Dynamic Solutions International, LLC

Quick Guide for the CE-QUAL-W2 Post Processor W2_Post

October 2012

W2_Post A post-processor for CE-QUAL-W2 Version3 that provides the user with a broad range of visualization and analyses of the model results. W2_Post provides for rapid visualization and assessment of W2 model results. W2_Post uses a binary file generated by the CE-QUAL-W2 (i.e. the "W2L" file extension) for all of its model data analysis. No need to output multiple types of output from W2. The post-processor provides extensive model calibration / measured data comparison tools and statistics. The following are summaries of each major type of post-processing available.

1) Model Grid Visualizations
   a) Plan View
      i) Normal View (i.e. using model input angles and widths)
      ii) Simple View (simplified block view of grid)
      iii) Line View
   b) Longitudinal Profiles by Branch
   c) Segment Profiles
   d) Cells colored by connection and type
   e) Google Earth KML, metafile and bitmap outputs

2) Animations
   a) Animations time interpolate model stored results (in the W2L file) to user specified interval to speed up/slow down animations.
   b) Compare up to four separate model runs within a single animation. Mix and match parameters.
   c) Up to four parameters from a single run can be animated.
   d) User control of min/max color ranges.
   e) User control of axis formats and types (i.e. segment/layer labels or distance/elevation units)

3) Vertical Profiles
   a) View profile of any segment at any time (@ W2L intervals) for any parameter.
   b) Automatic comparison of model and measured data with various statistics.
   c) Various output formats.

4) Contours
   a) View any branch longitudinal profile for any constituent.
   b) Rapidly scroll through time.
   c) Color filled and/or line contours.
   d) Branch/Longitudinal Profile calibration statistics.
   e) Various output formats.

5) Time Series
   a) Point and click interface to select cells to plot.
   b) Get a time series of any cell (if inundated) for any parameters for all or some of the modeled times.
   c) Wide range of graph formatting options.
   d) Various output options.

6) Velocity Vectors
   a) View 2D velocity patters for any branch/longitudinal profile.
   b) Rapidly scroll through time.
   c) Various arrows formatting options.
   d) Various output formats.

7) 2D Plan View
   a) View 2D plan view concentrations at:
      i) A specified layer
      ii) Top active layer for each segment
      iii) Volume weighted average for each segment
   b) Rapidly scroll through time.
   c) Use real world coordinates
   d) If the model is using UTM, then Google Earth KML export option is available

W2_Tool/W2_Post Specific Files

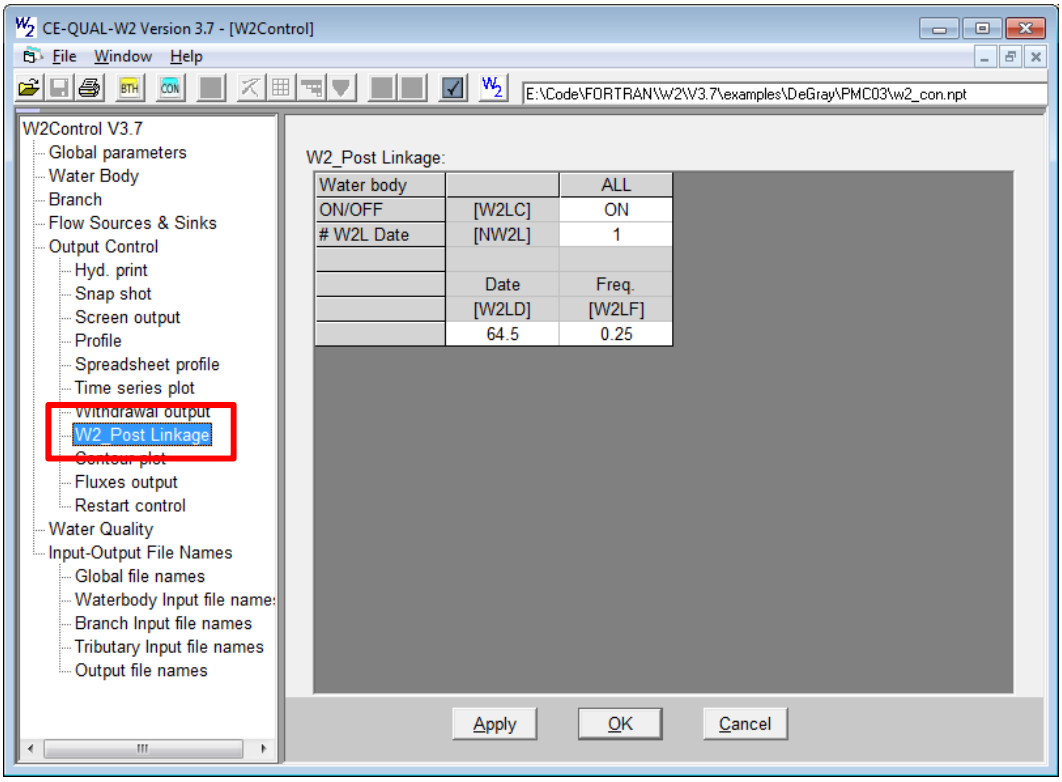
W2P The "W2P" file is the extension used by the W2_Tool utilities to define and retain non-model specific information and user interface settings. This file is optional for W2_Post, however, it is strongly recommended to save your project and use it for loading your projects.

W2L A binary file that W2 creates during the model run. The W2L file contains all of the data necessary to post-process the model results. However, it does not contain the scales and formatting that, once set, streamlines the post-processing.

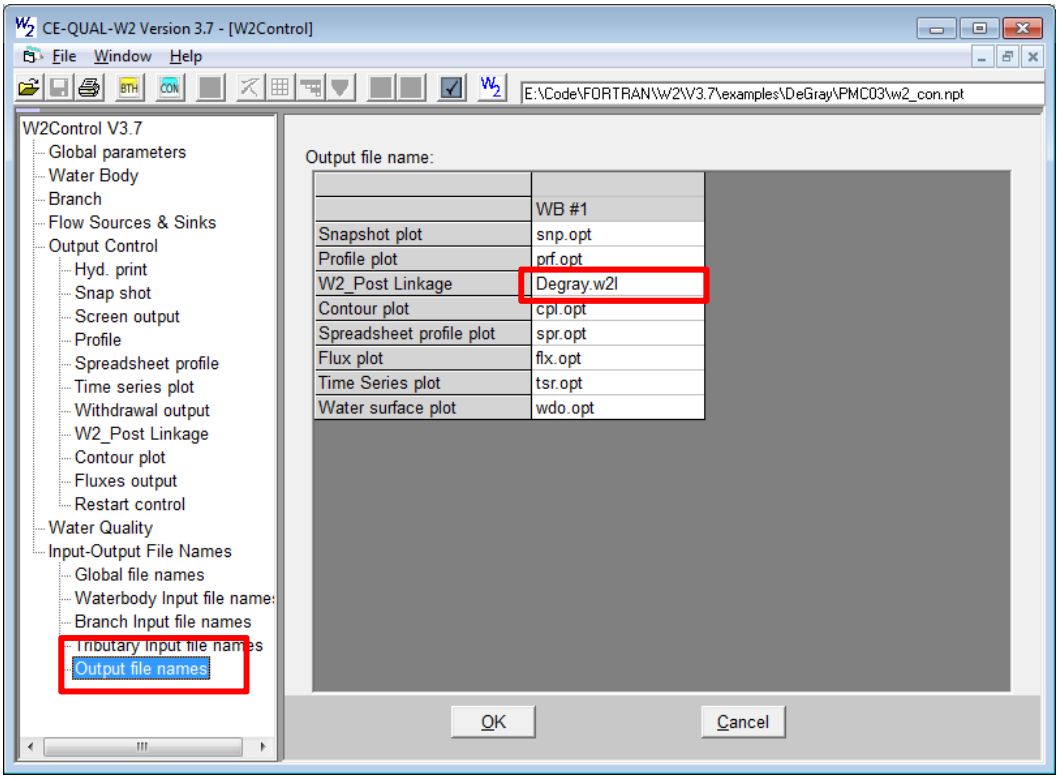
Setting up the W2_Post Linkage

- Run the W2Control preprocessor for W2.

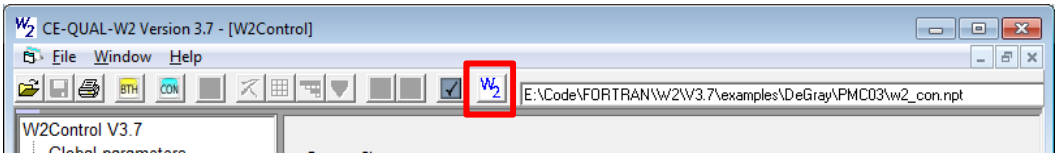
- Turn on the W2_Post Linkage and define the snapshot timing.



- Define the W2L file name



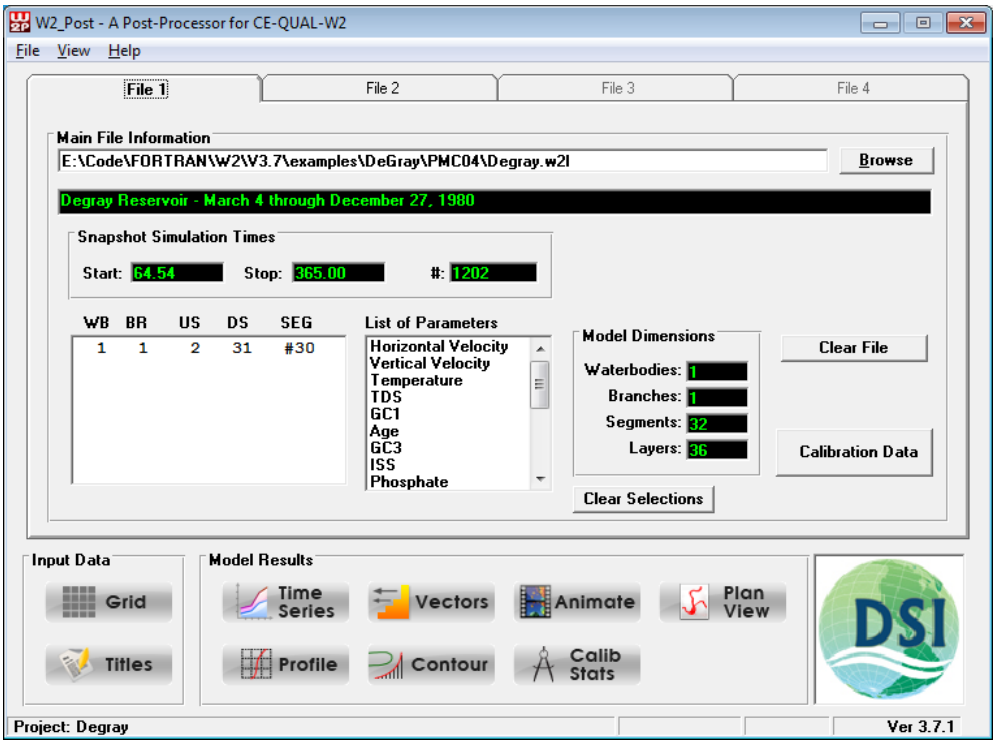
- Save the model, then
- Run the Model



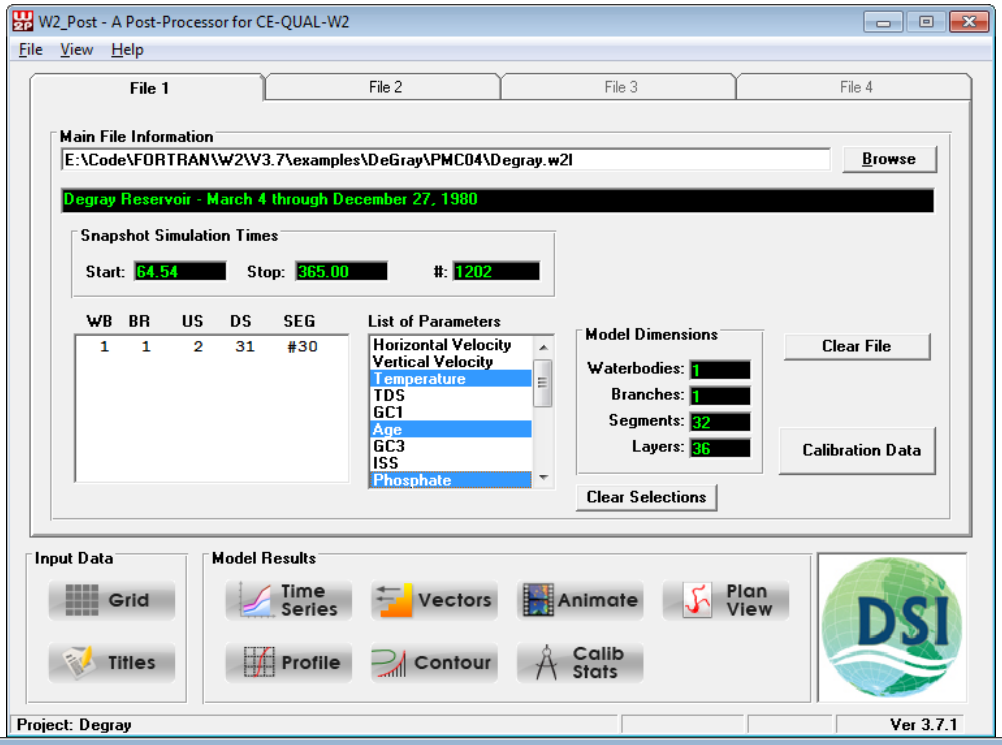
Run W2_Post

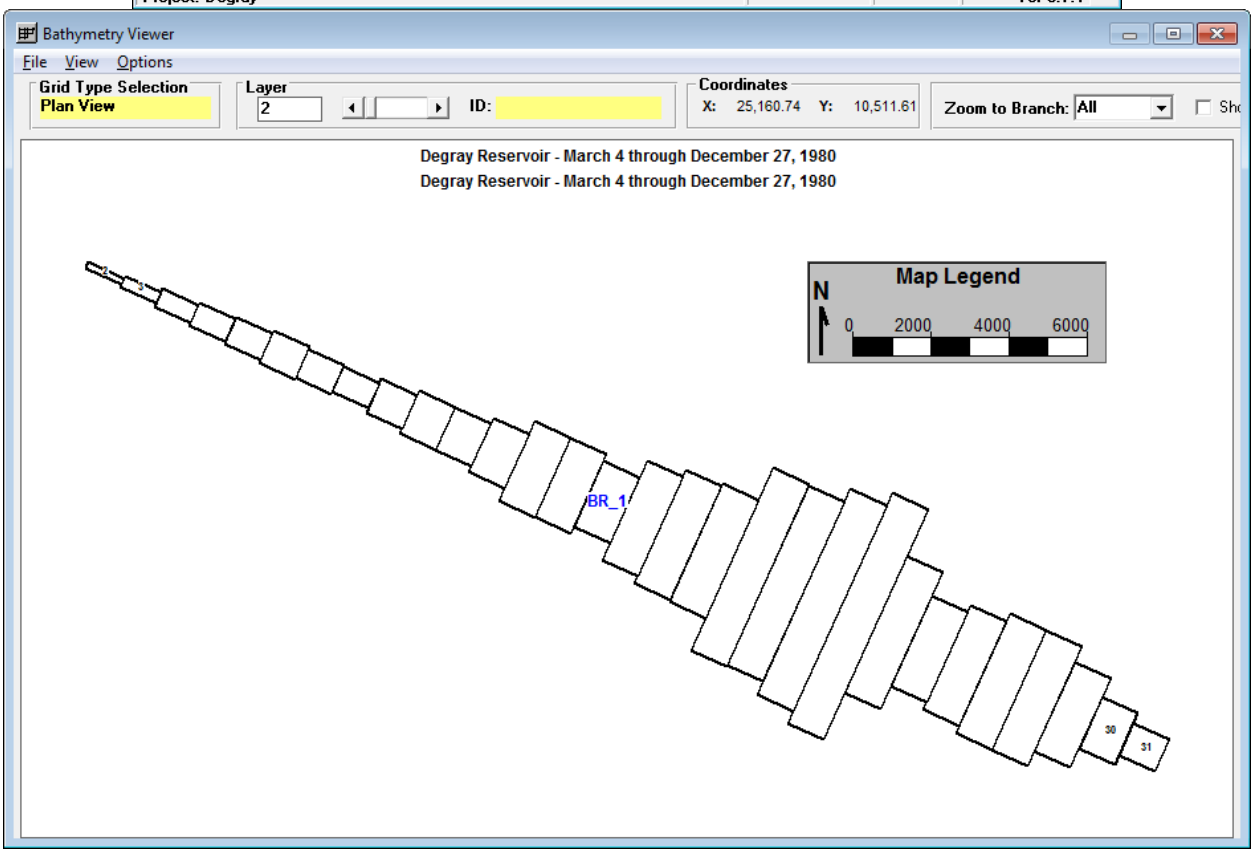
- The default W2_Post executable file name: W2Tool_Post3.exe

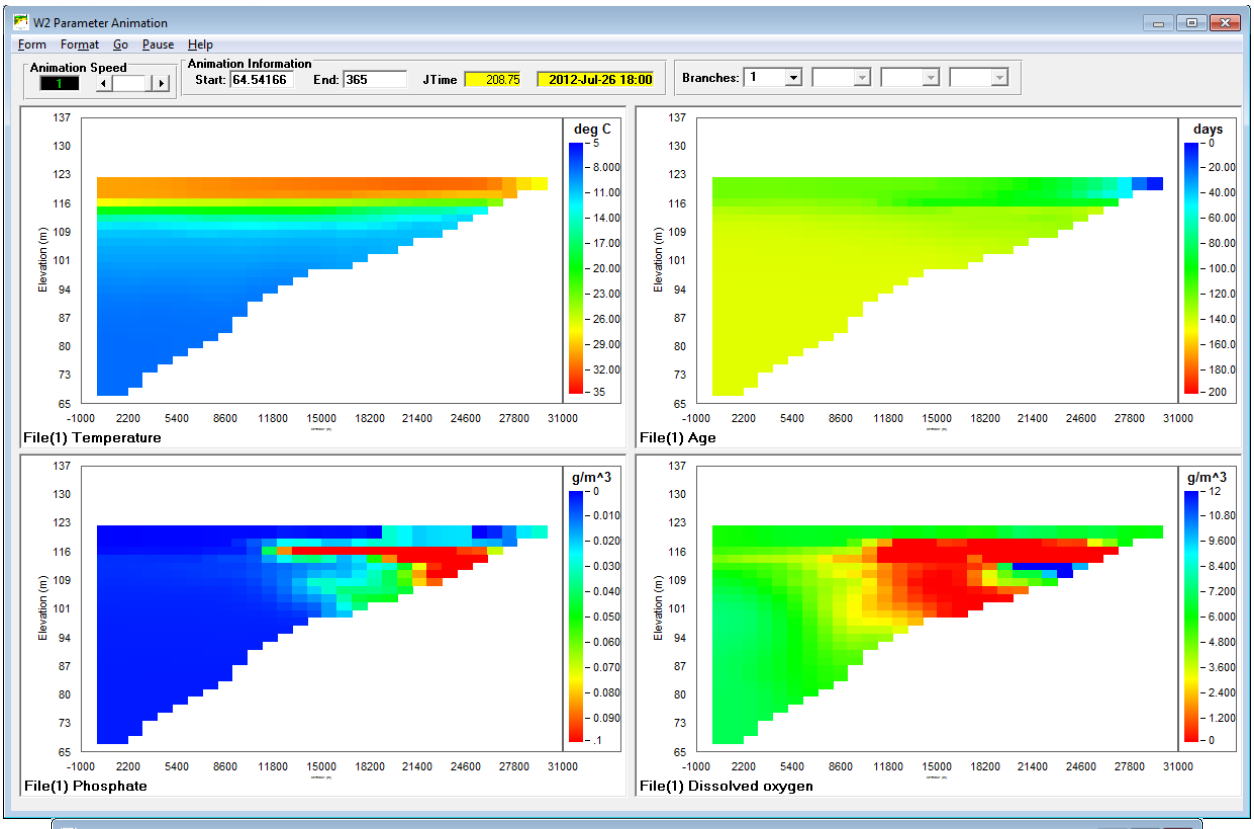
- The W2_Post main form:

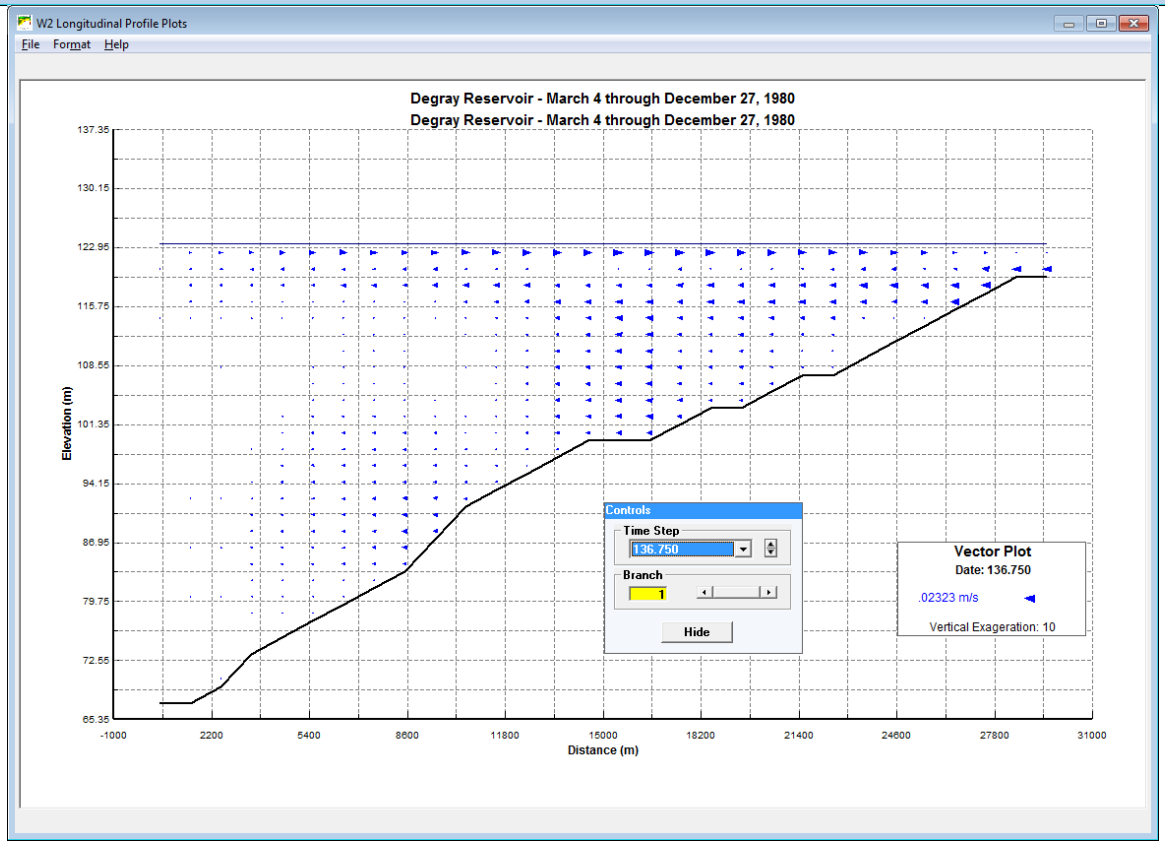


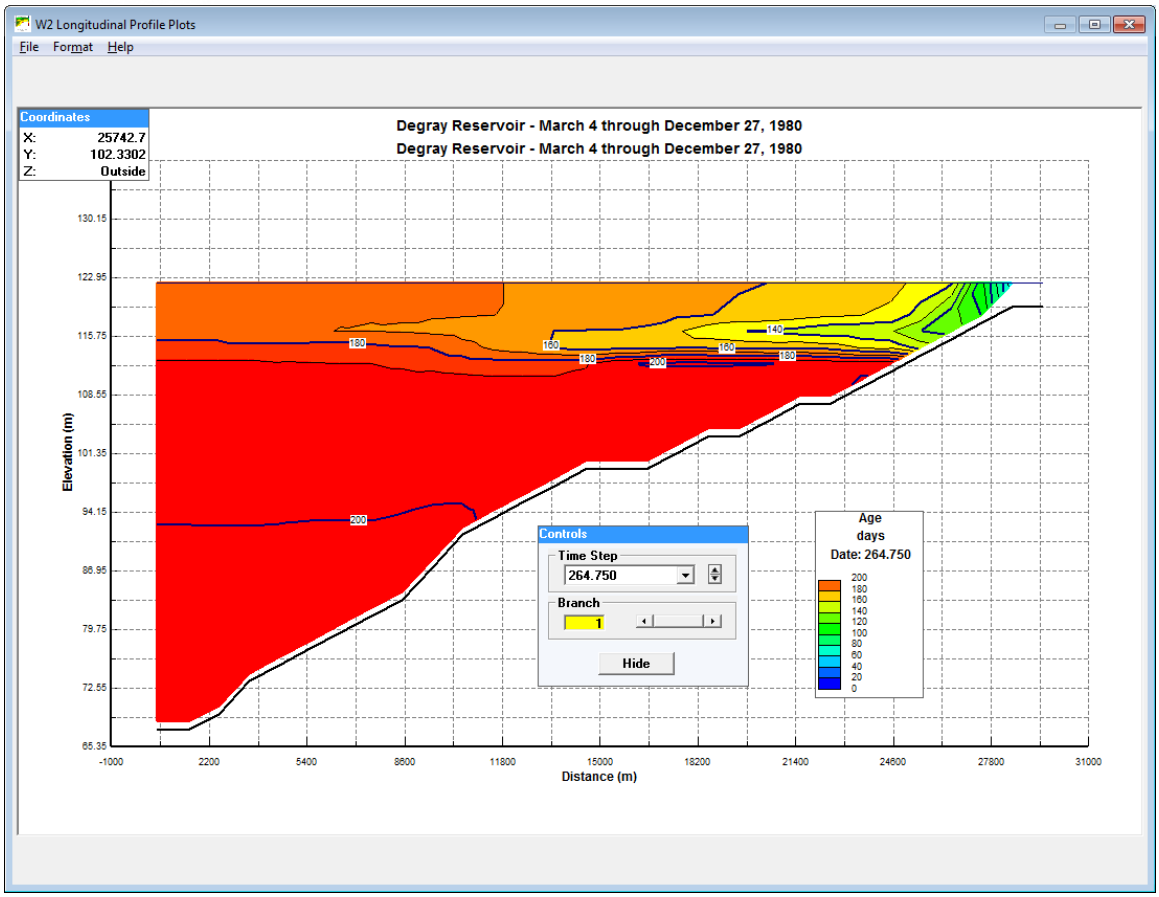
Degray Reservoir Example



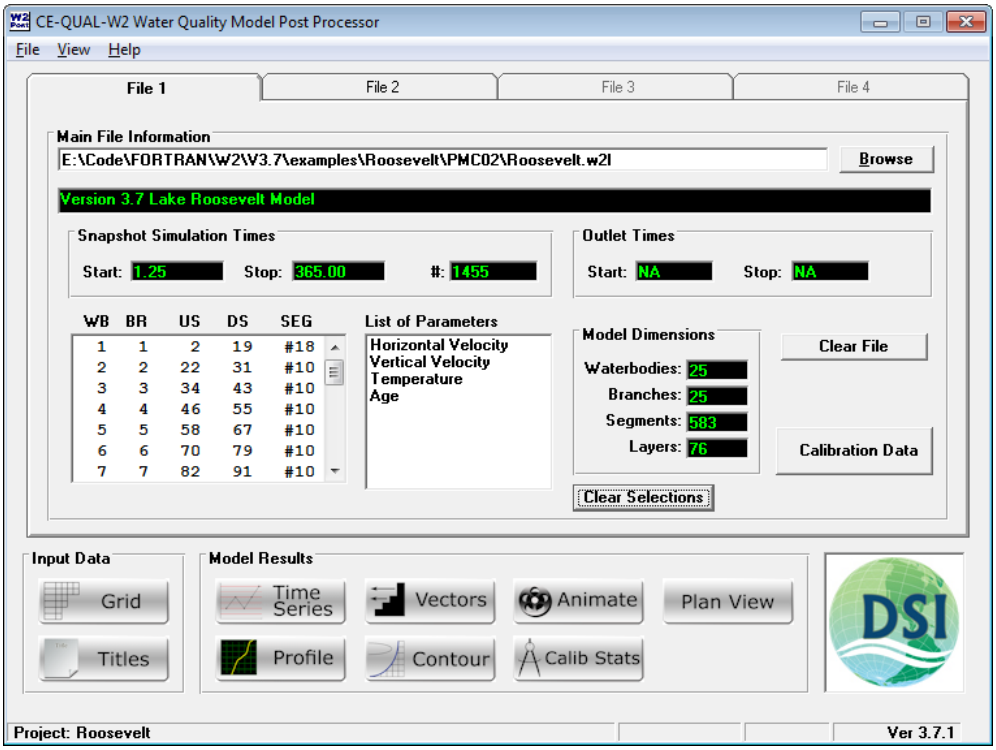



W2 Parameter Animation
Form Format Go Pause Help
Animation Speed
Animation Information
Start: 64.54166 End: 365 JTime 208.75 2012-Jul-26 18:00
Branches: 1
deg C
days
g/m^3
g/m^3
Elevation (m)
Distance (m)
File(1) Temperature
File(1) Age
File(1) Phosphate
File(1) Dissolved oxygen

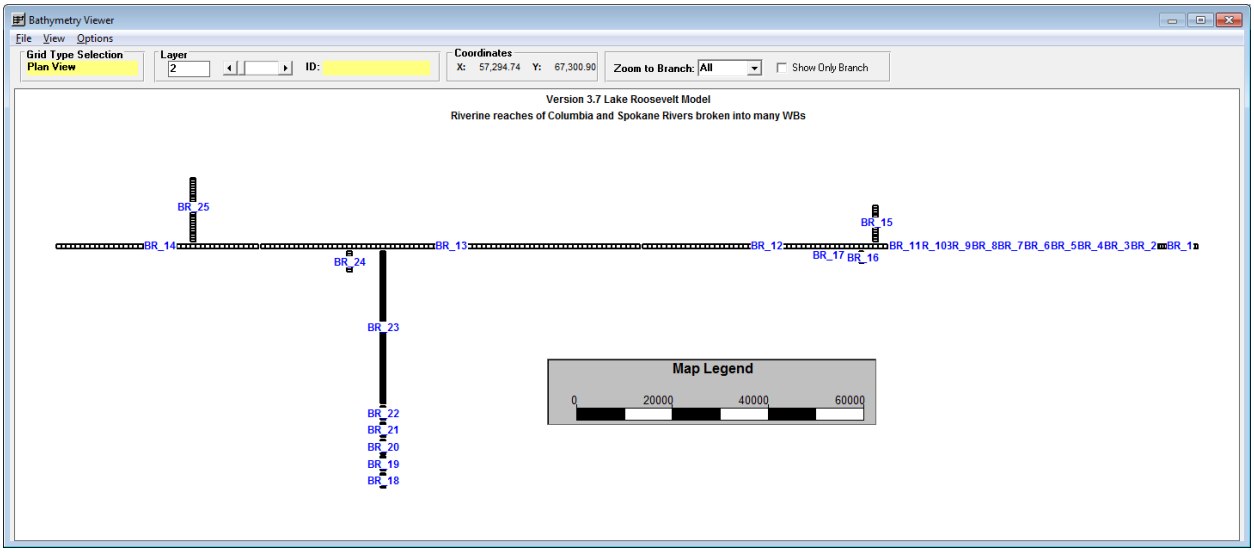

W2 Longitudinal Profile Plots
File Format Help
Degray Reservoir - March 4 through December 27, 1980
Degray Reservoir - March 4 through December 27, 1980
Elevation (m)
Distance (m)
Controls
Time Step
136.750
Branch
1
Hide
Vector Plot
Date: 136.750
.02323 m/s
Vertical Exageration: 10


W2 Longitudinal Profile Plots
File Format Help
Coordinates
X: 25742.7
Y: 102.3302
Z: Outside
Degray Reservoir - March 4 through December 27, 1980
Degray Reservoir - March 4 through December 27, 1980
Elevation (m)
130.15
122.95
115.75
108.55
101.35
94.15
86.95
79.75
72.55
65.35
-1000
2200
5400
8600
11800
15000
18200
21400
24600
27800
31000
Distance (m)
180
160
180
200
160
180
140
200
Controls
Time Step
264.750
Branch
1
Hide
Age
days
Date: 264.750
200
180
160
140
120
100
80
60
40
20
0

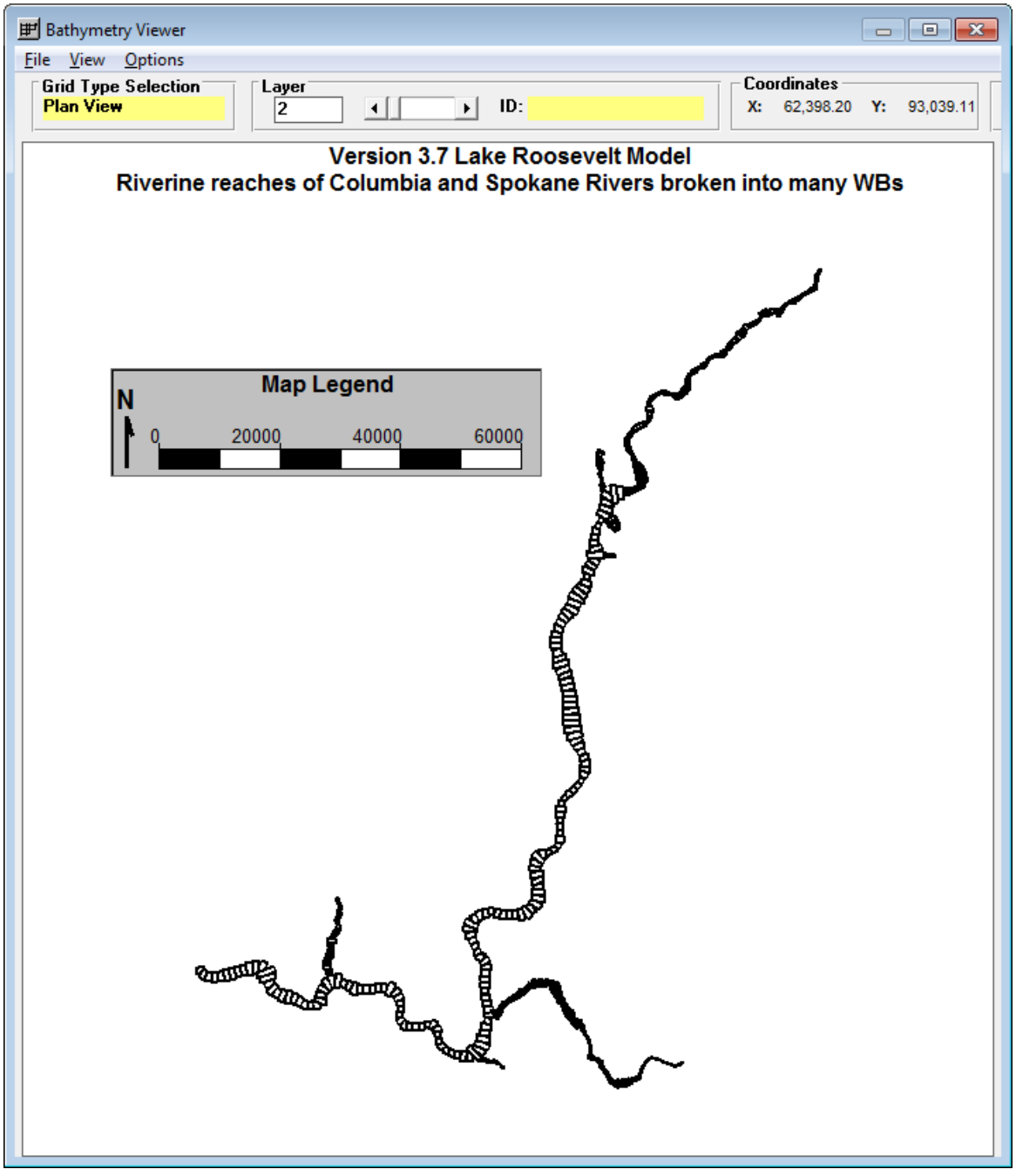
Roosevelt Reservoir Example



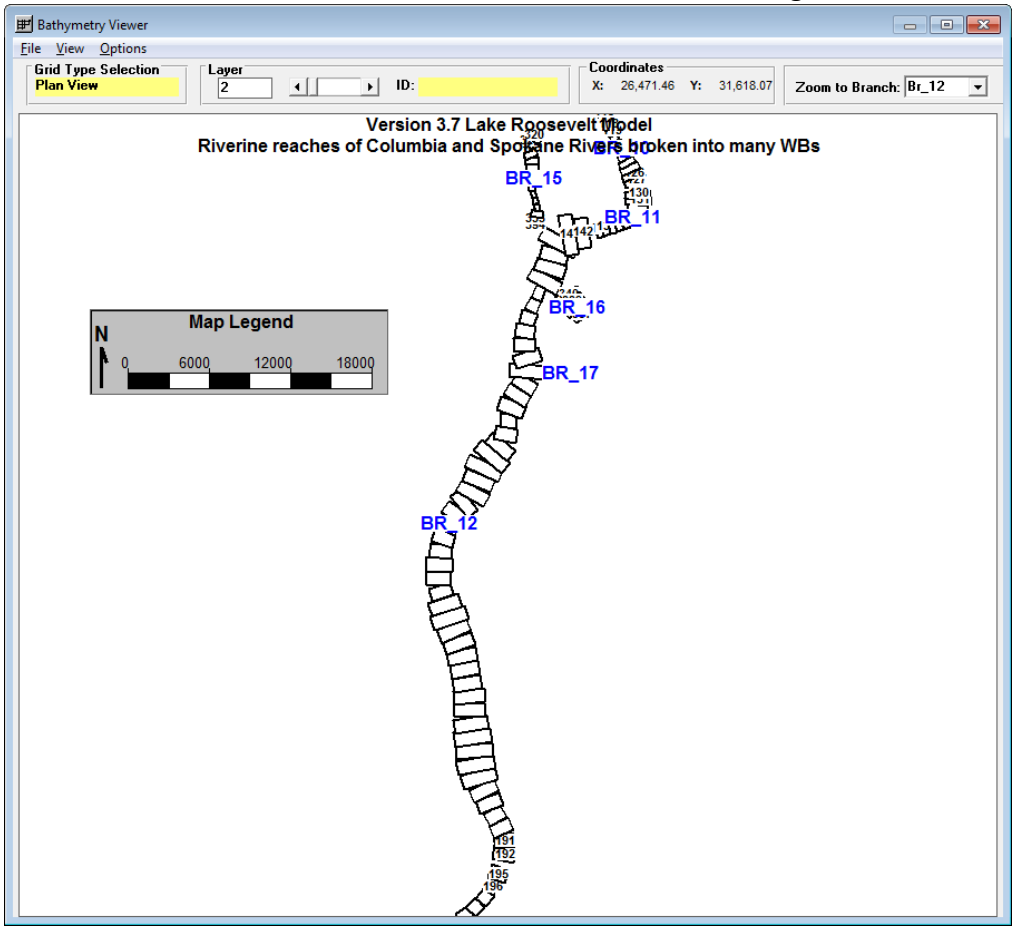
Grid – Plan View – Block View



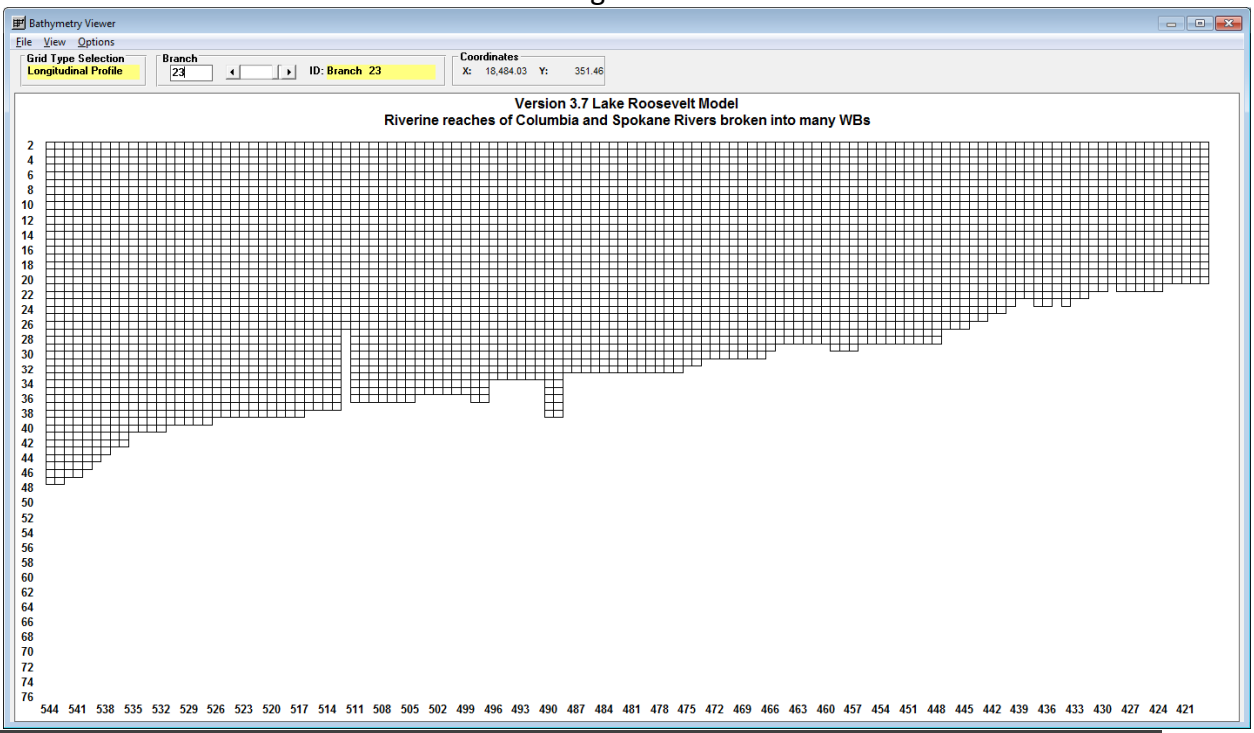
Grid – Plan View – Normal View



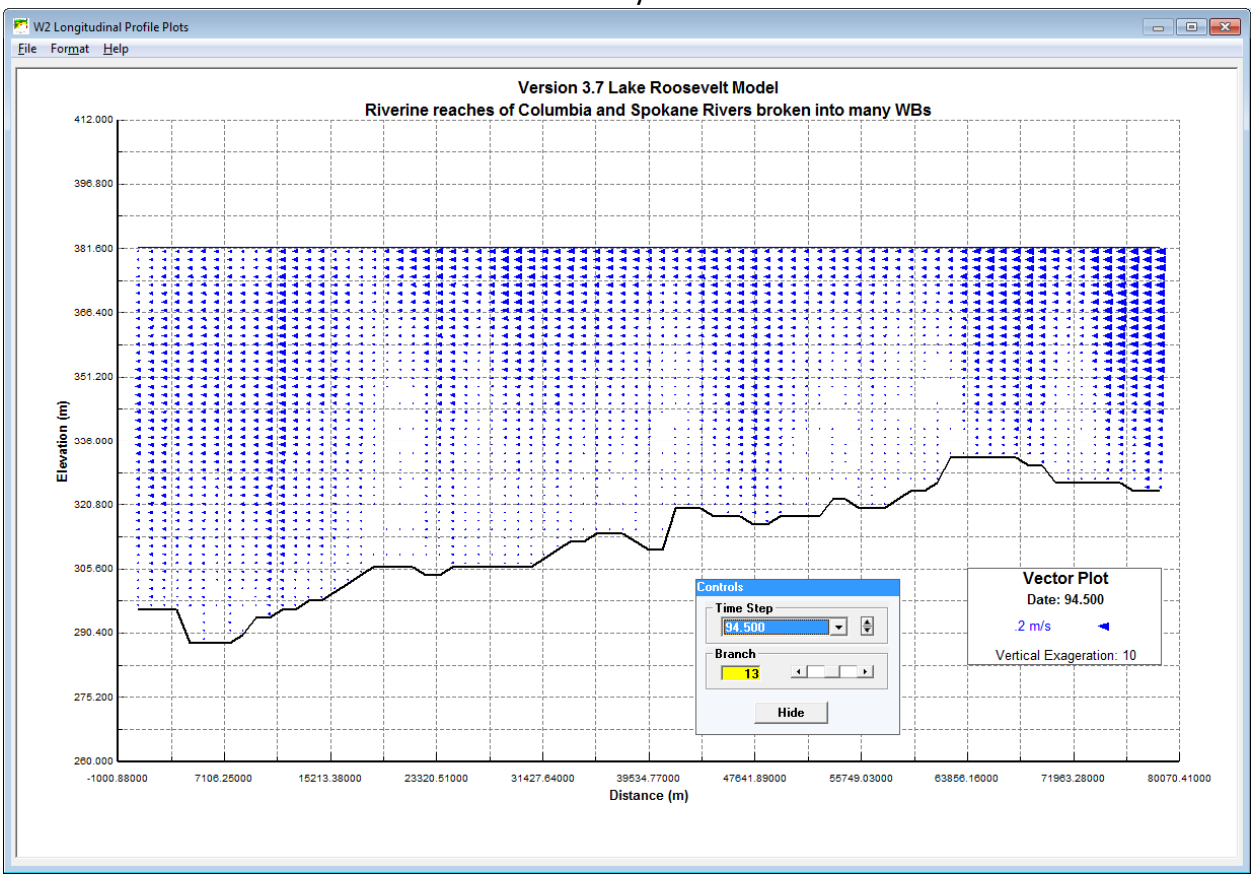
Grid – Plan View – Normal View with Labeling



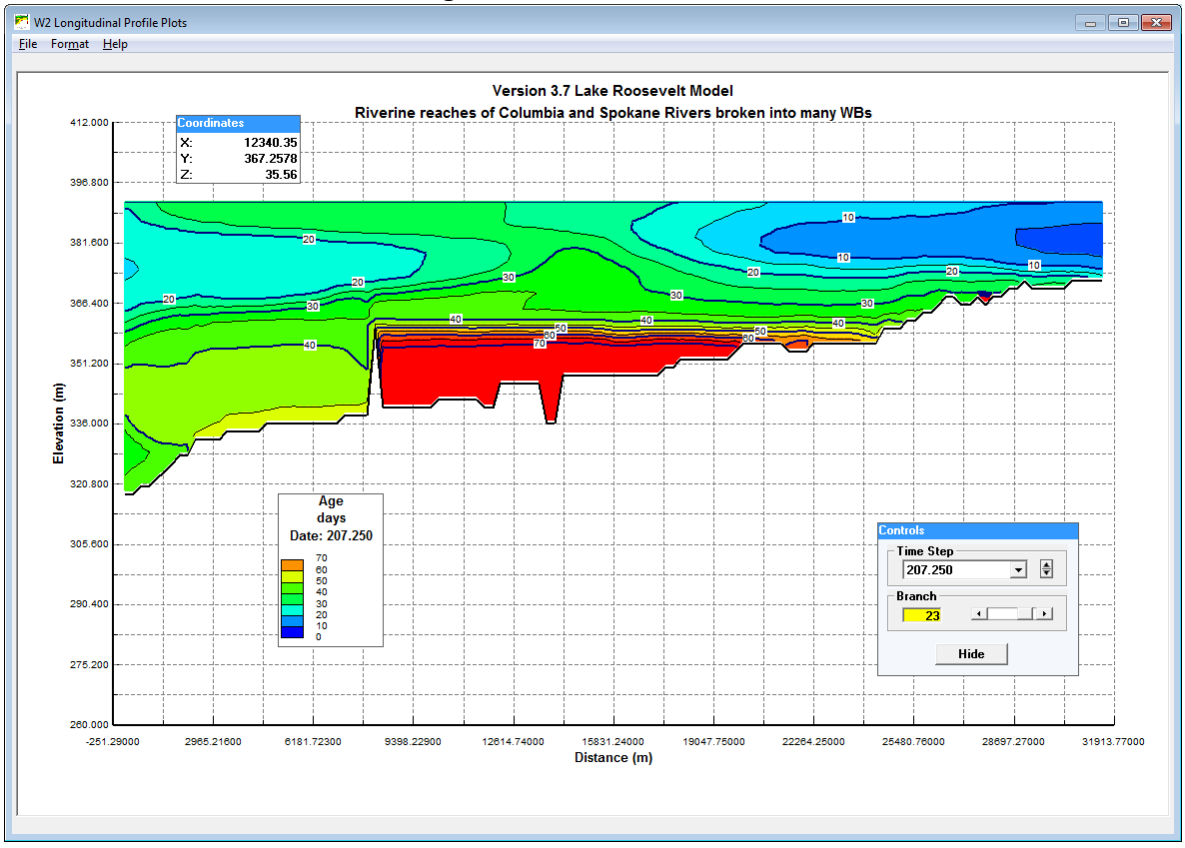
Grid – Longitudinal Profile



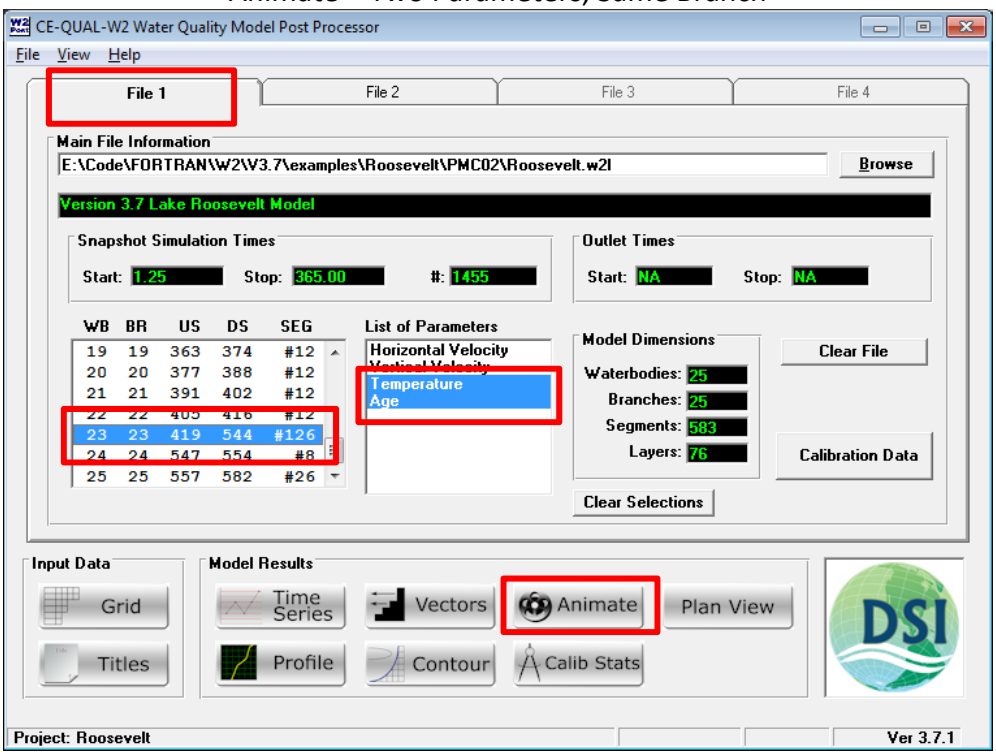
2D Velocity Vectors



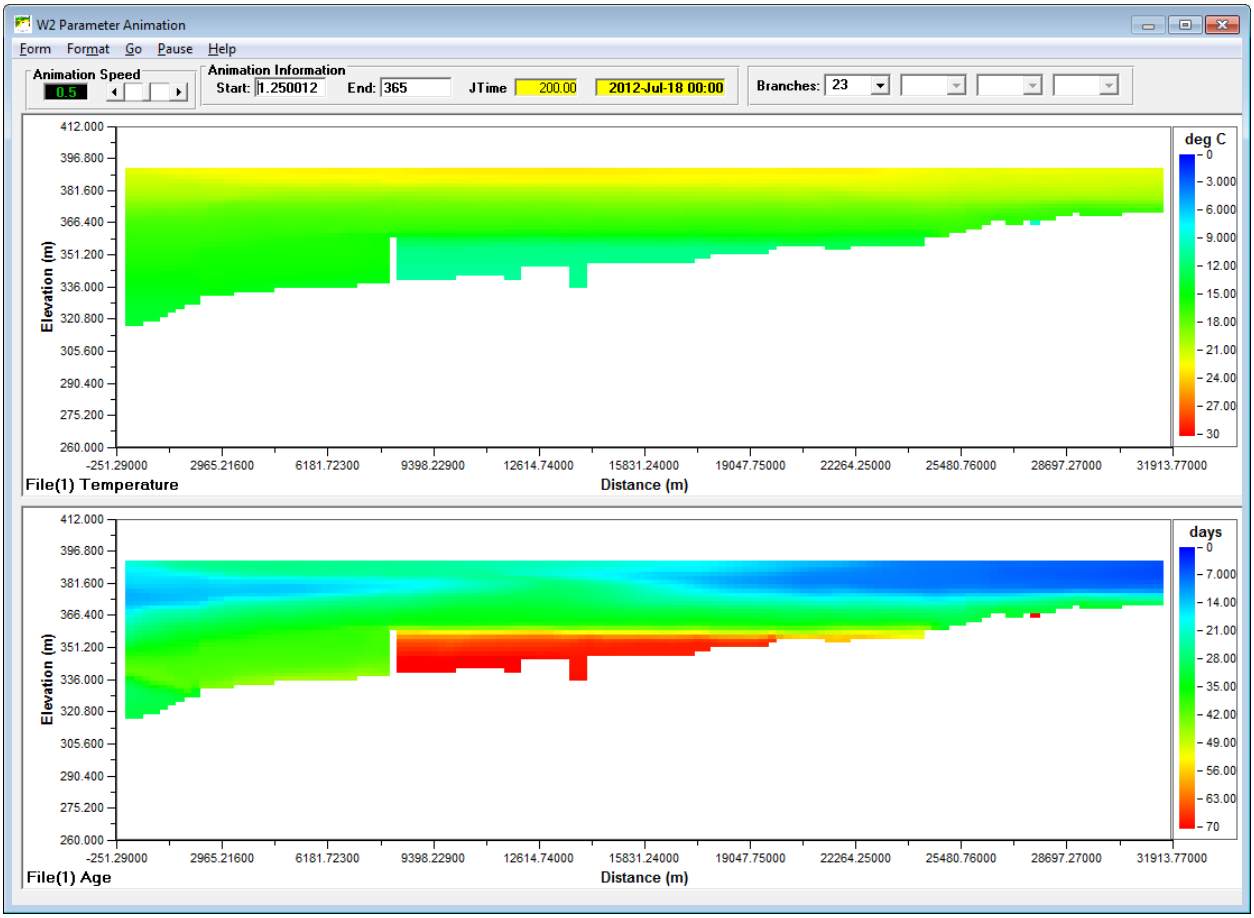
Longitudinal Profile - Contours



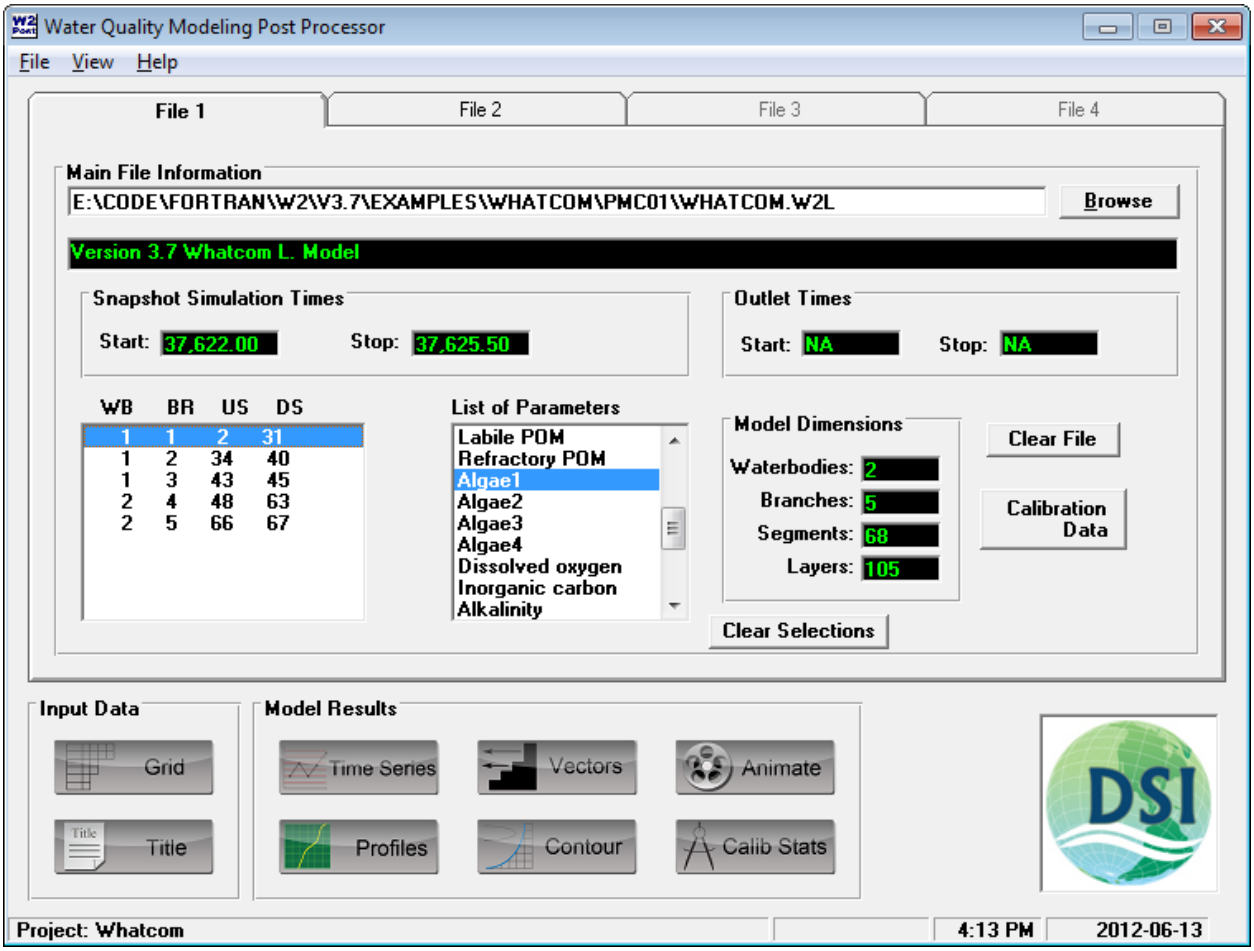
Animate – Two Parameters, Same Branch

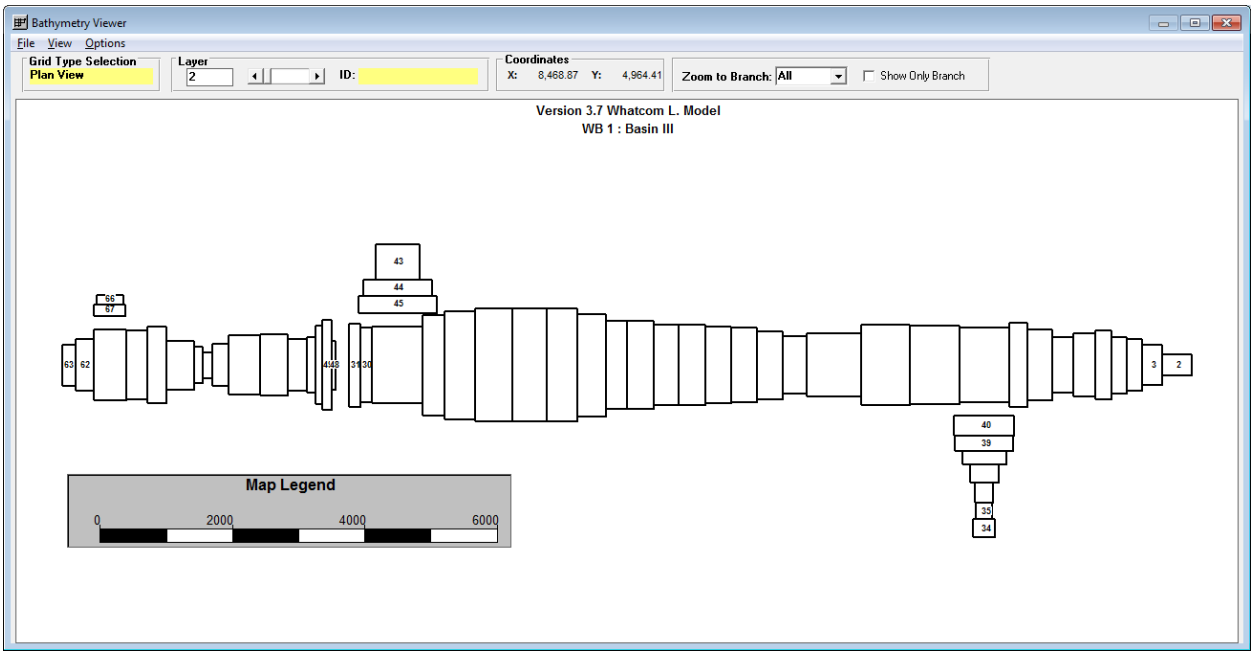


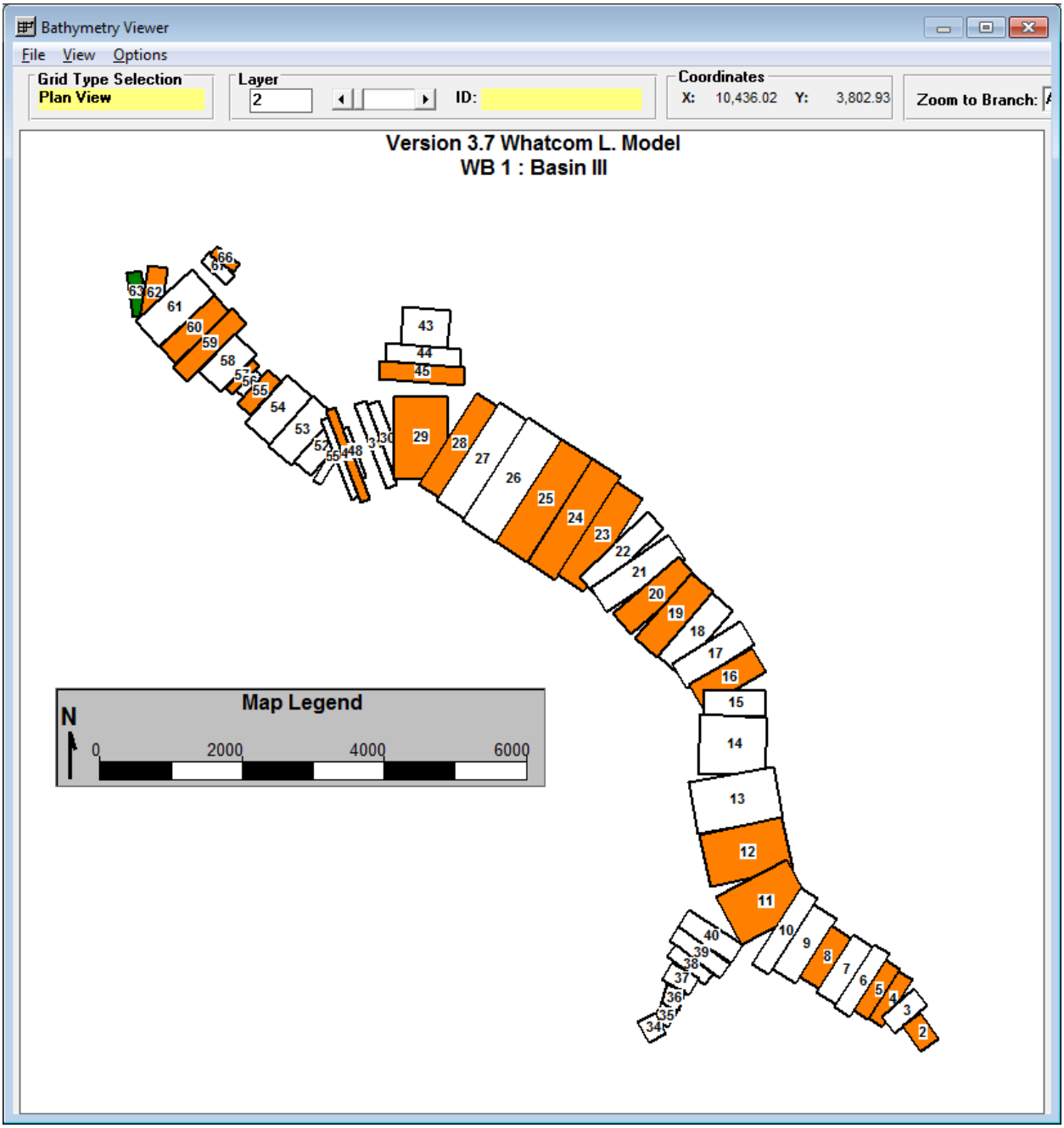
1) Open the W2L file desired
   a) Each “File” tab on the W2_Post form can be animated on one screen. Only 4 total branch/parameter combinations can be animate at the same time.
2) Select the branch for each file
3) Select the parameters for each branch.
4) Press “Animate”

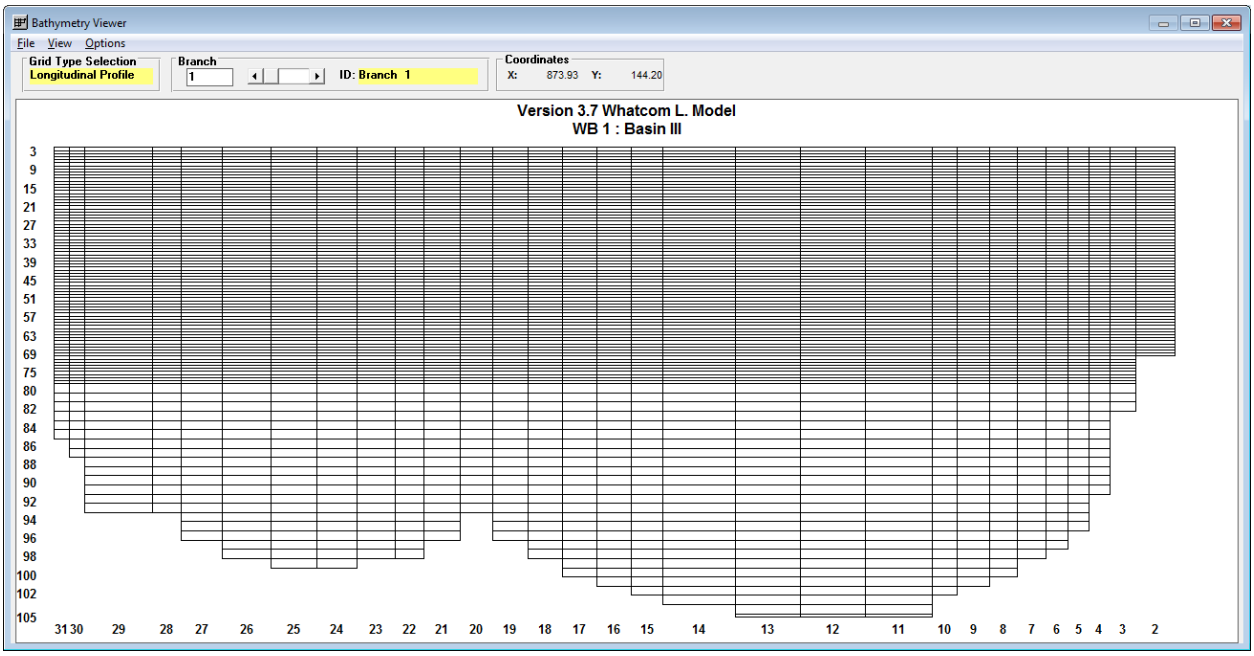


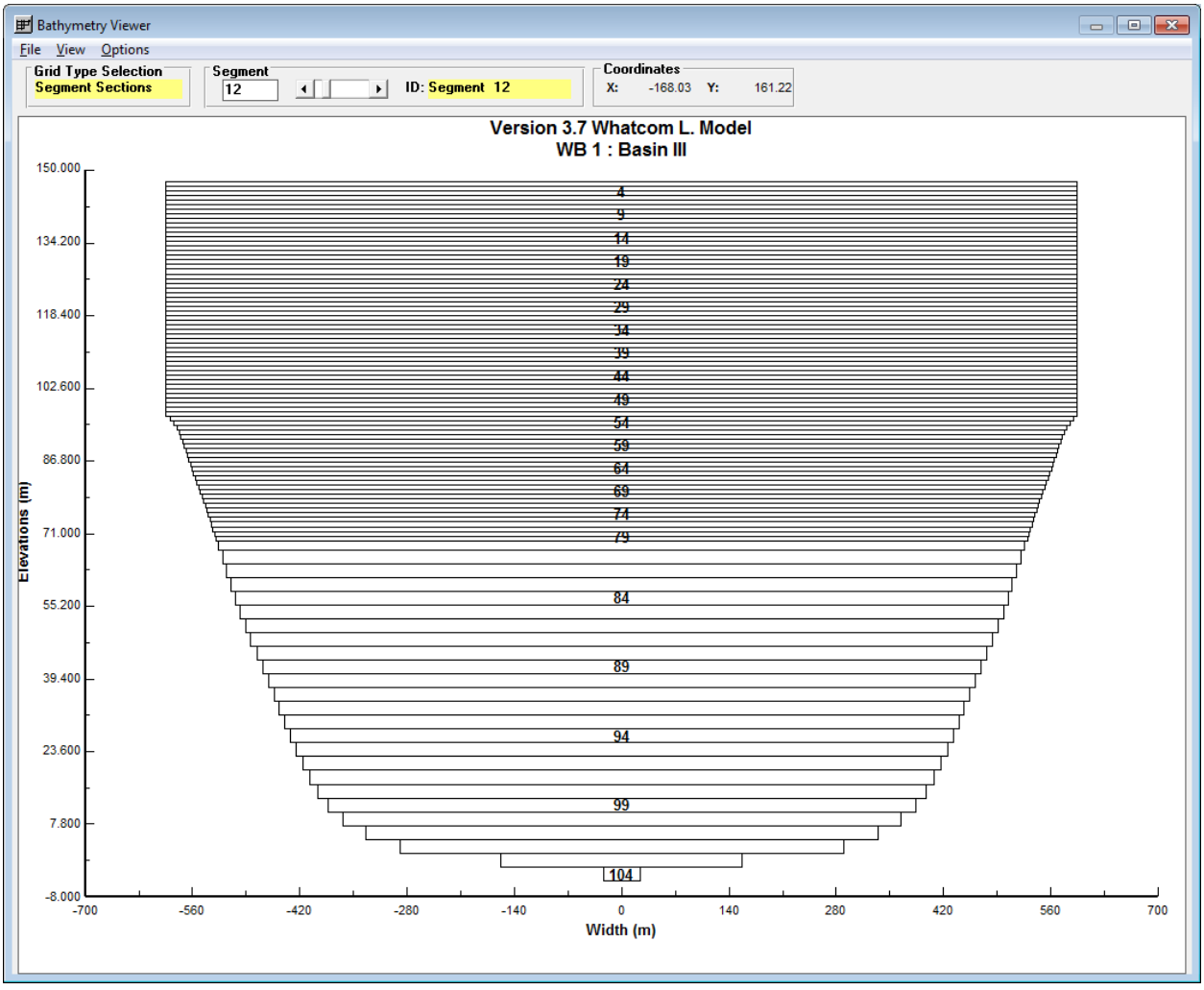
Whatcom Reservoir Example

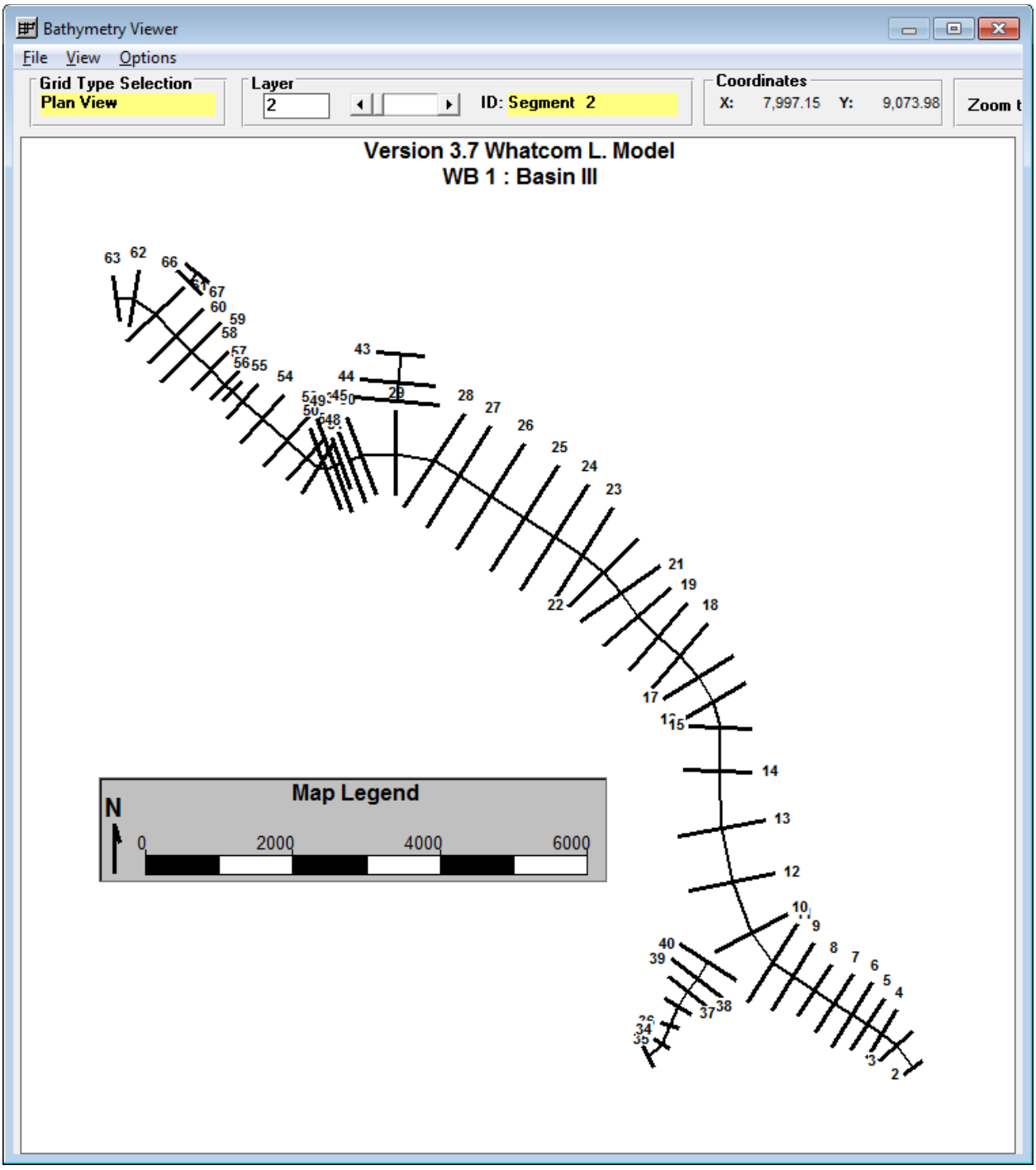


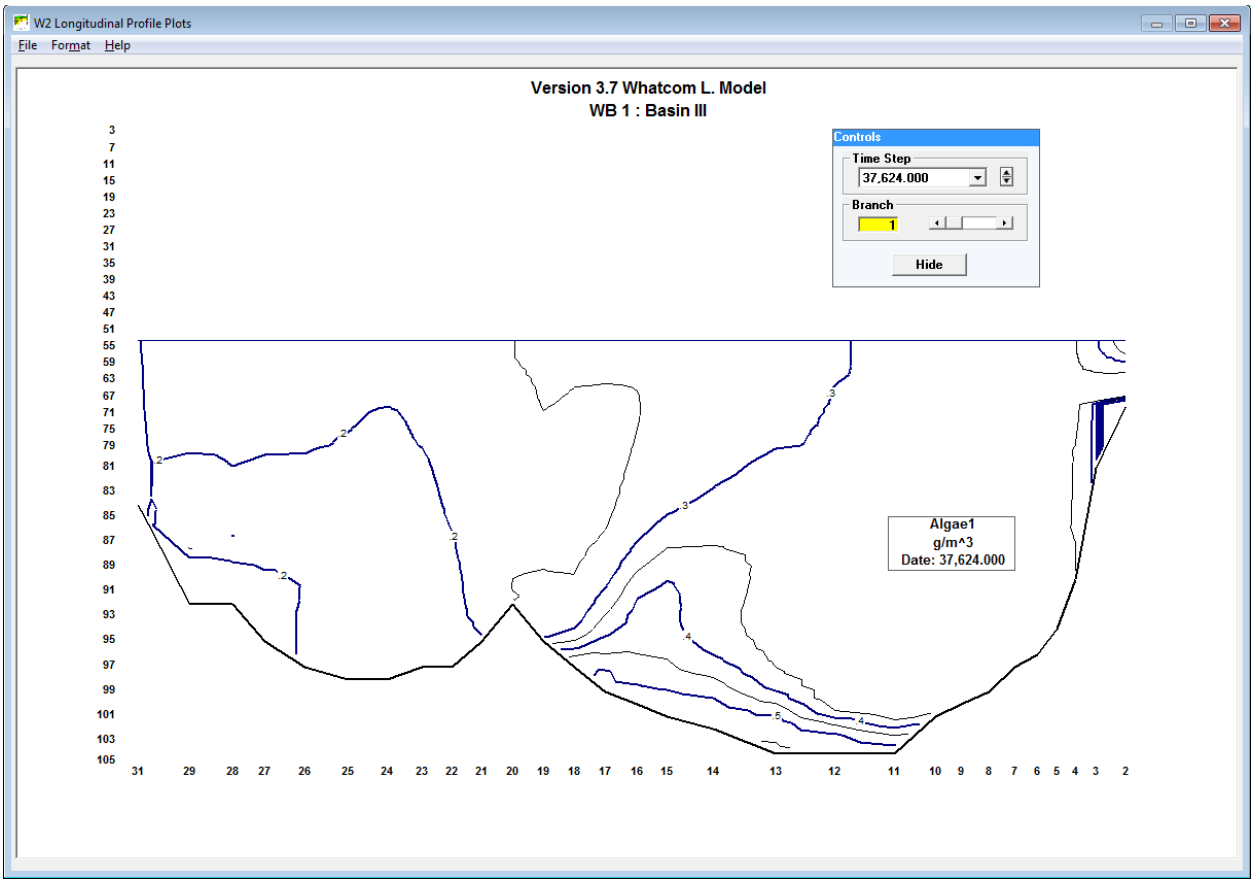

Bathymetry Viewer
File View Options
Grid Type Selection
Plan View
Layer
2
ID:
Coordinates
X: 8,468.87 Y: 4,964.41
Zoom to Branch: All
Show Only Branch
Version 3.7 Whatcom L. Model
WB 1 : Basin III
43
44
45
66
67
63
62
3
2
40
39
35
34
Map Legend
0
2000
4000
6000

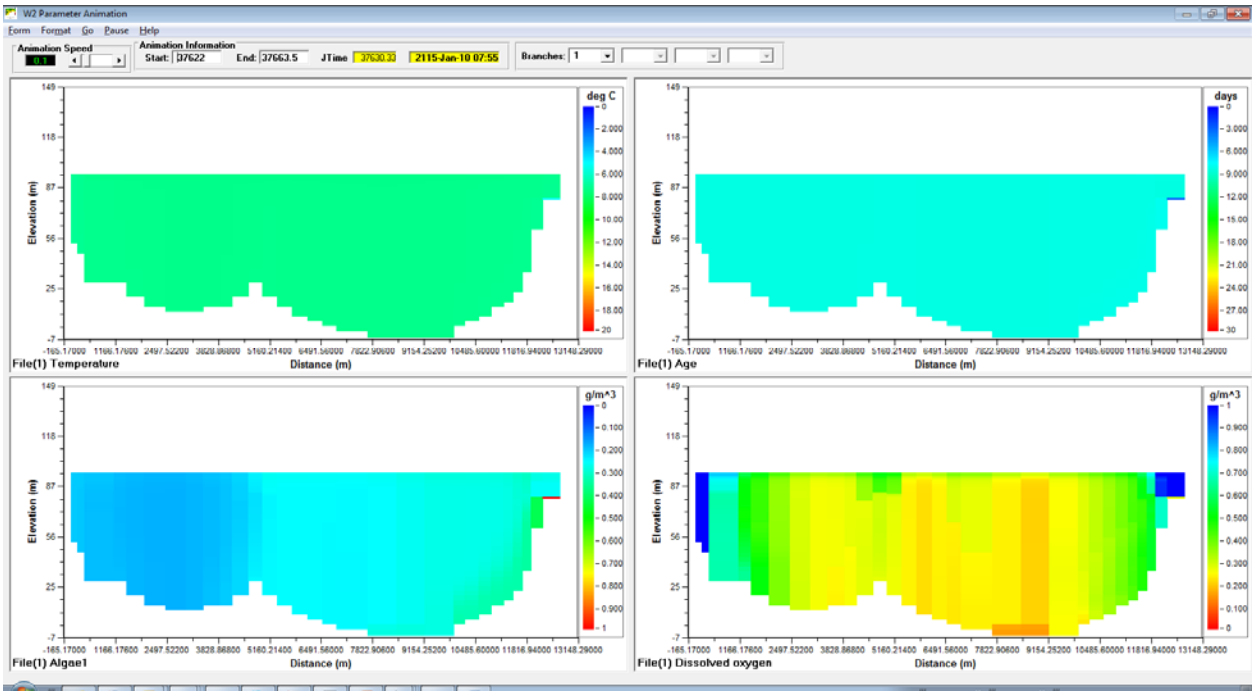

Bathymetry Viewer
File View Options
Grid Type Selection
Plan View
Layer
2
ID:
Coordinates
X: 10,436.02 Y: 3,802.93
Zoom to Branch:
Version 3.7 Whatcom L. Model
WB 1 : Basin III
Map Legend
N
0
2000
4000
6000


Bathymetry Viewer
File View Options
Grid Type Selection
Longitudinal Profile
Branch
1
ID: Branch 1
Coordinates
X: 873.93 Y: 144.20
Version 3.7 Whatcom L. Model
WB 1 : Basin III
3
9
15
21
27
33
39
45
51
57
63
69
75
80
82
84
86
88
90
92
94
96
98
100
102
105
31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2

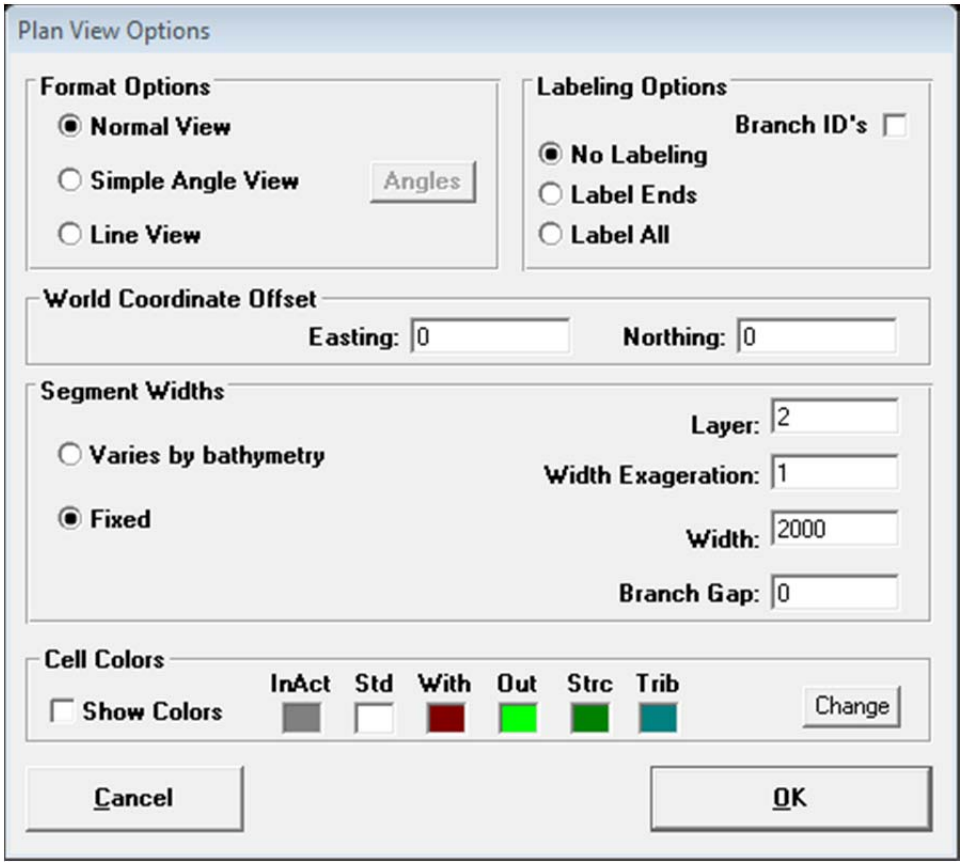

Bathymetry Viewer
File View Options
Grid Type Selection
Segment Sections
Segment
12
ID: Segment 12
Coordinates
X: -168.03 Y: 161.22
Version 3.7 Whatcom L. Model
WB 1 : Basin III
150.000
134.200
118.400
102.600
86.800
71.000
55.200
39.400
23.600
7.800
-8.000
Elevations (m)
4
9
14
19
24
29
34
39
44
49
54
59
64
69
74
79
84
89
94
99
104
-700
-560
-420
-280
-140
0
140
280
420
560
700
Width (m)


Bathymetry Viewer
File View Options
Grid Type Selection
Plan View
Layer
2
ID: Segment 2
Coordinates
X: 7,997.15 Y: 9,073.98
Zoom t
Version 3.7 Whatcom L. Model
WB 1 : Basin III
Map Legend
N
0
2000
4000
6000

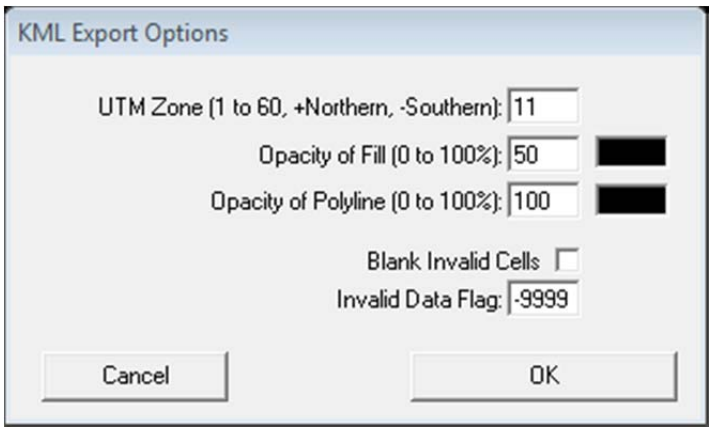

W2 Longitudinal Profile Plots
File Format Help
Version 3.7 Whatcom L. Model
WB 1 : Basin III
Controls
Time Step
37,624.000
Branch
1
Hide
Algae1
g/m^3
Date: 37,624.000


W2 Parameter Animation
File(1) Temperature
File(1) Age
File(1) Algae1
File(1) Dissolved oxygen
Elevation (m)
Distance (m)
deg C
days
g/m^3

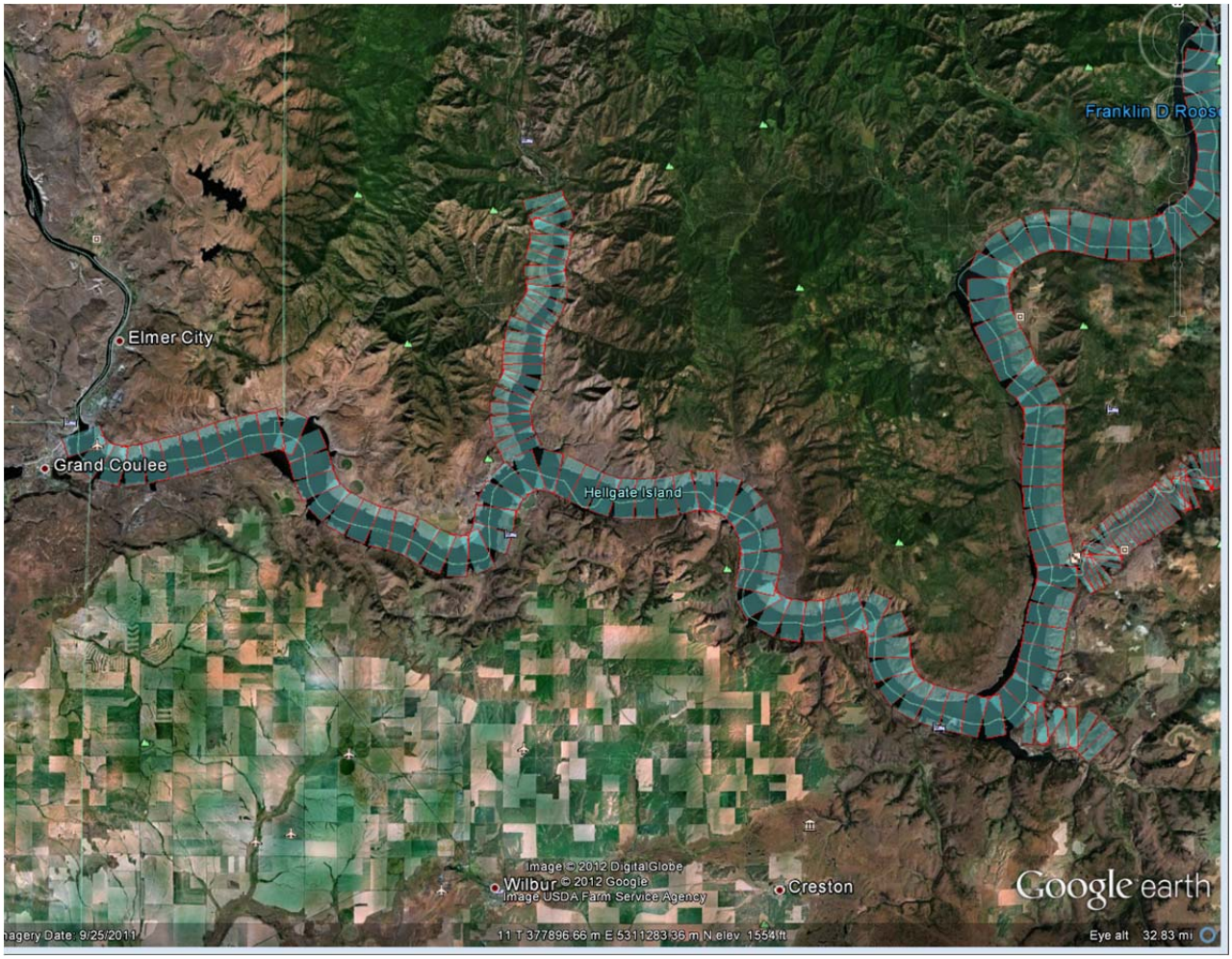
Output of grid to KML or Google Earth file



Enter UTM coordinates for Easting and Westing; these can be obtained from Google Earth. You must choose what coordinate to start your grid. For Lake Roosevelt the world coordinates are WorldX=352136.09375 WorldY=5313519.5

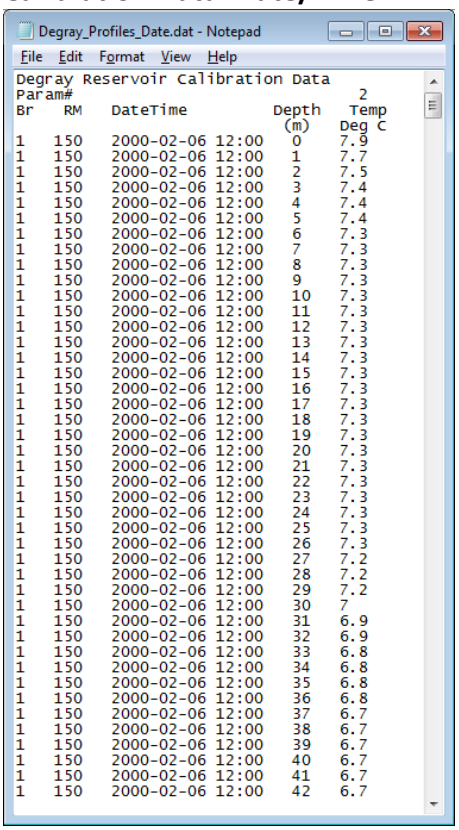


You also must set the UTM zone. For Lake Roosevelt this is shown in Google Earth if you set the x-y coordinates to UTM.


Franklin D Roos
Elmer City
Grand Coulee
Hellgate Island
Image © 2012 DigitalGlobe
Wilbur © 2012 Google
Image USDA Farm Service Agency
Creston
Google earth
agery Date: 9/25/2011
11 T 377896.66 m E 5311283.36 m N elev 1554 ft
Eye alt 32.83 mi

Calibration Data: Vertical Profiles

Calibration Data: Date/Time

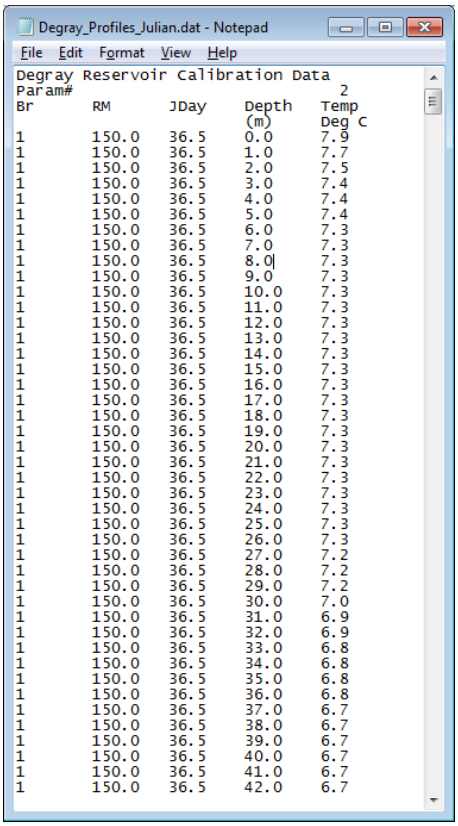


Degray_Profiles_Date.dat - Notepad

File Edit Format View Help

```
Degray Reservoir Calibration Data
Param#                                        2
Br    RM    DateTime          Depth    Temp
                                (m)    Deg C
1    150    2000-02-06 12:00    0      7.9
1    150    2000-02-06 12:00    1      7.7
1    150    2000-02-06 12:00    2      7.5
1    150    2000-02-06 12:00    3      7.4
1    150    2000-02-06 12:00    4      7.4
1    150    2000-02-06 12:00    5      7.4
1    150    2000-02-06 12:00    6      7.3
1    150    2000-02-06 12:00    7      7.3
1    150    2000-02-06 12:00    8      7.3
1    150    2000-02-06 12:00    9      7.3
1    150    2000-02-06 12:00    10     7.3
1    150    2000-02-06 12:00    11     7.3
1    150    2000-02-06 12:00    12     7.3
1    150    2000-02-06 12:00    13     7.3
1    150    2000-02-06 12:00    14     7.3
1    150    2000-02-06 12:00    15     7.3
1    150    2000-02-06 12:00    16     7.3
1    150    2000-02-06 12:00    17     7.3
1    150    2000-02-06 12:00    18     7.3
1    150    2000-02-06 12:00    19     7.3
1    150    2000-02-06 12:00    20     7.3
1    150    2000-02-06 12:00    21     7.3
1    150    2000-02-06 12:00    22     7.3
1    150    2000-02-06 12:00    23     7.3
1    150    2000-02-06 12:00    24     7.3
1    150    2000-02-06 12:00    25     7.3
1    150    2000-02-06 12:00    26     7.3
1    150    2000-02-06 12:00    27     7.2
1    150    2000-02-06 12:00    28     7.2
1    150    2000-02-06 12:00    29     7.2
1    150    2000-02-06 12:00    30     7
1    150    2000-02-06 12:00    31     6.9
1    150    2000-02-06 12:00    32     6.9
1    150    2000-02-06 12:00    33     6.8
1    150    2000-02-06 12:00    34     6.8
1    150    2000-02-06 12:00    35     6.8
1    150    2000-02-06 12:00    36     6.8
1    150    2000-02-06 12:00    37     6.7
1    150    2000-02-06 12:00    38     6.7
1    150    2000-02-06 12:00    39     6.7
1    150    2000-02-06 12:00    40     6.7
1    150    2000-02-06 12:00    41     6.7
1    150    2000-02-06 12:00    42     6.7
```

Calibration Data: Julian Date



Degray_Profiles_Julian.dat - Notepad

File Edit Format View Help

```
Degray Reservoir Calibration Data
Param#                                        2
Br        RM        JDay      Depth    Temp
                              (m)      Deg C
1         150.0     36.5      0.0      7.9
1         150.0     36.5      1.0      7.7
1         150.0     36.5      2.0      7.5
1         150.0     36.5      3.0      7.4
1         150.0     36.5      4.0      7.4
1         150.0     36.5      5.0      7.4
1         150.0     36.5      6.0      7.3
1         150.0     36.5      7.0      7.3
1         150.0     36.5      8.0      7.3
1         150.0     36.5      9.0      7.3
1         150.0     36.5      10.0     7.3
1         150.0     36.5      11.0     7.3
1         150.0     36.5      12.0     7.3
1         150.0     36.5      13.0     7.3
1         150.0     36.5      14.0     7.3
1         150.0     36.5      15.0     7.3
1         150.0     36.5      16.0     7.3
1         150.0     36.5      17.0     7.3
1         150.0     36.5      18.0     7.3
1         150.0     36.5      19.0     7.3
1         150.0     36.5      20.0     7.3
1         150.0     36.5      21.0     7.3
1         150.0     36.5      22.0     7.3
1         150.0     36.5      23.0     7.3
1         150.0     36.5      24.0     7.3
1         150.0     36.5      25.0     7.3
1         150.0     36.5      26.0     7.3
1         150.0     36.5      27.0     7.2
1         150.0     36.5      28.0     7.2
1         150.0     36.5      29.0     7.2
1         150.0     36.5      30.0     7.0
1         150.0     36.5      31.0     6.9
1         150.0     36.5      32.0     6.9
1         150.0     36.5      33.0     6.8
1         150.0     36.5      34.0     6.8
1         150.0     36.5      35.0     6.8
1         150.0     36.5      36.0     6.8
1         150.0     36.5      37.0     6.7
1         150.0     36.5      38.0     6.7
1         150.0     36.5      39.0     6.7
1         150.0     36.5      40.0     6.7
1         150.0     36.5      41.0     6.7
1         150.0     36.5      42.0     6.7
```

File Contents

Line1: Text description of file contents (ignored by W2_Post)

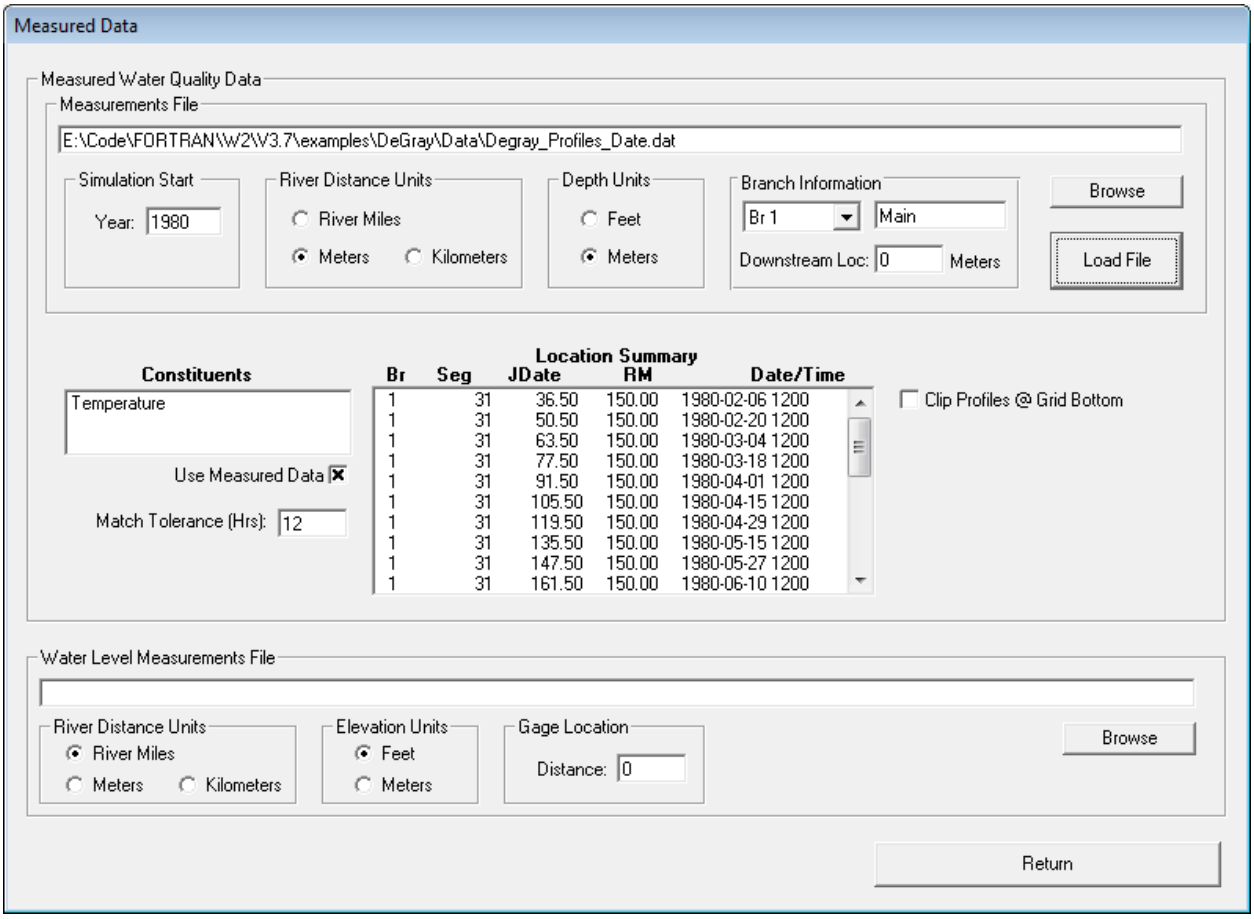
Line2: A line containing the parameter numbers (from the W2 parameters being modeled) that are included in this calibration file. Any number of parameters can be included, one parameter per column.

Line3 and Line4: Description and units (ignored by W2_Post).

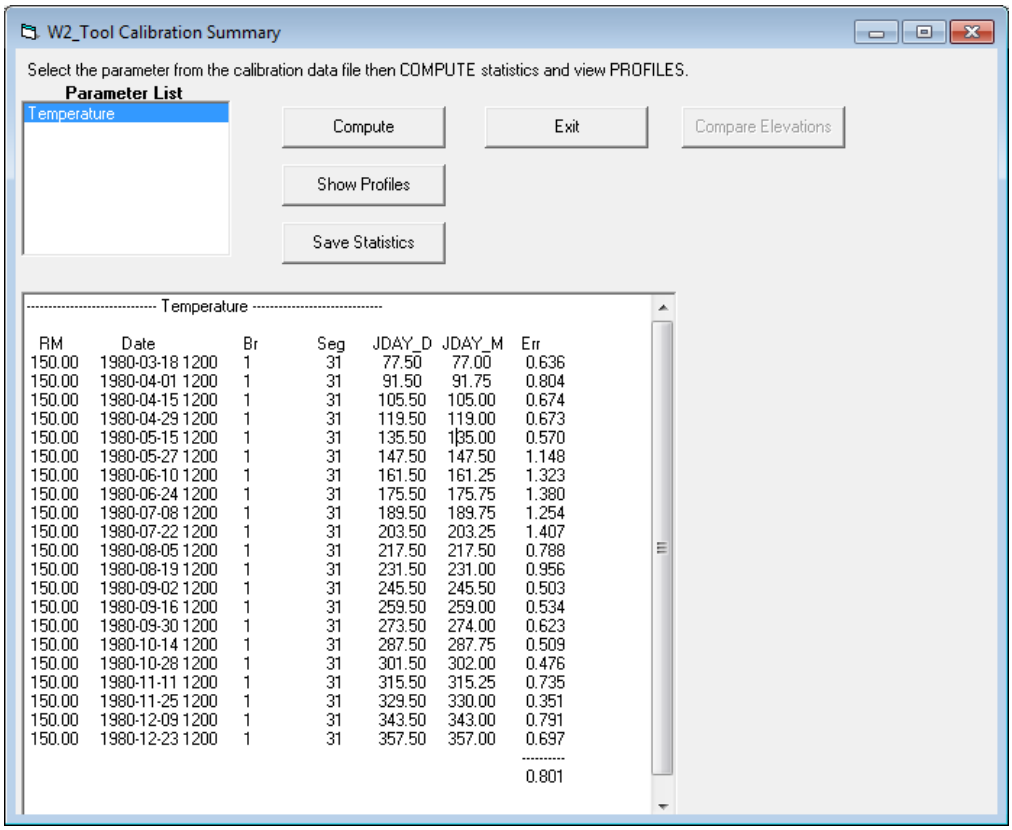
Column Definitions:

Br:	W2 model branch number
RM:	Distance upstream of the most downstream segment face of the specified branch
Date/Time or Julian Date:	A valid date time formatted field (must include time), or A valid Julian date from the start date of the model (e.g. 2004-01-01)
Depth:	Depth of the measurement
Parameter	Measurement value corresponding to each depth. Each parameter in a column. Use -999 to indicate missing values. All columns must be filled.

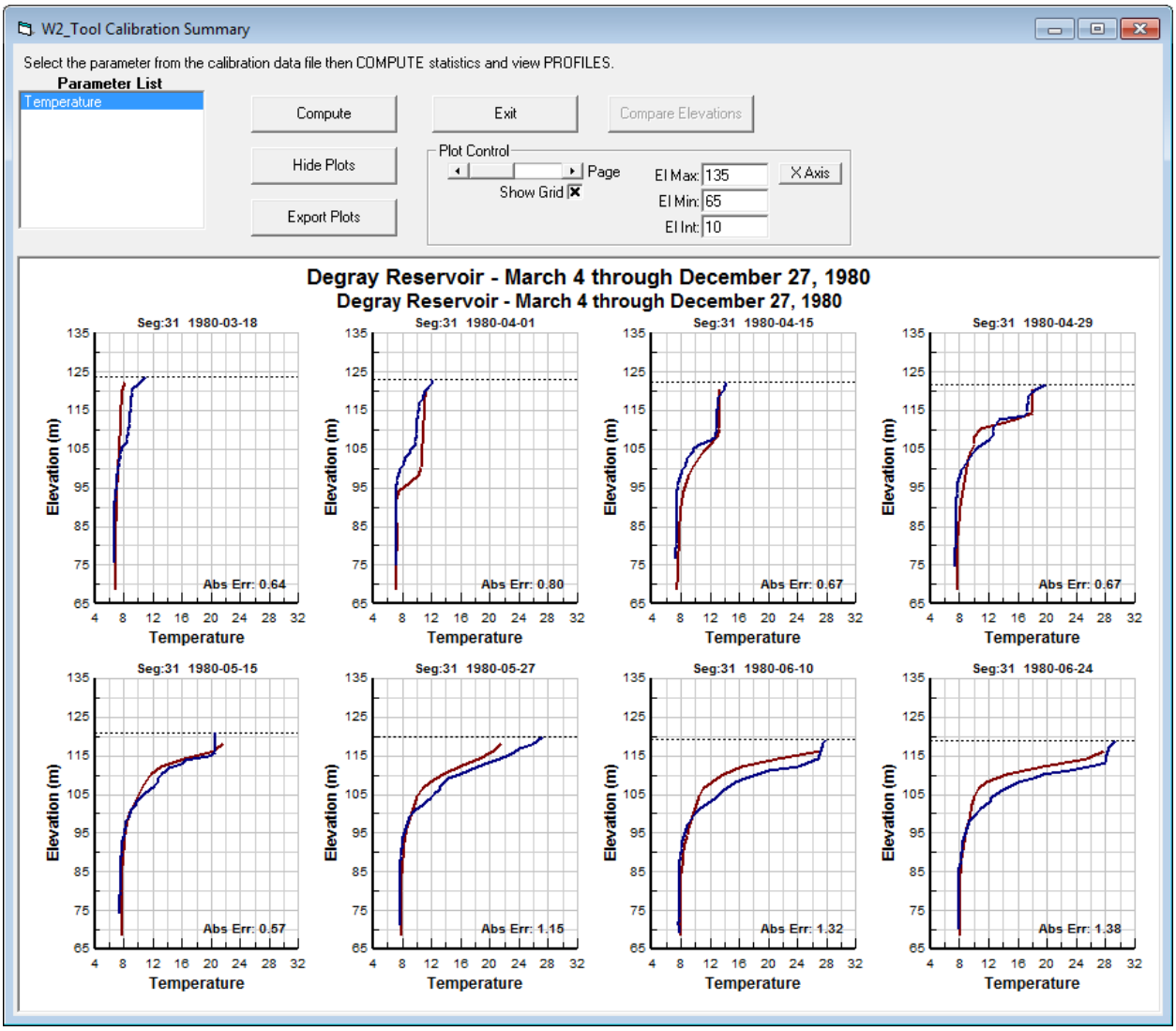
Example Form showing the calibration file settings after loading the specified file (using “Load File”).

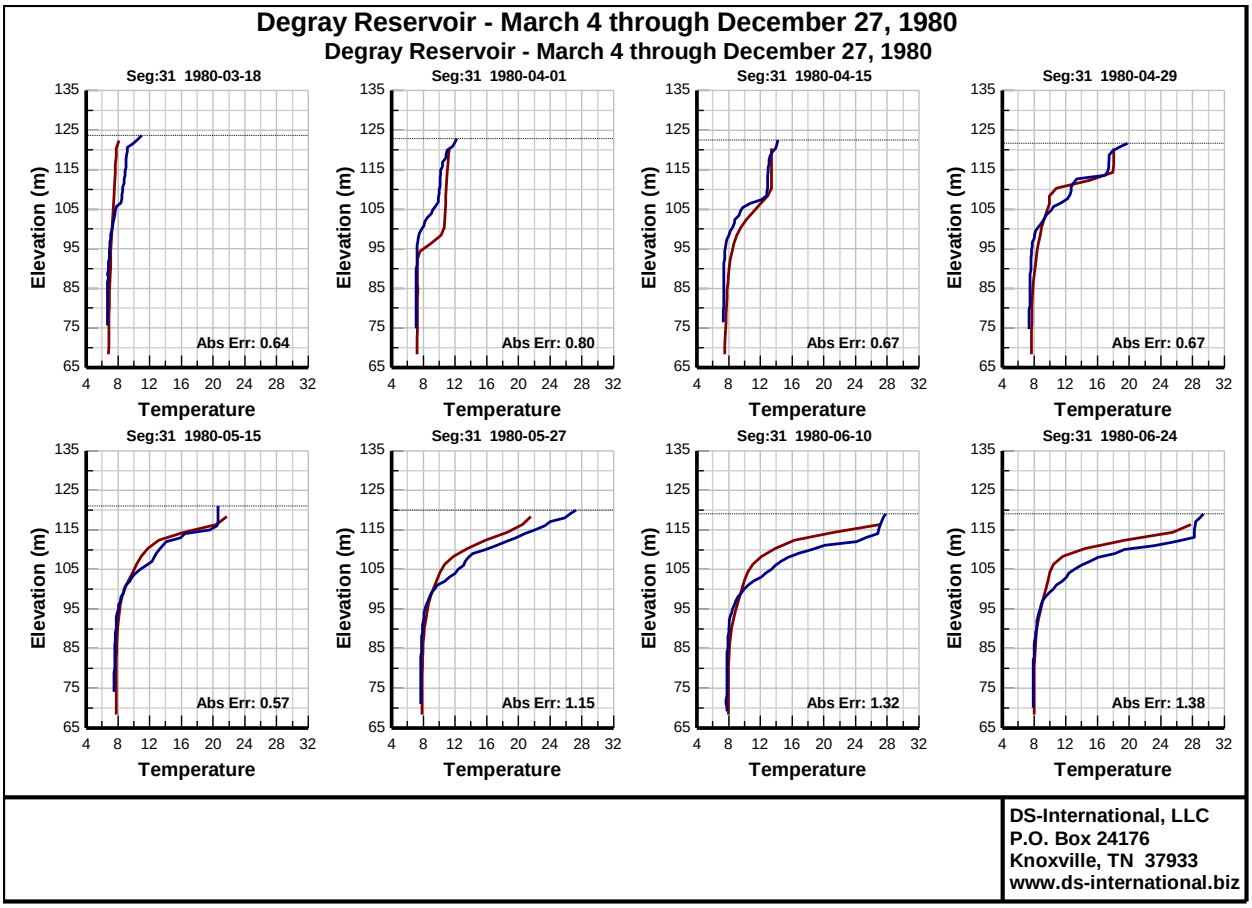


Using the “Calib Stats” button on the main W2_Post form, the user will see the W2_Tool Calibration Summary form. The user must select the parameter to compute then click on the “Compute” button. W2_Post will then compute the profile statistics and summarize all of the measured profiles in the summary, as seen below.



After computing the summary statistics, the user can view the profiles by clicking on the “Show Profiles”. Eight profiles are shown per page. Plotting control is available using the “X Axis” and elevation settings on the form. The profiles can be saved as metafiles using the “Export Plots” button. An example is shown below.





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