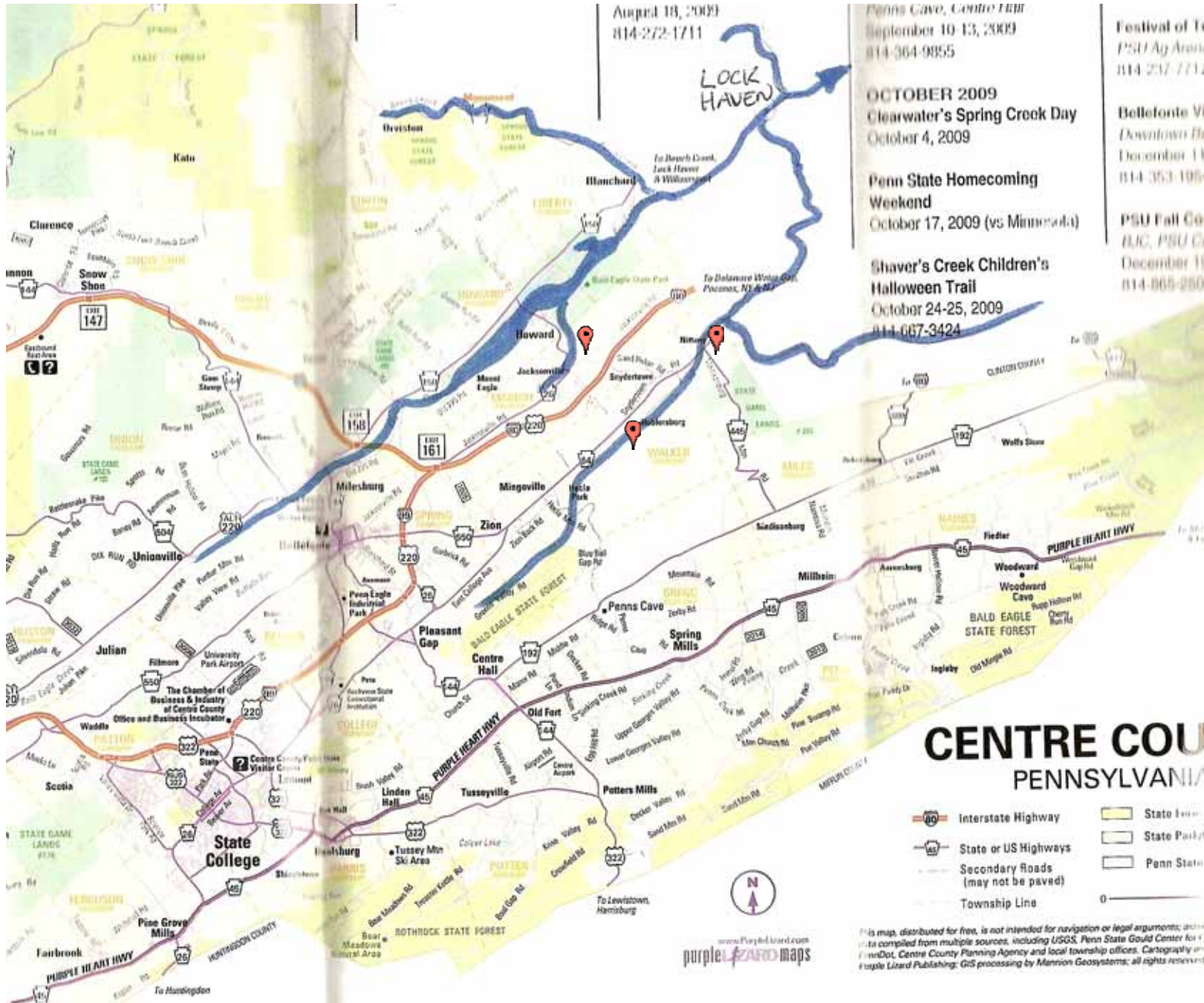


# Data Comparisons – Part 1

Teams 2 & 8 locations





August 18, 2009  
814-272-1711

LOCK HAVEN

Penns Cave, Centre Hill  
September 10-13, 2009  
814-364-9855

OCTOBER 2009  
Clearwater's Spring Creek Day  
October 4, 2009

Penn State Homecoming  
Weekend  
October 17, 2009 (vs Minnesota)

Shaver's Creek Children's  
Halloween Trail  
October 24-25, 2009  
814-667-3424

Festival of the  
PSU Ag Area  
814-237-7734

Bellefonte V  
Downtown B  
December 11  
814-353-1066

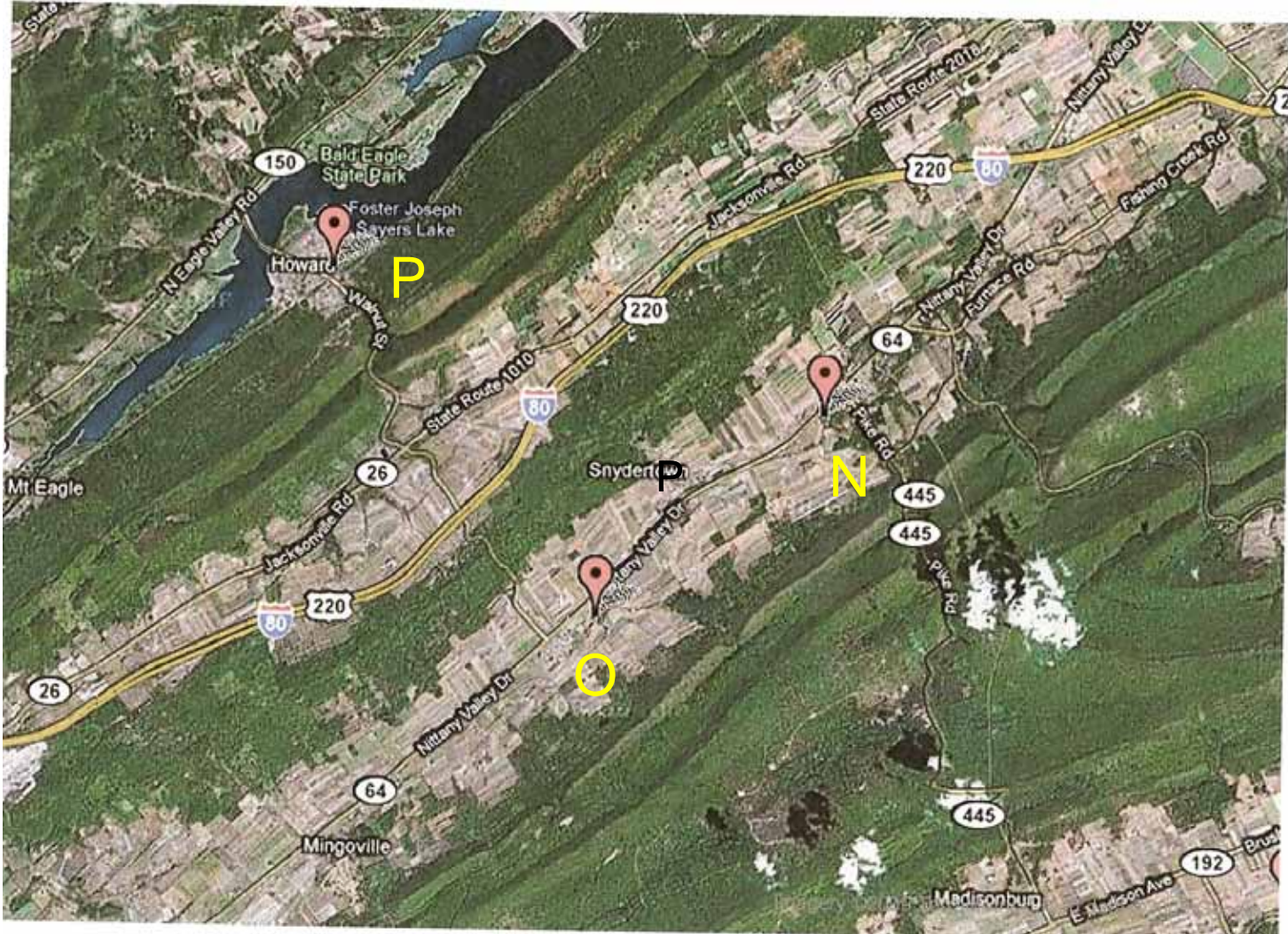
PSU Fall Co  
B.C. PSU C  
December 11  
814-865-280

# CENTRE COUNTY PENNSYLVANIA

- Interstate Highway
- State or US Highways
- Secondary Roads (may not be paved)
- Township Line
- State Highway
- State Park
- Penn State

www.PurpleLizard.com  
purple LIZARD maps

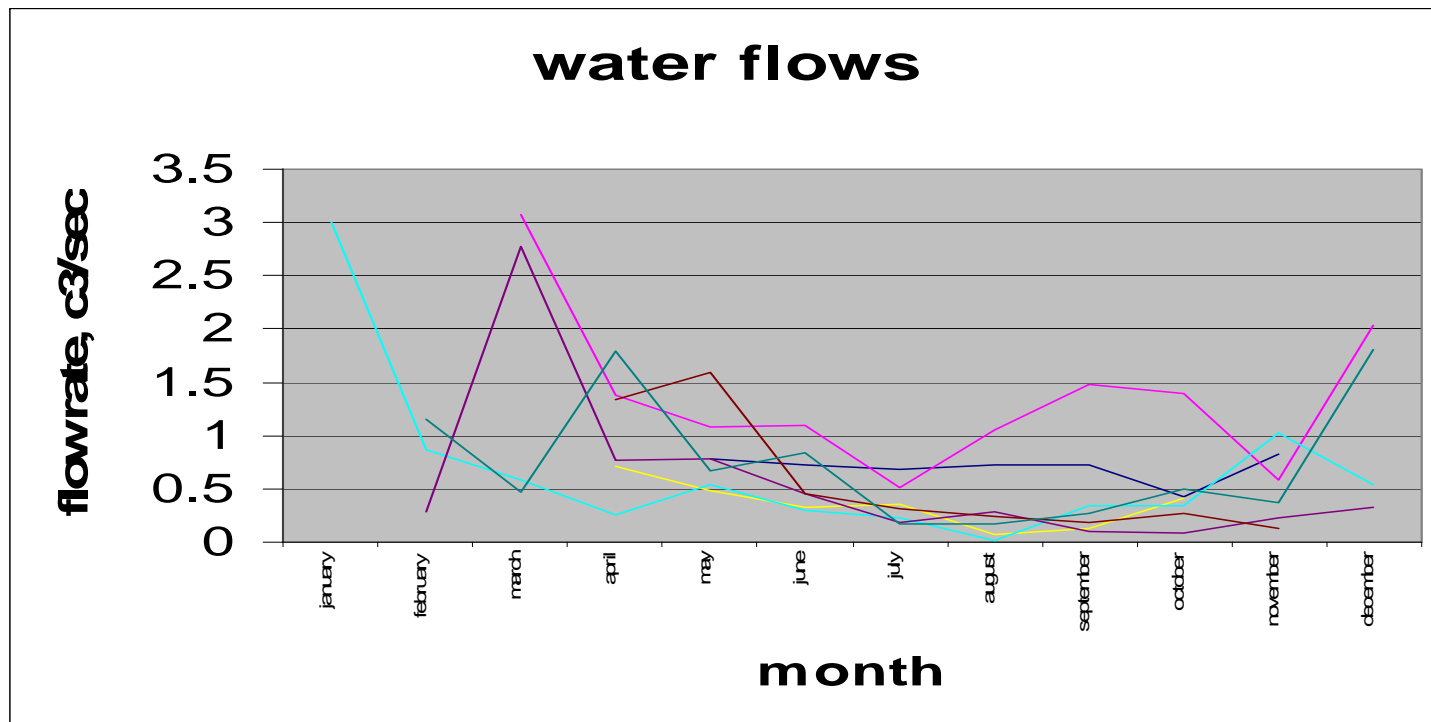
This map, distributed for free, is not intended for navigation or legal arguments; and it is compiled from multiple sources, including USGS, Penn State Gould Center for GIS, and other sources. Centre County Planning Agency and local township offices. Cartography by Purple Lizard Publishing; GIS processing by Mension Geosystems; all rights reserved.



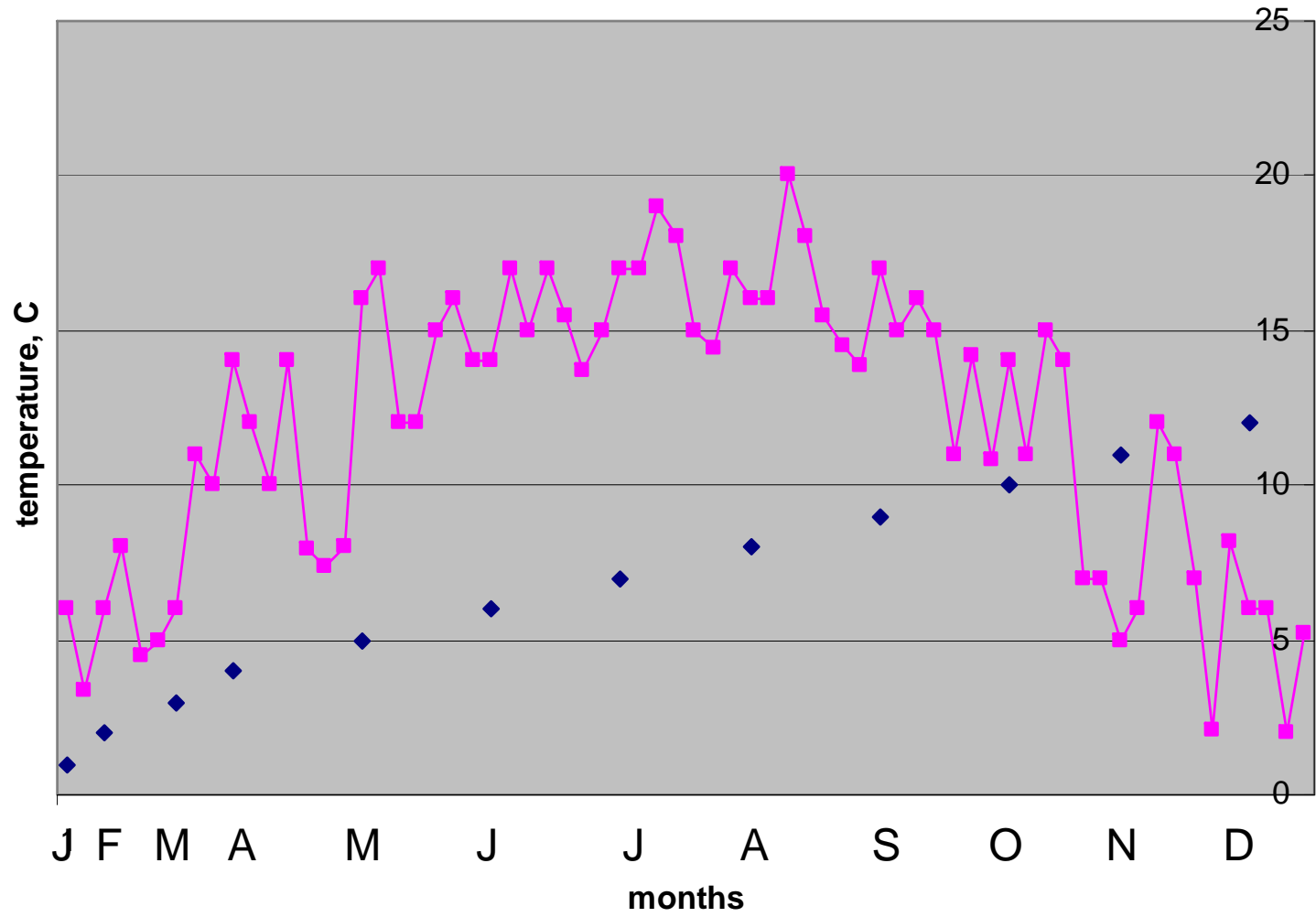
# Water flow – O location

- Measured water flow in stream by month & year

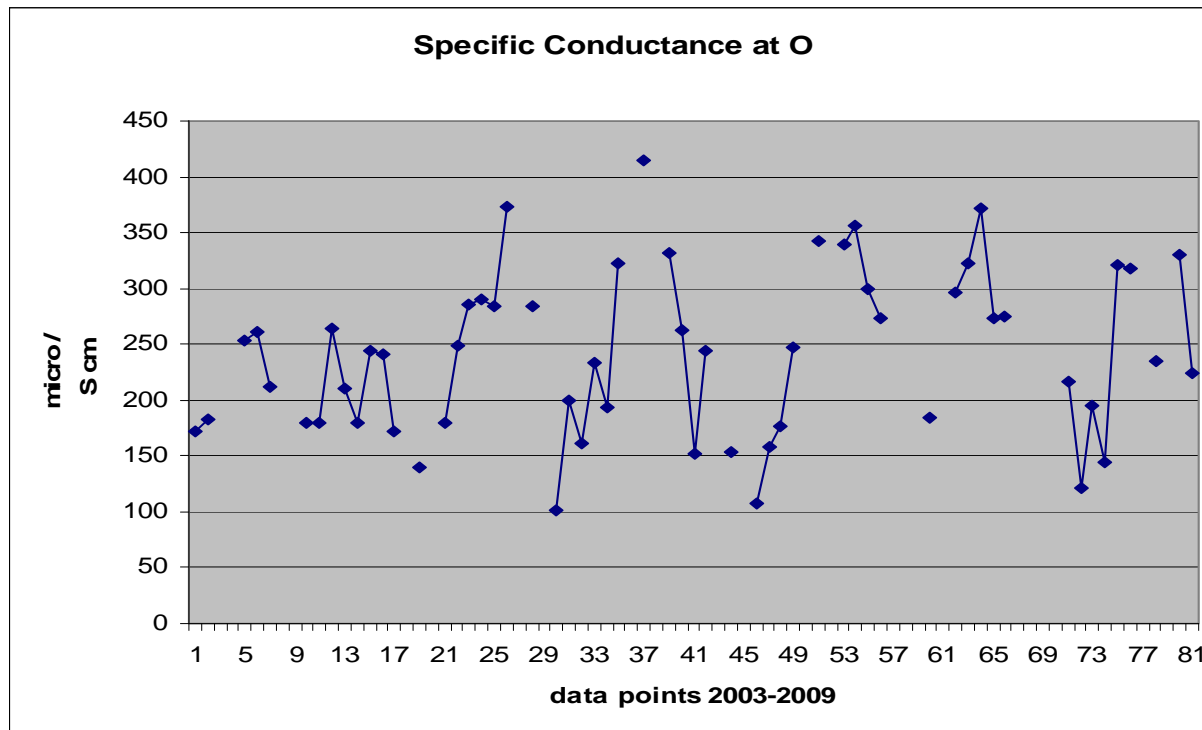
2003 to 2009 2004 had higher flows thru-out year, spring always the highest



# O water temperature

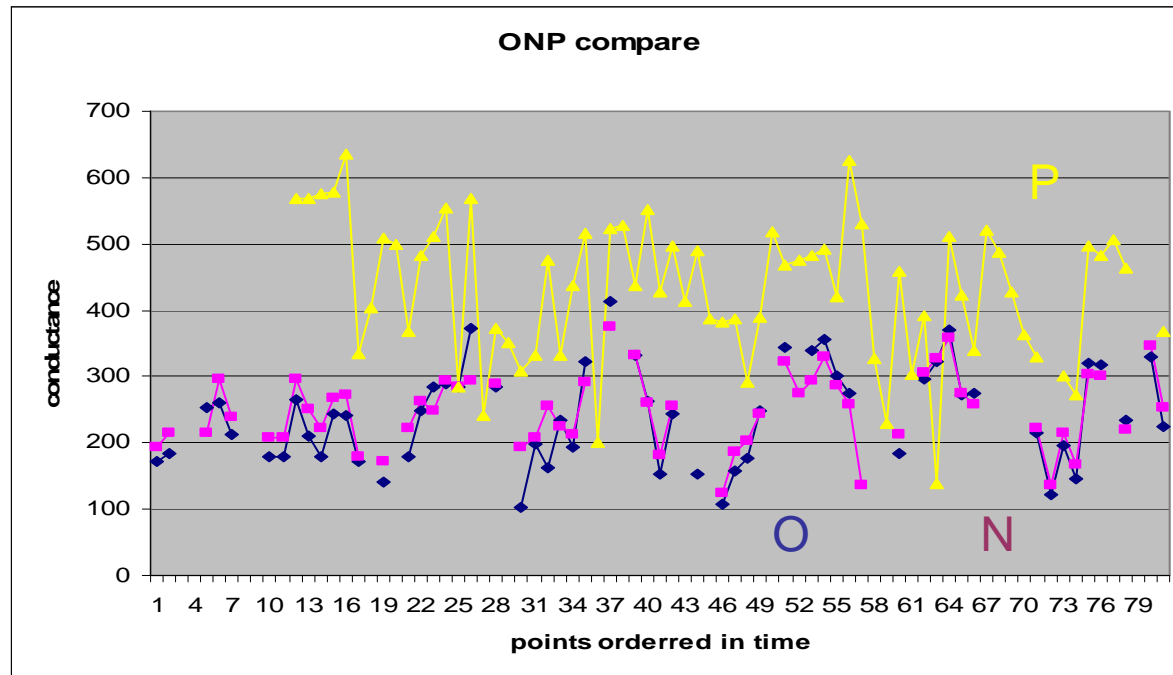


# monitoring at location O



- Conductivity - samples collected in order. Data appears to be very random, scattered, high variability.

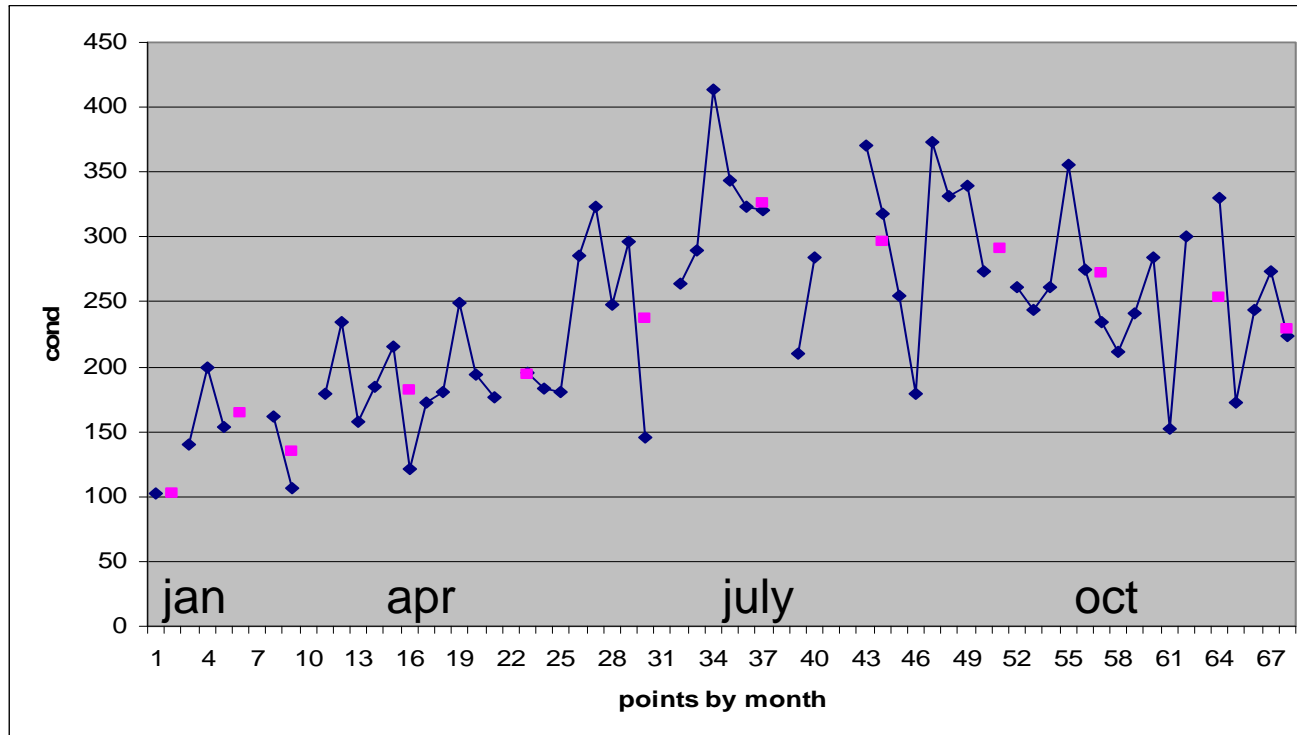
## Conductivity at the 3 sample locations



- Data remains consistent for same stream (O&N, blue & red)
- Data is different for different streams (O&N vs P, yellow)



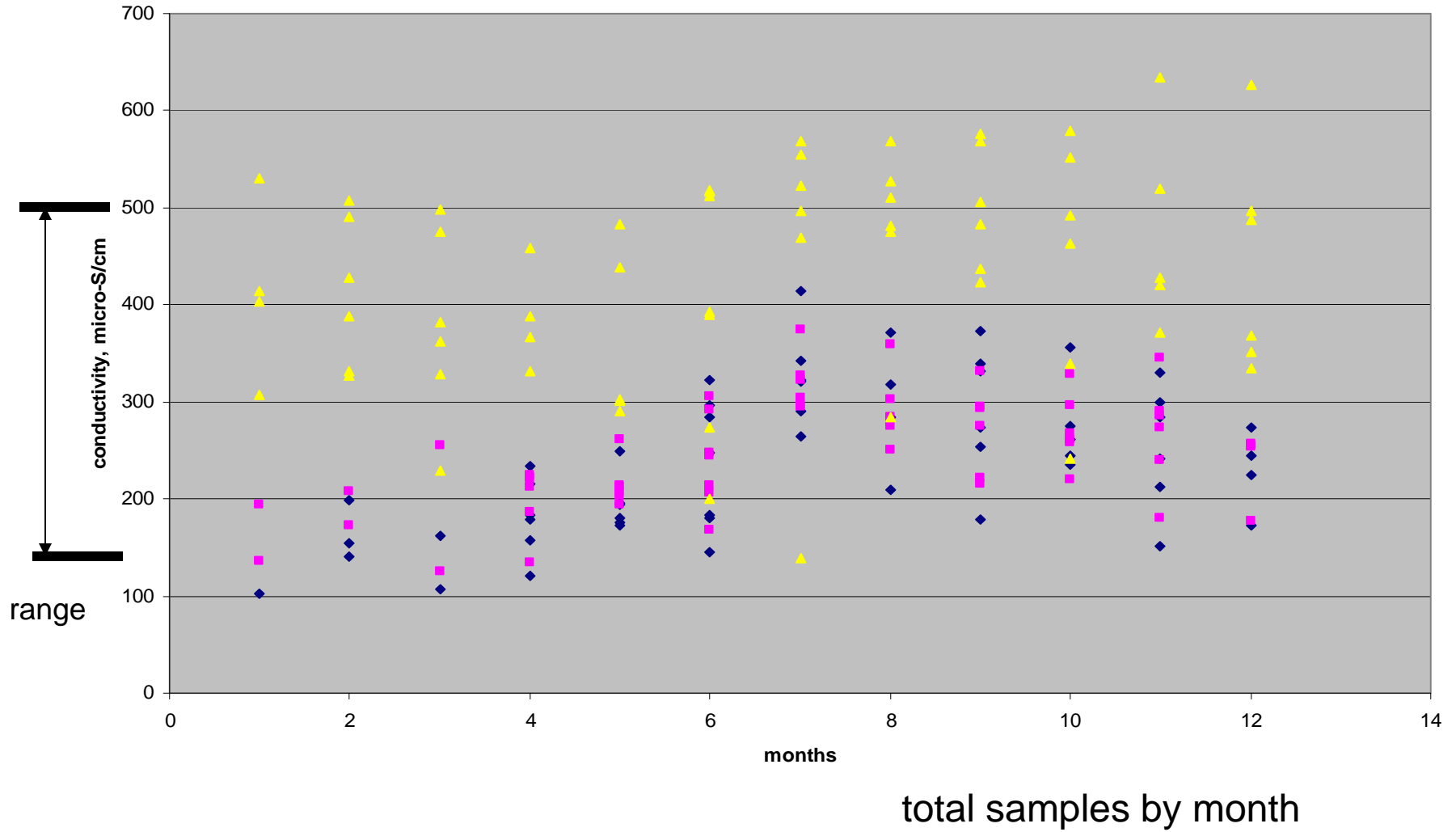
# O location - conductivity values regrouped by month



- Group data by months, monthly average in red
- Less scatter; shows some relationship with seasons

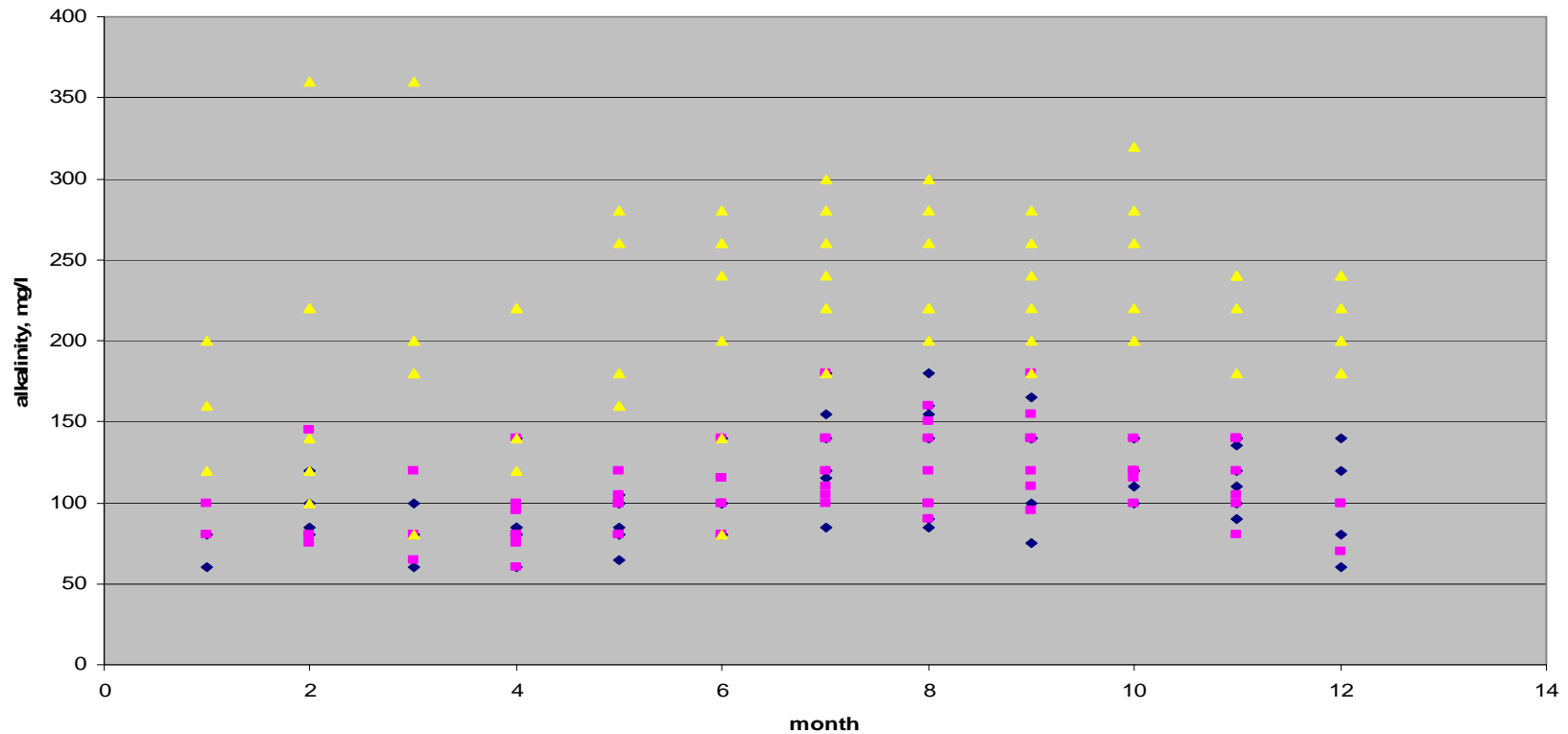
# Little Fishing Creek O → N Lick Run P

conductivity



# alkalinity

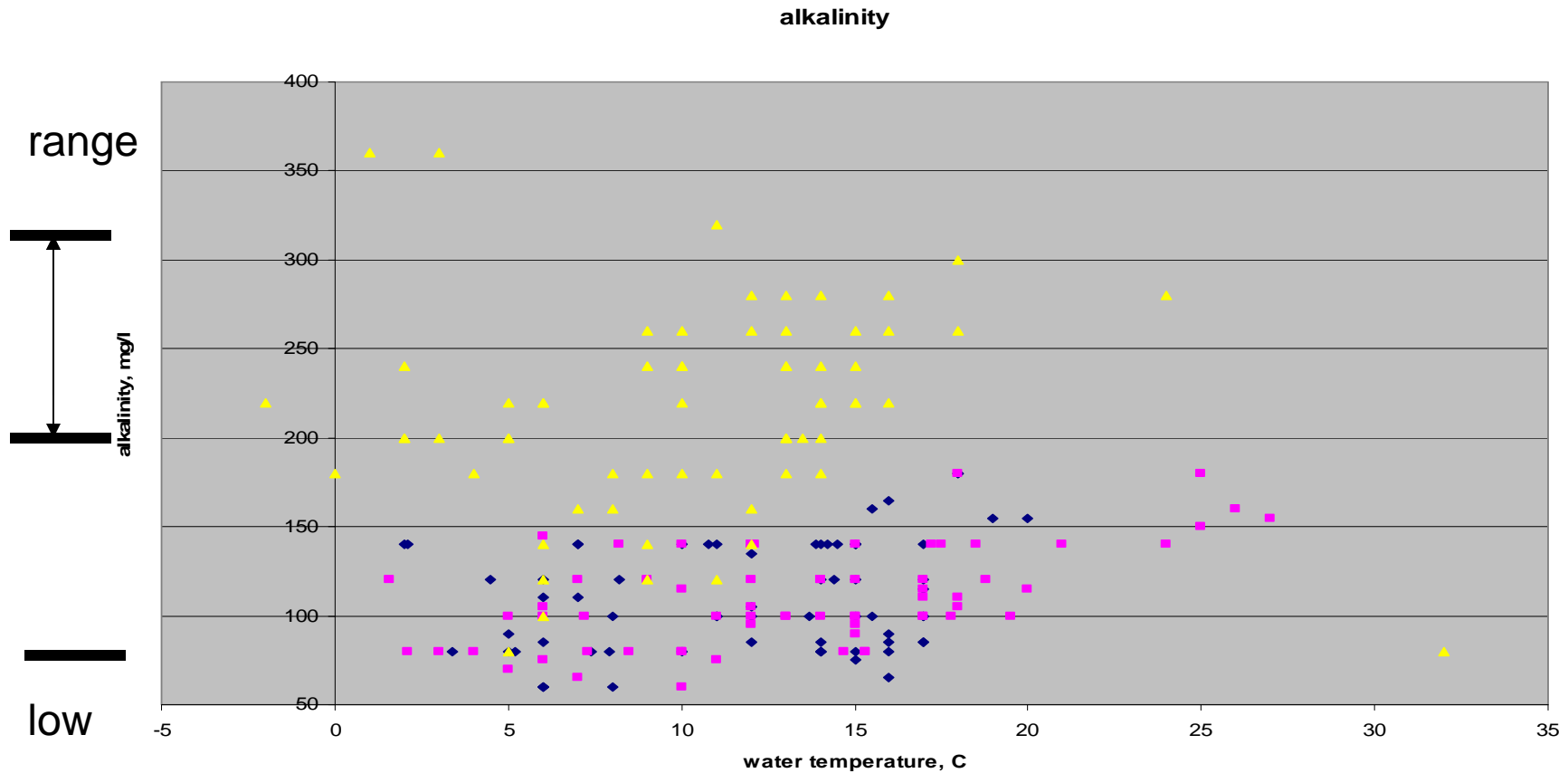
alkalinity



- Lick Run higher values than Little Fishing Creek why? limestone? - 2/05 at 360, 3/05 at 360, 10/04 at 320

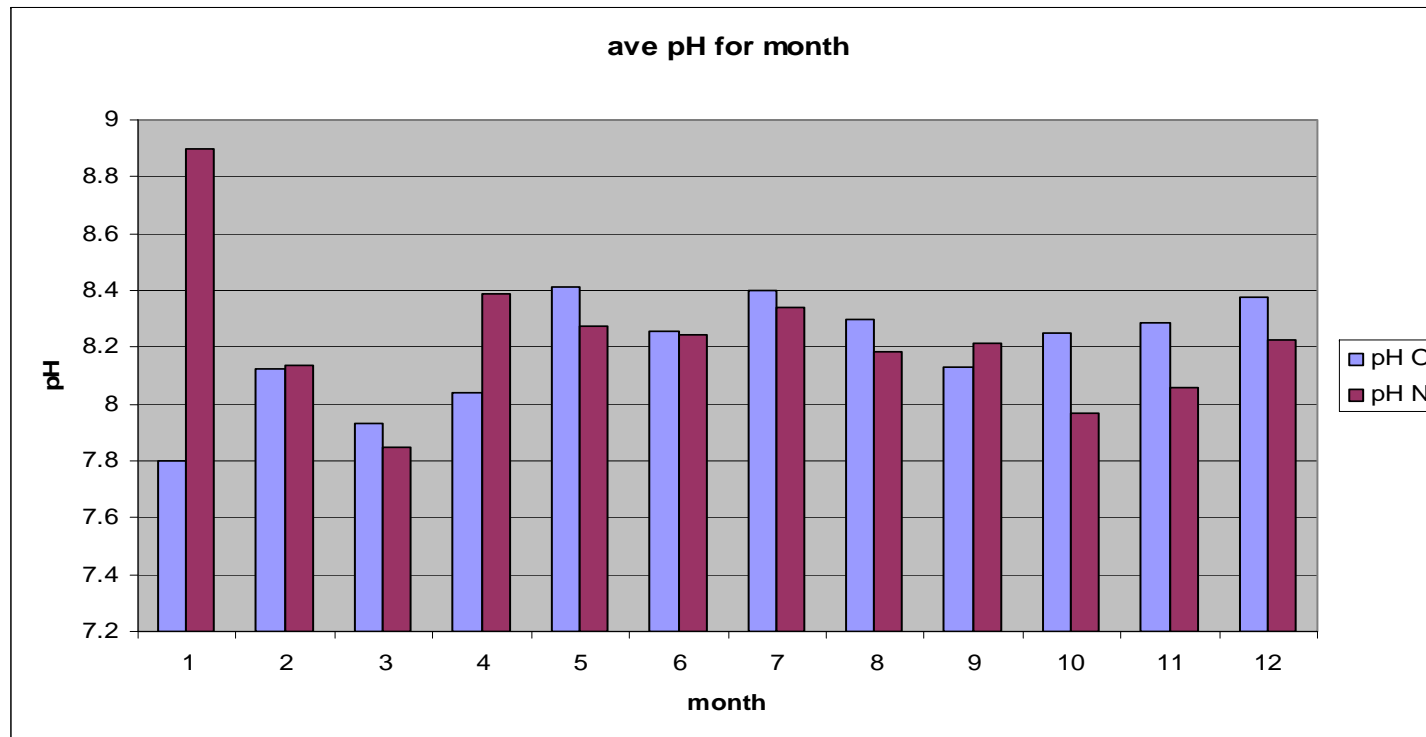
total samples by month

# Alkalinity — is it temperature dependent?



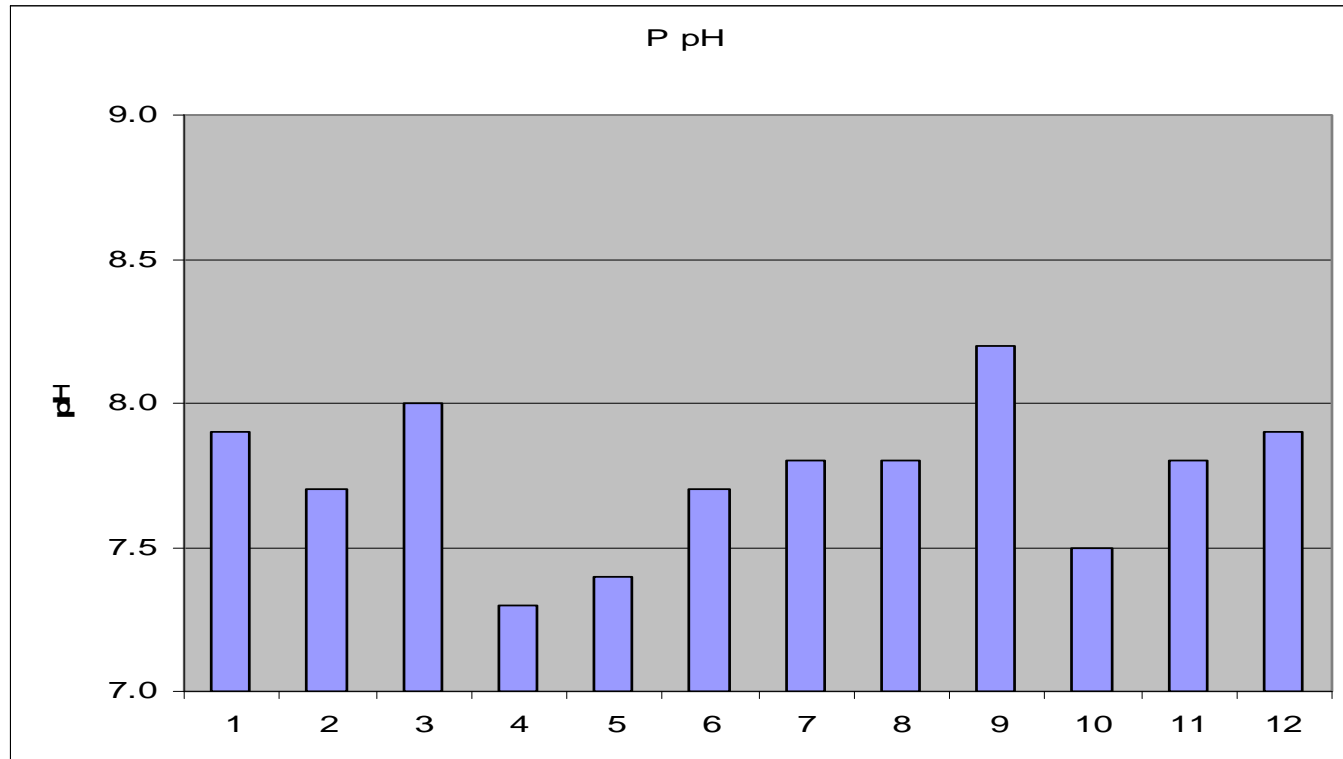
- Small temperature connection

# monthly pH for Little Fishing Creek



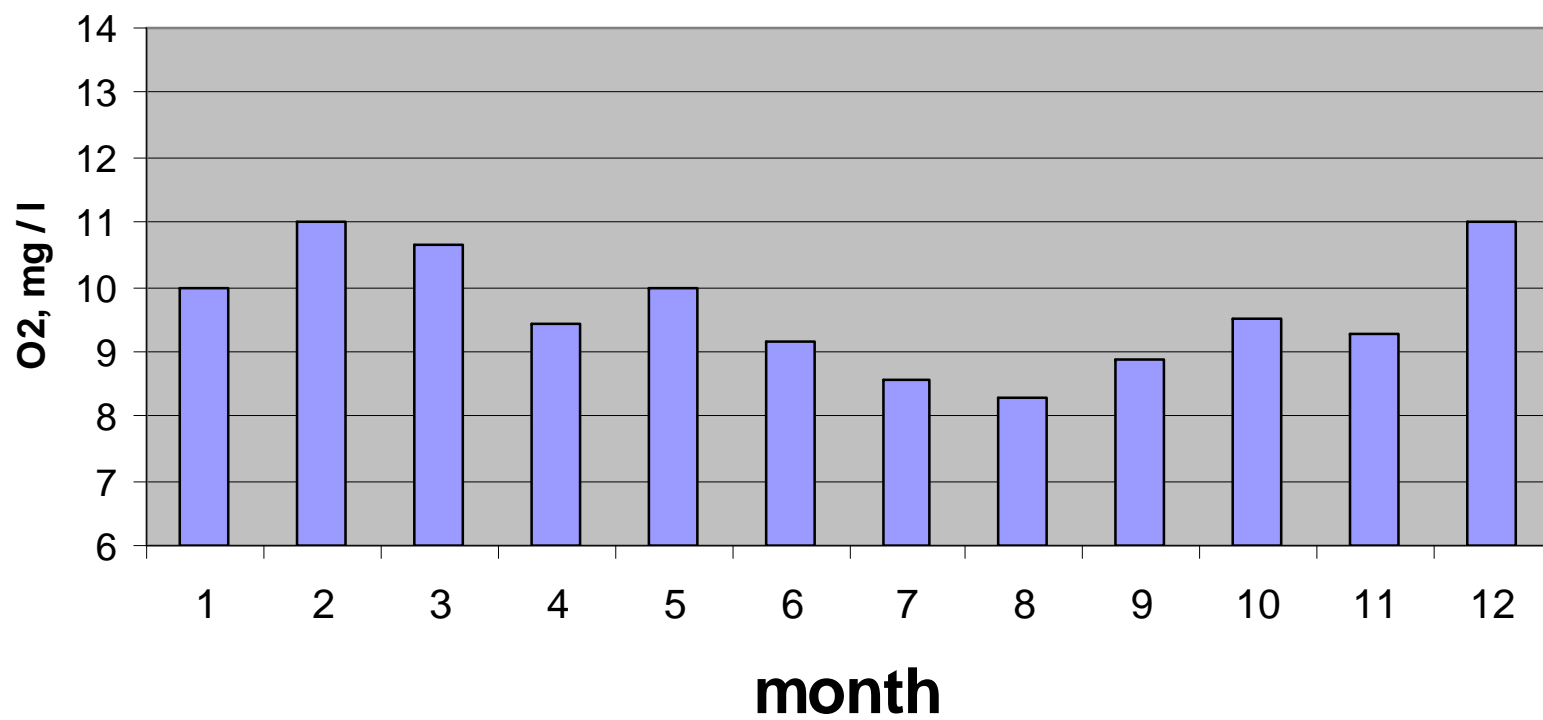
- what happened in January? O => N
- 7.7 => 8.6, 7.9 => 9.2 (only 2 samples)

# pH

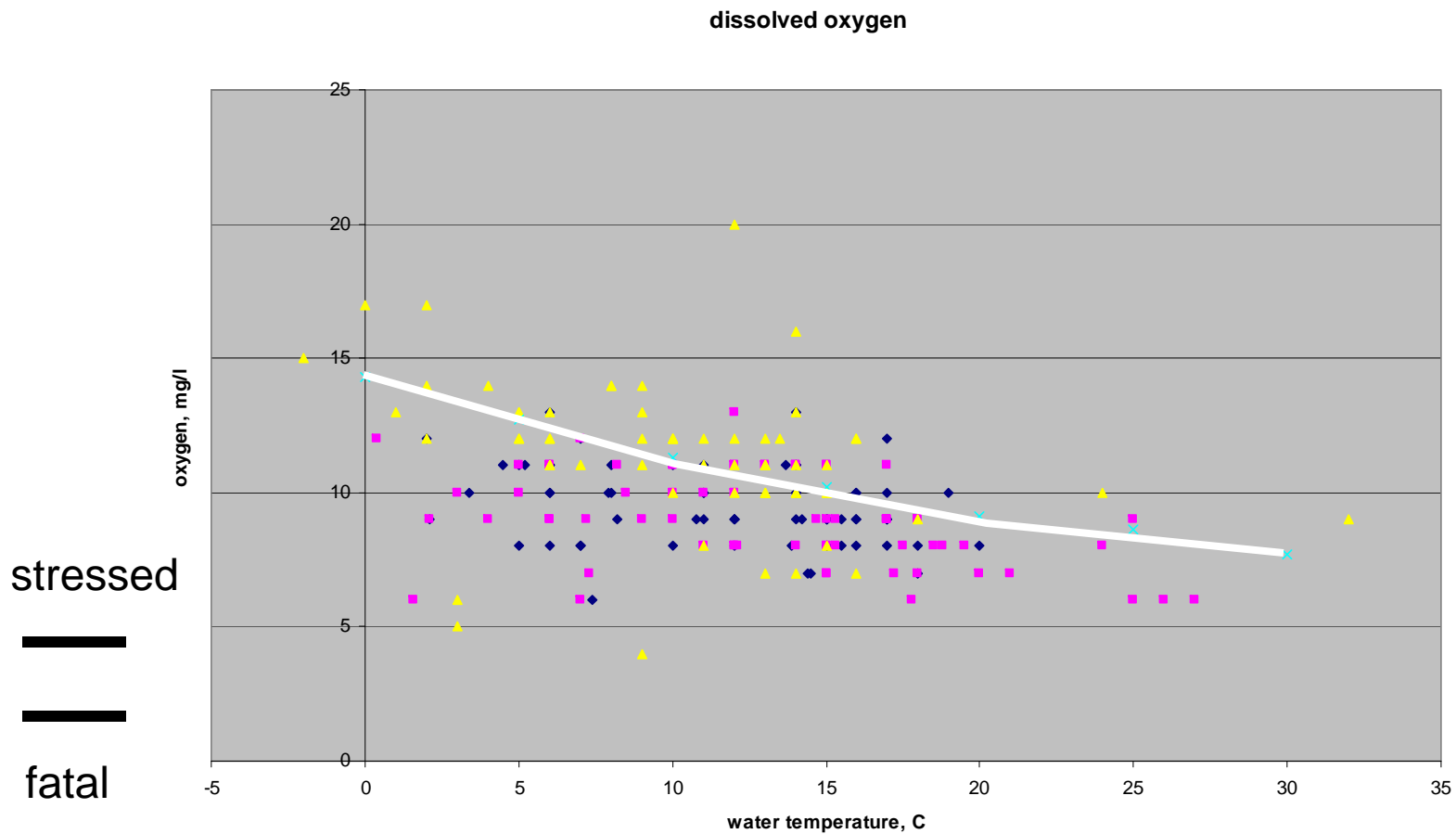


- Lick Run P greater variation. why? april & may lowest  
A= 6.7, 7.2, 7.8, 7.4 M= 7.2, 7.2, 6.7, 7.6, 8.1 (4 samples)

## dissolved O2 for O location



- Dissolved Oxygen
- Little Fishing Creek O = blue, N = red
- Lick Run P = yellow saturation = white

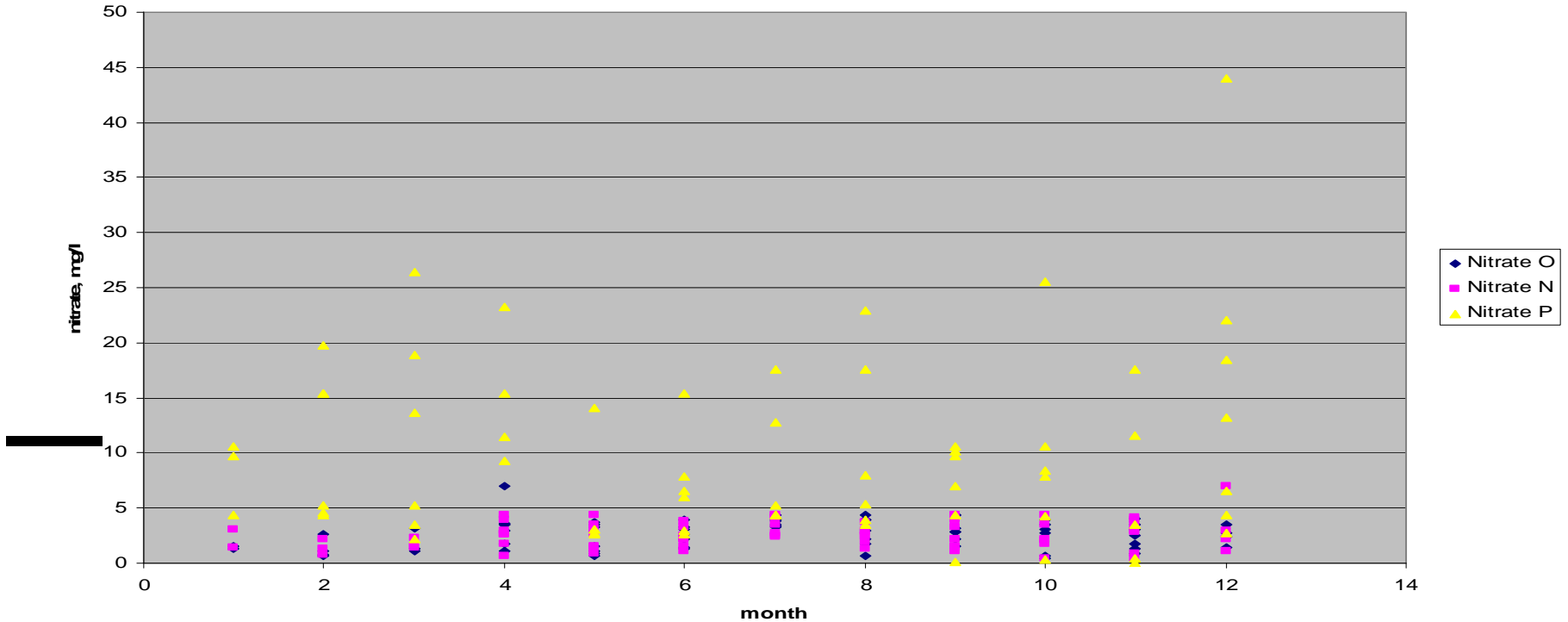




# nitrates

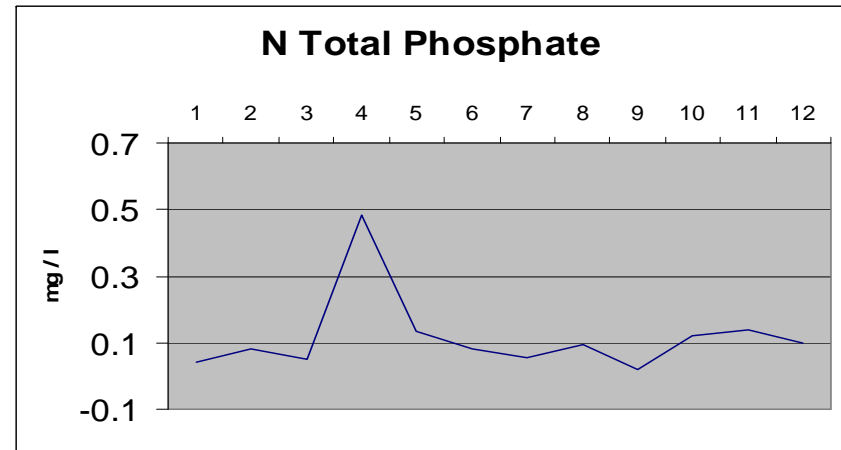
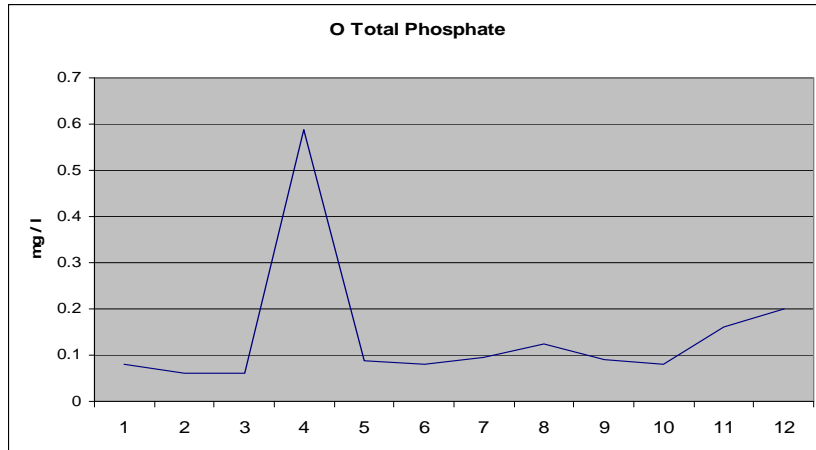
high for drinking water

nitrates



- Lick Run - more nitrates than Little Fishing Creek – why? 12/05 at 44, 3/06 at 26, 10/09 at 26  
not seasonal

# Total phosphates



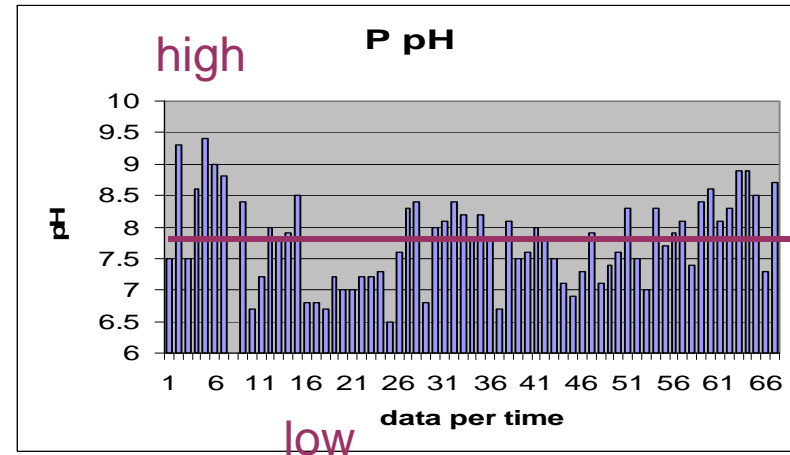
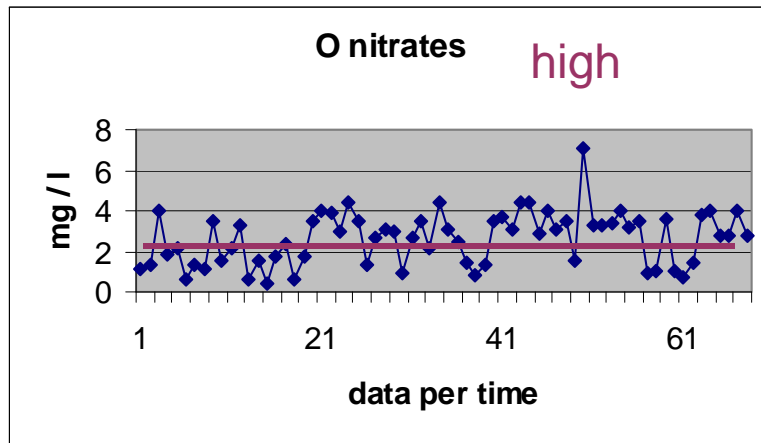
- Little Fishing Creek April 2009 –
- Both locations had high analysis spikes, nitrates also both above at 2.9 and 3.6 (average = 2.6)
- second highest total phosphate values in April also Is seasonal

- Little Fishing Creek - O flows to N

# sulphates

- LFC always at 50 mg/l or less. Lick run always except 3 times (at 55, 60, 65 mg/l).
- OK if under 150 mg/l. If above, likely due to a digging related issue, that exposes pyrite material to air and water, creating an acid forming situation.

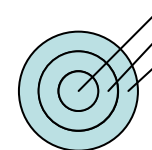
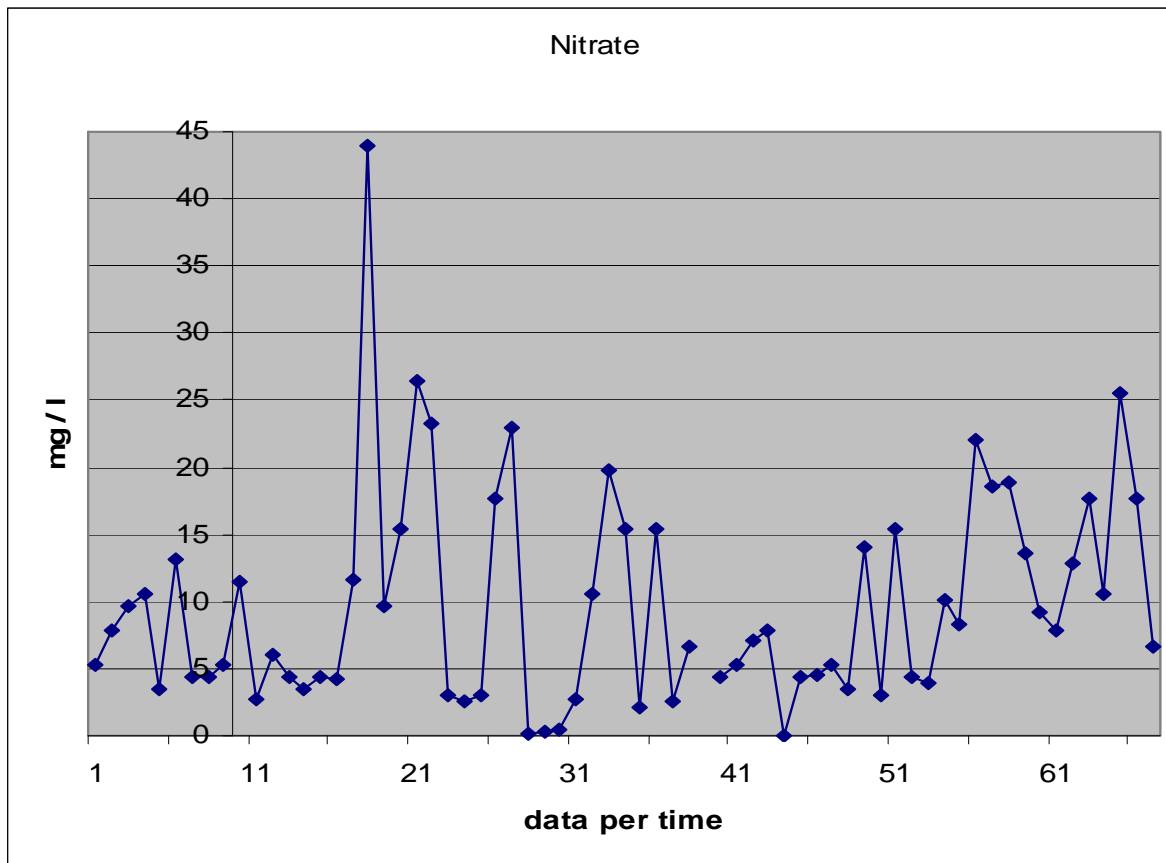
# variable data – what is OK?



- April 2008 – high at 7.0
- $X + 2(\text{dev}) = 2.6 + 2(1.3) = 5.2$
- within ave  $\pm 2(\text{std deviations}) = 95.5\%$
- $X + 3(\text{dev}) = 6.5$
- within ave  $\pm 3(\text{std deviations}) = 99.7\%$
- outside the range of expected value
- noted - previous day rain

- Aug 2004 - high 9.3 pH
- Nov 2004 - 9.4
- Training? Conductance = high (569, 635)
- 8 pts acid (low 6.5-6.9 pH)
- 8 / 8 in years 2005-2007
- 6 / 8 in Sept – Dec months (fall season)

# P - nitrates with lot variability, what is normal?



Data point at 44 nitrates

12-7-05  
water temperature = -2C  
pH = 6.7  
sulphate = 60

# summary

- Expect two locations from same stream to have similar values in chemical analyses.  
example – upstream & downstream on Little Fishing Creek      If not – wonder WHY
- Can't compare the analyses from different streams – differences in geology, land use, etc.  
example – Lick Run was consistently higher for conductivity, alkalinity, nitrates
- Data results are dependent on time of year and type of activities. The comparison of past values in common seasons is probably more useful.
- Normal? Can't identify with only few data points.