From:	Bruce G Campbell [bcampbel@usgs.gov]
Sent:	Monday, March 19, 2012 11:02 AM
To:	Scott Harder
Subject:	Fw: Re: Fw: Re: Re URL: http://groundwaterwatch.usgs.gov/AWLSites.asp

Hi Scott -- Below are (I hope) answers to your questions about how the USGS calculates stats on the Groundwater Watch web pages. If you have additional questions, don't hesitate to let me know.

We should work on some way to get your data into our system, so it would all be in one place. We recently had a review here in the office and this was discussed. Maybe you and Joe could come over one day soon and we could talk some more.

In any case, your data could go to the National GW monitoring network:
http://cida.usgs.gov/gw_data_portal/

Bruce

-----Forwarded by Bruce G Campbell/WRD/USGS/DOI on 03/19/2012 10:52AM -----

To: Bruce G Campbell/WRD/USGS/DOI@USGS
From: William L Cunningham/WRD/USGS/DOI
Date: 03/19/2012 10:43AM
Subject: Re: Fw: Re: Re URL: http://groundwaterwatch.usgs.gov/AWLSites.asp

Hi Bruce:

These can be tough to duplicate because there are a lot of subtle decisions that must be made behind the scenes, and a variety of measurement frequencies to consider in a national dataset. The stats approach is presented on the help pages: http://groundwaterwatch.usgs.gov/help1.htm

There are a few key points about the stats (from the help pages):
Percentiles are estimated from N measurements as follows:

For the pth percentile:
set $p(N+1)$ equal to $k + d$ for k an integer, and d, a fraction greater than or equal to 0 and less than 1.
For $0 < k < N$, $Y(p) = Y[k] + d(Y[k+1] - Y[k])$
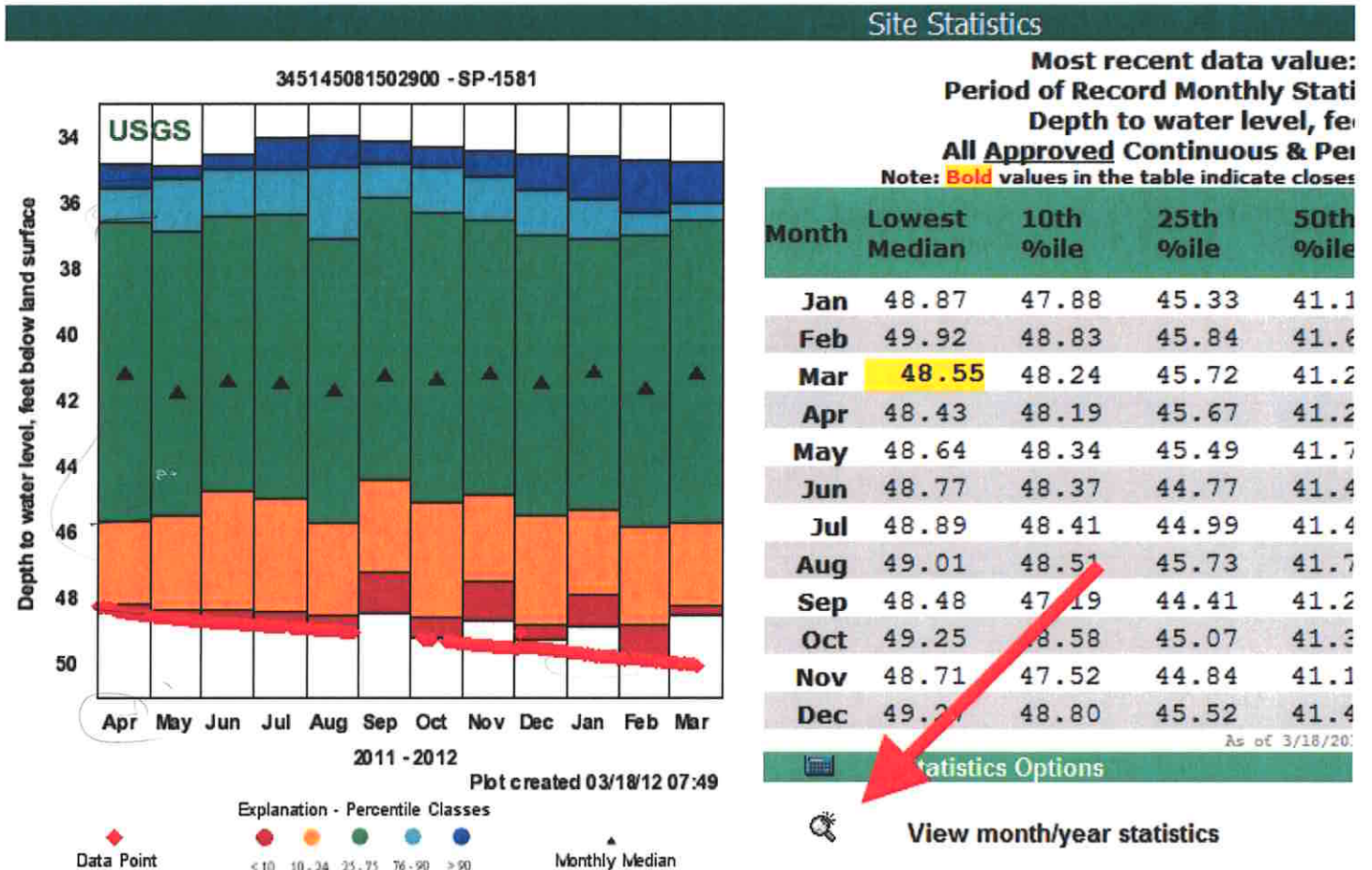For $k = 0$, $Y(p) = Y[1]$
For $k = N$, $Y(p) = Y[N]$

And

All available data (periodic and continuous) from an individual well are grouped by month in a given year, ranked, and a median for each Month/Year combination is selected. Individual month/year medians are grouped by month over the period of record (multiple years). These monthly medians are then ranked, and the appropriate statistics are presented based on the following criteria:

If there are 4 or less years of data for any given month, no statistics are computed for that month. If there are more than 4 years and less than 10 years of data in a given month, the minimum, median, and maximum water levels are displayed in the table, and plotted in the adjacent hydrograph using a vertical line. If there are 10 or more years of data in a given month, water-level percentiles are computed and displayed in a table and in the adjacent hydrograph using colored monthly bars. When only partial water-level dates are available, hydrographs are generated using the first month (January) and first day of the month for missing month and/or day to be

1

consistent with other components of NWISWeb. Provisional data that have not received final USGS approval are not included in these statistical calculations.

Lastly, only Approved data are used in the calculation. Thus there are several things that can trip folks up when they are trying to replicate our stats (1) they include provisional data, (2) they calculate a "month-year" values differently than we do, (3) they do not include "all data" -- we include periodic and daily values if both are present in a month, or (4) they calculate percentiles differently than we do. To troubleshoot, I suggest that they take a look at the "View month/year statistics" button for the site in question:

Site Statistics

Most recent data value:
Period of Record Monthly Stati
Depth to water level, fe
All Approved Continuous & Pe
Note: **Bold** values in the table indicate close

Month	Lowest Median	10th %ile	25th %ile	50th %ile
Jan	48.87	47.88	45.33	41.1
Feb	49.92	48.83	45.84	41.6
Mar	48.55	48.24	45.72	41.2
Apr	48.43	48.19	45.67	41.2
May	48.64	48.34	45.49	41.7
Jun	48.77	48.37	44.77	41.4
Jul	48.89	48.41	44.99	41.4
Aug	49.01	48.51	45.73	41.7
Sep	48.48	47.19	44.41	41.2
Oct	49.25	48.58	45.07	41.3
Nov	48.71	47.52	44.84	41.1
Dec	49.2	48.80	45.52	41.4

As of 3/18/20

tatistics Options

View month/year statistics

We've included that link to show exactly what we've done by month for the period of record.

If none of that helps, it's possible that we have an error on GWW. So let me know if this does not help them.

Bill

Hi Bill -- Had a question from one of our state cooperators on how some of the stats are calculated on the Groundwater Watch pages (see below). Can you help me out with this one?

Thanks -- Bruce

-----Forwarded by Bruce G Campbell/WRD/USGS/DOI on 03/19/2012 09:22AM -----

To: harders@dnr.sc.gov
From: Whitney J Stringfield/WRD/USGS/DOI
Date: 03/16/2012 12:05PM
cc: archive_ask@usgs.gov, gs-w-sc_NWISWeb_Data_Inquiries@usgs.gov
Subject: Re: Re URL: http://groundwaterwatch.usgs.gov/AWLSites.asp

Bruce,

Do you have an answer or is this strictly a Data Section question?
Thanks

Whitney

harders---03/16/2012 11:55:35 AM---Transaction=GSF64MDL [16MAR2012 15:55:32UTC]
Customer email: harders@dnr.sc.gov

From:	harders@dnr.sc.gov
To:	gs-w-sc_NWISWeb_Data_Inquiries@usgs.gov
Cc:	archive_ask@usgs.gov
Date:	03/16/2012 11:55 AM
Subject:	Re URL: http://groundwaterwatch.usgs.gov/AWLSites.asp

---

```
Transaction=GSF64MDL [16MAR2012 15:55:32UTC]
Customer email:   harders@dnr.sc.gov
Customer:         Scott Harder
Customer phone:   803-734-4764
Customer address:
1000 Assembly St.
Columbia, SC 29201
Subject:          Re URL: http://groundwaterwatch.usgs.gov/AWLSites.asp
Originating page: http://nwis.waterdata.usgs.gov/nwis/feedback/?to=South Carolina
Water Science Center Water-Data
Inquiries&amp;site_state_abbrev=sc&amp;site_district_abbrev=sc
Handling note:    Source node: nadww01
Primary response: gs-w-sc_NWISWeb_Data_Inquiries@usgs.gov
Copies to:        gs-w_NWISWeb_Feedback@usgs.gov
org_name:             South Carolina Department of Natural Resources
referer_url:
```

http://groundwaterwatch.usgs.gov/AWLSites.asp?S=335336082214600

USGS PERSONNEL: This email was generated through the Contact USGS system. When replying to the customer PLEASE BE SURE TO CC archive_ask@usgs.gov. (Customers, please do not send email to archive_ask, as it will not be answered.) If you answer by phone, simply forward this email to archive_ask@usgs.gov. You can see more information about replying to customers at <http://answers.usgs.gov/usgs/responding.htm> (USGS only). gs-w-sc_NWISWeb_Data_Inquiries@usgs.gov has primary responsibility for replying to harders@dnr.sc.gov. Others who wish to reply should coordinate their responses with gs-w-sc_NWISWeb_Data_Inquiries@usgs.gov.
==

Hi. I am a hydrologist for the state of SC. We have a state groundwater monitoring network and for many of our wells I am interested in producing some graphs and statistics very similar to what you are doing on the Waterwatch site for your ground water wells. I had written a program to compute monthly percentiles for the ground water data and had used several of the USGS wells to validate that the program was working correctly. I cannot reproduce your monthly percentile values given for MCK-0052 (McCormick County SC) and OCO-0233 (Oconee County SC) on the website, though it should be a pretty straightforwared calculation. In some cases I am real close or right on, but for some months I may be off 0.5 to 1.3 ft off. Could you provide your methodology and/or look into the percentile values on the website for these wells? As I said, I would like to reproduce similar analysis and graphs for a host of other wells that we continuously monitor in SC, but would like to be as conistent with the USGS as possible. Thanks for your time.

Scott Harder