

EPSCoR Data Webinar

Declan McCabe, Saint Michael's College Biology

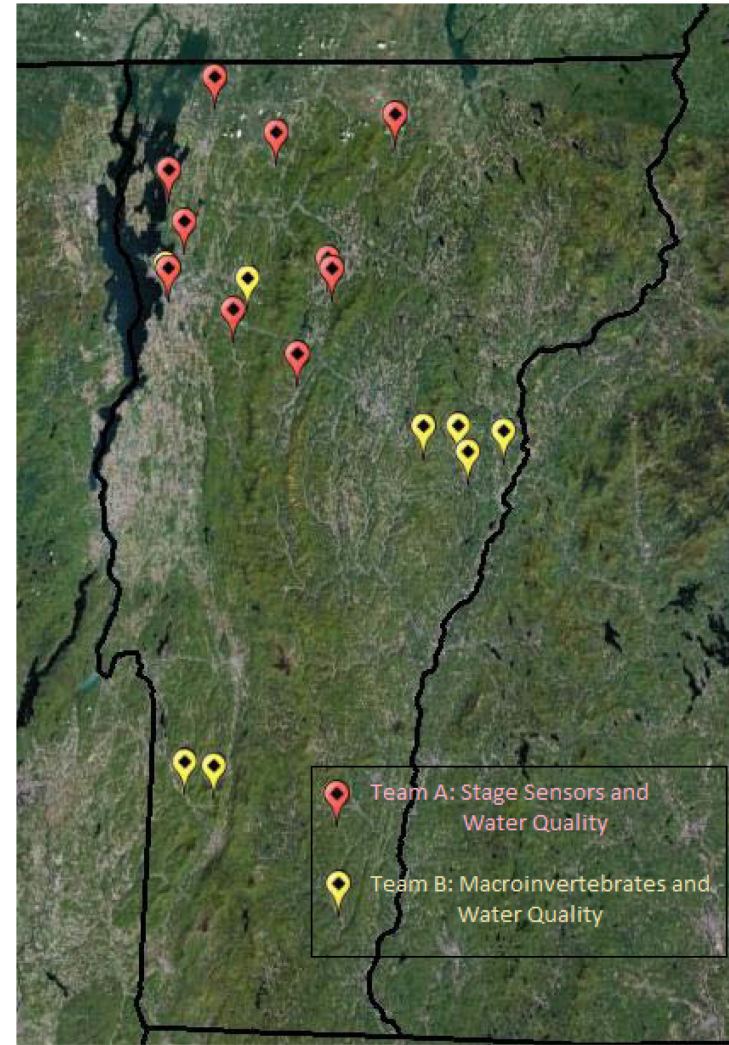
www.uvm.edu/epscor/redir/streamsprojectdata

What we *will* cover:

- Data sources
- Data grooming
- Data presentation

What we *may* get to:

- Powerpoint tips
- Poster templates



Land use

- Land use data available for all 2012 sites
- Streams project site:

www.uvm.edu/epscor/redirect/streamsprojectdata

Site Code	Location	Stream Type	Participating Organization	Monitoring Year	Catchment Area Acres	Agricultural Acres	Percent Catchment Agricultural	Urban Acres	Percent Catchment Urban	Forested Acres	Percent Catchment Forest
CTWW_WtsRv_804	Bradford, VT	Riffle	Oxbow High School	2012-2013	27304.22	896.99	0.033	370.36	0.014	25155.46	0.921

Water temperature expectations

- It varies far less than air temperature
- Peaks lag behind air temp peaks
- Summer water temp cooler than air; reverse in winter
- Water from springs: temp = annual average air temp and very stable
- Other questions: Urban/agricultural/forested; before/after storms – hypotheses to test

Water temperature expectations

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Summary air temperature data

- <http://www.nws.noaa.gov/climate/xmacis.php?wfo=btv>
- Click “Local data records”
- Look under “Climate graphs” for Burlington temperature



The screenshot shows a web browser window with two tabs: "National Weather Service - B..." and "National Climatic Data Cente...". The address bar displays the URL www.nws.noaa.gov/climate/index.php?wfo=btv. The page content includes a "Local forecast by 'City, St'" section with a search box and a "Go" button. Below this is a navigation menu with buttons for "Observed Weather", "Climate Locations", "Climate Prediction", "Climate Resources", "Local Data/Records", "Astronomical", and "NOWData". The "Local Data/Records" button is highlighted. A blue banner at the bottom of the page reads "Observed Weather Reports".

Local forecast by "City, St"

City, St

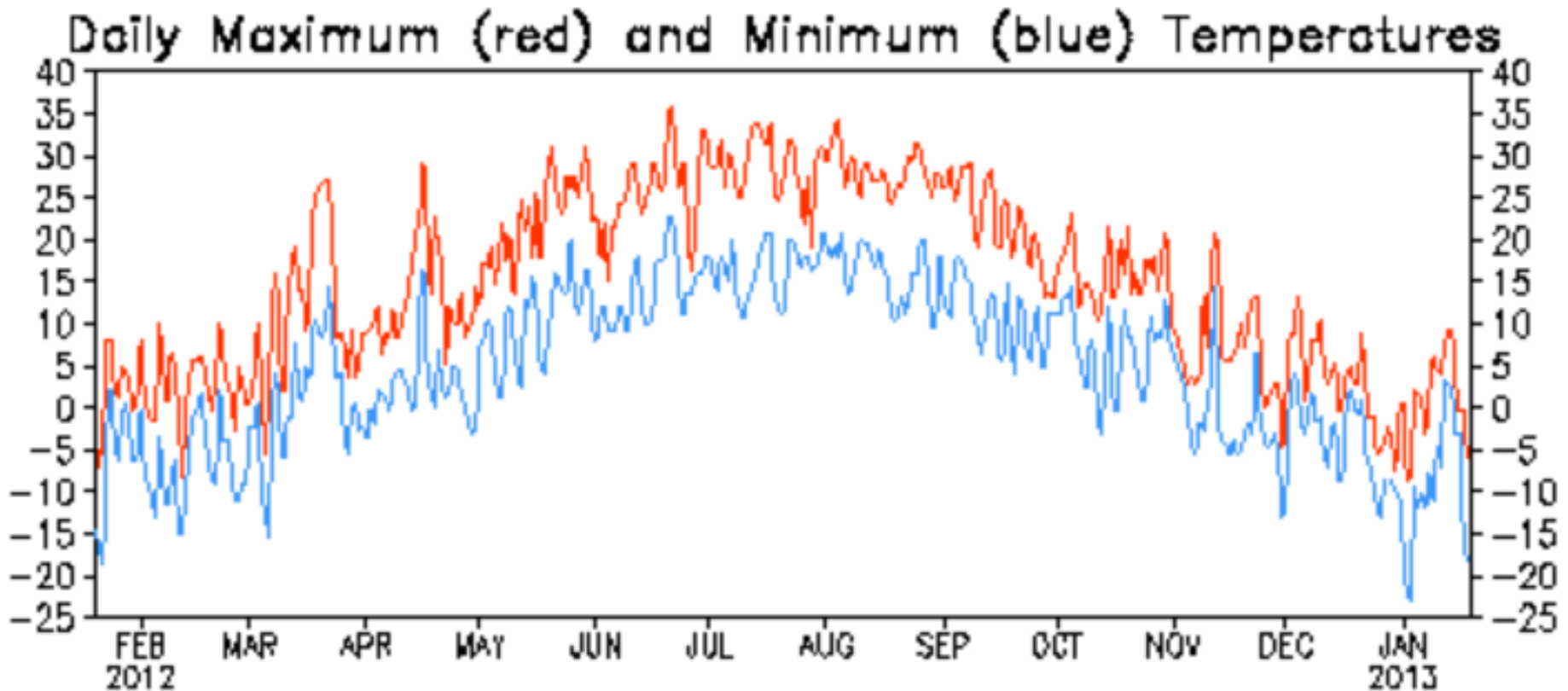
As part of its ongoing efforts to improve service to the public, The National Weather Service has released a local 3-month temperature outlook. Access the product for your area [here](#). Please click [here](#) to complete the feedback survey.

Observed Weather Climate Locations Climate Prediction Climate Resources **Local Data/Records** Astronomical NOWData

Observed Weather Reports

Air temperature

- Confirm that your stream temperature probe is not measuring air temperature:



Data updated through 18 JAN 2013

Detailed air temperature data

- <http://cdo.ncdc.noaa.gov/qclcd/QCLCD?prior=N>
- 7 Vermont NOAA weather stations: Barre; Bennington; Burlington; Morrisville; Rutland; Saint Johnsbury; Springfield
- Data go back to mid 2000s; every 15 minutes; precipitation and other parameters available

Temperature probe: raw data

- Important data
- First graph:
 - Scatter graph
 - Date on X axis
 - Temperature on Y

	A	B	C	D	E	F
1	1-Wire/iButton Part Number: DS1921G-F5					
2	1-Wire/iButton Registration Number: F90000002E338221					
3	Is Mission Active? true					
4	Mission Start: Fri Aug 31 12:45:00 EDT 2012					
5	Sample Rate: Every 60 minute(s)					
6	Number of Mission Samples: 430					
7	Total Samples: 430					
8	Roll Over Enabled? false					
9	Roll Over Occurred? Roll over has NOT occurred					
10	Active Alarms: None fired					
11	Next Clock Alarm At: Disabled					
12	High Temperature Alarm: 85 °C					
13	Low Temperature Alarm: -40 °C					
14						
15	Date/Time	Unit	Value			
16	#####	C	25			
17	#####	C	27.5			
18	#####	C	26			
19	#####	C	26			
20	#####	C	28.5			
21	#####	C	27.5			
22	#####	C	27			
23	#####	C	27.5			
24	#####	C	26.5			

09_18_2012_WR_SIBRK_7

Quick graph

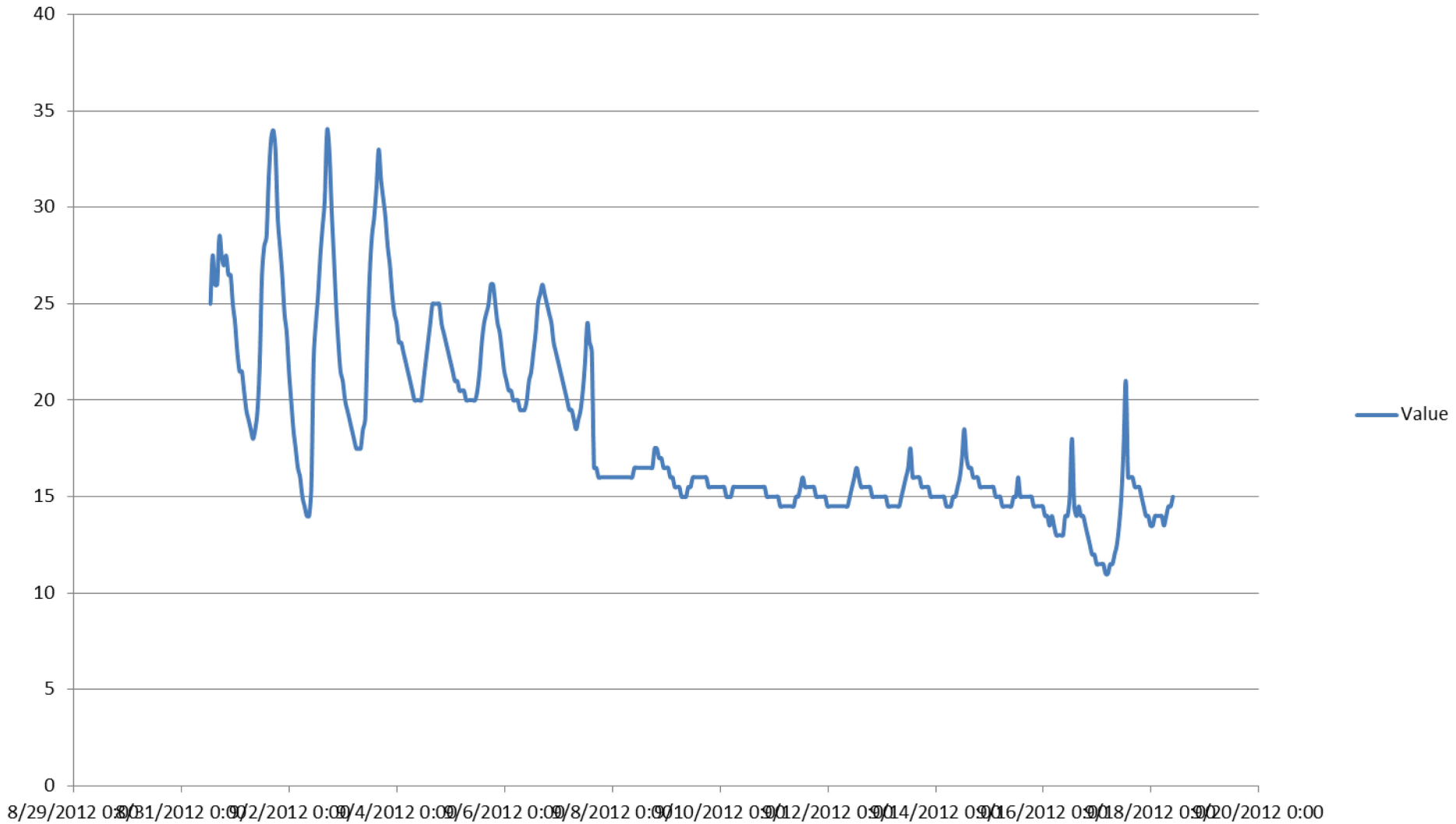
- Units are degrees Celsius
- Delete column B (units)
- Highlight data (and headings)
- “Insert”; “Scatter graph”

	A	B	C	D
1	1-Wire/iButton Part Number: DS1921G-F5			
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15	Date/Time	Value		
16	8/31/2012 12:45	25		
17	8/31/2012 13:45	27.5		
18	8/31/2012 14:45	26		
19	8/31/2012 15:45	26		
20	8/31/2012 16:45	28.5		
21	8/31/2012 17:45	27.5		
22	8/31/2012 18:45	27		
23	8/31/2012 19:45	27.5		
24	8/31/2012 20:45	26.5		

09_18_2012_WR_SIBRI

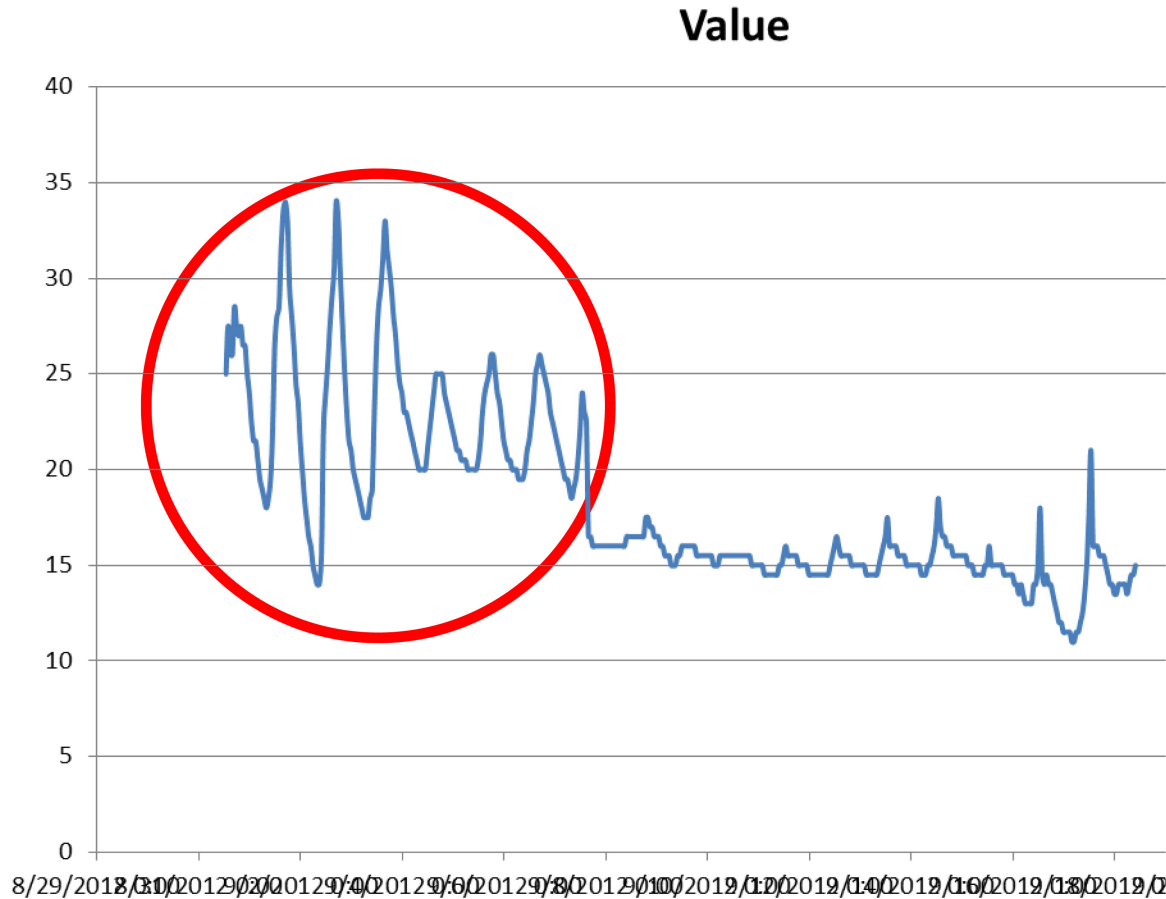
Average: 20589.76563 Count: 20 Sum: 370615.7813 100%

Scatter graph: quick look-see quality



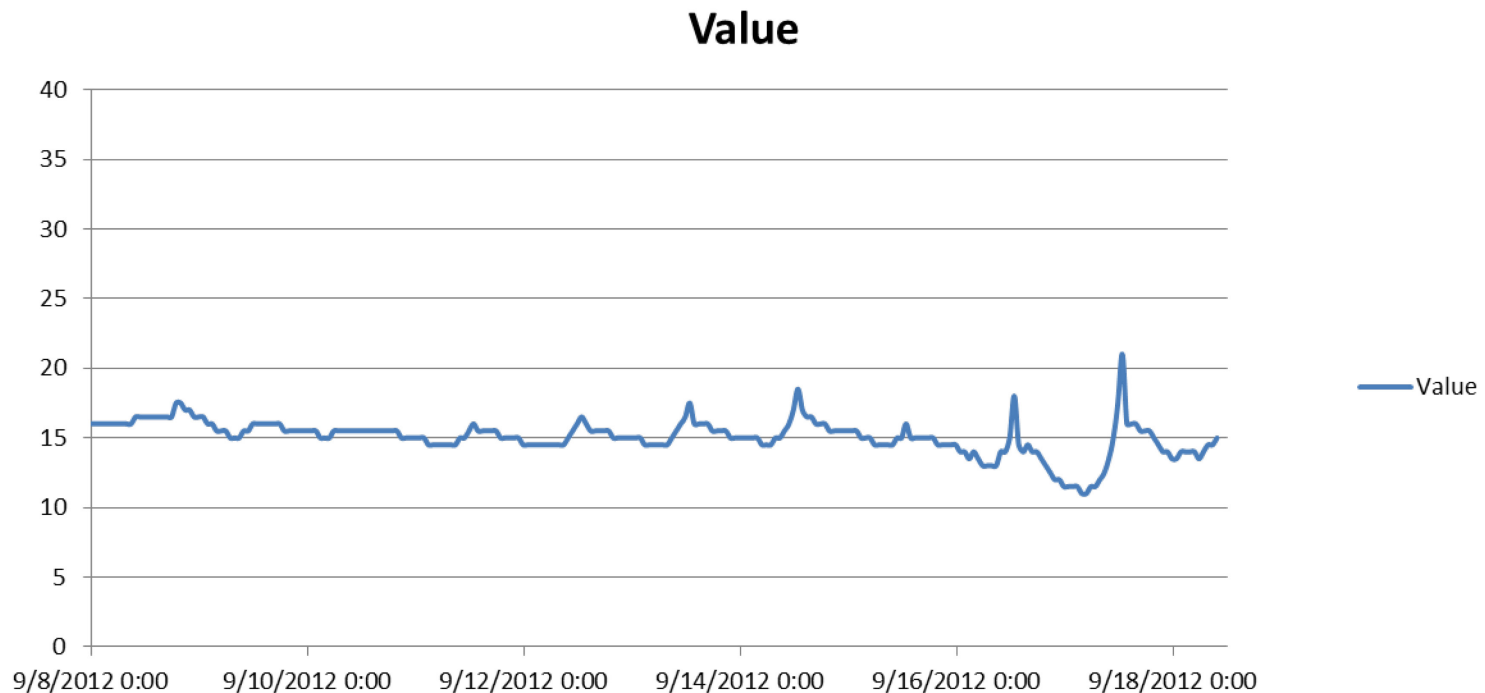
Data grooming

- Identify & fix mistakes
- Toss out erroneous data
- Example 1:
- Probe above water
- Good probe test though 😊



Example 1 continued

- Same graph with air data deleted!
- Increased variability in latter 5 days
- Realistic?
- Check weather reports



What to measure

- You have far more raw temperature data than anyone should present 😊
- What to choose?
- Narrow your date ranges
- Suggestions: Average; minimum; maximum; range
- Please don't feel limited by the suggestions!

Temperature response variables in Excel

- Average “=*average(B120:B375)*” –
calculates average of numbers in cells B120
through B375

Temperature response variables in Excel

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- Maximum *"=max(B120:B375)"*
- Minimum *"=min(B120:B375)"*

Temperature response variables in Excel

- Average *"=average(B120:B375)"* – calculates average of numbers in cells B120 through B375
- Maximum *"=max(B120:B375)"*
- Minimum *"=min(B120:B375)"*
- Range = Maximum – minimum

Accessing gage data

- Link:
<http://nh.water.usgs.gov/>
- Click on the map
- Click on the station nearest you

USGS Water Resources of New ...

nh.water.usgs.gov

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USGS
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Water Resources of New Hampshire

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Water Data

View near-real-time streamflow conditions
▶ by station list, or
▶ by map below.



▶ Real-time groundwater levels

▶ Summary of Water Resources Conditions for

NEWS RELEASE 12/4/2012:
Arsenic Likely in Nearly 40 Percent of New Hampshire

Nearly 40 percent of New Hampshire's bedrock contains naturally occurring arsenic, according to a new U.S. Geological Survey report. The arsenic is associated with the bedrock type and by fractures, but are associated with hydrology, topography, land use and demographic factors. New Hampshire Departments of Health and

- Read the entire News Release
- See report and data

Recently Released Reports Now Available

NEW: Scientific Investigations Report 2012-511
groundwater from bedrock aquifers in New Hampshire

Water chemistry data

- www.uvm.edu/epscor/redirect/streamsprojectdata
- TSS; Total P; Total N
 - Select sites; date range; & TSS or P & N
 - “generate report”
- Thanks to Katie and Saul for keeping ahead of the sample load!
- You are welcome to use data from any and all sites and years



Phosphorus & Nitrogen

Click on the variable titles below to view a definition of that variable.

Export to Excel File

Site Code	Location	Type	Participating Organization	Date Collected	Replicate	Phosphorus (µg/L)	Nitrogen (µg/L)	Comments
LCD_EngBrk_117	Burlington, VT	Riffle	Rock Point School	2012-09-07	1	35.605	559.509	
LCD_EngBrk_117	Burlington, VT	Riffle	Rock Point School	2012-09-07	2	47.426	573.686	
LCD_EngBrk_117	Burlington, VT	Riffle	Rock Point School	2012-09-07	3	41.125	483.849	
LCD_EngBrk_117	Burlington, VT	Riffle	Rock Point School	2012-10-16	1	8.251	844.689	
LCD_EngBrk_117	Burlington, VT	Riffle	Rock Point School	2012-10-16	2	17.945	807.123	
LCD_EngBrk_117	Burlington, VT	Riffle	Rock Point School	2012-10-16	3	17.945	734.280	
LCD_EngBrk_117	Burlington, VT	Riffle	Rock Point School	2012-10-26	1	19.883	840.779	
LCD_EngBrk_117	Burlington, VT	Riffle	Rock Point School	2012-10-26	2	19.067	966.538	
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Water chemistry tips

- Phosphorus = 0??
- This means it was below the detection limit

What to present

- Average; inter-site comparisons; multi-site comparisons

Macroinvertebrate data

- Please upload what you have
- SMC-generated data are available
- Past year's data 2008-2012 available
- Same web site:
- www.uvm.edu/epscor/redir/streamsprojectdata
- Select *Macroinvertebrate ID2*
- Copy and paste to excel

Macroinvertebrate variables

- **Richness** (number of species)
- In excel: `=COUNTIF(G22:G410,">0")`

Macroinvertebrate variables

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Macroinvertebrate variables

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- **Dominance** (relative abundance of numerical dominant)
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- **EPT Richness** (Mayflies; stoneflies; caddisflies)
- Use richness formula on the EPT rows

For any response variable

Options:

2-site comparison:

- use separate samples as replicates

Multi-site questions:

- Sum bug samples from single site to make 1 representative sample (before calculations)

More on this:

<http://www.nature.com/scitable/knowledge/library/sampling-biological-communities-23676556>

- Average water quality samples

2-site comparison: Figures

- Data form:

- Raw data:

- What to graph:

- Excel formula:

=stdev(A12:A15)

	Dominance	
	Allen Brook	Foster Brook
	0.25	0.13
	0.38	0.09
	0.29	0.14
	0.41	0.18
	Allen Brook	Foster Brook
Average:	0.33	0.14
Std deviation	0.08	0.04

Making bar graphs

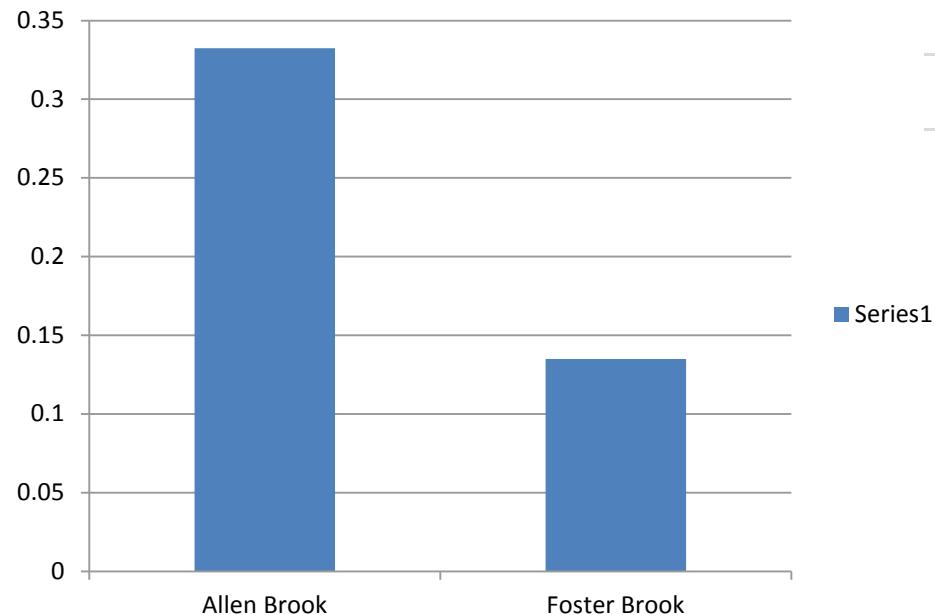
- Highlight 4 cells
- “Insert 2D column graph”

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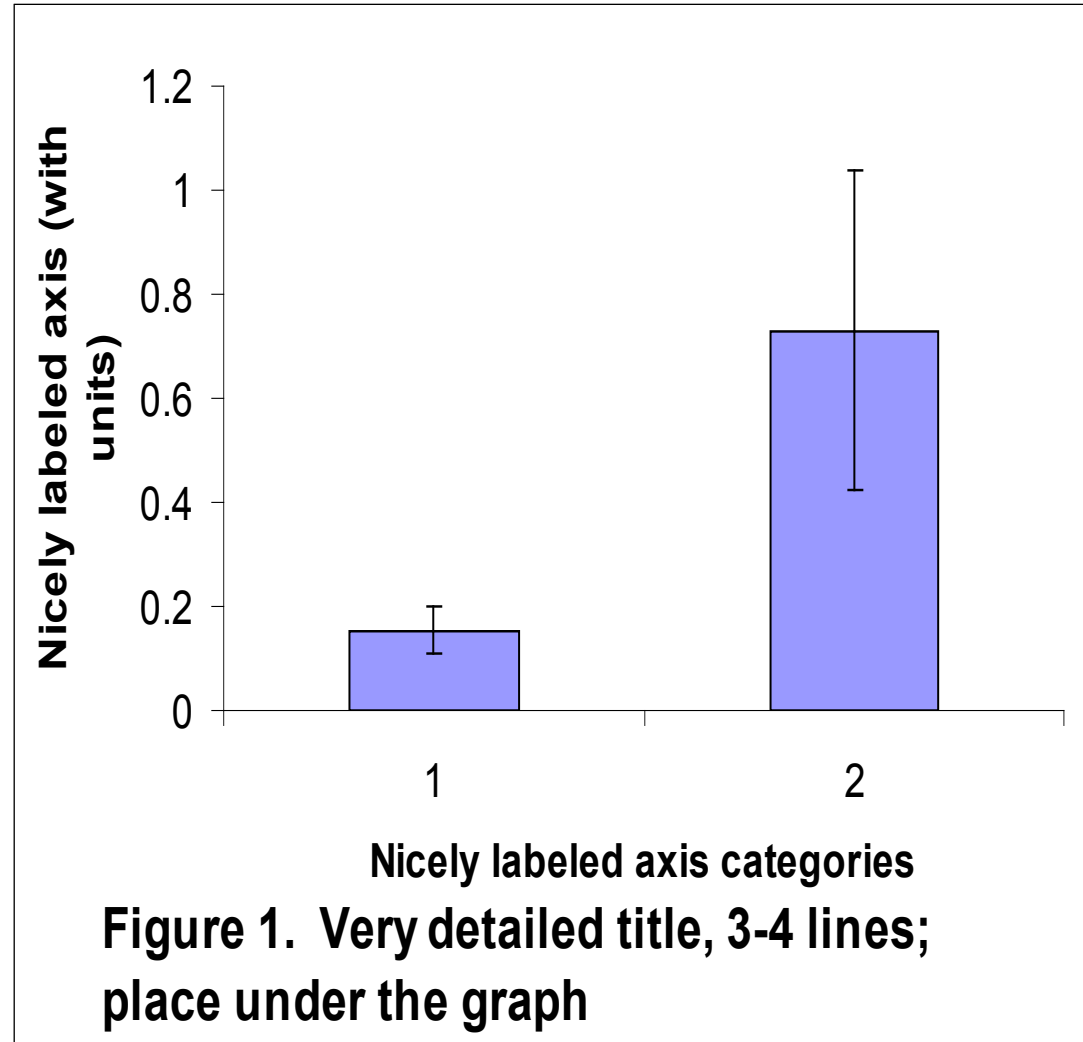
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2-site comparison: Figures

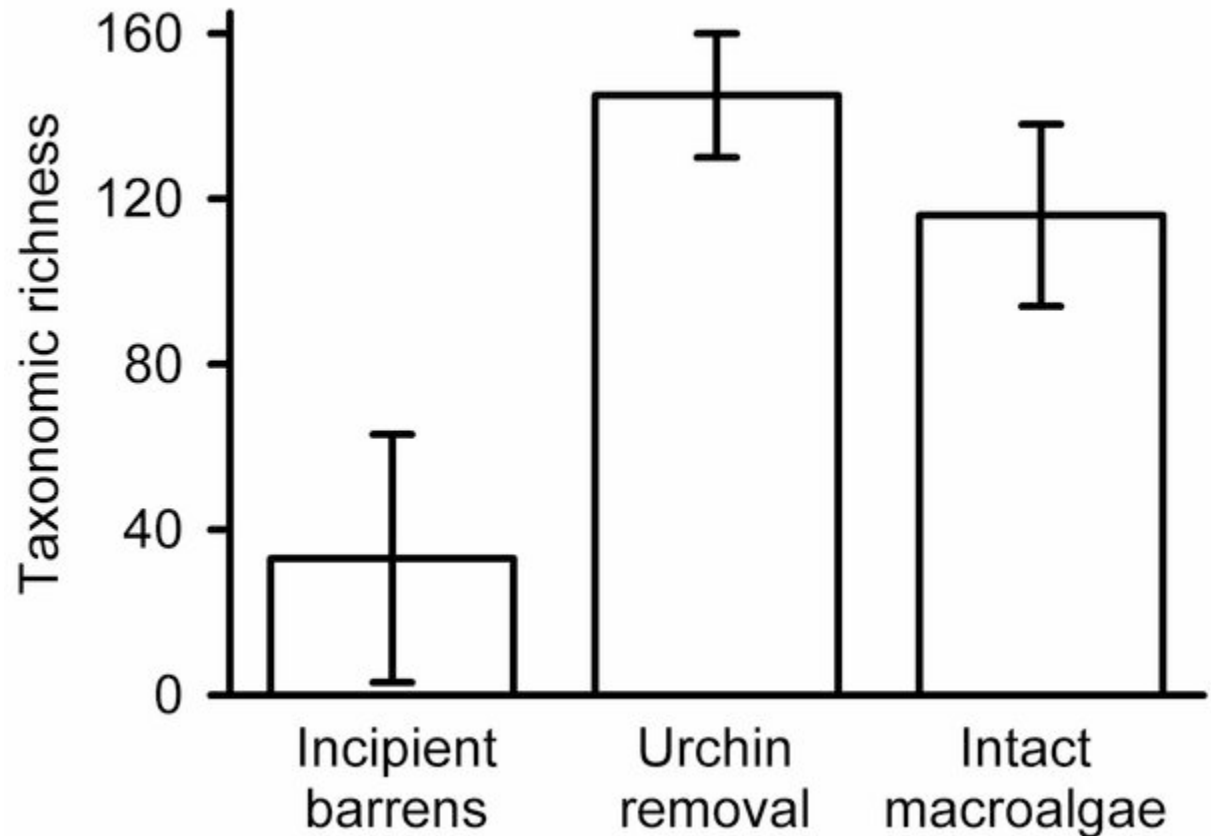
- Reduce clutter
- Avoid 3-D effects
- Legend on the bottom



2-site comparison: Figures

Improvements

- Thicker lines
- Larger font



Multi-site comparison

- Data form:
- Average the response variables at each site
- OR
- Max; min; range

		Average
Stream	%Forested	Richness
LCD_EngBrk_117	0.18	6.883333
LCD_PoBrk_133	0.183	6.971429
LCD_BrtltBrk_139	0.242	7.466667
LCD_IndBrk_323	0.563	11.3125
LCD_LwsCrk_227	0.681	13.85714
WR_SIBrk_711	0.987	14.11111

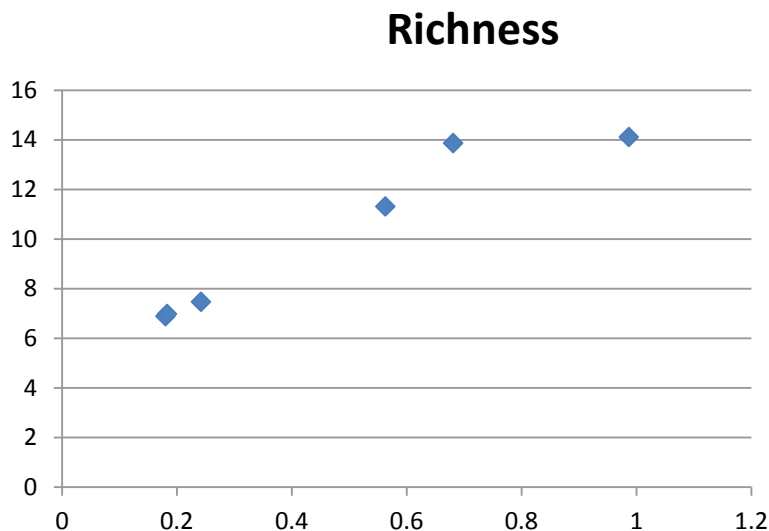
Making scatter plots

- Highlight data
- *Insert scatter*

		Average
Stream	%Forested	Richness
LCD_EngBrk_117	0.18	6.883333
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◆ Richness

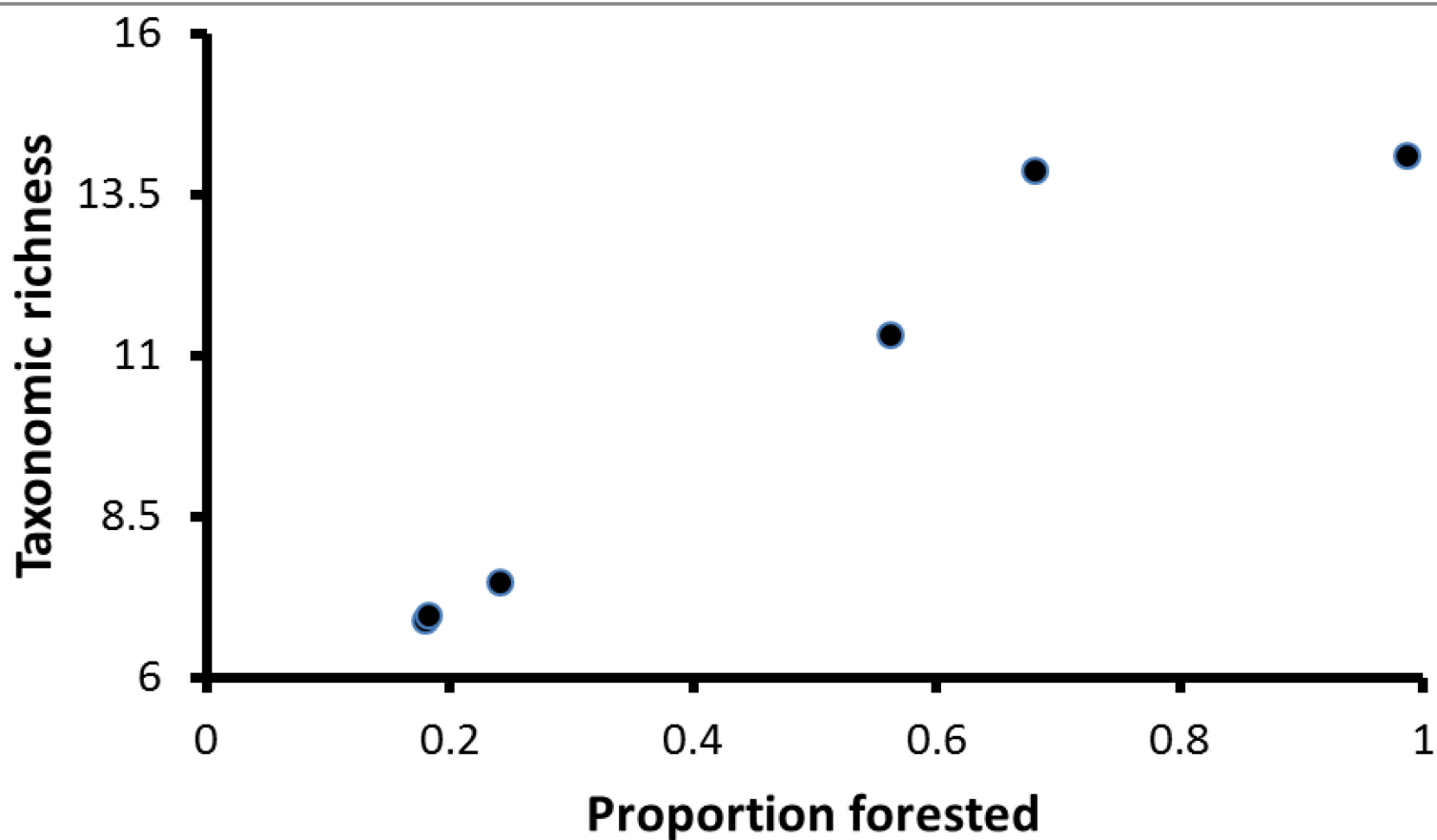


Figure 1. Taxonomic richness of macroinvertebrates compared to the proportion of the water shed that is forested.

Powerpoint suggestions

- Acknowledgements on first slide
- Black text on bright background works
- 32 point font displays well; turn off Autofit & Auto Formatting
- Few words
- Practice timing (avoid the big hook)

Posters

- Make a powerpoint slide:
- 4' wide; 3' high
- Use “snap-to” function for alignment
- Get high-resolution school logos (not from your school web site)

- Thanks for attending.



Thanks also to:
Lindsay; Katie; Saul; Miranda