



PASZA

Peace Air Shed Zone Association

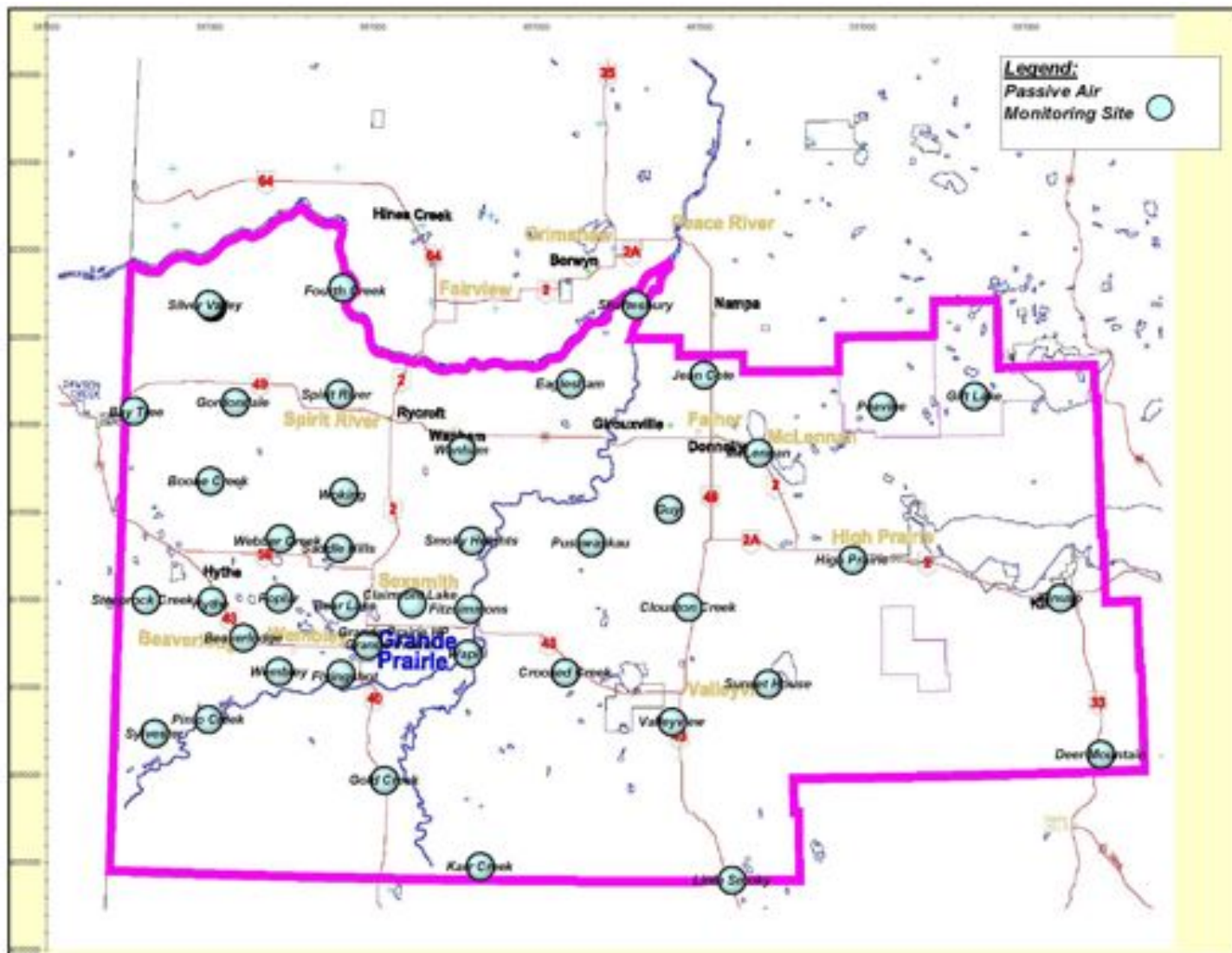
PASSIVE AIR QUALITY ANALYSIS 2002 – 2009

This document provides an overview of passive air quality data from 2002 to 2009.

The information is intended to provide the general public with a visual summary of air quality in their community.

PASZA Zone

Map of Peace Air Shed Zone Passive Station Location



Passive Monitoring Technology

The PASZA Air Quality Monitoring Program includes a network of passive samplers to collect air quality data over the entire zone (38,500 square kilometers). Passive samplers rely on the principles of permeation and diffusion to physically uptake the specific compound being sampled. The advantages of passive samplers are:

- Accuracy
- Low detectable limits
- Simple design
- Ease of use
- Cost effectiveness
- Do not require electricity
- Can be located in remote areas

A disadvantage to passive samplers is the limitation of identifying the conditions related to a specific event measured during the sampling period.

The Passive Monitoring Network forms the backbone of the PASZA AQM Program and provides data that is used to:

- Assess the spatial variation of nitrogen dioxide, ozone and sulphur dioxide
- Identify long-term air quality trends
- Qualify data in relation to Alberta's Air Quality Guidelines

Quality assurance procedures include the rotation of duplicate samples through 10% of the sites and the analysis of 10% field blanks. Lab analysis on all samples is done "blind" meaning that samples are analyzed with no knowledge of where the samples were located.



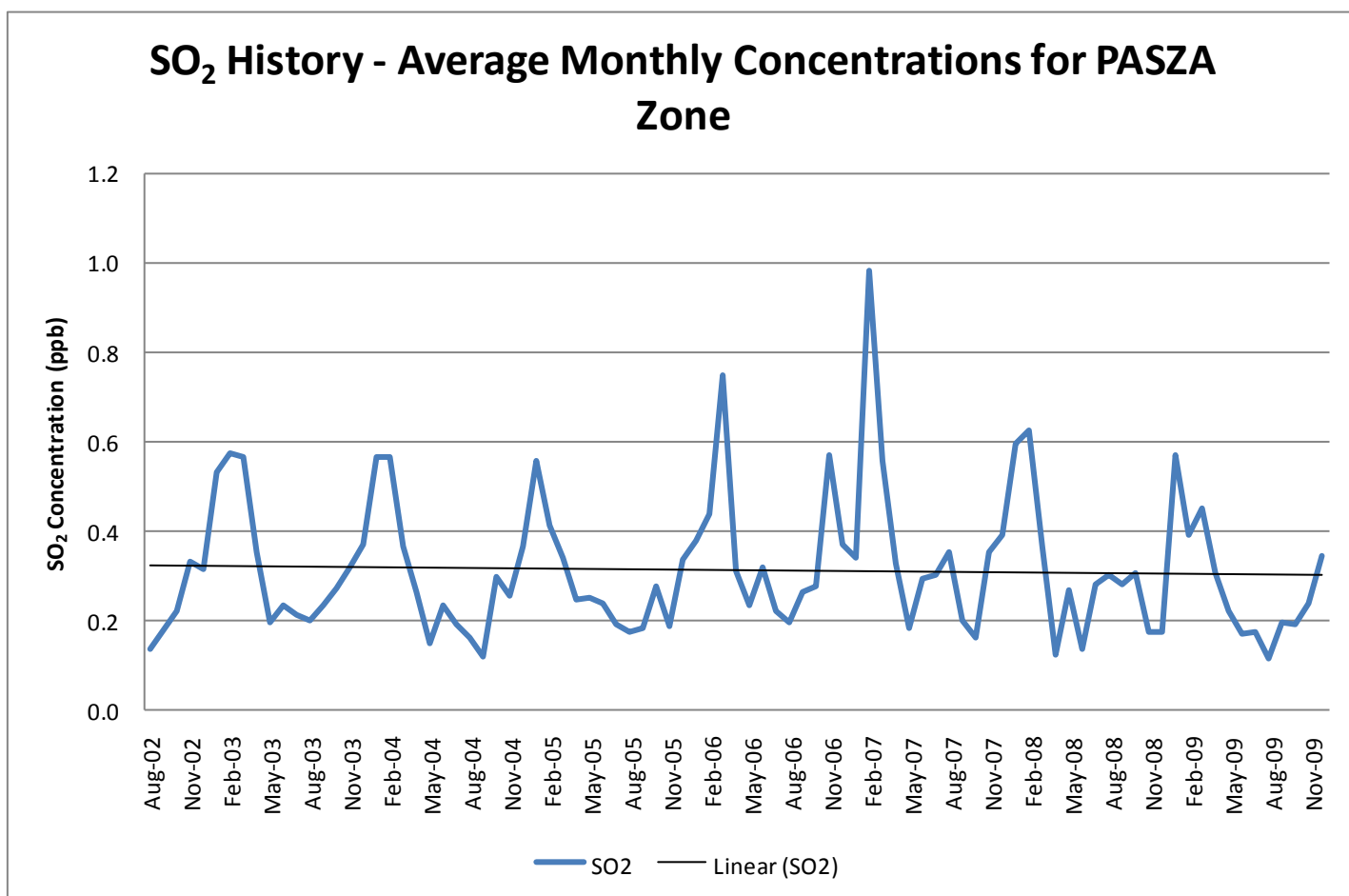
Sulphur dioxide

Sulphur dioxide (SO₂) is a colourless gas with a pungent odour. In Alberta, natural gas processing plants are responsible for close to half of the emissions of this gas. Oil sands facilities and power plants are also major sources. Other sources include gas plant flares, oil refineries, pulp and paper mills and fertilizer plants.

Alberta Ambient Air Quality Objective

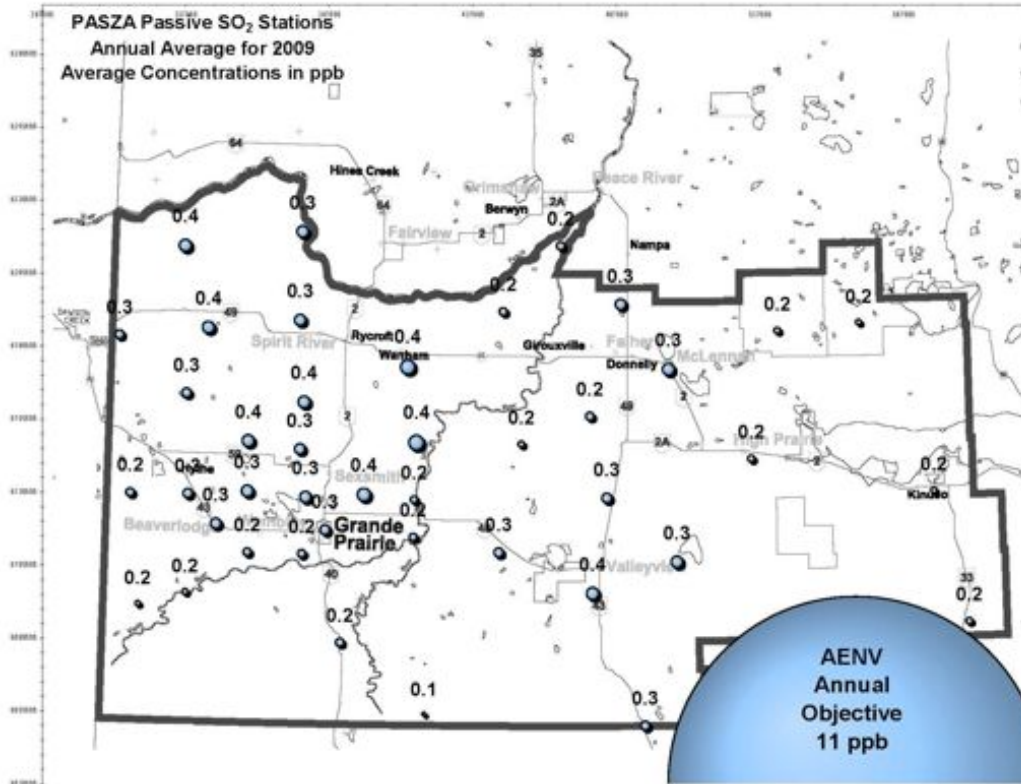
Sulphur Dioxide (SO₂)

1-hour average:	172 parts per billion
24-hour average:	57 parts per billion
Annual average:	11 parts per billion

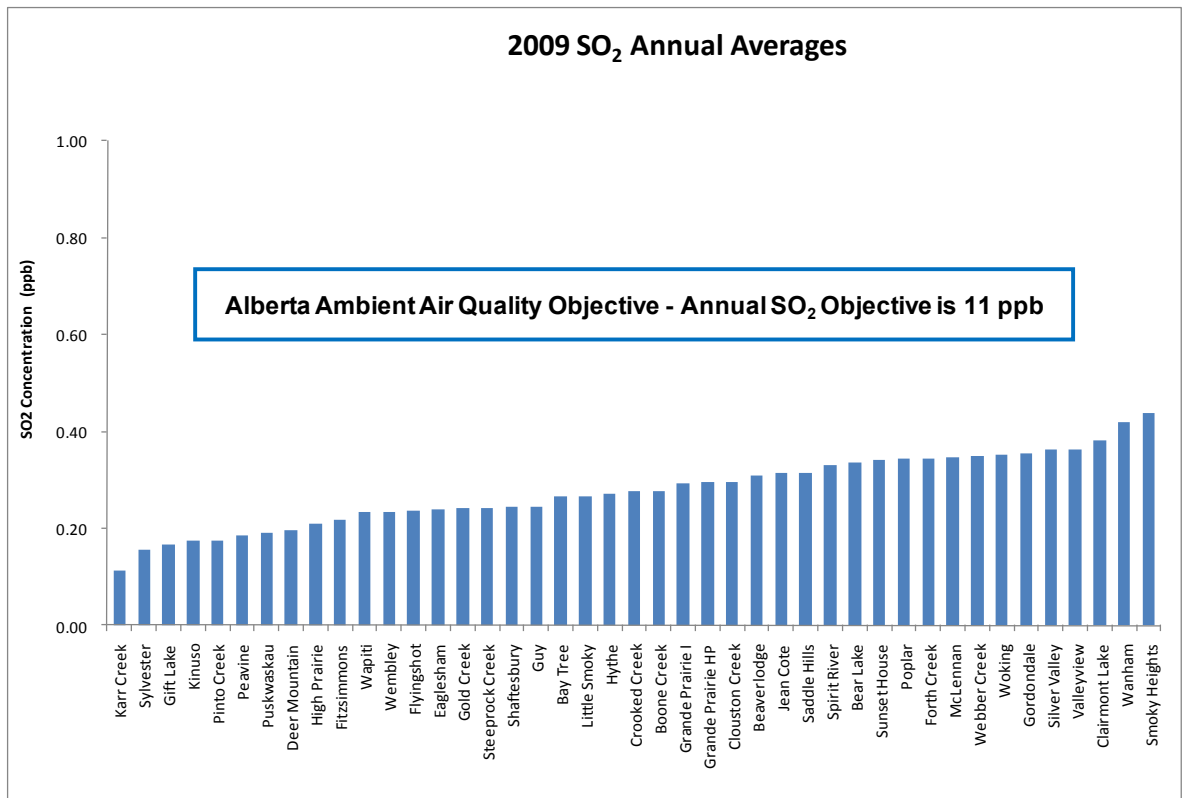


The above chart illustrates the average monthly sulphur dioxide concentrations. The dashed blue line represents a linear trend line; to indicate if average values are increasing, decreasing or remaining unchanged.

Sulphur dioxide



2009 SO₂ Annual Averages



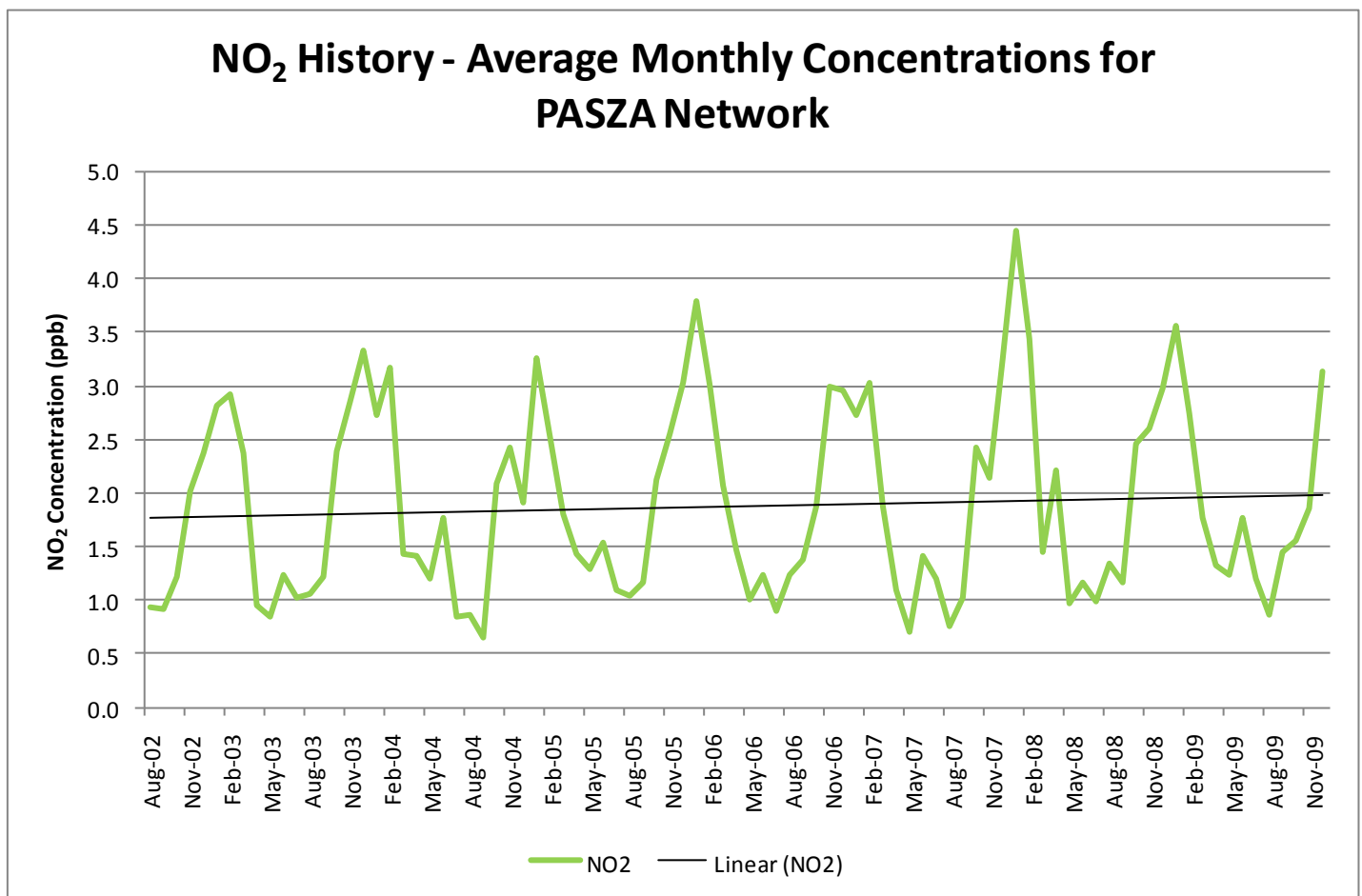
Nitrogen dioxide

Nitrogen dioxide (NO₂) is a reddish-brown gas with a characteristically pungent odour. Major sources of NO₂ include vehicle transportation, industrial facilities and coal burning power plants. Other sources include natural gas combustion, heating fuel combustion and forest fires. NO₂ is partially responsible for the brown haze that is sometimes seen in urban areas and NO₂ plays a major role in the formation of ground level ozone.

Alberta Ambient Air Quality Objective

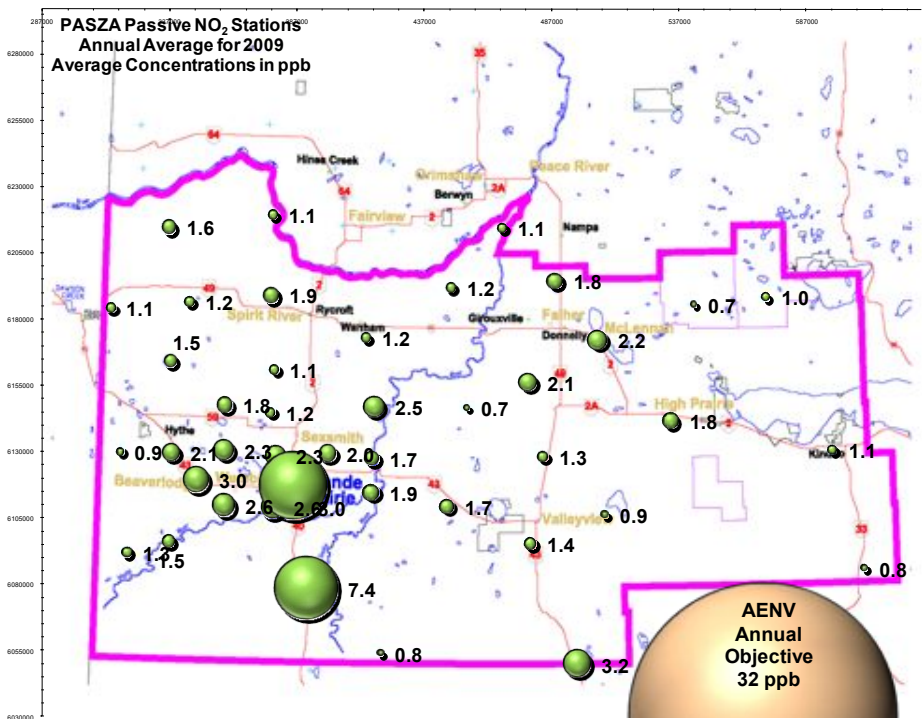
Nitrogen Dioxide (NO₂)

1-hour average:	212 parts per billion
24-hour average:	106 parts per billion
Annual average:	32 parts per billion

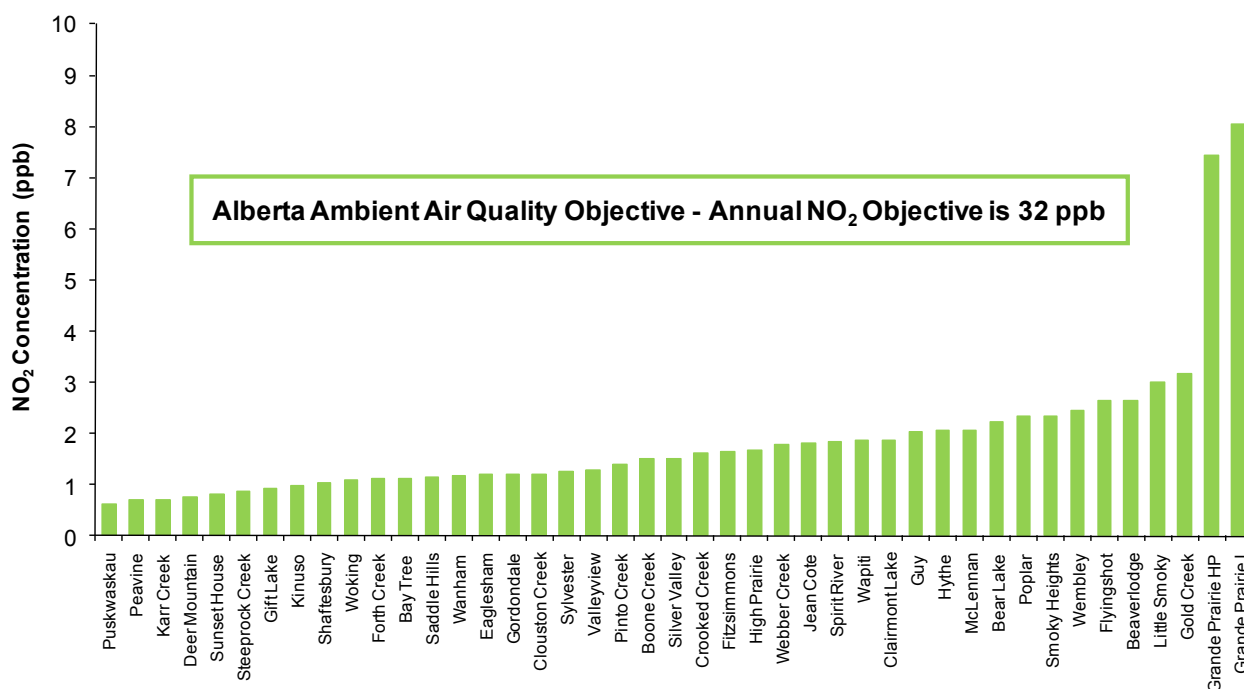


The above chart illustrates the average monthly nitrogen dioxide concentrations. The dashed blue line represents a linear trend line; to indicate if average values are increasing, decreasing or remaining unchanged.

Nitrogen dioxide



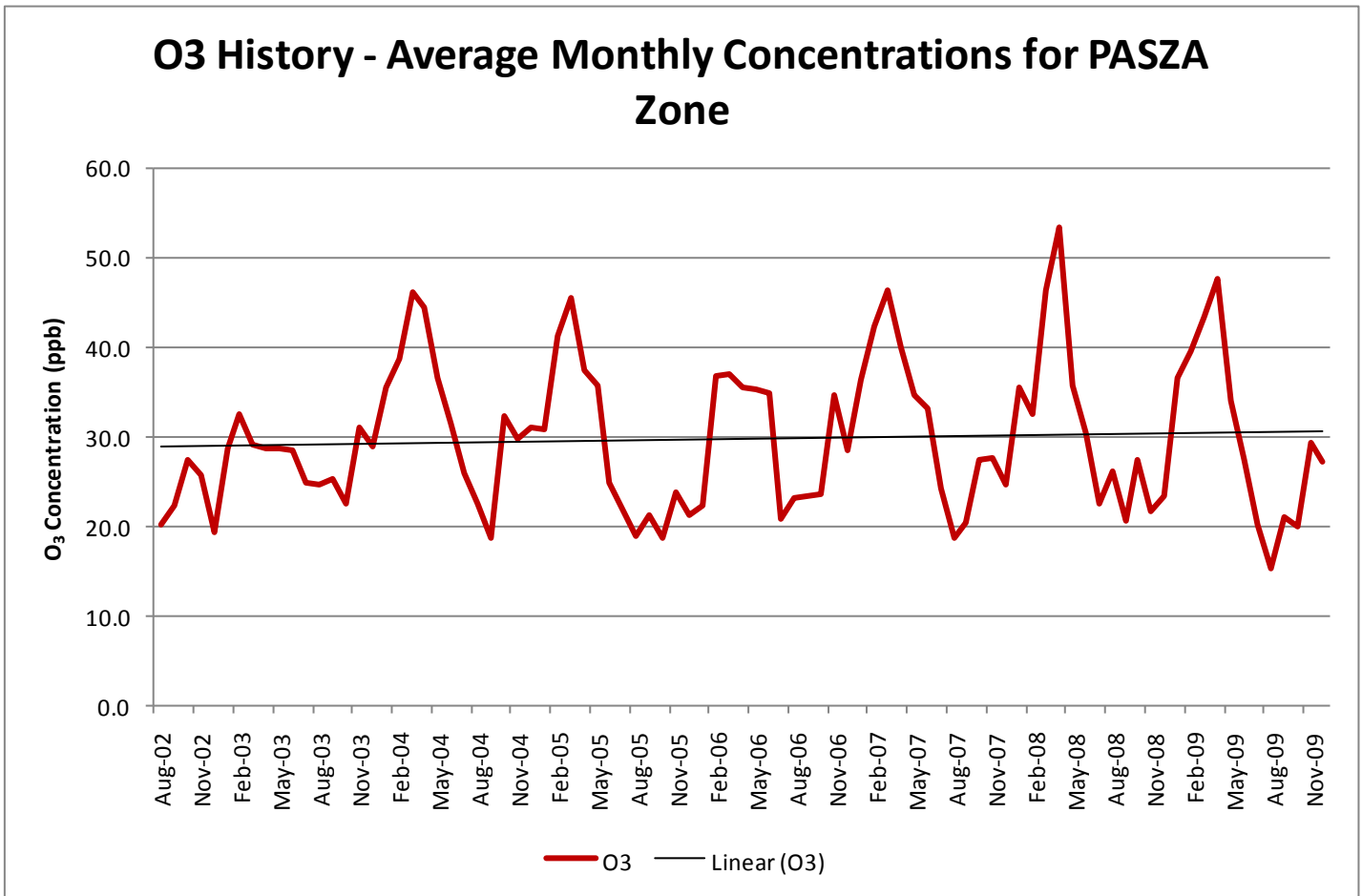
2009 NO₂ Annual Averages



Ozone

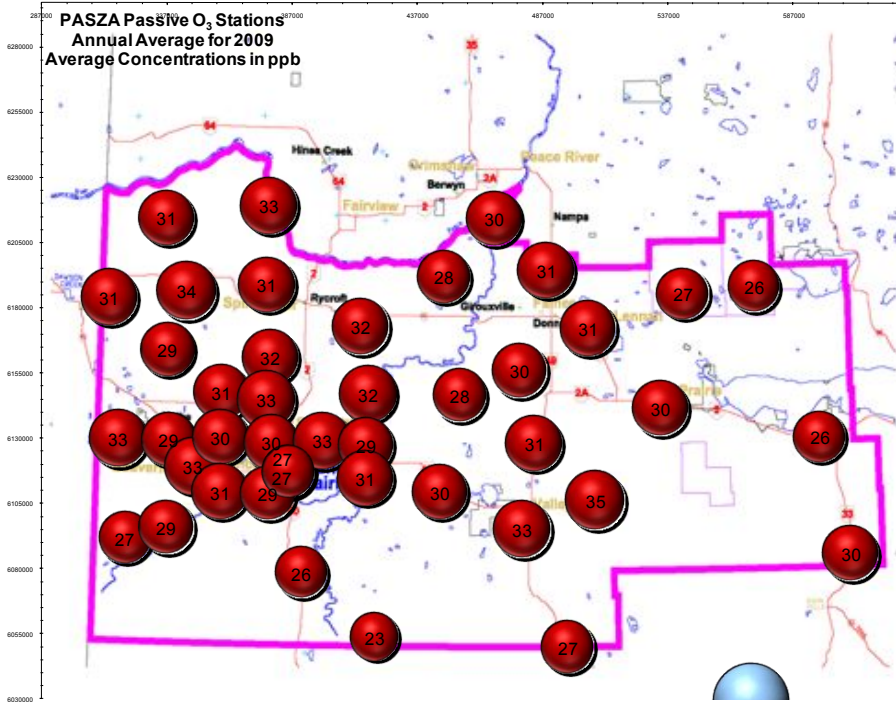
Ozone (O₃), unlike other pollutants is not emitted directly by human activities, but is produced by a complex set of lower atmosphere chemical reactions. O₃ is also transported to the ground from the O₃ rich upper atmosphere by weather and can be carried from upwind urban centres and industrial complexes. At normal outdoor concentrations, O₃ is a colourless and odourless gas, but can have a sharp odour at very high concentrations during lightning storms.

Alberta Ambient Air Quality Objective
Ozone (O₃)
1-hour average: 82 parts per billion

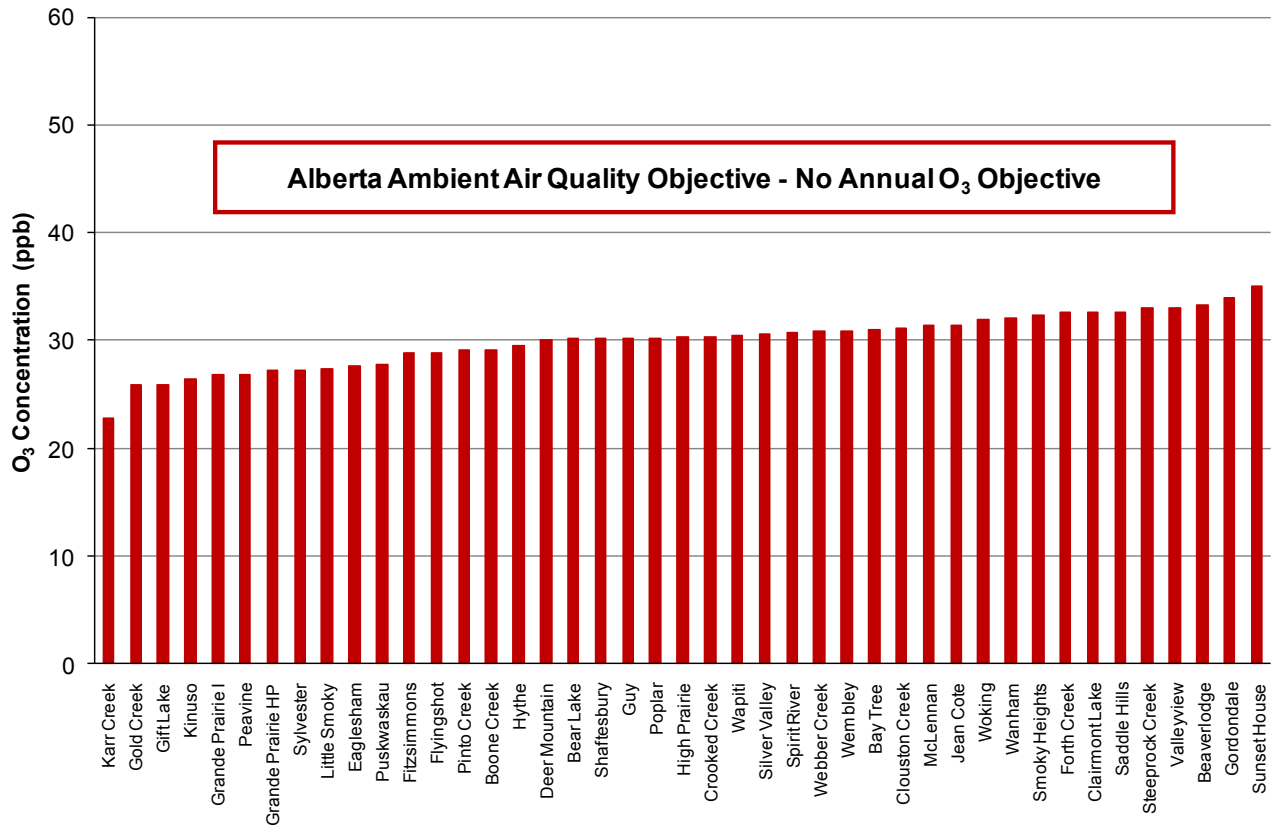


The above chart illustrates the average monthly ozone concentrations. The dashed blue line represents a linear trend line; to indicate if average values are increasing, decreasing or remaining unchanged.

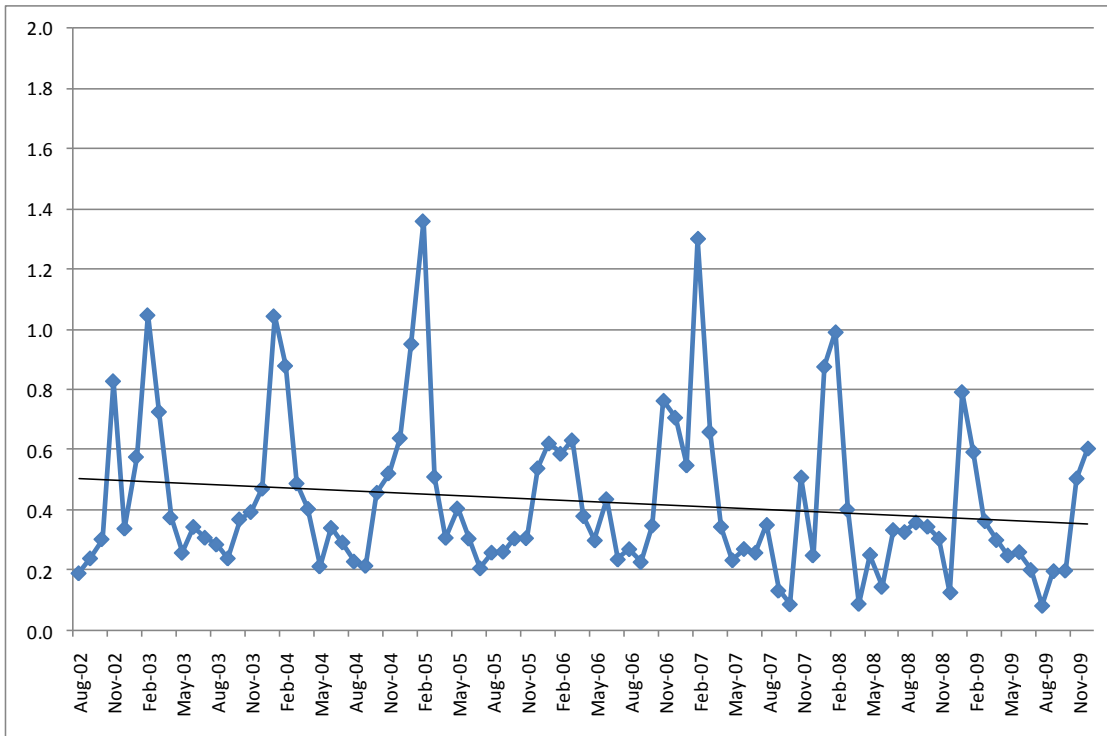
Ozone



2009 O₃ Annual Averages

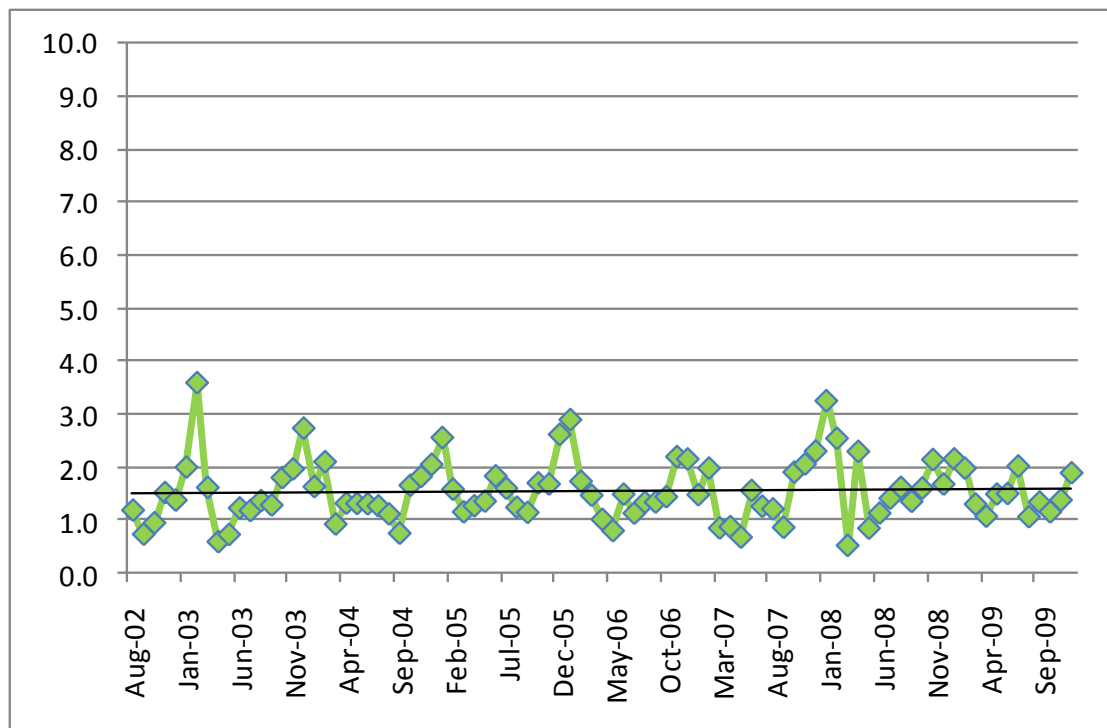


1 Silver Valley



SO₂

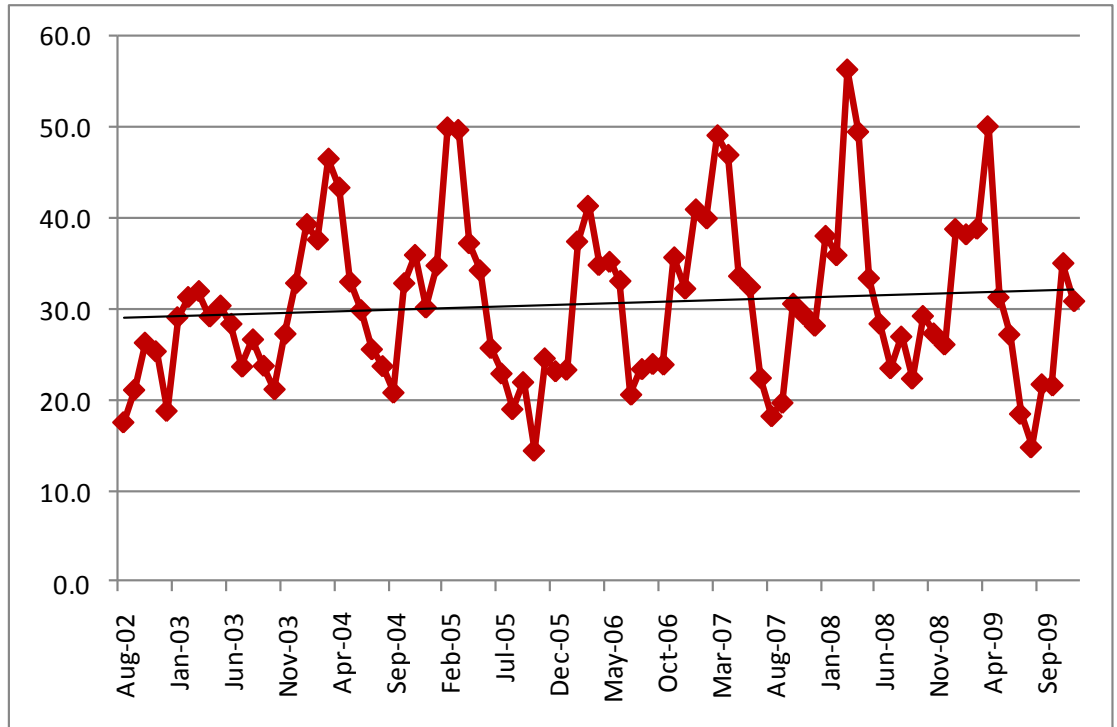
Solid black line represents a linear trend analysis of the monthly data.



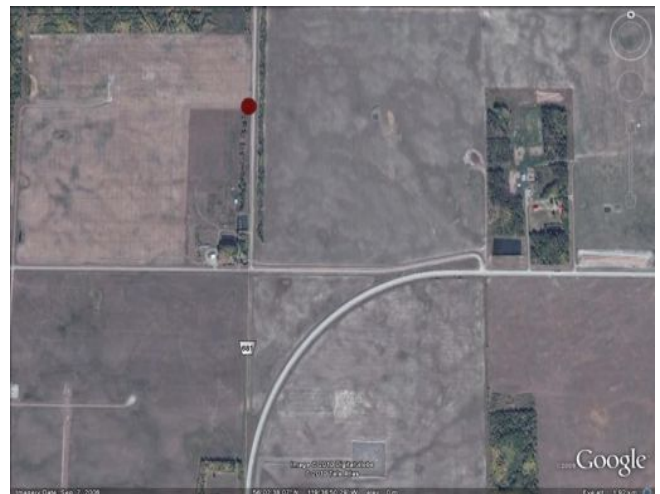
NO₂

1 Silver Valley

O₃

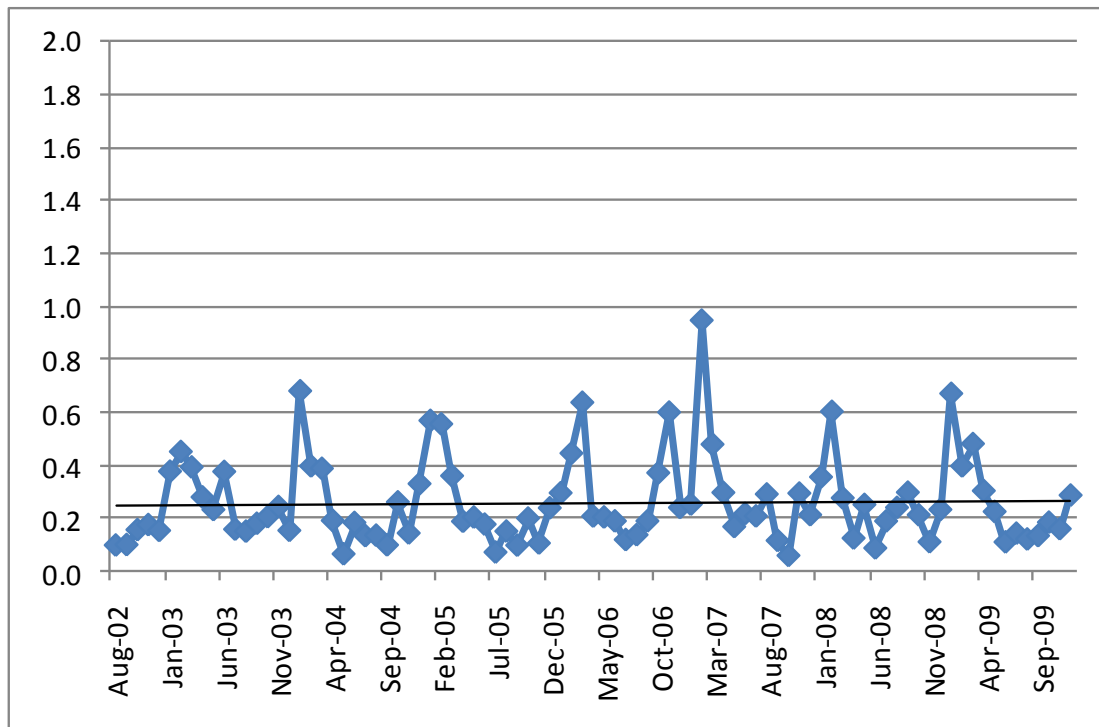


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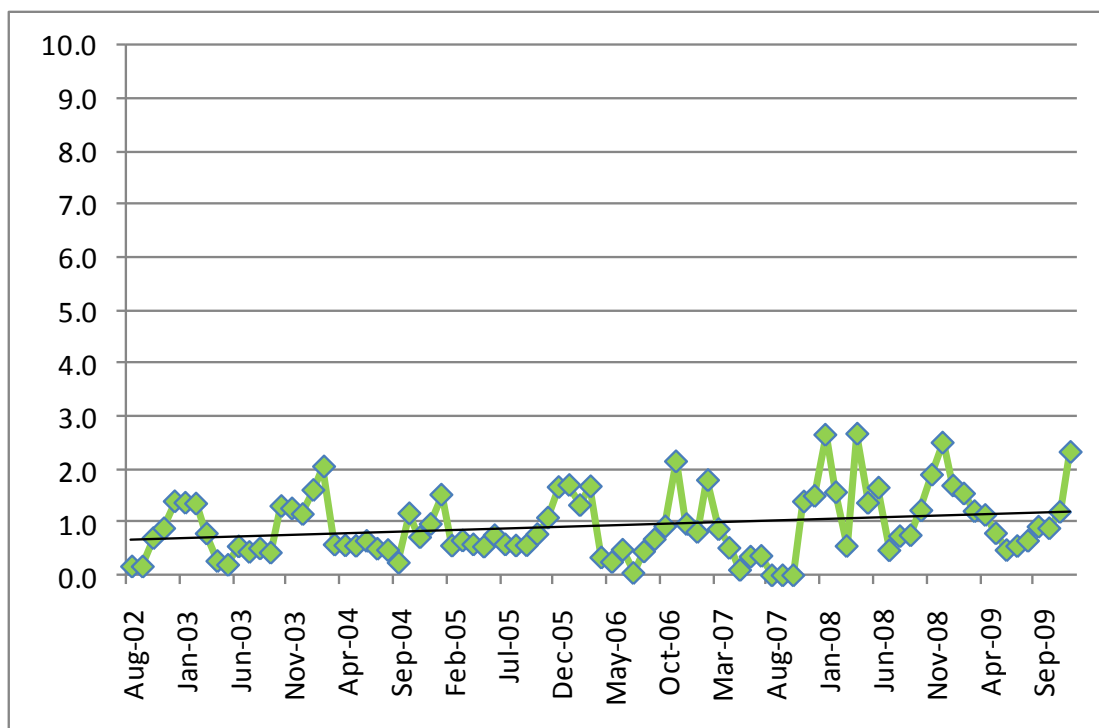
Road Map

2 Bay Tree



SO₂

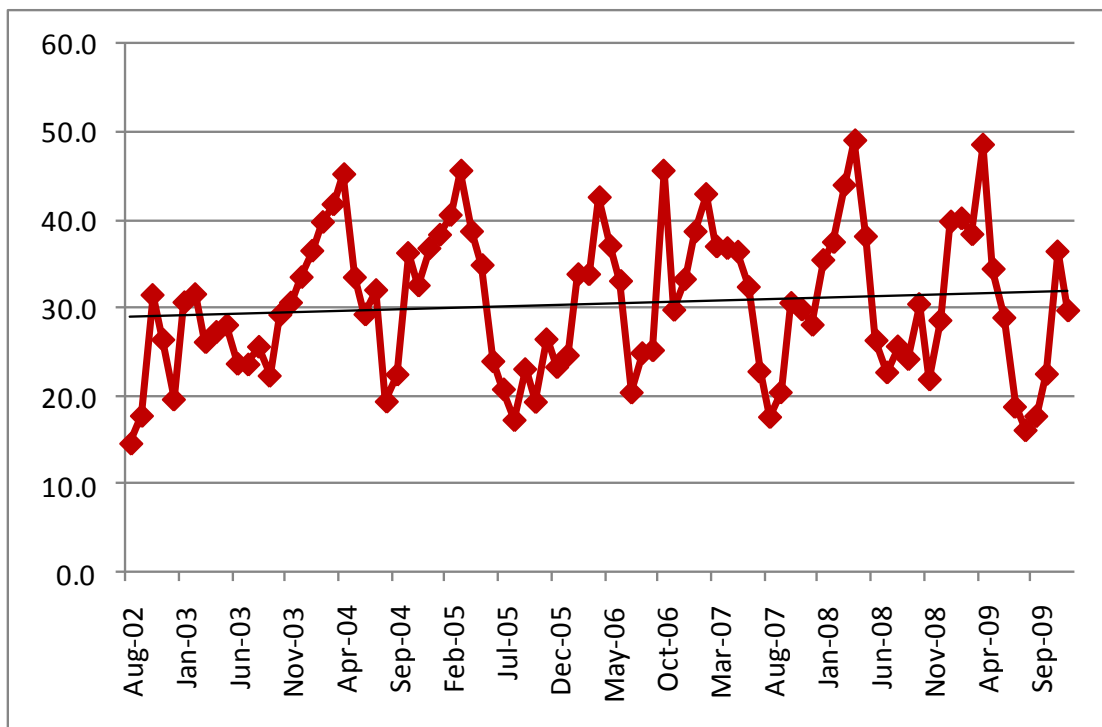
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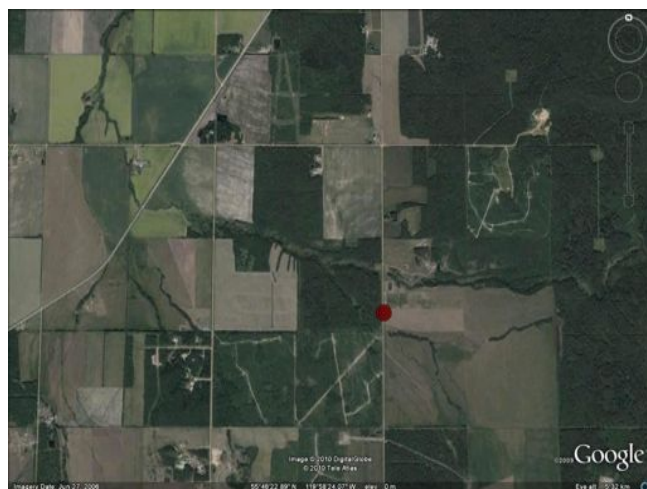
NO₂

2 Bay Tree

O₃



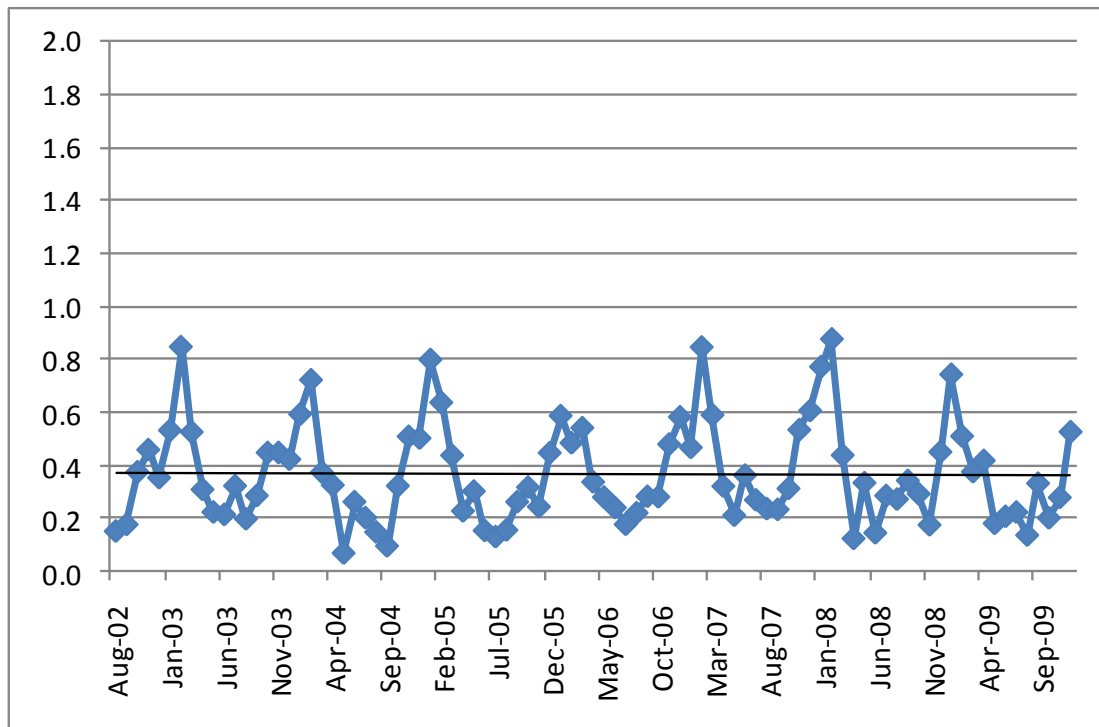
Solid black line represents a linear trend analysis of the monthly data.



*Bay Tree Station was relocated during monitoring period.

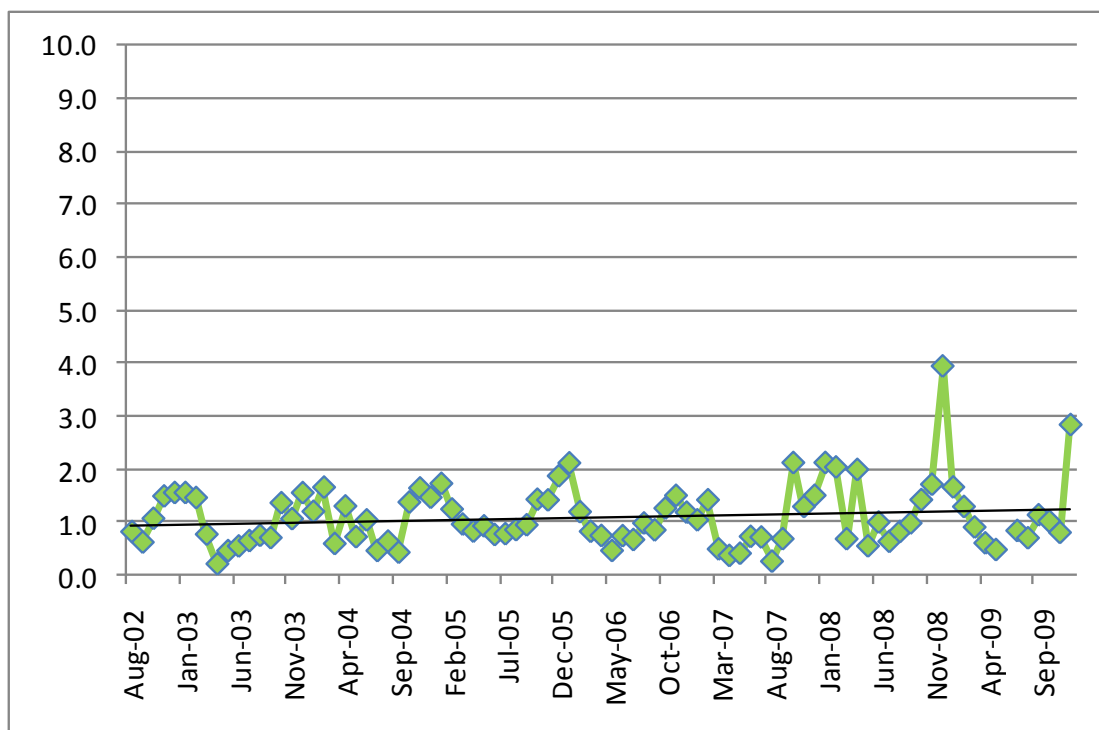
Road Map

3 Fourth Creek



SO₂

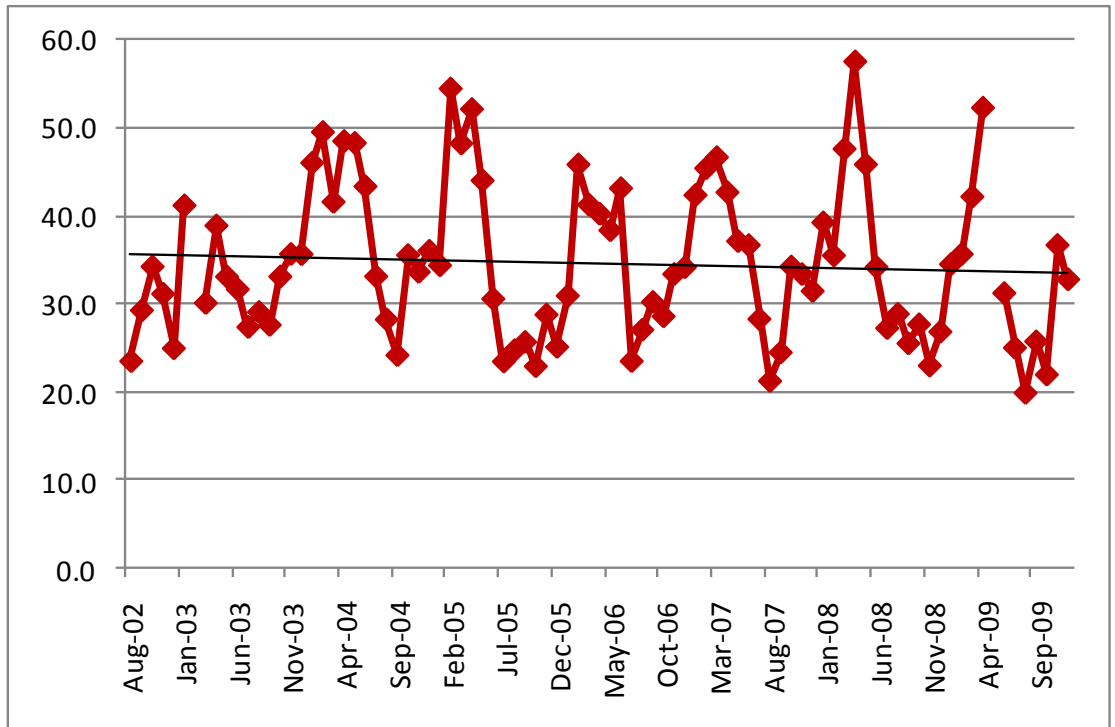
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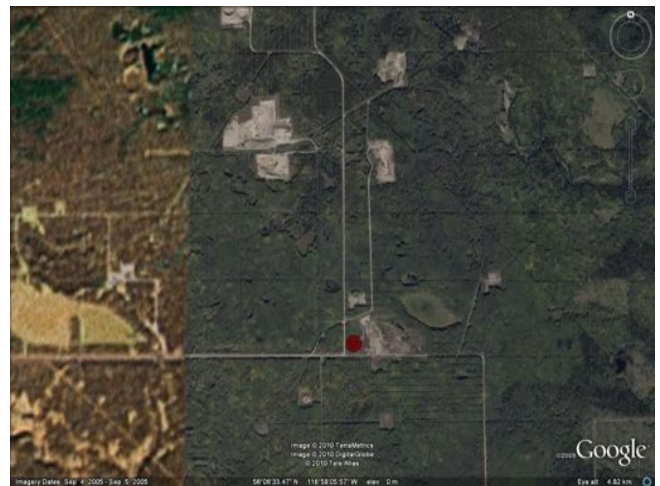
NO₂

3 Fourth Creek

O₃

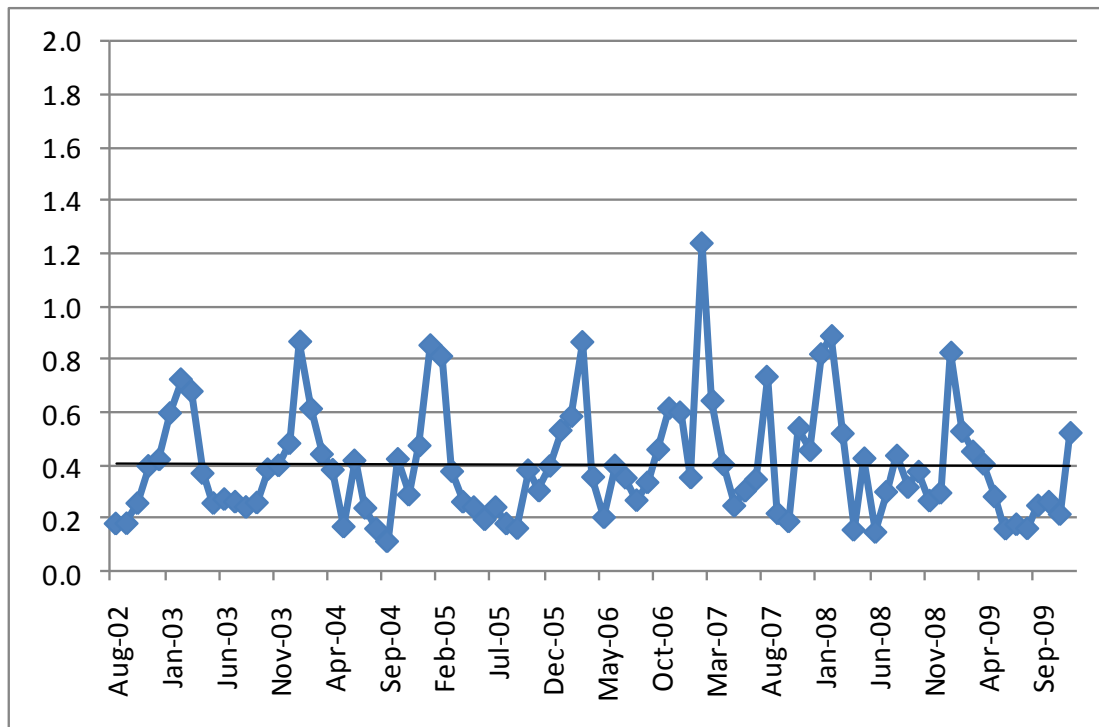


Solid black line represents a linear trend analysis of the monthly data.



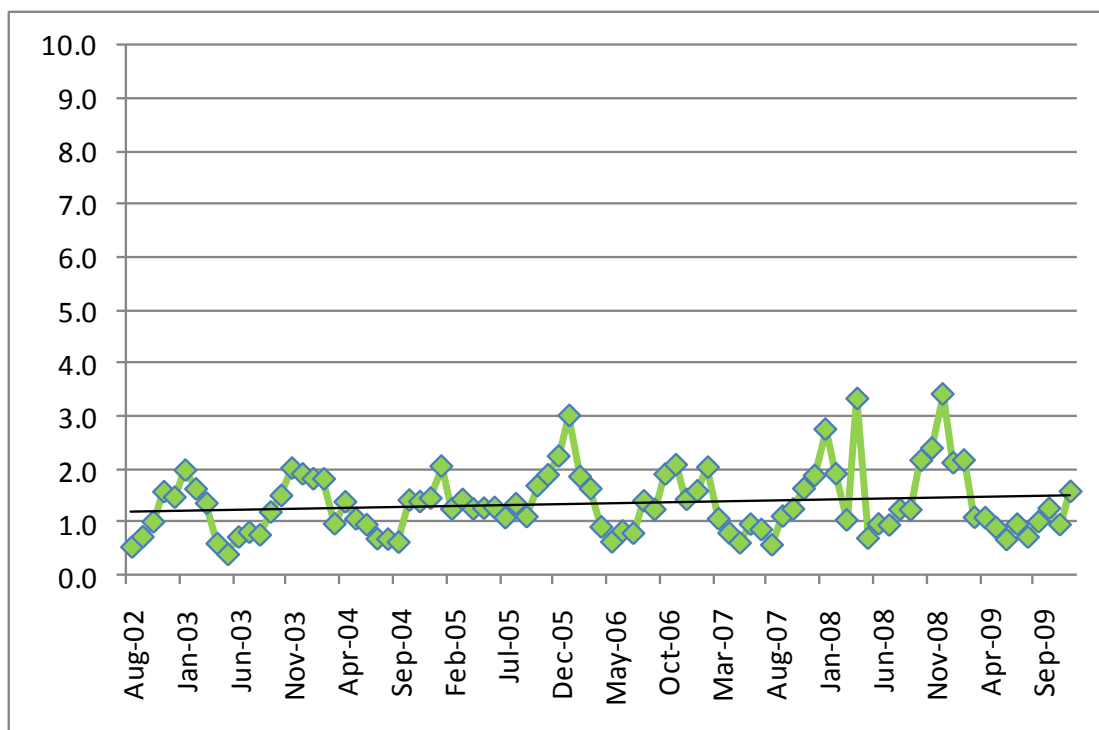
Road Map

4 Gordondale



SO₂

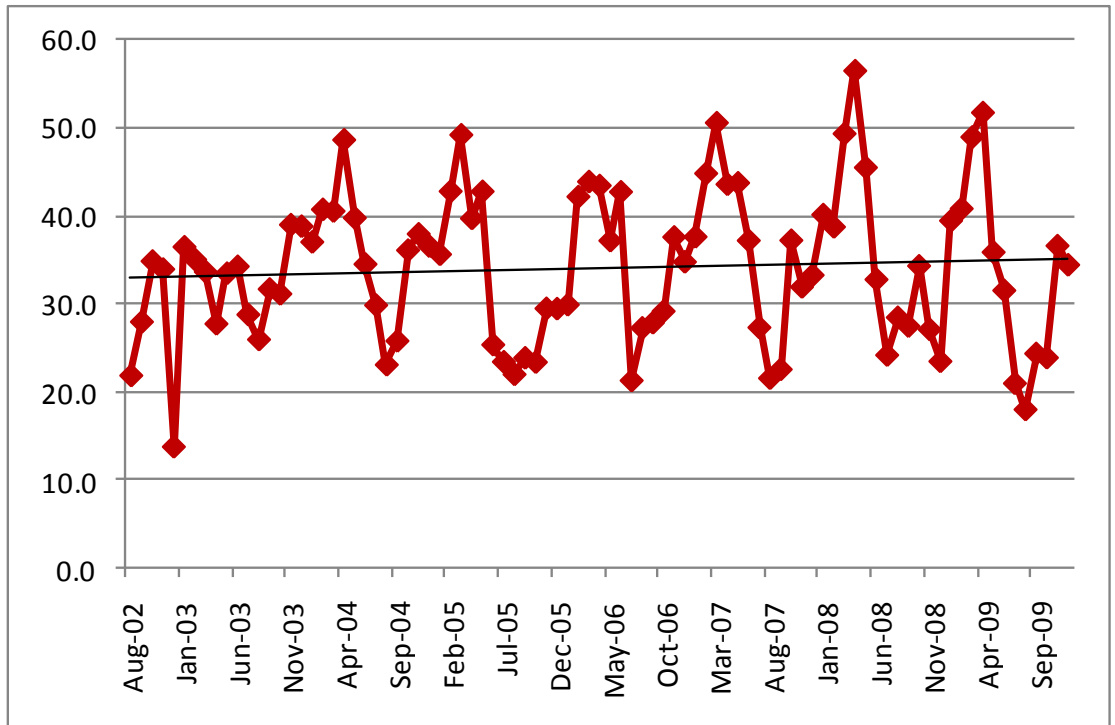
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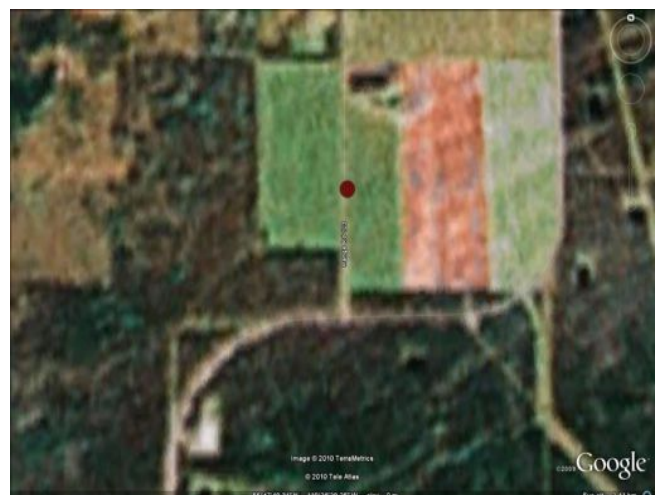
NO₂

4 Gordondale

O₃

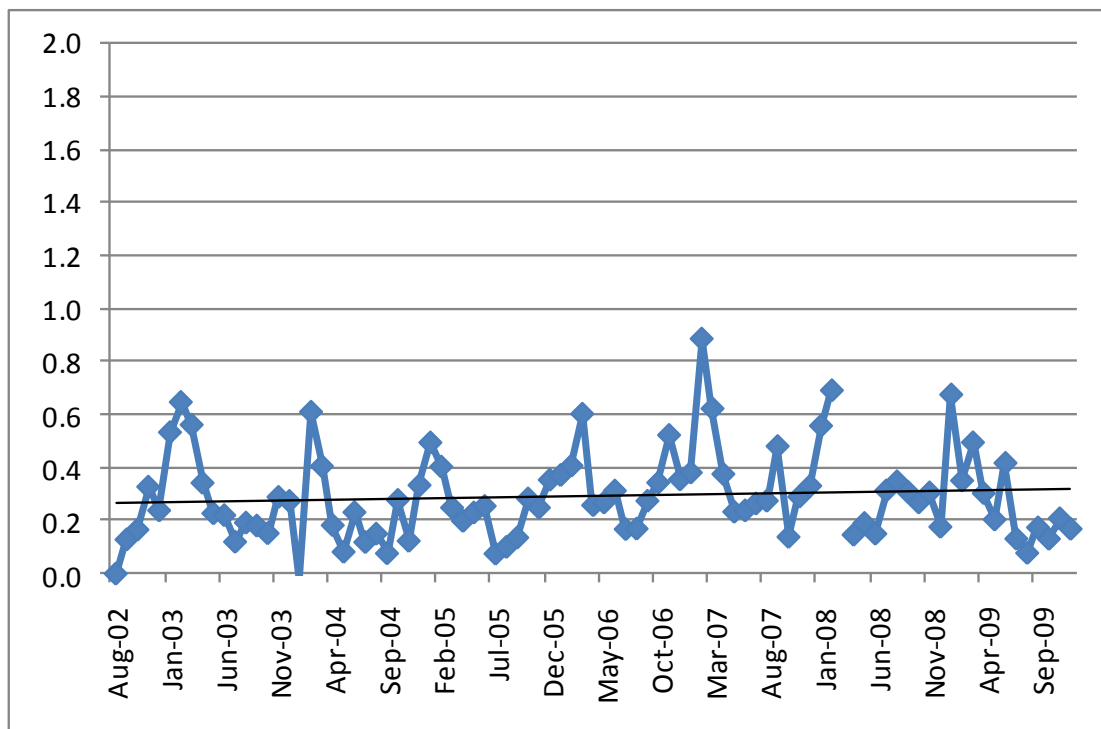


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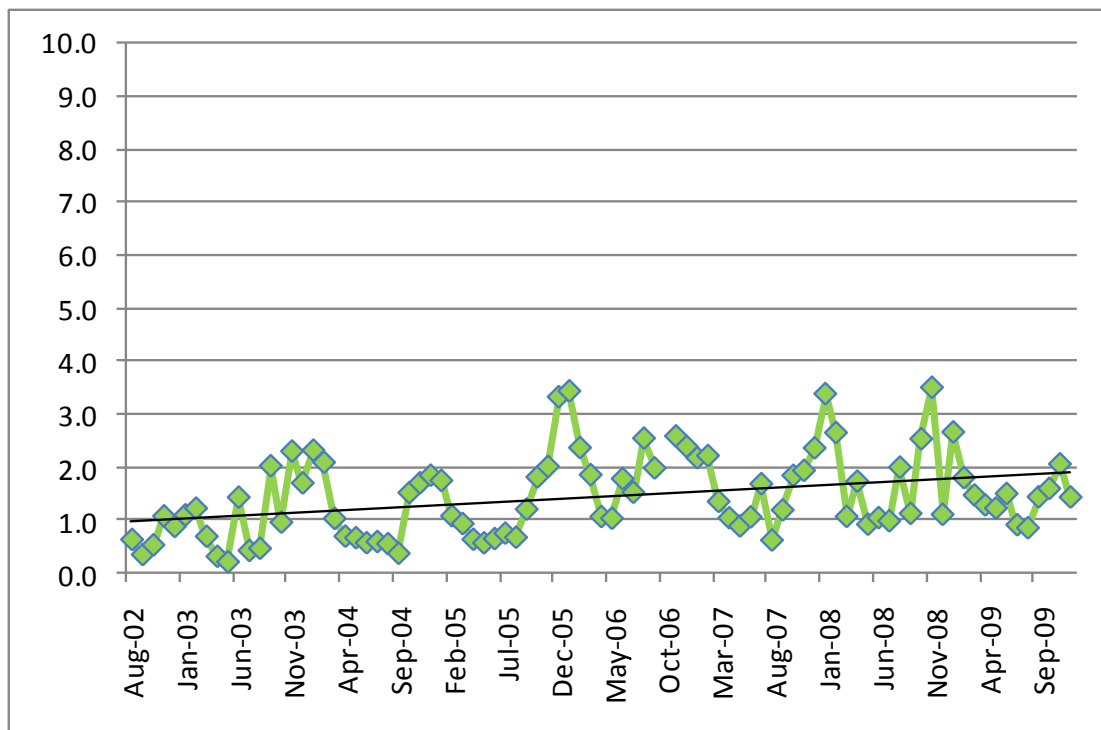
Road Map

5 Boone Creek



SO₂

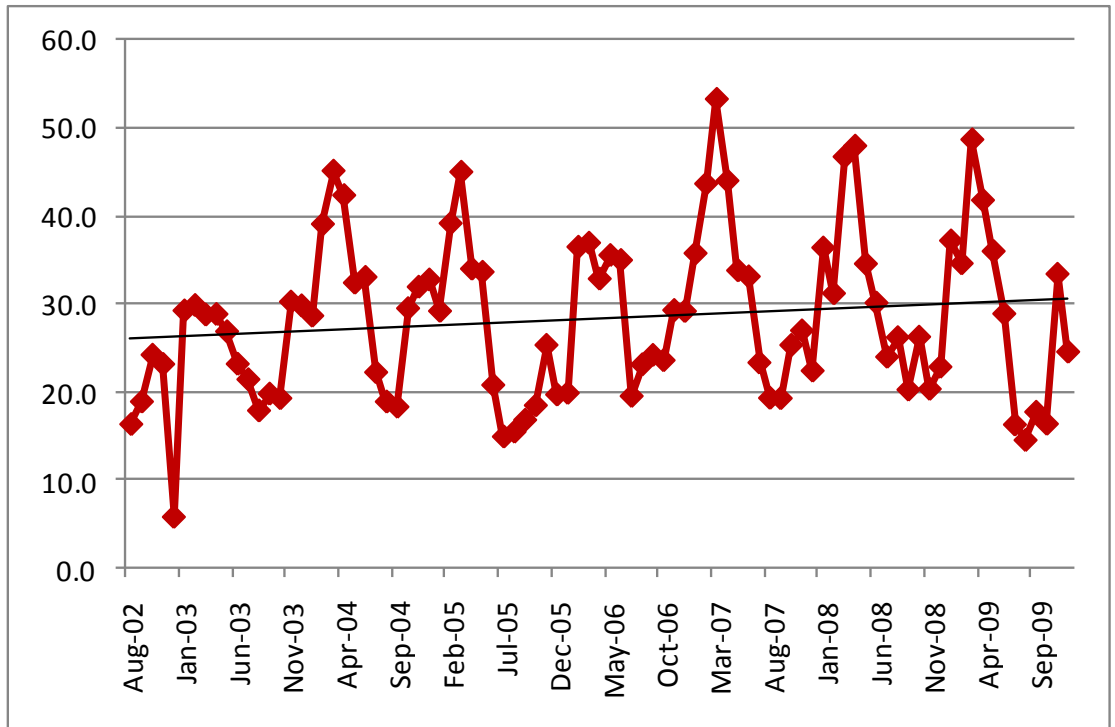
Solid black line represents a linear trend analysis of the monthly data.



NO₂

5 Boone Creek

O₃



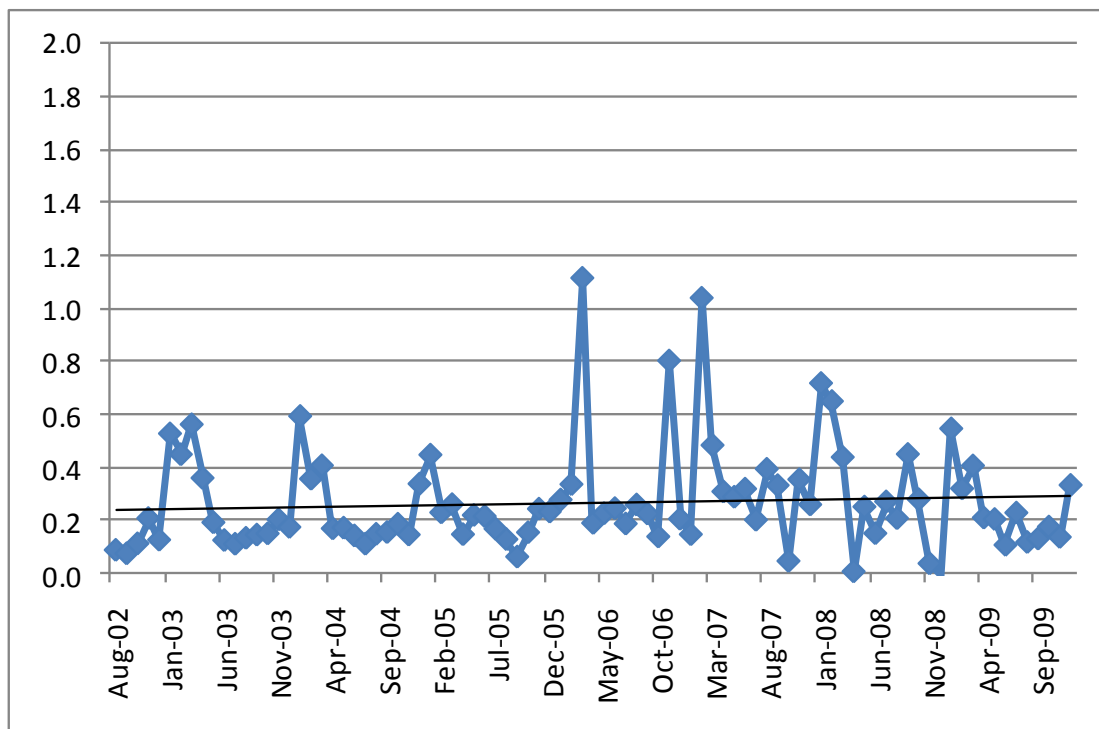
Solid black line represents a linear trend analysis of the monthly data.



Boone Creek Station was relocated during monitoring period.

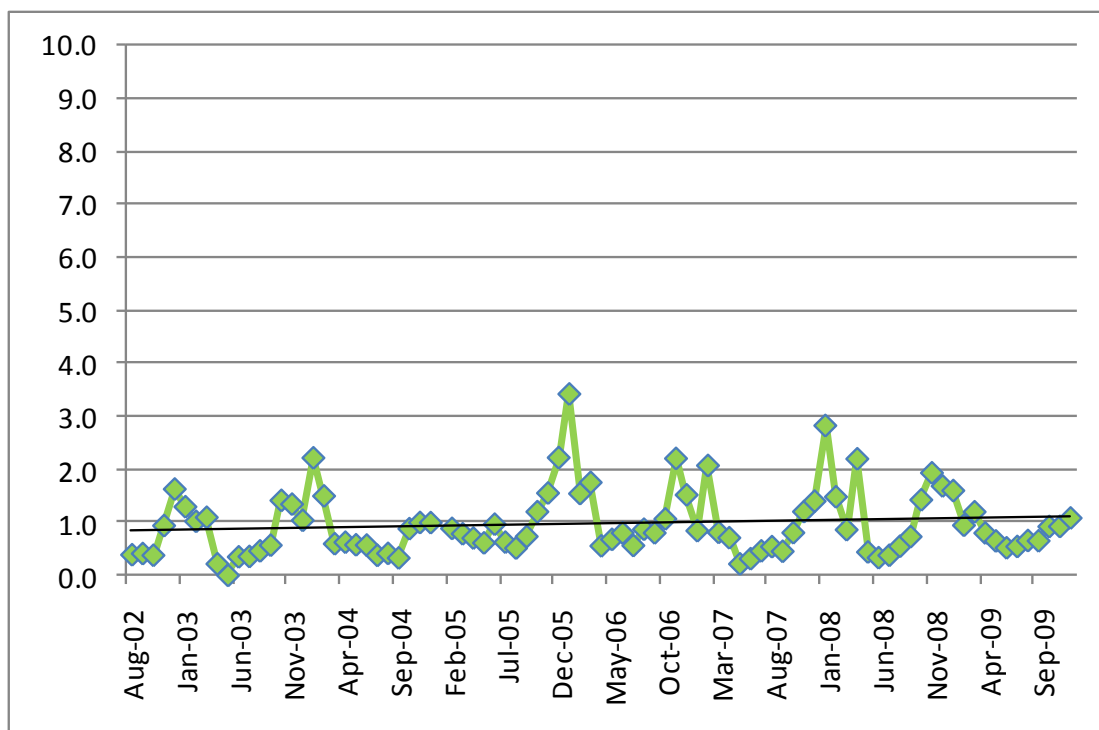
Road Map

7 Steeprock Creek



SO₂

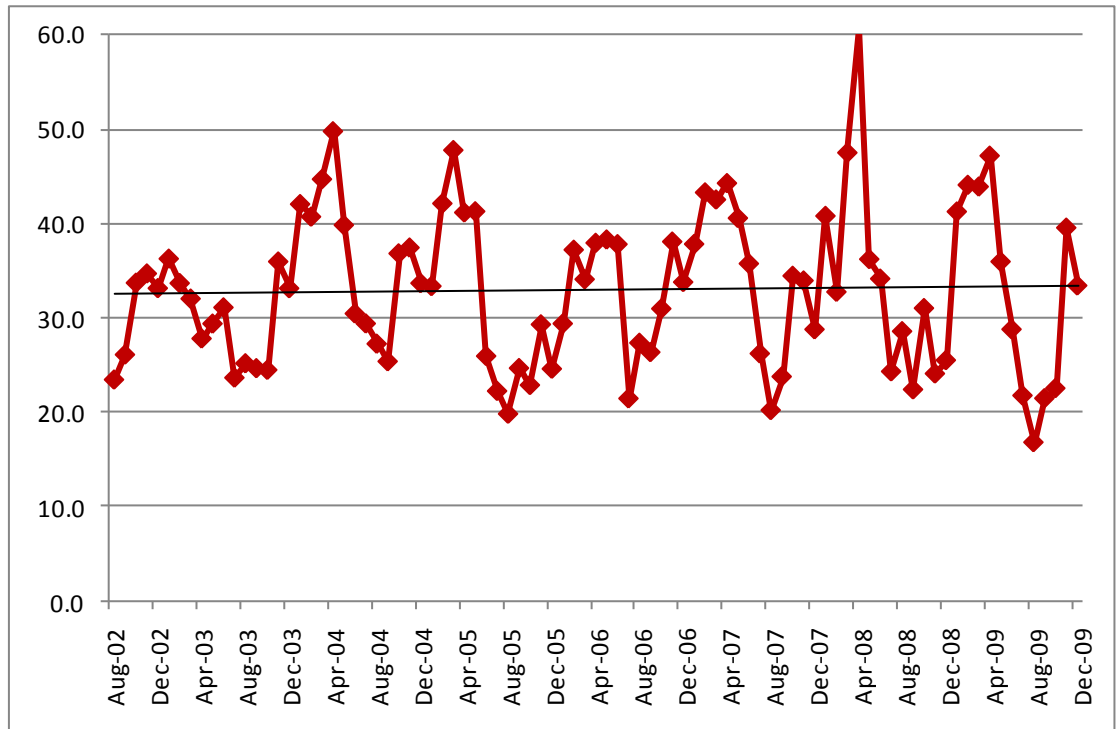
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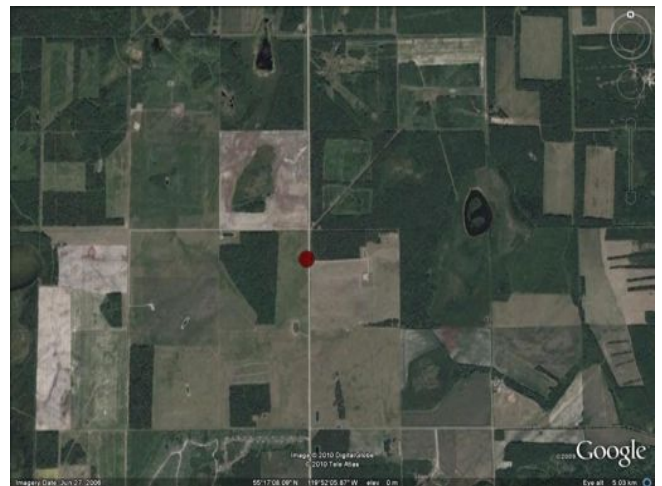
NO₂

7 Steeprock Creek

O₃

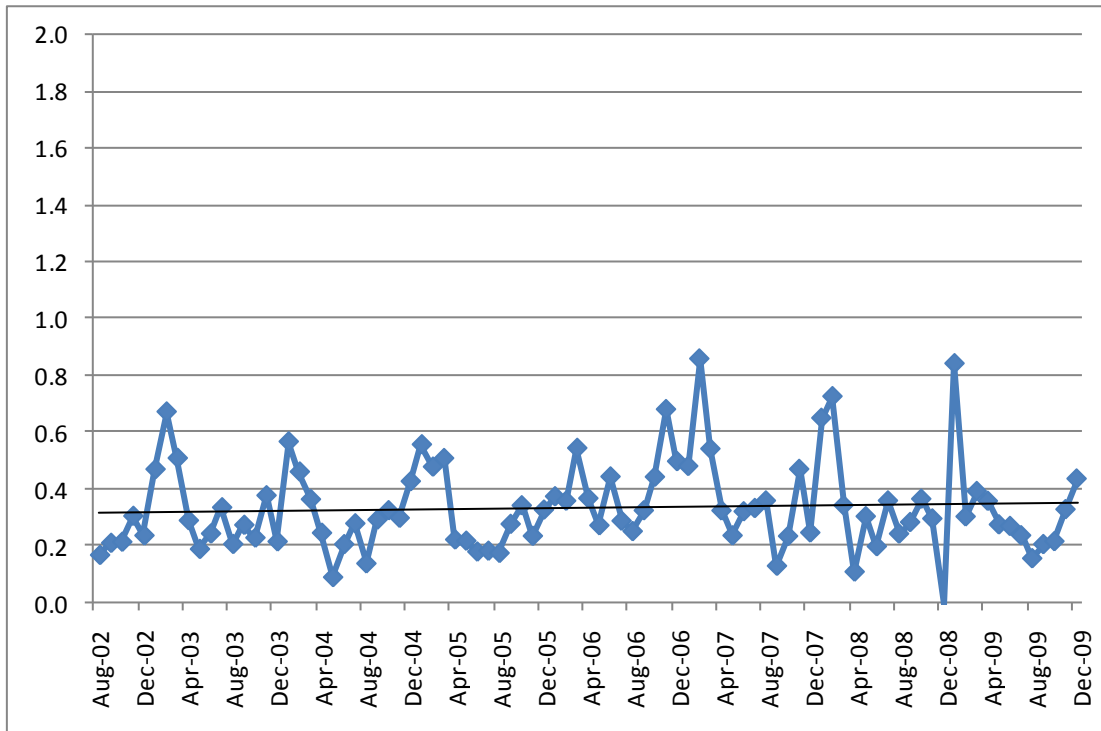


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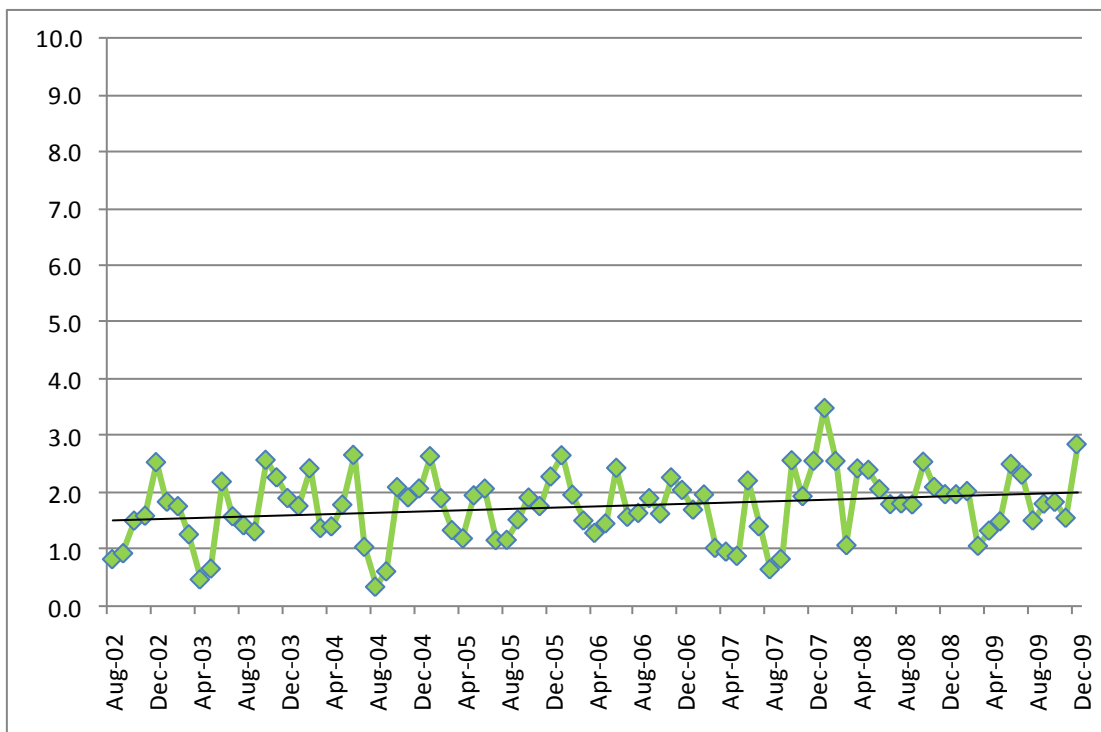
Road Map

9 Spirit River



SO₂

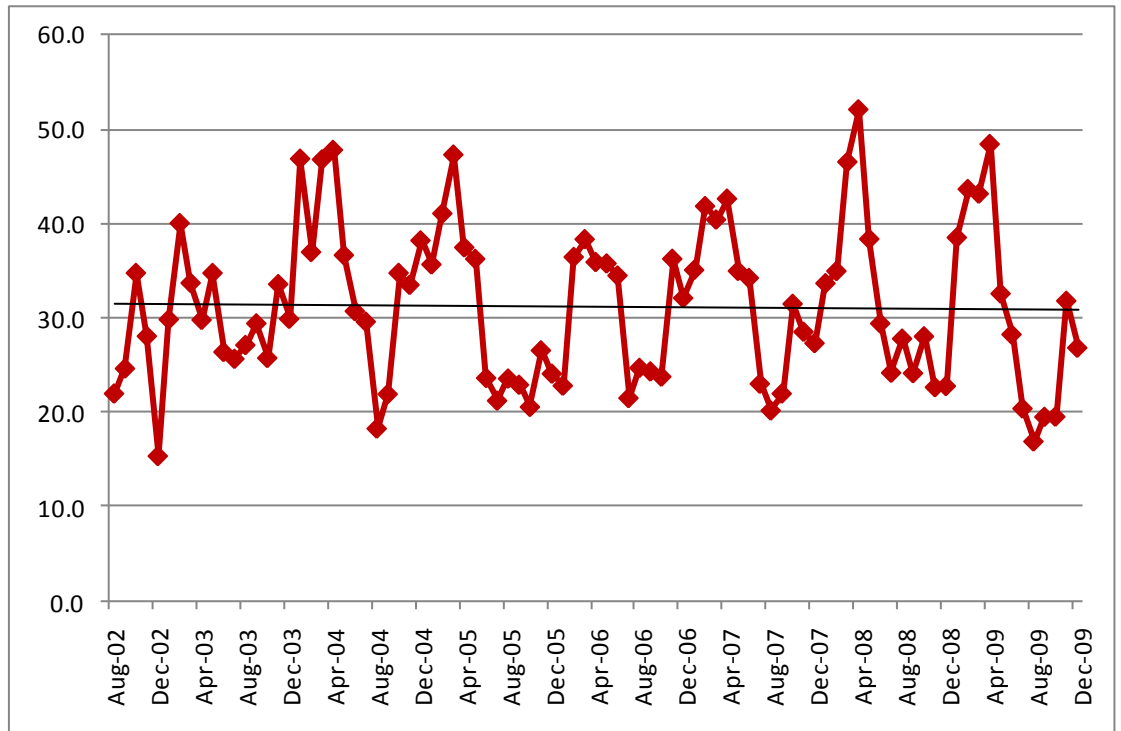
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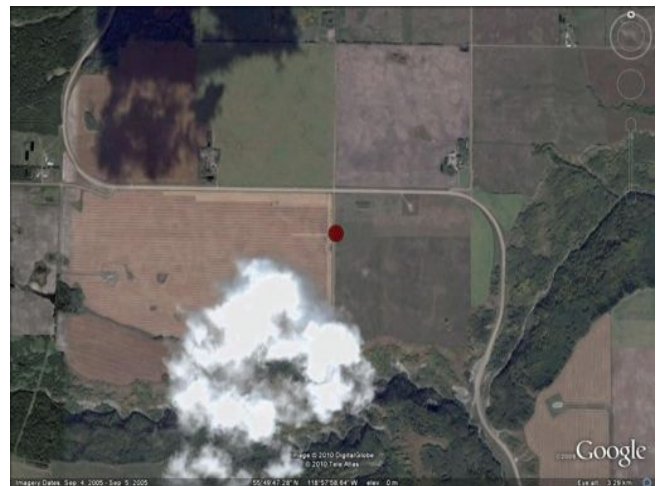
NO₂

9 Spirit River

O₃

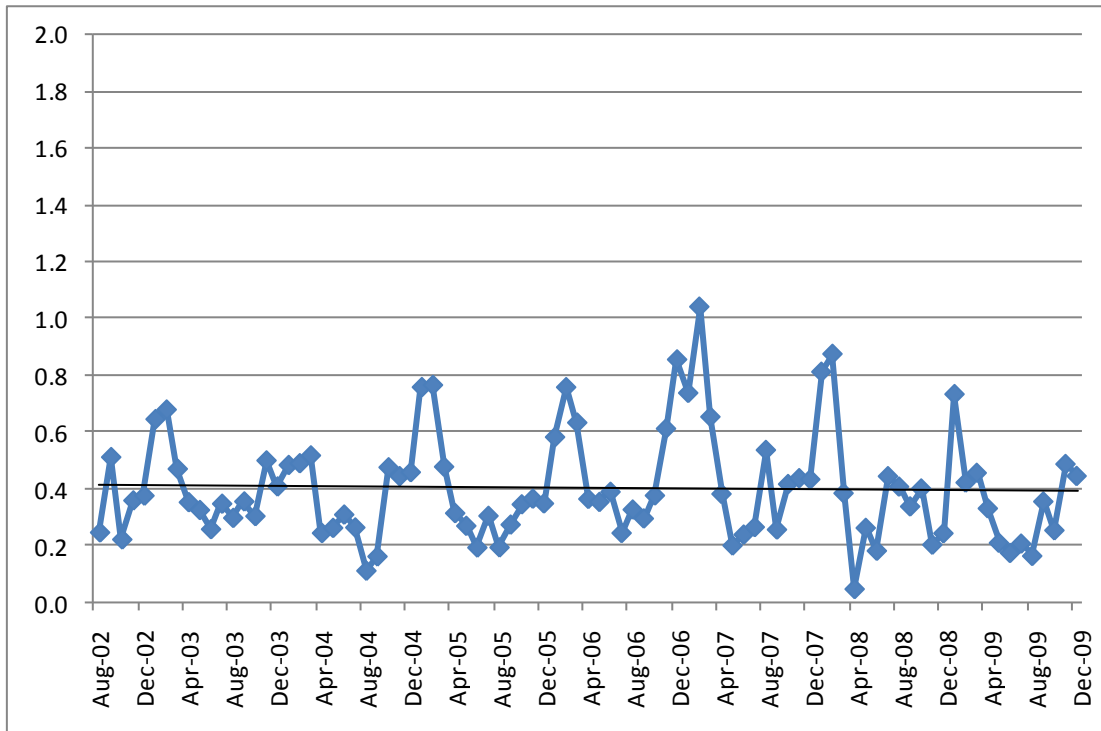


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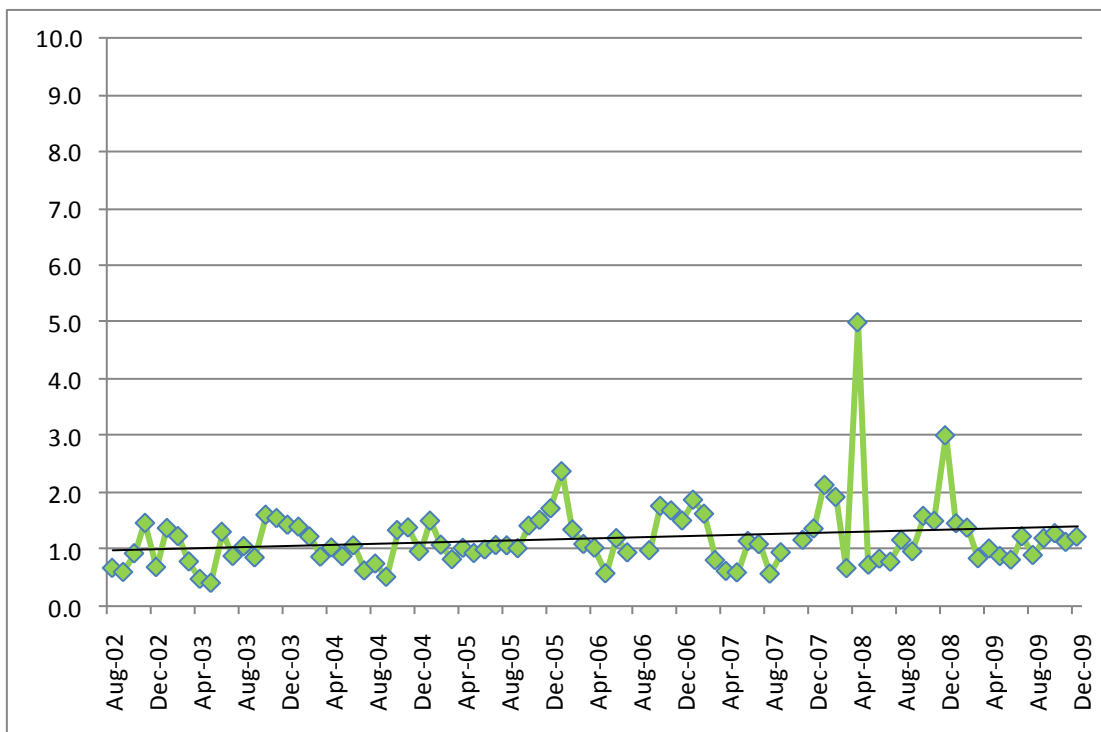
Road Map

10 Woking



SO₂

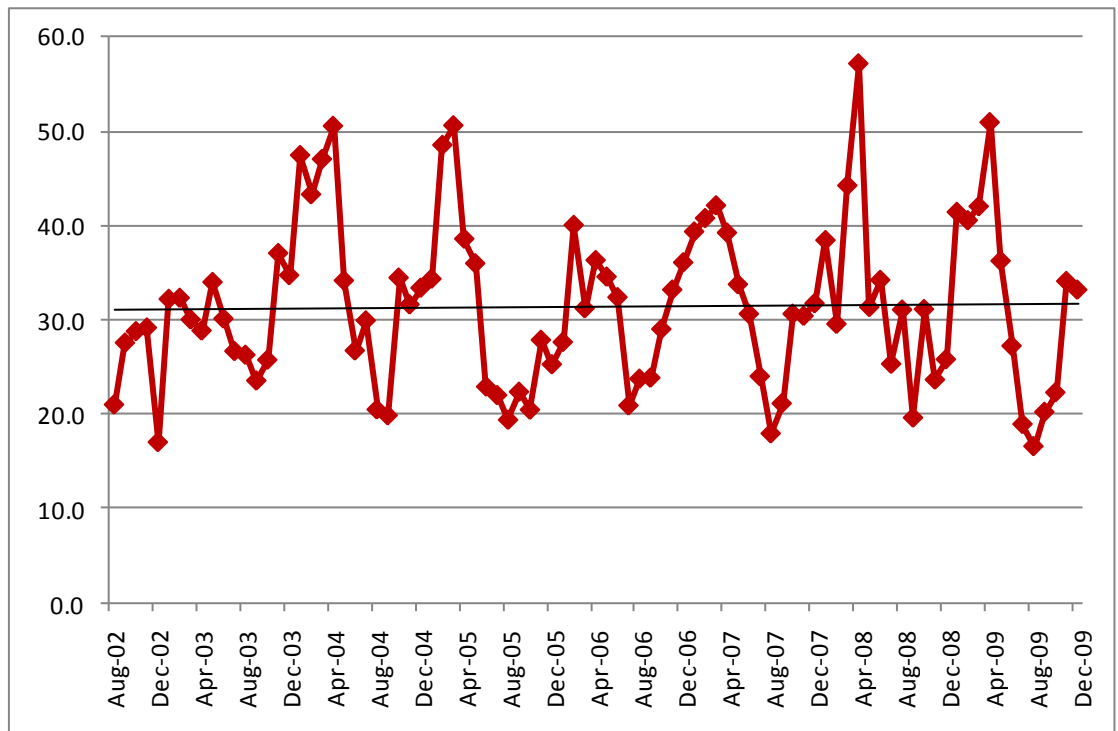
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NO₂

10 Woking

O₃

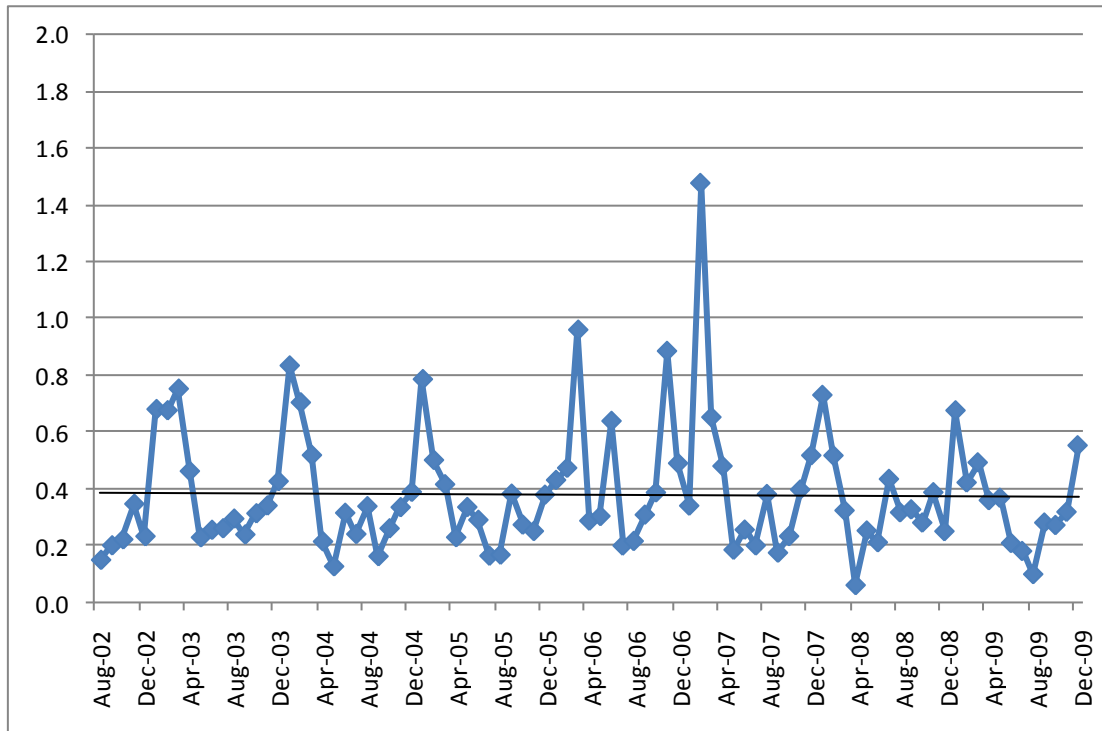


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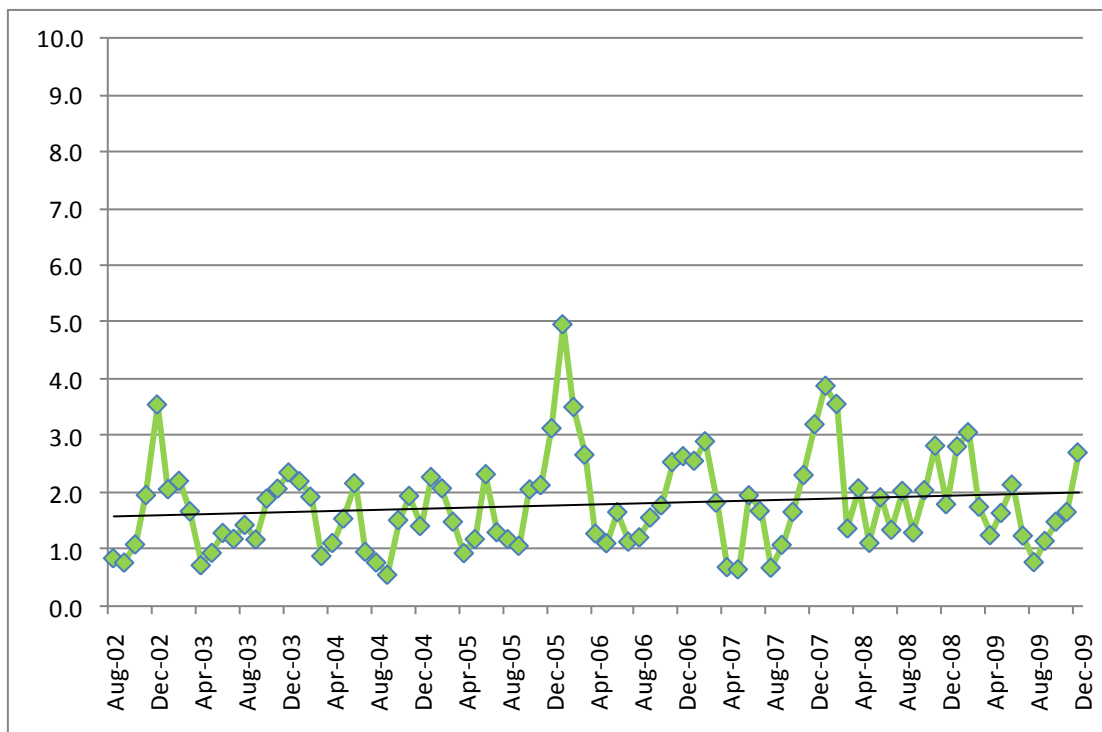
Road Map

11 Webber Creek



SO₂

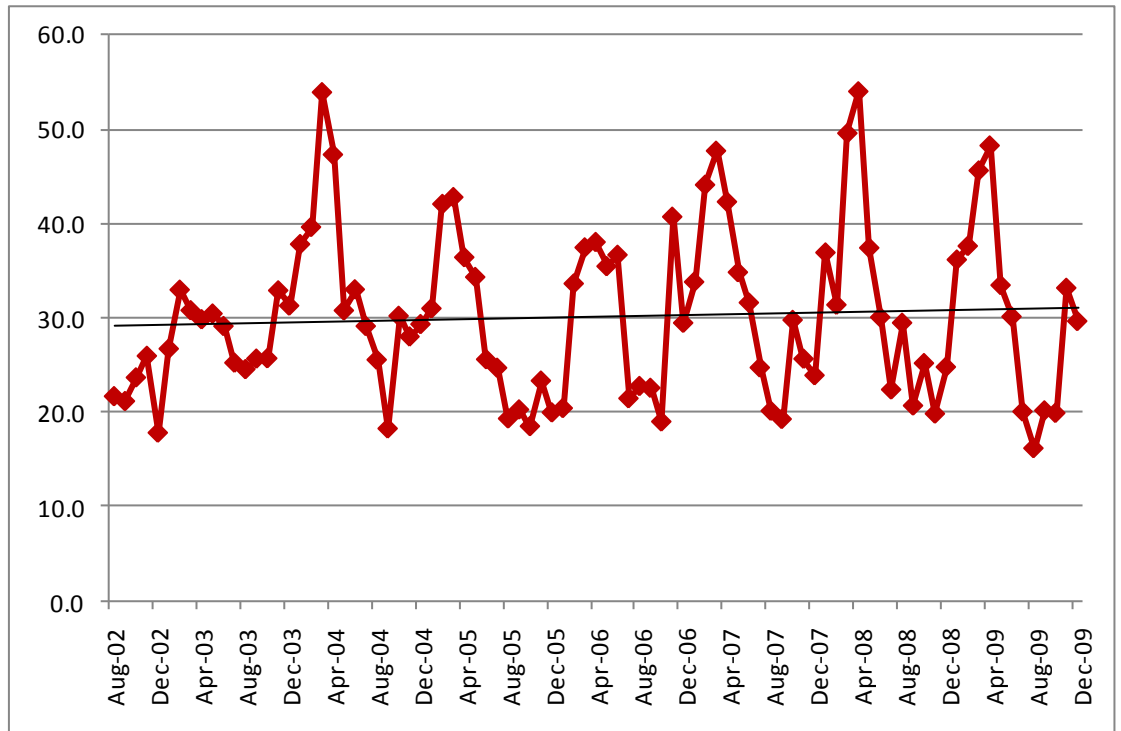
Solid black line represents a linear trend analysis of the monthly data.



NO₂

11 Webber Creek

O₃

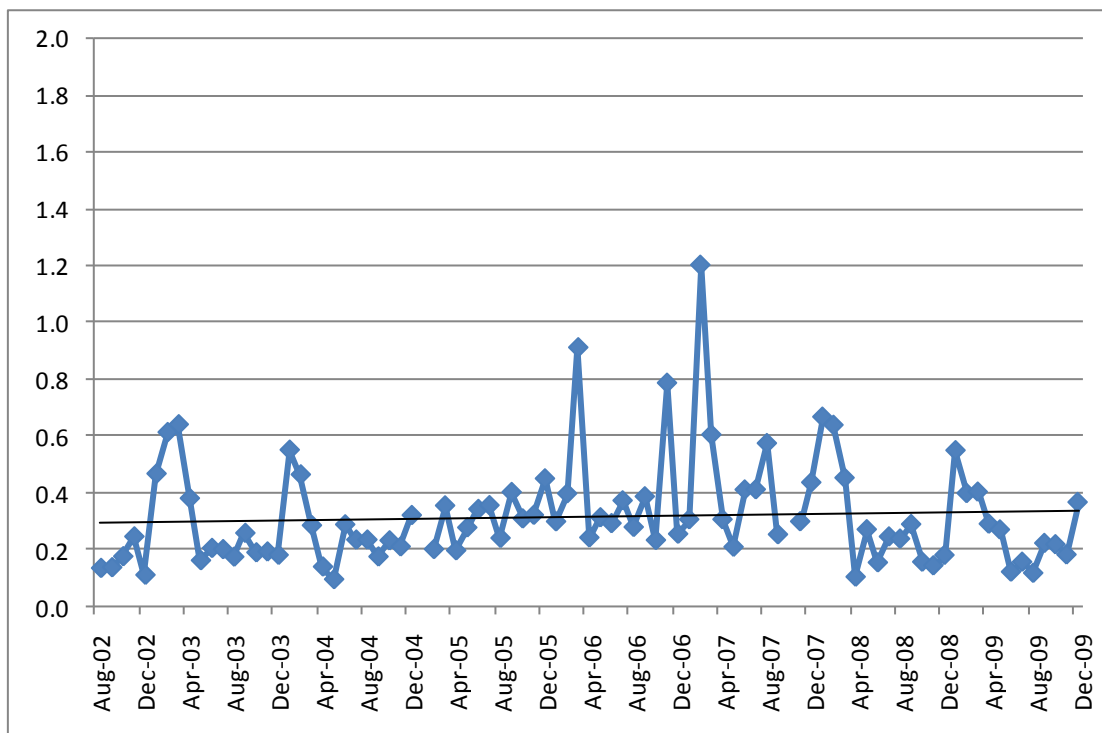


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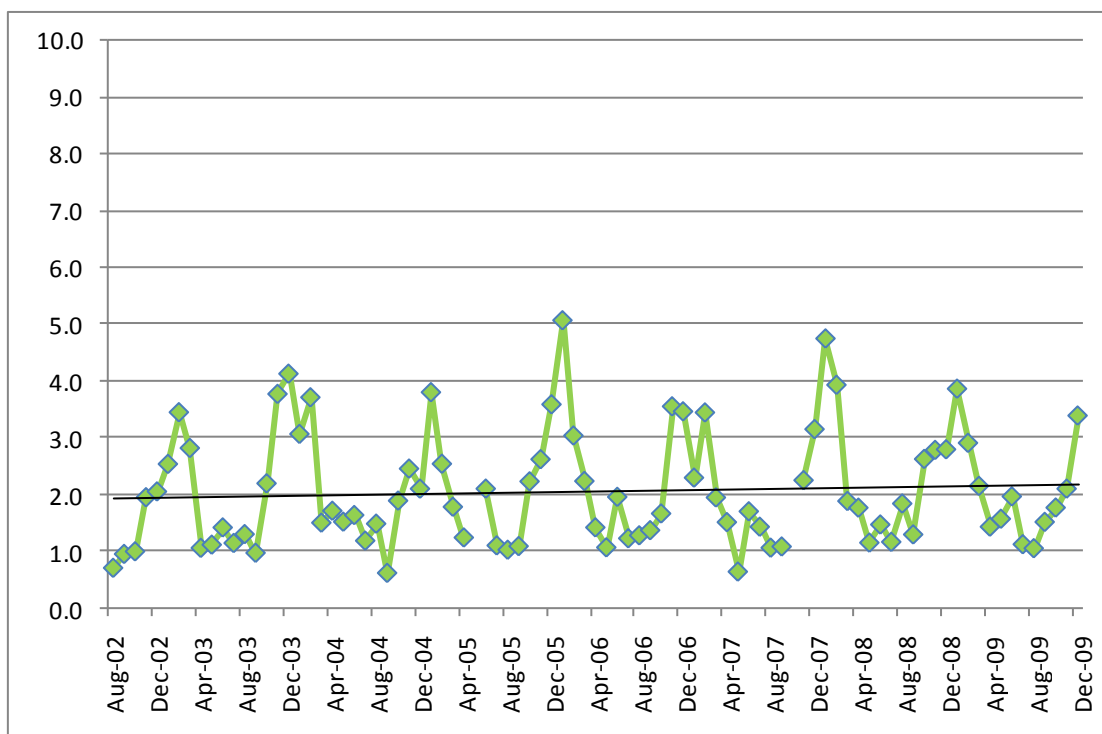
Road Map

12 Hythe



SO₂

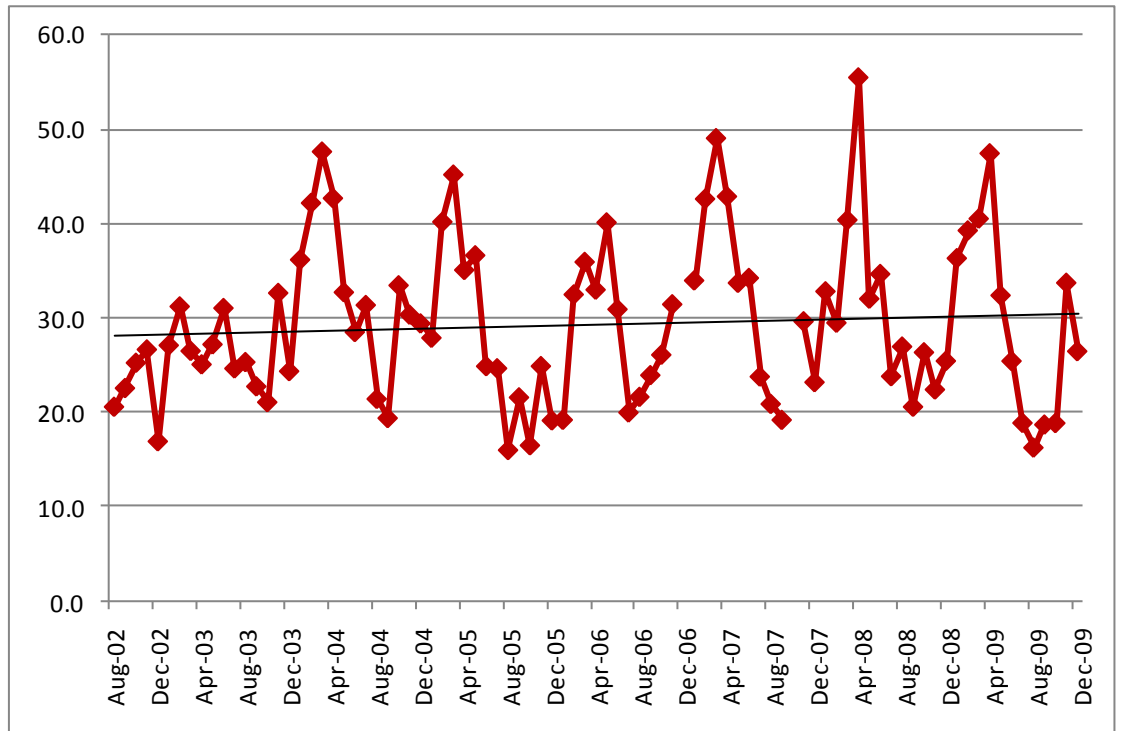
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NO₂

12 Hythe

O₃

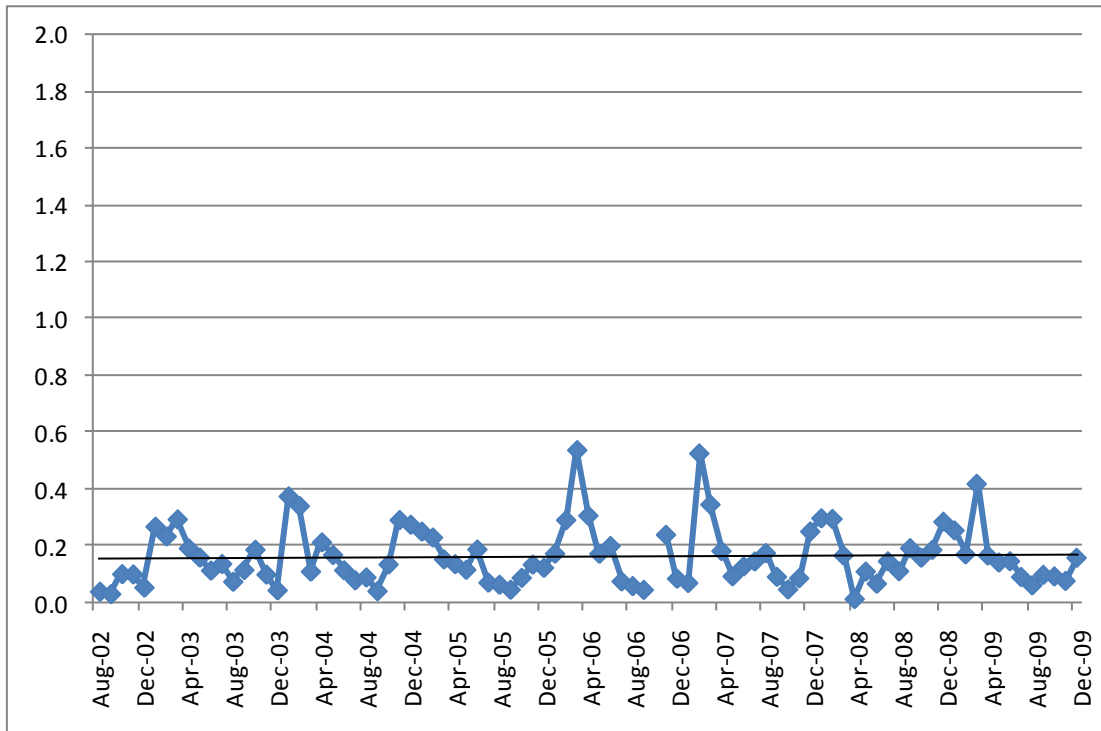


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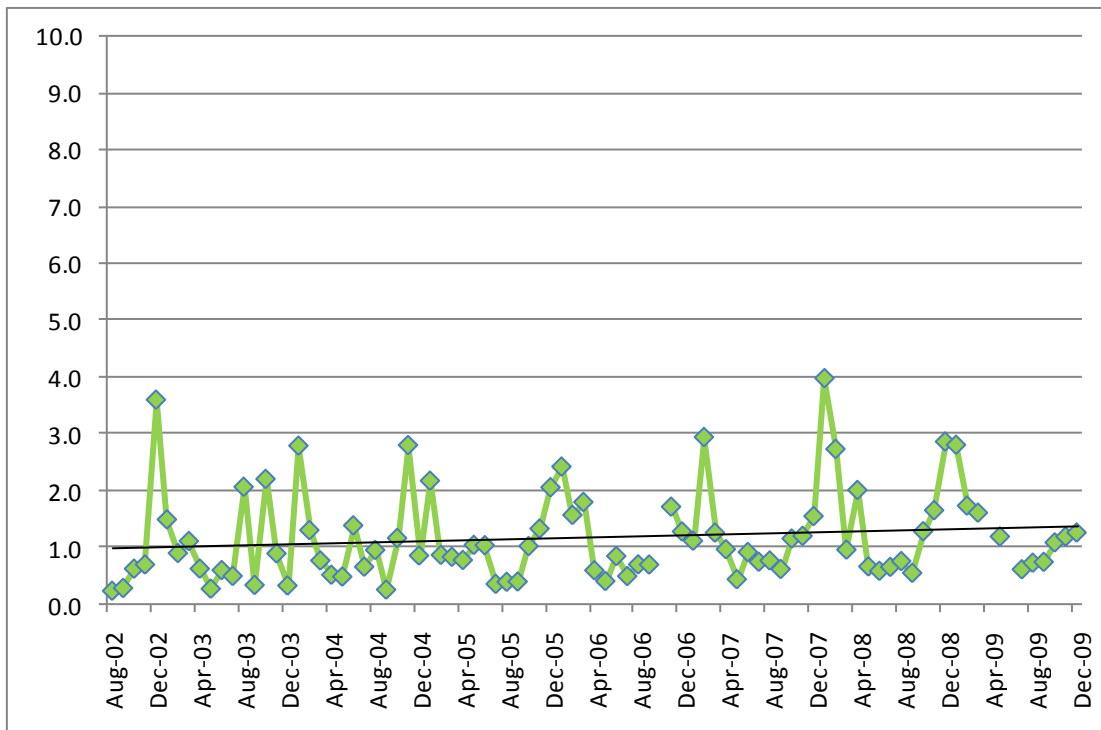
Road Map

14 Sylvester



SO₂

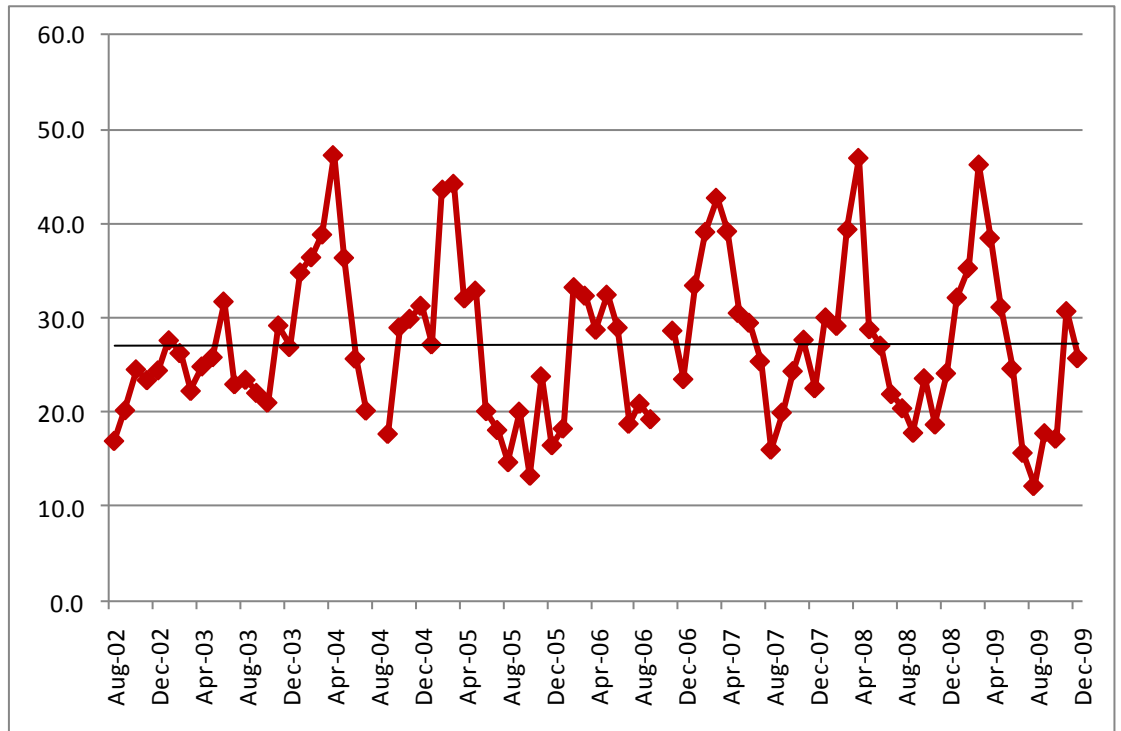
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NO₂

14 Sylvester

O₃

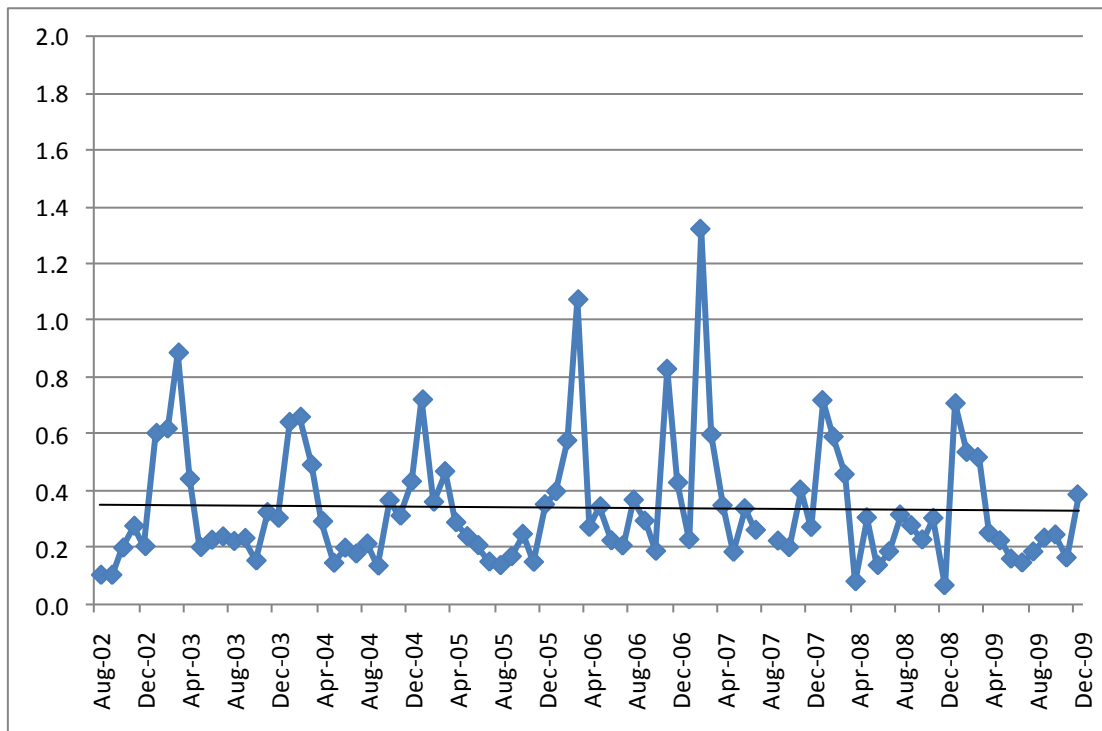


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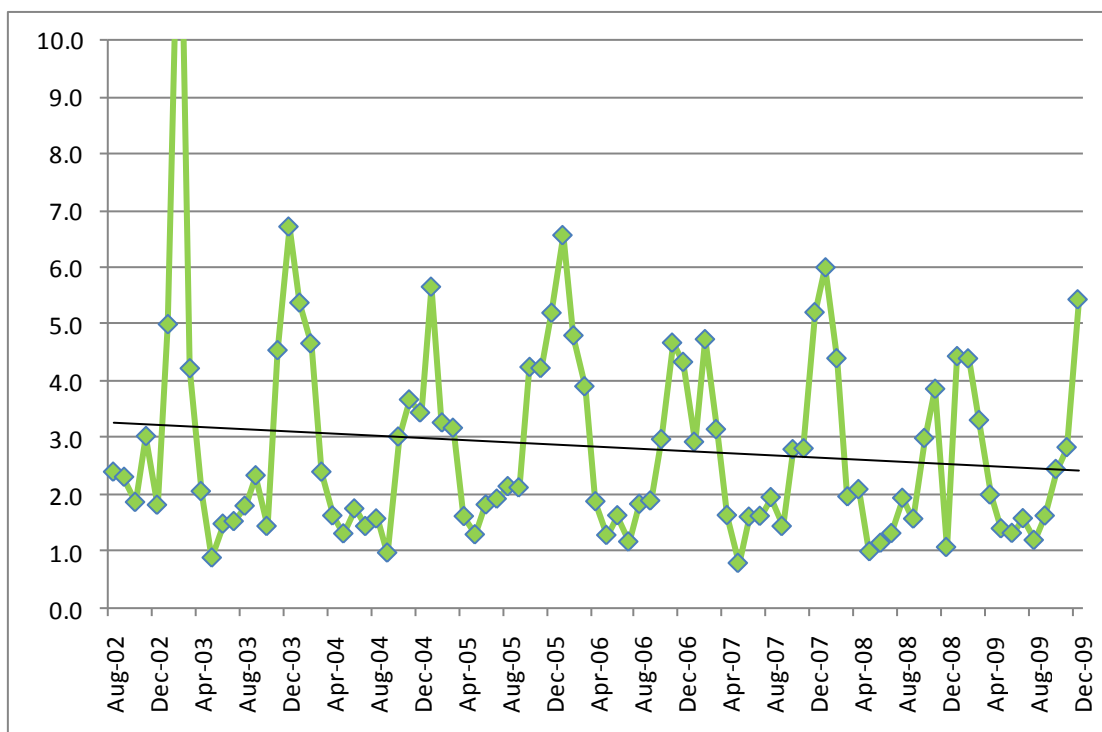
Road Map

16 Beaverlodge



SO₂

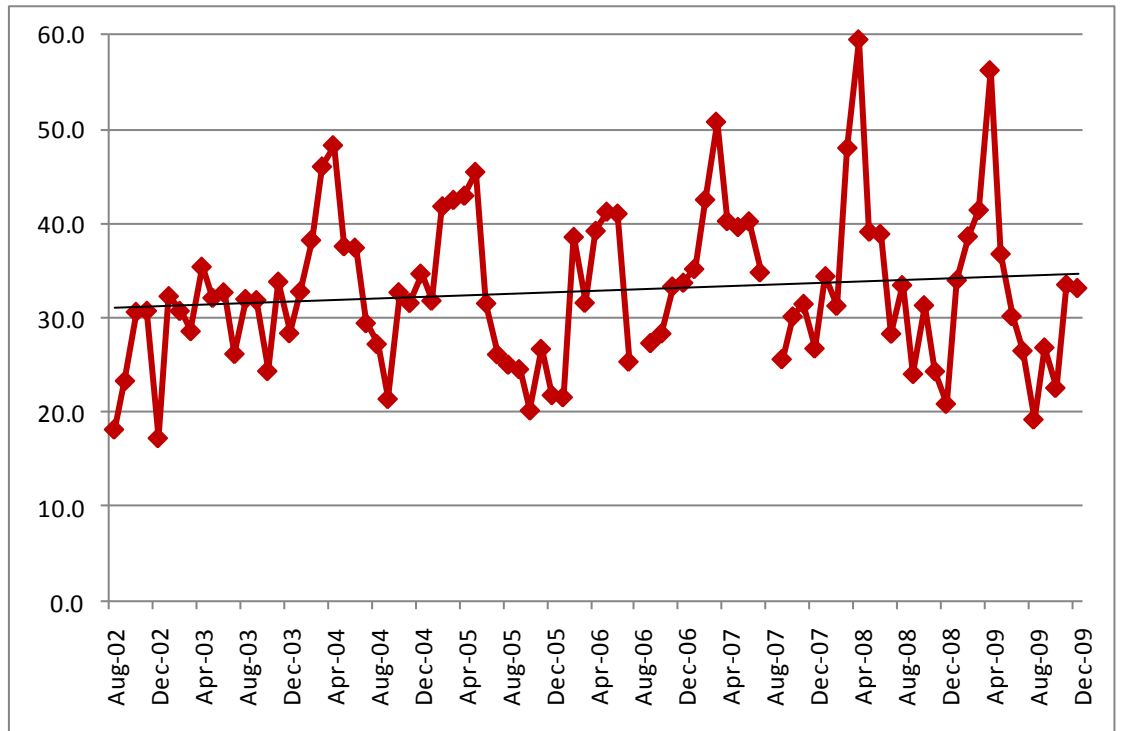
Solid black line represents a linear trend analysis of the monthly data.



NO₂

16 Beaverlodge

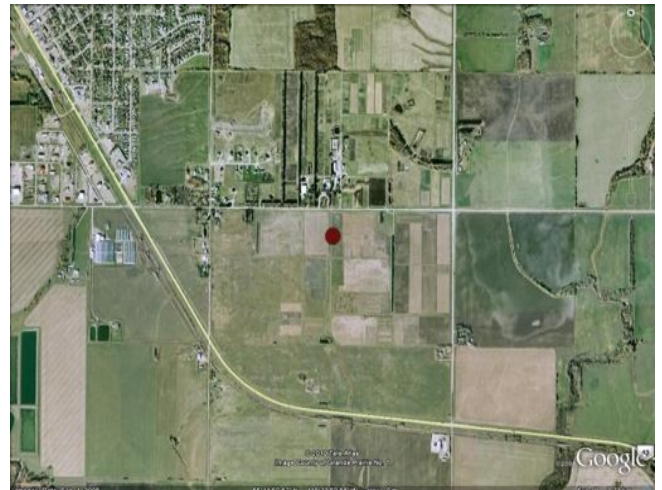
O₃



Solid black line represents a linear trend analysis of the monthly data.

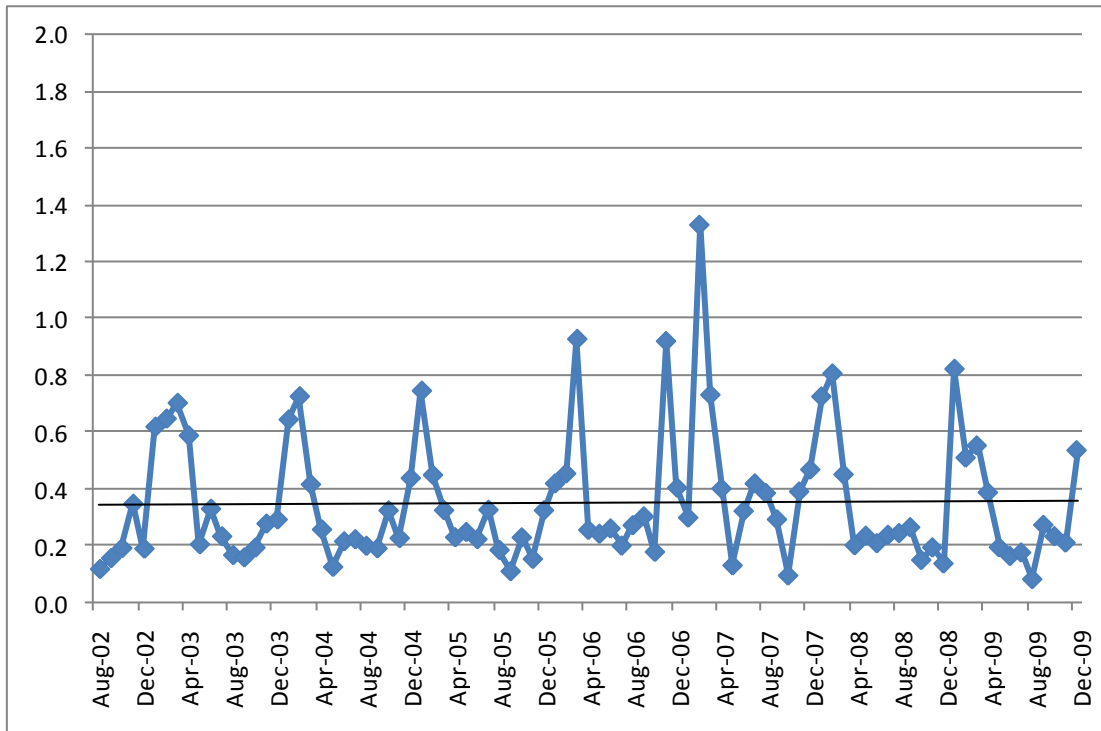


Beaverlodge Station was relocated during monitoring period.



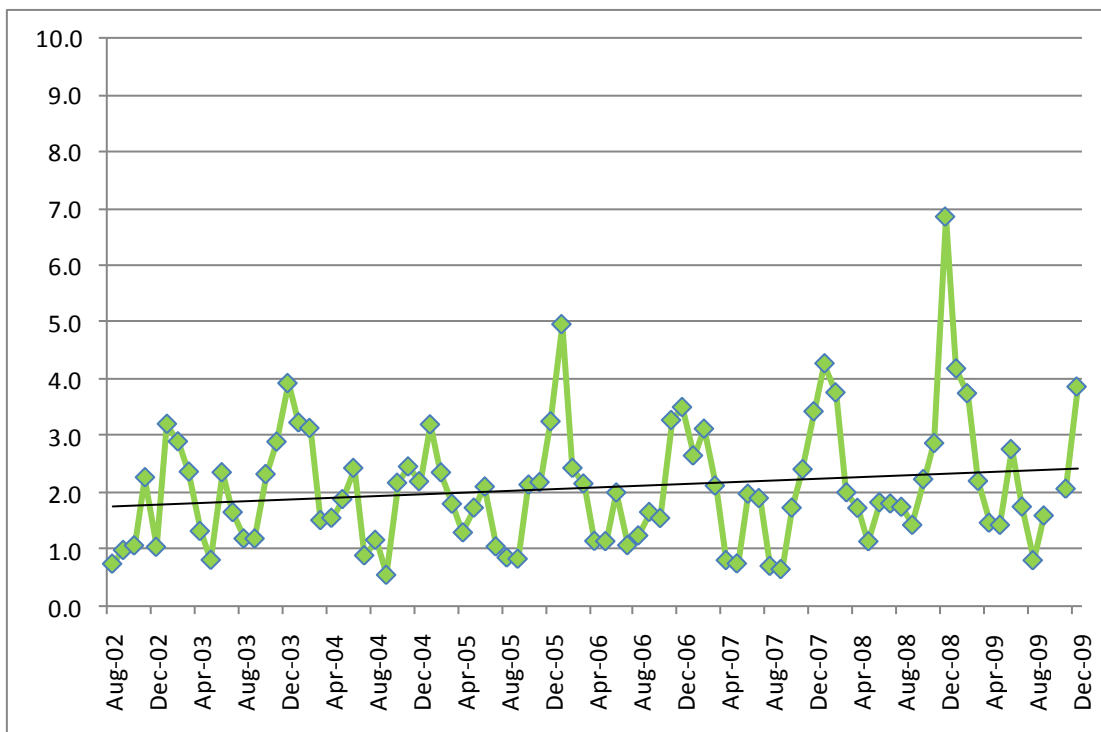
Road Map

17 Poplar



SO₂

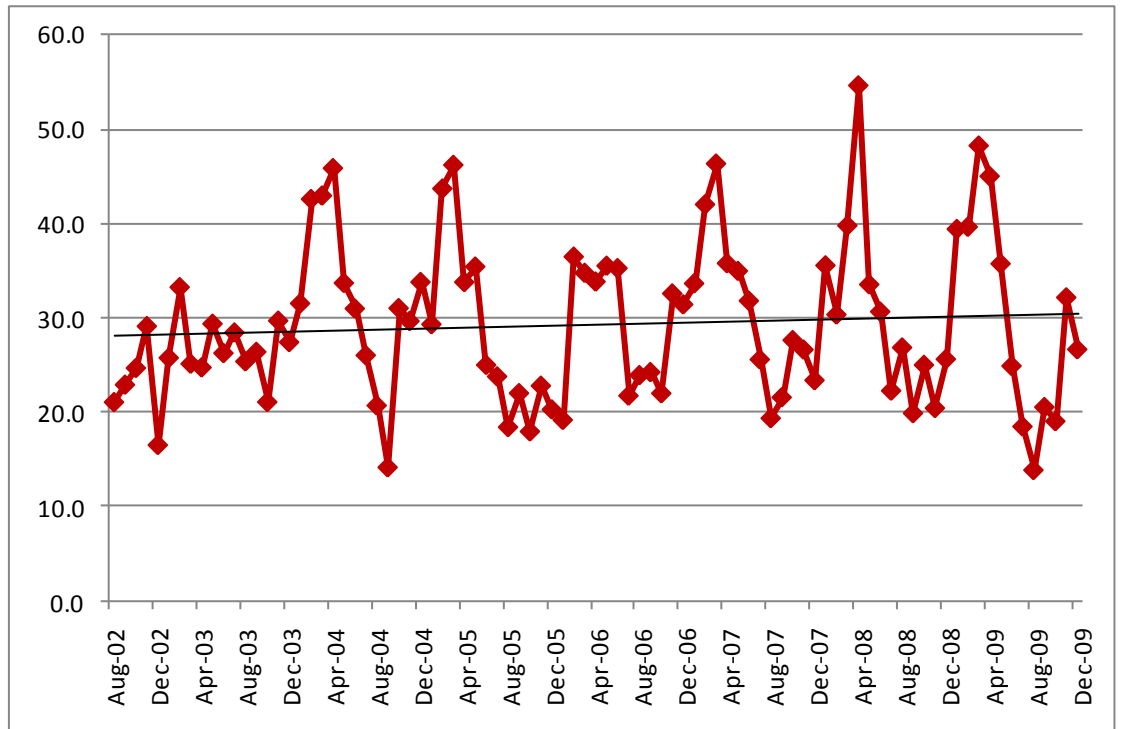
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NO₂

17 Poplar

O₃

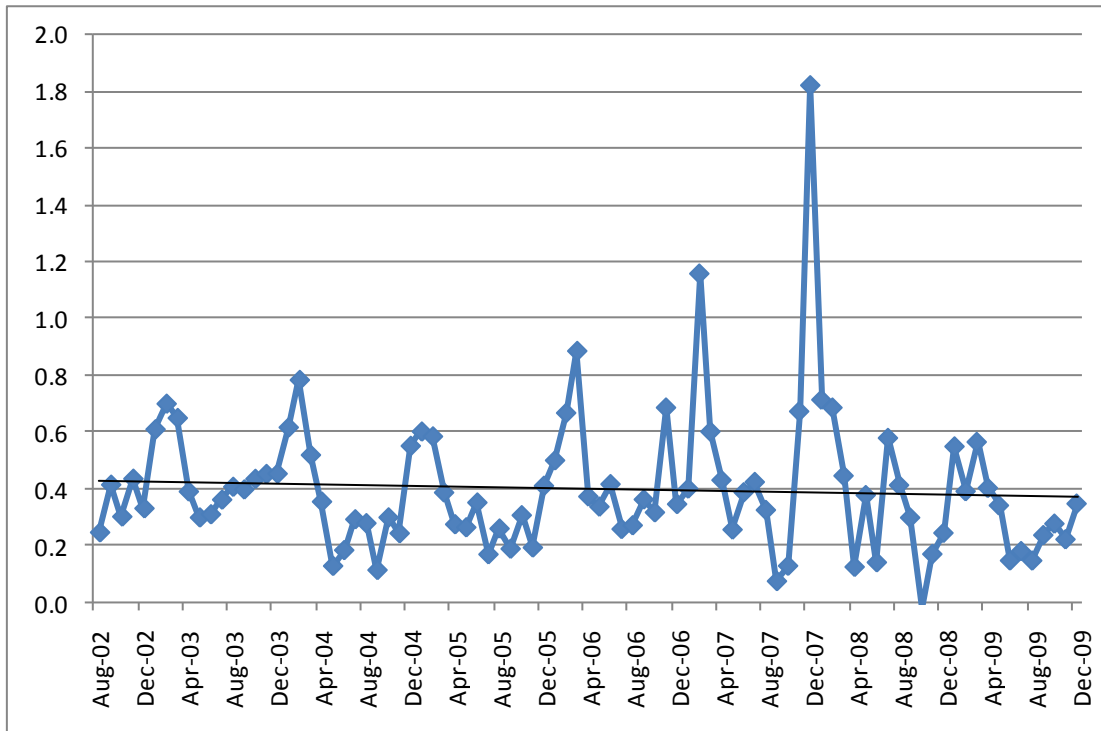


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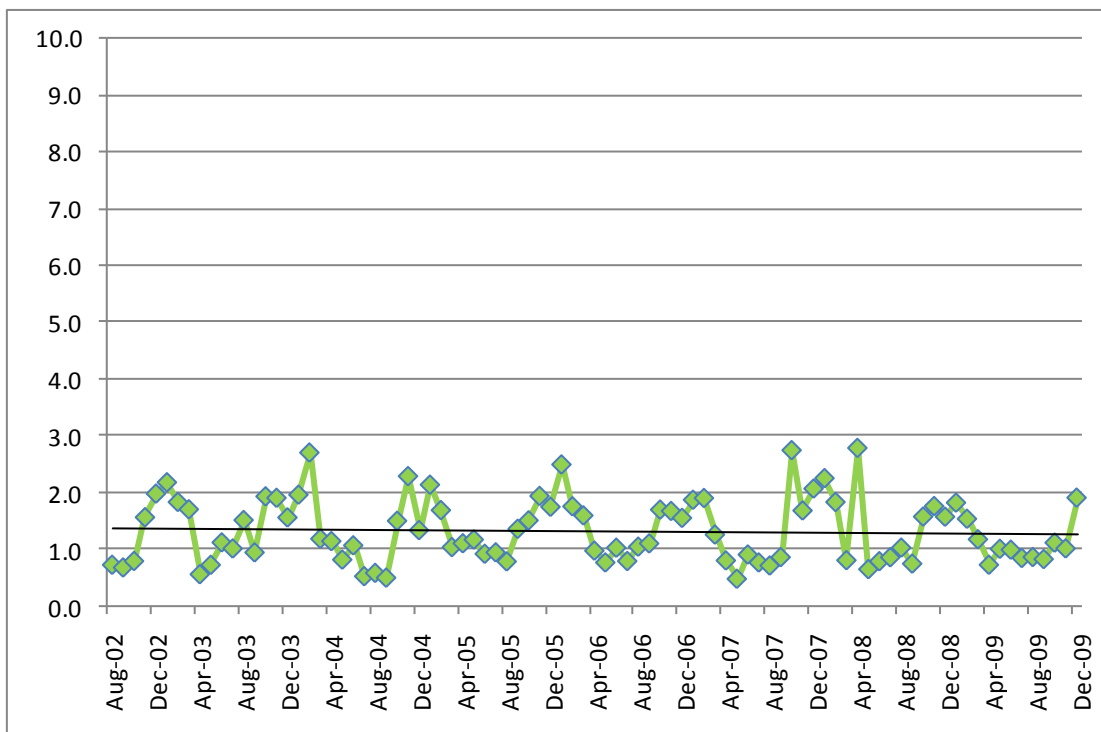
Road Map

18 Saddle Hills



SO₂

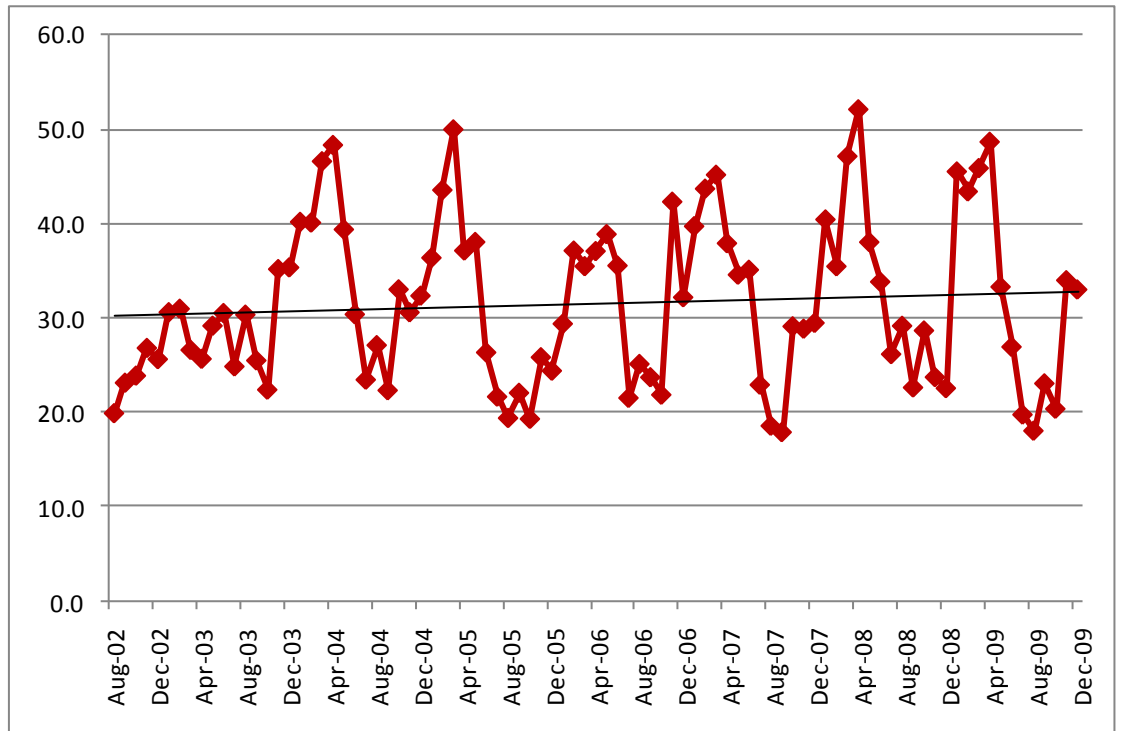
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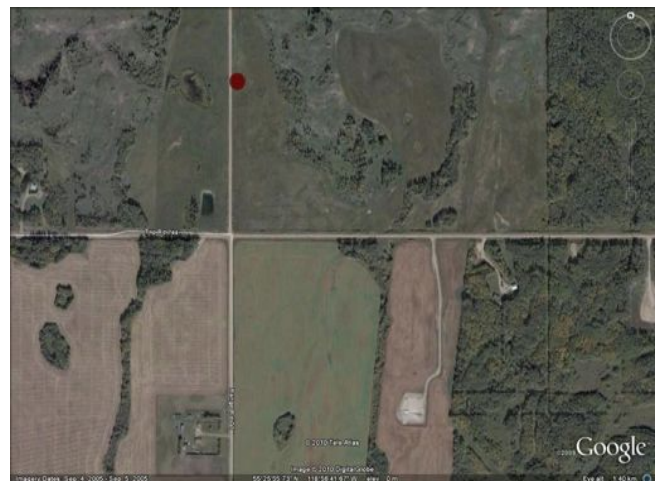
NO₂

18 Saddle Hills

O₃

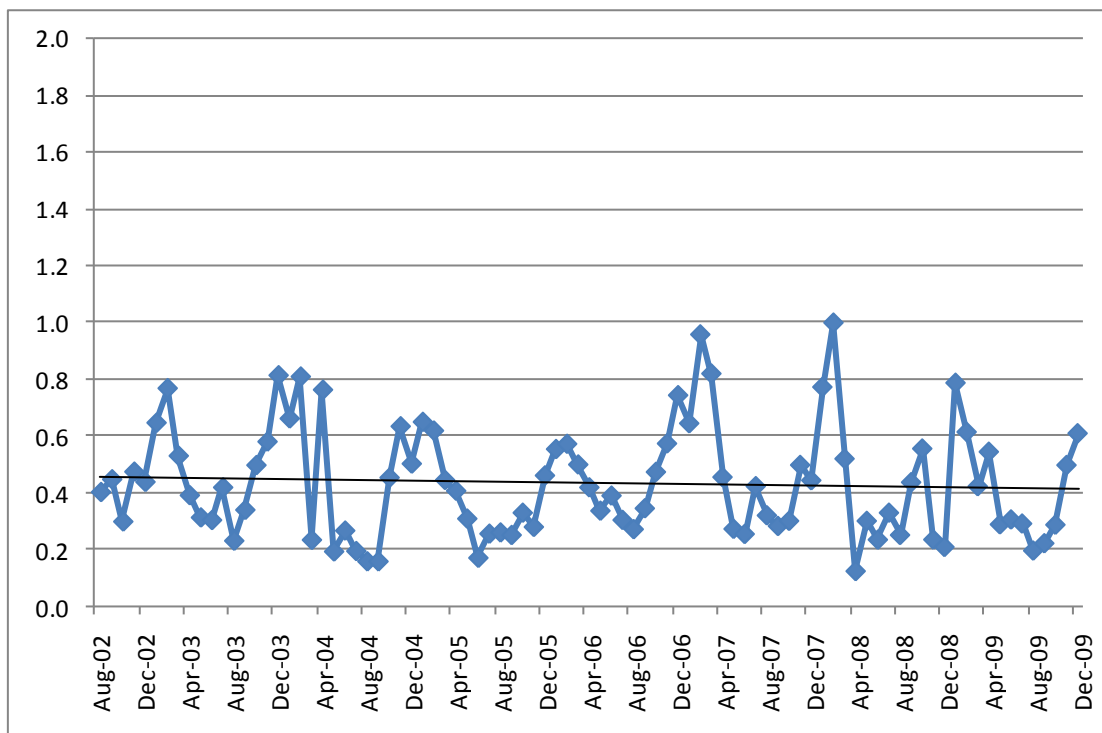


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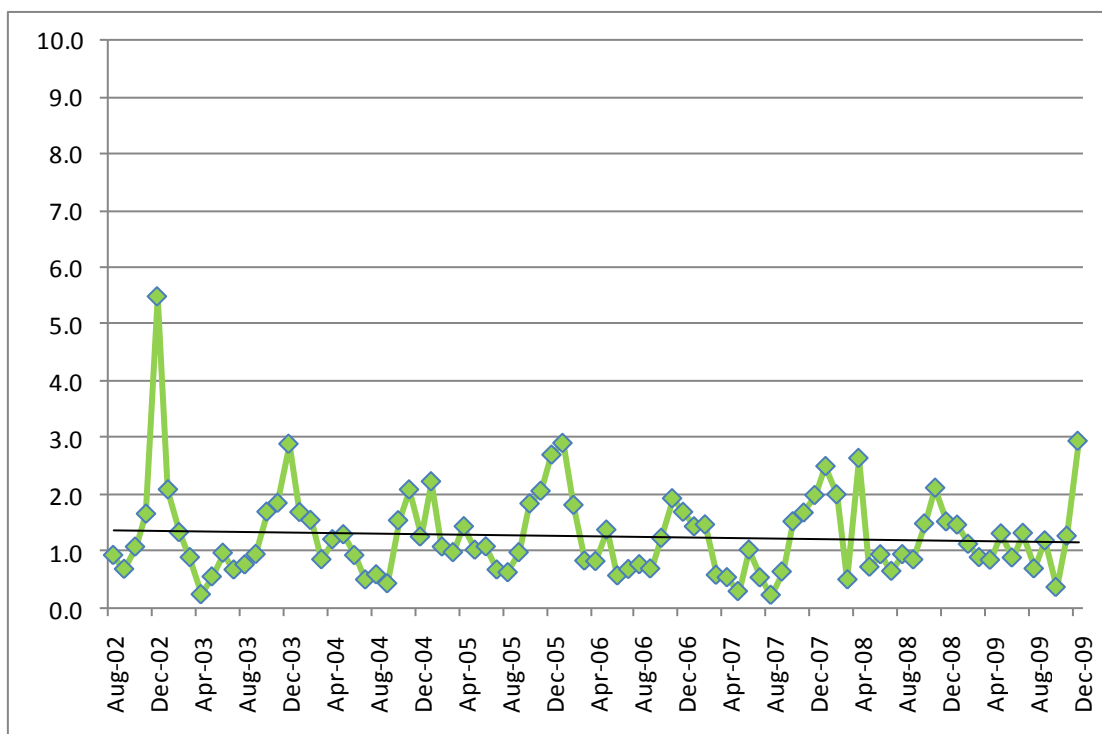
Road Map

19 Wanham



SO₂

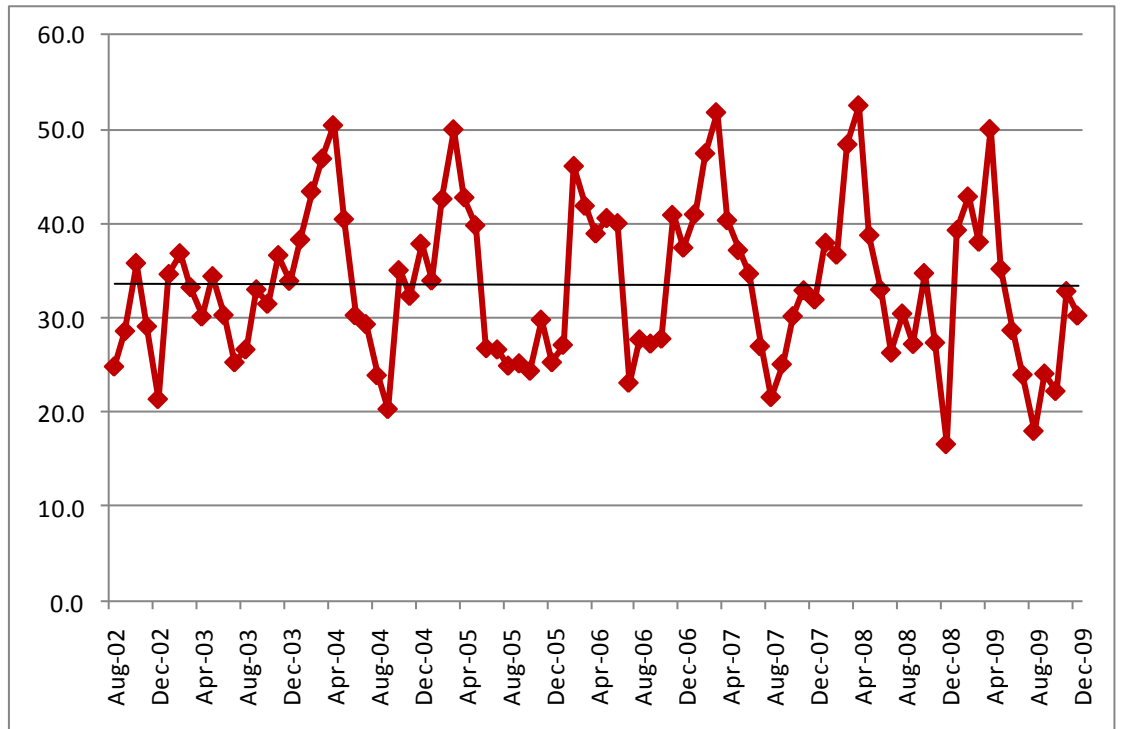
Solid black line represents a linear trend analysis of the monthly data.



NO₂

19 Wanham

O₃

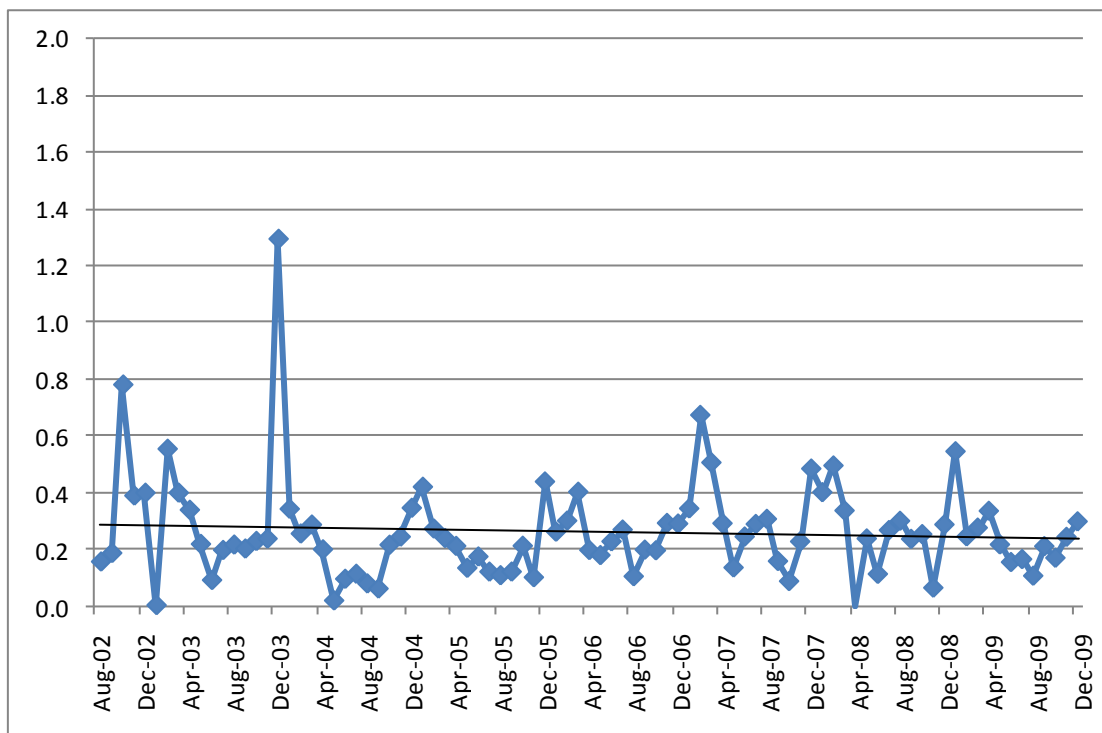


Solid black line represents a linear trend analysis of the monthly data.



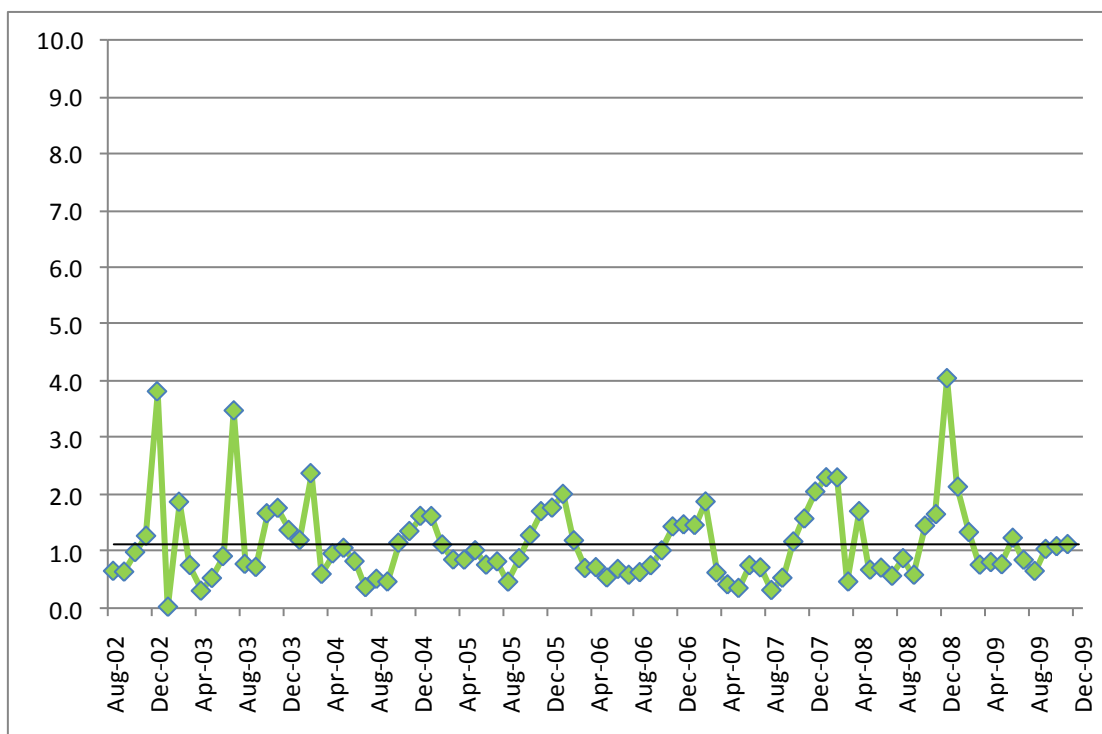
Road Map

20 Shaftesbury



SO₂

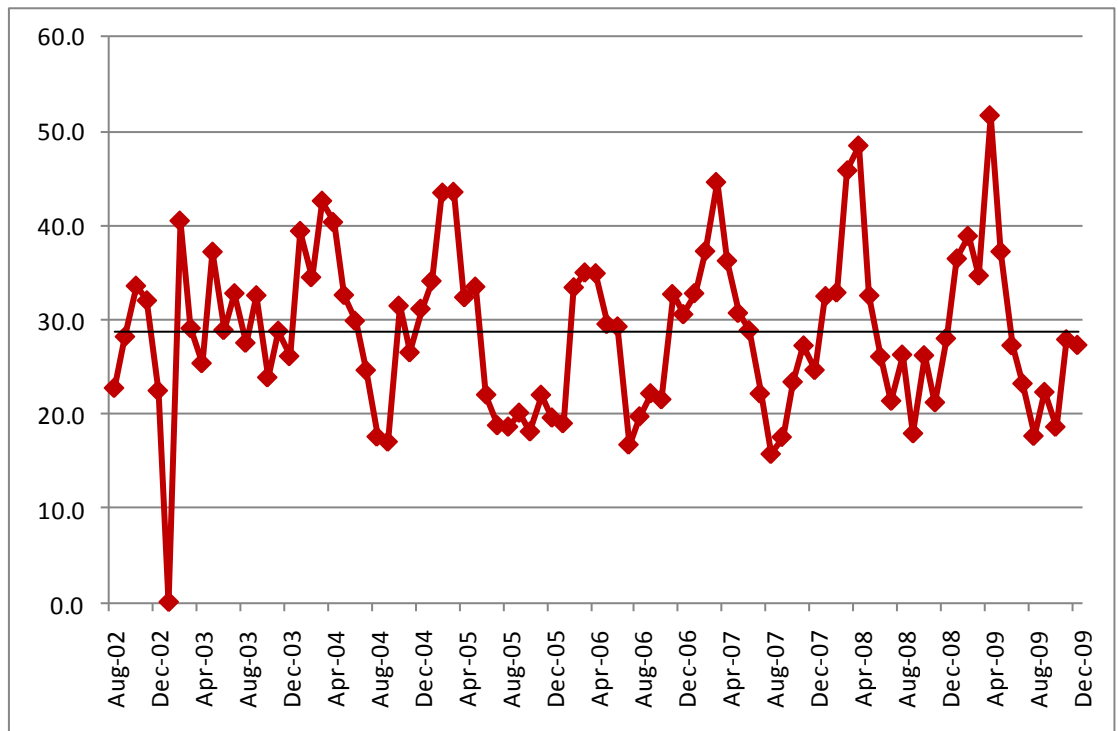
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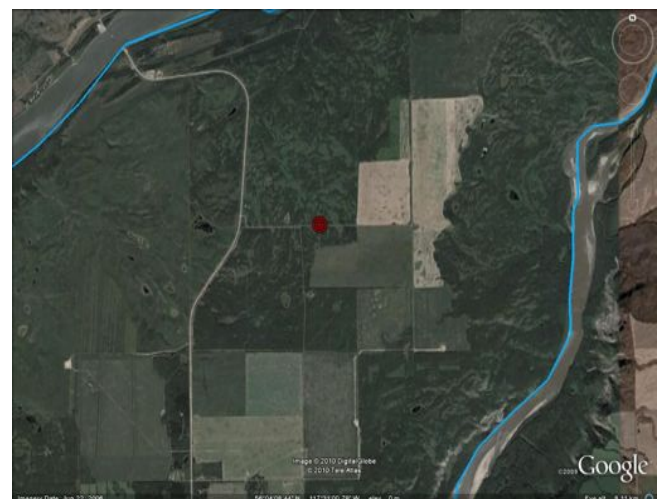
NO₂

20 Shaftesbury

O₃

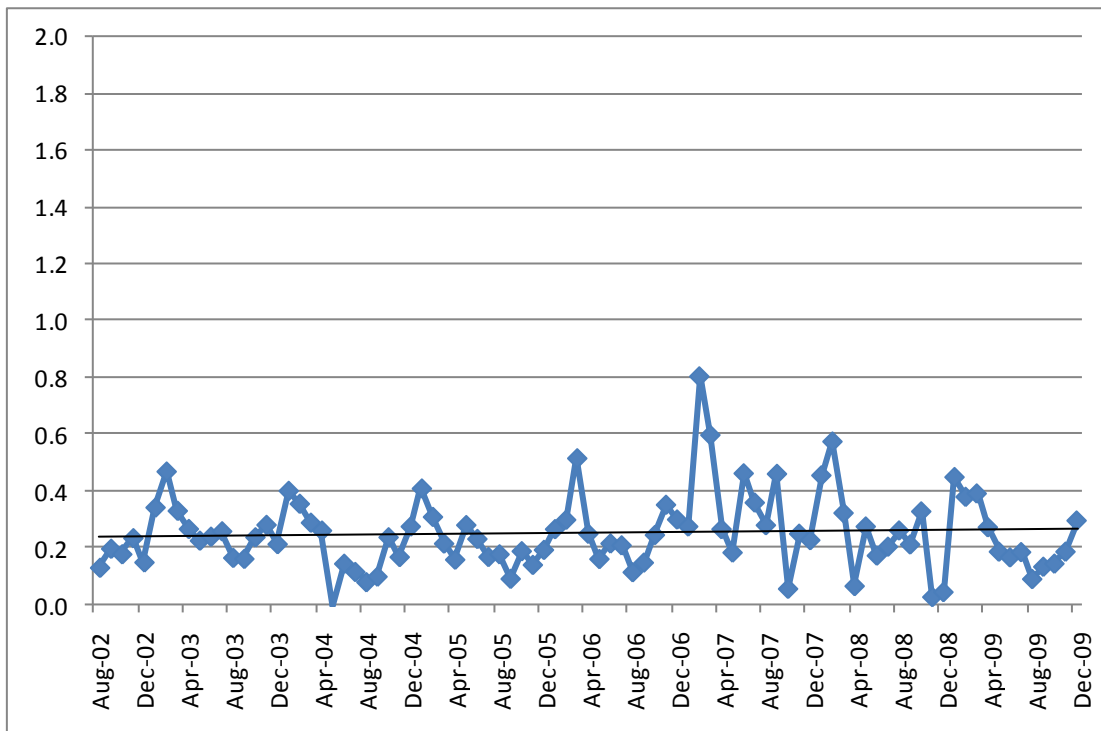


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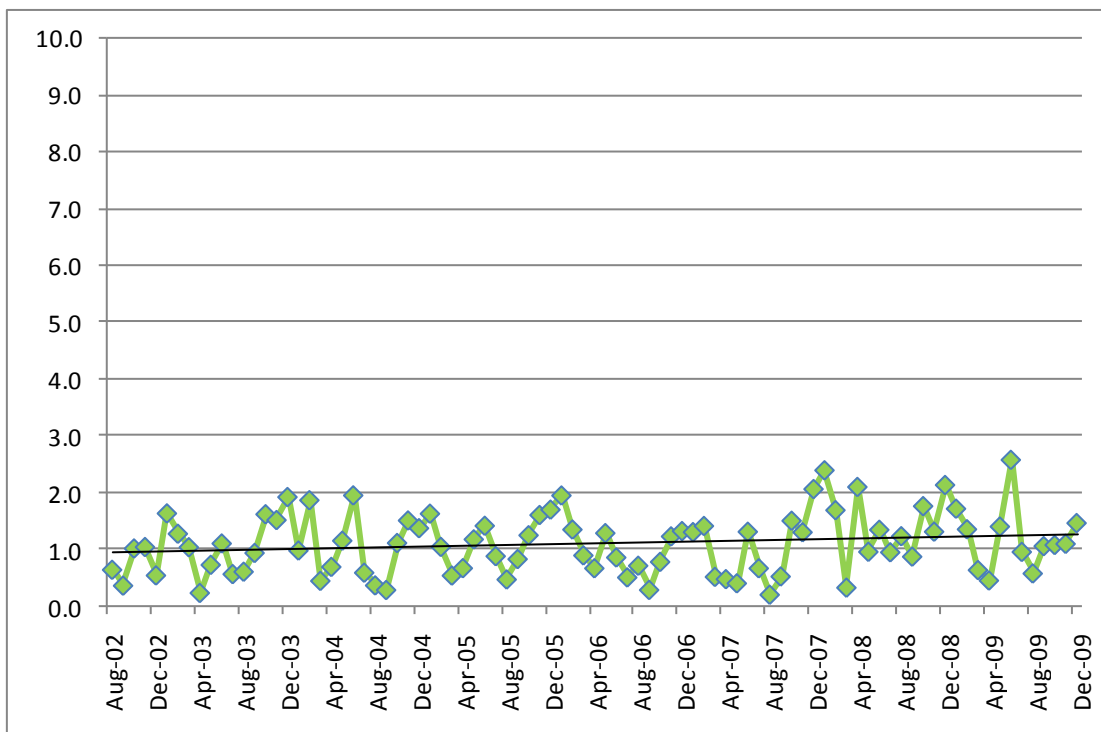
Road Map

21 Eaglesham



SO₂

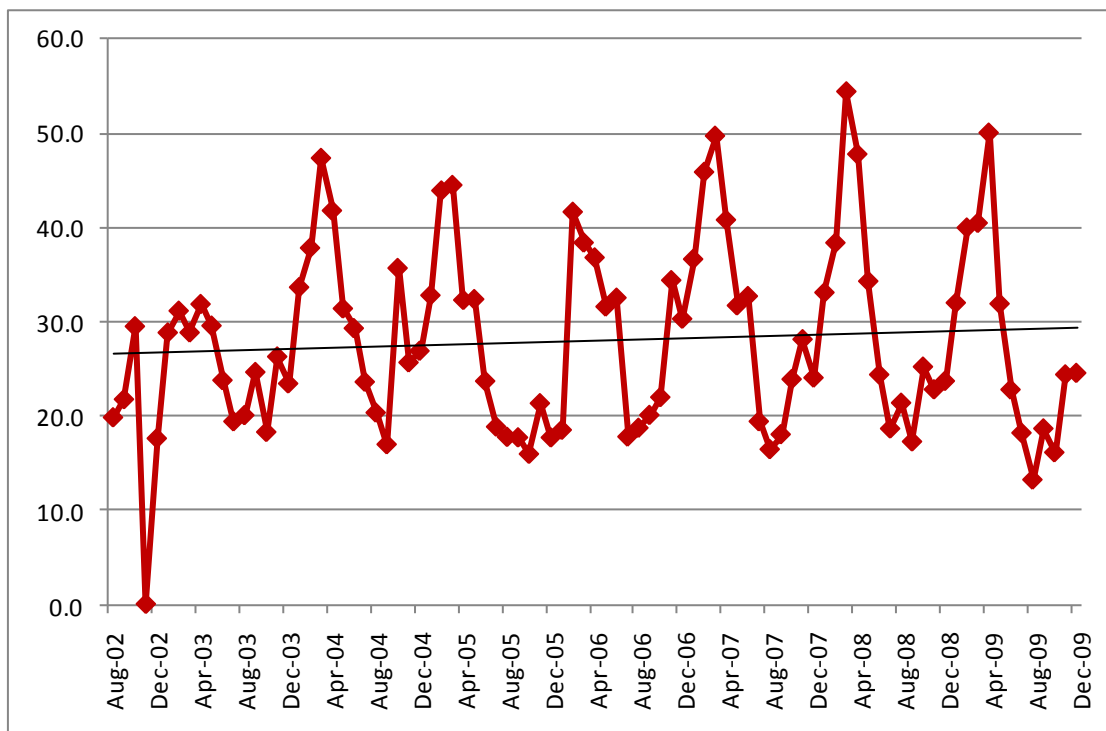
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NO₂

21 Eaglesham

O₃

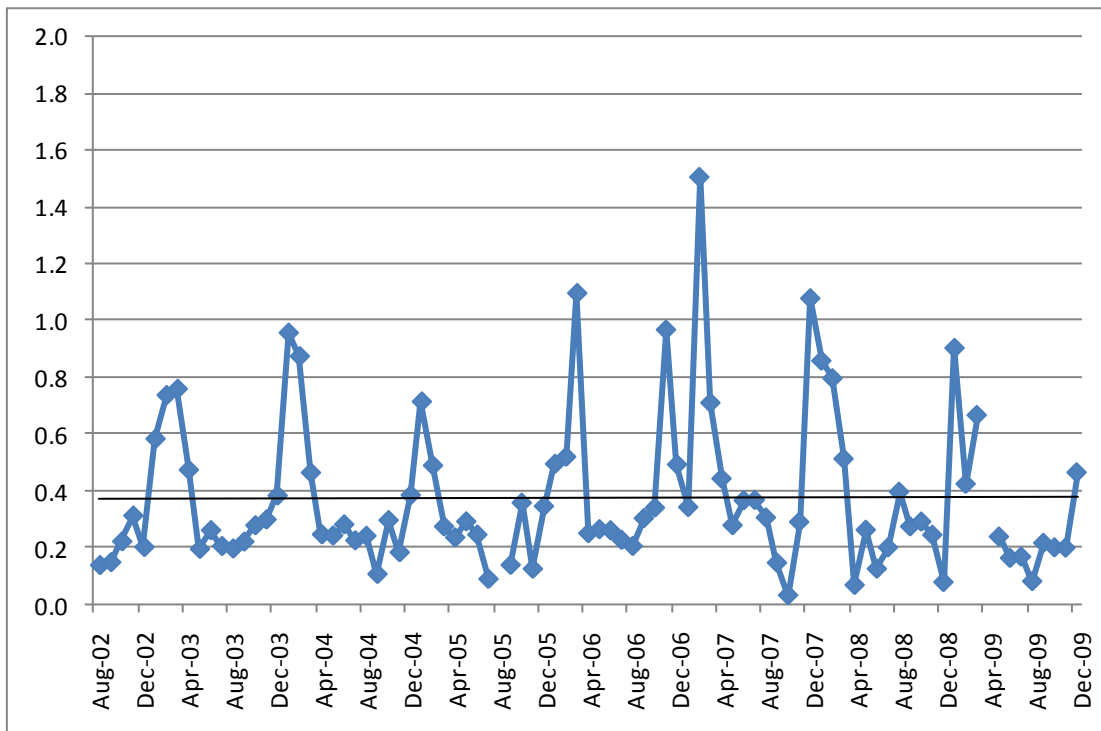


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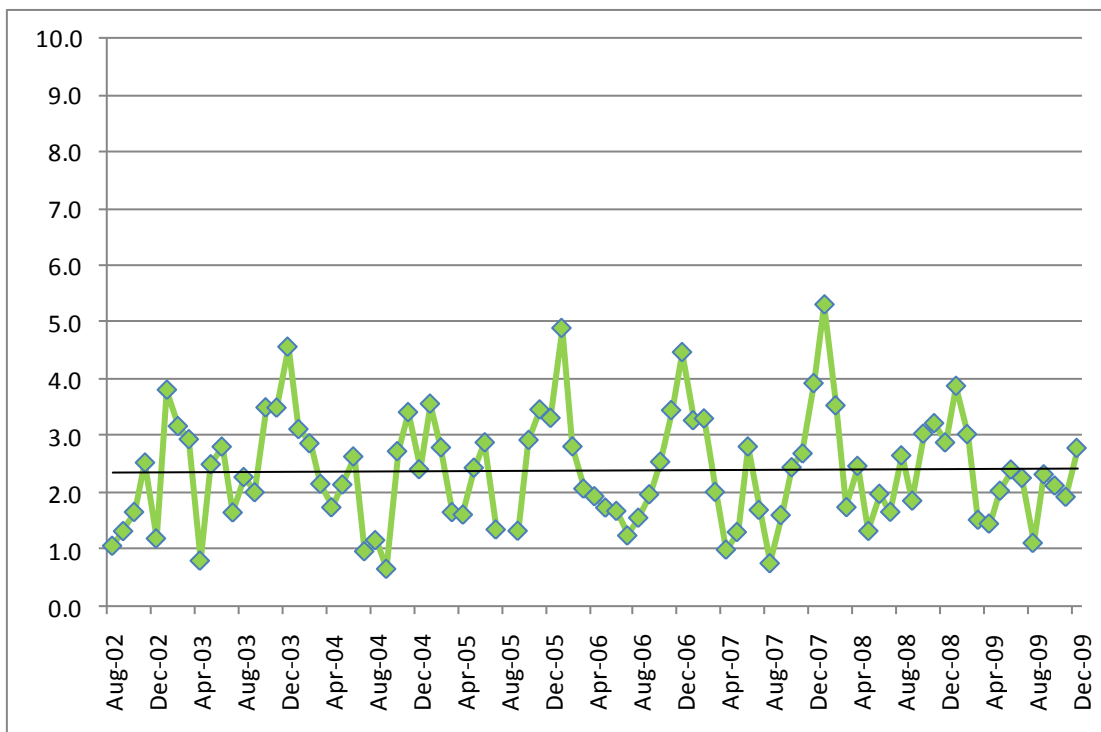


Road Map

23 Bear Lake

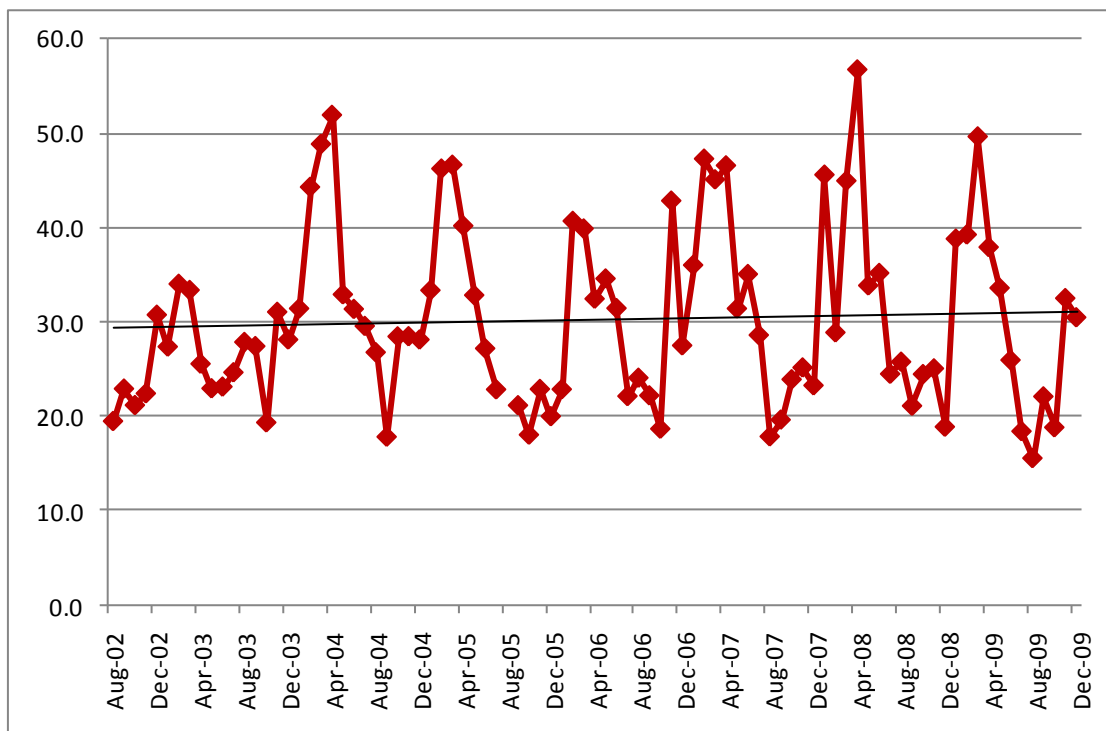


Solid black line represents a linear trend analysis of the monthly data.

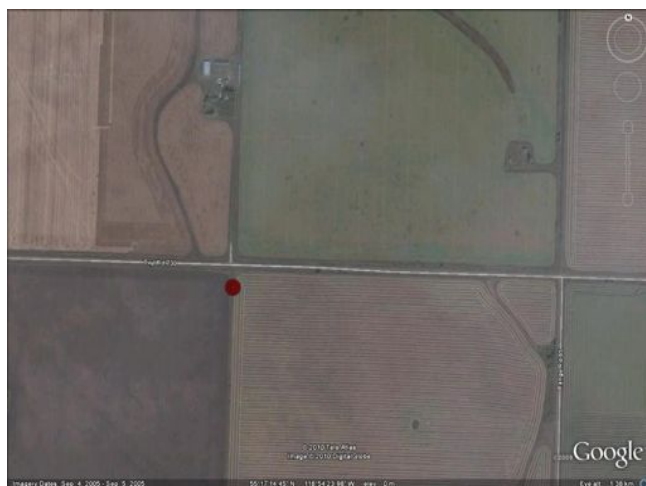


22 Bear Lake

O₃

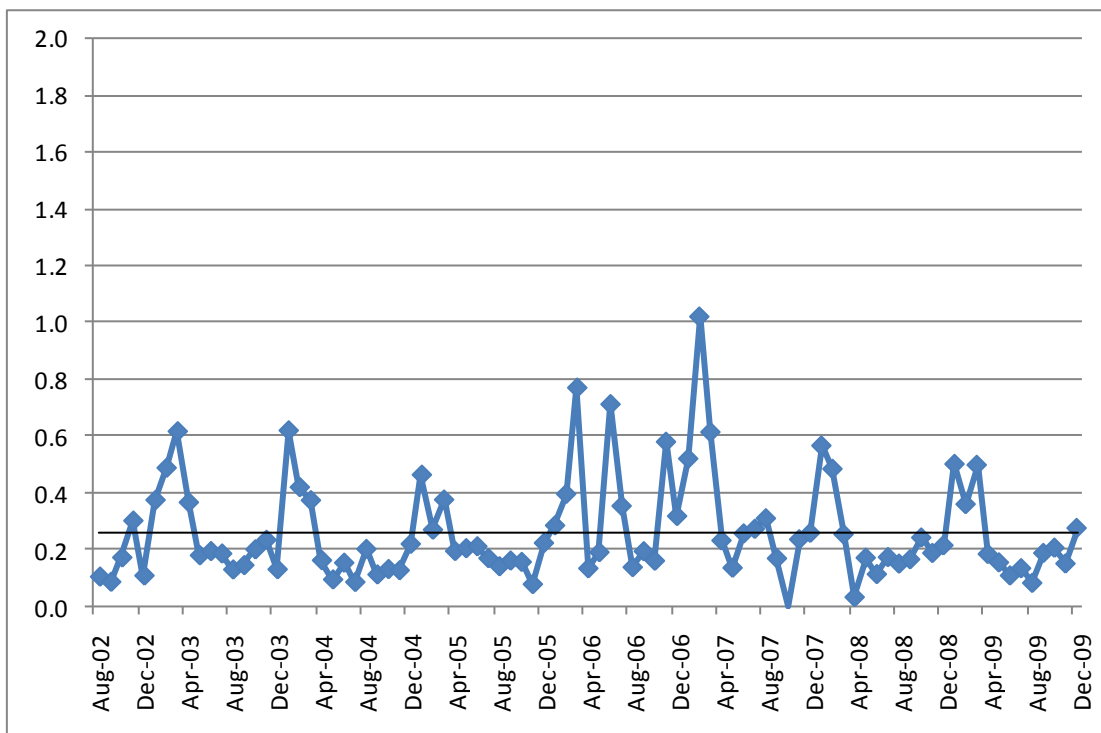


Solid black line represents a linear trend analysis of the monthly data.



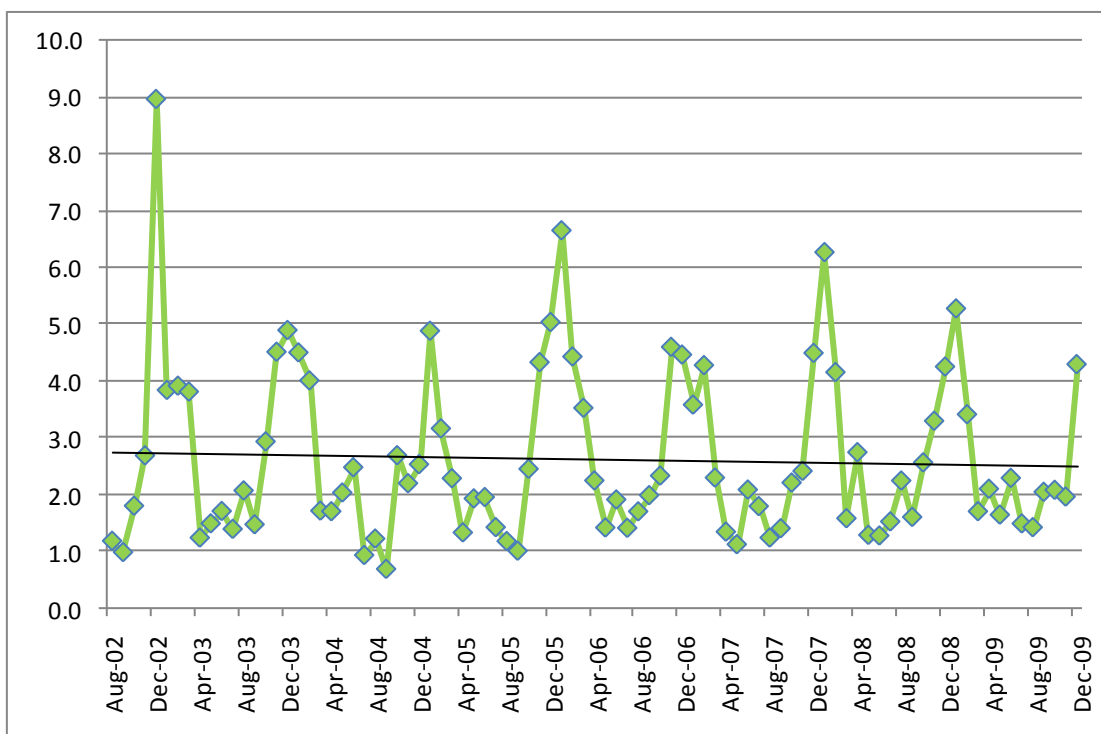
Road Map

24 Wembley



SO₂

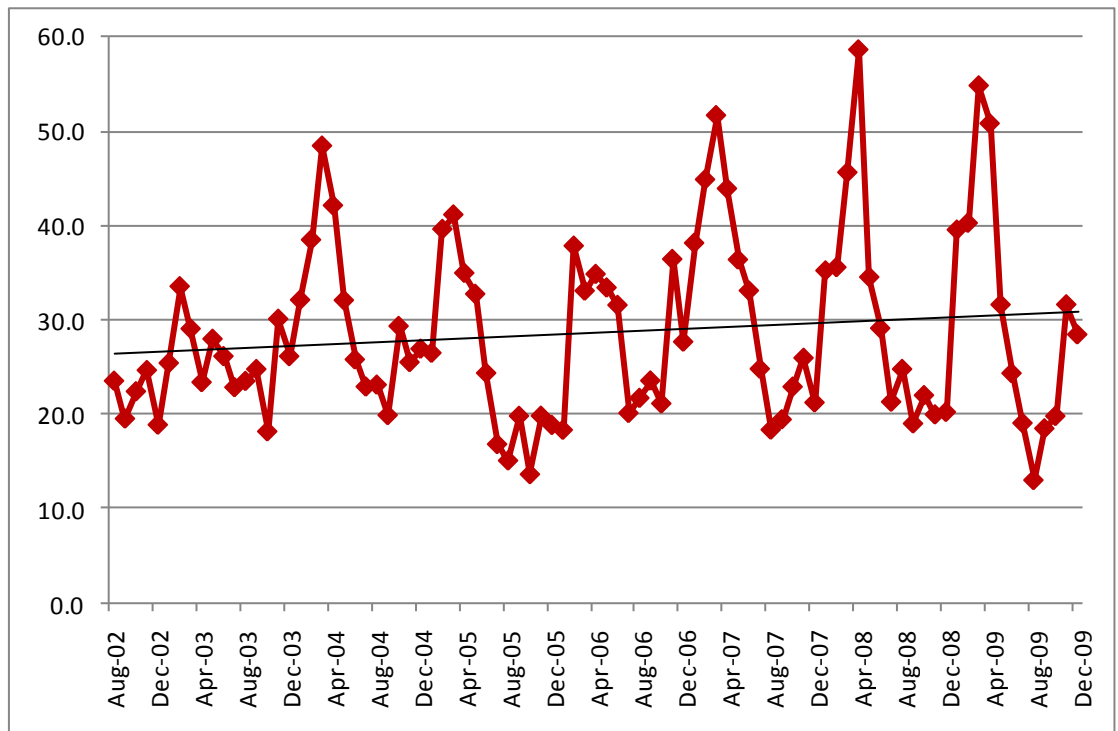
Solid black line represents a linear trend analysis of the monthly data.



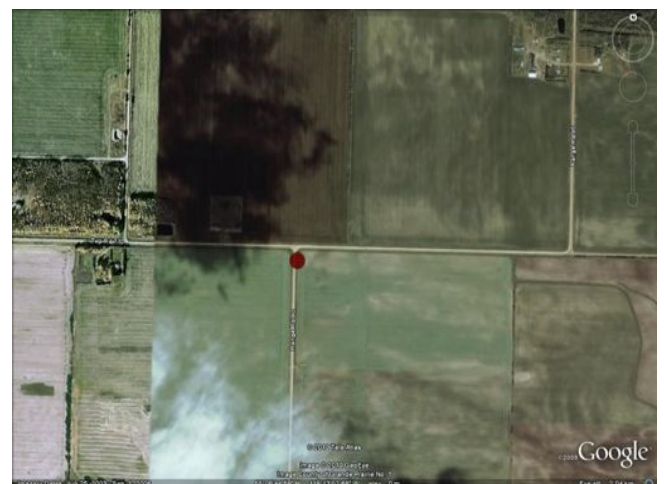
NO₂

24 Wembley

O₃

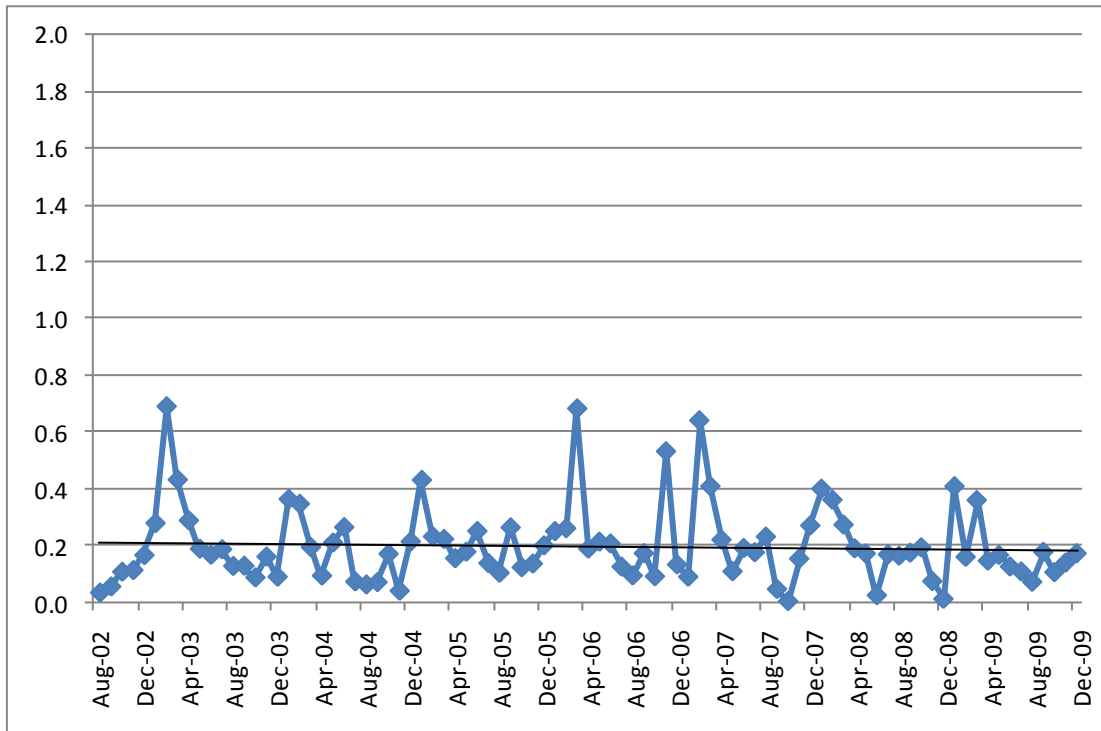


Solid black line represents a linear trend analysis of the monthly data.



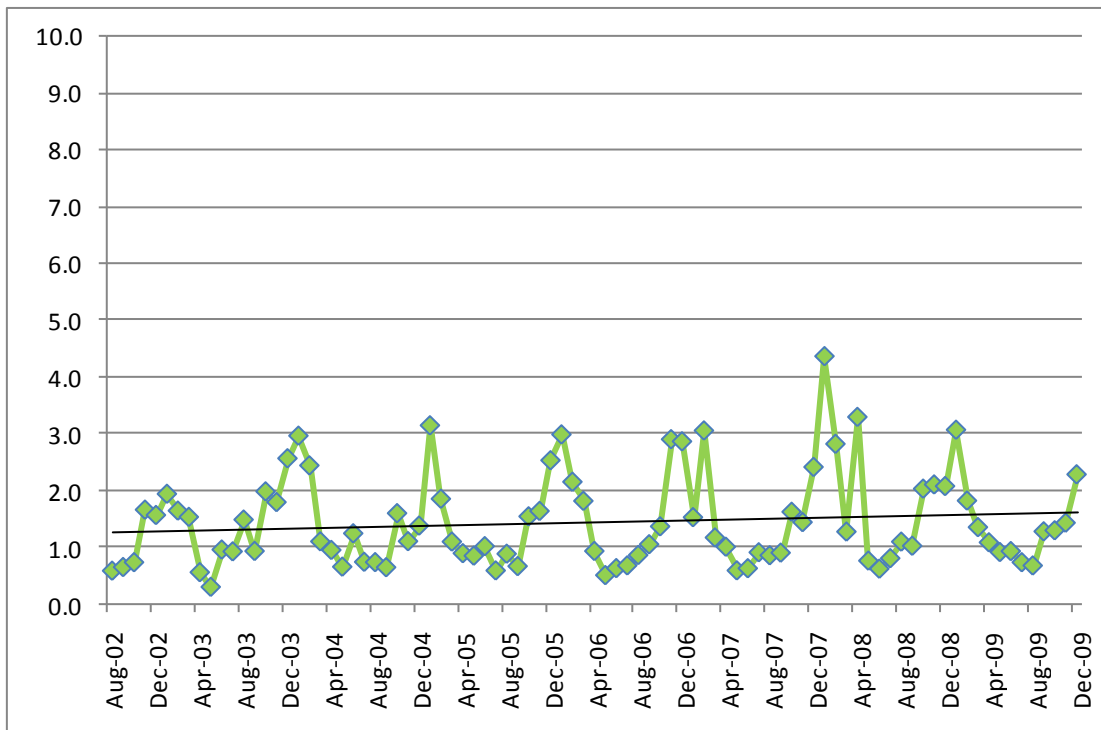
Road Map

25 Pinto Creek



SO₂

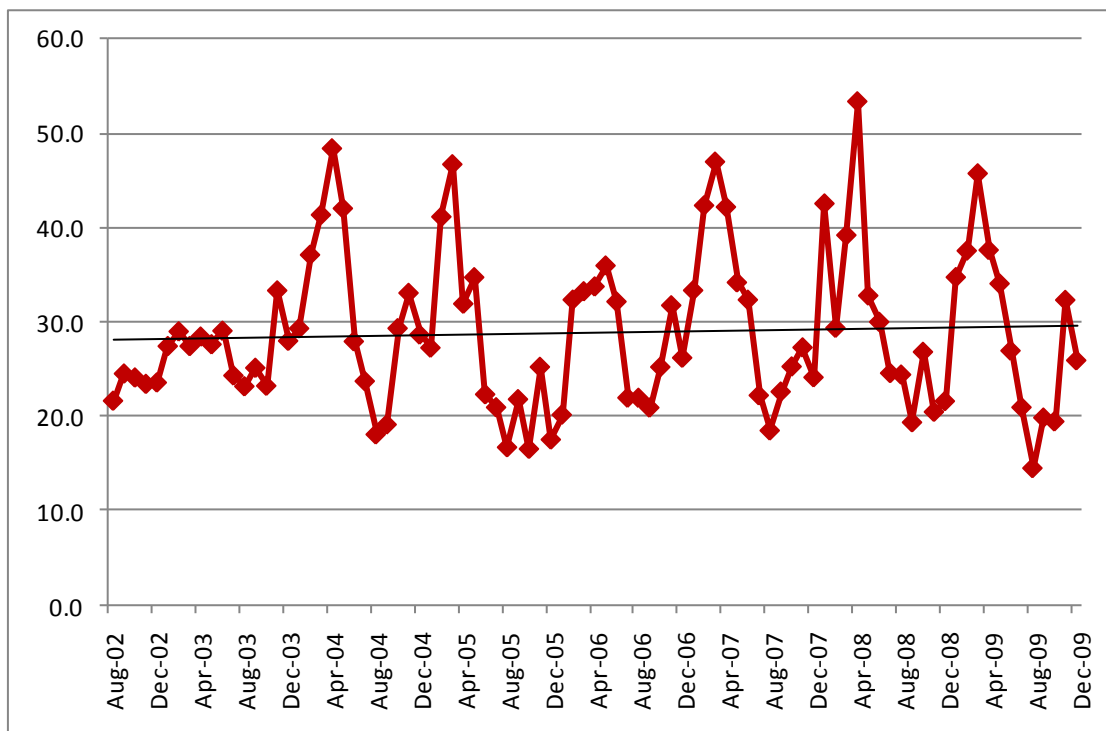
Solid black line represents a linear trend analysis of the monthly data.



NO₂

25 Pinto Creek

O₃

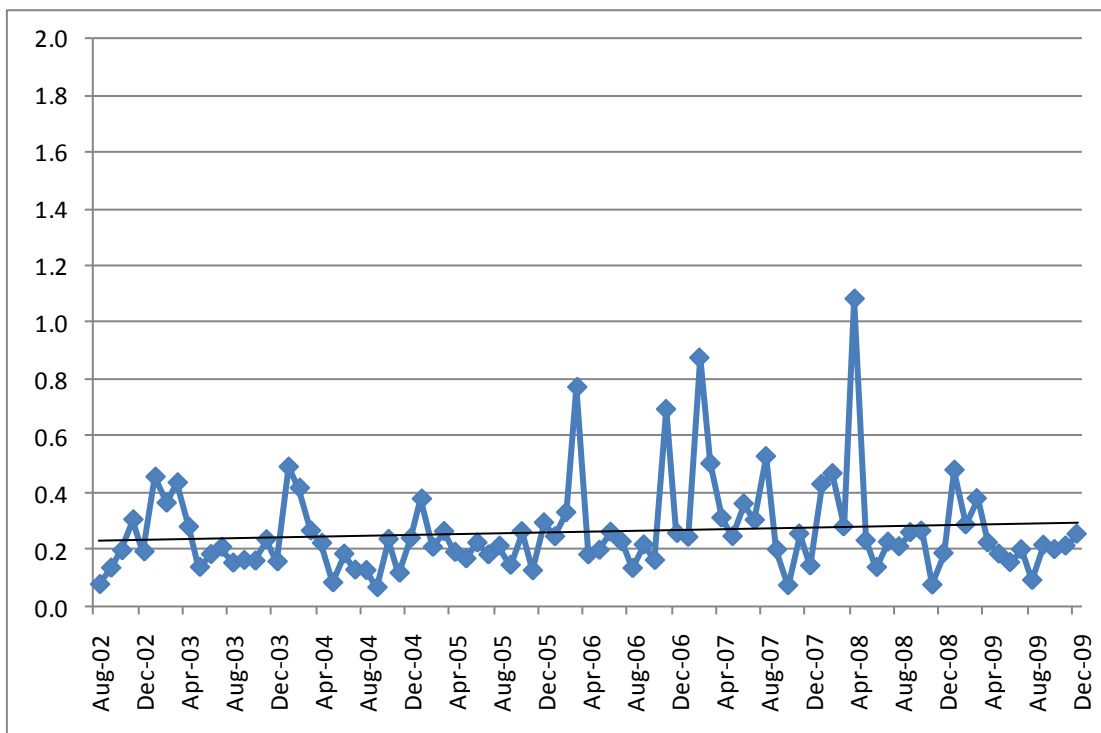


Solid black line represents a linear trend analysis of the monthly data.



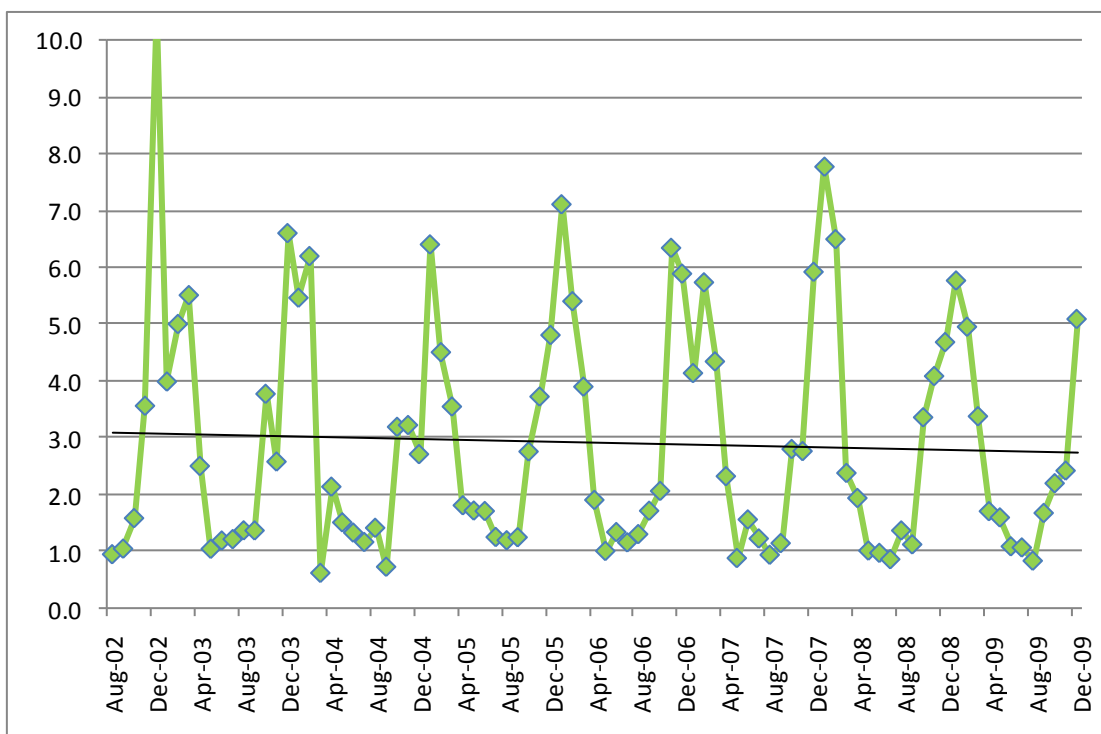
Road Map

26 Flying Shot



SO₂

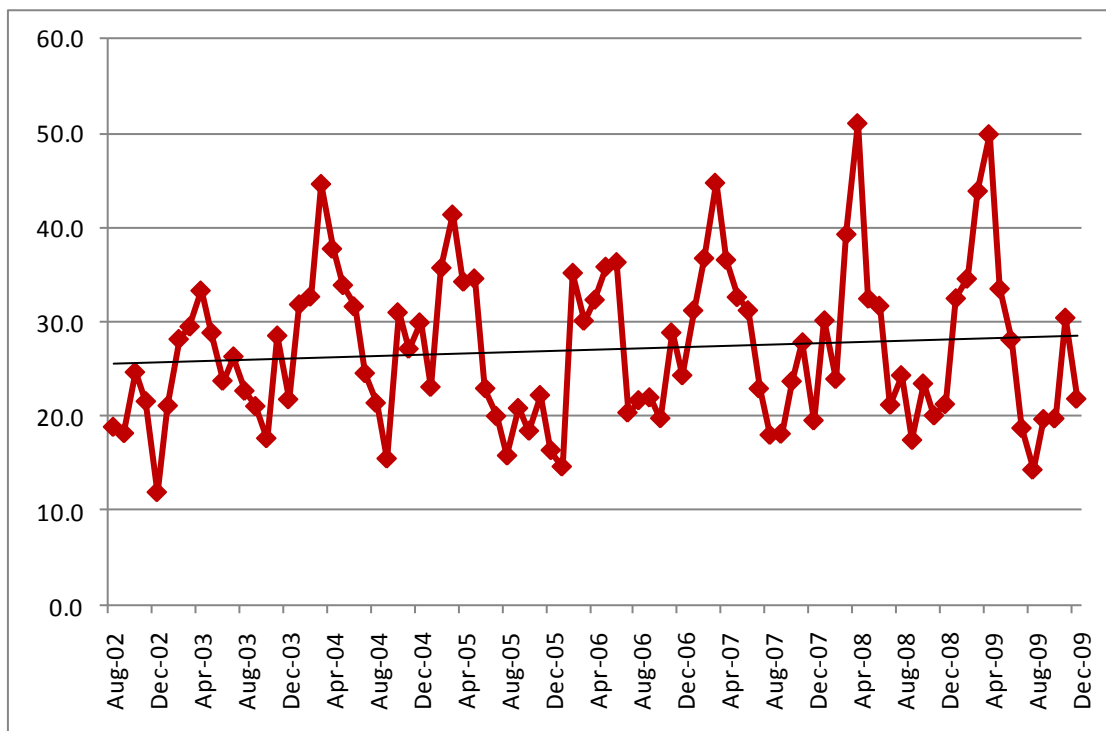
Solid black line represents a linear trend analysis of the monthly data.



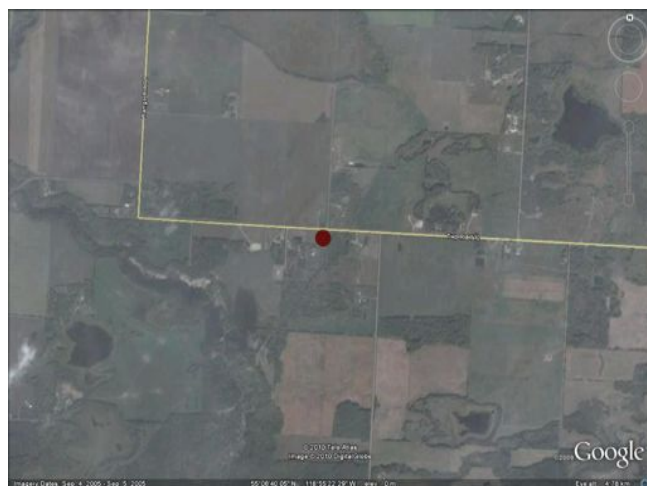
NO₂

26 Flying Shot

O₃

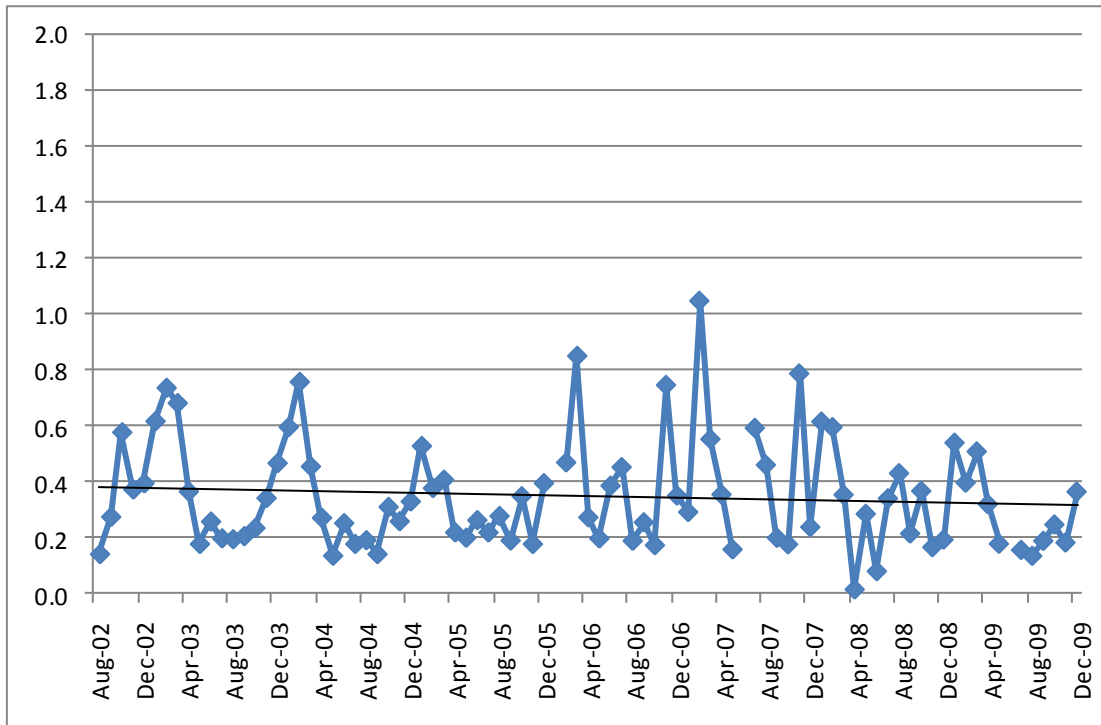


Solid black line represents a linear trend analysis of the monthly data.



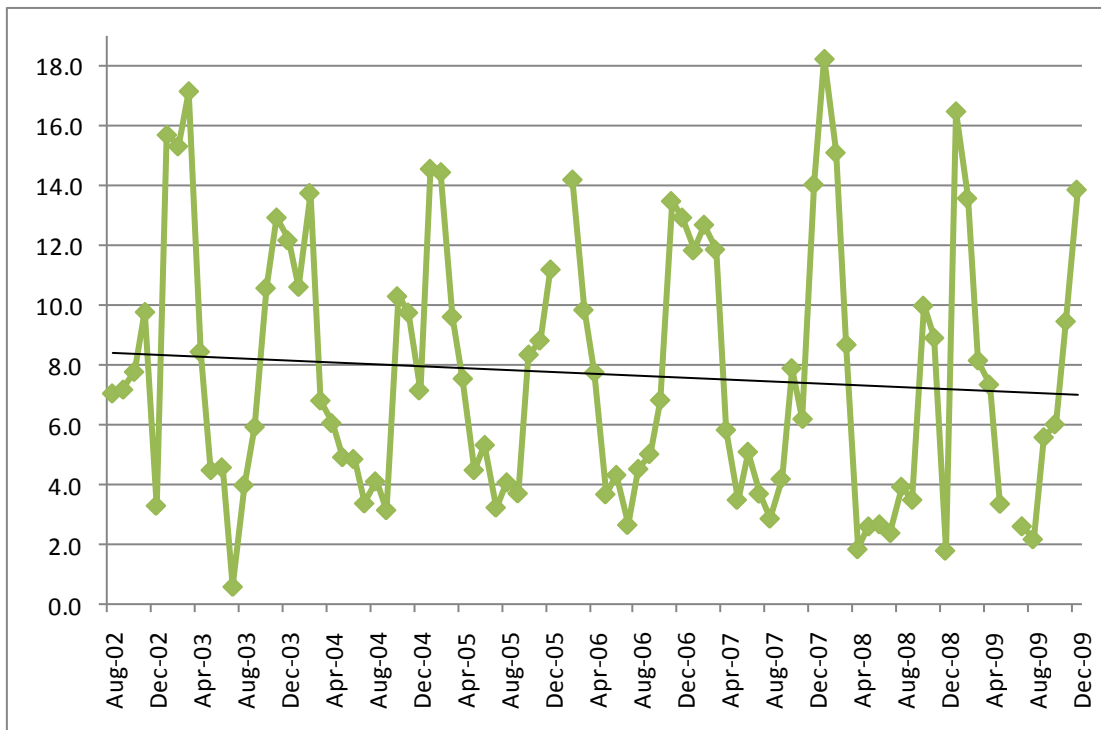
Road Map

27 Grande Prairie #1



SO₂

Solid black line represents a linear trend analysis of the monthly data.

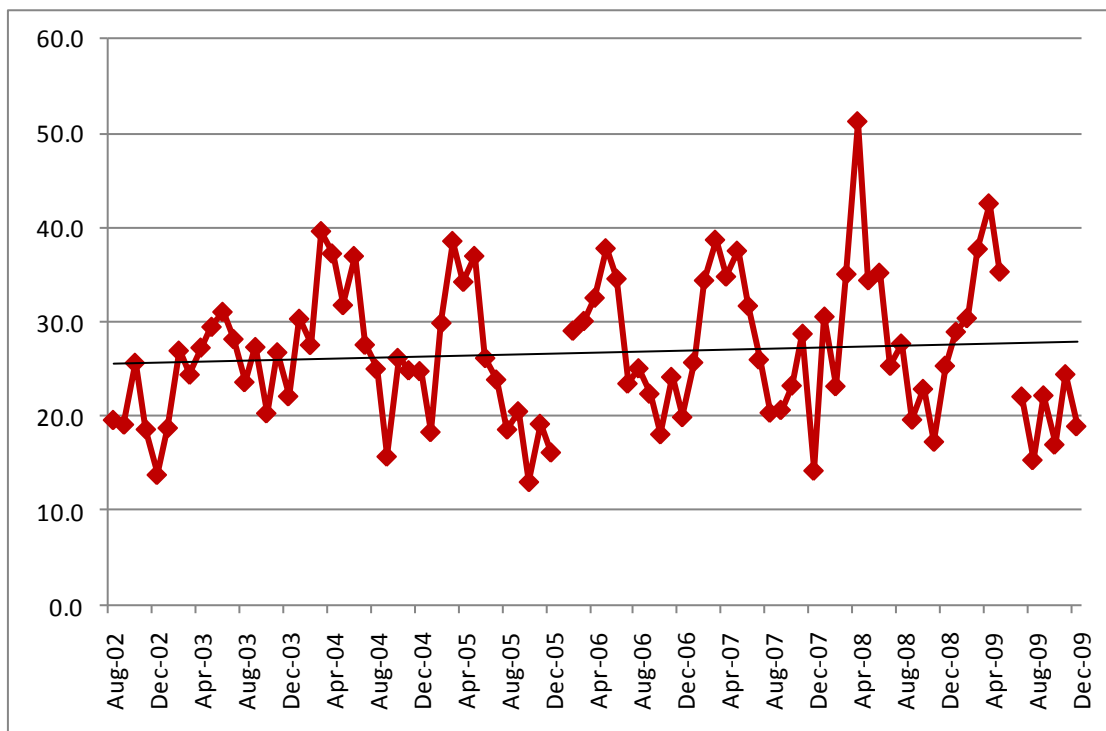


NO₂

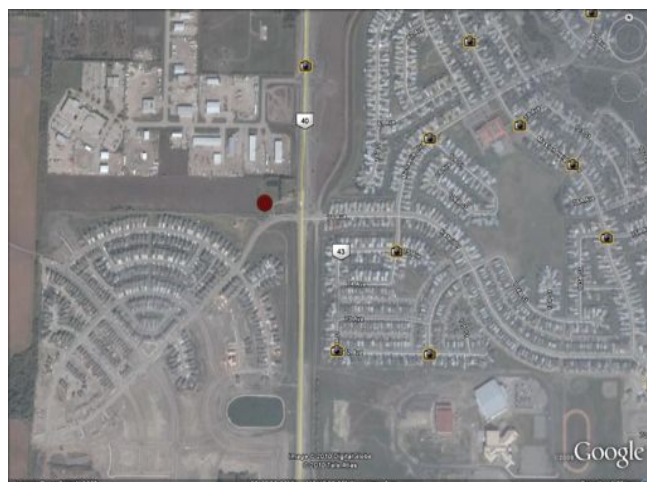
NO₂ scale has been increased to 18 ppb.

27 Grande Prairie #1

O₃



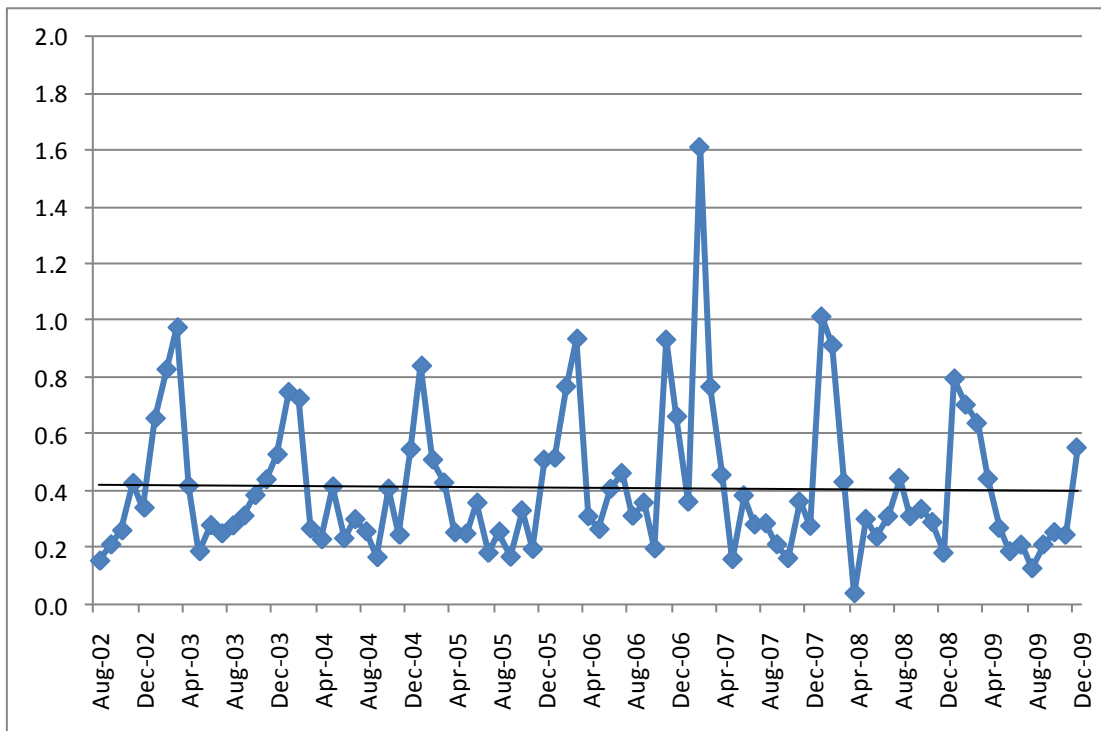
Solid black line represents a linear trend analysis of the monthly data.



Grande Prairie #1 Station was relocated during monitoring period.

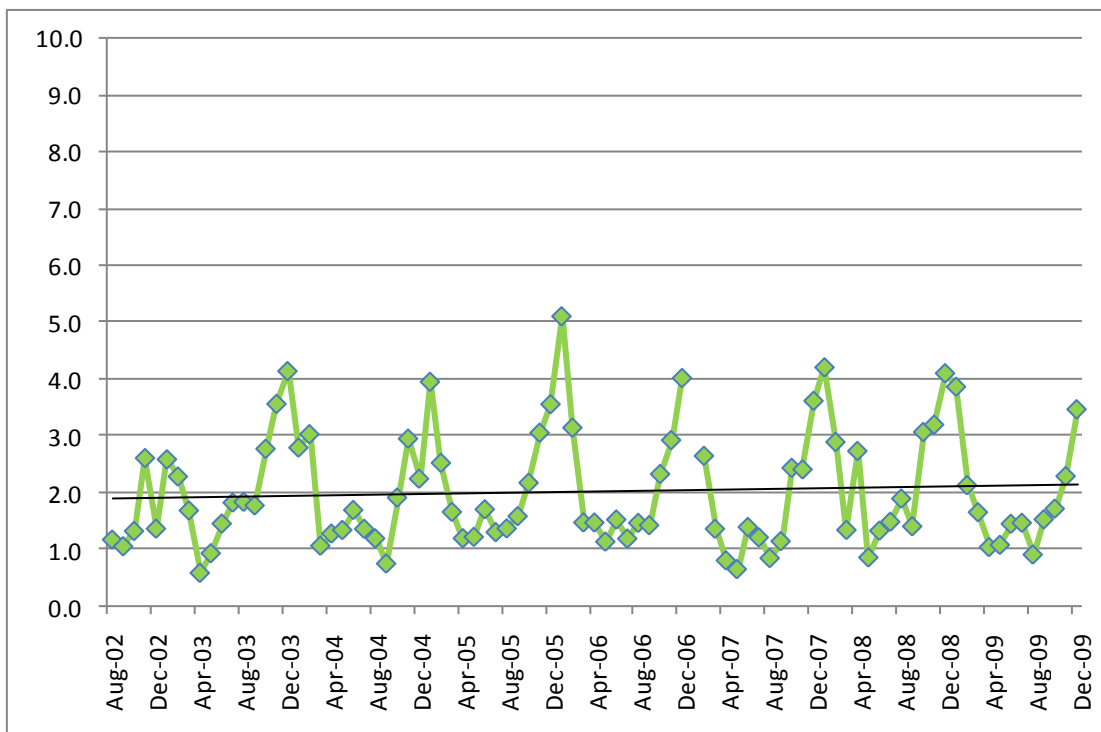
Road Map

28 Clairmont Lake



SO₂

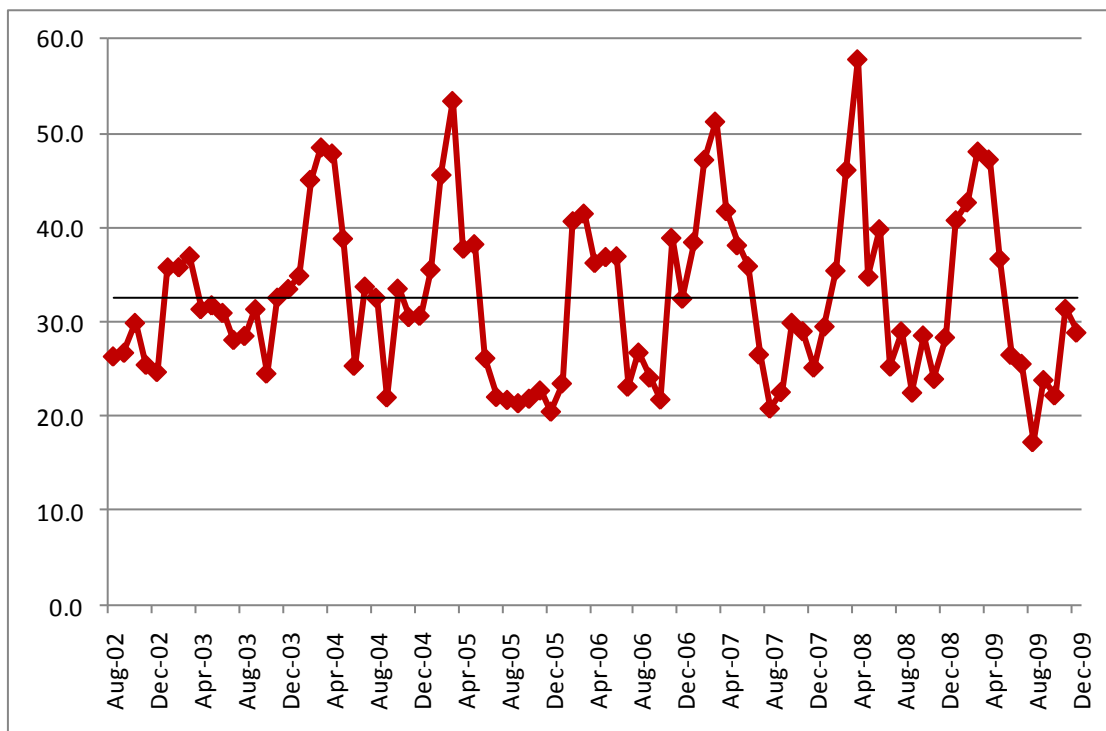
Solid black line represents a linear trend analysis of the monthly data.



NO₂

28 Clairmont Lake

O₃

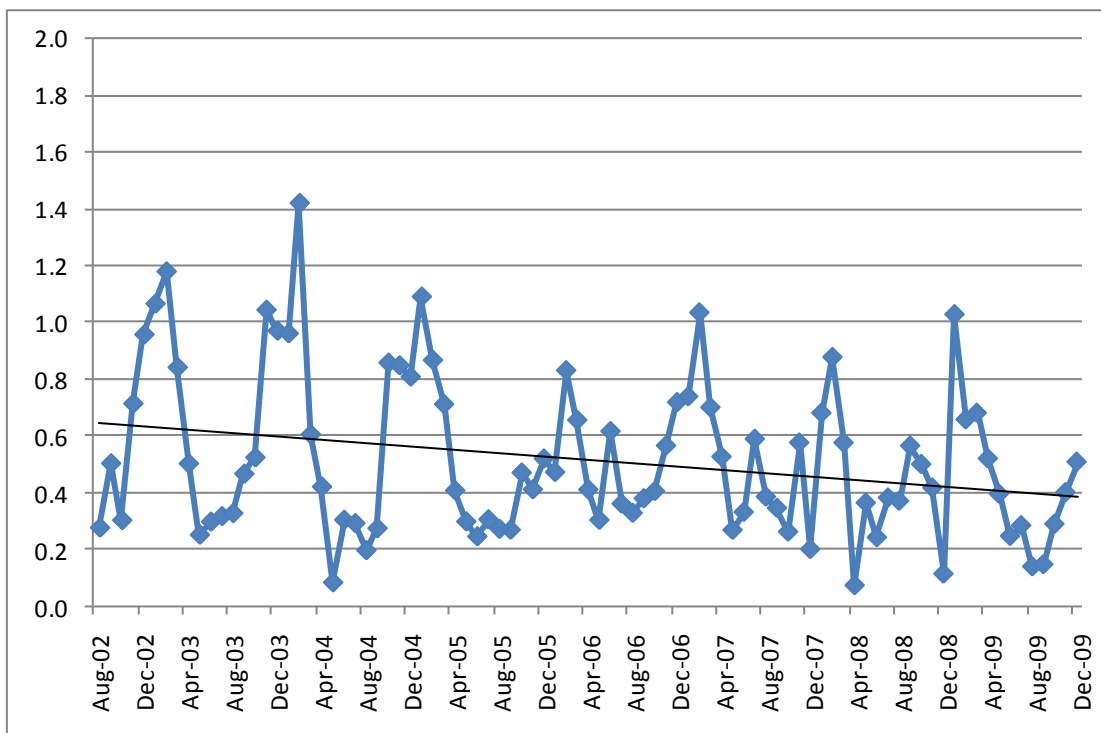


Solid black line represents a linear trend analysis of the monthly data.



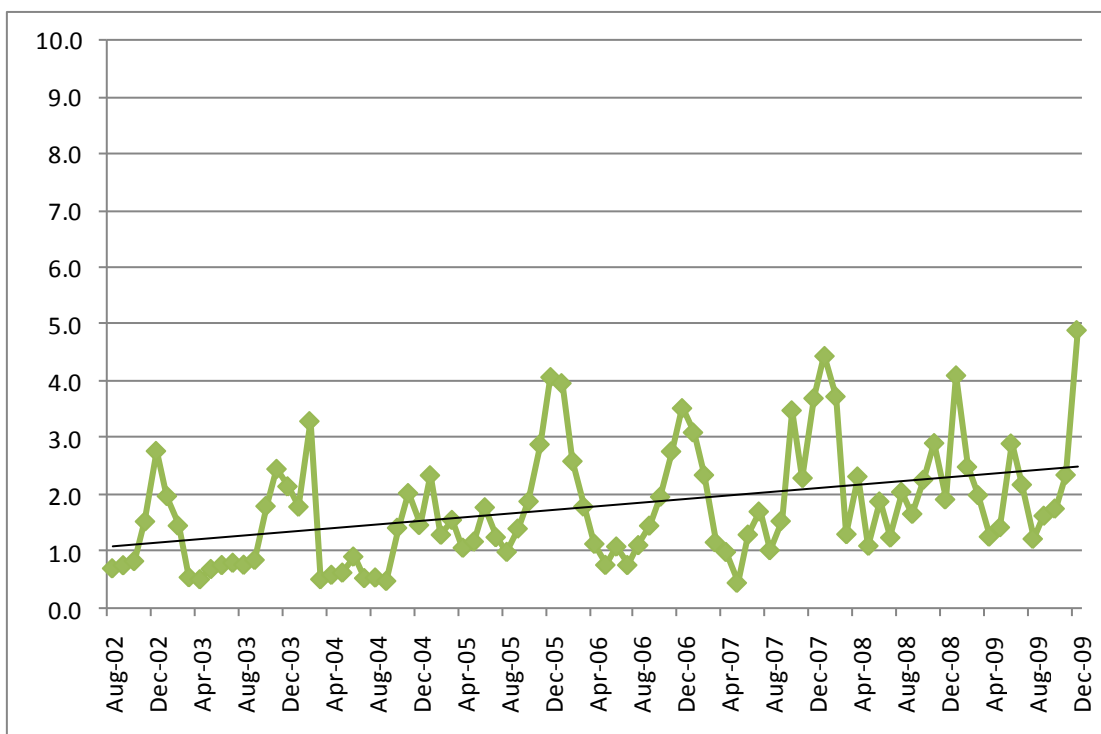
Road Map

29 Smoky Heights



SO₂

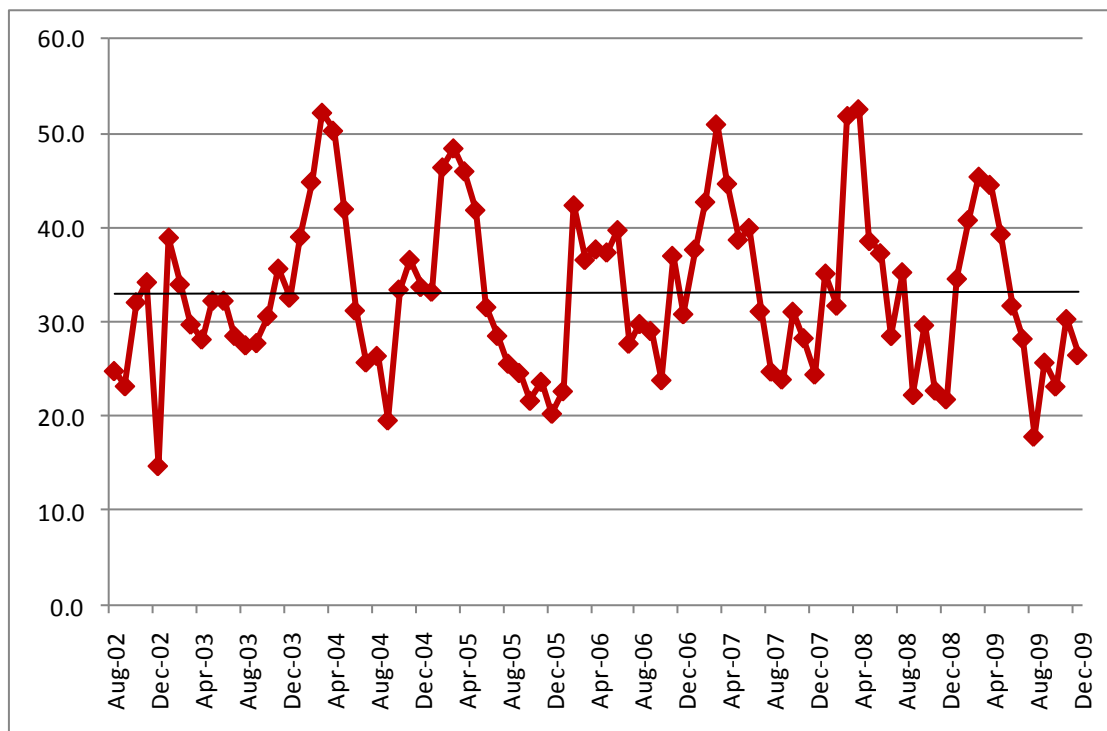
Solid black line represents a linear trend analysis of the monthly data.



NO₂

29 Smoky Heights

O₃



Solid black line represents a linear trend analysis of the monthly data.

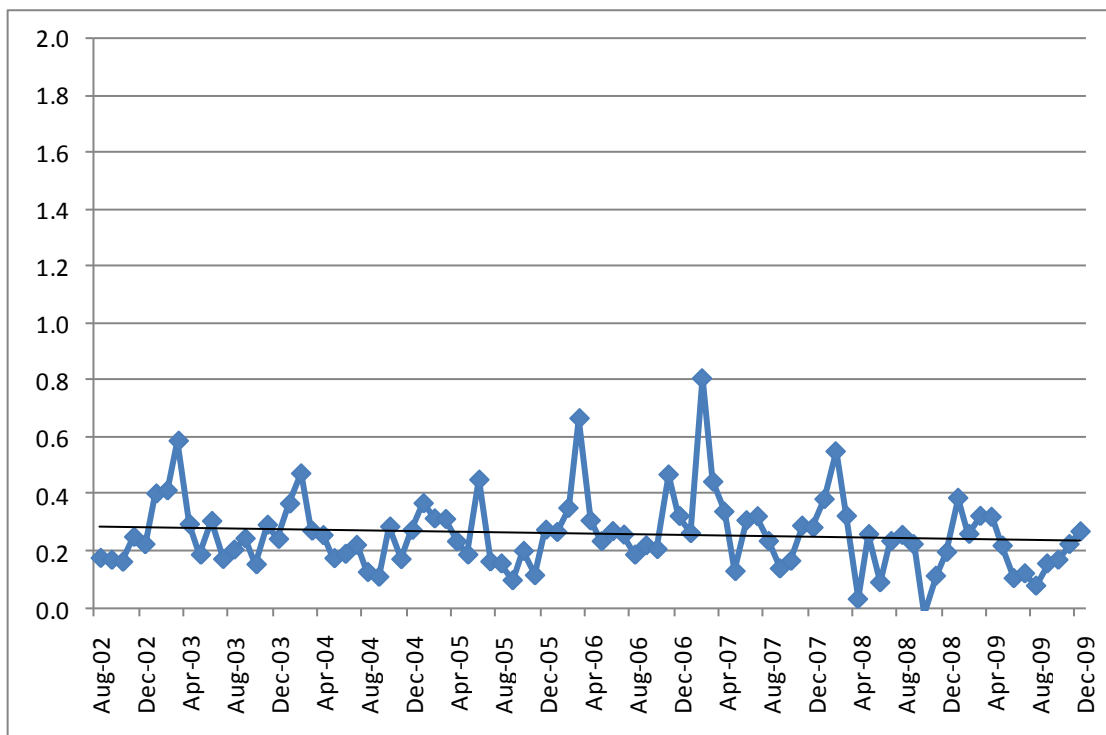


Smoky Heights Station was relocated during monitoring period.



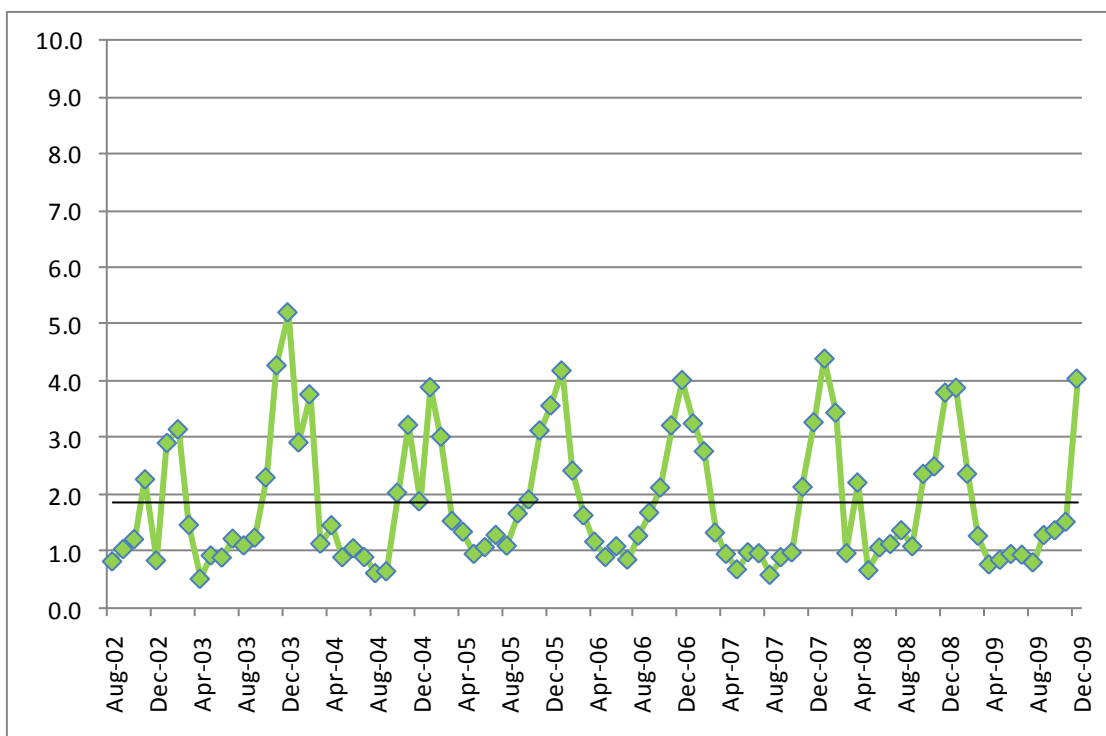
Road Map

30 Fitzsimmons



SO₂

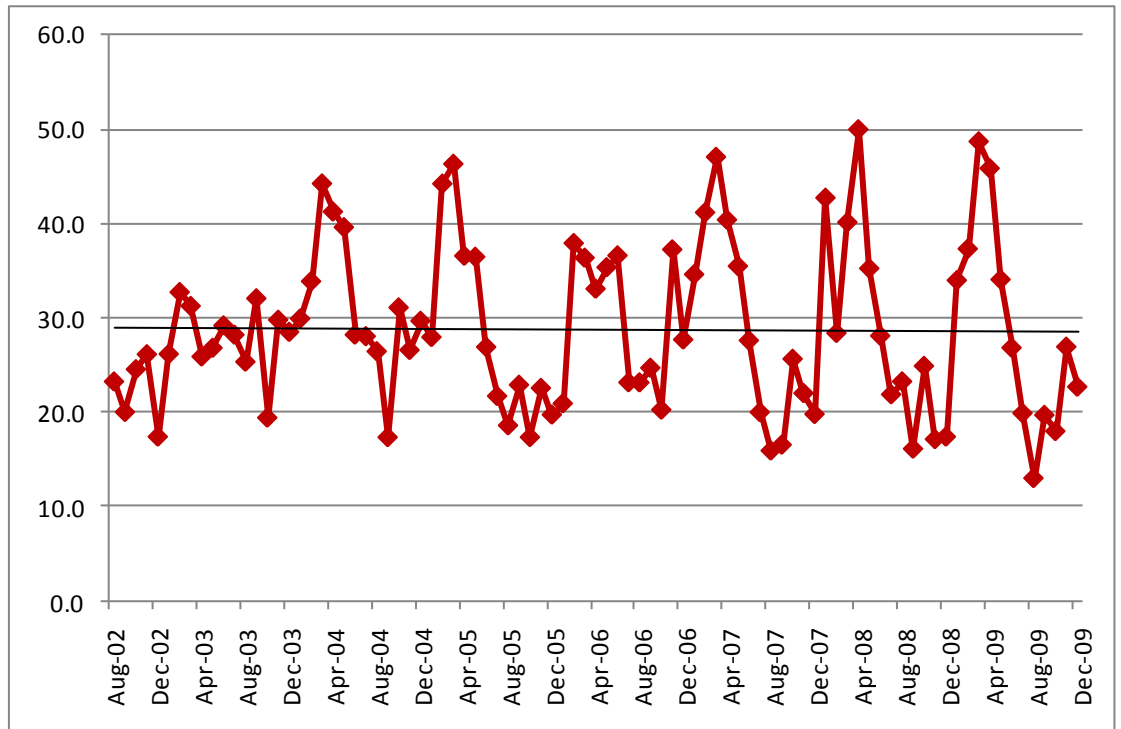
Solid black line represents a linear trend analysis of the monthly data.



NO₂

30 Fitzsimmons

O₃

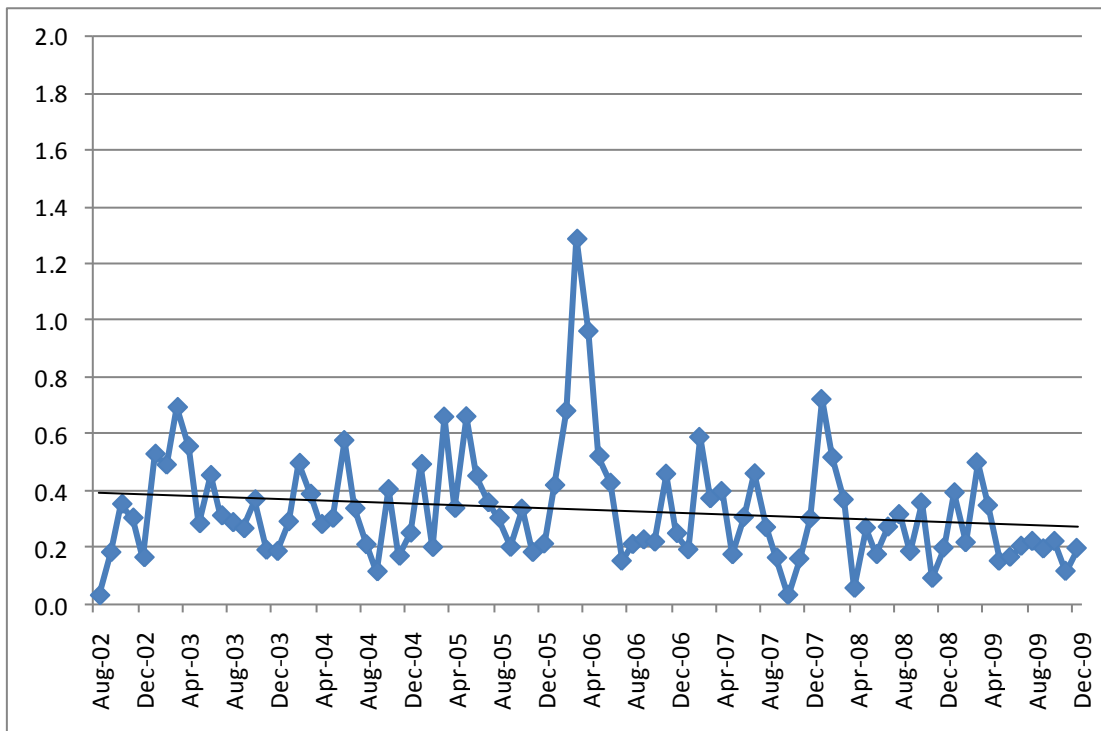


Solid black line represents a linear trend analysis of the monthly data.



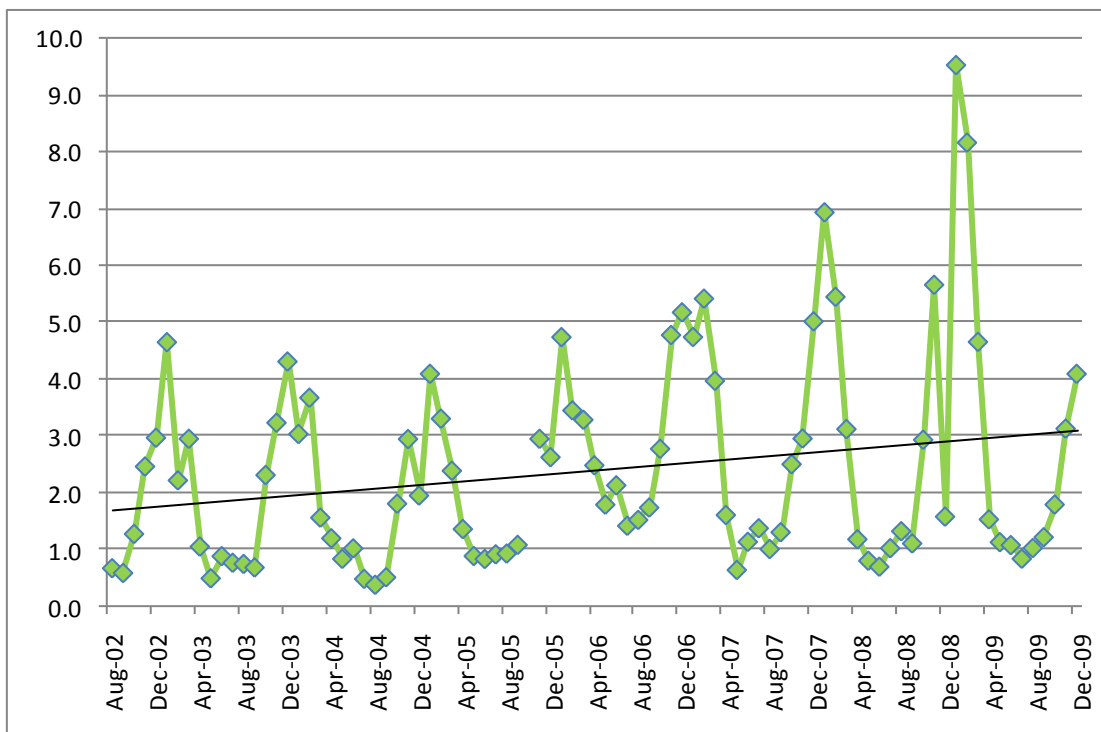
Road Map

32 Gold Creek



SO₂

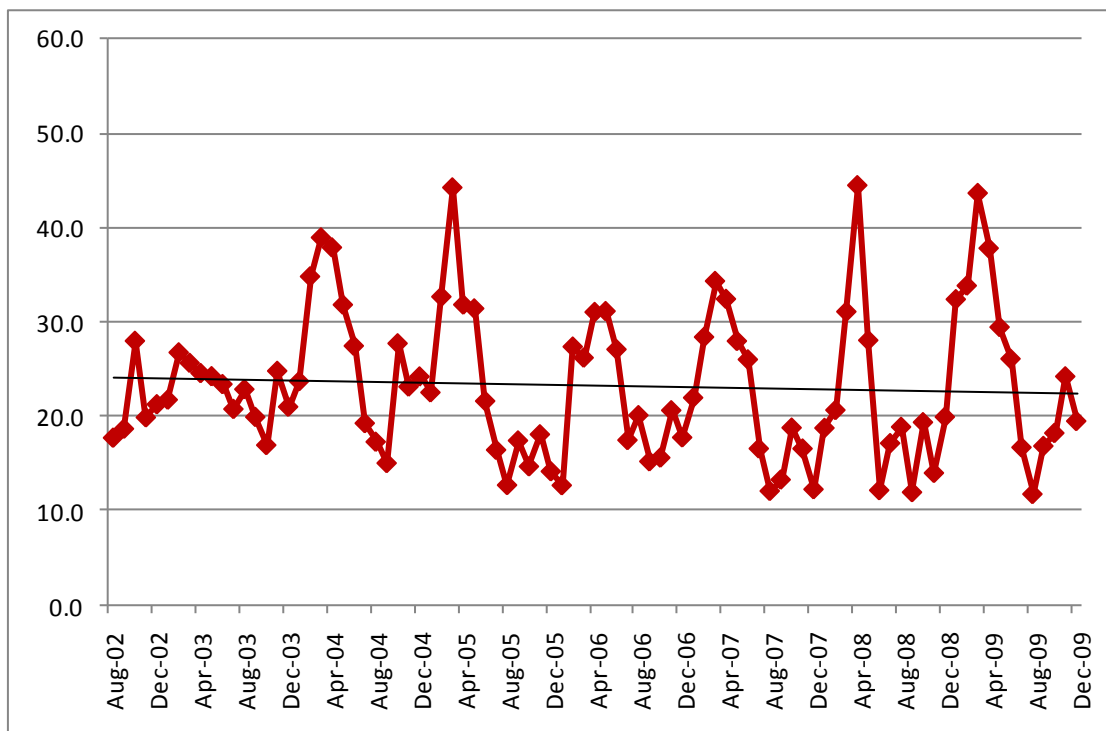
Solid black line represents a linear trend analysis of the monthly data.



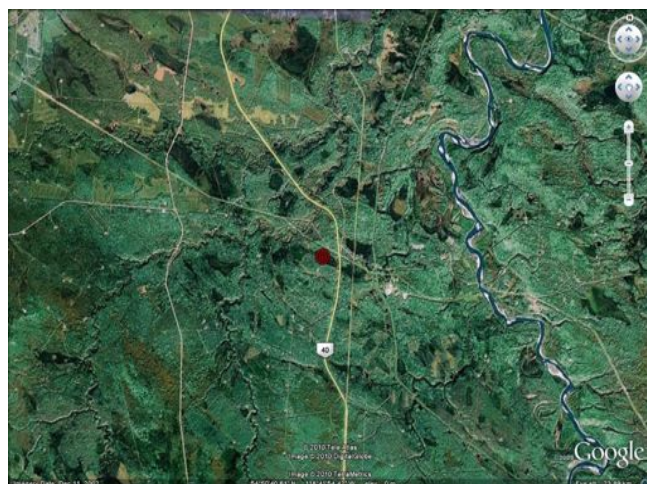
NO₂

32 Gold Creek

O₃

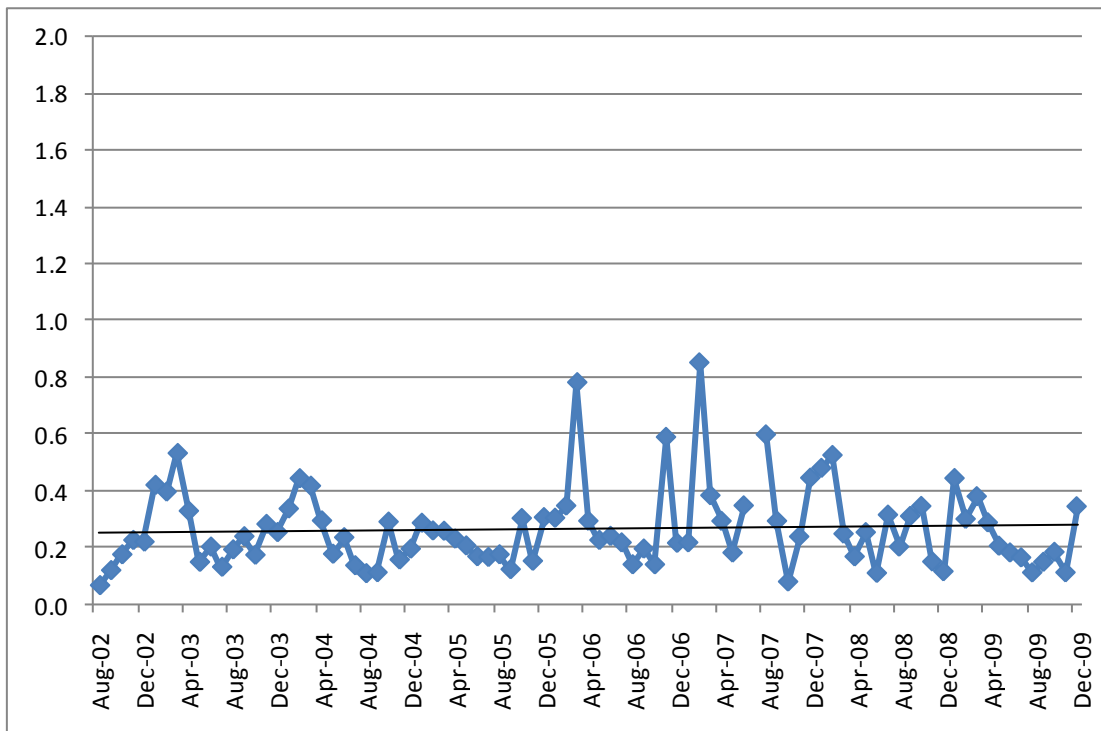


Solid black line represents a linear trend analysis of the monthly data.



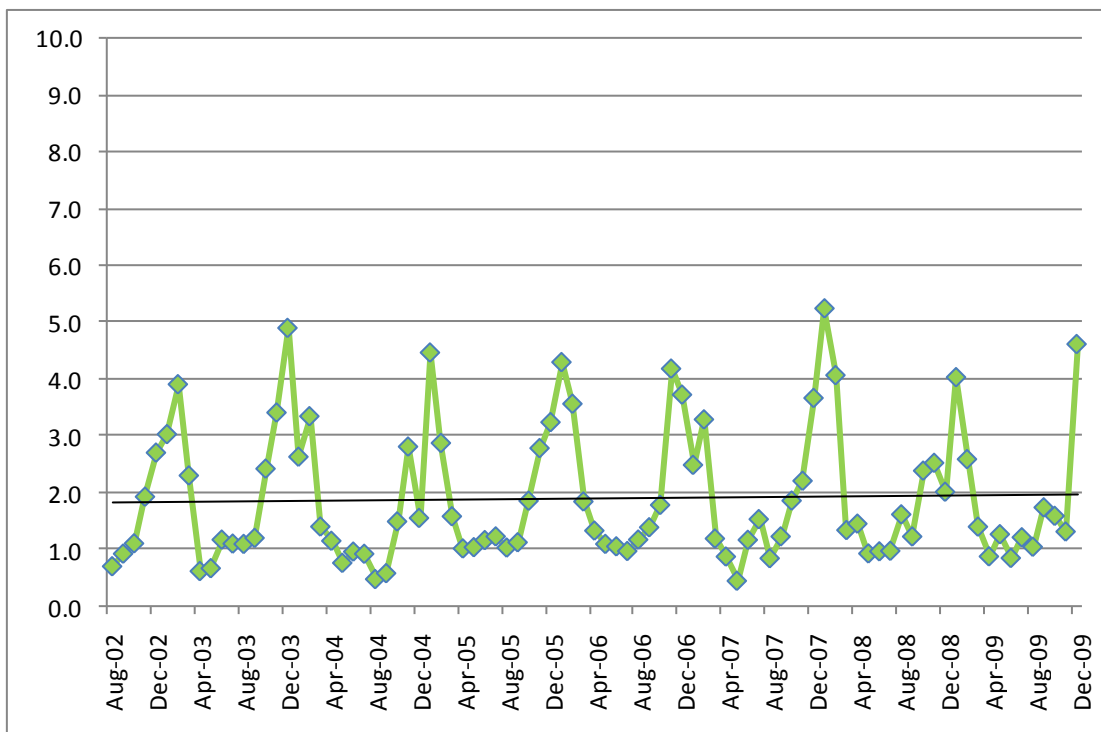
Road Map

33 Wapiti



SO₂

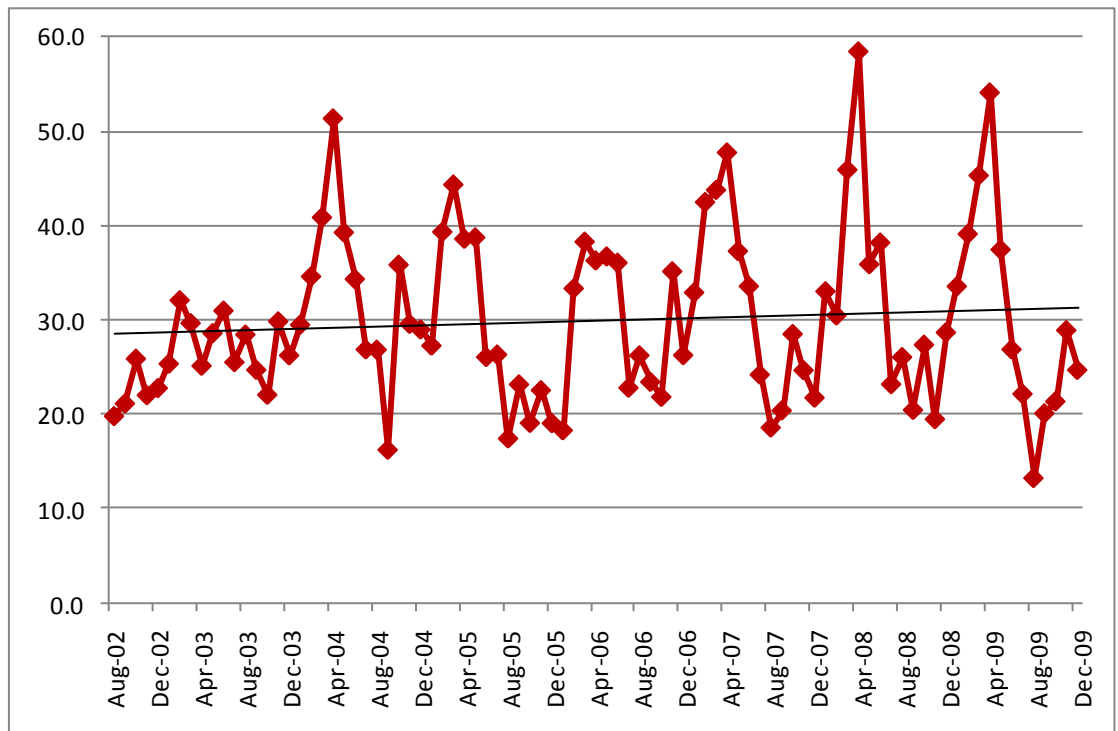
Solid black line represents a linear trend analysis of the monthly data.



NO₂

33 Wapiti

O₃

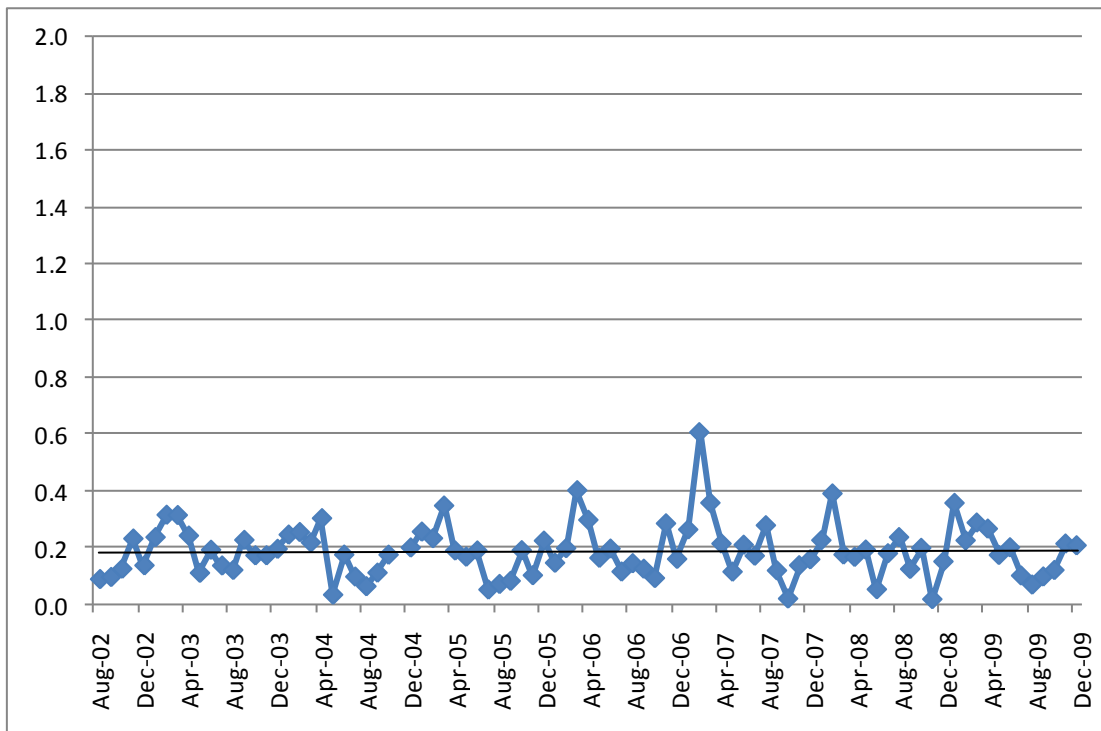


Solid black line represents a linear trend analysis of the monthly data.



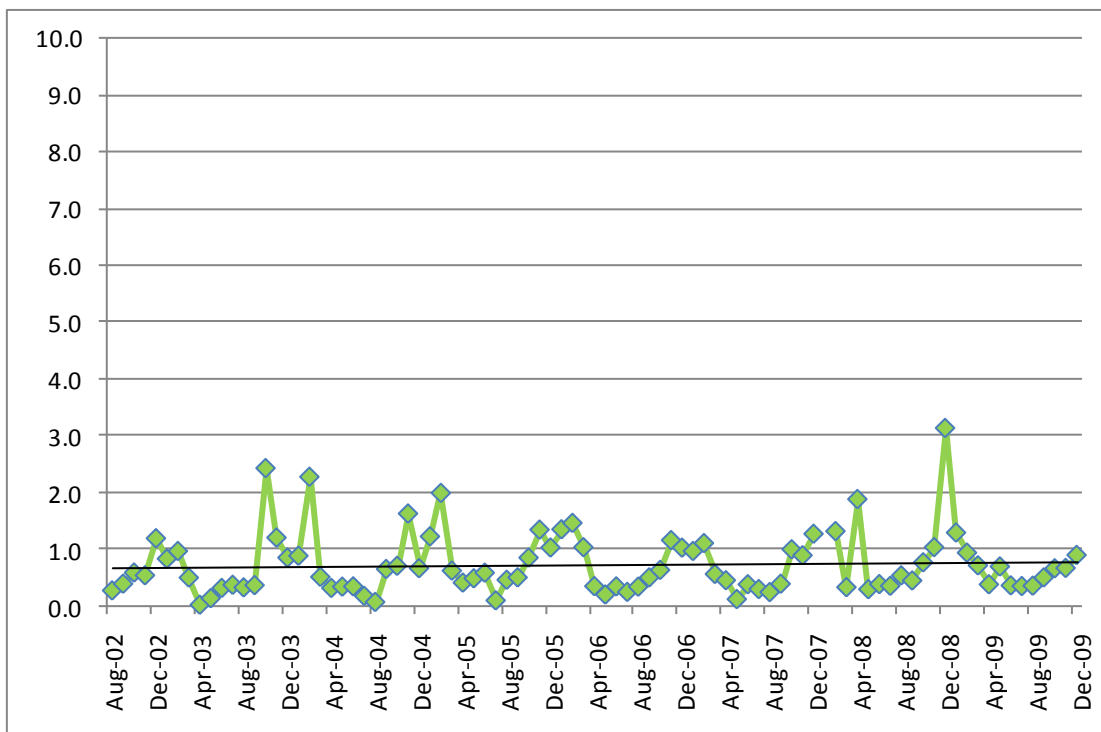
Road Map

34 Puskwaskau



SO₂

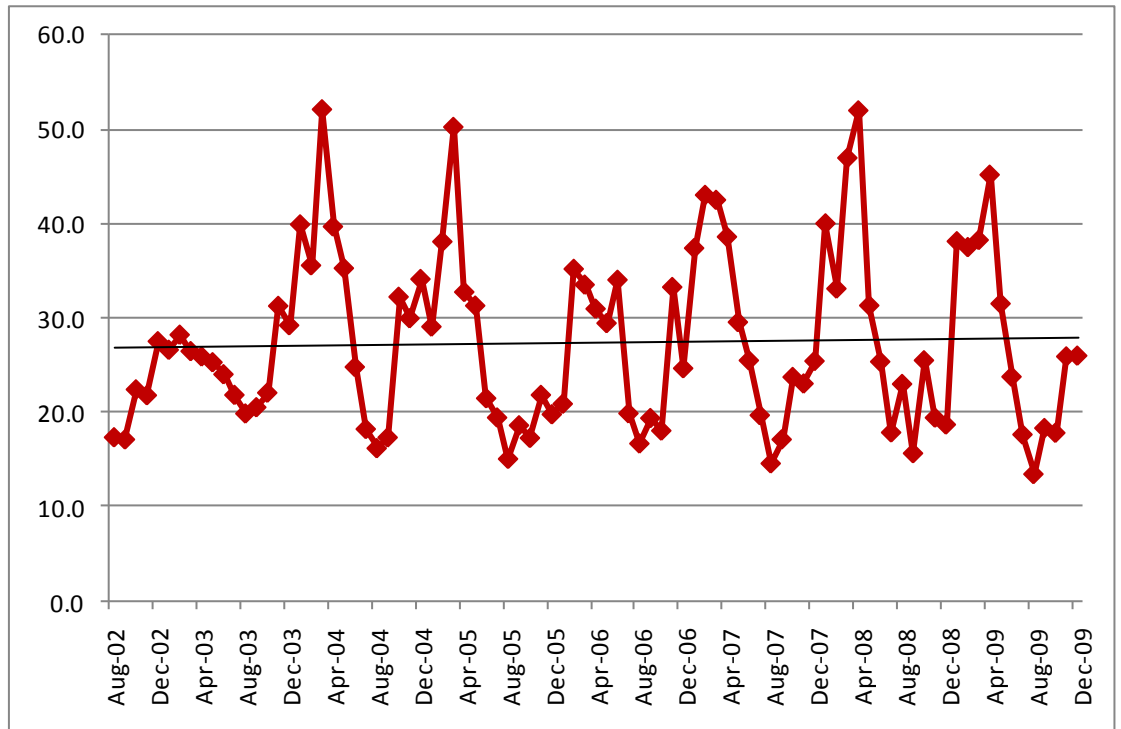
Solid black line represents a linear trend analysis of the monthly data.



NO₂

34 Puskwaskau

O₃

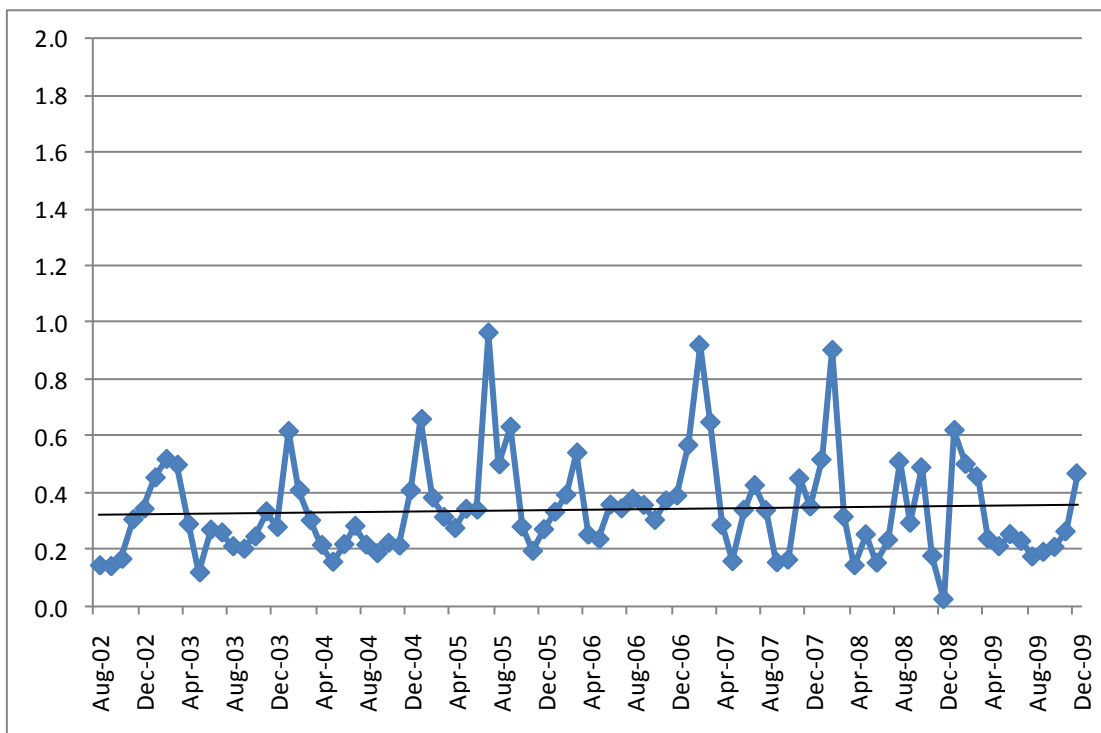


Solid black line represents a linear trend analysis of the monthly data.



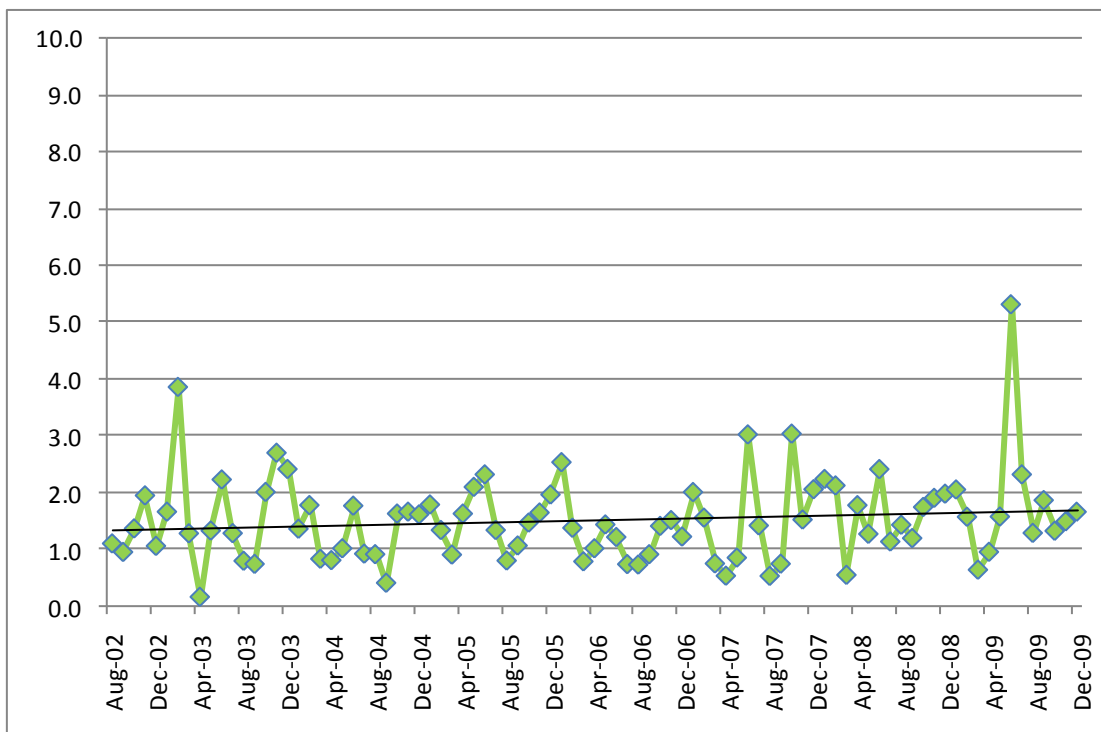
Road Map

35 Jean Cote



SO₂

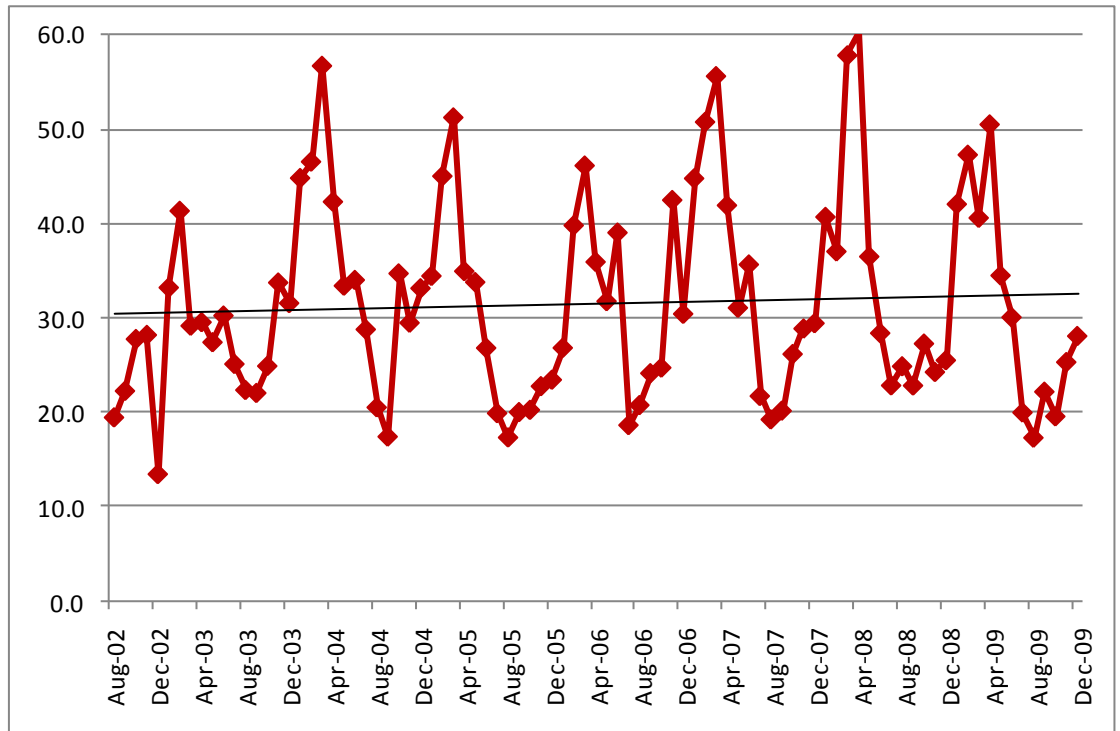
Solid black line represents a linear trend analysis of the monthly data.



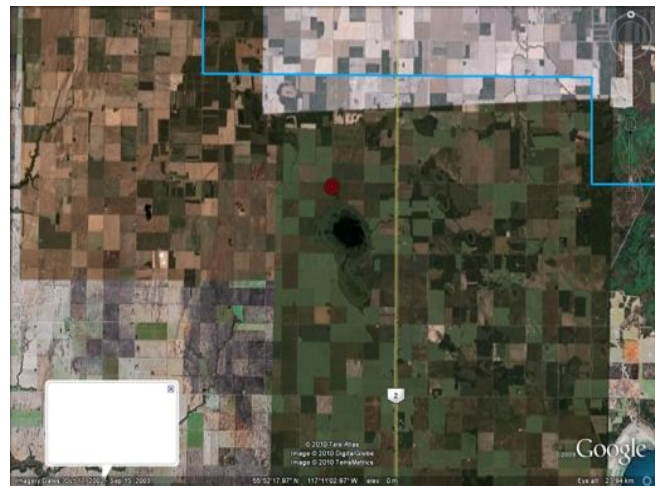
NO₂

35 Jean Cote

O₃

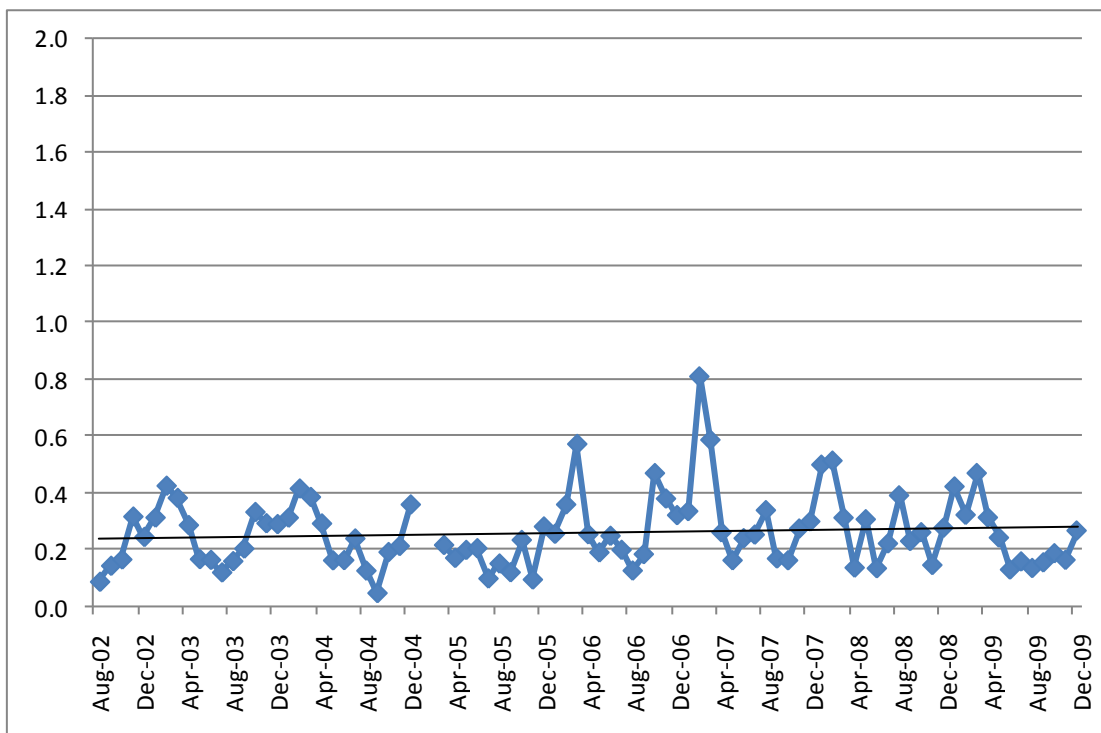


Solid black line represents a linear trend analysis of the monthly data.



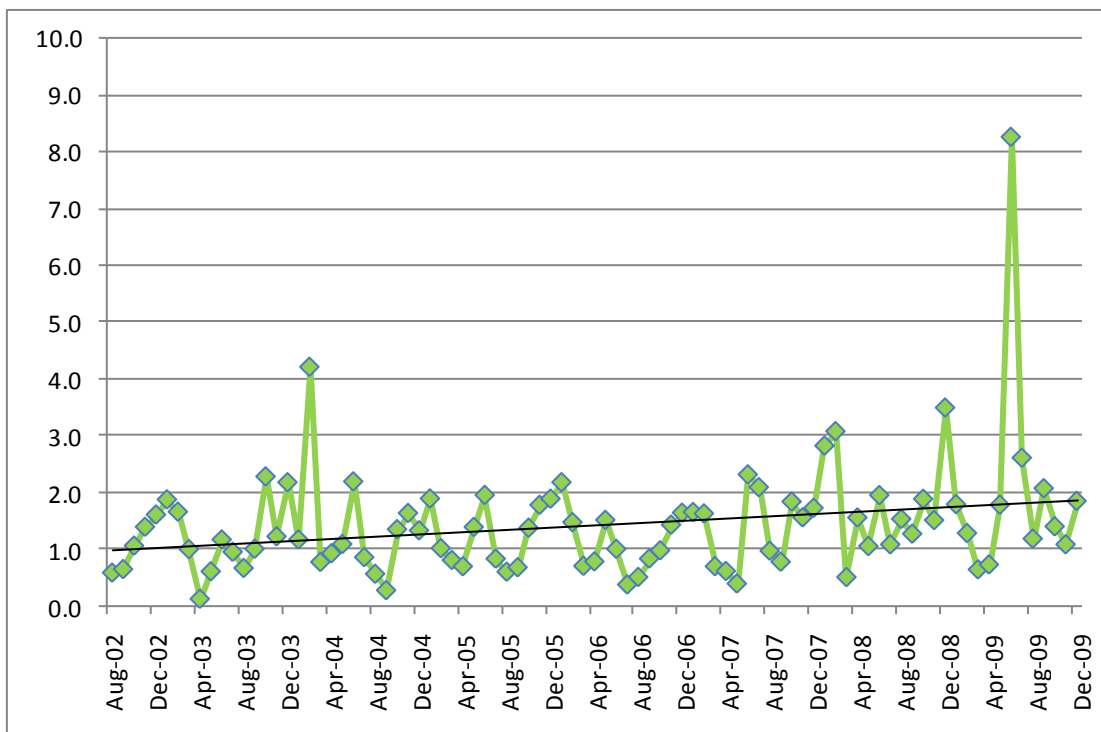
Road Map

36 Guy



SO₂

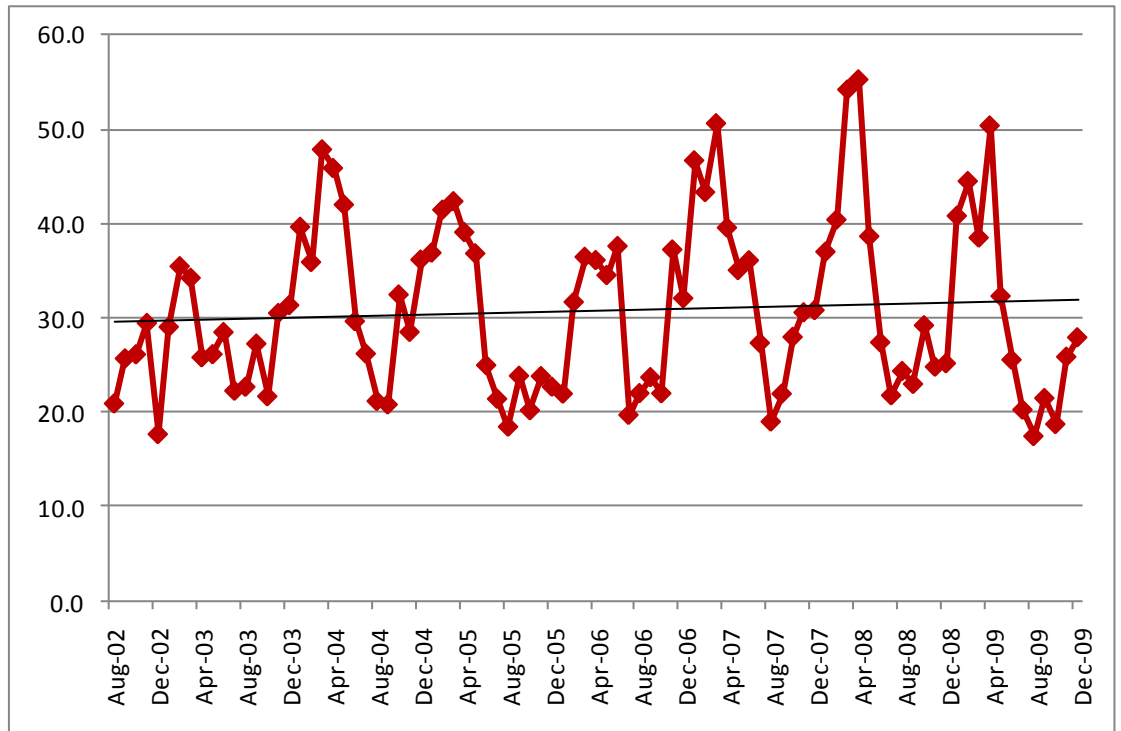
Solid black line represents a linear trend analysis of the monthly data.



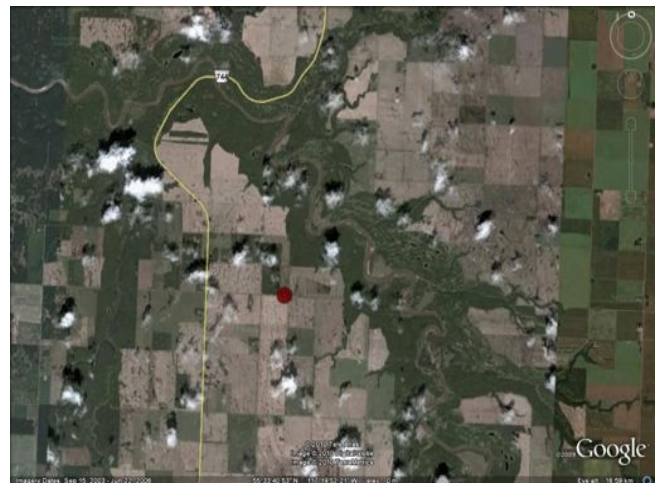
NO₂

36 Guy

O₃

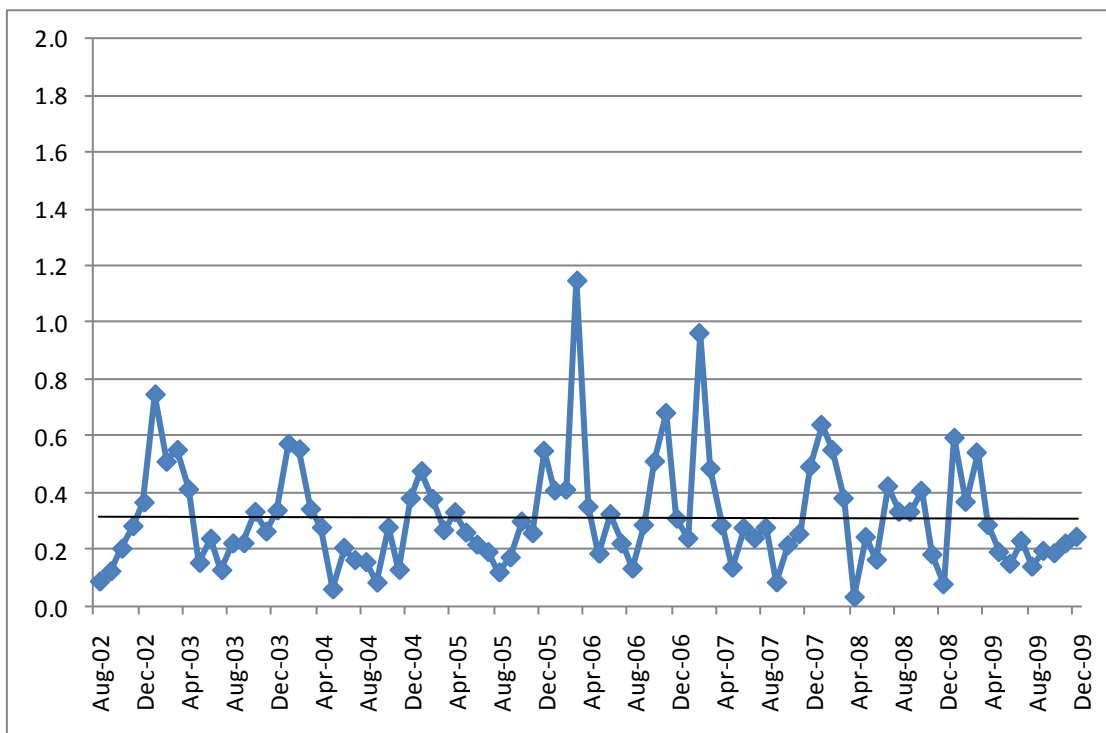


Solid black line represents a linear trend analysis of the monthly data.



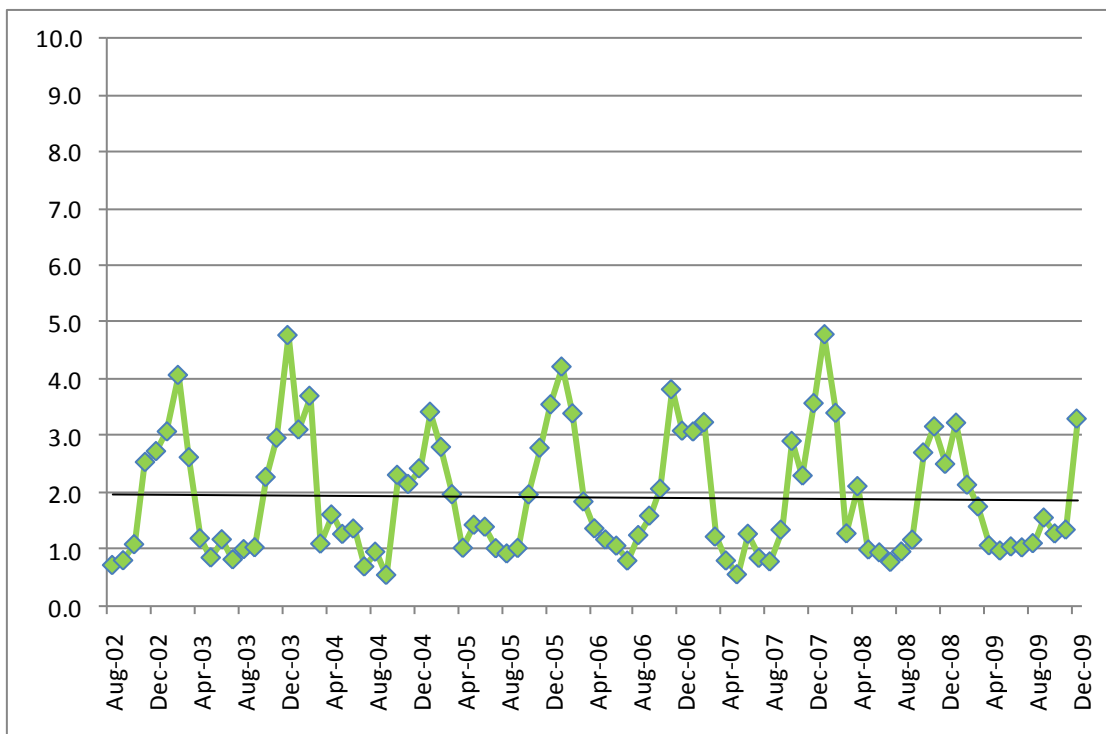
Road Map

37 Crooked Creek



SO₂

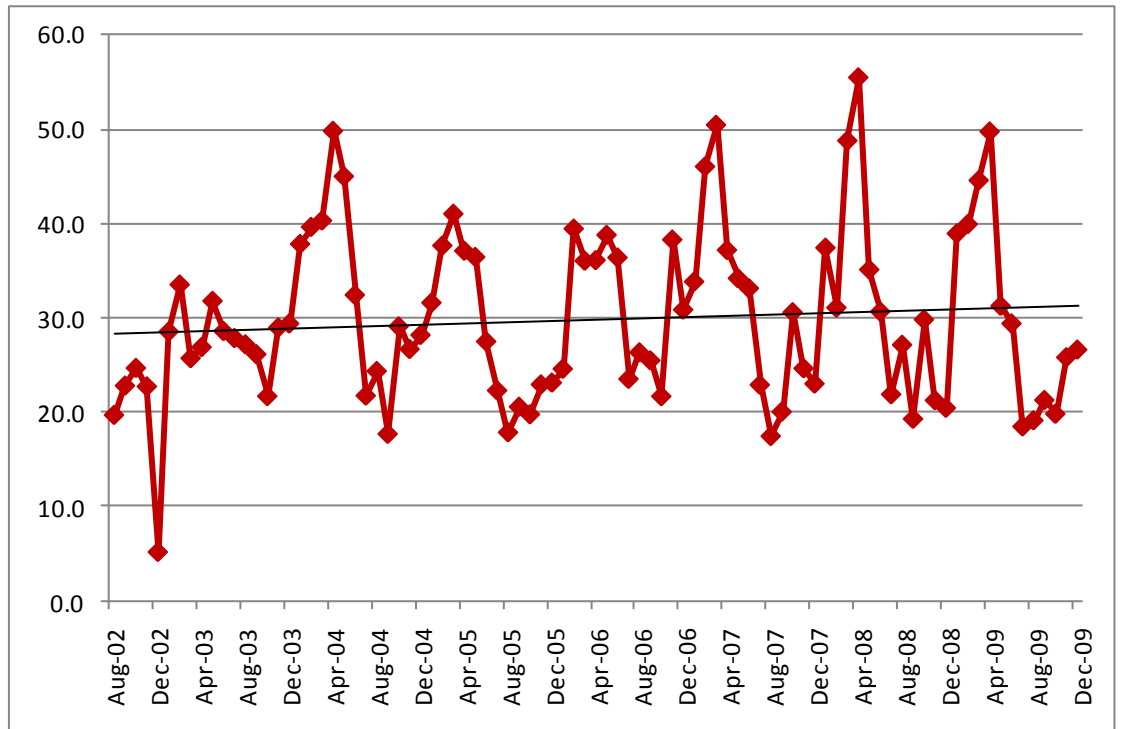
Solid black line represents a linear trend analysis of the monthly data.



NO₂

37 Crooked Creek

O₃

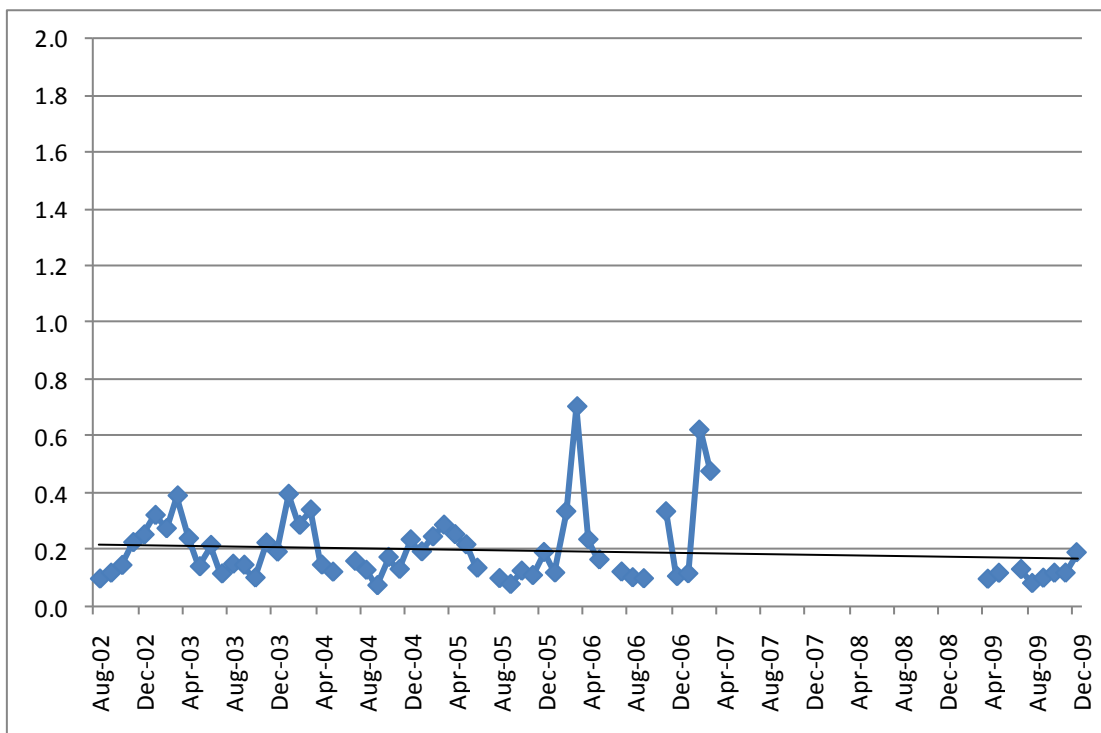


Solid black line represents a linear trend analysis of the monthly data.



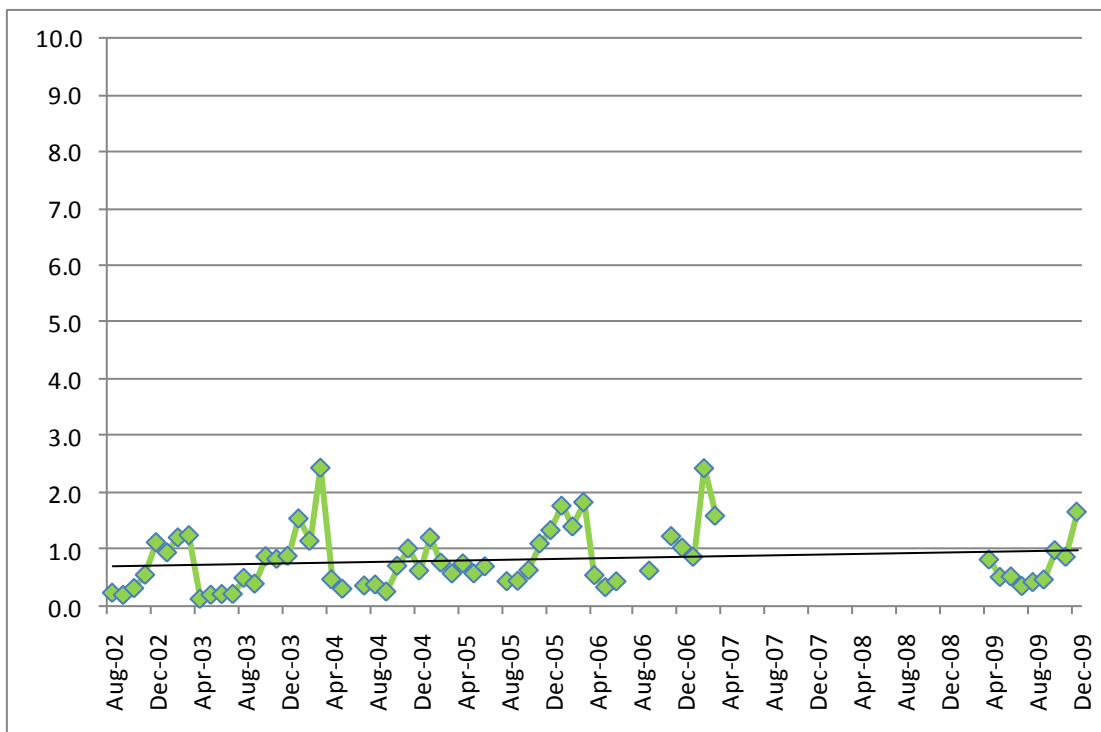
Road Map

38 Karr Creek



SO₂

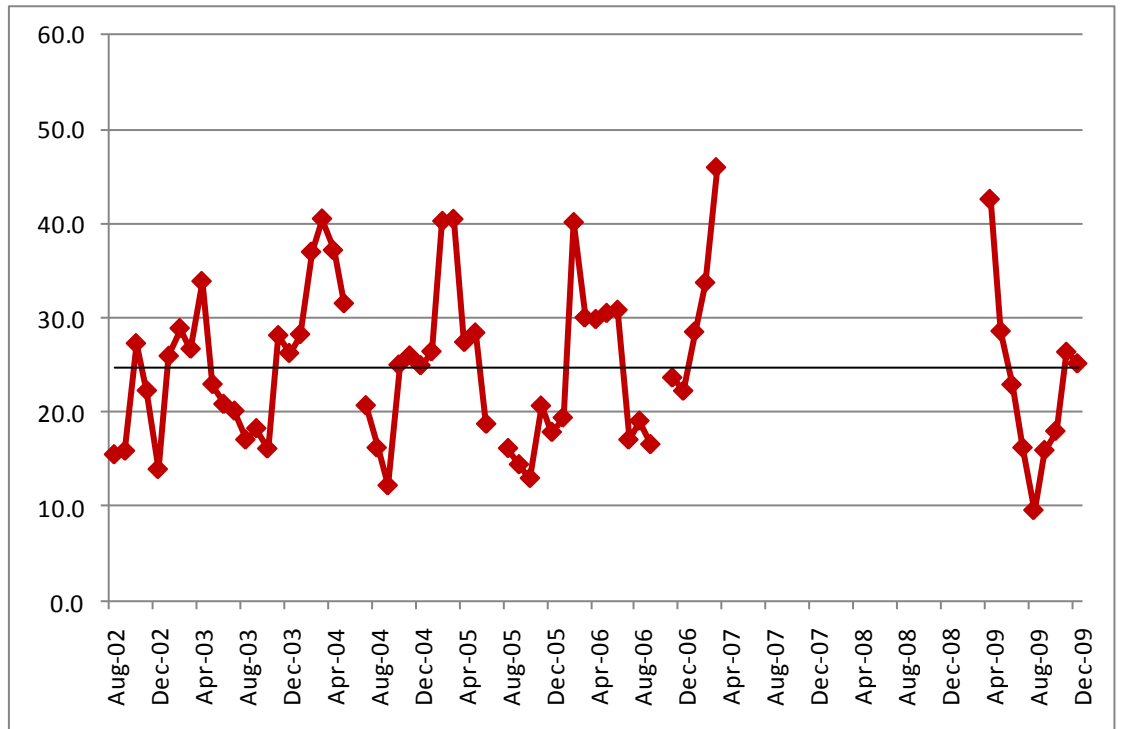
Solid black line represents a linear trend analysis of the monthly data.



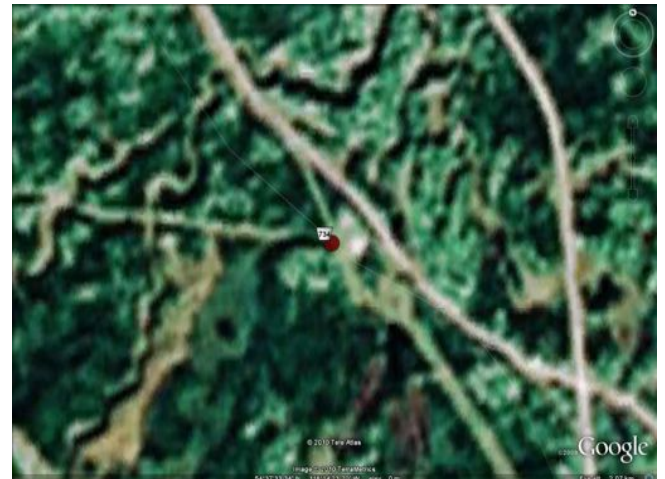
NO₂

38 Karr Creek

O₃



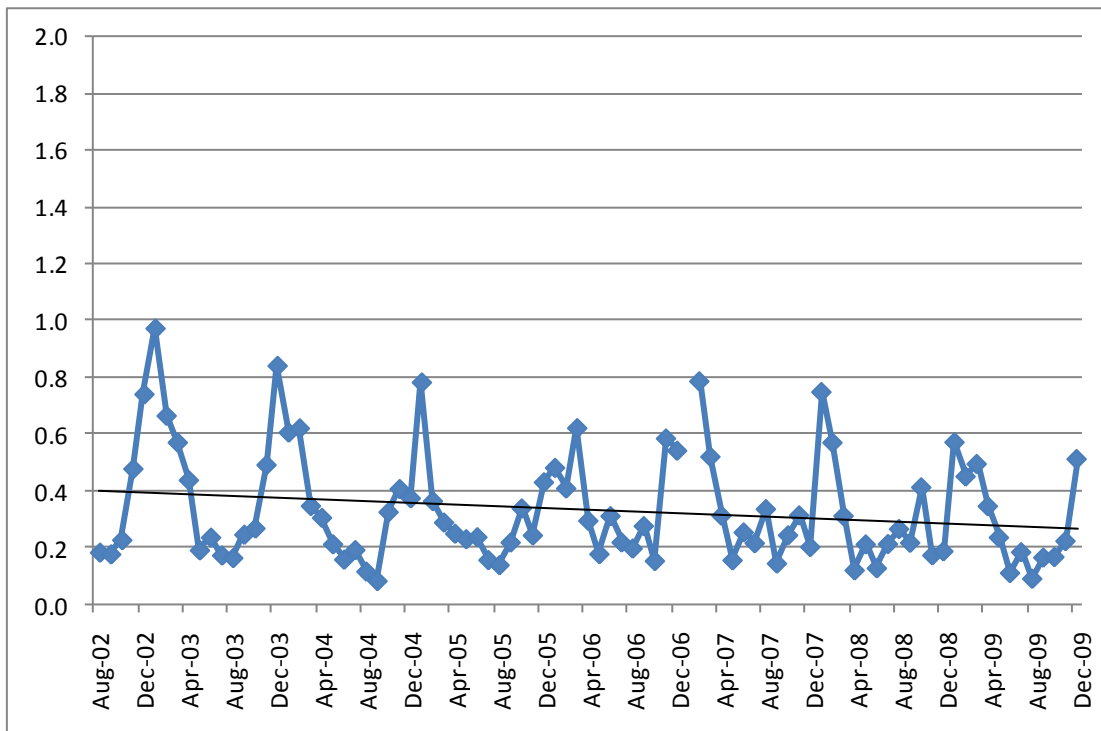
Solid black line represents a linear trend analysis of the monthly data.



* Karr Creek Station was temporarily removed because of construction in the area.

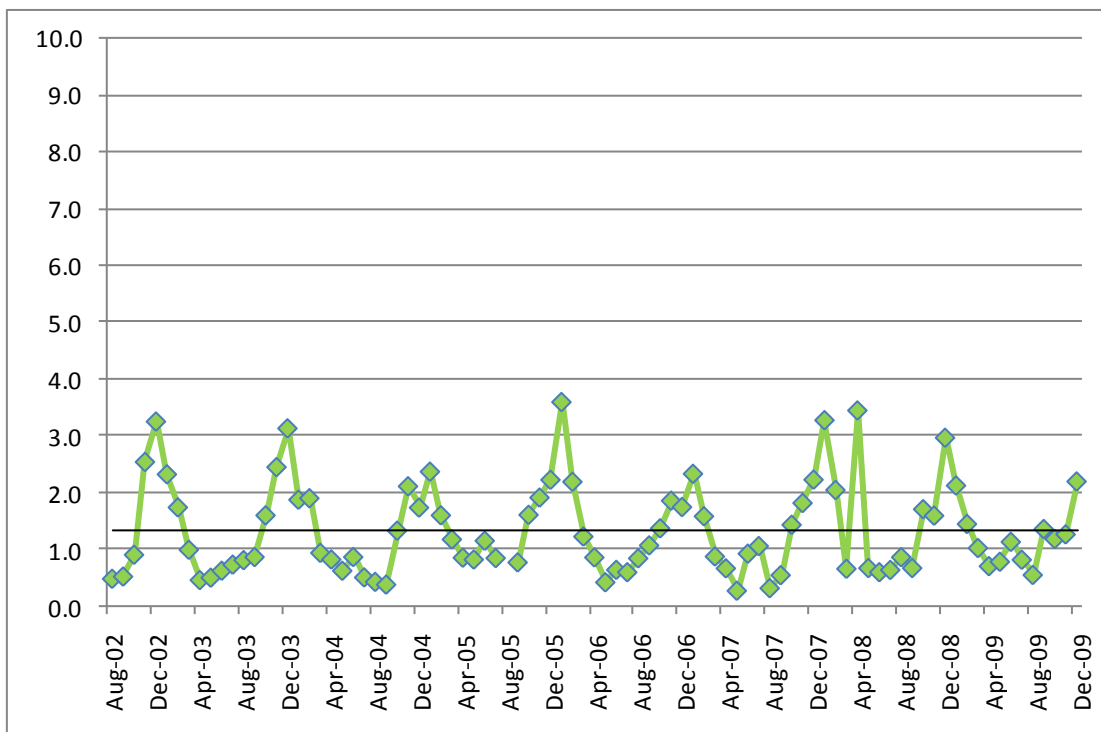
Road Map

39 Clouston Creek



SO₂

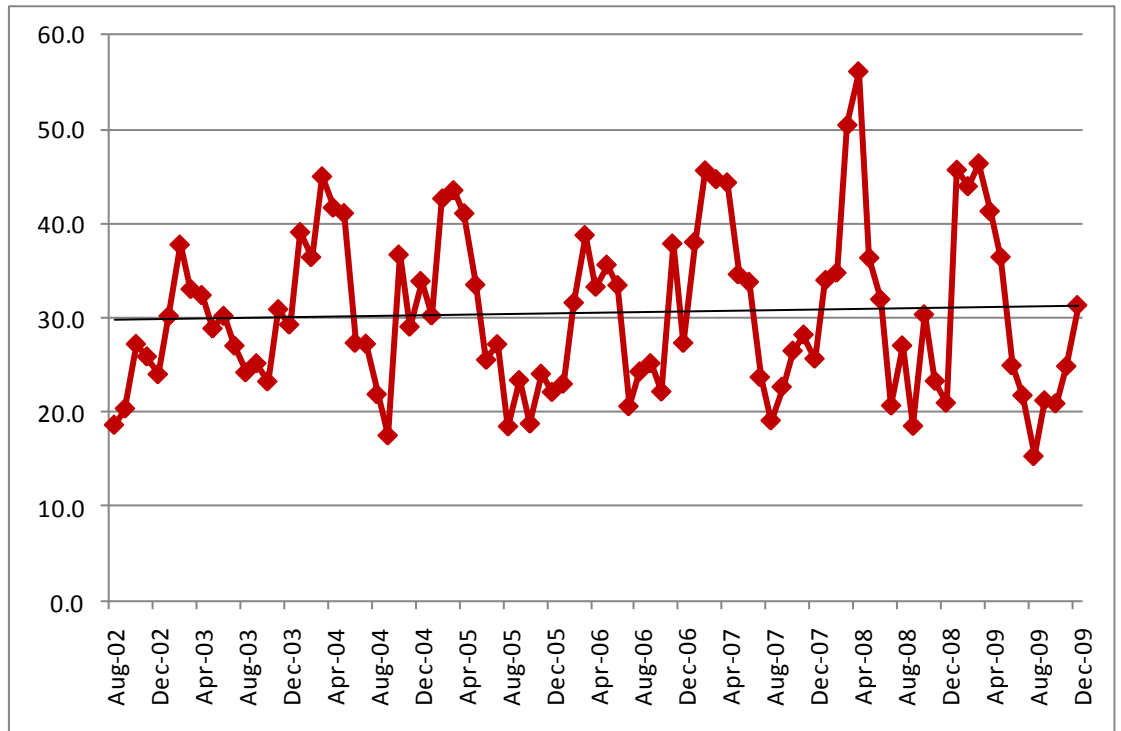
Solid black line represents a linear trend analysis of the monthly data.



NO₂

39 Clouston Creek

O₃

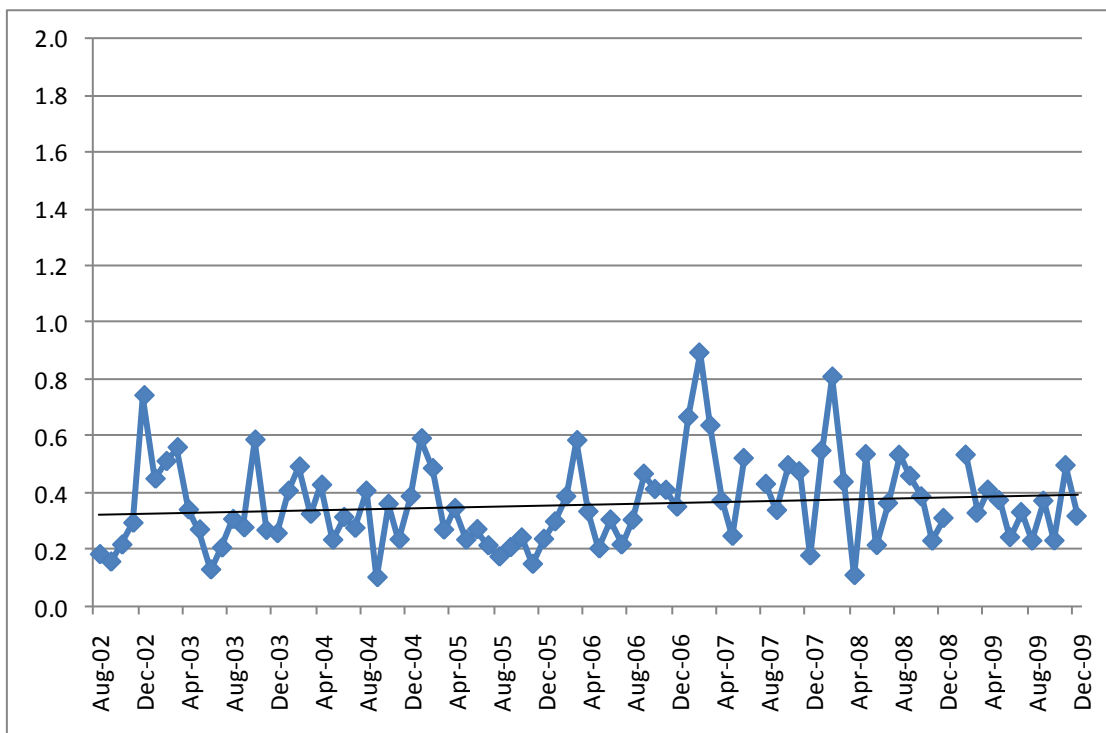


Solid black line represents a linear trend analysis of the monthly data.



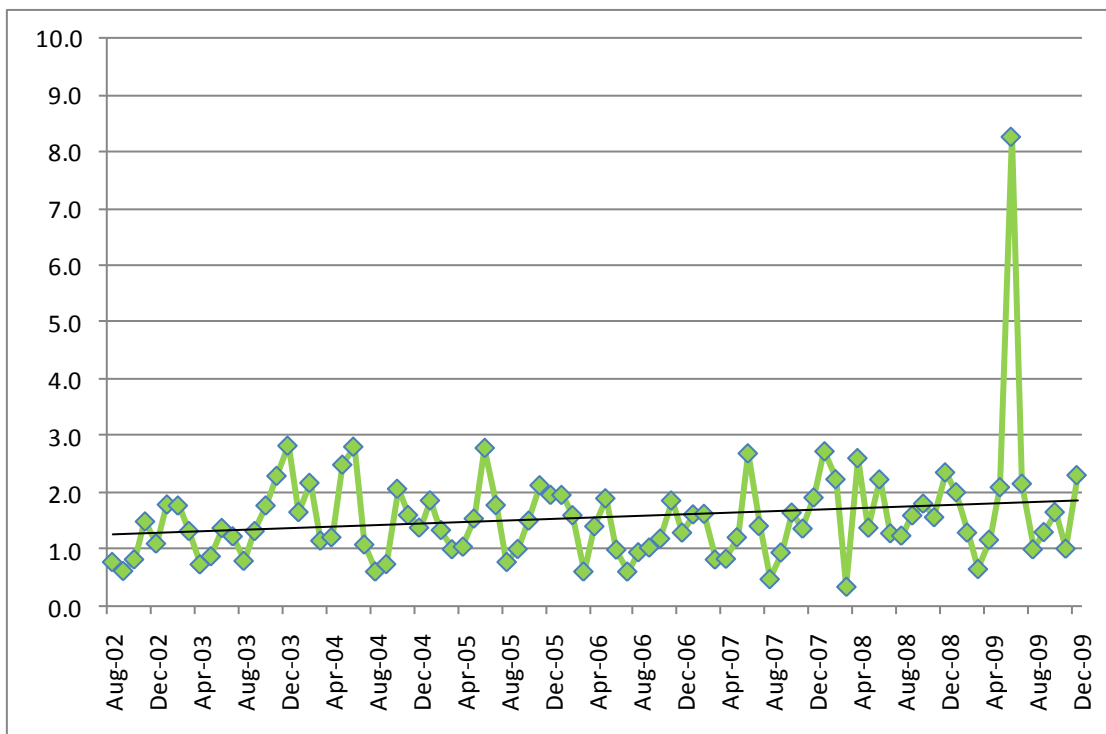
Road Map

40 McLennan



SO₂

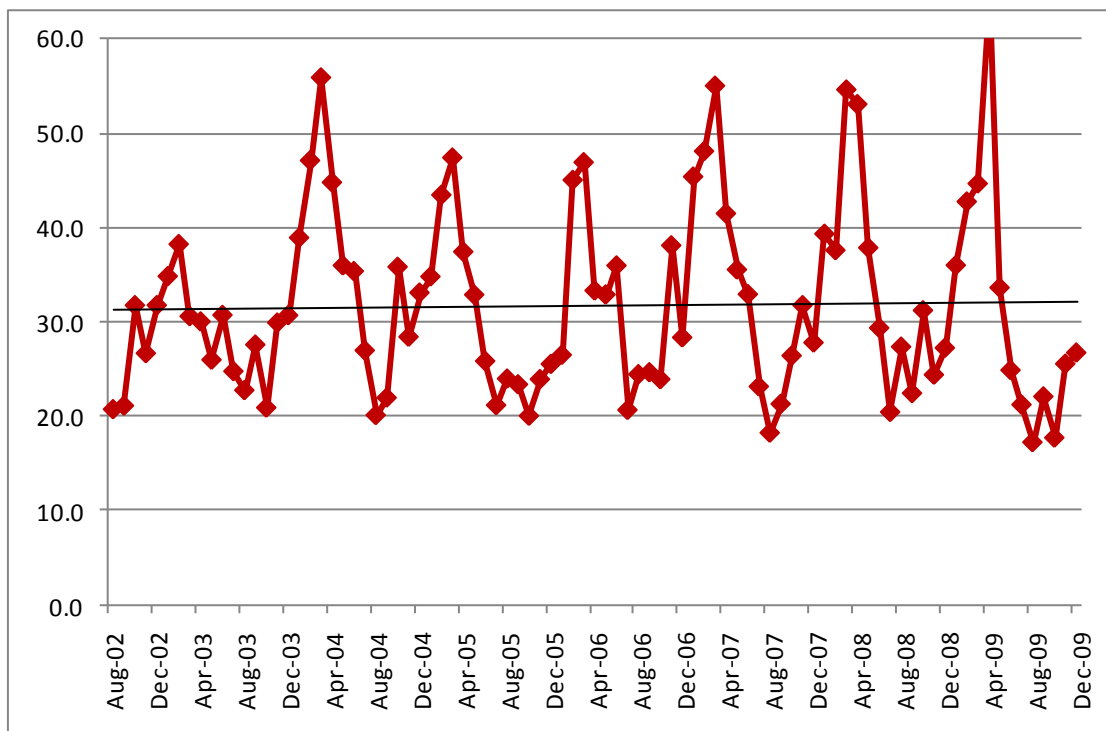
Solid black line represents a linear trend analysis of the monthly data.



NO₂

40 McLennan

O₃

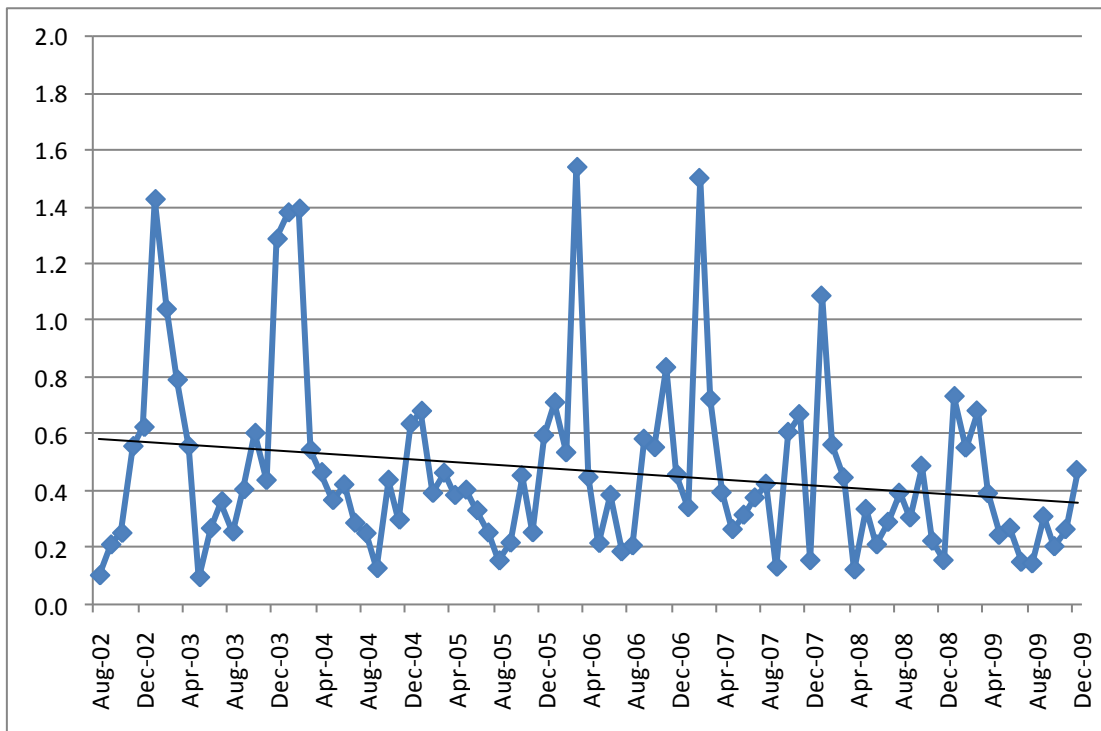


Solid black line represents a linear trend analysis of the monthly data.

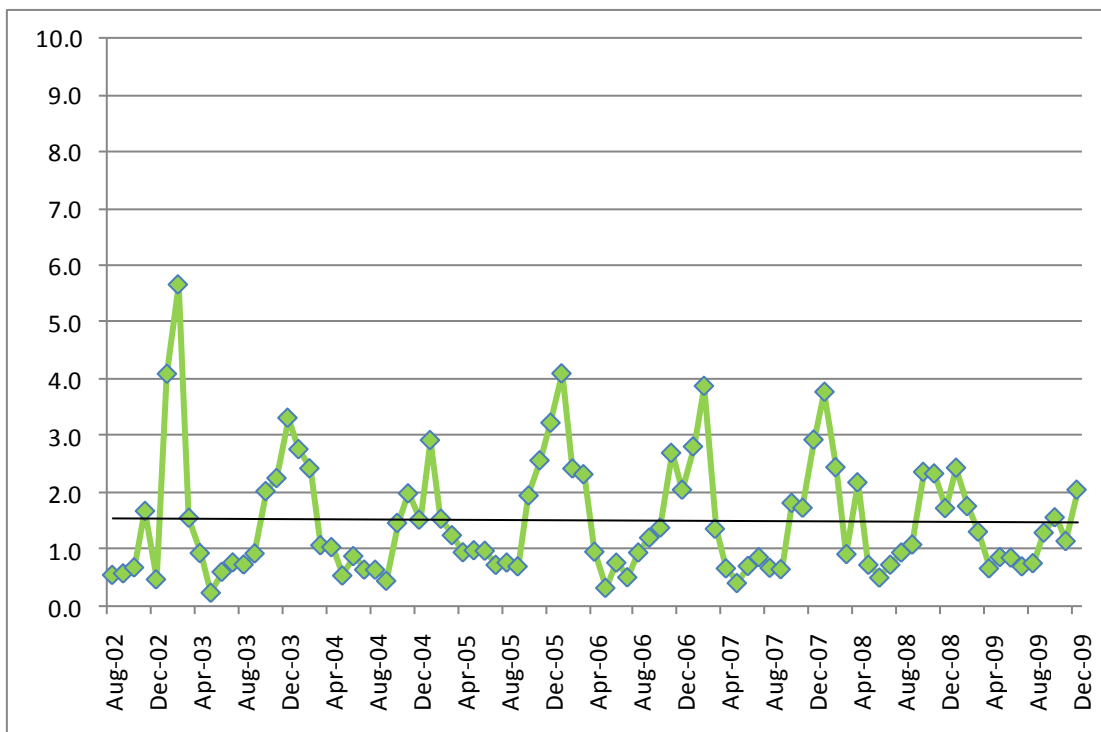


Road Map

41 Valleyview

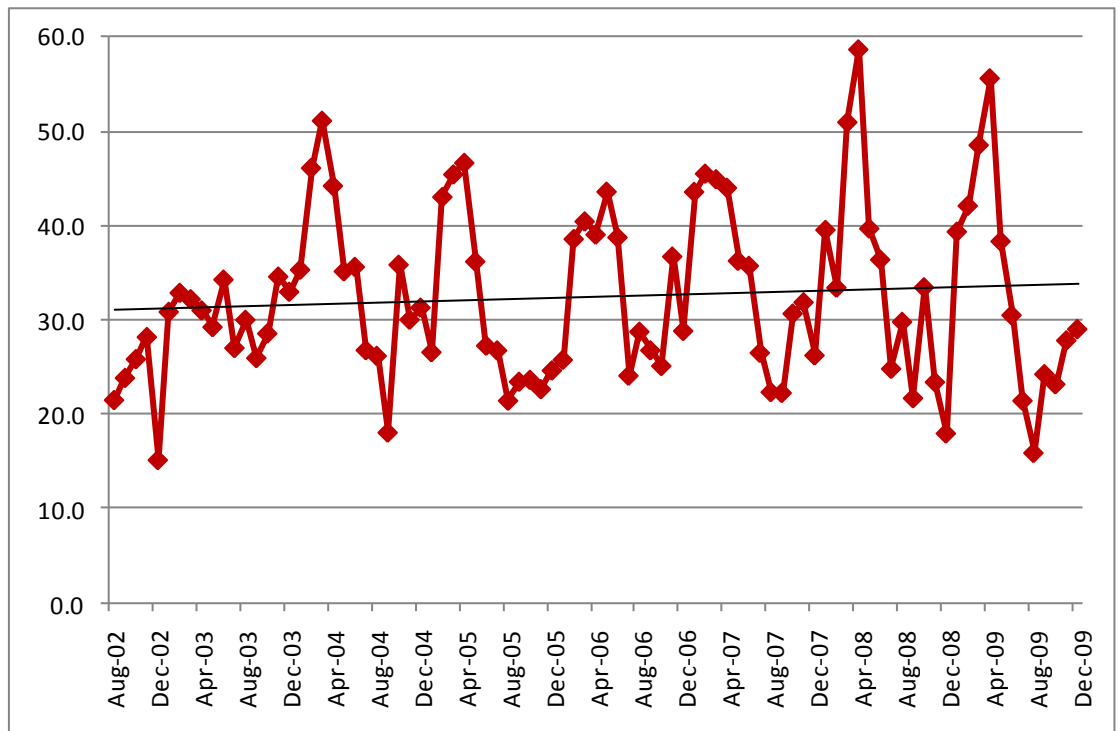


Solid black line represents a linear trend analysis of the monthly data.



41 Valleyview

O₃

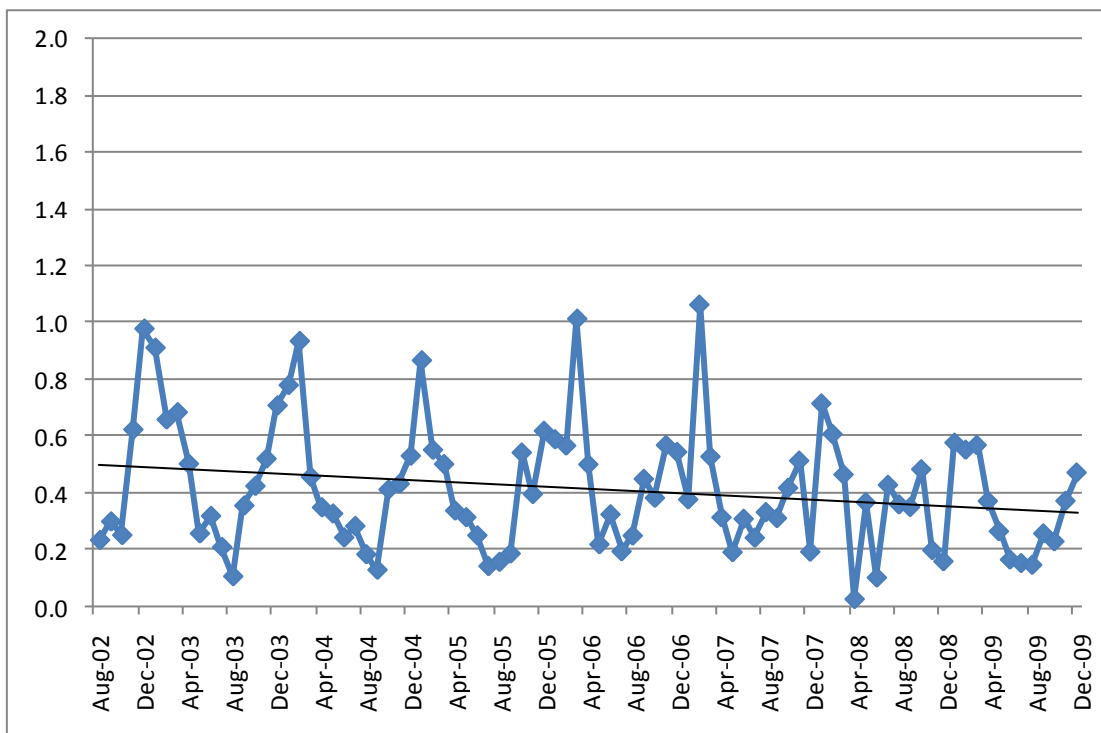


Solid black line represents a linear trend analysis of the monthly data.



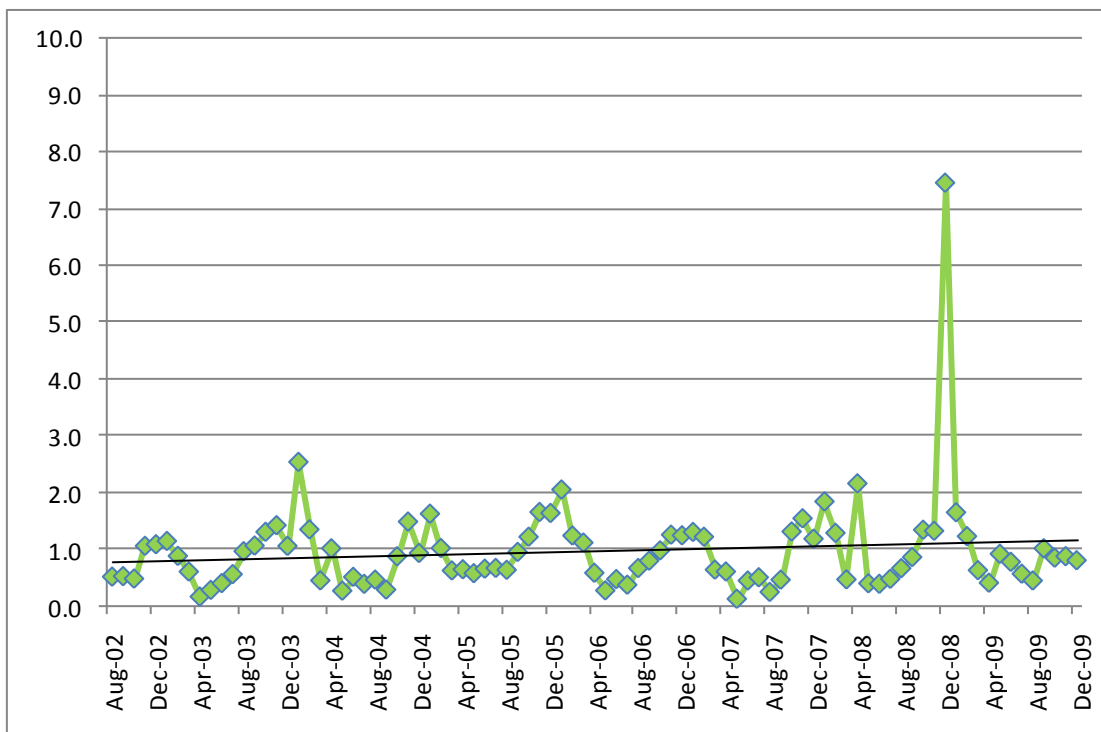
Road Map

42 Sunset House



SO₂

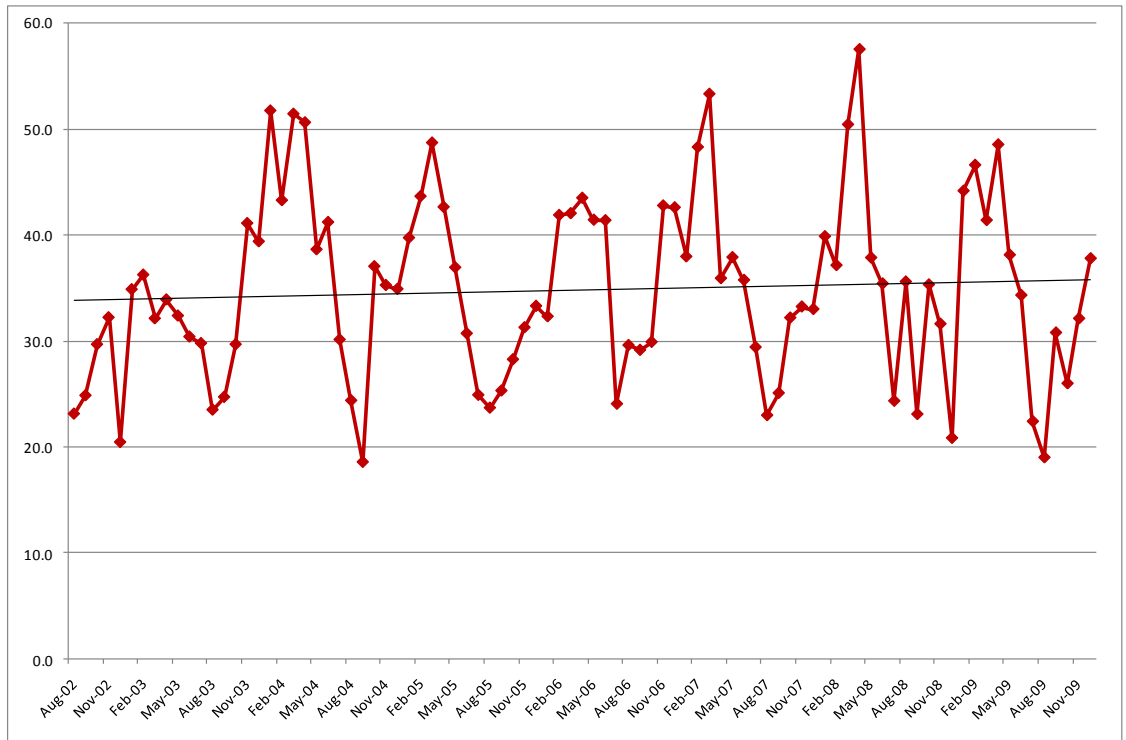
Solid black line represents a linear trend analysis of the monthly data.



NO₂

42 Sunset House

O₃

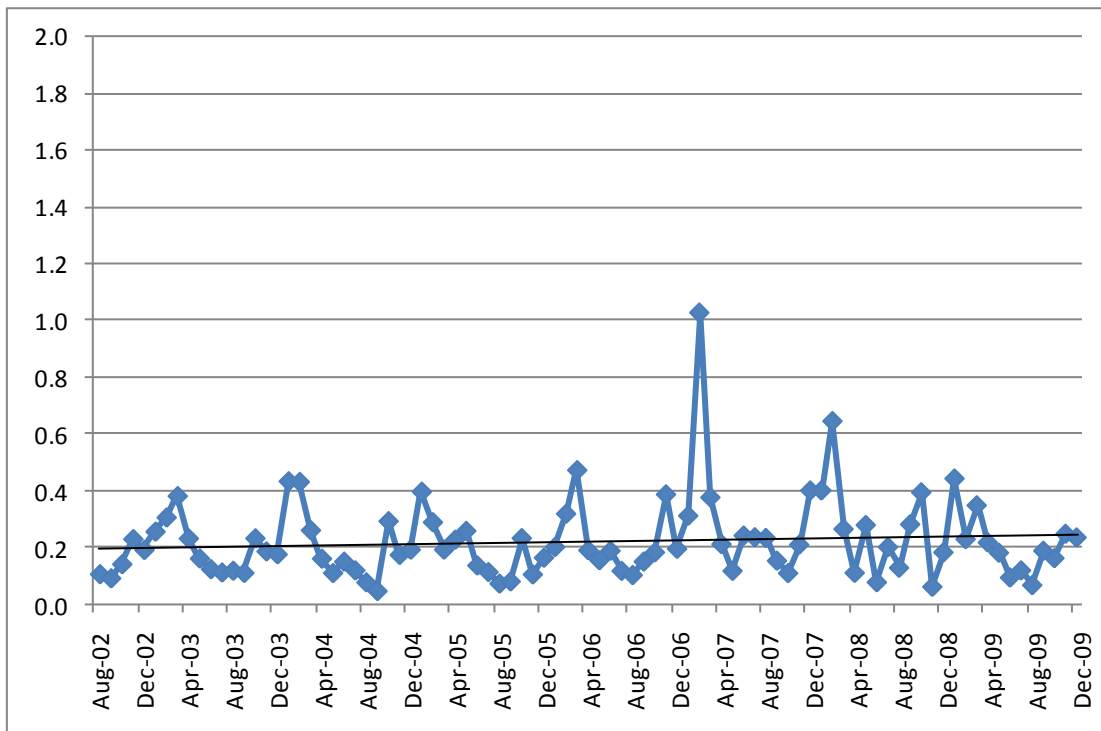


Solid black line represents a linear trend analysis of the monthly data.



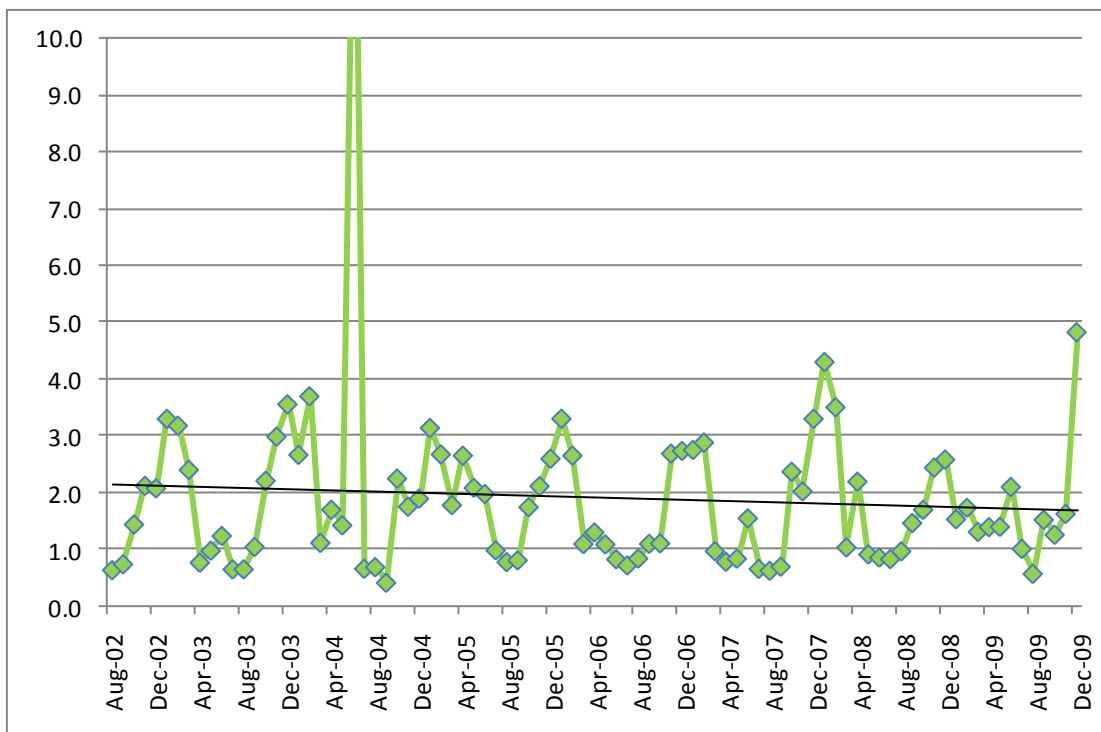
Road Map

43 High Prairie



SO₂

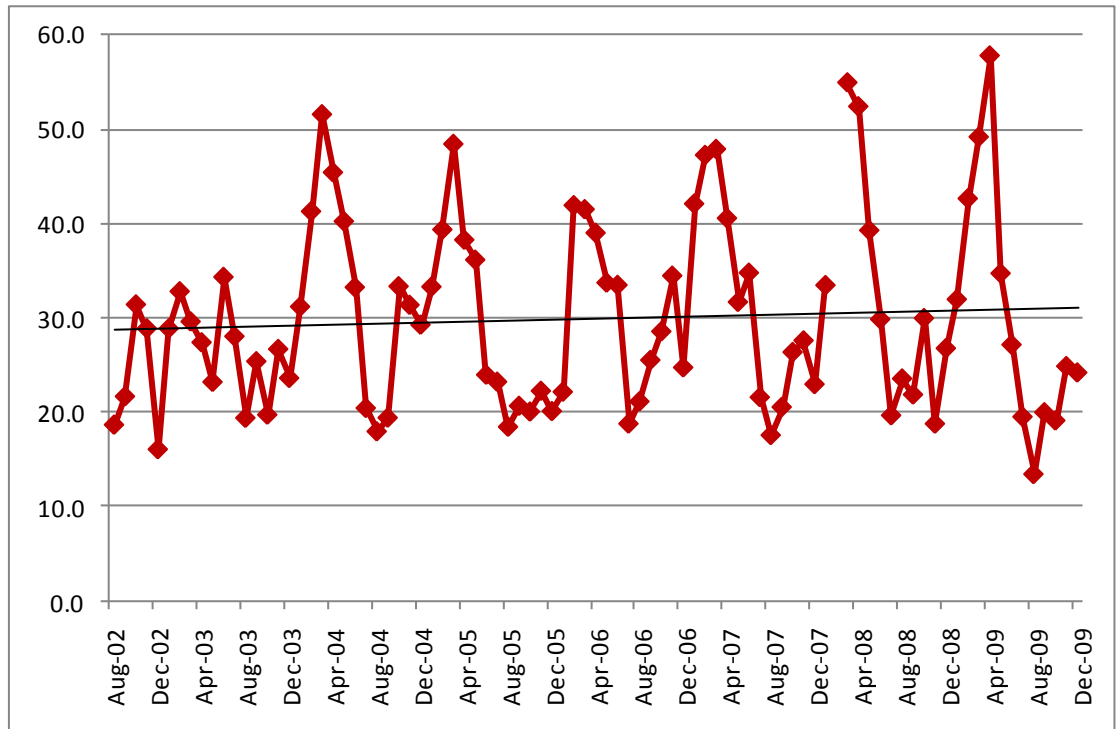
Solid black line represents a linear trend analysis of the monthly data.



NO₂

43 High Prairie

O₃

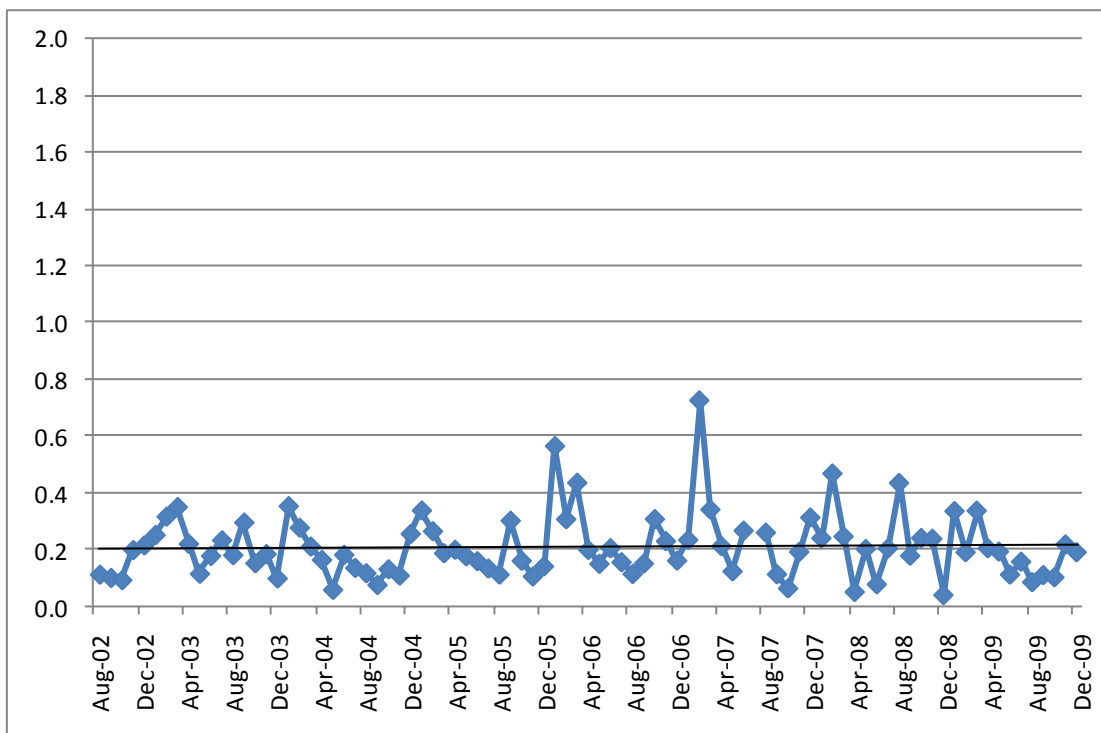


Solid black line represents a linear trend analysis of the monthly data.



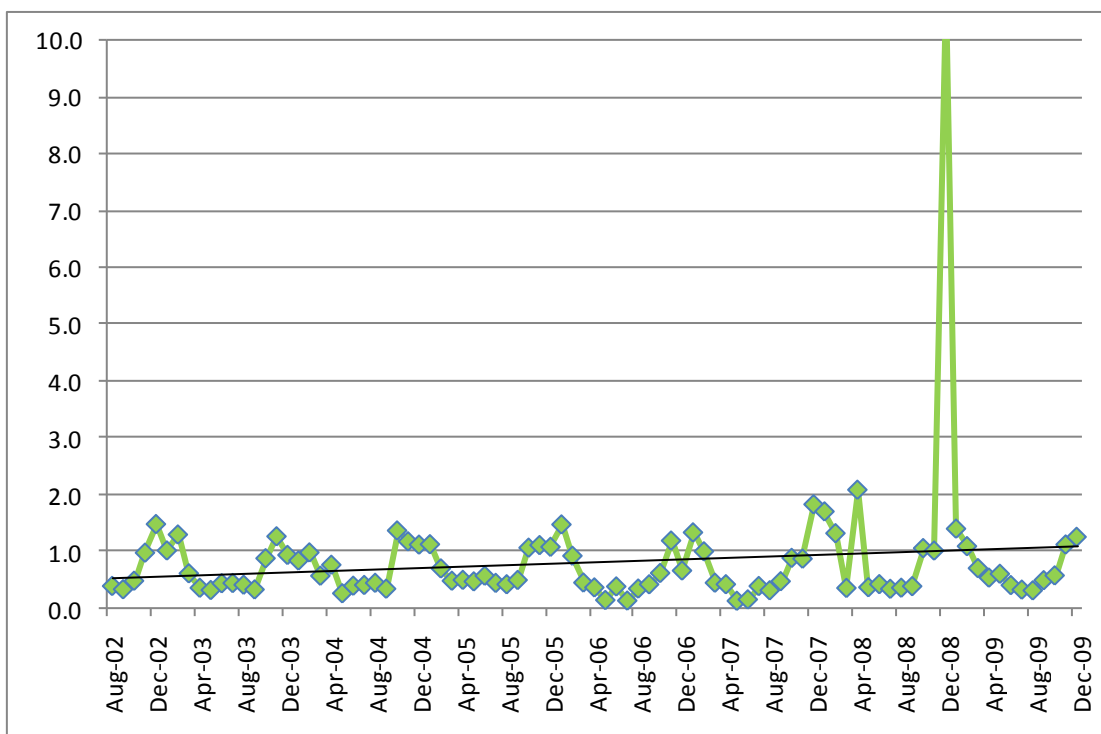
Road Map

44 Peavine



SO₂

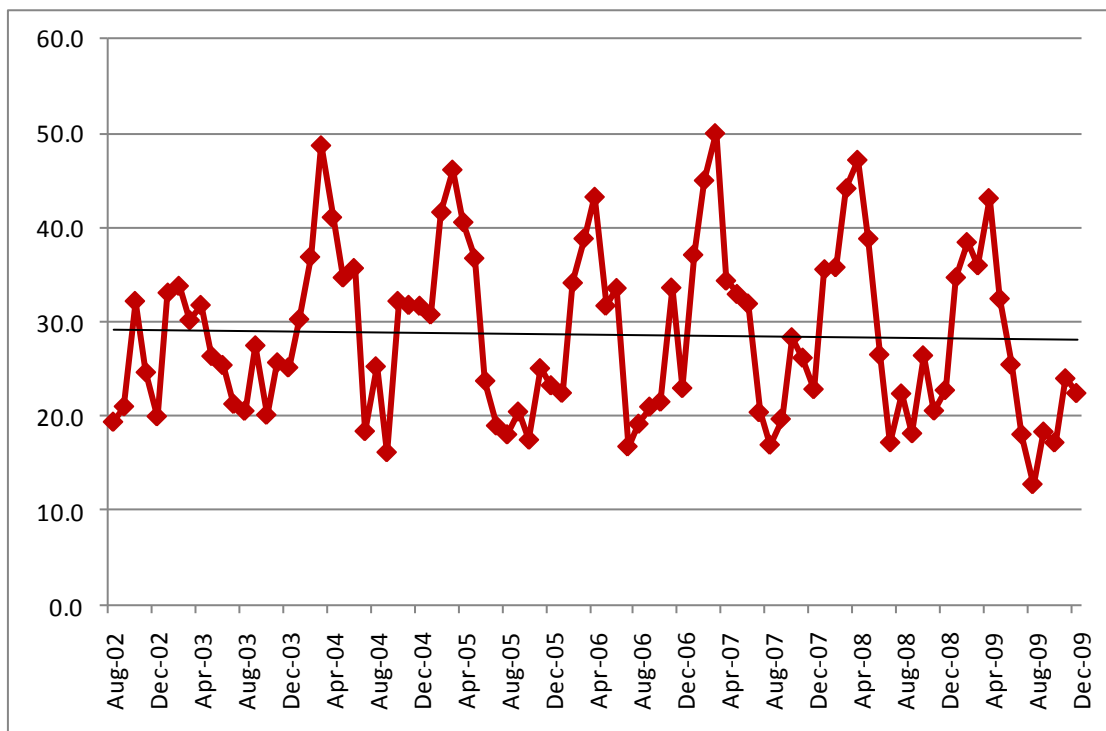
Solid black line represents a linear trend analysis of the monthly data.



NO₂

44 Peavine

O₃

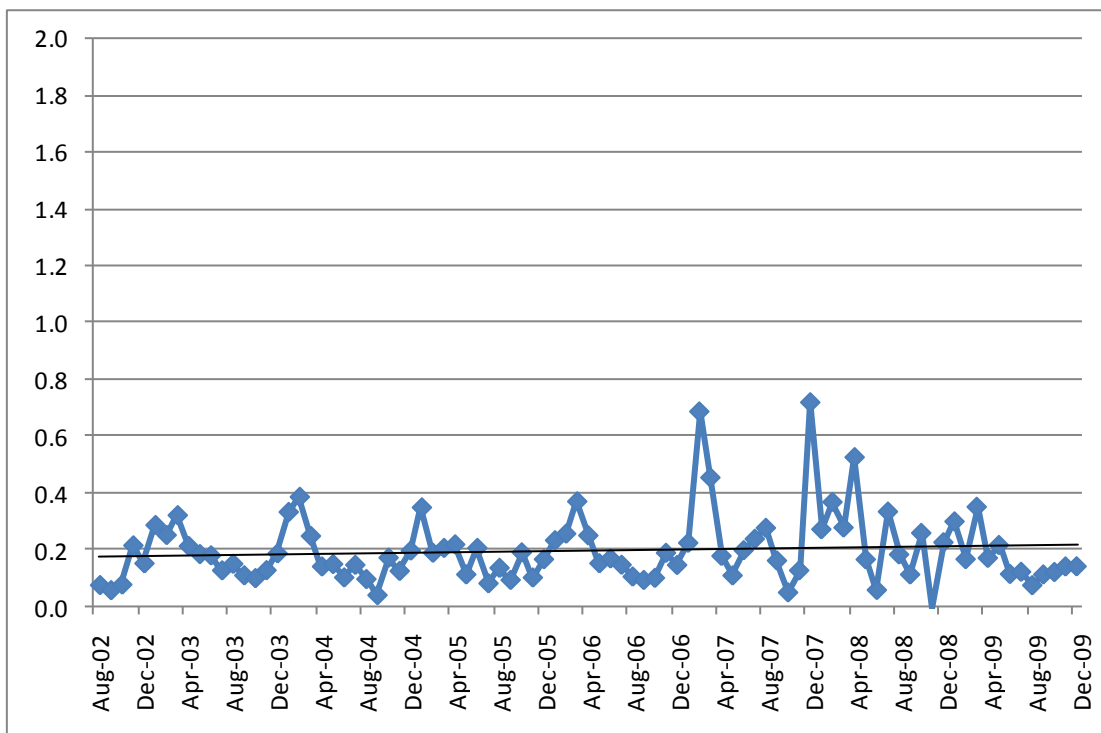


Solid black line represents a linear trend analysis of the monthly data.



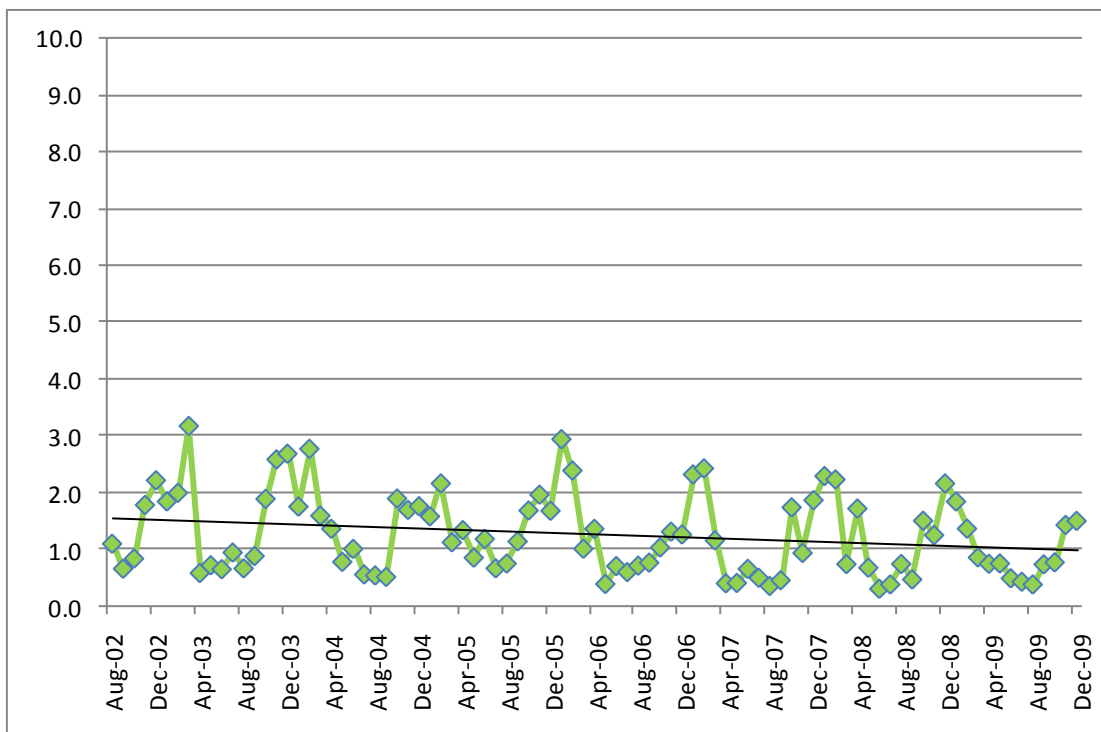
Road Map

45 Gift Lake



SO₂

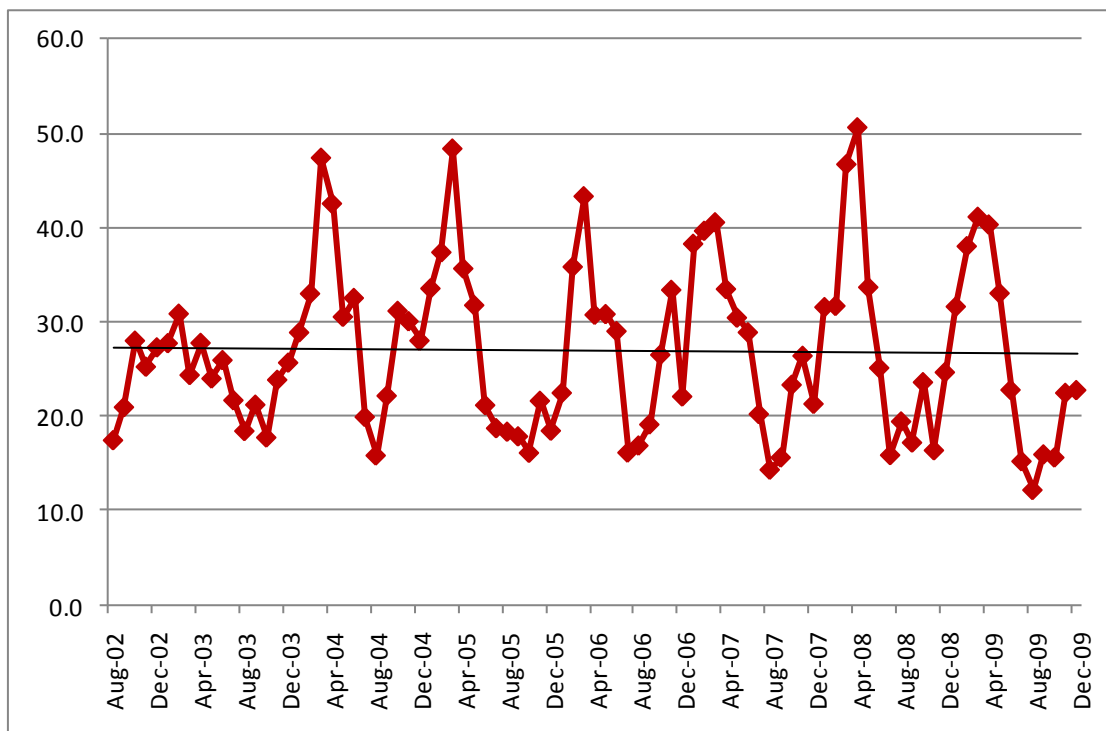
Solid black line represents a linear trend analysis of the monthly data.



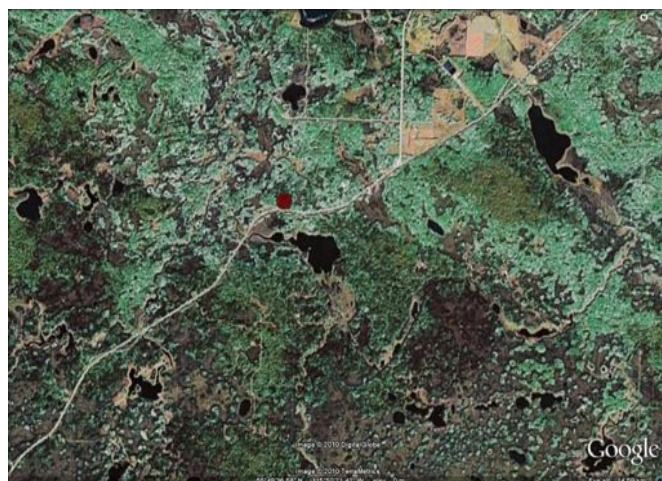
NO₂

45 Gift Lake

O₃

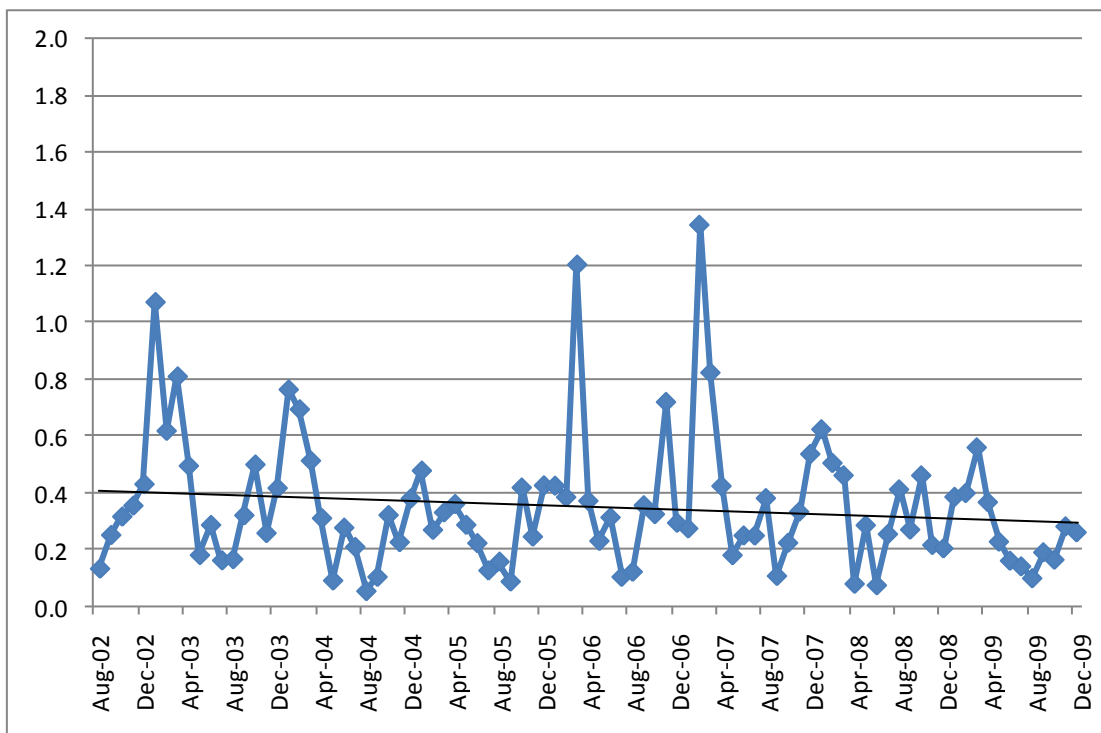


Solid black line represents a linear trend analysis of the monthly data.



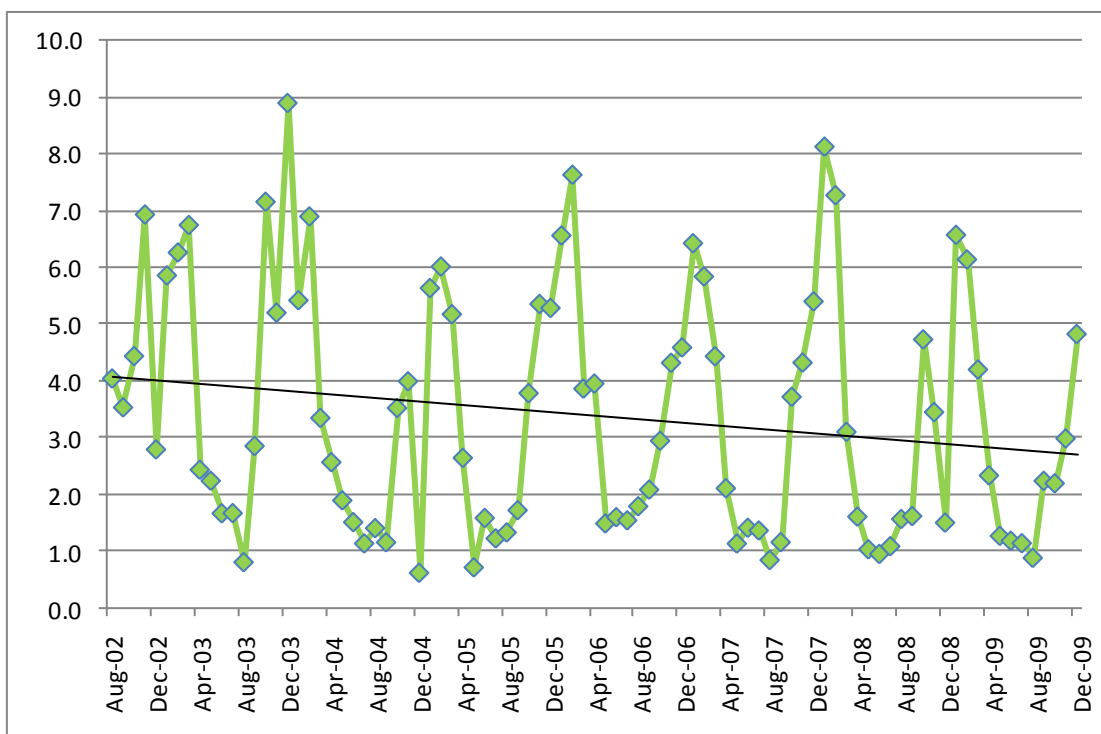
Road Map

46 Little Smoky



SO₂

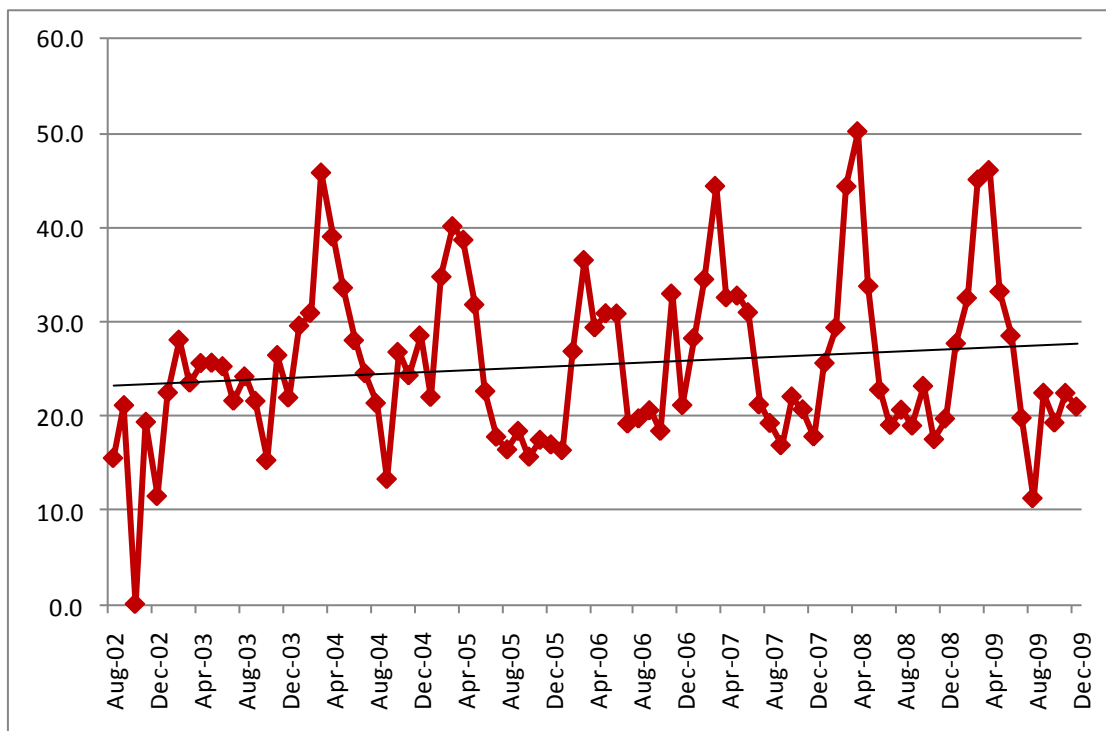
Solid black line represents a linear trend analysis of the monthly data.



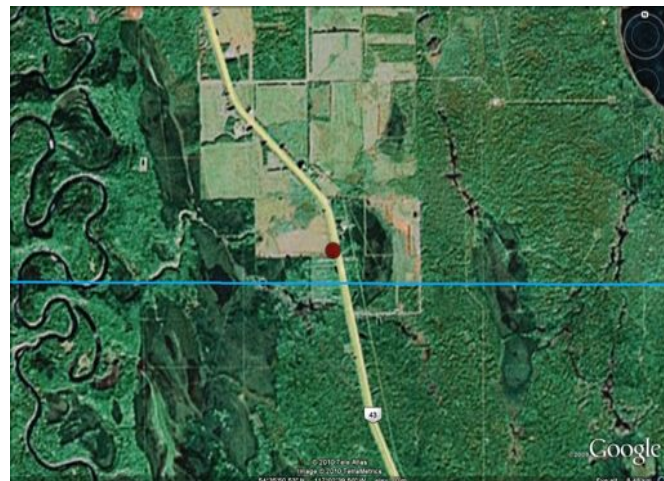
NO₂

46 Little Smoky

O₃



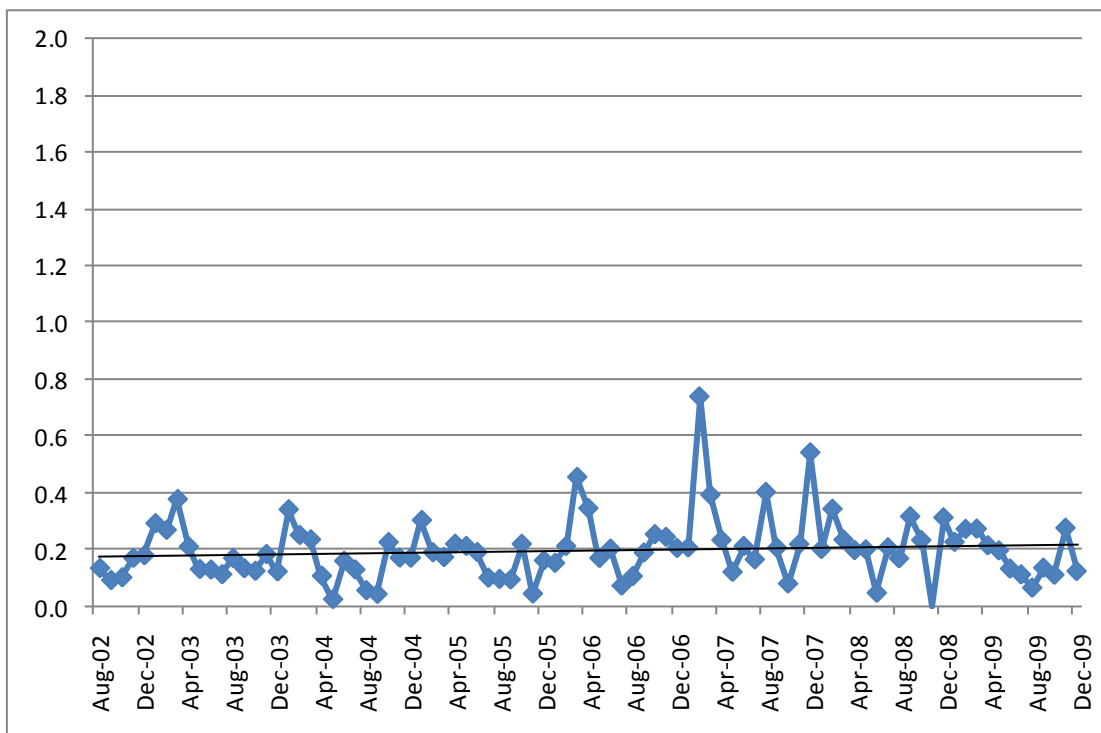
Solid black line represents a linear trend analysis of the monthly data.



* Little Smoky Station was relocated during monitoring period.

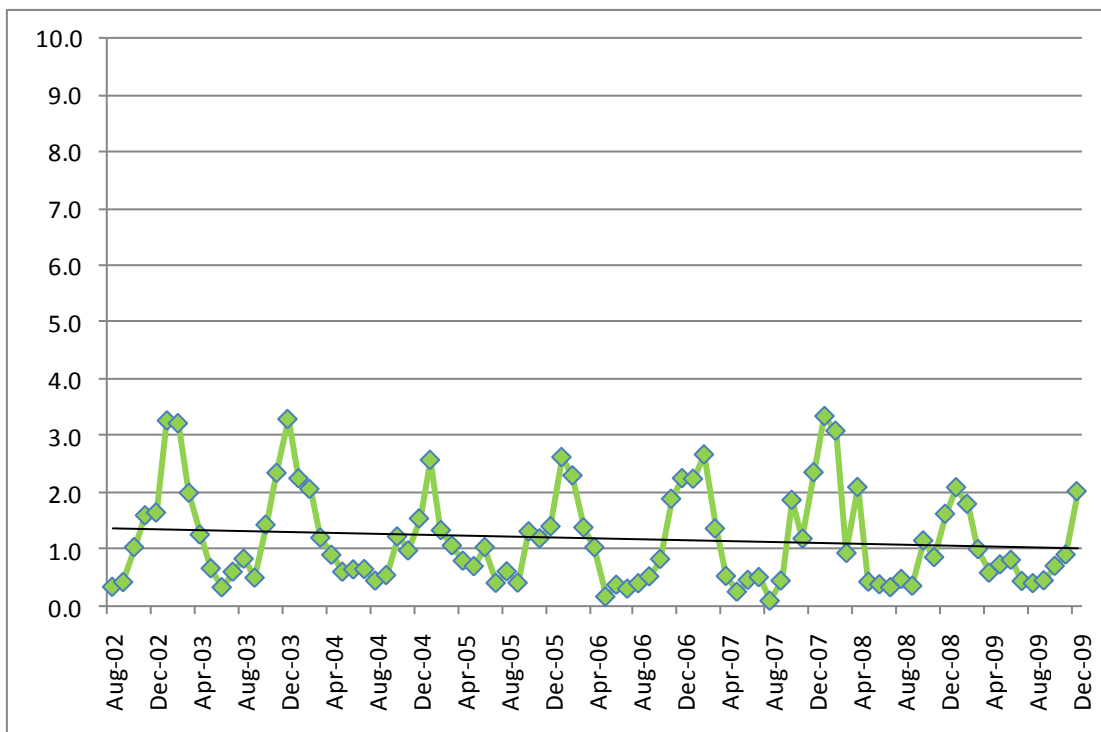
Road Map

47 Kinuso



SO₂

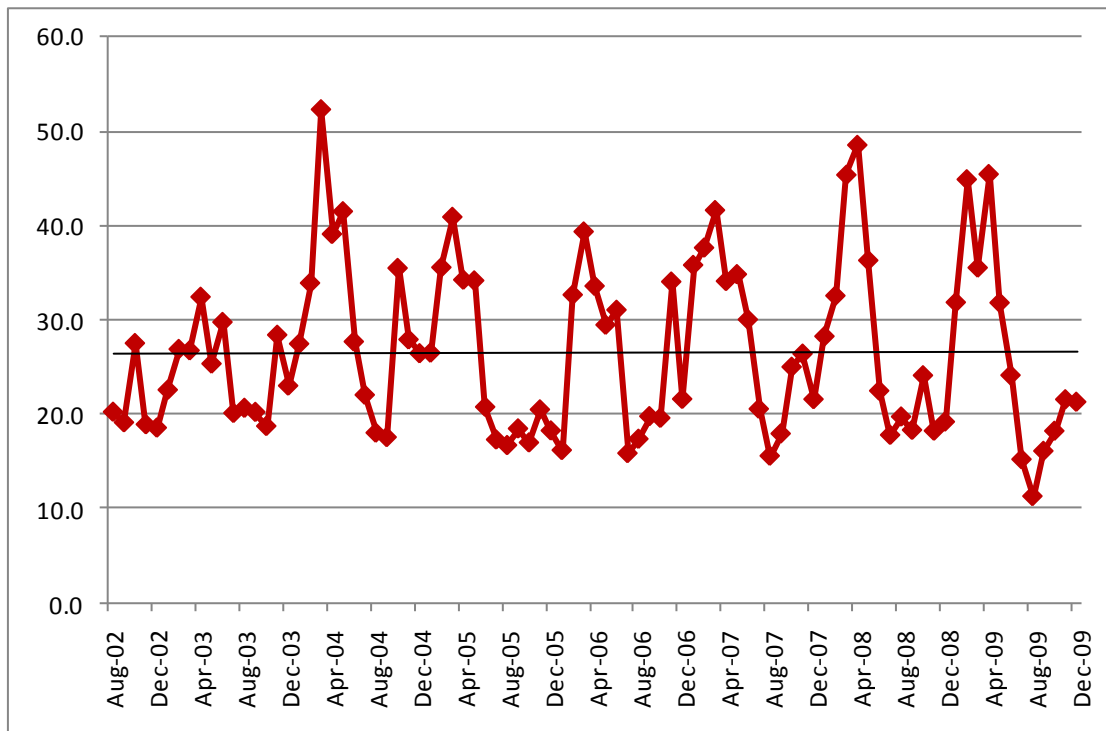
Solid black line represents a linear trend analysis of the monthly data.



NO₂

47 Kinuso

O₃

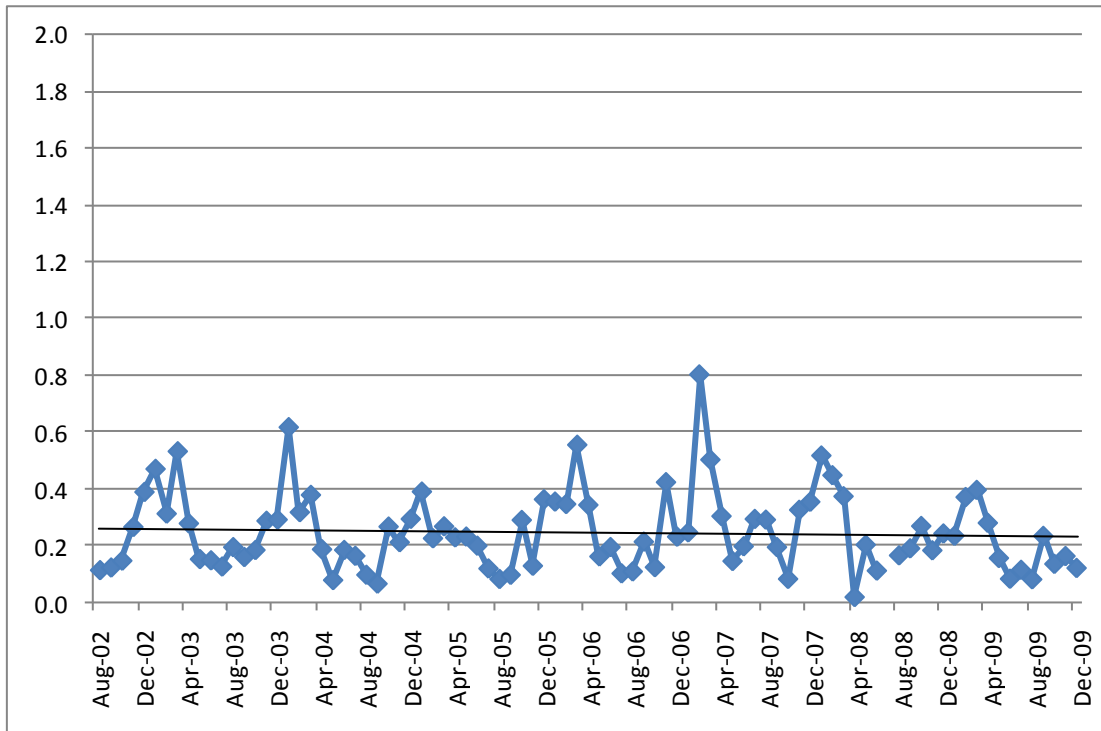


Solid black line represents a linear trend analysis of the monthly data.



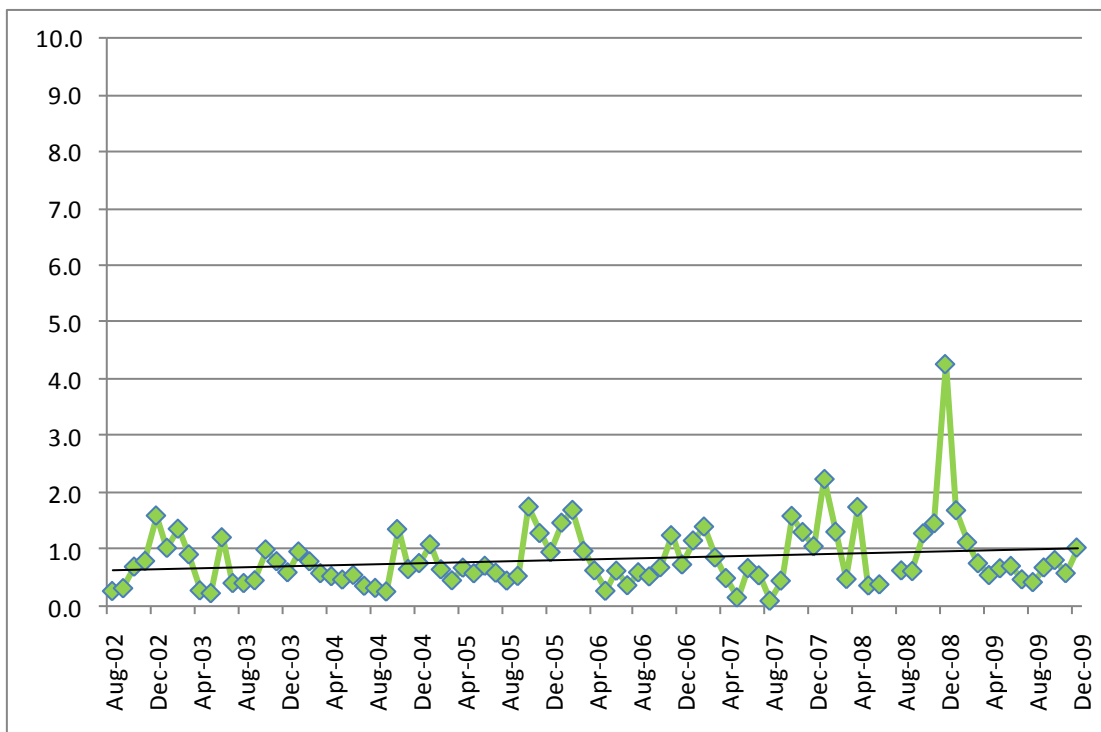
Road Map

48 Deer Mountain



SO₂

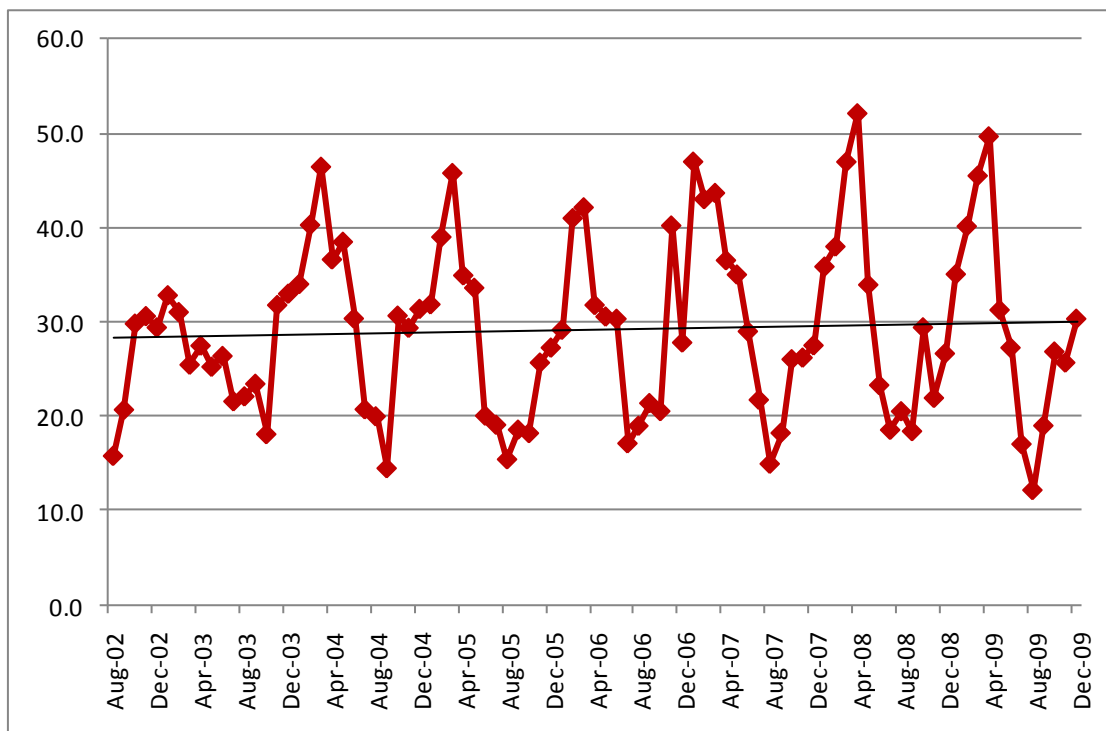
Solid black line represents a linear trend analysis of the monthly data.



NO₂

48 Deer Mountain

O₃

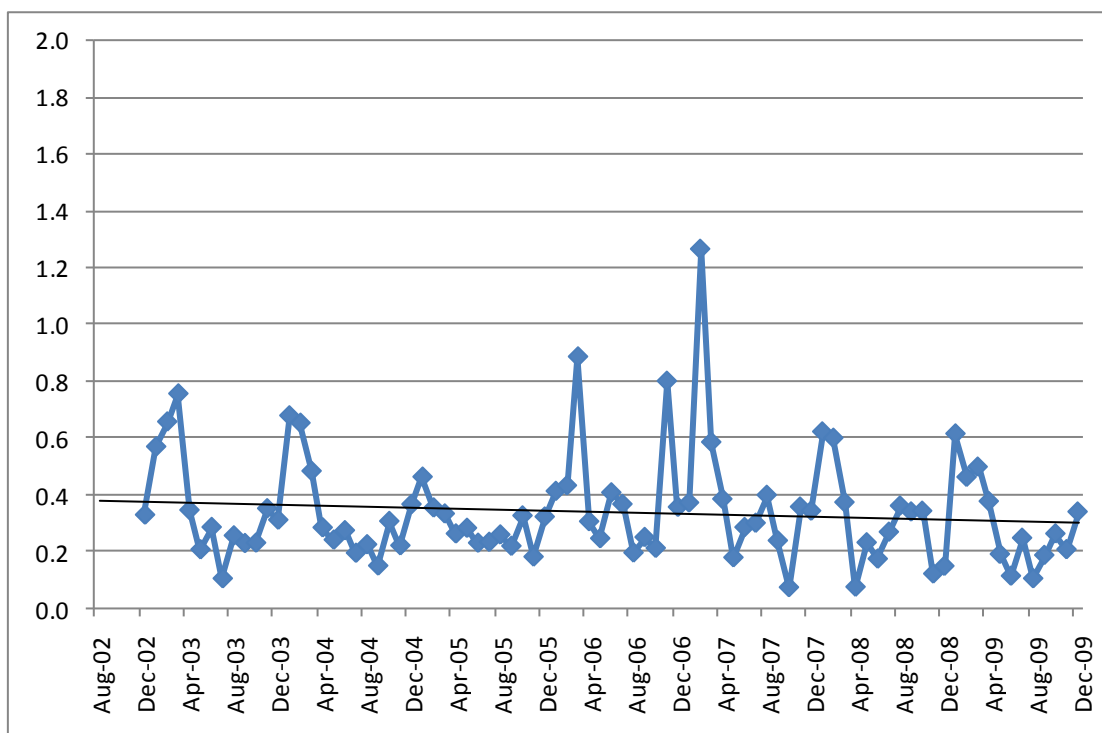


Solid black line represents a linear trend analysis of the monthly data.



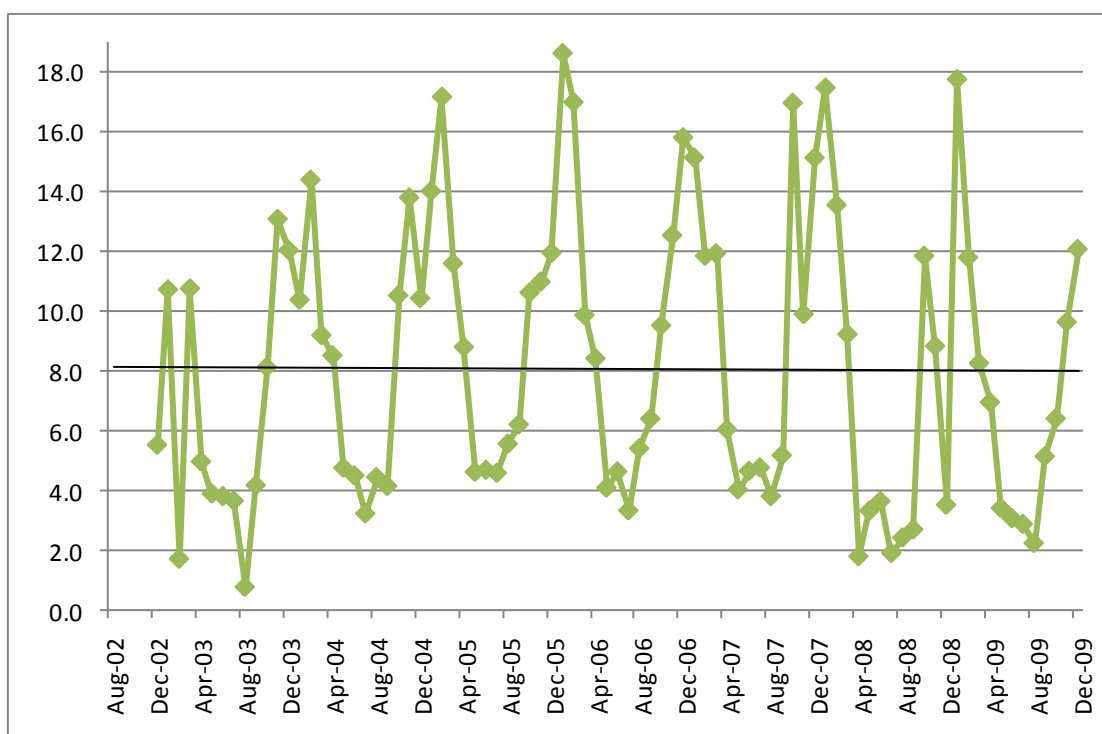
Road Map

49 Henry Pirker (Grande Prairie)



SO₂

Solid black line represents a linear trend analysis of the monthly data.

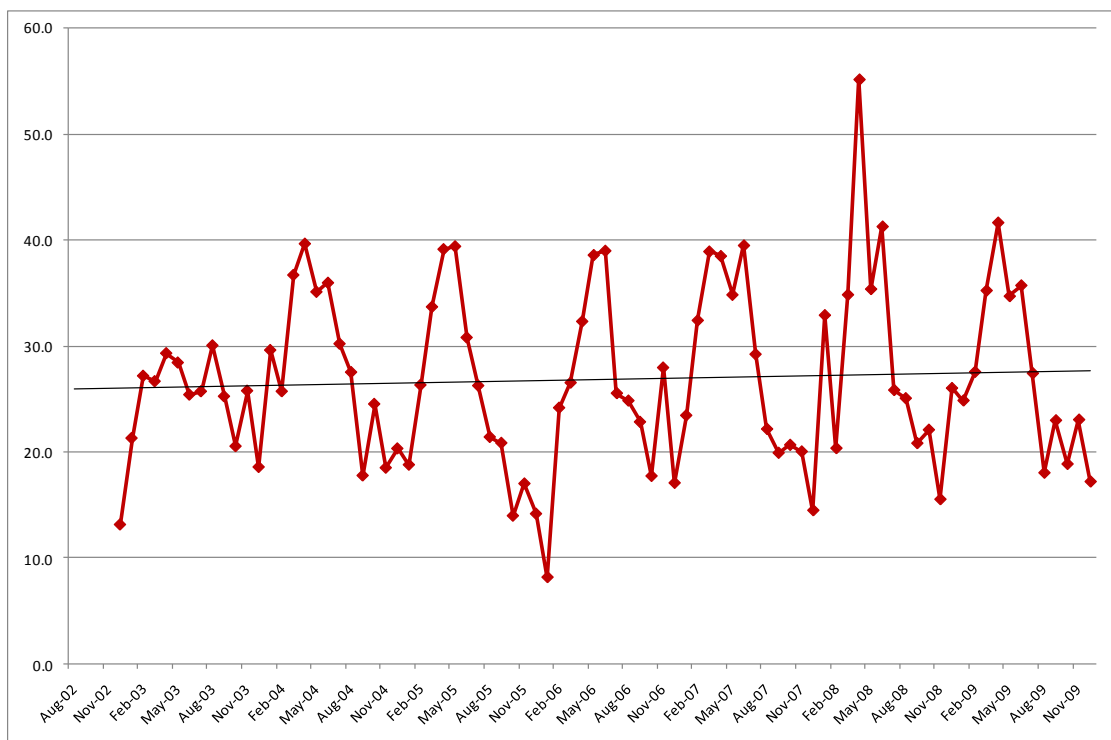


NO₂

NO₂ scale has been increased to 18 ppb.

49 Henry Pirker (Grande Prairie)

O₃



Solid black line represents a linear trend analysis of the monthly data.



* Henry Pirker Station was relocated during monitoring period.

Road Map