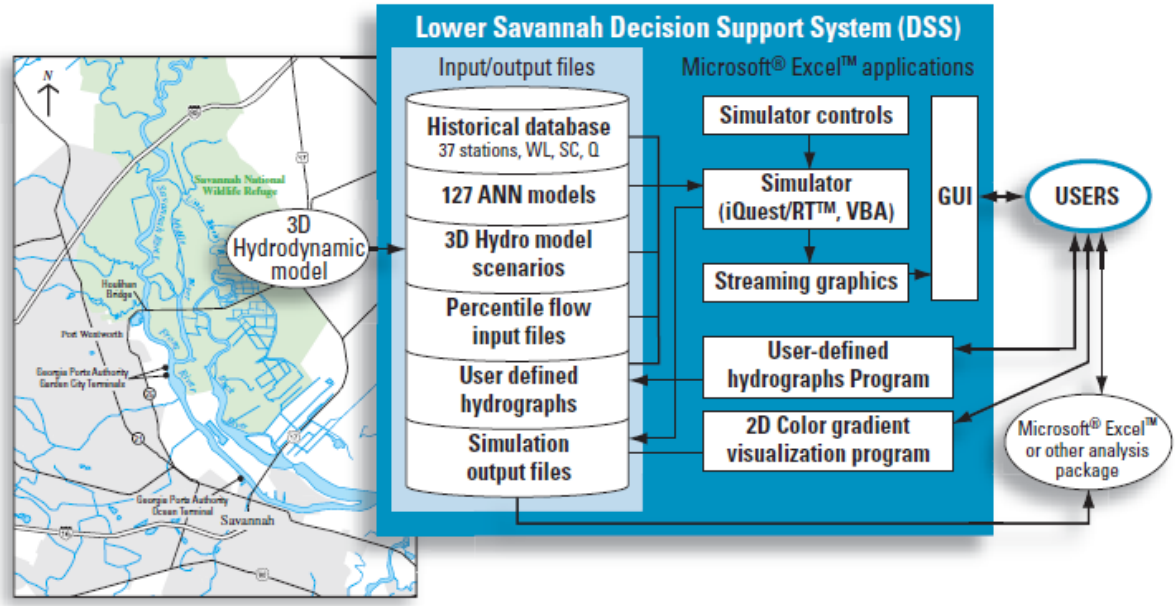
Appendix V. User's Manual for Model-to-Marsh Decision Support System (Version 2)



Contents

Contents—continued

Figures

1. Introduction

This document describes how to install and operate the Model-to-Marsh Climate Change (M2M) decision support system (DSS) application (hereafter referred to as "M2M-2 DSS"). This M2M-2 DSS predicts how the flow rate down the Savannah River, as measured at a U.S. Geological Survey gage at Clyo, Ga. (station 02198500), and tidal forcing as measured by the water level at a gage in Savannah Harbor at Fort Pulaski, Ga. (Station 02198980), affect the water levels and specific conductivities at a number of gages on the Savannah, Back, and Little Back Rivers (fig. 1). The effects of climate change are simulated by applying a user set bias to the water level at the Savannah Harbor gage (02198980). In turn, the predictions made at these locations are used to predict the water levels and specific conductances of the tidal marshes. The model is an EXCEL™/VBA (Visual Basic for Applications)[1] program that integrates a large dataset, artificial neural network (ANN) models, streaming graphics, and a graphical user interface. The dataset comprises half-hourly samples of flow (Q), water level (WL), and specific conductance (SC) covering April 1994 to May 2005. Data through May 2005 were used to develop the ANNs, and are included as separate files, one file for each year of data. This allows the user to run long-term simulations to evaluate permutations of the actual historical record.

2. Installation and System Requirements

Copy the folder titled M2M_4285 to your computer's hard drive. You may place this folder anywhere on your system. The only requirement is that all the files stay in the same directory.

Copy the following files to your computers System32 directory:

admquestrt.dll,
mscomct2.ocx.

For example, on a Microsoft XP or Windows 2000 system, the path would be C:\Windows\System32\.

If present, you should delete the file NE32.dll from the System32 directory (you would have this if you loaded an earlier version of the Savannah Phase II application.

Register the above files by typing the following at the Run Prompt (usually accessed from the Start Menu:

Regsvr32 c:\windows\system32\admquestrt.dll
Regsvr32 c:\windows\system32\mscomct2.ocx

This assumes the path is c:\windows\system32.

The program was developed and tested using Microsoft EXCEL™ 2002. This version or any later version is to be used to run the program.

3. Removal

Delete the folder containing the applications and its contents.

[1] Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

4. Operation

There are 3 EXCEL™ programs that make up the application. In each program, the latest release date is included in the file name in the format mmddyyyy (month/day/year). The three programs are listed below.

SavannahM2M_V2_mmddyyyy.xls

This is the main program from which all simulations are run. This program is hereafter referred to as the "MODEL."

CreateUserHydrograph_mmddyyyy.xls

This program is used to create user define hydrographs, which can be used to run simulations. This program was developed for the Version 1 of M2M, which is described in greater detail in Section 6.

M2MVisualization_mmddyyyy.xls

This program is used to interpolate salinity levels throughout the marsh and visualize the results. This program was developed for the Version 1 of M2M, which is described in greater detail in Section 7.

The remainder of this section will describe how to use the M2M-2 DSS.

The M2M-2 DSS is opened like a standard EXCEL™ workbook. Simply open the .xls file. Depending on the security settings you have set up for EXCEL, you may have to Enable Macros.

The model workbook consists of the following worksheets: *About, Controls, AllUSGSGraphs, SelectedGraphs, RiverOutputTemplate, MarshOutputTemplate,* and *RevisionControl.* A description of each worksheet and its use/function follows.

4.1 *About* Worksheet.

When the workbook opens, the *About* (fig. A1) worksheet is automatically displayed for 5 seconds. This sheet contains the version number of the M2M-2 DSS and contact information for the program's developers. After displaying for 5 seconds, the user is automatically taken to the *Controls* worksheet. The user may return to the *About* worksheet at any time for contact/version information.

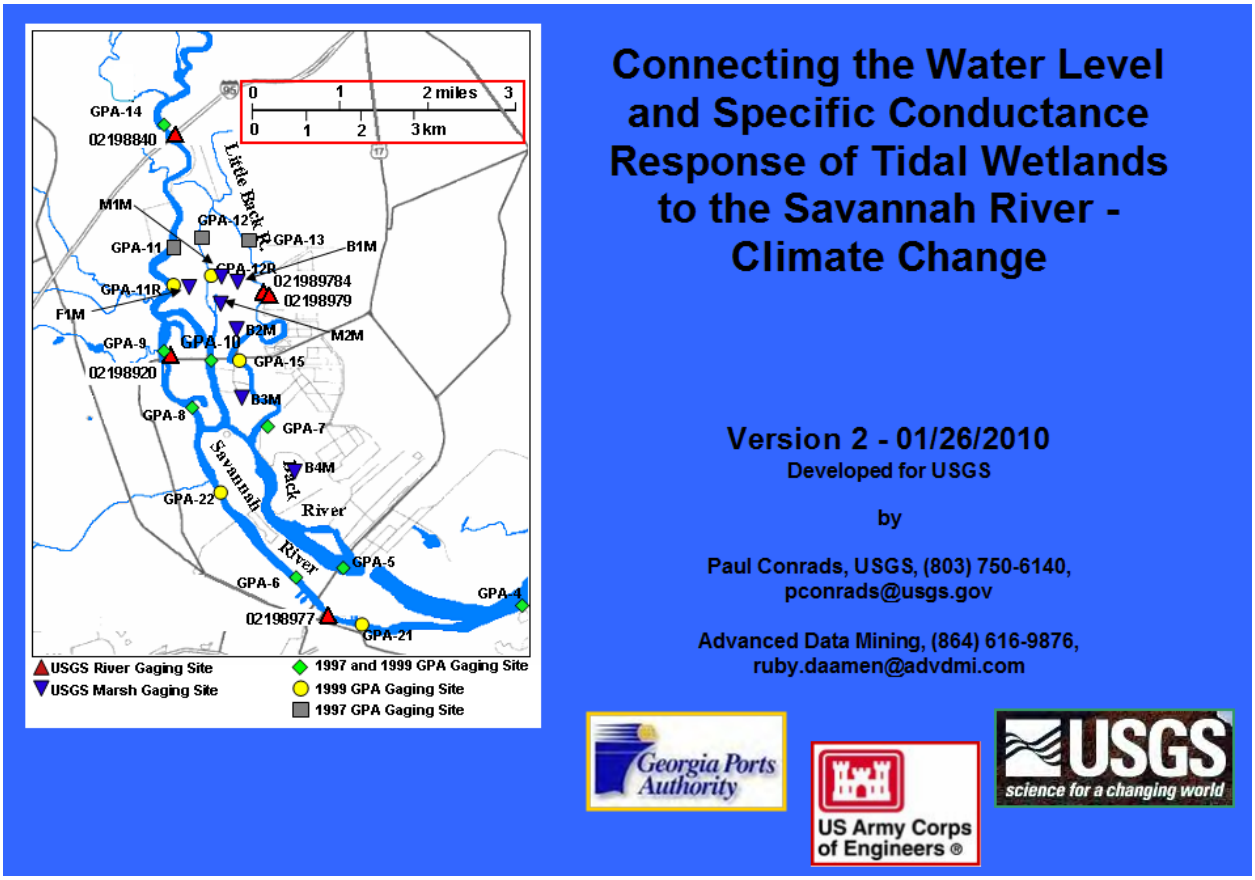


Figure A1. *About* worksheet.

4.2 *Controls* Worksheet

The *Controls* (fig. A2) Worksheet contains a map of the Savannah River Basin and a *User Controls* user form, which is used to control each simulation run. This form can be moved, closed, and reopened as needed. If closed (by selecting the X in the upper right corner of the form), it is reopened by selecting the *Show User Controls* command button that appears when the form is closed. Figure A2 shows the worksheet and the Control Form used to set up a simulation.

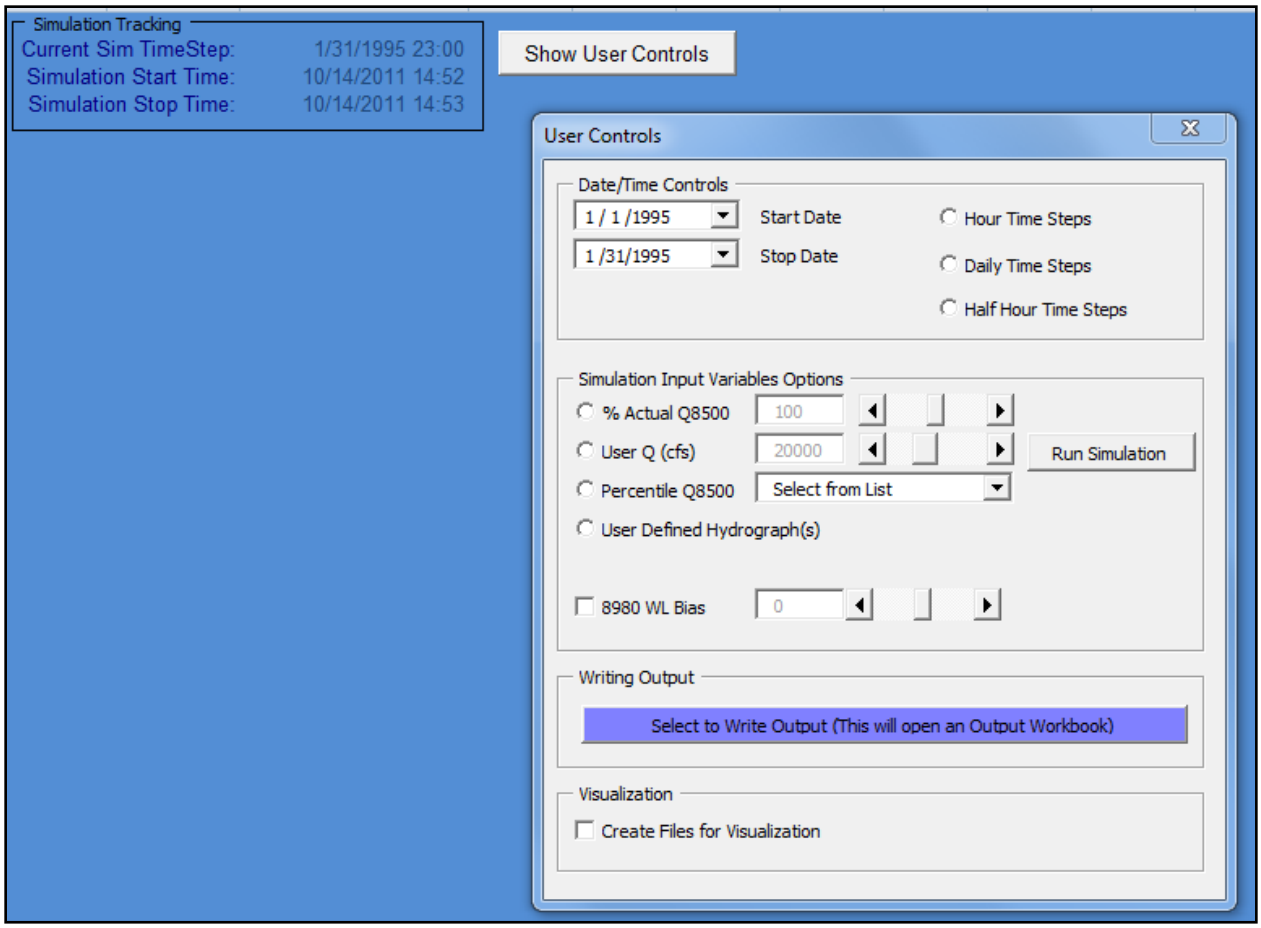


Figure A2. *Controls* worksheet.

4.2.1. Date/Time Step Controls

This section is used to set the start date, end date, and step size of a simulation run. The start and end dates are set using the calendar combo boxes. Dates selected must fall between April 1, 1994, and May 1, 2005. The step size is selected by choosing the Hour, Daily, or Half Hour Time Step Option Button.

4.2.2. Input Variable Options

This section is used to select the user settings for the flow (Q) at Clyo, Ga., (Q8500) and the water level (WL) bias at 8980 (station 02198980, Savannah River at Fort Pulaski, Ga.). The user can opt to set the flow at Clyo in one of four ways.

- Percent of Actual Q: This sets the User Q as a percentage of the Actual historical Q. The percentage is varied using the scroll bar. The setting will display in the text box to the left of the scroll bar. Allowable range is 1 to 200 percent.
- Fixed user Q: This sets the User Q to a fixed value. The value is varied using the scroll bar to select a value. The setting displays in the text box to the left of the scroll bar. Allowable range is 100 to 53,000 ft^3/s

- Percentile File: Select one of the percentile files (5 to 95 percent) from the drop down box. These files consist of a percentile of the daily mean value from 1929 to 2002.
- User built Hydrograph: This allows the user to select hydrograph file(s) created using the *CreateUserhydrographmmddyyyy*.xls application from a browser window. The user will be prompted to select the Userhydrograph files(s). Up to 2 years (2 yearly files) may be selected. To select multiple files (the files must cover successive years), simply hold down the <Ctl> Key when picking files. Each Userhydrograph file spans 1 year. Instructions for creating the files are provided in detail in Section 6 of this manual. The user needs to make sure that the simulation dates selected do not fall outside the dates spanned by the UserHydrograph files(s).

The WL at station 02198980 can be modified per the sea-level-rise scenarios by setting a bias for the gage. The allowable range is +/- 10 feet in increments of 0.10 foot.

This section also contains the "Run Simulation" command button. When all simulation controls are set, selecting this button will begin the simulation run. There will be some delay while the data files needed for the simulations are loaded.

4.2.3 Output Options

Select the "Write Output" button to have the output written to a workbook. You will be prompted for the name of the workbook that will be created to hold the output. Once the simulation run is complete, the file will be saved and closed. The output file consists of two worksheets—one containing river data and the other marsh data (figs. A3, A4). Data written to the Output File include flow at Clyo, water level in the Savannah Harbor, and for each modeled gaging location:

- Historical data,
- Predicted value, based on actual data (predactual),
- Predicted change resulting from user settings (pred-user), and
- Predicted value, based on user settings (user).

Gages measuring water level are preceded by "WL," and those measuring salinity are preceded by "Sal."

4.2.4 Visualization Control

Checking the box labeled "Create Files for Visualization" will save four files to the VisualizationFiles directory. The files will contain the data for the gages needed by the visualization program (described in Section 7).
The files saved are

- SavVisActual_m_dd_yyyy_h_mm.cvs (where m=month, dd= day, yyyy=year, h=hour, mm = minutes), which will contain the actual data for the gages;
- SavVisPred_m_dd_yyyy_h_mm.cvs, which will contain the predicted values based on actual flow;

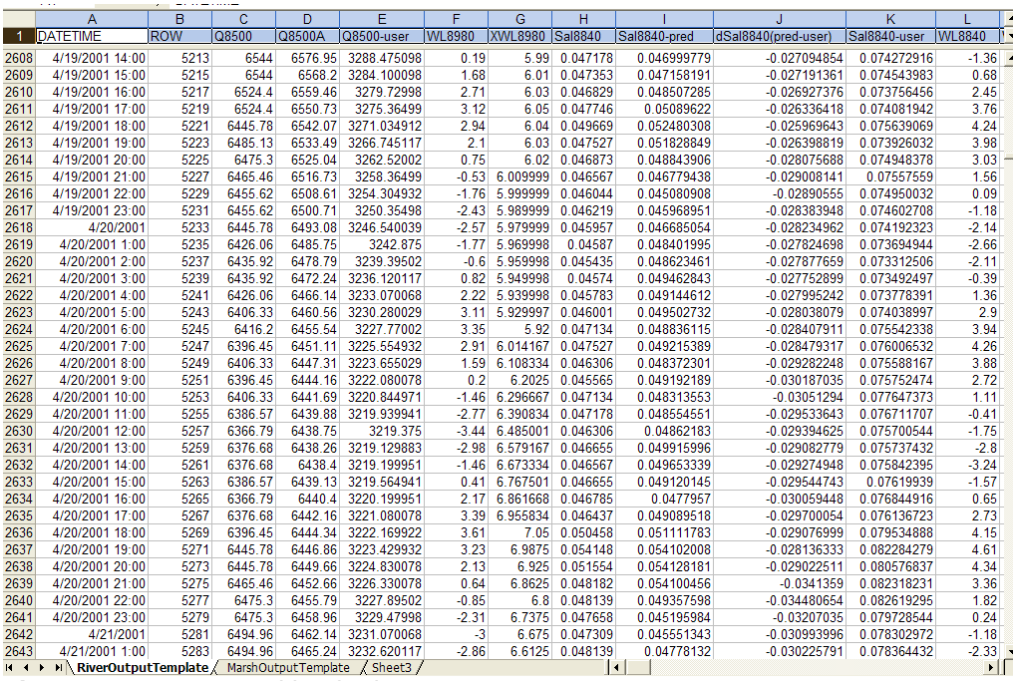
- SavVisUser_m_dd_yyyy_h_mm.cvs, which will contain the predicted values based on user settings; and
- SavVisDelta_m_dd_yyyy_h_mm.cvs, which will contain the changes due to user settings.

4.2.5 Simulation Tracking

The top left corner of the Control Worksheet displays the current time stamp of a simulation, as well as an indication of how long a simulation takes to run via the start and stop times.

4.3 *RiverOutputTemplate* and *MarshOutputTemplate* Worksheets

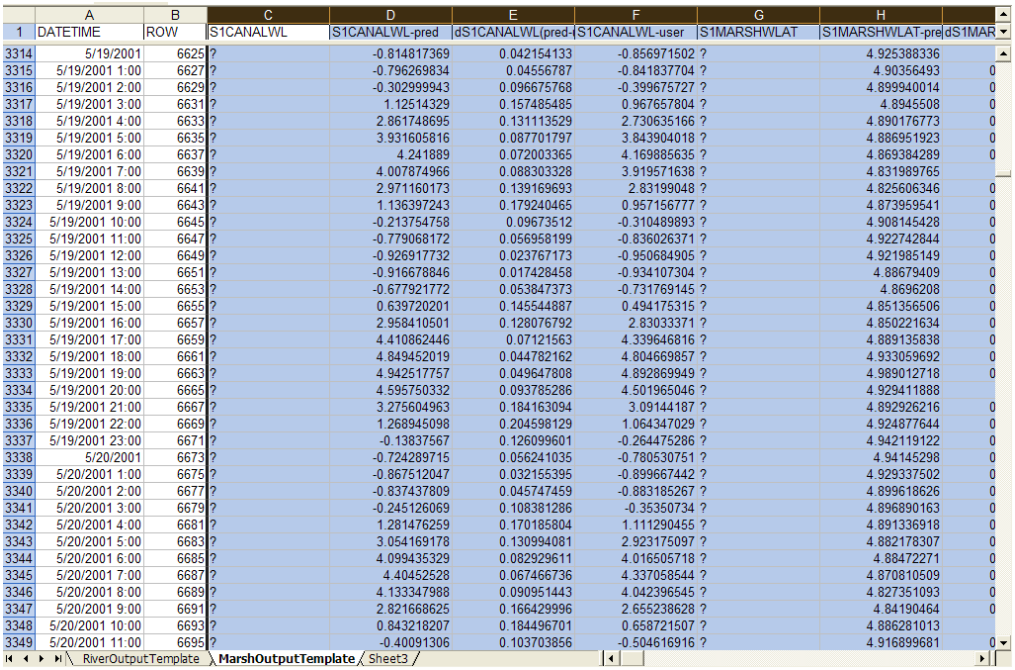
The two output template worksheets (figs. A3 and A4) show the format of the output files created when ***Write Output*** is selected.



	A	B	C	D	E	F	G	H	I	J	K	L
1	DATETIME	ROW	Q8500	Q8500A	Q8500-user	WL8980	XWL8980	Sal8840	Sal8840-pred	dSal8840(pred-user)	Sal8840-user	WL8840
2608	4/19/2001 14:00	5213	6544	6576.95	3288.475098	0.19	5.99	0.047178	0.046999779	-0.027094854	0.074272916	-1.36
2609	4/19/2001 15:00	5215	6544	6568.2	3284.100098	1.68	6.01	0.047353	0.047158191	-0.027191361	0.074543983	0.68
2610	4/19/2001 16:00	5217	6524.4	6559.46	3279.72998	2.71	6.03	0.046829	0.048507285	-0.026927376	0.073756456	2.45
2611	4/19/2001 17:00	5219	6524.4	6550.73	3275.36499	3.12	6.05	0.047746	0.05089622	-0.026336418	0.074081942	3.76
2612	4/19/2001 18:00	5221	6445.78	6542.07	3271.034912	2.94	6.04	0.049669	0.052480308	-0.025969643	0.075639069	4.24
2613	4/19/2001 19:00	5223	6485.13	6533.49	3266.745117	2.1	6.03	0.047527	0.051828849	-0.026398819	0.073926032	3.98
2614	4/19/2001 20:00	5225	6475.3	6525.04	3262.52002	0.75	6.02	0.046873	0.048843906	-0.028075688	0.074948378	3.03
2615	4/19/2001 21:00	5227	6465.46	6516.73	3258.36499	-0.53	6.009999	0.046567	0.046779438	-0.029008141	0.07557559	1.56
2616	4/19/2001 22:00	5229	6455.62	6508.61	3254.304932	-1.76	5.999999	0.046044	0.045080908	-0.02890555	0.074950032	0.09
2617	4/19/2001 23:00	5231	6455.62	6500.71	3250.35498	-2.43	5.989999	0.046219	0.045968951	-0.028383948	0.074602708	-1.18
2618	4/20/2001	5233	6445.78	6493.08	3246.540039	-2.57	5.979999	0.045957	0.046685054	-0.028234962	0.074192323	-2.14
2619	4/20/2001 1:00	5235	6426.06	6485.75	3242.875	-1.77	5.969998	0.04587	0.048401995	-0.027824698	0.073694944	-2.66
2620	4/20/2001 2:00	5237	6435.92	6478.79	3239.39502	-0.6	5.959998	0.045435	0.048623461	-0.027877659	0.073312506	-2.11
2621	4/20/2001 3:00	5239	6435.92	6472.24	3236.120117	0.82	5.949998	0.04574	0.049462843	-0.027752899	0.073492497	-0.39
2622	4/20/2001 4:00	5241	6426.06	6466.14	3233.070068	2.22	5.939998	0.045783	0.049144612	-0.027995242	0.073778391	1.36
2623	4/20/2001 5:00	5243	6406.33	6460.56	3230.280029	3.11	5.929997	0.046001	0.049502732	-0.028038079	0.074038997	2.9
2624	4/20/2001 6:00	5245	6416.2	6455.54	3227.77002	3.35	5.92	0.047134	0.048836115	-0.028407911	0.075542338	3.94
2625	4/20/2001 7:00	5247	6396.45	6451.11	3225.554932	2.91	6.014167	0.047527	0.049215389	-0.028479317	0.076006532	4.26
2626	4/20/2001 8:00	5249	6406.33	6447.31	3223.655029	1.59	6.108334	0.046306	0.048372301	-0.029282248	0.075588167	3.88
2627	4/20/2001 9:00	5251	6396.45	6444.16	3222.080078	0.2	6.2025	0.045565	0.049192189	-0.030187035	0.075752474	2.72
2628	4/20/2001 10:00	5253	6406.33	6441.69	3220.844971	-1.46	6.296667	0.047134	0.048313553	-0.03051294	0.077647373	1.11
2629	4/20/2001 11:00	5255	6386.57	6439.88	3219.939941	-2.77	6.390834	0.047178	0.048554551	-0.029533643	0.076711707	-0.41
2630	4/20/2001 12:00	5257	6366.79	6438.75	3219.375	-3.44	6.485001	0.046306	0.04862183	-0.029394625	0.075700544	-1.75
2631	4/20/2001 13:00	5259	6376.68	6438.26	3219.129883	-2.98	6.579167	0.046655	0.049915996	-0.029082779	0.075737432	-2.8
2632	4/20/2001 14:00	5261	6376.68	6438.4	3219.199951	-1.46	6.673334	0.046567	0.049653339	-0.029274948	0.075842395	-3.24
2633	4/20/2001 15:00	5263	6386.57	6439.13	3219.564941	0.41	6.767501	0.046655	0.049120145	-0.029544743	0.07619939	-1.57
2634	4/20/2001 16:00	5265	6366.79	6440.4	3220.199951	2.17	6.861668	0.046785	0.0477957	-0.030059448	0.076844916	0.65
2635	4/20/2001 17:00	5267	6376.68	6442.16	3221.080078	3.39	6.955834	0.046437	0.049089518	-0.029700054	0.076136723	2.73
2636	4/20/2001 18:00	5269	6396.45	6444.34	3222.169922	3.61	7.05	0.050458	0.051111783	-0.029076999	0.079534888	4.15
2637	4/20/2001 19:00	5271	6445.78	6446.86	3223.429932	3.23	6.9875	0.054148	0.054102008	-0.028136333	0.082284279	4.61
2638	4/20/2001 20:00	5273	6445.78	6449.66	3224.830078	2.13	6.925	0.051554	0.054128181	-0.029022511	0.080576837	4.34
2639	4/20/2001 21:00	5275	6465.46	6452.66	3226.330078	0.64	6.8625	0.048182	0.054100456	-0.0341359	0.082318231	3.36
2640	4/20/2001 22:00	5277	6475.3	6455.79	3227.89502	-0.85	6.8	0.048139	0.049357598	-0.034480654	0.082619295	1.82
2641	4/20/2001 23:00	5279	6475.3	6458.96	3229.47998	-2.31	6.7375	0.047658	0.045195984	-0.03207035	0.079728544	0.24
2642	4/21/2001	5281	6494.96	6462.14	3231.070068	-3	6.675	0.047309	0.045551343	-0.030993996	0.078302972	-1.18
2643	4/21/2001 1:00	5283	6494.96	6465.24	3232.620117	-2.86	6.6125	0.048139	0.04778132	-0.030225791	0.078364432	-2.33

RiverOutputTemplate | MarshOutputTemplate | Sheet3

Figure A3. Output workbook–river output**.**



	A	B	C	D	E	F	G	H	
1	DATETIME	ROW	S1CANALWL	S1CANALWL-pred	dS1CANALWL(pred-	S1CANALWL-user	S1MARSHWLAT	S1MARSHWLAT-pre	dS1MAR
3314	5/19/2001	6625	?	-0.814817369	0.042154133	-0.856971502	?	4.925388336	
3315	5/19/2001 1:00	6627	?	-0.796269834	0.04556787	-0.841837704	?	4.90356493	0
3316	5/19/2001 2:00	6629	?	-0.302999943	0.096675768	-0.399675727	?	4.899940014	0
3317	5/19/2001 3:00	6631	?	1.12514329	0.157485485	0.967657804	?	4.8945508	0
3318	5/19/2001 4:00	6633	?	2.861748695	0.131113529	2.730635166	?	4.890176773	0
3319	5/19/2001 5:00	6635	?	3.931605816	0.087701797	3.843904018	?	4.886951923	0
3320	5/19/2001 6:00	6637	?	4.241889	0.072003365	4.169885635	?	4.869384289	0
3321	5/19/2001 7:00	6639	?	4.007874966	0.088303328	3.919571638	?	4.831989765	
3322	5/19/2001 8:00	6641	?	2.971160173	0.139169693	2.83199048	?	4.825606346	0
3323	5/19/2001 9:00	6643	?	1.136397243	0.179240465	0.957156777	?	4.873959541	0
3324	5/19/2001 10:00	6645	?	-0.213754758	0.09673512	-0.310489893	?	4.908145428	0
3325	5/19/2001 11:00	6647	?	-0.779068172	0.056958199	-0.836026371	?	4.922742844	0
3326	5/19/2001 12:00	6649	?	-0.926917732	0.023767173	-0.950684905	?	4.921985149	0
3327	5/19/2001 13:00	6651	?	-0.916678846	0.017428458	-0.934107304	?	4.88679409	0
3328	5/19/2001 14:00	6653	?	-0.677921772	0.053847373	-0.731769145	?	4.8696208	0
3329	5/19/2001 15:00	6655	?	0.639720201	0.145544887	0.494175315	?	4.851356506	0
3330	5/19/2001 16:00	6657	?	2.958410501	0.128076792	2.83033371	?	4.850221634	0
3331	5/19/2001 17:00	6659	?	4.410862446	0.07121563	4.339646816	?	4.889135838	0
3332	5/19/2001 18:00	6661	?	4.849452019	0.044782162	4.804669857	?	4.933059692	0
3333	5/19/2001 19:00	6663	?	4.942517757	0.049647808	4.892869949	?	4.989012718	0
3334	5/19/2001 20:00	6665	?	4.595750332	0.093785286	4.501965046	?	4.929411888	
3335	5/19/2001 21:00	6667	?	3.275604963	0.184163094	3.09144187	?	4.892926216	0
3336	5/19/2001 22:00	6669	?	1.268945098	0.204598129	1.064347029	?	4.924877644	0
3337	5/19/2001 23:00	6671	?	-0.13837567	0.126099601	-0.264475286	?	4.942119122	0
3338	5/20/2001	6673	?	-0.724289715	0.056241035	-0.780530751	?	4.94145298	0
3339	5/20/2001 1:00	6675	?	-0.867512047	0.032155395	-0.899667442	?	4.929337502	0
3340	5/20/2001 2:00	6677	?	-0.837437809	0.045747459	-0.883185267	?	4.899618626	0
3341	5/20/2001 3:00	6679	?	-0.245126069	0.108381286	-0.35350734	?	4.896890163	0
3342	5/20/2001 4:00	6681	?	1.281476259	0.170185804	1.111290455	?	4.891336918	0
3343	5/20/2001 5:00	6683	?	3.054169178	0.130994081	2.923175097	?	4.882178307	0
3344	5/20/2001 6:00	6685	?	4.099435329	0.082929611	4.016505718	?	4.88472271	0
3345	5/20/2001 7:00	6687	?	4.40452528	0.067466736	4.337058544	?	4.870810509	0
3346	5/20/2001 8:00	6689	?	4.133347988	0.090951443	4.042396545	?	4.827351093	0
3347	5/20/2001 9:00	6691	?	2.821668625	0.166429996	2.655238628	?	4.84190464	0
3348	5/20/2001 10:00	6693	?	0.843218207	0.184496701	0.658721507	?	4.886281013	
3349	5/20/2001 11:00	6695	?	-0.40091306	0.103703856	-0.504616916	?	4.916899681	0

RiverOutputTemplate | **MarshOutputTemplate** | Sheet3

Figure A4. Output workbook–marsh output**.**

5. Creating a User Hydrograph

A separate Excel program called Createuserhydrograph_mmddyyyy.xls is used to generate a userhydrograph file. Each userhydrograph created must include a 1 year of half-hourly values. This application is contained in the same folder as the model.

There are three worksheets in the workbook: *About, Userhydrographtemplate*, and *Userformsheet*.

5.1 *About* Worksheet

The *About* Worksheet (fig. A5) contains the contact and revision information for the application. It will display for 5 seconds, and then the *Userhydrographtemplate* worksheet will display.

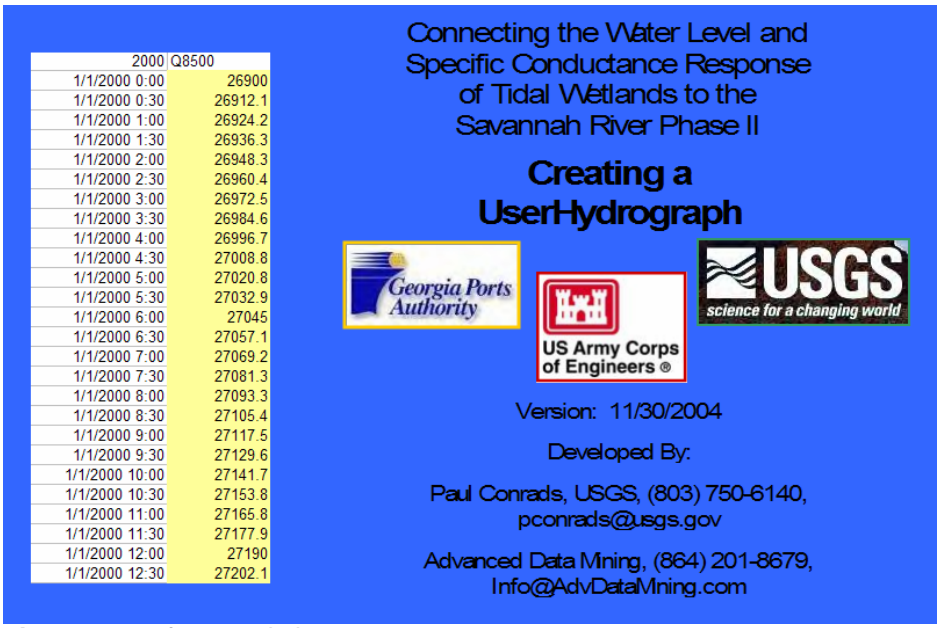


Figure A5. *About* worksheet.

5.2 *Userhydrographtemplate* Worksheet

The *Userhydrographtemplate* (hereafter referred to as the "Template"; fig. A6) worksheet contains your choices for generating a hydrograph. This application can be used in two ways. The user can cut and paste in flow values and then save the values to the file, or the user can generate a hydrofile from scratch by setting setpoints for flow values. The program would then fill in the remaining values by interpolating between setpoints.

Found on the *Template* worksheet is the *Creating a Userhydrograph* Userform (hereafter referred to as "OptionForm"), which steps the user through the process of creating a userhydrograph (Section 2 of fig. A6 shows the opened OptionForm).

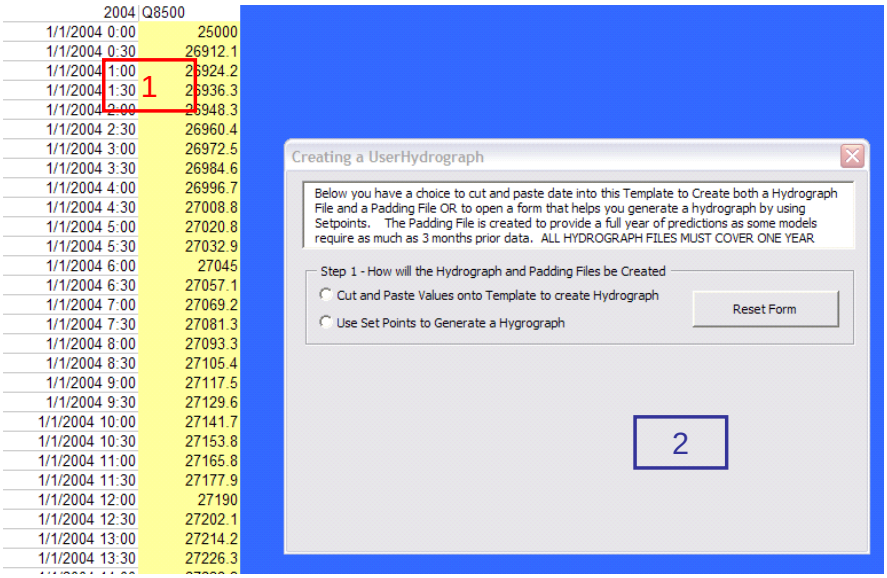


Figure A6. *Userhydrographtemplate* worksheet.

5.2.1 Creating a Userhydrograph using the Cut and Paste Option

The Cut and Paste Option allows the user to use flow values created outside of this program. The user pastes flow values into the specified location on the Template worksheet. Figure A7 shows the OptionForm with the Cut and Paste Option selected. The steps to perform the Cut and Paste Option follow.

- Select the option to Cut and Paste Values onto the Template.
- Select the Year using the Year combo box. Any year between 1994 and 2002 is allowed.
- Paste the Flow Values in the specified cells on the worksheet. The user needs to supply 1 full year of half-hourly values. If the year selected is a leap year, the user needs to provide 366 days worth of values.
- Save the Hydrograph values to File by selecting the *Save Hydrograph* command button.

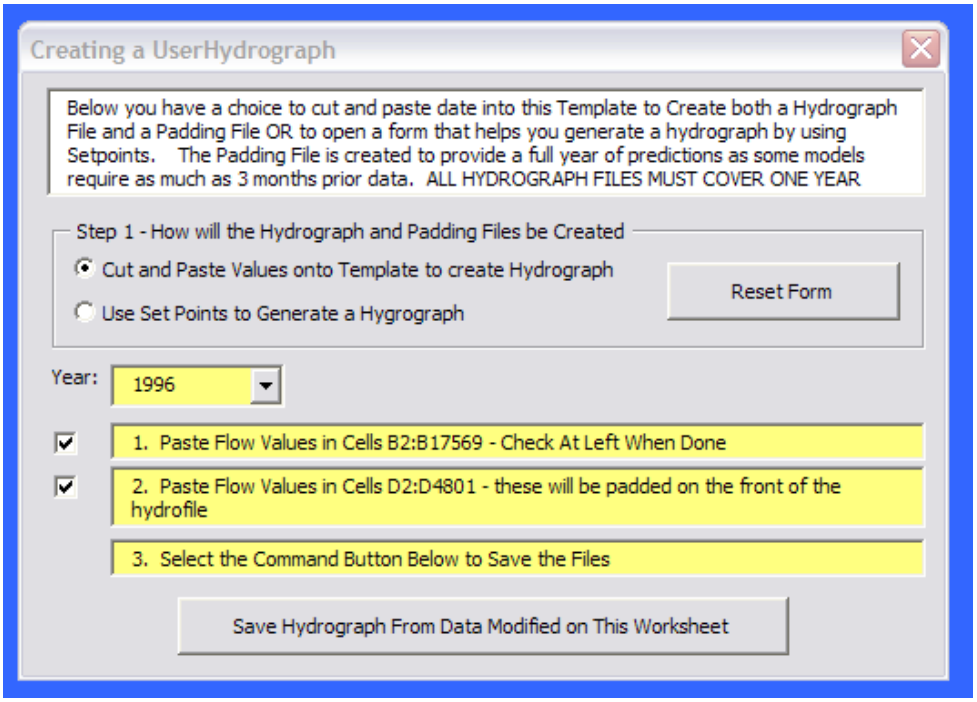


Figure A7. OptionForm with "Cut and Paste" option.

5.2.2 Creating a UserHydrograph using the Set Points Option

The Set Points Option allows the user to set values for specific dates. Once all set points are selected the program will interpolate between set points to generate the remaining flow values. Figure A8shows details of the OptionForm when the Generate hydrograph option is selected. The steps to perform the function follow.

- Select the Use Set Points option.
- Select the Generate Hydrograph Flows Command Button. This will open the Userform worksheet and the Create User Hydrograph Form (hereafter referred to as "SetPointForm").

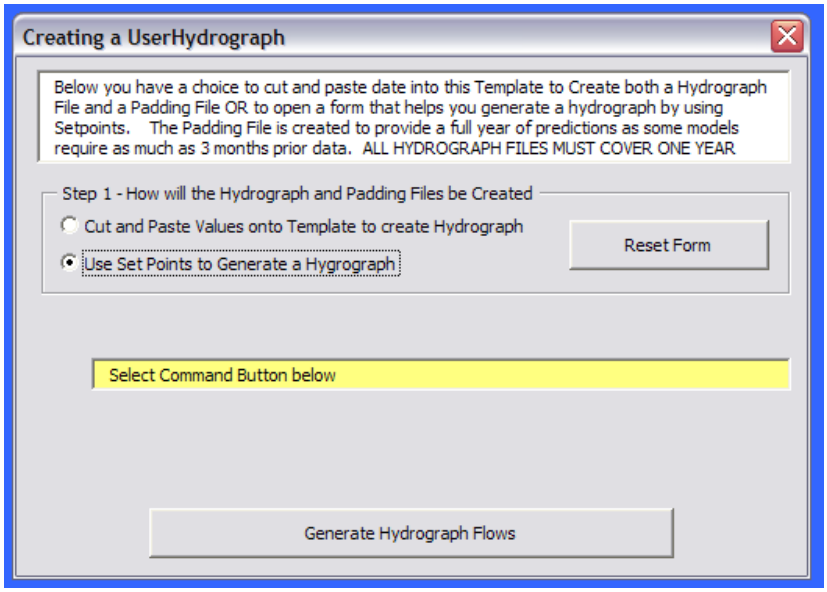


Figure A8. UserForm with "Generate a Hydrograph" option selected.

5.2.2.1 Userform Worksheet

The *SetPoint* Form (fig. A9) allows the user to specify set points for the userhydrograph. The program will then interpolate between the specified set points to create a userhydrograph. The steps are listed below.

- Select any year between 1994 and 2005 (Section 1 of fig. A9) for the userhydrograph.
- Enter a flow for the first set point. The first set point is automatically set to January 1 of the specified year.
- Enter a hold time for the value. The user has two choices for units in setting a hold time. The user may select that the hold time be specified in half-hourly time steps or daily time steps using the provided option buttons (Section 2 of fig. A9). For example, if the user has specified a hold time of 1 and selected daily time steps, the flow value specified will stay constant for 1 day. If the user has selected half-hourly time steps, the flow value specified will stay constant for 1 half hour.
- A user may specify up to 24 set points. After a set point has been entered, a new blank set point will become visible.
- After all set points have been entered, select the *Calculate and Save User Hydrograph* Command Button (Section 3 of fig. A9). This will interpolate values between setpoints, holding any given value for the specified hold time. If the last set point is not at year's end, the program will hold the last set point value to year's end.
- The user will be prompted for the name of the UserHydrograph File. A workbook will open with the User Hydrograph Data and the file saved. Figure A9shows the user windows that pop up for choosing the file name and saving of the file.

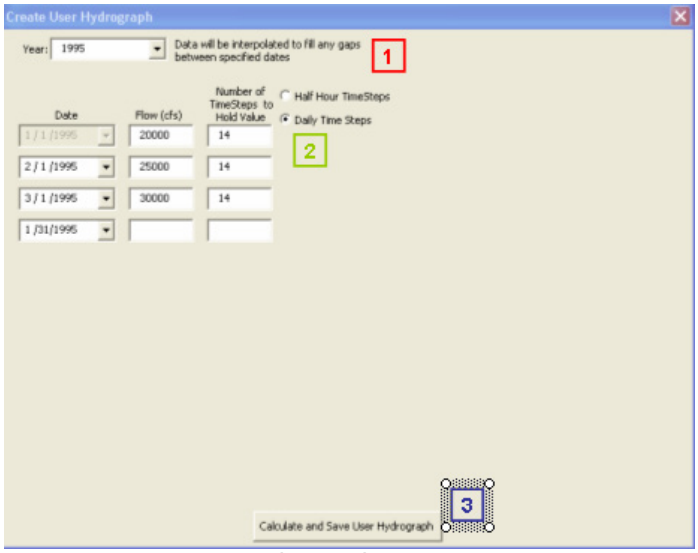


Figure A9. Create UserHydrograph Form.

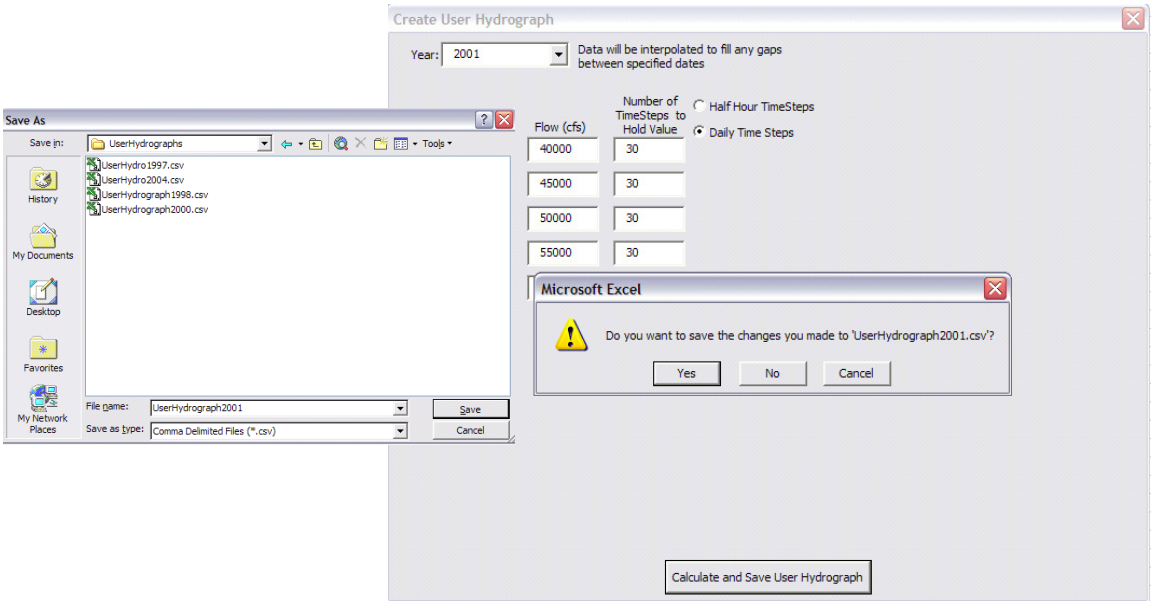


Figure A10. Saving the UserHydrograph.

5.3 Revision Control Worksheet

The Revision Control Worksheet notes each revision and its changes.

6. Marsh Filling and Visualization

The application *M2MVisualization_mmddyyy.xls* (hereafter refered to as "M2M-Vis") is used to fill Salinity values for the entire marsh area using salinity values from various gages. The program uses output from the Model program to fill the marsh values. To create these files, the user selects *Save Visualization* files when running a simulation using the Model. The files are saved in the *Visualization Files* folder.

The M2M-Vis application consists of seven worksheets, which are described below.

6.1 *About* Worksheet

The *About* Worksheet (fig. A11) contains contact and revision information.

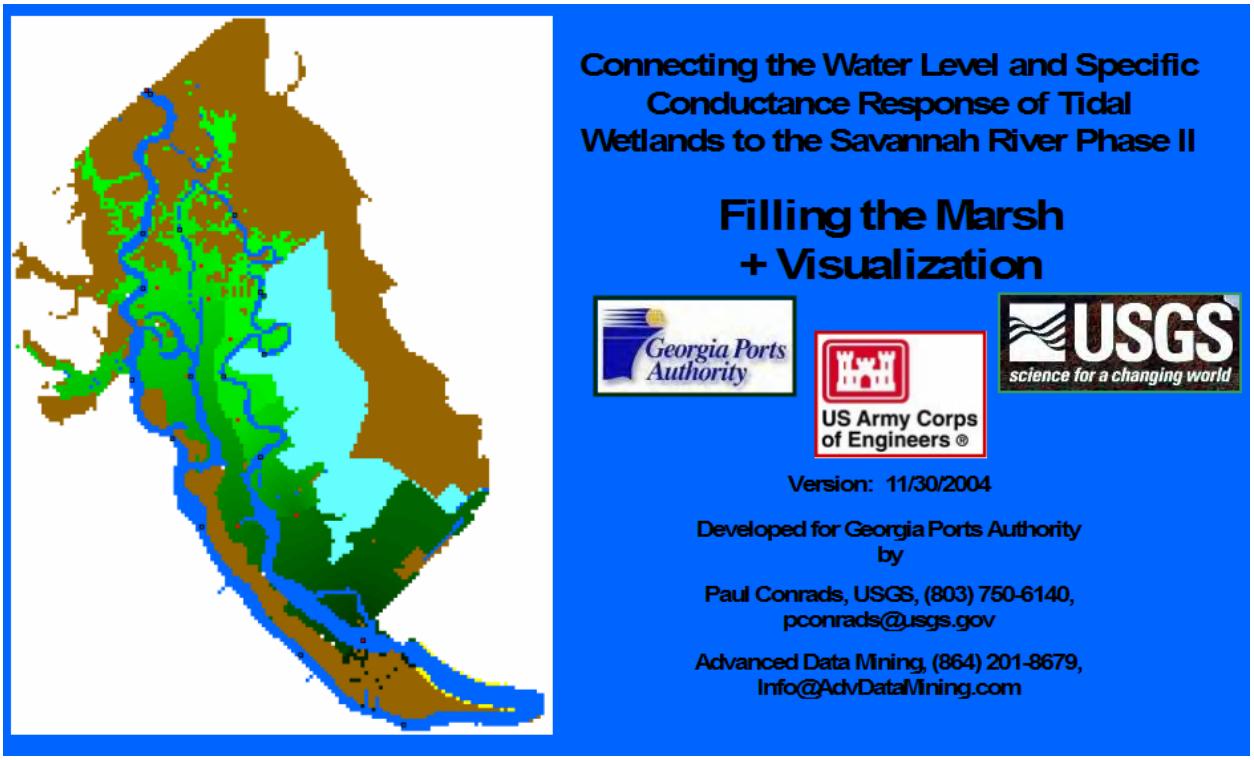


Figure A11. *About* worksheet for M2M visualization application.

6.2 *Visualization* Worksheet

The *Visualization* Worksheet (fig. A12) contains the visualization of the marsh and all controls for handling the filling and colorization of the marsh. The controls for filling the marsh are contained on the *Visualization Setup Userform* (Section 2 of Figure A12). Controls for changing the color scheme of the visualization grid are contained in the *Visualization Color Scheme Userform* (Section 3 of fig. A12).

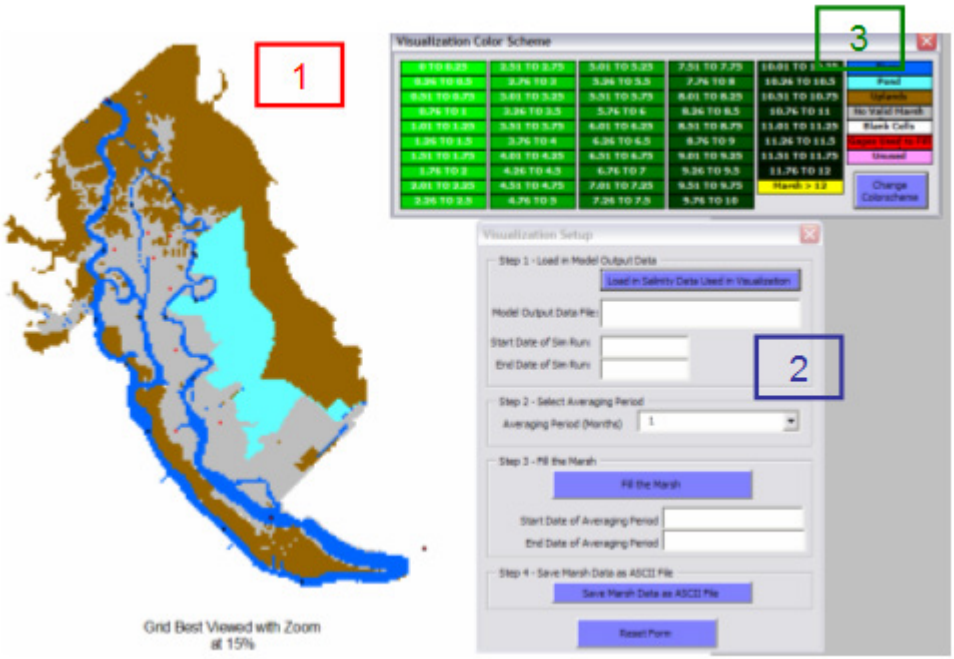


Figure A12. *Visualization* worksheet from M2M-Vis application.

6.2.1 Visualization Grid

The Visualization Grid (Area 1 of fig. A12) displays the Savannah River, Back River, marsh, and surrounding area. The river, upland area, and pond are displayed in blue, brown, and light blue, respectively. These remain fixed. The marsh area shown in gray in figure A12 will display in various shades of green (or other color scheme set by user), depending on the salinity. An example of this is shown in figure A13.

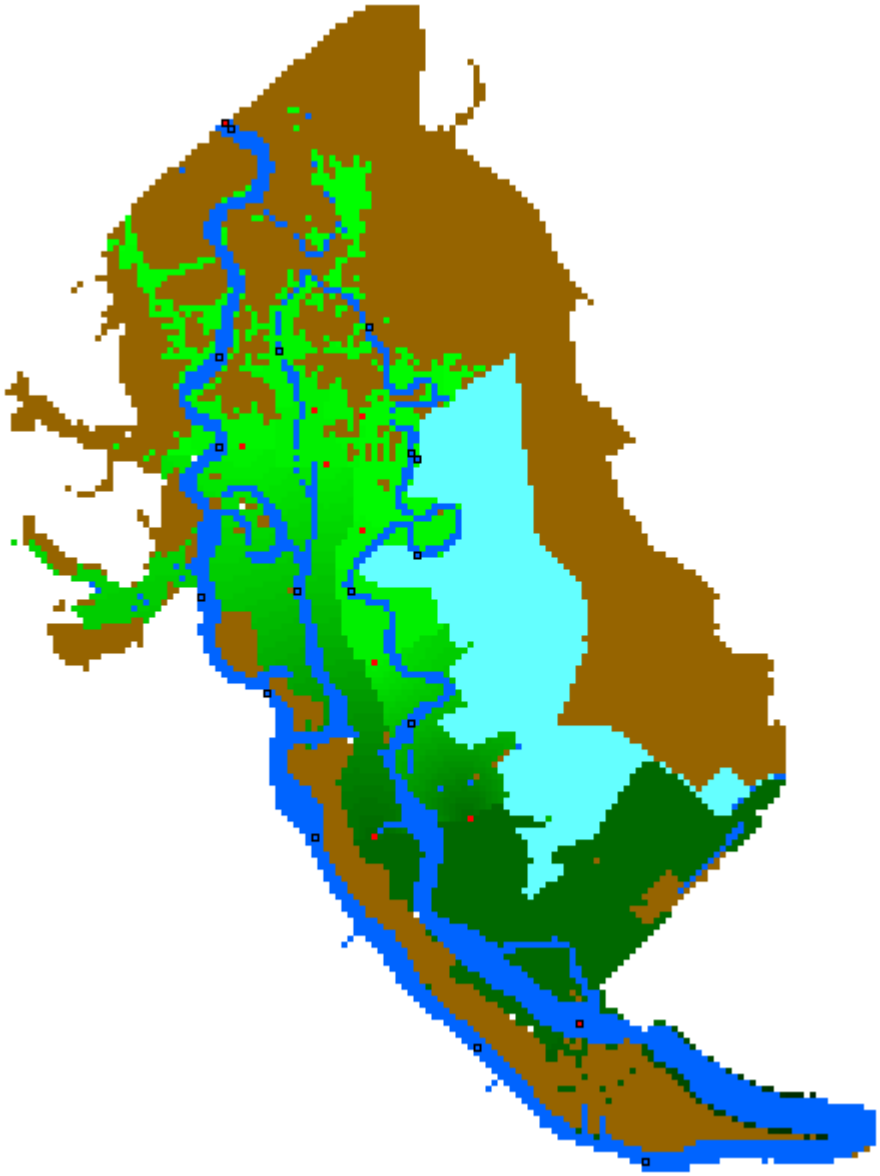


Figure A13. Color gradient of marsh area. Darker shades of green represent increasing salinity concentrations.

6.2.2 Visualization Setup UserForm

The *Visualization Setup Userform* (hereafter refered to as "SetupForm") is used to control the filling of the marsh for visualization (fig. A4). The form is divided into four steps, which are described below.

6.2.2.1 Step 1 – Load in Model Output Data

Here the user selects the file containing the salinity data that will be used to fill the marsh. Selecting the *Load in Salinity data Used in Visualization* Command Button will open a browser window from which the user can select the desired file. The only data that can be read into this program are the visualization data created by the Model program during the simulation run. The next three text boxes are for display only (no user input allowed) and will display the name of the data file selected, the start date of the simulation run for the selected file, and the end date of the simulation run for the selected file.

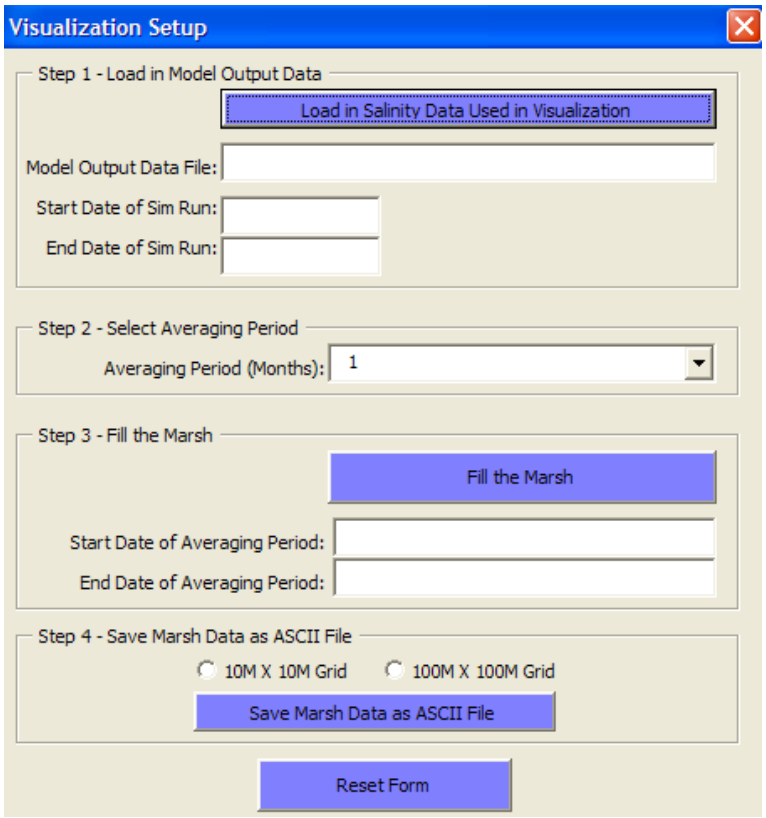


Figure A14. VisualizationSetup Userform.

6.2.2.2 Step 2 – Select Averaging Period

The visualization data contain half-hourly or hourly data created by the model program. These data can be averaged in increments of 1 month up to a year or more than 2 years. The averaging period to be used for filling is selected using the combo box in Step 2.

6.2.2.3 Step 3 – Fill the Marsh

Selecting the *Fill the Marsh* Command Button will compute averages for the gage locations given the selected averaging period. These averages will be used to interpolate the Marsh salinity values. The Marsh will then be filled with the colorization based on the Color Scheme used. In the color scheme used in figure A15, the darker green values correlate to higher salinity values. The two text boxes below the *Fill the Marsh* Command button are for display only and show the Start and End Date of the Averaging Period.

6.2.2.4 Step 4 – Save Marsh Data as ASCII File

To save the Marsh data to file, first select either 10MX10M or 100MX100M. Selecting the Save Marsh Data as ASCII File Command Button will then save the Filled Marsh Data. The data can then serve as input for other applications. The format of the Saved Marsh data is a space delimited file with six rows of header information defining the grid followed by the data. The header below is for a 10M X 10M grid.

ncols,1490
nrows,1950
xllcorner, 957290.6875
yllcorner, 757059.0625
cellsize, 32.80839895
NODATA_value,-9999
<data>

Also note that the following constant values are used: 888 = River, 777= Impounded Water , 222= Upriver.

6.2.3 Visualization Color Scheme UserForm

The *Visualization Color Scheme Userform* (hereafter referred to as "ColorForm") displays the current color scheme for the colorization of the Marsh. The values superimposed on the colored cell indicate the use of the color (fig. A15). For example, salinity values of 0 to 0.25 are colored the lightest green. Any salinity value greater than 12 is colored yellow. The colored cells on the far right indicate the constant colors used in the grid. This color scheme can be changed by selecting the *Change Colorscheme* command button. Selecting this button will take the user to the *ColorScheme* Worksheet.

Figure A15. Visualization color scheme Userform.

6.3 *ColorScheme* Worksheet

The *Colorscheme* Worksheet (fig. A16 is used to change the colors used in the visualization of the marsh. Excel allows 56 colors. The user can assign any desired RGB values to a particular color index.

- The ColorIndex column of the Colorscheme Worksheet indicates the Color Index Being Assigned. These values cannot be changed.
- The Red, Green, and Blue columns have the red, green, and blue components of the color, respectively. The values used can range from 0 to 255. The user changes these values to change the color scheme.
- The column to the right of the Blue column shows the color setting based on the user RGB values selected.
- Cell G2 contains the user set maximum salinity value. The user enters this value.

6.3.1 Color Values for the Marsh Salinity Levels

In Section 1 of figure A16, the user can alter the RGB values for the 49 color indexes used in coloring the marsh. Index 1 is for the lowest salinity value, and Index 48 is for the maximum salinity value. Any salinity value greater than the maximum set will be colored using Index 49. To determine the salinity values used for Index 2 to Index 27, the total range is divided into 48 equal parcels.

6.3.2 Color Values for Constant Values

In Section 2 of figure A16, the colors are selected for constant areas. These defined areas are

- River, Pond (Imprisoned Water), Uplands, No Valid Marsh Data, Blank Cells, Gages Used to Fill Marsh, and one unused.

6.3.3 Maximum Salinity Setting

In Section 3 of figure A16, specifically Cell G2 of the worksheet, the user sets the maximum salinity value which is used in creating the color gradients.

6.3.4 Reset the Color Scheme

Selecting the *Reset Color Scheme* Command Button will update the Color Index to match the new user settings. The new colors will display in column F of the worksheet.

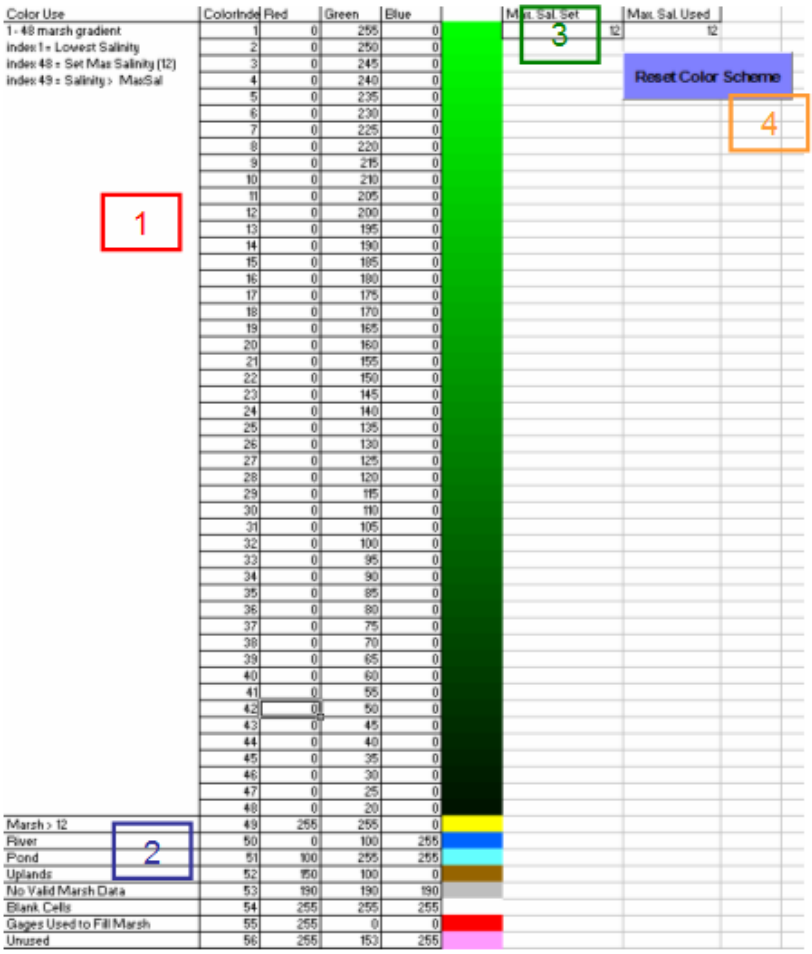


Figure A16. *ColorScheme* worksheet.

6.4 *Simulation Data* Worksheet

The *Simulation Data* Worksheet (fig. A17) contains the data read in from the Visualization File.

	A	B	C	D	E	F	G	H	I	J	K
1	DateTime	SC8840	SCGPA04B	SCGPA05B	SCB1	SCB2	SCB3	SCB4	SCF1	SCM1	SCM2
2	36526	0.0513	22.729	7.3763	0.4381	0.4842	0.9773	6.2567	0.7966	0.9011	1.4594
3	36526.04167	0.0513	24.4509	9.5851	0.4379	0.4877	0.979	6.2687	0.8026	0.9045	1.4577
4	36526.08333	0.0514	24.1186	11.2806	0.4382	0.4889	0.9817	6.2851	0.7993	0.9039	1.5216
5	36526.125	0.0517	23.7396	12.649	0.4385	0.4932	0.9877	6.3194	0.8019	0.9036	1.5229
6	36526.16667	0.0518	24.1594	13.0702	0.4384	0.4971	0.9905	6.3366	0.8099	0.9046	1.5332
7	36526.20833	0.0526	24.2877	14.1548	0.4387	0.5025	0.9965	6.3682	0.8191	0.9046	1.459
8	36526.25	0.0523	24.367	14.6027	0.4384	0.5027	0.9951	6.3555	0.8234	0.9062	1.4306
9	36526.29167	0.0519	23.8487	13.0824	0.4381	0.4996	0.9907	6.3232	0.8224	0.9075	1.4177
10	36526.33333	0.0513	23.5442	11.7726	0.4376	0.4956	0.9836	6.2733	0.8204	0.9106	1.4619
11	36526.375	0.0515	22.1844	8.8105	0.4374	0.492	0.979	6.2402	0.8118	0.912	1.4171
12	36526.41667	0.0516	21.388	6.885	0.4372	0.489	0.9755	6.2188	0.7996	0.9124	1.42
13	36526.45833	0.0518	21.0091	4.6031	0.4373	0.4878	0.9755	6.2208	0.7913	0.9107	1.4526
14	36526.5	0.0517	20.0528	6.0375	0.4373	0.484	0.9733	6.2066	0.7814	0.9082	1.4737
15	36526.54167	0.0518	20.9867	8.5314	0.4376	0.4822	0.9748	6.2094	0.773	0.9048	1.4367
16	36526.58333	0.0519	22.6016	10.8723	0.4377	0.4832	0.977	6.2194	0.7724	0.9037	1.4564

Figure A17. *Simulation data* worksheet.

6.5 Original *Colorscheme* Worksheet

This worksheet contains the original color scheme and is read only. To restore the original scheme, the user can copy and paste the values from this worksheet onto the *Colorscheme* Worksheet.

6.6 *Revision Control* Worksheet

The *Revision Control* Worksheet notes each revision and its changes.