7.5 7.5	8.0 8.0 8.0	7.0 8.0 8.0	-

Table A20. Raw Data of Extractable Cu (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	7.0 7.0 7.0	7.5 7.7 7.9	9.8 9.0 8.9	8.5 8.0 7.5	9.0 9.0 9.0
4	Little Springfield Lakes	19.0 19.0 20.0	21.0 22.0 22.0	21.0 21.0 20.0	21.0 21.0 21.0	21.0 21.0 21.0
5	N.W. Miramichi River	8.5 7.7 9.0	9.5 9.5 9.0	11.0 10.0 10.0	10.0 10.0 10.0	10.0 9.5 9.5
6	Qu'Appelle River	6.0 6.0 6.0	7.9 7.5 7.5	9.3 9.3 9.7	8.5 8.0 8.5	9.0 9.0 9.0
7	Thunder Creek	8.7 9.0 9.0	11.0 12.0 11.0	14.0 14.0 14.0	10.0 10.0 10.0	13.0 12.5 12.5
8	Riviere St. Louis	9.0 8.7 8.7	10.0 9.7 9.7	10.0 10.0 10.0	12.0 12.0 12.0	11.0 10.0 11.0
9	Sumas River	9.0 9.0 9.0	15.0 15.0 16.0	12.0 12.0 12.0	12.0 11.0 12.0	12.5 12.5 12.5
10	Fraser River	70.0 75.0 70.0	70.0 75.0 75.0	80.0 75.0 75.0	80.0 80.0 80.0	-

Table A21. Raw Data of Total Cu (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	9.0 9.0 9.5	11.0 11.0 10.0	9.5 11.0 9.5	10.0 10.0 10.0	10.0 10.0 9.5
	Little Springfield Lakes	27.0	28.0	23.0	25.0	26.0
		26.0 27.0	28.0 30.0	23.0 24.0	27.0 26.0	27.0 26.0
5	N.W. Miramichi River	10.0	11.0	12.0	11.0	11.0
		10.0 11.0	11.0 11.0	11.0 11.0	11.0 10.0	11.0 11.0 10.0
		11.0 10.0	11.0 10.0 11.0	10.0 10.0 11.0	10.0 11.0	-
6	Qu'Appelle River	11.0 10.0 10.0	11.0 10.0 11.0	10.0 10.0 11.0	10.0 11.0	10.0 10.0 9.0
7	Thunder Creek	16.0	16.0	15.0	15.0	16.0
		17.0	16.0	15.0	15.0	16.0
		15.0	16.0	15.0	14.0	16.0
8	Riviere St. Louis	12.0	13.0	12.0	12.0	12.0
		15.0	12.0	12.0	12.0	12.0
		13.0	12.0	12.0	12.0	11.0
9	Sumas River	12.0	14.0	12.0	12.0	12.0
		13.0	14.0	12.0	12.0	12.0
		12.0	14.0	-	14.0	13.0
10	Fraser River	75.0	76.0	75.0	75.0	-
		77.0	75.0	76.0	76.0	-
		76.0	79.0	-	77.0	-
		74.0	80.0	-	74.0	-
		76.0	80.0	10.0	72.0	-

Table A22. Raw Data of Extractable Pb (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	18 18 18	17 17 17	18 18 18	17 17 17	17 17 17
4	Little Springfield Lakes	28 28 28	25 26 25	26 27 26	25 26 25	27 27 27
5	N.W. Miramichi River	23 23 23	21 21 21	22 22 22	22 22 22	22 22 22
6	Qu'Appelle River	10 10 10	10 10 10	11 11 10	9 9 9	- - -
7	Thunder Creek	10 10 10	11 12 12	12 13 13	12 12 13	- - -
8	Rivière St. Louis	-	-	-	-	-
9	Sumas River	18 16 18	17 15 16	18 17 17	17 16 17	17 17 17
10	Fraser River	16 16 18	16 17 16	14 14 16	15 13 14	- - -

Table A23. Raw Data of Total Pb (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	19.0 18.0 19.0	20.0 18.0 18.0	17.0 17.0 17.0	19.0 19.0 19.0	18.0 16.0 17.0
4	Little Springfield Lakes	28.0 28.0 28.0	26.0 25.0 25.0	27.0 26.0 26.0	27.0 28.0 27.0	26.0 26.0 24.0
5	N.W. Miramichi River	21.0 21.0 21.0	19.0 20.0 19.0	21.0 20.0 20.0	22.0 22.0 21.0	22.0 19.0 -
6	Qu'Appelle River	10.0 - 10.0	10.0 9.5 10.0	10.0 9.5 10.0	10.0 10.0 -	10.0 10.0 9.0
7	Thunder Creek	14.0 14.0 16.0 14.0	13.0 14.0 13.0 14.0	13.0 15.0 13.0 16.0	12.0 15.0 13.0 12.0	14.0 14.0 12.0
8	Riviere St. Louis	95.0 108.0 98.0 101.0 99.0	103.0 100.0 110.0	125.0 120.0 120.0	120.0 100.0 110.0	100.0 100.0 120.0
9	Sumas River	18.0 17.0 18.0	16.0 17.0 16.0	18.0 18.0 18.0	18.0 18.0 -	- 18.0 -
10	Fraser River	13.0 13.0 14.0 12.0 13.0	15.0 15.0 15.0 16.0 15.0	13.0 13.0 13.0 13.0	13.0 13.0 -	-

Table A24. Raw Data of Extractable Ni (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	19 19 20	18 19 19	19 20 20	19 19 20	22 21 21
4	Little Springfield Lakes	-	-	-	-	-
5	N.W. Miramichi River	13 12 13	14 14 13	14 14 13	13 14 14	15 15 15
6	Qu'Appelle River	19 19 19	19 19 19	16 15 15	18 19 19	19 19 20
7	Thunder Creek	18 18 18	19 19 19	19 20 18	19 20 20	21 21 21
8	Rivière St. Louis	16 17 17	17 18 18	14 13 13	16 17 17	18 18 18
9	Sumas River	-	-	-	-	-
10	Fraser River	10 9 10	9 9 10	10 10 -	10 10 9	-

Table A25. Raw Data of Total Ni (ppb) Monitoring

Water Number	Water Name	Storage Time, Week		
		0	5	10
1	Hamilton Harbour	20 21 22	23 23 21	22 21 22
4	Little Springfield Lakes	55 63 61	60 61 61	60 60 62
5	N.W. Miramichi River	15 15 15	15 16 16	15 15 17
6	Qu'Appelle River	19 20 19	20 21 21	19 20 20
7	Thunder Creek	21 21 21	24 23 25	23 24 24

Table A26. Raw Data of Total Zn (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			
		0	5	10	15
1	Hamilton Harbour	19	18	18	18
		17	18	18	18
4	Little Springfield Lakes	17	18	18	19
		71	71	70	17
5	N.W. Miramichi River	73	72	70	75
		68	72	72	73
6	Qu'Appelle River	74	72	70	73
				72	73
7	Thunder Creek	64	60	62	64
		62	62	60	64
		66	64	60	64
			63	60	61
			65	60	64
		7	5	5	5
		5	6	5	5
		6	5	6	5
			6	5	5
				6	6
		15	15	16	15
		14	16	15	14
		16	18	14	15
			15	15	15
			15	15	14

Table A26. Raw Data of Total Zn (ppb) Monitoring cont'd

Water Number	Water Name	Storage Time, Week		
		0	5	10
8	Rivière St. Louis	15 11 10	11 12 13 12 13	9 10 10 10 11
9	Sumas River	3 3 3	3 3 3	3 3 3
10	Fraser River	50 50 50 51 47	48 46 50 43 47	47 48 46 48 45

Table A27. Raw Data of Total Cr (ppb) Monitoring

Water Number	Water Name	Storage Time, Week		
		0	5	10
1	Hamilton Harbour	7	7	8
		6	6	7
4	Little Springfield Lakes	6	7	8
		5	6	7
5	N.W. Miramichi River	6	7	7
		5	6	6
6	Qu'Appelle River	6	6	6
		5	5	5
7	Thunder Creek	7	6	6
		8	<1	7

Table A27. Raw Data of Total Cr (ppb) Monitoring cont'd

Water Number	Water Name	Storage Time, Week		
		0	5	10
8	Rivière St. Louis	13 11 11	12 11 14	12 12 12
			14 13	13 12
9	Sumas River	8 8 8	9 7 9 7	2 7 8 8
				-
10	Fraser River	3 5 5	4 4 4 5	4 4 4 3

Table A28. Raw Data of Extractable V (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	-	9	9	9	9
		10	9	-	9	9
		10	10	-	10	10
4	Little Springfield Lakes	7	10	-	9	10
		7	10	-	9	10
		7	10	-	9	10
5	N.W. Miramichi River	7	9	-	9	9
		10	9	-	9	9
		10	9	-	9	9
6	Qu'Appelle River	13	12	-	12	13
		13	12	-	12	13
		13	12	-	12	12
7	Thunder Creek	13	13	-	11	14
		13	12	-	11	14
		13	12	-	11	14
8	Rivière St. Louis	12	11	-	10	11
		10	12	-	10	11
		10	12	-	10	10
9	Sumas River	10	10	-	10	10
		10	10	-	9.5	10
		10	10	-	10	10
10	Fraser River	5	5	-	5	-
		4	5	-	5	-
		6	5	-	4	-

Table A29. Raw Data of Total V (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	5	10	15	
1	Hamilton Harbour	12 16 10 11 14	9 9 9 9 9	11 10 11 10 10	8 8 8 8 10	
4	Little Springfield Lakes	11 13 11 11 15	8 8 8 8 8	10 11 11 10	7 7 9 8	
5	N.W. Miramichi River	15 12 12 15 14	8 8 9 8 9	7 7 7 8 8	8 8 8 9 9	
6	Qu'Appelle River	17 15 18 16 16	12 11 11 12 12	10 11 11 10 11	12 13 12 13 10	
7	Thunder Creek	13 18 16 16 15	12 12 11 12 12	11 12 12 13 14	15 14 15 14 14	

Table A29. Raw Data of Total V (ppb) Monitoring cont'd

Water Number	Water Name	Storage Time, Week		
		0	5	10
8	Rivière St. Louis	15 12 11 11 10	11 11 12 12 12	11 11 10 11 11
9	Sumas River	10 10 13 12 13	10 11 10 10 11	10 11 7 8 9
10	Fraser River	7 7 7 7	5 6 5 6	5 6 7 5

Table A30. Raw Data of Extractable Mo (ppb) Monitoring

Water Number	Water Name	Storage Time, Week				
		0	3	7	11	15
1	Hamilton Harbour	18 17 17	21 21 22	21 20 20	23 23 23	23 22 22
4	Little Springfield Lakes	16 15 15	19 19 20	17 - 17	19 18 18	19 19 19
5	N.W. Miramichi River	15 16 16	19 22 21	18 17 17	21 18 18	19 19 19
6	Qu'Appelle River	17 17 17	24 25 25	20 20 20	20 22 24	22 22 22
7	Thunder Creek	15 15 15	24 24 24	20 18 20	22 22 20	20 21 20
8	Rivière St. Louis	16 16 16	24 24 24	19 17 16	22 22 22	22 22 22
9	Sumas River	15 15 15	21 22 20	20 19 19	22 22 22	21 22 22
10	Fraser River	8 8 8	9 - 9	9.5 9.5 9.5	10 9 8	-

Table A31. Raw Data of Total Mo (ppb) Monitoring

Water Number	Water Name	Storage Time, Week			
		0	3	7	11
1	Hamilton Harbour	23 22 22	24 22 24	23 22 24	23 23 23
4	Little Springfield Lakes	20 20 20	21 21 20	19 20 18	20 19 20
5	N.W. Miramichi River	17.5 20 22	21 20 21	20 20 18	19 20 19
6	Qu'Appelle River	19 20 21	24 24 25	22 23 19	22 21 22
7	Thunder Creek	20 20 22	24 24 23	24 22 21	21 23 23
8	Rivière St. Louis	20 22 25	23 24 23	23 19 22	23 22 22
9	Sumas River	19 19 22	21 20 22	20 -	20 22 20
10	Fraser River	12 12 13	12 13 11	13 12 12	13 13 12