March 1, 2011

MEMORANDUM

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District

SUBJECT: Comments submitted by Mr. Martyn Johnson regarding discharge measurements for the Homosassa River system

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This memorandum documents correspondence between Martyn Johnson, Doug Leeper, with the Southwest Florida Water Management District, and Kevin Grimsley and Richard Kane with the United States Geological Survey, regarding discharge measurements and development of minimum flows for the Homosassa River system.

Three e-mails from Martyn Johnson, including one sent to Kevin Grimsley on February 16, 2011, and two sent to Doug Leeper on February 19 and February 26, 2011, respectively, are included as attachments to this memorandum. A response to Martyn Johnson from Doug Leeper is also included along with other relevant communications.

DAL

Attachments:
- Attachment A – E-Mail from Martyn Johnson to Kevin Grimsley, dated February 16, 2011
- Attachment B – Attachment (*Vm from Vi Bias Question.xls*) to E-Mail from Martyn Johnson to Kevin Grimsley, Dated February 16, 2011
- Attachment C – E-Mail from Martyn Johnson to Doug Leeper, dated February 19, 2011
- Attachment D – Attachment (*SEFork Detail Comments-Analysis.doc*) to e-mail from Martyn Johnson to Doug Leeper, dated February 19, 2011
- Attachment E – Second attachment (*SEFork Flow Analysis.xls*) to e-mail from Martyn Johnson to Doug Leeper, dated February 19, 2011
- Attachment F – E-mail from Doug Leeper to Kevin Grimsley and Richard Kane, dated February 21, 2011
- Attachment G – E-mail from Richard Kane to Doug Leeper, dated February 21, 2011
- Attachment H – E-mail from Kevin Grimsley to Doug Leeper, dated February 24, 2011
- Attachment I – Attachments (10) to e-mail from Kevin Grimsley to Doug Leeper, dated February 24, 2011
- Attachment J – E-mail from Martyn Johnson to Doug Leeper and others, dated February 26, 2011
- Attachment K – E-mail from Doug Leeper to Martyn Johnson, dated March 1, 2011

Attachment A

E-Mail from Martyn Johnson to Kevin Grimsley (United States Geological Survey), Dated February 16, 2011

From: Alan Martyn Johnson
To: Kevin J Grimsley
Cc: Doug Leeper; rkane
Subject: RE: Homosassa River Flow Concerns
Date: Wednesday, February 16, 2011 12:50:15 PM
Attachments: Vm from Vi Bias Question.xls

Kevin,
Thank you very much for this information about the Stage Area Rating.

As you suggested this is missing from the Appendix B of the peer review where equations B-3 and B-4 (Vm from Vi and Q=Vm x A) are shown for this site. I just saw Doug's e-mail indicating they will include this in the revised report.

Knowing this equation is used certainly helps me understand part of the situation. I was close in my Feb 2 e-mail in suggesting the channel was 200 feet wide and 1600 square feet at GH 0. Not bad for an amateur...looks like the channel is 214 feet across and 1806 square feet...I was close to understanding but just missed making the last connection. I did note in my Feb 2 e-mail the formula did not take and I missed a g from exaggerate!!

For right now let me expand on the Homosassa River Site and the table I included in the Feb 2 e-mail. You may recall in our conversation Friday I commented on the squaring of the velocity in the calculation of Vm from Vi and how it appears to bias the result. In the attached spreadsheet I have highlighted in red the squared component of the equation and the influence highlighted orange. This results in a bias to **decrease the inflow figures or increase the out flow figures** (which ever way you look at it). I find it hard to understand how the differences highlighted in green (for example how is it possible that the velocity Vm can be 60% higher for the positive versus negative 1.5 ft/sec detected Vi velocity), can be explained.

As you will see further adding to the difficulty of finding an explanation the influence of the squared component has is the influence it has dependent on it being above or below 1.0 (I hope I made that clear but just in case 1.5 squared is 2.25 times the 0.12138 factor whereas 0.5 squared is 0.25 times the 0.12138 factor).

I trust this makes it a little easier to understand the question raised by my sharing the table in my Feb 2 e-mail.

But for completeness let me add:
for 1.0 ft/sec out flow at gage height 0 this gives 1.03230154x1806.4=1865cfs
for -1.0 ft/sec inflow at gage height 0 this gives -0.7714985x1806.4=1394cfs
for 0.5 ft/sec outflow at gage height 0 this gives 0.49031654x1806.4=885cfs
for -0.5 ft/sec inflow at gage height 0 this gives -0.41158346x 1806.4=743cfs

Kevin,
I recall your explanation about zero Vi not being zero Vm and the sketch you drew for me. As you will see from the spreadsheet the influence from the GH factored component that is offset from zero, is almost negligibly small. It is the slope of the curve that is influenced by the squaring of the velocity Vi, which reduces the inflow.

Again I appreciate all the efforts to help me understand the situation. I am trying to figure out why the 'locals' who have seen the river deteriorate over time are observing the changes when the modelling thinks all is OK. Flows are critical in this modelling and the reason I started looking at the Homosassa River site data was a comment from a gentleman who has known and patrolled the river for many years (who's name I unfortunately do not know). He said at the Lecanto workshop in January that 'he thought the flow from Halls River was much less than shown in the presentation'. The discharge presented from Halls River are derived, as I understand it, by subtracting the Homosassa Springs and SE Fork discharges from the Homosassa River.

Would really appreciate if you can clarify this for me.

Thanks,
Martyn

Table 2-3. Summary statistics for mean daily discharge records approved by the United States Geological Survey for Homosassa River system gage sites. Values are expressed as cubic feet per second (cfs) unless specified. Periods of record for approved data are listed by gage site in Table 2-2.

Statistic (cfs or N)	Homosassa Springs at Homosassa Springs FL	SE Fork Homosassa Spring at Homosassa Springs FL	Combined Springs[a]	Halls River[b]	Homosassa River at Homosassa FL (tidally filtered)	Hidden River near Homosassa FL
Maximum	141	100	240	1,995	2,090	25.0
75th Percentile	98	68	165	200	350	11
Median	88	60	147	108	251	8.0
25th Percentile	79	53	131	28	167	4.6
Minimum	34	23	57	-765	-636	1.3
Mean	89	61	149	129	272	8.0
Standard Deviation	14	11	26	181	183	4.4
Number (N) of daily Records	4,975	3,123	3,102	1,662	1,774	2,063

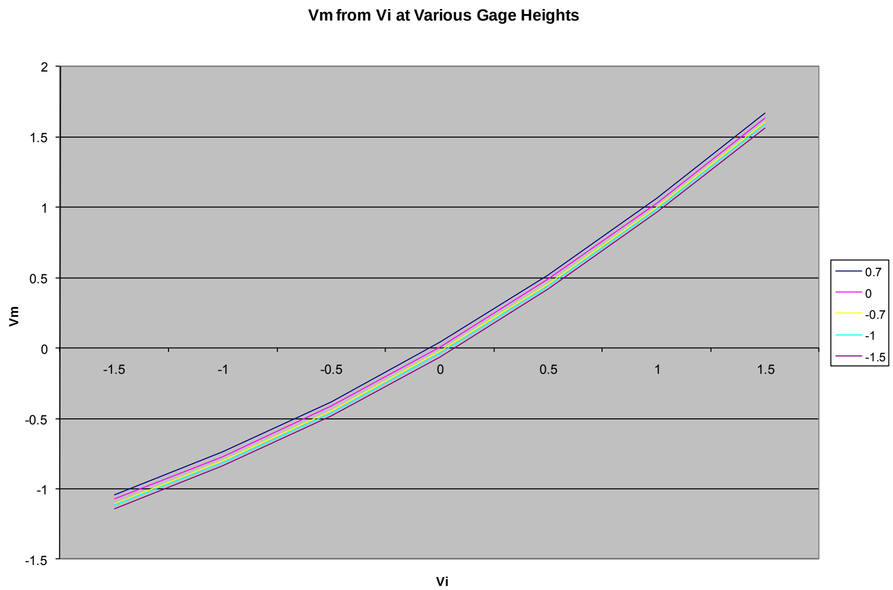
a Combined Springs discharge determined as the sum of the Homosassa Springs at Homosassa FL and SE Fork Homosassa Spring at Homosassa Springs FL discharge for days when records were available for both sites.
b Halls River discharge estimated by subtracting combined springs discharge from tidally filtered Homosassa River at Homosassa FL discharge for days when records were available for the two spring sites and the Homosassa River site

<u>NOTE: e-mail string deleted by Doug Leeper, Southwest Florida Water Management District</u>

Attachment B

Attachment (Vm from Vi Bias Question.xls) to E-Mail from Martyn Johnson to Kevin Grimsley, Dated February 16, 2011

Sheet: Chart1



Sheet: Vm from Vi Bias Question

	CALCULATED Vm FROM Vi AT VARIOUS GAGE HEIGHTS FROM PUBLISHE EQUATION								**% difference**	**% difference**
		Velocity Vi							**Inflow -0.5 ft/sec v**	**Inflow -1.5 ft/sec v**
	GH	-1.5	-1	-0.5	0	0.5	1	1.5	**Outflow 0.5 ft/sec**	**Outflow 1.5 ft/sec**
	0.7	-1.03896096	-0.739736	-0.37982096	0.04078404	0.522079	1.06406404	1.66673904	**137%**	**160%**
	0	-1.07072346	- 0.7714985	-0.41158346	0.00902154	0.4903165	1.03230154	1.63497654	**119%**	**153%**
	-0.7	-1.10248596	-0.803261	-0.44334596	-0.02274096	0.458554	1.00053904	1.60321404	**103%**	**145%**
	-1	-1.11609846	- 0.8168735	-0.45695846	-0.03635346	0.4449415	0.98692654	1.58960154	**97%**	**142%**
	-1.5	-1.13878596	-0.839561	-0.47964596	-0.05904096	0.422254	0.96423904	1.56691404	**88%**	**138%**
FOR Vi -1.5 feet/sec		-1.5								
		Equation Components					FIXED	FIXED+VARIAB LE	Variable	Squared Influence in
		0.00902154	0.9019Vi	0.12138ViVi	.045375GH		Component	Component	Influence	Fixed Component
	0.7	0.00902154	-1.35285	**0.273105**	0.0317625		-1.07072346	-1.03896096	-3.06%	-25.5%
	0	0.00902154	-1.35285	**0.273105**	0		-1.07072346	-1.07072346	0.00%	-25.5%
	-0.7	0.00902154	-1.35285	**0.273105**	-0.0317625		-1.07072346	-1.10248596	2.88%	-25.5%
	-1	0.00902154	-1.35285	**0.273105**	-0.045375		-1.07072346	-1.11609846	4.07%	-25.5%
	-1.5	0.00902154	-1.35285	**0.273105**	-0.0680625		-1.07072346	-1.13878596	5.98%	-25.5%
FOR Vi 1.5 feet/sec		1.5								
		Equation Components								
		0.00902154	0.9019Vi	0.12138ViVi	.045375GH					
	0.7	0.00902154	1.35285	**0.273105**	0.0317625		1.63497654	1.66673904	1.91%	16.7%
	0	0.00902154	1.35285	**0.273105**	0		1.63497654	1.63497654	0.00%	16.7%
	-0.7	0.00902154	1.35285	**0.273105**	-0.0317625		1.63497654	1.60321404	-1.98%	16.7%
	-1	0.00902154	1.35285	**0.273105**	-0.045375		1.63497654	1.58960154	-2.85%	16.7%
	-1.5	0.00902154	1.35285	**0.273105**	-0.0680625		1.63497654	1.56691404	-4.34%	16.7%
FOR Vi -0.5 feet/sec		-0.5								
		Equation Components								
		0.00902154	0.9019Vi	0.12138ViVi	.045375GH					
	0.7	0.00902154	-0.45095	**0.030345**	0.0317625		-0.41158346	-0.37982096	-8.36%	-7.4%
	0	0.00902154	-0.45095	**0.030345**	0		-0.41158346	-0.41158346	0.00%	-7.4%

	-0.7	0.00902154	-0.45095	**0.030345**	-0.0317625		-0.41158346	-0.44334596	7.16%	-7.4%
	-1	0.00902154	-0.45095	**0.030345**	-0.045375		-0.41158346	-0.45695846	9.93%	-7.4%
	-1.5	0.00902154	-0.45095	**0.030345**	-0.0680625		-0.41158346	-0.47964596	14.19%	-7.4%
FOR Vi 0.5 feet/sec		0.5								
		Equation Components								
		0.00902154	0.9019Vi	0.12138ViVi	.045375GH					
	0.7	0.00902154	0.45095	**0.030345**	0.0317625		0.49031654	0.52207904	6.08%	6.2%
	0	0.00902154	0.45095	**0.030345**	0		0.49031654	0.49031654	0.00%	6.2%
	-0.7	0.00902154	0.45095	**0.030345**	-0.0317625		0.49031654	0.45855404	-6.93%	6.2%
	-1	0.00902154	0.45095	**0.030345**	-0.045375		0.49031654	0.44494154	-10.20%	6.2%
	-1.5	0.00902154	0.45095	**0.030345**	-0.0680625		0.49031654	0.42225404	-16.12%	6.2%
FOR Vi 0.0 feet/sec		0								
		Equation Components								
		0.00902154	0.9019Vi	0.12138ViVi	.045375GH					
	0.7	0.00902154	0	**0**	0.0317625		0.00902154	0.04078404		
	0	0.00902154	0	**0**	0		0.00902154	0.00902154		
	-0.7	0.00902154	0	**0**	-0.0317625		0.00902154	-0.02274096		
	-1	0.00902154	0	**0**	-0.045375		0.00902154	-0.03635346		
	-1.5	0.00902154	0	**0**	-0.0680625		0.00902154	-0.05904096		

Attachment C

E-Mail from Martyn Johnson to Doug Leeper, Dated February 19, 2011

From: Alan Martyn Johnson
To: Doug Leeper
Cc: Kevin J Grimsley; rkane; Ron Basso
Subject: SE Fork Homosassa River Flow Calculation Concerns
Date: Saturday, February 19, 2011 3:30:16 PM
Attachments: SEFork Detail Comments-Analysis.doc
SEFork Flow Analysis.xls

Doug,
Attached are two files that address the concerns I have mentioned before about the equation used to calculate the flow from the SEFork. In a recent e-mail I commented about your explanation, indicating that the average of the measurements and the actual daily mean discharge are one and the same thing. There is no separate measurement of the actual mean discharge.
Quote
Individual discrete discharge estimates may exhibit moderate variation from actual physical conditions at the site, but the average of the composited discrete measurements made over a 24-hour period has been shown to correspond well with actual daily mean discharge.
End Quote.

In the Word file I have provided a detailed explanation of the numbers as I see them and detail that these are not moderate variations from actual. I see them as frankly inexplicable variations from actual and logical explanation. The Excel file has the supporting data/calculation/analysis from the base data copied from the USGS web site and the calculation equation as published.

I decided to leave my discussion in the word file as the included charts did not want to copy into an e-mail and I hope it easier for you and others to review.
Please take the time to look over my comments, if I am wrong I will happily admit it providing there is valid explanation.

I know that the reaction may be that if I am right it will require a good explanation of why this was not recognized earlier and maybe why so much money has been spent on studies that appear to come to conclusions vastly different to what people are observing. My aim is to understand how the observations of good honest people do not match the 'scientific' data.

A lot more effort is needed to understand why the Homosassa River is deteriorating and not into finding ways to justify more water extraction from the aquifer. This is like Congress years ago ignoring the foolishness of the mortgage market that resulted in the crash, or the damage that has been even more dramatic in other rivers where recovery is now necessary. Transferring the problem is not the solution.

I have started to look at the water chemistry data you shared earlier and while comment soon.

Do not dismiss my analysis without a good reasoned argument, as you may have gathered I do not disappear easily.

Thanks for your continued attention to this matter of preventing further destruction of the Homosassa River. Simple solution is moratorium on drilling anymore wells or increasing extractions for 5 years for assessment to be validated.

Martyn

Attachment D

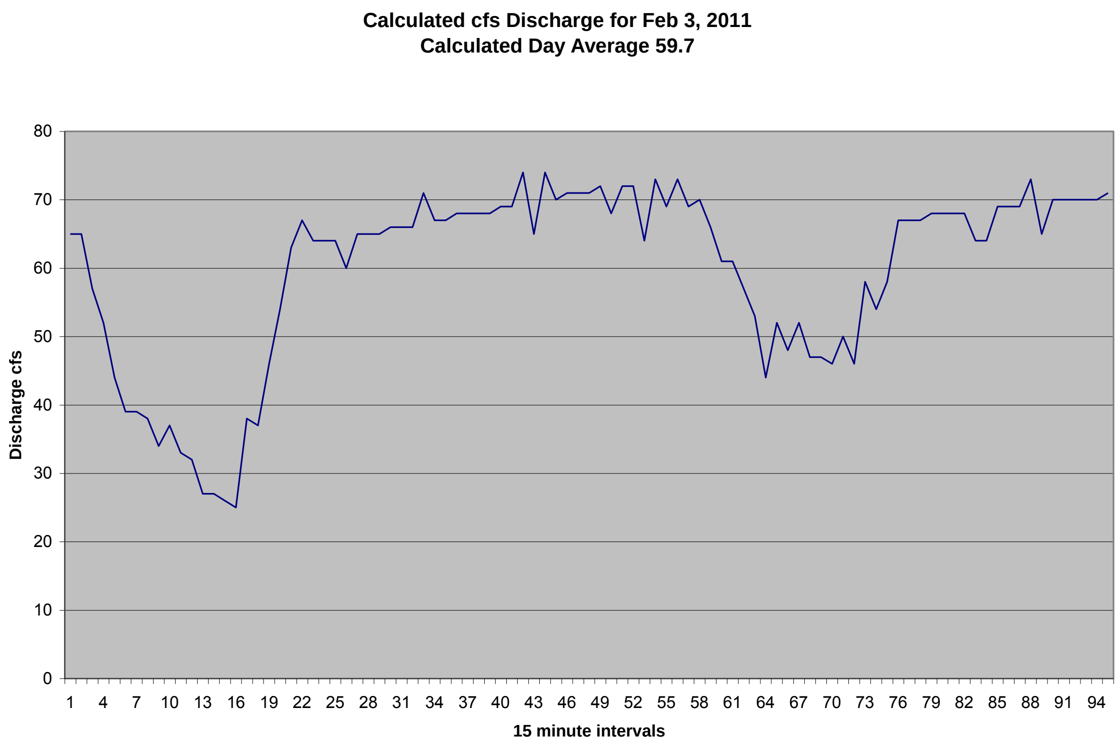
<u>Attachment (SEFork Detail Comments-Analysis.doc) to E-Mail from Martyn Johnson to Doug Leeper, Dated February 19, 2011</u>

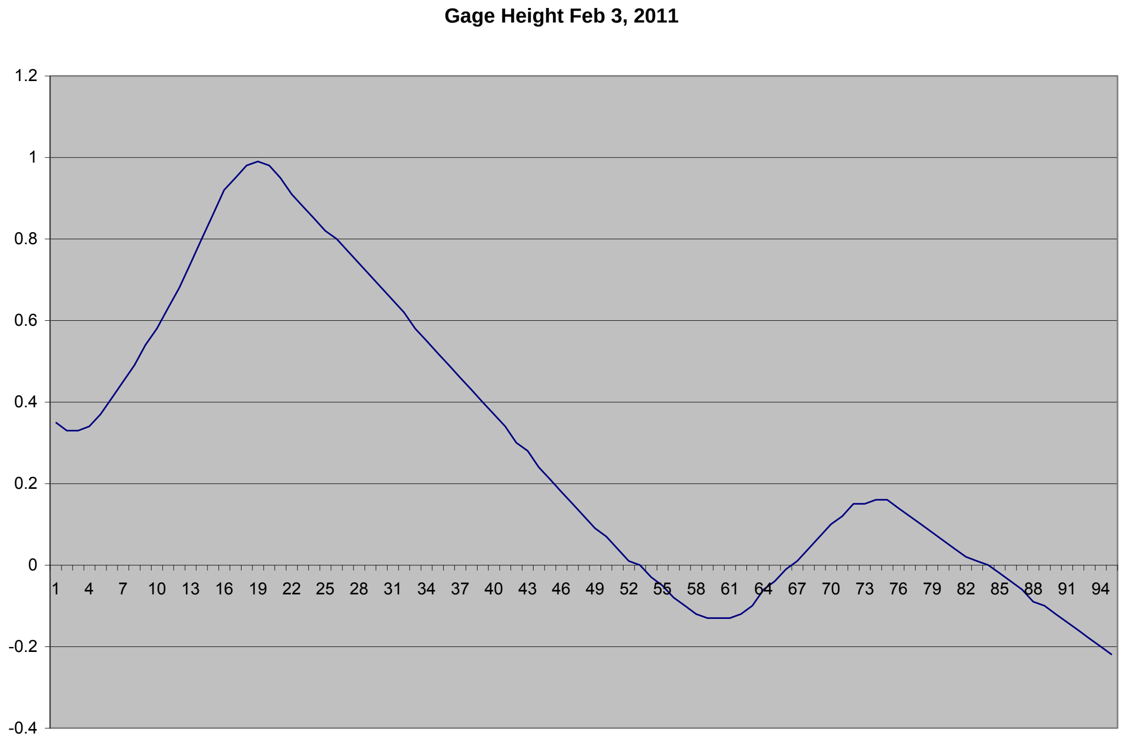
In previous e-mails I have questioned the accuracy of the discharge from the SE Fork of the Homosassa River as calculated from the equation referred to as B-2:

$Q = 18.63 + 3.31(GW) – 10.31(GH) – 418.14(dS/dt)$

As promised I will try to further explain my point as follows.

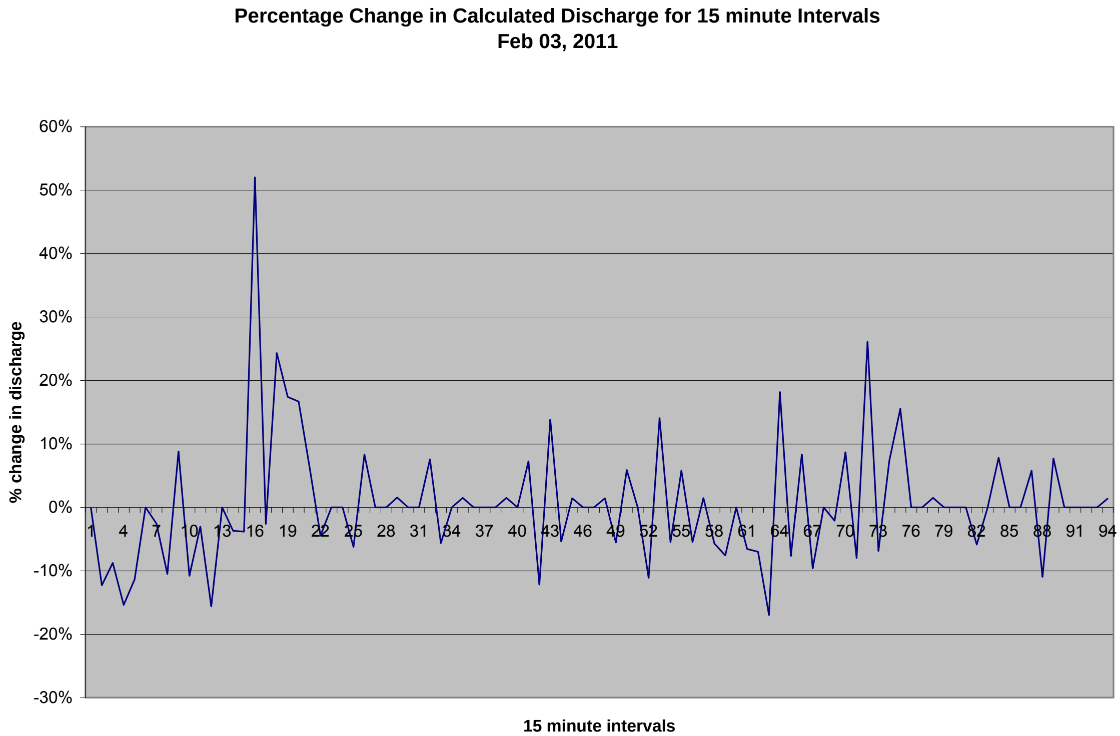
First look at the chart titled cfs Discharge Feb 3, 2011 you will see that the calculated discharges cycle and range from a low of 25cfs to high of 74cfs (data from sheet Feb 3, 2011 cells D98 and D99, real-time data from USGS is in cells B3 thruD97). This says that there is 3 times more water flowing under the bridge at 10:30 and 11:00 than at 4:00. Even if these calculated values are 'moderate variations from actual physical conditions'
They are very difficult to imagine e.g. kayaking under the bridge with 3 times the volume of water flowing thru the channel which is 0.6 feet shallower, that is making the velocity over 3 times greater. That is not reality. The Gage Heights are shown on worksheet Gage Height Feb 3, 2011.





But, wait the Gage Height continues to drop from 0.3 feet at 11:00 to -0.13 feet at 15:00 and the discharge rate cfs decreases from 74cfs to 61cfs. No such a dramatic change. But, look what the calculated discharge is at 16:00 it has dropped to 44cfs in one hour with a Gage Height change to -0.06 feet. Almost 30% drop in one hour. These can not be 'moderate variations from the actual physical conditions'.

As I am at the point of percentage changes in discharge, the percentage changes in each 15 minute interval are calculated from the real-time data in the Feb 3, 2011 worksheet cells E4 thru E97 and on the chart Percent Change in 15 minutes.



Hunting is the only comment/conclusion I can draw.

Now going back to those calculated discharges. What do these say if we assume they are somewhere close to actual.
We can be reasonably sure that the flow from the various springs in the SE Fork does not change with anything like a 3 fold change during the day given by the calculation e.g. 25cfs to 74cfs. There will be a small change due to the change in water level (head) over the spring (see ** below). So for now assume that it is constant as expressed by the calculated average daily flow. For Feb 3, 2011 that is 59.7cfs as shown in cell D100 of the Feb 3, 2011 worksheet (on USGS web site the Mean for Feb 3 is provisionally shown as 60cfs).

The explanation for changes of discharge under the bridge result from spring discharge accumulating in, or draining from the pool upstream of the bridge/gage site.
That is during times when gage height is increasing water accumulates in the pool and during times when gage height is decreasing water drains from the pool.
On the worksheet Feb 3 in column F the flow during the 15 minute interval is shown as total cubic feet of discharge under the bridge/gage site.
Note: this is not the rate of discharge for the entire 15 minutes…average it if you want outcome is the same.
In column H the cubic feet of discharge above or below average is shown in red or green.
During times that water is below average it is accumulating in the pool so if the cubic feet are accumulated this is shown in cells such as I22 in this case 350000 cubic feet would have accumulated. It has gone somewhere, because according to the calculation it did not pass under the bridge/past the gage site. If it is in the pool which I have previously suggested is about 3 acres it would result in an increase level of 2.68 feet as shown in J23. The gage height shows an increase over this time of 0.33 to

0.98 feet or 0.65 feet. Similarly, drop in level of 2.27 feet shown in J64 where the actual drop is 1.08 feet.

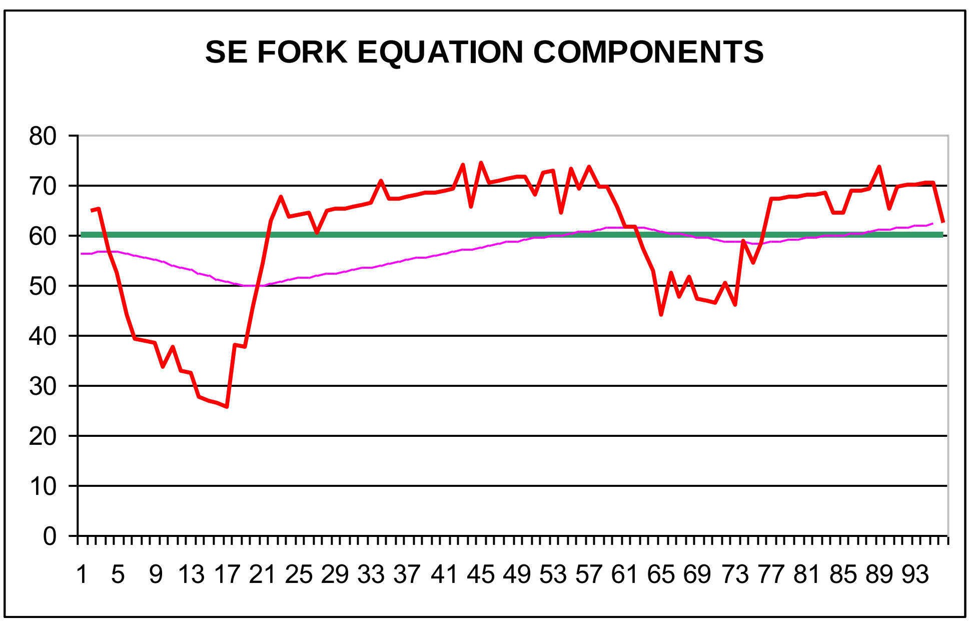
Hard to understand the calculated discharges…or am I again missing something? But, is that not what the calculation is saying.

These are not moderate variations from actual physical conditions; the regression analysis rendered and equation that generate a gross exaggeration of the actual. You can't have good data coming from bad however much you say about averaging.   Agreed over the day it appears to all balance out as would be expected with averaging a cyclic situation. The actual change in gage height over the day of -0.57 feet this would represent an average discharge past the gage site of 0.86cfs additional (assuming again the 3 acre pool).

Now, take a look at the calculation and the various components as is shown on worksheet Equation Components Analysis.

The first and second components are fixed for the day. The 18.63 constant and the 3.31 times the Weeki Wachee level which for Feb 3 was 12.52 feet equaling 41.44 which is total fixed 60.07. The first variable is 10.31 times the gage height shown in column H. During the day this subtraction, from the fixed 60.07, varies from a maximum of 10.21 to a minimum of -2.27. Resulting in max to min spread when this component is included of 62.34 to 49.86. It could be speculated that this component is intended to address the change of discharge from the various springs mentioned at ** above, for those interested to consider this further the change in head is expressed as a % in column I.

The fourth component -418.14 time ds/dt (the change in stage height or gage height in each 15 minute interval) results in a subtraction of 25.08 to -16.72 (note subtraction of a minus results in an increase so) these are shown in column M and in the graph included in the worksheet.



Green line is the Fixed, Purple Line is the 10.31*GH subtracted

Red line is the 418.14*ds/dt subtracted.

Breakdown of the equation components is included in the worksheet for Jan 13, 2011 and Nov 3, 2010. Jan 13, 2011 incidentally is the day mentioned in a previous e-mail when the water level was very low and flows from Trotter and Pumphouse Springs were not influenced by any change of head (** reference) yet the calculated discharge shows the flow coming to an abrupt decline after 20:45.

My conclusions:

1. The equation is wrong. It bares no resemblance to the actual physical conditions.
2. The huge multiplier on the ds/dt causes exaggeration of actual accumulation or discharge from the pool upstream of the gage site. The failure to recognize the reality of the ds/dt component in the regression analysis has most likely decreased the multiplier used on the GW component thus underestimating the flow from the springs.
3. The multiplier used, in what I speculated is the attempt to adjust for change in head over the springs, appears to be larger than normal for a change in head over a fixed orifice. (the spring vents are a fixed orifice over time periods such as weeks/months but may change over years) and the influence of the change in gage height is much more likely to be a direct relationship to the change in actual head…I know Weeki Wachee may not be the actual head, but it is used as record go back forever!

Commentary

Just possibly the flow from the SE Fork has dropped a lot more than this calculated data shows and could be a factor in the increased salinity which is resulting in barnacle growth.

Speculation may be. But, adding to the above comments the only field measurements for the SEF where I have been able to compare actual versus calculated are;

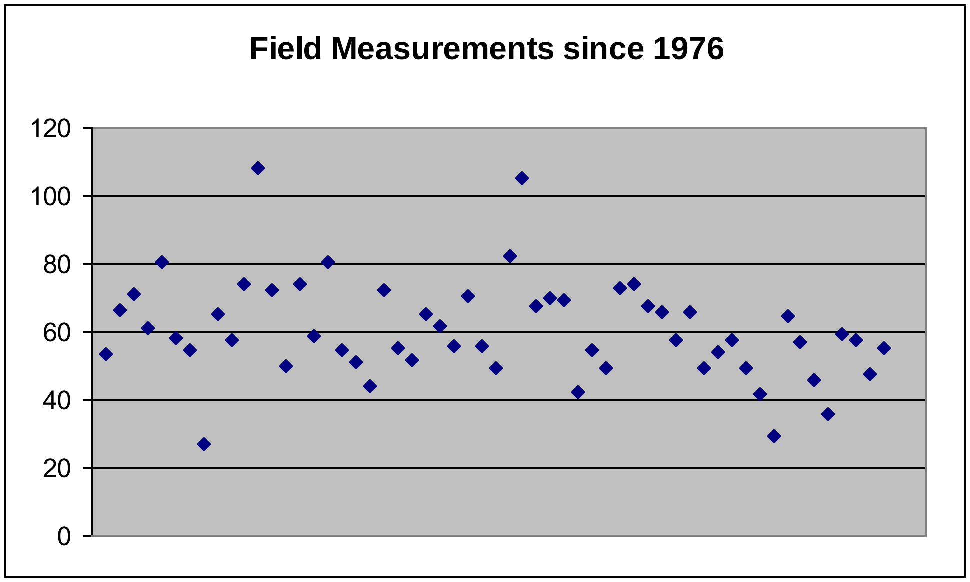
Meas. Number	Date	Time	Stream flow (ft^3/s)	Real Time Data 'Calculated' Date	Time	cfs
162	2010-12-09	16:21	55.1	2010-12-09	16:30	66
161	2010-10-06	14:34:30	44.8	2010-10-06	14:30	52
160	2010-10-06	14:29	49.2			
159	2010-10-06	14:21:30	44.8			
158	2010-10-06	14:14:30	51.3		14:15	61

In both these situations the actual field measured discharge is lower than the calculated value. Agreed two situation do not make a trend, but hopefully someone has access to the calculated data to compare to other field measurements.

Additionally, if the field measurements since 1976 are plotted there appears to be a declining trend. This declining trend is also in the calculated discharge data, but as can be seen in the equation component analysis this is primarily 3.31*GW. If that factor is in error even by a small amount the flow is considerably higher. Long term residents have commented at the workshop meetings the flow was much stronger.

Please note this next chart is nothing more than illustration.

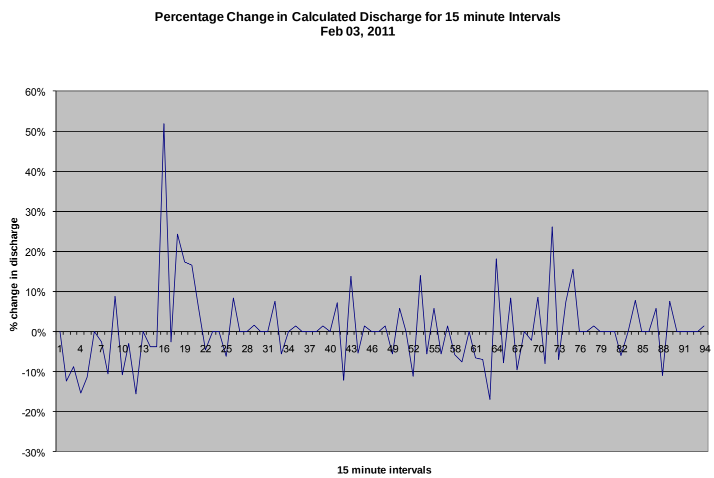
- The data includes measurements made for 0.08 to 0.12 hrs in October 2010, and others range from 0.15 to 1.27 hrs…and all intervals in between. Maybe a look at the SOP (Standard Operating Procedure is in order).
- The condition at the time of the measurement as reflected in notations such as POOR for July 2008 and Feb 2009 and the influence of "Field Measurement Adjustment" also noted on the web site data is not clear.
- Field measurements 1932 to 1976 are not included.



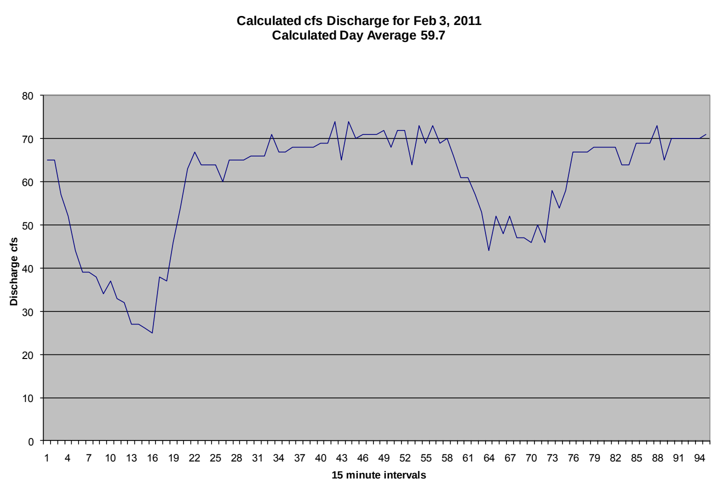
Attachment E

Second Attachment (SEFork Flow Analysis.xls) to E-Mail from Martyn Johnson to Doug Leeper, Dated February 19, 2011

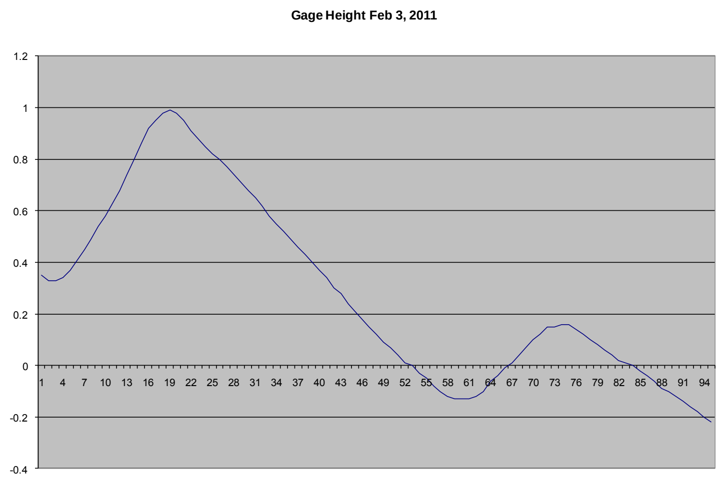
Sheet: Percentage Change in 15 minute



Sheet: cfs Discharge Feb 3, 2011



Sheet: Gage Height Feb 3, 2011



Sheet: Feb 3, 2011

GH	Discharge		Discharge cf in 15 minutes	Change	Above/Below Average			
0.35	65		58500		4784			
0.33	65	0%	58500	0	4784	9568		
0.33	57	-12%	51300	-7200	-2416			
0.34	52	-9%	46800	-4500	-6916			
0.37	44	-15%	39600	-7200	-14116			
0.41	39	-11%	35100	-4500	-18616			
0.45	39	0%	35100	0	-18616			
0.49	38	-3%	34200	-900	-19516			
0.54	34	-11%	30600	-3600	-23116			
0.58	37	9%	33300	2700	-20416			
0.63	33	-11%	29700	-3600	-24016			
0.68	32	-3%	28800	-900	-24916			
0.74	27	-16%	24300	-4500	-29416			
0.8	27	0%	24300	0	-29416			
0.86	26	-4%	23400	-900	-30316			
0.92	25	-4%	22500	-900	-31216			
0.95	38	52%	34200	11700	-19516			
0.98	37	-3%	33300	-900	-20416			
0.99	46	24%	41400	8100	-12316			
0.98	54	17%	48600	7200	-5116	-350384	Cumulative cf below average	
0.95	63	17%	56700	8100	2984		2.68	Increase level in 3 acre pool
0.91	67	6%	60300	3600	6584			

0.88	64	-4%	57600	-2700	3884
0.85	64	0%	57600	0	3884
0.82	64	0%	57600	0	3884
0.8	60	-6%	54000	-3600	284
0.77	65	8%	58500	4500	4784
0.74	65	0%	58500	0	4784
0.71	65	0%	58500	0	4784
0.68	66	2%	59400	900	5684
0.65	66	0%	59400	0	5684
0.62	66	0%	59400	0	5684
0.58	71	8%	63900	4500	10184
0.55	67	-6%	60300	-3600	6584
0.52	67	0%	60300	0	6584
0.49	68	1%	61200	900	7484
0.46	68	0%	61200	0	7484
0.43	68	0%	61200	0	7484
0.4	68	0%	61200	0	7484
0.37	69	1%	62100	900	8384
0.34	69	0%	62100	0	8384
0.3	74	7%	66600	4500	12884
0.28	65	-12%	58500	-8100	4784
0.24	74	14%	66600	8100	12884
0.21	70	-5%	63000	-3600	9284
0.18	71	1%	63900	900	10184
0.15	71	0%	63900	0	10184

0.12	71	0%	63900	0	10184			
0.09	72	1%	64800	900	11084			
0.07	68	-6%	61200	-3600	7484			
0.04	72	6%	64800	3600	11084			
0.01	72	0%	64800	0	11084			
0	64	-11%	57600	-7200	3884			
-0.03	73	14%	65700	8100	11984			
-0.05	69	-5%	62100	-3600	8384			
-0.08	73	6%	65700	3600	11984			
-0.1	69	-5%	62100	-3600	8384			
-0.12	70	1%	63000	900	9284			
-0.13	66	-6%	59400	-3600	5684			
-0.13	61	-8%	54900	-4500	1184			
-0.13	61	0%	54900	0	1184	296053		Cumulative cf above average
-0.12	57	-7%	51300	-3600	-2416		2.27	Decrease level in 3 acre pool
-0.1	53	-7%	47700	-3600	-6016			
-0.06	44	-17%	39600	-8100	-14116			
-0.04	52	18%	46800	7200	-6916			
-0.01	48	-8%	43200	-3600	-10516			
0.01	52	8%	46800	3600	-6916			
0.04	47	-10%	42300	-4500	-11416			
0.07	47	0%	42300	0	-11416			
0.1	46	-2%	41400	-900	-12316			
0.12	50	9%	45000	3600	-8716			
0.15	46	-8%	41400	-3600	-12316			

0.15	58	26%	52200	10800	-1516			
0.16	54	-7%	48600	-3600	-5116			
0.16	58	7%	52200	3600	-1516	-111221		
0.14	67	16%	60300	8100	6584		0.85	Increase level in 3 acre pool
0.12	67	0%	60300	0	6584			
0.1	67	0%	60300	0	6584			
0.08	68	1%	61200	900	7484			
0.06	68	0%	61200	0	7484			
0.04	68	0%	61200	0	7484			
0.02	68	0%	61200	0	7484			
0.01	64	-6%	57600	-3600	3884			
0	64	0%	57600	0	3884			
-0.02	69	8%	62100	4500	8384			
-0.04	69	0%	62100	0	8384			
-0.06	69	0%	62100	0	8384			
-0.09	73	6%	65700	3600	11984			
-0.1	65	-11%	58500	-7200	4784			
-0.12	70	8%	63000	4500	9284			
-0.14	70	0%	63000	0	9284			
-0.16	70	0%	63000	0	9284			
-0.18	70	0%	63000	0	9284			
-0.2	70	0%	63000	0	9284			
-0.22	71	1%	63900	900	10184	155984		
MIN	25						1.19	Decrease level in 3 acre pool
MAX	74							
AVG	59.6842				0	0		

Total Gage Height Change

-0.57

Flow under Bridge due to Gage Drop

74487.
6

Sheet: Jan 13, 2011

				Discharge in 15 minutes	Above/Below Average
01/13/2011 00:00 EST	-0.43	73		65700	3375
01/13/2011 00:15 EST	-0.44	69	-6%	62100	-225
01/13/2011 00:30 EST	-0.46	73	5%	65700	3375
01/13/2011 00:45 EST	-0.47	69	-6%	62100	-225
01/13/2011 01:00 EST	-0.48	69	0%	62100	-225
01/13/2011 01:15 EST	-0.49	69	0%	62100	-225
01/13/2011 01:30 EST	-0.5	69	0%	62100	-225
01/13/2011 01:45 EST	-0.51	70	1%	63000	675
01/13/2011 02:00 EST	-0.52	70	0%	63000	675
01/13/2011 02:15 EST	-0.53	70	0%	63000	675
01/13/2011 02:30 EST	-0.55	74	5%	66600	4275
01/13/2011 02:45 EST	-0.56	70	-6%	63000	675
01/13/2011 03:00 EST	-0.57	70	0%	63000	675
01/13/2011 03:15 EST	-0.59	74	5%	66600	4275
01/13/2011 03:30	-0.61	75	1%	67500	5175

EST					
01/13/ 2011 03:45 EST	-0.62	71	-6%	63900	**1575**
01/13/ 2011 04:00 EST	-0.64	75	5%	67500	**5175**
01/13/ 2011 04:15 EST	-0.66	75	0%	67500	**5175**
01/13/ 2011 04:30 EST	-0.67	71	-6%	63900	**1575**
01/13/ 2011 04:45 EST	-0.69	76	7%	68400	**6075**
01/13/ 2011 05:00 EST	-0.7	71	-7%	63900	**1575**
01/13/ 2011 05:15 EST	-0.72	76	7%	68400	**6075**
01/13/ 2011 05:30 EST	-0.74	76	0%	68400	**6075**
01/13/ 2011 05:45 EST	-0.75	72	-6%	64800	**2475**
01/13/ 2011 06:00 EST	-0.77	76	5%	68400	**6075**
01/13/ 2011 06:15 EST	-0.78	72	-6%	64800	**2475**
01/13/ 2011 06:30 EST	-0.81	81	11%	72900	**10575**
01/13/ 2011 06:45 EST	-0.81	68	-19%	61200	**-1125**
01/13/ 2011 07:00 EST	-0.83	77	12%	69300	**6975**
01/13/ 2011 07:15 EST	-0.85	77	0%	69300	**6975**
01/13/ 2011 07:30	-0.86	73	-5%	65700	**3375**

EST					
01/13/ 2011 07:45 EST	-0.88	77	5%	69300	6975
01/13/ 2011 08:00 EST	-0.9	78	1%	70200	7875
01/13/ 2011 08:15 EST	-0.91	74	-5%	66600	4275
01/13/ 2011 08:30 EST	-0.92	74	0%	66600	4275
01/13/ 2011 08:45 EST	-0.92	70	-6%	63000	675
01/13/ 2011 09:00 EST	-0.92	70	0%	63000	675
01/13/ 2011 09:15 EST	-0.93	74	5%	66600	4275
01/13/ 2011 09:30 EST	-0.94	74	0%	66600	4275
01/13/ 2011 09:45 EST	-0.95	74	0%	66600	4275
01/13/ 2011 10:00 EST	-0.97	78	5%	70200	7875
01/13/ 2011 10:15 EST	-0.99	79	1%	71100	8775
01/13/ 2011 10:30 EST	-1	75	-5%	67500	5175
01/13/ 2011 10:45 EST	-1	70	-7%	63000	675
01/13/ 2011 11:00 EST	-1.01	75	7%	67500	5175
01/13/ 2011 11:15 EST	-1	66	-14%	59400	-2925
01/13/ 2011 11:30	-1.01	75	12%	67500	5175

EST					
01/13/ 2011 11:45 EST	-1.01	70	-7%	63000	675
01/13/ 2011 12:00 EST	-1	66	-6%	59400	-2925
01/13/ 2011 12:15 EST	-1.02	79	16%	71100	8775
01/13/ 2011 12:30 EST	-1.03	75	-5%	67500	5175
01/13/ 2011 12:45 EST	-1.03	71	-6%	63900	1575
01/13/ 2011 13:00 EST	-1.03	71	0%	63900	1575
01/13/ 2011 13:15 EST	-1.03	71	0%	63900	1575
01/13/ 2011 13:30 EST	-1.03	71	0%	63900	1575
01/13/ 2011 13:45 EST	-1.03	71	0%	63900	1575
01/13/ 2011 14:00 EST	-1.03	71	0%	63900	1575
01/13/ 2011 14:15 EST	-1.03	71	0%	63900	1575
01/13/ 2011 14:30 EST	-1.03	71	0%	63900	1575
01/13/ 2011 14:45 EST	-1.04	75	5%	67500	5175
01/13/ 2011 15:00 EST	-1.04	71	-6%	63900	1575
01/13/ 2011 15:15 EST	-0.97	41	-73%	36900	-25425
01/13/ 2011 15:30	-0.97	70	41%	63000	675

EST					
01/13/ 2011 15:45 EST	-0.97	70	0%	63000	675
01/13/ 2011 16:00 EST	-0.97	70	0%	63000	675
01/13/ 2011 16:15 EST	-0.97	70	0%	63000	675
01/13/ 2011 16:30 EST	-0.97	70	0%	63000	675
01/13/ 2011 16:45 EST	-0.97	70	0%	63000	675
01/13/ 2011 17:00 EST	-0.97	70	0%	63000	675
01/13/ 2011 17:15 EST	-0.97	70	0%	63000	675
01/13/ 2011 17:30 EST	-0.97	70	0%	63000	675
01/13/ 2011 17:45 EST	-0.97	70	0%	63000	675
01/13/ 2011 18:00 EST	-0.97	70	0%	63000	675
01/13/ 2011 18:15 EST	-0.97	70	0%	63000	675
01/13/ 2011 18:30 EST	-0.97	70	0%	63000	675
01/13/ 2011 18:45 EST	-0.98	74	5%	66600	4275
01/13/ 2011 19:00 EST	-0.98	70	-6%	63000	675
01/13/ 2011 19:15 EST	-0.98	70	0%	63000	675
01/13/ 2011 19:30	-0.99	74	5%	66600	4275

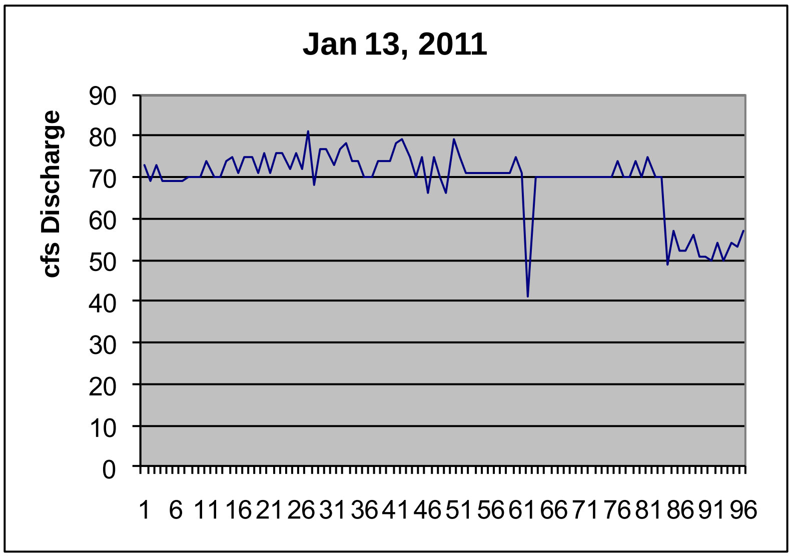
EST					
01/13/ 2011 19:45 EST	-0.99	70	-6%	63000	675
01/13/ 2011 20:00 EST	-1	75	7%	67500	5175
01/13/ 2011 20:15 EST	-1	70	-7%	63000	675
01/13/ 2011 20:30 EST	-1	70	0%	63000	675
01/13/ 2011 20:45 EST	-0.95	49	-43%	44100	-18225
01/13/ 2011 21:00 EST	-0.92	57	14%	51300	-11025
01/13/ 2011 21:15 EST	-0.88	52	-10%	46800	-15525
01/13/ 2011 21:30 EST	-0.84	52	0%	46800	-15525
01/13/ 2011 21:45 EST	-0.81	56	7%	50400	-11925
01/13/ 2011 22:00 EST	-0.77	51	-10%	45900	-16425
01/13/ 2011 22:15 EST	-0.73	51	0%	45900	-16425
01/13/ 2011 22:30 EST	-0.69	50	-2%	45000	-17325
01/13/ 2011 22:45 EST	-0.66	54	7%	48600	-13725
01/13/ 2011 23:00 EST	-0.62	50	-8%	45000	-17325
01/13/ 2011 23:15 EST	-0.59	54	7%	48600	-13725
01/13/ 2011 23:30	-0.56	53	-2%	47700	-14625

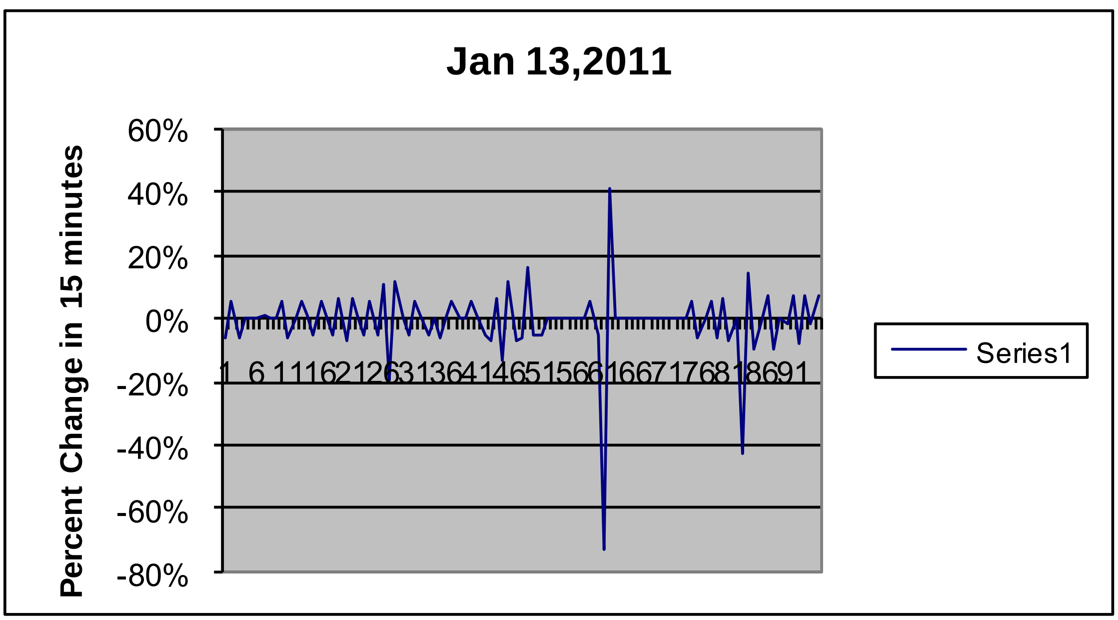
EST		
01/13/2011 23:45 EST	-0.54	57
	AVG	69.25
MAX	-0.43	81
MIN	-1.04	41

7% 51300 -11025

5983200 0

5983200





Sheet: Nov 02, 2010

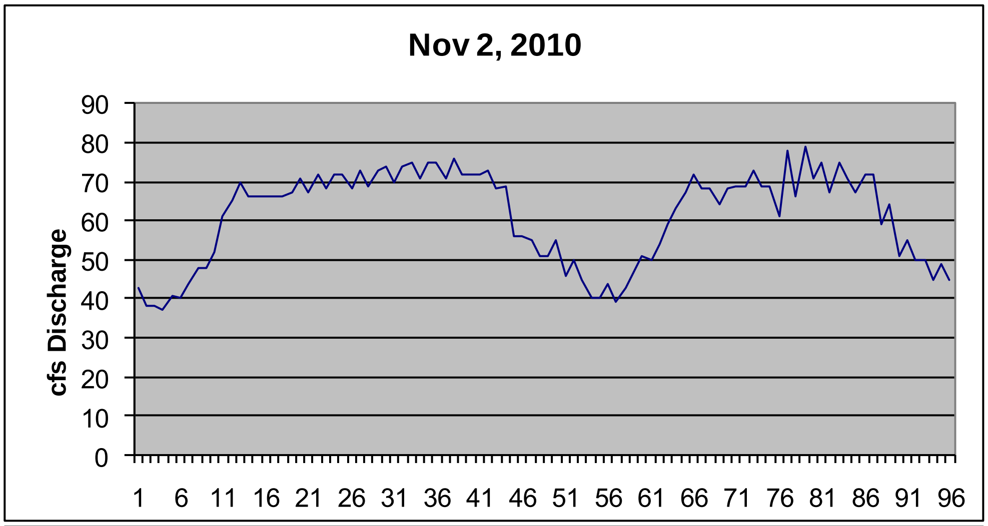
				Discharge in 15 minutes	Above/Below Average
11/02/2010 00:00 EST	0.55	43		38700	-16491
11/02/2010 00:15 EST	0.6	38	-13%	34200	-20991
11/02/2010 00:30 EST	0.65	38	0%	34200	-20991
11/02/2010 00:45 EST	0.7	37	-3%	33300	-21891
11/02/2010 01:00 EST	0.74	41	10%	36900	-18291
11/02/2010 01:15 EST	0.78	40	-3%	36000	-19191
11/02/2010 01:30 EST	0.81	44	9%	39600	-15591
11/02/2010 01:45 EST	0.83	48	8%	43200	-11991
11/02/2010 02:00 EST	0.85	48	0%	43200	-11991
11/02/2010 02:15 EST	0.86	52	8%	46800	-8391
11/02/2010 02:30 EST	0.85	61	15%	54900	-291
11/02/2010 02:45 EST	0.83	65	6%	58500	3309
11/02/2010 03:00 EST	0.8	70	7%	63000	7809
11/02/2010 03:15 EST	0.78	66	-6%	59400	4209
11/02/2010 03:30 EST	0.76	66	0%	59400	4209
11/02/2010 03:45 EST	0.74	66	0%	59400	4209
11/02/2010 04:00 EST	0.72	66	0%	59400	4209

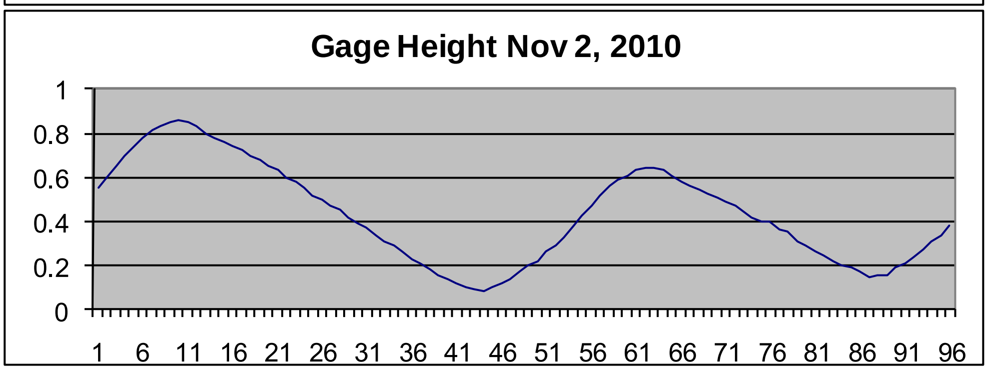
11/02/2010 04:15 EST	0.7	66	0%	59400	4209
11/02/2010 04:30 EST	0.68	67	1%	60300	5109
11/02/2010 04:45 EST	0.65	71	6%	63900	8709
11/02/2010 05:00 EST	0.63	67	-6%	60300	5109
11/02/2010 05:15 EST	0.6	72	7%	64800	9609
11/02/2010 05:30 EST	0.58	68	-6%	61200	6009
11/02/2010 05:45 EST	0.55	72	6%	64800	9609
11/02/2010 06:00 EST	0.52	72	0%	64800	9609
11/02/2010 06:15 EST	0.5	68	-6%	61200	6009
11/02/2010 06:30 EST	0.47	73	7%	65700	10509
11/02/2010 06:45 EST	0.45	69	-6%	62100	6909
11/02/2010 07:00 EST	0.42	73	5%	65700	10509
11/02/2010 07:15 EST	0.39	74	1%	66600	11409
11/02/2010 07:30 EST	0.37	70	-6%	63000	7809
11/02/2010 07:45 EST	0.34	74	5%	66600	11409
11/02/2010 08:00 EST	0.31	75	1%	67500	12309
11/02/2010 08:15 EST	0.29	71	-6%	63900	8709
11/02/2010 08:30 EST	0.26	75	5%	67500	12309
11/02/2010 08:45 EST	0.23	75	0%	67500	12309
11/02/2010 09:00 EST	0.21	71	-6%	63900	8709

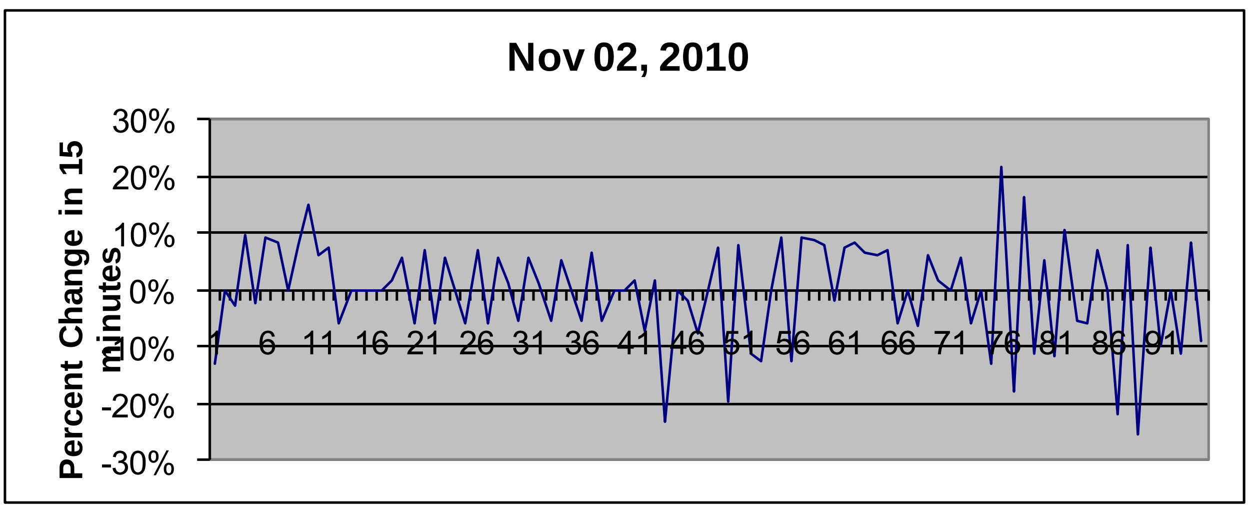
11/02/2010 09:15 EST	0.18	76	7%	68400	13209
11/02/2010 09:30 EST	0.16	72	-6%	64800	9609
11/02/2010 09:45 EST	0.14	72	0%	64800	9609
11/02/2010 10:00 EST	0.12	72	0%	64800	9609
11/02/2010 10:15 EST	0.1	73	1%	65700	10509
11/02/2010 10:30 EST	0.09	68	-7%	61200	6009
11/02/2010 10:45 EST	0.08	69	1%	62100	6909
11/02/2010 11:00 EST	0.1	56	-23%	50400	-4791
11/02/2010 11:15 EST	0.12	56	0%	50400	-4791
11/02/2010 11:30 EST	0.14	55	-2%	49500	-5691
11/02/2010 11:45 EST	0.17	51	-8%	45900	-9291
11/02/2010 12:00 EST	0.2	51	0%	45900	-9291
11/02/2010 12:15 EST	0.22	55	7%	49500	-5691
11/02/2010 12:30 EST	0.26	46	-20%	41400	-13791
11/02/2010 12:45 EST	0.29	50	8%	45000	-10191
11/02/2010 13:00 EST	0.33	45	-11%	40500	-14691
11/02/2010 13:15 EST	0.38	40	-13%	36000	-19191
11/02/2010 13:30 EST	0.43	40	0%	36000	-19191
11/02/2010 13:45 EST	0.47	44	9%	39600	-15591
11/02/2010 14:00 EST	0.52	39	-13%	35100	-20091

11/02/2010 14:15 EST	0.56	43	9%	38700	-16491
11/02/2010 14:30 EST	0.59	47	9%	42300	-12891
11/02/2010 14:45 EST	0.61	51	8%	45900	-9291
11/02/2010 15:00 EST	0.63	50	-2%	45000	-10191
11/02/2010 15:15 EST	0.64	54	7%	48600	-6591
11/02/2010 15:30 EST	0.64	59	8%	53100	-2091
11/02/2010 15:45 EST	0.63	63	6%	56700	1509
11/02/2010 16:00 EST	0.61	67	6%	60300	5109
11/02/2010 16:15 EST	0.58	72	7%	64800	9609
11/02/2010 16:30 EST	0.56	68	-6%	61200	6009
11/02/2010 16:45 EST	0.54	68	0%	61200	6009
11/02/2010 17:00 EST	0.53	64	-6%	57600	2409
11/02/2010 17:15 EST	0.51	68	6%	61200	6009
11/02/2010 17:30 EST	0.49	69	1%	62100	6909
11/02/2010 17:45 EST	0.47	69	0%	62100	6909
11/02/2010 18:00 EST	0.44	73	5%	65700	10509
11/02/2010 18:15 EST	0.42	69	-6%	62100	6909
11/02/2010 18:30 EST	0.4	69	0%	62100	6909
11/02/2010 18:45 EST	0.4	61	-13%	54900	-291
11/02/2010 19:00 EST	0.36	78	22%	70200	15009

11/02/2010 19:15 EST	0.35	66	-18%	59400	4209
11/02/2010 19:30 EST	0.31	79	16%	71100	15909
11/02/2010 19:45 EST	0.29	71	-11%	63900	8709
11/02/2010 20:00 EST	0.26	75	5%	67500	12309
11/02/2010 20:15 EST	0.25	67	-12%	60300	5109
11/02/2010 20:30 EST	0.22	75	11%	67500	12309
11/02/2010 20:45 EST	0.2	71	-6%	63900	8709
11/02/2010 21:00 EST	0.19	67	-6%	60300	5109
11/02/2010 21:15 EST	0.17	72	7%	64800	9609
11/02/2010 21:30 EST	0.15	72	0%	64800	9609
11/02/2010 21:45 EST	0.16	59	-22%	53100	-2091
11/02/2010 22:00 EST	0.16	64	8%	57600	2409
11/02/2010 22:15 EST	0.19	51	-25%	45900	-9291
11/02/2010 22:30 EST	0.21	55	7%	49500	-5691
11/02/2010 22:45 EST	0.24	50	-10%	45000	-10191
11/02/2010 23:00 EST	0.27	50	0%	45000	-10191
11/02/2010 23:15 EST	0.31	45	-11%	40500	-14691
11/02/2010 23:30 EST	0.34	49	8%	44100	-11091
11/02/2010 23:45 EST	0.38	45	-9%	40500	-14691
		61.32291667			0


Nov 2, 2010
cfs Discharge
90
80
70
60
50
40
30
20
10
0
1 6 11 16 21 26 31 36 41 46 51 56 61 66 71 76 81 86 91 96


Gage Height Nov 2, 2010
1
0.8
0.6
0.4
0.2
0
1 6 11 16 21 26 31 36 41 46 51 56 61 66 71 76 81 86 91 96


Nov 02, 2010
Percent Change in 15 minutes
30%
20%
10%
0%
-10%
-20%
-30%
1 6 11 16 21 26 31 36 41 46 51 56 61 66 71 76 81 86 91

Sheet: Equation Component Analysis

								FYI						
Weeki Wachee GW		12.5		Equation Components		FIXED		Change	FIRST	% Change			SECOND	**% Change**
				18.63	3.31*GW		10.31*GH	Head	VARIABLE	FIRST	ds/dt	418.14*ds/dt	VARIABLE	**SECOND**
					plus		minus		INCLUDED	VARIABLE		minus	INCLUDED	**VARIABLE**
03/2011 00:00 EST	0.37	65		18.63	41.44	**60.07**	3.815	97.04%	56.257	6.4%				
02/03/2011 00:15 EST	0.35	65	0.0%	18.63	41.44	**60.07**	3.609	97.20%	56.463	6.0%	-0.02	-8.36	64.83	**12.9%**
02/03/2011 00:30 EST	0.33	65	0.0%	18.63	41.44	**60.07**	3.402	97.36%	56.669	5.7%	-0.02	-8.36	65.03	**12.9%**
02/03/2011 00:45 EST	0.33	57	-14.0%	18.63	41.44	**60.07**	3.402	97.36%	56.669	5.7%	0	0	56.67	**0.0%**
02/03/2011 01:00 EST	0.34	52	-9.6%	18.63	41.44	**60.07**	3.505	97.28%	56.566	5.8%	0.01	4.181	52.38	**-8.0%**
02/03/2011 01:15 EST	0.37	44	-18.2%	18.63	41.44	**60.07**	3.815	97.04%	56.257	6.4%	0.03	12.54	43.71	**-28.7%**
02/03/2011 01:30 EST	0.41	39	-12.8%	18.63	41.44	**60.07**	4.227	96.73%	55.844	7.0%	0.04	16.73	39.12	**-42.8%**
02/03/2011 01:45 EST	0.45	39	0.0%	18.63	41.44	**60.07**	4.64	96.41%	55.432	7.7%	0.04	16.73	38.71	**-43.2%**
02/03/2011 02:00 EST	0.49	38	-2.6%	18.63	41.44	**60.07**	5.052	96.09%	55.019	8.4%	0.04	16.73	38.29	**-43.7%**
02/03/2011 02:15 EST	0.54	34	-11.8%	18.63	41.44	**60.07**	5.567	95.69%	54.504	9.3%	0.05	20.91	33.6	**-62.2%**
02/03/2011 02:30 EST	0.58	37	8.1%	18.63	41.44	**60.07**	5.98	95.37%	54.091	10.0%	0.04	16.73	37.37	**-44.8%**
02/03/2011 02:45 EST	0.63	33	-12.1%	18.63	41.44	**60.07**	6.495	94.97%	53.576	10.8%	0.05	20.91	32.67	**-64.0%**

02/03/2011 03:00 EST	0.68	32	-3.1%	18.63	41.44	**60.07**	7.011	94.57%	53.06	11.7%	0.05	20.91	32.15	**-65.0%**
02/03/2011 03:15 EST	0.74	27	-18.5%	18.63	41.44	**60.07**	7.629	94.09%	52.442	12.7%	0.06	25.09	27.35	**-91.7%**
02/03/2011 03:30 EST	0.8	27	0.0%	18.63	41.44	**60.07**	8.248	93.61%	51.823	13.7%	0.06	25.09	26.73	**-93.8%**
02/03/2011 03:45 EST	0.86	26	-3.8%	18.63	41.44	**60.07**	8.867	93.13%	51.205	14.8%	0.06	25.09	26.12	**-96.1%**
02/03/2011 04:00 EST	0.92	25	-4.0%	18.63	41.44	**60.07**	9.485	92.65%	50.586	15.8%	0.06	25.09	25.5	**-98.4%**
02/03/2011 04:15 EST	0.95	38	34.2%	18.63	41.44	**60.07**	9.795	92.41%	50.277	16.3%	0.03	12.54	37.73	**-33.2%**
02/03/2011 04:30 EST	0.98	37	-2.7%	18.63	41.44	**60.07**	10.1	92.17%	49.967	16.8%	0.03	12.54	37.42	**-33.5%**
02/03/2011 04:45 EST	0.99	46	19.6%	18.63	41.44	**60.07**	10.21	92.09%	49.864	17.0%	0.01	4.181	45.68	**-9.2%**
02/03/2011 05:00 EST	0.98	54	14.8%	18.63	41.44	**60.07**	10.1	92.17%	49.967	16.8%	-0.01	-4.18	54.15	**7.7%**
02/03/2011 05:15 EST	0.95	63	14.3%	18.63	41.44	**60.07**	9.795	92.41%	50.277	16.3%	-0.03	-12.5	62.82	**20.0%**
02/03/2011 05:30 EST	0.91	67	6.0%	18.63	41.44	**60.07**	9.382	92.73%	50.689	15.6%	-0.04	-16.7	67.41	**24.8%**
02/03/2011 05:45 EST	0.88	64	-4.7%	18.63	41.44	**60.07**	9.073	92.97%	50.998	15.1%	-0.03	-12.5	63.54	**19.7%**
02/03/2011 06:00 EST	0.85	64	0.0%	18.63	41.44	**60.07**	8.764	93.21%	51.308	14.6%	-0.03	-12.5	63.85	**19.6%**
02/03/2011 06:15 EST	0.82	64	0.0%	18.63	41.44	**60.07**	8.454	93.45%	51.617	14.1%	-0.03	-12.5	64.16	**19.6%**
02/03/2011 06:30 EST	0.8	60	-6.7%	18.63	41.44	**60.07**	8.248	93.61%	51.823	13.7%	-0.02	-8.36	60.19	**13.9%**

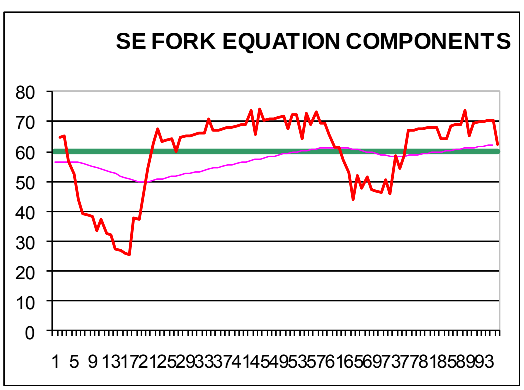
02/03/2011 06:45 EST	0.77	65	7.7%	18.63	41.44	**60.07**	7.939	93.85%	52.133	13.2%	-0.03	-12.5	64.68	**19.4%**
02/03/2011 07:00 EST	0.74	65	0.0%	18.63	41.44	**60.07**	7.629	94.09%	52.442	12.7%	-0.03	-12.5	64.99	**19.3%**
02/03/2011 07:15 EST	0.71	65	0.0%	18.63	41.44	**60.07**	7.32	94.33%	52.751	12.2%	-0.03	-12.5	65.3	**19.2%**
02/03/2011 07:30 EST	0.68	66	1.5%	18.63	41.44	**60.07**	7.011	94.57%	53.06	11.7%	-0.03	-12.5	65.6	**19.1%**
02/03/2011 07:45 EST	0.65	66	0.0%	18.63	41.44	**60.07**	6.702	94.81%	53.37	11.2%	-0.03	-12.5	65.91	**19.0%**
02/03/2011 08:00 EST	0.62	66	0.0%	18.63	41.44	**60.07**	6.392	95.05%	53.679	10.6%	-0.03	-12.5	66.22	**18.9%**
02/03/2011 08:15 EST	0.58	71	7.0%	18.63	41.44	**60.07**	5.98	95.37%	54.091	10.0%	-0.04	-16.7	70.82	**23.6%**
02/03/2011 08:30 EST	0.55	67	-6.0%	18.63	41.44	**60.07**	5.671	95.61%	54.401	9.4%	-0.03	-12.5	66.94	**18.7%**
02/03/2011 08:45 EST	0.52	67	0.0%	18.63	41.44	**60.07**	5.361	95.85%	54.71	8.9%	-0.03	-12.5	67.25	**18.7%**
02/03/2011 09:00 EST	0.49	68	1.5%	18.63	41.44	**60.07**	5.052	96.09%	55.019	8.4%	-0.03	-12.5	67.56	**18.6%**
02/03/2011 09:15 EST	0.46	68	0.0%	18.63	41.44	**60.07**	4.743	96.33%	55.329	7.9%	-0.03	-12.5	67.87	**18.5%**
02/03/2011 09:30 EST	0.43	68	0.0%	18.63	41.44	**60.07**	4.433	96.57%	55.638	7.4%	-0.03	-12.5	68.18	**18.4%**
02/03/2011 09:45 EST	0.4	68	0.0%	18.63	41.44	**60.07**	4.124	96.81%	55.947	6.9%	-0.03	-12.5	68.49	**18.3%**
02/03/2011 10:00 EST	0.37	69	1.4%	18.63	41.44	**60.07**	3.815	97.04%	56.257	6.4%	-0.03	-12.5	68.8	**18.2%**
02/03/2011 10:15 EST	0.34	69	0.0%	18.63	41.44	**60.07**	3.505	97.28%	56.566	5.8%	-0.03	-12.5	69.11	**18.2%**

02/03/2011 10:30 EST	0.3	74	6.8%	18.63	41.44	**60.07**	3.093	97.60%	56.978	5.1%	-0.04	-16.7	73.7	**22.7%**
02/03/2011 10:45 EST	0.28	65	-13.8%	18.63	41.44	**60.07**	2.887	97.76%	57.184	4.8%	-0.02	-8.36	65.55	**12.8%**
02/03/2011 11:00 EST	0.24	74	12.2%	18.63	41.44	**60.07**	2.474	98.08%	57.597	4.1%	-0.04	-16.7	74.32	**22.5%**
02/03/2011 11:15 EST	0.21	70	-5.7%	18.63	41.44	**60.07**	2.165	98.32%	57.906	3.6%	-0.03	-12.5	70.45	**17.8%**
02/03/2011 11:30 EST	0.18	71	1.4%	18.63	41.44	**60.07**	1.856	98.56%	58.215	3.1%	-0.03	-12.5	70.76	**17.7%**
02/03/2011 11:45 EST	0.15	71	0.0%	18.63	41.44	**60.07**	1.547	98.80%	58.525	2.6%	-0.03	-12.5	71.07	**17.7%**
02/03/2011 12:00 EST	0.12	71	0.0%	18.63	41.44	**60.07**	1.237	99.04%	58.834	2.1%	-0.03	-12.5	71.38	**17.6%**
02/03/2011 12:15 EST	0.09	72	1.4%	18.63	41.44	**60.07**	0.928	99.28%	59.143	1.5%	-0.03	-12.5	71.69	**17.5%**
02/03/2011 12:30 EST	0.07	68	-5.9%	18.63	41.44	**60.07**	0.722	99.44%	59.35	1.2%	-0.02	-8.36	67.71	**12.4%**
02/03/2011 12:45 EST	0.04	72	5.6%	18.63	41.44	**60.07**	0.412	99.68%	59.659	0.7%	-0.03	-12.5	72.2	**17.4%**
02/03/2011 13:00 EST	0.01	72	0.0%	18.63	41.44	**60.07**	0.103	99.92%	59.968	0.2%	-0.03	-12.5	72.51	**17.3%**
02/03/2011 13:15 EST	0	64	-12.5%	18.63	41.44	**60.07**	0	100.00%	60.071	0.0%	-0.01	-4.18	64.25	**6.5%**
02/03/2011 13:30 EST	-0.03	73	12.3%	18.63	41.44	**60.07**	-0.31	100.24%	60.381	-0.5%	-0.03	-12.5	72.92	**17.2%**
02/03/2011 13:45 EST	-0.05	69	-5.8%	18.63	41.44	**60.07**	-0.52	100.40%	60.587	-0.9%	-0.02	-8.36	68.95	**12.1%**
02/03/2011 14:00 EST	-0.08	73	5.5%	18.63	41.44	**60.07**	-0.82	100.64%	60.896	-1.4%	-0.03	-12.5	73.44	**17.1%**

02/03/2011 14:15 EST	-0.1	69	-5.8%	18.63	41.44	60.07	-1.03	100.80%	61.102	-1.7%	-0.02	-8.36	69.47	12.0%
02/03/2011 14:30 EST	-0.12	70	1.4%	18.63	41.44	60.07	-1.24	100.96%	61.308	-2.1%	-0.02	-8.36	69.67	12.0%
02/03/2011 14:45 EST	-0.13	66	-6.1%	18.63	41.44	60.07	-1.34	101.04%	61.412	-2.2%	-0.01	-4.18	65.59	6.4%
02/03/2011 15:00 EST	-0.13	61	-8.2%	18.63	41.44	60.07	-1.34	101.04%	61.412	-2.2%	0	0	61.41	0.0%
02/03/2011 15:15 EST	-0.13	61	0.0%	18.63	41.44	60.07	-1.34	101.04%	61.412	-2.2%	0	0	61.41	0.0%
02/03/2011 15:30 EST	-0.12	57	-7.0%	18.63	41.44	60.07	-1.24	100.96%	61.308	-2.1%	0.01	4.181	57.13	-7.3%
02/03/2011 15:45 EST	-0.1	53	-7.5%	18.63	41.44	60.07	-1.03	100.80%	61.102	-1.7%	0.02	8.363	52.74	-15.9%
02/03/2011 16:00 EST	-0.06	44	-20.5%	18.63	41.44	60.07	-0.62	100.48%	60.69	-1.0%	0.04	16.73	43.96	-38.0%
02/03/2011 16:15 EST	-0.04	52	15.4%	18.63	41.44	60.07	-0.41	100.32%	60.484	-0.7%	0.02	8.363	52.12	-16.0%
02/03/2011 16:30 EST	-0.01	48	-8.3%	18.63	41.44	60.07	-0.1	100.08%	60.174	-0.2%	0.03	12.54	47.63	-26.3%
02/03/2011 16:45 EST	0.01	52	7.7%	18.63	41.44	60.07	0.103	99.92%	59.968	0.2%	0.02	8.363	51.61	-16.2%
02/03/2011 17:00 EST	0.04	47	-10.6%	18.63	41.44	60.07	0.412	99.68%	59.659	0.7%	0.03	12.54	47.11	-26.6%
02/03/2011 17:15 EST	0.07	47	0.0%	18.63	41.44	60.07	0.722	99.44%	59.35	1.2%	0.03	12.54	46.81	-26.8%
02/03/2011 17:30 EST	0.1	46	-2.2%	18.63	41.44	60.07	1.031	99.20%	59.04	1.7%	0.03	12.54	46.5	-27.0%
02/03/2011 17:45 EST	0.12	50	8.0%	18.63	41.44	60.07	1.237	99.04%	58.834	2.1%	0.02	8.363	50.47	-16.6%

02/03/2011 18:00 EST	0.15	46	-8.7%	18.63	41.44	60.07	1.547	98.80%	58.525	2.6%	0.03	12.54	45.98	**-27.3%**
02/03/2011 18:15 EST	0.15	58	20.7%	18.63	41.44	60.07	1.547	98.80%	58.525	2.6%	0	0	58.52	**0.0%**
02/03/2011 18:30 EST	0.16	54	-7.4%	18.63	41.44	60.07	1.65	98.72%	58.422	2.7%	0.01	4.181	54.24	**-7.7%**
02/03/2011 18:45 EST	0.16	58	6.9%	18.63	41.44	60.07	1.65	98.72%	58.422	2.7%	0	0	58.42	**0.0%**
02/03/2011 19:00 EST	0.14	67	13.4%	18.63	41.44	60.07	1.443	98.88%	58.628	2.4%	-0.02	-8.36	66.99	**12.5%**
02/03/2011 19:15 EST	0.12	67	0.0%	18.63	41.44	60.07	1.237	99.04%	58.834	2.1%	-0.02	-8.36	67.2	**12.4%**
02/03/2011 19:30 EST	0.1	67	0.0%	18.63	41.44	60.07	1.031	99.20%	59.04	1.7%	-0.02	-8.36	67.4	**12.4%**
02/03/2011 19:45 EST	0.08	68	1.5%	18.63	41.44	60.07	0.825	99.36%	59.246	1.4%	-0.02	-8.36	67.61	**12.4%**
02/03/2011 20:00 EST	0.06	68	0.0%	18.63	41.44	60.07	0.619	99.52%	59.453	1.0%	-0.02	-8.36	67.82	**12.3%**
02/03/2011 20:15 EST	0.04	68	0.0%	18.63	41.44	60.07	0.412	99.68%	59.659	0.7%	-0.02	-8.36	68.02	**12.3%**
02/03/2011 20:30 EST	0.02	68	0.0%	18.63	41.44	60.07	0.206	99.84%	59.865	0.3%	-0.02	-8.36	68.23	**12.3%**
02/03/2011 20:45 EST	0.01	64	-6.3%	18.63	41.44	60.07	0.103	99.92%	59.968	0.2%	-0.01	-4.18	64.15	**6.5%**
02/03/2011 21:00 EST	0	64	0.0%	18.63	41.44	60.07	0	100.00%	60.071	0.0%	-0.01	-4.18	64.25	**6.5%**
02/03/2011 21:15 EST	-0.02	69	7.2%	18.63	41.44	60.07	-0.21	100.16%	60.277	-0.3%	-0.02	-8.36	68.64	**12.2%**
02/03/2011 21:30 EST	-0.04	69	0.0%	18.63	41.44	60.07	-0.41	100.32%	60.484	-0.7%	-0.02	-8.36	68.85	**12.1%**

02/03 /2011 21:45 EST	-0.06	69	0.0%	18.63	41.44	60.07	-0.62	100.48%	60.69	-1.0%	-0.02	-8.36	69.05	**12.1%**
02/03 /2011 22:00 EST	-0.09	73	5.5%	18.63	41.44	60.07	-0.93	100.72%	60.999	-1.5%	-0.03	-12.5	73.54	**17.1%**
02/03 /2011 22:15 EST	-0.1	65	-12.3%	18.63	41.44	60.07	-1.03	100.80%	61.102	-1.7%	-0.01	-4.18	65.28	**6.4%**
02/03 /2011 22:30 EST	-0.12	70	7.1%	18.63	41.44	60.07	-1.24	100.96%	61.308	-2.1%	-0.02	-8.36	69.67	**12.0%**
02/03 /2011 22:45 EST	-0.14	70	0.0%	18.63	41.44	60.07	-1.44	101.12%	61.515	-2.4%	-0.02	-8.36	69.88	**12.0%**
02/03 /2011 23:00 EST	-0.16	70	0.0%	18.63	41.44	60.07	-1.65	101.28%	61.721	-2.7%	-0.02	-8.36	70.08	**11.9%**
02/03 /2011 23:15 EST	-0.18	70	0.0%	18.63	41.44	60.07	-1.86	101.44%	61.927	-3.1%	-0.02	-8.36	70.29	**11.9%**
02/03 /2011 23:30 EST	-0.2	70	0.0%	18.63	41.44	60.07	-2.06	101.60%	62.133	-3.4%	-0.02	-8.36	70.5	**11.9%**
02/03 /2011 23:45 EST	-0.22	71	1.4%	18.63	41.44	60.07	-2.27	101.76%	62.339	-3.8%	-0.02		62.34	**0.0%**
		59.7				**60.07**			**57.129**			**-2.54**	**59.65**	
MAX	0.99					MAX	10.21	101.76%	62.34		MAX	25.09	74.32	
MIN	-0.22					MIN	-2.27	92.09%	49.86		MIN	-16.7	25.5	
Day Change GH														
	-0.59													



Weeki	12.52			Equation Components		FIXED		FIRST	% Change			SECOND	% Change
				18.63	3.31*GW		10.31*GH	VARIABLE	FIRST	ds/dt	418.14*ds/dt	VARIABLE	**SECOND**
					plus		minus	INCLUDED	VARIABLE		minus	INCLUDED	**VARIABLE**
01/13/2011 00:00 EST	-0.43	73		18.63	41.44	**60.07**	-4.43	64.5	6.9%				
01/13/2011 00:15 EST	-0.44	69	-5.8%	18.63	41.44	**60.07**	-4.54	64.61	7.0%	-0.01	-4.18	68.79	**6.1%**
01/13/2011 00:30 EST	-0.46	73	5.5%	18.63	41.44	**60.07**	-4.74	64.81	7.3%	-0.02	-8.36	73.18	**11.4%**
01/13/2011 00:45 EST	-0.47	69	-5.8%	18.63	41.44	**60.07**	-4.85	64.92	7.5%	-0.01	-4.18	69.1	**6.1%**
01/13/2011 01:00 EST	-0.48	69	0.0%	18.63	41.44	**60.07**	-4.95	65.02	7.6%	-0.01	-4.18	69.2	**6.0%**
01/13/2011 01:15 EST	-0.49	69	0.0%	18.63	41.44	**60.07**	-5.05	65.12	7.8%	-0.01	-4.18	69.3	**6.0%**
01/13/2011 01:30 EST	-0.5	69	0.0%	18.63	41.44	**60.07**	-5.16	65.23	7.9%	-0.01	-4.18	69.41	**6.0%**
01/13/2011 01:45 EST	-0.51	70	1.4%	18.63	41.44	**60.07**	-5.26	65.33	8.0%	-0.01	-4.18	69.51	**6.0%**
01/13/2011 02:00 EST	-0.52	70	0.0%	18.63	41.44	**60.07**	-5.36	65.43	8.2%	-0.01	-4.18	69.61	**6.0%**

01/13/2011 02:15 EST	-0.53	70	0.0%	18.63	41.44	**60.07**	-5.46	65.54	8.3%	-0.01	-4.18	69.72	**6.0%**
01/13/2011 02:30 EST	-0.55	74	5.4%	18.63	41.44	**60.07**	-5.67	65.74	8.6%	-0.02	-8.36	74.1	**11.3%**
01/13/2011 02:45 EST	-0.56	70	-5.7%	18.63	41.44	**60.07**	-5.77	65.84	8.8%	-0.01	-4.18	70.03	**6.0%**
01/13/2011 03:00 EST	-0.57	70	0.0%	18.63	41.44	**60.07**	-5.88	65.95	8.9%	-0.01	-4.18	70.13	**6.0%**
01/13/2011 03:15 EST	-0.59	74	5.4%	18.63	41.44	**60.07**	-6.08	66.15	9.2%	-0.02	-8.36	74.52	**11.2%**
01/13/2011 03:30 EST	-0.61	75	1.3%	18.63	41.44	**60.07**	-6.29	66.36	9.5%	-0.02	-8.36	74.72	**11.2%**
01/13/2011 03:45 EST	-0.62	71	-5.6%	18.63	41.44	**60.07**	-6.39	66.46	9.6%	-0.01	-4.18	70.64	**5.9%**
01/13/2011 04:00 EST	-0.64	75	5.3%	18.63	41.44	**60.07**	-6.6	66.67	9.9%	-0.02	-8.36	75.03	**11.1%**
01/13/2011 04:15 EST	-0.66	75	0.0%	18.63	41.44	**60.07**	-6.8	66.88	10.2%	-0.02	-8.36	75.24	**11.1%**
01/13/2011 04:30 EST	-0.67	71	-5.6%	18.63	41.44	**60.07**	-6.91	66.98	10.3%	-0.01	-4.18	71.16	**5.9%**
01/13/2011 04:45	-0.69	76	6.6%	18.63	41.44	**60.07**	-7.11	67.19	10.6%	-0.02	-8.36	75.55	**11.1%**

EST													
01/13/2011 05:00 EST	-0.7	71	-7.0%	18.63	41.44	**60.07**	-7.22	67.29	10.7%	-0.01	-4.18	71.47	**5.9%**
01/13/2011 05:15 EST	-0.72	76	6.6%	18.63	41.44	**60.07**	-7.42	67.49	11.0%	-0.02	-8.36	75.86	**11.0%**
01/13/2011 05:30 EST	-0.74	76	0.0%	18.63	41.44	**60.07**	-7.63	67.7	11.3%	-0.02	-8.36	76.06	**11.0%**
01/13/2011 05:45 EST	-0.75	72	-5.6%	18.63	41.44	**60.07**	-7.73	67.8	11.4%	-0.01	-4.18	71.99	**5.8%**
01/13/2011 06:00 EST	-0.77	76	5.3%	18.63	41.44	**60.07**	-7.94	68.01	11.7%	-0.02	-8.36	76.37	**10.9%**
01/13/2011 06:15 EST	-0.78	72	-5.6%	18.63	41.44	**60.07**	-8.04	68.11	11.8%	-0.01	-4.18	72.29	**5.8%**
01/13/2011 06:30 EST	-0.81	81	11.1%	18.63	41.44	**60.07**	-8.35	68.42	12.2%	-0.03	-12.5	80.97	**15.5%**
01/13/2011 06:45 EST	-0.81	68	-19.1%	18.63	41.44	**60.07**	-8.35	68.42	12.2%	0	0	68.42	**0.0%**
01/13/2011 07:00 EST	-0.83	77	11.7%	18.63	41.44	**60.07**	-8.56	68.63	12.5%	-0.02	-8.36	76.99	**10.9%**
01/13/2011 07:15 EST	-0.85	77	0.0%	18.63	41.44	**60.07**	-8.76	68.83	12.7%	-0.02	-8.36	77.2	**10.8%**

01/13/2011 07:30 EST	-0.86	73	-5.5%	18.63	41.44	**60.07**	-8.87	68.94	12.9%	-0.01	-4.18	73.12		**5.7%**
01/13/2011 07:45 EST	-0.88	77	5.2%	18.63	41.44	**60.07**	-9.07	69.14	13.1%	-0.02	-8.36	77.51		**10.8%**
01/13/2011 08:00 EST	-0.9	78	1.3%	18.63	41.44	**60.07**	-9.28	69.35	13.4%	-0.02	-8.36	77.71		**10.8%**
01/13/2011 08:15 EST	-0.91	74	-5.4%	18.63	41.44	**60.07**	-9.38	69.45	13.5%	-0.01	-4.18	73.63		**5.7%**
01/13/2011 08:30 EST	-0.92	74	0.0%	18.63	41.44	**60.07**	-9.49	69.56	13.6%	-0.01	-4.18	73.74		**5.7%**
01/13/2011 08:45 EST	-0.92	70	-5.7%	18.63	41.44	**60.07**	-9.49	69.56	13.6%	0	0	69.56		**0.0%**
01/13/2011 09:00 EST	-0.92	70	0.0%	18.63	41.44	**60.07**	-9.49	69.56	13.6%	0	0	69.56		**0.0%**
01/13/2011 09:15 EST	-0.93	74	5.4%	18.63	41.44	**60.07**	-9.59	69.66	13.8%	-0.01	-4.18	73.84		**5.7%**
01/13/2011 09:30 EST	-0.94	74	0.0%	18.63	41.44	**60.07**	-9.69	69.76	13.9%	-0.01	-4.18	73.94		**5.7%**
01/13/2011 09:45 EST	-0.95	74	0.0%	18.63	41.44	**60.07**	-9.79	69.87	14.0%	-0.01	-4.18	74.05		**5.6%**
01/13/2011 10:00	-0.97	78	5.1%	18.63	41.44	**60.07**	-10	70.07	14.3%	-0.02	-8.36	78.43		**10.7%**

EST													
01/13/2011 10:15 EST	-0.99	79	1.3%	18.63	41.44	**60.07**	-10.2	70.28	14.5%	-0.02	-8.36	78.64	**10.6%**
01/13/2011 10:30 EST	-1	75	-5.3%	18.63	41.44	**60.07**	-10.3	70.38	14.6%	-0.01	-4.18	74.56	**5.6%**
01/13/2011 10:45 EST	-1	70	-7.1%	18.63	41.44	**60.07**	-10.3	70.38	14.6%	0	0	70.38	**0.0%**
01/13/2011 11:00 EST	-1.01	75	6.7%	18.63	41.44	**60.07**	-10.4	70.48	14.8%	-0.01	-4.18	74.67	**5.6%**
01/13/2011 11:15 EST	-1	66	-13.6%	18.63	41.44	**60.07**	-10.3	70.38	14.6%	0.01	4.181	66.2	**-6.3%**
01/13/2011 11:30 EST	-1.01	75	12.0%	18.63	41.44	**60.07**	-10.4	70.48	14.8%	-0.01	-4.18	74.67	**5.6%**
01/13/2011 11:45 EST	-1.01	70	-7.1%	18.63	41.44	**60.07**	-10.4	70.48	14.8%	0	0	70.48	**0.0%**
01/13/2011 12:00 EST	-1	66	-6.1%	18.63	41.44	**60.07**	-10.3	70.38	14.6%	0.01	4.181	66.2	**-6.3%**
01/13/2011 12:15 EST	-1.02	79	16.5%	18.63	41.44	**60.07**	-10.5	70.59	14.9%	-0.02	-8.36	78.95	**10.6%**
01/13/2011 12:30 EST	-1.03	75	-5.3%	18.63	41.44	**60.07**	-10.6	70.69	15.0%	-0.01	-4.18	74.87	**5.6%**

01/13/2011 12:45 EST	-1.03	71	-5.6%	18.63	41.44	**60.07**	-10.6	70.69	15.0%	0	0	70.69	**0.0%**
01/13/2011 13:00 EST	-1.03	71	0.0%	18.63	41.44	**60.07**	-10.6	70.69	15.0%	0	0	70.69	**0.0%**
01/13/2011 13:15 EST	-1.03	71	0.0%	18.63	41.44	**60.07**	-10.6	70.69	15.0%	0	0	70.69	**0.0%**
01/13/2011 13:30 EST	-1.03	71	0.0%	18.63	41.44	**60.07**	-10.6	70.69	15.0%	0	0	70.69	**0.0%**
01/13/2011 13:45 EST	-1.03	71	0.0%	18.63	41.44	**60.07**	-10.6	70.69	15.0%	0	0	70.69	**0.0%**
01/13/2011 14:00 EST	-1.03	71	0.0%	18.63	41.44	**60.07**	-10.6	70.69	15.0%	0	0	70.69	**0.0%**
01/13/2011 14:15 EST	-1.03	71	0.0%	18.63	41.44	**60.07**	-10.6	70.69	15.0%	0	0	70.69	**0.0%**
01/13/2011 14:30 EST	-1.03	71	0.0%	18.63	41.44	**60.07**	-10.6	70.69	15.0%	0	0	70.69	**0.0%**
01/13/2011 14:45 EST	-1.04	75	5.3%	18.63	41.44	**60.07**	-10.7	70.79	15.1%	-0.01	-4.18	74.98	**5.6%**
01/13/2011 15:00 EST	-1.04	71	-5.6%	18.63	41.44	**60.07**	-10.7	70.79	15.1%	0	0	70.79	**0.0%**
01/13/2011 15:15	-0.97	41	-73.2%	18.63	41.44	**60.07**	-10	70.07	14.3%	0.07	29.27	40.8	**-71.7%**

EST													
01/13/2011 15:30 EST	-0.97	70	41.4%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 15:45 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 16:00 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 16:15 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 16:30 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 16:45 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 17:00 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 17:15 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 17:30 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 17:45 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**

01/13/2011 18:00 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 18:15 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 18:30 EST	-0.97	70	0.0%	18.63	41.44	**60.07**	-10	70.07	14.3%	0	0	70.07	**0.0%**
01/13/2011 18:45 EST	-0.98	74	5.4%	18.63	41.44	**60.07**	-10.1	70.18	14.4%	-0.01	-4.18	74.36	**5.6%**
01/13/2011 19:00 EST	-0.98	70	-5.7%	18.63	41.44	**60.07**	-10.1	70.18	14.4%	0	0	70.18	**0.0%**
01/13/2011 19:15 EST	-0.98	70	0.0%	18.63	41.44	**60.07**	-10.1	70.18	14.4%	0	0	70.18	**0.0%**
01/13/2011 19:30 EST	-0.99	74	5.4%	18.63	41.44	**60.07**	-10.2	70.28	14.5%	-0.01	-4.18	74.46	**5.6%**
01/13/2011 19:45 EST	-0.99	70	-5.7%	18.63	41.44	**60.07**	-10.2	70.28	14.5%	0	0	70.28	**0.0%**
01/13/2011 20:00 EST	-1	75	6.7%	18.63	41.44	**60.07**	-10.3	70.38	14.6%	-0.01	-4.18	74.56	**5.6%**
01/13/2011 20:15 EST	-1	70	-7.1%	18.63	41.44	**60.07**	-10.3	70.38	14.6%	0	0	70.38	**0.0%**
01/13/2011 20:30	-1	70	0.0%	18.63	41.44	**60.07**	-10.3	70.38	14.6%	0	0	70.38	**0.0%**

EST													
01/13/2011 20:45 EST	-0.95	49	-42.9%	18.63	41.44	**60.07**	-9.79	69.87	14.0%	0.05	20.91	48.96	**-42.7%**
01/13/2011 21:00 EST	-0.92	57	14.0%	18.63	41.44	**60.07**	-9.49	69.56	13.6%	0.03	12.54	57.01	**-22.0%**
01/13/2011 21:15 EST	-0.88	52	-9.6%	18.63	41.44	**60.07**	-9.07	69.14	13.1%	0.04	16.73	52.42	**-31.9%**
01/13/2011 21:30 EST	-0.84	52	0.0%	18.63	41.44	**60.07**	-8.66	68.73	12.6%	0.04	16.73	52.01	**-32.2%**
01/13/2011 21:45 EST	-0.81	56	7.1%	18.63	41.44	**60.07**	-8.35	68.42	12.2%	0.03	12.54	55.88	**-22.4%**
01/13/2011 22:00 EST	-0.77	51	-9.8%	18.63	41.44	**60.07**	-7.94	68.01	11.7%	0.04	16.73	51.28	**-32.6%**
01/13/2011 22:15 EST	-0.73	51	0.0%	18.63	41.44	**60.07**	-7.53	67.6	11.1%	0.04	16.73	50.87	**-32.9%**
01/13/2011 22:30 EST	-0.69	50	-2.0%	18.63	41.44	**60.07**	-7.11	67.19	10.6%	0.04	16.73	50.46	**-33.1%**
01/13/2011 22:45 EST	-0.66	54	7.4%	18.63	41.44	**60.07**	-6.8	66.88	10.2%	0.03	12.54	54.33	**-23.1%**
01/13/2011 23:00 EST	-0.62	50	-8.0%	18.63	41.44	**60.07**	-6.39	66.46	9.6%	0.04	16.73	49.74	**-33.6%**

01/13/2011 23:15 EST	-0.59	54	7.4%	18.63	41.44	**60.07**	-6.08	66.15	9.2%	0.03	12.54	53.61	**-23.4%**
01/13/2011 23:30 EST	-0.56	53	-1.9%	18.63	41.44	**60.07**	-5.77	65.84	8.8%	0.03	12.54	53.3	**-23.5%**
01/13/2011 23:45 EST	-0.54	57	7.0%	18.63	41.44	**60.07**	-5.57	65.64	8.5%	0.02		65.64	**0.0%**
						60.07		**68.7**			**-0.58**	**69.31**	
MAX	-0.44	81				MAX	-4.54			MAX	29.27	80.97	
MIN	-1.04	41				MIN	-10.7			MIN	-12.5	40.8	
Day Change GH													
	-0.11												

Weeki GW	14.09			Equation Components		**FIXED**		FIRST	% Change			SECOND	**% Change**
				18.63	3.31*GW		10.31*GH	VARIABLE	FIRST	ds/dt	418.14 *ds/dt	VARIABLE	**SECOND**
					plus		minus	INCLUDED	VARIABLE		minus	INCLUDED	**VARIABLE**
11/02/2010 00:00 EST	0.55	43		18.63	46.638	**65.268**	5.6705	59.5974	-9.5%			43	
11/02/2010 00:15 EST	0.6	38	-13.2%	18.63	46.638	**65.268**	6.186	59.0819	-10.5%	0.05	20.907	38.1749	**-54.8%**
11/02/2010 00:30 EST	0.65	38	0.0%	18.63	46.638	**65.268**	6.7015	58.5664	-11.4%	0.05	20.907	37.6594	**-55.5%**
11/02/2010 00:45 EST	0.7	37	-2.7%	18.63	46.638	**65.268**	7.217	58.0509	-12.4%	0.05	20.907	37.1439	**-56.3%**
11/02/2010 01:00 EST	0.74	41	9.8%	18.63	46.638	**65.268**	7.6294	57.6385	-13.2%	0.04	16.726	40.9129	**-40.9%**
11/02/2010 01:15 EST	0.78	40	-2.5%	18.63	46.638	**65.268**	8.0418	57.2261	-14.1%	0.04	16.726	40.5005	**-41.3%**
11/02/2010 01:30 EST	0.81	44	9.1%	18.63	46.638	**65.268**	8.3511	56.9168	-14.7%	0.03	12.544	44.3726	**-28.3%**
11/02/2010 01:45 EST	0.83	48	8.3%	18.63	46.638	**65.268**	8.5573	56.7106	-15.1%	0.02	8.3628	48.3478	**-17.3%**
11/02/2010 02:00 EST	0.85	48	0.0%	18.63	46.638	**65.268**	8.7635	56.5044	-15.5%	0.02	8.3628	48.1416	**-17.4%**
11/02/2010 02:15 EST	0.86	52	7.7%	18.63	46.638	**65.268**	8.8666	56.4013	-15.7%	0.01	4.1814	52.2199	**-8.0%**
11/02/2010 02:30 EST	0.85	61	14.8%	18.63	46.638	**65.268**	8.7635	56.5044	-15.5%	-0.01	-4.1814	60.6858	**6.9%**
11/02/2010 02:45 EST	0.83	65	6.2%	18.63	46.638	**65.268**	8.5573	56.7106	-15.1%	-0.02	-8.3628	65.0734	**12.9%**
11/02/2010 03:00 EST	0.8	70	7.1%	18.63	46.638	**65.268**	8.248	57.0199	-14.5%	-0.03	-12.544	69.5641	**18.0%**

11/02/2010 03:15 EST	0.78	66	-6.1%	18.63	46.638	**65.268**	8.0418	57.2261	-14.1%	-0.02	-8.3628	65.5889	**12.8%**
11/02/2010 03:30 EST	0.76	66	0.0%	18.63	46.638	**65.268**	7.8356	57.4323	-13.6%	-0.02	-8.3628	65.7951	**12.7%**
11/02/2010 03:45 EST	0.74	66	0.0%	18.63	46.638	**65.268**	7.6294	57.6385	-13.2%	-0.02	-8.3628	66.0013	**12.7%**
11/02/2010 04:00 EST	0.72	66	0.0%	18.63	46.638	**65.268**	7.4232	57.8447	-12.8%	-0.02	-8.3628	66.2075	**12.6%**
11/02/2010 04:15 EST	0.7	66	0.0%	18.63	46.638	**65.268**	7.217	58.0509	-12.4%	-0.02	-8.3628	66.4137	**12.6%**
11/02/2010 04:30 EST	0.68	67	1.5%	18.63	46.638	**65.268**	7.0108	58.2571	-12.0%	-0.02	-8.3628	66.6199	**12.6%**
11/02/2010 04:45 EST	0.65	71	5.6%	18.63	46.638	**65.268**	6.7015	58.5664	-11.4%	-0.03	-12.544	71.1106	**17.6%**
11/02/2010 05:00 EST	0.63	67	-6.0%	18.63	46.638	**65.268**	6.4953	58.7726	-11.1%	-0.02	-8.3628	67.1354	**12.5%**
11/02/2010 05:15 EST	0.6	72	6.9%	18.63	46.638	**65.268**	6.186	59.0819	-10.5%	-0.03	-12.544	71.6261	**17.5%**
11/02/2010 05:30 EST	0.58	68	-5.9%	18.63	46.638	**65.268**	5.9798	59.2881	-10.1%	-0.02	-8.3628	67.6509	**12.4%**
11/02/2010 05:45 EST	0.55	72	5.6%	18.63	46.638	**65.268**	5.6705	59.5974	-9.5%	-0.03	-12.544	72.1416	**17.4%**
11/02/2010 06:00 EST	0.52	72	0.0%	18.63	46.638	**65.268**	5.3612	59.9067	-8.9%	-0.03	-12.544	72.4509	**17.3%**
11/02/2010 06:15 EST	0.5	68	-5.9%	18.63	46.638	**65.268**	5.155	60.1129	-8.6%	-0.02	-8.3628	68.4757	**12.2%**
11/02/2010 06:30 EST	0.47	73	6.8%	18.63	46.638	**65.268**	4.8457	60.4222	-8.0%	-0.03	-12.544	72.9664	**17.2%**
11/02/2010 06:45 EST	0.45	69	-5.8%	18.63	46.638	**65.268**	4.6395	60.6284	-7.7%	-0.02	-8.3628	68.9912	**12.1%**

11/02/2010 07:00 EST	0.42	73	5.5%	18.63	46.638	65.268	4.3302	60.9377	-7.1%	-0.03	-12.544	73.4819	**17.1%**
11/02/2010 07:15 EST	0.39	74	1.4%	18.63	46.638	65.268	4.0209	61.247	-6.6%	-0.03	-12.544	73.7912	**17.0%**
11/02/2010 07:30 EST	0.37	70	-5.7%	18.63	46.638	65.268	3.8147	61.4532	-6.2%	-0.02	-8.3628	69.816	**12.0%**
11/02/2010 07:45 EST	0.34	74	5.4%	18.63	46.638	65.268	3.5054	61.7625	-5.7%	-0.03	-12.544	74.3067	**16.9%**
11/02/2010 08:00 EST	0.31	75	1.3%	18.63	46.638	65.268	3.1961	62.0718	-5.1%	-0.03	-12.544	74.616	**16.8%**
11/02/2010 08:15 EST	0.29	71	-5.6%	18.63	46.638	65.268	2.9899	62.278	-4.8%	-0.02	-8.3628	70.6408	**11.8%**
11/02/2010 08:30 EST	0.26	75	5.3%	18.63	46.638	65.268	2.6806	62.5873	-4.3%	-0.03	-12.544	75.1315	**16.7%**
11/02/2010 08:45 EST	0.23	75	0.0%	18.63	46.638	65.268	2.3713	62.8966	-3.8%	-0.03	-12.544	75.4408	**16.6%**
11/02/2010 09:00 EST	0.21	71	-5.6%	18.63	46.638	65.268	2.1651	63.1028	-3.4%	-0.02	-8.3628	71.4656	**11.7%**
11/02/2010 09:15 EST	0.18	76	6.6%	18.63	46.638	65.268	1.8558	63.4121	-2.9%	-0.03	-12.544	75.9563	**16.5%**
11/02/2010 09:30 EST	0.16	72	-5.6%	18.63	46.638	65.268	1.6496	63.6183	-2.6%	-0.02	-8.3628	71.9811	**11.6%**
11/02/2010 09:45 EST	0.14	72	0.0%	18.63	46.638	65.268	1.4434	63.8245	-2.3%	-0.02	-8.3628	72.1873	**11.6%**
11/02/2010 10:00 EST	0.12	72	0.0%	18.63	46.638	65.268	1.2372	64.0307	-1.9%	-0.02	-8.3628	72.3935	**11.6%**
11/02/2010 10:15 EST	0.1	73	1.4%	18.63	46.638	65.268	1.031	64.2369	-1.6%	-0.02	-8.3628	72.5997	**11.5%**
11/02/2010 10:30 EST	0.09	68	-7.4%	18.63	46.638	65.268	0.9279	64.34	-1.4%	-0.01	-4.1814	68.5214	**6.1%**

11/02/2010 10:45 EST	0.08	69	1.4%	18.63	46.638	**65.268**	0.8248	64.4431	-1.3%	-0.01	-4.1814	68.6245	**6.1%**
11/02/2010 11:00 EST	0.1	56	-23.2%	18.63	46.638	**65.268**	1.031	64.2369	-1.6%	0.02	8.3628	55.8741	**-15.0%**
11/02/2010 11:15 EST	0.12	56	0.0%	18.63	46.638	**65.268**	1.2372	64.0307	-1.9%	0.02	8.3628	55.6679	**-15.0%**
11/02/2010 11:30 EST	0.14	55	-1.8%	18.63	46.638	**65.268**	1.4434	63.8245	-2.3%	0.02	8.3628	55.4617	**-15.1%**
11/02/2010 11:45 EST	0.17	51	-7.8%	18.63	46.638	**65.268**	1.7527	63.5152	-2.8%	0.03	12.544	50.971	**-24.6%**
11/02/2010 12:00 EST	0.2	51	0.0%	18.63	46.638	**65.268**	2.062	63.2059	-3.3%	0.03	12.544	50.6617	**-24.8%**
11/02/2010 12:15 EST	0.22	55	7.3%	18.63	46.638	**65.268**	2.2682	62.9997	-3.6%	0.02	8.3628	54.6369	**-15.3%**
11/02/2010 12:30 EST	0.26	46	-19.6%	18.63	46.638	**65.268**	2.6806	62.5873	-4.3%	0.04	16.726	45.8617	**-36.5%**
11/02/2010 12:45 EST	0.29	50	8.0%	18.63	46.638	**65.268**	2.9899	62.278	-4.8%	0.03	12.544	49.7338	**-25.2%**
11/02/2010 13:00 EST	0.33	45	-11.1%	18.63	46.638	**65.268**	3.4023	61.8656	-5.5%	0.04	16.726	45.14	**-37.1%**
11/02/2010 13:15 EST	0.38	40	-12.5%	18.63	46.638	**65.268**	3.9178	61.3501	-6.4%	0.05	20.907	40.4431	**-51.7%**
11/02/2010 13:30 EST	0.43	40	0.0%	18.63	46.638	**65.268**	4.4333	60.8346	-7.3%	0.05	20.907	39.9276	**-52.4%**
11/02/2010 13:45 EST	0.47	44	9.1%	18.63	46.638	**65.268**	4.8457	60.4222	-8.0%	0.04	16.726	43.6966	**-38.3%**
11/02/2010 14:00 EST	0.52	39	-12.8%	18.63	46.638	**65.268**	5.3612	59.9067	-8.9%	0.05	20.907	38.9997	**-53.6%**
11/02/2010 14:15 EST	0.56	43	9.3%	18.63	46.638	**65.268**	5.7736	59.4943	-9.7%	0.04	16.726	42.7687	**-39.1%**

11/02/2010 14:30 EST	0.59	47	8.5%	18.63	46.638	**65.268**	6.0829	59.185	-10.3%	0.03	12.544	46.6408	**-26.9%**
11/02/2010 14:45 EST	0.61	51	7.8%	18.63	46.638	**65.268**	6.2891	58.9788	-10.7%	0.02	8.3628	50.616	**-16.5%**
11/02/2010 15:00 EST	0.63	50	-2.0%	18.63	46.638	**65.268**	6.4953	58.7726	-11.1%	0.02	8.3628	50.4098	**-16.6%**
11/02/2010 15:15 EST	0.64	54	7.4%	18.63	46.638	**65.268**	6.5984	58.6695	-11.2%	0.01	4.1814	54.4881	**-7.7%**
11/02/2010 15:30 EST	0.64	59	8.5%	18.63	46.638	**65.268**	6.5984	58.6695	-11.2%	0	0	58.6695	**0.0%**
11/02/2010 15:45 EST	0.63	63	6.3%	18.63	46.638	**65.268**	6.4953	58.7726	-11.1%	-0.01	-4.1814	62.954	**6.6%**
11/02/2010 16:00 EST	0.61	67	6.0%	18.63	46.638	**65.268**	6.2891	58.9788	-10.7%	-0.02	-8.3628	67.3416	**12.4%**
11/02/2010 16:15 EST	0.58	72	6.9%	18.63	46.638	**65.268**	5.9798	59.2881	-10.1%	-0.03	-12.544	71.8323	**17.5%**
11/02/2010 16:30 EST	0.56	68	-5.9%	18.63	46.638	**65.268**	5.7736	59.4943	-9.7%	-0.02	-8.3628	67.8571	**12.3%**
11/02/2010 16:45 EST	0.54	68	0.0%	18.63	46.638	**65.268**	5.5674	59.7005	-9.3%	-0.02	-8.3628	68.0633	**12.3%**
11/02/2010 17:00 EST	0.53	64	-6.3%	18.63	46.638	**65.268**	5.4643	59.8036	-9.1%	-0.01	-4.1814	63.985	**6.5%**
11/02/2010 17:15 EST	0.51	68	5.9%	18.63	46.638	**65.268**	5.2581	60.0098	-8.8%	-0.02	-8.3628	68.3726	**12.2%**
11/02/2010 17:30 EST	0.49	69	1.4%	18.63	46.638	**65.268**	5.0519	60.216	-8.4%	-0.02	-8.3628	68.5788	**12.2%**
11/02/2010 17:45 EST	0.47	69	0.0%	18.63	46.638	**65.268**	4.8457	60.4222	-8.0%	-0.02	-8.3628	68.785	**12.2%**
11/02/2010 18:00 EST	0.44	73	5.5%	18.63	46.638	**65.268**	4.5364	60.7315	-7.5%	-0.03	-12.544	73.2757	**17.1%**

11/02/2010 18:15 EST	0.42	69	-5.8%	18.63	46.638	65.268	4.3302	60.9377	-7.1%	-0.02	-8.3628	69.3005	**12.1%**
11/02/2010 18:30 EST	0.4	69	0.0%	18.63	46.638	65.268	4.124	61.1439	-6.7%	-0.02	-8.3628	69.5067	**12.0%**
11/02/2010 18:45 EST	0.4	61	-13.1%	18.63	46.638	65.268	4.124	61.1439	-6.7%	0	0	61.1439	**0.0%**
11/02/2010 19:00 EST	0.36	78	21.8%	18.63	46.638	65.268	3.7116	61.5563	-6.0%	-0.04	-16.726	78.2819	**21.4%**
11/02/2010 19:15 EST	0.35	66	-18.2%	18.63	46.638	65.268	3.6085	61.6594	-5.9%	-0.01	-4.1814	65.8408	**6.4%**
11/02/2010 19:30 EST	0.31	79	16.5%	18.63	46.638	65.268	3.1961	62.0718	-5.1%	-0.04	-16.726	78.7974	**21.2%**
11/02/2010 19:45 EST	0.29	71	-11.3%	18.63	46.638	65.268	2.9899	62.278	-4.8%	-0.02	-8.3628	70.6408	**11.8%**
11/02/2010 20:00 EST	0.26	75	5.3%	18.63	46.638	65.268	2.6806	62.5873	-4.3%	-0.03	-12.544	75.1315	**16.7%**
11/02/2010 20:15 EST	0.25	67	-11.9%	18.63	46.638	65.268	2.5775	62.6904	-4.1%	-0.01	-4.1814	66.8718	**6.3%**
11/02/2010 20:30 EST	0.22	75	10.7%	18.63	46.638	65.268	2.2682	62.9997	-3.6%	-0.03	-12.544	75.5439	**16.6%**
11/02/2010 20:45 EST	0.2	71	-5.6%	18.63	46.638	65.268	2.062	63.2059	-3.3%	-0.02	-8.3628	71.5687	**11.7%**
11/02/2010 21:00 EST	0.19	67	-6.0%	18.63	46.638	65.268	1.9589	63.309	-3.1%	-0.01	-4.1814	67.4904	**6.2%**
11/02/2010 21:15 EST	0.17	72	6.9%	18.63	46.638	65.268	1.7527	63.5152	-2.8%	-0.02	-8.3628	71.878	**11.6%**
11/02/2010 21:30 EST	0.15	72	0.0%	18.63	46.638	65.268	1.5465	63.7214	-2.4%	-0.02	-8.3628	72.0842	**11.6%**
11/02/2010 21:45 EST	0.16	59	-22.0%	18.63	46.638	65.268	1.6496	63.6183	-2.6%	0.01	4.1814	59.4369	**-7.0%**

11/02/2010 22:00 EST	0.16	64	7.8%	18.63	46.638	65.268	1.6496	63.6183	-2.6%	0	0	63.6183	**0.0%**
11/02/2010 22:15 EST	0.19	51	-25.5%	18.63	46.638	65.268	1.9589	63.309	-3.1%	0.03	12.544	50.7648	**-24.7%**
11/02/2010 22:30 EST	0.21	55	7.3%	18.63	46.638	65.268	2.1651	63.1028	-3.4%	0.02	8.3628	54.74	**-15.3%**
11/02/2010 22:45 EST	0.24	50	-10.0%	18.63	46.638	65.268	2.4744	62.7935	-3.9%	0.03	12.544	50.2493	**-25.0%**
11/02/2010 23:00 EST	0.27	50	0.0%	18.63	46.638	65.268	2.7837	62.4842	-4.5%	0.03	12.544	49.94	**-25.1%**
11/02/2010 23:15 EST	0.31	45	-11.1%	18.63	46.638	65.268	3.1961	62.0718	-5.1%	0.04	16.726	45.3462	**-36.9%**
11/02/2010 23:30 EST	0.34	49	8.2%	18.63	46.638	65.268	3.5054	61.7625	-5.7%	0.03	12.544	49.2183	**-25.5%**
11/02/2010 23:45 EST	0.38	45	-8.9%	18.63	46.638	65.268	3.9178	61.3501	-6.4%	0.04	16.726	44.6245	**-37.5%**
		61.3				**65.268**		**60.78305**			**-0.7483**	**61.35062**	
MAX	0.86	79									MAX	78.7974	
MIN	0.08	37									MIN	37.1439	
Day Change GH													
	-0.17												

Attachment F

E-Mail from Doug Leeper to Kevin Grimsley and Richard Kane (United States Geological Survey), Dated February 21, 2011

From: Doug Leeper
To: Kevin Grimsely (kjgrims@usgs.gov); Richard Kane (rkane@usgs.gov)
Cc: Marty Kelly; Ron Basso
Subject: FW: SE Fork Homosassa River Flow Calculation Concerns
Date: Monday, February 21, 2011 11:40:02 AM

Kevin and Richard:

Before I respond to Mr. Johnson regarding his latest e-mail, I'd like to hear from you guys regarding the merit of his arguments concerning discharge reported for the SE Fork gage site, and if any data collection issues for the site exist, how they may be best addressed. For example, we've spoken previously about outfitting the site as an index-velocity-type site, and the District is considering requesting funding for this effort in our FY2010 budget – I'm assuming you guys think this may be a good idea???

Thanks,
Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

NOTE: e-mail string deleted by Doug Leeper, Southwest Florida Water Management District

Attachment G

E-Mail Richard Kane (United States Geological Survey) to Doug Leeper,
Dated February 21, 2011

From: Richard L Kane
To: Doug Leeper
Cc: Kevin Grimsely (kjgrims@usgs.gov); Marty Kelly; Ron Basso; Richard L Kane
Subject: Re: FW: SE Fork Homosassa River Flow Calculation Concerns
Date: Monday, February 21, 2011 6:48:48 PM

Doug, Kevin and I did briefly discuss Mr. Johnson's latest email. Although he did a very a laborious exercise and brought up so many different issues it will take a considerable amount of time to respond to each one in writing. We'd prefer to discuss the emails with SWFWMD over the phone or in person, whichever you prefer. We do feel that you will get more accuracy with an index-velocity meter but not sure that will satisfy Mr. Johnson as he didn't understand the complexity of the IV rating at Homosassa River and ultimately in his letter he does let on to his agenda (moratorium on drilling and water withdrawals for 5 years), Also Dan Yobbi has expressed willingness to further explain the regression equations methods he developed for use with use large springs in a tidal regime.

____

Richard L. Kane
Acting Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov
(813-975-8620, ext. 131)
FAX (813-975-0839)
Cell 813-918-1275

NOTE: e-mail string deleted by Doug Leeper, Southwest Florida Water Management District

Attachment H

E-Mail from Kevin Grimsley (United States Geological Survey to Doug Leeper, Dated February 24, 2011

From: Kevin J Grimsley
To: Doug Leeper
Cc: Richard L Kane
Subject: SE Fork discharge plots
Date: Thursday, February 24, 2011 11:19:43 AM
Attachments: SE Fork Computed vs Measured.pdf
02310688.02182009.pdf
02310688.03082005.pdf
02310688.05232006.pdf
02310688.07012008.pdf
02310688.07132004.pdf
02310688.08112009.pdf
02310688.08162005.pdf
02310688.10062010.pdf
02310688.12092010.pdf

42 measurements from 2004 to current. Average difference between measured Q and computed Q was -2.4%. (I've already communicated that to Mr Johnson in a previous email) The negative sign indicates that on average the computed Q was slightly higher than the measured.
The first plot below shows the computed vs measured discharges. If everything were perfect, they would all fall on the "1 to 1 line". The regression aims to at least balance the measurements evenly on each side. Looking at the graph you can see that there are slightly more measurements plotting above the line than below. This represents the -2.4% from above and is certainly an acceptable error. Nothing's perfect.
The plots below show details of how groups of measurements compare with the computed values. Again, some plot above and some below, but in general they are pretty accurate.
****

Kevin Grimsley, P.E.
Supervisory Hydrologist
USGS, Florida Water Science Center
10500 University Center Drive, Suite 215
Tampa, FL 33612
kjgrims@usgs.gov
813-975-8620 x159

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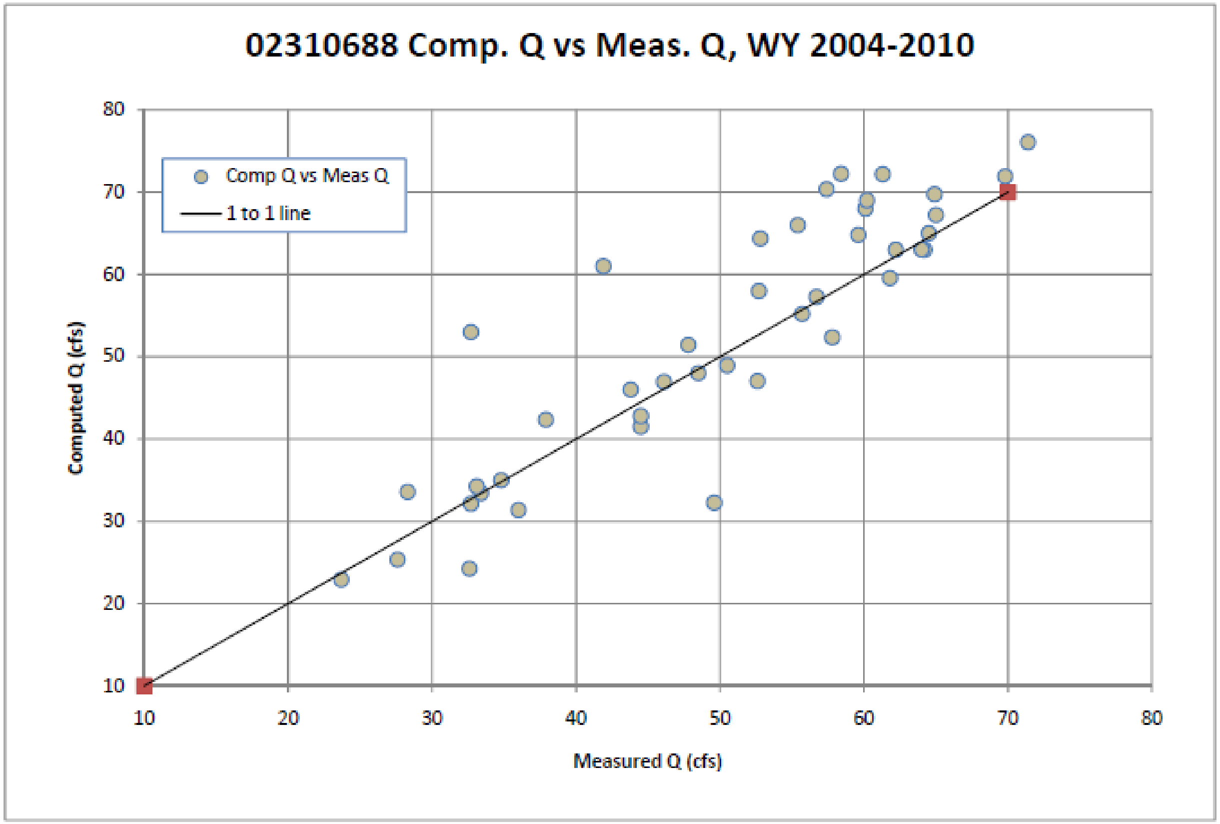
Attachment I

Attachments (10) to E-Mail from Kevin Grimsley to Doug Leeper,
Dated February 24, 2011




110
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4H
6H
8H
10H
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16H
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18
February, 2009
150A
150B
150C
INSP
INSP
INSP
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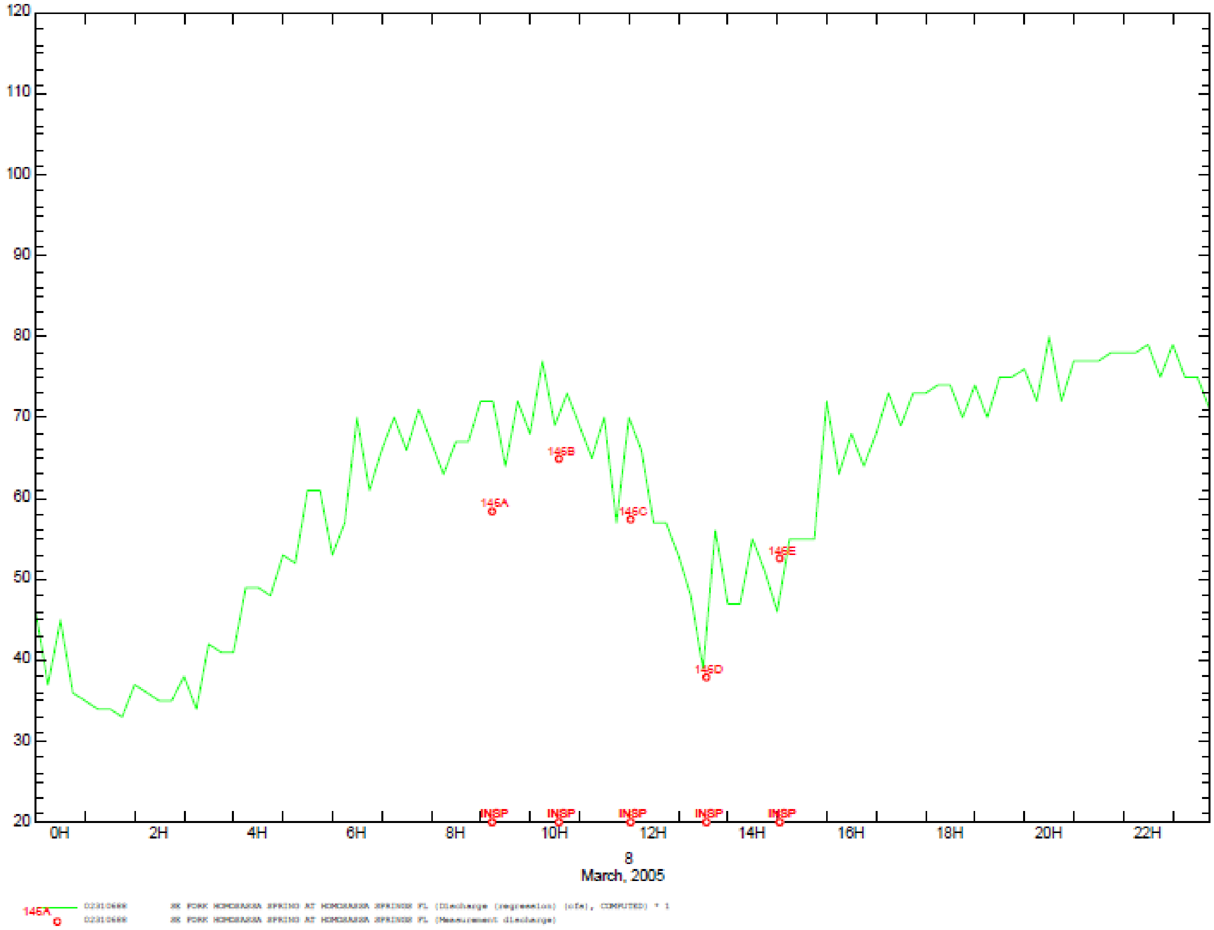
150A


120
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145A
145B
145C
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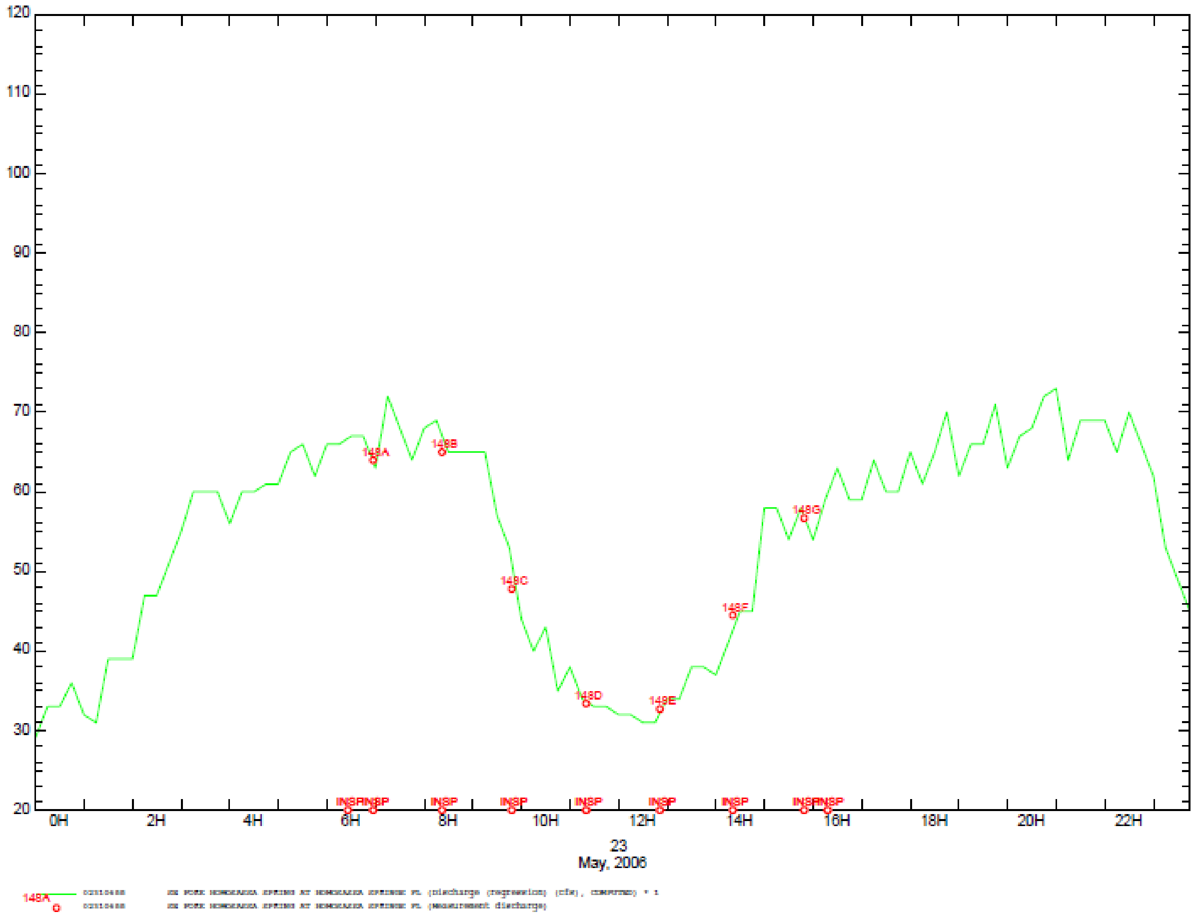
16H
18H
20H
22H
8
March, 2005
02310688 SE FORK HOMOSASSA SPRING AT HOMOSASSA SPRINGS FL (Discharge (regression) (cfs), COMPUTED) * 1
02310688 SE FORK HOMOSASSA SPRING AT HOMOSASSA SPRINGS FL (Measurement discharge)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148A
148B
148C
148D
148E
148F
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INSP
INSPINSP
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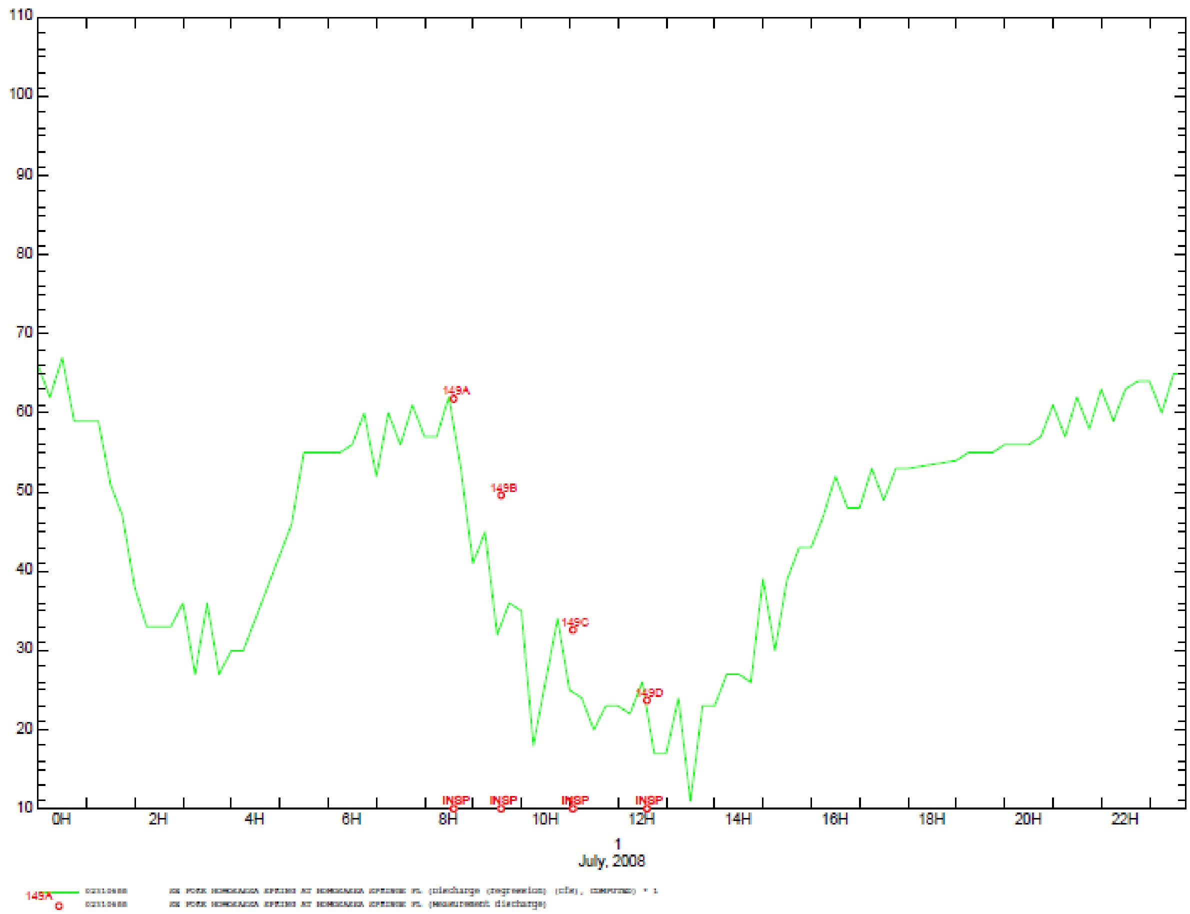
20H
22H
23
May, 2006



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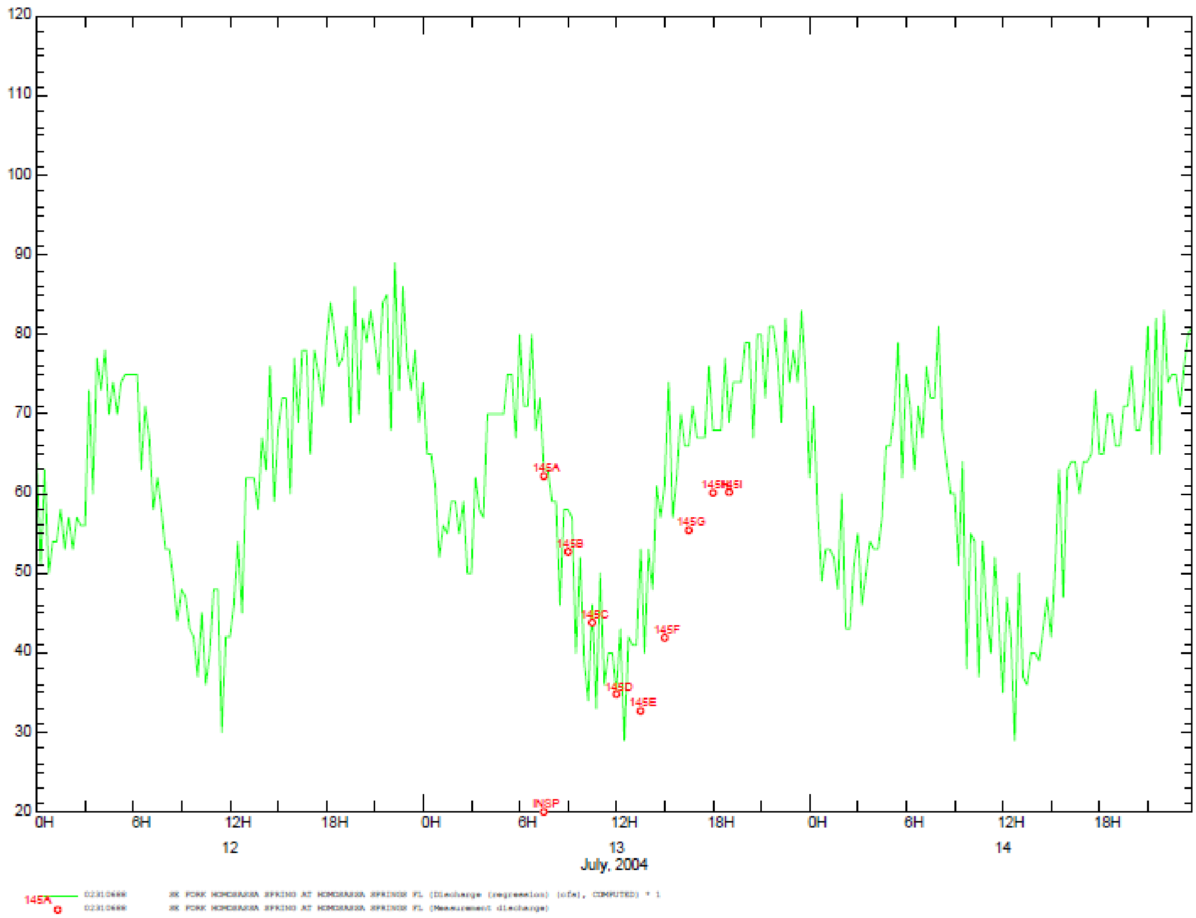
1
July, 2008
149A
149B
149C
149D
INSP
INSP
INSP
INSP


120
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July, 2004
145A
145B
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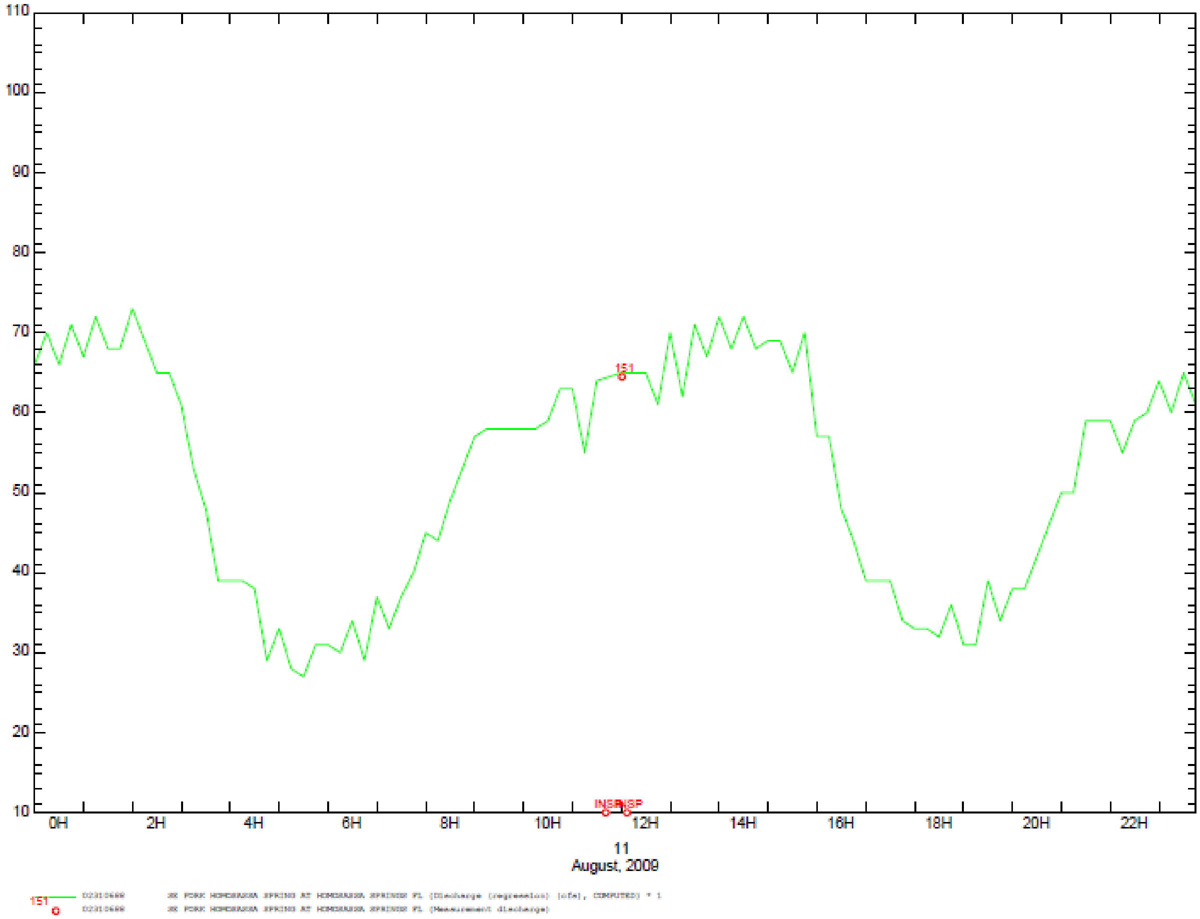
INSP



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16H
18H
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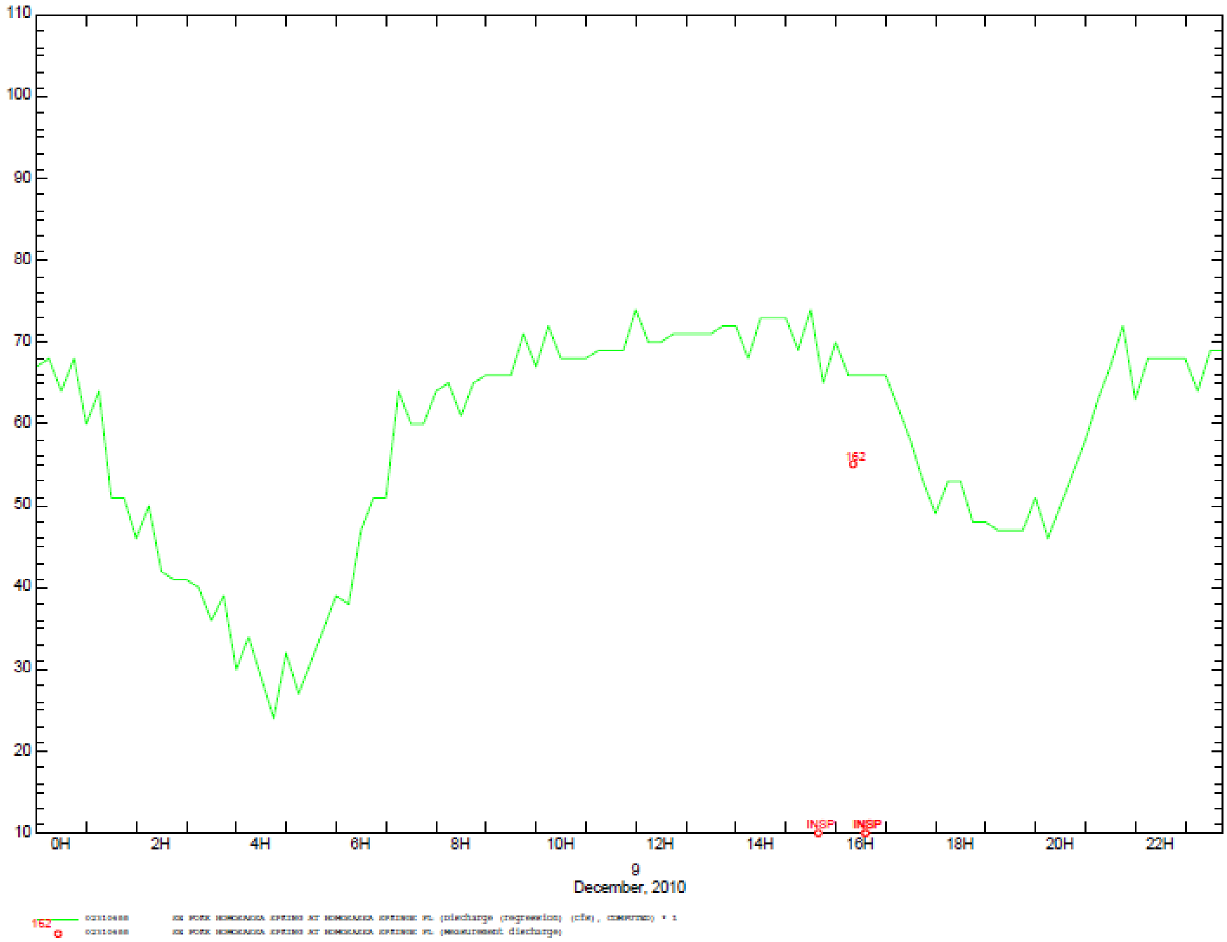
22H
11
August, 2009
151
INSP
INSP
151


110
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INSP
INSP
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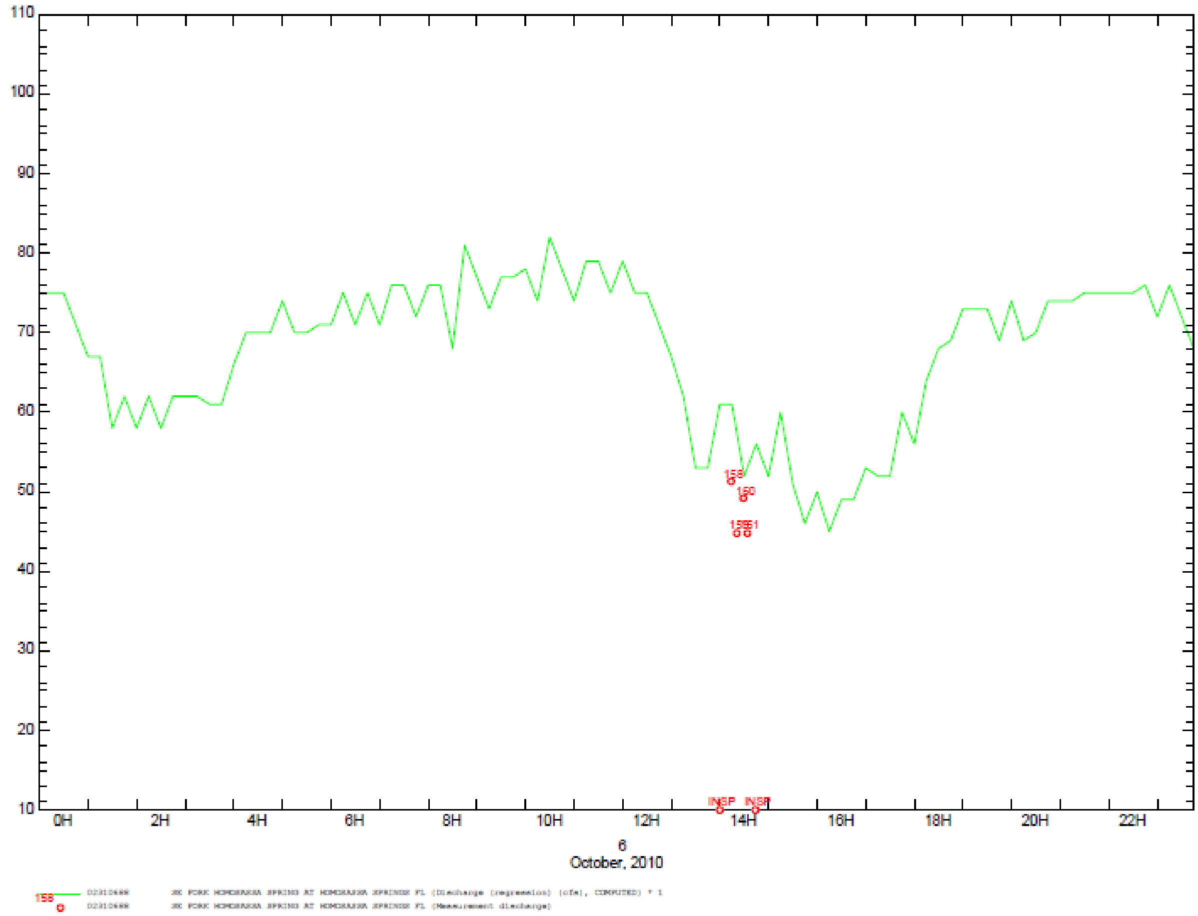

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12H
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16H
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August, 2005
147A
147B
147C
147D
147E
147F
147G
INSP

Attachment J

<u>E-Mail from Martyn Johnson to Doug Leeper and others</u>
<u>Dated February 26, 2011</u>

From: Alan Martyn Johnson
To: Doug Leeper; Kevin J Grimsley; Ron Koerber; rkane
Subject: Homosassa Flows
Date: Saturday, February 26, 2011 6:53:52 AM

FYI
For the next 3 weeks I will have very limited e-mail/computing access.
I trust that the silence regarding my e-mails of 2/16 and 2/19 regarding the flow calculations indicates that someone is taking a close look at these.

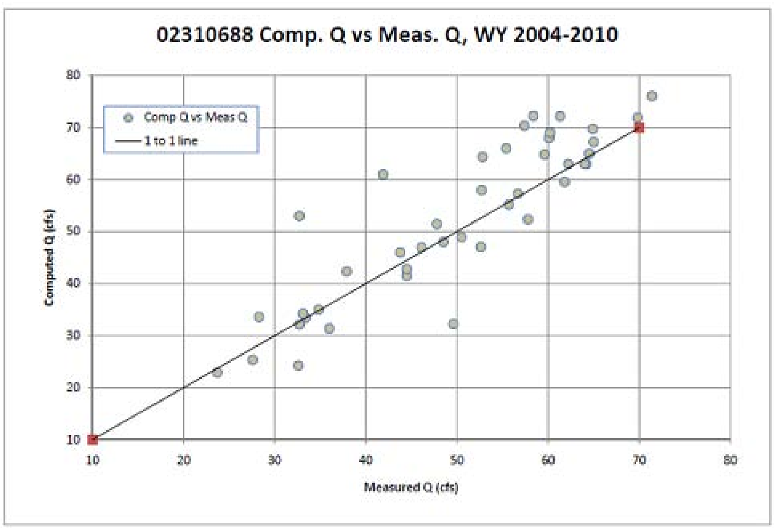
Martyn

Attachment K

E-Mail from Doug Leeper to Martyn Johnson, Dated March 1, 2011

From: Doug Leeper
To: "Alan Martyn Johnson"
Cc: Kevin Grimsely (kjgrims@usgs.gov); Richard Kane (rkane@usgs.gov); Ron Basso
Bcc: Marty Kelly; Sid Flannery; Mike Heyl; Cara S. Martin; Mark Barcelo; Karen Lloyd; Jay Yingling; Yassert Gonzalez
Subject: RE: SE Fork Homosassa River Flow Calculation Concerns
Date: Tuesday, March 01, 2011 11:31:12 AM
Attachments: image003.png

Martyn:
Thanks for the e-mail you sent to me on February 19, 2011, concerning measurement and reporting of discharge at the SE Fork Homosassa Springs gage site. I spoke with staff from the United States Geological Survey about your e-mail and was provided with information which indicates that discharge estimates based on the regression equation approach correspond well with discharge measurements made at the site. The figure below, provided by Kevin Grimsley, shows the relationship between 42 discharge measurements (Measured Q) made between 2004 and the present time, and corresponding discharge estimates based on the regression approach (Computed Q). Kevin informed me that the average difference between the computed and measured values is -2.4%; a difference that seems to be quite acceptable, given the complexities of flows in the SE Fork.



Douglas A. Leeper, Chief Environmental Scientist
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Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

NOTE: e-mail string deleted by Doug Leeper, Southwest Florida Water Management District

From:	Doug Leeper
To:	Marty Kelly; Ron Basso; Mike Heyl
Subject:	FW: Public Input for Spring Workshop
Date:	Thursday, August 04, 2011 4:14:09 PM
Attachments:	Weeki Wachee and Lecanto Wells Aug 4.xls Field Measurements Percent change Aug4.xls

FYI – I will have to respond to this next week.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
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Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Thursday, August 04, 2011 8:55 AM
To: Doug Leeper
Cc: Kevin J Grimsley; rkane
Subject: RE: Public Input for Spring Workshop

Doug,
Appreciate you complying the various pieces of correspondence in such an orderly manner. I have them all but not as neatly presented, excellent job. This would certainly help in a meeting with Richard and Kevin.

As you know I am a part time resident in Homosassa and will not be back there until early next month, according to present plans. As I mentioned in my e-mail some response to my e-mails of February would help prepare for a meeting.

In addition to those e-mails I have this morning updated an Excel spreadsheet that I had started back in March when I got your e-mail of March 1 with the graph from Kevin.

SE FORK HOMOSASSA FIELD MEASUREMENTS ANALYSIS
The file is attached.
As you will see I have primarily looked at the Field Measurements that are multiple measurements on the same day with the aim of getting an idea about how flows change in the SE Fork. The data in black is direct copy of the data from USGS. The blue data collates the various data from the same day and attempts to calculate the percentage changes of flow in a 15 minute interval in order to compare this to the variations in the calculated flows that I have generally questioned.
As can be seen in the red bordered section the percentage changes are generally gradual and in line with the Gage Height and Gage Height Changes i.e. logical.

Notes:

1. *The Gage Height Changes in Column M do not correspond to the changes in Column I; this is the data USGS has. Column T shows the changes as calculated from Column I.*

2. *I have highlighted the data for 2010-10-06 which looks suspect; may I suggest that someone recheck data entry for this date.*
3. *I have also highlighted the data for 2000-12-13. This data reports a gage change of 0.88 ft from 1:00 to 5:30 (assume this is am). This is an unusually high rate of change in four and half hours, with 0.74 ft change in just three hours from 1:00 to 4:00. I can only speculate that there must have been something special happening at this time to get someone out in the early hours, particularly as they had been there the day before. The low flow rates are logical for such a rapid rise in gage height.*
4. *All data is treated the same i.e. as if it were instantaneous data at the time the measurement is reported. I can only assume that the fact that Duration (Column N) of any individual measurement may have some influence; some measurements are 0.2 hrs some 0.5 hrs with a number of others in the mix e.g. for March 8, 2005 146A-E the figures are 0.7, 0.5, 0.45, 0.3, 0.3. Possibly the UNSP notation has some meaning here. You may recall a previous comment I made about reviewing the Standard Operating Procedures.*

Bottom Line. This analysis of the field measurement data appears to support the questions I have raised about the 15 minute interval calculated data. Most of the changes in the field measurements are gradual and logical.

WELL LEVELS ANALYSIS AND WHICH IS THE DRIVING FORCE
Well Level Analysis file attached.
The other day I mentioned that out of curiosity I had taken a look at the well levels at Weeki Wachee and Lecanto North to try to understand a little more. As I mentioned I have long questioned why the Weeki Wachee Well level is used in the calculation of flows for the springs in Homosassa when it is not in the Homosassa Basin. Lecanto North is also not in the Homosassa Basin but much closer to the drawn boundary and half the distance from the Homosassa springs: Lecanto North is a long monitored well. As you can see on the graphs from the two wells, they react very similarly over the years to what I assume is rainfall/recharge although the pattern is hard to correlate when looking at the rainfall figures for Citrus and Hernando.

The number of data points in any year is not consistent so no time scale is shown on the graphs.

On the second sheet I cullet the data to get matching (or closely matching) dates, and then looked at the deviations from average. It confirms what I have heard talk of Weeki Wachee Well is in serious decline and Lecanto North is not too far behind.
Taking these thoughts/observations to the flows in the SE Fork Homosassa it is concerning that the declines seen in the YELLOW BARS for Lecanto North have become strongly negative in about the same timeframe (starting about 2005) that residents have noted the changes re barnacle growth and nature of weed growth.

HOW DOES THE NORTHERN DISTRICT MODEL ACCOUNT FOR WATER FROM WEEKI WACHEE GETTING TO/INFLUENCING FLOWS IN THE HOMOSASSA SPRINGS, PARTICULARLY THE SE FORK?
More food for thought.

Martyn

From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Wed, 3 Aug 2011 10:20:19 -0400
Subject: RE: Public Input for Spring Workshop

Martyn:

I'd like to reiterate that I think it would be extremely useful to schedule a meeting with Richard Kane and Kevin Grimsley to discuss your concerns with flow measurement in the Homosassa River system. As indicated previously, I welcome the opportunity to participate in such a meeting. In support of this potential meeting I've compiled correspondence between you, Richard, Kevin and me into three Adobe PDF portfolio documents, anticipating that it may be reasonable to review these correspondences prior to a face-to-face meeting. The first of the portfolio documents is attached to this e-mail. I'll send the other two as attachments to additional e-mails.

In response to your question about interactions between stakeholder representatives and others that participate in the District's Springs Coast Minimum Flows and Levels workshops, I would note that I have no specific information regarding interaction of these folks outside of the workshop setting. I assume, however, that workshop participants discuss minimum flows and levels issues outside of the scheduled workshop periods, based
on e-mails that are sent to me and those that I am copied on.

Douglas A. Leeper, Chief Environmental Scientist
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Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

August 3, 2011

MEMORANDUM

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District

SUBJECT: Correspondence from Martyn Johnson to Doug Leeper, concerning flow measurement in the Homosassa River system

---

This memorandum documents e-mail from Mr. Martyn Johnson to Doug Leeper (with the Southwest Florida Water Management District) concerning measurement of flows in the Homosassa River by the United States Geological Survey. The e-mail is documented here based on relevance to the development of minimum flows for the Homosassa River system.

DAL
Attachment: March 15, 2011 e-mail from Martyn Johnson to Doug Leeper, with e-mail string

Attachment

<u>March 15, 2011 E-Mail from Martyn Johnson to Doug Leeper, with E-mail String</u>

From:	Alan Martyn Johnson
To:	Doug Leeper
Cc:	Kevin J Grimsley; rkane; Ron Basso
Subject:	RE: SE Fork Homosassa River Flow Calculation Concerns
Date:	Tuesday, March 15, 2011 3:30:52 AM
Attachments:	image003.png

Doug,
I did see your e-mail a few days ago, but did not have time to look at the graph in detail or formulate a reply due to the limited internet access I have.

I will also have to be brief now as I am still out of the US.

Frankly, the explanation is in my opinion shallow. Quick list of key points;

1. There appear to be 42 field measurements on the USGS web page since 2004 not 40.
2. No data is provided of how the results were calculated...field measurements were taken over various time intervals...how was dS/dt used (another approximation?)
3. Approximately 36% of the results have differences over 20%. From drawing a line on the graph it appears that 12% are at or above 20% negative and 24% are at or above plus 20%, with 7 of the 10 positive differences well above 20%....45% and 60% being noted.
4. There is no explanation of where the water goes (according to the equation scenario as presented in my e-mail).
5. There is no explanation about the notations such as good, poor and adjustment mentioned in my e-mail.

I have heard comments from various people that the equation is refined as more data/observations become available but it appears that there is little evidence that supports such open minded approach.

The continued efforts to defend questionable data are very concerning. I trust this will not have to be opened to a wider assessment when I return to the US.

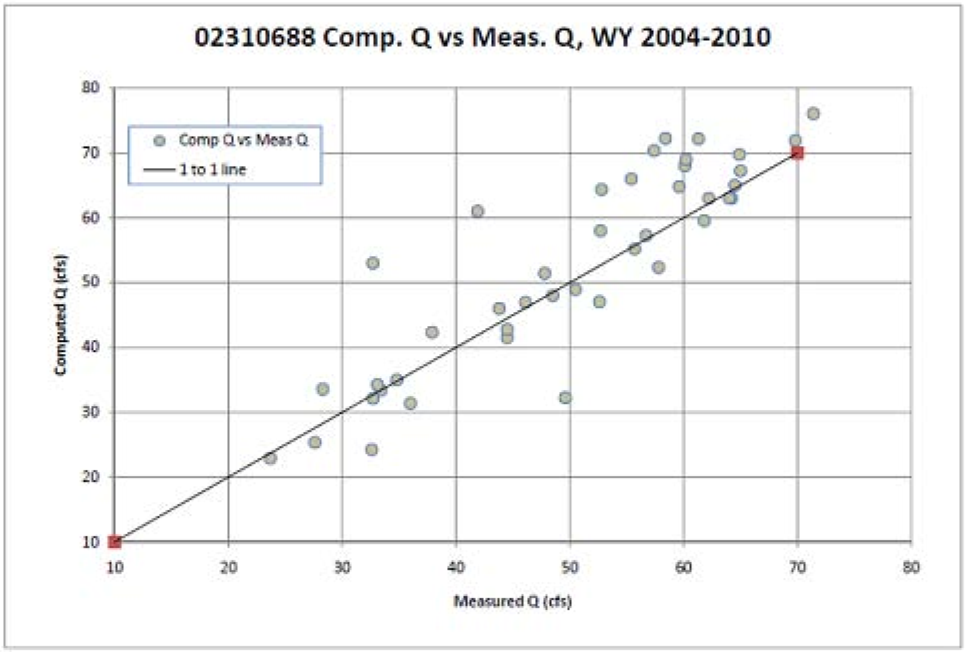
Are the any thoughts about my comments on the Homosassa River Site or are tese still being formulated?

Martyn

From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
CC: kjgrims@usgs.gov; rkane@usgs.gov; Ron.Basso@swfwmd.state.fl.us
Date: Tue, 1 Mar 2011 11:31:12 -0500
Subject: RE: SE Fork Homosassa River Flow Calculation Concerns

Martyn:

Thanks for the e-mail you sent to me on February 19, 2011, concerning measurement and reporting of discharge at the SE Fork Homosassa Springs gage site. I spoke with staff from the United States Geological Survey about your e-mail and was provided with information which indicates that discharge estimates based on the regression equation approach correspond well with discharge measurements made at the site. The figure below, provided by Kevin Grimsley, shows the relationship between 42 discharge measurements (Measured Q) made between 2004 and the present time, and corresponding discharge estimates based on the regression approach (Computed Q). Kevin informed me that the average difference between the computed and measured values is -2.4%; a difference that seems to be quite acceptable, given the complexities of flows in the SE Fork.



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E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Saturday, February 19, 2011 3:30 PM
To: Doug Leeper
Cc: Kevin J Grimsley; rkane; Ron Basso
Subject: SE Fork Homosassa River Flow Calculation Concerns

Doug,
Attached are two files that address the concerns I have mentioned before about the equation used to calculate the flow from the SEFork. In a recent e-mail I commented about your explanation, indicating that the average of the measurements and the actual daily mean discharge are one and the same thing. There is no separate measurement of the actual mean discharge.
Quote
Individual discrete discharge estimates may exhibit moderate variation from actual physical conditions at the site, but the average of the composited discrete measurements made over a 24-hour period has been shown to correspond well with actual daily mean discharge.
End Quote.

In the Word file I have provided a detailed explanation of the numbers as I see them and detail that these are not moderate variations from actual. I see them as frankly inexplicable variations from actual and logical explanation. The Excel file has the supporting data/calculation/analysis from the base data copied from the USGS web site and the calculation equation as published.

I decided to leave my discussion in the word file as the included charts did not want to copy into an e-mail and I hope it easier for you and others to review.

Please take the time to look over my comments, if I am wrong I will happily admit it providing there is valid explanation.

I know that the reaction may be that if I am right it will require a good explanation of why this was not recognized earlier and maybe why so much money has been spent on studies that appear to come to conclusions vastly different to what people are observing. My aim is to understand how the observations of good honest people do not match the 'scientific' data.

A lot more effort is needed to understand why the Homosassa River is deteriorating and not into finding ways to justify more water extraction from the aquifer. This is like Congress years ago ignoring the foolishness of the mortgage market that resulted in the crash, or the damage that has been even more dramatic in other rivers where recovery is now necessary. Transferring the problem is not the solution.

I have started to look at the water chemistry data you shared earlier and while comment soon.

Do not dismiss my analysis without a good reasoned argument, as you may have gathered I do not disappear easily.

Thanks for your continued attention to this matter of preventing further destruction of the Homosassa River. Simple solution is moratorium on drilling anymore wells or increasing extractions for 5 years for assessment to be validated.

Martyn

April 27, 2011

MEMORANDUM

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District

SUBJECT: Electronic mail correspondence concerning comments from Mr. Martyn Johnson regarding discharge measurement in the Homosassa River system

---

This memorandum documents correspondence between Mr. Martyn Johnson, Mr. Doug Leeper (with the District) and others regarding concerns expressed by Mr. Johnson regarding measurement of discharge in the Homosassa River system. Copies of electronic mails associated with this issue are attached to this memorandum.

DAL

Attachments: A - E-Mail (with string of additional e-mails) from Marty Johnson to Doug Leeper, Richard Kane, Ron Basso, and Kevin Grimsley, Dated April 14, 2011

B - E-Mail (with e-mail string deleted) from Richard Kane to Doug Leeper, Dated April 14, 2011

C - E-Mail (with portion of e-mail string deleted) from Ken Watson to Doug Leeper, Dated April 16, 2011

Attachment A

E-Mail (with string of additional e-mails) from Marty Johnson to Doug Leeper, Richard Kane, Ron Basso, and Kevin Grimsley, Dated April 14, 2011

From: Alan Martyn Johnson
To: Doug Leeper; rkane; Ron Basso; Kevin J Grimsley
Cc: Dana Bryan; lee.edmiston@dep.state.fl.us; jdweaver@usgs.gov
Subject: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns
Date: Thursday, April 14, 2011 9:06:35 AM

Gentlemen,

I am now back in the USA and disappointed that there is no response to my e-mail of March 15 and the related ones in February.

AS POINTED OUT THE EXPLANATIONS OF THE DATA GENERATED BY THE USGS WHICH IS USED EXTENSIVELY IN THE DEVELOPMENT OF THE MINIMUM FLOWS FOR THE HOMOSASSA RIVER ARE QUESTIONABLE.

It is inconceivable that given the attempts I have made to get to the true evaluation of the flows in the Homosassa River that an 'ostrich mentality' appears to prevail. There have been a number of indications that USGS and SWFWMD are open to looking at and refining the methods and equations used to report the flows, but nothing happens other than shallow attempts to defend the status quo.
I could conclude that someone is scared to admit that hundreds of thousands of dollars have been spent trying to justify that further extraction of ground water from the aquifer will not damage this unique ecosystem only to find that some of the basic data used in the studies may be inaccurate.

Also, it is becoming increasingly clear that there is little or no interest in giving credence to the long term residents that there are serious changes occuring in recent years in the Homosassa River. These changes are real; barnacles reported further and further up the river are not fictitious they are clear evidence of increasing salinity.

The USGS flow measurements appear to be inaccurate; I specifically would reference what happens to the spring derived waters in the SE Fork if the USGS equation is correct. I have raised this point a number of times.

I have no doubt that the people that developed these equations did so with the best of intent, but as we look more critically at these there are grounds to rethink how accurate they are. Further, I have pointed out the 'eddy current' that draws higher salinity water to the sensors at SE Fork Site 02310688. There appears to be no attempt to look at this or correct the matter.

My attempts to address these matters by allowing those closest to the issue take credit for recognizing and correcting the errors appear to be falling on deaf ears, or reluctance to face the realities. Therefore, I have little choice other than to start bringing this matter to the attention of people higher in the organization structures so they are informed before the Homosassa River is no longer suitable to be recognized as an Outstanding Florida Water (as it was by the Florida Legislature in1992) which is a water designated worthy of special protection because of its natural attributes.

Martyn Johnson

<><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><>
From: martynellijay@hotmail.com
To: doug.leeper@swfwmd.state.fl.us
CC: kjgrims@usgs.gov; rkane@usgs.gov; ron.basso@swfwmd.state.fl.us
Subject: RE: SE Fork Homosassa River Flow Calculation Concerns
Date: Tue, 15 Mar 2011 03:30:34 -0400

Doug,

I did see your e-mail a few days ago, but did not have time to look at the graph in detail or formulate a reply due to the limited internet access I have.
I will also have to be brief now as I am still out of the US.
Frankly, the explanation is in my opinion shallow. Quick list of key points;
1. There appear to be 42 field measurements on the USGS web page since 2004 not 40.
2. No data is provided of how the results were calculated...field measurements were taken over various time intervals...how was dS/dt used (another approximation?)
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Martyn

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From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
CC: kjgrims@usgs.gov; rkane@usgs.gov; Ron.Basso@swfwmd.state.fl.us
Date: Tue, 1 Mar 2011 11:31:12 -0500
Subject: RE: SE Fork Homosassa River Flow Calculation Concerns

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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Saturday, February 19, 2011 3:30 PM
To: Doug Leeper
Cc: Kevin J Grimsley; rkane; Ron Basso
Subject: SE Fork Homosassa River Flow Calculation Concerns

Doug,

Attached are two files that address the concerns I have mentioned before about the equation used to calculate the flow from the SEFork. In a recent e-mail I commented about your explanation, indicating that the average of the measurements and the actual daily mean discharge are one and the same thing. There is no separate measurement of the actual mean discharge.
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conclusions vastly different to what people are observing. My aim is to understand how the observations of good honest people do not match the 'scientific' data.
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Do not dismiss my analysis without a good reasoned argument, as you may have gathered I do not disappear easily.
Thanks for your continued attention to this matter of preventing further destruction of the Homosassa River. Simple solution is moratorium on drilling anymore wells or increasing extractions for 5 years for assessment to be validated.

Martyn

Attachment B

E-Mail (with e-mail string deleted) from Richard Kane to Doug Leeper, Dated April 14, 2011

From: Richard L Kane
To: Doug Leeper
Cc: Ron Basso; RichardLKane/WRD/USGS/DOI; KevinJGrimsley/WRD/USGS/DOI
Subject: Re: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns
Date: Thursday, April 14, 2011 10:13:38 AM

Doug, I am not sure what to say other than I have complete confidence in the accuracy of the USGS measurements. It sounds as if Mr. Johnson is concluding that since we are not computing the discharge that he thinks we should, that the measurement must be inaccurate. All of these sites and methods have been reviewed by the Office of Surface Water and we can certainly ask them to take another closer look and make recommendations. We welcome any external review that would help to improve the data collection effort.

I did recommend to Marty that we add an Index-velocity gage at SE fork and we can run it concurrently with the GW Regression methods and see what differences we get. We are also considering changing the velocity sensor at Homosassa River at Homosassa (02310700) from an up looker to a side looker. This has nothing to do with Mr. Johnson's comments but a determination from our own internal review of the data which we do annually. We think a side looker may help us to tighten up the rating but we wouldn't expect to see much difference in the daily values. If all of these changes are made we will also need to make a complete set of tidal measurements at both sites during different seasons of the year so new ratings would take us at least another year to develop.

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov
(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275

Attachment C

E-Mail (with portion of e-mail string deleted) from Ken Watson to Doug Leeper, Dated April 16, 2011

From: Ken Watson
To: Doug Leeper
Cc: "Ken Watson"; dmades@hsweng.com
Subject: FW: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns
Date: Saturday, April 16, 2011 10:19:33 AM

Some thoughts from Dean, our resident USGS procedures expert.

Ken W. Watson, Ph.D., President
3820 Northdale Blvd., #210B | Tampa, FL 33624
Direct: 813.549.0223 | Phone: 813.968.7722 ext. 223
Fax: 813.962.2406 | email: @hsweng.com
HSW Engineering, Inc. | www.hsweng.com
Green Today... Better Tomorrow.
Please consider the environment before printing this email.

From: Dean Mades [mailto:dmades@hsweng.com]
Sent: Friday, April 15, 2011 2:50 PM
To: 'Ken Watson'
Subject: RE: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns

Some thoughts…………………….

1. In regards to Mr. Johnson, he should consider making an appointment to meet with the USGS (as I did) and letting them explain their stream-gaging procedures. There are volumes of manuals and data that could be produced to demonstrate the QA practices that Richard Kane alludes to for determining streamflow.

2. A concurrent flow-monitoring approach using an index-velocity gage and the current regression method might provide meaningful data for evaluating the accuracy of the flow record reported for SE Fork.

I do not know how accurate the past several years of average daily flow record has been rated by the USGS, but the daily record reported for water year 2005 is “poor”, which the USGS defines as not meeting the next-level rating of “fair” which is within 15 percent of the true value.

The accuracy of the daily record derived using both methods is proportional to the accuracy of the field discharge measurements, which have historically been qualitatively rated by the field personnel and range between good (within 5% of actual discharge) and poor (>8% of actual discharge).

For an analysis of this nature, it would be essential to use an appropriate field protocol to ensure the field measurements are rated “good” to the extent possible.

3. Regarding the Homosassa gage, it would be prudent to continue operating the uplooking AVM for 6 months or so concurrently with a side-looking AVM if one is installed. This concurrent AVM record will be useful for characterizing the consistency and variability in the index velocity measured by the two different meters, and the associated flow record derived using the index velocity record.

Dean M. Mades, P.E.
4411 Bee Ridge Road, #305 | Sarasota, FL 34233
Direct: 941.894.4018
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Green Today... Better Tomorrow.
Please consider the environment before printing this email.

From: Ken Watson [mailto:kwatson@hsweng.com]
Sent: Thursday, April 14, 2011 11:24 AM
To: dmades@hsweng.com
Subject: FW: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns

Feel free to comment.

Ken W. Watson, Ph.D., President
3820 Northdale Blvd., #210B | Tampa, FL 33624
Direct: 813.549.0223 | Phone: 813.968.7722 ext. 223
Fax: 813.962.2406 | email: @hsweng.com
HSW Engineering, Inc. | www.hsweng.com
Green Today... Better Tomorrow.
Please consider the environment before printing this email.

From: Doug Leeper [mailto:Doug.Leeper@swfwmd.state.fl.us]
Sent: Thursday, April 14, 2011 11:18 AM
To: kwatson@hsweng.com
Subject: FW: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns

FYI

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Richard L Kane [mailto:rkane@usgs.gov]
Sent: Thursday, April 14, 2011 10:14 AM

To: Doug Leeper
Cc: Ron Basso; RichardLKane/WRD/USGS/DOI; KevinJGrimsley/WRD/USGS/DOI
Subject: Re: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns

Doug, I am not sure what to say other than I have complete confidence in the accuracy of the USGS measurements. It sounds as if Mr. Johnson is concluding that since we are not computing the discharge that he thinks we should, that the measurement must be inaccurate. All of these sites and methods have been reviewed by the Office of Surface Water and we can certainly ask them to take another closer look and make recommendations. We welcome any external review that would help to improve the data collection effort.
I did recommend to Marty that we add an Index-velocity gage at SE fork and we can run it concurrently with the GW Regression methods and see what differences we get. We are also considering changing the velocity sensor at Homosassa River at Homosassa (02310700) from an up looker to a side looker. This has nothing to do with Mr. Johnson's comments but a determination from our own internal review of the data which we do annually. We think a side looker may help us to tighten up the rating but we wouldn't expect to see much difference in the daily values. If all of these changes are made we will also need to make a complete set of tidal measurements at both sites during different seasons of the year so new ratings would take us at least another year to develop.

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****

NOTE: deleted orginal e-mail and string from M. Johnson that was sent to D. Leeper on April 14, 2011 (see attachment A to this memorandum).

May 6, 2011

MEMORANDUM

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District

SUBJECT: Electronic mail correspondence concerning comments from Mr. Martyn Johnson regarding discharge measurement in the Homosassa River system

---

This memorandum documents correspondence between Mr. Martyn Johnson, Mr. Doug Leeper (with the District) and others regarding concerns expressed by Mr. Johnson regarding measurement of discharge in the Homosassa River system. Copies of electronic mails associated with this issue are attached to this memorandum.

DAL

Attachments:
A - E-Mail (with string of additional e-mails) from Martyn Johnson to Doug Leeper , Dated May 2, 2011
B - Photographs (3) attached to E-Mail) from Martyn Johnson to Doug Leeper , Dated May 2, 2011
C - E-Mail from Doug Leeper to Richard Kane, Dated May 4, 2011
D - E-Mail from Richard Kane to Doug Leeper, Dated May 4, 2011
E - E-Mail (with e-mail string deleted) from Doug Leeper to Martyn Johnson, Dated May 6, 2011

Attachment A

E-Mail (with string of additional e-mails) from Martyn Johnson to Doug Leeper, Dated May 2, 2011

From: Alan Martyn Johnson
To: Doug Leeper
Cc: Ron Basso; rkane; Kevin J Grimsley
Subject: RE: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns
Date: Monday, May 02, 2011 3:36:04 PM
Attachments: Site 02310688 1.JPG
Site 02310688 2.JPG
Site 02310688 3.JPG

Doug,

Thanks for keeping me informed of the plans for the working group.

I remain extremely concerned about the measurement of flows particularly from the SE Fork. I think we agree that the flow from the various springs in this section of the river provides the bulk of the lower salinity water which is critical to the conditions in the Homosassa River.

I am following up to get information about a suitable Acoustic Doppler Current Profiler that could be installed permanently to measure the flow at the SE Fork gage site. I have no doubt that the USGS and SWFWMD have much more ability to suggest a suitable unit, but the reluctance to deviate from the line that the "*data that are available are the best available information and have been developed using accepted and reviewed methods*" makes me more determined to be better informed about suitable equipment and general costs before requesting that such equipment be considered for installation.

You will no doubt recall at the last workshop you did consider the possibility of setting a minimum flow for the SE Fork alone, good idea and worthy of further investigation.
As I recall there is comment about flow from the SE Fork declining over the study period in the peer review draft report. The reported data only considers the 'estimated/calculated' flows. Commentary from local residents tends to indicate that the reductions are much greater than reported. The frailties of both these assessments of this critical flow makes it paramount that we assure hard facts replace estimates calculated from questionable equations and the difficulty of quantifying commentary. I look forward to any discussion and or consideration to installation of a ADCP at this location.

As I kayak this section of the river I notice the changes in the vents, of particularly note recently is a vent area/depression center-left stream about three-quarters of the way upstream from the bridge. Two of the smaller vents have become more active with limestone (presumably) particles clearly evident in the flow. These particles appear similar to those deposited just upstream of the gage site, see photos attached (no weed growth).
Also in the photographs you can see the stack of rip-rap concrete bags that further contribute to the eddy current I have mentioned before. The occasional higher salinity readings at this gage site I strongly believe are the result of these eddy currents drawing a thin layer of higher

salinity water along the concrete embankment downstream of the gage site. I am sure that if I had dye available to inject into the flow at the concrete embankment there are a few occasions where I could have visually confirmed this happening. Observation of the small clumps of weed being drawn along the concrete wall can frequently be seen at times the stage level is increasing. This false data unfortunately is used in Section 2 of the July 2010 report and brings some of the regression analysis into question.

Doug,

I appreciate your continued efforts regarding the Homosassa River. I heard on the telecast of your presentation to the Board of Commissioners that input from interested parties is keeping you busy. We have genuine concerns and appreciate your time dealing with these concerns but trust some of your time is spent relaying our concerns to SWFWMD's Board.

Thanks,
Martyn

<><><><><><><><><><><><><><><><><><><><><><><><><><><>
From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
CC: Ron.Basso@swfwmd.state.fl.us; rkane@usgs.gov; kjgrims@usgs.gov
Date: Wed, 27 Apr 2011 09:12:19 -0400
Subject: RE: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns

Martyn:

I'm writing to let you know that in response to your recent e-mails, I have been in contact with staff from the USGS and others regarding development of discharge records for sites in the Homosassa River system. It appears that the data that are available are the best available information and have been developed using accepted and reviewed methods. I'm sure that all who are interested in collecting and using the discharge data support the review and possible enhancement of approaches that could be used to improve the accuracy of the data.

Of relevance to your concerns about the measurement of discharge in the Homosassa River system, I am pleased to inform you that the District plans to convene a working group for discussion of issues related to minimum flows development for the Homosassa and other coastal spring-dominated river systems. I believe that discussion of the measurement of discharge in the Homosassa River system and other local coastal systems, including the Chassahowitzka, Weeki Wachee and Crystal River system would be an appropriate topic for the working group to explore. Although we are only in the early stages of developing the working group, I envision that the stakeholders group will include representatives from governmental organizations and local stakeholders groups, such as the Save the Homosassa River Alliance. I expect that the working group may meet on an approximate monthly basis for six months or so for discussion of: existing data and minimum flow methodologies and projects; studies or other data collection/analysis efforts that could be implemented to enhance the District's development of minimum flows for the Chassahowitzka, Crystal, and Homosassa River systems; reevaluation of adopted minimum flows for the Weeki Wachee River system; and evaluation of compliance with minimum flows that are ultimately established for each of these river systems. I will certainly keep you apprised of developments related to the planned work-group process.

I look forward to continuing to work with you on the development of minimum flows for the

Homosassa River system.
Sincerely,

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
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E-Mail: doug.leeper@watermatters.org
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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Thursday, April 14, 2011 9:07 AM
To: Doug Leeper; rkane; Ron Basso; Kevin J Grimsley
Cc: Dana Bryan; lee.edmiston@dep.state.fl.us; jdweaver@usgs.gov
Subject: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns

Gentlemen,
I am now back in the USA and disappointed that there is no response to my e-mail of March 15 and the related ones in February.
AS POINTED OUT THE EXPLANATIONS OF THE DATA GENERATED BY THE USGS WHICH IS USED EXTENSIVELY IN THE DEVELOPMENT OF THE MINIMUM FLOWS FOR THE HOMOSASSA RIVER ARE QUESTIONABLE.
It is inconceivable that given the attempts I have made to get to the true evaluation of the flows in the Homosassa River that an 'ostrich mentality' appears to prevail. There have been a number of indications that USGS and SWFWMD are open to looking at and refining the methods and equations used to report the flows, but nothing happens other than shallow attempts to defend the status quo.
I could conclude that someone is scared to admit that hundreds of thousands of dollars have been spent trying to justify that further extraction of ground water from the aquifer will not damage this unique ecosystem only to find that some of the basic data used in the studies may be inaccurate.
Also, it is becoming increasingly clear that there is little or no interest in giving credence to the long term residents that there are serious changes occuring in recent years in the Homosassa River. These changes are real; barnacles reported further and further up the river are not fictitious they are clear evidence of increasing salinity.
The USGS flow measurements appear to be inaccurate; I specifically would reference what happens to the spring derived waters in the SE Fork if the USGS equation is correct. I have raised this point a number of times.
I have no doubt that the people that developed these equations did so with the best of intent, but as we look more critically at these there are grounds to rethink how accurate they are. Further, I have pointed out the 'eddy current' that draws higher salinity water to the sensors at SE Fork Site 02310688. There appears to be no attempt to look at this or correct the matter.
My attempts to address these matters by allowing those closest to the issue take credit for recognizing and correcting the errors appear to be falling on deaf ears, or reluctance to face the realities. Therefore, I have little choice other than to start bringing this matter to the attention of people higher in the organization structures so they are informed before the Homosassa River is no longer suitable to be recognized as an Outstanding Florida Water (as it was by the Florida Legislature in1992) which is a water designated worthy of special protection because of its natural attributes.
Martyn Johnson
From: martynellijay@hotmail.com
To: doug.leeper@swfwmd.state.fl.us

CC: kjgrims@usgs.gov; rkane@usgs.gov; ron.basso@swfwmd.state.fl.us
Subject: RE: SE Fork Homosassa River Flow Calculation Concerns
Date: Tue, 15 Mar 2011 03:30:34 -0400
Doug,
I did see your e-mail a few days ago, but did not have time to look at the graph in detail or formulate a reply due to the limited internet access I have.
I will also have to be brief now as I am still out of the US.
Frankly, the explanation is in my opinion shallow. Quick list of key points;
1. There appear to be 42 field measurements on the USGS web page since 2004 not 40.
2. No data is provided of how the results were calculated...field measurements were taken over various time intervals...how was dS/dt used (another approximation?)
3. Approximately 36% of the results have differences over 20%. From drawing a line on the graph it appears that 12% are at or above 20% negative and 24% are at or above plus 20%, with 7 of the 10 positive differences well above 20%....45% and 60% being noted.
4. There is no explanation of where the water goes (according to the equation scenario as presented in my e-mail).
5. There is no explanation about the notations such as good, poor and adjustment mentioned in my e-mail.
I have heard comments from various people that the equation is refined as more data/observations become available but it appears that there is little evidence that supports such open minded approach.
The continued efforts to defend questionable data are very concerning. I trust this will not have to be opened to a wider assessment when I return to the US.
Are the any thoughts about my comments on the Homosassa River Site or are tese still being formulated?
Martyn

<><><><><><><><><><><><><><><><><><><><><><><><><><><><><>
From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
CC: kjgrims@usgs.gov; rkane@usgs.gov; Ron.Basso@swfwmd.state.fl.us
Date: Tue, 1 Mar 2011 11:31:12 -0500
Subject: RE: SE Fork Homosassa River Flow Calculation Concerns
Martyn:
Thanks for the e-mail you sent to me on February 19, 2011, concerning measurement and reporting of discharge at the SE Fork Homosassa Springs gage site. I spoke with staff from the United States Geological Survey about your e-mail and was provided with information which indicates that discharge estimates based on the regression equation approach correspond well with discharge measurements made at the site. The figure below, provided by Kevin Grimsley, shows the relationship between 42 discharge measurements (Measured Q) made between 2004 and the present time, and corresponding discharge estimates based on the regression approach (Computed Q). Kevin informed me that the average difference between the computed and measured values is -2.4%; a difference that seems to be quite acceptable, given the complexities of flows in the SE Fork.
Error! Filename not specified.
Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
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Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org

Web Site: watermatters.org

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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Saturday, February 19, 2011 3:30 PM
To: Doug Leeper
Cc: Kevin J Grimsley; rkane; Ron Basso
Subject: SE Fork Homosassa River Flow Calculation Concerns

Doug,

Attached are two files that address the concerns I have mentioned before about the equation used to calculate the flow from the SEFork. In a recent e-mail I commented about your explanation, indicating that the average of the measurements and the actual daily mean discharge are one and the same thing. There is no separate measurement of the actual mean discharge.

Quote

Individual discrete discharge estimates may exhibit moderate variation from actual physical conditions at the site, but the average of the composited discrete measurements made over a 24-hour period has been shown to correspond well with actual daily mean discharge.

End Quote.

In the Word file I have provided a detailed explanation of the numbers as I see them and detail that these are not moderate variations from actual. I see them as frankly inexplicable variations from actual and logical explanation. The Excel file has the supporting data/calculation/analysis from the base data copied from the USGS web site and the calculation equation as published.

I decided to leave my discussion in the word file as the included charts did not want to copy into an email and I hope it easier for you and others to review.

Please take the time to look over my comments, if I am wrong I will happily admit it providing there is valid explanation.

I know that the reaction may be that if I am right it will require a good explanation of why this was not recognized earlier and maybe why so much money has been spent on studies that appear to come to conclusions vastly different to what people are observing. My aim is to understand how the observations of good honest people do not match the 'scientific' data.

A lot more effort is needed to understand why the Homosassa River is deteriorating and not into finding ways to justify more water extraction from the aquifer. This is like Congress years ago ignoring the foolishness of the mortgage market that resulted in the crash, or the damage that has been even more dramatic in other rivers where recovery is now necessary. Transferring the problem is not the solution.

I have started to look at the water chemistry data you shared earlier and while comment soon.

Do not dismiss my analysis without a good reasoned argument, as you may have gathered I do not disappear easily.

Thanks for your continued attention to this matter of preventing further destruction of the Homosassa River. Simple solution is moratorium on drilling anymore wells or increasing extractions for 5 years for assessment to be validated.

Martyn

IMPORTANT NOTICE: All E-mail sent to or from this address are public record and archived. The Southwest Florida Water Management District does not allow use of District equipment and E-mail facilities for non-District business purposes.

Attachment B

<u>Photographs (3) attached to E-Mail from Martyn Johnson to Doug Leeper, Dated May 2, 2011</u>

Attachment C

E-Mail from Doug Leeper to Richard Kane, Dated May 4, 2011

From: Doug Leeper
To: Richard Kane (rkane@usgs.gov); Kevin Grimsely (kjgrims@usgs.gov); Ron Basso; Marty Kelly
Subject: Developing a Response to M. Johnsons" May 2 E-Mail
Date: Wednesday, May 04, 2011 9:29:12 AM
Attachments: image002.png

Guys:

FYI - I plan to respond to Mr. Johnson's most recent (May 2) e-mail with comments that indicate we have discussed installation of acoustic Doppler instrumentation at the SE Fork site, and have also discussed measurement of Q at a Halls River site. I'm hoping that a discussion of Q measurement during one of the planned Springs Coast MFLs technical issues meetings will address many of Mr. Johnson's concerns and lead to fewer e-mail exchanges…
Per a conversation between me, Richard and Kevin this past January, here are some rough cost estimates that I will use for my response e-mail.

Current costs for non-doppler site: ~$16K annually, ~$6-7K annually for WQ
Doppler-site costs: ~$30K annually, ~$6-7K annually for WQ, ~$15K initial set-up

Will also consider the budget requests that were submitted for FY2012 in support of District funding of USGS gage work. Here's an excerpt from a draft version of the budget spreadsheet which I will have to discuss with Marty Kelly (to check whether these numbers are accurate and whether they made it into his "final" funding request for the project) that includes some costs for the SE Fork and Halls River sites.

STATION NUMBER	STATION NAME	SW	2012 GW	QW	Total	Comment	Comment 2
02310688	SOUTHEAST FORK HOMOSASSA SPRING (bottom K and T)	13300	0	7400	20700	Continuing	Discharge split (16600) funded in data section
	Installation	12000			12000		Add Index-velocity sensor
2310690	Halls River near Homosassa (Stage, IV, bottom K and T)	29900		7400	37300	New	
	Installation	24000			24000		

Will copy you on my response to Mr. Johnson.
Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
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Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

Attachment D

E-Mail from Richard Kane to Doug Leeper, Dated May 4, 2011

From: Richard L Kane
To: Doug Leeper
Cc: Kevin Grimsely (kjgrims@usgs.gov); Marty Kelly; Ron Basso; Richard L Kane
Subject: Re: Developing a Response to M. Johnsons" May 2 E-Mail
Date: Wednesday, May 04, 2011 9:55:21 AM
Attachments: ATT00001.png

The cost can be a little confusing. Please that at SE Fork we split that cost between SWFWMD-Data program and Min flows project. Installation cost at SE is less than Halls River since the gage house is already set up and we only have to purchase index-velocity meter and install. Halls River cost are from scratch.
Also the terminology for Doppler's can also be quite confusing. I think Mr. Johnson was confusing ADCP discharge measurements with Acoustic Doppler Meters. I have provide some simple definition that you can use if you think it will help.

ADCP (Acoustic Doppler Current Profiler) - we use this for making discharge measurement from boats.
ADV - Acoustic Doppler Velocity meter, also called a Flow Tracker, is used to make wading discharge measurements (these have for the most part replaced mechanical meters)
ADM - Acoustic Doppler Meter - there are several types (side looking, uplooking, point velocity) and these are use to measure a cross-sectional velocity on a continuous basis
Index velocity Method - this method uses the ADM velocity cross section (vertical or horizontal) with a measured velocity cross-section from ADCP or ADV measurement (along with other parameters of stage and discharge) to develop an index-velocity discharge rating. We use these types of ratings with the stream is affected by backwater, either from tidal situation or when large river back up flow into smaller streams.
Stage discharge method - this method uses stage and discharge from streams not affected by tidal or back water to develop a discharge rating curve.

Richard L. Kane
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(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275

Attachment E

E-Mail (with e-mail string deleted) from Doug Leeper to Martyn Johnson, Dated May 6, 2011

From: Doug Leeper
To: "martynellijay@hotmail.com"
Cc: Richard Kane (rkane@usgs.gov); Kevin Grimsely (kjgrims@usgs.gov); Ron Basso
Bcc: Marty Kelly; Cara S. Martin; Mike Heyl; Sid Flannery; Karen Lloyd; Jay Yingling; Yassert Gonzalez; kwatson@hsweng.com
Subject: RE: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns
Date: Friday, May 06, 2011 3:18:00 PM

Martyn:
Thanks for your recent comments regarding data collection in the Southeast Fork of the Homosassa River. Based on your concerns, I'm sure that you will be interested in learning that earlier this year, as the District was planning for our next fiscal year budget, we requested funding for installation and maintenance of acoustic Doppler instrumentation at the USGS Southeast Fork gage site and for equipping a site in Halls River for measurement of discharge and other parameters. Note that if we receive the requested funding, and I emphasize "if" as we are in a time of great budgetary uncertainty, the Southeast Fork and Halls River sites will be outfitted with acoustic Doppler meters (ADMs). The ADMs would be permanently mounted at the gage sites and used to collect continuous velocity information. Boat-mounted acoustic Doppler current profilers (ADCPs), and/or hand-held acoustic Doppler velocity (ADV) meters would be used as they are currently used at existing gage sites in the system to measure cross-section velocities, which could be used along with other information to develop index-velocity discharge ratings for the sites. These ratings could be used in combination with the ADM data to calculate discharge at the sites. Costs associated with maintenance and data collection at USGS sites may be expected to vary depending upon the instrumentation needed, maintenance requirements, and so forth. Current cost for data collection and site maintenance at a standard site where stage is measured and used to calculate discharge run about $16K annually, with an additional cost of approximately $7.5K for water quality parameter measurement. Current cost for data collection and site maintenance at a site equipped with Doppler instrumentation runs about $30K annually, plus the approximate $7.5K associated with water quality data collection. Initial costs for establishment of a Dopplerinstrument equipped site can vary considerably, depending on existing site conditions. For example, outfitting the existing Southeast Fork site with Doppler equipment will cost $12K, while establishing a new, fully-equipped site in Halls River will cost $24K.
I hope you find this information useful as you continue thinking about protection of the Homosassa River system.

Douglas A. Leeper, Chief Environmental Scientist
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Web Site: watermatters.org

From:	Ron Basso
To:	Doug Leeper
Subject:	RE: Public Input for Spring Workshop
Date:	Friday, August 05, 2011 11:34:19 AM
Attachments:	M_Johnson_emailAugust 4.docx

Doug:

Here is my response to his question on the NDM.

Ron Basso, P.G.
Senior Professional Geologist
Hydrologic Evaluation Section
Southwest Florida Water Management District
ph 1-800-423-1476 (in state)
ph 352-796-7211, ext. 4291 (outside state)
FAX 352-797-5799

From: Doug Leeper
Sent: Thursday, August 04, 2011 4:14 PM
To: Marty Kelly; Ron Basso; Mike Heyl
Subject: FW: Public Input for Spring Workshop

FYI – I will have to respond to this next week.

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E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Thursday, August 04, 2011 8:55 AM
To: Doug Leeper
Cc: Kevin J Grimsley; rkane
Subject: RE: Public Input for Spring Workshop

Doug,
Appreciate you complying the various pieces of correspondence in such an orderly manner. I have them all but not as neatly presented, excellent job. This would certainly help in a meeting with Richard and Kevin.

As you know I am a part time resident in Homosassa and will not be back there until early next month, according to present plans. As I mentioned in my e-mail some response to my e-mails of February would help prepare for a meeting.

In addition to those e-mails I have this morning updated an Excel spreadsheet that I had started back in March when I got your e-mail of March 1 with the graph from Kevin.

SE FORK HOMOSASSA FIELD MEASUREMENTS ANALYSIS
The file is attached.
As you will see I have primarily looked at the Field Measurements that are multiple measurements on the same day with the aim of getting an idea about how flows change in the SE Fork. The data in black is direct copy of the data from USGS. The blue data collates the various data from the same day and attempts to calculate the percentage changes of flow in a 15 minute interval in order to compare this to the variations in the calculated flows that I have generally questioned.
As can be seen in the red bordered section the percentage changes are generally gradual and in line with the Gage Height and Gage Height Changes i.e. logical.

Notes:

1. *The Gage Height Changes in Column M do not correspond to the changes in Column I; this is the data USGS has. Column T shows the changes as calculated from Column I.*
2. *I have highlighted the data for 2010-10-06 which looks suspect; may I suggest that someone recheck data entry for this date.*
3. *I have also highlighted the data for 2000-12-13. This data reports a gage change of 0.88 ft from 1:00 to 5:30 (assume this is am). This is an unusually high rate of change in four and half hours, with 0.74 ft change in just three hours from 1:00 to 4:00. I can only speculate that there must have been something special happening at this time to get someone out in the early hours, particularly as they had been there the day before. The low flow rates are logical for such a rapid rise in gage height.*
4. *All data is treated the same i.e. as if it were instantaneous data at the time the measurement is reported. I can only assume that the fact that Duration (Column N) of any individual measurement may have some influence; some measurements are 0.2 hrs some 0.5 hrs with a number of others in the mix e.g. for March 8, 2005 146A-E the figures are 0.7, 0.5, 0.45, 0.3, 0.3. Possibly the UNSP notation has some meaning here. You may recall a previous comment I made about reviewing the Standard Operating Procedures.*

Bottom Line. This analysis of the field measurement data appears to support the questions I have raised about the 15 minute interval calculated data. Most of the changes in the field measurements are gradual and logical.

WELL LEVELS ANALYSIS AND WHICH IS THE DRIVING FORCE
Well Level Analysis file attached.
The other day I mentioned that out of curiosity I had taken a look at the well levels at Weeki Wachee and Lecanto North to try to understand a little more. As I mentioned I have long questioned why the Weeki Wachee Well level is used in the calculation of flows for the springs in Homosassa when it is not in the Homosassa Basin. Lecanto North is also not in the Homosassa Basin but much closer to the drawn boundary and half the distance from the Homosassa springs: Lecanto North is a long monitored well. As you can see on the graphs from the two wells, they react very similarly over the years to what I assume is rainfall/recharge although the pattern is hard to correlate when looking at the rainfall figures

for Citrus and Hernando.

The number of data points in any year is not consistent so no time scale is shown on the graphs.

On the second sheet I cullet the data to get matching (or closely matching) dates, and then looked at the deviations from average. It confirms what I have heard talk of Weeki Wachee Well is in serious decline and Lecanto North is not too far behind.
Taking these thoughts/observations to the flows in the SE Fork Homosassa it is concerning that the declines seen in the YELLOW BARS for Lecanto North have become strongly negative in about the same timeframe (starting about 2005) that residents have noted the changes re barnacle growth and nature of weed growth.

HOW DOES THE NORTHERN DISTRICT MODEL ACCOUNT FOR WATER FROM WEEKI WACHEE GETTING TO/INFLUENCING FLOWS IN THE HOMOSASSA SPRINGS, PARTICULARLY THE SE FORK?

More food for thought.

Martyn

From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Wed, 3 Aug 2011 10:20:19 -0400
Subject: RE: Public Input for Spring Workshop

Martyn:

I'd like to reiterate that I think it would be extremely useful to schedule a meeting with Richard Kane and Kevin Grimsley to discuss your concerns with flow measurement in the Homosassa River system. As indicated previously, I welcome the opportunity to participate in such a meeting. In support of this potential meeting I've compiled correspondence between you, Richard, Kevin and me into three Adobe PDF portfolio documents, anticipating that it may be reasonable to review these correspondences prior to a face-to-face meeting. The first of the portfolio documents is attached to this e-mail. I'll send the other two as attachments to additional e-mails.

In response to your question about interactions between stakeholder representatives and others that participate in the District's Springs Coast Minimum Flows and Levels workshops, I would note that I have no specific information regarding interaction of these folks outside of the workshop setting. I assume, however, that workshop participants discuss minimum flows and levels issues outside of the scheduled workshop periods, based
on e-mails that are sent to me and those that I am copied on.

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May 18, 2011

MEMORANDUM

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District

SUBJECT: Electronic mail correspondence concerning comments from Mr. Martyn Johnson regarding discharge measurement in the Homosassa River system

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This memorandum documents correspondence between Mr. Martyn Johnson, Mr. Doug Leeper (with the District) regarding concerns expressed by Mr. Johnson regarding measurement of discharge in the Homosassa River system. Copies of electronic mails associated with this issue are attached to this memorandum.

DAL

Attachments: A - E-Mail from Marty Johnson to Doug Leeper, Dated May 14, 2011
B - E-Mail from Doug Leeper to Martyn Johnson, Dated May 18, 2011

Attachment A

E-Mail (with string of additional e-mails) from Martyn Johnson to Doug Leeper, Dated May 14, 2011

From: Alan Martyn Johnson
To: Doug Leeper
Cc: rkane; Kevin J Grimsley; Ron Basso
Subject: RE: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns
Date: Saturday, May 14, 2011 1:42:35 PM

Doug,
Thanks for the information. For some reason your message did not show up in my in box until today although I note it was sent May 6. The wonders of modern communication, not to worry!

This is good news providing the 'if' does not get in the way!
Do you have any idea about the timeframe for the budget approval?

I have been in contact with three manufacturers:
Sontek; who suggested their Argonaut-SW Shallow Water Current Meter as a low cost approach at $7K
Nortek; who suggested their Easy Q Meter at $8.5K
Teledyne; who suggested their Channel Master at $10K linked to their StreamPro at $16K for linking into the USGS system.
The first two units have internal data collection for retrieval on site.

I also asked about rental this is possible with Nortek and Teledyne and a company TRS was referenced. Very interesting follow up conversations with both Nortek and Teledyne.

ALL VERY INTERESTING BUT, I have no doubt that the best alternative is to hope that the budget for the monitoring is approved. I will not do anything further on this until we hear more about approval.

I was planning on contacting the USGS office in Atlanta to see if they could help on this important monitoring/accuracy issue by finding a spare unit to provide monitoring for a month or two, or find someway to rent a unit. I will put such ideas on hold for right now.

Doug,
I suspect that you were very instrumental in getting these items included in the budget. Thanks for your efforts on this and please pass on my thanks to others who helped or took the initiative.

I do plan on taking a closer look at the water chemistry data you shared with me sometime back. Not forgotten just had a lot of other things on recently.

Martyn
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From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
CC: rkane@usgs.gov; kjgrims@usgs.gov; Ron.Basso@swfwmd.state.fl.us
Date: Fri, 6 May 2011 15:18:40 -0400
Subject: RE: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns

Martyn:

Thanks for your recent comments regarding data collection in the Southeast Fork of the Homosassa River. Based on your concerns, I'm sure that you will be interested in learning that earlier this year, as the District was planning for our next fiscal year budget, we requested funding for installation and maintenance of acoustic Doppler instrumentation at the USGS Southeast Fork gage site and for equipping a site in Halls River for measurement of discharge and other parameters. Note that if we receive the requested funding, and I emphasize "if" as we are in a time of great budgetary uncertainty, the Southeast Fork and Halls River sites will be outfitted with acoustic Doppler meters (ADMs). The ADMs would be permanently mounted at the gage sites and used to collect continuous velocity information. Boat-mounted acoustic Doppler current profilers (ADCPs), and/or hand-held acoustic Doppler velocity (ADV) meters would be used as they are currently used at existing gage sites in the system to measure cross-section velocities, which could be used along with other information to develop index-velocity discharge ratings for the sites. These ratings could be used in combination with the ADM data to calculate discharge at the sites. Costs associated with maintenance and data collection at USGS sites may be expected to vary depending upon the instrumentation needed, maintenance requirements, and so forth. Current cost for data collection and site maintenance at a standard site where stage is measured and used to calculate discharge run about $16K annually, with an additional cost of approximately $7.5K for water quality parameter measurement. Current cost for data collection and site maintenance at a site equipped with Doppler instrumentation runs about $30K annually, plus the approximate $7.5K associated with water quality data collection. Initial costs for establishment of a Dopplerinstrument equipped site can vary considerably, depending on existing site conditions. For example, outfitting the existing Southeast Fork site with Doppler equipment will cost $12K, while establishing a new, fully-equipped site in Halls River will cost $24K.
I hope you find this information useful as you continue thinking about protection of the Homosassa River system.

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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Monday, May 02, 2011 3:35 PM
To: Doug Leeper
Cc: Ron Basso; rkane; Kevin J Grimsley

Subject: RE: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns

Doug,
Thanks for keeping me informed of the plans for the working group.
I remain extremely concerned about the measurement of flows particularly from the SE Fork. I think we agree that the flow from the various springs in this section of the river provides the bulk of the lower salinity water which is critical to the conditions in the Homosassa River.
I am following up to get information about a suitable Acoustic Doppler Current Profiler that could be installed permanently to measure the flow at the SE Fork gage site. I have no doubt that the USGS and SWFWMD have much more ability to suggest a suitable unit, but the reluctance to deviate from the line that the "*data that are available are the best available information and have been developed using accepted*
and reviewed methods" makes me more determined to be better informed about suitable equipment and general costs before requesting that such equipment be considered for installation.
You will no doubt recall at the last workshop you did consider the possibility of setting a minimum flow for the SE Fork alone, good idea and worthy of further investigation.
As I recall there is comment about flow from the SE Fork declining over the study period in the peer review draft report. The reported data only considers the 'estimated/calculated' flows. Commentary from local residents tends to indicate that the reductions are much greater than reported. The frailties of both these assessments of this critical flow makes it paramount that we assure hard facts replace estimates calculated from questionable equations and the difficulty of quantifying commentary. I look forward to any discussion and or consideration to installation of a ADCP at this location.
As I kayak this section of the river I notice the changes in the vents, of particularly note recently is a vent area/depression center-left stream about three-quarters of the way upstream from the bridge. Two of the smaller vents have become more active with limestone (presumably) particles clearly evident in the flow. These particles appear similar to those deposited just upstream of the gage site, see photos attached (no weed growth).
Also in the photographs you can see the stack of rip-rap concrete bags that further contribute to the eddy current I have mentioned before. The occasional higher salinity readings at this gage site I strongly believe are the result of these eddy currents drawing a thin layer of higher salinity water along the concrete embankment downstream of the gage site. I am sure that if I had dye available to inject into the flow at the concrete embankment there are a few occasions where I could have visually confirmed this happening. Observation of the small clumps of weed being drawn along the concrete wall can frequently be seen at times the stage level is increasing. This false data unfortunately is used in Section 2 of the July 2010 report and brings some of the regression analysis into question.
Doug,
I appreciate your continued efforts regarding the Homosassa River. I heard on the telecast of your presentation to the Board of Commissioners that input from interested parties is keeping you busy. We have genuine concerns and appreciate your time dealing with these concerns but trust some of your time is spent relaying our concerns to SWFWMD's Board.
Thanks,
Martyn
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From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
CC: Ron.Basso@swfwmd.state.fl.us; rkane@usgs.gov; kjgrims@usgs.gov
Date: Wed, 27 Apr 2011 09:12:19 -0400
Subject: RE: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns

Martyn:
I'm writing to let you know that in response to your recent e-mails, I have been in contact with staff from the USGS and others regarding development of discharge records for sites in the

Homosassa River system. It appears that the data that are available are the best available information and have been developed using accepted and reviewed methods. I'm sure that all who are interested in collecting and using the discharge data support the review and possible enhancement of approaches that could be used to improve the accuracy of the data.
Of relevance to your concerns about the measurement of discharge in the Homosassa River system, I am pleased to inform you that the District plans to convene a working group for discussion of issues related to minimum flows development for the Homosassa and other coastal spring-dominated river systems. I believe that discussion of the measurement of discharge in the Homosassa River system and other local coastal systems, including the Chassahowitzka, Weeki Wachee and Crystal River system would be an appropriate topic for the working group to explore. Although we are only in the early stages of developing the working group, I envision that the stakeholders group will include representatives from governmental organizations and local stakeholders groups, such as the Save the Homosassa River Alliance. I expect that the working group may meet on an approximate monthly basis for six months or so for discussion of: existing data and minimum flow methodologies and projects; studies or other data collection/analysis efforts that could be implemented to enhance the District's development of minimum flows for the Chassahowitzka, Crystal, and Homosassa River systems; reevaluation of adopted minimum flows for the Weeki Wachee River system; and evaluation of compliance with minimum flows that are ultimately established for each of these river systems. I will certainly keep you apprised of developments related to the planned work-group process.
I look forward to continuing to work with you on the development of minimum flows for the Homosassa River system.

Sincerely,
Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Thursday, April 14, 2011 9:07 AM
To: Doug Leeper; rkane; Ron Basso; Kevin J Grimsley
Cc: Dana Bryan; lee.edmiston@dep.state.fl.us; jdweaver@usgs.gov
Subject: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns

Gentlemen,
I am now back in the USA and disappointed that there is no response to my e-mail of March 15 and the related ones in February.
AS POINTED OUT THE EXPLANATIONS OF THE DATA GENERATED BY THE USGS WHICH IS USED EXTENSIVELY IN THE DEVELOPMENT OF THE MINIMUM FLOWS FOR THE HOMOSASSA RIVER ARE QUESTIONABLE.
It is inconceivable that given the attempts I have made to get to the true evaluation of the flows in the Homosassa River that an 'ostrich mentality' appears to prevail. There have been a number of indications that USGS and SWFWMD are open to looking at and refining the methods and equations

used to report the flows, but nothing happens other than shallow attempts to defend the status quo.
I could conclude that someone is scared to admit that hundreds of thousands of dollars have been spent trying to justify that further extraction of ground water from the aquifer will not damage this unique ecosystem only to find that some of the basic data used in the studies may be inaccurate.
Also, it is becoming increasingly clear that there is little or no interest in giving credence to the long term residents that there are serious changes occuring in recent years in the Homosassa River. These changes are real; barnacles reported further and further up the river are not fictitious they are clear evidence of increasing salinity.
The USGS flow measurements appear to be inaccurate; I specifically would reference what happens to the spring derived waters in the SE Fork if the USGS equation is correct. I have raised this point a number of times.
I have no doubt that the people that developed these equations did so with the best of intent, but as we look more critically at these there are grounds to rethink how accurate they are. Further, I have pointed out the 'eddy current' that draws higher salinity water to the sensors at SE Fork Site 02310688.
There appears to be no attempt to look at this or correct the matter.
My attempts to address these matters by allowing those closest to the issue take credit for recognizing and correcting the errors appear to be falling on deaf ears, or reluctance to face the realities. Therefore, I have little choice other than to start bringing this matter to the attention of people higher in the organization structures so they are informed before the Homosassa River is no longer suitable to be recognized as an Outstanding Florida Water (as it was by the Florida Legislature in1992) which is a water designated worthy of special protection because of its natural attributes.
Martyn Johnson
<><><><><><><><><><><><>

From: martynellijay@hotmail.com
To: doug.leeper@swfwmd.state.fl.us
CC: kjgrims@usgs.gov; rkane@usgs.gov; ron.basso@swfwmd.state.fl.us
Subject: RE: SE Fork Homosassa River Flow Calculation Concerns
Date: Tue, 15 Mar 2011 03:30:34 -0400
Doug,
I did see your e-mail a few days ago, but did not have time to look at the graph in detail or formulate a reply due to the limited internet access I have.
I will also have to be brief now as I am still out of the US.
Frankly, the explanation is in my opinion shallow. Quick list of key points;
1. There appear to be 42 field measurements on the USGS web page since 2004 not 40.
2. No data is provided of how the results were calculated...field measurements were taken over various time intervals...how was dS/dt used (another approximation?)
3. Approximately 36% of the results have differences over 20%. From drawing a line on the graph it appears that 12% are at or above 20% negative and 24% are at or above plus 20%, with 7 of the 10 positive differences well above 20%....45% and 60% being noted.
4. There is no explanation of where the water goes (according to the equation scenario as presented in my e-mail).
5. There is no explanation about the notations such as good, poor and adjustment mentioned in my e-mail.
I have heard comments from various people that the equation is refined as more data/observations become available but it appears that there is little evidence that supports such open minded approach.
The continued efforts to defend questionable data are very concerning. I trust this will not have to be opened to a wider assessment when I return to the US.
Are the any thoughts about my comments on the Homosassa River Site or are tese still being formulated?
Martyn
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From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
CC: kjgrims@usgs.gov; rkane@usgs.gov; Ron.Basso@swfwmd.state.fl.us
Date: Tue, 1 Mar 2011 11:31:12 -0500
Subject: RE: SE Fork Homosassa River Flow Calculation Concerns

Martyn:

Thanks for the e-mail you sent to me on February 19, 2011, concerning measurement and reporting of discharge at the SE Fork Homosassa Springs gage site. I spoke with staff from the United States Geological Survey about your e-mail and was provided with information which indicates that discharge estimates based on the regression equation approach correspond well with discharge measurements made at the site. The figure below, provided by Kevin Grimsley, shows the relationship between 42 discharge measurements (Measured Q) made between 2004 and the present time, and corresponding discharge estimates based on the regression approach (Computed Q). Kevin informed me that the average difference between the computed and measured values is -2.4%; a difference that seems to be quite acceptable, given the complexities of flows in the SE Fork.

Error! Filename not specified.

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Web Site: watermatters.org
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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Saturday, February 19, 2011 3:30 PM
To: Doug Leeper
Cc: Kevin J Grimsley; rkane; Ron Basso
Subject: SE Fork Homosassa River Flow Calculation Concerns

Doug,
Attached are two files that address the concerns I have mentioned before about the equation used to calculate the flow from the SEFork. In a recent e-mail I commented about your explanation, indicating that the average of the measurements and the actual daily mean discharge are one and the same thing. There is no separate measurement of the actual mean discharge.
Quote
Individual discrete discharge estimates may exhibit moderate variation from actual physical conditions at the site, but the average of the composited discrete measurements made over a 24-hour period has been shown to correspond well with actual daily mean discharge.
End Quote.
In the Word file I have provided a detailed explanation of the numbers as I see them and detail that these are not moderate variations from actual. I see them as frankly inexplicable variations from actual and logical explanation. The Excel file has the supporting data/calculation/analysis from the base

data copied from the USGS web site and the calculation equation as published.
I decided to leave my discussion in the word file as the included charts did not want to copy into an email and I hope it easier for you and others to review.
Please take the time to look over my comments, if I am wrong I will happily admit it providing there is valid explanation.
I know that the reaction may be that if I am right it will require a good explanation of why this was not recognized earlier and maybe why so much money has been spent on studies that appear to come to conclusions vastly different to what people are observing. My aim is to understand how the observations of good honest people do not match the 'scientific' data.
A lot more effort is needed to understand why the Homosassa River is deteriorating and not into finding ways to justify more water extraction from the aquifer. This is like Congress years ago ignoring the foolishness of the mortgage market that resulted in the crash, or the damage that has been even more dramatic in other rivers where recovery is now necessary. Transferring the problem is not the solution.
I have started to look at the water chemistry data you shared earlier and while comment soon.
Do not dismiss my analysis without a good reasoned argument, as you may have gathered I do not disappear easily.
Thanks for your continued attention to this matter of preventing further destruction of the Homosassa River. Simple solution is moratorium on drilling anymore wells or increasing extractions for 5 years for assessment to be validated.
Martyn

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IMPORTANT NOTICE: All E-mail sent to or from this address are public record and archived. The Southwest Florida Water Management District does not allow use of District equipment and E-mail facilities for non-District business purposes.

Attachment B

E-Mail from Doug Leeper to Martyn Johnson, Dated May 18, 2011
(note: e-mail string deleted)

From: Doug Leeper
To: "Alan Martyn Johnson"
Bcc: Richard Kane (rkane@usgs.gov); Kevin Grimsely (kjgrims@usgs.gov); Ron Basso; Marty Kelly; Sid Flannery; Mike Heyl; Jay Yingling; Yassert Gonzalez; Karen Lloyd
Subject: RE: Homosassa River 02310700 and SE Fork 02310688 Flow Calculation Concerns
Date: Wednesday, May 18, 2011 8:21:04 AM

Martyn:

Per your recent request, I'm providing dates for important upcoming activities associated with the District's FY2012 budget ----

May 24, 2011 - FY2012 Budget Update - Update Revenue Estimates following 2011 Legislative Session at the District Governing Board Meeting
June 28, 2011 - Presentation of FY2012 Recommended Annual Service Budget at the District Governing Board Meeting
July 26, 2011 - FY2012 Budget Update & Adopt Proposed Millage Rates for District and Watershed Basins at the District Governing Board Meeting
August 1, 2011 - Submit Standard Format Tentative Budget to Governor, President of the Senate, Speaker of the House, Legislative Committee Chairs, Secretary of the Department of Environmental Protection, and each County Commission
August 30, 2011 - FY2012 Budget Update at the District Governing Board Meeting
September 13, 2011 - Public Hearing on the Tentative Budget at the District's Tampa Service Office
September 27, 2011 - Public Hearing on the Final Budget at the Tampa Service Office
October 1, 2011 – Start of FY2012

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Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From:	Alan Martyn Johnson
To:	Doug Leeper; rkane; Kevin J Grimsley
Subject:	USGS Data
Date:	Saturday, August 06, 2011 10:16:57 AM
Attachments:	Specific Conductance Homosassa Sprngs Gage.htm

Doug,
Thanks for taking the action to remove the 'data' document from the working group web site, as I suggested. While it had no value as a stand alone document, we would have had to included a disclaimer statement that it was based on Provisional Data from USGS had it remained.
If I had copied the data today from the USGS web site there would have been lots of P's next to the data. While this is strictly in line with USGS Policy (2006) it was interesting to note this change to strict compliance only occurred very recently on all the real time data that I look at. I trust there will be a meaningful review before approval.

Richard and Kevin,
Where will Real Time Data be available as Approved Data?

On the subject of Provisional Data Approval for SE Fork
May I suggest when USGS is reviewing the 2010-2011 water year data to make it 'Approved', USGS may want to have someone take a serious look at the Specific Conductance Data from the SE Fork Homosassa.

I first commented about the eddy currents drawing water along the concrete wall downstream of the site in an e-mail December 20, 2010. Later I commented about the build up of material (sand) just upstream of the gage site.
The higher Specific Conductance readings at this site, I believe, are due to location of the gage site and the bags of concrete that have been placed by whomever to make it easier to get in/out of the water. I seriously doubt it was USGS placed these bags (I do have some photographs but they are not like having on on site report from one of your people).
If someone took the time, the flow can easily be seen on site when the tide is rising rapidly. If you review the data you will also see this pattern of higher SC figures when tide is increasing rapidly and it is clearly not due to reverse flow into the approx 3 acre pool upstream of the bridge/gage site. I pass on these observations to help USGS provide the best possible data. Please advise if you have passed this on to the appropriate persons in USGS, or that you disagree with my observations.

And while I am on the subject of Specific Conductance
Doug,
Take a look at the attached graph of Specific Conductance for the Homosassa Springs Site. (Hope it attached correctly, if not it is from the USGS web site Gage 02310678 and covers the time period for which daily data is available).
The graph shows an increasing trend in the Minimum Daily Specific Conductance over the last 5-6 years. If it were possible to remove the extremely high figures from this analysis the trend could be seen more easily; not sure but I think the very high figure was at the time of a hurricane was it Alberto mid 2006?
This graph is another strong indicator of how the nature of water entering the river is deteriorating; more salt water intrusion less flow from the aquifer fed spring in the group of three vents. The pattern is also evident when looking at Specific Conductance in relation to stage height over a few days.

Sorry to spoil your morning coffee again with more questions and commentary!!!

Martyn

From:	Richard L Kane
To:	Doug Leeper; Kevin J Grimsley
Cc:	Richard L Kane
Subject:	Re: USGS Data
Date:	Saturday, August 06, 2011 5:20:54 PM

Doug and Kevin would please review my comments to Mr. Johnson before I send them to him.

Mr Johnson, thank for your interest in the USGS data and the quality of the data. USGS has been collecting streamflow data at springs in Florida for over 100 years and quality assurance of our data is of the highest importance to our agency and is not taken lightly. I have responded to your comments below. Kevin will reply to your previous letter to the record in more depth when he returns to the office next week. I look forward to meeting up with you in our office soon as I don't think exchanging emails back and forth is productive at this point. I think we explain our procedures more effectively at a face to face meeting where we can show you our data and procedures.

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov
(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275

From:	Alan Martyn Johnson <martynellijay@hotmail.com>
To:	Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
Date:	08/06/2011 10:16 AM
Subject:	USGS Data

Doug,
Thanks for taking the action to remove the 'data' document from the working group web site, as I suggested. While it had no value as a stand alone document, we would have had to included a disclaimer statement that it was based on Provisional Data from USGS had it remained.
If I had copied the data today from the USGS web site there would have been lots of P's next to the data. While this is strictly in line with USGS Policy (2006) it was interesting to note this change to strict compliance only occurred very recently on all the real time data that I look at. I trust there will be a meaningful review before approval.

The "P" was applied at during last NWIS upgrade. These upgrades come from HQ and cannot be edited when retrieving data from NWISWEB. The purpose of the provisional flag was to prevent the provisional data statement at the top of page from being separated from the actually data and being used eroneoneously.

Richard and Kevin,

Where will Real Time Data be available as Approved Data?

Data is worked, checked and reviewed all throughout the year. Some of our more complex sites are reviewed once annually. All data is published by April 1 and is approved by that time for the previous water year.

On the subject of Provisional Data Approval for SE Fork
May I suggest when USGS is reviewing the 2010-2011 water year data to make it 'Approved', USGS may want to have someone take a serious look at the Specific Conductance Data from the SE Fork Homosassa.

Quality assurance is of the highest importance to USGS. Our hydrologic technicians and hydrologists all have science degrees and years of specialized USGS training. Kevin is the national trainer for the water quality monitors and we are very fortunate to have someone of his caliber in the Florida Water Science Center. After data is collected in the field it is worked up provisionally, then checked by another technician, and then reviewed by a senior technician or hydrologist. Finally after all of the data has been verified it is approved in the database and then published in the annual data report. In addition every three years the National USGS technical offices of Surface Water, Ground Water, and Water Quality visit our center and review all of our procedures, and a portion of data that has been worked up in the past three years. Further since we do publish all of our data it is constantly being reviewed and scrutinized by the scientific community.

I first commented about the eddy currents drawing water along the concrete wall downstream of the site in an e-mail December 20, 2010. Later I commented about the build up of material (sand) just upstream of the gage site.
The higher Specific Conductance readings at this site, I believe, are due to location of the gage site and the bags of concrete that have been placed by whomever to make it easier to get in/out of the water. I seriously doubt it was USGS placed these bags (I do have some photographs but they are not like having on on site report from one of your people).
If someone took the time, the flow can easily be seen on site when the tide is rising rapidly.
If you review the data you will also see this pattern of higher SC figures when tide is increasing rapidly and it is clearly not due to reverse flow into the approx 3 acre pool upstream of the bridge/gage site. I pass on these observations to help USGS provide the best possible data. Please advise if you have passed this on to the appropriate persons in USGS, or that you disagree with my observations.

I believe Kevin previously addressed your concerns of the eddy current. We do not feel it has any affect on the water quality data or the discharge. This site is not controlled by geomorphic features in the channel like a normal stage-discharge site may be. Tide and changes in groundwater affect the water quality and discharge. The flow is bidirectional, meaning the flow on the top moves in a different direction than the flow on the bottom. If we were measuring velocity continuously it would matter, but in this case we only measure stage and the water level of the aquifer. Since the water level is affected by gravity it is constantly seeking it's lowest level and an eddy current would not affect the water level or the forces of tide all through out eh cross section of the channel. When we install the velocity sensor we will want to avoid this eddy current, thanks for bringing it to our attention.

When the tide comes in the salinity increase (this is normal). As the stage rises due to high tides the head on the spring increases and the downward pressure caused by gravity prevents freshwater from flowing out of the spring at the same rate and this is seen in the decreasing discharge. I am not sure about the concrete bags (we have to deal with a lot of vandalism at this site (we would certainly appreciate your efforts in keeping us informed when when you notice unusual happenings at the springs). I'll check on it but they would have no more affect on the water quality then the concrete bridge. Even if it were not in a solid state and dissolving in the river it would be very dilute and much less than normal salinity.

And while I am on the subject of Specific Conductance
Doug,
Take a look at the attached graph of Specific Conductance for the Homosassa Springs Site. (Hope it attached correctly, if not it is from the USGS web site Gage 02310678 and covers the time period for which daily data is available).
The graph shows an increasing trend in the Minimum Daily Specific Conductance over the last 5-6 years. If it were possible to remove the extremely high figures from this analysis the trend could be seen more easily; not sure but I think the very high figure was at the time of a hurricane was it Alberto mid 2006?

Yes I agree when you remove the outliers you get a better view of the long term trends.

This graph is another strong indicator of how the nature of water entering the river is deteriorating; more salt water intrusion less flow from the aquifer fed spring in the group of three vents. The pattern is also evident when looking at Specific Conductance in relation to stage height over a few days.
I think we all agree with this statement. During the workshop, Doug gave an excellent presentation of long term sea level rise using NOAA gages in the Gulf over the past 50 years. As sea level continues to rise, salinity will continue to increase at the spring head and that with the combined affect of groundwater pumping of the Floridan aquifer will cause the flow in the spring to decrease and the estuaries to change.

Sorry to spoil your morning coffee again with more questions and commentary!!!

Martyn

[attachment "Specific Conductance Homosassa Sprngs Gage.htm" deleted by Richard L Kane/WRD/USGS/DOI]

From:	Doug Leeper
To:	"Richard L Kane"
Cc:	Marty Kelly; Mike Heyl; Ron Basso; Sid Flannery; Kevin Grimsely (kjgrims@usgs.gov)
Subject:	RE: USGS Data
Date:	Monday, August 08, 2011 9:59:00 AM

Richard:

Thanks for the opportunity to review your response e-mail. Looks pretty good to me. I've offered a few suggested minor changes to your text below. My suggested changes area identified using yellow highlighting.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Richard L Kane [mailto:rkane@usgs.gov]
Sent: Saturday, August 06, 2011 5:21 PM
To: Doug Leeper; Kevin J Grimsley
Cc: Richard L Kane
Subject: Re: USGS Data

Doug and Kevin would please review my comments to Mr. Johnson before I send them to him.

Mr Johnson, thank for your interest in the USGS data and the quality of the data. USGS has been collecting streamflow data at springs in Florida for over 100 years and quality assurance of our data is of the highest importance to our agency and is not taken lightly. I have responded to your comments below. Kevin will reply to your previous letter to the record in more depth when he returns to the office next week. I look forward to meeting up with you in our office soon as I don't think exchanging emails back and forth is productive at this point. I think we will be able to explain our procedures more effectively at a face to face meeting where we can show you our data and procedures.

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov
(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275

From:	Alan Martyn Johnson <martynellijay@hotmail.com>
To:	Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
Date:	08/06/2011 10:16 AM
Subject:	USGS Data

Doug,
Thanks for taking the action to remove the 'data' document from the working group web site, as I suggested. While it had no value as a stand alone document, we would have had to included a disclaimer statement that it was based on Provisional Data from USGS had it remained.
If I had copied the data today from the USGS web site there would have been lots of P's next to the data. While this is strictly in line with USGS Policy (2006) it was interesting to note this change to strict compliance only occurred very recently on all the real time data that I look at. I trust there will be a meaningful review before approval.

The "P" was applied at during last NWIS upgrade. These upgrades come from HQ and cannot be edited when retrieving data from NWISWEB. The purpose of the provisional flag was to prevent the provisional data statement at the top of page from being separated from the actually data and being used eroneoneously.

Richard and Kevin,
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I think we all agree with this statement. During the workshop, Doug gave an excellent presentation of long term sea level rise using NOAA gages in the Gulf over the past 50 years. As sea level continues to rise, salinity will continue to increase at the spring head and that with the combined affect of groundwater pumping of the Floridan aquifer will cause the flow in the spring to decrease and the estuaries to change. Similarly, any reductions in rainfall would be expected to lead to increased salinity in the river system.

Sorry to spoil your morning coffee again with more questions and commentary!!!

Martyn

[attachment "Specific Conductance Homosassa Sprngs Gage.htm" deleted by Richard L

Kane/WRD/USGS/DOI]

From: Richard L Kane
To: Kevin J Grimsley
Cc: Doug Leeper
Subject: Fw: Springs Coast MFLs Workshop Date & New Documents on Web Page
Date: Monday, August 08, 2011 12:54:18 PM

Kevin please be send Doug the approved version of the PPT and rebuttal letter when you get back to Tampa. Thanks.

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov
(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275

----- Forwarded by Richard L Kane/WRD/USGS/DOI on 08/08/2011 12:53 PM -----

From: Doug Leeper <Doug.Leeper@swfwmd.state.fl.us>

To: "Al Grubman (grubman1@gmail.com)" <grubman1@gmail.com>, "Bill Geiger (bgeiger@cityofbrooksville.us)" <bgeiger@cityofbrooksville.us>, "Bill Pouder (bill.pouder@myfwc.com)" <bill.pouder@myfwc.com>, "Boyd Blihovde (Boyd_Blihovde@fws.gov)" <Boyd_Blihovde@fws.gov>, "Brad Rimbey (BWR.CRRC@tampabay.rr.com)" <BWR.CRRC@tampabay.rr.com>, "Brent Whitley (brentwhitley@sierra-properties.com)" <brentwhitley@sierra-properties.com>, "Brockway, Alys (abrockway@co.hernando.fl.us)" <abrockway@co.hernando.fl.us>, "Dennis D. Dutcher (Dennis3ds@aol.com)" <Dennis3ds@aol.com>, "Frank DiGiovanni (administration@inverness-fl.gov)" <administration@inverness-fl.gov>, "Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us)" <Kathleen.Greenwood@dep.state.fl.us>, "Helen Spivey (manatees@habitats.org)" <manatees@habitats.org>, "Hilliard, Dan (2buntings@comcast.net)" <2buntings@comcast.net>, "Hoehn, Ted" <ted.hoehn@MyFWC.com>, "Hope Corona (hopecorona@tampabay.rr.com)" <hopecorona@tampabay.rr.com>, "Jim Farley (jfarley682@aol.com)" <jfarley682@aol.com>, "Katie Tripp (ktripp@savethemanatee.org)" <ktripp@savethemanatee.org>, "Norman Hopkins (norman@amyhrf.org)" <norman@amyhrf.org>, "Rebecca Bays (rebecca.bays@bocc.citrus.fl.us)" <rebecca.bays@bocc.citrus.fl.us>, "Richard Kane (rkane@usgs.gov)" <rkane@usgs.gov>, "Richard Radacky (rradacky@cityofbrooksville.us)" <rradacky@cityofbrooksville.us>, "Ron Miller (rmille76@tampabay.rr.com)" <rmille76@tampabay.rr.com>, "Sarah Tenison (cityofweekiwachee@yahoo.com)" <cityofweekiwachee@yahoo.com>, "Sulllivan, Jack (jsullivan@carltonfields.com)" <jsullivan@carltonfields.com>, "Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us)" <Carolyn.Voyles@dep.state.fl.us>, "Whitey Markle (whmarkle@gmail.com)" <whmarkle@gmail.com>, " (janicehowie@aol.com)" <janicehowie@aol.com>, "Abdon Sidibie (asidibie@chronicle.online.com)" <asidibie@chronicle.online.com>, "Alex McPherson (aamcpherson@msn.com)" <aamcpherson@msn.com>, "Ann - 2 Hodgson (ahodgson@gmail.com)" <ahodgson@gmail.com>, "Ann Hodgson (ahodgson@audubon.org)" <ahodgson@audubon.org>, "Bernard Berauer (bfberauer@aol.com)" <bfberauer@aol.com>, "Beverly Overa (boverly@tampabay.rr.com)" <boverly@tampabay.rr.com>, "Bill Garvin (wgarvin@tampabay.rr.com)" <wgarvin@tampabay.rr.com>, "Bob Caldwell (Bobcaldwell51@yahoo.com)" <Bobcaldwell51@yahoo.com>, "Brack Barker (brack154@msn.com)" <brack154@msn.com>, "Carl Mattthai (thebabesmimi@gmail.com)" <thebabesmimi@gmail.com>, "Casey, Emily (fcnwr@atlantic.net)" <fcnwr@atlantic.net>, "Charles Dean (dean.charles.web@flsenate.gov)" <dean.charles.web@flsenate.gov>, "Charles Stonerock (katcha.stonerock3@gmail.com)" <katcha.stonerock3@gmail.com>, "Chris Safos (chrissafos@embarqmail.com)" <chrissafos@embarqmail.com>, "Czerwinski, Mike (mczerwin@tampabay.rr.com)" <mczerwin@tampabay.rr.com>, "Darlene Herth (2cetechnology21@gmail.com)" <2cetechnology21@gmail.com>, "Darrell Snedecor (president@citruscountyaudubon.com)" <president@citruscountyaudubon.com>, "Don Hiers (dhiers3@gmail.com)" <dhiers3@gmail.com>, "Douglas Dame (doug_dame@yahoo.com)" <doug_dame@yahoo.com>, "Elaine Luther (barneyandcap@hotmail.com)" <barneyandcap@hotmail.com>, "Emily Casey (ecasey21@hotmail.com)" <ecasey21@hotmail.com>, "Emma Knight (eknight@wetlandsolutionsinc.com)" <eknight@wetlandsolutionsinc.com>, "George Harbin (gharbin@tampabay.rr.com)" <gharbin@tampabay.rr.com>, "George McClog (classof47@gmail.com)" <classof47@gmail.com>, "Gorgon O'Connor (gorgon_o@yahoo.com)" <gorgon_o@yahoo.com>, "Harry Steiner (harry109@aol.com)" <harry109@aol.com>, "Jack Calbeck (calbeckj@citrus.k12.fl.us)" <calbeckj@citrus.k12.fl.us>, "jane Perrin (jcsperrinmd@sbcglobal.net)" <jcsperrinmd@sbcglobal.net>, "Jerry Morton (JerrMorton@aol.com)" <JerrMorton@aol.com>, "Jessie Gourlie (gourliej@thirdplanetwind.com)" <gourliej@thirdplanetwind.com>, "Jim Collins (jimmiekey22@yahoo.com)" <jimmiekey22@yahoo.com>, "Jimmie Smith (Jimmie.Smith@myfloridahouse.gov)" <Jimmie.Smith@myfloridahouse.gov>, Joe Calamari <jcalamari@coastal-engineering.com>, "John Lord (jclord109@yahoo.com)" <jclord109@yahoo.com>, "John Mayo (freedomway1@gmail.com)" <freedomway1@gmail.com>, "Karen Johnstone (kjohns213@sbcglobal.net)" <kjohns213@sbcglobal.net>, "Kim Caldwell (caldwell.kimberly@yahoo.com)" <caldwell.kimberly@yahoo.com>, "Kim Dinkins (kim.dinkins@marioncountyfl.org)" <kim.dinkins@marioncountyfl.org>, "Linda Pierce (tpierce35@tampabay.rr.com)" <tpierce35@tampabay.rr.com>, "Linda Vanderveen (hernandoaudubon@yahoo.com)" <hernandoaudubon@yahoo.com>, "Mary Anne Lynn (mlynn1978@tampabay.rr.com)" <mlynn1978@tampabay.rr.com>, "Matthew Corona (mcorona1@tampabay.rr.com)" <mcorona1@tampabay.rr.com>, "Max Rhinesmith (rhinesmith@webtv.net)" <rhinesmith@webtv.net>, "Andy Houston (ahouston@crystalriverfl.org)" <ahouston@crystalriverfl.org>, "Art Yerian (Al.Yerian@dep.state.fl.us)" <Art.Yerian@dep.state.fl.us>, "Brad Thorpe (brad.thorpe@bocc.citrus.fl.us)" <brad.thorpe@bocc.citrus.fl.us>, "Courtney Edwards (cedwards@savethemanatee.org)" <cedwards@savethemanatee.org>, "Dale Jones (Jones@MyFWC.com)" <Jones@MyFWC.com>, "Dana Bryan (dana.bran@dep.state.fl.us)" <dana.bran@dep.state.fl.us>, "David Hamilton (countyadministrator@hernandocounty.us)"

<countyadministrator@hernandocounty.us>, "David Hankla (david_hankla@fws.gov)" <david_hankla@fws.gov>, "Don Wright (wright@sura.org)" <wright@sura.org>, "Dusty McDevitt (mcdevitt@usgs.gov)" <mcdevitt@usgs.gov>, "Ed Call (marvin.call@MyFWC.com)" <marvin.call@MyFWC.com>, "Eric Nagid (eric.nagid@MyFWC.com)" <eric.nagid@MyFWC.com>, "FFWCC MFLs Review E-Mail Address (fwcconservationplanningservices@myfwc.com)" <fwcconservationplanningservices@myfwc.com>, "J. J. Kenney (jj.kenney@bocc.citrus.fl.us)" <jj.kenney@bocc.citrus.fl.us>, "Jennene Norman-Vacha (jnvacha@ci.brooksville.fl.us)" <jnvacha@ci.brooksville.fl.us>, "Joyce_Kleen@fws.gov" <Joyce_Kleen@fws.gov>, "Kandi Harper (kandi.harper@bocc.citrus.fl.us)" <kandi.harper@bocc.citrus.fl.us>, "Keith Ramos (Keith.Ramos@fws.gov)" <Keith.Ramos@fws.gov>, "Kent Smith (kent.smith2@myfwc.com)" <kent.smith2@myfwc.com>, "Kevin Grimsely (kjgrims@usgs.gov)" <kjgrims@usgs.gov>, "Michael Lusk (Michael_Lusk@fws.gov)" <Michael_Lusk@fws.gov>, "Mitchell Newberger (mnewberger@verizon.net)" <mnewberger@verizon.net>, "Nick Robbins (Nick.Robbins@dep.state.fl.us)" <Nick.Robbins@dep.state.fl.us>, "Nicole Adimey (Nicole_Adimey@fws.gov)" <Nicole_Adimey@fws.gov>, "Paul Thomas (paulw.thomas@MyFWC.com)" <paulw.thomas@MyFWC.com>, "Ron Mezich (ron.mezich@MyFWC.com)" <ron.mezich@MyFWC.com>, "Shelly Yaun (shelly.yaun@dep.state.fl.us)" <shelly.yaun@dep.state.fl.us>, "Toby Brewer (Toby.Brewer@dep.state.fl.us)" <Toby.Brewer@dep.state.fl.us>, "Wallace, Traci" <traci.wallace@MyFWC.com>, "Adkins, Jim" <jadkins@harnandocounty.us>, "Bitter, Jim" <jbitter@tampabay.rr.com>, "Bryant, Richard" <rangerrb@bellsouth.net>, "Cantero, Vince" <vince.cantero@bocc.citrus.fl.us>, "Carpenter, Paul" <paul.carp@verizon.net>, "Daniels, Chase" <chase.daniels@myflorida.house.gov>, "Dueker, Duane" <duanedueker@aol.com>, "Gramling, Hugh" <hgramling@tbwg.org>, "Harrelson, Cathy" <cathyharrelson@gmail.com>, "Hubbell, Pete" <phubbell@wraconsultants.com>, "Johnson, Eric" <eric.johnson@myfwc.com>, "Johnson, Martyn" <martynellijay@hotmail.com>, "Keim, Robert" <rkeim@gmail.com>, "Kline, Allen" <pastoralfarm@netsignia.net>, "Knight, Bob" <bknight@wetlandsolutionsinc.com>, "Knight, Robert" <Robert.Knight@bocc.citrus.fl.us>, "Knudson, Ross" <rossef@aol.com>, "Overa, Tom" <tovera1@tampabay.rr.com>, "Owen, Rick" <richard.owen@dep.state.fl.us>, "Parrow, Liz" <eparrow@pip2.net>, "Rolf Auermann (rauerman@tampabay.rr.com)" <rauerman@tampabay.rr.com>, "Rusnak, Teddi" <tcrusnak@tampabay.rr.com>, "Watkins, Priscilla" <priswat@tampabay.rr.com>, "Watrous, Russell" <russselljwatrous@yahoo.com>

Cc: Barbara Matrone <Barbara.Matrone@swfwmd.state.fl.us>, "Cara S. Martin" <Cara.Martin@swfwmd.state.fl.us>, Chris Zajac <Chris.Zajac@swfwmd.state.fl.us>, "Darcy A. Brune" <Darcy.Brune@swfwmd.state.fl.us>, Dave Dewitt <Dave.Dewitt@swfwmd.state.fl.us>, Doug Leeper <Doug.Leeper@swfwmd.state.fl.us>, "Gary E. Williams" <Gary.Williams@swfwmd.state.fl.us>, Jay Yingling <Jay.Yingling@swfwmd.state.fl.us>, Karen Lloyd <Karen.Lloyd@swfwmd.state.fl.us>, Ken Weber <Ken.Weber@swfwmd.state.fl.us>, Lou Kavouras <Lou.Kavouras@swfwmd.state.fl.us>, Mark Barcelo <Mark.Barcelo@swfwmd.state.fl.us>, Mark Hammond <Mark.Hammond@swfwmd.state.fl.us>, Marty Kelly <Marty.Kelly@swfwmd.state.fl.us>, Mike Heyl <Mike.Heyl@swfwmd.state.fl.us>, Paul Williams <Paul.Williams@swfwmd.state.fl.us>, "Robyn O. Felix" <Robyn.Felix@swfwmd.state.fl.us>, Ron Basso <Ron.Basso@swfwmd.state.fl.us>, Sid Flannery <Sid.Flannery@swfwmd.state.fl.us>, Veronica Craw <Veronica.Craw@swfwmd.state.fl.us>, Xinjian Chen <Xinjian.Chen@swfwmd.state.fl.us>, Yassert Gonzalez <Yassert.Gonzalez@swfwmd.state.fl.us>

Date: 08/08/2011 12:35 PM

Subject: Springs Coast MFLs Workshop Date & New Documents on Web Page

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Greetings:

Thanks again for contributing to the recent Springs Coast Minimum Flows and Levels Public Workshop. The next workshop is scheduled for **September 6, 2011** and will begin at 1:30 P.M. in Room 166 of the Lecanto Government Services Building, which is located at 3600 West Sovereign Path, Lecanto, FL 34461. An agenda for the upcoming meeting will soon be posted on the workshop web site at:

http://www.WaterMatters.org/SpringsCoastMFL

Summary notes for the July 19th workshop are currently posted in the "Updates" section of the workshop web page. Excerpts from a 2010 report prepared for the District by HydroGeoLogic, Inc. have also been posted on the web page, under the "Background Information and Reports" heading. The excerpts include a report chapter and associated figures that address recent modeling of saltwater intrusion for the Springs Coast area. The modeling approach that was employed is described in the posted file, along with results for scenarios associated with recent and projected water usage and drought conditions. This saltwater-intrusion modeling information is being provided in response to requests from various stakeholder representatives made during the July workshop.

Please let me know if you have any problems accessing either of the recently posted documents.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District

2379 Broad Street, Brooksville, FL 34604-6899

Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272

Fax: 352-754-6885

E-Mail: doug.leeper@watermatters.org

Web Site: watermatters.org

From:	Doug Leeper
To:	Sid Flannery
Subject:	FW: Public Input for Spring Workshop
Date:	Monday, August 08, 2011 10:00:39 AM
Attachments:	Weeki Wachee and Lecanto Wells Aug 4.xls Field Measurements Percent change Aug4.xls

FYI Sid – here's another recent e-mail from M. Johnson.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Thursday, August 04, 2011 8:55 AM
To: Doug Leeper
Cc: Kevin J Grimsley; rkane
Subject: RE: Public Input for Spring Workshop

Doug,
Appreciate you complying the various pieces of correspondence in such an orderly manner. I have them all but not as neatly presented, excellent job. This would certainly help in a meeting with Richard and Kevin.

As you know I am a part time resident in Homosassa and will not be back there until early next month, according to present plans. As I mentioned in my e-mail some response to my e-mails of February would help prepare for a meeting.

In addition to those e-mails I have this morning updated an Excel spreadsheet that I had started back in March when I got your e-mail of March 1 with the graph from Kevin.

SE FORK HOMOSASSA FIELD MEASUREMENTS ANALYSIS
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Bottom Line. This analysis of the field measurement data appears to support the questions I have raised about the 15 minute interval calculated data. Most of the changes in the field measurements are gradual and logical.

WELL LEVELS ANALYSIS AND WHICH IS THE DRIVING FORCE
Well Level Analysis file attached.
The other day I mentioned that out of curiosity I had taken a look at the well levels at Weeki Wachee and Lecanto North to try to understand a little more. As I mentioned I have long questioned why the Weeki Wachee Well level is used in the calculation of flows for the springs in Homosassa when it is not in the Homosassa Basin. Lecanto North is also not in the Homosassa Basin but much closer to the drawn boundary and half the distance from the Homosassa springs: Lecanto North is a long monitored well. As you can see on the graphs from the two wells, they react very similarly over the years to what I assume is rainfall/recharge although the pattern is hard to correlate when looking at the rainfall figures for Citrus and Hernando.

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On the second sheet I cullet the data to get matching (or closely matching) dates, and then looked at the deviations from average. It confirms what I have heard talk of Weeki Wachee Well is in serious decline and Lecanto North is not too far behind.
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HOW DOES THE NORTHERN DISTRICT MODEL ACCOUNT FOR WATER FROM WEEKI WACHEE GETTING TO/INFLUENCING FLOWS IN THE HOMOSASSA SPRINGS, PARTICULARLY THE SE FORK?
More food for thought.

Martyn

From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Wed, 3 Aug 2011 10:20:19 -0400
Subject: RE: Public Input for Spring Workshop

Martyn:

I'd like to reiterate that I think it would be extremely useful to schedule a meeting with Richard Kane and Kevin Grimsley to discuss your concerns with flow measurement in the Homosassa River system. As indicated previously, I welcome the opportunity to participate in such a meeting. In support of this potential meeting I've compiled correspondence between you, Richard, Kevin and me into three Adobe PDF portfolio documents, anticipating that it may be reasonable to review these correspondences prior to a face-to-face meeting. The first of the portfolio documents is attached to this e-mail. I'll send the other two as attachments to additional e-mails.

In response to your question about interactions between stakeholder representatives and others that participate in the District's Springs Coast Minimum Flows and Levels workshops, I would note that I have no specific information regarding interaction of these folks outside of the workshop setting. I assume, however, that workshop participants discuss minimum flows and levels issues outside of the scheduled workshop periods, based
on e-mails that are sent to me and those that I am copied on.

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E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Richard L Kane
To: Alan Martyn Johnson
Cc: Doug Leeper; Kevin J Grimsley; Richard L Kane
Subject: Re: USGS Data
Date: Monday, August 08, 2011 12:46:29 PM

Mr Johnson, thank for your interest in the USGS data and the quality of the data. USGS has been collecting streamflow data at springs in Florida for over 100 years and quality assurance of our data is of the highest importance to our agency and is not taken lightly. I have responded to your comments below. Kevin will reply to your previous letter to the record in more depth when he returns to the office next week. I look forward to meeting up with you in our office soon as I don't think exchanging emails back and forth is productive at this point. I think we will be able to explain our procedures more effectively at a face to face meeting where we can show you our data and procedures.

Richard L. Kane
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rkane@usgs.gov
(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275

From: Alan Martyn Johnson <martynellijay@hotmail.com>
To: Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
Date: 08/06/2011 10:16 AM
Subject: USGS Data

Doug,
Thanks for taking the action to remove the 'data' document from the working group web site, as I suggested. While it had no value as a stand alone document, we would have had to included a disclaimer statement that it was based on Provisional Data from USGS had it remained.
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Richard and Kevin,
Where will Real Time Data be available as Approved Data?
Data is worked, checked and reviewed all throughout the year. Some of our more complex sites are reviewed once annually. All data is published by April 1 and is approved by that

time for the previous water year.

On the subject of Provisional Data Approval for SE Fork
May I suggest when USGS is reviewing the 2010-2011 water year data to make it 'Approved', USGS may want to have someone take a serious look at the Specific Conductance Data from the SE Fork Homosassa.

Quality assurance is of the highest importance to USGS. Our hydrologic technicians and hydrologists all have science degrees and years of specialized USGS training. Kevin is the national trainer for the water quality monitors and we are very fortunate to have someone of his caliber in the Florida Water Science Center. After data is collected in the field it is worked up provisionally, then checked by another technician, and then reviewed by a senior technician or hydrologist. Finally after all of the data has been verified it is approved in the database and then published in the annual data report. In addition, every three years the National USGS technical offices of Surface Water, Ground Water, and Water Quality visit our center and review all of our procedures, and a portion of data that has been worked up in the past three years. Further, since we do publish all of our data, it is constantly being reviewed and scrutinized by the scientific community.

I first commented about the eddy currents drawing water along the concrete wall downstream of the site in an e-mail December 20, 2010. Later I commented about the build up of material (sand) just upstream of the gage site.
The higher Specific Conductance readings at this site, I believe, are due to location of the gage site and the bags of concrete that have been placed by whomever to make it easier to get in/out of the water. I seriously doubt it was USGS placed these bags (I do have some photographs but they are not like having on on site report from one of your people).
If someone took the time, the flow can easily be seen on site when the tide is rising rapidly. If you review the data you will also see this pattern of higher SC figures when tide is increasing rapidly and it is clearly not due to reverse flow into the approx 3 acre pool upstream of the bridge/gage site. I pass on these observations to help USGS provide the best possible data. Please advise if you have passed this on to the appropriate persons in USGS, or that you disagree with my observations.

I believe Kevin previously addressed your concerns of the eddy current. We do not feel it has any affect on the water quality data or the discharge. This site is not controlled by geomorphic features in the channel like a normal stage-discharge site may be. Tide and changes in groundwater affect the water quality and discharge. The flow is bidirectional, meaning the flow on the top moves in a different direction than the flow on the bottom. If we were measuring velocity continuously it would matter, but in this case we only measure stage and the water level of the aquifer. Since the water level is affected by gravity it is constantly seeking it's lowest level and an eddy current would not affect the water level or the forces of tide throughout the cross section of the channel. When we install the velocity sensor we will want to avoid this eddy current; thanks for bringing it to our attention.

When the tide comes in the salinity increase (this is normal). As the stage rises due to high tides the head on the spring increases and the downward pressure caused by gravity prevents freshwater from flowing out of the spring at the same rate and this is seen in the decreasing discharge. I am not sure about the concrete bags (we have to deal with a lot of vandalism at this site (we would certainly appreciate your efforts in keeping us informed when you notice unusual happenings at the springs). I'll check on ~~it~~ this matter, but that the concrete bags would have no more affect on water quality than the concrete bridge. Even if ~~it~~ the concrete bags were not in a solid state and dissolving in the river, any additions of matter from the bags would be very dilute and not expected to affect salinity.

And while I am on the subject of Specific Conductance
Doug,
Take a look at the attached graph of Specific Conductance for the Homosassa Springs Site. (Hope it attached correctly, if not it is from the USGS web site Gage 02310678 and covers the time period for which daily data is available).

The graph shows an increasing trend in the Minimum Daily Specific Conductance over the last 5-6 years. If it were possible to remove the extremely high figures from this analysis the trend could be seen more easily; not sure but I think the very high figure was at the time of a hurricane was it Alberto mid 2006?

Yes I agree when you remove the outliers you get a better view of the long term trends.

This graph is another strong indicator of how the nature of water entering the river is deteriorating; more salt water intrusion less flow from the aquifer fed spring in the group of three vents. The pattern is also evident when looking at Specific Conductance in relation to stage height over a few days.

I think we all agree with this statement. During the workshop, Doug gave an excellent presentation of long term sea level rise using NOAA gages in the Gulf over the past 50 years. As sea level continues to rise, salinity will continue to increase at the spring head and that, with the combined affect of groundwater pumping of the Floridan aquifer will cause the flow in the spring to decrease and the estuaries to change. Similarly, any reductions in rainfall would be expected to lead to increased salinity in the river system.

Sorry to spoil your morning coffee again with more questions and commentary!!!

Martyn

[attachment "Specific Conductance Homosassa Sprngs Gage.htm" deleted by Richard L Kane/WRD/USGS/DOI]

From:	Doug Leeper
To:	"Alan Martyn Johnson"
Bcc:	Marty Kelly; Mike Heyl; Sid Flannery; Ron Basso; Mark Barcelo; Cara S. Martin; Richard Kane (rkane@usgs.gov); Kevin Grimsely (kjgrims@usgs.gov)
Subject:	RE: Input on Hydrologic Data & Question about the Northern District Model
Date:	Monday, August 08, 2011 1:42:00 PM

Martyn:

Thanks for your continued input regarding flows in the Homosassa River system. In response to the question at the bottom of your August 4th e-mail, Ron Basso, a Senior Professional Geologist/Engineer with the District's Resource Projects Department prepared the following comments and gave me the approval to forward his comments to you. So, here they are ---

Response from Ron Basso

I'm not sure the exact nature of your question but I believe your concern is what is the effect on the SE Folk of Homosassa River from groundwater withdrawals that impact the Weeki Wachee Spring. My answer is that we modeled all groundwater withdrawals within a 5,000 square mile basin and the cumulative impact from all these withdrawals is reflected in the Northern District Model predicted reductions in flow of the Homosassa Springs group. The active domain of the Northern District model (NDM) includes all of the Northern West-Central Florida Ground-Water Basin (NWCFGWB) of the Floridan aquifer. In addition, most of Lake County outside the NWCFGWB is also included in the model to assess water use near the SWFWMD eastern boundary. A groundwater basin has well-defined boundaries in a lateral direction with a definable bottom. Rainfall that falls within a groundwater basin provides recharge to the aquifer within that basin. Groundwater does not flow laterally between groundwater basins or outside of a basin. It is important to include all groundwater withdrawals within a basin to conservatively assess the total impact to a spring, stream, or aquifer level. District staff could have limited the modeling assessment to a smaller area of groundwater withdrawn near Homosassa Springs but the predicted impact would have been smaller than the flow decline presented in the report.

It is also true that impacts to spring flow increase the closer the withdrawal is to the spring vent, particularly if they are large withdrawals since it is the elevation of the Floridan aquifer water level near the spring that drives its flow. This is one of the main reasons why predicted reductions in spring flow at Weeki Wachee Spring are much greater than those a Homosassa springs. Two very large public supply wellfields are located within 10 miles of Weeki Wachee Spring: west Hernando Utility (Spring Hill) and the Cross Bar wellfield that supplies Tampa Bay Water Utility.

I hope this response addresses your question regarding the Northern District model. Please feel free to discuss this issue further if it requires further clarification or I did not fully address your question.

End of Response from Ron Basso

Douglas A. Leeper, Chief Environmental Scientist
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To: martynellijay@hotmail.com
Date: Wed, 3 Aug 2011 10:20:19 -0400
Subject: RE: Public Input for Spring Workshop

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Web Site: watermatters.org

From:	Doug Leeper
To:	"Alan Martyn Johnson"
Bcc:	Marty Kelly; Richard Kane (rkane@usgs.gov)
Subject:	RE: Homosassa River
Date:	Wednesday, August 10, 2011 3:57:00 PM

Martyn - Funds for SE Fork are in the proposed FY2012 District budget. USGS may also have funding in their budget, but I'm not sure how their budgeting process works.

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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Wednesday, August 10, 2011 8:15 AM
To: Doug Leeper; rkane
Subject: Homosassa River

Doug and Richard,
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Thanks. I will reply later in the week when I am not as busy.

Quick question.
Are the velocity monitoring units in USGS or SWFWMD budget for 2011/2012.

Very brief...
Doug; Ron's answer did cover my question.
Richard; Reverse flow...no. I have idea of how to confirm baffle 12" x 2" by 4 ft. temporarily installed. No time to explain now.
And the concrete bags are flow pattern concern. Reasonably sure I sent photographs earlier in year.

Sorry I do not have more time right now.

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From:	Alan Martyn Johnson
To:	Doug Leeper; rkane
Subject:	Homosassa River
Date:	Wednesday, August 10, 2011 8:15:02 AM

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From:	Alan Martyn Johnson
To:	rkane
Cc:	Doug Leeper; Kevin J Grimsley
Subject:	RE: USGS Data
Date:	Saturday, August 13, 2011 6:18:45 PM
Attachments:	Site 02310688 1.JPG Site 02310688 2.JPG Site 02310688 3.JPG

Richard,
Thanks for taking the time to reply to my e-mail.

I have never doubted that USGS want to do a good job and I have encouraged the review of data for the Homosassa River at the local level. That is the best place for review to occur; not by me presenting my concerns to others who may have different motives. But, I keep being fed the thought that the data is all OK. I will not be making a visit to your office to be given the 100 year justification presentation. I would like to discuss specific concerns I have raised, e-mails are a good place to start. If you are planning on attending the next MFL Workshop Doug has scheduled in Lecanto we could meet at that time. Which is about the earliest I will be back in Florida.

Regarding the P. This is most annoying as it makes analysis of the current data much more difficult, and it has spilled over into data such Field Measurements that are now all text entries. Frankly, I wonder if this does not show a lack of confidence in the data. Lets take an example; When was any of the data for the Homosassa River Gage Sites worked/checked/reviewed that resulted in a change? If USGS have a problem site I can fully understand implementing the P option, but to do it cross the board is counter productive to making the data available (nice to look at and of little use is like wallpaper)...why not just wait until the end of the year and send out the averages! Someone needs to think this great idea from HQ through.

I am sure USGS has a large QA operation. I worked in QA for a major international company for many years. On the question of reviewing procedures; I have asked about the Standard Operating Procedure for Field Measurements. Specifically, I was trying to understand why some measurements have a different duration to others at the same site. I also pointed out some field measurements that appeared unusual and thought it may be worth checking for a logging error. I have another that I will share later.

There appears to be a need for you to make a site visit. As I recall Kevin did say that he had mis-spoke regarding any thought of reverse flow at the SE Fork site.
I have previously sent photographs of the concrete bags (attached for reference). I would speculate that the concrete bags were most likely placed by the Roads Department to prevent erosion. The bags appear to be more neatly placed than if it had been done by swimmers trying to get in and out.

The point is the concrete/riprap butress adds to the change in direction of the flow and cause the thin layer of water to flow upstream along the concrete wall. Could get into velocity and pressure drops, but the photographs should suffice. In the photograph taken looking downstream No. 1 you can see the pattern and how weed has kept hold along the wall. Clearly the stream velocity is greater where the sand/materials are light in color. I have observed the flow first hand many times. The flow in the main stream under the bridge ranges from 0.5 - 1.2 feet per second according to my measurements. I am sure you can verify and be more accurate from your Field Measurement data. Added to this is the fact that the 'higher' salinity water only differs in density in the fourth decimal place, this is not seawater. And I have no idea where the idea where the idea came from that the bags are chemically responsible for the increases in the conductance readings, certainly not my thought.

Now actions speak louder than words.
As I said in my brief reply earlier in the week there is a simple way of confirming the cause of the higher specific conductance readings. Install a temporary baffle at the end of the wall furthest from the instrument site in photo 1. This could easily be installed using some spikes attached to the bottom of the baffle to sit in the river bed and an angle iron holding the top of the baffle perpendicular to the concrete wall. AND if I were not such an honest person I would simply go and install a baffle board and then show you your real time data. Humor me have someone go do it; you can always have the data reworked, after all it is provisional.

We agree that if nothing is done and we just sit by and watch the Homosassa River will be ruined. Pumping from the aquifer needs to be controlled. The concept of Minimum Flows and Levels is basically good but having questionable data used in studies to justify pumping more water is not acceptable. The best available data is not worth using if it is wrong.

Sorry if you find some of my comments harsh, but getting at the truth often requires a few feathers to be ruffled.
I do look forward to meeting with you.

Martyn

To: martynellijay@hotmail.com
CC: doug.leeper@swfwmd.state.fl.us; kjgrims@usgs.gov; rkane@usgs.gov
Subject: Re: USGS Data
From: rkane@usgs.gov
Date: Mon, 8 Aug 2011 12:46:23 -0400

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Richard and Kevin,
Where will Real Time Data be available as Approved Data?
Data is worked, checked and reviewed all throughout the year. Some of our more complex sites are reviewed once annually. All data is published by April 1 and is approved by that time for the previous water year.

On the subject of Provisional Data Approval for SE Fork
May I suggest when USGS is reviewing the 2010-2011 water year data to make it 'Approved', USGS may want to have someone take a serious look at the Specific Conductance Data from the SE Fork Homosassa.
Quality assurance is of the highest importance to USGS. Our hydrologic technicians and hydrologists all have science degrees and years of specialized USGS training. Kevin is the national trainer for the water quality monitors and we are very fortunate to have someone of his caliber in the Florida Water Science Center. After data is collected in the field it is worked up provisionally, then checked by another technician, and then reviewed by a senior technician or hydrologist. Finally after all of the data has been verified it is approved in the database and then published in the annual data report. In addition, every three years the National USGS technical offices of Surface Water, Ground Water, and Water Quality visit our center and review all of our procedures, and a portion of data that has been worked up in the past three years. Further, since we do publish all of our data, it is constantly being reviewed and scrutinized by the scientific community.

I first commented about the eddy currents drawing water along the concrete wall downstream of the site in an e-mail December 20, 2010. Later I commented about the build up of material (sand) just upstream of the gage site.
The higher Specific Conductance readings at this site, I believe, are due to location of the gage site and the bags of concrete that have been placed by whomever to make it easier to get in/out of the water. I seriously doubt it was USGS placed these bags (I do have some photographs but they are not like having on on site report from one of your people).

If someone took the time, the flow can easily be seen on site when the tide is rising rapidly. If you review the data you will also see this pattern of higher SC figures when tide is increasing rapidly and it is clearly not due to reverse flow into the approx 3 acre pool upstream of the bridge/gage site. I pass on these observations to help USGS provide the best possible data. Please advise if you have passed this on to the appropriate persons in USGS, or that you disagree with my observations.

I believe Kevin previously addressed your concerns of the eddy current. We do not feel it has any affect on the water quality data or the discharge. This site is not controlled by geomorphic features in the channel like a normal stage-discharge site may be. Tide and changes in groundwater affect the water quality and discharge. The flow is bidirectional, meaning the flow on the top moves in a different direction than the flow on the bottom. If we were measuring velocity continuously it would matter, but in this case we only measure stage and the water level of the aquifer. Since the water level is affected by gravity it is constantly seeking it's lowest level and an eddy current would not affect the water level or the forces of tide throughout the cross section of the channel. When we install the velocity sensor we will want to avoid this eddy current; thanks for bringing it to our attention.

When the tide comes in the salinity increase (this is normal). As the stage rises due to high tides the head on the spring increases and the downward pressure caused by gravity prevents freshwater from flowing out of the spring at the same rate and this is seen in the decreasing discharge. I am not sure about the concrete bags (we have to deal with a lot of vandalism at this site (we would certainly appreciate your efforts in keeping us informed when you notice unusual happenings at the springs). I'll check on ~~it~~ this matter, but that the concrete bags would have no more affect on water quality than the concrete bridge. Even if ~~it~~ the concrete bags were not in a solid state and dissolving in the river, any additions of matter from the bags would be very dilute and not expected to affect salinity.

And while I am on the subject of Specific Conductance
Doug,
Take a look at the attached graph of Specific Conductance for the Homosassa Springs Site. (Hope it attached correctly, if not it is from the USGS web site Gage 02310678 and covers the time period for which daily data is available).
The graph shows an increasing trend in the Minimum Daily Specific Conductance over the last 5-6 years. If it were possible to remove the extremely high figures from this analysis the trend could be seen more easily; not sure but I think the very high figure was at the time of a hurricane was it Alberto mid 2006?

Yes I agree when you remove the outliers you get a better view of the long term trends.

This graph is another strong indicator of how the nature of water entering the river is deteriorating; more salt water intrusion less flow from the aquifer fed spring in the group of three vents. The pattern is also evident when looking at Specific Conductance in relation to stage height over a few days.

I think we all agree with this statement. During the workshop, Doug gave an excellent presentation of long term sea level rise using NOAA gages in the Gulf over the past 50 years. As sea level continues to rise, salinity will continue to increase at the spring head and that, with the combined affect of groundwater pumping of the Floridan aquifer will cause the flow in the spring to decrease and the estuaries to change. Similarly, any reductions in rainfall would be expected to lead to increased salinity in the river system.

Sorry to spoil your morning coffee again with more questions and commentary!!!

Martyn

[attachment "Specific Conductance Homosassa Sprngs Gage.htm" deleted by Richard L Kane/WRD/USGS/DOI]

From: Alan Martyn Johnson
To: Doug Leeper
Subject: RE: Input on Hydrologic Data & Question about the Northern District Model
Date: Saturday, August 13, 2011 7:12:14 PM

Doug,
Thanks again for this answer from Ron Basso. This confirmed my thought that the water level in the Weeki Wachee Well is not directly related to the hydraulic head driving water from the Homosassa springs complex.
As I pointed out in the data I sent you there is some connection which derives from similar rainfall patterns in the relatively close locations. I also understand that the Weeki Wachee Well was a convenient choice for those persons studying the hydrology of the area some years ago. But I think it has out lived its usefulness in the equation. I honestly believe that its use causing errors in the data which at this juncture need to be minimized.

Are there alternatives? I am not in a position to evaluate the other wells that are within the Homosassa Basin such as; Lecanto Well 1, Holder Mine, Perryman, ROMP or Highlands. I guess that all these suffer from the fact that they are not fed directly into the USGS by satellite connection.

I will take this matter up again with USGS, but as the data is only provisional until 'vetted and reviewed' the urgency factor for satellite direct connection may not be as critical as accuracy.

Again thanks to Ron. My question was very basic, his answer more than was needed.

Hope I can make it to the next Working Group meeting. I will have to spend some time looking further at that chemical analysis data you sent me earlier. Pumphouse and Trotter Spring did show some increases in salinity over the last few years... not that it had not been seen back in 2001 as I recall which was a low rainfall period, but the trend looked stronger/more sustained. These are both highly critical springs to the Homosassa River.

Oh, did anyone comment about the missing weed in the river this year. I am no weed expert, but there is a distinct difference to the weed a couple of years ago.

Are there any updates available on the chemical analysis; the latest data in what you sent me was mid 2009? Is it available on the web?

Some days I wish I could be looking at this more, but I doubt all my questions would keep you from other important matters.

From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Mon, 8 Aug 2011 13:42:38 -0400
Subject: RE: Input on Hydrologic Data & Question about the Northern District Model

Martyn:

Thanks for your continued input regarding flows in the Homosassa River system. In response to the question at the bottom of your August 4th e-mail, Ron Basso, a Senior Professional Geologist/Engineer with the District's Resource Projects Department prepared the following comments and gave me the approval to forward his comments to you. So, here they are ---

Response from Ron Basso
I'm not sure the exact nature of your question but I believe your concern is what is the effect on the SE Folk of Homosassa River from groundwater withdrawals that impact the Weeki Wachee Spring. My answer is that we modeled all groundwater withdrawals within a 5,000 square mile basin and the cumulative impact from all these withdrawals is reflected in the Northern District Model predicted reductions in flow of the Homosassa Springs group. The active domain of the Northern District model (NDM) includes all of the Northern West-Central Florida Ground-Water Basin (NWCFGWB) of the Floridan aquifer. In addition, most of Lake County outside the NWCFGWB is also included in the model to assess water use near the SWFWMD eastern boundary. A groundwater basin has well-defined boundaries in a lateral direction with a definable bottom. Rainfall that falls within a groundwater basin provides recharge to the aquifer within that basin. Groundwater does not flow laterally between groundwater basins or outside of a basin. It is important to include all groundwater withdrawals within a basin to conservatively assess the total impact to a spring, stream, or aquifer level. District staff could have limited the modeling assessment to a smaller area of groundwater withdrawn near Homosassa Springs but the predicted impact would have been smaller than the flow decline presented in the report.

It is also true that impacts to spring flow increase the closer the withdrawal is to the spring vent, particularly if they are large withdrawals since it is the elevation of the Floridan aquifer water level near the spring that drives its flow. This is one of the main reasons why predicted reductions in spring flow at Weeki Wachee Spring are much greater than those a Homosassa springs. Two very large public supply wellfields are located within 10 miles of Weeki Wachee Spring: west Hernando Utility (Spring Hill) and the Cross Bar wellfield that supplies Tampa Bay Water Utility.

I hope this response addresses your question regarding the Northern District model. Please feel free to discuss this issue further if it requires further clarification or I did not fully address your question.
End of Response from Ron Basso

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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Thursday, August 04, 2011 8:55 AM
To: Doug Leeper
Cc: Kevin J Grimsley; rkane
Subject: RE: Public Input for Spring Workshop

Doug,
Appreciate you complying the various pieces of correspondence in such an orderly manner. I have them all but not as neatly presented, excellent job. This would certainly help in a meeting with Richard and Kevin.

As you know I am a part time resident in Homosassa and will not be back there until early next month, according to present plans. As I mentioned in my e-mail some response to my e-mails of February would help prepare for a meeting.

In addition to those e-mails I have this morning updated an Excel spreadsheet that I had started back in March when I got your e-mail of March 1 with the graph from Kevin.

SE FORK HOMOSASSA FIELD MEASUREMENTS ANALYSIS
The file is attached.
As you will see I have primarily looked at the Field Measurements that are multiple measurements on the same day with the aim of getting an idea about how flows change in the SE Fork. The data in black is direct copy of the data from USGS. The blue data collates the various data from the same day and attempts to calculate the percentage changes of flow in a 15 minute interval in order to compare this to the variations in the calculated flows that I have generally questioned.
As can be seen in the red bordered section the percentage changes are generally gradual and in line with the Gage Height and Gage Height Changes i.e. logical.

Notes:

1. *The Gage Height Changes in Column M do not correspond to the changes in Column I; this is the data USGS has. Column T shows the changes as calculated from Column I.*
2. *I have highlighted the data for 2010-10-06 which looks suspect; may I suggest that someone recheck data entry for this date.*
3. *I have also highlighted the data for 2000-12-13. This data reports a gage change of 0.88 ft from 1:00 to 5:30 (assume this is am). This is an unusually high rate of change in four and half hours, with 0.74 ft change in just three hours from 1:00 to 4:00. I can only speculate that there must have been something special happening at this time to get someone out in the early hours, particularly as they had been there the day before. The low flow rates are logical for such a rapid rise in gage height.*
4. *All data is treated the same i.e. as if it were instantaneous data at the time the measurement is reported. I can only assume that the fact that Duration (Column N) of any individual measurement may have some influence; some measurements are 0.2 hrs some 0.5 hrs with a number of others in the mix e.g. for March 8, 2005 146A-E the figures are 0.7, 0.5, 0.45, 0.3, 0.3. Possibly the UNSP notation has some meaning here. You may recall a previous comment I made about reviewing the Standard Operating Procedures.*

Bottom Line. This analysis of the field measurement data appears to support the questions I have raised about the 15 minute interval calculated data. Most of the changes in the field measurements are gradual and logical.

WELL LEVELS ANALYSIS AND WHICH IS THE DRIVING FORCE
Well Level Analysis file attached.
The other day I mentioned that out of curiosity I had taken a look at the well levels at Weeki Wachee and Lecanto North to try to understand a little more. As I mentioned I have long questioned why the Weeki Wachee Well level is used in the calculation of flows for the springs in Homosassa when it is not in the Homosassa Basin. Lecanto North is also not in the Homosassa Basin but much closer to the drawn boundary and half the distance from the Homosassa springs: Lecanto North is a long monitored well. As you can see on the graphs from the two wells, they react very similarly over the years to what I assume is rainfall/recharge although the pattern is hard to correlate when looking at the rainfall figures for Citrus and Hernando.

The number of data points in any year is not consistent so no time scale is shown on the graphs.

On the second sheet I cullet the data to get matching (or closely matching) dates, and then looked at the deviations from average. It confirms what I have heard talk of Weeki Wachee Well is in serious decline and Lecanto North is not too far behind.
Taking these thoughts/observations to the flows in the SE Fork Homosassa it is concerning that the declines seen in the YELLOW BARS for Lecanto North have become strongly negative in about the same timeframe (starting about 2005) that residents have noted the changes re barnacle growth and nature of weed growth.

HOW DOES THE NORTHERN DISTRICT MODEL ACCOUNT FOR WATER FROM WEEKI WACHEE GETTING TO/INFLUENCING FLOWS IN THE HOMOSASSA SPRINGS, PARTICULARLY THE SE FORK?
More food for thought.

Martyn

From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Wed, 3 Aug 2011 10:20:19 -0400
Subject: RE: Public Input for Spring Workshop

Martyn:

I'd like to reiterate that I think it would be extremely useful to schedule a meeting with Richard Kane and Kevin Grimsley to discuss your concerns with flow measurement in the Homosassa River system. As indicated previously, I welcome the opportunity to participate in such a meeting. In support of this potential meeting I've compiled correspondence between you, Richard, Kevin and me into three Adobe PDF portfolio documents, anticipating that it may be reasonable to review these correspondences prior to a face-to-face meeting. The first of the portfolio documents is attached to this e-mail. I'll send the other two as attachments to additional e-mails.

In response to your question about interactions between stakeholder representatives and others that participate in the District's Springs Coast Minimum Flows and Levels workshops, I would note that I have no specific information regarding interaction of these folks outside of the workshop setting. I assume, however, that workshop participants discuss minimum flows and levels issues outside of the scheduled workshop periods, based
on e-mails that are sent to me and those that I am copied on.

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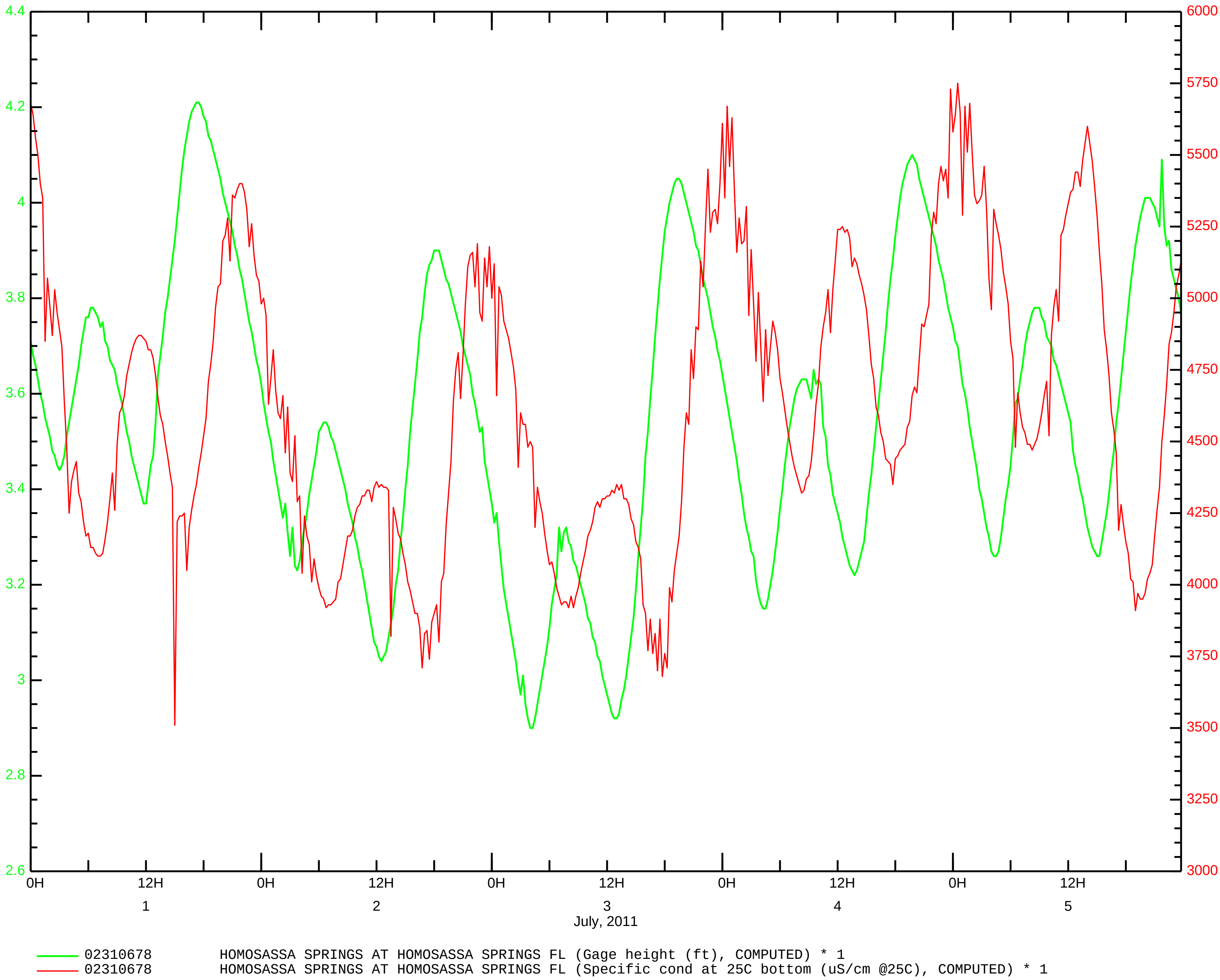

4.4
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July, 2011
02310678 HOMOSASSA SPRINGS AT HOMOSASSA SPRINGS FL (Gage height (ft), COMPUTED) * 1
02310678 HOMOSASSA SPRINGS AT HOMOSASSA SPRINGS FL (Specific cond at 25C bottom (uS/cm @25C), COMPUTED) * 1

From:	Alan Martyn Johnson
To:	Doug Leeper; rkane; Kevin J Grimsley
Subject:	Specific Conductance and Flows Homosassa Springs Gage 02310678
Date:	Sunday, August 14, 2011 7:27:57 AM
Attachments:	Attachment Aug 14 SApecific Conductance.doc

E-MAIL AUG 6
It appears that the attachment to my August 6 e-mail did not attach correctly, or is not e-mail friendly. So here it is in a Word document that will hopefully work as an attachment.

As I commented, this graph for the Homosassa Springs Site is another indicator of how the nature of water entering the river is deteriorating It appears there is either more higher salinity water from Homosassa 1 and 2, or less flow from the lower salinity spring Homosassa 3. Daily Minimums for Specific conductance of the combined flows in 2005 was around 2500 µs/cm they are now rarely below 3500 µs/cm and never below 3000 µs/cm. This is shown on the USGS graphic in the attachment.

That observation was more of a side observation to what I was interested in, but I thought noteworthy.

SPECIFIC CONDUCTANCE STAGE HEIGHT AND FLOW HOMOSASSA SPRINGS GAGE SITE

I have expressed concerns about the use of the Weeki Wachee Well level in the calculation of flows for the springs in the Homosassa complex. As, I started to look more critically at the data from the Homosassa Spring Gage Site, I noted the cyclic pattern of the Specific Conductance relative to the Stage Height.

Analysis of the data shows:

Specific Conductance is HIGHER when the Stage Height is LOWER.

I was surprised by the inverse relationship that is so pronounced, particularly in light of the different chemical composition of water from these springs .

The second chart in the attachment shows the data for July 1-5 as obtained from the USGS Real Time Data. I did analyses from other dates and the pattern is the same.
Scale on the y-axis for the two plots is not the same, x-axis numbers are the 15 minute time intervals.
The third chart shows the Specific Conductance to show the actual magnitude of the change.

This pattern indicates that the flow from each of the three vents changes disproportionately with the stage height .

The most logical explanation for the Specific Conductance pattern to be inverse to Stage Height is the flow from Homosassa 1 and 2 decreases proportionally more than flow from Homosassa 3 as Stage Height increases. And the differences appear to be very significant.

In round numbers the Specific Conductance of water in the three vents for recent years is:
Homosassa 1: 4500 µs/cm

Homosassa 2: 6500 µs/cm
Homosassa 3: 2500 µs/cm
Note: This data is from SWFWMD data Doug shared with me some time ago, I rounded the numbers for ease of presentation.

During the period July 1-5 the combined flow at the gage site, in round numbers, is:
Average 4500 µs/cm
Maximum 5500 µs/cm
Minimum 3500 µs/cm

These numbers imply:
For Average Specific Conductance the flow from HS 2 and HS 3 would be equal. Equal flow would balance the SC to 4500 µs/cm.

For Low Specific Conductance the flow from HS 1 and 2 would have to drop over 50%. If HS 2 is the stronger flow the drop would have to be more than 50%.

For High Specific Conductance the flow from HS 2 would have to increase over 100%.
Note:
Specific Conductance varies with the composition of the water body, but the water analyses for Homosassa 1, 2, 3 show a close relationship of Specific Conductance being 1.9 times TDS Total Dissolved Solids for all three waters from 1994-2009 i.e. the numbers can be comingled without compromising the general thought.

For changes of this nature the hydraulic head driving HS 1 and 2 must be significantly different to that driving the flow in HS 3.

So with this observation of the data, is the use of the Weeki Wachee well level in the equation to calculate flows at this site even more of a stretch to get accurate discharge figure?

Dave Fulcher USGS reported the standard error of 15% in Appendix B-2 of the MFL report for the Homosassa Spring calculated discharge data. Standard error of 15% is not exactly brimming with confidence.

Having raised these questions;
Overall I have less concerns about Discharge Data for Homosassa Springs than the SE Fork. But, that is not to say the validity of the equation does not need to be reviewed.

I have reviewed the Field Measurements from the USGS web site and find that the data does not match well with the equation. Field Measurements June 2002 particularly stood out and contain a number of points that do not follow the logic of decrease stage results in increase flow. **This may be another one to have QA look at, but I realise this was almost 10 years ago. Said I had another one for the QA professionals to review…the unusually low flows measured may be a factor for logic not holding.**

The pronounced inverse relationship between Stage Height and Specific Conductance does for me raise questions about discharge from the Homosassa Spring. I will be more than willing to hear someone else explain this.

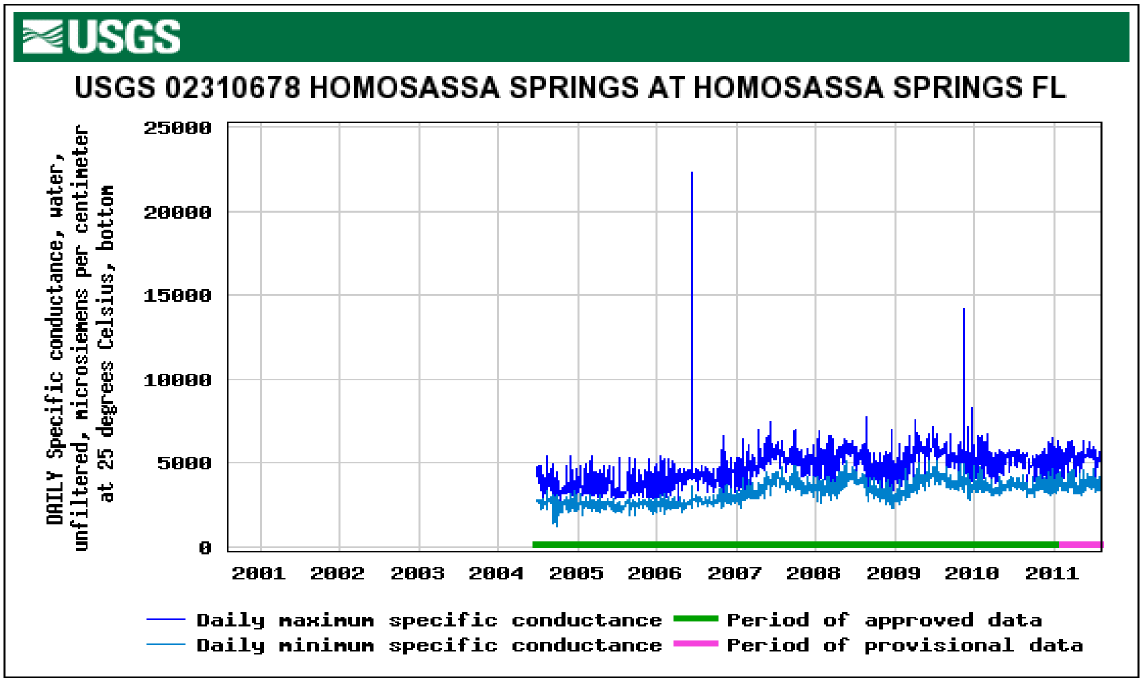
Again I add to my concerns about the methodology/procedures for determining discharge are questionable and fraught with assumptions and estimates. So much is riding on the accuracy of these discharge measurements.

Still say there is already too much water being pumped out of the aquifer and it is destroying the Homosassa River, and others.

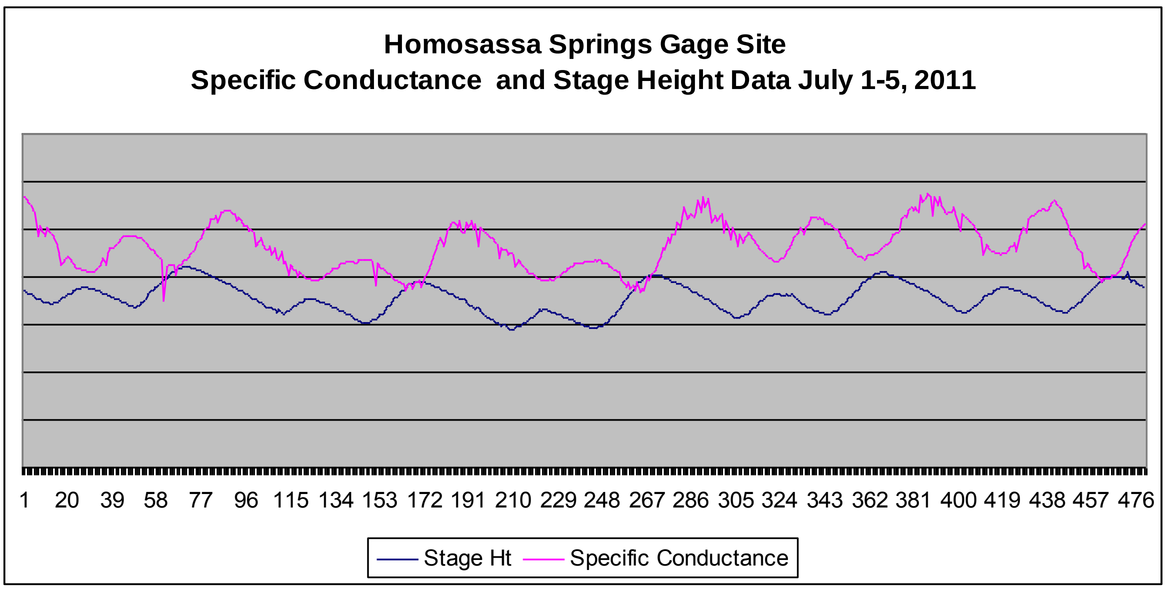
Martyn

P.S. RE SE Fork ADCP budget item.
However, someone looks at all these questions about flow measurement I trust the the Budget Director does not hear that the currently available data is fine, when he/she reviews the need for the Velocity Monitoring Equipment. Budgets are tight why spend money when the present data meets the needs and has been used to support studies that cost hundreds of thousands and more likely many millions of dollars.

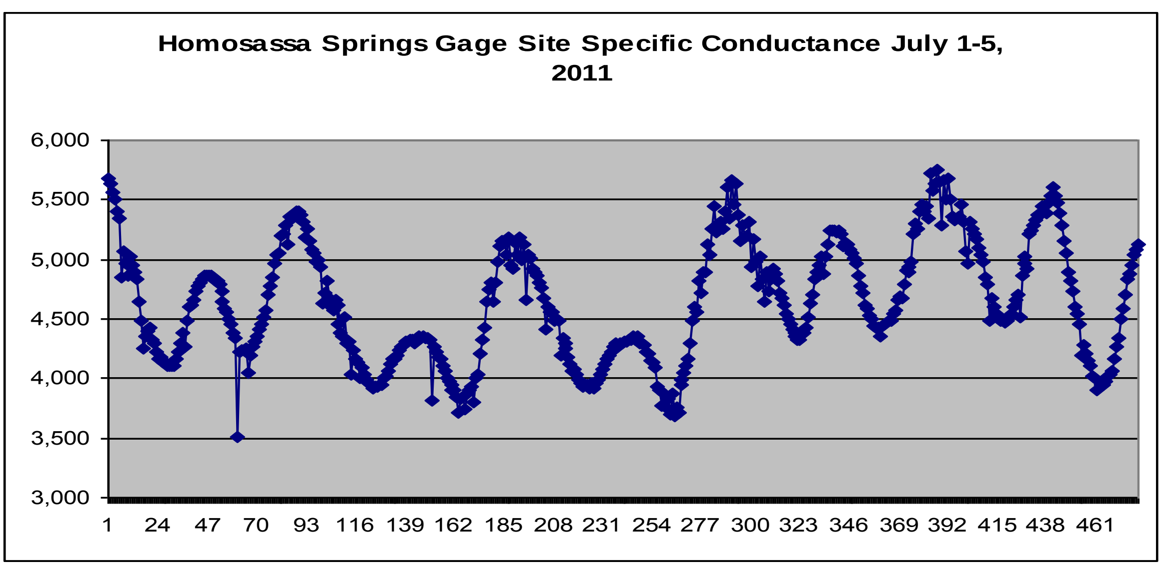
I reiterate my previous suggestion to install a field unit on a temporary basis to validate the expenditure.
Quote
Richard/USGS and/or SWFWMD may be able to find a suitable unit that is available short term. Surely somewhere there is a maintenance workshop that cleans/maintains the vast number of units that USGS has. Collecting flow data for say 3 months would help assure that this budgeted unit is a validated expenditure. The 3 month data would not have to be fed to the USGS Real Time Data system it could be collected using an on site recorder and reviewed say monthly. Just an idea to progress matters in an orderly constructive framework. Any thoughts from yourself or Richard regarding trying to find /install a 'test' unit would be appreciated.
End Quote



USGS
USGS 02310678 HOMOSASSA SPRINGS AT HOMOSASSA SPRINGS FL
DAILY Specific conductance, water, unfiltered, microsiemens per centimeter at 25 degrees Celsius, bottom
25000
20000
15000
10000
5000
0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Daily maximum specific conductance
Daily minimum specific conductance
Period of approved data
Period of provisional data



Homosassa Springs Gage Site
Specific Conductance and Stage Height Data July 1-5, 2011
1 20 39 58 77 96 115 134 153 172 191 210 229 248 267 286 305 324 343 362 381 400 419 438 457 476
Stage Ht
Specific Conductance



Homosassa Springs Gage Site Specific Conductance July 1-5, 2011
6,000
5,500
5,000
4,500
4,000
3,500
3,000
1 24 47 70 93 116 139 162 185 208 231 254 277 300 323 346 369 392 415 438 461

From:	Doug Leeper
To:	Marty Kelly; Ron Basso; Xinjian Chen
Subject:	FW: USGS Data
Date:	Monday, August 15, 2011 7:55:30 AM
Attachments:	Site 02310688 1.JPG Site 02310688 2.JPG Site 02310688 3.JPG

FYI - I I'm forwarding a recent series of e-mails to keep you informed of this ongoing issue.
Doug Leeper

From: Alan Martyn Johnson [martynellijay@hotmail.com]
Sent: Saturday, August 13, 2011 6:18 PM
To: rkane
Cc: Doug Leeper; Kevin J Grimsley
Subject: RE: USGS Data

Richard,
Thanks for taking the time to reply to my e-mail.

I have never doubted that USGS want to do a good job and I have encouraged the review of data for the Homosassa River at the local level. That is the best place for review to occur; not by me presenting my concerns to others who may have different motives. But, I keep being fed the thought that the data is all OK. I will not be making a visit to your office to be given the 100 year justification presentation. I would like to discuss specific concerns I have raised, e-mails are a good place to start. If you are planning on attending the next MFL Workshop Doug has scheduled in Lecanto we could meet at that time. Which is about the earliest I will be back in Florida.

Regarding the P. This is most annoying as it makes analysis of the current data much more difficult, and it has spilled over into data such Field Measurements that are now all text entries. Frankly, I wonder if this does not show a lack of confidence in the data. Lets take an example; When was any of the data for the Homosassa River Gage Sites worked/checked/reviewed that resulted in a change? If USGS have a problem site I can fully understand implementing the P option, but to do it cross the board is counter productive to making the data available (nice to look at and of little use is like wallpaper)...why not just wait until the end of the year and send out the averages! Someone needs to think this great idea from HQ through.

I am sure USGS has a large QA operation. I worked in QA for a major international company for many years. On the question of reviewing procedures; I have asked about the Standard Operating Procedure for Field Measurements. Specifically, I was trying to understand why some measurements have a different duration to others at the same site. I also pointed out some field measurements that appeared unusual and thought it may be worth checking for a logging error. I have another that I will share later.

There appears to be a need for you to make a site visit. As I recall Kevin did say that he had mis-spoke regarding any thought of reverse flow at the SE Fork site.
I have previously sent photographs of the concrete bags (attached for reference). I would speculate that the concrete bags were most likely placed by the Roads Department to prevent erosion. The bags appear to be more neatly placed than if it had been done by swimmers trying to get in and out.

The point is the concrete/riprap butress adds to the change in direction of the flow and cause the thin layer of water to flow upstream along the concrete wall. Could get into velocity and pressure drops, but the photographs should suffice. In the photograph taken looking downstream No. 1 you can see the pattern and how weed has kept hold along the wall. Clearly the stream velocity is greater where the sand/materials are light in color. I have observed the flow first hand many times. The flow in the main stream under the bridge ranges from 0.5 - 1.2 feet per second according to my measurements. I am sure you can verify and be more accurate from your Field Measurement data. Added to this is the fact that the 'higher' salinity water only differs in density in the fourth decimal place, this is not seawater. And I have no idea where the idea where the idea came from that the bags are chemically responsible for the increases in the conductance readings, certainly not my thought.

Now actions speak louder than words.
As I said in my brief reply earlier in the week there is a simple way of confirming the cause of the higher specific conductance readings. Install a temporary baffle at the end of the wall furthest from the instrument site in photo 1. This could easily be installed using some spikes attached to the bottom of the baffle to sit in the river bed and an angle iron holding the top of the baffle perpendicular to the concrete wall. AND if I were not such an honest person I would simply go and install a baffle board and then show you your real time data. Humor me have someone go do it; you can always have the data reworked, after all it is provisional.

We agree that if nothing is done and we just sit by and watch the Homosassa River will be ruined. Pumping from the aquifer needs to be controlled. The concept of Minimum Flows and Levels is basically good but having questionable data used in studies to justify pumping more water is not acceptable. The best available data is not worth using if it is wrong.

Sorry if you find some of my comments harsh, but getting at the truth often requires a few feathers to be ruffled.
I do look forward to meeting with you.

Martyn

To: martynellijay@hotmail.com
CC: doug.leeper@swfwmd.state.fl.us; kjgrims@usgs.gov; rkane@usgs.gov
Subject: Re: USGS Data
From: rkane@usgs.gov
Date: Mon, 8 Aug 2011 12:46:23 -0400

Mr Johnson, thank for your interest in the USGS data and the quality of the data. USGS has been collecting streamflow data at springs in Florida for over 100 years and quality assurance of our data is of the highest importance to our agency and is not taken lightly. I have responded to your comments below. Kevin will reply to your previous letter to the record in more depth when he returns to the office next week. I look forward to meeting up with you in our office soon as I don't think exchanging emails back and forth is productive at this point. I think we will be able to explain our procedures more effectively at a face to face meeting where we can show you our data and procedures.

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center

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(813-498-5057)
FAX (813-498-5001)
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From: Alan Martyn Johnson <martynellijay@hotmail.com>
To: Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
Date: 08/06/2011 10:16 AM
Subject: USGS Data

Doug,
Thanks for taking the action to remove the 'data' document from the working group web site, as I suggested. While it had no value as a stand alone document, we would have had to included a disclaimer statement that it was based on Provisional Data from USGS had it remained.
If I had copied the data today from the USGS web site there would have been lots of P's next to the data. While this is strictly in line with USGS Policy (2006) it was interesting to note this change to strict compliance only occurred very recently on all the real time data that I look at. I trust there will be a meaningful review before approval.
The "P" was applied at during last NWIS upgrade. These upgrades come from HQ and cannot be edited when retrieving data from NWISWEB. The purpose of the provisional flag was to prevent the provisional data statement at the top of page from being separated from the actually data and being used eroneoneously.

Richard and Kevin,
Where will Real Time Data be available as Approved Data?
Data is worked, checked and reviewed all throughout the year. Some of our more complex sites are reviewed once annually. All data is published by April 1 and is approved by that time for the previous water year.

On the subject of Provisional Data Approval for SE Fork
May I suggest when USGS is reviewing the 2010-2011 water year data to make it 'Approved', USGS may want to have someone take a serious look at the Specific Conductance Data from the SE Fork Homosassa.
Quality assurance is of the highest importance to USGS. Our hydrologic technicians and hydrologists all have science degrees and years of specialized USGS training. Kevin is the national trainer for the water quality monitors and we are very fortunate to have someone of his caliber in the Florida Water Science Center. After data is collected in the field it is worked up provisionally, then checked by another technician, and then reviewed by a senior technician or hydrologist. Finally after all of the data has been verified it is approved in the database and then published in the annual data report. In addition, every three years the National USGS technical offices of Surface Water, Ground Water, and Water Quality visit our center and review all of our procedures, and a portion of data that has been worked up in the past three years. Further, since we do publish all of our data, it is constantly being reviewed and scrutinized by the scientific community.

I first commented about the eddy currents drawing water along the concrete wall downstream

of the site in an e-mail December 20, 2010. Later I commented about the build up of material (sand) just upstream of the gage site.
The higher Specific Conductance readings at this site, I believe, are due to location of the gage site and the bags of concrete that have been placed by whomever to make it easier to get in/out of the water. I seriously doubt it was USGS placed these bags (I do have some photographs but they are not like having on on site report from one of your people).
If someone took the time, the flow can easily be seen on site when the tide is rising rapidly. If you review the data you will also see this pattern of higher SC figures when tide is increasing rapidly and it is clearly not due to reverse flow into the approx 3 acre pool upstream of the bridge/gage site. I pass on these observations to help USGS provide the best possible data. Please advise if you have passed this on to the appropriate persons in USGS, or that you disagree with my observations.
I believe Kevin previously addressed your concerns of the eddy current. We do not feel it has any affect on the water quality data or the discharge. This site is not controlled by geomorphic features in the channel like a normal stage-discharge site may be. Tide and changes in groundwater affect the water quality and discharge. The flow is bidirectional, meaning the flow on the top moves in a different direction than the flow on the bottom. If we were measuring velocity continuously it would matter, but in this case we only measure stage and the water level of the aquifer. Since the water level is affected by gravity it is constantly seeking it's lowest level and an eddy current would not affect the water level or the forces of tide throughout the cross section of the channel. When we install the velocity sensor we will want to avoid this eddy current; thanks for bringing it to our attention.

When the tide comes in the salinity increase (this is normal). As the stage rises due to high tides the head on the spring increases and the downward pressure caused by gravity prevents freshwater from flowing out of the spring at the same rate and this is seen in the decreasing discharge. I am not sure about the concrete bags (we have to deal with a lot of vandalism at this site (we would certainly appreciate your efforts in keeping us informed when you notice unusual happenings at the springs). I'll check on ~~it~~ this matter, but that the concrete bags would have no more affect on water quality than the concrete bridge. Even if ~~it~~ the concrete bags were not in a solid state and dissolving in the river, any additions of matter from the bags would be very dilute and not expected to affect salinity.

And while I am on the subject of Specific Conductance
Doug,
Take a look at the attached graph of Specific Conductance for the Homosassa Springs Site. (Hope it attached correctly, if not it is from the USGS web site Gage 02310678 and covers the time period for which daily data is available).
The graph shows an increasing trend in the Minimum Daily Specific Conductance over the last 5-6 years. If it were possible to remove the extremely high figures from this analysis the trend could be seen more easily; not sure but I think the very high figure was at the time of a hurricane was it Alberto mid 2006?

Yes I agree when you remove the outliers you get a better view of the long term trends.

This graph is another strong indicator of how the nature of water entering the river is deteriorating; more salt water intrusion less flow from the aquifer fed spring in the group of three vents. The pattern is also evident when looking at Specific Conductance in relation to stage height over a few days.

I think we all agree with this statement. During the workshop, Doug gave an excellent presentation of long term sea level rise using NOAA gages in the Gulf over the past 50 years. As sea level continues to rise, salinity will continue to increase at the spring head and that, with the combined affect of groundwater pumping of the Floridan aquifer will cause the flow in the spring to decrease and the estuaries to change. Similarly, any reductions in rainfall would be expected to lead to increased salinity in the river system.

Sorry to spoil your morning coffee again with more questions and commentary!!!

Martyn

[attachment "Specific Conductance Homosassa Sprngs Gage.htm" deleted by Richard L Kane/WRD/USGS/DOI]

From:	Richard L Kane
To:	Doug Leeper
Cc:	Kevin Grimsley
Subject:	Fwd: Specific Conductance and Flows Homosassa Springs Gage 02310678
Date:	Sunday, August 14, 2011 5:55:55 PM
Attachments:	Attachment Aug 14 SApecific Conductance.doc ATT00001.htm 02310678.uv.pdf ATT00002.htm

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Doug, you can look at the PDF attachment that I pulled from ADAPS and it looks like the QW lags the stage but is not inverse of it. We're not fully funded to analyze the data so we cannot say for sure why it lags the tidal peaks. But it looks more like the SC is controlled more by the tide. It could be that the salinity has to come out of storage but not sure. Or that the reading is a bottom reading and you could bidirectional flows and salinity on the bottom will lag the stage peak.

Dave Fulcher does not remember the 15% error quote. We have never done an error analysis so we could have 5% accuracy or higher. Do you know where the 15% comes from?

I am going to contact Dan Yobbi to find out why he chose the Weeki Wachee well for the regressions.

Richard Kane
Associate Center Director, Data
FLWSC
10500 University Center Dr., Suite 215
813-498-5057 w
813-918-1275 c

Begin forwarded message:

> **From:** "Richard L Kane" <rkane@usgs.gov>
> **Date:** August 14, 2011 9:50:18 AM EDT
> **To:** "Kevin J Grimsley" <kjgrims@usgs.gov>
> **Subject: Fw: Specific Conductance and Flows Homosassa Springs Gage 02310678**
>
> Kevin I have pulled the data that Mr. Johnson questions for Homosassa Sps. I think his plots must have been off or scale incorrect on the x axis. When you look at this plot direct from the database I would say that the QW lags the change in stage and is not inverse of it. I'm not sure why it lags, you might understand it better than me. What do you think? Mr. Johnson's assumption, if I read it right, is that the increase in SC is from the tide going out and the flow increasing from the springs thereby increasing the dissolved solids. Since we are really not getting paid to do the analysis of the data we can't put too much time into it but he is making some kind of point that the relationship with WW well is not valid. Do you think we should bring Yobbi into this?
> *(See attached file: 02310678.uv.pdf)*

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov
(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275
----- Forwarded by Richard L Kane/WRD/USGS/DOI on 08/14/2011 09:50 AM -----

From: Alan Martyn Johnson <martynellijay@hotmail.com>
To: Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
Date: 08/14/2011 07:27 AM
Subject: Specific Conductance and Flows Homosassa Springs Gage 02310678

E-MAIL AUG 6

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That observation was more of a side observation to what I was interested in, but I thought noteworthy.

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Analysis of the data shows:

Specific Conductance is HIGHER when the Stage Height is LOWER.

I was surprised by the inverse relationship that is so pronounced, particularly in light of the different chemical composition of water from these springs .

The second chart in the attachment shows the data for July 1-5 as obtained from the USGS Real Time Data. I did analyses from other dates and the pattern is the same.
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The most logical explanation for the Specific Conductance pattern to be inverse to Stage Height is the flow from Homosassa 1 and 2 decreases proportionally more than flow from Homosassa 3 as Stage Height increases. And the differences appear to be very significant.

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So with this observation of the data, is the use of the Weeki Wachee well level in the equation to calculate flows at this site even more of a stretch to get accurate discharge figure?

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The pronounced inverse relationship between Stage Height and Specific Conductance does for me raise questions about discharge from the Homosassa Spring. I will be more than willing to hear someone else explain this.

Again I add to my concerns about the methodology/procedures for determining discharge are questionable and fraught with assumptions and estimates. So much is riding on the accuracy of these discharge measurements.

Still say there is already too much water being pumped out of the aquifer and it is destroying the Homosassa River, and others.

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P.S. RE SE Fork ADCP budget item.
However, someone looks at all these questions about flow measurement I trust the the Budget Director does not hear that the currently available data is fine, when he/she reviews the need for the Velocity Monitoring Equipment. Budgets are tight why spend money when the present data meets the needs and has been used to support studies that cost hundreds of thousands and more likely many millions of dollars.

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From:	Richard L Kane
To:	Alan Martyn Johnson
Cc:	Doug Leeper; Kevin J Grimsley; Richard L Kane
Subject:	Re: Specific Conductance and Flows Homosassa Springs Gage 02310678
Date:	Sunday, August 14, 2011 9:13:14 PM
Attachments:	02310678.uv.pdf

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I verified with Dan Yobbi the reason for using the Weeki Wachee Well. He did look at the Lecanto well and he felt that the WW well showed a better representation of the ground water basin and it's relationship with spring discharge. Remember the springs are not affected by surface water basins like normal rivers, It's all groundwater driven. It was important to use a well that was far enough away from the springs to not be affected by tides but still show a good (regional) response to groundwater recharge and discharge. The WW well fit this criteria very well. The rating equations at SE Fork and Homosassa use the gage height also. The gage height are variables used in the equation since tidal changes are an important surrogate in computing accurate discharge at these sites. Dan tried equations without stage and the computed discharge did not compare as well with measured discharge.

It's up to SWFWMD about the velocity meter but since they relying more on unit value data then I do hope they agree to this. However they do not also answer all of out questions. Some problem we have had previously with velocity meters was the high vandalism rate (especially at SE Fork) , vegetation on the sensors, and fish. The velocity meter cannot tell the difference from particles in the water or schools of fish.

Hope this helps.

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov

(813-498-5057)
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To: Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
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From:	Doug Leeper
To:	Marty Kelly; Ron Basso; Xinjian Chen
Subject:	FW: Specific Conductance and Flows Homosassa Springs Gage 02310678
Date:	Monday, August 15, 2011 7:57:52 AM
Attachments:	Attachment Aug 14 SApecific Conductance.doc

From: Alan Martyn Johnson [martynellijay@hotmail.com]
Sent: Sunday, August 14, 2011 7:27 AM
To: Doug Leeper; rkane; Kevin J Grimsley
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Date:	Monday, August 15, 2011 7:59:27 AM
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From: Alan Martyn Johnson <martynellijay@hotmail.com>
To: Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
Date: 08/14/2011 07:27 AM
Subject: Specific Conductance and Flows Homosassa Springs Gage 02310678

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From:	Marty Kelly
To:	Doug Leeper
Subject:	RE: Specific Conductance and Flows Homosassa Springs Gage 02310678
Date:	Monday, August 15, 2011 8:04:26 AM

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Sent: Monday, August 15, 2011 7:59 AM
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From:	Doug Leeper
To:	Marty Kelly
Subject:	RE: Specific Conductance and Flows Homosassa Springs Gage 02310678
Date:	Monday, August 15, 2011 9:08:02 AM

Yes - am on annual leave and plan to try the beach between incoming clouds. Also, I do plan to travel to St. Cloud on Wednesday.
later, Doug

From: Marty Kelly
Sent: Monday, August 15, 2011 8:04 AM
To: Doug Leeper
Subject: RE: Specific Conductance and Flows Homosassa Springs Gage 02310678

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From:	Alan Martyn Johnson
To:	rkane
Cc:	Doug Leeper; Kevin J Grimsley
Subject:	Homosassa Springs and SE Fork Additional comments
Date:	Monday, August 15, 2011 7:41:57 PM
Attachments:	SE Fork Chart August 15, 2011.doc

Richard,

HOMOSASSA SPRINGS SITE/Earlier e-mail

With a little more time this evening I would like to expand on my very brief comment this morning, that the lag is associated with how quickly the flow rates from each of the vents adjusts to stage. In addition to the time it takes for the flows to modulate to the change in back pressure from the stage height change, there is also the time it takes for the water change (60 ft down) to reach the monitoring instrument location.

A few thoughts to put some numbers/meat to this for better explanation of my point:

1. Main Spring

I would estimate the main spring is about 30 feet wide at the top (observatory level may be more but lets use 30) and is described as conical down to the vents which are reported as 65 feet deep (I have no other way of verifying this other than the bulletin I read).
If these are good estimate this cone would hold about 14,000 cubic ft and take **about 3 minutes to elute at 80 cfs spring flow.**

2. Pool

The pool from the main spring to the instrument location on the NE bank is about 0.25 acres minimum. If the average depth is 3 feet this is holds about 30,000 cubic feet and take about **6 minutes to elute at 80 cfs spring flow**.

The 80 cfs comes from recent field measurements over the last year, and is the maximum calculated flow for the data time period we are reviewing.

Total about 10 minutes assuming **laminar flow**, which I would again speculate is not the case, particularly as the instrument location is close to the bank.

3. Daily Stage Height Inequality

Add to the above the daily inequality of the stage height change, which presumably also has an effect.
Lower Low to Higher High change is in the order of 1 foot
Higher Low to the Lower High is in the order of 0.4 feet foot, for the data time period we are reviewing. This will also have an influence as to how **the relative flows from each of the vents changes** in each of these cycles in addition to the changes; in addition to the total cfs. These cycles are evident on the chart.

SO OVERALL IT IS NOT SURPRISING TO SEE AN IMPERFECT MATCH OF THE STAGE HEIGHT AND SPECIFIC CONDUCTANCE WITH TIME AT THE GAGE SITE…BUT THE PATTERN IS CLEAR.

I could suggest placing a specific conductance monitor in the conical vent at a depth of say 30 feet to better track this. But, for now you can possible refine my thoughts about the pool from the spring to the instrument site, by sharing the stage area and velocity profiles across the channel from the ADCP field measurements. I am sure that will help refine my guesstimates. Others who have first hand knowledge may be able to confirm or revise my estimates regarding the size of the main spring.

My point again the flow from these springs does not have direct relationship with Weeki Wachee Well Level.

SE Fork Calculation Equation

I was pleased to note in your e-mail from yesterday that you are still in touch with Dan Yobbi. That must be one interesting individual. I am sure I would enjoy sitting with him and discussing, over our beverage of choice, the Homosassa River along with his many other experiences.

$$Q = 18.63 + 3.31(GW) – 10.31(GH) – 418.14(dS/dt)$$

For now I would like to get his and possibly some of your personnel to explain:

The large variations in calculated flow resulting primarily from the factor 418.4 * dS/dt.

The Gage Height Component; minus 10.31 * GH appears to address the discharge change due to hydraulic head change thru the day from the Fixed Component, for the day, 18.63 + 3.31 * Weeki Wachee.

The Stage Change Component; minus 418.4 * dS/dt essentially cancels itself out over a 24 hour period. Normal change in Stage Height between 00:00 am from one day to the next is typically 0.1 to 0.2 feet with occasional results upto 0.6 feet. I have previously shared this graph with you the attached chart, which is for Feb 3, 2011 when the 24 hour change was 0.59 feet.

The large changes in the calculated flows (the red line) have no logical basis when considered in conjunction with the 3 acre pool upstream of the bridge/ monitoring site. This is essentially a confined pool that accumulates spring waters during stage height increases; and discharges water during stage height decreases. This appears to be the primary cause of flow changes at the gage site/under the bridge. There is certainly not reverse flow at any of the spring vents in the SEF and the 3 acre pool I have estimated is more than the immediately defined boundaries; giving some additional area for changes of ground water in the sandy soils.

Sorry, but the logic does not hold.

All thoughts and commentary welcome.

Martyn

From:	Alan Martyn Johnson
To:	rkane
Cc:	Doug Leeper; Kevin J Grimsley; Ron Basso
Subject:	RE: Specific Conductance and Flows Homosassa Springs Gage 02310678
Date:	Monday, August 15, 2011 8:43:14 AM

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Hope this helps.

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov
(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275

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Date: 08/14/2011 07:27 AM
Subject: Specific Conductance and Flows Homosassa Springs Gage 02310678

E-MAIL AUG 6

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I have expressed concerns about the use of the Weeki Wachee Well level in the calculation of flows for the springs in the Homosassa complex. As, I started to look more critically at the data from the Homosassa Spring Gage Site, I noted the cyclic pattern of the Specific Conductance relative to the Stage Height.

Analysis of the data shows:

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However, someone looks at all these questions about flow measurement I trust the the Budget Director does not hear that the currently available data is fine, when he/she reviews the need for the Velocity Monitoring Equipment. Budgets are tight why spend money when the present data meets the needs and has been used to support studies that cost hundreds of thousands and more likely many millions of dollars.

I reiterate my previous suggestion to install a field unit on a temporary basis to validate the expenditure.
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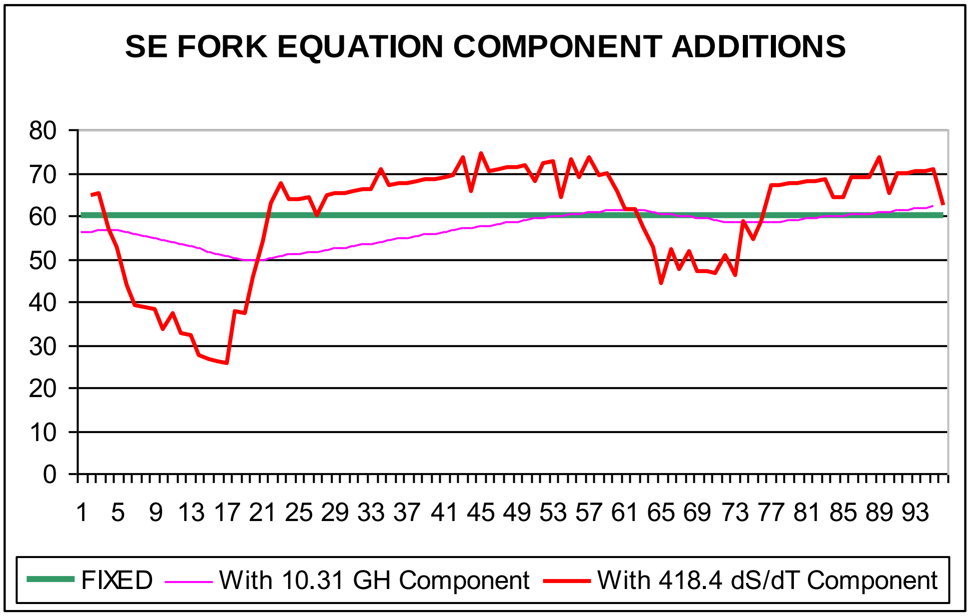
[attachment "Attachment Aug 14 SApecific Conductance.doc" deleted by Richard L Kane/WRD/USGS/DOI]



SE FORK EQUATION COMPONENT ADDITIONS
80
70
60
50
40
30
20
10
0
1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89 93
FIXED
With 10.31 GH Component
With 418.4 dS/dT Component

From: Ron Basso
To: rkane
Cc: Doug Leeper; Kevin J Grimsley
Subject: RE: Specific Conductance and Flows Homosassa Springs Gage 02310678
Date: Tuesday, August 16, 2011 9:07:20 AM

All:

Mr. Martyn took my recent response to him out of context. The quote was in reference to the Northern West-Central Groundwater Basin which covers all the springsheds of the nature coast. He seems to still be confusing impacts to the springs with just the individual springshed withdrawals rather than the entire 5,000 square mile groundwater basin.

Ron Basso, P.G.
Senior Professional Geologist
Hydrologic Evaluation Section
Southwest Florida Water Management District
ph 1-800-423-1476 (in state)
ph 352-796-7211, ext. 4291 (outside state)
FAX 352-797-5799

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Monday, August 15, 2011 8:43 AM
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From:	Kevin J Grimsley
To:	Alan Martyn Johnson
Cc:	rkane; Doug Leeper
Subject:	Re: Homosassa Springs and SE Fork Additional comments
Date:	Monday, August 15, 2011 9:12:31 PM

Martyn,

We're planning on performing a few cross-section conductance measurements to investigate this lag between the water level and conductance cycles. We'll see what those measurements reveal, but we do not believe it has anything to do with variations in flow rates between the vents. We believe this is caused by stratification of flow around the gage location. In any case, these differences have no standing in evaluating the validity of using the Weeki Wachee Well in the discharge regressions.

Here are Dann Yobbi's thoughts on these subjects:

"The Weeki Wachee well was chosen because of the excellent relation with discharge at Week Wachee Springs and the relatively large water level range that represents the regional recharge/discharge conditions in the aquifer system. Flow of the springs is dependent on aquifer heads and ground-water gradients. Stage and rate of change in stage are surrogates for the effects of tide on discharge.

The test of the equations is its comparison with MEASURED DISCHARGE. If measured discharge compares favorably with simulated discharge, the equation is a reliable predictor of discharge. This is why it was critical to make field measurements of discharge at several ground-water conditions and at different tide conditions during the year.

If tide did not effect flow of Homosassa Springs or SE Fork, there would be a very small range of discharge of both springs because of the very low gradient of the potentiometric surface near these springs. Take out stage and rate of change from the equations and look at the discharge."

As I've said several times before and Dann repeated, the appropriate evaluation of the equations is how they compare with the measured discharge. Once again, the average difference between the SE Fork equation and our measurements has been less than 5% which is excellent. Are there some measurements that are more than 5%? Absolutely, but it's unreasonable to expect otherwise. I'm pretty sure there isn't a station in the state that's always within 5%. We don't pretend that these equations are flawless, but they are reasonable and they have been reviewed and re-reviewed.

There is documented reverse flow at the gage location along the left bank. The entire flow does not reverse, but it is bidirectional at many high tides. This has nothing to do with concrete bags or eddy currents. This is caused by the incoming tide pushing back against the flow from the springs.

****

Kevin Grimsley, P.E.
Supervisory Hydrologist
USGS, Florida Water Science Center
10500 University Center Drive, Suite 215

Tampa, FL 33612
kjgrims@usgs.gov
813-975-8620 x159
****

On Aug 15, 2011, at 7:41 PM, "Alan Martyn Johnson" <martynellijay@hotmail.com> wrote:

Richard,

HOMOSASSA SPRINGS SITE/Earlier e-mail

With a little more time this evening I would like to expand on my very brief comment this morning, that the lag is associated with how quickly the flow rates from each of the vents adjusts to stage. In addition to the time it takes for the flows to modulate to the change in back pressure from the stage height change, there is also the time it takes for the water change (60 ft down) to reach the monitoring instrument location.

A few thoughts to put some numbers/meat to this for better explanation of my point:

1. Main Spring

I would estimate the main spring is about 30 feet wide at the top (observatory level may be more but lets use 30) and is described as conical down to the vents which are reported as 65 feet deep (I have no other way of verifying this other than the bulletin I read).
If these are good estimate this cone would hold about 14,000 cubic ft and take **about 3 minutes to elute at 80 cfs spring flow.**

2. Pool

The pool from the main spring to the instrument location on the NE bank is about 0.25 acres minimum. If the average depth is 3 feet this is holds about 30,000 cubic feet and take about **6 minutes to elute at 80 cfs spring flow**.

The 80 cfs comes from recent field measurements over the last year, and is the maximum calculated flow for the data time period we are reviewing.

Total about 10 minutes assuming **laminar flow**, which I would again speculate is not the case, particularly as the instrument location is close to the bank.

3. Daily Stage Height Inequality

Add to the above the daily inequality of the stage height change, which presumably also has an effect.
Lower Low to Higher High change is in the order of 1 foot
Higher Low to the Lower High is in the order of 0.4 feet foot, for the data time

period we are reviewing. This will also have an influence as to how **the relative flows from each of the vents changes** in each of these cycles in addition to the changes; in addition to the total cfs. These cycles are evident on the chart.

SO OVERALL IT IS NOT SURPRISING TO SEE AN IMPERFECT MATCH OF THE STAGE HEIGHT AND SPECIFIC CONDUCTANCE WITH TIME AT THE GAGE SITE…BUT THE PATTERN IS CLEAR.

I could suggest placing a specific conductance monitor in the conical vent at a depth of say 30 feet to better track this. But, for now you can possible refine my thoughts about the pool from the spring to the instrument site, by sharing the stage area and velocity profiles across the channel from the ADCP field measurements. I am sure that will help refine my guesstimates. Others who have first hand knowledge may be able to confirm or revise my estimates regarding the size of the main spring.

My point again the flow from these springs does not have direct relationship with Weeki Wachee Well Level.

SE Fork Calculation Equation

I was pleased to note in your e-mail from yesterday that you are still in touch with Dan Yobbi. That must be one interesting individual. I am sure I would enjoy sitting with him and discussing, over our beverage of choice, the Homosassa River along with his many other experiences.

$$Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(dS/dt)$$

For now I would like to get his and possibly some of your personnel to explain:

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Sorry, but the logic does not hold.

All thoughts and commentary welcome.

Martyn

<SE Fork Chart August 15, 2011.doc>

From:	Richard L Kane
To:	Doug Leeper
Cc:	Kevin J Grimsley; Richard L Kane
Subject:	Fw: Homosassa Springs and SE Fork Additional comments
Date:	Tuesday, August 16, 2011 9:12:02 AM

Doug, Kevin and I have been discussing the QW issue that Mr. Johnson brought up. You can read Dann Yobbi's reply below and question if SWFWMD is monitoring salinity in any of the nearby ROMP wells. Not sure if this is something you want to look at in more detail but is beyond our current scope of work. Dann would be willing to attend the next Springs Workshop and give a presentation of his research and findings from working in the springs area over 20 years if you thought this would be helpful. Let me know soon as I would have to set up a travel authorization for him.

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____

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Cell 813-918-1275

----- Forwarded by Richard L Kane/WRD/USGS/DOI on 08/16/2011 08:46 AM -----

From:	DANN YOBBI <dyobbi@sbcglobal.net>
To:	Richard L Kane <rkane@usgs.gov>
Cc:	Kevin J Grimsley <kjgrims@usgs.gov>
Date:	08/15/2011 10:38 PM
Subject:	Homosassa Springs and SE Fork Additional comments

Hey Richard--

The lag in salinity is NOT UNUSUAL. The mistake that everyone is making is forgetting that this is a GROUNDWATER ISSUE--NOT A SURFACE-WATER issue. Movement of saltwater to the spring vents is related to movement of the saltwater interface in the Upper Floridan aquifer. Movement of the interface is affected by tidal groundwater heads in the aquifer system and not water levels in the spring pool. Water levels in the spring pool are primarily related to surface-water gradients (tide) in the river. My suggestion is to look at water levels in a nearby tidal affected well and compare with salinity at the spring. I would expect only a small lag in salinity at the spring and water levels in the tidally affected well (assuming the well is close to the spring). Any chance that we are still monitoring salinity and water levels in any ROMP wells in the coastal springs tidal area?? I monitored salinity in one of the ROMP wells near the mouth of the Weeki Wachee River and discharge and salinity in Salt Springs (trib to Weeki Wachee River) in 1989-90. Not sure if unit values were stored for these sites but I could investigate if you think it may help. Data for these sites also may be in my file boxes in the Tampa storage room.

As far as the spring flow having no relation with the Weeki Wachee well, the regression analysis results between measured discharge and water levels in the well speaks for itself. Alan should take a class in groundwater and forget about his engineering classes. A review of Groundwater 101 would be most helpful to him.

With regard to the the "rate of change" in the equation--This is a dependent variable which accounts for the change in the surface-water gradient (velocity) and is needed to more accurately estimate instantaneous discharge. On a weekly or possible daily basis it may offset itself. (However, I would have to look at the data to verify this assumption).

A trip back would be nice if you think it would help with discussions with Alan. A face-to-face meeting with all in involved may put this issue to bed.

Let me know--

dann

From: Richard L Kane <rkane@usgs.gov>
To: dyobbi@sbcglobal.net
Cc: Kevin Grimsley <kjgrims@usgs.gov>
Sent: Mon, August 15, 2011 5:45:18 PM
Subject: Fwd: Homosassa Springs and SE Fork Additional comments

Hey Dann if you want to comment go ahead otherwise if you want to keep your privacy just forward comments to me and I will pass them on. If you are looking for a trip back let me know and I will check if I can pay your travel as a volunteer. Kevin and Yvonne Stoker discussed the lag issue which we all agree is unusual but with the current data and limitation on our scope of work we can't really say for sure what the reason for the lag is but that it would be an interesting study.

____
Richard Kane
Associate Center Director, Data
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813-498-5057 w
813-918-1275 c

Begin forwarded message:

From: "Alan Martyn Johnson" <martynellijay@hotmail.com>
Date: August 15, 2011 7:41:52 PM EDT
To: "rkane" <rkane@usgs.gov>
Cc: "Doug Leeper" <doug.leeper@swfwmd.state.fl.us>,"Kevin J Grimsley " <kjgrims@usgs.gov>
Subject: Homosassa Springs and SE Fork Additional comments

Richard,

HOMOSASSA SPRINGS SITE/Earlier e-mail

With a little more time this evening I would like to expand on my very brief comment this morning, that the lag is associated with how quickly the flow rates from each of the vents adjusts to stage. In addition to the time it takes for the flows to modulate to the change in back pressure from the stage height change, there is also the time it takes for the water change (60 ft down) to reach the monitoring instrument location.

A few thoughts to put some numbers/meat to this for better explanation of my point:

1. Main Spring

I would estimate the main spring is about 30 feet wide at the top (observatory level may be more but lets use 30) and is described as conical down to the vents which are reported as 65 feet deep (I have no other way of verifying this other than the bulletin I read).
If these are good estimate this cone would hold about 14,000 cubic ft and take **about 3 minutes to elute at 80 cfs spring flow.**

2. Pool

The pool from the main spring to the instrument location on the NE bank is about 0.25 acres minimum. If the average depth is 3 feet this is holds about 30,000 cubic feet and take about **6 minutes to elute at 80 cfs spring flow**.

The 80 cfs comes from recent field measurements over the last year, and is the maximum calculated flow for the data time period we are reviewing.

Total about 10 minutes assuming **laminar flow**, which I would again speculate is not the case, particularly as the instrument location is close to the bank.

3. Daily Stage Height Inequality

Add to the above the daily inequality of the stage height change, which presumably also has an effect.
Lower Low to Higher High change is in the order of 1 foot
Higher Low to the Lower High is in the order of 0.4 feet foot, for the data time period we are reviewing. This will also have an influence as to how **the relative flows from each of the vents changes** in each of these cycles in addition to the changes; in addition to the total cfs. These cycles are evident on the chart.

SO OVERALL IT IS NOT SURPRISING TO SEE AN IMPERFECT MATCH OF THE STAGE HEIGHT AND SPECIFIC CONDUCTANCE WITH TIME AT THE GAGE SITE…BUT THE PATTERN IS CLEAR.

I could suggest placing a specific conductance monitor in the conical vent at a depth of say 30 feet to better track this. But, for now you can possible refine my thoughts about the pool from the spring to the instrument site, by sharing the stage area and velocity profiles across the channel from the ADCP field measurements. I am sure that will help refine my guesstimates. Others who have first hand knowledge may be able to confirm or revise my estimates regarding the size of the main spring.

My point again the flow from these springs does not have direct relationship with

Weeki Wachee Well Level.

SE Fork Calculation Equation

I was pleased to note in your e-mail from yesterday that you are still in touch with Dan Yobbi. That must be one interesting individual. I am sure I would enjoy sitting with him and discussing, over our beverage of choice, the Homosassa River along with his many other experiences.

$$Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(dS/dt)$$

For now I would like to get his and possibly some of your personnel to explain:
The large variations in calculated flow resulting primarily from the factor 418.4 * dS/dt.
The Gage Height Component; minus 10.31 * GH appears to address the discharge change due to hydraulic head change thru the day from the Fixed Component, for the day, 18.63 + 3.31 * Weeki Wachee.
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Sorry, but the logic does not hold.

All thoughts and commentary welcome.

Martyn

From: Doug Leeper
To: "Richard L Kane"
Cc: Kevin Grimsely (kjgrims@usgs.gov); Marty Kelly; Ron Basso; kwatson@hsweng.com; Marty Kelly; Ron Basso
Subject: RE: Specific Conductance and Flows Homosassa Springs Gage 02310678
Date: Tuesday, August 16, 2011 9:56:00 AM

Richard:

Here's an answer to your question regarding the "source" of the reported 15% standard error for discharge estimates at the Homosassa Springs gage. The text below, excerpted from Appendix B of the 2011 report titled "A Modeling Study of the Relationships of Freshwater Flow with the Salinity and Thermal Characteristics of the Homosassa River", indicates the error estimate was based on a May 2009 discussion between HSW Engineering, Inc. staff and Dave Fulcher.

Hope this helps.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
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E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

<><> START TEXT EXCERPT <><>

Appendix B
Investigation Summary of
USGS Gage Datum and Spring Flow Calculation

The USGS maintains five gauging stations within the study area at which stage is measured. In addition, discharge is reported for three of the gauging stations based on the following stream-gauging methods which were discussed with Dave Fulcher (USGS-Tampa) on May 1, 2009.

Homosassa Springs at Homosassa (02310678):
The current rating curve for the spring discharge reported at this station is represented by the equation:
$Q = 90.8162 + 3.823(GW) – 20.3771(GH)$ (B-1)
where
Q = spring discharge measurement (cfs),
GW = maximum daily groundwater level measured at the Floridan aquifer monitor well Weeki Wachee Well at Weeki Wachee (283201082315601) on the day of the discharge measurement used for the rating (ft NGVD29), and
GH = 15-minute gauge height of the river stage recorded at the time of the discharge measurement used for the rating, in feet relative to a gauge datum that is 2.99 feet below NAVD88.
Discharge measurements are made quarterly to characterize the rating. Measurements used to be made using conventional, Price-AA current meters deployed simultaneously by three people wading to minimize the measurement time. An acoustic doppler current profiler (ADCP) is now used. According to Mr. Fulcher, the standard error of the rating is approximately 15 percent, and no shifts have been applied during the rating analysis.

Although the rating curve in equation B-1 was developed using the maximum daily groundwater level measured at the Weeki Wachee well, the 15-minute discharge is calculated using the concurrent 1-hour groundwater level recorded at the Weeki Wachee monitor well and the 15-minute stage recorded at the spring. The average daily flow reported for the station is the average of 96 unit values of discharge calculated at 15-minute intervals during the day. During periods when unit discharge cannot be calculated using equation B-1, spring discharge is estimated from hydrographic comparison with nearby spring gauge(s).
<><> END TEXT EXCERPRT <><>

From: Richard L Kane [mailto:rkane@usgs.gov]
Sent: Sunday, August 14, 2011 5:52 PM
To: Doug Leeper
Cc: Kevin Grimsley
Subject: Fwd: Specific Conductance and Flows Homosassa Springs Gage 02310678

Doug, you can look at the PDF attachment that I pulled from ADAPS and it looks like the QW lags the stage but is not inverse of it. We're not fully funded to analyze the data so we cannot say for sure why it lags the tidal peaks. But it looks more like the SC is controlled more by the tide. It could be that the salinity has to come out of storage but not sure. Or that the reading is a bottom reading and you could bidirectional flows and salinity on the bottom will lag the stage peak.

Dave Fulcher does not remember the 15% error quote. We have never done an error analysis so we could have 5% accuracy or higher. Do you know where the 15% comes from?

I am going to contact Dan Yobbi to find out why he chose the Weeki Wachee well for the regressions.

____
Richard Kane
Associate Center Director, Data
FLWSC
10500 University Center Dr., Suite 215
813-498-5057 w
813-918-1275 c

Begin forwarded message:

> **From:** "Richard L Kane" <rkane@usgs.gov>
> **Date:** August 14, 2011 9:50:18 AM EDT
> **To:** "Kevin J Grimsley" <kjgrims@usgs.gov>
> **Subject: Fw: Specific Conductance and Flows Homosassa Springs Gage 02310678**
>
> Kevin I have pulled the data that Mr. Johnson questions for Homosassa Sps. I think his plots must have been off or scale incorrect on the x axis. When you look at this plot direct from the database I would say that the QW lags the change in stage and is not inverse of it. I'm not sure why it lags, you might understand it better than me. What do you think? Mr. Johnson's assumption, if I read it right, is that the increase in SC is from the tide going out and the flow increasing from the springs thereby increasing the dissolved solids. Since we are

really not getting paid to do the analysis of the data we can't put too much time into it but he is making some kind of point that the relationship with WW well is not valid. Do you think we should bring Yobbi into this?
(See attached file: 02310678.uv.pdf)

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FAX (813-498-5001)
Cell 813-918-1275
----- Forwarded by Richard L Kane/WRD/USGS/DOI on 08/14/2011 09:50 AM -----

From: Alan Martyn Johnson <martynellijay@hotmail.com>
To: Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
Date: 08/14/2011 07:27 AM
Subject: Specific Conductance and Flows Homosassa Springs Gage 02310678

E-MAIL AUG 6

It appears that the attachment to my August 6 e-mail did not attach correctly, or is not e-mail friendly. So here it is in a Word document that will hopefully work as an attachment.

As I commented, this graph for the Homosassa Springs Site is another indicator of how the nature of water entering the river is deteriorating It appears there is either more higher salinity water from Homosassa 1 and 2, or less flow from the lower salinity spring Homosassa 3. Daily Minimums for Specific conductance of the combined flows in 2005 was around 2500 µs/cm they are now rarely below 3500 µs/cm and never below 3000 µs/cm.
This is shown on the USGS graphic in the attachment.

That observation was more of a side observation to what I was interested in, but I thought noteworthy.

SPECIFIC CONDUCTANCE STAGE HEIGHT AND FLOW HOMOSASSA SPRINGS GAGE SITE

I have expressed concerns about the use of the Weeki Wachee Well level in the calculation of flows for the springs in the Homosassa complex. As, I started to look more critically at the data from the Homosassa Spring Gage Site, I noted the cyclic pattern of the Specific Conductance relative to the Stage Height.

Analysis of the data shows:

Specific Conductance is HIGHER when the Stage Height is LOWER.

I was surprised by the inverse relationship that is so pronounced, particularly in light of the different chemical composition of water from these springs .

The second chart in the attachment shows the data for July 1-5 as obtained from the USGS Real Time Data. I did analyses from other dates and the pattern is the same.
Scale on the y-axis for the two plots is not the same, x-axis numbers are the 15 minute time intervals.
The third chart shows the Specific Conductance to show the actual magnitude of the change.

This pattern indicates that the flow from each of the three vents changes disproportionately with the stage height .

The most logical explanation for the Specific Conductance pattern to be inverse to Stage Height is the flow from Homosassa 1 and 2 decreases proportionally more than flow from Homosassa 3 as Stage Height increases. And the differences appear to be very significant.

In round numbers the Specific Conductance of water in the three vents for recent years is:
Homosassa 1: 4500 µs/cm
Homosassa 2: 6500 µs/cm
Homosassa 3: 2500 µs/cm
Note: This data is from SWFWMD data Doug shared with me some time ago, I rounded the numbers for ease of presentation.

During the period July 1-5 the combined flow at the gage site, in round numbers, is:
Average 4500 µs/cm
Maximum 5500 µs/cm
Minimum 3500 µs/cm

These numbers imply:
For Average Specific Conductance the flow from HS 2 and HS 3 would be equal. Equal flow would balance the SC to 4500 µs/cm.

For Low Specific Conductance the flow from HS 1 and 2 would have to drop over 50%. If HS 2 is the stronger flow the drop would have to be more than 50%.

For High Specific Conductance the flow from HS 2 would have to increase over 100%.
Note:
Specific Conductance varies with the composition of the water body, but the water analyses for Homosassa 1, 2, 3 show a close relationship of Specific Conductance being 1.9 times TDS Total Dissolved Solids for all three waters from 1994-2009 i.e. the numbers can be comingled without compromising the general thought.

For changes of this nature the hydraulic head driving HS 1 and 2 must be significantly different to that driving the flow in HS 3.

So with this observation of the data, is the use of the Weeki Wachee well level in the equation to calculate flows at this site even more of a stretch to get accurate discharge figure?

Dave Fulcher USGS reported the standard error of 15% in Appendix B-2 of the MFL report for the Homosassa Spring calculated discharge data. Standard error of 15% is not exactly brimming with confidence.

Having raised these questions;
Overall I have less concerns about Discharge Data for Homosassa Springs than the SE Fork. But, that is not to say the validity of the equation does not need to be reviewed.

I have reviewed the Field Measurements from the USGS web site and find that the data does not match well with the equation. Field Measurements June 2002 particularly stood out and contain a number of points that do not follow the logic of decrease stage results in increase flow. **This may be another one to have QA look at, but I realise this was almost 10 years ago. Said I had another one for the QA professionals to review...the unusually low flows measured may be a factor for logic not holding.**

The pronounced inverse relationship between Stage Height and Specific Conductance does for me raise questions about discharge from the Homosassa Spring. I will be more than willing to hear someone else explain this.

Again I add to my concerns about the methodology/procedures for determining discharge are questionable and fraught with assumptions and estimates. So much is riding on the accuracy of these discharge measurements.

Still say there is already too much water being pumped out of the aquifer and it is destroying the Homosassa River, and others.

Martyn

P.S. RE SE Fork ADCP budget item.
However, someone looks at all these questions about flow measurement I trust the the Budget Director does not hear that the currently available data is fine, when he/she reviews the need for the Velocity Monitoring Equipment. Budgets are tight why spend money when the present data meets the needs and has been used to support studies that cost hundreds of thousands and more likely many millions of dollars.

I reiterate my previous suggestion to install a field unit on a temporary basis to validate the expenditure.
Quote
Richard/USGS and/or SWFWMD may be able to find a suitable unit that is available short term. Surely somewhere there is a maintenance workshop that cleans/maintains the vast number of units that USGS has. Collecting flow data for say 3 months would help assure that this budgeted unit is a validated expenditure. The 3 month data would not have to be fed to the USGS Real Time Data system it could be collected using an on site recorder and reviewed say monthly. Just an idea to progress matters in an orderly constructive framework. Any thoughts from yourself or Richard regarding trying to find /install a 'test' unit would be appreciated.
End Quote
(See attached file: Attachment Aug 14 SApecific Conductance.doc)

From: Richard L Kane
To: Doug Leeper
Subject: Fw: SPRINGS REPORTs
Date: Tuesday, August 16, 2011 9:42:57 AM
Attachments: wrir_92_4069.djvu

Doug you might want to add these reports to the Springs Website. You should be able to download these reports from the USGS Library.

Yobbi, D.K., 1992, Effects of tidal stage and ground-water levels on the discharge and water quality of springs in coastal Citrus and Hernando Counties, Florida: U.S. Geological Survey Water-Resources Investigations Report 92-4069, 44 p.

Yobbi, D.K., and Knochenmus, L.A., 1989, Salinity and flow relations and effects of reduced flow in the Chassahowitzka River and Homosassa River estuaries, southwest Florida: U.S. Geological Survey Water-Resources Investigations Report 88-4044, 38 p.

Yobbi, D.K., and Knochenmus, L.A., 1989, Effects of river discharge and high-tide stage on salinity intrusion in the Weeki Wachee, Crystal, and Withlacoochee River estuaries, southwest Florida: U.S. Geological Survey Water-Resources Investigations Report 88-4116, 63 p.

Yobbi, D.K., 1989, Simulation of steady-state ground water and spring flow in the upper Floridan aquifer of coastal Citrus and Hernando Counties, Florida: U.S. Geological Survey Water-Resources Investigations Report 88-4036, 33 p

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----- Forwarded by Richard L Kane/WRD/USGS/DOI on 08/16/2011 09:13 AM -----

From: DANN YOBBI <dyobbi@sbcglobal.net>
To: Richard L Kane <rkane@usgs.gov>
Cc: Kevin J Grimsley <kjgrims@usgs.gov>
Date: 08/15/2011 11:50 PM
Subject: MY SPRINGS REPORT

Richard/Kevin--Take a look at my springs report; particularly, the graph and regression equation relating specific conductance and stage at Homosassa Springs with tidal ground water levels. The report gives a basic discussion of the tide effects on salinity changes in the coastal springs.

From: Doug Leeper
To: "Richard L Kane"
Cc: Kevin Grimsely (kjgrims@usgs.gov); Marty Kelly; Ron Basso; Mike Heyl
Subject: RE: Homosassa Springs and SE Fork Additional comments
Date: Tuesday, August 16, 2011 10:22:00 AM

Richard –

Thanks for your and Dann Yobbi's comments regarding groundwater/salinity issues in the Homosassa system. I'll be sure to discuss this stuff with Ron Basso and others here at the District.

Regarding the next workshop and a presentation by Dann – don't feel that will be necessary. Kevin provided a good overview of USGS monitoring in the Springs Coast area at the last workshop. I guess Dan's presence could help with a face-to-face meeting with Martyn Johnson, if Mr. Johnson agrees to meet with USGS staff.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
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E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Richard L Kane [mailto:rkane@usgs.gov]
Sent: Tuesday, August 16, 2011 9:12 AM
To: Doug Leeper
Cc: Kevin J Grimsley; Richard L Kane
Subject: Fw: Homosassa Springs and SE Fork Additional comments

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----- Forwarded by Richard L Kane/WRD/USGS/DOI on 08/16/2011 08:46 AM -----

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To:	Richard L Kane <rkane@usgs.gov>
Cc:	Kevin J Grimsley <kjgrims@usgs.gov>
Date:	08/15/2011 10:38 PM
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Let me know--

dann

From: Richard L Kane <rkane@usgs.gov>
To: dyobbi@sbcglobal.net
Cc: Kevin Grimsley <kjgrims@usgs.gov>
Sent: Mon, August 15, 2011 5:45:18 PM
Subject: Fwd: Homosassa Springs and SE Fork Additional comments

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____

Richard Kane
Associate Center Director, Data
FLWSC
10500 University Center Dr., Suite 215
813-498-5057 w
813-918-1275 c

Begin forwarded message:

From: "Alan Martyn Johnson" <martynellijay@hotmail.com>
Date: August 15, 2011 7:41:52 PM EDT
To: "rkane" <rkane@usgs.gov>
Cc: "Doug Leeper" <doug.leeper@swfwmd.state.fl.us>,"Kevin J Grimsley " <kjgrims@usgs.gov>
Subject: Homosassa Springs and SE Fork Additional comments

Richard,

HOMOSASSA SPRINGS SITE/Earlier e-mail

With a little more time this evening I would like to expand on my very brief comment this morning, that the lag is associated with how quickly the flow rates from each of the vents adjusts to stage. In addition to the time it takes for the flows to modulate to the change in back pressure from the stage height change, there is also the time it takes for the water change (60 ft down) to reach the monitoring instrument location.

A few thoughts to put some numbers/meat to this for better explanation of my point:

1. Main Spring

I would estimate the main spring is about 30 feet wide at the top (observatory level may be more but lets use 30) and is described as conical down to the vents which are reported as 65 feet deep (I have no other way of verifying this other than the bulletin I read).
If these are good estimate this cone would hold about 14,000 cubic ft and take **about 3 minutes to elute at 80 cfs spring flow.**

2. Pool

The pool from the main spring to the instrument location on the NE bank is about 0.25 acres minimum. If the average depth is 3 feet this is holds about 30,000 cubic feet and take about **6 minutes to elute at 80 cfs spring flow**.

The 80 cfs comes from recent field measurements over the last year, and is the maximum calculated flow for the data time period we are reviewing.

Total about 10 minutes assuming **laminar flow**, which I would again speculate is not the case, particularly as the instrument location is close to the bank.

3. Daily Stage Height Inequality

Add to the above the daily inequality of the stage height change, which presumably also has an effect.
Lower Low to Higher High change is in the order of 1 foot
Higher Low to the Lower High is in the order of 0.4 feet foot, for the data time period we are reviewing. This will also have an influence as to how **the relative flows from each of the vents changes** in each of these cycles in addition to the changes; in addition to the total cfs. These cycles are evident on the chart.

SO OVERALL IT IS NOT SURPRISING TO SEE AN IMPERFECT MATCH OF THE STAGE HEIGHT AND SPECIFIC CONDUCTANCE WITH TIME AT THE GAGE SITE…BUT THE PATTERN IS CLEAR.

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My point again the flow from these springs does not have direct relationship with Weeki Wachee Well Level.

<u>SE Fork Calculation Equation</u>

I was pleased to note in your e-mail from yesterday that you are still in touch with Dan Yobbi. That must be one interesting individual. I am sure I would enjoy sitting with him and discussing, over our beverage of choice, the Homosassa River along with his many other experiences.

$$Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(dS/dt)$$

For now I would like to get his and possibly some of your personnel to explain:
The large variations in calculated flow resulting primarily from the factor 418.4 * dS/dt.
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3, 2011 when the 24 hour change was 0.59 feet.

The large changes in the calculated flows (the red line) have no logical basis when considered in conjunction with the 3 acre pool upstream of the bridge/ monitoring site. This is essentially a confined pool that accumulates spring waters during stage height increases; and discharges water during stage height decreases. This appears to be the primary cause of flow changes at the gage site/under the bridge. There is certainly not reverse flow at any of the spring vents in the SEF and the 3 acre pool I have estimated is more than the immediately defined boundaries; giving some additional area for changes of ground water in the sandy soils.

Sorry, but the logic does not hold.

All thoughts and commentary welcome.

Martyn

From: Alan Martyn Johnson <martynellijay@hotmail.com>
To: Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
Date: 08/14/2011 07:27 AM
Subject: Specific Conductance and Flows Homosassa Springs Gage 02310678

E-MAIL AUG 6
It appears that the attachment to my August 6 e-mail did not attach correctly, or is not e-mail friendly. So here it is in a Word document that will hopefully work as an attachment.

As I commented, this graph for the Homosassa Springs Site is another indicator of how the nature of water entering the river is deteriorating It appears there is either more higher salinity water from Homosassa 1 and 2, or less flow from the lower salinity spring Homosassa 3. Daily Minimums for Specific conductance of the combined flows in 2005 was around 2500 µs/cm they are now rarely below 3500 µs/cm and never below 3000 µs/cm. This is shown on the USGS graphic in the attachment.

That observation was more of a side observation to what I was interested in, but I thought noteworthy.

SPECIFIC CONDUCTANCE STAGE HEIGHT AND FLOW HOMOSASSA SPRINGS GAGE SITE

I have expressed concerns about the use of the Weeki Wachee Well level in the calculation of flows for the springs in the Homosassa complex. As, I started to look more critically at the data from the Homosassa Spring Gage Site, I noted the cyclic pattern of the Specific Conductance relative to the Stage Height.

Analysis of the data shows:

Specific Conductance is HIGHER when the Stage Height is LOWER.

I was surprised by the inverse relationship that is so pronounced, particularly in light of the different chemical composition of water from these springs .

The second chart in the attachment shows the data for July 1-5 as obtained from the USGS Real Time Data. I did analyses from other dates and the pattern is the same.
Scale on the y-axis for the two plots is not the same, x-axis numbers are the 15 minute time intervals.
The third chart shows the Specific Conductance to show the actual magnitude of the change.

This pattern indicates that the flow from each of the three vents changes disproportionately with the stage height .

The most logical explanation for the Specific Conductance pattern to be inverse to Stage

Height is the flow from Homosassa 1 and 2 decreases proportionally more than flow from Homosassa 3 as Stage Height increases. And the differences appear to be very significant.

In round numbers the Specific Conductance of water in the three vents for recent years is:
Homosassa 1: 4500 µs/cm
Homosassa 2: 6500 µs/cm
Homosassa 3: 2500 µs/cm
Note: This data is from SWFWMD data Doug shared with me some time ago, I rounded the numbers for ease of presentation.

During the period July 1-5 the combined flow at the gage site, in round numbers, is:
Average 4500 µs/cm
Maximum 5500 µs/cm
Minimum 3500 µs/cm

These numbers imply:
For Average Specific Conductance the flow from HS 2 and HS 3 would be equal. Equal flow would balance the SC to 4500 µs/cm.

For Low Specific Conductance the flow from HS 1 and 2 would have to drop over 50%. If HS 2 is the stronger flow the drop would have to be more than 50%.

For High Specific Conductance the flow from HS 2 would have to increase over 100%.
Note:
Specific Conductance varies with the composition of the water body, but the water analyses for Homosassa 1, 2, 3 show a close relationship of Specific Conductance being 1.9 times TDS Total Dissolved Solids for all three waters from 1994-2009 i.e. the numbers can be comingled without compromising the general thought.

For changes of this nature the hydraulic head driving HS 1 and 2 must be significantly different to that driving the flow in HS 3.

So with this observation of the data, is the use of the Weeki Wachee well level in the equation to calculate flows at this site even more of a stretch to get accurate discharge figure?

Dave Fulcher USGS reported the standard error of 15% in Appendix B-2 of the MFL report for the Homosassa Spring calculated discharge data. Standard error of 15% is not exactly brimming with confidence.

Having raised these questions;
Overall I have less concerns about Discharge Data for Homosassa Springs than the SE Fork. But, that is not to say the validity of the equation does not need to be reviewed.

I have reviewed the Field Measurements from the USGS web site and find that the data does not match well with the equation. Field Measurements June 2002 particularly stood out and contain a number of points that do not follow the logic of decrease stage results in increase flow. **This may be another one to have QA look at, but I realise this was almost 10 years ago. Said I had another one for the QA professionals to review...the unusually low flows measured may be a factor for logic not holding.**

The pronounced inverse relationship between Stage Height and Specific Conductance does for me raise questions about discharge from the Homosassa Spring. I will be more than willing to hear someone else explain this.

Again I add to my concerns about the methodology/procedures for determining discharge are questionable and fraught with assumptions and estimates. So much is riding on the accuracy of these discharge measurements.

Still say there is already too much water being pumped out of the aquifer and it is destroying the Homosassa River, and others.

Martyn

P.S. RE SE Fork ADCP budget item.
However, someone looks at all these questions about flow measurement I trust the the Budget Director does not hear that the currently available data is fine, when he/she reviews the need for the Velocity Monitoring Equipment. Budgets are tight why spend money when the present data meets the needs and has been used to support studies that cost hundreds of thousands and more likely many millions of dollars.

I reiterate my previous suggestion to install a field unit on a temporary basis to validate the expenditure.
Quote
Richard/USGS and/or SWFWMD may be able to find a suitable unit that is available short term. Surely somewhere there is a maintenance workshop that cleans/maintains the vast number of units that USGS has. Collecting flow data for say 3 months would help assure that this budgeted unit is a validated expenditure. The 3 month data would not have to be fed to the USGS Real Time Data system it could be collected using an on site recorder and reviewed say monthly. Just an idea to progress matters in an orderly constructive framework. Any thoughts from yourself or Richard regarding trying to find /install a 'test' unit would be appreciated.
End Quote
[attachment "Attachment Aug 14 SApecific Conductance.doc" deleted by Richard L Kane/WRD/USGS/DOI]

From: Doug Leeper
To: Marty Kelly; Ron Basso; Mike Heyl; kwatson@hsweng.com
Subject: FW: E-Mail from KGrimsley to MJohnson
Date: Tuesday, August 16, 2011 10:27:00 AM

FYI

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Kevin J Grimsley [mailto:kjgrims@usgs.gov]
Sent: Monday, August 15, 2011 9:08 PM
To: Alan Martyn Johnson
Cc: rkane; Doug Leeper
Subject: Re: Homosassa Springs and SE Fork Additional comments

Martyn,

We're planning on performing a few cross-section conductance measurements to investigate this lag between the water level and conductance cycles. We'll see what those measurements reveal, but we do not believe it has anything to do with variations in flow rates between the vents. We believe this is caused by stratification of flow around the gage location. In any case, these differences have no standing in evaluating the validity of using the Weeki Wachee Well in the discharge regressions.

Here are Dann Yobbi's thoughts on these subjects:

"The Weeki Wachee well was chosen because of the excellent relation with discharge at Week Wachee Springs and the relatively large water level range that represents the regional recharge/discharge conditions in the aquifer system. Flow of the springs is dependent on aquifer heads and ground-water gradients. Stage and rate of change in stage are surrogates for the effects of tide on discharge.

The test of the equations is its comparison with MEASURED DISCHARGE. If measured discharge compares favorably with simulated discharge, the equation is a reliable predictor of discharge. This is why it was critical to make field measurements of discharge at several ground-water conditions and at different tide conditions during the year.

If tide did not effect flow of Homosassa Springs or SE Fork, there would be a very small range of discharge of both springs because of the very low gradient of the potentiometric surface near these springs. Take out stage and rate of change from the equations and look at the discharge."

As I've said several times before and Dann repeated, the appropriate evaluation of the equations is how they compare with the measured discharge. Once again, the average difference between the SE Fork equation and our measurements has been less than 5% which is excellent. Are there some measurements that are more than 5%? Absolutely, but it's unreasonable to expect otherwise. I'm pretty sure there isn't a station in the state that's always within 5%. We don't pretend that these equations are flawless, but they are reasonable and they have been reviewed and re-reviewed.

There is documented reverse flow at the gage location along the left bank. The entire flow does not reverse, but it is bidirectional at many high tides. This has nothing to do with concrete bags or eddy currents. This is caused by the incoming tide pushing back against the flow from the springs.

****
Kevin Grimsley, P.E.
Supervisory Hydrologist
USGS, Florida Water Science Center
10500 University Center Drive, Suite 215
Tampa, FL 33612
kjgrims@usgs.gov
813-975-8620 x159
****

On Aug 15, 2011, at 7:41 PM, "Alan Martyn Johnson" <martynellijay@hotmail.com> wrote:

Richard,

HOMOSASSA SPRINGS SITE/Earlier e-mail

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All thoughts and commentary welcome.

Martyn

<SE Fork Chart August 15, 2011.doc>

From: Doug Leeper
To: "Alan Martyn Johnson"
Cc: Ron Basso; Marty Kelly
Subject: RE: Groundwater Basins
Date: Thursday, August 18, 2011 8:12:00 AM

Martyn- My short answer to your inquiry is no. Effects of water use throughout the entire Northwest Central Florida groundwater basin may be expected to potentially influence spring discharge in any of the regional springs/springsheds. That is, the springshed boundaries are not true hydrologic divides. The location and magnitude of area withdrawals, along with local variation in the underlying geology of the Northwest Central Florida groundwater basin would, of course be expected to influence the spatial distribution of withdrawal impacts. The springshed basins are best thought of as areas were land-use may be expected to most strongly impact groundwater quality.

Note that I expect Ron may likely chime in to correct my "non-geologist" response to your question.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
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Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Thursday, August 18, 2011 7:57 AM
To: Doug Leeper; Ron Basso
Subject: Groundwater Basins

Doug and Ron,
Sorry to keep asking essentially the same question, but this is to help me clarify my understanding about groundwater flowing between basins or not.

I will try to be brief and to the point.

As I understand a groundwater basin such as the Homosassa Basin and the Chassahowitzka Basin and the Weeki Wachee Basin are independent of each other as regards groundwater flowing from one basin to the next. Each basin is defined by the geological boundary (topography of the basin bottom) that forms an almost watertight container (sorry if that is an over simplification but I hope it conveys my understanding succinctly). Water enters each basin as rainfall (Homosassa 292 sq miles, Chassahowitzka 190 sq miles) and leaves as transevaporative loss, surface water run off, spring flow or pumping. Groundwater held in the basin does not move from one basin to another.

The Figure 2-2 from the Chassahowitzka report page 11 (copy attached) shows the various groundwater basins H, C, W and as I understand each is independent (for all practical purposes).

I think any confusion may arise from understanding NorthWest Central Florida Groundwater Basin and Costal Rivers Basin. Which lead to a question of "Am I sure each of the sub-basins within these BIG BASINS are not interconnected other than geographic proximity?".

Is my understanding that each of the 'sub-basins' are independent? At least independent for all practical purposes.

Hopefully it is a easy question to answer with a yes/no. If no maybe we can discuss at the next meeting to save your time right now.

Thanks,
Martyn

From:	Alan Martyn Johnson
To:	Doug Leeper; Ron Basso
Subject:	Groundwater Basins
Date:	Thursday, August 18, 2011 7:56:57 AM
Attachments:	Chassahowitzka Report Figure 2-2 page 11.doc

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From: Ron Basso
To: Doug Leeper; Alan Martyn Johnson
Cc: Marty Kelly
Subject: RE: Groundwater Basins
Date: Thursday, August 18, 2011 8:39:06 AM
Attachments: GW_Basins.pptx

Mr. Martyn:

The smaller springshed boundaries are used primarily to determine potential water quality degradation(e.g. nitrates or other pollutants) from water infiltrating from land surface and making its way into the local flow system of the spring. The water level In the Upper Floridan aquifer or if you like, the pressurized surface of the aquifer can be affected by well withdrawals outside these rather small springsheds – it's this larger, more regional flow system of the Floridan aquifer that provides flow to the coastal springs and discharges groundwater through lateral seepage at the coast. The flow at an individual spring vent is controlled by the elevation or driving head of the Floridan aquifer water level at that vent. Withdrawals within the larger Northern West-Central Floridan Groundwater Basin (see attached figure) would all to some degree contribute to lowered spring flow and lateral groundwater discharge along the nature coast. These large groundwater basins are separated by major flow divides and exhibit similar geology. I hope this has clarified the issue for you – if not, please contact me and let's discuss.

Ron Basso, P.G.
Senior Professional Geologist
Hydrologic Evaluation Section
Southwest Florida Water Management District
ph 1-800-423-1476 (in state)
ph 352-796-7211, ext. 4291 (outside state)
FAX 352-797-5799

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Sent: Thursday, August 18, 2011 8:12 AM
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Martyn

From:	Kevin J Grimsley
To:	Doug Leeper
Subject:	Re: Specific Conductance and Flows Homosassa Springs Gage 02310678
Date:	Tuesday, August 16, 2011 9:17:37 PM

Hey Doug,

Since Mr Johnson has declined our invitation to visit our office for a meeting, we've decided to make one more attempt at a meeting on the morning of the September workgroup meeting. You're certainly invited as well as anyone else from SWFWMD you think should attend. Dann Yobbi has agreed to attend as well.

Do you think we should try to arrange a space at the Lecanto building or perhaps there at the district office?

On Aug 16, 2011, at 9:56 AM, "Doug Leeper" <Doug.Leeper@swfwmd.state.fl.us> wrote:

> Richard:
>
> Here's an answer to your question regarding the "source" of the reported 15% standard error for discharge estimates at the Homosassa Springs gage. The text below, excerpted from Appendix B of the 2011 report titled "A Modeling Study of the Relationships of Freshwater Flow with the Salinity and Thermal Characteristics of the Homosassa River", indicates the error estimate was based on a May 2009 discussion between HSW Engineering, Inc. staff and Dave Fulcher.
>
> Hope this helps.
>
> Douglas A. Leeper, Chief Environmental Scientist
>
> Resource Projects Department, Southwest Florida Water Management District
>
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<><> START TEXT EXCERPT <><>

Appendix B

Investigation Summary of

USGS Gage Datum and Spring Flow Calculation

The USGS maintains five gauging stations within the study area at which stage is measured. In addition, discharge is reported for three of the gauging stations based on the following stream-gauging methods which were discussed with Dave Fulcher (USGS-Tampa) on May 1, 2009.

Homosassa Springs at Homosassa (02310678):

The current rating curve for the spring discharge reported at this station is represented by the equation:

Q = 90.8162 + 3.823(GW) – 20.3771(GH) (B-1)

where

Q = spring discharge measurement (cfs),

GW = maximum daily groundwater level measured at the Floridan aquifer monitor well

Weeki Wachee Well at Weeki Wachee (283201082315601) on the day of the

discharge measurement used for the rating (ft NGVD29), and

GH = 15-minute gauge height of the river stage recorded at the time of the discharge

measurement used for the rating, in feet relative to a gauge datum that is 2.99 feet

below NAVD88.

Discharge measurements are made quarterly to characterize the rating. Measurements used to be made using conventional, Price-AA current meters deployed simultaneously by three people wading to minimize the measurement time. An acoustic doppler current profiler (ADCP) is now used. According to Mr. Fulcher, the standard error of the rating is approximately 15 percent, and no shifts have been applied during the rating analysis.

Although the rating curve in equation B-1 was developed using the maximum daily groundwater level measured at the Weeki Wachee well, the 15-minute discharge is calculated using the concurrent 1-hour groundwater level recorded at the Weeki Wachee monitor well and the 15-minute stage recorded at the spring. The average daily flow reported for the station is the average of 96 unit values of discharge calculated at 15-minute intervals during the day. During periods when unit discharge cannot be calculated using equation B-1, spring discharge is estimated from hydrographic comparison with nearby spring gauge(s).

<><> END TEXT EXCERPRT <><>

From: Richard L Kane [mailto:rkane@usgs.gov]
Sent: Sunday, August 14, 2011 5:52 PM
To: Doug Leeper
Cc: Kevin Grimsley
Subject: Fwd: Specific Conductance and Flows Homosassa Springs Gage 02310678

Doug, you can look at the PDF attachment that I pulled from ADAPS and it looks like the QW lags the stage but is not inverse of it. We're not fully funded to analyze the data so we cannot say for sure why it lags the tidal peaks. But it looks more like the SC is controlled more by the tide. It could be that the salinity has to come out of storage but not sure. Or that the reading is a bottom reading and you could bidirectional flows and salinity on the bottom will lag the stage peak.

Dave Fulcher does not remember the 15% error quote. We have never done an error analysis so we could have 5% accuracy or higher. Do you know where the 15% comes from?

I am going to contact Dan Yobbi to find out why he chose the Weeki Wachee well for the regressions.

Richard Kane

Associate Center Director, Data

FLWSC

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Begin forwarded message:

> **From:** "Richard L Kane" <rkane@usgs.gov>

Date: August 14, 2011 9:50:18 AM EDT
To: "Kevin J Grimsley" <kjgrims@usgs.gov>
Subject: Fw: Specific Conductance and Flows Homosassa Springs Gage 02310678

Kevin I have pulled the data that Mr. Johnson questions for Homosassa Sps. I think his plots must have been off or scale incorrect on the x axis. When you look at this plot direct from the database I would say that the QW lags the change in stage and is not inverse of it. I'm not sure why it lags, you might understand it better than me. What do you think? Mr. Johnson's assumption, if I read it right, is that the increase in SC is from the tide going out and the flow increasing from the springs thereby increasing the dissolved solids. Since we are really not getting paid to do the analysis of the data we can't put too much time into it but he is making some kind of point that the relationship with WW well is not valid. Do you think we should bring Yobbi into this?
(See attached file: 02310678.uv.pdf)

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
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Cell 813-918-1275
----- Forwarded by Richard L Kane/WRD/USGS/DOI on 08/14/2011 09:50 AM -----

From: Alan Martyn Johnson <martynellijay@hotmail.com>
To: Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
Date: 08/14/2011 07:27 AM
Subject: Specific Conductance and Flows Homosassa Springs Gage 02310678

E-MAIL AUG 6

It appears that the attachment to my August 6 e-mail did not attach correctly, or is not e-mail friendly. So here it is in a Word document that will hopefully work as an attachment.

As I commented, this graph for the Homosassa Springs Site is another indicator of how the nature of water entering the river is deteriorating It appears there is

either more higher salinity water from Homosassa 1 and 2, or less flow from the lower salinity spring Homosassa 3. Daily Minimums for Specific conductance of the combined flows in 2005 was around 2500 µs/cm they are now rarely below 3500 µs/cm and never below 3000 µs/cm.
This is shown on the USGS graphic in the attachment.

That observation was more of a side observation to what I was interested in, but I thought noteworthy.

SPECIFIC CONDUCTANCE STAGE HEIGHT AND FLOW HOMOSASSA SPRINGS GAGE SITE

I have expressed concerns about the use of the Weeki Wachee Well level in the calculation of flows for the springs in the Homosassa complex. As, I started to look more critically at the data from the Homosassa Spring Gage Site, I noted the cyclic pattern of the Specific Conductance relative to the Stage Height.

Analysis of the data shows:

Specific Conductance is HIGHER when the Stage Height is LOWER.

I was surprised by the inverse relationship that is so pronounced, particularly in light of the different chemical composition of water from these springs .

The second chart in the attachment shows the data for July 1-5 as obtained from the USGS Real Time Data. I did analyses from other dates and the pattern is the same.
Scale on the y-axis for the two plots is not the same, x-axis numbers are the 15 minute time intervals.
The third chart shows the Specific Conductance to show the actual magnitude of the change.

This pattern indicates that the flow from each of the three vents changes disproportionately with the stage height .

The most logical explanation for the Specific Conductance pattern to be inverse to Stage Height is the flow from Homosassa 1 and 2 decreases proportionally more than flow from Homosassa 3 as Stage Height increases. And the differences appear to be very significant.

In round numbers the Specific Conductance of water in the three vents for recent years is:
Homosassa 1: 4500 µs/cm
Homosassa 2: 6500 µs/cm
Homosassa 3: 2500 µs/cm
Note: This data is from SWFWMD data Doug shared with me some time ago, I rounded the numbers for ease of presentation.

During the period July 1-5 the combined flow at the gage site, in round numbers, is:
Average 4500 µs/cm
Maximum 5500 µs/cm
Minimum 3500 µs/cm

These numbers imply:
For Average Specific Conductance the flow from HS 2 and HS 3 would be equal. Equal flow would balance the SC to 4500 µs/cm.

For Low Specific Conductance the flow from HS 1 and 2 would have to drop over 50%. If HS 2 is the stronger flow the drop would have to be more than 50%.

For High Specific Conductance the flow from HS 2 would have to increase over 100%.
Note:
Specific Conductance varies with the composition of the water body, but the water analyses for Homosassa 1, 2, 3 show a close relationship of Specific Conductance being 1.9 times TDS Total Dissolved Solids for all three waters from 1994-2009 i.e. the numbers can be comingled without compromising the general thought.

For changes of this nature the hydraulic head driving

HS 1 and 2 must be significantly different to that driving the flow in HS 3.

So with this observation of the data, is the use of the Weeki Wachee well level in the equation to calculate flows at this site even more of a stretch to get accurate discharge figure?

Dave Fulcher USGS reported the standard error of 15% in Appendix B-2 of the MFL report for the Homosassa Spring calculated discharge data. Standard error of 15% is not exactly brimming with confidence.

Having raised these questions;
Overall I have less concerns about Discharge Data for Homosassa Springs than the SE Fork. But, that is not to say the validity of the equation does not need to be reviewed.

I have reviewed the Field Measurements from the USGS web site and find that the data does not match well with the equation. Field Measurements June 2002 particularly stood out and contain a number of points that do not follow the logic of decrease stage results in increase flow. **This may be another one to have QA look at, but I realise this was almost 10 years ago. Said I had another one for the QA professionals to review...the unusually low flows measured may be a factor for logic not holding.**

The pronounced inverse relationship between Stage Height and Specific Conductance does for me raise questions about discharge from the Homosassa Spring. I will be more than willing to hear someone else explain this.

Again I add to my concerns about the methodology/procedures for determining discharge are questionable and fraught with assumptions and estimates. So much is riding on the accuracy of these discharge measurements.

Still say there is already too much water being pumped out of the aquifer and it is destroying the Homosassa River, and others.

Martyn

P.S. RE SE Fork ADCP budget item.
However, someone looks at all these questions about flow measurement I trust the the Budget Director does not hear that the currently available data is fine, when he/she reviews the need for the Velocity Monitoring Equipment. Budgets are tight why spend money when the present data meets the needs and has been used to support studies that cost hundreds of thousands and more likely many millions of dollars.

I reiterate my previous suggestion to install a field unit on a temporary basis to validate the expenditure.
Quote
Richard/USGS and/or SWFWMD may be able to find a suitable unit that is available short term. Surely somewhere there is a maintenance workshop that cleans/maintains the vast number of units that USGS has. Collecting flow data for say 3 months would help assure that this budgeted unit is a validated expenditure. The 3 month data would not have to be fed to the USGS Real Time Data system it could be collected using an on site recorder and reviewed say monthly. Just an idea to progress matters in an orderly constructive framework. Any thoughts from yourself or Richard regarding trying to find /install a 'test' unit would be appreciated.
End Quote
(See attached file: Attachment Aug 14 SApecific Conductance.doc)

From:	Doug Leeper
To:	"Kevin J Grimsley"
Cc:	Marty Kelly
Subject:	RE: Specific Conductance and Flows Homosassa Springs Gage 02310678
Date:	Thursday, August 18, 2011 8:22:00 AM

Kevin:

I'll be glad to participate in a meeting with Mr. Johnson on the morning of September 6th. I've gone ahead and reserved a small conference room here at the District for 8:30 to 11:00 AM (thought you might want to meet from 9 to 11, as a placeholder.

If you want to meet in Lecanto, I (we) will have to check on the availability of a meeting room at the Government Services Building. The Brooksville meeting room is a sure thing. If we meet in Brooksville, I will definitely need to be done by 11 to get stuff ready and travel to Lecanto for the afternoon workshop.

Even if we end up meeting in Lecanto, I would not want to run the meeting with Mr. Johnson to close to the starting time for the afternoon workshop. I will need time to eat, greet incoming meeting participants, coordinate presentations, etc.

Seems you can extend the invitation to Mr. Johnson, knowing that we can meet in Brooksville, or possibly in Lecanto (pending a check on room availability).

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
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Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Kevin J Grimsley [mailto:kjgrims@usgs.gov]
Sent: Tuesday, August 16, 2011 9:13 PM
To: Doug Leeper
Subject: Re: Specific Conductance and Flows Homosassa Springs Gage 02310678

Hey Doug,

Since Mr Johnson has declined our invitation to visit our office for a meeting, we've decided to make one more attempt at a meeting on the morning of the September workgroup meeting. You're certainly invited as well as anyone else from SWFWMD you think should attend. Dann Yobbi has agreed to attend as well.

Do you think we should try to arrange a space at the Lecanto building or perhaps there at the district office?

NOTE: REMAINDER OF E-MAIL STRING DELETED BY DOUG LEEPER

From:	Kevin J Grimsley
To:	Alan Martyn Johnson
Cc:	Doug Leeper; rkane; Marty Kelly
Subject:	Proposed meeting
Date:	Thursday, August 18, 2011 10:57:18 AM

Mr. Johnson,

Since you have indicated that you won't travel to our office for a meeting, Doug Leeper has agreed to provide a conference room at the SWFWMD office in Brooksville for a meeting on the morning of September 6 before the working group meeting that afternoon. We can meet between 9 and 11 am that morning, but then we'll have to conclude so we can all prepare for the afternoon meeting. We're also flying Dann Yobbi back from Nevada so that he can participate in both meetings and answer any questions relating to his work here in Florida.

We hope that this face to face meeting will allow us to discuss all these issues more efficiently than trading emails over a period of months as we've been doing. We look forward to meeting with you and please let as know as soon as possible whether or not you will be able to attend.

****
Kevin Grimsley, P.E.
Supervisory Hydrologist
USGS, Florida Water Science Center
10500 University Center Drive, Suite 215
Tampa, FL 33612
kjgrims@usgs.gov
813-498-5064
****

From:	Alan Martyn Johnson <martynellijay@hotmail.com>
To:	rkane <rkane@usgs.gov>
Cc:	Doug Leeper <doug.leeper@swfwmd.state.fl.us>, Kevin J Grimsley <kjgrims@usgs.gov>
Date:	08/13/2011 06:19 PM
Subject:	RE: USGS Data

Richard,
Thanks for taking the time to reply to my e-mail.

I have never doubted that USGS want to do a good job and I have encouraged the review of data for the Homosassa River at the local level. That is the best place for review to occur; not by me presenting my concerns to others who may have different motives. But, I keep being fed the thought that the data is all OK. I will not be making a visit to your office to be given the 100 year justification presentation. I would like to discuss specific concerns I have raised, e-mails are a good place to start. If you are planning on attending the next MFL Workshop Doug has scheduled in Lecanto we could meet at that time. Which is about the earliest I will be back in Florida.

Regarding the P. This is most annoying as it makes analysis of the current data much more difficult, and it has spilled over into data such Field Measurements that are now all text entries. Frankly, I wonder if this does not show a lack of confidence in the data. Lets take an example; When was any of the data for the Homosassa River Gage Sites worked/checked/reviewed that resulted in a change? If USGS have a problem site I can fully understand implementing the P option, but to do it cross the board is counter productive to making the data available (nice to look at and of little use is like wallpaper)...why not just wait until the end of the year and send out the averages! Someone needs to think this great idea from HQ through.

I am sure USGS has a large QA operation. I worked in QA for a major international company for many years. On the question of reviewing procedures; I have asked about the Standard Operating Procedure for Field Measurements. Specifically, I was trying to understand why some measurements have a different duration to others at the same site. I also pointed out some field measurements that appeared unusual and thought it may be worth checking for a logging error. I have another that I will share later.

There appears to be a need for you to make a site visit. As I recall Kevin did say that he had mis-spoke regarding any thought of reverse flow at the SE Fork site.
I have previously sent photographs of the concrete bags (attached for reference). I would speculate that the concrete bags were most likely placed by the Roads Department to prevent erosion. The bags appear to be more neatly placed than if it had been done by swimmers trying to get in and out.

The point is the concrete/riprap butress adds to the change in direction of the flow and cause the thin layer of water to flow upstream along the concrete wall. Could get into velocity and pressure drops, but the photographs should suffice. In the photograph taken looking downstream No. 1 you can see the pattern and how weed has kept hold along the wall. Clearly the stream velocity is greater where the sand/materials are light in color. I have observed the flow first hand many times. The flow in the main stream under the bridge ranges from 0.5 - 1.2 feet per second according to my measurements. I am sure you can verify and be more accurate from your Field Measurement data. Added to this is the fact that the 'higher' salinity water only differs in density in the fourth decimal place, this is not seawater. And I have no idea where the idea where the idea came from that the bags are chemically responsible for the increases in the conductance readings, certainly not my thought.

Now actions speak louder than words.
As I said in my brief reply earlier in the week there is a simple way of confirming the cause of the higher specific conductance readings. Install a temporary baffle at the end of the wall furthest from the instrument site in photo 1. This could easily be installed using some spikes attached to the bottom of the baffle to sit in the river bed and an angle iron holding the top of the baffle perpendicular to the concrete wall. AND if I were not such an honest person I would simply go and install a baffle board and then show you your real time data. Humor me have someone go do it; you can always have the data reworked, after all it is provisional.

We agree that if nothing is done and we just sit by and watch the Homosassa River will be ruined. Pumping from the aquifer needs to be controlled. The concept of Minimum Flows and Levels is basically good but having questionable data used in studies to justify pumping more water is not acceptable. The best available data is not worth using if it is wrong.

Sorry if you find some of my comments harsh, but getting at the truth often requires a few

feathers to be ruffled.
I do look forward to meeting with you.

Martyn

To: martynellijay@hotmail.com
CC: doug.leeper@swfwmd.state.fl.us; kjgrims@usgs.gov; rkane@usgs.gov
Subject: Re: USGS Data
From: rkane@usgs.gov
Date: Mon, 8 Aug 2011 12:46:23 -0400

Mr Johnson, thank for your interest in the USGS data and the quality of the data. USGS has been collecting streamflow data at springs in Florida for over 100 years and quality assurance of our data is of the highest importance to our agency and is not taken lightly. I have responded to your comments below. Kevin will reply to your previous letter to the record in more depth when he returns to the office next week. I look forward to meeting up with you in our office soon as I don't think exchanging emails back and forth is productive at this point. I think we will be able to explain our procedures more effectively at a face to face meeting where we can show you our data and procedures.

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From: Alan Martyn Johnson <martynellijay@hotmail.com>
To: Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
Date: 08/06/2011 10:16 AM
Subject: USGS Data

Doug,
Thanks for taking the action to remove the 'data' document from the working group web site, as I suggested. While it had no value as a stand alone document, we would have had to included a disclaimer statement that it was based on Provisional Data from USGS had it remained.
If I had copied the data today from the USGS web site there would have been lots of P's next to the data. While this is strictly in line with USGS Policy (2006) it was interesting to note this change to strict compliance only occurred very recently on all the real time data that I look at. I trust there will be a meaningful review before approval.
The "P" was applied at during last NWIS upgrade. These upgrades come from HQ and cannot be edited when retrieving data from NWISWEB. The purpose of the provisional flag was to prevent the provisional

data statement at the top of page from being separated from the actually data and being used eroneoneously.

Richard and Kevin,
Where will Real Time Data be available as Approved Data?
Data is worked, checked and reviewed all throughout the year. Some of our more complex sites are reviewed once annually. All data is published by April 1 and is approved by that time for the previous water year.

On the subject of Provisional Data Approval for SE Fork
May I suggest when USGS is reviewing the 2010-2011 water year data to make it 'Approved', USGS may want to have someone take a serious look at the Specific Conductance Data from the SE Fork Homosassa.
Quality assurance is of the highest importance to USGS. Our hydrologic technicians and hydrologists all have science degrees and years of specialized USGS training. Kevin is the national trainer for the water quality monitors and we are very fortunate to have someone of his caliber in the Florida Water Science Center. After data is collected in the field it is worked up provisionally, then checked by another technician, and then reviewed by a senior technician or hydrologist. Finally after all of the data has been verified it is approved in the database and then published in the annual data report. In addition, every three years the National USGS technical offices of Surface Water, Ground Water, and Water Quality visit our center and review all of our procedures, and a portion of data that has been worked up in the past three years. Further, since we do publish all of our data, it is constantly being reviewed and scrutinized by the scientific community.

I first commented about the eddy currents drawing water along the concrete wall downstream of the site in an e-mail December 20, 2010. Later I commented about the build up of material (sand) just upstream of the gage site.
The higher Specific Conductance readings at this site, I believe, are due to location of the gage site and the bags of concrete that have been placed by whomever to make it easier to get in/out of the water. I seriously doubt it was USGS placed these bags (I do have some photographs but they are not like having on on site report from one of your people).
If someone took the time, the flow can easily be seen on site when the tide is rising rapidly.
 If you review the data you will also see this pattern of higher SC figures when tide is increasing rapidly and it is clearly not due to reverse flow into the approx 3 acre pool upstream of the bridge/gage site. I pass on these observations to help USGS provide the best possible data. Please advise if you have passed this on to the appropriate persons in USGS, or that you disagree with my observations.
I believe Kevin previously addressed your concerns of the eddy current. We do not feel it has any affect on the water quality data or the discharge. This site is not controlled by geomorphic features in the channel like a normal stage-discharge site may be. Tide and changes in groundwater affect the water quality and discharge. The flow is bidirectional, meaning the flow on the top moves in a different direction than the flow on the bottom. If we were measuring velocity continuously it would matter, but in this case we only measure stage and the water level of the aquifer. Since the water level is affected by gravity it is constantly seeking it's lowest level and an eddy current would not affect the water level or the forces of tide throughout the cross section of the channel. When we install the velocity sensor we will want to avoid this eddy current; thanks for bringing it to our attention.

When the tide comes in the salinity increase (this is normal). As the stage rises due to high tides the head on the spring increases and the downward pressure caused by gravity prevents freshwater from flowing out of the spring at the same rate and this is seen in the decreasing discharge. I am not sure about the concrete bags (we have to deal with a lot of vandalism at this site (we would certainly appreciate your efforts in keeping us informed when you notice unusual happenings at the springs). I'll check on ~~it~~ this matter, but that the concrete bags would have no more affect on water quality than the concrete bridge. Even if ~~it~~ the concrete bags were not in a solid state and dissolving in the river, any additions of matter from the bags would be very dilute and not expected to affect salinity.

And while I am on the subject of Specific Conductance
Doug,
Take a look at the attached graph of Specific Conductance for the Homosassa Springs Site. (Hope it attached correctly, if not it is from the USGS web site Gage 02310678 and covers the time period for which daily data is available).
The graph shows an increasing trend in the Minimum Daily Specific Conductance over the last 5-6 years. If it were possible to remove the extremely high figures from this analysis the trend could be seen more easily; not sure but I think the very high figure was at the time of a hurricane was it Alberto mid 2006?

Yes I agree when you remove the outliers you get a better view of the long term trends.

This graph is another strong indicator of how the nature of water entering the river is deteriorating; more salt water intrusion less flow from the aquifer fed spring in the group of three vents. The pattern is also evident when looking at Specific Conductance in relation to stage height over a few days.

I think we all agree with this statement. During the workshop, Doug gave an excellent presentation of long term sea level rise using NOAA gages in the Gulf over the past 50 years. As sea level continues to rise, salinity will continue to increase at the spring head and that, with the combined affect of groundwater pumping of the Floridan aquifer will cause the flow in the spring to decrease and the estuaries to change. Similarly, any reductions in rainfall would be expected to lead to increased salinity in the river system.

Sorry to spoil your morning coffee again with more questions and commentary!!!

Martyn

From: Alan Martyn Johnson
To: Kevin J Grimsley
Cc: Doug Leeper; rkane; Marty Kelly
Subject: RE: Proposed meeting
Date: Friday, August 19, 2011 8:11:44 AM

Kevin,

My plan was to travel to Homosassa early Sept 6 in order to be able to attend the Working Group Meeting in the afternoon. I will discuss the plan with powers that be (my wife) to see if we can travel Labor Day which means changing other plans. I appreciate the offer and will try to get a more definate reply by Monday, or at least early part of next week.

Please be sure to understand the intent of any meeting and what I wrote to Richard.
Quote
I will not be making a visit to your office to be given the 100 year justification presentation. I would like to discuss specific concerns I have raised, e-mails are a good place to start. If you are planning on attending the next MFL Workshop Doug has scheduled in Lecanto we could meet at that time. Which is about the earliest I will be back in Florida.
Unquote
The point is I do not want to hear about how USGS has been doing things for the last 100 years and about all the degreed personel. I would like to discuss specifics with logical scientific answers to specific questions I have raised. That discussion can be at any location, I suggested Lecanto as the earliest I could meet.

The data generated by USGS has been the basis of many studies that impact MFL recommendations. The data should be beyond reproach/question, I have simply raised questions that do not get answered or do not get logical answers that, at least in my mind, put the data in the beyond reproach category.

I have pointed out specific data that I suggested are checked for logging errors. No reply such as "thanks we looked" or "we will look at that. Thanks for pointing it out".

If we meet in Brooksville Sept 6 I would like clear factual explanations of:

1. Why the SE Fork equation can be considered to represent the real flows when some dramatic changes from one 15 minute reading to the next.
2. Why is there a squared component in the equation to calculate flow at the Homosassa River at Homosassa Site that results in bias of inflow and out flow at that same velocity measurement from the ADCP and stage area.

In connection with point 1 I have shared part of my analysis of the field measurements with USGS which leads to the following points that need to be discussed:
A. Why are the flow patterns from the field measurements which span 24 hours (or close to that) different to the 24 hour flow patterns resulting from the equation.
B. Why are field measurements taken over different 'Duration Times'. I have not expanded on some thought I have about this as USGS has not answered the question/query.

Will get back to you next week re meeting.

Martyn

To: martynellijay@hotmail.com
CC: doug.leeper@swfwmd.state.fl.us; rkane@usgs.gov; Marty.Kelly@swfwmd.state.fl.us
Subject: Proposed meeting
From: kjgrims@usgs.gov
Date: Thu, 18 Aug 2011 10:57:10 -0400

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From: rkane@usgs.gov
Date: Mon, 8 Aug 2011 12:46:23 -0400

Mr Johnson, thank for your interest in the USGS data and the quality of the data. USGS has been collecting streamflow data at springs in Florida for over 100 years and quality assurance of our data is of the highest importance to our agency and is not taken lightly. I have responded to your comments below. Kevin will reply to your previous letter to the record in more depth when he returns to the office next week. I look forward to meeting up with you in our office soon as I don't think exchanging emails back and forth is productive at this point. I think we will be able to explain our procedures more effectively at a face to face meeting where we can show you our data and procedures.

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov
(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275

From:	Alan Martyn Johnson <martynellijay@hotmail.com>
To:	Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Kevin J Grimsley <kjgrims@usgs.gov>
Date:	08/06/2011 10:16 AM
Subject:	USGS Data

Doug,
Thanks for taking the action to remove the 'data' document from the working group web site, as I suggested. While it had no value as a stand alone document, we would have had to included a disclaimer statement that it was based on Provisional Data from USGS had it remained.
If I had copied the data today from the USGS web site there would have been lots of P's next to the data. While this is strictly in line with USGS Policy (2006) it was interesting to note this change to strict compliance only occurred very recently on all the real time data that I

look at. I trust there will be a meaningful review before approval.
The "P" was applied at during last NWIS upgrade. These upgrades come from HQ and cannot be edited when retrieving data from NWISWEB. The purpose of the provisional flag was to prevent the provisional data statement at the top of page from being separated from the actually data and being used eroneoneously.

Richard and Kevin,
Where will Real Time Data be available as Approved Data?
Data is worked, checked and reviewed all throughout the year. Some of our more complex sites are reviewed once annually. All data is published by April 1 and is approved by that time for the previous water year.

On the subject of Provisional Data Approval for SE Fork
May I suggest when USGS is reviewing the 2010-2011 water year data to make it 'Approved', USGS may want to have someone take a serious look at the Specific Conductance Data from the SE Fork Homosassa.
Quality assurance is of the highest importance to USGS. Our hydrologic technicians and hydrologists all have science degrees and years of specialized USGS training. Kevin is the national trainer for the water quality monitors and we are very fortunate to have someone of his caliber in the Florida Water Science Center. After data is collected in the field it is worked up provisionally, then checked by another technician, and then reviewed by a senior technician or hydrologist. Finally after all of the data has been verified it is approved in the database and then published in the annual data report. In addition, every three years the National USGS technical offices of Surface Water, Ground Water, and Water Quality visit our center and review all of our procedures, and a portion of data that has been worked up in the past three years. Further, since we do publish all of our data, it is constantly being reviewed and scrutinized by the scientific community.

I first commented about the eddy currents drawing water along the concrete wall downstream of the site in an e-mail December 20, 2010. Later I commented about the build up of material (sand) just upstream of the gage site.
The higher Specific Conductance readings at this site, I believe, are due to location of the gage site and the bags of concrete that have been placed by whomever to make it easier to get in/out of the water. I seriously doubt it was USGS placed these bags (I do have some photographs but they are not like having on on site report from one of your people).
If someone took the time, the flow can easily be seen on site when the tide is rising rapidly. If you review the data you will also see this pattern of higher SC figures when tide is increasing rapidly and it is clearly not due to reverse flow into the approx 3 acre pool upstream of the bridge/gage site. I pass on these observations to help USGS provide the best possible data. Please advise if you have passed this on to the appropriate persons in USGS, or that you disagree with my observations.
I believe Kevin previously addressed your concerns of the eddy current. We do not feel it has any affect on the water quality data or the discharge. This site is not controlled by geomorphic features in the channel like a normal stage-discharge site may be. Tide and changes in groundwater affect the water quality and discharge. The flow is bidirectional, meaning the flow on the top moves in a different direction than the flow on the bottom. If we were measuring velocity continuously it would matter, but in this case we only measure stage and the water level of the aquifer. Since the water level is affected by gravity it is constantly seeking it's lowest level and an eddy current would not affect the water level or the forces of tide throughout the cross section of the channel. When we install the velocity sensor we will want to avoid this eddy current; thanks for bringing it to our attention.

When the tide comes in the salinity increase (this is normal). As the stage rises due to high tides the head on the spring increases and the downward pressure caused by gravity prevents freshwater from flowing out of the spring at the same rate and this is seen in the decreasing discharge. I am not sure about the concrete bags (we have to deal with a lot of vandalism at this site (we would certainly appreciate your efforts in keeping us informed when you notice unusual happenings at the springs). I'll check on ~~it~~ this matter, but that the concrete bags would have no more affect on water quality than the concrete bridge. Even if ~~it~~ the concrete bags were not in a solid state and dissolving in the river, any additions of matter from the bags would be very dilute and not expected to affect salinity.

And while I am on the subject of Specific Conductance
Doug,
Take a look at the attached graph of Specific Conductance for the Homosassa Springs Site. (Hope it attached correctly, if not it is from the USGS web site Gage 02310678 and covers the time period for which daily data is available).
The graph shows an increasing trend in the Minimum Daily Specific Conductance over the last 5-6 years. If it were possible to remove the extremely high figures from this analysis the trend could be seen more easily; not sure but I think the very high figure was at the time of a hurricane was it Alberto mid 2006?

Yes I agree when you remove the outliers you get a better view of the long term trends.

This graph is another strong indicator of how the nature of water entering the river is deteriorating; more salt water intrusion less flow from the aquifer fed spring in the group of three vents. The pattern is also evident when looking at Specific Conductance in relation to stage height over a few days.

I think we all agree with this statement. During the workshop, Doug gave an excellent presentation of long term sea level rise using NOAA gages in the Gulf over the past 50 years. As sea level continues to rise, salinity will continue to increase at the spring head and that, with the combined affect of groundwater pumping of the Floridan aquifer will cause the flow in the spring to decrease and the estuaries to change. Similarly, any reductions in rainfall would be expected to lead to increased salinity in the river system.

Sorry to spoil your morning coffee again with more questions and commentary!!!

Martyn

From:	Alan Martyn Johnson
To:	Kevin J Grimsley
Cc:	rkane; Doug Leeper
Subject:	RE: Homosassa Springs and SE Fork Additional comments
Date:	Friday, August 19, 2011 8:49:15 AM

Kevin,
Pleased to hear that you are planning on some follow up measurements to investigate the Specific Conductance data.

I will have to dig back to find the comparative field measurements to calculated flow that I have kept over the months since getting involved in this, but I will do that over the weekend.

Two questions for now.

1. Where is the documented information about the reverse flow at the SE Fork gage site? See hilite below.
   I have documented this flow in my observations and it does not make it to the bridge. May be you have something elsae but as I have said many locals agree that there is not reverse flow under the bridge.

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This appears to be a stretch of any physical chemistry I ever studied about aqueous solutions. Added to that is the fact that the temperature measurements at the site only show very slight changes that are logical 22.3 to 22.4 and 22.5 the pattern repeats daily starting 9:00-10:00 and ending 18:00...solar heating maybe. Certainly does not look like conditions for stratification. This cycle is far too regular and we have all observed the flow past the gage site.

Martyn

From: kjgrims@usgs.gov
Subject: Re: Homosassa Springs and SE Fork Additional comments
CC: rkane@usgs.gov; doug.leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Mon, 15 Aug 2011 21:08:29 -0400

Martyn,

We're planning on performing a few cross-section conductance measurements to investigate this lag between the water level and conductance cycles. We'll see what those measurements reveal, but we do not believe it has anything to do with variations in flow rates between the vents. We believe this is caused by stratification of flow around the gage location. In any case, these differences have no standing in evaluating the validity of using the Weeki Wachee Well in the discharge regressions.

Here are Dann Yobbi's thoughts on these subjects:

"The Weeki Wachee well was chosen because of the excellent relation with discharge at Week Wachee Springs and the relatively large water level range that represents the regional recharge/discharge conditions in the aquifer system. Flow of the springs is dependent on aquifer heads and ground-water gradients. Stage and rate of change in stage are surrogates for the effects of tide on discharge.

The test of the equations is its comparison with MEASURED DISCHARGE. If measured discharge compares favorably with simulated discharge, the equation is a reliable predictor of discharge. This is why it was critical to make field measurements of discharge at several ground-water conditions and at different tide conditions during the year.

If tide did not effect flow of Homosassa Springs or SE Fork, there would be a very small range of discharge of both springs because of the very low gradient of the potentiometric surface near these springs. Take out stage and rate of change from the equations and look at the discharge."

As I've said several times before and Dann repeated, the appropriate evaluation of the equations is how they compare with the measured discharge. Once again, the average difference between the SE Fork equation and our measurements has been less than 5% which is excellent. Are there some measurements that are more than 5%? Absolutely, but it's unreasonable to expect otherwise. I'm pretty sure there isn't a station in the state that's always within 5%. We don't pretend that these equations are flawless, but they are reasonable and they have been reviewed and re-reviewed.

There is documented reverse flow at the gage location along the left bank. The entire flow does not reverse, but it is bidirectional at many high tides. This has nothing to do with concrete bags or eddy currents. This is caused by the incoming tide pushing back against the flow from the springs.

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Kevin Grimsley, P.E.
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10500 University Center Drive, Suite 215
Tampa, FL 33612
kjgrims@usgs.gov
813-975-8620 x159
****

On Aug 15, 2011, at 7:41 PM, "Alan Martyn Johnson" <martynellijay@hotmail.com> wrote:

Richard,

HOMOSASSA SPRINGS SITE/Earlier e-mail

With a little more time this evening I would like to expand on my very brief comment this morning, that the lag is associated with how quickly the flow rates from each of the vents adjusts to stage. In addition to the time it takes for the flows to modulate to the change in back pressure from the stage height change, there is also the time it takes for the water change (60 ft down) to reach the monitoring instrument location.

A few thoughts to put some numbers/meat to this for better explanation of my point:

1. Main Spring

I would estimate the main spring is about 30 feet wide at the top (observatory level may be more but lets use 30) and is described as conical down to the vents which are reported as 65 feet deep (I have no other way of verifying this other than the bulletin I read).

If these are good estimate this cone would hold about 14,000 cubic ft and take **about 3 minutes to elute at 80 cfs spring flow.**

2. Pool

The pool from the main spring to the instrument location on the NE bank is about 0.25 acres minimum. If the average depth is 3 feet this is holds about 30,000 cubic feet and take about **6 minutes to elute at 80 cfs spring flow**.

The 80 cfs comes from recent field measurements over the last year, and is the maximum calculated flow for the data time period we are reviewing.

Total about 10 minutes assuming **laminar flow**, which I would again speculate is not the case, particularly as the instrument location is close to the bank.

3. Daily Stage Height Inequality

Add to the above the daily inequality of the stage height change, which presumably also has an effect.
Lower Low to Higher High change is in the order of 1 foot
Higher Low to the Lower High is in the order of 0.4 feet foot, for the data time period we are reviewing. This will also have an influence as to how **the relative flows from each of the vents changes** in each of these cycles in addition to the changes; in addition to the total cfs. These cycles are evident on the chart.

SO OVERALL IT IS NOT SURPRISING TO SEE AN IMPERFECT MATCH OF THE STAGE HEIGHT AND SPECIFIC CONDUCTANCE WITH TIME AT THE GAGE SITE…BUT THE PATTERN IS CLEAR.

I could suggest placing a specific conductance monitor in the conical vent at a depth of say 30 feet to better track this. But, for now you can possible refine my thoughts about the pool from the spring to the instrument site, by sharing the stage area and velocity profiles across the channel from the ADCP field measurements. I am sure that will help refine my guesstimates. Others who have first hand knowledge may be able to confirm or revise my estimates regarding the size of the main spring.

My point again the flow from these springs does not have direct relationship with Weeki Wachee Well Level.

<u>SE Fork Calculation Equation</u>

I was pleased to note in your e-mail from yesterday that you are still in touch with Dan Yobbi. That must be one interesting individual. I am sure I would enjoy sitting with him and discussing, over our beverage of choice, the Homosassa River along with his many other experiences.

$$Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(dS/dt)$$

For now I would like to get his and possibly some of your personnel to explain:
The large variations in calculated flow resulting primarily from the factor 418.4 * dS/dt.
The Gage Height Component; minus 10.31 * GH appears to address the discharge change due to hydraulic head change thru the day from the Fixed Component, for the day, 18.63 + 3.31 * Weeki Wachee.
The Stage Change Component; minus 418.4 * dS/dt essentially cancels itself out over a 24 hour period. Normal change in Stage Height between 00:00 am from one day to the next is typically 0.1 to 0.2 feet with occasional results upto 0.6 feet.   I have previously shared this graph with you the attached chart, which is for Feb 3, 2011 when the 24 hour change was 0.59 feet.

The large changes in the calculated flows (the red line) have no logical basis when considered in conjunction with the 3 acre pool upstream of the bridge/ monitoring site. This is essentially a confined pool that accumulates spring waters during stage height increases; and discharges water during stage height decreases. This appears to be the primary cause of flow changes at the gage site/under the bridge. There is certainly not reverse flow at any of the spring vents in the SEF and the 3 acre pool I have estimated is more than the immediately defined boundaries; giving some additional area for changes of ground water in the sandy soils.

Sorry, but the logic does not hold.

All thoughts and commentary welcome.

Martyn

<SE Fork Chart August 15, 2011.doc>

From:	Alan Martyn Johnson
To:	Ron Basso; Doug Leeper
Cc:	Marty Kelly
Subject:	RE: Groundwater Basins
Date:	Friday, August 19, 2011 8:34:02 AM

Ron and Doug,
Thanks for your e-mail replys. Appreciate the fast response. I have not got a lot of time right now to digest this, but Ron could you expand on your comment from a few days ago.

Quote

A groundwater basin has well-defined boundaries in a lateral direction with a definable bottom. Rainfall that falls within a groundwater basin provides recharge to the aquifer within that basin. Groundwater does not flow laterally between groundwater basins or outside of a basin. It is important to include all groundwater withdrawals within a basin to conservatively assess the total impact to a spring, stream, or aquifer level.

Unquote

What groundwater basins have well defined boundaries?
And,
What is a local flow system of the spring?
I should have know better than to use the term 'watertight'!

How do we determine the driving head of the Floridian aquifer for the Homosassa springs group?
This question comes from your comment below The flow at an individual spring vent is controlled by the elevation or driving head of the Floridan aquifer water level at that vent.
Presumably this 'driving head' and or change of driving head is in the NDM or it would not be able to calculate spring flow under various scenarios.

Martyn

From: Ron.Basso@swfwmd.state.fl.us
To: Doug.Leeper@swfwmd.state.fl.us; martynellijay@hotmail.com
CC: Marty.Kelly@swfwmd.state.fl.us
Date: Thu, 18 Aug 2011 08:39:01 -0400
Subject: RE: Groundwater Basins

Mr. Martyn:

The smaller springshed boundaries are used primarily to determine potential water quality degradation(e.g. nitrates or other pollutants) from water infiltrating from land surface and making its way into the local flow system of the spring. The water level In the Upper Floridan aquifer or if you like, the pressurized surface of the aquifer can be affected by well withdrawals outside these rather small springsheds – it's this larger, more regional flow system of the Floridan aquifer that provides flow to the coastal springs and discharges groundwater through lateral seepage at the coast. The flow at an individual spring vent is controlled by the elevation or driving head of the Floridan aquifer water level at that vent. Withdrawals within the larger Northern West-Central Floridan Groundwater Basin (see attached figure) would all to some degree contribute to lowered spring flow and lateral groundwater discharge along the nature coast. These large groundwater basins are separated by major flow divides and exhibit similar geology. I hope this has clarified the issue for you – if not, please contact me and let's discuss.

Ron Basso, P.G.
Senior Professional Geologist
Hydrologic Evaluation Section
Southwest Florida Water Management District
ph 1-800-423-1476 (in state)
ph 352-796-7211, ext. 4291 (outside state)
FAX 352-797-5799

From: Doug Leeper
Sent: Thursday, August 18, 2011 8:12 AM
To: Alan Martyn Johnson
Cc: Ron Basso; Marty Kelly
Subject: RE: Groundwater Basins

Martyn- My short answer to your inquiry is no. Effects of water use throughout the entire Northwest Central Florida groundwater basin may be expected to potentially influence spring discharge in any of the regional springs/springsheds. That is, the springshed boundaries are not true hydrologic divides. The location and magnitude of area withdrawals, along with local variation in the underlying geology of the Northwest Central Florida groundwater basin would, of course be expected to influence the spatial distribution of withdrawal impacts. The springshed basins are best thought of as areas were land-use may be expected to most strongly impact groundwater quality.

Note that I expect Ron may likely chime in to correct my "non-geologist" response to your question.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Thursday, August 18, 2011 7:57 AM
To: Doug Leeper; Ron Basso
Subject: Groundwater Basins

Doug and Ron,
Sorry to keep asking essentially the same question, but this is to help me clarify my understanding about groundwater flowing between basins or not.

I will try to be brief and to the point.

As I understand a groundwater basin such as the Homosassa Basin and the Chassahowitzka Basin and the Weeki Wachee Basin are independent of each other as regards groundwater flowing from one basin to the next. Each basin is defined by the geological boundary (topography of the basin bottom) that forms an almost watertight container (sorry if that is an over simplification but I hope it conveys my understanding succinctly). Water enters each basin as rainfall (Homosassa 292 sq miles, Chassahowitzka 190 sq miles) and leaves as transevaporative loss, surface water run off, spring flow or pumping. Groundwater held in the basin does not move from one basin to another.

The Figure 2-2 from the Chassahowitzka report page 11 (copy attached) shows the various groundwater basins H, C, W and as I understand each is independent (for all practical purposes).

I think any confusion may arise from understanding NorthWest Central Florida Groundwater Basin and Costal Rivers Basin. Which lead to a question of "Am I sure each of the sub-basins within these BIG BASINS are not interconnected other than geographic proximity?".

Is my understanding that each of the 'sub-basins' are independent? At least independent for all practical purposes.

Hopefully it is a easy question to answer with a yes/no. If no maybe we can discuss at the next meeting to save your time right now.

Thanks,
Martyn

From:	Kevin J Grimsley
To:	Alan Martyn Johnson
Cc:	Doug Leeper; rkane
Subject:	RE: Homosassa Springs and SE Fork Additional comments
Date:	Friday, August 19, 2011 12:32:33 PM

Our measurements have documented reverse flow along the left bank. We'll be happy to show you those measurements at our meeting. As far as how far upstream that reverse flow continues, I have no idea. That's not something we look at, and it doesn't affect our measurements either way.

As far as the possible stratification at Homosassa springs, let's wait and see what our measurements show but sometimes we have gages that show a lateral stratification because of the flow patterns. The conductance could be completely different on the other side of the spring run, we'll see.

****
Kevin Grimsley, P.E.
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To:	Kevin J Grimsley <kjgrims@usgs.gov>
Cc:	rkane <rkane@usgs.gov>, Doug Leeper <doug.leeper@swfwmd.state.fl.us>
Date:	08/19/2011 08:48 AM
Subject:	RE: Homosassa Springs and SE Fork Additional comments

---

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Martyn

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To: martynellijay@hotmail.com
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<SE Fork Chart August 15, 2011.doc>

From:	Alan Martyn Johnson
To:	Kevin J Grimsley; Doug Leeper; rkane; Marty Kelly
Subject:	Proposed Meeting and Promised follow-up to last e-mail SE Fork
Date:	Saturday, August 20, 2011 5:22:42 PM
Attachments:	SE Fork Feild Measurement graphs for Kevin.doc

Kevin,
I am not able to make a firm commitment to the proposed meeting at 9:00 am September 6, 2010 so will have to pass on the offer.

We are not prepared to change our present Labor Day plans, or consider driving down overnight for a meeting that would convey information some of which we would have thought could be shared by e-mail. I certainly would like to discuss some of these things in person, but the proposed timing is not going to work.

I trust my comment to Richard about Dann Yobbi being an interesting person to meet did not spark the thought for the expenditure on the airline ticket. May be some other time. Thanks to Doug for the offer to facilitate.

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Martyn

From:	Kevin J Grimsley
To:	Alan Martyn Johnson
Cc:	Doug Leeper; Marty Kelly; rkane
Subject:	Re: Proposed Meeting and Promised follow-up to last e-mail SE Fork
Date:	Saturday, August 20, 2011 9:14:19 PM

Martyn,

We're disappointed to hear that you won't be able to make the proposed meeting on the morning of the 6th. We feel like we've tried to resolve these perceived issues through email for the past 9 months without success. We believe that a face to face meeting is the only way that we can effectively discuss the many questions you have asked us. We simply cannot indefinitely continue to trade emails over these topics.

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Doug, you and anyone else from SWFWMD are obviously welcome for this meeting as well.

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Kevin Grimsley, P.E.
Supervisory Hydrologist
USGS, Florida Water Science Center
10500 University Center Drive, Suite 215
Tampa, FL 33612
kjgrims@usgs.gov
813-498-5064
****

From:	Alan Martyn Johnson <martynellijay@hotmail.com>
To:	Kevin J Grimsley <kjgrims@usgs.gov>, Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, <marty.kelly@swfwmd.state.fl.us>
Date:	08/20/2011 05:22 PM
Subject:	Proposed Meeting and Promised follow-up to last e-mail SE Fork

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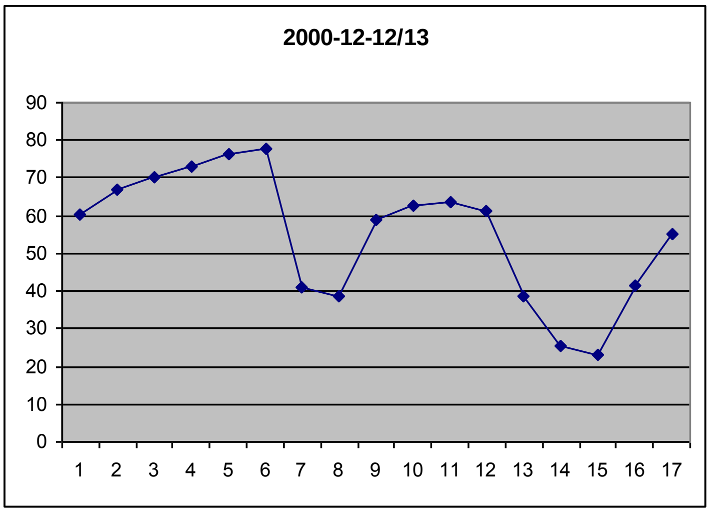
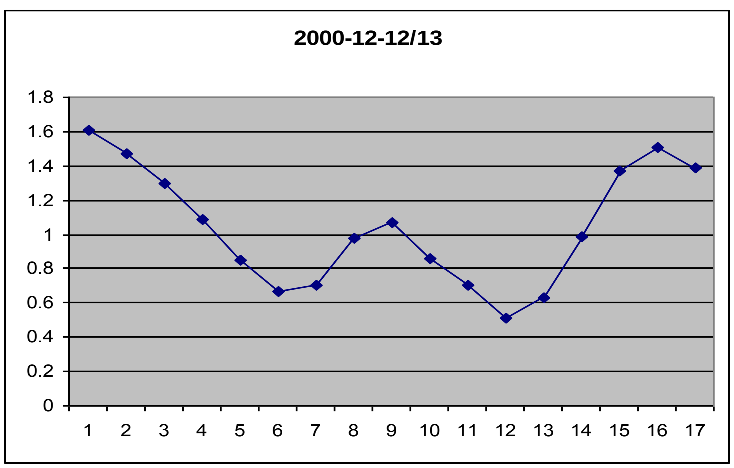
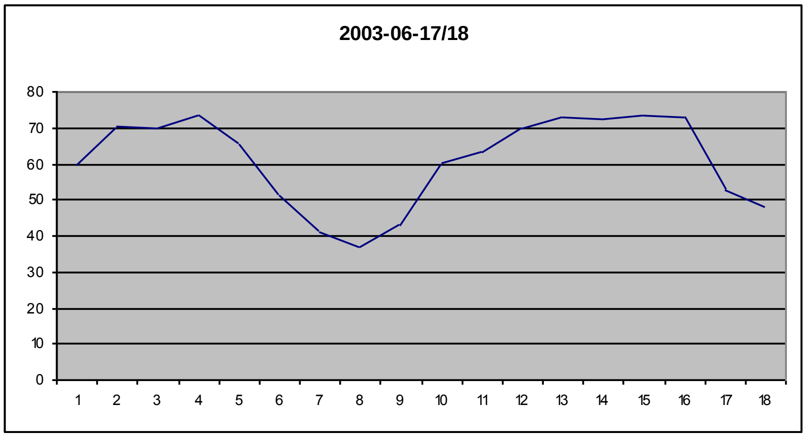
[attachment "SE Fork Feild Measurement graphs for Kevin.doc" deleted by Kevin J Grimsley/WRD/USGS/DOI]

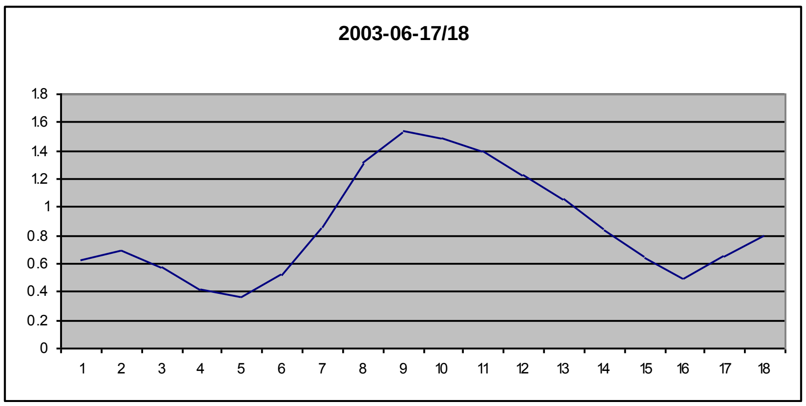
South-East Fork Homosassa River Field Measurements

Quick graphs of the Field Measurements on the days that measurements were done for 24 Hours






2003-06-17/18
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18


2003-06-17/18
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

From: Alan Martyn Johnson
To: Kevin J Grimsley
Cc: Doug Leeper; Marty Kelly; rkane; Ron Basso
Subject: RE: Proposed Meeting and Promised follow-up to last e-mail SE Fork
Date: Sunday, August 21, 2011 8:52:12 AM

Kevin,
Sorry to disappoint you, but you only came up with the idea in an e-mail last Thursday morning that I replied to Friday around 8 am, which is the time I normally look at my e-mails. I clearly stated that the timing of the proposed meeting did not fit with my plan, indicating that change may be possible. As promise I got back to you with a clear answer yesterday afternoon.

Your e-mail sent 9:14 pm last night either shows a high level of dedication to your job or that you are overworked and having to spend long hours at the office.

Disappointment is a word I would have used if I had cancelled a meeting agreed to some time ago.

If, as you have implied you are flying Dann in to attend the meeting in Lecanto, what is wrong meeting after the meeting. Or more valuable may be for him to address some pre-prepared specific questions at the meeting. This would benefit all panel members with the answers/Danns input.

Travelling to Tampa is a personal expense for me...Dann travelling from Nevada on taxpayers expense needs to have a greater purpose than talking to just me.

Regarding your comment that Dann is the only person that can answer how the equations were developed is very troubling. This shows that he poorly documented the facts and logic behind the equations, or that the USGS has had a poor succession planning program to assure the valuable knowledge about the programs that develop data (used for major expenditure and major decisions about water/environmental resources) is not lost into retirement. I assume Dann has retired.

I did comment yesterday on the equations in Dann's 2001 report and made the presumption that the present SE Fork equation was developed after the date of the report.

Then I got to thinking: real -time data has been available since 2000-10-01 for the SE Fork. Which implies that the same field measurement data sets in Dann's 2001 report may have been used to develop the equation. As I recall you told me (or someone did) that it has always been the same. I am sure you can confirm or correct that point.

I will be more than happy to prepare some specific questions for Dann to respond to at the Lecanto meeting.

Martyn

To: martynellijay@hotmail.com
CC: doug.leeper@swfwmd.state.fl.us; marty.kelly@swfwmd.state.fl.us; rkane@usgs.gov
Subject: Re: Proposed Meeting and Promised follow-up to last e-mail SE Fork
From: kjgrims@usgs.gov
Date: Sat, 20 Aug 2011 21:14:13 -0400

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From:	Ron Basso
To:	Alan Martyn Johnson; Doug Leeper
Cc:	Marty Kelly
Subject:	RE: Groundwater Basins
Date:	Monday, August 22, 2011 9:55:57 AM
Attachments:	fig1.jpg springsheds.pptx

Mr. Johnson:

Let me address your questions as presented in your last email.

What groundwater basins have well defined boundaries?

The large groundwater basins map I sent to you earlier have fairly well-defined boundaries. These basins are delineated by examining the potentiometic surface elevation (water level elevation) of the Floridan aquifer. The USGS publishes May and September maps of the Floridan aquifer elevation from a series of monitor wells across the District. They then contour these elevations based on a 10 ft interval. From these contour maps, you can determine the approximate basin boundaries as groundwater flow is perpendicular to the contoured surface (see attached figure). Groundwater flow is generally in opposite directions on either side of this boundary. So along the east side of the eastern boundary of the Northern Basin, ground water flows toward the Atlantic Ocean. On the western side, it flows toward the Gulf of Mexico. The boundaries of a groundwater basin can change slightly from year to year since they are based on regional potentiometric surface maps and these can change based on climatic conditions and local withdrawals. However the general configuration of the Floridan aquifer flow field (direction of groundwater flow) has remained rather static over the last four decades. The geology of the Florida peninsula largely dictates this flow field configuration.

What is a local flow system of the spring?

These are the springsheds defined for each major group of springs (see attached file). You can further subdivide the Floridan aquifer potentiometic surface into smaller local flow fields that feed each spring group. Again, these areas are used primarily to determine what water quality constituents might eventually make their way into spring discharge since anything that infiltrates from the surface downward could eventually make its way to the vent. Based on these springsheds, the expectation is that these water quality changes can make their way within a contemporary time frame – say months to a few decades depending on distance from the spring vent.

How do we determine the driving head of the Floridian aquifer for the Homosassa springs group?

The Northern District model simulates the potentiometric surface elevation of the Floridan aquifer. We calibrate the model by matching measured water levels at monitor wells and the USGS May and September maps. The flow field configuration generated by the model is very similar to the mapped surface by the USGS. Simulated discharge for each spring in the model depends on the elevation of the Floridan aquifer water level at each spring node, the assigned pool stage elevation at each node, and the conductance (or ability for water to move underground) assigned to each node. We calibrate the springflow by adjusting conductance so that we get a good match between observed and simulated springflow.

Presumably this 'driving head' and or change of driving head is in the NDM or it would not be able to calculate spring flow under various scenarios.

Correct, we simply turn off pumping in the model and record simulated discharge – we then run a separate scenario with current or projected future withdrawals and take the difference between that and non-pumping discharge. Will also take the difference in simulated Floridan aquifer water levels between the two scenarios – we term this drawdown or the predicted decline in Floridan aquifer water levels due to withdrawals.

I think what's confusing are the individual springshed boundaries in relation to the larger groundwater basin boundary since they both divide the flow field to some extent. Maybe thinking of it this way will help - rather than change the orientation of the flow field, regional withdrawals simply "lower" the entire elevation of the potentiometric surface to some extent which in turn decreases springflow along the nature coast and lateral groundwater discharge to the gulf. It's a bit of an oversimplification since the closer the withdrawal is to the vent, the greater its potential impact but the main point is that these flow field boundaries are semi-permanent regardless of withdrawal quantities. The reason water budgets are defined for the springsheds and the larger groundwater basins is that it makes it convenient to calculate parameters without guessing groundwater inflow. I hope this response helps clarify these issues.

Ron Basso, P.G.
Senior Professional Geologist
Hydrologic Evaluation Section
Southwest Florida Water Management District
ph 1-800-423-1476 (in state)
ph 352-796-7211, ext. 4291 (outside state)
FAX 352-797-5799

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Friday, August 19, 2011 8:34 AM
To: Ron Basso; Doug Leeper
Cc: Marty Kelly
Subject: RE: Groundwater Basins

Ron and Doug,
Thanks for your e-mail replys. Appreciate the fast response. I have not got a lot of time right now to digest this, but Ron could you expand on your comment from a few days ago.
Quote
A groundwater basin has well-defined boundaries in a lateral direction with a definable bottom. Rainfall that falls within a groundwater basin provides recharge to the aquifer

within that basin. Groundwater does not flow laterally between groundwater basins or outside of a basin. It is important to include all groundwater withdrawals within a basin to conservatively assess the total impact to a spring, stream, or aquifer level.
Unquote

What groundwater basins have well defined boundaries?
And,
What is a local flow system of the spring?
I should have know better than to use the term 'watertight'!

How do we determine the driving head of the Floridian aquifer for the Homosassa springs group?
This question comes from your comment below The flow at an individual spring vent is controlled by the elevation or driving head of the Floridan aquifer water level at that vent.
Presumably this 'driving head' and or change of driving head is in the NDM or it would not be able to calculate spring flow under various scenarios.

Martyn

From: Ron.Basso@swfwmd.state.fl.us
To: Doug.Leeper@swfwmd.state.fl.us; martynellijay@hotmail.com
CC: Marty.Kelly@swfwmd.state.fl.us
Date: Thu, 18 Aug 2011 08:39:01 -0400
Subject: RE: Groundwater Basins

Mr. Martyn:

The smaller springshed boundaries are used primarily to determine potential water quality degradation(e.g. nitrates or other pollutants) from water infiltrating from land surface and making its way into the local flow system of the spring. The water level In the Upper Floridan aquifer or if you like, the pressurized surface of the aquifer can be affected by well withdrawals outside these rather small springsheds – it's this larger, more regional flow system of the Floridan aquifer that provides flow to the coastal springs and discharges groundwater through lateral seepage at the coast. The flow at an individual spring vent is controlled by the elevation or driving head of the Floridan aquifer water level at that vent. Withdrawals within the larger Northern West-Central Floridan Groundwater Basin (see attached figure) would all to some degree contribute to lowered spring flow and lateral groundwater discharge along the nature coast. These large groundwater basins are separated by major flow divides and exhibit similar geology. I hope this has clarified the issue for you – if not, please contact me and let's discuss.

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Sent: Thursday, August 18, 2011 8:12 AM
To: Alan Martyn Johnson
Cc: Ron Basso; Marty Kelly
Subject: RE: Groundwater Basins

Martyn- My short answer to your inquiry is no. Effects of water use throughout the entire Northwest Central Florida groundwater basin may be expected to potentially influence spring discharge in any of the regional springs/springsheds. That is, the springshed boundaries are not true hydrologic divides. The location and magnitude of area withdrawals, along with local variation in the underlying geology of the Northwest Central Florida groundwater basin would, of course be expected to influence the spatial distribution of withdrawal impacts. The springshed basins are best thought of as areas were land-use may be expected to most strongly impact groundwater quality.

Note that I expect Ron may likely chime in to correct my "non-geologist" response to your question.

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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Thursday, August 18, 2011 7:57 AM
To: Doug Leeper; Ron Basso
Subject: Groundwater Basins

Doug and Ron,
Sorry to keep asking essentially the same question, but this is to help me clarify my understanding about groundwater flowing between basins or not.

I will try to be brief and to the point.

As I understand a groundwater basin such as the Homosassa Basin and the Chassahowitzka Basin and the Weeki Wachee Basin are independent of each other as regards groundwater flowing from one basin to the next. Each basin is defined by the geological boundary (topography of the basin bottom) that forms an almost watertight container (sorry if that is an over simplification but I hope it conveys my understanding succinctly). Water enters each basin as rainfall (Homosassa 292 sq miles, Chassahowitzka 190 sq miles) and leaves as transevaporative loss, surface water run off, spring flow or pumping. Groundwater held in the basin does not move from one basin to another.

The Figure 2-2 from the Chassahowitzka report page 11 (copy attached) shows the various groundwater basins H, C, W and as I understand each is independent (for all practical purposes).

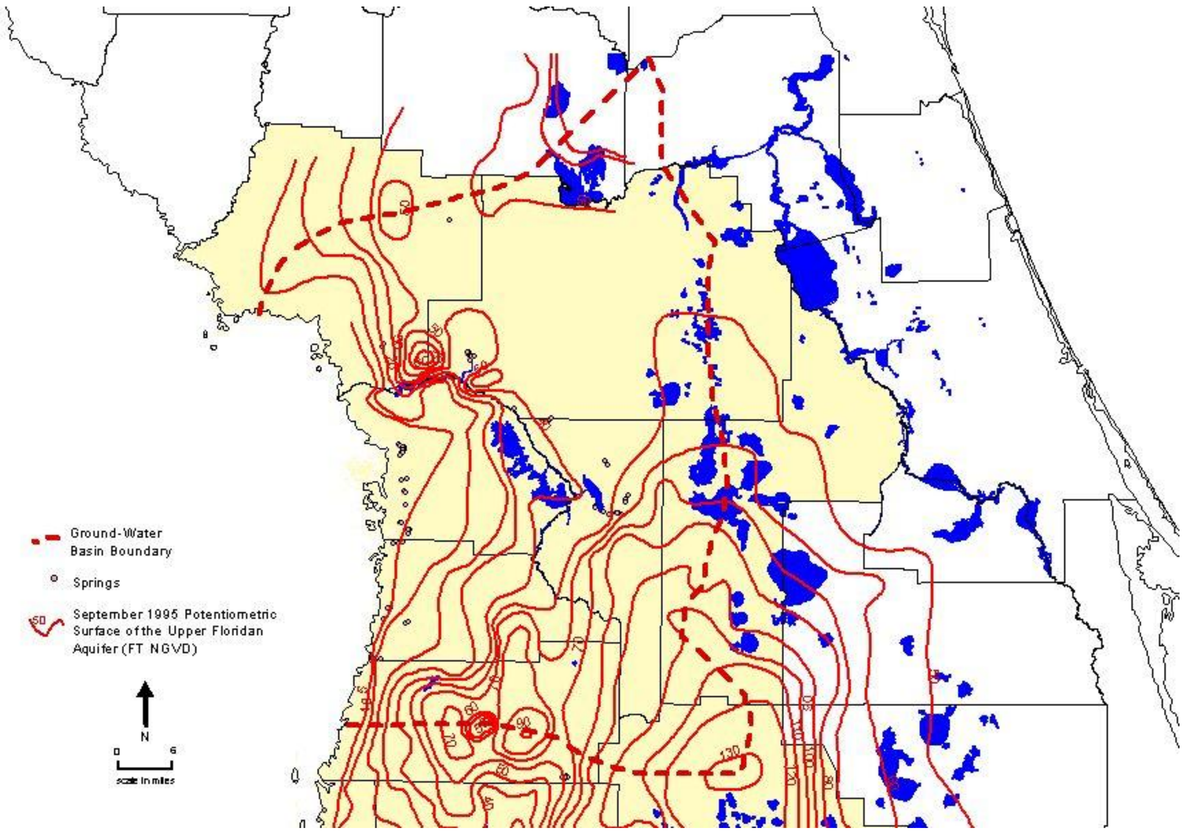
I think any confusion may arise from understanding NorthWest Central Florida Groundwater Basin and

Costal Rivers Basin. Which lead to a question of "Am I sure each of the sub-basins within these BIG BASINS are not interconnected other than geographic proximity?".

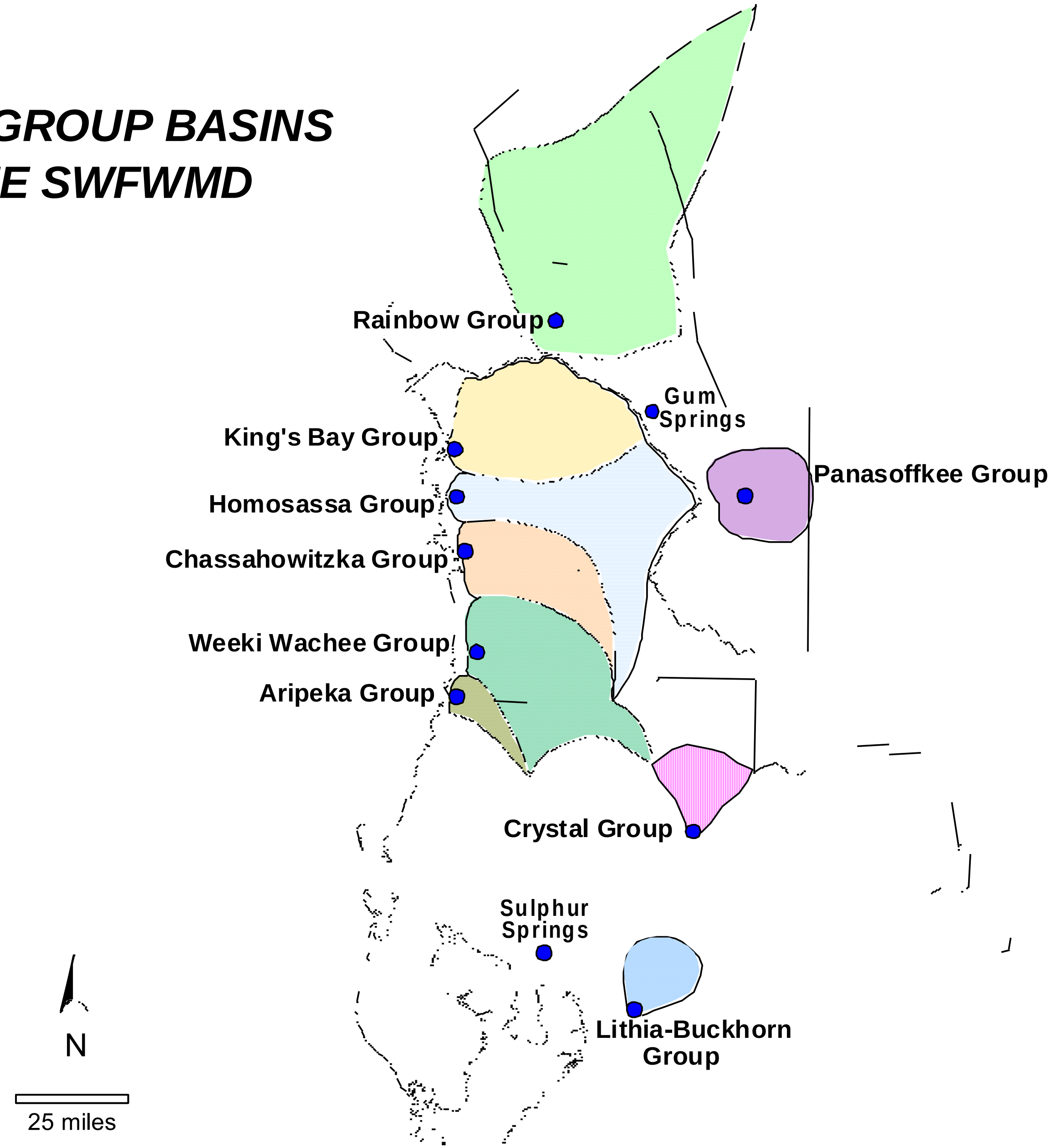
Is my understanding that each of the 'sub-basins' are independent? At least independent for all practical purposes.

Hopefully it is a easy question to answer with a yes/no. If no maybe we can discuss at the next meeting to save your time right now.

Thanks,
Martyn


Ground-Water
Basin Boundary
Springs
50
September 1995 Potentiometric
Surface of the Upper Floridan
Aquifer (FT NGVD)
N
0
6
scale in miles
130

SPRING GROUP BASINS IN THE SWFWMD



From:	Alan Martyn Johnson
To:	Doug Leeper
Cc:	Ron Miller; brimbey3@tampabay.rr.com; brentwhitley@sierra-properties.com; 2buntings@comcast.net; jbitter@tampabay.rr.com; grubman1@gmail.com
Subject:	RE: Posting of USGS Reports on Springs Coast MFLs Workshop Web Page
Date:	Tuesday, August 23, 2011 8:57:24 AM

Doug,
My that was big copy list!
Your comment............ should not be "required reading"......... was spot on.

Seriously, if Richard thinks these are critical to MFL discussion he should extract some key points that he wants to bring to our attention.

Recently I did take the time to read the 2001 report you posted sometime ago on the Working Group Web site. And to show what I mean about extracts here are a few from my notes.

Extracts from Report 01-4230 Knochenmus and Yobbi

Page 30/31
The Homosassa Springs complex includes multiple springs discharging water at variable rates and qualities (figs. 19 and 21). Historical specific conductance data for Homosassa Springs since the 1960's (at undocumented tidal altitudes) ranged from about 1,000 to more than 4,000 ìS/cm *(fig. 20). The average specific conductance values were 3,245, 5,694, and 1,339* ìS/cm *for the three spring vents known as Homosassa Springs 1, 2, and 3, respectively, during 1993-97 (Southwest Florida Water Management District, 1997, p. 27-30). The six named spring vents that contribute flow to the tributary, Southeast Fork of the Homosassa River, discharge the freshest water in the complex with specific conductance values less than 500* ìS/cm *(Southwest Florida Water Management District, 1997).*

Such references should be compared to today with specific conductance for the SE Fork and Homosassa Spring 3 typically at twice the quoted figures.
Those comparisons are relevant to the current discussion about how the river/springs have already deteriorated.
The discussion and focus needs to be on the why the deterioration.

Page 34 Table shows 17 flow equations.
Equations for Homosassa Springs and SE Fork are no longer in use today. Check some others when get chance. Data in Appendix for SE Fork scant/limited.

This is only of relevance to today's discussion as to how difficult it is to get good measurement of flows.

Page 41/42

Ground-water withdrawals, tabulated
from a list of users permitted to withdraw greater than 100,000 gal/d were 34.8, 1,098, 620, and 73.5 Mgal for the Aripeka, Weeki Wachee, Chassahowitzka, and Homosassa Springs Ground-Water Basins, respectively (fig. 27). The tabulated water use essentially reflect the volume of ground water withdrawn in Pasco and Hernando Counties. Citrus County is predominantly rural, so many of the wells were not tabulated nor included in the analyzed data set because the pumped rates were less than 100,000 gal/d. Based on water-use estimates (Marella, 1999, Southwest Florida Water Management District, 1999a and 1999b) ground-water use by small users (less than 100,000 gal/d) is about twice that of larger users in Citrus County. The volume was therefore adjusted by tripling the tabulated number to account for these small but numerous users in Citrus County. The values used for ground-water withdrawals in the water budget were 0.6, 3.6, 2.2, and 0.6 in/yr in the Aripeka, Weeki Wachee, Chassahowitzka, and Homosassa Springs Ground-Water Basins and averaged 1.8 in/yr for the Coastal Springs Ground-Water Basin (fig. 25 and table 2).

While this gave me a better understanding of where the 0.6 inches of the budget quoted in the 2010 Draft Report for MFL Homosassa came from, it reminded me that the answer to Ron Millers questions posted on the Working Group Web site did not reference this large withdrawal that at least Yobbi did recognize. Incidentally I think the 73.5 Mgal, if that does mean 73.5 million gallons per day is an error; probably 7.35?
But the real interesting point was from the table on page 40 which shows that the Water Budget for the four basins. I looked at these number in a slightly different way to how the 0.6 inches was reported in the 2010 Draft report. I calculated how much of the water getting into the ground is withdrawn by pumping.

Aripeka *0.6/19.3 is* ***3.1%***
Weeki Wachee *3.6/25.6 is* ***14.1%***
Chassahowitzka *2.2/18.2 is* ***12%***
Homosassa *0.6/19.8 is* ***3%***
The reporting in the 2010 Homosassa Draft Report of 1.2% is correct but it is a percentage of rainfall not what gets into the ground.

These are just a few of my notes from reading the most recent of these old reports.
Again it leads me to the conclusion I have expressed so many times.

NO MORE WELLS NO MORE PUMPING DAMAGE IS ALREADY EVIDENT.

Just a couple of thoght for today.
Martyn

Date: Mon, 22 Aug 2011 11:53:23 -0400
Subject: Posting of USGS Reports on Springs Coast MFLs Workshop Web Page

Greetings:

In response to a suggestion from Richard Kane, the stakeholder representative from the United States Geological Survey, the District has added four reports containing information on discharge in several Springs Coast rivers to the Springs Coast Minimum Flows and Levels Public Workshop web page. The reports listed below are posted under the "Background Information and Reports" heading at the bottom of the page. The reports should not be considered "required reading" for workshop participants, but they do contain a great deal of useful information.

Yobbi, D.K., 1989, Simulation of steady-state ground water and spring flow in the upper Floridan aquifer of coastal Citrus and Hernando Counties, Florida: U.S. Geological Survey Water-Resources Investigations Report 88-4036.

Yobbi, D.K., 1992, Effects of tidal stage and ground-water levels on the discharge and water quality of springs in coastal Citrus and Hernando Counties, Florida: U.S. Geological Survey Water-Resources Investigations Report 92-4069.

Yobbi, D.K., and Knochenmus, L.A., 1989, Salinity and flow relations and effects of reduced flow in the Chassahowitzka River and Homosassa River estuaries, southwest Florida: U.S. Geological Survey Water-Resources Investigations Report 88-4044.

Yobbi, D.K., and Knochenmus, L.A., 1989, Effects of river discharge and high-tide stage on salinity intrusion in the Weeki Wachee, Crystal, and Withlacoochee River estuaries, southwest Florida: U.S. Geological Survey Water-Resources Investigations Report 88-4116.

Here's a link to the workshop web page:

http://www.WaterMatters.org/SpringsCoastMFL

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From:	Kevin J Grimsley
To:	Alan Martyn Johnson
Cc:	Doug Leeper; Marty Kelly; rkane; Ron Basso
Subject:	RE: Proposed Meeting and Promised follow-up to last e-mail SE Fork
Date:	Monday, August 22, 2011 4:45:27 PM

Martyn,

I simply said that we're disappointed that you couldn't make the meeting. We're not saying that you've backed out of anything. I appreciate you getting back to me sooner rather than later.

I don't believe there will be time to meet after the workshop. The last meeting ran pretty late and from everything I can tell, this one probably will too. By all means, feel free to prepare some questions for Dann to answer at the workshop, but I'm just not sure there will be time.

I do understand that traveling to Tampa is a personal expense for you, but believe me when I say that I've spent quite a bit of my personal time responding to your questions. Dann's plane ticket is also a drop in the bucket compared to the on-the-job hours that Richard Kane and myself have spent responding to emails.

I said that Dann is the only person who can answer "specific, detailed" questions about how he developed these equations. We have several people who are perfectly capable of creating similar regressions, but that doesn't mean that we can tell you why Dann made specific choices when he developed these regressions.

Please reconsider our invitation for a meeting on September 7th where we can thoroughly discuss your questions.

****
Kevin Grimsley, P.E.
Supervisory Hydrologist
USGS, Florida Water Science Center
10500 University Center Drive, Suite 215
Tampa, FL 33612
kjgrims@usgs.gov
813-498-5064
****

From:	Alan Martyn Johnson <martynellijay@hotmail.com>
To:	Kevin J Grimsley <kjgrims@usgs.gov>
Cc:	Doug Leeper <doug.leeper@swfwmd.state.fl.us>, <marty.kelly@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Ron Basso <ron.basso@swfwmd.state.fl.us>
Date:	08/21/2011 08:52 AM
Subject:	RE: Proposed Meeting and Promised follow-up to last e-mail SE Fork

Kevin,

Sorry to disappoint you, but you only came up with the idea in an e-mail last Thursday morning that I replied to Friday around 8 am, which is the time I normally look at my e-mails. I clearly stated that the timing of the proposed meeting did not fit with my plan, indicating that change may be possible. As promise I got back to you with a clear answer yesterday afternoon.

Your e-mail sent 9:14 pm last night either shows a high level of dedication to your job or that you are overworked and having to spend long hours at the office.

Disappointment is a word I would have used if I had cancelled a meeting agreed to some time ago.

If, as you have implied you are flying Dann in to attend the meeting in Lecanto, what is wrong meeting after the meeting. Or more valuable may be for him to address some pre-prepared specific questions at the meeting. This would benefit all panel members with the answers/Danns input.

Travelling to Tampa is a personal expense for me...Dann travelling from Nevada on taxpayers expense needs to have a greater purpose than talking to just me.

Regarding your comment that Dann is the only person that can answer how the equations were developed is very troubling. This shows that he poorly documented the facts and logic behind the equations, or that the USGS has had a poor succession planning program to assure the valuable knowledge about the programs that develop data (used for major expenditure and major decisions about water/environmental resources) is not lost into retirement. I assume Dann has retired.

I did comment yesterday on the equations in Dann's 2001 report and made the presumption that the present SE Fork equation was developed after the date of the report.

Then I got to thinking: real -time data has been available since 2000-10-01 for the SE Fork. Which implies that the same field measurement data sets in Dann's 2001 report may have been used to develop the equation. As I recall you told me (or someone did) that it has always been the same. I am sure you can confirm or correct that point.

I will be more than happy to prepare some specific questions for Dann to respond to at the Lecanto meeting.

Martyn

To: martynellijay@hotmail.com
CC: doug.leeper@swfwmd.state.fl.us; marty.kelly@swfwmd.state.fl.us; rkane@usgs.gov
Subject: Re: Proposed Meeting and Promised follow-up to last e-mail SE Fork
From: kjgrims@usgs.gov
Date: Sat, 20 Aug 2011 21:14:13 -0400

Martyn,

We're disappointed to hear that you won't be able to make the proposed meeting on the morning of the 6th. We feel like we've tried to resolve these perceived issues through email for the past 9 months without success. We believe that a face to face meeting is the only way that we can effectively discuss the many questions you have asked us. We simply cannot indefinitely continue to trade emails over these topics.

We would like to extend one more invitation for a meeting the following day, September 7th, at our office in Tampa. That will be Dann's last day in town and he's the only person who can answer specific, detailed questions about how the regressions were derived (such as the ones you've asked below) since he's the person that derived them. I really hope that you'll be able to make this meeting and that we'll be able to put your concerns to rest.

Doug, you and anyone else from SWFWMD are obviously welcome for this meeting as well.

****
Kevin Grimsley, P.E.
Supervisory Hydrologist
USGS, Florida Water Science Center
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kjgrims@usgs.gov
813-498-5064
****

From:	Alan Martyn Johnson <martynellijay@hotmail.com>
To:	Kevin J Grimsley <kjgrims@usgs.gov>, Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, <marty.kelly@swfwmd.state.fl.us>
Date:	08/20/2011 05:22 PM
Subject:	Proposed Meeting and Promised follow-up to last e-mail SE Fork

---

Kevin,
I am not able to make a firm commitment to the proposed meeting at 9:00 am September 6, 2010 so will have to pass on the offer.

We are not prepared to change our present Labor Day plans, or consider driving down overnight for a meeting that would convey information some of which we would have thought could be shared by e-mail. I certainly would like to discuss some of these things in person, but the proposed timing is not going to work.

I trust my comment to Richard about Dann Yobbi being an interesting person to meet did not spark the thought for the expenditure on the airline ticket. May be some other time. Thanks to Doug for the offer to facilitate.

Further to my last e-mail A CORRECTION....FROM MEMORY I STATED THE TEMPERATURE AT THE HOMOSASSA SPRING GAGE...I WAS IN ERROR BY ONE DEGREE THE FIGURES ARE 23.3, 23.4, 23.5. SORRY just a bad memory or going too fast!

Regarding the figures I said I would look up and some comments.

SE Fork Feild versus Calculated Real Time data that I have on file re the 5% difference.

The first ones were shared with Doug in an e-mail January 10 after the first Lecanto meeting.

FYI for your colleague the two most recent field measurements at the Homosassa Springs Site are:
2010-12-08 @ 16:11:30 94.2 cfs
Calculated results in the record are:@16:00 92 cfs 2.3%
@16:15 92 cfs 2.3%
2010-10-13 @ 14:54:30 83.1 cfs
Calculated results in the record are:@14:45 71cfs 14.5%
@15:00 72 cfs 13.4%
@15:15 73 cfs 12.2 %
Did I select these figures to make a point? No they are simply the two that are easily referenced in the USGS real time data records that are on line. Please feel free to double check these in case I have made a typographical error.
Looking at the SE Fork field measurements in the same way:
2010-12-09 @16:21 55.1 cfs
Calculated results in the record are:@16:15 66 cfs 19.7%
@16:30 66 cfs 19.7%
2010-10-06 @14:14 51.3 cfs 18.9%
@14:21 44.8 cfs 16.0%
@14:29 49.2 cfs 5.6%
@14:34 44.8 cfs 16.0%
Calculated results in the record are: @14:15 61 cfs
@14:30 52 cfs
@14:45 52 cfs

Kevin,
You may recall that in a recent analysis I suggested that the figures for 2010-10-06 should be checked for possible logging errors as they were for very short duration times compared to other and did not follow logic with the stage heights in the measuring time frame.

Next was from the time we met at the springs.
E-mail Feb 14
I note that I shared the above data in that message
Regarding the measurements Ray and yourself made at the Homosassa Springs site I looked at the calculated discharge figures around that time Friday they show 93 cfs compared to the 102-104 cfs you measured. 9.6% and 11.8%

I have added the highlighted percentage difference figures which were not in the original e-mails.

Since February I have these additional figures in my file:

Homosassa Springs 06/15/2011
Field Measurement 14:46 66.4 cfs
USGS Real Time Calculated 54 cfs 18.6%

SE Fork 5/31/2011
Field Measurement 12:32 30.6 cfs
USGS Real Time Calculated 36 cfs 17.6%

The open question I have is how is the Field Measurement (which most commonly is reported as Measurement Duration 0.5 hours, some other durations noted) related to the time of the Field Measurement as reported and the 'instantaneous' calculation from the equation to report Real Time Data. 30 minute duration v 15 minute intervals?

How was equation derived

I have read the 2001 Report by Knochnemus and Yobbi
In the report they attempt to get an equation for the SE Fork and came up with;
Equation 17 from 44 field measurements ln Qseflag=2.60+(0.017*Qhs)

When I look at the Field Measurements they tried to use, 47 listed in the Appendix and also on the USGS web site, I am not surprised they had problems.

Date	No. Measurements	Timeframe	My comment
02-04-97	3	10:28-12:17	Too short timeframe. Discounted to get 44.
06-03-97	6	7:37-12:13	Short timeframe mostly decreasing stage
11-04-97	11	7:06-16:56	Continuous decline of stage. Unusual!
02-24-98	8	10:00-17:00	Flat stage all day. How did they find this and the previous date.
6-17-98	12	7:00-18:00	Good but only just one cycle
10-27-98	7	9:00-17:00	Good but only just one cycle

Presumably someone had another go at an analysis using the data for Field Measurements 2000-12-12/13 and 2003-06-17/18 to come up with the presently used equation. But they failed to look at the field data and note that flow rates and stage height do not have a direct relationship with respect to change .
If you look at the quick graphs attached you will see my point: such as flows remain high after stage starts to decline (remember my comments about the 3 acre pool upstream of the bridge. Sorry the graphs are not fancy for presentation at some fancy meeting. Pretty them up if you want they say the same thing.

Comments as always welcome.
Number of other comments from reading the 2001 report but will keep those for later.

Martyn

[attachment "SE Fork Feild Measurement graphs for Kevin.doc" deleted by Kevin J Grimsley/WRD/USGS/DOI]

From:	Alan Martyn Johnson
To:	Ron Basso; Doug Leeper
Cc:	Marty Kelly
Subject:	RE: Groundwater Basins
Date:	Tuesday, August 23, 2011 9:05:38 AM

Ron,
Very much appreciate you taking the time to answer my questions.

This explanation helps me rebalance my thinking/understanding of the matter.
References to the various basins in the Report by Knochenmus and Yobbi 01-4230 got me thinking too rigidly or is it simplisticly about these basins.

Big Thanks,
Martyn

From: Ron.Basso@swfwmd.state.fl.us
To: martynellijay@hotmail.com; Doug.Leeper@swfwmd.state.fl.us
CC: Marty.Kelly@swfwmd.state.fl.us
Date: Mon, 22 Aug 2011 09:55:49 -0400
Subject: RE: Groundwater Basins

Mr. Johnson:

Let me address your questions as presented in your last email.

What groundwater basins have well defined boundaries?

The large groundwater basins map I sent to you earlier have fairly well-defined boundaries. These basins are delineated by examining the potentiometic surface elevation (water level elevation) of the Floridan aquifer. The USGS publishes May and September maps of the Floridan aquifer elevation from a series of monitor wells across the District. They then contour these elevations based on a 10 ft interval. From these contour maps, you can determine the approximate basin boundaries as groundwater flow is perpendicular to the contoured surface (see attached figure). Groundwater flow is generally in opposite directions on either side of this boundary. So along the east side of the eastern boundary of the Northern Basin, ground water flows toward the Atlantic Ocean. On the western side, it flows toward the Gulf of Mexico. The boundaries of a groundwater basin can change slightly from year to year since they are based on regional potentiometric surface maps and these can change based on climatic conditions and local withdrawals. However the general configuration of the Floridan aquifer flow field (direction of groundwater flow) has remained rather static over the last four decades. The geology of the Florida peninsula largely dictates this flow field configuration.

What is a local flow system of the spring?

These are the springsheds defined for each major group of springs (see attached file). You can further subdivide the Floridan aquifer potentiometic surface into smaller local flow fields that feed each spring group. Again, these areas are used primarily to determine what water quality constituents might eventually make their way into spring discharge since anything that infiltrates from the surface downward could eventually make its way to the vent. Based on these springsheds, the expectation is that these water quality changes can make their way within a contemporary time frame – say months to a few decades depending on distance from the spring vent.

How do we determine the driving head of the Floridian aquifer for the Homosassa springs group?

The Northern District model simulates the potentiometric surface elevation of the Floridan aquifer. We calibrate the model by matching measured water levels at monitor wells and the USGS May and September maps. The flow field configuration generated by the model is very similar to the mapped surface by the USGS. Simulated discharge for each spring in the model depends on the elevation of the Floridan aquifer water level at each spring node, the assigned pool stage elevation at each node, and the conductance (or ability for water to move underground) assigned to each node. We calibrate the springflow by adjusting conductance so that we get a good match between observed and simulated springflow.

Presumably this 'driving head' and or change of driving head is in the NDM or it would not be able to calculate spring flow under various scenarios.

Correct, we simply turn off pumping in the model and record simulated discharge – we then run a separate scenario with current or projected future withdrawals and take the difference between that and non-pumping discharge. Will also take the difference in simulated Floridan aquifer water levels between the two scenarios – we term this drawdown or the predicted decline in Floridan aquifer water levels due to withdrawals.

I think what's confusing are the individual springshed boundaries in relation to the larger groundwater basin boundary since they both divide the flow field to some extent. Maybe thinking of it this way will help - rather than change the orientation of the flow field, regional withdrawals simply "lower" the entire elevation of the potentiometric surface to some extent which in turn decreases springflow along the nature coast and lateral groundwater discharge to the gulf. It's a bit of an oversimplification since the closer the withdrawal is to the vent, the greater its potential impact but the main point is that these flow field boundaries are semi-permanent regardless of withdrawal quantities. The reason water budgets are defined for the springsheds and the larger groundwater basins is that it makes it convenient to calculate parameters without guessing groundwater inflow. I hope this response helps clarify these issues.

Ron Basso, P.G.
Senior Professional Geologist
Hydrologic Evaluation Section
Southwest Florida Water Management District
ph 1-800-423-1476 (in state)
ph 352-796-7211, ext. 4291 (outside state)
FAX 352-797-5799

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Friday, August 19, 2011 8:34 AM

To: Ron Basso; Doug Leeper
Cc: Marty Kelly
Subject: RE: Groundwater Basins

Ron and Doug,
Thanks for your e-mail replys. Appreciate the fast response. I have not got a lot of time right now to digest this, but Ron could you expand on your comment from a few days ago.

Quote

A groundwater basin has well-defined boundaries in a lateral direction with a definable bottom. Rainfall that falls within a groundwater basin provides recharge to the aquifer within that basin. Groundwater does not flow laterally between groundwater basins or outside of a basin. It is important to include all groundwater withdrawals within a basin to conservatively assess the total impact to a spring, stream, or aquifer level.

Unquote

What groundwater basins have well defined boundaries?
And,
What is a local flow system of the spring?
I should have know better than to use the term 'watertight'!

How do we determine the driving head of the Floridian aquifer for the Homosassa springs group?
This question comes from your comment below The flow at an individual spring vent is controlled by the elevation or driving head of the Floridan aquifer water level at that vent.
Presumably this 'driving head' and or change of driving head is in the NDM or it would not be able to calculate spring flow under various scenarios.

Martyn

From: Ron.Basso@swfwmd.state.fl.us
To: Doug.Leeper@swfwmd.state.fl.us; martynellijay@hotmail.com
CC: Marty.Kelly@swfwmd.state.fl.us
Date: Thu, 18 Aug 2011 08:39:01 -0400
Subject: RE: Groundwater Basins

Mr. Martyn:

The smaller springshed boundaries are used primarily to determine potential water quality degradation(e.g. nitrates or other pollutants) from water infiltrating from land surface and making its way into the local flow system of the spring. The water level In the Upper Floridan aquifer or if you like, the pressurized surface of the aquifer can be affected by well withdrawals outside these rather small springsheds – it's this larger, more regional flow system of the Floridan aquifer that provides flow to the coastal springs and discharges groundwater through lateral seepage at the coast. The flow at an individual spring vent is controlled by the elevation or driving head of the Floridan aquifer water level at that vent. Withdrawals within the larger Northern West-Central Floridan Groundwater Basin (see attached figure) would all to some degree contribute to lowered spring flow and lateral groundwater discharge along the nature coast. These large groundwater basins are separated by major flow divides and exhibit similar geology. I hope this has clarified the issue for you – if not, please contact me and let's discuss.

Ron Basso, P.G.
Senior Professional Geologist
Hydrologic Evaluation Section
Southwest Florida Water Management District

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ph 352-796-7211, ext. 4291 (outside state)
FAX 352-797-5799

From: Doug Leeper
Sent: Thursday, August 18, 2011 8:12 AM
To: Alan Martyn Johnson
Cc: Ron Basso; Marty Kelly
Subject: RE: Groundwater Basins

Martyn- My short answer to your inquiry is no. Effects of water use throughout the entire Northwest Central Florida groundwater basin may be expected to potentially influence spring discharge in any of the regional springs/springsheds. That is, the springshed boundaries are not true hydrologic divides. The location and magnitude of area withdrawals, along with local variation in the underlying geology of the Northwest Central Florida groundwater basin would, of course be expected to influence the spatial distribution of withdrawal impacts. The springshed basins are best thought of as areas were land-use may be expected to most strongly impact groundwater quality.

Note that I expect Ron may likely chime in to correct my "non-geologist" response to your question.

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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Thursday, August 18, 2011 7:57 AM
To: Doug Leeper; Ron Basso
Subject: Groundwater Basins

Doug and Ron,
Sorry to keep asking essentially the same question, but this is to help me clarify my understanding about groundwater flowing between basins or not.

I will try to be brief and to the point.

As I understand a groundwater basin such as the Homosassa Basin and the Chassahowitzka Basin and the Weeki Wachee Basin are independent of each other as regards groundwater flowing from one basin to the next. Each basin is defined by the geological boundary (topography of the basin bottom) that forms an almost watertight container (sorry if that is an over simplification but I hope it conveys my understanding succinctly). Water enters each basin as rainfall (Homosassa 292 sq miles, Chassahowitzka 190 sq miles) and leaves as transevaporative loss, surface water run off, spring flow or pumping. Groundwater held in the basin does not move from one basin to another.

The Figure 2-2 from the Chassahowitzka report page 11 (copy attached) shows the various groundwater basins H, C, W and as I understand each is independent (for all practical purposes).

I think any confusion may arise from understanding NorthWest Central Florida Groundwater Basin and Costal Rivers Basin. Which lead to a question of "Am I sure each of the sub-basins within these BIG BASINS are not interconnected other than geographic proximity?".

Is my understanding that each of the 'sub-basins' are independent? At least independent for all practical purposes.

Hopefully it is a easy question to answer with a yes/no. If no maybe we can discuss at the next meeting to save your time right now.

Thanks,
Martyn

IMPORTANT NOTICE: All E-mail sent to or from this address are public record and archived. The Southwest Florida Water Management District does not allow use of District equipment and E-mail facilities for non-District business purposes.

From:	Alan Martyn Johnson
To:	Kevin J Grimsley
Cc:	Doug Leeper; Marty Kelly; rkane; Ron Basso
Subject:	RE: Proposed Meeting and Promised follow-up to last e-mail SE Fork
Date:	Tuesday, August 23, 2011 9:20:26 AM

Kevin,
I will prepare some questions and share these later in the week.

If we really do not get anywhere that afternoon in Lecanto I may consider at that time the value of travelling to Tampa. But, I have to tell you there are others that are becoming very interested in the subject of flow measurements. We all get the big picture but the devil is in the detail.

Look forward to hearing the results of the Specific Conductance test Homosassa Springs.

Martyn

To: martynellijay@hotmail.com
CC: doug.leeper@swfwmd.state.fl.us; marty.kelly@swfwmd.state.fl.us; rkane@usgs.gov; ron.basso@swfwmd.state.fl.us
Subject: RE: Proposed Meeting and Promised follow-up to last e-mail SE Fork
From: kjgrims@usgs.gov
Date: Mon, 22 Aug 2011 16:45:20 -0400

Martyn,

I simply said that we're disappointed that you couldn't make the meeting. We're not saying that you've backed out of anything. I appreciate you getting back to me sooner rather than later.

I don't believe there will be time to meet after the workshop. The last meeting ran pretty late and from everything I can tell, this one probably will too. By all means, feel free to prepare some questions for Dann to answer at the workshop, but I'm just not sure there will be time.

I do understand that traveling to Tampa is a personal expense for you, but believe me when I say that I've spent quite a bit of my personal time responding to your questions. Dann's plane ticket is also a drop in the bucket compared to the on-the-job hours that Richard Kane and myself have spent responding to emails.

I said that Dann is the only person who can answer "specific, detailed" questions about how he developed these equations. We have several people who are perfectly capable of creating similar regressions, but that doesn't mean that we can tell you why Dann made specific choices when he developed these regressions.

Please reconsider our invitation for a meeting on September 7th where we can thoroughly discuss your questions.

****
Kevin Grimsley, P.E.
Supervisory Hydrologist
USGS, Florida Water Science Center

10500 University Center Drive, Suite 215
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kjgrims@usgs.gov
813-498-5064
****

From:	Alan Martyn Johnson <martynellijay@hotmail.com>
To:	Kevin J Grimsley <kjgrims@usgs.gov>
Cc:	Doug Leeper <doug.leeper@swfwmd.state.fl.us>, <marty.kelly@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, Ron Basso <ron.basso@swfwmd.state.fl.us>
Date:	08/21/2011 08:52 AM
Subject:	RE: Proposed Meeting and Promised follow-up to last e-mail SE Fork

---

Kevin,
Sorry to disappoint you, but you only came up with the idea in an e-mail last Thursday morning that I replied to Friday around 8 am, which is the time I normally look at my e-mails. I clearly stated that the timing of the proposed meeting did not fit with my plan, indicating that change may be possible. As promise I got back to you with a clear answer yesterday afternoon.

Your e-mail sent 9:14 pm last night either shows a high level of dedication to your job or that you are overworked and having to spend long hours at the office.

Disappointment is a word I would have used if I had cancelled a meeting agreed to some time ago.

If, as you have implied you are flying Dann in to attend the meeting in Lecanto, what is wrong meeting after the meeting. Or more valuable may be for him to address some pre-prepared specific questions at the meeting. This would benefit all panel members with the answers/Danns input.

Travelling to Tampa is a personal expense for me...Dann travelling from Nevada on taxpayers expense needs to have a greater purpose than talking to just me.

Regarding your comment that Dann is the only person that can answer how the equations were developed is very troubling. This shows that he poorly documented the facts and logic behind the equations, or that the USGS has had a poor succession planning program to assure the valuable knowledge about the programs that develop data (used for major expenditure and major decisions about water/environmental resources) is not lost into retirement. I assume Dann has retired.

I did comment yesterday on the equations in Dann's 2001 report and made the presumption that the present SE Fork equation was developed after the date of the report.

Then I got to thinking: real -time data has been available since 2000-10-01 for the SE Fork. Which implies that the same field measurement data sets in Dann's 2001 report may have been used to develop the equation. As I recall you told me (or someone did) that it has always been the same. I am sure you can confirm or correct that point.

I will be more than happy to prepare some specific questions for Dann to respond to at the Lecanto meeting.

Martyn

To: martynellijay@hotmail.com
CC: doug.leeper@swfwmd.state.fl.us; marty.kelly@swfwmd.state.fl.us; rkane@usgs.gov
Subject: Re: Proposed Meeting and Promised follow-up to last e-mail SE Fork
From: kjgrims@usgs.gov
Date: Sat, 20 Aug 2011 21:14:13 -0400

Martyn,

We're disappointed to hear that you won't be able to make the proposed meeting on the morning of the 6th. We feel like we've tried to resolve these perceived issues through email for the past 9 months without success. We believe that a face to face meeting is the only way that we can effectively discuss the many questions you have asked us. We simply cannot indefinitely continue to trade emails over these topics.

We would like to extend one more invitation for a meeting the following day, September 7th, at our office in Tampa. That will be Dann's last day in town and he's the only person who can answer specific, detailed questions about how the regressions were derived (such as the ones you've asked below) since he's the person that derived them. I really hope that you'll be able to make this meeting and that we'll be able to put your concerns to rest.

Doug, you and anyone else from SWFWMD are obviously welcome for this meeting as well.

****
Kevin Grimsley, P.E.
Supervisory Hydrologist
USGS, Florida Water Science Center
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813-498-5064
****

From:	Alan Martyn Johnson <martynellijay@hotmail.com>
To:	Kevin J Grimsley <kjgrims@usgs.gov>, Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, <marty.kelly@swfwmd.state.fl.us>
Date:	08/20/2011 05:22 PM
Subject:	Proposed Meeting and Promised follow-up to last e-mail SE Fork

---

Kevin,
I am not able to make a firm commitment to the proposed meeting at 9:00 am September 6, 2010 so will have to pass on the offer.

We are not prepared to change our present Labor Day plans, or consider driving down overnight for a meeting that would convey information some of which we would have thought could be shared by e-mail. I certainly would like to discuss some of these things in person, but the proposed timing is not going to work.

I trust my comment to Richard about Dann Yobbi being an interesting person to meet did not spark the thought for the expenditure on the airline ticket. May be some other time. Thanks to Doug for the offer to facilitate.

Further to my last e-mail A CORRECTION....FROM MEMORY I STATED THE TEMPERATURE AT THE HOMOSASSA SPRING GAGE...I WAS IN ERROR BY ONE DEGREE THE FIGURES ARE 23.3, 23.4, 23.5. SORRY just a bad memory or going too fast!

Regarding the figures I said I would look up and some comments.

SE Fork Feild versus Calculated Real Time data that I have on file re the 5% difference.

The first ones were shared with Doug in an e-mail January 10 after the first Lecanto meeting.

FYI for your colleague the two most recent field measurements at the Homosassa Springs Site are:

2010-12-08 @ 16:11:30	94.2 cfs			
Calculated results in the record are:		@16:00	92 cfs	2.3%
		@16:15	92 cfs	2.3%
2010-10-13 @ 14:54:30	83.1 cfs			
Calculated results in the record are:		@14:45	71cfs	14.5%
		@15:00	72 cfs	13.4%
		@15:15	73 cfs	12.2 %

Did I select these figures to make a point? No they are simply the two that are easily referenced in the USGS real time data records that are on line. Please feel free to double check these in case I have made a typographical error.

Looking at the SE Fork field measurements in the same way:

2010-12-09 @16:21	55.1 cfs			
Calculated results in the record are:		@16:15	66 cfs	19.7%
		@16:30	66 cfs	19.7%
2010-10-06 @14:14	51.3 cfs	18.9%		
@14:21	44.8 cfs	16.0%		
@14:29	49.2 cfs	5.6%		
@14:34	44.8 cfs	16.0%		
Calculated results in the record are:		@14:15	61 cfs	
		@14:30	52 cfs	
		@14:45	52 cfs	

Kevin,

You may recall that in a recent analysis I suggested that the figures for 2010-10-06 should be checked for possible logging errors as they were for very short duration times compared to other and did not follow logic with the stage heights in the measuring time frame.

Next was from the time we met at the springs.
E-mail Feb 14
I note that I shared the above data in that message
Regarding the measurements Ray and yourself made at the Homosassa Springs site I looked at the calculated discharge figures around that time Friday they show 93 cfs compared to the 102-104 cfs you measured. 9.6% and 11.8%

I have added the highlighted percentage difference figures which were not in the original e-mails.

Since February I have these additional figures in my file:

Homosassa Springs 06/15/2011
Field Measurement 14:46 66.4 cfs
USGS Real Time Calculated 54 cfs 18.6%

SE Fork 5/31/2011
Field Measurement 12:32 30.6 cfs
USGS Real Time Calculated 36 cfs 17.6%

The open question I have is how is the Field Measurement (which most commonly is reported as Measurement Duration 0.5 hours, some other durations noted) related to the time of the Field Measurement as reported and the 'instantaneous' calculation from the equation to report Real Time Data. 30 minute duration v 15 minute intervals?

How was equation derived

I have read the 2001 Report by Knochnemus and Yobbi
In the report they attempt to get an equation for the SE Fork and came up with;
Equation 17 from 44 field measurements ln Qseflag=2.60+(0.017*Qhs)

When I look at the Field Measurements they tried to use, 47 listed in the Appendix and also on the USGS web site, I am not surprised they had problems.

Date	No. Measurements	Timeframe	My comment
02-04-97	3	10:28-12:17	Too short timeframe. Discounted to get 44.
06-03-97	6	7:37-12:13	Short timeframe mostly decreasing stage
11-04-97	11	7:06-16:56	Continuous decline of stage. Unusual!
02-24-98	8	10:00-17:00	Flat stage all day. How did they find this and the previous date.
6-17-98	12	7:00-18:00	Good but only just one cycle
10-27-	7	9:00-17:00	Good but only just one cycle

98			

Presumably someone had another go at an analysis using the data for Field Measurements 2000-12-12/13 and 2003-06-17/18 to come up with the presently used equation. But they failed to look at the field data and note that flow rates and stage height do not have a direct relationship with respect to change .
If you look at the quick graphs attached you will see my point: such as flows remain high after stage starts to decline (remember my comments about the 3 acre pool upstream of the bridge. Sorry the graphs are not fancy for presentation at some fancy meeting. Pretty them up if you want they say the same thing.

Comments as always welcome.
Number of other comments from reading the 2001 report but will keep those for later.

Martyn

[attachment "SE Fork Feild Measurement graphs for Kevin.doc" deleted by Kevin J Grimsley/WRD/USGS/DOI]

From:	Doug Leeper
To:	Marty Kelly; Ron Basso
Subject:	FW: Posting of USGS Reports on Springs Coast MFLs Workshop Web Page
Date:	Tuesday, August 23, 2011 11:21:00 AM

FYI – Don't think you guys received this, the third of Mr. Johnson's e-mail's directed or copied to me today.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
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Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Tuesday, August 23, 2011 8:57 AM
To: Doug Leeper
Cc: Ron Miller; brimbey3@tampabay.rr.com; brentwhitley@sierra-properties.com; 2buntings@comcast.net; jbitter@tampabay.rr.com; grubman1@gmail.com
Subject: RE: Posting of USGS Reports on Springs Coast MFLs Workshop Web Page

Doug,
My that was big copy list!
Your comment............. should not be "required reading"......... was spot on.

Seriously, if Richard thinks these are critical to MFL discussion he should extract some key points that he wants to bring to our attention.

Recently I did take the time to read the 2001 report you posted sometime ago on the Working Group Web site. And to show what I mean about extracts here are a few from my notes.

Extracts from Report 01-4230 Knochenmus and Yobbi

Page 30/31
The Homosassa Springs complex includes multiple springs discharging water at variable rates and qualities (figs. 19 and 21). Historical specific conductance data for Homosassa Springs since the 1960's (at undocumented tidal altitudes) ranged from about 1,000 to more than 4,000 ìS/cm (fig. 20). The average specific conductance values were 3,245, 5,694, and 1,339 ìS/cm for the three spring vents known as Homosassa Springs 1, 2, and 3, respectively, during 1993-97 (Southwest Florida Water Management District, 1997, p. 27-30). The six named spring vents that contribute flow to the tributary, Southeast Fork of the Homosassa River, discharge the freshest water in the complex with specific conductance values less than 500 ìS/cm (Southwest Florida Water Management District, 1997).

Such references should be compared to today with specific conductance for the SE Fork and Homosassa Spring 3 typically at twice the quoted figures.
Those comparisons are relevant to the current discussion about how the river/springs have already deteriorated.
The discussion and focus needs to be on the why the deterioration.

Page 34 Table shows 17 flow equations.
Equations for Homosassa Springs and SE Fork are no longer in use today. Check some others when get chance. Data in Appendix for SE Fork scant/limited.

This is only of relevance to today's discussion as to how difficult it is to get good measurement of flows.

Page 41/42
Ground-water withdrawals, tabulated from a list of users permitted to withdraw greater than 100,000 gal/d were 34.8, 1,098, 620, and 73.5 Mgal for the Aripeka, Weeki Wachee, Chassahowitzka, and Homosassa Springs Ground-Water Basins, respectively (fig. 27). The tabulated water use essentially reflect the volume of ground water withdrawn in Pasco and Hernando Counties. Citrus County is predominantly rural, so many of the wells were not tabulated nor included in the analyzed data set because the pumped rates were less than 100,000 gal/d. Based on water-use estimates (Marella, 1999, Southwest Florida Water Management District, 1999a and 1999b) ground-water use by small users (less than 100,000 gal/d) is about twice that of larger users in Citrus County. The volume was therefore adjusted by tripling the tabulated number to account for these small but numerous users in Citrus County. The values used for ground-water withdrawals in the water budget were 0.6, 3.6, 2.2, and 0.6 in/yr in the Aripeka, Weeki Wachee, Chassahowitzka, and Homosassa Springs Ground-Water Basins and averaged 1.8 in/yr for the Coastal Springs Ground-Water Basin (fig. 25 and table 2).

While this gave me a better understanding of where the 0.6 inches of the budget quoted in the 2010 Draft Report for MFL Homosassa came from, it reminded me that the answer to Ron Millers questions posted on the Working Group Web site did not reference this large withdrawal that at least Yobbi did recognize. Incidentally I think the 73.5 Mgal, if that does mean 73.5 million gallons per day is an error; probably 7.35?
But the real interesting point was from the table on page 40 which shows that the Water Budget for the four basins. I looked at these number in a slightly different way to how the 0.6 inches was reported in the 2010 Draft report. I calculated how much of the water getting into the ground is withdrawn by pumping.

Aripeka** 0.6/19.3 is **3.1%

Weeki Wachee *3.6/25.6 is* ***14.1%***
Chassahowitzka *2.2/18.2 is* ***12%***
Homosassa *0.6/19.8 is* ***3%***
The reporting in the 2010 Homosassa Draft Report of 1.2% is correct but it is a percentage of rainfall not what gets into the ground.

These are just a few of my notes from reading the most recent of these old reports.
Again it leads me to the conclusion I have expressed so many times.

NO MORE WELLS NO MORE PUMPING DAMAGE IS ALREADY EVIDENT.

Just a couple of thoght for today.
Martyn

Date: Mon, 22 Aug 2011 11:53:23 -0400
Subject: Posting of USGS Reports on Springs Coast MFLs Workshop Web Page

Greetings:

In response to a suggestion from Richard Kane, the stakeholder representative from the United States Geological Survey, the District has added four reports containing information on discharge in several Springs Coast rivers to the Springs Coast Minimum Flows and Levels Public Workshop web page. The reports listed below are posted under the "Background Information and Reports" heading at the bottom of the page. The reports should not be considered "required reading" for workshop participants, but they do contain a great deal of useful information.

Yobbi, D.K., 1989, Simulation of steady-state ground water and spring flow in the upper Floridan aquifer of coastal Citrus and Hernando Counties, Florida: U.S. Geological Survey Water-Resources Investigations Report 88-4036.

Yobbi, D.K., 1992, Effects of tidal stage and ground-water levels on the discharge and water quality of springs in coastal Citrus and Hernando Counties, Florida: U.S. Geological Survey Water-Resources Investigations Report 92-4069.

Yobbi, D.K., and Knochenmus, L.A., 1989, Salinity and flow relations and effects of reduced flow in the Chassahowitzka River and Homosassa River estuaries, southwest Florida: U.S. Geological Survey Water-Resources Investigations Report 88-4044.

Yobbi, D.K., and Knochenmus, L.A., 1989, Effects of river discharge and high-tide stage on salinity intrusion in the Weeki Wachee, Crystal, and Withlacoochee River estuaries, southwest Florida: U.S. Geological Survey Water-Resources Investigations Report 88-4116.

Here's a link to the workshop web page:

http://www.WaterMatters.org/SpringsCoastMFL

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Web Site: watermatters.org

From:	Doug Leeper
To:	"Alan Martyn Johnson"
Bcc:	Marty Kelly; Richard Kane (rkane@usgs.gov); Kevin Grimsely (kjgrims@usgs.gov)
Subject:	RE: Input on Hydrologic Data & Question about the Northern District Model
Date:	Thursday, August 25, 2011 3:23:00 PM

Martyn:

Here are answers to the questions raised in your August 13th e-mail.

1. You wrote: *As I pointed out in the data I sent you there is some connection which derives from similar rainfall patterns in the relatively close locations. I also understand that the Weeki Wachee Well was a convenient choice for those persons studying the hydrology of the area some years ago. But I think it has out lived its usefulness in the equation. I honestly believe that its use causing errors in the data which at this juncture need to be minimized.*

Are there alternatives? I am not in a position to evaluate the other wells that are within the Homosassa Basin such as; Lecanto Well 1, Holder Mine, Perryman, ROMP or Highlands. I guess that all these suffer from the fact that they are not fed directly into the USGS by satellite connection.

I will take this matter up again with USGS, but as the data is only provisional until 'vetted and reviewed' the urgency factor for satellite direct connection may not be as critical as accuracy.

My response: Your inquiry about alternative wells seem appropriate for the planned discussion of streamflow/water quality measurement with United States Geological Survey staff. One alternative to the use of the Weeki Wachee well for estimating discharge in Springs Coast rivers would involve installation of equipment for use of the index-velocity method. As discussed previously, we are hopeful that the District will be able to fund some additional streamflow gauging work directed towards this effort in the Southeast Fork and in Halls River.

2. You wrote: *Oh, did anyone comment about the missing weed in the river this year. I am no weed expert, but there is a distinct difference to the weed a couple of years ago.*

My response: Boyd Blihovde and others, noted that there have been changes in the vegetation in the Chassahowitzka Wildlife refuge in recent years. In subsequent discussions, Boyd has indicated that he would like to address this issue at the upcoming September workshop.

3. You wrote: *Are there any updates available on the chemical analysis; the latest data in what you sent me was mid 2009? Is it available on the web?*

My response: The District maintains water quality data in its Water Management Information System (WMIS), and these data can be downloaded from the District's "Hydrologic Data and Water Quality Data" web page at:

http://www.swfwmd.state.fl.us/data/wmdbweb/disclaimer.htm

If this link does not work the web page may be found by browsing to the District web site, pointing to "Data & Maps" in the vertically arranged list at the left side of the page, and clicking on "Hydrologic Data".

I ran through a data download for a site yesterday morning and will use this experience to provide some guidance for retrieving data. Note that the "Hydrologic Data and Water Quality Data" page includes a "Frequently Asked Questions" document that may provide additional guidance regarding data retrieval. Anyway, here are my recommended steps that should (hopefully) work…

Step 1. Click on the "View Hydrologic and water quality data" link on the "Hydrologic Data and Water Quality Data" page. This will open the main WMIS page.
Step 2. Enter a site identification number for a single site or for multiple sites. When entering multiple sites, separate the SIDs with a comma. Site identification numbers for the sites in the Homosassa system are included in the spreadsheet I sent to you this past January.
Step 3. Hit the Search button in the lower right portion of the WMIS page. This will open a WMIS page with information about the selected (input) sites.
Step 4. In the centrally located results section of the window, click on the empty white box for each site, or simply click the empty white box at the top of the results window to select all listed sites.
Step 5. Click on the "Add Parameters" button.
Step 6. Choose the parameters of interest (or all) from the menu.
Step 7. Specify data collection dates, if desired (I believe the default is period of record).
Step 8. Enter an e-mail address.
Step 9. Check the "Combine Download Site" if you want data for multiple sites to be combined.
Step 10. Click on the "Download Data" button. The WMIS system will send an e-mail to the address you have provided, indicating the data have been downloaded to a server for review and/or retrieval.
Step 11. Follow the link in the e-mail to review and/or download the requested data.

Hope your find this information to be useful.
As an aside, the workshop audio CD is on its way to you in Georgia.

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From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Saturday, August 13, 2011 7:12 PM
To: Doug Leeper
Subject: RE: Input on Hydrologic Data & Question about the Northern District Model

Doug,

Thanks again for this answer from Ron Basso. This confirmed my thought that the water level in the Weeki Wachee Well is not directly related to the hydraulic head driving water from the Homosassa springs complex.
As I pointed out in the data I sent you there is some connection which derives from similar rainfall patterns in the relatively close locations. I also understand that the Weeki Wachee Well was a convenient choice for those persons studying the hydrology of the area some years ago. But I think it has out lived its usefulness in the equation. I honestly believe that its use causing errors in the data which at this juncture need to be minimized.

Are there alternatives? I am not in a position to evaluate the other wells that are within the Homosassa Basin such as; Lecanto Well 1, Holder Mine, Perryman, ROMP or Highlands. I guess that all these suffer from the fact that they are not fed directly into the USGS by satellite connection.

I will take this matter up again with USGS, but as the data is only provisional until 'vetted and reviewed' the urgency factor for satellite direct connection may not be as critical as accuracy.

Again thanks to Ron. My question was very basic, his answer more than was needed.

Hope I can make it to the next Working Group meeting. I will have to spend some time looking further at that chemical analysis data you sent me earlier. Pumphouse and Trotter Spring did show some increases in salinity over the last few years... not that it had not been seen back in 2001 as I recall which was a low rainfall period, but the trend looked stronger/more sustained. These are both highly critical springs to the Homosassa River.

Oh, did anyone comment about the missing weed in the river this year. I am no weed expert, but there is a distinct difference to the weed a couple of years ago.

Are there any updates available on the chemical analysis; the latest data in what you sent me was mid 2009? Is it available on the web?

Some days I wish I could be looking at this more, but I doubt all my questions would keep you from other important matters.

NOTE: Remainder of e-mail string deleted by Doug Leeper

From:	Alan Martyn Johnson
To:	Doug Leeper; rkane; Kevin J Grimsley
Cc:	Marty Kelly
Subject:	Tidally Adjusted Flow at 02310700
Date:	Friday, August 26, 2011 7:27:46 AM

Doug, Richard, Kevin,

Hopefully this is an easy question for someone to answer.

How is Tidally Adjusted Discharge calculated for the Homosassa River at Homosassa Gage Site 02310700?

This question relates to a flow issue I touched on after the first Lecanto meeting; flow from Halls River.
In the July 12, 2010 Draft Reports the following Table is shown on Page 50. I could not get to grips with the Halls River figures. When I looked at the daily data from the Gage Site 02310700 that only resulted in more questions. And I noted that the tidally adjusted discharge has not been reported since October 1, 2010.

Martyn

Table 2-3. Summary statistics for mean daily discharge records approved by the United States Geological Survey for Homosassa River system gage sites. Values are expressed as cubic feet per second (cfs) unless specified. Periods of record for approved data are listed by gage site in Table 2-2.

Statistic (cfs or N)	Homosassa Springs at Homosassa Springs FL	SE Fork Homosassa Spring at Homosassa Springs FL	Combined Springs[a]	Halls River[b]	Homosassa River at Homosassa FL (tidally filtered)	Hidden River near Homosassa FL
Maximum	141	100	240	1,995	2,090	25.0
75th Percentile	98	68	165	200	350	11
Median	88	60	147	108	251	8.0
25th Percentile	79	53	131	28	167	4.6
Minimum	34	23	57	-765	-636	1.3
Mean	89	61	149	129	272	8.0
Standard Deviation	14	11	26	181	183	4.4
Number (N) of daily Records	4,975	3,123	3,102	1,662	1,774	2,063

[a] Combined Springs discharge determined as the sum of the Homosassa Springs at Homosassa FL and SE Fork Homosassa
Spring at Homosassa Springs FL discharge for days when records were available for both sites.
[b] Halls River discharge estimated by subtracting combined springs discharge from tidally filtered Homosassa River at Homosassa

FL discharge for days when records were available for the two spring sites and the Homosassa River site.

This is an extract from the on-line records; note the differences between the filtered and non filtered figures.

Date	Dis-charge, ft3/s, not filtrd. for tide (Mean)	Dis-charge, tidally fltrd, ft3/s, RESIDUAL (Mean)	Not Filtered-Filtered
6/10/2010	145A	128A	17
6/11/2010	103A	77A	26
6/12/2010	149A	129A	20
6/13/2010	211A	230A	-19
6/14/2010	139A	190A	-51
6/15/2010	158A	234A	-76
6/16/2010	308A	218A	90
6/17/2010	284A	239A	45
6/18/2010	277A	225A	52
6/19/2010	336A	250A	86
6/20/2010	290A	275A	15
6/21/2010	285A	164A	121
6/22/2010	263A	235A	28
6/23/2010	232A	262A	-30
6/24/2010	185A	255A	-70
6/25/2010	135A	201A	-66
6/26/2010	125A	154A	-29
6/27/2010	99A	140A	-41
6/28/2010	135A	151A	-16
6/29/2010	228A	269A	-41
6/30/2010	200A	231A	-31
7/1/2010	285A	261A	24
7/2/2010	292A	254A	38
7/3/2010	195A	190A	5
7/4/2010	170A	163A	7
7/5/2010	255A	220A	35
7/6/2010	319A	285A	34
7/7/2010	351A	278A	73

7/8/2010	191[A]	194[A]	-3
7/9/2010	127[A]	158[A]	-31
7/10/2010	87[A]	[P]	0
7/11/2010	[P]	[P]	0
7/12/2010	[P]	[P]	0
7/13/2010	[P]	[P]	0
7/14/2010	[P]	[P]	0
7/15/2010	235[A]	[P]	0
7/16/2010	197[A]	[P]	0
7/17/2010	209[A]	200[A]	9
7/18/2010	243[A]	222[A]	21
7/19/2010	277[A]	212[A]	65
7/20/2010	221[A]	202[A]	19
7/21/2010	197[A]	185[A]	12
7/22/2010	129[A]	175[A]	-46
7/23/2010	198[A]	185[A]	13
7/24/2010	-74[A]	31[A]	-105
7/25/2010	140[A]	117[A]	23
7/26/2010	168[A]	209[A]	-41
7/27/2010	177[A]	203[A]	-26
7/28/2010	194[A]	192[A]	2
7/29/2010	188[A]	192[A]	-4
7/30/2010	167[A]	180[A]	-13
7/31/2010	222[A]	213[A]	9
8/1/2010	245[A]	216[A]	29
8/2/2010	244[A]	214[A]	30
8/3/2010	228[A]	200[A]	28
8/4/2010	194[A]	150[A]	44
8/5/2010	173[A]	125[A]	48
8/6/2010	91[A]	126[A]	-35
8/7/2010	246[A]	243[A]	3
8/8/2010	356[A]	395[A]	-39
8/9/2010	367[A]	420[A]	-53
8/10/2010	247[A]	258[A]	-11

From:	Richard L Kane
To:	Doug Leeper
Cc:	Kevin Grimsley; Richard L Kane
Subject:	Re: Input on Hydrologic Data & Question about the Northern District Model
Date:	Thursday, August 25, 2011 4:17:15 PM

Doug the WW well is a great well for the springs equations. What Dann Yobbi was looking for was a well that could be used for most of the springs and had a good representation of the Floridan Aquifer. He didn't want to use a well too close to the springs as it could have been influenced by salt water intrusion and tidal affect. Also the equations were developed for a project and over several years. So if you started over again with another well we would need to propose a new project and spend some time, possibly several years, in developing new equations.
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Richard Kane
Associate Center Director, Data
FLWSC
10500 University Center Dr., Suite 215
813-498-5057 w
813-918-1275 c

On Aug 25, 2011, at 3:23 PM, "Doug Leeper" <Doug.Leeper@swfwmd.state.fl.us> wrote:

Martyn:

Here are answers to the questions raised in your August 13th e-mail.

1. You wrote: *As I pointed out in the data I sent you there is some connection which derives from similar rainfall patterns in the relatively close locations. I also understand that the Weeki Wachee Well was a convenient choice for those persons studying the hydrology of the area some years ago. But I think it has out lived its usefulness in the equation. I honestly believe that its use causing errors in the data which at this juncture need to be minimized.*

Are there alternatives? I am not in a position to evaluate the other wells that are within the Homosassa Basin such as; Lecanto Well 1, Holder Mine, Perryman, ROMP or

Highlands. I guess that all these suffer from the fact that they are not fed directly into the USGS by satellite connection.

I will take this matter up again with USGS, but as the data is only provisional until 'vetted and reviewed' the urgency factor for satellite direct connection may not be as critical as accuracy.

My response: Your inquiry about alternative wells seem appropriate for the planned discussion of streamflow/water quality measurement with United States Geological Survey staff. One alternative to the use of the Weeki Wachee well for estimating discharge in Springs Coast rivers would involve installation of equipment for use of the index-velocity method. As discussed previously, we are hopeful that the District will be able to fund some additional streamflow gauging work directed towards this effort in the Southeast Fork and in Halls River.

2. You wrote: *Oh, did anyone comment about the missing weed in the river this year. I am no weed expert, but there is a distinct difference to the weed a couple of years ago.*

My response: Boyd Blihovde and others, noted that there have been changes in the vegetation in the Chassahowitzka Wildlife refuge in recent years. In subsequent discussions, Boyd has indicated that he would like to address this issue at the upcoming September workshop.

3. You wrote: *Are there any updates available on the chemical analysis; the latest data in what you sent me was mid 2009? Is it available on the web?*

My response: The District maintains water quality data in its Water Management Information System (WMIS), and these data can be downloaded from the District's "Hydrologic Data and Water Quality Data" web page at:

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If this link does not work the web page may be found by browsing to the District web site, pointing to "Data & Maps" in the vertically arranged list at the left side of the page, and clicking on "Hydrologic Data".

I ran through a data download for a site yesterday morning and will use this experience to provide some guidance for retrieving data. Note that the "Hydrologic Data and Water Quality Data" page includes a "Frequently Asked Questions" document that may provide additional guidance regarding data retrieval. Anyway, here are my recommended steps that should (hopefully) work…

Step 1. Click on the "View Hydrologic and water quality data" link on the "Hydrologic Data and Water Quality Data" page. This will open the main WMIS page.

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Step 5. Click on the "Add Parameters" button.

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Step 8. Enter an e-mail address.

Step 9. Check the "Combine Download Site" if you want data for multiple sites to be combined.

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Step 11. Follow the link in the e-mail to review and/or download the requested data.

Hope your find this information to be useful.

As an aside, the workshop audio CD is on its way to you in Georgia.

Douglas A. Leeper, Chief Environmental Scientist

Resource Projects Department, Southwest Florida Water Management District

2379 Broad Street, Brooksville, FL 34604-6899

Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272

Fax: 352-754-6885

E-Mail: doug.leeper@watermatters.org

Web Site: watermatters.org

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Saturday, August 13, 2011 7:12 PM
To: Doug Leeper
Subject: RE: Input on Hydrologic Data & Question about the Northern District Model

Doug,
Thanks again for this answer from Ron Basso. This confirmed my thought that the water level in the Weeki Wachee Well is not directly related to the hydraulic head driving water from the Homosassa springs complex.
As I pointed out in the data I sent you there is some connection which derives from similar rainfall patterns in the relatively close locations. I also understand that the Weeki Wachee Well was a convenient choice for those persons studying the hydrology of the area some years ago. But I think it has out lived its usefulness in the equation. I honestly believe that its use causing errors in the data which at this juncture need to be minimized.

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Hope I can make it to the next Working Group meeting. I will have to spend some time looking further at that chemical analysis data you sent me earlier. Pumphouse and Trotter Spring did show some increases in salinity over the last few years... not that it had not been seen back in 2001 as I recall which was a low rainfall period, but the trend looked stronger/more sustained. These are both highly critical springs to the Homosassa River.

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NOTE: Remainder of e-mail string deleted by Doug Leeper

<mime.htm>

From:	Alan Martyn Johnson
To:	Doug Leeper
Cc:	Ron Miller
Subject:	RE: Input on Hydrologic Data & Question about the Northern District Model
Date:	Friday, August 26, 2011 7:10:05 AM

Doug,
Very much appreciate your reply.

Your comment about Halls River was almost ESP.....yesterday when I was thinking about questions for USGS I looked at some old notes and a Halls River flow question was there. I will see if I can quickly address it in a few minutes.

Regarding the chemical analysis data I had tried looking on the WMIS site, but there was obviously a skills gap. I will try over the weekend with your step by step instructions next to me. Thanks.

Not aware of who Boyd Blihovde is, but pleased he is going to discuss observations/changes in vegetation. It was my wife that brought my attention to the weed growth change noting that we had not seen the 'weed machine' removing weed this year and could not recall if the County did it last year.

Martyn

From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Thu, 25 Aug 2011 15:23:29 -0400
Subject: RE: Input on Hydrologic Data & Question about the Northern District Model

Martyn:

Here are answers to the questions raised in your August 13th e-mail.

1. You wrote: *As I pointed out in the data I sent you there is some connection which derives from similar rainfall patterns in the relatively close locations. I also understand that the Weeki Wachee Well was a convenient choice for those persons studying the hydrology of the area some years ago. But I think it has out lived its usefulness in the equation. I honestly believe that its use causing errors in the data which at this juncture need to be minimized.*

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Sent: Saturday, August 13, 2011 7:12 PM
To: Doug Leeper
Subject: RE: Input on Hydrologic Data & Question about the Northern District Model

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NOTE: Remainder of e-mail string deleted by Doug Leeper

From:	Doug Leeper
To:	"Richard L Kane"
Cc:	Marty Kelly; Ron Basso
Subject:	Thanks
Date:	Friday, August 26, 2011 7:46:00 AM

Thanks Richard.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
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Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Richard L Kane [mailto:rkane@usgs.gov]
Sent: Thursday, August 25, 2011 4:10 PM
To: Doug Leeper
Cc: Kevin Grimsley; Richard L Kane
Subject: Re: Input on Hydrologic Data & Question about the Northern District Model

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Richard Kane
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NOTE: Remainder of e-mail string deleted by Doug Leeper

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Florida Water Science Center
10500 University Center Drive, Suite 215
Tampa, Florida 33612-6490
Tel. (813)975-8620
Fax (813) 975-0839

August 23, 2011

Douglas Leeper, Chief Environmental Scientist
Resource Projects Department,
Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34604

Mr. Leeper:

This letter is in response to the correspondence by Mr. Martyn Johnson posted on the Springs Coast MFL Working Group website hosted by Southwest Florida Water Management District (SWFWMD).

The USGS has been measuring discharge from springs throughout Florida for over 100 years using the most advanced equipment and techniques available. Coastal springs that are tidally affected, such as Homosassa Springs, are among the most complex in the country, because they have so many different factors influencing the flow.

Hydrologists from the USGS office in Tampa have been corresponding with Mr. Johnson since November, 2010, and have attempted to address his numerous questions about flows in the Homosassa River area. Because of the complexity of these tidal springs, however, it can be difficult to explain the intricacies of the data computation and analysis to a layperson even with some fundamental experience in stream gaging. Our hydrologists spend years building experience before they work on complex systems such as these.

Each one of Mr. Johnson's concerns regarding USGS data has been investigated and the USGS strongly refutes Mr. Johnson's claims that our data is inaccurate or biased.

Manual discharge measurements are made quarterly at these gages in order to continuously assess the accuracy of the discharge algorithms. It is standard practice that if the measurements display a deviation from the algorithm, then a new one is developed to match the manual measurements. The USGS data and its associated discharge algorithms in this area were reviewed again even, though they had already been through a rigorous review process when they were developed and yearly thereafter. The algorithms were found to be performing as intended and no change was made.

It would be improper to assume that this data (or any other) is without error, however. Some of the limiting factors of discharge computations at tidal springs include equipment, environmental factors, and stability of the algorithms. The inherent error in a discharge measurement for a natural river environment is estimated to range between 2% and 10% depending on the conditions. Inaccuracies inherent in the algorithm used to compute spring discharge could also lead to errors, but we have done our best to minimize these errors. These are the best methods and equipment available. There simply is no better alternative.

The USGS has allocated partial funding and have requested some additional funding from SWFWMD for equipment that would measure continuous velocity and provide an alternate method of computing discharge for comparison with the existing method at the Southeast Fork Homosassa Spring gage. We have made comparisons between these methods before and do not believe this will change the discharge significantly, but it would bring a further measure of confidence to the discharge values.

The USGS has no current involvement in the Minimum Flows process beyond providing high quality data from our streamgages. Although we have done studies that investigated factors affecting spring flow and quality in the past, we have not been asked to perform any new investigation into what might be responsible for an increase in salinity at the springs as Mr. Johnson has observed, so we cannot say whether the primary factor might be drought, pumping, sea-level rise or some other factor. A new study might be possible if problems are ongoing and funding can be arranged. We look forward to continuing our participation in the Springs Coast MFL Working Group and hope that we can further the public's understanding of these complex hydrologic systems.

Sincerely,

Rafael W. Rodriguez

Rafael W. Rodriguez, Director
Florida Water Science Center

From:	Kevin J Grimsley
To:	Alan Martyn Johnson
Cc:	Doug Leeper; rkane; Marty Kelly
Subject:	Re: Tidally Adjusted Flow at 02310700
Date:	Friday, August 26, 2011 10:56:44 AM

A tidal filter is applied to discharge from the 02310700 (as well as many of our other tidally influenced discharge stations) in order to remove the cyclical tidal signature from the discharge data. This is useful for evaluating changes in the net flow without the "noise" from the tidal changes.

This filter is not applied in real-time. It is applied on a yearly basis as part of our Annual Data Report covering data from Oct. 1 through Sept. 30. It is also expected that the filtered values would be different from non-filtered, or else why would we apply a tidal filter at all.

On Aug 26, 2011, at 7:27 AM, "Alan Martyn Johnson" <martynellijay@hotmail.com> wrote:

Doug, Richard, Kevin,

Hopefully this is an easy question for someone to answer.

How is Tidally Adjusted Discharge calculated for the Homosassa River at Homosassa Gage Site 02310700?

This question relates to a flow issue I touched on after the first Lecanto meeting; flow from Halls River.
In the July 12, 2010 Draft Reports the following Table is shown on Page 50. I could not get to grips with the Halls River figures. When I looked at the daily data from the Gage Site 02310700 that only resulted in more questions. And I noted that the tidally adjusted discharge has not been reported since October 1, 2010.

Martyn

Table 2-3. Summary statistics for mean daily discharge records approved by the United States Geological Survey for Homosassa River system gage sites. Values are expressed as cubic feet per second (cfs) unless specified. Periods of record for approved data are listed by gage site in Table 2-2.

Statistic (cfs or N)	Homosassa Springs at Homosassa Springs FL	SE Fork Homosassa Spring at Homosassa Springs FL	Combined Springs[a]	Halls River[b]	Homosassa River at Homosassa FL (tidally filtered)	Hidden River near Homosassa FL
Maximum	141	100	240	1,995	2,090	25.0
75th Percentile	98	68	165	200	350	11
Median	88	60	147	108	251	8.0
25th	79	53	131	28	167	4.6

Percentile						
Minimum	34	23	57	-765	-636	1.3
Mean	89	61	149	129	272	8.0
Standard Deviation	14	11	26	181	183	4.4
Number (N) of daily Records	4,975	3,123	3,102	1,662	1,774	2,063

[a] Combined Springs discharge determined as the sum of the Homosassa Springs at Homosassa FL and SE Fork Homosassa
Spring at Homosassa Springs FL discharge for days when records were available for both sites.
[b] Halls River discharge estimated by subtracting combined springs discharge from tidally filtered Homosassa River at Homosassa
FL discharge for days when records were available for the two spring sites and the Homosassa River site.

This is an extract from the on-line records; note the differences between the filtered and non filtered figures.

Date	Dis-charge, ft3/s, not filtrd. for tide (Mean)	Dis-charge, tidally fltrd, ft3/s, RESIDUAL (Mean)	Not Filtered-Filtered
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6/20/2010	290[A]	275[A]	15
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6/22/2010	263[A]	235[A]	28
6/23/2010	232[A]	262[A]	-30
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6/28/2010	135^{A}	151^{A}	-16
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7/6/2010	319^{A}	285^{A}	34
7/7/2010	351^{A}	278^{A}	73
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7/10/2010	87^{A}	^{P}	0
7/11/2010	^{P}	^{P}	0
7/12/2010	^{P}	^{P}	0
7/13/2010	^{P}	^{P}	0
7/14/2010	^{P}	^{P}	0
7/15/2010	235^{A}	^{P}	0
7/16/2010	197^{A}	^{P}	0
7/17/2010	209^{A}	200^{A}	9
7/18/2010	243^{A}	222^{A}	21
7/19/2010	277^{A}	212^{A}	65
7/20/2010	221^{A}	202^{A}	19
7/21/2010	197^{A}	185^{A}	12
7/22/2010	129^{A}	175^{A}	-46
7/23/2010	198^{A}	185^{A}	13
7/24/2010	-74^{A}	31^{A}	-105
7/25/2010	140^{A}	117^{A}	23
7/26/2010	168^{A}	209^{A}	-41
7/27/2010	177^{A}	203^{A}	-26
7/28/2010	194^{A}	192^{A}	2
7/29/2010	188^{A}	192^{A}	-4
7/30/2010	167^{A}	180^{A}	-13
7/31/2010	222^{A}	213^{A}	9
8/1/2010	245^{A}	216^{A}	29
8/2/2010	244^{A}	214^{A}	30
8/3/2010	228^{A}	200^{A}	28
8/4/2010	194^{A}	150^{A}	44
8/5/2010	173^{A}	125^{A}	48
8/6/2010	91^{A}	126^{A}	-35
8/7/2010	246^{A}	243^{A}	3
8/8/2010	356^{A}	395^{A}	-39
8/9/2010	367^{A}	420^{A}	-53
8/10/2010	247^{A}	258^{A}	-11

<mime.htm>

From:	Rafael W Rodriguez
To:	Doug Leeper
Cc:	Richard L Kane; Kevin J Grimsley
Subject:	USGS Response
Date:	Friday, August 26, 2011 4:48:30 PM
Attachments:	D.Leeper-SWFWMD-rwr-82311.pdf

Dear Mr. Leeper,
Attached please find our response to the correspondence by Mr. Martyn Johnson posted on the Springs Coast MFL Working Group website hosted by SWFWMD.

****
Rafael W. Rodriguez
Director
USGS Florida Water Science Center
10500 University Center Drive, Suite 215
Tampa, FL 33612
Phone: (813) 498-5024
Cell: (813) 463-3660
Fax: (813) 498-5003
rrodrigu@usgs.gov
http://fl.water.usgs.gov
****

From: Doug Leeper
To: Marty Kelly
Subject: FW: USGS Response
Date: Friday, August 26, 2011 4:52:33 PM
Attachments: D.Leeper-SWFWMD-rwr-82311.pdf

From: Rafael W Rodriguez [mailto:rrodrigu@usgs.gov]
Sent: Friday, August 26, 2011 4:48 PM
To: Doug Leeper
Cc: Richard L Kane; Kevin J Grimsley
Subject: USGS Response

Dear Mr. Leeper,
Attached please find our response to the correspondence by Mr. Martyn Johnson posted on the Springs Coast MFL Working Group website hosted by SWFWMD.

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Rafael W. Rodriguez
Director
USGS Florida Water Science Center
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Phone: (813) 498-5024
Cell: (813) 463-3660
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rrodrigu@usgs.gov
http://fl.water.usgs.gov
****

From:	Alan Martyn Johnson
To:	Kevin J Grimsley
Cc:	Doug Leeper; rkane; Marty Kelly
Subject:	RE: Tidally Adjusted Flow at 02310700
Date:	Saturday, August 27, 2011 8:00:39 AM

Sorry if my question was not clear.

'How' was intended to convey **What is the equation/mathmatical formula used to make this calculation?**

I realize the tidally adjusted figure is not reported in the 15 minute data, but I do see it in the Approved Daily Data as exampled in my e-mail.

Martyn

P.S.
My interest in this stems from the January 6 Lecanto Workshop. A question/comment made by a gentleman sitting front left as Doug/Ron were viewing the audience. Sorry but I did not get his name.
Summarizing:
He said that he did not think the flow figures from Halls River springs were anywhere near the reported figures. He said that he had patrolled the river for many years and had seen deterioration.

I did touch on this in an e-mail January 10 to Doug and Ron, but did not specifically include the comment about Halls River Flow.

Doug and Ron,
I would like to follow up on a few points from last Thursday evenings workshop in Lecanto. But, first a Thank You to both of you for a good professional job in front of an audience who are deeply concerned by the deterioration they have witnessed in the Homosassa River over the years.

Skeptical audience
Notable were comments from long time residents who have seen the river on a daily basis for over 50 years and those from former government employees who patrolled the waterways for over 20 years. They stated that the river has changed/deteriorated; flows have reduced, vegetation has changed, fish and wildlife have changed. They and others frequently mentioned recent and major barnacle growths where they were never seen before. There is clear observed evidence of salt water intrusion/salinity increases and the associated negative impact on this unique river.

I also generally noted Halls River flow in correspondence in 2010; *I appreciate that there are thoughts to monitoring flow from Halls River* November 15, 2010

From: kjgrims@usgs.gov
Subject: Re: Tidally Adjusted Flow at 02310700
CC: doug.leeper@swfwmd.state.fl.us; rkane@usgs.gov; marty.kelly@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Fri, 26 Aug 2011 10:49:08 -0400

A tidal filter is applied to discharge from the 02310700 (as well as many of our other tidally influenced discharge stations) in order to remove the cyclical tidal signature from the discharge data. This is useful for evaluating changes in the net flow without the "noise" from the tidal changes.

This filter is not applied in real-time. It is applied on a yearly basis as part of our Annual Data Report covering data from Oct. 1 through Sept. 30. It is also expected that the filtered values would be different from non-filtered, or else why would we apply a tidal filter at all.

On Aug 26, 2011, at 7:27 AM, "Alan Martyn Johnson" <martynellijay@hotmail.com> wrote:

Doug, Richard, Kevin,

Hopefully this is an easy question for someone to answer.

How is Tidally Adjusted Discharge calculated for the Homosassa River at Homosassa Gage Site 02310700?

This question relates to a flow issue I touched on after the first Lecanto meeting; flow from Halls River.
In the July 12, 2010 Draft Reports the following Table is shown on Page 50. I could not get to grips with the Halls River figures. When I looked at the daily data from the Gage Site 02310700 that only resulted in more questions. And I noted that the tidally adjusted discharge has not been reported since October 1, 2010.

Martyn

Table 2-3. Summary statistics for mean daily discharge records approved by the United States Geological Survey for Homosassa River system gage sites. Values are expressed as cubic feet per second (cfs) unless specified. Periods of record for approved data are listed by gage site in Table 2-2.

Statistic (cfs or N)	Homosassa Springs at Homosassa Springs FL	SE Fork Homosassa Spring at Homosassa Springs FL	Combined Springs[a]	Halls River[b]	Homosassa River at Homosassa FL (tidally filtered)	Hidden River near Homosassa FL
Maximum	141	100	240	1,995	2,090	25.0
75th Percentile	98	68	165	200	350	11
Median	88	60	147	108	251	8.0
25th Percentile	79	53	131	28	167	4.6
Minimum	34	23	57	-765	-636	1.3
Mean	89	61	149	129	272	8.0
Standard Deviation	14	11	26	181	183	4.4
Number (N) of daily Records	4,975	3,123	3,102	1,662	1,774	2,063

[a] Combined Springs discharge determined as the sum of the Homosassa Springs at Homosassa FL and SE Fork Homosassa
Spring at Homosassa Springs FL discharge for days when records were available for both sites.
[b] Halls River discharge estimated by subtracting combined springs discharge from tidally filtered Homosassa River at Homosassa
FL discharge for days when records were available for the two spring sites and the Homosassa River site.

This is an extract from the on-line records; note the differences between the filtered and non filtered figures.

Date	Dis-charge, ft3/s, not filtrd. for tide (Mean)	Dis-charge, tidally fltrd, ft3/s, RESIDUAL (Mean)	Not Filtered-Filtered
6/10/2010	145 A	128 A	17
6/11/2010	103 A	77 A	26
6/12/2010	149 A	129 A	20
6/13/2010	211 A	230 A	-19
6/14/2010	139 A	190 A	-51
6/15/2010	158 A	234 A	-76
6/16/2010	308 A	218 A	90
6/17/2010	284 A	239 A	45
6/18/2010	277 A	225 A	52
6/19/2010	336 A	250 A	86
6/20/2010	290 A	275 A	15
6/21/2010	285 A	164 A	121
6/22/2010	263 A	235 A	28
6/23/2010	232 A	262 A	-30
6/24/2010	185 A	255 A	-70
6/25/2010	135 A	201 A	-66
6/26/2010	125 A	154 A	-29
6/27/2010	99 A	140 A	-41
6/28/2010	135 A	151 A	-16
6/29/2010	228 A	269 A	-41
6/30/2010	200 A	231 A	-31
7/1/2010	285 A	261 A	24
7/2/2010	292 A	254 A	38
7/3/2010	195 A	190 A	5
7/4/2010	170 A	163 A	7
7/5/2010	255 A	220 A	35
7/6/2010	319 A	285 A	34
7/7/2010	351 A	278 A	73
7/8/2010	191 A	194 A	-3
7/9/2010	127 A	158 A	-31
7/10/2010	87 A	P	0

7/11/2010	P	P	0
7/12/2010	P	P	0
7/13/2010	P	P	0
7/14/2010	P	P	0
7/15/2010	235A	P	0
7/16/2010	197A	P	0
7/17/2010	209A	200A	9
7/18/2010	243A	222A	21
7/19/2010	277A	212A	65
7/20/2010	221A	202A	19
7/21/2010	197A	185A	12
7/22/2010	129A	175A	-46
7/23/2010	198A	185A	13
7/24/2010	-74A	31A	-105
7/25/2010	140A	117A	23
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7/27/2010	177A	203A	-26
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8/3/2010	228A	200A	28
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8/8/2010	356A	395A	-39
8/9/2010	367A	420A	-53
8/10/2010	247A	258A	-11

<mime.htm>

From:	Alan Martyn Johnson
To:	Mike Heyl
Cc:	Doug Leeper; brentwhitley@sierra-properties.com
Subject:	Chassahowitzka Discharge Equation
Date:	Sunday, August 28, 2011 9:00:55 AM

Mike,
Following correspondence with Brent Whitley I looked at some data for the Chassahowitzka discharge and found that the equation (Chassahowitzka discharge calculation per Table 1 in the Report No. 01-4230) was close but did not match with actual current data as reported by USGS.
While trying to confirm the equation in use the closest reference I found was your March 19, 2010 Memorandum on the sections part of the MFL reports for the Chassahowitzka.

Can you confirm the equation currently in use?

This is a direct copy from the 2001 report 01-4230:
Q=(6.06* wlwww)-(stgchz*7.81)-
(Δstg*825.22)+7.17

Do not understand why coping delta from a pdf file gives a ? stg, but not to worry.

Let me enlarge to be sure;

Q = (6.06 * wlwww) - (stgchz * 7.81) - (Δstg * 825.22) + 7.17
As I read this
wlwww = max level at Weeki Wachee for the day of calculation
stgchz = stage height at the gage site for the time of the calculation
Δstg = stage height change over the last 15 minutes

When I tried this equation with some actual data it is close, but it is not an exact match. The equation gives cfs values about 10 cfs higher than reported. I double checked my spreadsheet and could not find any errors. Then I though may be some numbers in the equation were transposed when the 2001 report went to print. I tried a few but no luck.

Mike,
I sent this directly to you as you appear to have looked at this in detail. I have copied Doug in order this can be redirected if necessary.
Sorry to trouble you if this is out of order.

Thanks,
Martyn

For reference this is some of the check I did.

Date / Time				Weechi Wachee Well Aug 25			14.34			
	Gage height, feet,	**Dis-charge, ft3/s,**	Q	6.06wwl	stage		7.81minus	stage change	825.22plus	7.17
08/25/2011 00:00 EST	1.18	-4.4[P]		86.9004		1.18	9.2158			
08/25/2011 00:15 EST	1.25	-4.8[P]	12	86.9004		1.25	9.7625	0.07	57.7654	7.17
08/25/2011 00:30 EST	1.31	3.9[P]	20	86.9004		1.31	10.2311	0.06	49.5132	7.17
08/25/2011 00:45 EST	1.35	22[P]	36	86.9004		1.35	10.5435	0.04	33.0088	7.17
08/25/2011 01:00 EST	1.37	40[P]	53	86.9004		1.37	10.6997	0.02	16.5044	7.17
08/25/2011 01:15 EST	1.38	49[P]	61	86.9004		1.38	10.7778	0.01	8.2522	7.17
08/25/2011 01:30 EST	1.38	58[P]	69	86.9004		1.38	10.7778	0	0	7.17
08/25/2011 01:45 EST	1.38	58[P]	69	86.9004		1.38	10.7778	0	0	7.17
08/25/2011 02:00 EST	1.36	76[P]	86	86.9004		1.36	10.6216	-0.02	-16.5044	7.17
08/25/2011 02:15 EST	1.35	67[P]	77	86.9004		1.35	10.5435	-0.01	-8.2522	7.17
08/25/2011 02:30 EST	1.33	76[P]	86	86.9004		1.33	10.3873	-0.02	-16.5044	7.17
08/25/2011 02:45 EST	1.3	85[P]	94	86.9004		1.3	10.153	-0.03	-24.7566	7.17
08/25/2011 03:00 EST	1.27	86[P]	95	86.9004		1.27	9.9187	-0.03	-24.7566	7.17
08/25/2011 03:15 EST	1.24	86[P]	95	86.9004		1.24	9.6844	-0.03	-24.7566	7.17
08/25/2011 03:30 EST	1.22	77[P]	87	86.9004		1.22	9.5282	-0.02	-16.5044	7.17
08/25/2011 03:45 EST	1.19	86[P]	95	86.9004		1.19	9.2939	-0.03	-24.7566	7.17
08/25/2011 04:00 EST	1.16	86[P]	95	86.9004		1.16	9.0596	-0.03	-24.7566	7.17
08/25/2011 04:15 EST	1.13	86[P]	96	86.9004		1.13	8.8253	-0.03	-24.7566	7.17

From:	Doug Leeper
To:	Mike Heyl
Subject:	FW: USGS Response
Date:	Monday, August 29, 2011 7:54:35 AM
Attachments:	D.Leeper-SWFWMD-rwr-82311.pdf

FYI – I expect that I will post Rafael's letter on the workshop web site after discussing it with Marty.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Rafael W Rodriguez [mailto:rrodrigu@usgs.gov]
Sent: Friday, August 26, 2011 4:48 PM
To: Doug Leeper
Cc: Richard L Kane; Kevin J Grimsley
Subject: USGS Response

Dear Mr. Leeper,
Attached please find our response to the correspondence by Mr. Martyn Johnson posted on the Springs Coast MFL Working Group website hosted by SWFWMD.

****
Rafael W. Rodriguez
Director
USGS Florida Water Science Center
10500 University Center Drive, Suite 215
Tampa, FL 33612
Phone: (813) 498-5024
Cell: (813) 463-3660
Fax: (813) 498-5003
rrodrigu@usgs.gov
http://fl.water.usgs.gov
****

From: Mike Heyl
To: Alan Martyn Johnson
Cc: Doug Leeper; brentwhitley@sierra-properties.com; Marty Kelly
Subject: RE: Chassahowitzka Discharge Equation
Date: Monday, August 29, 2011 7:11:39 AM

Martyn – That looks like the USGS equation from the 2001 report. You will need to contact them for an answer. Sorry, I don't know the answer.

MGH

==
Michael G. Heyl - Chief Environmental Scientist
Mike.Heyl@SWFWMD.state.fl.us or Mike.Heyl@WaterMatters.org
==
SWFWMD/Ecologic Evaluation (7:00 am - 3:30 pm)
7601 U.S. Highway 301 1-813-985-7481 Ext 2211
Tampa, Fl. 33637-6759 1-813-987-6747 (Fax)
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Sent: Sunday, August 28, 2011 9:01 AM
To: Mike Heyl
Cc: Doug Leeper; brentwhitley@sierra-properties.com
Subject: Chassahowitzka Discharge Equation

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wlwww = max level at Weeki Wachee for the day of calculation
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				Weechi Wachee Well Aug 25		14.34			
08/25/2011 00:00 EST	1.18	-4.4P		86.9004	1.18	9.2158			
08/25/2011 00:15 EST	1.25	-4.8P	12	86.9004	1.25	9.7625	0.07	57.7654	7.17
08/25/2011 00:30 EST	1.31	3.9P	20	86.9004	1.31	10.2311	0.06	49.5132	7.17
08/25/2011 00:45 EST	1.35	22P	36	86.9004	1.35	10.5435	0.04	33.0088	7.17
08/25/2011 01:00 EST	1.37	40P	53	86.9004	1.37	10.6997	0.02	16.5044	7.17
08/25/2011 01:15 EST	1.38	49P	61	86.9004	1.38	10.7778	0.01	8.2522	7.17
08/25/2011 01:30 EST	1.38	58P	69	86.9004	1.38	10.7778	0	0	7.17
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08/25/2011 03:45 EST	1.19	86P	95	86.9004	1.19	9.2939	-0.03	-24.7566	7.17
08/25/2011 04:00 EST	1.16	86P	95	86.9004	1.16	9.0596	-0.03	-24.7566	7.17
08/25/2011 04:15 EST	1.13	86P	96	86.9004	1.13	8.8253	-0.03	-24.7566	7.17

From:	Mike Heyl
To:	Doug Leeper
Subject:	RE: USGS Response
Date:	Monday, August 29, 2011 8:13:02 AM

Thanks Doug. Should be interesting.

MGH

==
Michael G. Heyl - Chief Environmental Scientist
Mike.Heyl@SWFWMD.state.fl.us or Mike.Heyl@WaterMatters.org
==
SWFWMD/Ecologic Evaluation (7:00 am - 3:30 pm)
7601 U.S. Highway 301 1-813-985-7481 Ext 2211
Tampa, Fl. 33637-6759 1-813-987-6747 (Fax)
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Douglas A. Leeper, Chief Environmental Scientist
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E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Rafael W Rodriguez [mailto:rrodrigu@usgs.gov]
Sent: Friday, August 26, 2011 4:48 PM
To: Doug Leeper
Cc: Richard L Kane; Kevin J Grimsley
Subject: USGS Response

Dear Mr. Leeper,
Attached please find our response to the correspondence by Mr. Martyn Johnson posted on the Springs Coast MFL Working Group website hosted by SWFWMD.

****

Rafael W. Rodriguez
Director
USGS Florida Water Science Center
10500 University Center Drive, Suite 215

Tampa, FL 33612
Phone: (813) 498-5024
Cell: (813) 463-3660
Fax: (813) 498-5003
rrodrigu@usgs.gov
http://fl.water.usgs.gov
****

From: Doug Leeper
To: "Rafael W Rodriguez"
Cc: Richard Kane (rkane@usgs.gov); Kevin Grimsely (kjgrims@usgs.gov)
Subject: RE: USGS Response
Date: Monday, August 29, 2011 8:35:00 AM

Mr. Rodriguez:

Thanks for your recent letter concerning measurement of discharge in Springs Coast tidal rivers. I'll post your letter on the District's Springs Coast Minimum Flows and Levels Public Workshop web page.

Please let me take this opportunity to express my gratitude to Richard Kane and Kevin Grimsley for their contributions to the District's ongoing minimum flows and levels efforts on the Springs Coast.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
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Phone: (813) 498-5024
Cell: (813) 463-3660
Fax: (813) 498-5003
rrodrigu@usgs.gov
http://fl.water.usgs.gov
****

From:	Doug Leeper
To:	Martyn Johnson (martynellijay@hotmail.com)
Subject:	FW: Water Quality Data Issue.
Date:	Monday, August 29, 2011 12:26:00 PM
Importance:	High

FYI

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Service Desk
Sent: Monday, August 29, 2011 12:05 PM
To: All_Users
Subject: Water Quality Data Issue.
Importance: High

We are currently experiencing a problem with water quality data. Water Quality data is not current and unavailable for downloading. We are working to correct this issue. An email will be sent when the problem is resolved.

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IRD Service Desk
Southwest Florida Water Management District
(352)796-7211 x4008
Service.Desk@swfwmd.state.fl.us

From:	Richard L Kane
To:	Doug Leeper; Marty Kelly
Cc:	Richard L Kane; Kevin J Grimsley
Subject:	Halls River or SE Fork
Date:	Monday, August 29, 2011 12:53:21 PM
Attachments:	Halls River.pdf

Marty, Doug and I talked this morning about the installation of SE Fork and Halls River. I received the revised JFA for FY 11. We moved the funding for installation of Halls River to FY 11 but I can do either Halls River or SE Fork in September. Do you have a preference? Kevin Grimsley did explore Hall River last week. He recommended that we install the IV gage on a channel marker about 500 ft. upstream of the bridge. This site is downstream of the canal cut that flows toward the Gulf. He looked further upstream nearer the source of fresh water but the channel does get shallower and there is some question if you pick up all of the freshwater inflows. The channel marker site would probably work best for getting total flow into Homosassa River and we could make a few measurements in the canal to determine what impact the canal has on the flow. If you want us to install SE Fork first we could get it installed next week.

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov
(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275

From:	Doug Leeper
To:	"Richard L Kane"
Cc:	Marty Kelly; Kevin Coughlin
Subject:	RE: Halls River or SE Fork
Date:	Monday, August 29, 2011 1:23:00 PM

Richard – I spoke with Marty about our phone conversation this morning and he asked me to send you an e-mail indicating that he is OK with installation of the new equipment on the SE Fork first, rather than the start-up of the new Halls River site. Seems that initiation of the Halls site will take some additional field recon (site selection, flow measurements in the can and in upstream portions of Halls River, etc.), so it may be best to work on that in the coming fiscal year.

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E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Richard L Kane [mailto:rkane@usgs.gov]
Sent: Monday, August 29, 2011 12:53 PM
To: Doug Leeper; Marty Kelly
Cc: Richard L Kane; Kevin J Grimsley
Subject: Halls River or SE Fork

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FAX (813-498-5001)
Cell 813-918-1275

From: Doug Leeper
To: Martyn Johnson (martynellijay@hotmail.com)
Subject: FW: Resolved - Water Quality Data Issue.
Date: Tuesday, August 30, 2011 1:01:00 PM
Importance: High

FYI

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Importance: High

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From: Doug Leeper

To: "rrodrigu@usgs.gov"; Al Grubman (grubman1@gmail.com); Bill Geiger (bgeiger@cityofbrooksville.us); Bill Pouder (bill.pouder@myfwc.com); Boyd Blihovde (Boyd_Blihovde@fws.gov); Brad Rimbey (BWR.CRRC@tampabay.rr.com); Brent Whitley (brentwhitley@sierra-properties.com); Brockway, Alys (abrockway@co.hernando.fl.us); Dennis D. Dutcher (Dennis3ds@aol.com); Frank DiGiovanni (administration@inverness-fl.gov); Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us); Helen Spivey (manatees@habitats.org); Hilliard, Dan (2buntings@comcast.net); Hoehn, Ted; Hope Corona (hopecorona@tampabay.rr.com); Jim Farley (jfarley682@aol.com); Katie Tripp (ktripp@savethemanatee.org); Norman Hopkins (norman@amyhrf.org); Rebecca Bays (rebecca.bays@bocc.citrus.fl.us); Richard Kane (rkane@usgs.gov); Richard Radacky (rradacky@cityofbrooksville.us); Ron Miller (rmille76@tampabay.rr.com); Sarah Tenison (cityofweekiwachee@yahoo.com); Sulllivan, Jack (jsullivan@carltonfields.com); Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us); Whitey Markle (whmarkle@gmail.com); (janicehowie@aol.com); Abdon Sidibie (asidibie@chronicle.online.com); Alex McPherson (aamcpherson@msn.com); Ann - 2 Hodgson (ahodgson@gmail.com); Ann Hodgson (ahodgson@audubon.org); Bernard Berauer (bfberauer@aol.com); Beverly Overa (boverly@tampabay.rr.com); Bill Garvin (wgarvin@tampabay.rr.com); Bob Caldwell (Bobcaldwell51@yahoo.com); Brack Barker (brack154@msn.com); Carl Mattthai (thebabesmimi@gmail.com); Casey, Emily (fcnwr@atlantic.net); Charles Dean (dean.charles.web@flsenate.gov); Charles Stonerock (katcha.stonerock3@gmail.com); Chris Safos (chrissafos@embarqmail.com); Czerwinski, Mike (mczerwin@tampabay.rr.com); Darlene Herth (2cetechnology21@gmail.com); Darrell Snedecor (president@citruscountyaudubon.com); Don Hiers (dhiers3@gmail.com); Douglas Dame (doug_dame@yahoo.com); Elaine Luther (barneyandcap@hotmail.com); Emily Casey (ecasey21@hotmail.com); Emma Knight (eknight@wetlandsolutionsinc.com); George Harbin (gharbin@tampabay.rr.com); George McClog (classof47@gmail.com); Gorgon O"Connor (gorgon_o@yahoo.com); Harry Steiner (harry109@aol.com); Jack Calbeck (calbeckj@citrus.k12.fl.us); jane Perrin (jcsperrinmd@sbcglobal.net); Jerry Morton (JerrMorton@aol.com); Jessie Gourlie (gourliej@thirdplanetwind.com); Jim Collins (jimmiekey22@yahoo.com); Jimmie Smith (Jimmie.Smith@myfloridahouse.gov); Joe Calamari; John Lord (jclord109@yahoo.com); John Mayo (freedomway1@gmail.com); Karen Johnstone (kjohns213@sbcglobal.net); Kim Caldwell (caldwell.kimberly@yahoo.com); Kim Dinkins (kim.dinkins@marioncountyfl.org); Linda Pierce (tpierce35@tampabay.rr.com); Linda Vanderveen (hernandoaudubon@yahoo.com); Mary Anne Lynn (mlynn1978@tampabay.rr.com); Matthew Corona (mcorona1@tampabay.rr.com); Max Rhinesmith (rhinesmith@webtv.net); Andy Houston (ahouston@crystalriverfl.org); Art Yerian (Al.Yerian@dep.state.fl.us); Brad Thorpe (brad.thorpe@bocc.citrus.fl.us); Courtney Edwards (cedwards@savethemanatee.org); Dale Jones (Jones@MyFWC.com); Dana Bryan (dana.bryan@dep.state.fl.us); David Hamilton (countyadministrator@hernandocounty.us); David Hankla (david_hankla@fws.gov); Don Wright (wright@sura.org); Dusty McDevitt (mcdevitt@usgs.gov); Ed Call (marvin.call@MyFWC.com); Eric Nagid (eric.nagid@MyFWC.com); FFWCC MFLs Review E-Mail Address (fwcconservationplanningservices@myfwc.com); J. J. Kenney (jj.kenney@bocc.citrus.fl.us); Jennene Norman-Vacha (jnvacha@ci.brooksville.fl.us); Joyce_Kleen@fws.gov; Kandi Harper (kandi.harper@bocc.citrus.fl.us); Keith Ramos (Keith.Ramos@fws.gov); Kent Smith (kent.smith2@myfwc.com); Kevin Grimsely (kjgrims@usgs.gov); Michael Lusk (Michael_Lusk@fws.gov); Mitchell Newberger (mnewberger@verizon.net); Nick Robbins (Nick.Robbins@dep.state.fl.us); Nicole Adimey (Nicole_Adimey@fws.gov); Paul Thomas (paulw.thomas@MyFWC.com); Ron Mezich (ron.mezich@MyFWC.com); Shelly Yaun (shelly.yaun@dep.state.fl.us); Toby Brewer (Toby.Brewer@dep.state.fl.us); Wallace, Traci; "Adkins, Jim"; "Bitter, Jim"; "Bryant, Richard"; "Cantero, Vince"; "Carpenter, Paul"; "Daniels, Chase"; "Dueker, Duane"; "Gramling, Hugh"; "Harrelson, Cathy"; "Hubbell, Pete"; "Johnson, Eric"; "Johnson, Martyn"; "Keim, Robert"; "Kline, Allen"; "Knight, Bob"; "Knight, Robert"; "Knudson, Ross"; "Overa, Tom"; "Owen, Rick"; "Parrow, Liz"; Rolf Auermann (rauerman@tampabay.rr.com); "Rusnak, Teddi"; "Watkins, Priscilla"; "Watrous, Russell"

Cc: Barbara Matrone; Cara S. Martin; Chris Zajac; Darcy A. Brune; Dave Dewitt; Doug Leeper; Gary E. Williams; Jay Yingling; Karen Lloyd; Ken Weber; Lou Kavouras; Mark Barcelo; Mark Hammond; Marty Kelly; Mike Heyl; Paul Williams; Robyn O. Felix; Ron Basso; Sid Flannery; Veronica Craw; Xinjian Chen; Yassert Gonzalez

Subject: Two New Docs on Springs Coast MFLs Workshop Web Page

Date: Tuesday, August 30, 2011 2:35:00 PM

Greetings:

I'm writing today to make you aware of two documents that were recently posted to the Springs Coast Minimum Flows and Levels Public Workshop web page (link to the page is provided below).

http://www.WaterMatters.org/SpringsCoastMFL

The first document is an e-mail I sent to Mr. Ron Miller, the Stakeholder Representative for the Save the Homosassa River Alliance, in response to some questions concerning water use, flow estimation and the Northern District model that he submitted and asked be answered and posted prior to the September 6th workshop.

The second document is an electronic version of a letter from Mr. Rafael Rodriguez, the Director of the United States Geological Survey Florida Water Science Center. Mr. Rodriquez's letter was submitted in response to a written statement/correspondence from Mr. Martyn Johnson that was posted on the workshop series web page shortly after our July 18th meeting.

Please let me know if you have any problems accessing either of the recently posted documents.

I look forward to seeing you next week.

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Web Site: watermatters.org

From: Alan Martyn Johnson
To: Mike Heyl
Cc: Doug Leeper; Brent Whitley; Marty Kelly
Subject: RE: Chassahowitzka Discharge Equation
Date: Wednesday, August 31, 2011 4:39:57 PM

Mike,
Thanks for the reply. I have only just got back after being away for the first part of the week.

I will send my question to USGS.
Thanks.

From: Mike.Heyl@swfwmd.state.fl.us
To: martynellijay@hotmail.com
CC: Doug.Leeper@swfwmd.state.fl.us; brentwhitley@sierra-properties.com; Marty.Kelly@swfwmd.state.fl.us
Date: Mon, 29 Aug 2011 07:11:30 -0400
Subject: RE: Chassahowitzka Discharge Equation

Martyn – That looks like the USGS equation from the 2001 report. You will need to contact them for an answer. Sorry, I don't know the answer.

MGH

==
Michael G. Heyl - Chief Environmental Scientist
Mike.Heyl@SWFWMD.state.fl.us or Mike.Heyl@WaterMatters.org
==
SWFWMD/Ecologic Evaluation (7:00 am - 3:30 pm)
7601 U.S. Highway 301 1-813-985-7481 Ext 2211
Tampa, Fl. 33637-6759 1-813-987-6747 (Fax)

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Sunday, August 28, 2011 9:01 AM
To: Mike Heyl
Cc: Doug Leeper; brentwhitley@sierra-properties.com
Subject: Chassahowitzka Discharge Equation

Mike,
Following correspondence with Brent Whitley I looked at some data for the Chassahowitzka discharge and found that the equation (Chassahowitzka discharge calculation per Table 1 in the Report No. 01-4230) was close but did not match with actual current data as reported by USGS.
While trying to confirm the equation in use the closest reference I found was your March 19, 2010 Memorandum on the sections part of the MFL reports for the Chassahowitzka.

Can you confirm the equation currently in use?

This is a direct copy from the 2001 report 01-4230:
Q=(6.06* wlwww)-(stgchz*7.81)-
(Ästg*825.22)+7.17

Do not understand why coping delta from a pdf file gives a ? stg, but not to worry.

Let me enlarge to be sure;

Q = (6.06 * wlwww) - (stgchz * 7.81) - (Δstg * 825.22) + 7.17
As I read this
wlwww = max level at Weeki Wachee for the day of calculation
stgchz = stage height at the gage site for the time of the calculation
Δstg = stage height change over the last 15 minutes

When I tried this equation with some actual data it is close, but it is not an exact match. The equation gives cfs values about 10 cfs higher than reported.
I double checked my spreadsheet and could not find any errors. Then I though may be some numbers in the equation were transposed when the 2001 report went to print. I tried a few but no luck.

Mike,
I sent this directly to you as you appear to have looked at this in detail. I have copied Doug in order this can be redirected if necessary.
Sorry to trouble you if this is out of order.

Thanks,
Martyn

For reference this is some of the check I did.

Date / Time	Gage height, feet,	Dis-charge, ft3/s,							
				Weechi Wachee Well Aug 25		14.34			
			Q	6.06wwl	stage	7.81minus	stage change	825.22plus	7.17
08/25/2011 00:00 EST	1.18	-4.4[P]		86.9004	1.18	9.2158			
08/25/2011 00:15 EST	1.25	-4.8[P]	12	86.9004	1.25	9.7625	0.07	57.7654	7.17
08/25/2011 00:30 EST	1.31	3.9[P]	20	86.9004	1.31	10.2311	0.06	49.5132	7.17
08/25/2011 00:45 EST	1.35	22[P]	36	86.9004	1.35	10.5435	0.04	33.0088	7.17
08/25/2011 01:00 EST	1.37	40[P]	53	86.9004	1.37	10.6997	0.02	16.5044	7.17
08/25/2011 01:15 EST	1.38	49[P]	61	86.9004	1.38	10.7778	0.01	8.2522	7.17
08/25/2011 01:30 EST	1.38	58[P]	69	86.9004	1.38	10.7778	0	0	7.17
08/25/2011 01:45 EST	1.38	58[P]	69	86.9004	1.38	10.7778	0	0	7.17
08/25/2011 02:00 EST	1.36	76[P]	86	86.9004	1.36	10.6216	-0.02	-16.5044	7.17
08/25/2011 02:15 EST	1.35	67[P]	77	86.9004	1.35	10.5435	-0.01	-8.2522	7.17
08/25/2011 02:30 EST	1.33	76[P]	86	86.9004	1.33	10.3873	-0.02	-16.5044	7.17

08/25/2011 02:45 EST	1.3	85P	94	86.9004	1.3	10.153	-0.03	-24.7566	7.17
08/25/2011 03:00 EST	1.27	86P	95	86.9004	1.27	9.9187	-0.03	-24.7566	7.17
08/25/2011 03:15 EST	1.24	86P	95	86.9004	1.24	9.6844	-0.03	-24.7566	7.17
08/25/2011 03:30 EST	1.22	77P	87	86.9004	1.22	9.5282	-0.02	-16.5044	7.17
08/25/2011 03:45 EST	1.19	86P	95	86.9004	1.19	9.2939	-0.03	-24.7566	7.17
08/25/2011 04:00 EST	1.16	86P	95	86.9004	1.16	9.0596	-0.03	-24.7566	7.17
08/25/2011 04:15 EST	1.13	86P	96	86.9004	1.13	8.8253	-0.03	-24.7566	7.17

From:	Alan Martyn Johnson
To:	Doug Leeper
Subject:	RE: Resolved - Water Quality Data Issue.
Date:	Wednesday, August 31, 2011 4:44:41 PM
Importance:	High

Doug,
Thanks for this follow up also. May be I will get a chance Friday, but tonight I intend to try to get my USGS questions finished.
Martyn

From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Tue, 30 Aug 2011 13:01:31 -0400
Subject: FW: Resolved - Water Quality Data Issue.

FYI

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From:	Alan Martyn Johnson
To:	Doug Leeper
Subject:	RE: Water Quality Data Issue.
Date:	Wednesday, August 31, 2011 4:42:27 PM
Importance:	High

Doug,
Thanks for the heads up. Did try briefly last weekend, with on success. Now I possibly know why.

Really appreciate you taking the time to share this.

Martyn

From: Doug.Leeper@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Mon, 29 Aug 2011 12:26:18 -0400
Subject: FW: Water Quality Data Issue.

FYI

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From:	Alan Martyn Johnson
To:	Doug Leeper; rrodrigu@usgs.gov; jdweaver@usgs.gov
Cc:	grubman1@gmail.com; Brent Whitley; Ron Miller; rkane; Kevin J Grimsley; Dana Bryan; Marty Kelly
Subject:	RE: Two New Docs on Springs Coast MFLs Workshop Web Page
Date:	Wednesday, August 31, 2011 7:23:55 PM

Doug, Rafel and Jess,
After just now reading Rafel's letter posted on the Working Group web site I was tempted to send this reply to Doug's complete copy list.

I trust that Mr. Rodriguez has taken some time to review some of the questions that I have asked before implying that I fall into the category of a layperson.

Mr. Rodriguez had best consider a written apology be posted on the web site and sent to me personally. Alternatively, he could consider requesting that the letter be removed from the web site and rewrite his 'rebuttal' with some facts..

In my public input statement for the last meeting I commented about the importance of accurate measurement. For the SE fork of the Homosassa River I wrote
Quote
The calculated flow for many 15 minute intervals frequently change by plus or minus 20% from the previous interval and it is not unusual to see changes over 40%.
End Quote

Does Mr. Rodriguez think this statement is incorrect?

Regarding the Homosassa River I commented
Quote
at the Homosassa River Gage, there is a bias in the inflow versus outflow due to the equation used. No explanation to support the equation has been offered. Homosassa River Gage flow CMcRea's) is used to estimate flow from Halls River.
Unquote

I did not say the data was BIASED I said there is a bias due to the equation used. The equation is in the Appendices to the MFL Report equation B4:

Vm = 0.00902154 + 0.9019Vi + 0.12138Vi2 + 0.045375(GH)

Sorry. that does not copy well, but my point is regarding the highlighted component Vi squared. When Vi becomes negative the second component is negative but the third component remains positive. When Vi is positive both Vi components are positive. I shared numerical and graphic representations of this. Would Mr. Rodriguez like to take time to explain why this does not result in a bias.

On the point about stability of the algorithm (sixth paragraph second sentence). Sorry, but you are going to have to explain how an algorithm can be unstable.

For the SE Fork I understand that the algorithm/equation has not changed since unit data collection of Gage Height started in 2002-10-01. All those annual reviews and no one questioned how Dann Yobbi came up with the equation which is different to what he reported in Report 01-4230. I must agree that natural log equation in the report was possibly a stretch.

Further, did anyone think to question that a regression analysis done with Weeki Wachee Well levels as they were when those 124 data points in Report 01-4230 were collected, may no longer be as valid. Take a look they are in Appendix B as I recall.

Regular Field Measurements these are generally spot checks. For 48 Field Measurements I have been able to review since 2004 sixteen(16) have differences greater that 15%. There are a couple of good sets that I do not have the calculated discharge figures for; 2000-12- 12 and 13, also 2003-06-17 and 18. Maybe you can bring those figures with you to Lecanto. On the audio recording of the last meeting at Lecanto (just finished listening to some of it) someone at hour 1:09 into the recording said that it was important to do measurements throughout the cycle. I agree; a few full cycles is worth a lot of spot checks given the complexity of the SE Fork and Homosassa Springs with its three vents.

Finally, on the correspondence from 12/16/2010 I have received 6 e-mails from Richard Kane. Only the ones from 8/08/2011 and 8/14/2011 have any scientific commentary, but almost discount all that Specific Conductance Data USGS have collected for years from the Homosassa Springs 02310678; stratification take a look. I am sure Richard will share the e-mails. Honestly, it may have been Kevin Grimsley who used stratification. Kevin has sent 14 e-mails 11/15/2010 thru 8/22/2011, Kevin has been more helpful e.g. the Stage Area Equation for the Homosassa River Site which was missing from the Appendices mentioned earlier, but I still do not agree regarding bi-directional flow at the SE Fork.

Rafel,
Hope to meet you at the Lecanto Meeting. Maybe you can bring some scientific input instead being just a Director. Arrive couple of hours early and I will take you on a personal tour of the SE Fork so you can see it firsthand and understand that there is no bi-directional flow even at the left bank. Check it out. It is poor location of the instrument site...not very poor just poor.

Have you heard about prodding the bear?

Martyn

Date: Tue, 30 Aug 2011 14:35:15 -0400
Subject: Two New Docs on Springs Coast MFLs Workshop Web Page

Greetings:

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E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Alan Martyn Johnson
To: rrodrigu@usgs.gov; rkane
Cc: grubman1@gmail.com; Brent Whitley; Ron Miller; Kevin J Grimsley; Dana Bryan; Marty Kelly; jdweaver@usgs.gov; Doug Leeper
Subject: Homosassa MFL and Discharge Concerns
Date: Thursday, September 01, 2011 8:05:20 AM

Gentleman,
I have just completed a powerpoint file that includes just about all my concerns and the rationale behind these for Homosassa discharges. I was intending to share this to allow preparation for the meeting in Lecanto and possible follow up, if necessary, in Tampa. Sorry I did not get this completed last week. I know there are other that are interested and will be in Lecanto.

However, reflecting on how the Director Mr. Rodriguez, as representative of USGS, considers that lay people, such as long term local residents do not know what they have observed, it may be inappropriate to post on a 'publicly accessible' web site such detailed requests for explanation and evidence of concerns. We can do that in person, in Lecanto. I am prepared to stay late.

Some of the key points were briefly touched on in my earlier e-mail:

- Large changes from one 15 minute calculated discharge to the next, SE Fork
- dS/dt component in the equation balancing out over 24 hour SE Fork
- Weeki Wachee Well levels regarding when equations (algorithms) were developed versus recent
- Cyclic pattern of Specific Conductance Homosassa Main Spring
- Weeki Wachee delta P
- Squared component in the Homosassa River equation
- Tidal Filtering of Homosassa River Discharge

Please, facts pertaining to the specific issue, not general statements.

I know USGS wish to provide the very best data possible, but to do that requires some thinking outside your present comfort zone and being open to outside input.
Such as installing a temporary ADCP at the SE Fork to confirm that this is a valid long tern expenditure. I am happy to be proven off the mark; I do not like wating tax payer money.
How about using a velocity meter (pearce) to confirm bi-directional flow/or a Specific Conductance monitor for a few days to see if my observations about the thin film along the concrete wall at the SE Fork are true: I am not the type of person that says this without good foundation.

.I would appreciate your bringing to the meeting the following:

- Unit Discharge data for 2000-12-12 and 13
- Unit Discharge data for 2003-06-17 and 18. Would be good to have these for each of the Field Measurements on those dates.
- Explanation (mathematical) of tidal filtering for Homosassa River
- Current equation for computation of Chassahowitzka discharge and any dates it has changed
- Data set used to develop current SE Fork equation and the date this equation was first

used
- Data/observations indicating bi-directional flow at the SE Fork

I know that is a lot to ask.
But when the inherent error in a discharge measurement is between 2% and 10% it would be good to know where in that range the Homosassa measurements are when we are all trying to assure that the "Outstanding Florida Water" remains as such. Flow reductions of 5% are, according to studies done using UGGS data, likely to result in 15% reduction in critical ecological issues that constitue SIGNIFICANT HARM. Get it wrong and we finish up with the same problems that we all see south of us. USGS data is critical in the modeling and monitoring of this endeavor.

Martyn

Martyn

From:	Alan Martyn Johnson
To:	jdweaver@usgs.gov
Cc:	rrodrigu@usgs.gov; rkane; grubman1@gmail.com; Brent Whitley; Ron Miller; Kevin J Grimsley; Dana Bryan; Marty Kelly; Doug Leeper
Subject:	Homosassa River Follow up
Date:	Friday, September 02, 2011 7:46:56 AM
Attachments:	Copy of Site 02310688 1.JPG Copy of Site 02310688 2.JPG Homosassa River Extract for Jess Weaver September 2, 2011.doc

Mr. Weaver,
It is possible that your reaction to earlier e-mails I sent/copied to you; What is this all about?

This morning I thought it only fair to provide you with a few specific points to aid in your ability to understand the situation.

SE Fork
Attached are two photographs of the gage site. The first is looking downstream, the pattern of the deposited material on the river bed gives a strong indication of the flow pattern. Notice the vegitation close to the concrete wall. Also, notice how the concrete wall extends out into the flow closest to the camera position and how the instrument location is behind the riprap bags. The flow has made a significant right hand turn as it goes under the bridge. I think it realistic to expect the velocities to be greater at the left bank under such conditions. With the stage area being of the order of 100 sq ft (the channel under the bridge is 34 feet wide) stream velocities of 0.3 ft/sec to 0.6 ft/sec appear to be the normal range. Would it be reasonable to expect vertical layering of water of say 4000 microsiemens with water 1000 microsiemens? For me it is very difficult to understand such a physical chemistry phenomena is possible.

Homosassa Springs
In the attachment I have provided the Total Dissolved Solids analyses for the three vents and the slide from my powerpoint file. Given the three vents converge about 60 feet down in the conical formation under the viewing gallery (cone diameter at top is estimated 30 ft), and the range of discharge cfs it is difficult to understand how rising tide causes water to go into storage or how such waters can stratify after they have mixed.
I received the following from USGS after raising this matter:

Mr. Johnson, the plot that you attached was difficult to interpret so I pulled a direct plot from our database for the same time period. When I look at the data I would say that specific conductance lags the peak gage height but is not inverse of stage. I can't say for sure why the lag but I think it is due to the hydraulics of the system. When the tide comes in some water will go into storage and this could be the reason behind the lag. You probably want to look at the salinity changes when the tide is out and then note what kind of changes you see. I haven't really looked at this since it is outside the scope of our work orders.

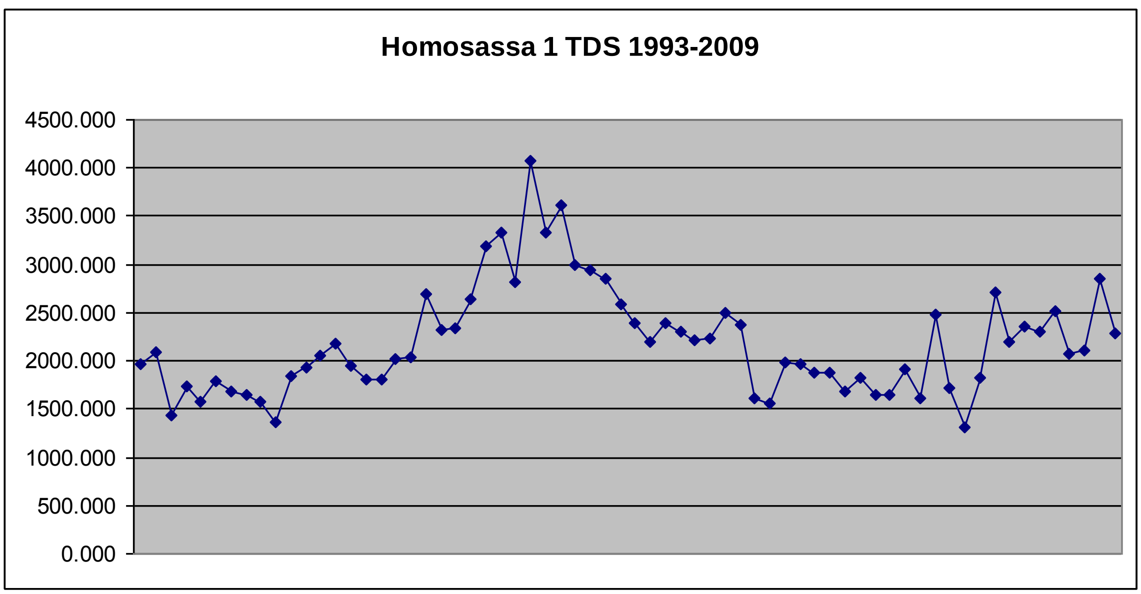
Hope this helps.

You may be interested to know that treatment of water for use in consumer products was a significant part of my career. I worked with manufacturers of water treatment systems in many parts of the world including design and operation. In my technical management capacity I had a water treatment specialist on my staff and had access and interacted with specialists at corporate headquarters in addition to working with manufacturers as mentioned. Quality Assurance was another significant part of that career and helping meet those goal was never outside my scope of work.

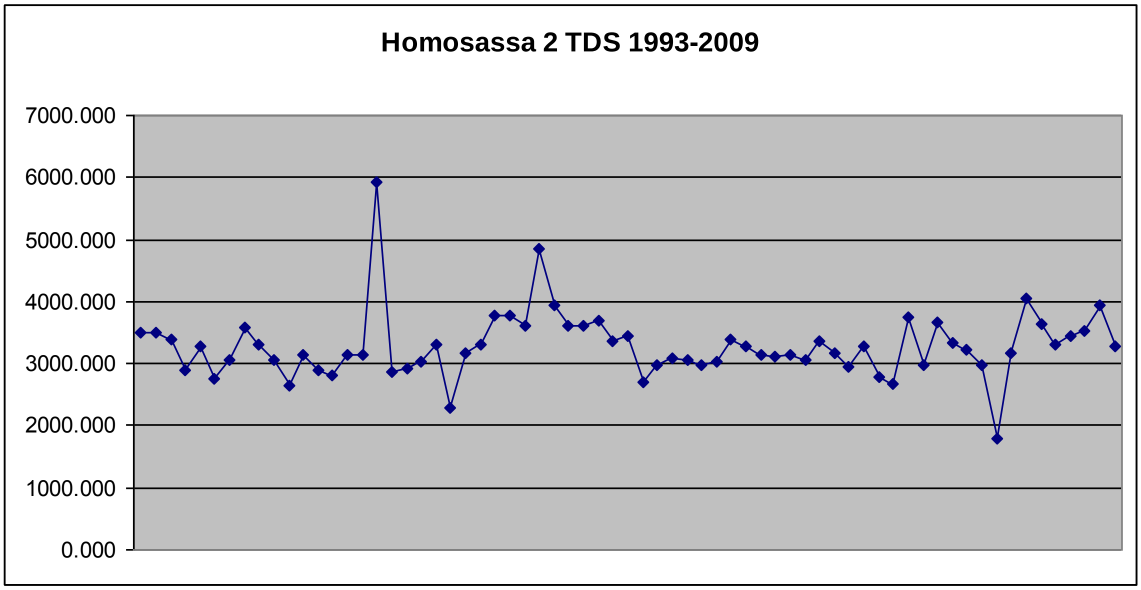
Have a great Labor Day weekend,

Martyn

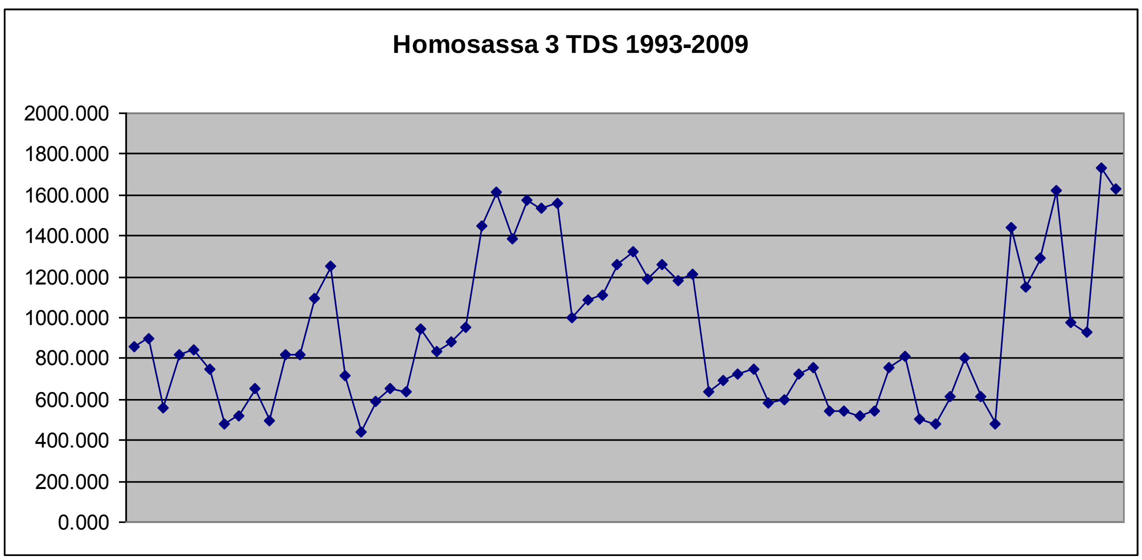
Homosassa Vent 1 Total Dissolved Solids



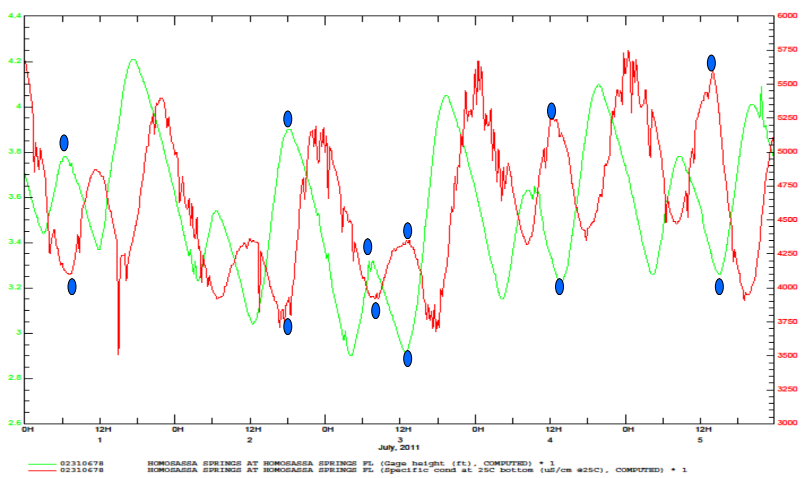
Homosassa Vent 2 Total Dissolved Solids



Homosassa Vent 3 Total Dissolved Solids



Homosassa Springs Specific Conductance and Gage Ht by USGS **Blue Markers Added**



With accompanying commentary "When I look at the data I would say that specific conductance lags the peak gage height but is not inverse of stage."…" I haven't really looked at this since it is outside the scope of our work orders."

Do not the blue circles show an inverse relationship? At high gage height discharge rate will be lower and elution time, which is the lag, greater.

From:	Kevin J Grimsley
To:	Alan Martyn Johnson
Cc:	Doug Leeper; Marty Kelly; rkane; Rafael W Rodriguez
Subject:	RE: Tidally Adjusted Flow at 02310700
Date:	Friday, September 02, 2011 2:01:51 PM

We use a Godin low-pass filter to remove the tidal signatures at gages such as 02310700. Information on the use of such filters is publically available.

Richard and I will not be able to stay after the workshop meeting next Tuesday to meet with you due to time constraints, but Dann Yobbi has agreed to stay after the meeting. Richard and I are still available to meet with you the following day during normal business hours at our office. We also need to ask that you direct future questions about our data and/or procedures through our official data inquiry webpage (http://waterdata.usgs.gov/fl/nwis/feedback/?to=Florida Water Data Inquiries). Thank you for your cooperation.

****
Kevin Grimsley, P.E.
Supervisory Hydrologist
USGS, Florida Water Science Center
10500 University Center Drive, Suite 215
Tampa, FL 33612
kjgrims@usgs.gov
813-498-5064
****

From:	Alan Martyn Johnson <martynellijay@hotmail.com>
To:	Kevin J Grimsley <kjgrims@usgs.gov>
Cc:	Doug Leeper <doug.leeper@swfwmd.state.fl.us>, rkane <rkane@usgs.gov>, <marty.kelly@swfwmd.state.fl.us>
Date:	08/27/2011 08:00 AM
Subject:	RE: Tidally Adjusted Flow at 02310700

Sorry if my question was not clear.

'How' was intended to convey **What is the equation/mathmatical formula used to make this calculation?**

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Martyn

P.S.
My interest in this stems from the January 6 Lecanto Workshop. A question/comment made by a gentleman sitting front left as Doug/Ron were viewing the audience. Sorry but I did not get his name.
Summarizing:
He said that he did not think the flow figures from Halls River springs were anywhere near

the reported figures. He said that he had patrolled the river for many years and had seen deterioration.

I did touch on this in an e-mail January 10 to Doug and Ron, but did not specifically include the comment about Halls River Flow.

Doug and Ron,
I would like to follow up on a few points from last Thursday evenings workshop in Lecanto. But, first a Thank You to both of you for a good professional job in front of an audience who are deeply concerned by the deterioration they have witnessed in the Homosassa River over the years.

Skeptical audience
Notable were comments from long time residents who have seen the river on a daily basis for over 50 years and those from former government employees who patrolled the waterways for over 20 years. They stated that the river has changed/deteriorated; flows have reduced, vegetation has changed, fish and wildlife have changed. They and others frequently mentioned recent and major barnacle growths where they were never seen before. There is clear observed evidence of salt water intrusion/salinity increases and the associated negative impact on this unique river.

I also generally noted Halls River flow in correspondence in 2010; *I appreciate that there are thoughts to monitoring flow from Halls River* November 15, 2010

From: kjgrims@usgs.gov
Subject: Re: Tidally Adjusted Flow at 02310700
CC: doug.leeper@swfwmd.state.fl.us; rkane@usgs.gov; marty.kelly@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Fri, 26 Aug 2011 10:49:08 -0400

A tidal filter is applied to discharge from the 02310700 (as well as many of our other tidally influenced discharge stations) in order to remove the cyclical tidal signature from the discharge data. This is useful for evaluating changes in the net flow without the "noise" from the tidal changes.

This filter is not applied in real-time. It is applied on a yearly basis as part of our Annual Data Report covering data from Oct. 1 through Sept. 30. It is also expected that the filtered values would be different from non-filtered, or else why would we apply a tidal filter at all.

On Aug 26, 2011, at 7:27 AM, "Alan Martyn Johnson" <martynellijay@hotmail.com> wrote:

Doug, Richard, Kevin,

Hopefully this is an easy question for someone to answer.

How is Tidally Adjusted Discharge calculated for the Homosassa River at Homosassa Gage Site 02310700?

This question relates to a flow issue I touched on after the first Lecanto meeting; flow from Halls River.

In the July 12, 2010 Draft Reports the following Table is shown on Page 50. I could not get to grips with the Halls River figures. When I looked at the daily data from the Gage Site 02310700 that only resulted in more questions. And I noted that the tidally adjusted discharge has not been reported since October 1, 2010.

Martyn

Table 2-3. Summary statistics for mean daily discharge records approved by the United States Geological Survey for Homosassa River system gage sites. Values are expressed as cubic feet per second (cfs) unless specified. Periods of record for approved data are listed by gage site in Table 2-2.

Statistic (cfs or N)	Homosassa Springs at Homosassa Springs FL	SE Fork Homosassa Spring at Homosassa Springs FL	Combined Springs[a]	Halls River[b]	Homosassa River at Homosassa FL (tidally filtered)	Hidden River near Homosassa FL
Maximum	141	100	240	1,995	2,090	25.0
75th Percentile	98	68	165	200	350	11
Median	88	60	147	108	251	8.0
25th Percentile	79	53	131	28	167	4.6
Minimum	34	23	57	-765	-636	1.3
Mean	89	61	149	129	272	8.0
Standard Deviation	14	11	26	181	183	4.4
Number (N) of daily Records	4,975	3,123	3,102	1,662	1,774	2,063

a Combined Springs discharge determined as the sum of the Homosassa Springs at Homosassa FL and SE Fork Homosassa Spring at Homosassa Springs FL discharge for days when records were available for both sites.
b Halls River discharge estimated by subtracting combined springs discharge from tidally filtered Homosassa River at Homosassa FL discharge for days when records were available for the two spring sites and the Homosassa River site.

This is an extract from the on-line records; note the differences between the filtered and non filtered figures.

		Dis-		

Date	Dis- charge, ft3/s, not filtrd. for tide (Mean)	charge, tidally fltrd, ft3/s, RESIDUAL (Mean)		Not Filtered-Filtered
6/10/2010	145[A]	128[A]		17
6/11/2010	103[A]	77[A]		26
6/12/2010	149[A]	129[A]		20
6/13/2010	211[A]	230[A]		-19
6/14/2010	139[A]	190[A]		-51
6/15/2010	158[A]	234[A]		-76
6/16/2010	308[A]	218[A]		90
6/17/2010	284[A]	239[A]		45
6/18/2010	277[A]	225[A]		52
6/19/2010	336[A]	250[A]		86
6/20/2010	290[A]	275[A]		15
6/21/2010	285[A]	164[A]		121
6/22/2010	263[A]	235[A]		28
6/23/2010	232[A]	262[A]		-30
6/24/2010	185[A]	255[A]		-70
6/25/2010	135[A]	201[A]		-66
6/26/2010	125[A]	154[A]		-29
6/27/2010	99[A]	140[A]		-41
6/28/2010	135[A]	151[A]		-16
6/29/2010	228[A]	269[A]		-41
6/30/2010	200[A]	231[A]		-31
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7/3/2010	195[A]	190[A]		5
7/4/2010	170[A]	163[A]		7
7/5/2010	255[A]	220[A]		35
7/6/2010	319[A]	285[A]		34
7/7/2010	351[A]	278[A]		73

7/8/2010	191[A]	194[A]		-3
7/9/2010	127[A]	158[A]		-31
7/10/2010	87[A]	[P]		0
7/11/2010	[P]	[P]		0
7/12/2010	[P]	[P]		0
7/13/2010	[P]	[P]		0
7/14/2010	[P]	[P]		0
7/15/2010	235[A]	[P]		0
7/16/2010	197[A]	[P]		0
7/17/2010	209[A]	200[A]		9
7/18/2010	243[A]	222[A]		21
7/19/2010	277[A]	212[A]		65
7/20/2010	221[A]	202[A]		19
7/21/2010	197[A]	185[A]		12
7/22/2010	129[A]	175[A]		-46
7/23/2010	198[A]	185[A]		13
7/24/2010	-74[A]	31[A]		-105
7/25/2010	140[A]	117[A]		23
7/26/2010	168[A]	209[A]		-41
7/27/2010	177[A]	203[A]		-26
7/28/2010	194[A]	192[A]		2
7/29/2010	188[A]	192[A]		-4
7/30/2010	167[A]	180[A]		-13
7/31/2010	222[A]	213[A]		9
8/1/2010	245[A]	216[A]		29
8/2/2010	244[A]	214[A]		30
8/3/2010	228[A]	200[A]		28
8/4/2010	194[A]	150[A]		44
8/5/2010	173[A]	125[A]		48
8/6/2010	91[A]	126[A]		-35
8/7/2010	246[A]	243[A]		3
8/8/2010	356[A]	395[A]		-39
8/9/2010	367[A]	420[A]		-53
8/10/2010	247[A]	258[A]		-11

<mime.htm>

From:	Alan Martyn Johnson
To:	Kevin J Grimsley
Cc:	Doug Leeper; Marty Kelly; rkane; rrodrigu@usgs.gov
Subject:	RE: Tidally Adjusted Flow at 02310700
Date:	Sunday, September 04, 2011 9:15:07 AM

Kevin,
Thanks for the info.
I will be in Lecanto at least one hour before the start of the Working Group Meeting, if early is better than late.
Martyn

To: martynellijay@hotmail.com
CC: doug.leeper@swfwmd.state.fl.us; marty.kelly@swfwmd.state.fl.us; rkane@usgs.gov; rrodrigu@usgs.gov
Subject: RE: Tidally Adjusted Flow at 02310700
From: kjgrims@usgs.gov
Date: Fri, 2 Sep 2011 14:01:41 -0400

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7/12/2010	[P]	[P]		0
7/13/2010	[P]	[P]		0
7/14/2010	[P]	[P]		0
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8/3/2010	228[A]	200[A]		28
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	[A]	[A]		

8/10/2010	247	258		-11

<mime.htm>

From: Alan Martyn Johnson
To: Kevin J Grimsley
Cc: jdweaver@usgs.gov; rrodrigu@usgs.gov; grubman1@gmail.com; Doug Leeper; Ron Miller; Brent Whitley; rkane
Subject: FW: Tidally Adjusted Flow at 02310700
Date: Monday, September 05, 2011 7:00:29 PM

Kevin,
The way I have previously looked at the tidal filtered data is the tidal filtered data reported on a daily basis is related to the daily mean discharge. There is no indication that some other timeframe is considered.

Following your last e-mail, I looked at the tidal filtered data in light of this being developed by trying to eliminate the extraneous noise (using the principal of a Godin style low pass filtering technique) in the 24 hour daily mean figures. This approach appears to develop a filter using many daily means (raw data for the analysis) and then applies the developed function equally to all individual raw data points. I think such an approach assumes that each piece of raw data has equal 'merit', however in reality this appears not to be true as the raw data used in the analysis misses an important cyclic factor: **the natural cycle interval is 24.84 hours**.

A notation regarding the "astronomical" tidal cycle is shown with many of the data sets on the USGS web site.

When you get a chance it may be worth asking if this natural cycle was considered when developing this tidal filtering methodology.

Add this to the questions about the square function in the equation to obtain Vm from Vi and it is easier to understand why the data regarding flow/discharge from Halls River is so difficult to make sense of. A number of times in SWFWMD MFL reports and the appendices questions/commentary is made about the discharge data from Halls River being difficult to 'understnd' my word, but I could quote some actual wording.

Please confirm if the astrological tidal cycle is used in 'calculating/computing the tidal filtered number that are reported for each day. I did include some actual figures in an earlier e-mai from the usgs record as example.

Do you recall the e-mails we exchanged about considering the null flow intervals (intervals between when the stream velocity was zero)?. I will revisit that idea using the Vi and stage height data when I get a chance.

I may be wrong but it strikes me that tidal filtering can't be done effectively if the astrological tidal cycle is not included in the thought process.

Martyn

From: martynellijay@hotmail.com
To: kjgrims@usgs.gov

CC: doug.leeper@swfwmd.state.fl.us; marty.kelly@swfwmd.state.fl.us; rkane@usgs.gov; rrodrigu@usgs.gov
Subject: RE: Tidally Adjusted Flow at 02310700
Date: Sun, 4 Sep 2011 09:15:01 -0400

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I will be in Lecanto at least one hour before the start of the Working Group Meeting, if early is better than late.
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Supervisory Hydrologist
USGS, Florida Water Science Center
10500 University Center Drive, Suite 215
Tampa, FL 33612
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Date:	08/27/2011 08:00 AM
Subject:	RE: Tidally Adjusted Flow at 02310700

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To: martynellijay@hotmail.com
Date: Fri, 26 Aug 2011 10:49:08 -0400

A tidal filter is applied to discharge from the 02310700 (as well as many of our other tidally influenced discharge stations) in order to remove the cyclical tidal signature from the discharge data. This is useful for evaluating changes in the net flow without the "noise" from the tidal changes.

This filter is not applied in real-time. It is applied on a yearly basis as part of our Annual Data Report covering data from Oct. 1 through Sept. 30. It is also expected that the filtered values would be different from non-filtered, or else why would we apply a tidal filter at all.

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This question relates to a flow issue I touched on after the first Lecanto meeting; flow from Halls River.
In the July 12, 2010 Draft Reports the following Table is shown on Page 50. I could not get to grips with the Halls River figures. When I looked at the daily data from the Gage Site 02310700 that only resulted in more questions. And I noted that the tidally adjusted discharge has not been reported since October 1, 2010.

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Table 2-3. Summary statistics for mean daily discharge records approved by the United States Geological Survey for Homosassa River system gage sites. Values are expressed as cubic feet per second (cfs) unless specified. Periods of record for approved data are listed by gage site in Table 2-2.

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25th Percentile	79	53	131	28	167	4.6
Minimum	34	23	57	-765	-636	1.3
Mean	89	61	149	129	272	8.0
Standard Deviation	14	11	26	181	183	4.4
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6/14/2010	139[A]	190[A]		-51
6/15/2010	158[A]	234[A]		-76
6/16/2010	308[A]	218[A]		90
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6/22/2010	263[A]	235[A]		28
6/23/2010	232[A]	262[A]		-30
6/24/2010	185[A]	255[A]		-70
6/25/2010	135[A]	201[A]		-66
6/26/2010	125[A]	154[A]		-29
6/27/2010	99[A]	140[A]		-41
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7/3/2010	195[A]	190[A]		5
7/4/2010	170[A]	163[A]		7
7/5/2010	255[A]	220[A]		35
	[A]	[A]		

7/6/2010	319	285		34
7/7/2010	351[A]	278[A]		73
7/8/2010	191[A]	194[A]		-3
7/9/2010	127[A]	158[A]		-31
7/10/2010	87[A]	P		0
7/11/2010	P	P		0
7/12/2010	P	P		0
7/13/2010	P	P		0
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7/16/2010	197[A]	P		0
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7/20/2010	221[A]	202[A]		19
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7/22/2010	129[A]	175[A]		-46
7/23/2010	198[A]	185[A]		13
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7/29/2010	188[A]	192[A]		-4
7/30/2010	167[A]	180[A]		-13
7/31/2010	222[A]	213[A]		9
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To:	Alan Martyn Johnson
Cc:	Doug Leeper; Marty Kelly; rkane
Subject:	Re: Tidally Adjusted Flow at 02310700
Date:	Monday, September 05, 2011 8:18:17 PM

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From:	Doug Leeper
To:	"Kevin J Grimsley"
Cc:	Richard Kane (rkane@usgs.gov); Martyn Johnson (martynellijay@hotmail.com)
Bcc:	Marty Kelly; Ron Basso; Mike Heyl
Subject:	RE: Tidally Adjusted Flow at 02310700
Date:	Tuesday, September 06, 2011 8:13:00 AM

Kevin – I believe I have room 166 at the Lecanto Govt. Svcs. Bldg. reserved from 12:00 on. You could meet in that room prior to the workshop, but it may get kind of busy/noisy just prior to the workshop start time of 1:30.
FYI - I'm not sure how much I will be able to participate in the planned discussion, as I will be prepping for the workshop.

See you later today.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Kevin J Grimsley [mailto:kjgrims@usgs.gov]
Sent: Monday, September 05, 2011 8:07 PM
To: Alan Martyn Johnson
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Subject:	RE: Tidally Adjusted Flow at 02310700

Sorry if my question was not clear.

'How' was intended to convey **What is the equation/mathmatical formula used to make this calculation?**

I realize the tidally adjusted figure is not reported in the 15 minute data, but I do see it in the Approved Daily Data as exampled in my e-mail.

Martyn

P.S.
My interest in this stems from the January 6 Lecanto Workshop. A question/comment made by a gentleman sitting front left as Doug/Ron were viewing the audience. Sorry but I did not get his name.
Summarizing:
He said that he did not think the flow figures from Halls River springs were anywhere near the reported figures. He said that he had patrolled the river for many years and had seen deterioration.

I did touch on this in an e-mail January 10 to Doug and Ron, but did not specifically include the comment about Halls River Flow.

Doug and Ron,
I would like to follow up on a few points from last Thursday evenings workshop in Lecanto. But, first a Thank You to both of you for a good professional job in front of an audience who are deeply concerned by the deterioration they have witnessed in the Homosassa River over the years.

Skeptical audience
Notable were comments from long time residents who have seen the river on a daily basis for over 50 years and those from former government employees who patrolled the waterways for over 20 years. They stated that the river has changed/deteriorated; flows have reduced, vegetation has changed, fish and wildlife have changed. They and others frequently mentioned recent and major barnacle growths where they were never seen before. There is clear observed evidence of salt water intrusion/salinity increases and the associated negative impact on this unique river.

I also generally noted Halls River flow in correspondence in 2010; *I appreciate that there are thoughts to monitoring flow from Halls River* November 15, 2010

From: kjgrims@usgs.gov
Subject: Re: Tidally Adjusted Flow at 02310700
CC: doug.leeper@swfwmd.state.fl.us; rkane@usgs.gov; marty.kelly@swfwmd.state.fl.us
To: martynellijay@hotmail.com
Date: Fri, 26 Aug 2011 10:49:08 -0400

A tidal filter is applied to discharge from the 02310700 (as well as many of our other tidally influenced discharge stations) in order to remove the cyclical tidal signature from the discharge data. This is useful for evaluating changes in the net flow without the "noise" from the tidal changes.

This filter is not applied in real-time. It is applied on a yearly basis as part of our Annual Data Report covering data from Oct. 1 through Sept. 30. It is also expected that the filtered values would be different from non-filtered, or else why would we apply a tidal filter at all.

On Aug 26, 2011, at 7:27 AM, "Alan Martyn Johnson" <martynellijay@hotmail.com> wrote:

Doug, Richard, Kevin,

Hopefully this is an easy question for someone to answer.

How is Tidally Adjusted Discharge calculated for the Homosassa River at Homosassa Gage Site 02310700?

This question relates to a flow issue I touched on after the first Lecanto meeting; flow from Halls River.
In the July 12, 2010 Draft Reports the following Table is shown on Page 50. I could not get to grips with the Halls River figures. When I looked at the daily data from the Gage Site 02310700 that only resulted in more questions. And I

noted that the tidally adjusted discharge has not been reported since October 1, 2010.

Martyn

Table 2-3. Summary statistics for mean daily discharge records approved by the United States Geological Survey for Homosassa River system gage sites. Values are expressed as cubic feet per second (cfs) unless specified. Periods of record for approved data are listed by gage site in Table 2-2.

Statistic (cfs or N)	Homosassa Springs at Homosassa Springs FL	SE Fork Homosassa Spring at Homosassa Springs FL	Combined Springs[a]	Halls River[b]	Homosassa River at Homosassa FL (tidally filtered)	Hidden River near Homosassa FL
Maximum	141	100	240	1,995	2,090	25.0
75th Percentile	98	68	165	200	350	11
Median	88	60	147	108	251	8.0
25th Percentile	79	53	131	28	167	4.6
Minimum	34	23	57	-765	-636	1.3
Mean	89	61	149	129	272	8.0
Standard Deviation	14	11	26	181	183	4.4
Number (N) of daily Records	4,975	3,123	3,102	1,662	1,774	2,063

a Combined Springs discharge determined as the sum of the Homosassa Springs at Homosassa FL and SE Fork Homosassa
Spring at Homosassa Springs FL discharge for days when records were available for both sites.
b Halls River discharge estimated by subtracting combined springs discharge from tidally filtered Homosassa River at Homosassa
FL discharge for days when records were available for the two spring sites and the Homosassa River site.

This is an extract from the on-line records; note the differences between the filtered and non filtered figures.

Date	Dis- charge, ft3/s, not filtrd. for tide (Mean)	Dis- charge, tidally fltrd, ft3/s, RESIDUAL (Mean)		Not Filtered-Filtered
6/10/2010	145A	128A		17
6/11/2010	103A	77A		26
6/12/2010	149A	129A		20
6/13/2010	211A	230A		-19
6/14/2010	139A	190A		-51
6/15/2010	158A	234A		-76
6/16/2010	308A	218A		90
6/17/2010	284A	239A		45
6/18/2010	277A	225A		52
6/19/2010	336A	250A		86
6/20/2010	290A	275A		15
6/21/2010	285A	164A		121
6/22/2010	263A	235A		28
6/23/2010	232A	262A		-30
6/24/2010	185A	255A		-70
6/25/2010	135A	201A		-66
6/26/2010	125A	154A		-29
6/27/2010	99A	140A		-41
6/28/2010	135A	151A		-16
6/29/2010	228A	269A		-41
6/30/2010	200A	231A		-31
7/1/2010	285A	261A		24
7/2/2010	292A	254A		38
7/3/2010	195A	190A		5
7/4/2010	170A	163A		7
7/5/2010	255A	220A		35

7/6/2010	319[A]	285[A]		34
7/7/2010	351[A]	278[A]		73
7/8/2010	191[A]	194[A]		-3
7/9/2010	127[A]	158[A]		-31
7/10/2010	87[A]	P		0
7/11/2010	P	P		0
7/12/2010	P	P		0
7/13/2010	P	P		0
7/14/2010	P	P		0
7/15/2010	235[A]	P		0
7/16/2010	197[A]	P		0
7/17/2010	209[A]	200[A]		9
7/18/2010	243[A]	222[A]		21
7/19/2010	277[A]	212[A]		65
7/20/2010	221[A]	202[A]		19
7/21/2010	197[A]	185[A]		12
7/22/2010	129[A]	175[A]		-46
7/23/2010	198[A]	185[A]		13
7/24/2010	-74[A]	31[A]		-105
7/25/2010	140[A]	117[A]		23
7/26/2010	168[A]	209[A]		-41
7/27/2010	177[A]	203[A]		-26
7/28/2010	194[A]	192[A]		2
7/29/2010	188[A]	192[A]		-4
7/30/2010	167[A]	180[A]		-13
7/31/2010	222[A]	213[A]		9
8/1/2010	245[A]	216[A]		29
8/2/2010	244[A]	214[A]		30
8/3/2010	228[A]	200[A]		28
8/4/2010	194[A]	150[A]		44
8/5/2010	173[A]	125[A]		48
8/6/2010	91[A]	126[A]		-35
8/7/2010	246[A]	243[A]		3
8/8/2010	356[A]	395[A]		-39
8/9/2010	367[A]	420[A]		-53

8/10/2010	247A	258A		-11

<mime.htm>

<mime.htm>

From:	Alan Martyn Johnson
To:	Kevin J Grimsley; rkane; Ron Basso
Cc:	grubman1@gmail.com; Doug Leeper; Ron Miller
Subject:	Homosassa River
Date:	Wednesday, September 07, 2011 10:37:47 AM

Ron,
I do not have Dann's e-mail, so have shared this with you to pass on as he said he may stop be your office today. Thanks.

Kevin, Richard and Dann,
Thank you for taking the time yesterday to meet with me regarding the various concerns I have on the measurement of discharge from the springs that feed the Homosassa River. These discharge measurements are the foundation of many of the studies and rationale that SWFWMD use to develop the MFL's for this Outstanding Florida Water.
While the discussion lacked a structured progression as we kept jumping from one point to another it was very useful and informative. I trust that some of my comments and thought gave you food for thought as you drove home/back to Tampa. I certainly reflected on our discussion and would briefly like to touch on a few points.

1. I understand and appreciate that USGS are tasked only with supplying data and that it is SWFWMD's role to use/interpret the data for the purposes of MFL development. I have understood this, but not until our discussion did I appreciate how USGS is 'commissioned' by SWFWMD regarding what data is to be developed.

2. Tidal filtering. Kevin explained that the filtering is performed on the 15 minute interval data so this should overcome the concern expressed in an e-mail that the 24.84 hour cycle was not included. As I said this 15 minute data has all these erratic changes in it that make filtering more complex. I agree with Dann that the generation of this filtered data is essentially not worth the effort. When we look at the resulting output it is difficult if not impossible to put this to any meaningful use with a meaningful level of confidence.

3. The unit discharge data was not available yesterday for the two sets of field measurements 2000-12-12/13 and 2003-06-17/18. As I recall Dann said he would look these up and share them. Alternatively, I could pick these up at the Tampa office along with any other information requested in my 8/31/2011 e-mail that you can share. I will look towards a date next week and contact you to find a convenient time.

4. Specific Conductance Homosassa Springs. I tried hard to comprehend the logic of the lag explanation for this cyclic specific conductance (although not discussed as such I assume the measurements done across the channel have resulted in discounting the stratification thought). I would certainly be interest if you can share the results of the cross channel measurements that Kevin mentioned.
   When I try to comprehend the lag hypothesis I just can not find a logical explanation of where six hours worth of discharge water is held (scratch pad over dinner last night that is 1.5 million cubic feet of water lag). Sorry but the logic is not there.
   However, the logic does hold with my hypothesis:
   The three vents are always discharging some water at the point they combine (60 feet down or thereabouts).

The flow from each of the vents varies with stage height.
Then given the chemical analyses over many years from the peristaltic sampling from each of the vents is: Homosassa Springs 1 in the chemical analyses data set Vent 1 highest TDS, Homosassa Springs 2 Vent 2 mid level TDS and Homosassa Springs 3 Vent 3 lowest TDS.
When Vent 3 is at its highest flow the TDS of the combined flows will be the lowest. THINK ABOUT IT CHEW THE CUD FOR A WHILE AND ASK YOURSELVES WHEN IN THE STAGE CYCLE IS VENT 3, the lowest TDS vent, LIKELY TO HAVE THE HIGHEST FLOW?
My hypothesis does not have to find an explanation for where is the 1.5 million cubic feet of water (80cfs for 6 hours, average high low cycle). And I maintain it is very difficult to logically explain reverse flow at this location. SWFWMD could easily initiate hourly sampling from the vents via the peristaltic sampling pumps for a 12 or 24 hour period. Specific Conductance only. I am even prepared to volunteer my time to do this.

I will be in touch, but thanks again I really appreciate your time, and specifically I would like to thanks to Kevin for staying on after the working group meeting. That demonstrated both personal commitment and professionalism to assure continuity of involvement by the Tampa Office. Thanks Dann for taking Kevin home!
Dann, thank you for your thought about monitoring the various small springs for the earliest signs of 'impending problems'. The thought had not so clearly crossed my mind that the smaller springs are more likely to give the earlier warning signs than the changes in the main flows. I had been focusing my interest on the SE Fork as it is the major source of the highest quality water to the river. Good point to be even more focused on each of the small springs including Bluebird Springs, which is not 'featured' in the main discussion.

Martyn
P.S.
Kevin,
I am sure you have but just in case; have you thought about placing the ADCP for the SE Fork just upstream of the bridge. At this location it would still be convenient to the transmission station- recorder location, AND MOST IMPORTANTLY LESS PRONE TO human interference. Few 'swimmers' hang out that side of the bridge.

From: Kevin J Grimsley
To: Doug Leeper
Subject: Re: Agenda for Spring MFLs Workshop and Link to Env Flows Paper
Date: Wednesday, September 07, 2011 10:56:14 AM

Hey Doug,

Does SWFWMD have any continuous conductance data for a well in the Homosassa area?

****
Kevin Grimsley, P.E.
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From: Doug Leeper <Doug.Leeper@swfwmd.state.fl.us>

To: "Al Grubman (grubman1@gmail.com)" <grubman1@gmail.com>, "Bill Geiger (bgeiger@cityofbrooksville.us)" <bgeiger@cityofbrooksville.us>, "Bill Pouder (bill.pouder@myfwc.com)" <bill.pouder@myfwc.com>, "Boyd Blihovde (Boyd_Blihovde@fws.gov)" <Boyd_Blihovde@fws.gov>, "Brad Rimbey (BWR.CRRC@tampabay.rr.com)" <BWR.CRRC@tampabay.rr.com>, "Brent Whitley (brentwhitley@sierra-properties.com)" <brentwhitley@sierra-properties.com>, "Brockway, Alys (abrockway@co.hernando.fl.us)" <abrockway@co.hernando.fl.us>, "Dennis D. 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Date: 09/01/2011 04:09 PM

Subject: Agenda for Spring MFLs Workshop and Link to Env Flows Paper

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Greetings:

I'm writing today to let you know that an agenda for the September 6th Springs Coast Minimum Flows and Levels Public Workshop is now posted on the District's workshop web page at:

http://www.WaterMatters.org/SpringsCoastMFL

I'd also like to take this opportunity to provide links for an interesting new article that may be useful for our discussions on minimum flows development on the Springs Coast. The paper is titled *A Presumptive Standard for Environmental Flow Protection*, and was authored by Brian Richter and several of his colleagues with The Nature Conservancy. The paper outlines information on protective flow standards based on what Richter has termed a "Sustainable Boundary Approach", which is a percentage-of-flow based environmental flows methodology. The article is to be published in the scientific journal, River Research and Applications, and is currently posted/available from the Wiley Online Library in advance of its publication in the printed journal. Here's a link to the article abstract that is posted on the Wiley Online Library web page.

http://onlinelibrary.wiley.com/doi/10.1002/rra.1511/abstract

An Adobe PDF version of the pre-print version of the full article is currently posted on the web site of the Southeast Aquatic Resources Partnership at the following uniform resource locator (URL).

http://southeastaquatics.net/uploads/category/Richter%20et%20al%202011.pdf

I hope you enjoy this article, and I look forward to seeing you next week.

Douglas A. Leeper, Chief Environmental Scientist
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E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From:	Doug Leeper
To:	Marty Kelly
Subject:	FW: Homosassa River
Date:	Wednesday, September 07, 2011 12:32:00 PM

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Wednesday, September 07, 2011 10:38 AM
To: Kevin J Grimsley; rkane; Ron Basso
Cc: grubman1@gmail.com; Doug Leeper; Ron Miller
Subject: Homosassa River

Ron,
I do not have Dann's e-mail, so have shared this with you to pass on as he said he may stop be your office today. Thanks.

Kevin, Richard and Dann,
Thank you for taking the time yesterday to meet with me regarding the various concerns I have on the measurement of discharge from the springs that feed the Homosassa River. These discharge measurements are the foundation of many of the studies and rationale that SWFWMD use to develop the MFL's for this Outstanding Florida Water.
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From:	Doug Leeper
To:	Dave Dewitt
Cc:	Kevin Grimsley (kjgrims@usgs.gov)
Subject:	FW: Agenda for Spring MFLs Workshop and Link to Env Flows Paper
Date:	Wednesday, September 07, 2011 1:20:00 PM

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From: Kevin J Grimsley [mailto:kjgrims@usgs.gov]
Sent: Wednesday, September 07, 2011 10:56 AM
To: Doug Leeper
Subject: Re: Agenda for Spring MFLs Workshop and Link to Env Flows Paper

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813-498-5064
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To:	Doug Leeper; Kevin Grimsley (kjgrims@usgs.gov)
Cc:	Ron Basso
Subject:	RE: Agenda for Spring MFLs Workshop and Link to Env Flows Paper
Date:	Wednesday, September 07, 2011 4:05:03 PM

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To: Dave Dewitt
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Date: Wednesday, September 07, 2011 4:07:00 PM

Thanks Dave – that's what I thought.

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From:	Alan Martyn Johnson
To:	Kevin J Grimsley
Cc:	rkane; Doug Leeper
Subject:	RE: Homosassa River
Date:	Wednesday, September 14, 2011 1:43:04 PM

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To: martynellijay@hotmail.com
CC: rkane@usgs.gov
Subject: Re: Homosassa River
From: kjgrims@usgs.gov
Date: Thu, 8 Sep 2011 10:17:25 -0400

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From:	Alan Martyn Johnson
To:	rrodrigu@usgs.gov
Cc:	rkane; Marty Kelly; Doug Leeper; jdweaver@usgs.gov
Subject:	E-mail 8-31-2011
Date:	Wednesday, September 14, 2011 1:36:25 PM

Mr. Rodriguez.
I think you have had time to read and think about the e-mail I sent August 31.

I would appreciate your confirming that the statement I made regarding the changes in flow from one 15 minute reported discharge is correct or incorrect.

Additionally, I look forward to you explaning the rationale behind the equation mentioned in the e-mail.

Martyn

From:	Kevin J Grimsley
To:	Dave Dewitt
Cc:	Doug Leeper; Ron Basso
Subject:	RE: Agenda for Spring MFLs Workshop and Link to Env Flows Paper
Date:	Wednesday, September 07, 2011 4:27:02 PM

Thanks Dave. Don't worry about deploying anything extra. I just thought you might have some existing data.

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To:	Doug Leeper <Doug.Leeper@swfwmd.state.fl.us>, "Kevin Grimsley (kjgrims@usgs.gov)" <kjgrims@usgs.gov>
Cc:	Ron Basso <Ron.Basso@swfwmd.state.fl.us>
Date:	09/07/2011 04:05 PM
Subject:	RE: Agenda for Spring MFLs Workshop and Link to Env Flows Paper

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From:	Doug Leeper
To:	Mike Heyl
Subject:	FW: E-Mail from MJohnson
Date:	Thursday, September 15, 2011 9:31:00 AM

Mike - Just noticed the e-mail string below contains a reference to the Chass, so I figured I would forward it to you to keep you in the loop.

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From: kjgrims@usgs.gov
Date: Thu, 8 Sep 2011 10:17:25 -0400

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To:	Alan Martyn Johnson
Cc:	Doug Leeper; rkane
Subject:	RE: Homosassa River
Date:	Monday, September 19, 2011 4:33:20 PM

Martyn,

It is our long standing policy that we do not release our rating equations to the public except where they may be published as part of an investigations report (as was the case with the regressions in Dann's report). Therefore, I cannot elaborate further than what is already provided in the report on specific equations.

You seem to be inferring that because gage height data is not available on the web for that period, that none was collected. That is not the case. Gage height data was collected under the project section at this time and it is common practice, especially in other parts of the country, to only publish the final product which is discharge.

I got your voicemail this morning and we truly appreciate you looking after our equipment. As you know, we've had vandalism issues before and hopefully once everyone gets used to seeing this new equipment they'll leave it alone. Everything still seems to be working fine for now, but we'll pass by the site to make sure. Thanks again.

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From:	Alan Martyn Johnson
To:	Kevin J Grimsley
Cc:	Doug Leeper; rkane; Brad Rimbey; Ron Miller
Subject:	RE: Homosassa River
Date:	Wednesday, September 21, 2011 3:20:46 PM

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To: martynellijay@hotmail.com
CC: doug.leeper@swfwmd.state.fl.us; rkane@usgs.gov
Subject: RE: Homosassa River
From: kjgrims@usgs.gov
Date: Mon, 19 Sep 2011 16:33:48 -0400

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From:	Alan Martyn Johnson
To:	rrodrigu@usgs.gov
Cc:	Doug Leeper; jdweaver@usgs.gov
Subject:	RE: E-mail 8-31-2011
Date:	Wednesday, September 21, 2011 5:50:39 PM
Attachments:	SE Fork Real Time Data July12,13,14 2011.xlsx

Mr. Rodriguez,
It appears that you are failing to comprehend that when you respond on USDI/USGS letterhead to a specific document stating that your organization (USGS) "strongly refutes....claims" in that document, you had best be specific.

It is your signature on the letter posted on the MFL Working Group web site, not that of your staff.

I trust you will take the time to closely review exactly what you signed and respond accordingly to the specifics in the subject e-mail.

As Background
The purpose of my concerns with discharge data is twofold:

- understand the accuracy of the flow data used in the various studies that predict significant harm e.g. salinity and thermal refuge in the Homosassa River, and
- how SWFWMD will be able to assess when a 5% decline in flow has occurred (assuming 5% is the MFL figure they adopt).

IMHO the harm has already been done, but that is a subject for SWFWMD.

USGS's role (your job) is to supply the discharge measurements to the best of your ability and to be clear about what the accuracy is for the specific gage sites on the Homosassa River. I doubt that you want me to reiterate all the statements that have been made, let me just say there has been inconsistency.

I realize that flow/discharge is complex, but USGS reduced these complexities to simple mathematical equations (algorithms) and has used these for some 10 years. Since 2004 there are some 148 field measurements from the SE Fork (others primarily dating back to 2000 I will request through the official channels for Freedom of Information as these are not supported on the web site), over 30% of these show differences of 15% or more with the calculated discharge. You have the data take a look.

- Is this good enough to make major decisions on? **I for one do not think so.**
- Should these differences have triggered some 24 hour monitoring to assure that all was OK. The tape from the July Working Group Meeting clearly has someone stating that a 24 hour monitoring is needed to get accurate data regarding another Creek, one hour nine minutes into the audio recording as I recall. **I for one think so, particularly as I have stated a number of times the best way to address these concerns is at the local level.**

I am pleased that the ADCP has been installed and appreciate the efforts of those who made it happen sooner rather than later, particularly given the budget restrictions you all have.

On a broader note; I would think that additional focus should be more on the declining levels in the aquifer which are **much easier to monitor accurately** and are much more relevant to the control of groundwater withdrawals, but that is not USGS's concern, and maybe not even SWFWMD's as they are trying to comply with regulations and continue to issue water permits.

In fairness I must add here that SWFWMD in developing their NDM (Northern District Model) consciously ignored data USGS had collected over many years stating something along the lines it was not 'comparable'. I think all these were field measurements that they must have thought less accurate. Ironic.

Who is really concerned about protecting the Outstanding Florida Waters?

I share these comments as background.

I look forward to your considered response to the specific points in the subject e-mail.

Martyn Johnson
P.S.
The attached file is the data I would have used in supporting my comments about the changes in the 15 minute data should anyone have been interested at the July meeting. I shared hard copy (hand hightlights) of this with Doug at the start of the July Meeting, I have added the highlighted colors in the file; lavender >15%, yellow>20%, red>40%). The data was not selected from a host of dates simply the ones just prior to the meeting. Doug had posted this as scanned copy on the Working Group web site but I suggested that it was removed as the stand alone document was of little value. I trust you can see that the percentage changes are from one 15 minute calculated discharge to the next. The changes are not only noteworthy as individual percentage changes but also as some of the trends seen when there are smaller changes from one interval to the next, but that would be adding to the point I was making in my public input statement.

To: martynellijay@hotmail.com
CC: rkane@usgs.gov
Subject: Re: E-mail 8-31-2011
From: rrodrigu@usgs.gov
Date: Mon, 19 Sep 2011 08:32:51 -0400

Mr. Johnson,

I have spoken with my staff and confirmed that your questions have already been answered to the best of our ability through both email correspondence and face-to-face meetings.

Thank you for your interest in USGS data.

****

Rafael W. Rodriguez
Director
USGS Florida Water Science Center
10500 University Center Drive, Suite 215

Tampa, FL 33612
Phone: (813) 498-5024
Cell: (813) 463-3660
Fax: (813) 498-5003
rrodrigu@usgs.gov
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From: Alan Martyn Johnson <martynellijay@hotmail.com>
To: <rrodrigu@usgs.gov>
Cc: rkane <rkane@usgs.gov>, <marty.kelly@swfwmd.state.fl.us>, Doug Leeper <doug.leeper@swfwmd.state.fl.us>, <jdweaver@usgs.gov>
Date: 09/14/2011 01:36 PM
Subject: E-mail 8-31-2011

Mr. Rodriguez.
I think you have had time to read and think about the e-mail I sent August 31.

I would appreciate your confirming that the statement I made regarding the changes in flow from one 15 minute reported discharge is correct or incorrect.

Additionally, I look forward to you explaning the rationale behind the equation mentioned in the e-mail.

Martyn

From: Doug Leeper
To: Marty Kelly; Mike Heyl
Subject: FW: Homosassa River
Date: Monday, September 26, 2011 8:11:00 AM

FYI only.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

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To: Kevin J Grimsley
Cc: Doug Leeper; rkane; Brad Rimbey; Ron Miller
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To:	Marty Kelly; Mike Heyl; Ron Basso
Subject:	FW: E-mail 8-31-2011
Date:	Monday, September 26, 2011 8:15:22 AM
Attachments:	SE Fork Real Time Data July12,13,14 2011.xlsx

FYI – I was only copied on this, so I will not be responding to Mr. Johnson.

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Subject: RE: E-mail 8-31-2011

Mr. Rodriguez,
It appears that you are failing to comprehend that when you respond on USDI/USGS letterhead to a specific document stating that your organization (USGS) "strongly refutes....claims" in that document, you had best be specific.

It is your signature on the letter posted on the MFL Working Group web site, not that of your staff.

I trust you will take the time to closely review exactly what you signed and respond accordingly to the specifics in the subject e-mail.

As Background
The purpose of my concerns with discharge data is twofold:

- understand the accuracy of the flow data used in the various studies that predict significant harm e.g. salinity and thermal refuge in the Homosassa River, and

- how SWFWMD will be able to assess when a 5% decline in flow has occurred (assuming 5% is the MFL figure they adopt).

IMHO the harm has already been done, but that is a subject for SWFWMD.

USGS's role (your job) is to supply the discharge measurements to the best of your ability and to be clear about what the accuracy is for the specific gage sites on the Homosassa River. I doubt that you want me to reiterate all the statements that have been made, let me just say there has been inconsistency.

I realize that flow/discharge is complex, but USGS reduced these complexities to simple mathematical equations (algorithms) and has used these for some 10 years. Since 2004 there are some 148 field measurements from the SE Fork (others primarily dating back to 2000 I will request through the official channels for Freedom of Information as these are not supported on the web site), over 30% of these show differences of 15% or more with the calculated discharge. You have the data take a look.

- Is this good enough to make major decisions on? **I for one do not think so.**
- Should these differences have triggered some 24 hour monitoring to assure that all was OK. The tape from the July Working Group Meeting clearly has someone stating that a 24 hour monitoring is needed to get accurate data regarding another Creek, one hour nine minutes into the audio recording as I recall. **I for one think so, particularly as I have stated a number of times the best way to address these concerns is at the local level.**

I am pleased that the ADCP has been installed and appreciate the efforts of those who made it happen sooner rather than later, particularly given the budget restrictions you all have.

On a broader note; I would think that additional focus should be more on the declining levels in the aquifer which are **much easier to monitor accurately** and are much more relevant to the control of groundwater withdrawals, but that is not USGS's concern, and maybe not even SWFWMD's as they are trying to comply with regulations and continue to issue water permits.

In fairness I must add here that SWFWMD in developing their NDM (Northern District Model) consciously ignored data USGS had collected over many years stating something along the lines it was not 'comparable'. I think all these were field measurements that they must have thought less accurate. Ironic.

Who is really concerned about protecting the Outstanding Florida Waters?

I share these comments as background.

I look forward to your considered response to the specific points in the subject e-mail.

Martyn Johnson
P.S.
The attached file is the data I would have used in supporting my comments about the changes in the 15 minute data should anyone have been interested at the July meeting. I shared hard copy (hand hightlights) of this with Doug at the start of the July Meeting, I have added the highlighted colors in the file; lavender >15%, yellow>20%, red>40%). The data was not selected from a host of dates simply the ones just prior to the meeting. Doug had posted this as scanned copy on the Working Group web site but I suggested that it was removed as the stand alone document was of little value. I trust you can see that the percentage changes are from one 15 minute calculated discharge to the next. The changes are not only noteworthy as individual percentage changes but also as some of the trends seen when there are smaller changes from one interval to the next, but that would be adding to the point I was making in my public input statement.

To: martynellijay@hotmail.com
CC: rkane@usgs.gov
Subject: Re: E-mail 8-31-2011
From: rrodrigu@usgs.gov
Date: Mon, 19 Sep 2011 08:32:51 -0400

Mr. Johnson,

I have spoken with my staff and confirmed that your questions have already been answered to the best of our ability through both email correspondence and face-to-face meetings.

Thank you for your interest in USGS data.

****
Rafael W. Rodriguez
Director
USGS Florida Water Science Center
10500 University Center Drive, Suite 215
Tampa, FL 33612
Phone: (813) 498-5024
Cell: (813) 463-3660
Fax: (813) 498-5003
rrodrigu@usgs.gov
http://fl.water.usgs.gov
****

From:	Alan Martyn Johnson <martynellijay@hotmail.com>
To:	<rrodrigu@usgs.gov>
Cc:	rkane <rkane@usgs.gov>, <marty.kelly@swfwmd.state.fl.us>, Doug Leeper <doug.leeper@swfwmd.state.fl.us>, <jdweaver@usgs.gov>
Date:	09/14/2011 01:36 PM
Subject:	E-mail 8-31-2011

Mr. Rodriguez.
I think you have had time to read and think about the e-mail I sent August 31.

I would appreciate your confirming that the statement I made regarding the changes in flow from one 15 minute reported discharge is correct or incorrect.

Additionally, I look forward to you explaning the rationale behind the equation mentioned in the e-mail.

Martyn

From:	Alan Martyn Johnson
To:	J Weaver
Cc:	R Rodriguez; Doug Leeper
Subject:	Letter August 23, 2011from Mr. Rodriguez to Doug Leeper
Date:	Thursday, October 06, 2011 7:49:31 AM

Mr. Weaver,
Both you and Mr. Rodriguez have been mute on my e-mail of August 31, 2011 regarding the subject letter.

I did provided a reminder on September 14, 2011 which again both you and Mr. Rodriguez appear to have chosen to ignore.

While it is possible that you do not read all your e-mail, but have them filtered by someone, please be assured this is the last time I will e-mail you on the matter should you choose to remain silent. However, please understand that your silence will not be the end of the matter.

I frankly find it bad manners for Mr. Rodriguez to write the letter and request that it is posted on SWFWMD's Working Groups web site without having communicated with me directly, or having the courtesy to copy me. Further, for a Federal Government employee to use Federal Government Letterhead to name an individual, and comment judgmentally without specifically addressing the points of difference is very concerning.

Martyn Johnson

From:	Jess D Weaver
To:	Alan Martyn Johnson
Cc:	R Rodriguez; Doug Leeper
Subject:	Re: Letter August 23, 2011from Mr. Rodriguez to Doug Leeper
Date:	Thursday, October 06, 2011 4:35:44 PM

Mr. Johnson,

I received your note of Oct. 6 and wanted to provide a brief response. While I do remember seeing earlier correspondence on this issue, I had hoped it would be resolved at the local level. Based on this follow up email, however, it appears that may not be the case. As such, I wanted to let you know that I'll be looking into this further and will ensure we get back to you with a response to your concerns.

Jess Weaver

Sent from my iPad

On Oct 6, 2011, at 7:50 AM, "Alan Martyn Johnson" <martynellijay@hotmail.com> wrote:

> Mr. Weaver,
> Both you and Mr. Rodriguez have been mute on my e-mail of August 31, 2011 regarding the subject letter.
>
> I did provided a reminder on September 14, 2011 which again both you and Mr. Rodriguez appear to have chosen to ignore.
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>
> Martyn Johnson

Public Input Statement from Martyn Johnson
To
Springs Coast MFL Working Group Meeting October 26, 2011

I am not able to attend the meeting in person, but would appreciate if the following can be read as public input on my behalf.

Two comments/questions.

1. At the September 6 meeting I asked if we all agreed that some deterioration has already occurred in the rivers. No one disagreed. I followed with the question: Do we know for sure why deterioration is happening?
   As we are not sure I suggested that Actions Speak Louder Than Works and that there should be serious consideration given to a 5 year moratorium on any additional well/withdrawals from the aquifer. This would provide time to better understand the situation.
   I would like to know if anyone has given serious thought to the suggestion.

   As background to the numbers of Well Permits and Water Use Permits the following is an extract from a reply sent by SWFWMD early in 2011.

   "Review of the District's Well Construction Database indicates that ***213 and 941 permits were issued for withdrawals in Citrus County during the past year and past three years****, respectively."……"With regard to water-use permitting……* ***Fewer than ten of the hundreds of surface- and groundwater use permit*** *requests received by the Brooksville Regulation Department during the past three years were not issued. Note that this department of the District handles water use permitting for withdrawals in the northern portion of the District, which includes Citrus County, Hernando County, Pasco County, Sumter County, and portions of Lake, Levy and Marion counties."*

2. As some may know the USGS installed the velocity monitoring unit under the bridge on Fishbowl Drive to monitor the stream velocity and discharge from the SE Fork of the Homosassa River.

   Can USGS or SWFWMD provide the panel any information regarding the data collected since operation started. Indications that I can see are that data started to be collected about September 9, 2011.

From:	Alan Martyn Johnson
To:	bwr.crrc@tampabay.rr.com
Cc:	Doug Leeper; Ron Miller; Al Grubman; Norman Hopkins; Dana Bryan; Brent Whitley
Subject:	RE: MFLs Workshop Presentations and Chloride Conc File Posted on Web Site
Date:	Saturday, October 22, 2011 8:48:29 AM
Attachments:	Public Input Statement from Martyn Johnson.doc

Brad,
Thanks for sharing the e-mail that the Agenda has been posted.

Unfortunately, I will not be able to attend the meeting as I have commitments in Atlanta thru the end of next week.

I have attached a word document with a public input statement (also copied below) which I would appreciate being presented on my behalf.
Thanks,
Martyn
P.S. Should be in FL early November.

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From: Doug Leeper
To: Marty Kelly; Mike Heyl; Ron Basso; Paul Williams; Richard Kane (rkane@usgs.gov); Kevin Grimsley (kjgrims@usgs.gov)
Subject: FW: MFLs Workshop Presentations and Chloride Conc File Posted on Web Site
Date: Monday, October 24, 2011 7:37:14 AM
Attachments: Public Input Statement from Martyn Johnson.doc

FYI

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From: Alan Martyn Johnson [mailto:martynellijay@hotmail.com]
Sent: Saturday, October 22, 2011 8:51 AM
To: bwr.crrc@tampabay.rr.com
Cc: Doug Leeper; Ron Miller; Al Grubman; Norman Hopkins; Dana Bryan; Brent Whitley
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From: Richard L Kane
To: Doug Leeper
Cc: Kevin J Grimsley; Richard L Kane
Subject: workshop letters
Date: Monday, October 24, 2011 8:25:31 AM

Hi Doug, got you phone message. Please do not remove the letters from the web site. We are working on a formal letter to Mr. Johnson from head quarters.
In regards to his latest request about the velocity meter at SE Fork. We will address this at the workshop. The velocity meter is in, we collected measurement last week following the storm event. We did note the velocity did go into reversal during the extreme high tide.

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov
(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275

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Cc:	Kevin J Grimsley; Richard L Kane
Subject:	workshop letters
Date:	Monday, October 24, 2011 8:25:31 AM

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