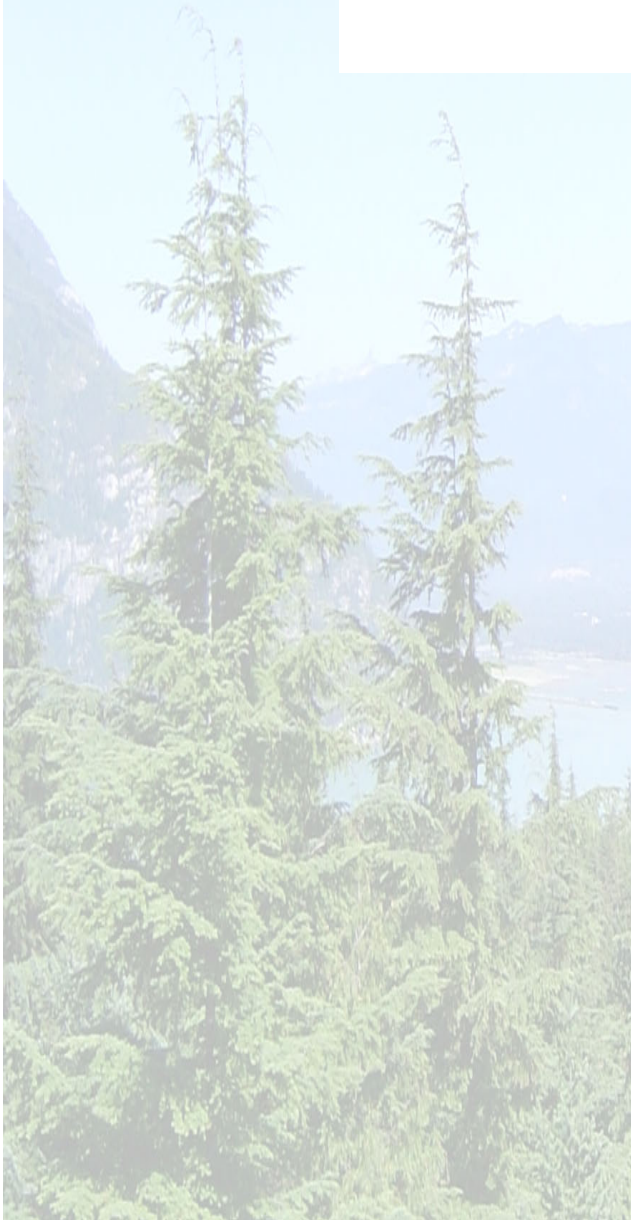




Ministry of Water, Land & Air Protection

LOWER MAINLAND REGION

Ambient PM₁₀ Monitoring
Sechelt, B.C.
2003 Update



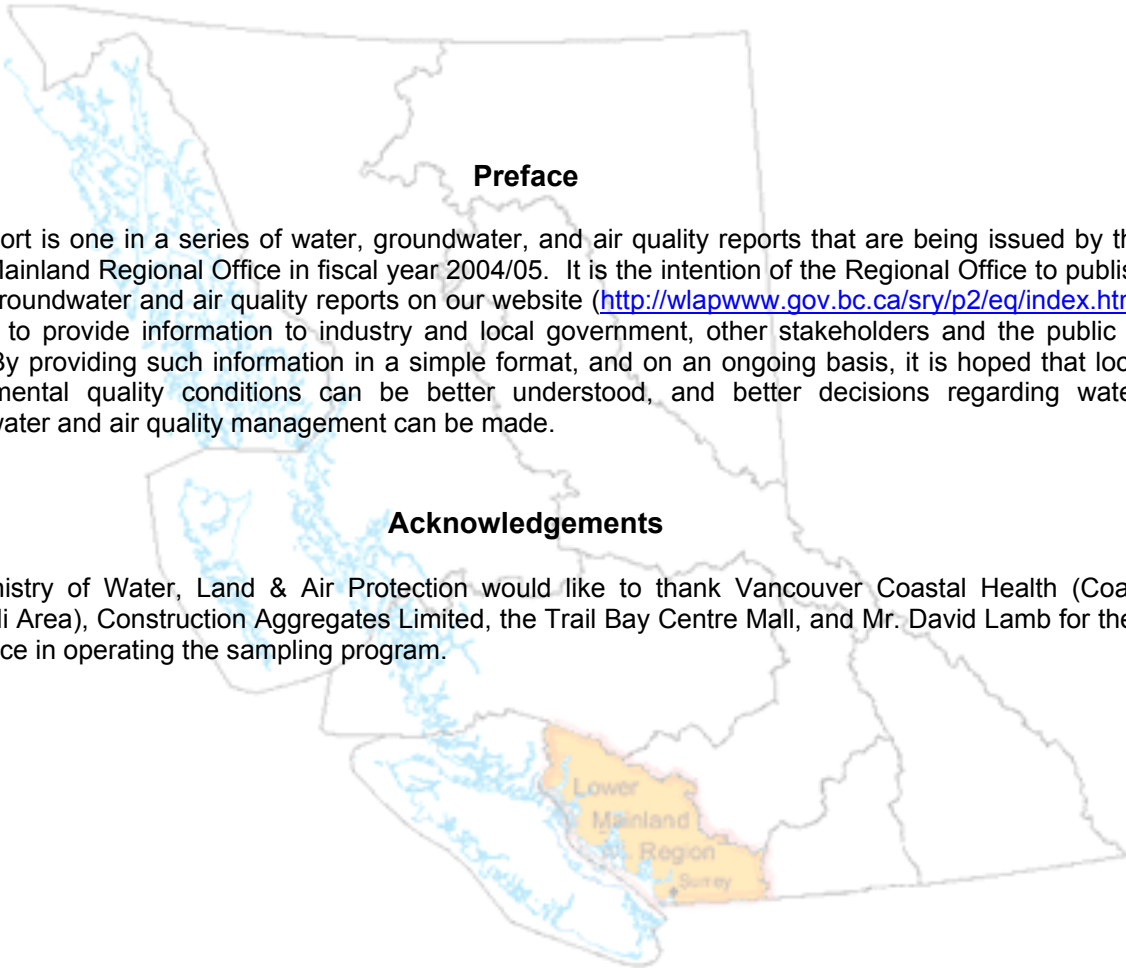
ENVIRONMENTAL QUALITY

Ambient PM₁₀ Monitoring Sechelt, B.C. 2003 Update

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Preface

This report is one in a series of water, groundwater, and air quality reports that are being issued by the Lower Mainland Regional Office in fiscal year 2004/05. It is the intention of the Regional Office to publish water, groundwater and air quality reports on our website (<http://wlapwww.gov.bc.ca/sry/p2/eq/index.htm>) in order to provide information to industry and local government, other stakeholders and the public at large. By providing such information in a simple format, and on an ongoing basis, it is hoped that local environmental quality conditions can be better understood, and better decisions regarding water, groundwater and air quality management can be made.

Acknowledgements

The Ministry of Water, Land & Air Protection would like to thank Vancouver Coastal Health (Coast Garibaldi Area), Construction Aggregates Limited, the Trail Bay Centre Mall, and Mr. David Lamb for their assistance in operating the sampling program.

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1.0 INTRODUCTION

In September 2002, the Ministry of Water, Land & Air Protection (WLAP) released a report¹ summarizing results of PM₁₀ sampling undertaken in Sechelt, British Columbia (BC) between 1999 and 2001. In addition to providing results of PM₁₀ sampling, the report discussed PM₁₀ and potential human health impacts associated with PM₁₀ exposure, detailed the PM₁₀ sampling methodology utilized in Sechelt, compared Sechelt PM₁₀ sampling results with provincial *Ambient Air Quality Objectives* and federal *Reference Levels*, and compared Sechelt PM₁₀ sampling results with PM₁₀ sampling results from other communities in BC. Readers are encouraged to review the above-noted report to obtain background information on the Sechelt PM₁₀ monitoring program. In November 2003, an updated report² summarizing results of PM₁₀ sampling in Sechelt in 2002 was released.

The objective of this 2003 update report is to summarize PM₁₀ data collected in 2003, compare 2003 data to provincial *Ambient Air Quality Objectives* and federal *Reference Levels*³, compare 2003 data with previous years of PM₁₀ data from Sechelt, and to compare 2003 PM₁₀ sampling results with PM₁₀ results from other communities in British Columbia.

2.0 RESULTS AND DISCUSSION

Sampling results for 2003 are tabled in Appendix A and presented graphically in Figure 1.0. In 2003, 42 of a possible 61 samples were collected. The minimum and maximum 24-hour PM₁₀ concentrations were 2 and 16 µg/m³, respectively, with a mean 24-hour concentration of 8.2 µg/m³. The 95-percentile concentration was 14 µg/m³. None of the 2003 samples exceeded provincial *Ambient Air Quality Objectives* or federal *Reference Levels*, but it should be noted that 12 fewer samples were collected in 2003 compared to 2002.

2.1 Comparison with Other Sampling Years

Minimum, maximum and mean values from the Sechelt PM₁₀ sampling program for the years 1999 through 2003 are presented in Figure 2.0.

Referring to Figure 2.0, the mean 24-hour PM₁₀ concentration decreased from 9.8 µg/m³ in 2000 to 8.2 µg/m³ in 2001, a decrease of approximately 16 percent. The mean 24-hour PM₁₀ concentration increased from 8.2 µg/m³ in 2001 to 8.5 µg/m³ in 2002; however, the increase is not statistically significant (p>0.05) and the two mean concentrations can be considered equal. In 2003, the mean 24-hour PM₁₀ concentration decreased to 8.2 µg/m³ (same as 2001); however, the decrease is not statistically significant (p>0.05) and the two means can be considered equal.

¹ **Ministry of Water, Land and Air Protection. 2001.** Ambient PM₁₀ Monitoring Report, Sechelt, B.C. 1999-2001. Ministry of Water, Land & Air Protection, Surrey, B.C. http://wlapwww.gov.bc.ca/sry/p2/air_quality/sechelt_report.pdf

² **Ministry of Water, Land and Air Protection. 2003.** Ambient PM₁₀ Monitoring, Sechelt, BC 2002 Update. Ministry of Water, Land & Air Protection, Surrey, B.C. http://wlapwww.gov.bc.ca/sry/p2/air_quality/sechelt_pm10_02final.pdf

³ *Air Quality Objectives* are levels intended to ensure long-term protection of public health and the environment. *Reference Levels* are health based levels at which statistically significant adverse effects on human health can be detected.

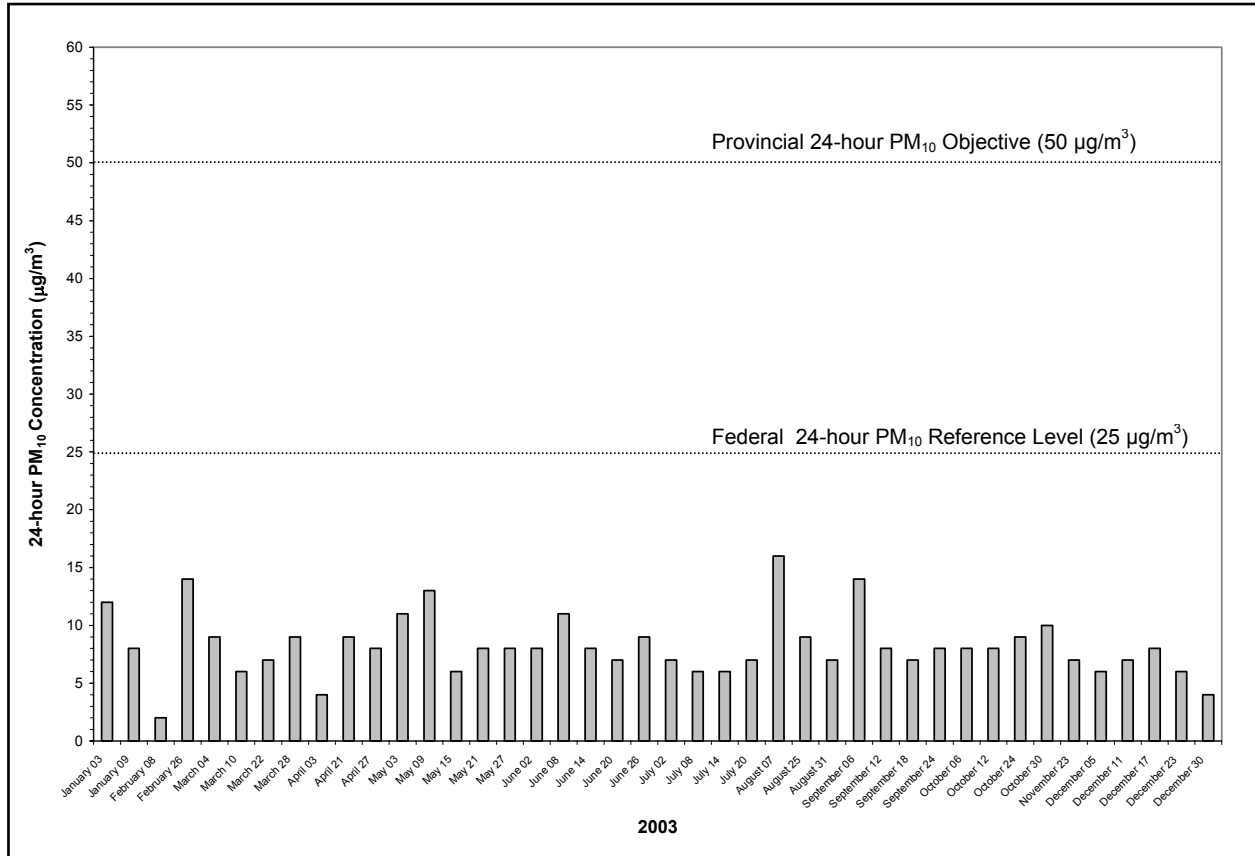


FIGURE 1.0 Results from 2003 PM₁₀ sampling at Trail Bay Centre Mall, Sechelt, B.C.

2.2 Comparison with Other PM₁₀ Sampling Programs

Figure 3.0 shows the mean 24-hour PM₁₀ concentrations at Sechelt, Chilliwack, Langdale, Powell River, Squamish and Kitsilano (Vancouver) for 2000, 2001, 2002 and 2003. Data from the comparison sites were obtained for the same sample dates as the Sechelt HiVol sampler. The comparison sites chosen are representative of other coastal and rural communities. Figure 3.0 data is tabled in Appendix B.

In 2003, the mean 24-hour PM₁₀ concentration in Sechelt was lower than each of the comparison sites. Ambient PM₁₀ concentrations in Sechelt continue to be lower than those in major urban centres (e.g. Kitsilano) or near major point sources (e.g. Squamish), a trend that has been consistent since the first complete year of PM₁₀ monitoring in Sechelt (i.e. 2000).

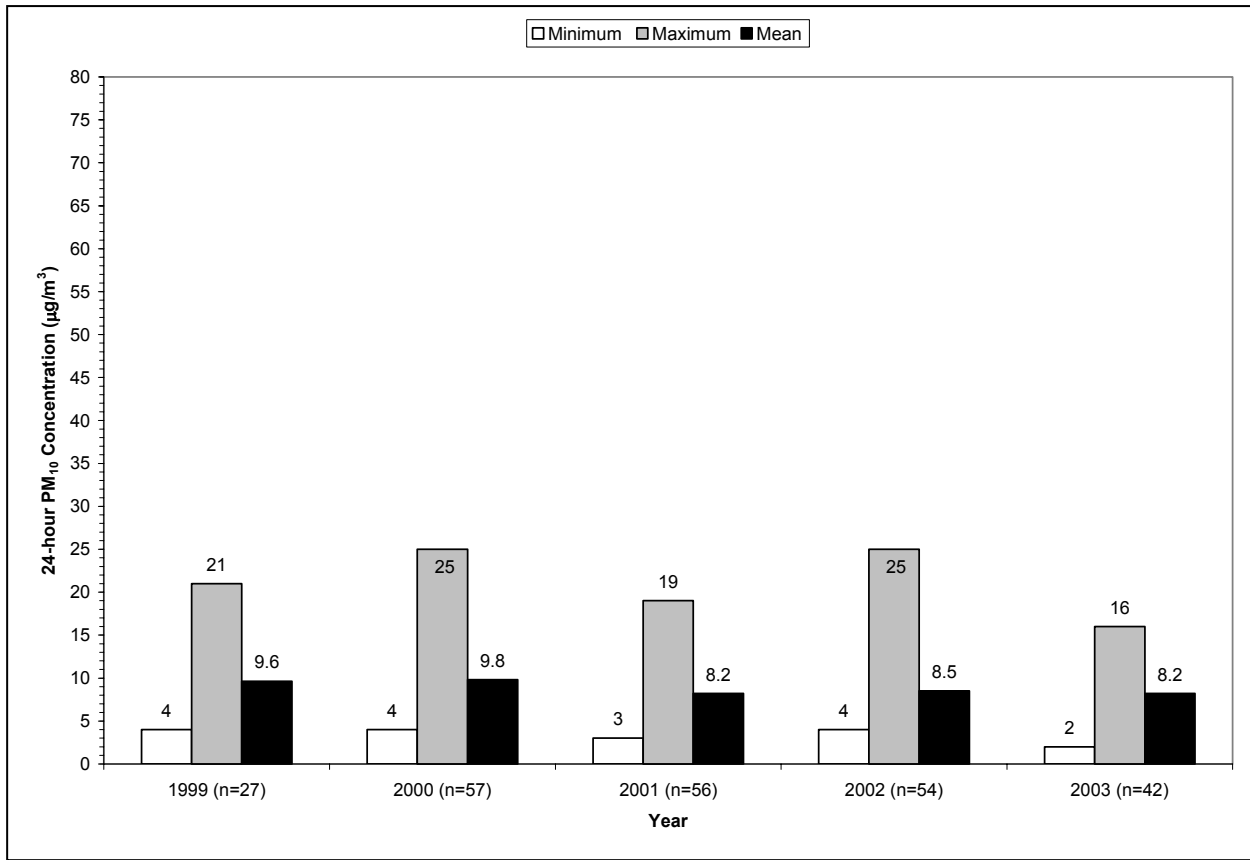


FIGURE 2.0 Comparison of Minimum, Maximum and Mean 24-hour PM₁₀ concentrations in Sechelt for 1999-2003

3.0 SUMMARY

PM₁₀ monitoring in Sechelt between 2000 and 2003 indicates:

- annual mean PM₁₀ levels have not increased;
- ambient PM₁₀ levels are below provincial *Air Quality Objectives* and federal *Reference Levels*; and,
- PM₁₀ levels in Sechelt are below levels observed in major urban centres.

Between January and December 2003, 42 PM₁₀ samples were collected. Ambient 24-hour PM₁₀ concentrations during this 12 month period ranged from < 2µg/m³ (minimum laboratory detection limit) and 16 µg/m³ with a mean 24-hour PM₁₀ concentration of 8.2 µg/m³. The Provincial Ambient Air Quality 24-hour PM₁₀ Objective of 50 µg/m³ and the Federal 24-hour PM₁₀ Reference Level of 25 µg/m³ were not exceeded in any of the samples.

It should be noted that 12 fewer samples were collected in 2003 compared to 2002 suggesting the 2003 data may not accurately reflect ambient PM₁₀ concentrations in Sechelt for 2003. However, comparing

Sechelt PM₁₀ data with PM₁₀ data from other communities for the 42 Sechelt sample dates indicates ambient PM₁₀ concentrations are generally lower in Sechelt relative to other areas (see Figure 3.0) and this same trend was observed in 2000, 2001 and 2002 when 57, 56 and 54 samples, respectively, were collected in Sechelt.

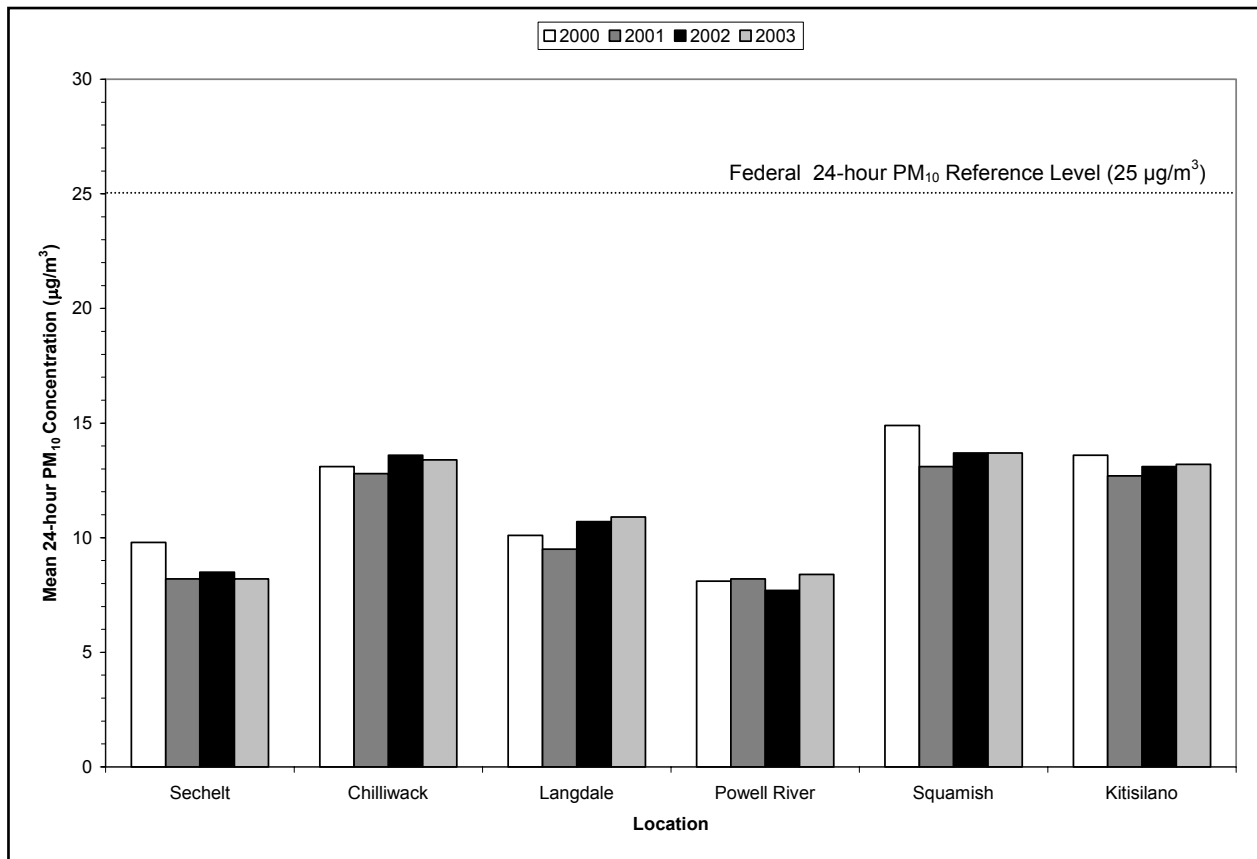


FIGURE 3.0 Comparison of 2000 - 2003 mean annual 24-hour PM₁₀ concentrations at 6 different locations.

PM₁₀ sampling results indicate ambient PM₁₀ concentrations in Sechelt decreased in 2003, but the decrease was not statistically significant ($p > 0.05$) and mean PM₁₀ concentrations in 2002 and 2003 can be considered equal.

WLAP will continue PM₁₀ sampling in Sechelt and results of the 2004 sampling program will be provided in 2005.

APPENDIX A
SECHELT TRAIL BAY MALL
2003 PM₁₀ RESULTS

Month	Date	µg/m ³ (24 hr. avg.)	Month	Date	µg/m ³ (24 hr. avg.)
January	03	12	July	02	7
	09	8		08	6
	15	no sample		14	6
	21	no sample		20	7
	27	no sample		26	no sample
February	02	no sample	August	01	no sample
	08	< 2.0		07	16
	14	no sample		13	no sample
	20	no sample		19	no sample
	26	14		25	9
				31	7
March	04	9	September	06	14
	10	6		12	8
	16	no sample		18	7
	22	7		24	8
	28	9		30	no sample
April	03	4	October	06	8
	09	no sample		12	8
	15	no sample		18	no sample
	21	9		24	9
	27	8		30	10
May	03	11	November	05	no sample
	09	13		11	no sample
	15	6		17	no sample
	21	8		23	7
	27	8		29	no sample
June	02	8	December	05	6
	08	11		11	7
	14	8		17	8
	20	7		23	6
	26	9		30*	4

* incorrect sample date (non NAPS)

APPENDIX B
FIGURE 3.0 DATA

Sample Date (2003)		24-hour PM ₁₀ (µg/m ³)					
		Sechelt	Chilliwack	Langdale	Powell River	Squamish	Kitsilano
January	03	12	14	15	10	10	--
	09	8	19	7	6	11	--
February	08	< 2	19	8	5	13	--
	26	14	17	13	12	22	--
March	04	9	12	12	7	12	16
	10	6	9	8	8	15	9
	22	7	6	7	7	5	8
	28	9	11	10	6	11	12
April	03	4	7	6	5	8	7
	21	9	16	12	8	10	9
	27	8	7	9	12	11	9
May	03	11	13	10	10	15	12
	09	13	20	17	13	24	20
	15	6	11	7	6	12	10
	21	8	9	11	8	13	12
	27	8	12	14	8	11	12
June	02	8	14	10	9	12	--
	08	11	22	12	13	26	15
	14	8	11	10	8	16	12
	20	7	9	7	12	10	10
	26	9	22	20	8	24	15
July	02	7	11	9	6	--	10
	08	6	12	7	7	14	10
	14	6	12	9	6	9	11
	20	7	15	13	8	18	11
August	07	16	24	21	21	26	26
	25	9	23	16	--	16	21
	31	7	18	12	7	18	14
September	06	14	31	19	11	31	19
	12	8	13	12	9	13	15
	18	7	7	10	8	10	11
	24	8	20	16	11	15	22
October	06	8	20	10	6	14	17
	12	8	7	11	7	11	11
	24	9	12	13	9	14	15
	30	10	9	6	10	8	9
November	23	7	8	11	4	8	--
December	05	6	6	9	4	15	--
	11	7	14	9	4	11	--
	17	8	9	8	--	10	--
	23	6	5	6	--	7	--
	30	4	8	6	--	6	--
Number of Samples		42	42	42	38	41	31
Mean		8.2	13.4	10.9	8.4	13.7	13.2