To: 'Anurag Mishra'[Anurag.Mishra@respec.com]; 'Paul, Sabu'[SPaul@mbakerintl.com]
Cc: 'Tony Donigian'[Tony.Donigian@respec.com]; 'Chris Wallen'[cmwallen@dsllc.com]; Shaikh, Taimur[Shaikh.Taimur@epa.gov]
From: Silong Lu
Sent: Thur 3/8/2018 7:49:26 PM
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC
IRW_946_NPS-2005-2006.PLT.xlsx

Anurag,

We revised the TSS concentration calculation based on your comment using daily loading rate divided by daily flow. The plot in the attached file shows that daily TSS concentration output directly from HSPF model (green line) matches the calculated daily TSS concentration calculated from hourly data (red line) reasonably well. However, the daily TSS concentration of the 72% reduction (blue line) has a different pattern and is still higher than that of the calibration, especially for the May 4 and May 10 of 2006 events (see the blue line for the two peak values of ~500-~700 mg/l).

Silong Lu, Ph.D, P.E., D. WRE|Voice: 865-212-3331 Ext 26|Fax: 865-212-3398|Email: slu@dsllc.com|www.dsllc.com

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From: Anurag Mishra [mailto:Anurag.Mishra@respec.com]
Sent: Thursday, March 08, 2018 12:43 PM
To: Paul, Sabu; slu@dsllc.com
Cc: Tony Donigian; 'Chris Wallen'; Shaikh Taimur
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Paul

In the comparison worksheet, I calculated average TSS concentration for the 2005 and 2006 period.

For Calibration time series, it is 4.17 mg/l, for baseline and reduction scenarios it is 4.11mg/l. The max TSS concentration was 451.6 mg/l for calibration time series, and 449.92 for baseline and 72% reduction scenario. Now, we should expect some change from calibration to baseline, as the land use distribution changed from NLCD 2006 to NLCD 2011 from calibration to baseline.

I am still looking at the worksheet that Silong sent and trying to figure out the differences.

~A

ANURAG MISHRA
650.962.1864 office // 650.395.7224 cell

From: Paul, Sabu <SPaul@mbakerintl.com>
Sent: Thursday, March 08, 2018 9:12 AM
To: slu@dsllc.com; Anurag Mishra <Anurag.Mishra@respec.com>
Cc: Tony Donigian <Tony.Donigian@respec.com>; 'Chris Wallen' <cmwallen@dsllc.com>; Shaikh Taimur <Shaikh.Taimur@epa.gov>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Silong/Anurag,
Please find attached a comparison of TSS loads – calibration and baseline results that Silong forwarded (the same results that was sent in 2016)- compared against 72% reduction scenario at 946. It seems that TSS loads for the reduction scenario is higher than the calibration run. But, this is because the baseline TSS loads at 946 are higher than the calibration. The reduction scenario produces the same loads as the baseline. This means, the baseline TSS load for this location is higher than the calibration run and we are not considering any reduction for TSS. If there is a valid reason, like higher point source load for baseline, this should be expected.

Regards,
Sabu.

From: Silong Lu [mailto:slu@dsllc.com]
Sent: Thursday, March 08, 2018 10:49 AM
To: 'Anurag Mishra' <Anurag.Mishra@respec.com>
Cc: 'Tony Donigian' <Tony.Donigian@respec.com>; Paul, Sabu <SPaul@mbakerintl.com>; 'Chris Wallen' <cmwallen@dsllc.com>;

'Shaikh Taimur' <Shaikh.Taimur@epa.gov>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Anurag,

See the attached excel file. There are two sheets in the file. The IRW_946_NPS shoot contains hourly TSS concentration (mg/l) calculation based on the hourly silt and clay loading rates (tons/hr) and flow rate (ft^3/hr). Sand was assumed to settle out quickly without any further transport in the lake. In your UCI file, 10% of the sediment is treated as sand.

In the comparison sheet, you will see a plot showing the daily TSS concentration of the 72% reduction (which, I believe, only accounts for silt and clay concentration and is consistent with our calculation in the IRW_946_NPS sheet) versus the daily TSS concentration of the calibration (average over the hourly data in the IRW_946_NPS sheet) for Subbasin 946. As can be seen, daily TSS concentration of the calibration (red line) is much smaller than that of the 72% reduction (blue line).

Silong Lu, Ph.D, P.E., D. WRE|Voice: 865-212-3331 Ext 26|Fax: 865-212-3398|Email: slu@dsllc.com|www.dsllc.com

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From: Anurag Mishra [mailto:Anurag.Mishra@respec.com]
Sent: Wednesday, March 07, 2018 8:20 PM
To: slu@dsllc.com
Cc: Tony Donigian; 'Paul, Sabu'; 'Chris Wallen'; Shaikh Taimur
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Silong

I looked at the TSS loads and flows that were provided to you in PLTGEN files for subbasin 946. I converted those to TSS concentrations in mg/l, I find that those values are not extremely different than the TSS concentrations for subbasin 946 generated in the scenario that I sent. Please feel free to share your screen tomorrow and then we can go over the details.

Thanks
~A

ANURAG MISHRA
650.962.1864 office // 650.395.7224 cell

From: Anurag Mishra
Sent: Wednesday, March 07, 2018 1:48 PM
To: 'slu@dsllc.com' <slu@dsllc.com>
Cc: Tony Donigian <Tony.Donigian@respec.com>; 'Paul, Sabu' <SPaul@mbakerintl.com>; 'Chris Wallen' <cmwallen@dsllc.com>; Shaikh Taimur <Shaikh.Taimur@epa.gov>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

I am going through the UCI files to check it. I will let you know as soon as I have a definite answer.

ANURAG MISHRA
650.962.1864 office // 650.395.7224 cell

From: Silong Lu <slu@dsllc.com>
Sent: Wednesday, March 07, 2018 1:45 PM
To: Anurag Mishra <Anurag.Mishra@respec.com>
Cc: Tony Donigian <Tony.Donigian@respec.com>; 'Paul, Sabu' <SPaul@mbakerintl.com>; 'Chris Wallen' <cmwallen@dsllc.com>; Shaikh Taimur <Shaikh.Taimur@epa.gov>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Anurag, as discussed over the phone, please let us know if this is just a conversion issue for subbasin 946 in your UCI file. As mentioned, for all the other subbasins we checked, TSS numbers seem fine.

From: Anurag Mishra [mailto:Anurag.Mishra@respec.com]
Sent: Wednesday, March 07, 2018 2:31 PM
To: slu@dsllc.com
Cc: Tony Donigian; 'Paul, Sabu'; 'Chris Wallen'; Shaikh Taimur
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Silong

Could you please email me the PLTGEN file where you are seeing the differences? Best option would be to forward the original email that you received with the PLTGEN data for the calibration model.

Thanks
~A

ANURAG MISHRA
650.962.1864 office // 650.395.7224 cell

From: Silong Lu <slu@dsllc.com>
Sent: Friday, March 02, 2018 1:39 PM
To: Anurag Mishra <Anurag.Mishra@respec.com>
Cc: Tony Donigian <Tony.Donigian@respec.com>; 'Paul, Sabu' <SPaul@mbakerintl.com>; 'Chris Wallen' <cmwallen@dsllc.com>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Hi Anurag,

We randomly checked TSS concentration/loading from different sub-basins and found that the TSS concentration/loading from Subbain 946 is higher than that used in the calibration model and wonder why. TSS concentrations/loadings from the other sub-basins we checked are slightly smaller than those used in the calibration model.

Thanks,

Silong Lu, Ph.D, P.E., D. WRE|Voice: 865-212-3331 Ext 26|Fax: 865-212-3398|Email: slu@dsllc.com|www.dsllc.com

---

From: Paul, Sabu [mailto:SPaul@mbakerintl.com]
Sent: Thursday, March 01, 2018 6:36 PM
To: Chris Wallen (cmwallen@dsllc.com); Silong Lu (slu@dsllc.com)
Cc: Anurag Mishra; Tony Donigian
Subject: FW: EXTERNAL: RE: Reduction scenario results for EFDC

Hi Chris/Silong,
Attached is the HSPF output for the 1st scenario. Please review and let us know if this is good.

Regards,
Sabu.

From: Anurag Mishra [mailto:Anurag.Mishra@respec.com]
Sent: Thursday, March 01, 2018 6:22 PM
To: Tony Donigian <Tony.Donigian@respec.com>; Paul, Sabu <SPaul@mbakerintl.com>; Shaikh Taimur <Shaikh.Taimur@epa.gov>
Subject: Re: EXTERNAL: RE: Reduction scenario results for EFDC

Paul/Taim

Please find the EFDC output for 72percent global reduction.

Thanks

~A

From: Tony Donigian
Sent: Thursday, March 1, 2018 11:53:22 AM
To: Anurag Mishra; Paul, Sabu; Shaikh Taimur
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Taim/Sabu –
I'm wondering if we should show the # of violations/year, and not the cumulative number over the simulation period?
Any thoughts on this? I'm thinking that might be more interesting ... but I'm just an engineer! ☺
Tony

TONY DONIGIAN

650-962-1864 // 650-962-1868 **D** // 650-722-2669 **C**

From: Anurag Mishra
Sent: Thursday, March 01, 2018 11:38 AM
To: Paul, Sabu <SPaul@mbakerintl.com>; Shaikh Taimur <Shaikh.Taimur@epa.gov>
Cc: Tony Donigian <Tony.Donigian@respec.com>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Sabu and Taim

I updated the number of violations in the table below and added the 72% global reduction scenario as well. The GeoMean were rounded to three decimal places before a violation was calculated.

I will send EFDC results later by COB today.

Thanks
~A

		max(30-day GeoMean) for TP Concentration [Standard is 0.0											
DSN ID	**Location**	**Location Name**	**State**	**Baseline (Sim0)**	**Number of Violations**	**Percent Violations**	**69% Global Reduction (Sim1)**	**Number of Violations**	**Percent Violations**	**72% Global Reduction**	**Number of Violations**	**Percent Violations**	**75% Global Reduction**
6320	630	Illinois River at State Line	AR	0.119	6521	99.6	0.040	13	0.2	0.037	0.0	0.0	0.034
9635	635		OK	0.119	6521	99.6	0.040	12	0.2	0.037	0.0	0.0	0.034
9637	637		OK	0.121	6500	99.3	0.041	8	0.1	0.038	1.0	0.0	0.035
6420	640		OK	0.121	6503	99.3	0.041	8	0.1	0.038	2.0	0.0	0.035
9650	650		OK	0.123	6499	99.3	0.042	9	0.1	0.039	3.0	0.0	0.036
9660	660		OK	0.129	6514	99.5	0.045	42	0.6	0.042	8.0	0.1	0.039

9670	670		OK	0.133	6505	99.4	0.047	60	0.9	0.043	16.0	0.2	0.040
9800	800		OK	0.144	6535	99.8	0.050	144	2.2	0.047	56.0	0.9	0.043
9810	810		OK	0.145	6535	99.8	0.051	145	2.2	0.047	56.0	0.9	0.043
9820	820		OK	0.146	6535	99.8	0.051	142	2.2	0.047	56.0	0.9	0.044
9830	830		OK	0.147	6535	99.8	0.052	161	2.5	0.049	65.0	1.0	0.045
9840	840		OK	0.150	6534	99.8	0.053	168	2.6	0.049	70.0	1.1	0.046
9850	850		OK	0.153	6534	99.8	0.055	184	2.8	0.051	88.0	1.3	0.047
9860	860		OK	0.159	6538	99.9	0.060	369	5.6	0.056	193.0	2.9	0.052
8690	870	Illinois River at Tahlequah	OK	0.165	6538	99.9	0.062	394	6.0	0.058	224.0	3.4	0.054
9880	880		OK	0.170	6539	99.9	0.064	463	7.1	0.060	285.0	4.4	0.056
9890	890		OK	0.174	6539	99.9	0.066	554	8.5	0.062	338.0	5.2	0.058

ANURAG MISHRA
650.962.1864 office // 650.395.7224 cell

From: Paul, Sabu [mailto:SPaul@mbakerintl.com]
Sent: Thursday, March 01, 2018 11:15 AM
To: Anurag Mishra <Anurag.Mishra@respec.com>
Cc: Tony Donigian <Tony.Donigian@respec.com>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Anurag,
Can you export the results corresponding to 72% for EFDC?

Regards,
Sabu.

From: Shaikh, Taimur [mailto:Shaikh.Taimur@epa.gov]
Sent: Thursday, March 01, 2018 1:29 PM
To: Anurag Mishra <Anurag.Mishra@respec.com>; Paul, Sabu <SPaul@mbakerintl.com>
Cc: Tony Donigian <Tony.Donigian@respec.com>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

72% it is.

Thanks Anurag.

Taim.

Taimur A. Shaikh, Ph.D.
Assessment, Listing, and TMDL Section (6WQ-PT)
Water Division | EPA Region 6

From: Anurag Mishra [mailto:Anurag.Mishra@respec.com]
Sent: Wednesday, February 28, 2018 11:54 PM
To: Paul, Sabu <SPaul@mbakerintl.com>; Shaikh, Taimur <Shaikh.Taimur@epa.gov>
Cc: Tony Donigian <Tony.Donigian@respec.com>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

With 72% Global Reduction, the max of 30-day Geomean at state line is 0.0373mg/L.
With 73% Global Reduction, the max of 30-day Geomean at state line is 0.0363mg/L.

Depending upon the number of significant digits we are looking at, we can select 72 or 73% Global Reduction.

~A

ANURAG MISHRA
650.962.1864 office // 650.395.7224 cell

From: Paul, Sabu [mailto:SPaul@mbakerintl.com]
Sent: Wednesday, February 28, 2018 7:33 AM
To: Anurag Mishra <Anurag.Mishra@respec.com>; Shaikh Taimur <Shaikh.Taimur@epa.gov>
Cc: Tony Donigian <Tony.Donigian@respec.com>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Anurag,
Thanks for sending these files. I am guessing we are running these with the 2015 point sources. Should we run the model with point sources at their permit level with design flow? Do you know how they compare – I mean the 2015 load and flow versus the permit/design flow?

Regards,
Sabu.

From: Anurag Mishra [mailto:Anurag.Mishra@respec.com]
Sent: Tuesday, February 27, 2018 6:56 PM
To: Paul, Sabu <SPaul@mbakerintl.com>; Shaikh Taimur <Shaikh.Taimur@epa.gov>
Cc: Tony Donigian <Tony.Donigian@respec.com>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Sabu

The EFDC output for the two scenarios is attached. Both folders have respective UCI files in them as well.

Thanks
~A

ANURAG MISHRA
650.962.1864 office // 650.395.7224 cell

From: Paul, Sabu [mailto:SPaul@mbakerintl.com]
Sent: Tuesday, February 27, 2018 1:12 PM
To: Anurag Mishra <Anurag.Mishra@respec.com>; Shaikh Taimur <Shaikh.Taimur@epa.gov>
Cc: Tony Donigian <Tony.Donigian@respec.com>
Subject: RE: EXTERNAL: RE: Reduction scenario results for EFDC

Anurag,

Please go ahead and generate the results for 75/99 scenario also.

Regards,
Sabu.

From: Anurag Mishra [mailto:Anurag.Mishra@respec.com]
Sent: Tuesday, February 27, 2018 3:42 PM
To: Paul, Sabu <SPaul@mbakerintl.com>; Shaikh Taimur <Shaikh.Taimur@epa.gov>
Cc: Tony Donigian <Tony.Donigian@respec.com>
Subject: EXTERNAL: RE: Reduction scenario results for EFDC

Sabu/Taim/Tony

I updated the table with the violation frequency for the baseline values as well.

Sabu, I generated the EFDC results for the scenario with 75% global reductions. Tony will QA/QC that run and I will send it to you after that.

Thanks
~A

		max(30-day GeoMean) for TP Concentration [Standard is 0.037 mg/l]											
DSN ID	**Location**	**Location Name**	**State**	**Baseline (Sim0)**	**Frequency of Violations**	**Percent Violations**	**69% Global Reduction (Sim1)**	**Frequency of Violations**	**Percent Violations**	**75% Global Reduction**	**Frequency of Violations**	**Percent Violations**	**75% AR Reduction and 90% OK Reduction)**
6320	630	Illinois River at State Line	AR	0.119	6527	99.7	0.040	17	0.3	0.034	0	0.0	0.034
9635	635		OK	0.119	6527	99.7	0.040	17	0.3	0.034	0	0.0	0.034
9637	637		OK	0.121	6510	99.5	0.041	13	0.2	0.035	0	0.0	0.035
6420	640		OK	0.121	6518	99.6	0.041	17	0.3	0.035	0	0.0	0.035
9650	650		OK	0.123	6513	99.5	0.042	19	0.3	0.036	0	0.0	0.035
9660	660		OK	0.129	6521	99.6	0.045	59	0.9	0.039	3	0.0	0.037
9670	670		OK	0.133	6518	99.6	0.047	70	1.1	0.040	5	0.1	0.038
9800	800		OK	0.144	6536	99.8	0.050	166	2.5	0.043	16	0.2	0.039
9810	810		OK	0.145	6536	99.8	0.051	165	2.5	0.043	20	0.3	0.039
9820	820		OK	0.146	6535	99.8	0.051	165	2.5	0.044	22	0.3	0.039
9830	830		OK	0.147	6536	99.8	0.052	188	2.9	0.045	31	0.5	0.040

9840	840		OK	0.150	6536	99.8	0.053	185	2.8	0.046	36	0.5	0.040
9850	850		OK	0.153	6536	99.8	0.055	233	3.6	0.047	48	0.7	0.041
9860	860		OK	0.159	6540	99.9	0.060	406	6.2	0.052	115	1.8	0.046
8690	870	Illinois River at Tahlequah	OK	0.165	6539	99.9	0.062	429	6.6	0.054	134	2.0	0.047
9880	880		OK	0.170	6540	99.9	0.064	502	7.7	0.056	165	2.5	0.049
9890	890		OK	0.174	6541	99.9	0.066	607	9.3	0.058	186	2.8	0.049

ANURAG MISHRA
650.962.1864 office // 650.395.7224 cell

From: Anurag Mishra
Sent: Monday, February 26, 2018 3:59 PM
To: 'Paul, Sabu' <SPaul@mbakerintl.com>; 'Shaikh Taimur' <Shaikh.Taimur@epa.gov>
Cc: Tony Donigian <Tony.Donigian@respec.com>
Subject: RE: Reduction scenario results for EFDC

Sabu

I will apply the 75% Global Reduction and generate the output. In the meanwhile, please find the Scenario Comparisons with the frequency of violations as you requested last week. Let me know if you need me to send the whole workbook.

Thanks
~A

		max(30-day GeoMean) for TP Concentration [Standard is 0.037 mg/l]											
DSN ID	**Location**	**Location Name**	**State**	**Baseline (Sim0)**	**69% Global Reduction (Sim1)**	**Frequency of Violations**	**Percent Violations**	**75% Global Reduction**	**Frequency of Violations**	**Percent Violations**	**75% AR Reduction and 90% OK Reduction)**	**Frequency of Violations**	**Percent Violations**
6320	630	Illinois River at State Line	AR	0.119	0.040	17	0.3	0.034	0	0.0	0.034	0	0.0
9635	635		OK	0.119	0.040	17	0.3	0.034	0	0.0	0.034	0	0.0
9637	637		OK	0.121	0.041	13	0.2	0.035	0	0.0	0.035	0	0.0
6420	640		OK	0.121	0.041	17	0.3	0.035	0	0.0	0.035	0	0.0
9650	650		OK	0.123	0.042	19	0.3	0.036	0	0.0	0.035	0	0.0
9660	660		OK	0.129	0.045	59	0.9	0.039	3	0.0	0.037	1	0.0

9670	670		OK	0.133	0.047	70	1.1	0.040	5	0.1	0.038	2	0.0
9800	800		OK	0.144	0.050	166	2.5	0.043	16	0.2	0.039	3	0.0
9810	810		OK	0.145	0.051	165	2.5	0.043	20	0.3	0.039	3	0.0
9820	820		OK	0.146	0.051	165	2.5	0.044	22	0.3	0.039	3	0.0
9830	830		OK	0.147	0.052	188	2.9	0.045	31	0.5	0.040	4	0.1
9840	840		OK	0.150	0.053	185	2.8	0.046	36	0.5	0.040	4	0.1
9850	850		OK	0.153	0.055	233	3.6	0.047	48	0.7	0.041	4	0.1
9860	860		OK	0.159	0.060	406	6.2	0.052	115	1.8	0.046	32	0.5
8690	870	Illinois River at Tahlequah	OK	0.165	0.062	429	6.6	0.054	134	2.0	0.047	45	0.7
9880	880		OK	0.170	0.064	502	7.7	0.056	165	2.5	0.049	62	0.9
9890	890		OK	0.174	0.066	607	9.3	0.058	186	2.8	0.049	71	1.1

ANURAG MISHRA
650.962.1864 office // 650.395.7224 cell

From: Paul, Sabu [mailto:SPaul@mbakerintl.com]
Sent: Monday, February 26, 2018 6:56 AM
To: Anurag Mishra <Anurag.Mishra@respec.com>
Cc: Tony Donigian <Tony.Donigian@respec.com>
Subject: Reduction scenario results for EFDC

Hi Anurag,

Please export the HSPF results for EFDC model corresponding to Scenario 4 (75% reduction) meeting the standards at the Stateline. Let me know when it is ready.

Regards,
Sabu.

Sabu Paul, Ph.D, P.E., PMP

Senior Technical Manager
Michael Baker International
9400 Innovation Drive, Suite 110 | Manassas, VA
[O] 703-334-4917 | [M] 571-606-3705
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