Appendix 2. User's Manual for the Pee Dee River and Atlantic Intracoastal Waterway Salinity Intrusion Model Decision Support System

1. INTRODUCTION

This document describes how to install and operate the **P**ee Dee **R**iver and Atlantic **I**ntracoastal Waterway **S**alinity Intrusion **M**odel (PRISM). The PRISM is a decision support system (DSS) built around a suite of empirical hydrologic models of the study area (fig. A1). Hydrologic behaviors in the study area have been measured at a number of gaging stations operated by the U.S. Geological Survey (USGS) since the mid 1980s.

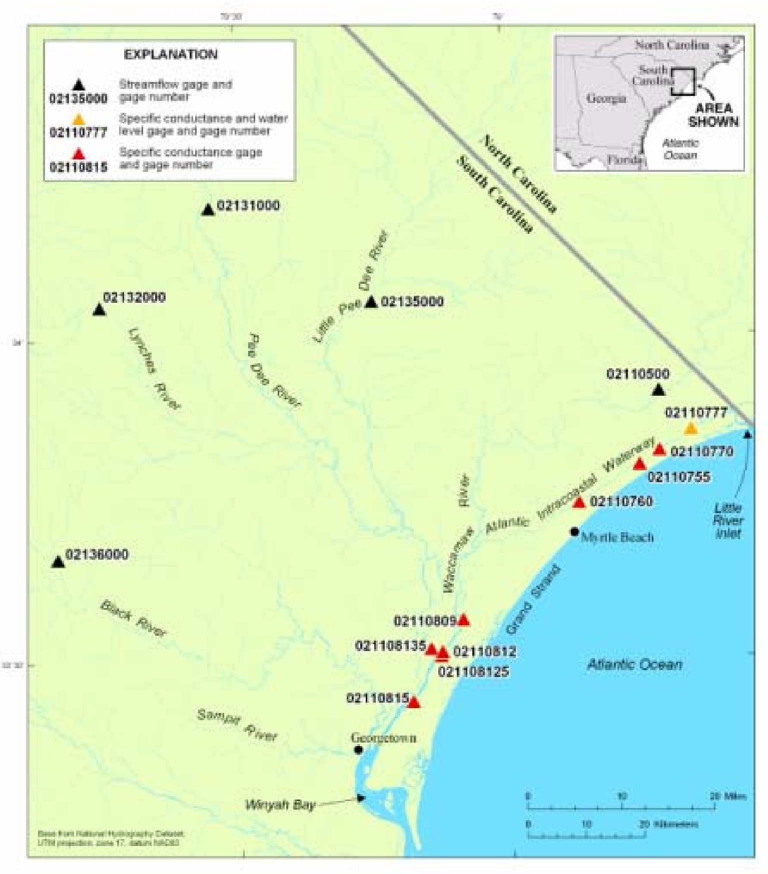

Figure A1. Study area showing USGS gage locations where flow, water level, and specific conductance were measured.

2. INSTALLATION

1. Create a folder called "PRISM" at the top level of your C: drive.
2. Extract all files from the distributed PRISM-yyyymmdd.zip[1] file. The WinZip™ file contains the following application files:

   PRISM-yyyymmdd.xls – a Microsoft Excel™ (Excel) spreadsheet application.

   18 files with an ".enn" extension – these are the artificial neural network (ANN) files.

   NNCALC32.xll – a custom Excel add-in used to execute the *.enn files.

   PRISMUserGuide-yyyymmdd.doc – the Microsoft Word™ file that you are reading right now.

   ReadMe.txt – a text file with these installation instructions.
3. Open your copy of Microsoft Excel™ for Office 2000™ (Excel). The version of Excel must be 2000 or newer. Ensure that the standard Excel Add-Ins listed below are installed and checked "available."

   Analysis Toolpak

   Analysis Toolpak – VBA

   Add-Ins are accessed from Excel's Tools menu. If any are missing, it may be necessary to install them from your Microsoft Office CD-ROM.
4. Set the macro security level of Excel to either medium or low using Tools > Macro > Security. PRISM uses VBA macros for a variety of purposes and must be able to execute them to operate correctly.

5. Install the NNCALC32 custom Excel add-in that resides in the NNCALC folder described in Step 2. This may be accomplished by clicking on Tools > Add-Ins > Browse, then browsing to the PRISM folder you created, clicking on the NNCALC32 icon, then clicking OK.
6. Open the PRISM-yyyymmdd.xls Excel spreadsheet application. When Excel asks if you want to run macros click “Enable Macros,” otherwise PRISM will not operate correctly.

Select the “Run” worksheet (fig. A2). “Run” is the graphical user interface (GUI) component that allows the user to set up and run simulations. At the top of “Run” is a text box labeled “Where Model Files are Located.” The model files are the *.enn files. Type in the fully qualified path name of the folder set up in Step 1 above and save the Excel application using File > Save for the set up changes to be permanent.

At the lower left of the “Run” worksheet are a number of columns having headers containing SC (specific conductance). If any of the SC-related fields show numerical values and not “?” or an Excel or NNCALC32 error code, the application is properly configured and ready to use. If all of the SC-related fields show “?” or an error code, exit Excel™ and reload Excel and the PRISM application.

An error code indicates that an ANN cannot execute because either the NNCALC32 add-in is not installed per Step 5 or NNCALC32 cannot find *.enn files because the folder path name in the “Where Model Files are Located” text box is incorrect.

If you cannot get PRISM to operate, re-check the configuration items in Steps 3-6 above.

---

[1] yyyymmdd is the version date of the PRISM application to be installed.

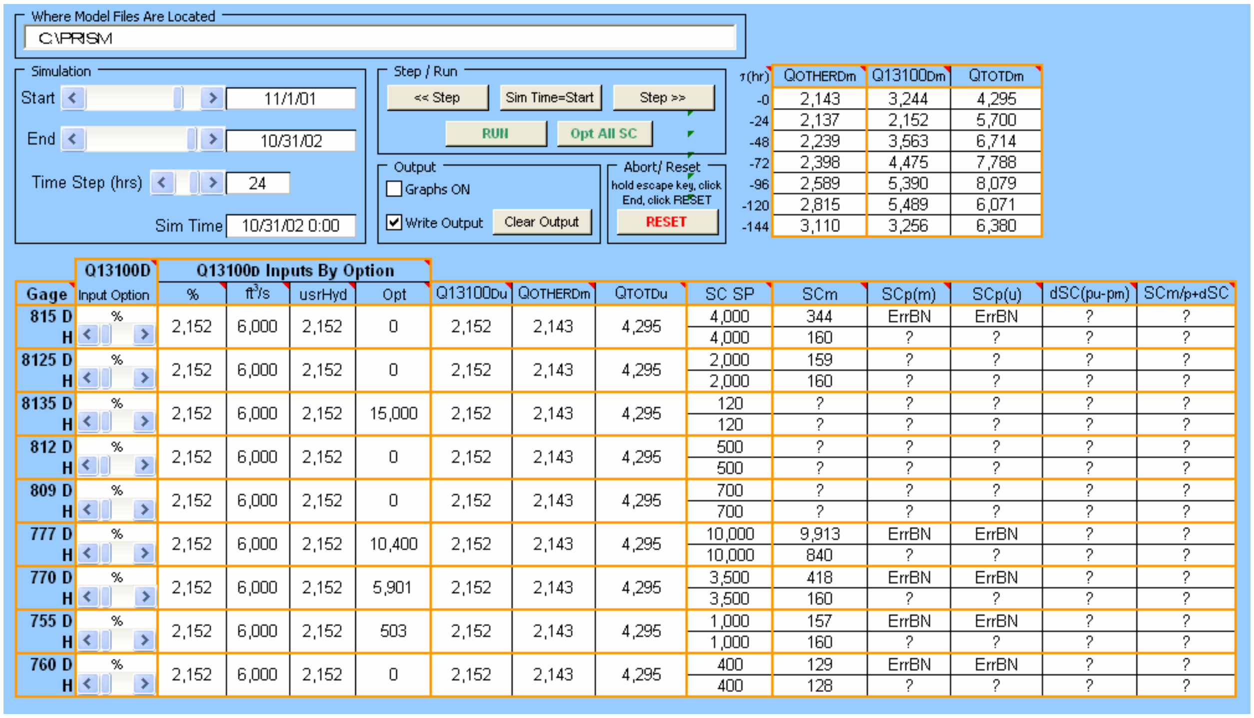

Figure A2. The "Run" worksheet, a component of Pee Dee River and Atlantic Intracoastal Waterway Salinity Intrusion Model graphical user interface.

3. REMOVAL

Simply delete the folder created to hold the PRISM files and its contents.

4. OPERATION

PRISM is opened like any standard Excel workbook. Simply open the PRISM-yyyymmdd.xls file and begin. PRISM and its GUI include a number of worksheets that are detailed in the following sections.

4.1. Variable Descriptions, Nomenclature, and “ReleaseNotes” Worksheet

PRISM refers to many input and output variables, usually in the form of column headers (fig. A3). Moving the cursor over a header marked with a red caret immediately above and to the right of the header will provide a description of the header variable.

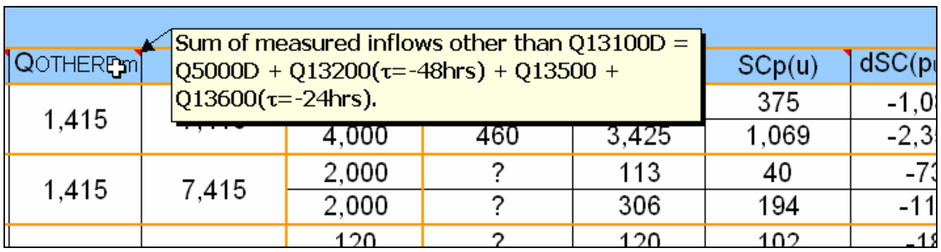

Figure A3. Description of the variable QOTHERDm on the “Run” worksheet.

Descriptions of variables are provided in the “ReleaseNotes” worksheet. This worksheet also describes PRISM’s development history and any new features or changes.

Some of the prefixes, suffixes, and other modifiers that are used in variable names include:

“D,” used as a suffix to indicate that a variable is a “daily” or 24-hour average;

“d,” used as a prefix to indicate that a variable is a difference between two variables’ values;

“p,” used to indicate that the variable is a model prediction;

“m,” used to indicate that a variable’s value is either,

- an actual measurement or
- a model prediction made using an actual Q131000 measurement as an input value;

“u,” used to indicate that a variable’s value is either

- a user-set or optimizer-set Q131000 value or

- a model prediction made using a user-set or optimizer-set Q131000 input value.

4.2. "Info" Worksheet

The "Info" worksheet is automatically displayed when PRISM is first loaded (fig. A4). It contains the program's version date and the contact information of its developers.

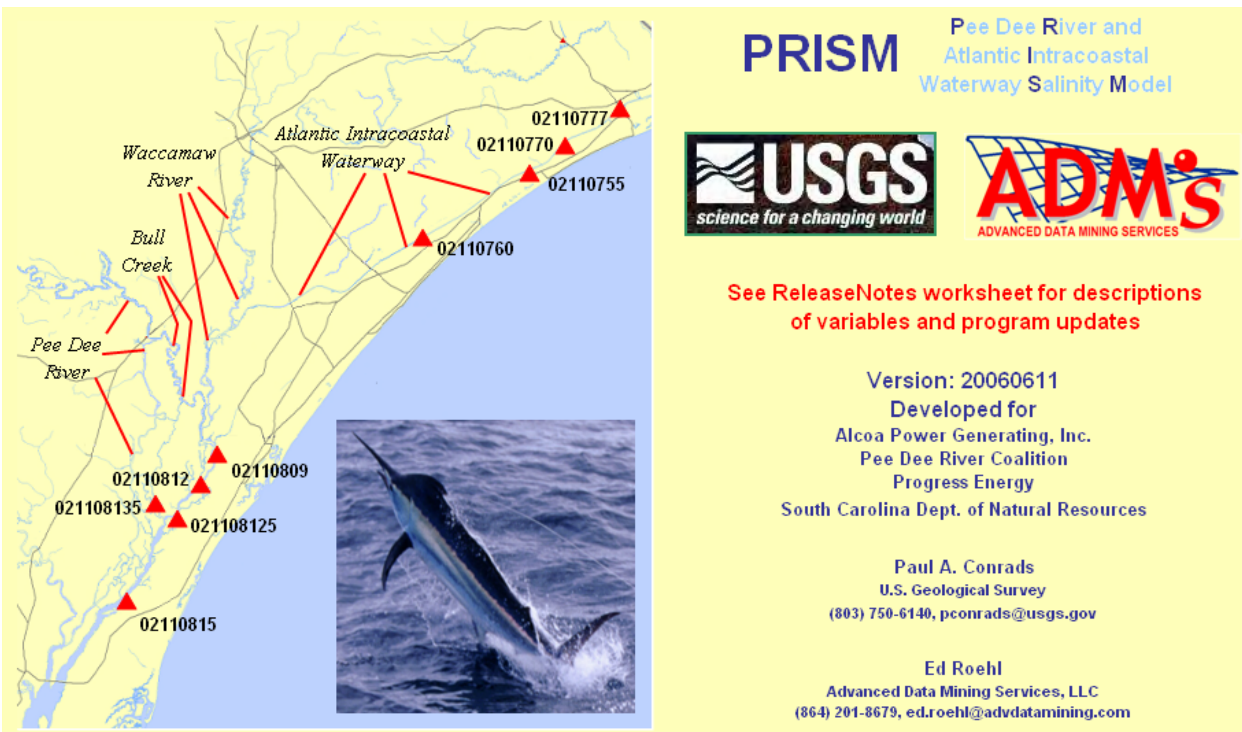

Figure A4. The "Info" worksheet.

4.3. "Run" Worksheet

The "Run" worksheet (fig. A2) is the GUI component that allows the user to set up and run simulations. At the top of "Run" is a text box labeled "Where Model Files are Located." The textbox is used to configure PRISM when it is first installed on a user's computer and is described further in section 2. As shown in figure A5, start and end dates for simulations can be set by using the controls at the upper left. The end date must be more recent than the start date. The "Time Step" can be set to either 1 hour or 24 hours. PRISM simultaneously calculates both daily average and hourly SC. The "Sim Time" text box indicates the time stamp that is providing the current input values to PRISM's models.

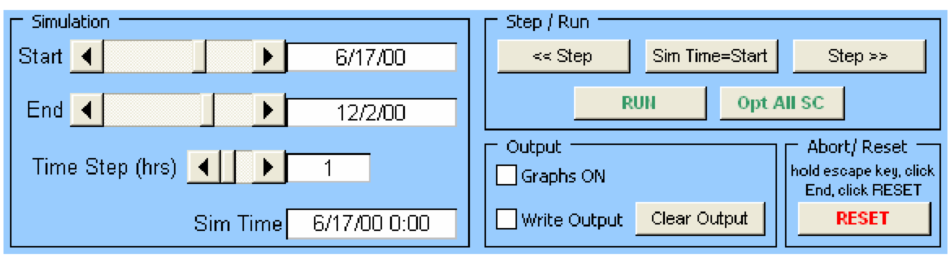

Figure A5. Simulation controls on "Run" worksheet.

In the "Step / Run" controls at the upper right in figure A5, "<<Step" and "Step>>" move the current time stamp backward or forward one time step. "Sim Time=Start" sets the current time stamp to the simulation "Start" date. "RUN" will start and run a simulation between the dates indicated by the simulation "Start" and "End" dates. "Opt All SC" will, for the current time stamp, run the optimizer for those gages designated by their "Q13100D Input Option" (fig. A2) to use the optimizer.

On a separate worksheet for each gage, PRISM provides detailed numerical and streaming graphical information that can be observed during simulations or when incrementally stepping through time. This allows the user to examine specific periods and behaviors of interest in detail. PRISM also will write input and output data to the “Output” worksheet. Because of the added computational load, simulations are slowed when streaming graphics and simulation output are generated. The “Graphs ON” and “Write Output” check boxes of the “Output” controls at lower center right in figure A5 allow the user to toggle the streaming graphics on or off. The “Clear Output” button erases all data in the “Output” worksheet to allow data from a new simulation to be recorded.

A simulation may be stopped at any time during a run by holding down the “Esc” key, after which a pop-up window will appear like the one shown in figure A6. Click on the “End” button to stop the simulation, then click the “RESET” button shown at the lower right in figure A5. The “RESET” button activates Excel’s™ automatic calculation feature (autocalc). Because the model programmatically manipulates autocalc for performance reasons, aborting a simulation can sometimes leave the model in a state where autocalc is not activated. This is remedied by clicking the “RESET” button.

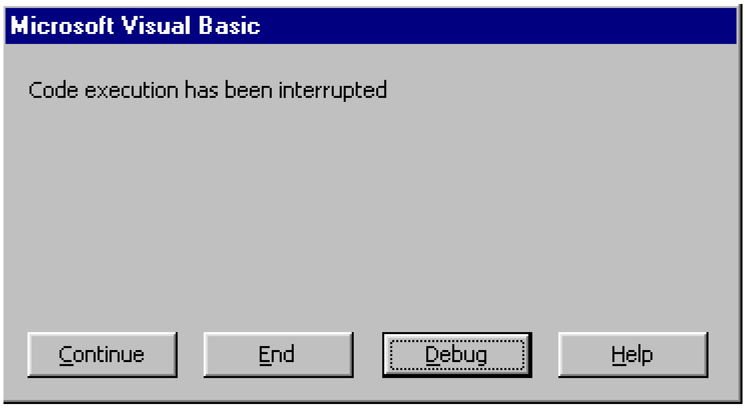

Figure A6. Pop-up window that appears when a simulation is interrupted using the "Esc" key.

Figure A7 shows that there are a number of input options for the models of each gage. By column from left to right:

"Gage:" denotes the gage options, setpoints, measurements, and predictions in the rows to the right in the "Run" worksheet. The "D" (daily average value) and the "H" (hourly value) label the "SC SP," "SCm," "SCp(m)," "SCp(u)," "dSC(pu-pm)," and "SCm/p+dSC" fields.

"Q13100D Input Option:" Options listed below are shown above slider bar. Only "%" is shown in figure A7:

- "%:" percent of historical flow
- "ft^3/s:" fixed flow rate in units of cubic feet per second
- "usrHyd:" uses the user-defined hydrograph pasted into the UserQ13100D worksheet by the user
- "LimitD:" the optimizer is engaged when the daily average SC at the gage exceeds the SC setpoint set on the "SPs" worksheet (see section 4.4)

- “LimitH:” the optimizer is engaged when the hourly SC at the gage exceeds the SC setpoint set on the “SPs” worksheet
- “OptD:” the optimizer is engaged continuously to hold daily average SC at the gage to the SC setpoint set on the “SPs” worksheet
- “OptH:” the optimizer is engaged continuously to hold daily average SC at the gage to the SC setpoint set on the “SPs” worksheet

“Q13100D Inputs By Option:” the potential user-set Q13100D values input to each gage’s model pair. The actual value used depends on the “Q13100D Input Option” setting.

- “%:” shows the “%” setpoint value set on the “SPs” worksheet
- “ft^3/s:” shows the “ft^3/s” setpoint value set on the “SPs” worksheet
- “usrHyd:” shows the value given for the current time stamp in the user-defined hydrograph on the UserQ13100D worksheet
- “Opt:” shows the value computed by the optimizer to meet the SC Setpoint set on the “SPs” worksheet

Q13100Du: the input value used according to the “Q13100D Input Option” setting.

QOTHERDm: sum of measured unregulated inflows = Q5000D + Q13200(•=48 hrs) + Q13500 + Q13600(•=24 hrs).

QTOTDu: total inflow = Q13100Du(•=24 hrs) + QOTHERm

“SC SP:” Daily and hourly SC setpoints as set on the “SPs” worksheet. The setpoint used is per the Q13100D Input Option.

“SCm:” measured daily and hourly SC

“SCp(m):” predicted daily and hourly SC using the measured Q13100D for input

“SCp(u):” predicted daily and hourly SC using the Q13100Du for input “dSC(pu-pm):” = SCp(u) – SCp(m)

“SCm/p+dSC:” = SCm + dSC(pu-pm) if SCm is not missing, else = SCp(m) + dSC(pu-pm) .

	Q13100D	Q13100D Inputs By Option											
Gage	Input Option	%	ft³/s	usrHyd	Opt	Q13100Du	QOTHERDm	QTOTDu	SC SP	SCm	SCp(m)	SCp(u)	dSC(pu-pm)	SCm/p+dSC
815 D	%	2,152	6,000	2,152	0	2,152	2,143	4,295	4,000	344	ErrBN	ErrBN	?	?
H									4,000	160	?	?	?	?
8125 D	%	2,152	6,000	2,152	0	2,152	2,143	4,295	2,000	159	?	?	?	?
H									2,000	160	?	?	?	?
8135 D	%	2,152	6,000	2,152	15,000	2,152	2,143	4,295	120	?	?	?	?	?
H									120	?	?	?	?	?
812 D	%	2,152	6,000	2,152	0	2,152	2,143	4,295	500	?	?	?	?	?
H									500	?	?	?	?	?
809 D	%	2,152	6,000	2,152	0	2,152	2,143	4,295	700	?	?	?	?	?
H									700	?	?	?	?	?
777 D	%	2,152	6,000	2,152	10,400	2,152	2,143	4,295	10,000	9,913	ErrBN	ErrBN	?	?
H									10,000	840	?	?	?	?
770 D	%	2,152	6,000	2,152	5,901	2,152	2,143	4,295	3,500	418	ErrBN	ErrBN	?	?
H									3,500	160	?	?	?	?
755 D	%	2,152	6,000	2,152	503	2,152	2,143	4,295	1,000	157	ErrBN	ErrBN	?	?
H									1,000	160	?	?	?	?
760 D	%	2,152	6,000	2,152	0	2,152	2,143	4,295	400	129	ErrBN	ErrBN	?	?
H									400	128	?	?	?	?

Figure A7. Input options and values for each gage.

4.4. “SPs” (Setpoints) Worksheet

The upper portion of the “SPs” worksheet is the component of PRISM’s GUI that allows the user to set flow and SC setpoints (fig. A8). The actual setpoint used for each gage is determined by the “Q13100D Input Option” selected on the “Run” worksheet. At the left of the “SPs” worksheet are controls that allow the “%” (of historical) Q13100D and the constant valued “ft^3/s” Q13100D setpoints to be set for each gage. At the right are the controls for setting the SC daily (D) and hourly (H) setpoints. The historical daily and hourly maximum and minimum SCs are provided for reference. Maximum and minimum allowed SC setpoints, which are constraints on the optimizer derived from the historical daily and hourly maximum and minimum SCs, also are given. A “hard-coded” optimizer constraint is that Q13100D is limited to a maximum of 15,000 ft^3/s.

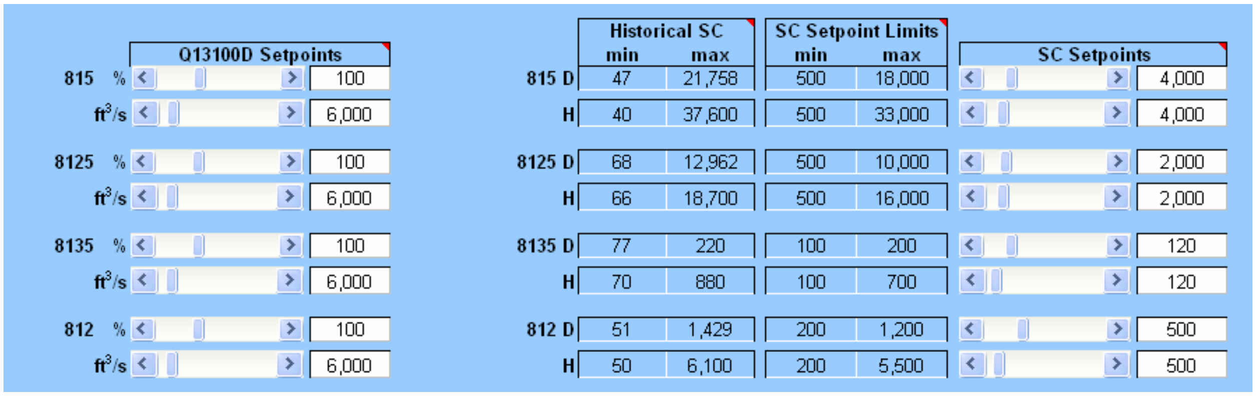

Figure A8. Upper portion of the “SPs” worksheet showing headings of the controls and variables.

4.5. “Database” and “Output” Worksheets

The “Database” worksheet contains the time series data used by PRISM to run simulations (fig. A9). These data are described in table A1 and are derived from the raw field measurements. They are augmented by calculated variables whose values are calculated by PRISM’s computer code. The user should not alter data in the “Database” worksheet.

DATETIME	ROW	IQ500Dm	IQ13100Dm	IQ13200Dm	IQ13500Dm	IQ13600Dm	FWL777Hm	FWL777Dm	IFXWL777Hm	IFXWL777Dm	SPEEDD4m
7/11/95 12:00	2	1517.51	18329.54	552.57	5589.35	1683.94	10.94	13.28556919	5.140999794	5.241818428	5.1979
7/11/95 13:00	3	1515.97	18330.77	551.89	5581.94	1689.08	10.53	13.28630733	5.256999969	5.24412632	5.2292
7/11/95 14:00	4	1514.43	18330.15	551.31	5574.18	1694.22	10.43	13.28596878	5.373000145	5.246202946	5.2292
7/11/95 15:00	5	1512.89	18326.77	550.83	5566.34	1699.32	11.85	13.28559971	5.488999844	5.248159885	5.2188
7/11/95 16:00	6	1511.35	18321.23	550.44	5558.34	1704.4	13.45	13.28556919	5.605000019	5.250107765	5.2292
7/11/95 17:00	7	1509.82	18313.54	550.12	5550.74	1709.48	14.68	13.28618431	5.722000122	5.252160072	5.2083
7/11/95 18:00	8	1508.28	18303.69	549.87	5543.57	1714.52	15.7	13.2874155	5.837999821	5.254424572	5.1771
7/11/95 19:00	9	1506.74	18291.69	549.68	5536.15	1719.57	16.44	13.28876877	5.953999996	5.257009029	5.1979
7/11/95 20:00	10	1505.23	18277.23	549.53	5529.17	1724.65	16.5	13.28963089	6.070000172	5.260024548	5.3229
7/11/95 21:00	11	1503.75	18260	549.43	5522.34	1729.72	15.41	13.28938484	5.977000237	5.263501644	5.3333
7/11/95 22:00	12	1502.31	18240.62	549.36	5515.78	1734.8	14.33	13.28827667	5.885000229	5.267477036	5.3438
7/11/95 23:00	13	1500.89	18218.77	549.32	5509.72	1739.85	13.21	13.28667736	5.791999817	5.271984577	5.3229
7/12/95 0:00	14	1499.51	18194.46	549.3	5504.09	1744.92	12.04	13.28492355	5.699999809	5.277058601	5.3229
7/12/95 1:00	15	1498.15	18168	549.28	5498.8	1750	11.22	13.28332329	5.606999874	5.282729149	5.3438
7/12/95 2:00	16	1496.83	18139.69	549.25	5493.75	1755.05	10.77	13.28196907	5.514999866	5.289030552	5.3125
7/12/95 3:00	17	1495.51	18108.92	549.19	5489.29	1760.06	10.81	13.28089237	5.421999931	5.295997143	5.3125
7/12/95 4:00	18	1494.22	18076.31	549.1	5484.98	1765.08	12.08	13.2791996	5.329999924	5.303661346	5.2708
7/12/95 5:00	19	1492.98	18041.54	548.97	5480.92	1770.09	13.54	13.27741528	5.236999989	5.312058449	5.2396
7/12/95 6:00	20	1491.82	18004.62	548.79	5476.55	1775.11	14.64	13.27596951	5.144999981	5.321221352	5.25
7/12/95 7:00	21	1490.71	17965.23	548.55	5471.94	1780.09	15.38	13.27498436	5.052000046	5.331181526	5.3125
7/12/95 8:00	22	1489.66	17923.38	548.26	5467.69	1785.02	15.73	13.27492332	4.960000038	5.341975212	5.3542
7/12/95 9:00	23	1488.65	17879.08	547.88	5463.14	1789.85	15.06	13.27596951	5.037000179	5.353449345	5.4167
7/12/95 10:00	24	1487.66	17832.62	547.43	5458.28	1794.65	14.01	13.27843094	5.114999771	5.365421772	5.4375
7/12/95 11:00	25	1486.74	17783.69	546.9	5453.32	1799.42	12.83	13.28209209	5.191999912	5.37770462	5.4375
7/12/95 12:00	26	1485.88	17732.62	546.27	5448.12	1804.15	11.83	13.28667736	5.269999981	5.39011097	5.4792
7/12/95 13:00	27	1485.08	17679.69	545.54	5442.77	1808.8	11.25	13.29249191	5.347000122	5.402452469	5.5104
7/12/95 14:00	28	1484.34	17624.31	544.7	5437.26	1813.32	10.77	13.29920006	5.425000191	5.41454792	5.5729
7/12/95 15:00	29	1483.66	17566.77	543.77	5431.6	1817.72	10.76	13.30704594	5.501999855	5.42620945	5.5521
7/12/95 16:00	30	1483.05	17507.38	542.72	5425.63	1822.03	12.13	13.31630802	5.579999924	5.437255383	5.5417

Figure A9. Example of measured data from the "Database" Worksheet.

Table A1. Descriptions of variables written to the "Output" worksheet during simulations.

DESCRIPTIONS OF OUTPUT VARIABLES	
VARIABLE	DESCRIPTION
DATETIME	time stamp
ROW	Database worksheet for identifier
IQ500Dm	(I)nterpolated (m)easured (D)aily average Q5000 (ft3/s)
Q13100Dm	(I)nterpolated (m)easured (D)aily average Q131000 (ft^3/s)
IQ13200Dm	(I)nterpolated (m)easured (D)aily average Q132000 (ft^3/s)
IQ13500Dm	(I)nterpolated (m)easured (D)aily average Q135000 (ft^3/s)
IQ13600Dm	(I)nterpolated (m)easured (D)aily average Q136000 (ft^3/s)
QOTHERDm	Sum of measured inflows other than Q13100D = Q5000D + Q13200(τ=48hrs) + Q13500 + Q13600(τ=24hrs).
QTOTDm	Q13100Dm(τ=24hrs) + QOTHERDm
FWL777Hm	(F)illed (m)easured (H)ourly water level at gage 02110777
FWL777Dm	(F)illed (m)easured (D)aily water level at gage 02110777
IFXWL777Hm	(I)nterpolated (F)illed (m)easured (H)ourly water level at gage 02110777
IFXWL777Dm	(I)nterpolated (F)illed (m)easured (D)aily water level at gage 02110777
SPEEDD4m	4-day average wind speed
DIRECTD4m	4-day average wind direction
InpOptionXXXX	Q13100Du input option for gage XXXX set on Run worksheet
%Q13100Dm(XXXX)	% Q13100Du setpoint for gage XXXX set on SPs worksheet
Q13100Du(XXXX)	User Q13100D per the selected Input Option for gage XXXX set on SPs worksheet
QTOTDu(XXXX)	Total inflow = Q13100Du(τ=24hrs) + QOTHERm
SCSP(XXXX)	SC setpoint for gage XXXX set on the SPs worksheet
SCXXXXDm	(D)aily (m)easured SC for gage XXXX
SCXXXXDp(m)	(D)aily predicted SC for gage XXXX using input Q13100Dm
SCXXXXDp(u)	(D)aily predicted SC for gage XXXX using input Q13100Du
dSCXXXXD(pu-pm)	SCXXXXDp(u) - SCXXXXDp(m)
SCXXXXDm/p+dSC	SCXXXXDm + dSCXXXXD(pu-pm) if SCXXXXDm is not missing, else = SCXXXXDp(m) + dSCXXXXD(pu-pm)
SCXXXXHm	(H)ourly (m)easured SC for gage XXXX
SCXXXXHp(m)	(H)ourly predicted SC for gage XXXX using input Q13100Dm
SCXXXXHp(u)	(H)ourly predicted SC for gage XXXX using input Q13100Du
dSCXXXXH(pu-pm)	SCXXXXHp(u) - SCXXXXHp(m)
SCXXXXHm/p+dSC	SCXXXXHm + dSCXXXXH(pu-pm) if SCXXXXHm is not missing, else = SCXXXXHp(m) + dSCXXXXH(pu-pm)

The "Output" worksheet contains a record of key variables for a particular simulation run (fig. A10). The "Write Output" check box on the "Run" worksheet (fig. A2) must be checked for output to be written. The variables written to the "Output" worksheet are explained in table A1. The user can copy output values into another Excel workbook for further analysis.

DATETIME	ROW	IQ500Dm	Q13100Dm	IQ13200Dm	IQ13500Dm	IQ13600Dm	QOTHERDm	QTOTDm	FWL777Hm	FWL777Dm	IFXWL777Hm	IFXWL777Dm
7/15/98 0:00	26390	39	1525	286	424	87	874	2939	15.28	13.05	4.46	4.54
7/16/98 0:00	26414	35	1799	277	413	78	835	2359	14.36	12.93	4.22	4.41
7/17/98 0:00	26438	37	2088	278	420	76	821	2619	13.13	12.69	3.93	4.37
7/18/98 0:00	26462	42	2856	276	423	90	818	2907	12.13	12.27	4.2	4.34
7/19/98 0:00	26486	56	4008	301	408	113	831	3687	11.25	12.27	4.14	4.5
7/20/98 0:00	26510	59	3908	354	398	113	846	4854	10.34	12.36	4.54	4.45
7/21/98 0:00	26534	55	2627	328	401	93	870	4778	10.22	12.38	4.66	4.65
7/22/98 0:00	26558	64	1821	338	417	77	928	3555	10.4	12.17	4.73	4.63
7/23/98 0:00	26582	73	3452	345	428	66	907	2727	11.05	11.95	5.04	4.69
7/24/98 0:00	26606	77	4709	348	418	57	899	4351	11.89	12.06	4.95	4.82
7/25/98 0:00	26630	77	5525	383	408	52	887	5596	12.56	12.17	4.78	4.68
7/26/98 0:00	26654	105	5171	441	414	54	919	6444	13.22	12.27	4.52	4.45
7/27/98 0:00	26678	143	4655	431	469	56	1049	6220	14.07	12.28	4.71	4.22
7/28/98 0:00	26702	144	3290	388	495	74	1136	5791	14.38	12.79	3.47	4.25
7/29/98 0:00	26726	132	2849	446	550	112	1187	4477	14.31	12.65	3.63	3.62
7/30/98 0:00	26750	124	6365	514	576	101	1200	4049	14.06	12.48	3.29	3.65
7/31/98 0:00	26774	113	8782	496	587	90	1247	7612	13.29	12.34	2.93	3.41
8/1/98 0:00	26798	107	7569	535	612	81	1323	10105	12.93	12.1	3.45	3.33
8/2/98 0:00	26822	182	6244	653	658	87	1417	8986	13.38	12.44	3.19	3.77
8/3/98 0:00	26846	165	6681	776	663	92	1450	7694	12.37	13.16	3.27	3.41
8/4/98 0:00	26870	138	4971	679	654	82	1537	8217	11.41	12.89	3.43	3.47
8/5/98 0:00	26894	125	3169	643	662	74	1645	6616	10.94	12.81	3.94	3.65
8/6/98 0:00	26918	114	3941	685	675	67	1543	4712	10.85	12.8	4.22	3.96
8/7/98 0:00	26942	105	4639	654	692	60	1507	5447	11.39	12.77	4.67	4.27
8/8/98 0:00	26966	102	4332	505	742	55	1590	6229	11.81	12.84	4.95	4.6
8/9/98 0:00	26990	105	4007	428	821	50	1635	5967	12.61	12.77	5.13	4.81
8/10/98 0:00	27014	90	3330	392	857	47	1502	5509	13.53	12.71	5.13	4.95
8/11/98 0:00	27038	79	2424	355	892	46	1446	4777	14.28	12.76	5.07	5
8/12/98 0:00	27062	80	1948	383	941	57	1460	3884	14.98	12.74	4.91	5.01

Figure A10. Example output from the “Output” worksheet.

4.6. Gage-Specific Worksheets "815," "8125," "8135," "812," "809," "777," "770," "755," and "766"

PRISM provides streaming numerical and graphical output for each gage on a gage-specific worksheet (fig. A11) and can be observed during simulations or when incrementally stepping through time. This allows the user to examine specific periods and behaviors of interest in detail. Some of the functionality of the gage-specific worksheets also is found on the “Run” worksheet that represents all of the gages.

The “<<Step,” “Step>>,” “Sim Time=Start,” “RUN,” and “RESET” buttons on the “Run” worksheet are described in section 4.3. The “Opt SCXXXXD” and “Opt SCXXXXH” buttons are similar to the “Opt All SC” button on the “Run” worksheet and will, for the current time stamp, run the optimizer for the gage according to the “Q13100D Input Option” settings on the “Run” worksheet.

The settings and numerical information below the buttons are the same as those on the “Run” worksheet and are described in section 4.3.

The graph at the lower left of the gage-specific worksheet shows the daily and hourly time series of the inputs to the gage’s model pair. The gages to the south in the study area, "815," "8125," "8135," "812," and "809," have inputs representing wind speed and direction in addition to those representing flow (ft^3/s), water level (WL), and tidal range (XWL). The graph at the lower right shows the daily and hourly SC-related measurement and prediction time series. The graphed variables are described in table A1.

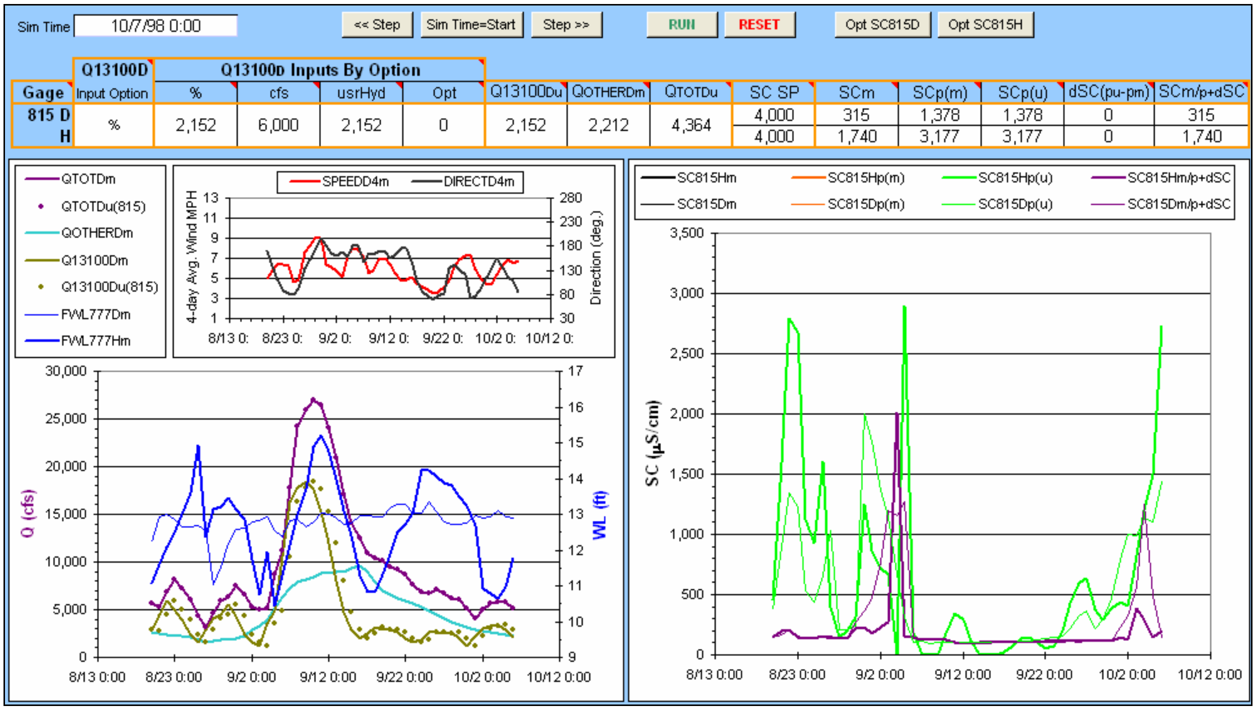

Figure A11. Example gage-specific worksheet (815).

4.7. "3DVis" Worksheet

PRISM's "3DVis" worksheet provides graphical SC profiles at the south and north ends of the study area (fig. A12). It is designed to visualize periods of special interest, selectable using the "Start" and "End" date controls and initialized using the "Sim Time=Start" button on the "Run" worksheet. On the left side of the 3DVis worksheet are data and the controls for operating the 3DVis worksheet. The data is a subset of that on the "Run" worksheet and is provided for reference while using the 3DVis worksheet. The "Vis. Daily or Hourly" control is used to select either daily or hourly SC for visualization. The "<<Step," "Step>>," "RUN," "Sim Time=Start," "RESET," "Time Step (hrs)," and "Graphs ON" buttons and controls are the same as those used in the “Run” worksheet and are described in section 4.3. Animations can be started using the “Run” button if the “Graphs ON” check box is checked in the “Run” worksheet.

Figures A12 and A13 show that two plots are created for each of the south and north ends of the study area. The left plots show the SC profile representing the actual historical data (when available), and the right plots show the profile predicted by the gage model pairs using the user-specified Q13100Du. Note that the predicted profiles are only meaningful if the models are set to use exactly the same input Q13100Du. For example, the plots shown in figures A12 and A13 were created using all models with settings “Q13100Du Input Option” = “%” on the “Run” worksheet and “Q13100D” “%” setpoints on the “SPs” worksheet = 80 (%).

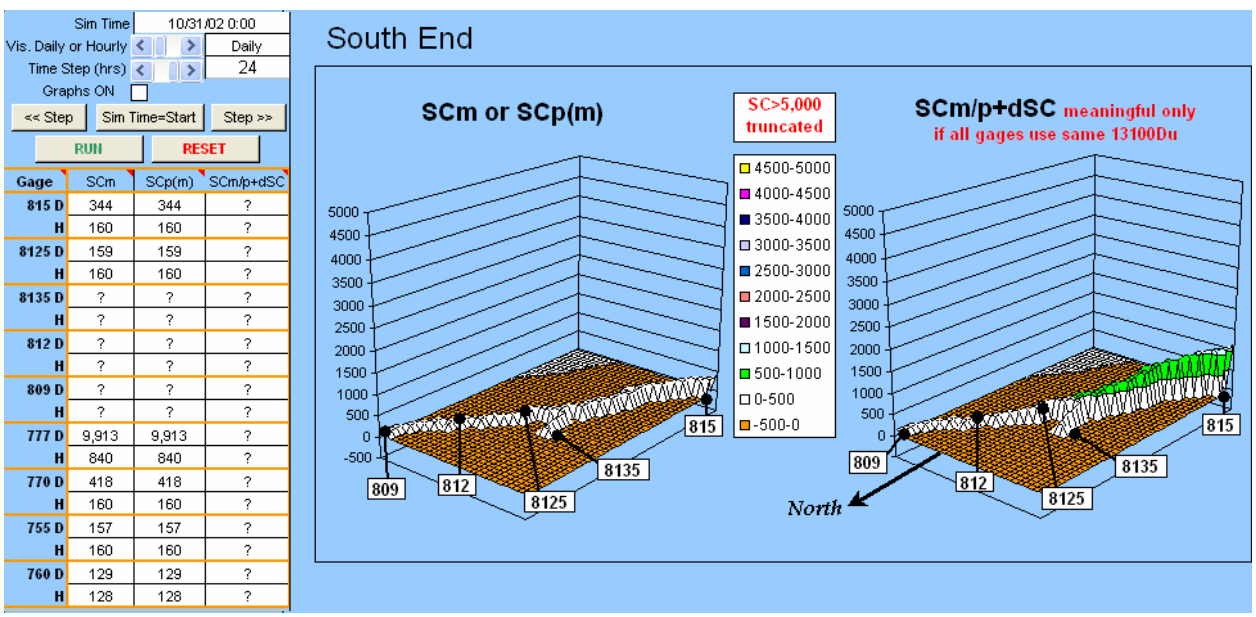

Figure A12. The “ 3DVis” worksheet showing specific conductance at south end of study area. Note shortened gage numbers and locations. Here, the Q13100Du setting is 80% of historical.

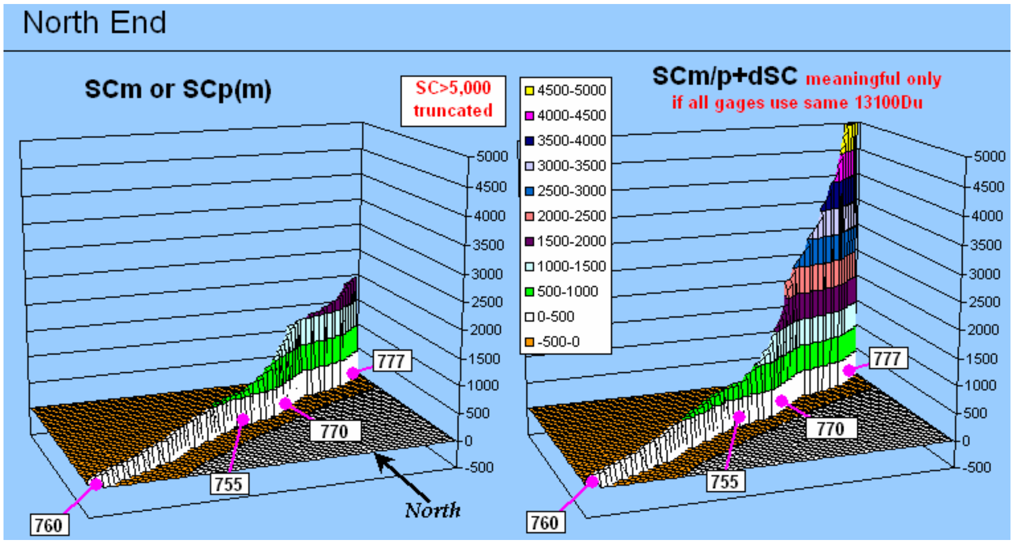

Figure A13. The "3DVis" worksheet showing specific conductance at north end of study area. Note shortened gage numbers and locations. Here, the Q13100Du setting is 80% of historical.

5. TECHNICAL ASSISTANCE

Please contact Paul Conrads of the USGS at (803) 750-6140, pconrads@usgs.gov, if you have problems with this model.