CE-QUAL-W2 MODEL OUTPUTS
OVERVIEW

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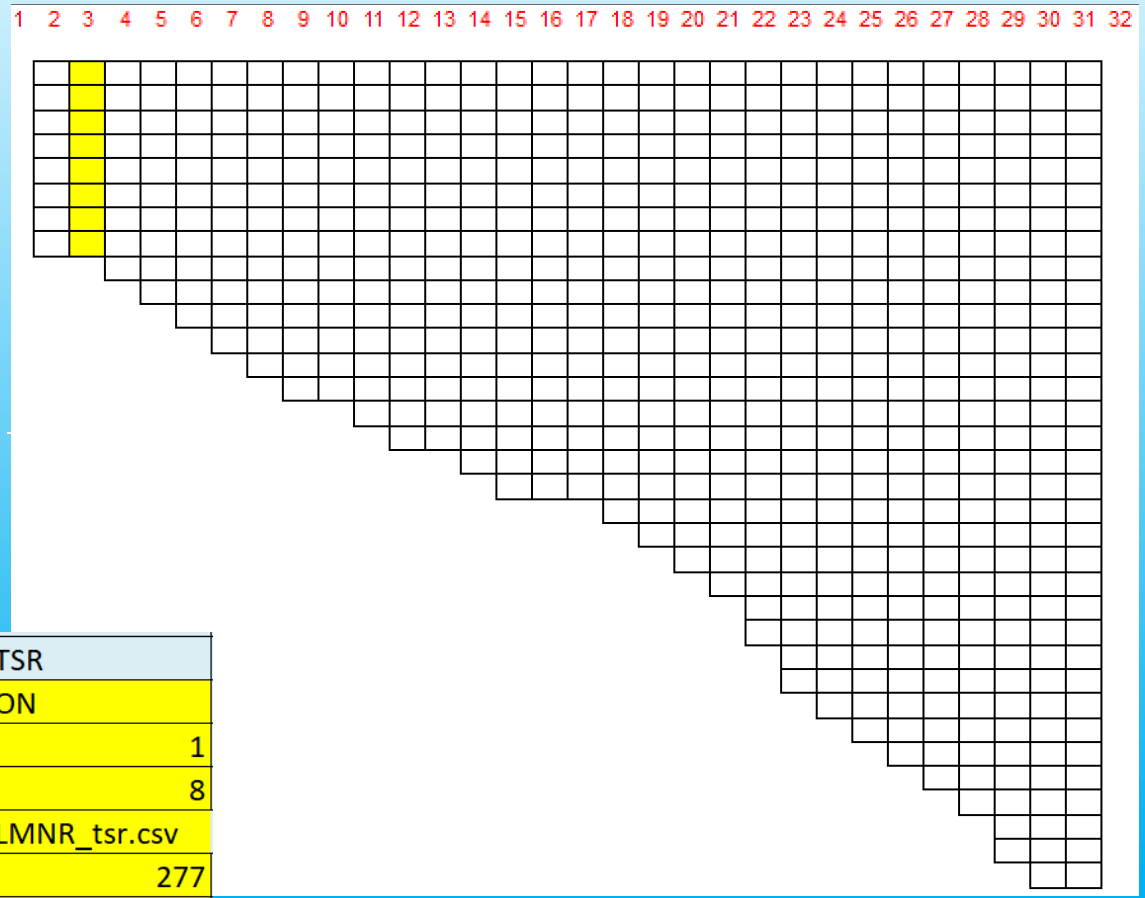
Outline

1. Model outputs
   - Time series plot output
   - Spreadsheet profile output
   - Water quality kinetic flux output
   - Withdrawal outflow
   - Water level output
   - Flow balance output
   - N and P mass balance output
   - DSI W2Linkage File
   - RESTART
2. Model (w2_v45_64.exe) outputs
   - w2.wrn
   - W2.err
   - W2ErrorDump.csv
3. Preprocessor (preW2-v45_64.exe) outputs
   - pre.opt
   - pre.wrn
   - pre.err

TSR Plot – Time Series Output Plot

A time series output file (csv) at a user specified segment for

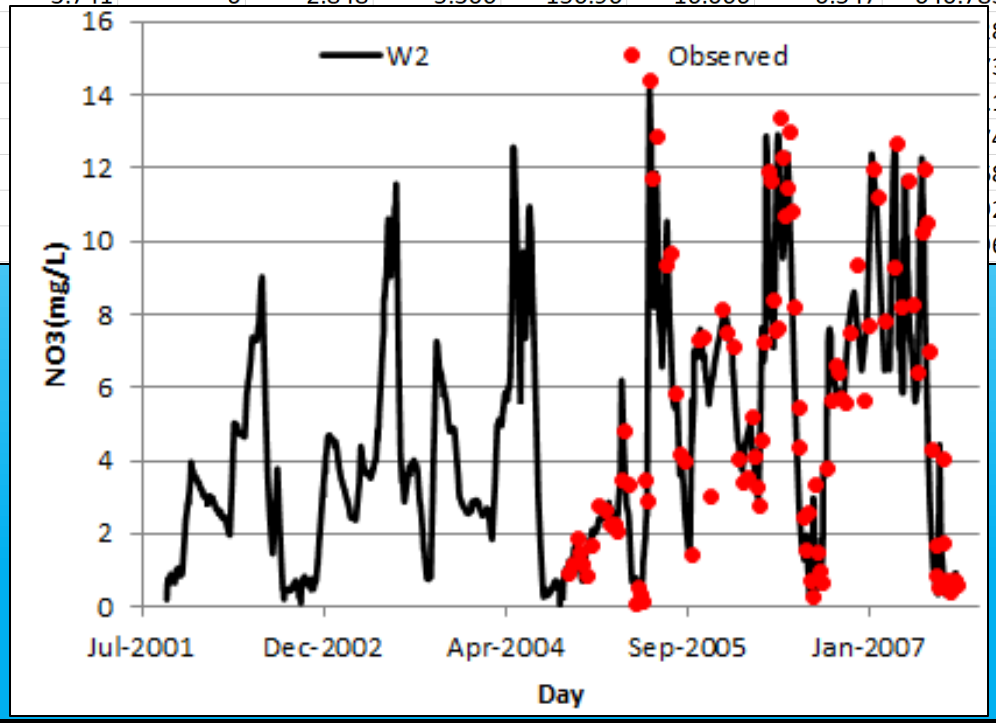
- Flow
- Temperature
- Active constituent concentrations
- Derived constituent concentrations
- Instantaneous kinetic flux rates (kg/d)
- Instantaneous algae growth rate limitation fractions for P, N, and light [0 to 1] for each algal group.



TSR PLOT- time series plot output	TSR
TSRC- time series ON or OFF	ON
NTSR- # of time series dates	1
NITSR- # of locations for the time series output	8
TSR FILE TSRFN time series output file name prefix and	LMNR_tsr.csv
TSR DATE- TSRD(NTSR)- start date of output in Julian d	277
TSR FREQ- TSRF(NTSR)- frequency of output in days	0.1
TSR SEG- ITSR(NITSR)- segment number of time series	2
TSR LAYER- ETSR(NITSR)- depth or layer# of time series	0

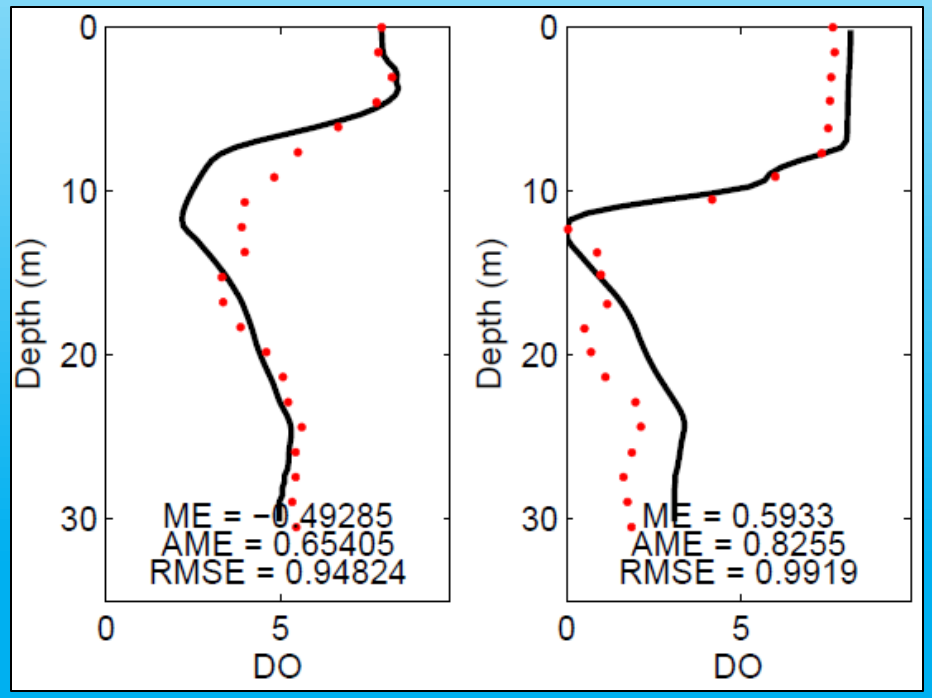
TSR Plot – Time Series Output Plot

	JDAY	DLT(s)	ELWS(m)	T2(C)	U(ms-1)	Q(m3s-1)	SRON(Wm-	EXT(m-1)	DEPTH(m)	WIDTH(m)	Tvolavg(C)	Reaeration	TDS	ISS1	PO4	NH4	NO3	DSI
2	277	75	209.374	16.266	0.044	18.506	0	3.079	5.282	156.96	16.234	0.549	620.068	18.794	0.013	0.039	0.371	21.425
3	277.101	75	209.384	16.174	0.048	19.897	0	3.039	5.292	156.96	16.146	0.548	620.879	18.656	0.014	0.047	0.388	21.402
4	277.2	75	209.382	16.085	0.057	23.962	0	3.001	5.289	156.96	16.06	0.547	622.43	18.512	0.015	0.053	0.409	21.392
5	277.3	75	209.377	16.021	0.05	20.845	22.561	2.967	5.284	156.96	15.999	0.546	626.003	18.36	0.017	0.057	0.447	21.394
6	277.401	75	209.374	16.022	0.032	13.211	158.51	2.951	5.281	156.96	16	0.546	629.827	18.199	0.017	0.055	0.489	21.373
7	277.5	75	209.388	16.03	0.03	12.439	131.435	2.943	5.295	156.96	16.008	0.546	631.623	18.066	0.018	0.051	0.51	21.341
8	277.601	75	209.395	16.041	0.053	22.282	137.884	2.934	5.302	156.96	16.018	0.546	633.057	17.932	0.018	0.047	0.529	21.298
9	277.7	75	209.362	16.136	0.075	31.3	33.471	2.888	5.269	156.96	16.11	0.547	638.376	17.712	0.02	0.048	0.602	21.221
10	277.8	75	209.399	16.09	0.009	3.741	0	2.848	5.306	156.96	16.066	0.547	640.783	17.58	0.022	0.053	0.625	21.212
11	277.901	75	209.37	16.048	0.089								8	17.432	0.023	0.06	0.648	21.2
12	278	75	209.373	16.014	0.049								3	17.286	0.024	0.067	0.687	21.188
13	278.101	75	209.352	15.959	0.059								1	17.176	0.026	0.071	0.732	21.174
14	278.2	75	209.352	15.856	0.035								4	17.079	0.027	0.075	0.77	21.163
15	278.3	75	209.364	15.714	0.038								8	16.982	0.027	0.078	0.793	21.147
16	278.401	75	209.343	15.658	0.05								2	16.932	0.027	0.075	0.837	21.108
17	278.5	75	209.345	15.73	0.04								6	16.775	0.027	0.061	0.863	21.052



SPR Plot – Spreadsheet Output

A spreadsheet profile output file (**spr.csv**) consists of variable name, Julian date, depth below water surface, elevation, and temperature and/or concentrations for the output segment.



1	Constituent	Julian_day	Depth	Elevation	Seg_2	Elevation	Seg_3
2	Temperature	40544	0.115	23.75	4.5	23.671	4.5
3	Temperature	40544	0.354	23.381	4.5	23.381	4.5
4	Temperature	40544	0.604	23.131	4.5	23.131	4.5
5	Temperature	40544	0.854	22.881	4.5	22.881	4.5
6	Temperature	40544	1.104	22.631	4.5	22.631	4.5
7	Temperature	40544	1.479	22.256	4.5	22.256	4.5
8	Temperature	40544	1.979	21.756	4.5	21.756	4.5
9	Temperature	40544	2.479	21.256	4.5	21.256	4.5
10	Temperature	40544	2.979	20.756	4.5	20.756	4.5
11	Temperature	40544	3.479	20.256	4.5	20.256	4.5
12	Temperature	40544	3.979	19.756	4.5	19.756	4.5
13	Temperature	40544	4.479	19.256	4.5	19.256	4.5

SPR PLOT - spreadsheet output	SPR
SPRC- Specifies if information is written to the spreads	ON
NSPR- # of dates	1
NISPR- # of segments	86
SPR DATE- SPRD(NSPR) - starting date of output in Juli	275
SPR FREQ- SPRF(NSPR) - output frequency- days	0.2
SPR SEG- ISPR(NISPR) - segment # of spreadsheet outp	2

Fluxes – Water Quality Kinetic Flux Output

	CST FLUX - Turn on fluxes in each waterbody,	KFNAME2	CFWBC1	CFWBC2	CFWBC3	CFWBC4	CFWBC5
1	TISS settling in - source, kg/day	TISSIN	OFF	OFF	OFF	OFF	OFF
2	TISS settling out - sink, kg/day	TISSOUT	OFF	OFF	OFF	OFF	OFF
3	PO4 algal respiration - source, kg/day	PO4AR	OFF	OFF	OFF	OFF	ON
4	PO4 algal growth - sink, kg/day	PO4AG	OFF	OFF	OFF	OFF	ON
5	PO4 algal net- source/sink, kg/day	PO4AP	OFF	OFF	OFF	OFF	ON
6	PO4 epiphyton respiration - source, kg/day	PO4ER	OFF	OFF	OFF	OFF	ON
7	PO4 epiphyton growth - sink, kg/day	PO4EG	OFF	OFF	OFF	OFF	ON
8	PO4 epiphyton net- source/sink, kg/day	PO4EP	OFF	OFF	OFF	OFF	ON
9	PO4 POM decay - source, kg/day	PO4POM	OFF	OFF	OFF	OFF	ON
10	PO4 DOM decay - source, kg/day	PO4DOM	OFF	OFF	OFF	OFF	ON
11	PO4 OM decay - source, kg/day	PO4OM	OFF	OFF	OFF	OFF	ON
12	PO4 sediment decay - source, kg/day	PO4SED	OFF	OFF	OFF	OFF	ON
13	PO4 SOD release - source, kg/day	PO4SOD	OFF	OFF	OFF	OFF	ON
14	PO4 net settling - source/sink, kg/day	PO4SET	OFF	OFF	OFF	OFF	ON
15	NH4 nitrification - sink, kg/day	NH4NITR	OFF	OFF	OFF	OFF	OFF
16	NH4 algal respiration - source, kg/day	NH4AR	OFF	OFF	OFF	OFF	OFF
17	NH4 algal growth - sink, kg/day	NH4AG	OFF	OFF	OFF	OFF	OFF
18	NH4 algal net - source/sink, kg/day	NH4AP	OFF	OFF	OFF	OFF	OFF
19	NH4 epiphyton respiration - source, kg/day	NH4ER	OFF	OFF	OFF	OFF	OFF
20	NH4 epiphyton growth - sink, kg/day	NH4EG	OFF	OFF	OFF	OFF	OFF
21	NH4 epiphyton net - source/sink, kg/day	NH4EP	OFF	OFF	OFF	OFF	OFF
22	NH4 POM decay - source, kg/day	NH4POM	OFF	OFF	OFF	OFF	OFF
23	NH4 DOM decay - source, kg/day	NH4DOM	OFF	OFF	OFF	OFF	OFF
24	NH4 OM decay - source, kg/day	NH4OM	OFF	OFF	OFF	OFF	OFF
25	NH4 sediment decay - source, kg/day	NH4SED	OFF	OFF	OFF	OFF	OFF
26	NH4 SOD release - source, kg/day	NH4SOD	OFF	OFF	OFF	OFF	OFF
27	NH3 gas loss - sink, kg/day	NH3GAS	OFF	OFF	OFF	OFF	OFF
28	NO3 denitrification - sink, kg/day	NO3DEN	OFF	OFF	OFF	OFF	OFF
29	NO3 algal growth - sink, kg/day	NO3AG	OFF	OFF	OFF	OFF	OFF
30	NO3 epiphyton growth - sink, kg/day	NO3EG	OFF	OFF	OFF	OFF	OFF
31	NO3 sediment uptake - sink, kg/day	NO3SED	OFF	OFF	OFF	OFF	OFF
32	DSi algal growth - sink, kg/day	DSIAG	OFF	OFF	OFF	OFF	OFF
33	DSi epiphyton growth - sink, kg/day	DSIEG	OFF	OFF	OFF	OFF	OFF
34	DSi PBSi decay - source, kg/day	DSIPIS	OFF	OFF	OFF	OFF	OFF
35	DSi sediment decay - source, kg/day	DSISED	OFF	OFF	OFF	OFF	OFF
36	DSi SOD release - source, kg/day	DSISOD	OFF	OFF	OFF	OFF	OFF
37	DSi net settling - source/sink, kg/day	DSISET	OFF	OFF	OFF	OFF	OFF
38	PBSi algal mortality - source, kg/day	PSIAM	OFF	OFF	OFF	OFF	OFF
39	PBSi net settling - source/sink, kg/day	PSINET	OFF	OFF	OFF	OFF	OFF
40	PBSi decay - sink, kg/day	PSIDK	OFF	OFF	OFF	OFF	OFF
41	LDOM decay - sink, kg/day	LDOMDK	OFF	OFF	OFF	OFF	OFF
42	LDOM decay to RDOM - sink, kg/day	LRDOM	OFF	OFF	OFF	OFF	OFF
43	RDOM decay - sink, kg/day	RDOMDK	OFF	OFF	OFF	OFF	OFF
44	LDOM algal mortality - source, kg/day	LDOMAP	OFF	OFF	OFF	OFF	OFF
45	LDOM epiphyton mortality - source, kg/day	LDOMEP	OFF	OFF	OFF	OFF	OFF
46	LPOM decay - sink, kg/day	LPOMDK	OFF	OFF	OFF	OFF	OFF
47	LPOM decay to RPOM - sink, kg/day	LRPOM	OFF	OFF	OFF	OFF	OFF
48	RPOM decay - sink, kg/day	RPOMDK	OFF	OFF	OFF	OFF	OFF
49	LPOM algal production - source, kg/day	LPOMAP	OFF	OFF	OFF	OFF	OFF
50	LPOM epiphyton production - source, kg/day	LPOMEP	OFF	OFF	OFF	OFF	OFF
51	LPOM net settling - source/sink, kg/day	LPOMSET	OFF	OFF	OFF	OFF	OFF
52	RPOM net settling - source/sink, kg/day	RPOMSET	OFF	OFF	OFF	OFF	OFF
53	CBOD decay - sink, kg/day	CBODDK	OFF	OFF	OFF	OFF	OFF
54	DO algal production - source, kg/day	DOAP	OFF	OFF	OFF	OFF	OFF
55	DO algal respiration - sink, kg/day	DOAR	OFF	OFF	OFF	OFF	OFF
56	DO epiphyton production - source, kg/day	DOEP	OFF	OFF	OFF	OFF	OFF
57	DO epiphyton respiration - sink, kg/day	DOER	OFF	OFF	OFF	OFF	OFF
58	DO POM decay - sink, kg/day	DOPOM	OFF	OFF	OFF	OFF	OFF
59	DO DOM decay - sink, kg/day	DODOM	OFF	OFF	OFF	OFF	OFF
60	DO OM decay - sink, kg/day	DOOM	OFF	OFF	OFF	OFF	OFF
61	DO nitrification - sink, kg/day	DONITR	OFF	OFF	OFF	OFF	OFF
62	DO CBOD uptake - sink, kg/day	DOCBOD	OFF	OFF	OFF	OFF	OFF
63	DO reaeration - source/sink, kg/day	DOREAR	OFF	OFF	OFF	OFF	OFF
64	DO sediment uptake - sink, kg/day	DOSED	OFF	OFF	OFF	OFF	OFF
65	DO SOD uptake - sink, kg/day	DOSOD	OFF	OFF	OFF	OFF	OFF
66	TIC algal uptake - sink, kg/day	TICAG	OFF	OFF	OFF	OFF	OFF
67	TIC epiphyton uptake - sink, kg/day	TICEG	OFF	OFF	OFF	OFF	OFF
68	Sediment decay - sink, kg/day	SEDDK	OFF	OFF	OFF	OFF	OFF
69	Sediment algal settling - sink, kg/day	SEDAS	OFF	OFF	OFF	OFF	OFF

FLUXES- water quality kinetic flux output	FLUX
FLXC Specifies if information is sent to the kinetic flux	ON
NFLX Number of kinetic flux dates	1
FLX DATE- FLXD(NFLX)- starting date of output in Julian	275
FLX FREQ- FLXF(NFLX)- output frequency days	30

Kflux-wb: kflux_wb#.opt

Kflux-wb output option writes individual mass fluxes, sequentially, in **2-dimensional blocks** of data for each time interval for active segments and layers

```
New date    275.000   October 1, 2000   Julian Date = 275 days .00 hours           LPOM decay - sink, kg/day

            2         3         4         5         6         7         8         9         10        11        12        13        14        15        16
 92 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
 93 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
 94 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
 95 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
 96 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
 97 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
 98           0.000E+00 0.000E+00 0.000E+00           0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
 99                     0.000E+00 0.000E+00           0.000E+00 0.000E+00 0.000E+00                     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
 **                              0.000E+00           0.000E+00 0.000E+00                                         0.000E+00 0.000E+00 0.000E+00 0.000E+00
 **                                                            0.000E+00                                         0.000E+00           0.000E+00 0.000E+00
 **                                                            0.000E+00                                                             0.000E+00 0.000E+00
 **                                                                                                                                  0.000E+00 0.000E+00
 **                                                                                                                                  0.000E+00
 **                                                                                                                                  0.000E+00
 **                                                                                                                                  0.000E+00
 **                                                                                                                                  0.000E+00
 **                                                                                                                                  0.000E+00
 **

New date    275.000   October 1, 2000   Julian Date = 275 days .00 hours           LPOM decay to RPOM - sink, kg/day

            2         3         4         5         6         7         8         9         10        11        12        13        14        15        16
```

Waterbody Flux Output: flx_wb#.csv

flx_wb output files include the waterbody-specific detailed mass balances for water quality constituent fluxes at the same level of temporal detail as CPL output.

1	JDAY	ELTM	LPOMDK (kg/d)	LRPOM (kg/d)	RPOMDK (kg/d)	CBODDK (kg/d)	DOSOD (kg/d)
2	275	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	305	30	7.09E+02	8.86E+01	4.10E+01	0.00E+00	9.81E+03
4	335	30	1.68E+02	2.10E+01	8.34E+00	0.00E+00	2.06E+03
5	365	30	1.05E+01	1.31E+00	6.96E-01	0.00E+00	3.55E-02
6	395	30	9.67E+00	1.21E+00	6.61E-01	0.00E+00	7.33E-02
7	425	30	9.75E+00	1.22E+00	6.97E-01	0.00E+00	1.99E-01
8	455	30	2.94E+01	3.67E+00	2.07E+00	0.00E+00	8.95E-01
9	485	30	4.56E+04	5.69E+03	3.35E+03	0.00E+00	9.66E+04

Withdrawal Output – WITH OUTPUT

QWO/TWO/CWO/DWO withdrawal output files include discharge/ temperature/ concentration/ derived concentration of selected segments or at hydraulic structure segments

qwo_#.csv

1	$Flow file for segment 76		
2	To the right of the sum of flows ar		
3	JDAY	QWD(m3s-1)	
4	40544	4593.171	4583.29
5	40544.04	4631.957	4621.74
6	40544.08	4672.085	4661.52
7	40544.13	4711.418	4700.511
8	40544.17	4750.647	4739.4
9	40544.21	4790.916	4779.319
10	40544.25	4829.71	4817.777
11	40544.29	4869.571	4857.292
12	40544.33	4909.746	4897.119
13	40544.38	4948.528	4935.563
14	40544.42	4989.119	4975.802
15	40544.46	5028.577	5014.918

two_#.csv

1	$Temperature file for segment 76		
2	To the right of the sum of tempera		
3	JDAY	T(C)	
4	40817	4.5	4.5
5	40818	5.51	5.51
6	40819	6.24	6.24

WITH OUTPUT- withdrawal output	WDO
WDOC- withdrawal output ON or OFF	ON
NWDO- # of withdrawal output dates	1
NIWDO- # of withdrawal output segments	1
WDO FILE WDOFN withdrawal output file name prefix	wdo.csv
WITH DAT- WDOD(NWDO)- start date of output in Julia	1
WITH FREQ- WDOF(NWDO)- frequency of output days	0.0416666
WITH SEG- IWDO(NIWDO)- segment number of withdr	76

cwo_#.csv

1	$Concentration file for segment 76		
2			
3	JDAY	N2	DO
4	40817	19.8442	12.0836
5	40818	19.8267	12.0856
6	40819	19.7283	12.0289

dwo_#.csv

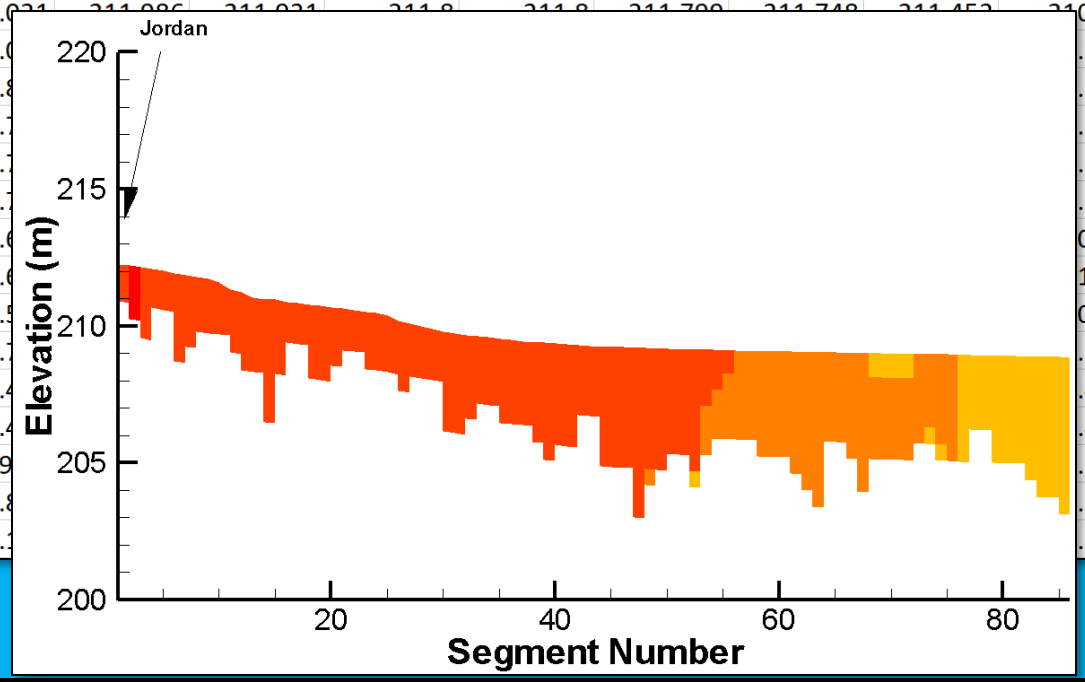
1	Derived constituent file for segme		
2			
3	JDAY	%DO	TDG
4	40544	92.6543	93.8272
5	40544.04	92.6162	93.7961
6	40544.08	92.5794	93.7695
7	40544.13	92.5415	93.7362
8	40544.17	92.3995	93.5974
9	40544.21	92.3549	93.5508
10	40544.25	92.2091	93.4108
11	40544.29	92.1608	93.3631
12	40544.33	92.1148	93.3268
13	40544.38	91.9782	93.1958
14	40544.42	91.9581	93.178
15	40544.46	91.9608	93.194

Water Level Output

wl.csv

Water level output	WLEVEL
WLC- time series of water levels ON or OFF at all segme	ON
WL FREQ- WLF- frequency of output in days	14

	JDAY	SEG 2	SEG 3	SEG 4	SEG 5	SEG 6	SEG 7	SEG 8	SEG 9	SEG 10	SEG 11	SEG 12	SEG 13	SEG 14	SEG 15	SEG 16	SEG 17
2	275	214.646	214.602	214.543	214.444	214.303	214.229	214.152	214.103	214.055	214.023	213.974	213.888	213.811	213.766	213.727	213.645
3	289	211.507	211.505	211.457	211.42	211.378	211.33	211.333	211.343	211.316	210.978	210.279	209.82	209.747	209.745	209.785	209.803
4	303	211.506	211.511	211.47	211.439	211.398	211.349	211.355	211.365	211.338	211.002	210.309	209.911	209.806	209.803	209.842	209.858
5	317	212.058	212.05	212.0								0.95	210.747	210.54	210.518	210.55	210.537
6	331	212.061	212.053	212.0								.953	210.75	210.541	210.519	210.552	210.538
7	345	211.837	211.829	211.8								.695	210.408	210.322	210.318	210.356	210.359
8	359	211.761	211.753	211.7								.601	210.267	210.186	210.184	210.223	210.235
9	373	211.76	211.752	211.7								.599	210.263	210.182	210.181	210.22	210.232
10	387	211.723	211.732	211.7								.605	210.274	210.191	210.186	210.223	210.231
11	401	211.682	211.692	211.6								0.42	210.037	209.913	209.905	209.945	209.954
12	415	211.665	211.674	211.6								10.4	210.011	209.89	209.883	209.922	209.933
13	429	211.568	211.573	211.5								0.36	209.965	209.848	209.842	209.882	209.895
14	443	211.8	211.808	211.7								.653	210.215	210.073	210.059	210.098	210.097
15	457	213.468	213.48	213.4								.498	212.205	211.863	211.788	211.804	211.701
16	471	219.497	219.479	219.4								.434	218.354	218.251	218.027	217.846	217.718
17	485	219.63	219.613	219								.506	218.424	218.32	218.103	217.933	217.829
18	499	216.92	216.926	216.8								.262	216.166	216.023	215.943	215.911	215.863
19	513	216.196	216.19	216.1								.518	215.421	215.259	215.167	215.136	215.074



Flow Balance Output: flowbal.csv

flowbal output file list all flow balance parameters, such as volume in, out, etc.

1	JDAY	WB	VOLIN(m3)	VOLPR(m3)	VOLOUT(m3)	VOLWD(m3)	VOLEV(m3)	VOLDT(m3)	VOLTRB(m3)	VOLICE(m3)	%VOLerror
2	40544	1	2.38E+05	0.00E+00	-2.11E+05	0.00E+00	0.00E+00	-2.77E+04	0.00E+00	0.00E+00	-2.57E-08
3	40558	1	5.58E+09	0.00E+00	-5.64E+09	0.00E+00	0.00E+00	5.08E+07	0.00E+00	0.00E+00	2.41E-09
4	40572	1	1.33E+10	0.00E+00	-1.34E+10	0.00E+00	0.00E+00	1.18E+07	0.00E+00	0.00E+00	1.55E-11
5	40586	1	2.07E+10	0.00E+00	-2.07E+10	0.00E+00	0.00E+00	-6.72E+07	0.00E+00	0.00E+00	1.15E-09
6	40600	1	2.82E+10	0.00E+00	-2.82E+10	0.00E+00	0.00E+00	-1.39E+08	0.00E+00	0.00E+00	1.43E-09
7	40614	1	3.56E+10	0.00E+00	-3.53E+10	0.00E+00	0.00E+00	-3.60E+08	0.00E+00	0.00E+00	4.80E-09
8	40628	1	4.33E+10	0.00E+00	-4.30E+10	0.00E+00	0.00E+00	-3.40E+08	0.00E+00	0.00E+00	4.80E-09
9	40642	1	5.32E+10	0.00E+00	-5.26E+10	0.00E+00	0.00E+00	-5.88E+08	0.00E+00	0.00E+00	-1.34E-08
10	40656	1	6.31E+10	0.00E+00	-6.25E+10	0.00E+00	0.00E+00	-5.58E+08	0.00E+00	0.00E+00	-1.69E-08

Flow balance output	**FLOWBAL**
FLOWBALC- summary of flows from all sources/sinks+v	ON
FLOWBAL FREQ- FLOWBALF- frequency of output in da	14

N and P Mass Balance Output: massbal.csv

This output option writes a summary of the N and P mass balance for each waterbody - cumulative N and P mass balance for all N/P sources/sinks.

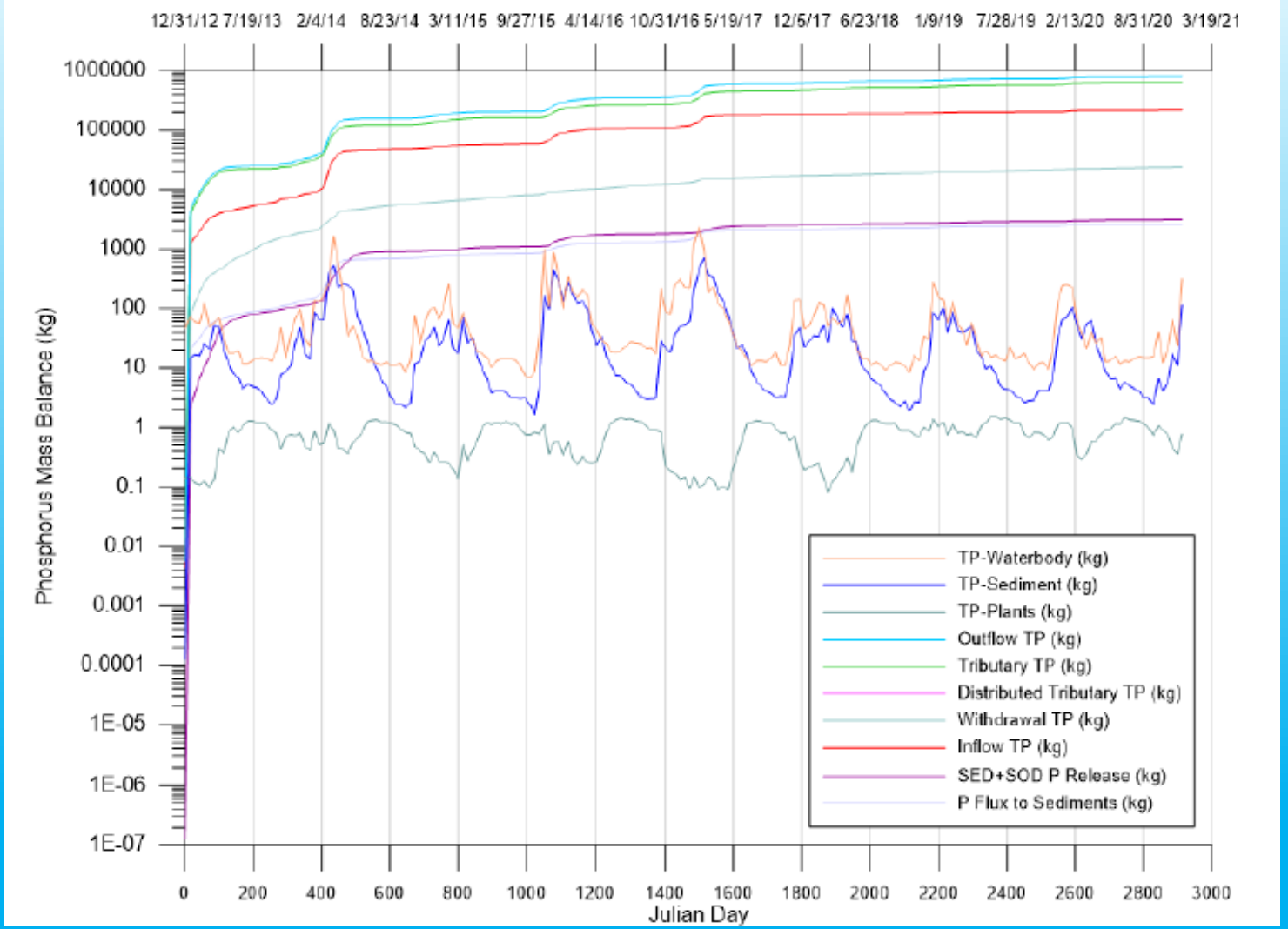
	JDAY	WB	TP-Waterbody(kg)	TP-Sediment(kg)	TP-Plants(kg)	OutflowTP(kg)	TributaryTP(kg)	Distributed	Withdrawal	Precipitatic	InflowTP(kg)	SED+SOD_PRelease(kg)	PFluxtoSediments(kg)	TN-Waterbody(kg)
2	275	1	5.59E+03	0.00E+00	0.00E+00	0.00E+00	2.88E+00	0.00E+00	7.71E-02	0.00E+00	1.95E-01	5.09E-04	0.00E+00	6.48E+04
3	289	1	1.70E+03	0.00E+00	0.00E+00	0.00E+00	3.09E+04	0.00E+00	9.10E+02	0.00E+00	2.39E+03	1.87E+00	0.00E+00	2.55E+04
4	303	1	2.58E+03	0.00E+00	0.00E+00	0.00E+00	5.84E+04	0.00E+00	2.01E+03	0.00E+00	5.08E+03	6.85E+00	0.00E+00	2.68E+04
5	317	1	2.40E+03	0.00E+00	0.00E+00	0.00E+00	8.45E+04	0.00E+00	3.65E+03	0.00E+00	8.95E+03	8.81E+00	0.00E+00	3.02E+04
6	331	1	3.51E+03	0.00E+00	0.00E+00	0.00E+00	1.17E+05	0.00E+00	6.14E+03	0.00E+00	1.90E+04	8.81E+00	0.00E+00	4.76E+04
7	345	1	4.25E+03	0.00E+00	0.00E+00	0.00E+00	1.56E+05	0.00E+00	8.07E+03	0.00E+00	2.68E+04	8.81E+00	0.00E+00	6.20E+04
8	359	1	2.83E+03	0.00E+00	0.00E+00	0.00E+00	2.03E+05	0.00E+00	9.59E+03	0.00E+00	3.21E+04	8.81E+00	0.00E+00	5.71E+04
9	373	1	3.63E+03	0.00E+00	0.00E+00	0.00E+00	2.39E+05	0.00E+00	1.04E+04	0.00E+00	3.72E+04	8.81E+00	0.00E+00	5.58E+04
10	387	1	3.27E+03	0.00E+00	0.00E+00	0.00E+00	2.68E+05	0.00E+00	1.14E+04	0.00E+00	4.29E+04	8.81E+00	0.00E+00	5.04E+04
11	401	1	3.39E+03	0.00E+00	0.00E+00	0.00E+00	3.04E+05	0.00E+00	1.23E+04	0.00E+00	4.81E+04	8.81E+00	0.00E+00	4.99E+04
12	415	1	3.38E+03	0.00E+00	0.00E+00	0.00E+00	3.42E+05	0.00E+00	1.32E+04	0.00E+00	5.32E+04	8.81E+00	0.00E+00	4.59E+04
13	429	1	4.04E+03	0.00E+00	0.00E+00	0.00E+00	3.91E+05	0.00E+00	1.41E+04	0.00E+00	5.81E+04	8.81E+00	0.00E+00	4.65E+04
14	443	1	3.67E+03	0.00E+00	0.00E+00	0.00E+00	4.46E+05	0.00E+00	1.52E+04	0.00E+00	6.42E+04	8.81E+00	0.00E+00	4.36E+04
15	457	1	7.99E+03	0.00E+00	0.00E+00	0.00E+00	5.66E+05	0.00E+00	1.62E+04	0.00E+00	8.53E+04	8.81E+00	0.00E+00	1.19E+05

- Derived variables (TN, TP) are turned ON
- CPL output is turned ON
- MBC - mass balance is turned ON
- NPBALC is turned ON

CALCULATION	WB1	WB2
VBC - volume balance computation	ON	
EBC - energy balance computation	OFF	
MBC - mass balance computation	ON	
PQC - Turn ON or OFF placement of inflows by density	ON	
EVC - Turn ON or OFF evaporation water loss	OFF	
PRC - Turn ON or OFF precipitation on water surface	OFF	

N and P mass balance output	NPBAL
NPBALC- summary of all N and P sources/sinks	ON
NP Balance FREQ- NPBALF- frequency of output in day	14

N and P Mass Balance Output: massbal.csv



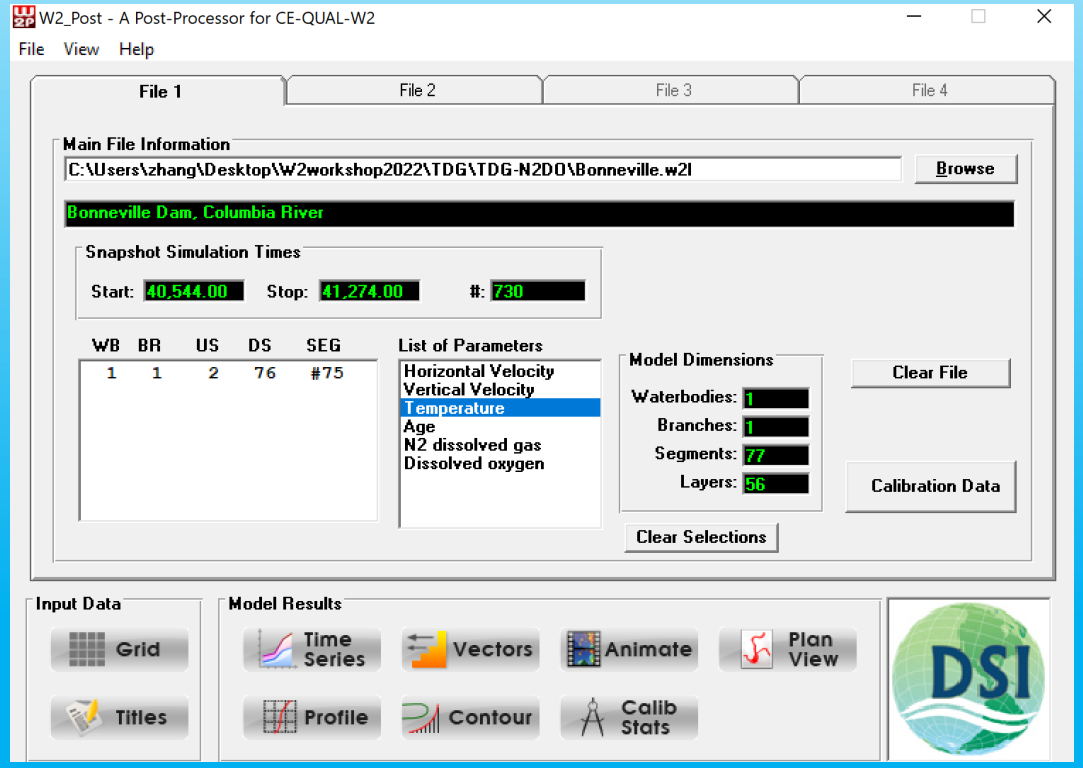
Contour Plot Output: CPL PLOT

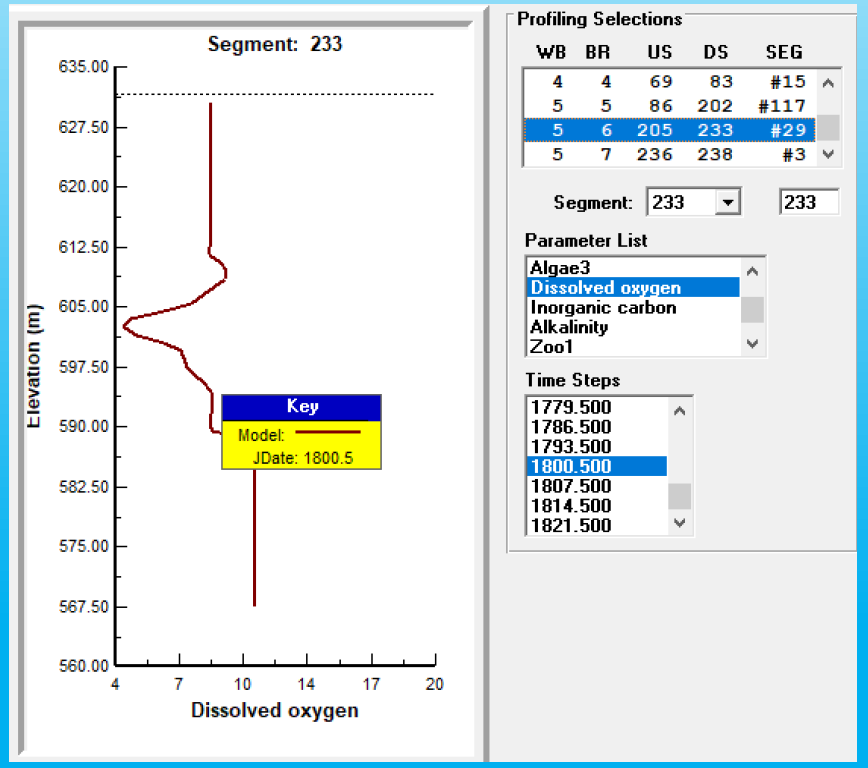
- The CPL output file stores detailed output for all model segments (and layers) within each simulated waterbody and provide the information needed for developing both temporal and spatial model-data comparisons.
- The CPL output file writes data in **2-dimensional blocks** for each output time interval by combining the sequence of segment and layer results in the vertical dimension (down) and the selected output variables in the horizontal dimension (across).

CPL PLOT - contour plot output	CPL
CPLC Specifies if information is output to the contour f	ON
NCPL Number of contour plot dates	1
TECPLOT Turns ON or OFF TECPLOT output format	OFF
CPL DATE- CPLD(NCPL)- starting date of output, output	1
CPL FREQ- CPLF(NCPL)- output frequency- days	30

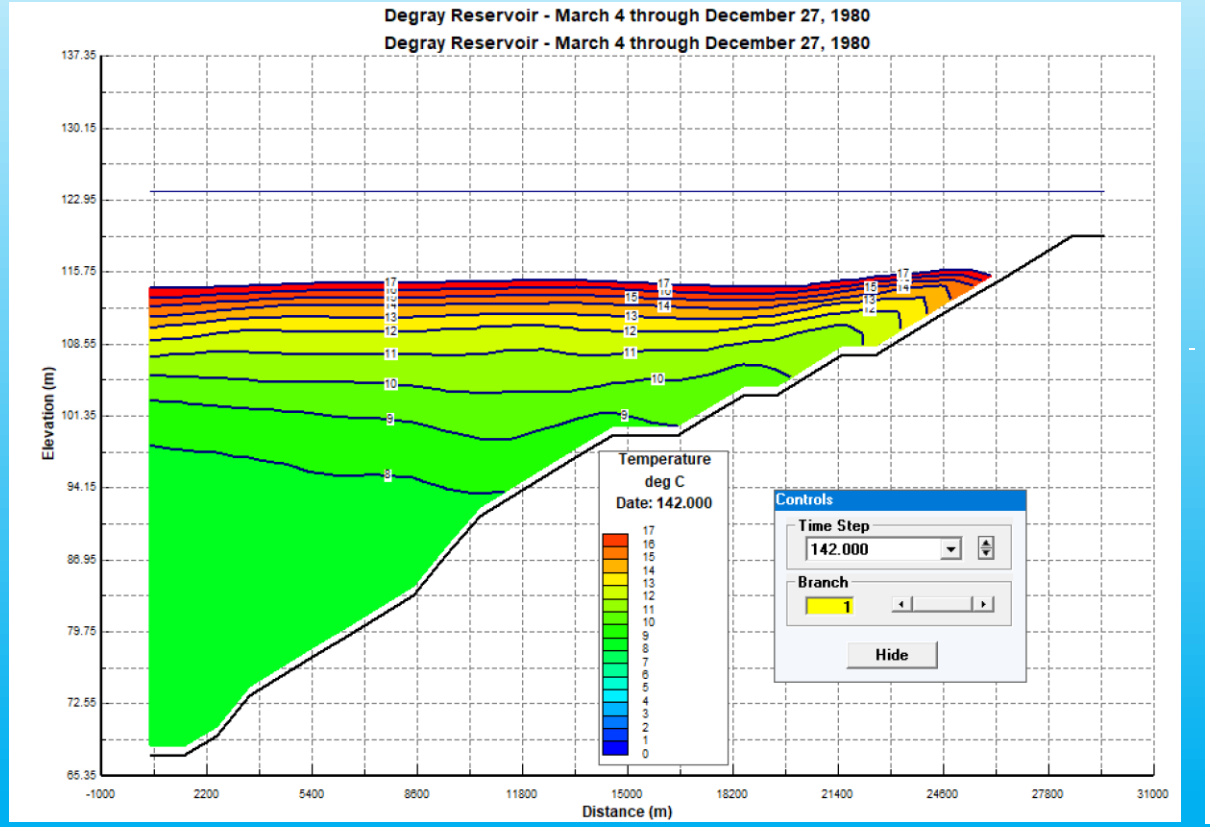
W2Post – XXX.w2l

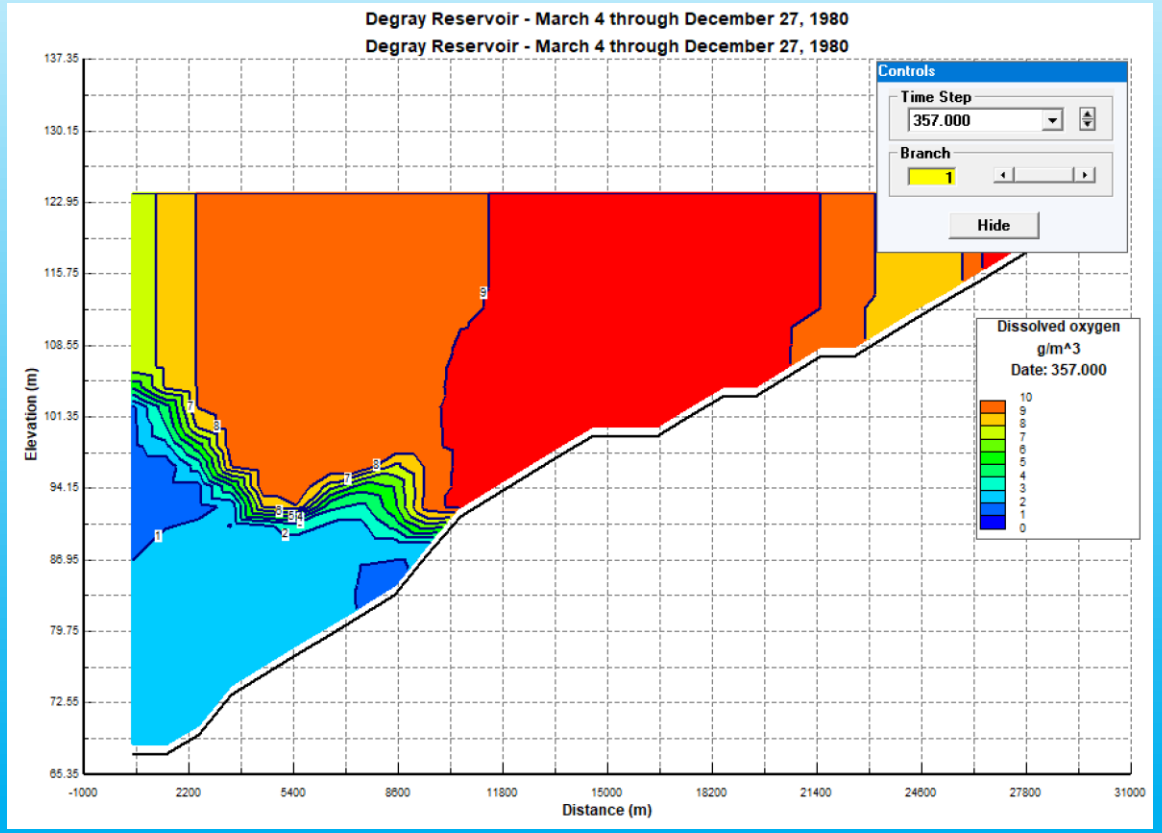
DSI W2Linkage File for W2Post (used to be called V	W2L
VPLC- ON or OFF Specifies if information is written	ON
NVPL- # of dates	1
VPL DATE- VPLD(NVPL)- starting date of output in Ju	275
VPL FREQ- VPLF(NVPL)- output frequency- days	30



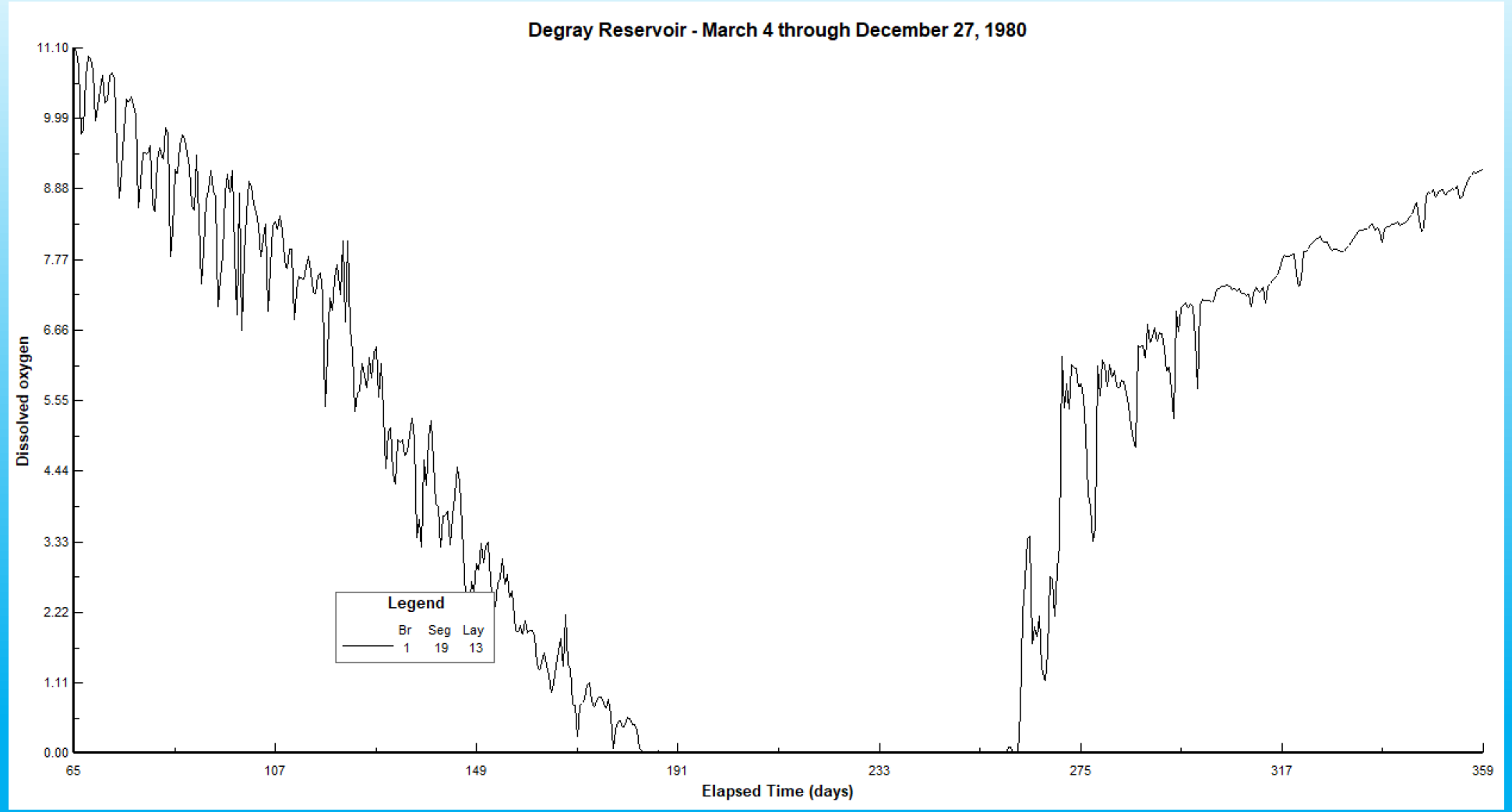


W2Post: Color Contour Plots

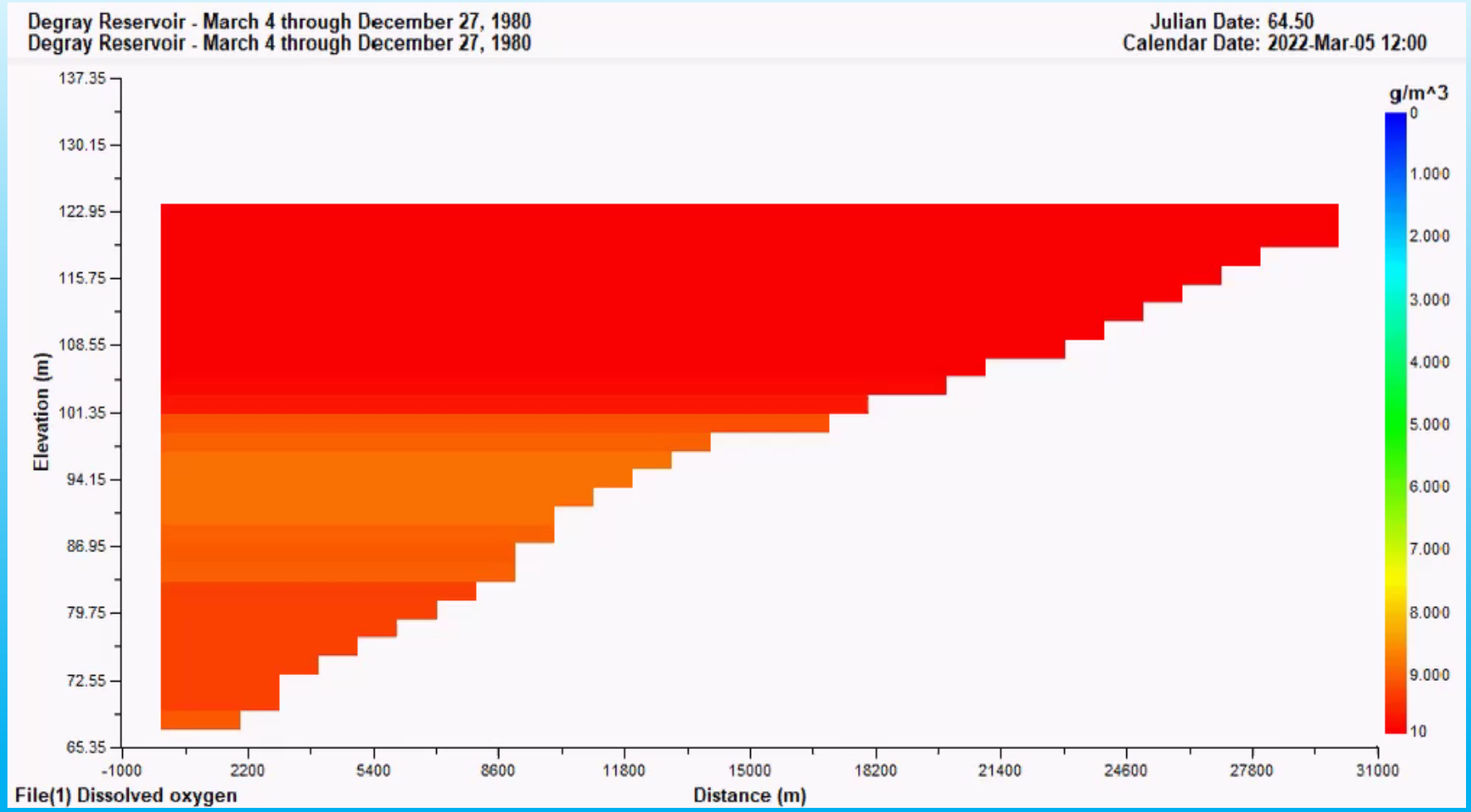




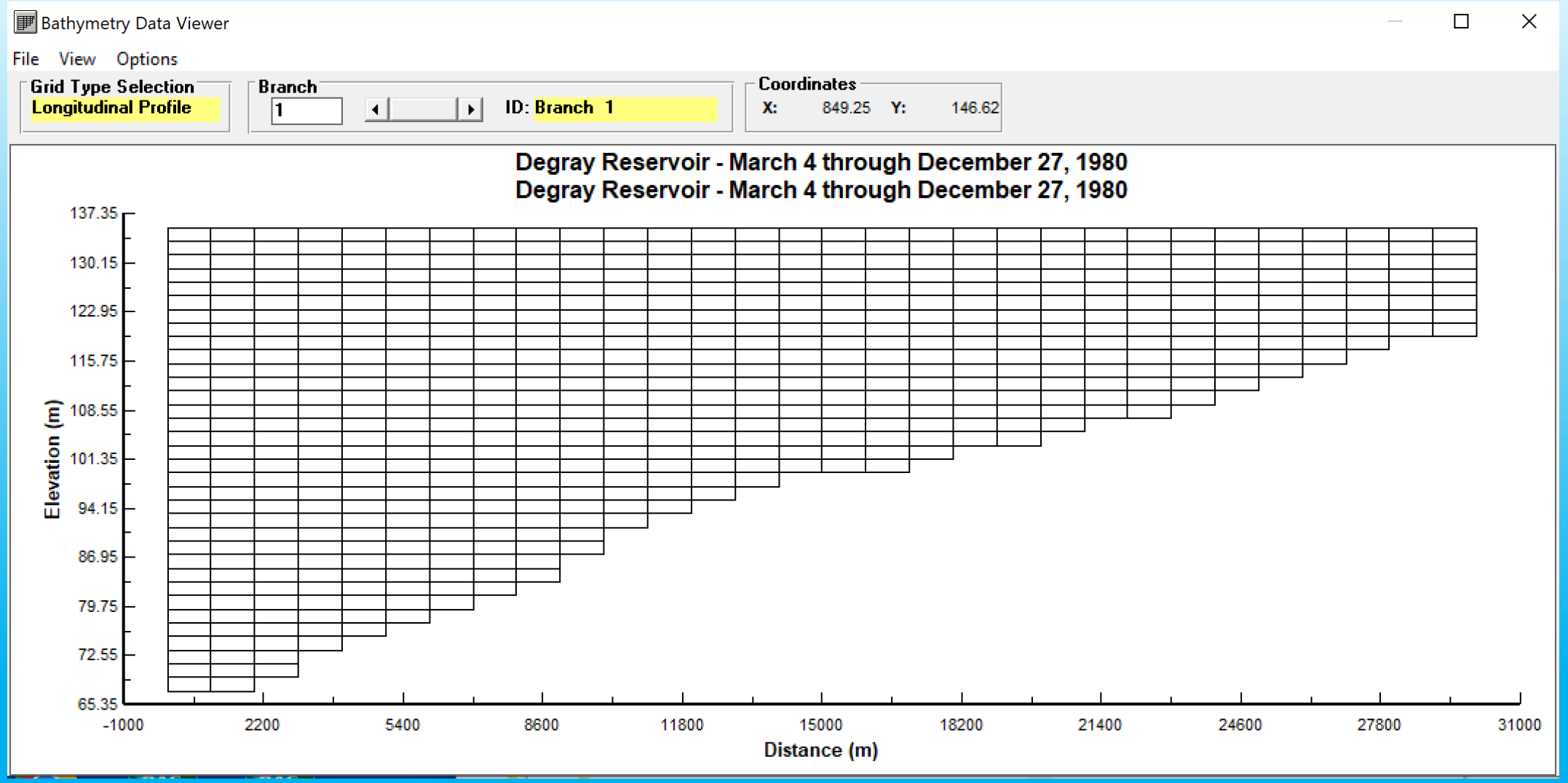
W2Post: Time Series Plot



W2Post: Animation



W2Post: Bathymetry Data Viewer



Restart and Snapshot Print

RESTART

RESTART	RESTART
RSOC- Restart control ON or OFF- for writing restart fil	ON
NRSO- # of restart dates and frequencies of output	1
RSIC- Restart read in control- ON or OFF- read in a rest	OFF
RSI FILE RSIFN- restart in file name	rso635.opt
RSO DATE- RSOD(NRSO) - output dates in Julian days	635
RSO FREQ- RSOF(NRSO) - frequency of output in days	50

SNP PRINT - Snapshot print

SNP PRINT - Snapshot print	SNP
SNPC, ON or OFF	OFF
NSNP, # of dates	2
SNP DATE SNPD(NSNP) output days in Julian days	275
SNP FREQ SNPF(NSNP) Frequency of output in days	500

Runtime Errors: w2.err

```
Unstable water surface elevation on day 40544.002
negative surface layer thickness using minimum timestep at iteration 1
 Branch #:           1  in Waterbody:           1  Surface layer KT:          39
Segment, Surface layer thickness, m, Flow m3/s, U(KT,I) m/s, ELWS, m
      2          **********       **********         NaN  **********
      3          **********       **********         NaN  **********
      4          **********       **********         NaN  **********
      5          **********       **********         NaN  **********
      6          **********       **********        0.00  **********
      7          **********       **********        0.00  **********
```

Runtime Warnings: w2.wrn

```
 **************    Add layer 39 at Julian day = 40544.000   NIT = 0  IZMIN =8**************
Raising bottom layer at segment        1 at iteration        0 at Julian day 40544.000
Raising bottom layer at segment        2 at iteration        0 at Julian day 40544.000
Raising bottom layer at segment        3 at iteration        0 at Julian day 40544.000
Raising bottom layer at segment        4 at iteration        0 at Julian day 40544.000
Raising bottom layer at segment        5 at iteration        0 at Julian day 40544.000
Computational warning at Julian day = 40544.002 at segment 4
timestep = 200.000 water surface deviation [Z] = 1825446160768266912945303649680632430560
Negative surface layer thickness in segment 4
  time step reduced to .010 s on day 40544.002 at iteration 1
Computational warning at Julian day = 40544.002
 timestep = .009 sec: DLT<DLTMIN set DLT=DLTMIN
Computational warning at Julian day = 40544.002 at segment 4
timestep = .010 water surface deviation [Z] = 27560953935686944030769365068437007305000000
```

pre.opt: Meteorological Data Summary

Meteorological Data Input Summary

Parameter	Waterbody	Average Value	Maximum	Minimum
TAIR(C)	1	10.317	39.160	-18.100
TDEW(C)	1	4.040	23.450	-22.700
WIND(m/s)	1	1.507	10.500	0.000
PHI(rad)	1	1.843	6.280	0.000
CLOUD(0-10)	1	3.659	10.000	0.000
SRO(W/m2)	1	0.000	0.000	0.000

pre.opt: Summary Statistics

Summary statistics regarding inflows, temperatures, and inflow constituent concentrations

Inflow Constituent Statistics

Branch 1

Constituent name	Average	Maximum	Minimum	ApproxLoading(kg/d)
TDS	603.073	796.000	248.000	0.10146E+08
ISS	90.040	812.000	2.000	0.77500E+07
Phosphate	0.114	0.205	0.000	0.39976E+04
Ammonium	0.159	0.530	0.020	0.47901E+04
Nitrate-Nitrite	3.088	10.020	0.000	0.13999E+06
Dissolved silica	18.948	22.000	14.000	0.41202E+06
Labile DOM	2.000	2.000	2.000	0.50055E+05
Refractory DOM	11.330	11.330	11.330	0.28356E+06
Labile POM	1.447	10.360	0.080	0.10393E+06
Refractory POM	8.195	58.690	0.450	0.58883E+06

pre.opt: Summary Statistics

Summary statistics regarding inflows, temperatures, and inflow constituent concentrations for each branch and summed for each waterbody

```
Water Balance Summary
  Waterbody 1
     total inflows      total outflows
   average  maximum    average  maximum
    310.04  2441.18       5.39    10.40

    Branch 1
      Inflows
             total
       average  maximum
         302.21  2441.18
           upstream          tributaries     distributed tributaries      precipitation
       average  maximum    average  maximum      average  maximum       average  maximum
        295.09  2441.18       7.12    51.19         0.00     0.00          0.00     0.00
      Outflows
             outlets          withdrawals
       average  maximum    average  maximum
          0.00     0.00       0.00     0.00
```

pre.opt: Summary Statistics

Summary statistics regarding inflows, temperatures, and inflow constituent concentrations

```
Branch Inflow Temperature Min/Max
Branch(JB)     Maximum Temp(C)      Minimum Temp(C)
         1           29.350              -0.740

Tributary Inflow Temperature Min/Max
Tributary(JT)     Maximum Temp(C)      Minimum Temp(C)
          1           29.600               0.000
Tributary(JT)     Maximum Temp(C)      Minimum Temp(C)
          2           29.100               0.000
```

pre.opt: Area-Volume-Elevation Table

Computed area-volume-elevation table, theoretical hydraulic residence at each elevation is included if the waterbody is a reservoir

Waterbody 1 Volume-Area-Elevation Table
Note: Elevation is at top of layer

Layer	Elevation (m)	Area (1.0E6 m^2)	Volume (1.0E6 m^3)	Active Cells	Average depth (m)	Average width (m)	Residence time (days)
2	494.53	79.137	4745.273	5641	60.0	686.18	331.35
3	493.53	78.873	4666.136	5583	59.2	683.89	325.83
4	492.53	78.555	4587.264	5525	58.4	681.14	320.32
5	491.53	78.306	4508.708	5467	57.6	678.98	314.83

Questions?