AGNPS Input Data Preparation Model

User's Guide

Version 3

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A. AGNPS Input Data Preparation Model

Introduction: The purpose of this documentation is to provide information on installing and executing the programs that make up the AGNPS Input Data Preparation Model. The software has been designed to run under Windows 98, Windows 2000, Windows NT and Windows XP. The sample images included in this documentation were created under the Windows XP operating system.

Text that is to be typed or screen objects that are to be clicked on by the user will be highlighted in **bold**typeface.

Overview: The input data set for AnnAGNPS Pollutant Loading Model consists of 31 sections of data, which can be supplied by the user in a number of ways. The AGNPS Arcview Interface was developed to help the user create a new or modify an existing AnnAGNPS data set. It is recommended that the user download, print, and read the AnnAGNPS Input Specifications in order to become familiar with the data requirements. The AnnAGNPS Data Preparation Model consists of four components: (A) AGNPS Arcview Interface (described in a separate document) or the AnnAGNPS Flownet Generator which will allow the user to extract data from a Digital Elevation Model (DEM); (B) AnnAGNPS Input Editor which will allow the user to import the extracted data from the DEM and/or manually enter data from the keyboard as well as edit existing AnnAGNPS input files; (C) AGNPS to AnnAGNPS Converter which will allow the user to convert existing AGNPS files to AnnAGNPS format; and (D) GEM, a synthetic weather generator, to generate the precipitation and min/max air temperatures for AnnAGNPS. These components are further discussed in following paragraphs.

B. AnnAGNPS Flownet Generator

This is a set of computer programs to assist the user to generate AnnAGNPS amorphous grids while extracting the DEM-related stream reach (receiving reach, length, elevation, & slope) and cell (drainage area, elevation, aspect, land slope, time of concentration profile slope & length, LS-factor, and receiving reach) data. The program set consists of: (1) an existing operational computer model "TopAGNPS", a subset of the ARS **TO**pographic **PA**rameteri**Z**ation (TOPAZ) model (Garbrecht and Martz, 1995); (2) a Fortran program "AgFlow", to generate the DEM-related input parameters ; and (3) a Visual Basic graphical interface "VbFloNet", as a tool to visualize the results from TopAGNPS & AgFlow and to be able to subdivide the watershed into hydro-geomorphic areas for setting different CSA & MSCL values.

Transfer Structure for AnnAGNPS Flownet Generator Model:

The following symbolic diagram shows the necessary files that are needed prior to successful execution of each batch procedure. File names are the expected generic names. They are either expected as input names or are generated as output files. Certain files that are noted as "DEM input…" or "Control input…" are to be initially supplied by the user and are necessary prior to execution of a particular program. Those that are noted as output are generated are some point during the data preparation process.

```
\AGNPS
    |
    |---DataPrep  (AnnAGNPS Input Data Preparation Model)
        |
        |---Flownet   (AnnAGNPS Flownet Generator)
            |---AgFlow
            |    |---DataSets
            |    |    |---Input
            |    |    |    |---AgFCnt.inp          (Control input-AgFlow)
            |    |    |    |---DisCha.dat          (Raster output-Dednm)
            |    |    |    |---DisOut.dat          (Raster output-Dednm)
            |    |    |    |---DnmCnt.inp          (Control input-Dednm)
            |    |    |    |---FloVec.dat          (Raster output-RasFor)
            |    |    |    |---FvSlop.dat          (Raster output-Dednm)
            |    |    |    |---HSlope.dat          (Raster output-Dednm)
```

```
|     |     |     |---Relief.out                  (Raster output-Dednm)
|     |     |     |---SubWta.dat                  (Raster output-RasFor)
|     |     |     |---TAspec.dat                  (Raster output-RasFor)
|     |     |     |---TSlope.dat                  (Raster output-Dednm)
|     |     |     |---UpArea.out                  (Raster output-Dednm)
|     |     |---Output
|     |     |     |---AgFlow.log                  (log file)
|     |     |     |---AnnAGNPS_Cell.dat           (cell data-InpEdit)
|     |     |     |---AnnAGNPS_Reach.dat          (reach data-InpEdit)
|     |     |     |---AnnAGNPS_Subarea.rpt        (Subarea information)
|     |     |     |---AnnAGNPS_SubWta.arc         (raster cell Ids-ArcView)
|     |     |     |---AnnAGNPS_SubWta.dat         (raster cell Ids-VbFloNet)
|     |     |     |---FlowGraf.rpt                (control input-VbFloNet)
|     |     |---Document
|     |     |---Execute
|     |           |---AgFlow.exe
|
|---TopAGNPS
|     |---DataSets
|     |     |---Input
|     |     |     |---DataPrep.bat
|     |     |     |---Dednm.inp             (DEM input-Dednm)
|     |     |     |---DnmCnt.inp            (Control input-Dednm)
|     |     |     |---NtgCod.inp            (Raster input-Dednm)
|     |     |     |---RasFor.inp            (Control input-RasFor)
|     |     |     |---RasPro.inp            (Control input-RasPro)
|     |     |---Output
|     |---Document
|     |---Execute
|           |---Dednm.exe
|           |---Rasfor.exe
|           |---Raspro.exe
|           |---Salflibc.dll
|
|---VbFloNet
      |---DataSets
      |     |---AnnAGNPS_Cell.dat       (Cell output-AgFlow)
      |     |---AnnAGNPS_Reach.dat      (Reach output-AgFlow)
      |     |---Bound.dat           (Raster output-RasFor)
      |     |---Bound.out           (Raster output-Dednm)
      |     |---Dednm.inp           (DEM input-Dednm)
      |     |---DisCha.dat          (Raster output-RasFor)
      |     |---DnmCnt.inp          (Control input-Dednm)
      |     |---FloVec.dat          (Raster output-RasFor)
      |     |---FloVec.out          (Raster output-Dednm)
      |     |---FlowGraf.rpt        (Graph output-AgFlow)
      |     |---NetW.dat            (Raster output-RasFor)
      |     |---NetW.out            (Raster output-Dednm)
      |     |---NetW.tab            (Table output - Dednm)
      |     |---NtgCod.dat          (Raster output-RasFor)
      |     |---Relief.dat          (Raster output-RasFor)
      |     |---Relief.out          (Raster output-Dednm)
      |     |---SubWta.dat          (Raster output-RasFor)
      |     |---SubWta.out          (Raster output-Dednm)
      |     |---TAspec.dat          (Raster output-RasFor)
      |     |---TSlope.dat          (Raster output-RasFor)
```

```
|     |---Uparea.dat          (Raster output-RasFor)
|     |---UpArea.out          (Raster output-Dednm)
|
|---Document
|---Execute
      |---VbFloNet.exe
      |---Setup
            |---vbflonet_Installation.exe
```

Installing the Flownet Generator

Steps for installing the Flownet Generator are:

Step 1. Open a web browser by clicking on the appropriate icon on the desktop or by clicking **Start**, **Programs**, and find the web browser program and click to execute, then enter: http://www.sedlab.olemiss.edu/AGNPS.html into the address bar of the browser and press **Enter** on the keyboard—Figure 1 will appear. Then click on **AGNPS Input Data Preparation Model**—Figure 2 will appear.

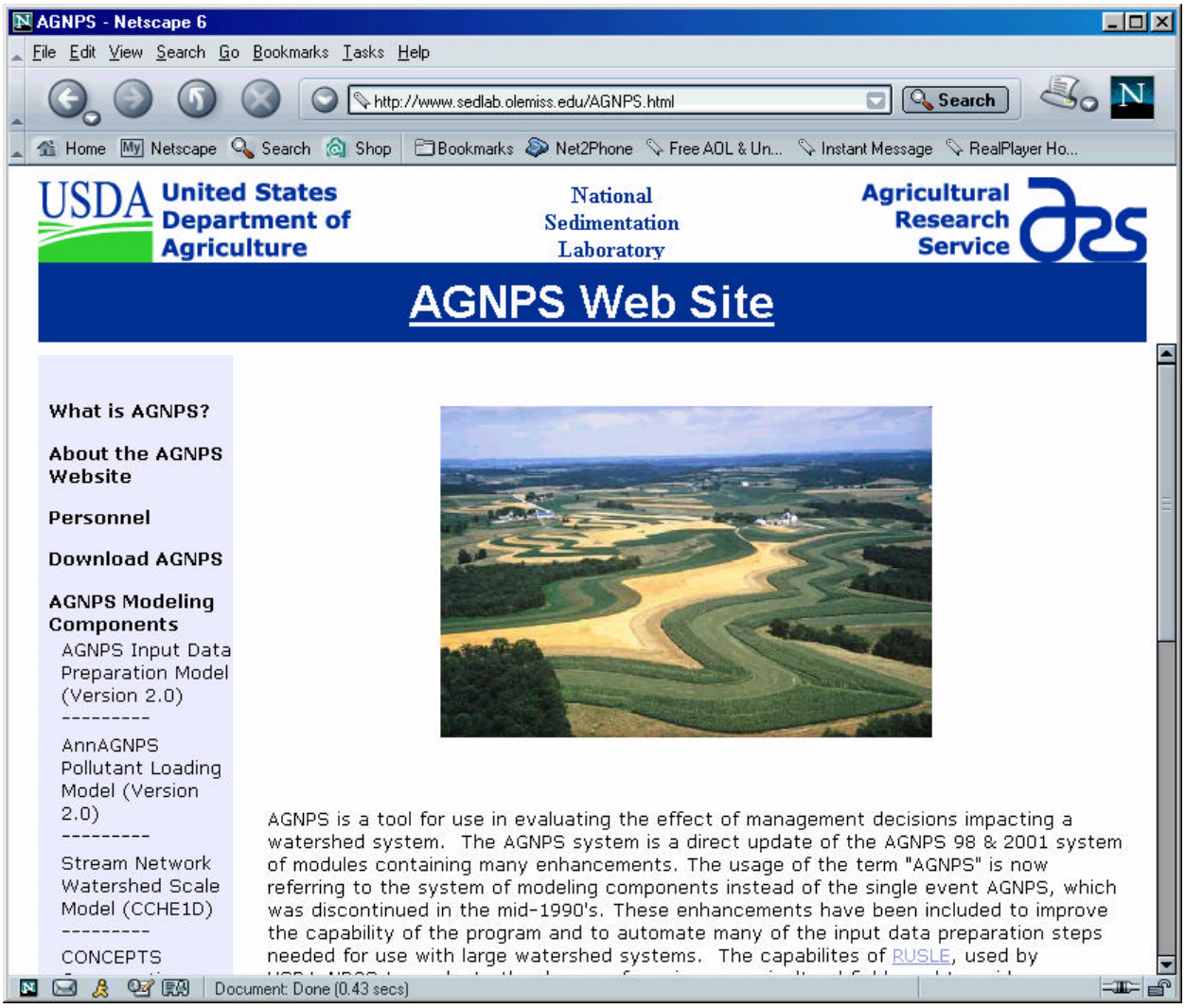


Figure 1: Opening browser.

Step 2. Scroll down to section B: Flownet Generator and click on its **Download Now** button (see Figure 2)—Figure 3 will appear.

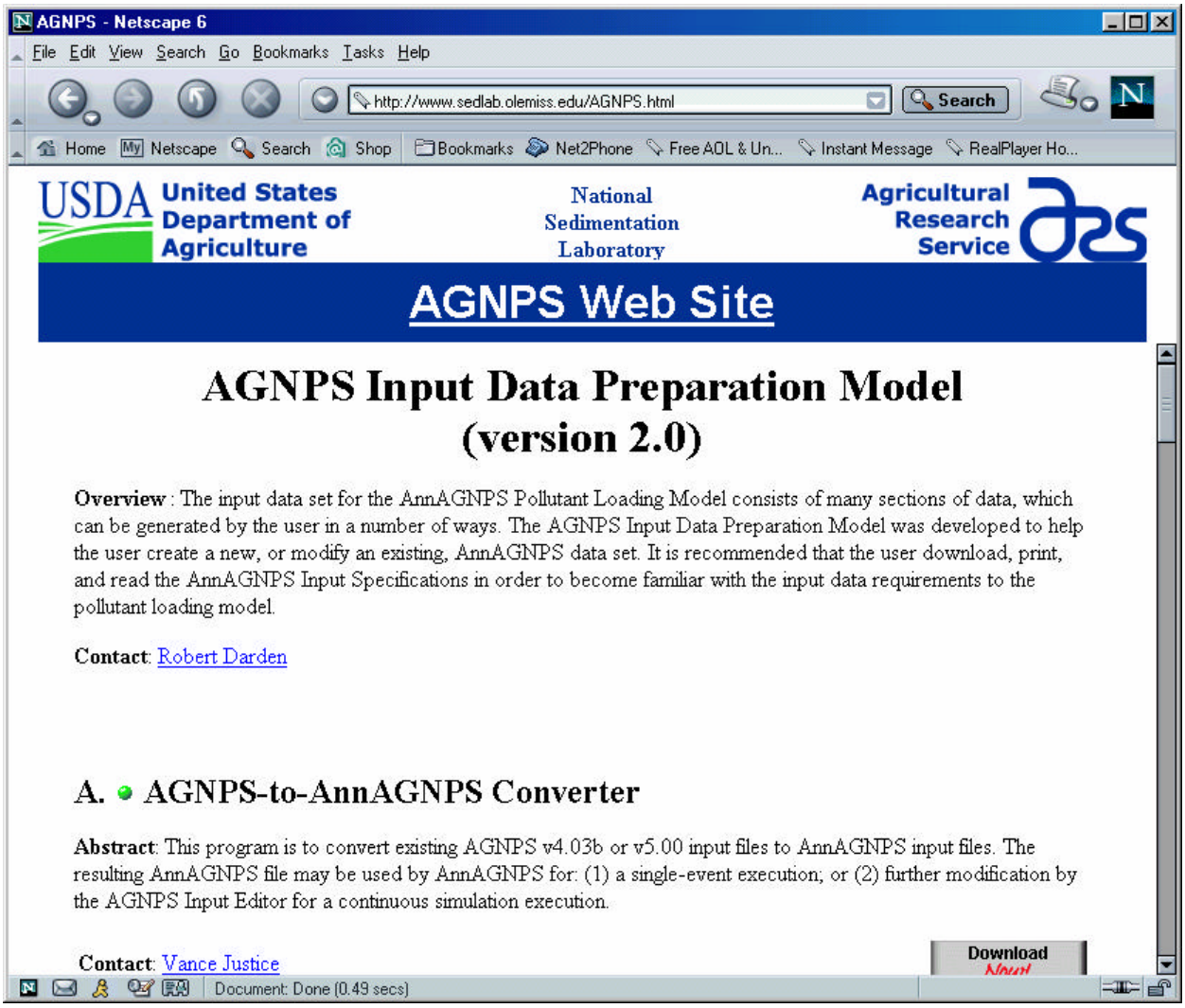


Figure 2: Download Now web page.

Step 3. If you have not previously done so, fill out the AGNPS Registration Form (see Figure 3) and click the **Submit** button—Figure 4 will appear. Registration must be completed for the first use only. If you've previously registered then click the **Already Registered Users** button—Figure 5 will appear and you will skip Step 4.

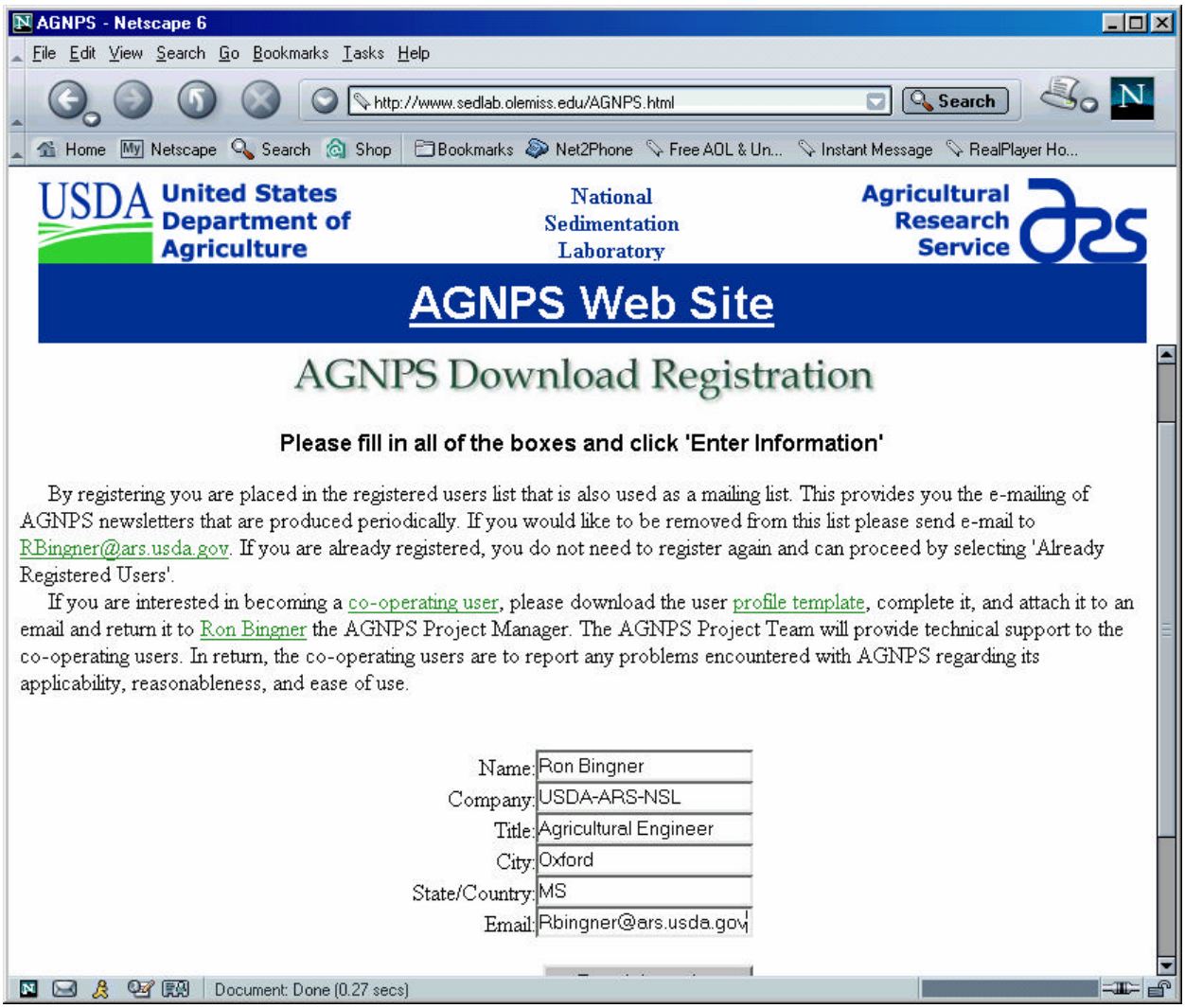


Figure 3: Registration web page for casual users.

Step 4. When finished viewing this web page, click on "Back" icon on your Browser's toolbar to return to "AGNPS Registration Form" web page; then click on the link **Already Registered Users** button (see Figure 4)—Figure 5 will appear.

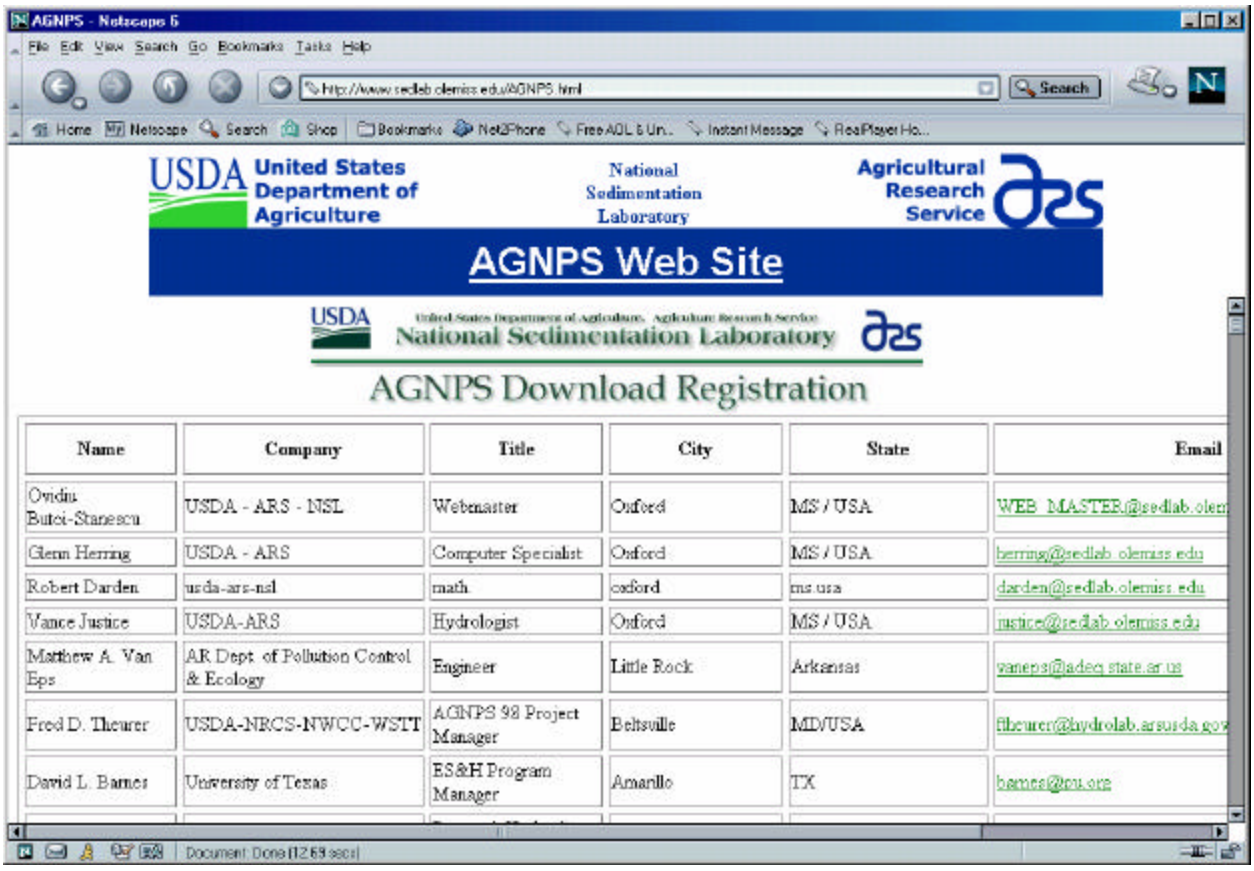


Figure 4: List of registered users web page.

Step 5. Scroll down to Flownet Generator and click on the green bullet under the Executable column (see Figure 5)—Figure 6 will appear

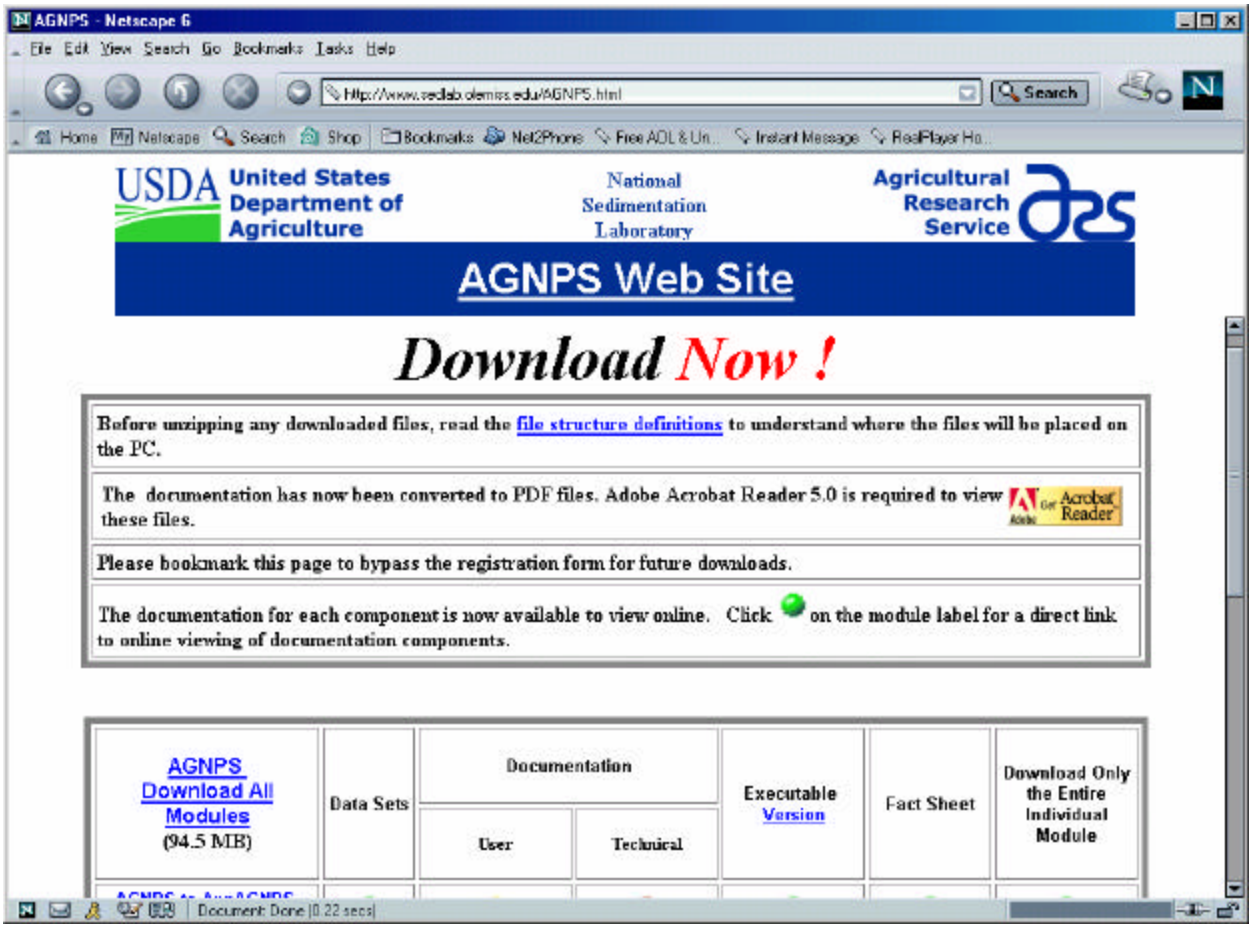


Figure 5: Download Now web page.

Step 6. Select the option "**Save this program to disk**." and click **OK—**Figure 7 **will appear**.

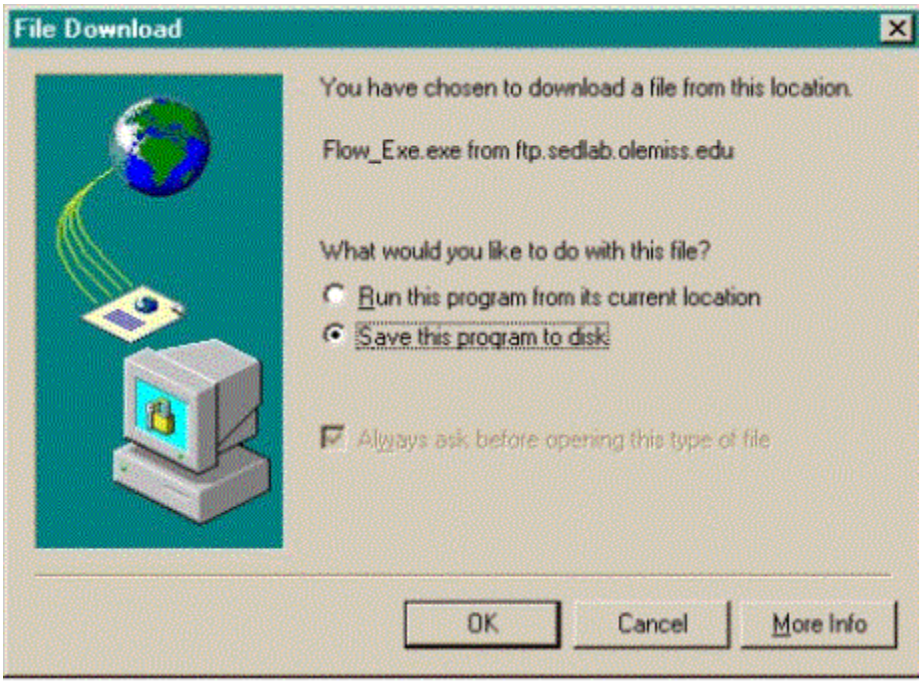


Figure 6: Download program to disk submenu.

Step 7. Use the drop down box to select or type in the path and click **Save** to save the self-extracting archive file "Flow_exe.exe" to a temporary location on the local hard disk for extraction. Make a note of where you saved this file. The file path will be needed in step 10.

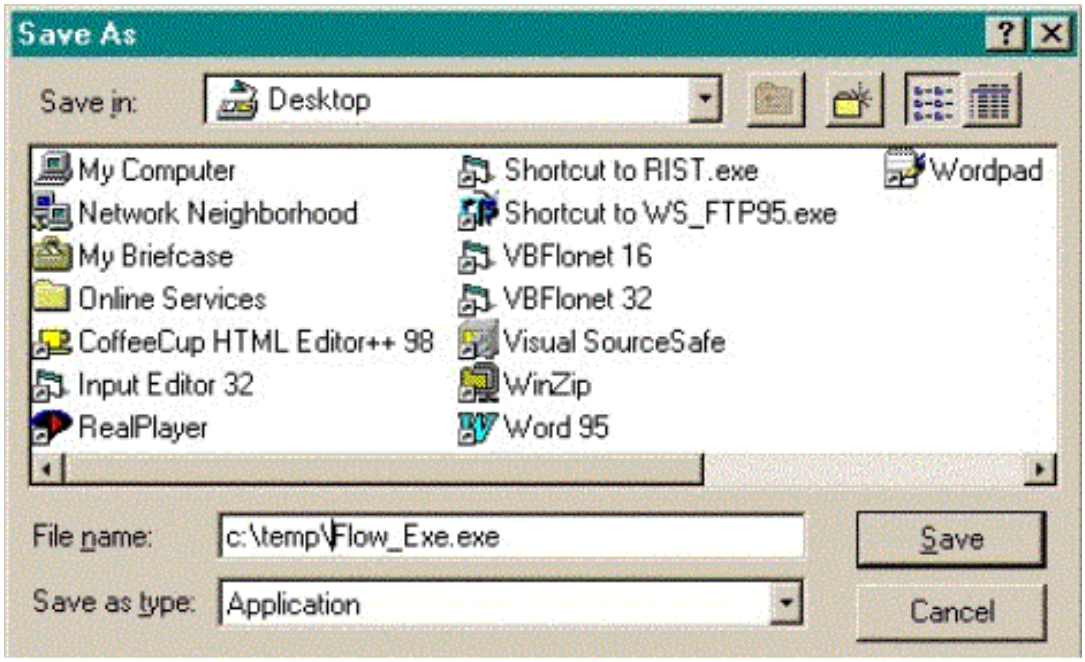


Figure 7: Save As submenu.

Step 8. Repeat step 6 for Data Sets ("FlowData.exe") and Documentation ("Flow_Doc.exe").

Step 9. Using Windows Explorer, locate the self-extracting archive files that were saved in Step 6.

Step 10. Double click "**Flow_exe.exe**" to begin extraction—Figure 8 will appear. Accept the default path of C:\ and click the **Unzip**button.

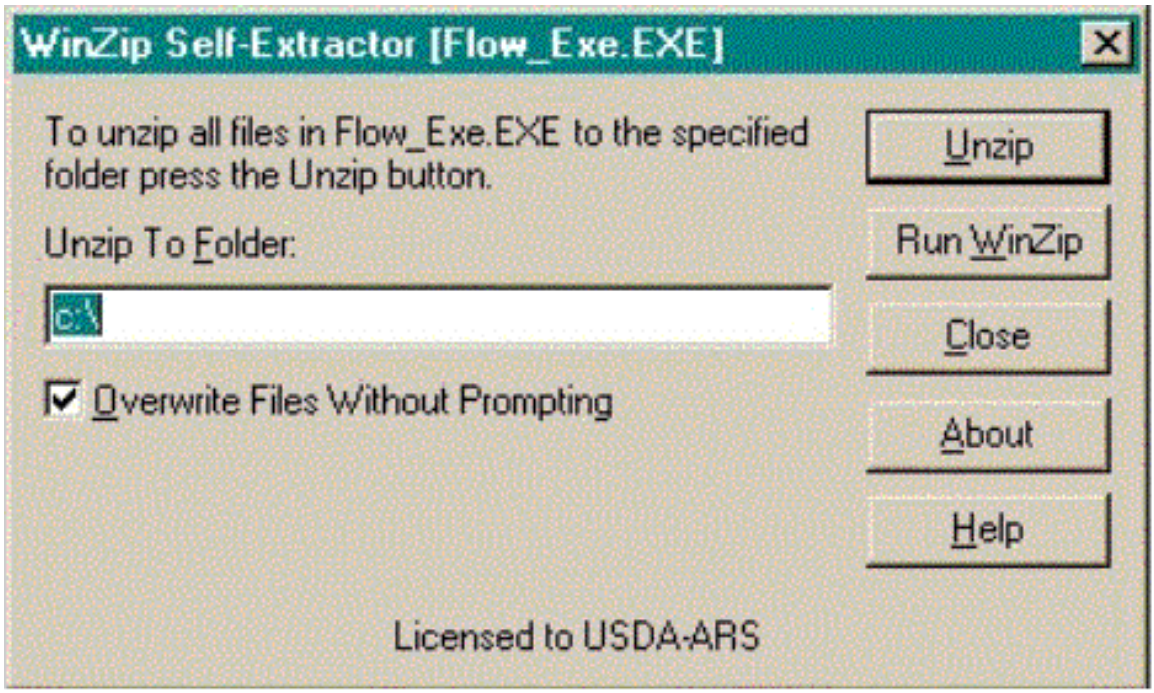


Figure 8: WinZip self-extraction for "Flow_Exe.EXE".

Upon successful completion, a dialogue box showing the number of files unzipped will appear as shown in Figure 9.

Figure 9: Successful completion message.

Step 11. Repeat Steps 8 and 9 for the remaining files, Data Sets ("FlowData.exe") and documentation ("Flow_Doc.exe")., saved in step 6.

This completes the installation of the TopAGNPS and AgFlow components of the Flownet Generator.

Step 12. VbFloNet, written in Visual Basic, requires a few additional steps.

Using Windows Explorer, locate the "vbflonet_installation.exe" file in the “Setup” subdirectory:

"C:\AGNPS\Dataprep\Flownet\VbFloNet\Execute\Setup"

This can also be completed during the unzip process

Double-click "**vbflonet_installation.exe**" to begin the Visual Basic Installation of VbFloNet—Figure 10 will appear after winzip extraction..

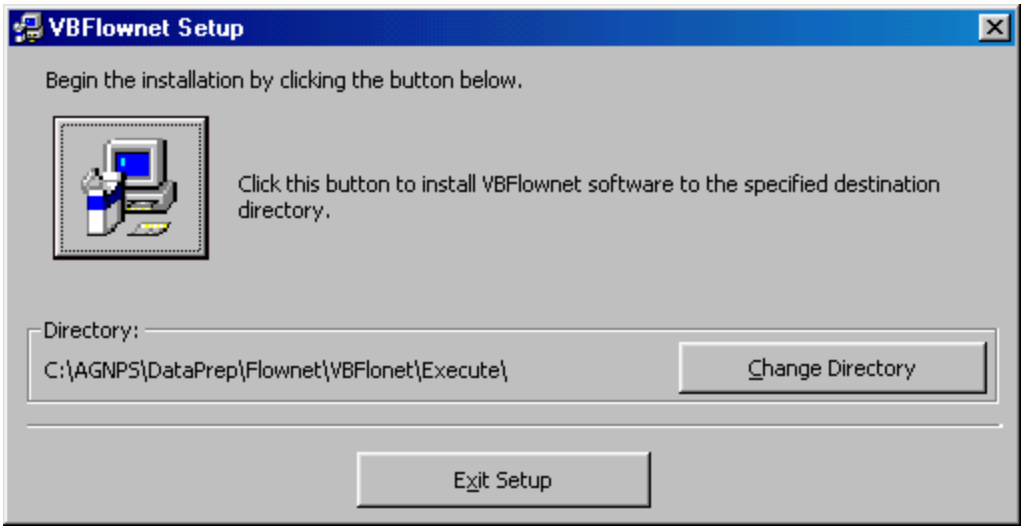


Figure 10: Flownet Generator installation.

Step 13. Click the **icon** as shown in Figure 10 to install VbFloNet.

This completes the installation of the Flownet Generator

C. Managing a Project

The following steps will detail one way of building and managing an AGNPS project through the process of developing the input parameters necessary to perform an AnnAGNPS simulation. First, a project is defined as a collection of data inputs, executable programs, and resulting data outputs. For each of the programs in the data preparation component of AGNPS, the input and output files will be documented in detail.

The following steps detail an example of how to build an AGNPS project. A specific application-oriented directory structure that includes a set of batch procedures are available that simulate the following instructions and are recommended if assistance is expected from the Project Team.

Step 14. Create a working folder. If you want help from the Project Team, follow the suggested directory, subdirectory, and file naming structure. If you do not expect help from the Project Team, you may simplify the structure and naming convention. The use of embedded blanks within directory and file names are discouraged

because it is prone to typing errors and some software does not recognize any characters subsequent to the first encountered embedded blank. An underscore ("_") is a standard substitution for an embedded blank.

a. Using Windows Explorer left click "**C:**"

b. Click **File**, click **New**, click **Folder**. Figure 11 illustrates the creation of a folder for multiple projects.

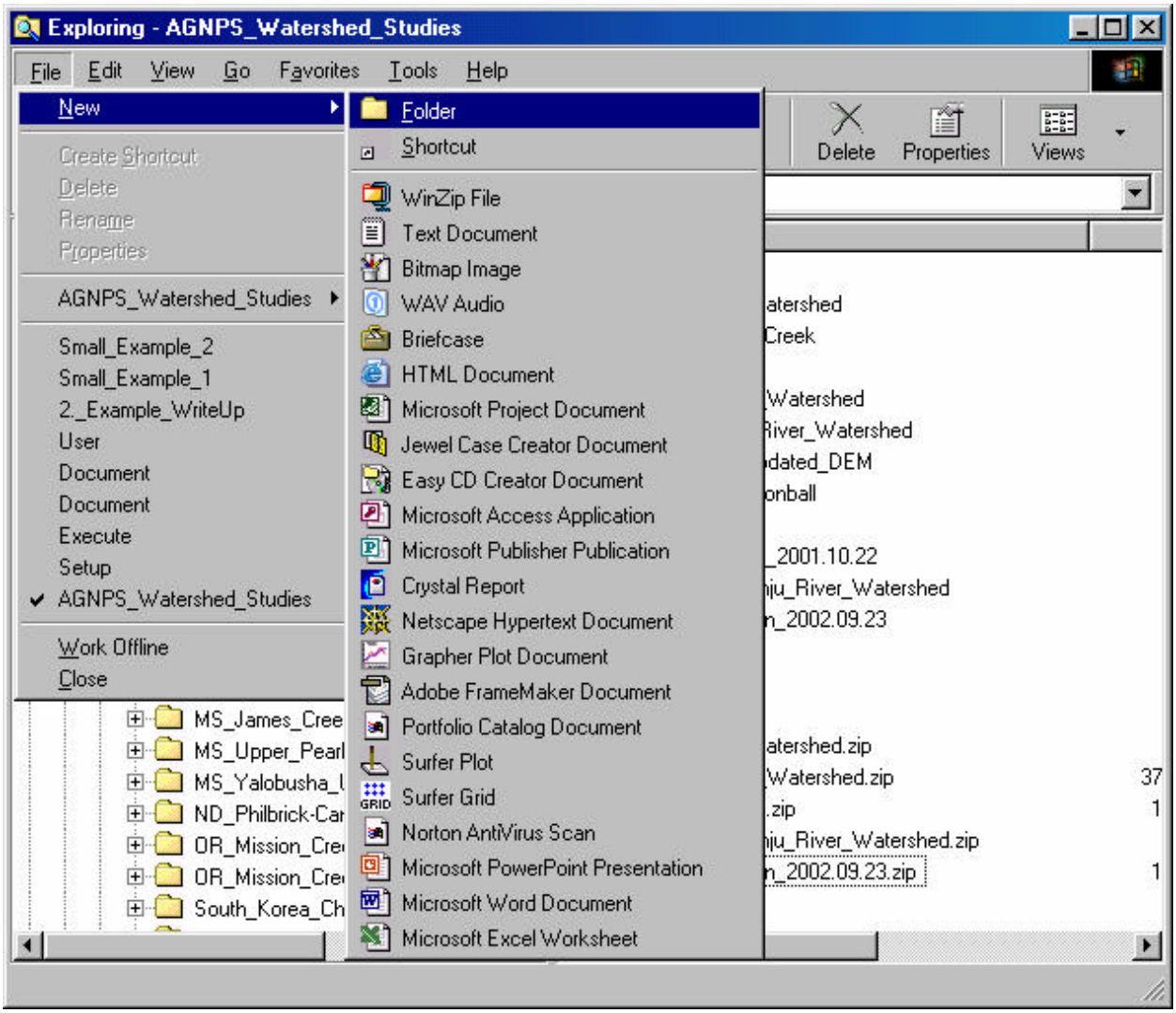


Figure 11: Creating a working folder.

c. Rename **New Folder** to "**AGNPS_Watershed_Studies**" which will be used for the purpose of this documentation. Under the "AGNPS_Watershed_Studies" folder create another new folder with the name **"OR_Mission_Creek"**. Use the two-letter state designation followed by the watershed (bayou, etc.) name for the subdirectory name. Multiple projects can be added later under the "AGNPS_Watershed_Studies" folder for each new watershed studied. A batch file procedure for the Mission Creek watershed is available from the download of the complete project zip file. Figure 12 is an examp le of multiple projects.

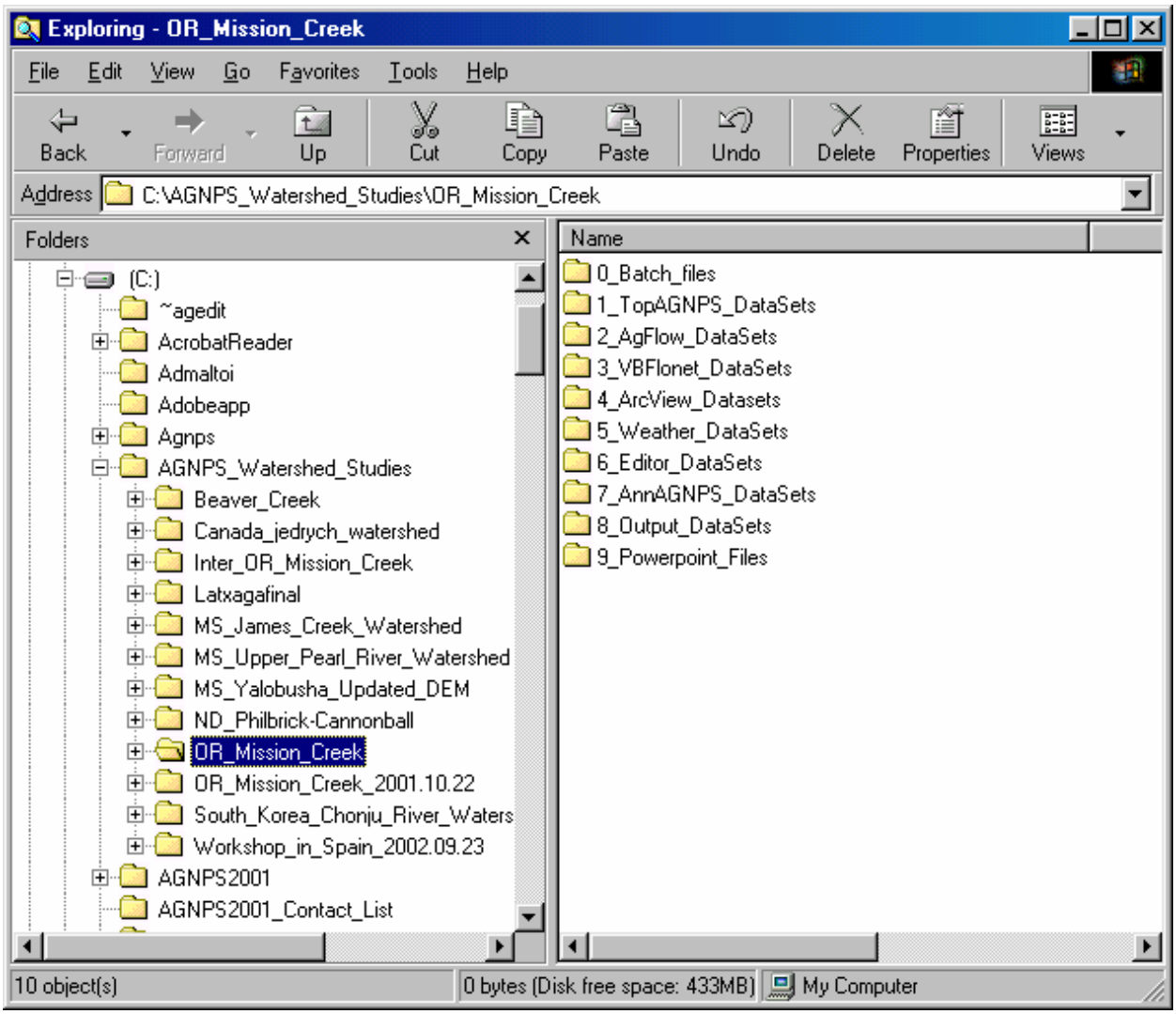


Figure 12: Mission Creek's project folders created.

Step 15. Copy the executable programs to the project folder.

a. Copy the AgFlow.exe file to the working project folder using following instructions.

Using Windows Explorer click on **AgFlow.exe** to select.
NOTE - AgFlow.exe is located in C:\AGNPS\DataPrep\Flownet\AgFlow\Execute
Click **Edit** on the Menu bar
Click **Copy** to copy the file
Double click the **project folder**
On the **Edit** menu, click **Paste**
AgFlow.exe appears in OR_Mission_Creek

b. Repeat Step 2A to copy **Dednm.exe, RasPro, RasFor.exe,** and **Salflibc.dll** to the project directory. These files are located in: C:\AGNPS\Dataprep\Flownet\TopAGNPS\Execute

Step 16. Copy the input files to the project directory.

There are: (1) one digital elevation map; (2) four control files; and (3) one optional geomorphic region file that are the basic input for each project (see Table 1). The contents of these files are detailed in the technical documentation. These files are a DEM data set and four control files. The control files contain specific information about the DEM data set and about how the programs will act on the data. For the purpose of this user's guide, the sample files for Mission Creek Watershed located in: "C:\AGNPS\DataPrep\Flownet\TopAGNPS\DataSets\Input " directory will be used:

Note - The control files must be modified for each individual project. Refer to the technical documentation for a description of these files and the parameters that are critical to each DEM data set.

Using the same method as described in step 2A, copy the following files to the project directory:

Table 1: Digital elevation model (DEM), geomorphic region (NtgCod.inp), and control files for TopAGNPS & AgFlow

	File	Description
1	Dednm.inp	DEM data for Mission Creek
2	DnmCnt.inp	control file for Dednm.exe
3	NtgCod.inp	geomorphic region for each raster's CSA & MSCL value.
4	RasPro.inp	control file for RasPro.exe
5	RasFor.inp	control file for RasFor.exe
6	AgFCnt.inp	control file for AgFlow.exe

Step 17. Execute "Dednm.exe".

Using Windows Explorer, double-click "**Dednm.exe**".

Processing information will be displayed on the screen. The program pauses for user interaction concerning the watershed outlet. The drainage area outlet defined by row and column came from the DnmCnt.inp control file. The values displayed within the matrix represent the number of upstream rasters at that location. The user may modify the outlet selection at this time, if necessary. For the purpose of the example, accept the outlet values by entering a "**1**" and press **enter**.

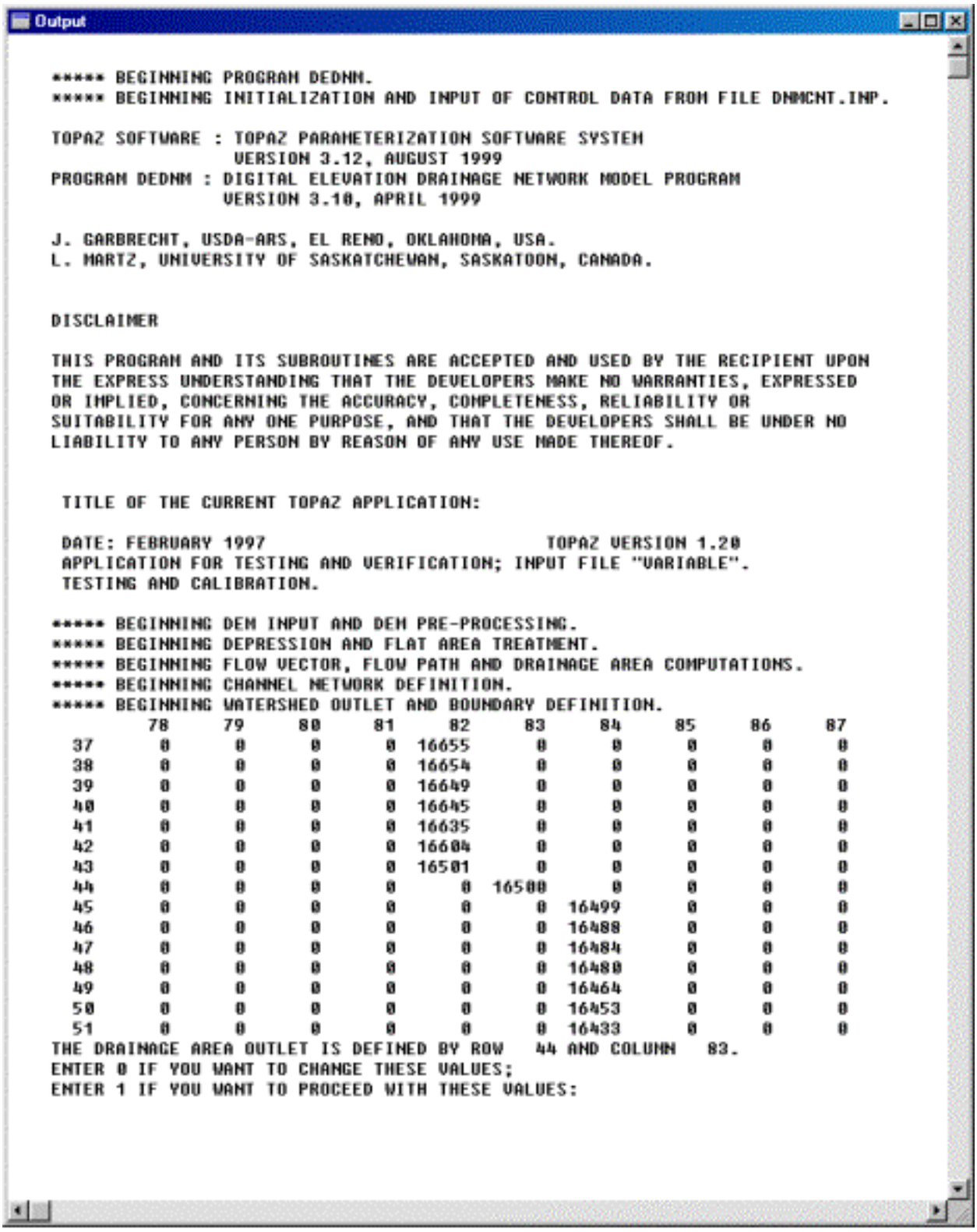


Figure 13: Initial window during execution of TopAGNPS (Dednm.exe) showing normal execution.

The following figure shows the normal termination of "Dednm.exe".

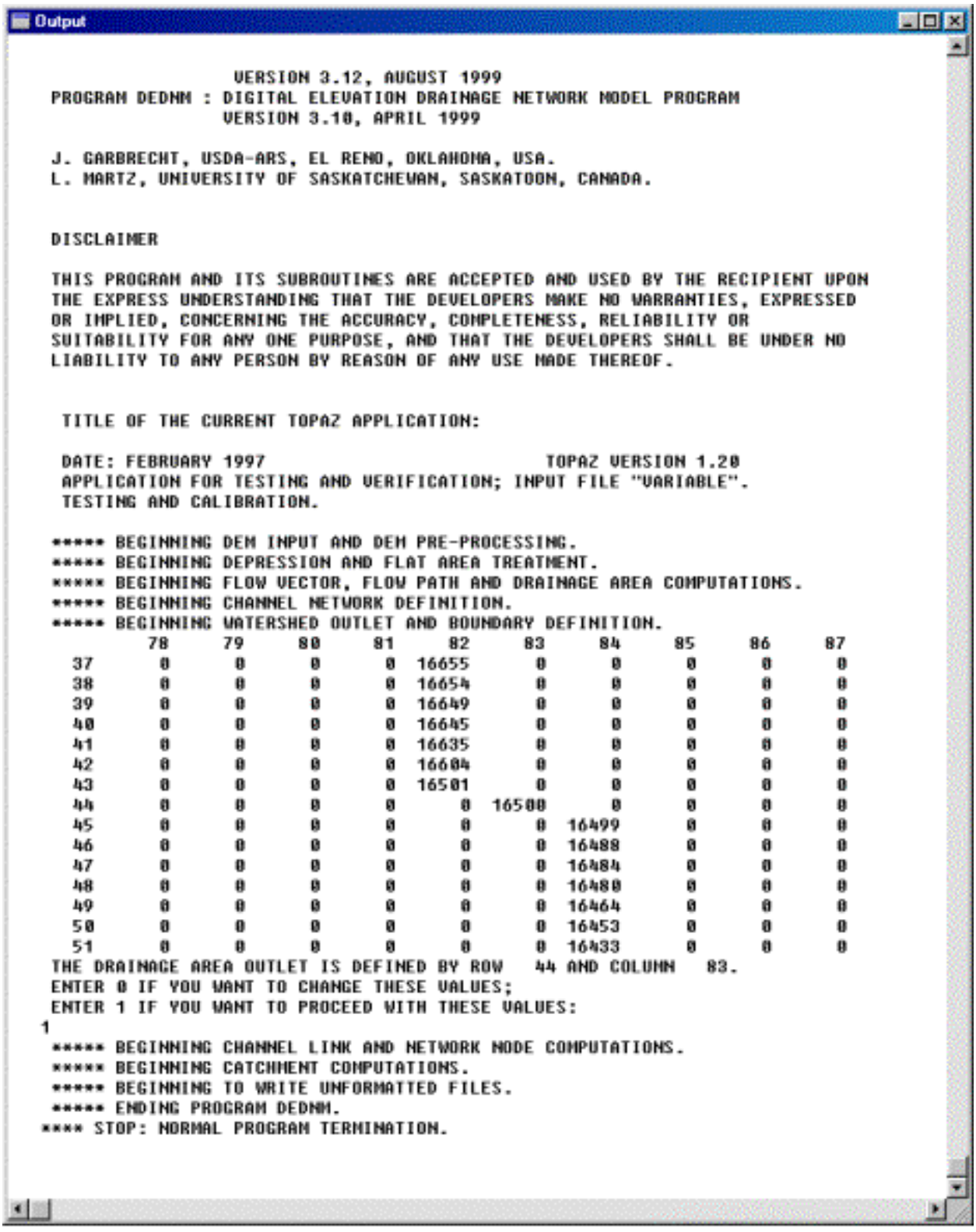


Figure 14: 2nd window during execution of TopAGNPS (Dednm.exe) showing normal execution & termination.

Dednm.exe produces output files with *.out, *.tab, *.rpt, *.UNF, and *.FIL extensions. The following figure shows the project directory containing some of the output files.

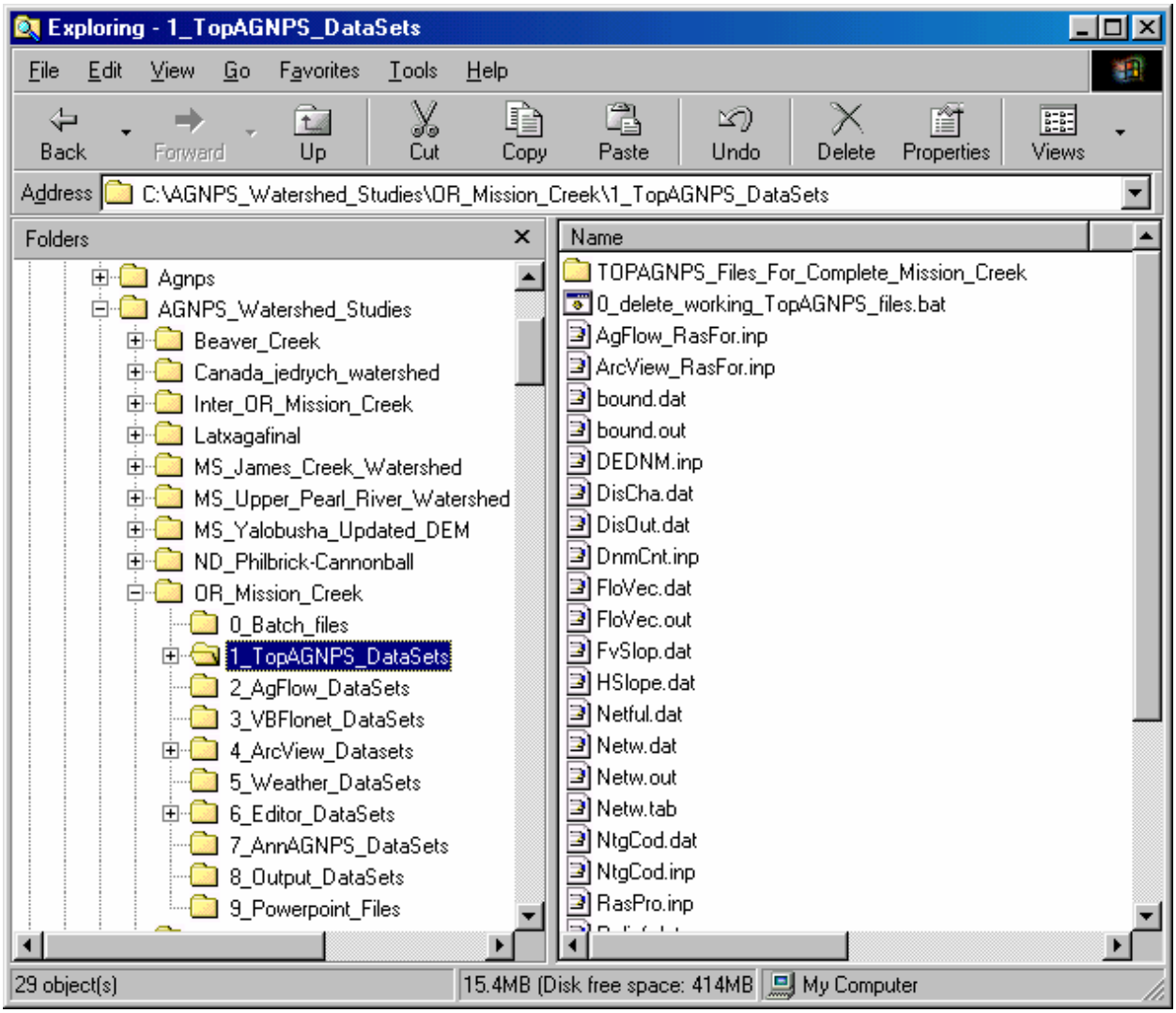


Figure 15: "1_TopAGNPS_DataSets" folder showing the necessary input to complete the execution of the "1_execute_TopAGNPS.bat" procedure and the needed TopAGNPS output files to complete all of the subsequent procedures.

Step 18. Executing "RasPro.exe"

"RasPro.exe" derives additional spatial landscape information and parameters using the "*.out" files from "Dednm.exe".

Using Windows Explorer, double-click "**RasPro.exe**".

Processing information will be displayed on the screen.

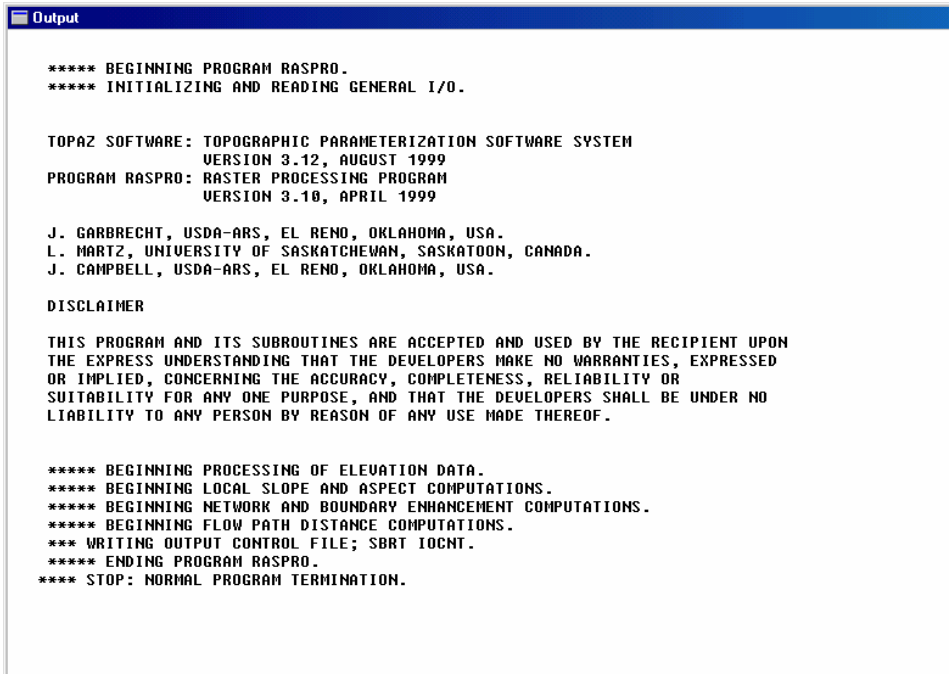


Figure 16: 3rd window during execution of TopAGNPS (RasPro.exe) showing normal execution & termination.

Step 19. Executing "RasFor.exe" to create files needed for "AgFlow".

"RasFor.exe" is a reformatting utility for the "*.out" files from "Dednm.exe".

Using Windows Explorer, double-click "**RasFor.exe**".

Processing information will be displayed on the screen.

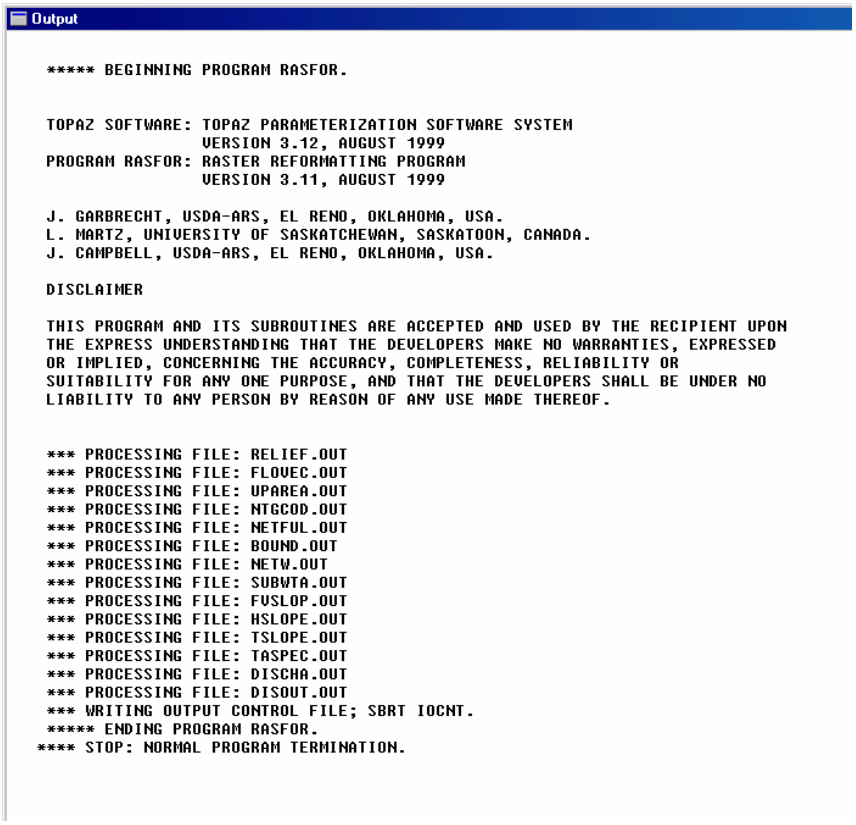


Figure 17: 4th window during execution of TopAGNPS (RasFor.exe) to create needed files for "AgFlow" and showing normal execution & termination.

"RasFor.exe", with the control file selected for files to be used by "AgFlow" & "VbFloNet", outputs files with "*.dat" extensions.

The output from the first execution (4th window) execution of RasFor.exe is shown in Table 2.

Table 2: Output files from TopAGNPS that are necessary input to AgFlow.

	File	Description
1	Discha.dat	distance from each raster to the channel
2	DisOut.dat	distance from each raster to the watershed outlet
3	DnmCnt.inp	control file for Dednm.inp
4	Flovec.dat	each rasters flow vector
5	FvSlop.dat	slope along each raster's vector
6	HSlope.dat	hydraulic slope for each raster—value is affected by the convergence of the upstream rasters
7	Relief.dat	calculated elevation of each raster
8	SubWta.dat	cell ID of each raster
9	TAspec.dat	aspect of each raster
10	TSlope.dat	terrain slope of each raster—these slopes are not in the direction of the flow vectors
11	UpArea.dat	number of upstream rasters for each raster

The following figure shows the portion of the project directory containing the output files generated by "RasFor.exe".

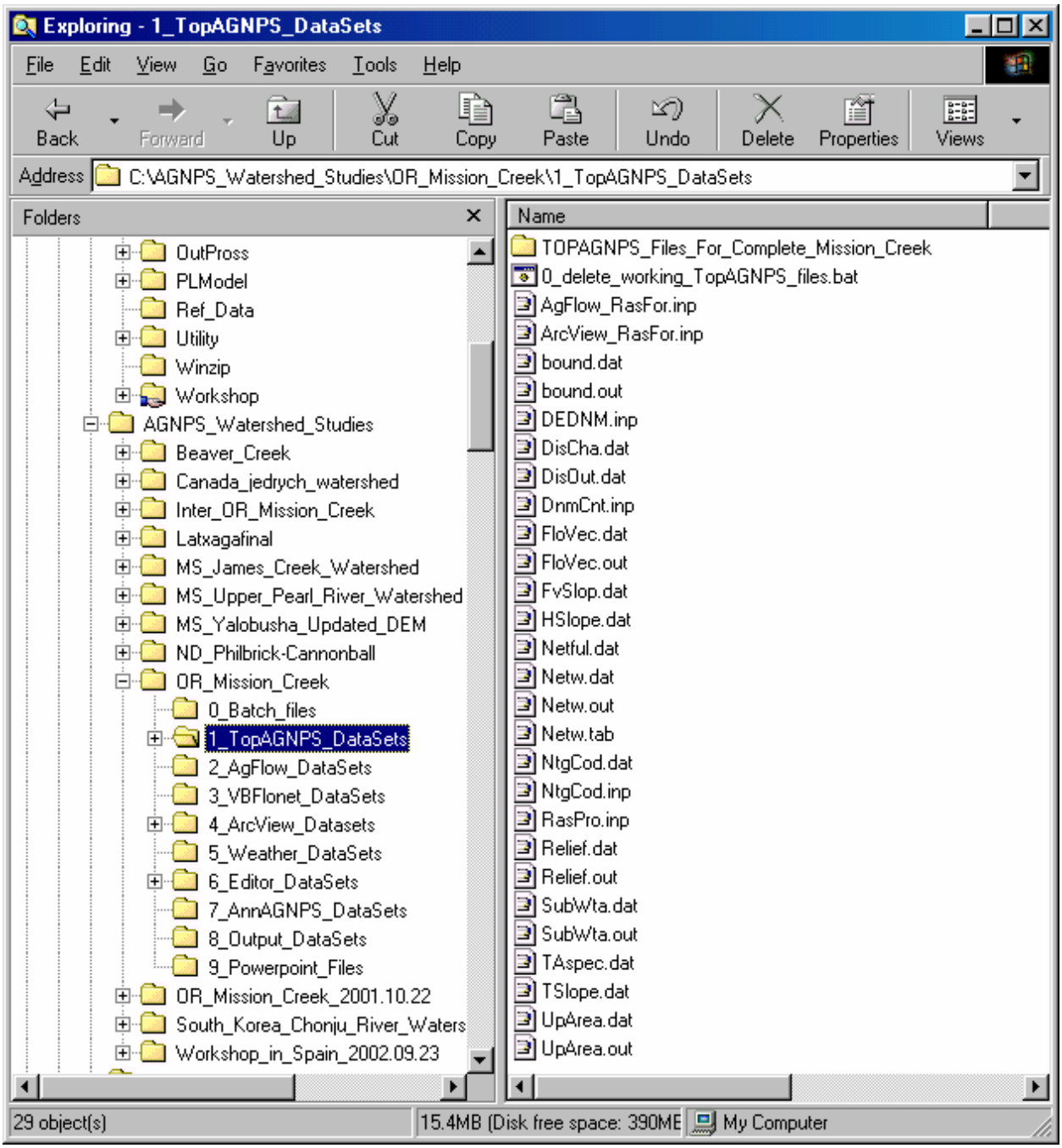


Figure 18: "C:\AGNPS_Watershed_Studies\OR_Mission_Creek\1_TopAGNPS_DataSets" subdirectory showing the list of the input control files used during the execution of "TopAGNPS" and the output files needed by "VbFloNet" & "AgFlow".

Step 20. Executing "RasFor.exe" to create files that can be used by "ArcView".

"RasFor.exe" is a reformatting utility for the "*.out" files from "Dednm.exe".

Using Windows Explorer, double-click "**RasFor.exe**" but use a different control file (RasFor.inp) that selects the correct output format.

Processing information will be displayed on the screen.

The figure below shows the normal termination of "RasFor.exe".

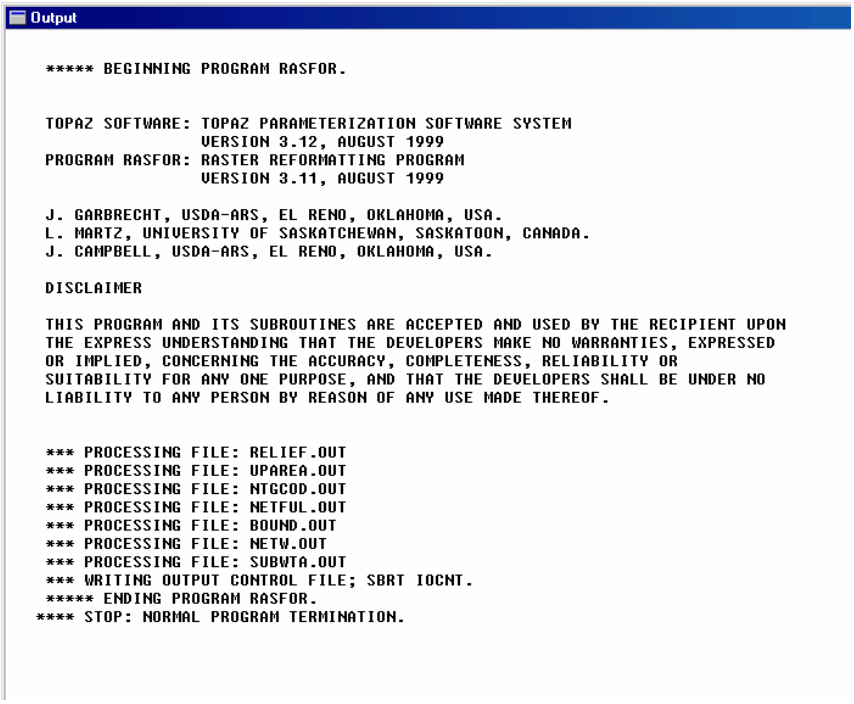


Figure 19: 5th window during execution of TopAGNPS (RasFor.exe) to create useful files for "ArcView" and showing normal execution & termination.

"RasFor.exe", with the control file selected for files that can be used by "ArcView", generates output files with "*.arc" extensions.

The output from the second execution (5th window) execution of RasFor.exe is shown in Table 3:

Table 3: Output files from TopAGNPS during second execution of RasFor showing files that are formatted to be imported directly into ArcView.

	File	Description
1	Bound.arc	code for each raster to indicate whether it is inside (1) or outside (0) the watershed boundary
2	Netful.arc	
3	Netw.arc	code to indicate channel rasters for stream network; code
4	Ntgcod.arc	geomorphic region for each raster's CSA & MSCL value
5	Relief.arc	calculated elevation of each raster
6	Subwta.arc	cell ID of each raster
7	Uparea.arc	number of upstream rasters for each raster

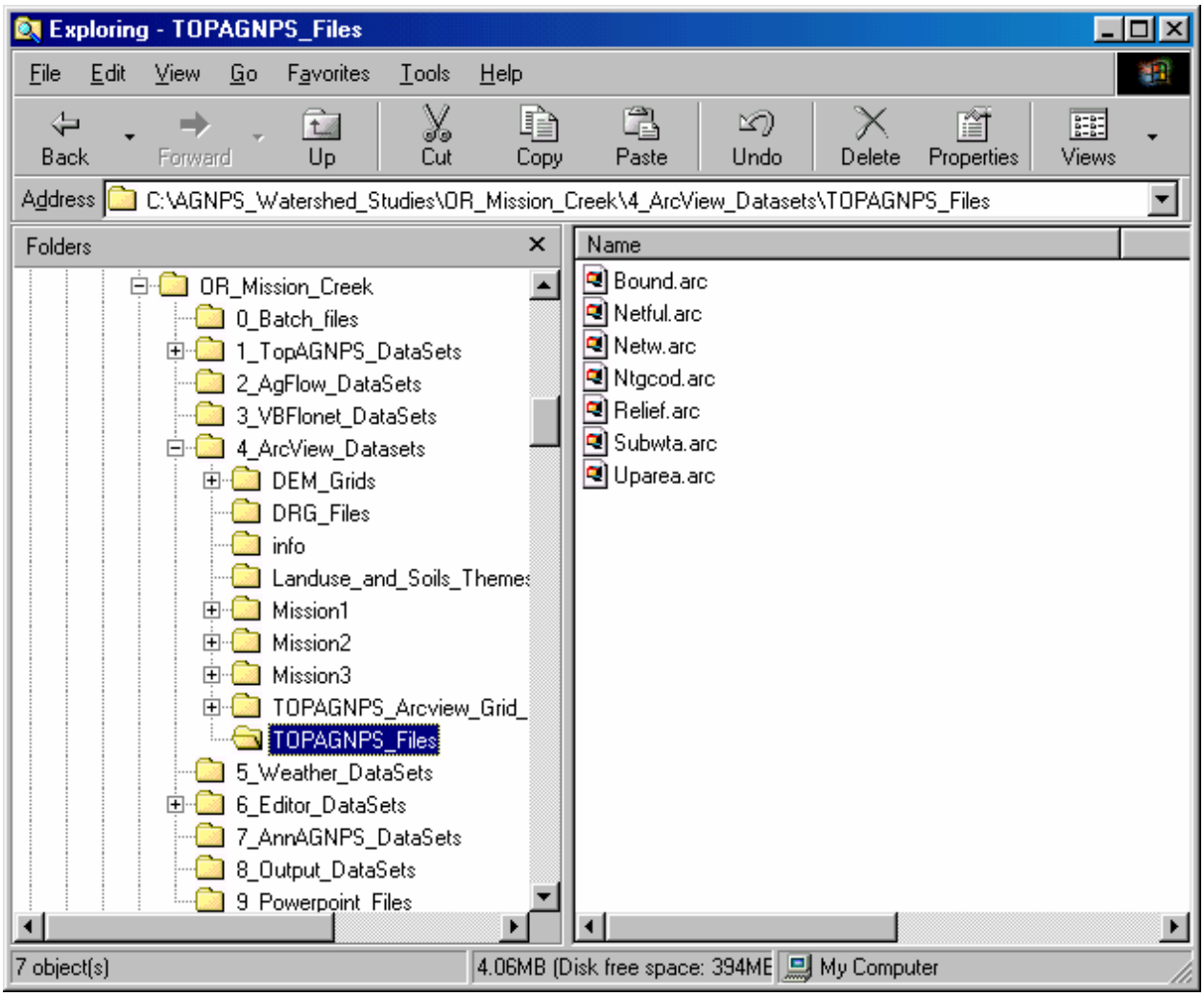


Figure 20: "C:\AGNPS_Watershed_Studies\OR_Mission_Creek\4_ArcView_Datasets\ TOPAGNPS_Files" subdirectory showing a list of output files useful for "ArcView" analyses.

Step 21. Executing AgFlow.exe.

AgFlow needs eleven files from TopAGNPS as input (see Table 4) and its control file AgFlow.inp (see Table 1). Lines 5, 6 & 7 of this control file contains the paths to the required input and output files for AgFlow.exe. However, the user must supply the path to the AgFCnt.inp file when executing AgFlow.exe. This can be accomplished by executing AgFlow.exe from within the same directory that contains AgFCnt.inp.

Table 4: Output files from TopAGNPS that are necessary input to AgFlow.

	File	Description
1	Discha.dat	distance from each raster to the channel
2	DisOut.dat	distance from each raster to the watershed outlet
3	DnmCnt.inp	control file for Dednm.inp
4	Flovec.dat	each rasters flow vector
5	FvSlop.dat	slope along each raster's vector
6	HSlope.dat	hydraulic slope for each raster—value is affected by the convergence of the upstream rasters

	File	Description
7	Relief.dat	calculated elevation of each raster
8	SubWta.dat	cell ID of each raster
9	TAspec.dat	aspect of each raster
10	TSlope.dat	terrain slope of each raster—these slopes are not in the direction of the flow vectors
11	UpArea.dat	number of upstream rasters for each raster

AgFlow.exe generates five files: (1) one file that is a record of the log for the execution of AgFlow; (2) two files containing cell & reach parameters for import into AnnAGNPS.inp; (3) one file that contains summary information by subareas; and (4) one file for input to VbFloNet. (See Table 5.)

Using Windows Explorer, double-click **AgFlow.exe**.

It is recommended that all AgFlow related files be in a separate directory for AgFlow alone. The following figure shows the normal termination of AgFlow.exe. The AgFlow.log file contains the entire record of what was being printed to the screen during the execution of AgFlow.exe. It is recommended that this file be reviewed because it will contain any warning or fatal error messages that may occur because of inappropriate input.

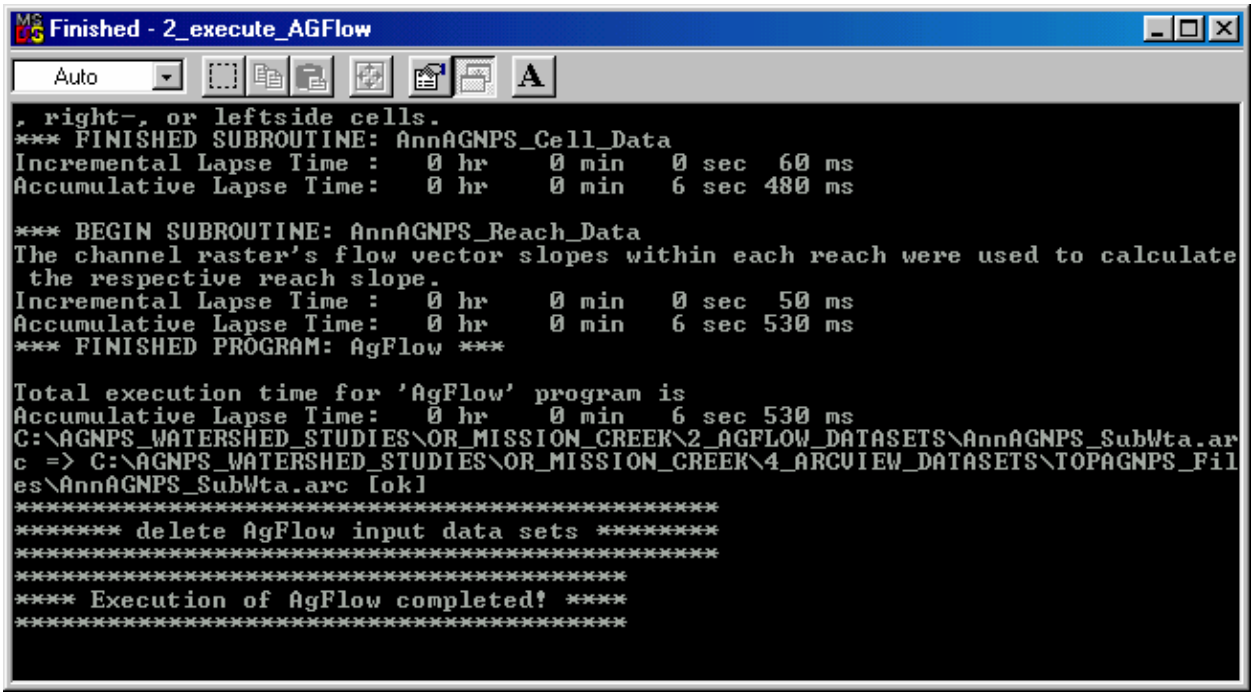


Figure 21: Normal termination of AgFlow.exe.

Table 5: Output files from AgFlow.

	File	Description
1	AgFlow.log	record of AgFlow execution
2	AnnAGNPS_Cell.dat	hydrologic cell data ready for import into AnnAGNPS.inp
3	AnnAGNPS_Reach.dat	hydrologic reach data ready for import into AnnAGNPS.inp
4	AnnAGNPS_Subarea.rpt	summary of hydrologic data by subarea

	File	Description
5	FlowGraf.rpt	input file for VbFloNet that contains the north (row) & west (column) boundaries of the DEM

Step 22. Executing VbFloNet.exe

VbFloNet was first developed because there was no GIS available to view TopAGNPS output and select geomorphic regions to refine the CSA & MSCL values that allow the user some control over the cell sizes. With the subsequent development of the AnnAGNPS/ArcView interface, the only remaining need is to select the geomorphic regions and create the NtgCod.inp file.

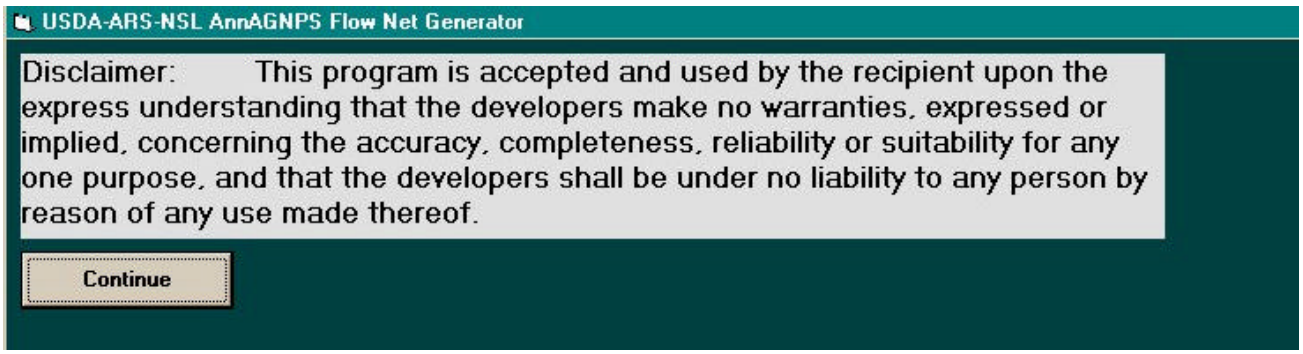
The location for the executable is in "C:\AGNPS\Dataprep\Flownet\VbFloNet\Execute" according to the procedure documented in the installation section.

VbFloNet requires several files to maximize its use. At present, VbFloNet requires DnmCnt.inp, NetW.tab, NetW.out, Bound.out, FloVec.out, Relief.out, SubWta.out, and UpArea.out from TopAGNPS. The *.dat files from RasFor are also needed to plot the information in VbFloNet. The files FlowGraf.rpt, AnnAGNPS_CELL.dat, and AnnAGNPS_REACH.dat files from AgFlow are also needed. All of these files need to reside together in the same folder such as in the project directory in the example, OR_Mission_Creek.

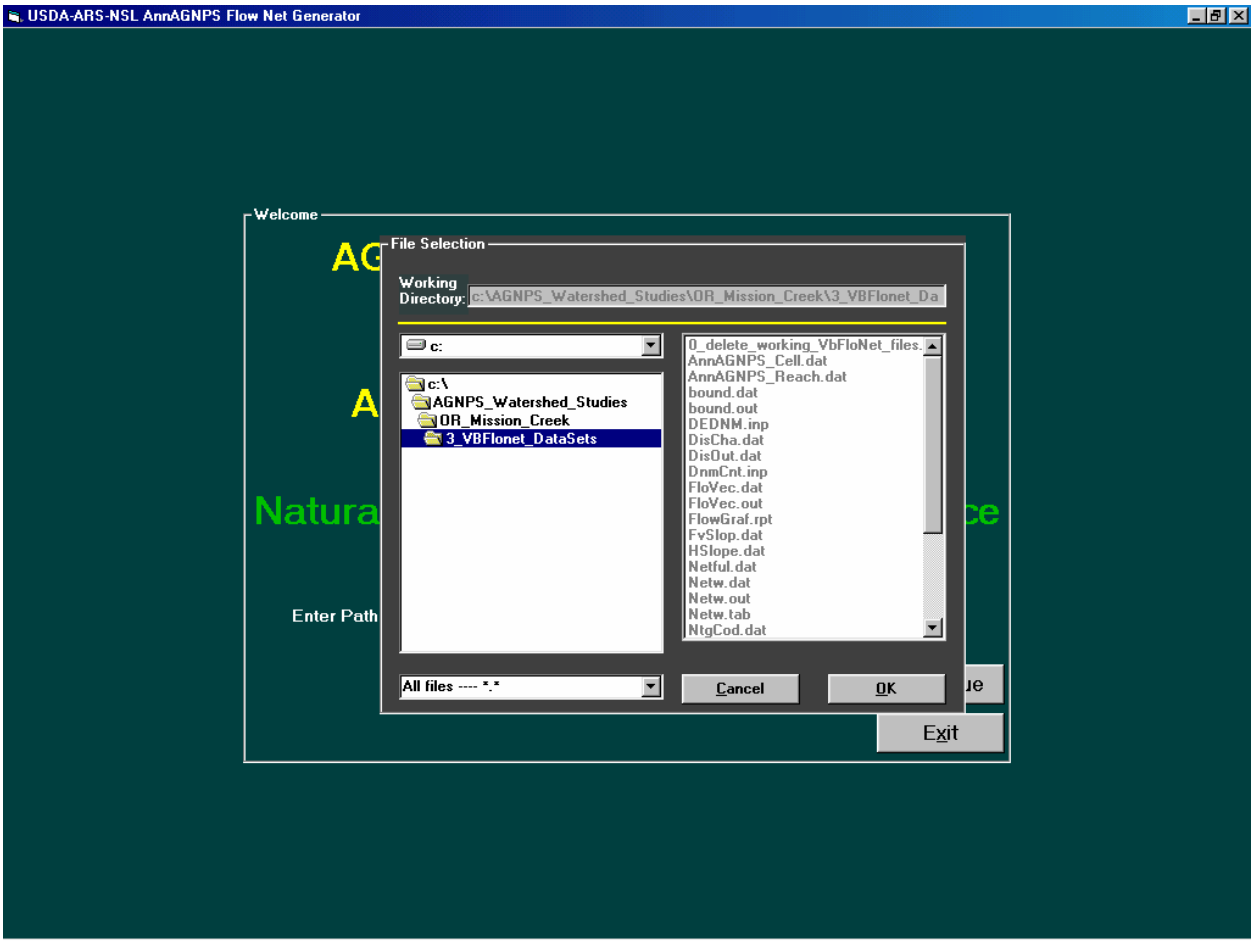
VbFloNet.exe allows the user to save plotted images in the Bitmap format (BMP extension). Any image processing software should be able to load BMP images. The user can also save portions of images as data that can be used for further analysis. This will be discussed later in the documentation.

Using Windows Explorer, double-click **VbFloNet.exe**.

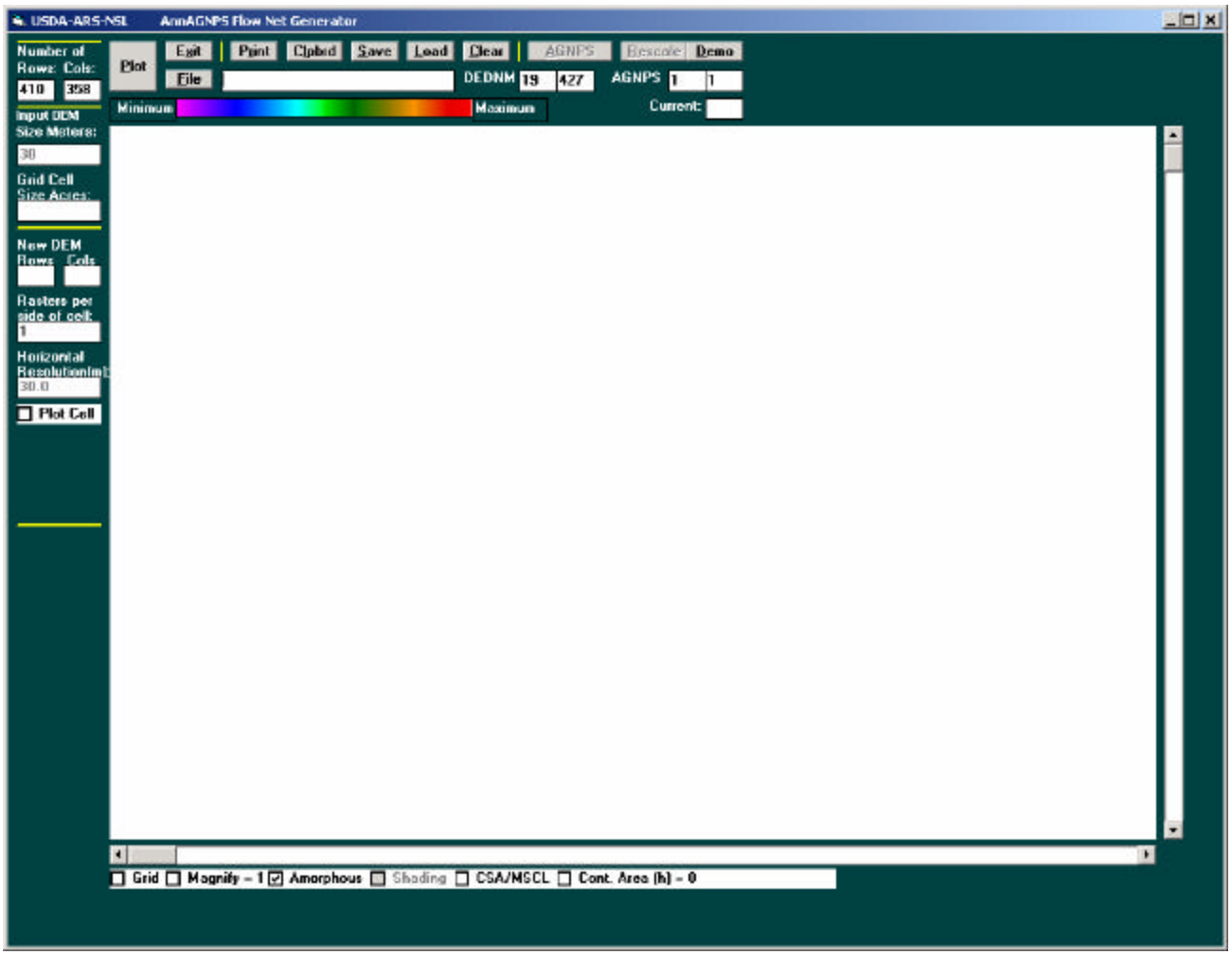
The program displays the Disclaimer Screen as shown below. Click the **Continue** button to proceed to the Welcome screen.



The Welcome screen gives information about the sponsors and version number of the program. In order to continue, the path to the directory containing AgFCnt.inp and the output files from TopAGNPS and AgFlow is needed. Click on the **Browse** button to find the path to the directory or manually type it in and click **Continue.**


USDA-ARS-NSL AnnAGNPS Flow Net Generator
Welcome
File Selection
Working Directory:
c:\AGNPS_Watershed_Studies\OR_Mission_Creek\3_VBFlonet_Da
c:
c:\
AGNPS_Watershed_Studies
OR_Mission_Creek
3_VBFlonet_DataSets
0_delete_working_VbFloNet_files.
AnnAGNPS_Cell.dat
AnnAGNPS_Reach.dat
bound.dat
bound.out
DEDNM.inp
DisCha.dat
DisOut.dat
DnmCnt.inp
FloVec.dat
FloVec.out
FlowGraf.rpt
FvSlop.dat
HSlope.dat
Netful.dat
Netw.dat
Netw.out
Netw.tab
NtgCod.dat
All files ---- *.*
Cancel
OK
Enter Path
Exit

The Main screen, referred to as the working screen, will appear as shown below.



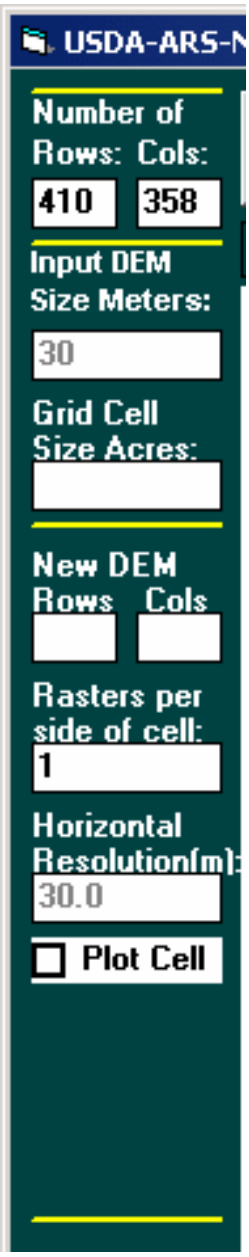
There are four major parts of the working screen:

Step 1. Information about the current DEM.

Step 2. Buttons along the top that can be clicked for action.

Step 3. Check Boxes along the bottom for various options.

Step 4. The plotting area for display of the images.



Following is a detailed breakdown of the four major parts of the working screen.

Step 1. Information about the current DEM.

The Number of Rows and Columns indicating the size of the input DEM are shown at the top of the information block.

a. Input DEM Size Meters: This box will display the horizontal resolution of the DEM. This box is not used at this time.

b. Grid Cell Size Acres: This box indicates the acreage of a square cell (AGNPS mode). This box is not used at this time. Though this box is not used, it's value will change if the "Rasters per side of cell:" value is changed.

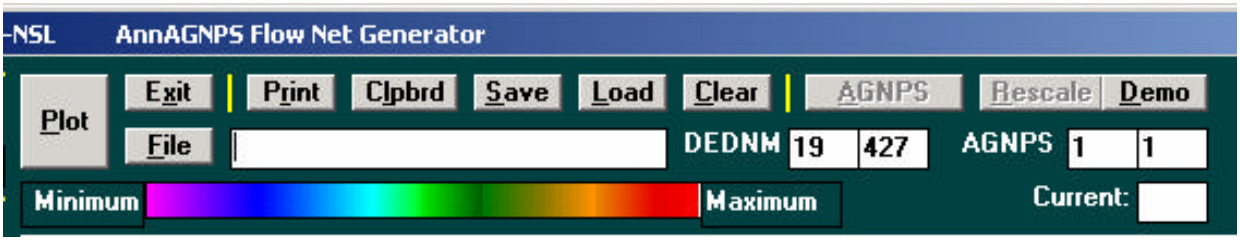
c. New DEM Rows and Columns: These boxes are not used at this time.

d. Rasters per side of cell: This value indicates the number of rasters per side of an AGNPS square cell. For example, a value of 5 would indicate a square cell of 5X5 rasters. This value is set to 1 for amorphous cells. This value comes from the AgFCnt.inp file. If this value is manually changed to something different than what is in the AgFCnt.inp file, then a dialogue box will appear as shown in the figure below.

e. Horizontal Resolution (m): Indicates the width of a single raster of data.

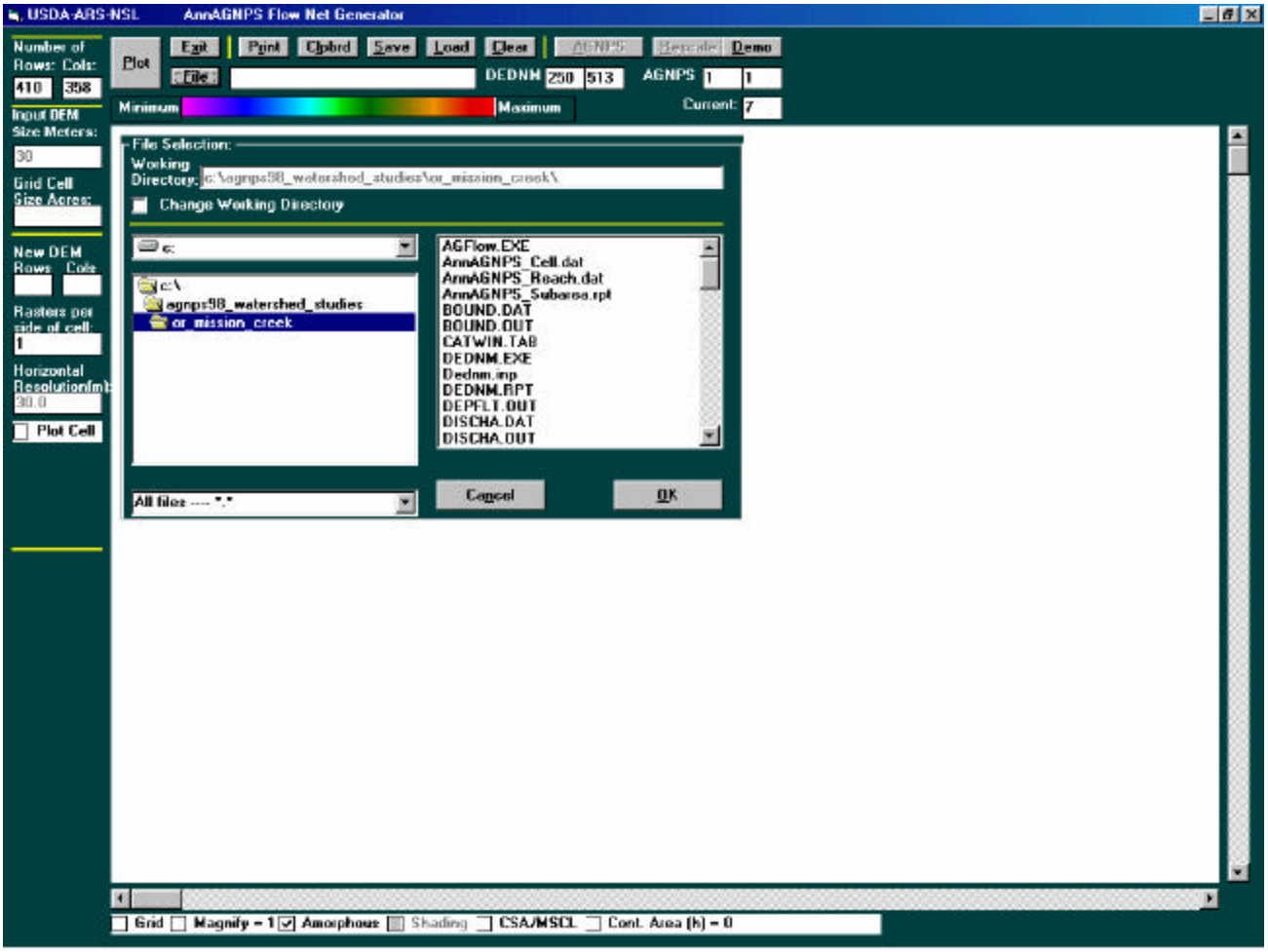
f. Plot Cell checkbox: This box is for AGNPS mode only. This box will allow the user to select an AGNPS square cell and display the rasters that make up that AGNPS square cell.

Step 2. Buttons along the top that can be clicked for action.



a. File: The File button allows the user to select a file to be plotted.

Click the **File** button to display the File Dialogue box. The file dialogue box appears as shown below. A double click on the **filename text box** will also display file dialogue box.



The file dialogue box shows the current working directory to be c:\AGNPS_2001\project_goodwin_creek. If previous projects have been created, then the working directory can be changed by first navigating to the directory you want to become the working directory and then clicking the **checkbox** to Change Working Directory.

We will keep c:\AGNPS_2001\project_goodwin_creek as the working directory for the purpose of the documentation.

Click on the **scrollbar** on the filename box to locate the file Relief.dat.

Click the filename **Relief.dat** to select it.

Click the **OK** button to continue

The file dialogue box will disappear and the filename Relief.dat will appear in the filename text box.

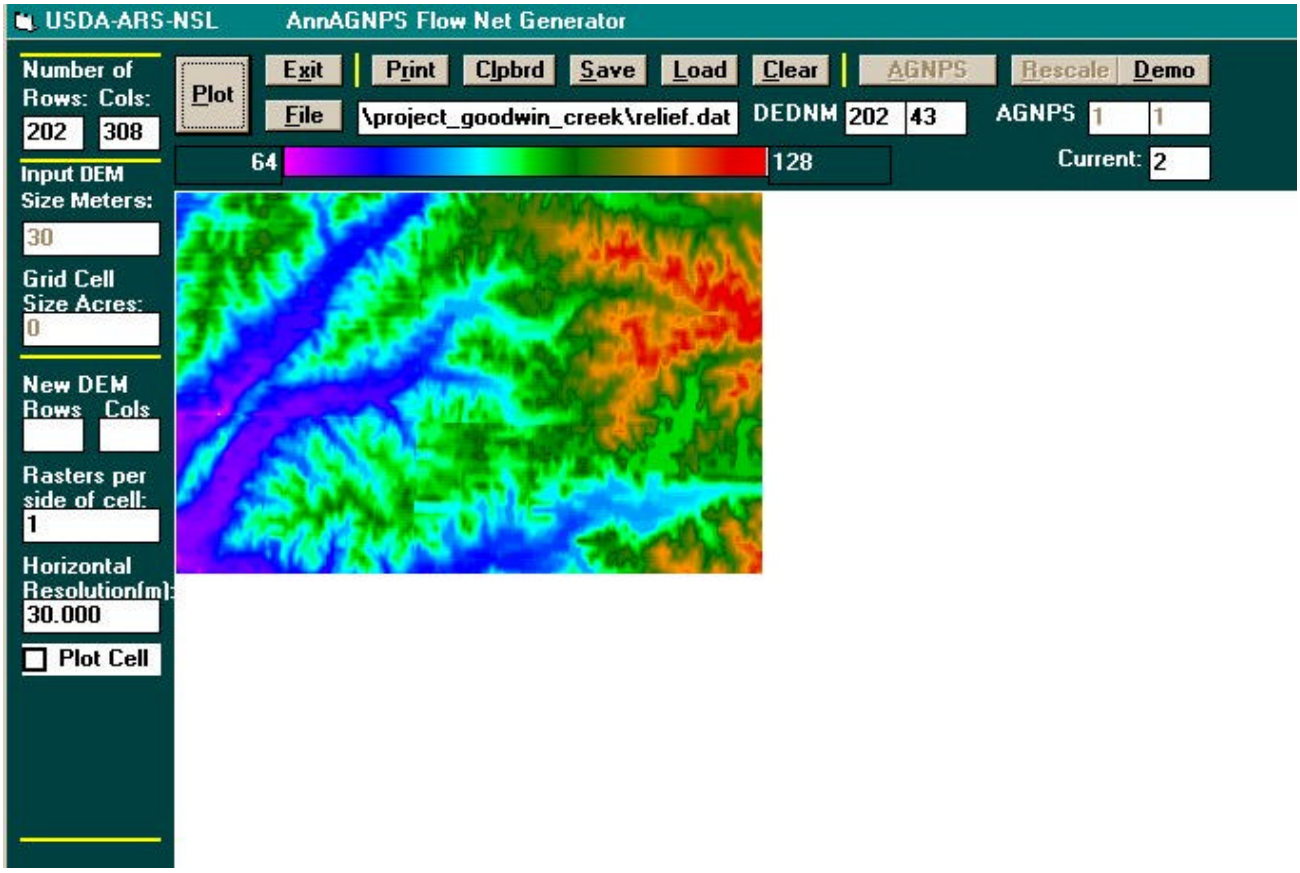
b. Plot: The Plot button is used to plot data to the screen. The files with extensions .out and .dat (outputs from Dednm.exe and RasFor.exe) can be plotted as well as the input DEM data with an extension of .inp.

Click the **Plot** button to plot the Relief.dat file that was selected in the previous step.

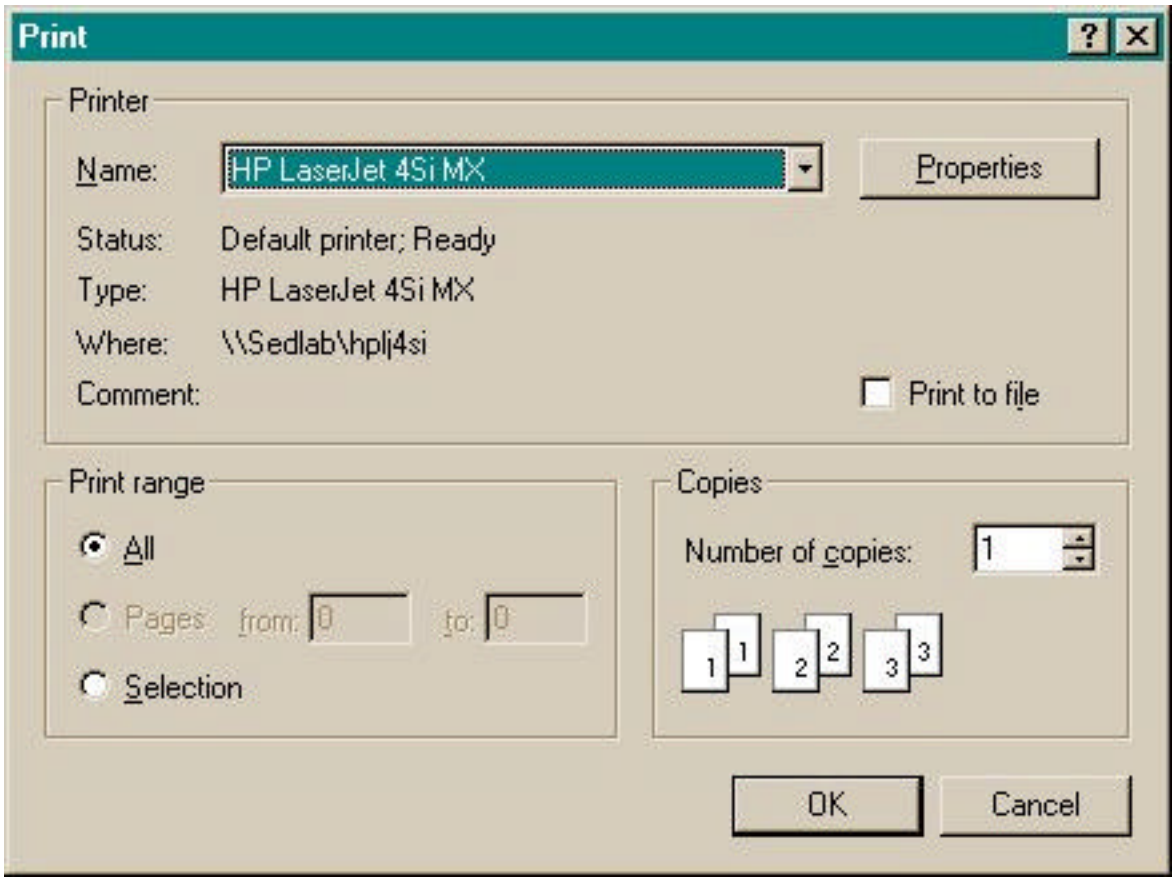
The text on the Plot button will change to "Quit Read" as the data is being read into the program. The user can abort the process of reading the data by clicking the **Quit Read** button.

The text on the button will change again to "Quit Plot" after the read process has ended and the plotting process begins. The user can abort the plotting process by clicking the **Quit Plot** button.

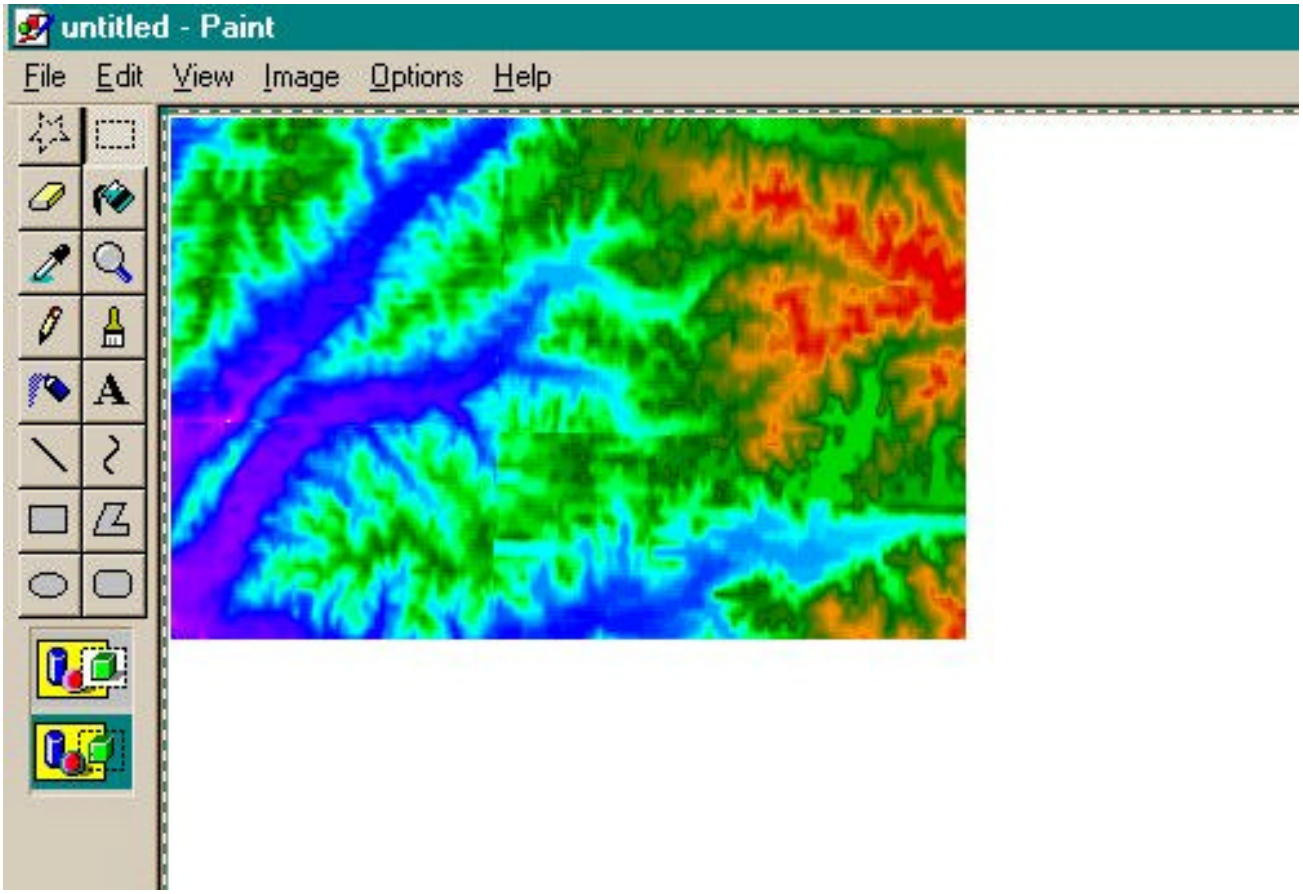
The Relief.dat file will plot as shown in the figure below.



c. Print: The Print button allows the user to print what is on the screen to a printer. A printer dialogue box will appear showing standard Windows printer options as shown below.

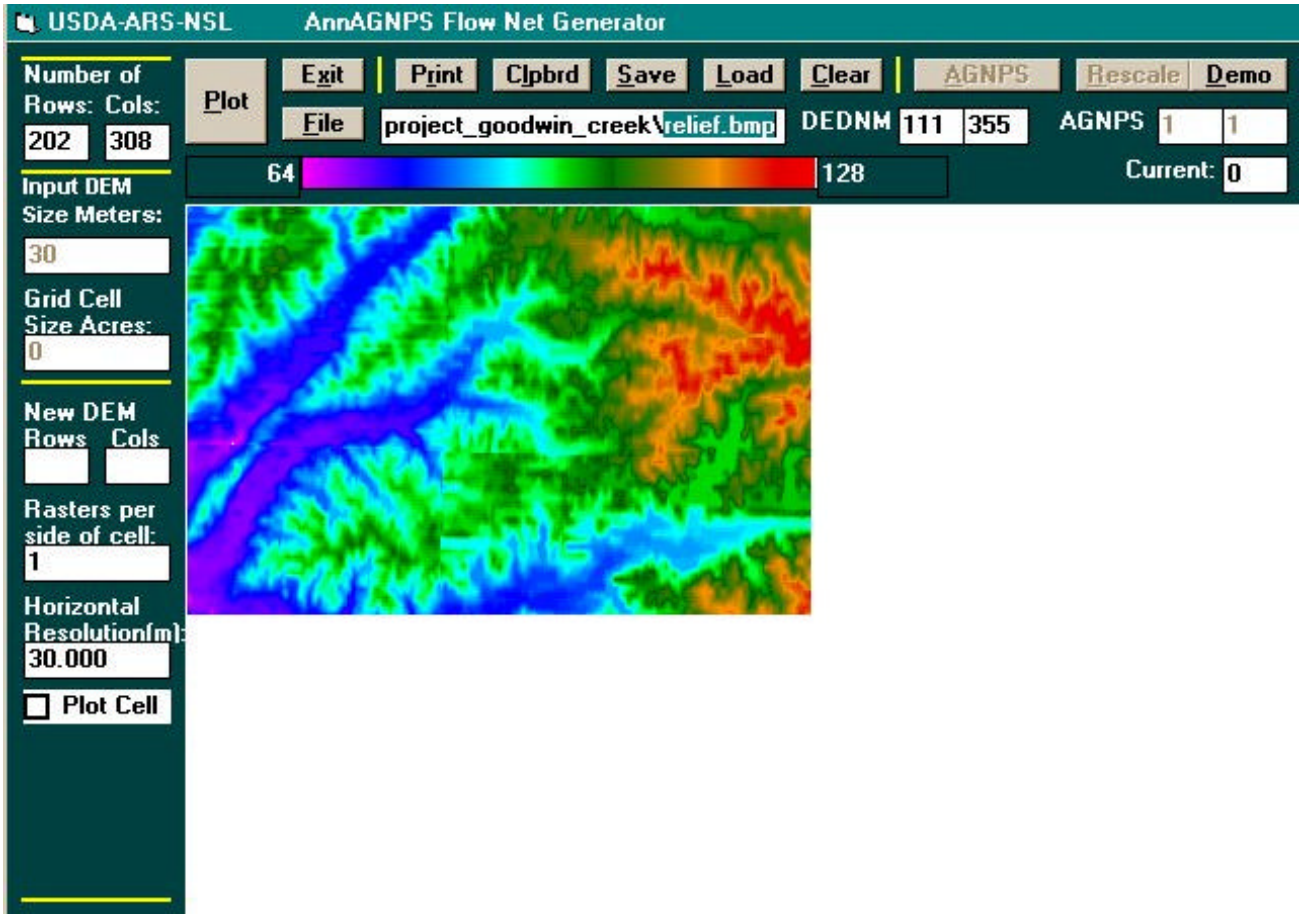


d. ClpBrd: VbFloNet.exe does not allow annotation at this time. The user, however, may annotate an image by copying the image to the clipboard and pasting the image into an image processing software package such as Windows Paint. Click the **ClpBrd** button to copy the image to the clipboard. Then open an image processing package such as Paint and click **Edit** from the menu and click **Paste** to paste the image to the screen.



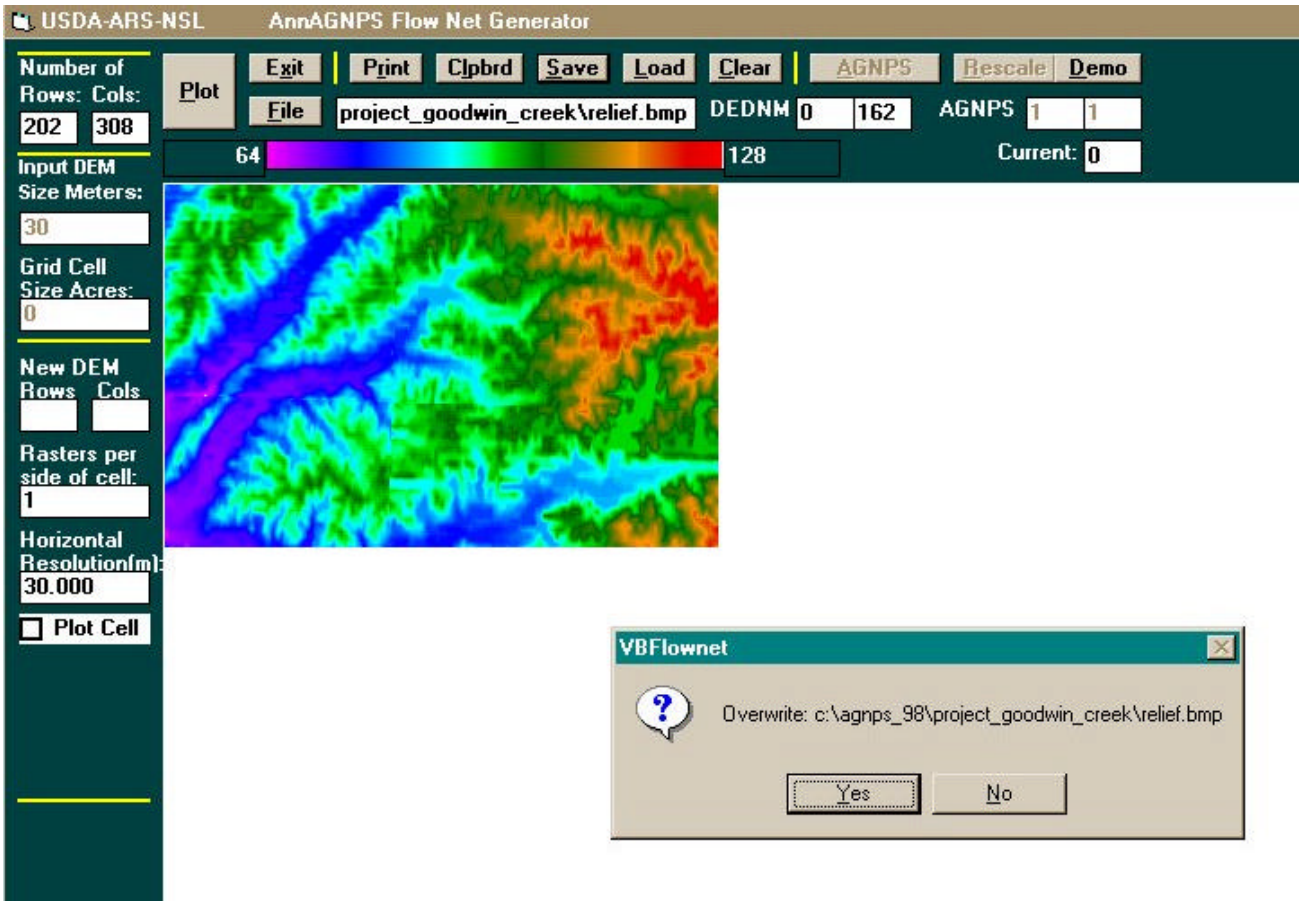
e. Save: The Save button allows the user to save the current image as a bitmap image (.bmp) to a file on the disk. When the user clicks the save button, the file name in the file name box is changed to have a bmp extension and then the disk is checked to see if a file by that name exists. If not, the file is saved. If the file does exist, then a message is displayed on the screen asking if the file should be overwritten.

Click **Save** to save the Relief.dat file. The file name is automatically changed to Relief.bmp.



Click **Save** again and the message box prompting to overwrite will appear.

Click **NO** to cancel the operation.



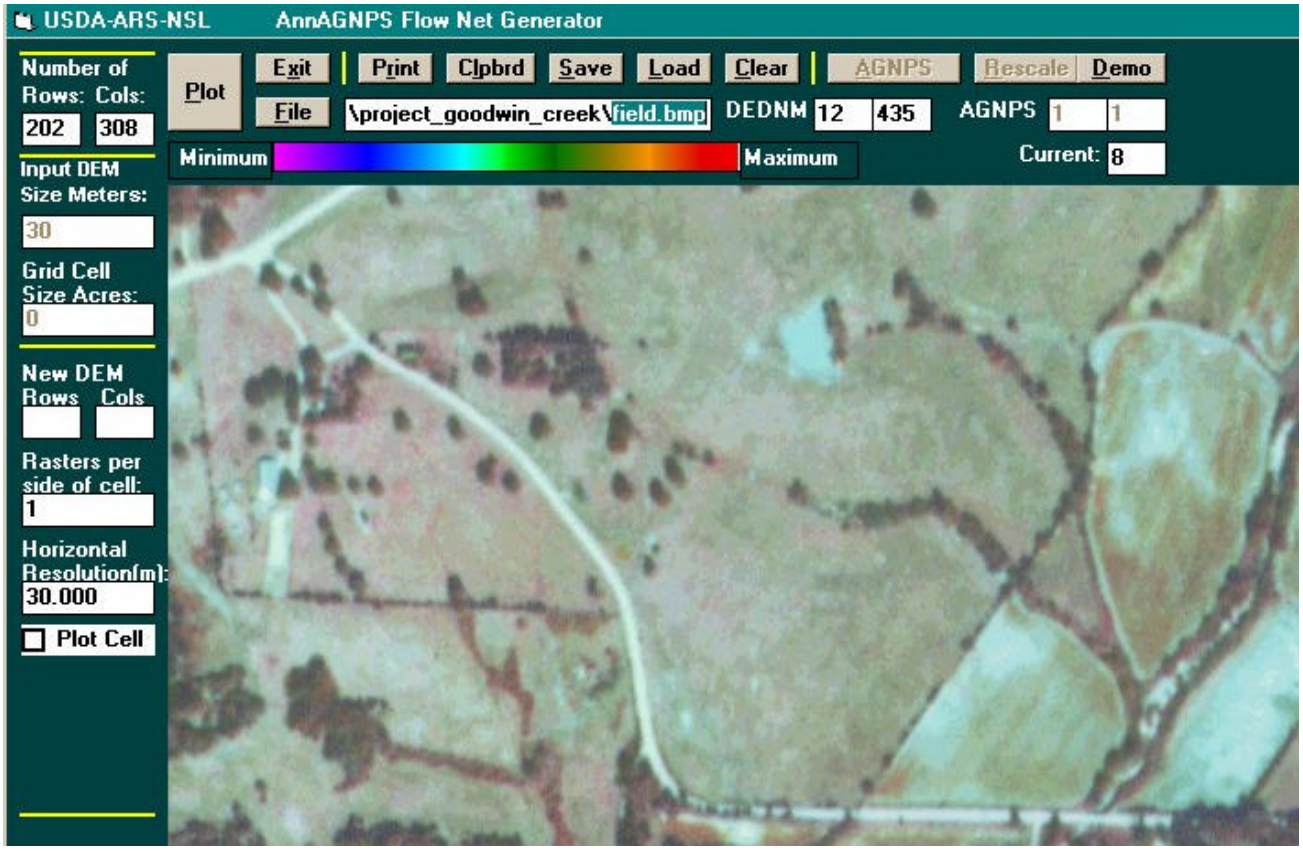
f. Clear: The Clear button clears the image off of the screen.

Click **Clear** to erase the image.

g. Load: The Load button is used to load a bitmap image. This will work for any standard bitmap image, not just images saved in VbFloNet.exe. For example, an aerial photograph that was scanned and saved to a bitmap file could be loaded in VbFloNet.exe as shown in the image below.

For the purpose of this documentation, we will reload the Relief.bmp image that was saved in the above procedure.

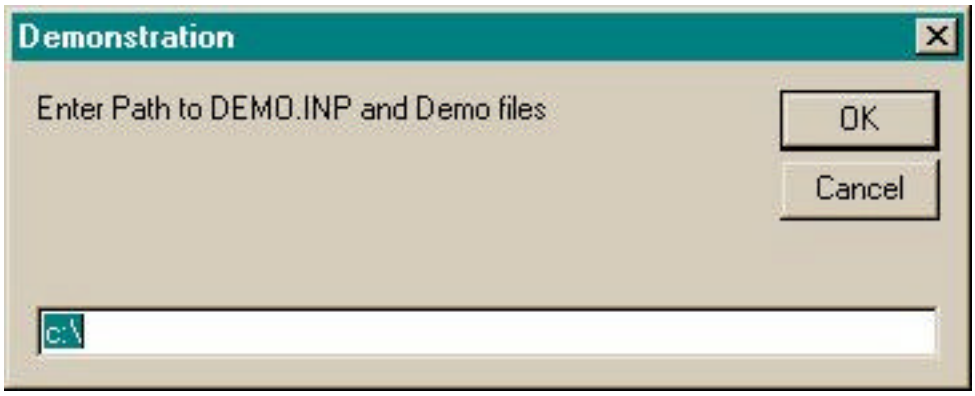
The file name in the file name box should still be Relief.bmp. The image display portion of the screen should be blank from clicking the Clear button in the above procedure. Click **Load** to reload the Relief.bmp file



h. AGNPS: The AGNPS button is only enabled for square grid runs as specified in the AgFCnt.inp file. This button is disabled for amorphous runs. A description of this button will be detailed later in the documentation.

i. Rescale: The Rescale button is not currently used.

j. Demo: The Demo button allows the user to display any number of saved bitmap images to the screen as a demonstration or presentation. The user must create a text file called Demo.inp that contains the information as described below. The user then copies or saves the images and the file Demo.inp to a specific directory (Demo.inp and images must be in the same directory). Once these steps have been completed, the user can click the DEMO button within VbFloNet.exe and a dialogue box will appear asking for the path to the directory containing Demo.inp and the images to be displayed as shown here.



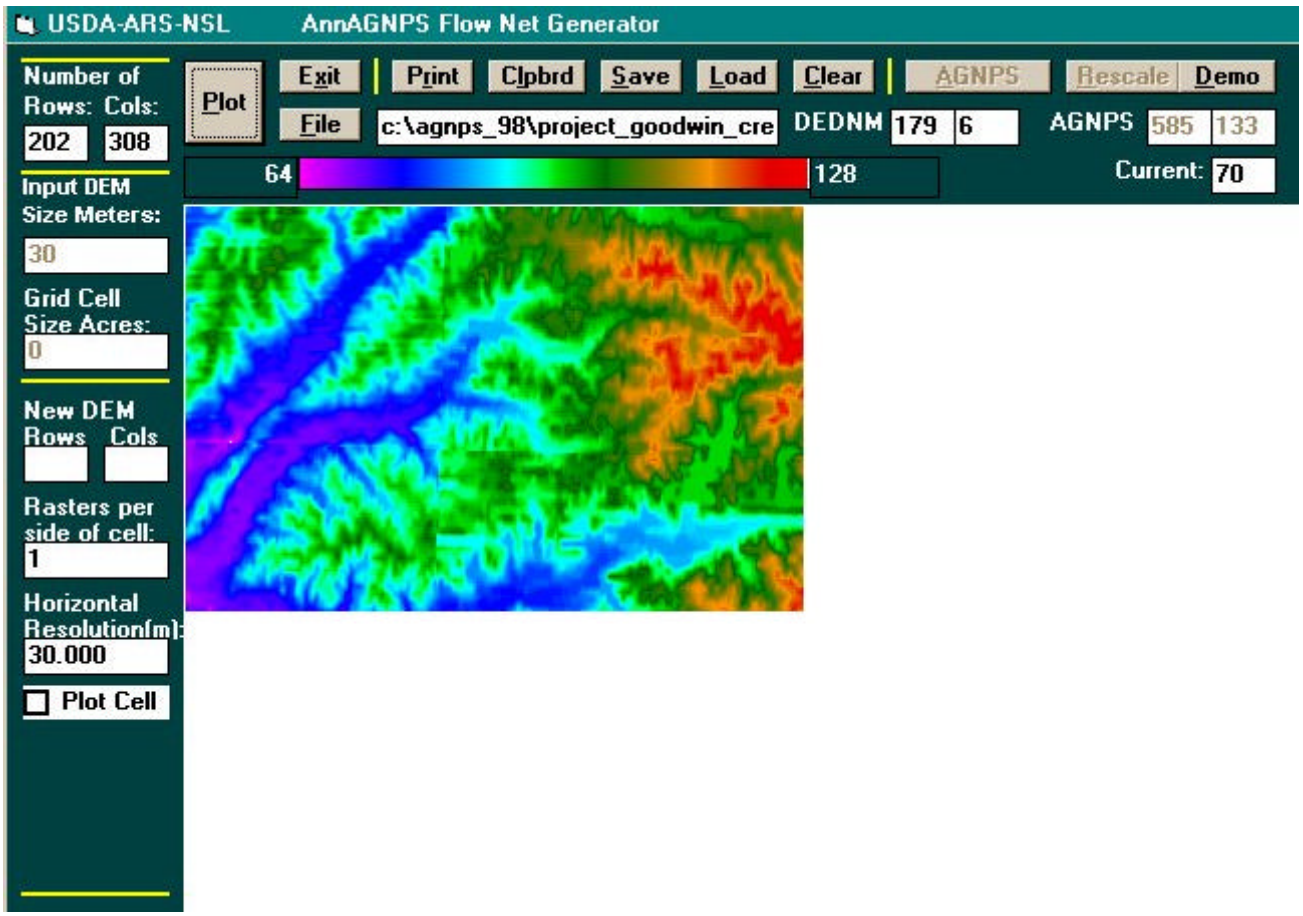
The Demo.inp file contains the following lines:

Line 1: number of images.
Line 2: number of times to loop through the demonstration.
Line 3: number of seconds before loading the next image.
Line 4 – n: list the file names in the order that they are to be shown.

Sample Demo.inp file:

```
4
2
10
DEM.bmp
Relief.bmp
SubWta.bmp
Aeriel.bmp
```

k. Dednm coordinates: The Dednm coordinates change as the mouse cursor moves over the displayed image. The coordinates shown are the row and column position within the data set. For example, to locate the watershed outlet on the Relief.dat image that was plotted earlier, move the mouse cursor to the point on the image where the outlet row and column are displayed in the Dednm coordinate row and column boxes.



l. M.) AGNPS coordinates: These coordinates are enabled only for AGNPS mode. It is the coordinates of an AGNPS square cell. This differs from the Dednm coordinates in that an AGNPS square cell can vary in size containing a varying number of rasters. For example, an AGNPS square cell could be of a size 5 X 5 indicating that it contains 25 rasters.

m. Color bar: The color bar is a spectrum of colors that give a color scale of the data being plotted. The minimum data value in the data set being plotted is displayed on the left side of the color bar. The maximum data value in the data set being plotted is displayed on the right of the color bar.

The color bar has another functionality in that it may be clicked on in order to select a color for other program features which will be discussed later.

n. Current value: The Current value box indicates the data value where the mouse cursor is located within the data set that was last plotted. The current value at the outlet of the watershed shown in Relief.dat used in this example is 70 as shown in the figure above.

Notice that the minimum data value on the left side of the color bar is 64 yet the watershed outlet value is 70. The reason for this is that the minimum value displayed is the minimum value for the entire image, not just that within the watershed. The value of 70 is the lowest value within the watershed.

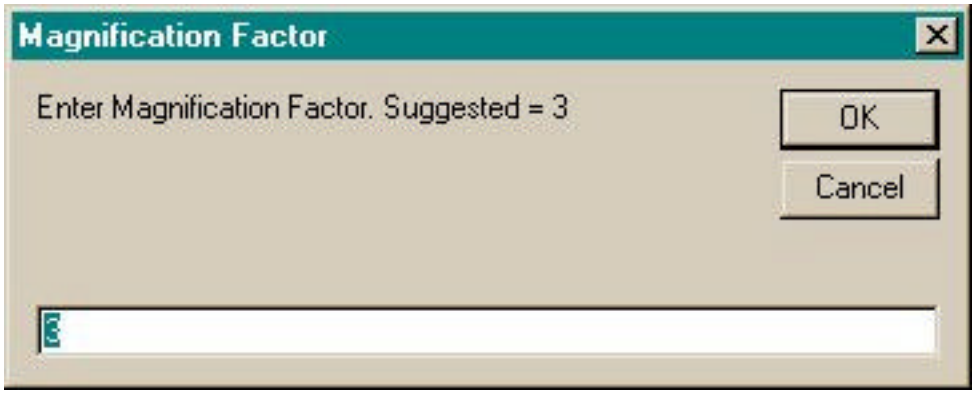
o. Exit: The Exit button will terminate the current session of VbFloNet.exe.

Check Boxes along the bottom for various options.

Step 1. Grid: The Grid checkbox allows the user to plot a grid system on top of the image. A grid system can be plotted on any image; however, it was designed to apply to AGNPS mode. The program uses the value in the "Rasters per side of cell:" box on the left side of the screen to determine how far apart to draw the grid lines. This value is typically greater than 1 for AGNPS square cells. The grid system then will delineate AGNPS square cells. This feature will be demonstrated later in the documentation.

Step 2. Magnify: The Magnify button allows the user to set a magnification factor for plotting an image. A dialogue box will appear asking for the user to enter a magnification factor. The dialogue box will have a suggested value for plotting based on the number of rows and columns. The suggested value will allow the image to be plotted as large as possible and yet no more than 25% of the image to be off of the screen.

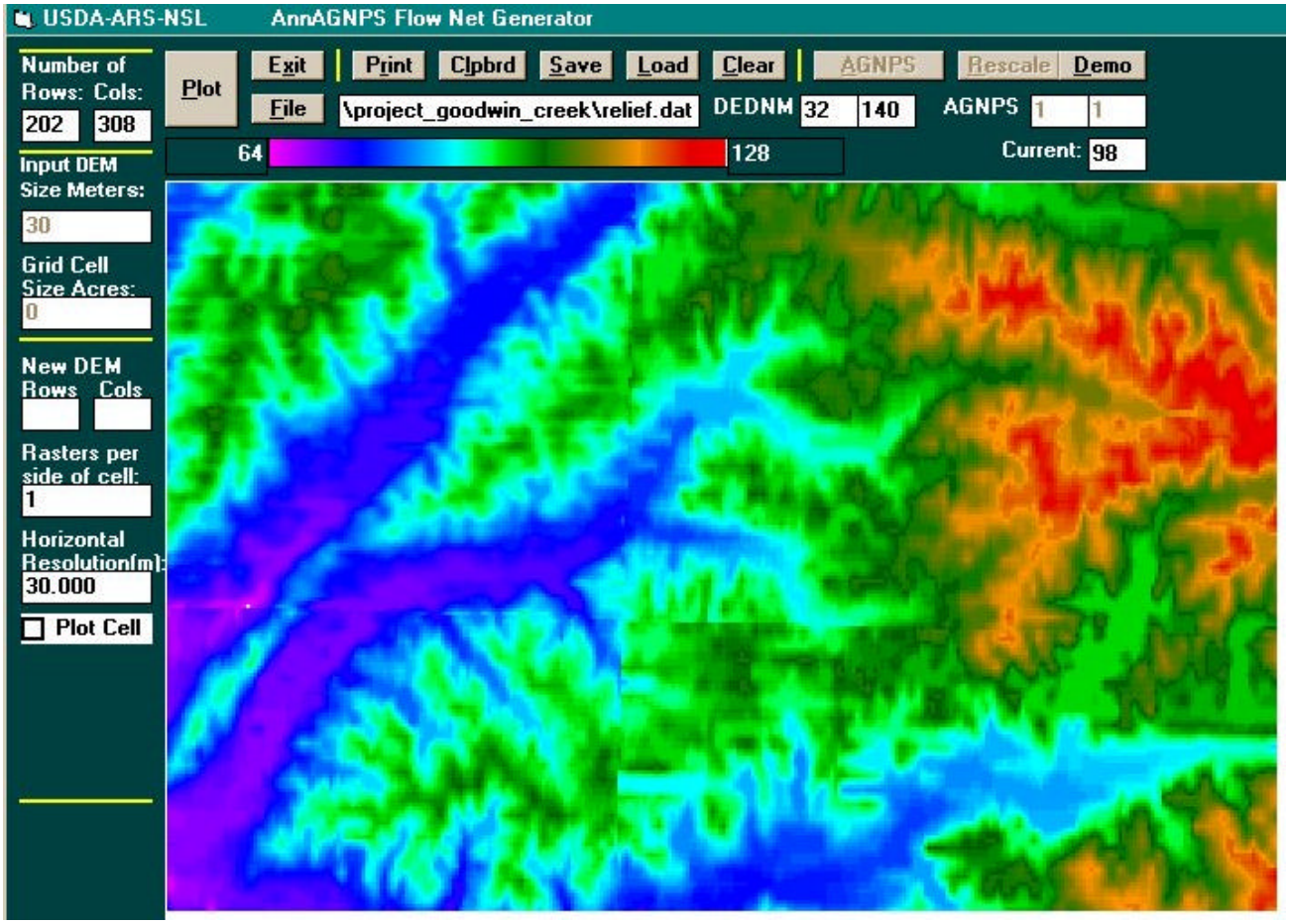
To Magnify an image:
Click the **Magnify** check box
The dialogue box will appear as shown below.



For the purpose of this documentation, change this value to 2.

Click **OK**

Click **Plot** to plot the Relief.dat at the new magnification factor. The figure below shows Relief.dat plotted at a magnification factor of 2.)



Step 3. Amorphous: The Amorphous box is checked on or off automatically when the AgFCnt.inp file is read at the start of the program. If the AgFCnt.inp indicated that the run is amorphous then the box is checked, if the run is a square run (AGNPS mode), then the Amorphous check box is left unchecked. Care must be taken in that an error message such as the one shown here will occur if the user deselects the checkbox for an amorphous run and then clicks on the image. Options for clicking on the image will be discussed in detail in part 4 "The plotting area for display of images."

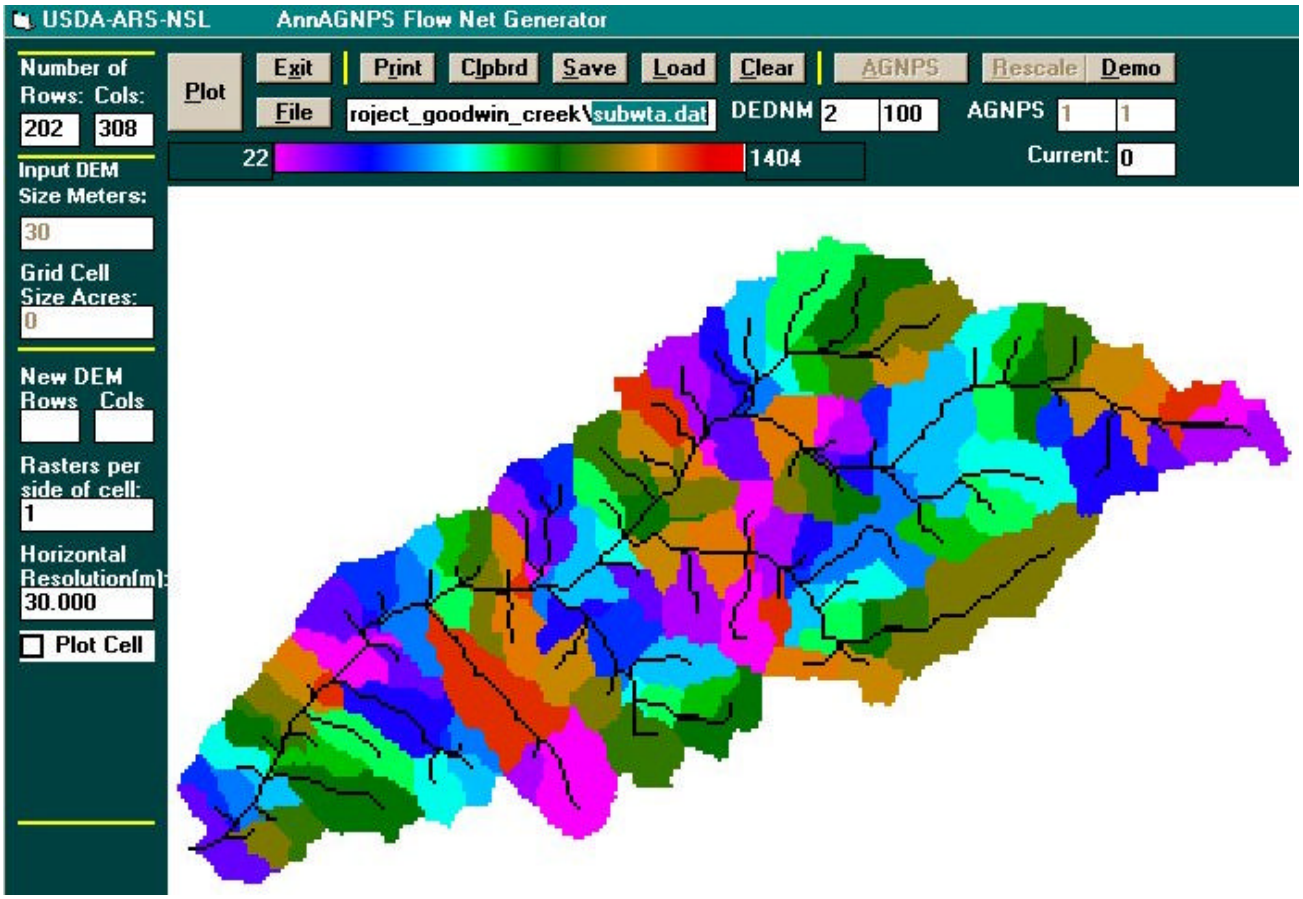
Step 4. Shading: The Shading checkbox is used in conjunction with some of the features that will be discussed in part 4 "The plotting area for display of images.". As a brief description here, shading refers to darkening or shading an area of the image that has been clicked on with the left mouse button. The color of the shading is a function of the color bar. The default color is black. The Shading check box is disabled by default.

Step 5. CSA/MSCL: The CSA/MSCL button allows the user to further subdivide a subwatershed area into smaller subwatersheds. Refer to the Technical documentation for information about the CSA and MSCL values. A dialogue box will appear when the user checks the box to change the CSA/MSCL information.

The user can enter a number from 1 to 5. This refers to the number of the pair of CSA and MSCL values that were established as part of the DnmCnt.inp file. The contents of the DnmCnt.inp file are described in the Technical documentation.

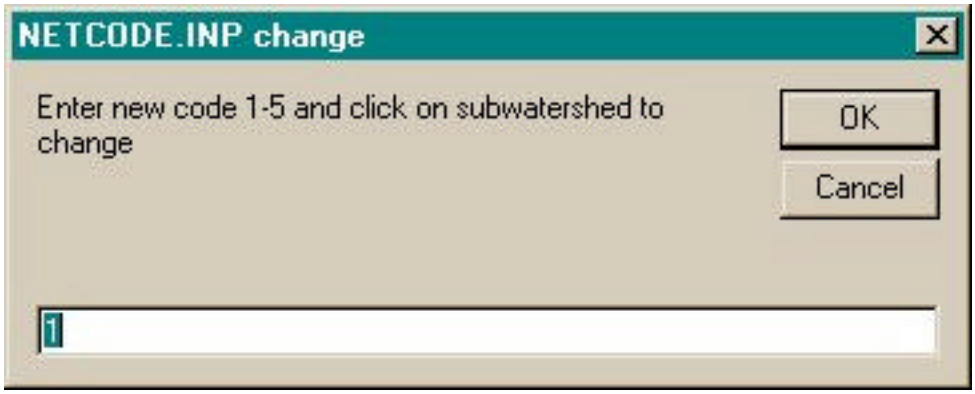
Once a value has been entered, the user would then click OK and then click on the subarea that is to be changed. Note that no visual change will take place to the subwatershed other than shading. Only the contents of the NtgCod.dat file will be changed. After the change has been implemented, the file NtgCod.dat is automatically copied to a file called NtgCod.inp. Dednm.exe uses this file, if it exists, to apply differing CSA and MSCL value pairs. The programs Dednm.exe, RasFor.exe, and AgFlow.exe must be rerun to regenerate all of the subwatershed information. Then the SubWta.dat can be plotted which should show a different number of subwatersheds. SubWta.dat contains subwatershed information. Perform the following steps to try this example.

First, click the **Clear** button to clear the screen of the Relief.dat file.
Click the **File** button and select the file **SubWta.dat.**
Click **OK** and then click **PLOT** to plot the image.
The following image should appear.



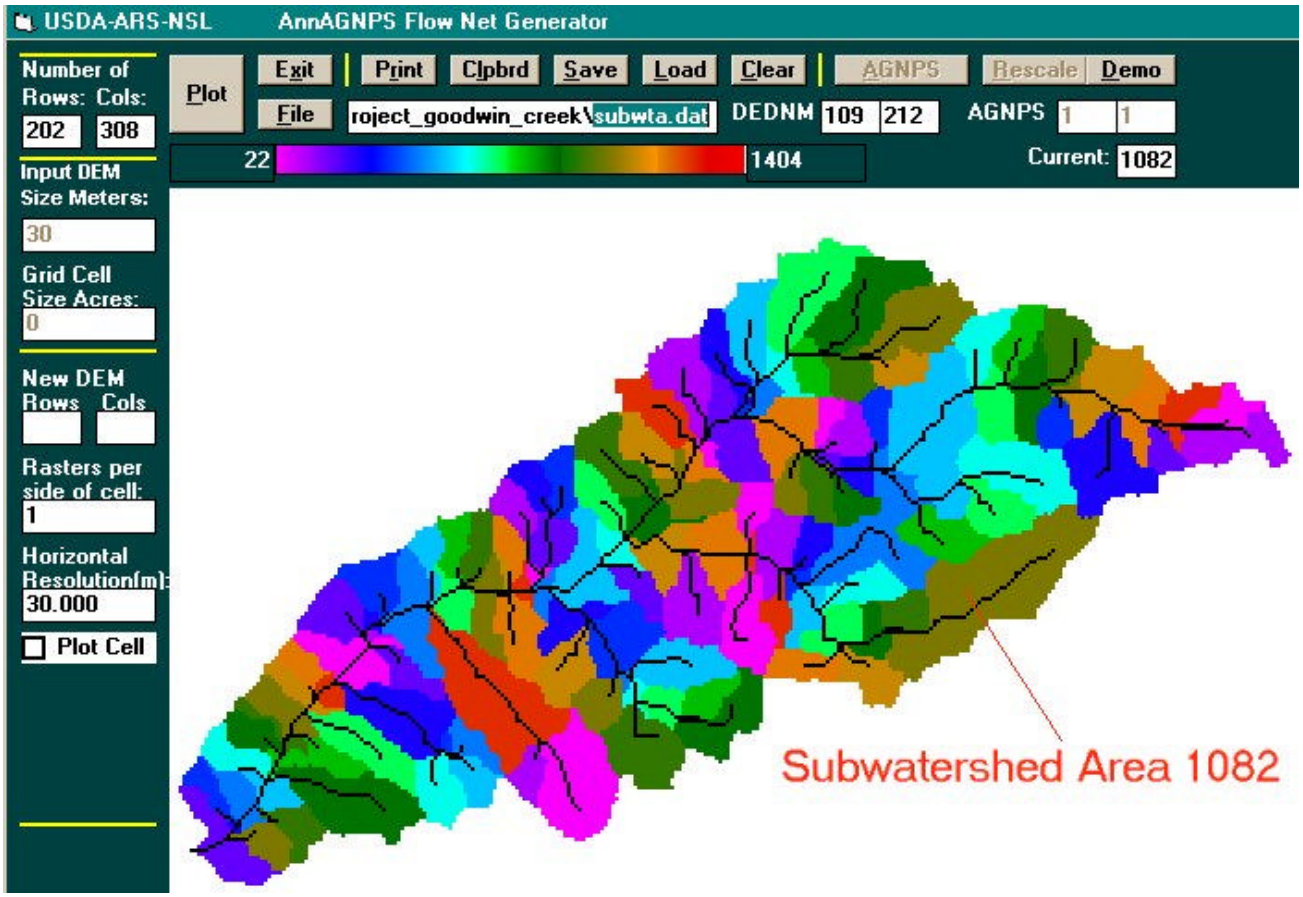
The NtgCod.dat file contains only "1"s at this point indicating to Dednm.exe to use the first pair of CSA/MSCL values as specified in the DnmCnt.inp file. Make note of the minimum and maximum values on either side of the color bar. These values as shown here are 22 and 1404. A description of the values contained in the SubWta.dat file can be found in the Technical documentation.

Now, click the **CSA/MSCL** check box. The following dialogue box will appear.



Enter a "2" and click **OK** to continue.

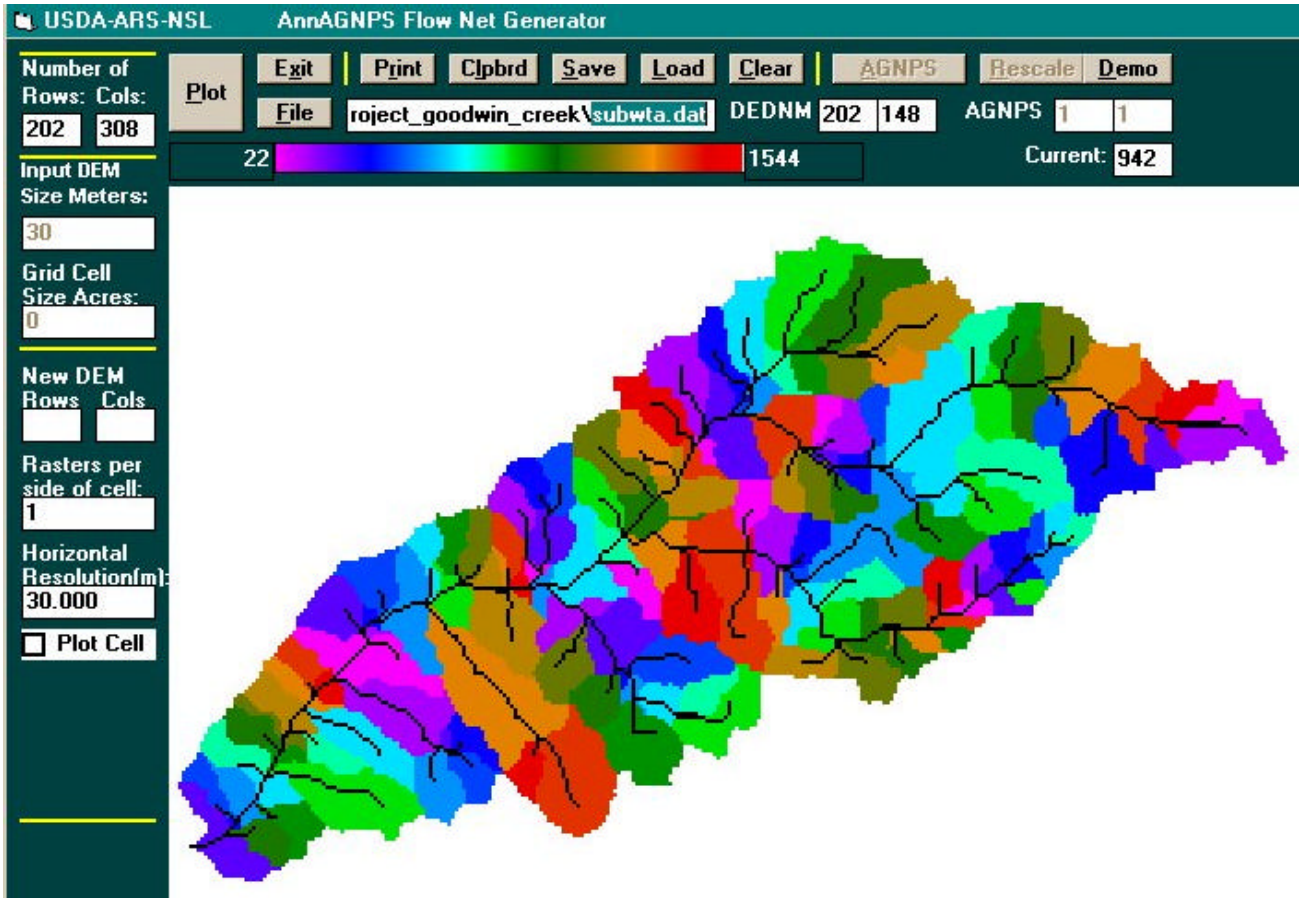
Move the mouse cursor to subwatershed 1082 as shown in the following figure and click the left mouse button.



The file NtgCod.dat should now contain the value of 2 for every raster that falls within subwatershed 1082. NtgCod.dat is automatically copied to NtgCod.inp.

Minimize VbFloNet.exe and rerun Dednm.exe, RasFor.exe, and AgFlow.exe according to the instructions outlined earlier in this document.

Maximize VbFloNet.exe and click the **Plot** button to replot the SubWta.dat file. The subwatershed area 1082 should now be shown as several smaller subwatersheds. See the figure below.



The maximum value changed as a result of changing the CSA & MSCL parameters. The new maximum value increased from 1404 to 1544.

Step 6. Local Area: The local area check box is not checked by default. The label on this box changes to indicate the area of a subwatershed on which the user clicks. If the Local Area check box is checked, then the Shading check box becomes enabled. More detail on the use of the Local Area check box and its use combined with other check boxes will be given section 4 "The plotting area for display of the images."

The plotting area for display of the images.

At this point, the major portion of the plotting area has been demonstrated with the plotting of the Relief.dat file and the SubWta.dat file in the above procedures. There are, however, several other aspects of the plotting area that needs to be discussed. There are two ways in which the user can interact with the plotting image to gain more information about the data that is plotted.

Step 1. The user can interact with the plotting area by moving the mouse cursor over the image. As the cursor is moved, the value of the data stored for the currently plotted image is displayed in the Current: box at the top of the screen.

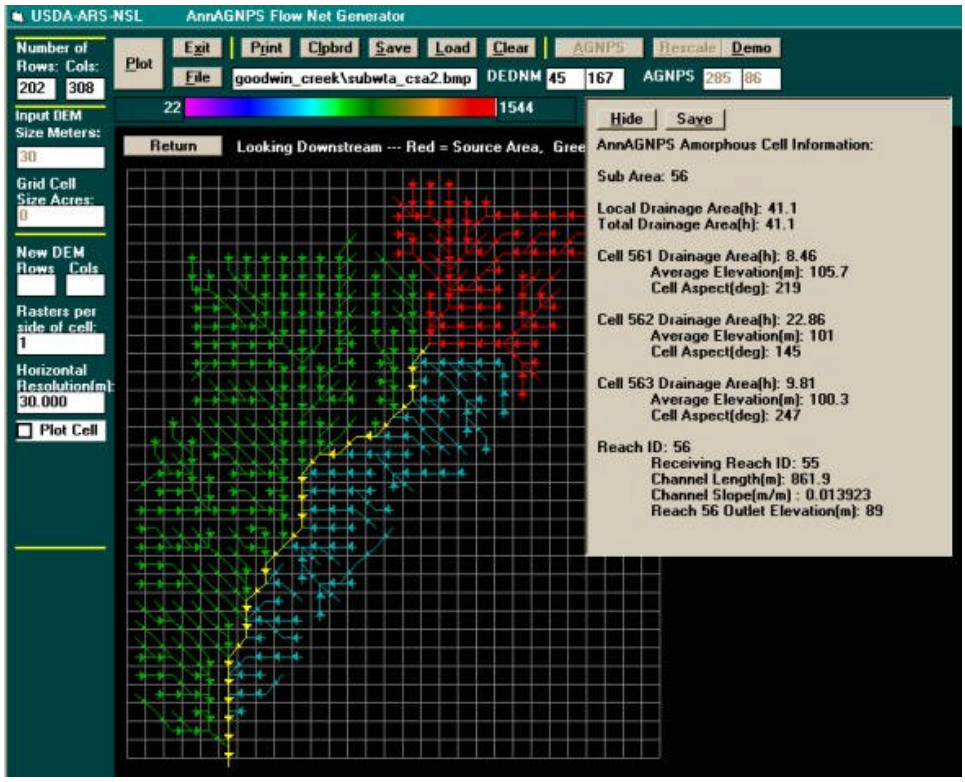
Step 2. The user can also interact with the plotting area by clicking with the left mouse button on a raster inside of the image that is plotted. Clicking on the image can have differing results depending on the combination of the check boxes at the bottom of the screen.

The SubWta.dat file should still be on the screen from the last procedure. The check boxes should be as follows:

Grid - not checked
Magnify - not checked - Magnify = 2
Amorphous - checked
Shading - not checked & disabled
CSA/MSCL - not checked
Local Area - not checked

With this combination of check boxes, move the cursor to subwatershed number 561. (Hint: View the Current: box as the mouse is moved to the most northerly subwatershed. 561 is the most northerly subwatershed.).

Left **click** inside the subwatershed. Multiple events take place when a user clicks on a subwatershed. First, the subwatershed is shaded beginning from the downstream end of the reach or the outlet of the subwatershed. Secondly, The dialogue box appears asking if the user desires to save the shaded area to a user specified file. Click **Cancel**. Next, a new plotting area appears which shows the flow direction for each raster in the subwatershed and an information box appears showing information about the subwatershed. Last of all, the local area check box is updated to show the drainage area of the subwatershed. See the figure below.



The arrows indicating the flow direction are color-coded. Red arrows indicate the source area of the subwatershed that flows into the upstream end of the reach. The green arrows indicate the area that drains from the right side into the reach. The blue arrows indicate the area that flows from the left side into the reach. The yellow arrows indicate the channel reach itself.

The information box gives information about the reach, drainage area, average elevation, cell aspect, receiving reach, channel length, channel slope, and the elevation at the downstream end, or outlet, of the reach.

These images can be saved as bitmap images by following the procedure as described with the Save button at the top of the screen. The information box has its own Save button but still uses the filename box at the top of the screen for setting the filename.

Click **Hide** to clear the information box.

Click **Return** to clear the screen of the flow vector image and return to the image of the subwatershed.

Check the **Local Area** check box at the bottom of the screen.

Click on the subwatershed number 561 again. This time, only the information box appears. Randomly click on various subwatersheds. The information box is updated with the correct information for each subwatershed.

Click **Hide** on the information box.

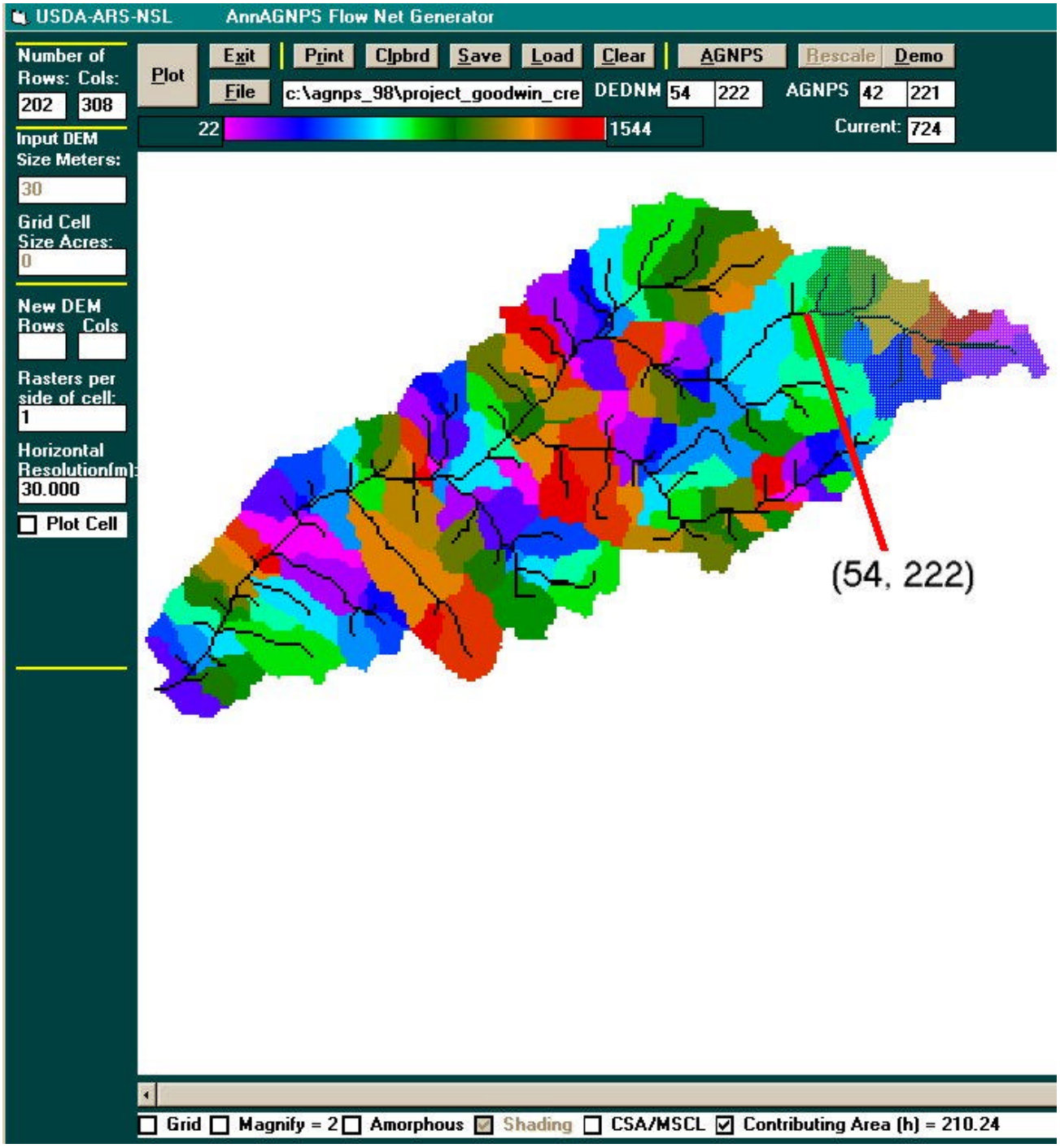
Check the **Shading** check box at the bottom of the screen.

Click on the subwatershed number 561 again. This time, the subwatershed is shaded and the dialogue box asking if the user wants to save the subwatershed is displayed.

Click **Cancel** and the information box appears again. Randomly click on various subwatersheds to repeat the process. The color of the shading is a function of the color bar at the top of the screen. **Click** on the color bar to select a color and then **click** on a subwatershed to see the effect of the shading.

Click **Hide** to remove the information box.

There is an occasion to deselect the Amorphous checkbox even though the data is Amorphous in nature. The user may wish to determine the contributing area to a specific raster in the watershed. In this event, deselect the **Amorphous** check box. The Local Area check box is automatically renamed to Contributing Area. **Click** on a raster to see the contributing area. The rasters that flow into the selected raster are shaded and the file dialogue box appears. Click **Cancel** and the Contributing Area check box is updated with the drainage area. For the purpose of this documentation, **move** the cursor to the Dednm coordinates 54, 222. **Click** the left mouse button. The contributing area for this event should be 210.24 hectares. The figure below shows the shaded area which drains into the coordinates 54, 222.



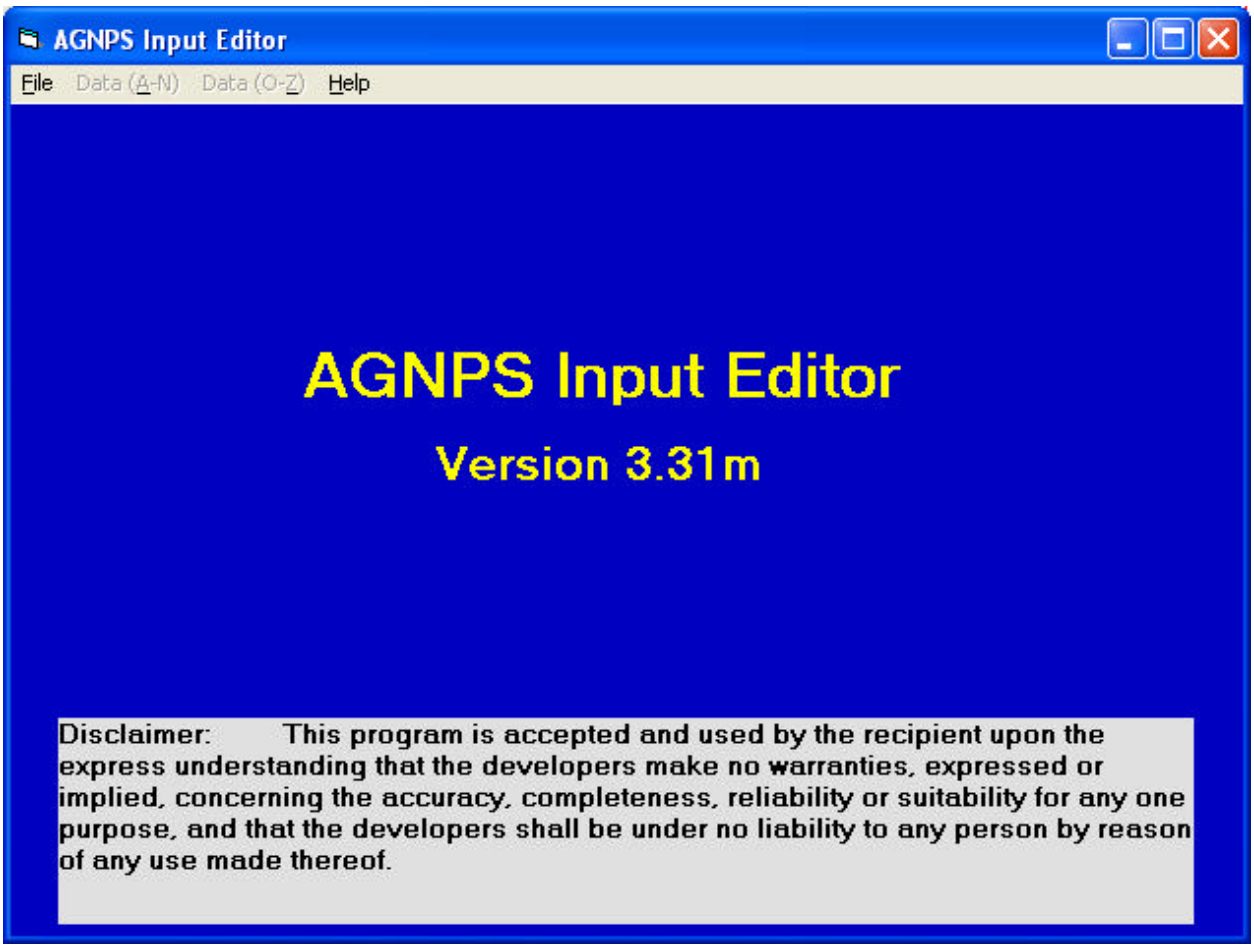
D. **AnnAGNPS Input Editor**

Abstract This is a Windows based program written in Visual Basic to permit AnnAGNPS users to develop an entire, or edit an existing, data set for the pollutant loading model. This program also is designed to be used with the "AnnAGNPS Flownet Generator" model, the "AGNPS to AnnAGNPS Conversion" program, and the AnnAGNPS Arcview Interface.

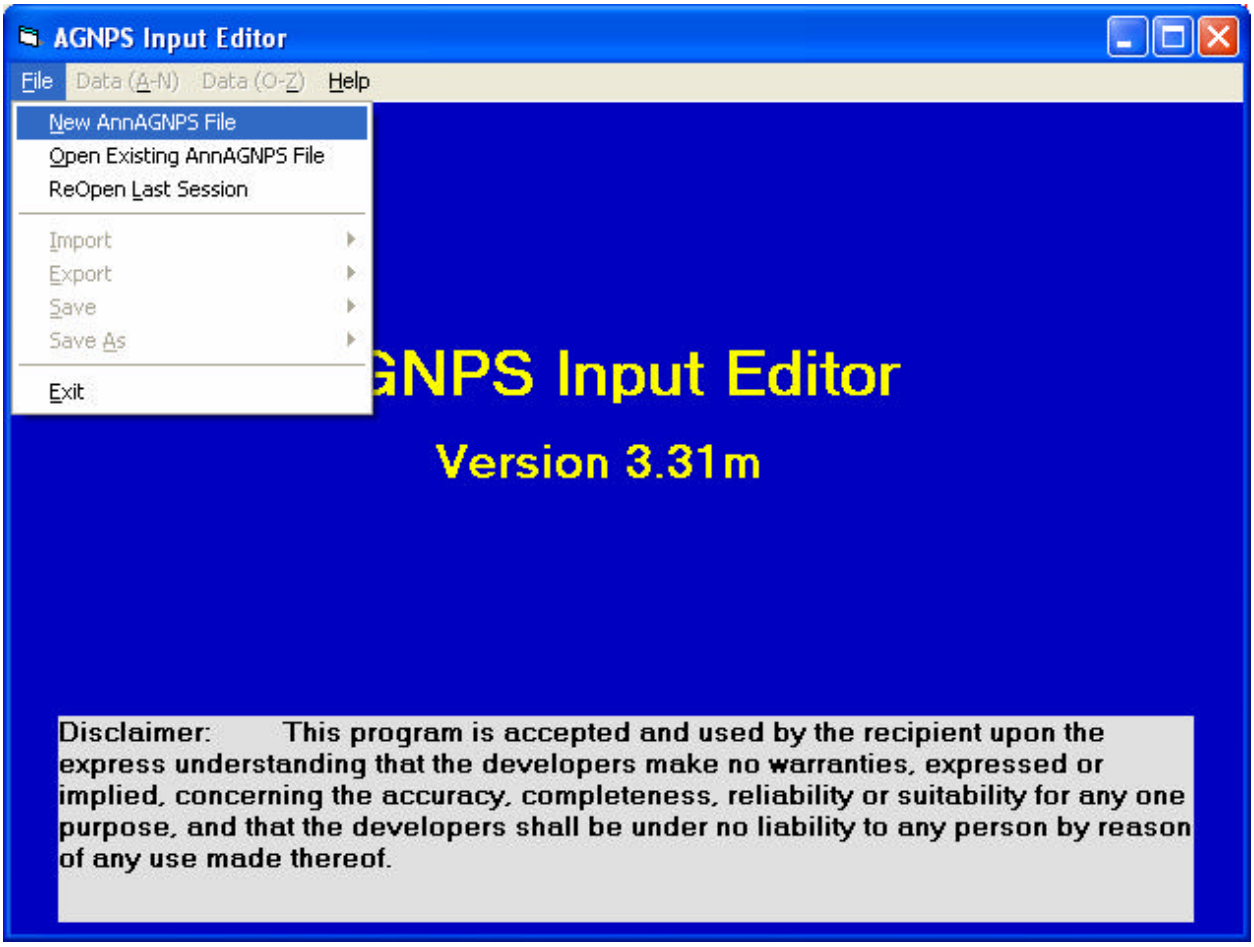
Contact: Vance Justice

Overview: The input data set for the AnnAGNPS Pollutant Loading Model consists of many sections of data, which can be generated by the user in a number of ways. The AnnAGNPS Input Editor is a Windows based program written in Visual Basic to permit AnnAGNPS users to develop an entire, or edit an existing, data set for AnnAGNPS. It is recommended that the user download, print, and read the AnnAGNPS Input Specifications in order to become familiar with the input data requirements.

Opening Screen: The opening screen for the Editor is similar to those of other Windows applications. The screen contains a menu bar to allow the user to begin. The user can minimize, maximize, or close the program by clicking the appropriate button on the right-hand side of the screen.

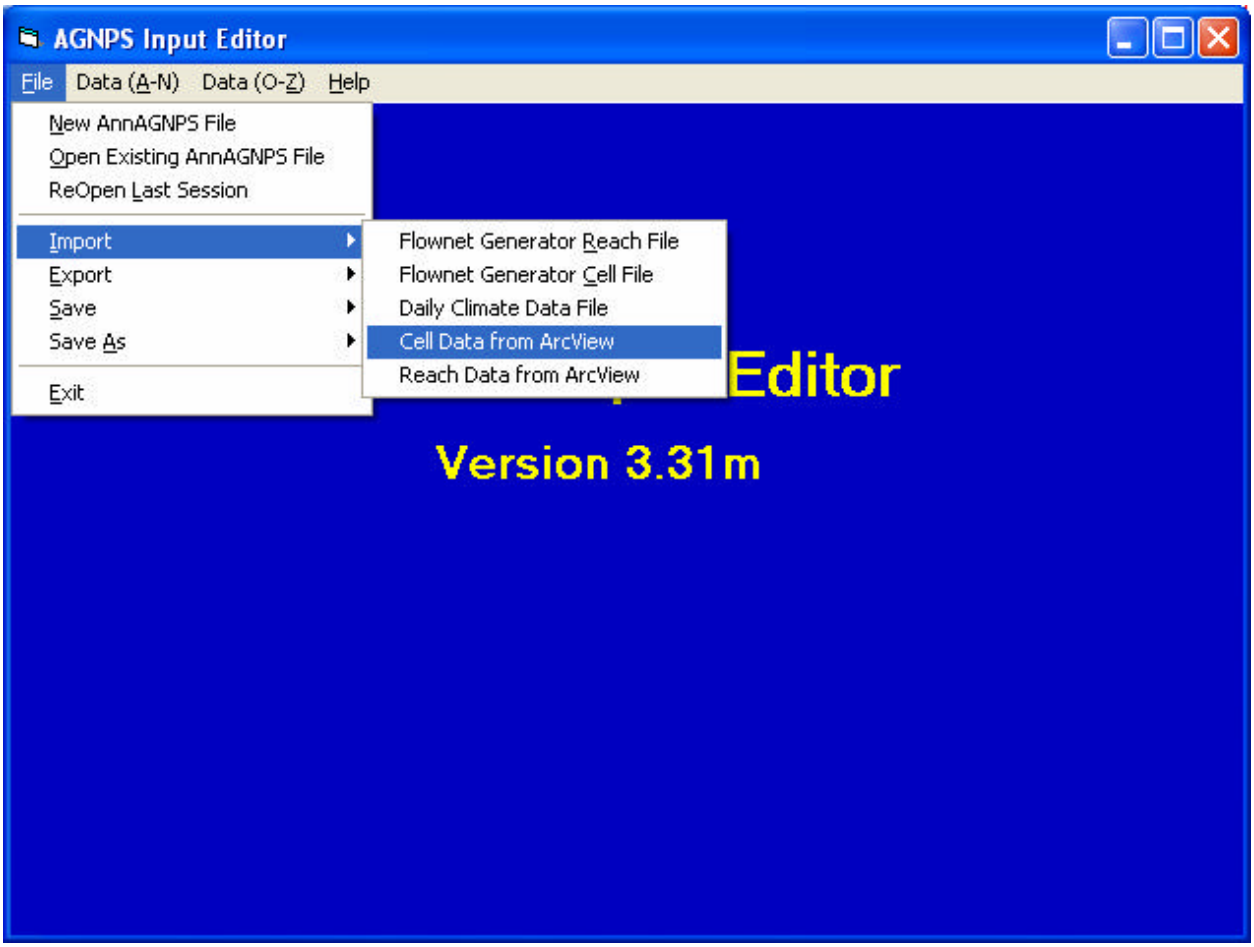


Opening a Session: The user must start a work session, in order to create or modify data, by clicking File on the menu bar. There are four options available to the user: (1) New AnnAGNPS file option allows the user to start a new session and begin to build a new AnnAGNPS data set.; (2) Open Existing AnnAGNPS file option opens a file dialogue box from which the user can select an existing AnnAGNPS data set; (3) ReOpen Last Session option allows the user to reopen the last session that was in progress (This option would be useful in the event the user exited the program without saving changes to the file or if a power failure occurred which interrupted a work session.); and (4) Exit which terminates the program if no changes have been made, or opens a file dialogue box if changes have been made.

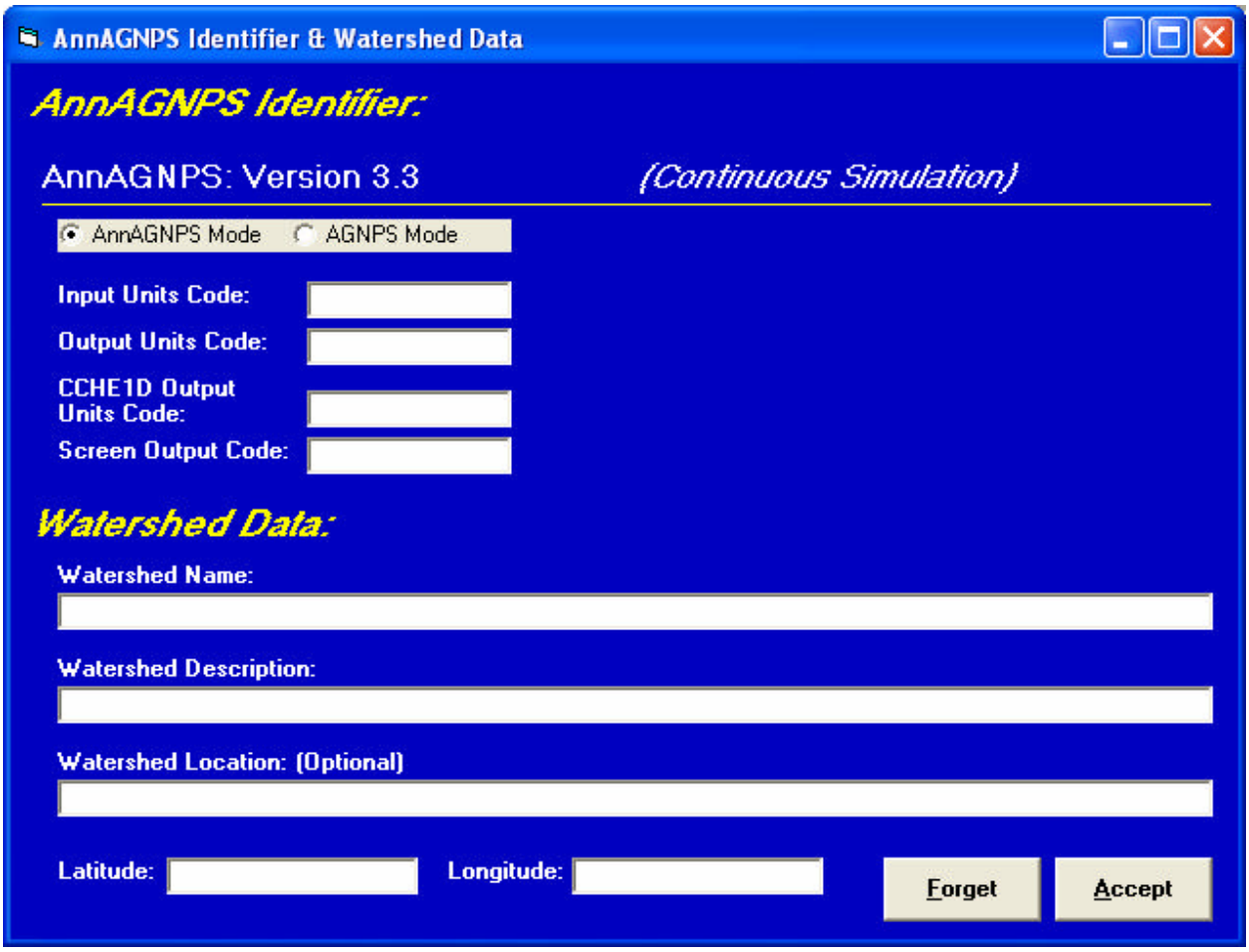


Four other options are enabled once a work session is opened: (1) Import; (2) Export; (3) Save; and (4) Save As

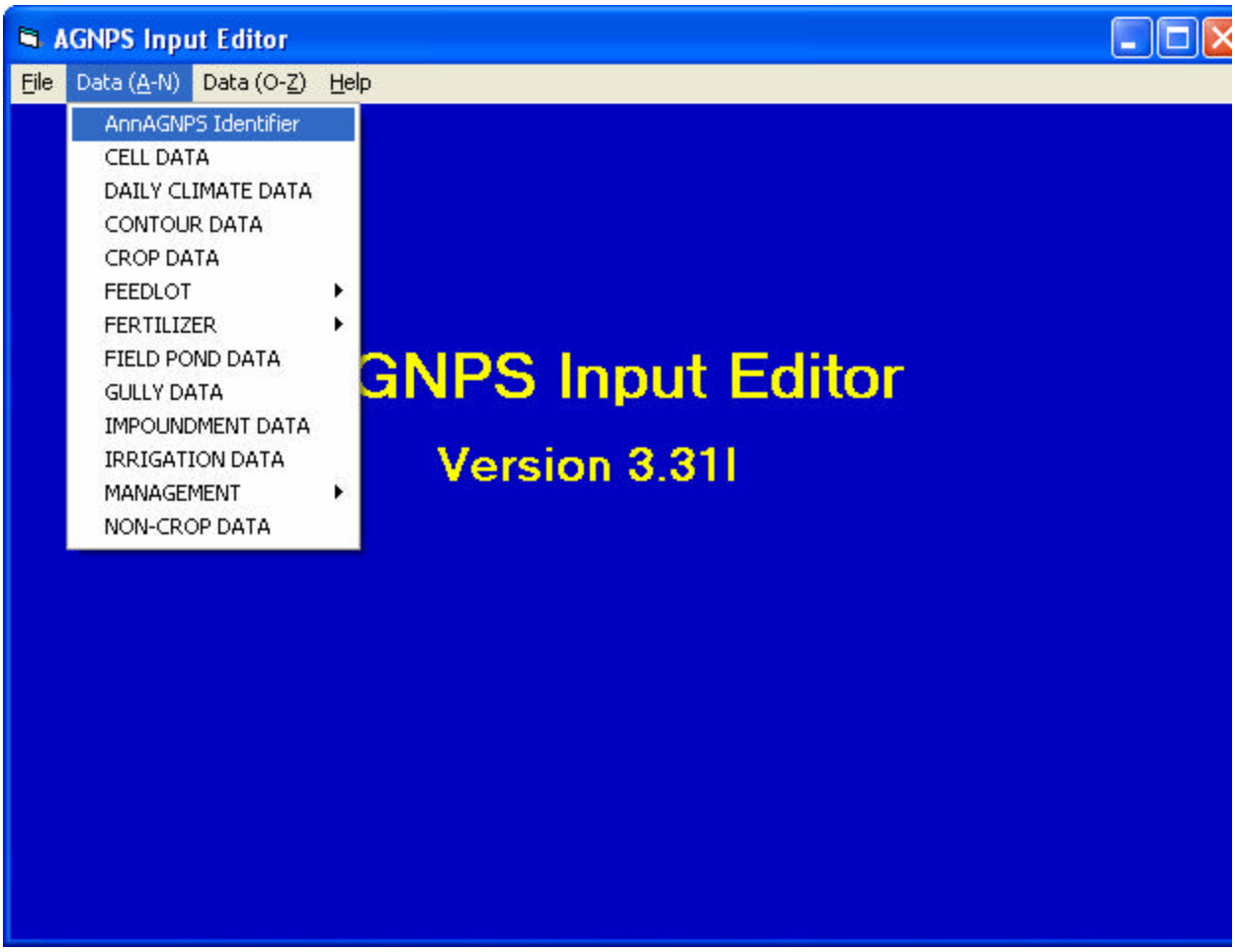
Import provides options to import the Flownet Generator Reach file (AnnAGNPS_Reach.dat) and the Flownet Generator Cell (AnnAGNPS_Cell.dat) file generated from the AnnAGNPS Flownet Generator as well as a Daily Climate File of the format specified in the AnnAGNPS Input File Specifications. Files created by the AGNPS Arcview Interface can also be imported for Cell and Reach Data sections (ann_cell.csv and ann_rch.csv). Export, at present, creates a set of formatted text files in the C:\~agedit folder with ".tmp" extensions, or a set of delimited files with ".txt" extensions. These files correspond to each of the data sections within the AnnAGNPS input file. Each ASCII file could be used as input to a database program. Save and Save As allows the user to save the changes made in the Input Editor to a file in AnnAGNPS format.



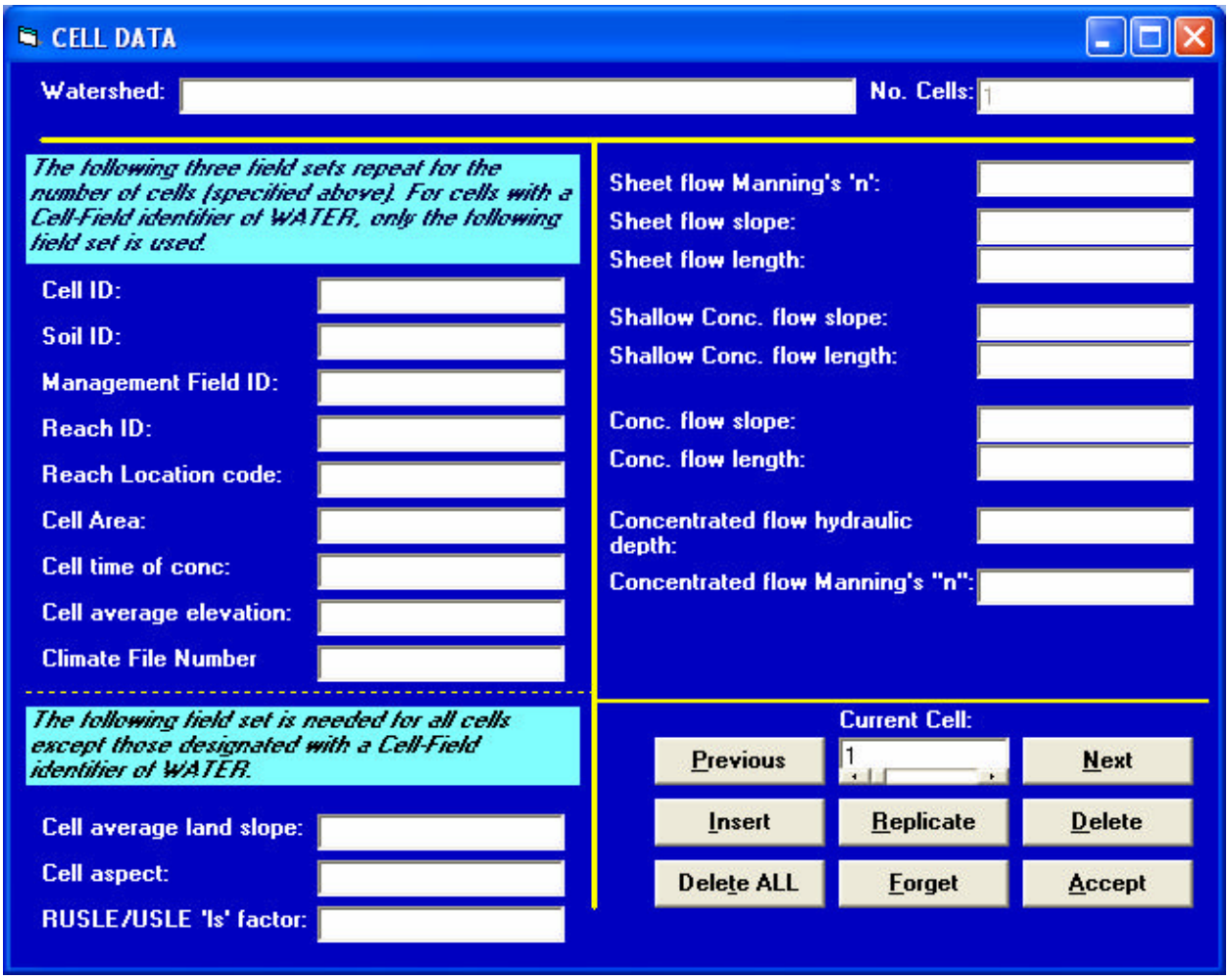
First Data Section: Once a work session has been started, the program loads the first data section form to the screen. This form actually contains two data sections from the AnnAGNPS Input Specifications: (1) AnnAGNPS Identifier; and (2) Watershed Data. The AnnAGNPS Identifier and Watershed Data sections are required by AnnAGNPS. The Watershed data provided here will be reflected on each of the data section forms as the user progresses through the session. Once the parameter fields have been entered, the user must click the "Accept" button to save the changes to the work session (not the user specified file). Pressing "Forget" discards any changes to the work session and returns to the opening screen.



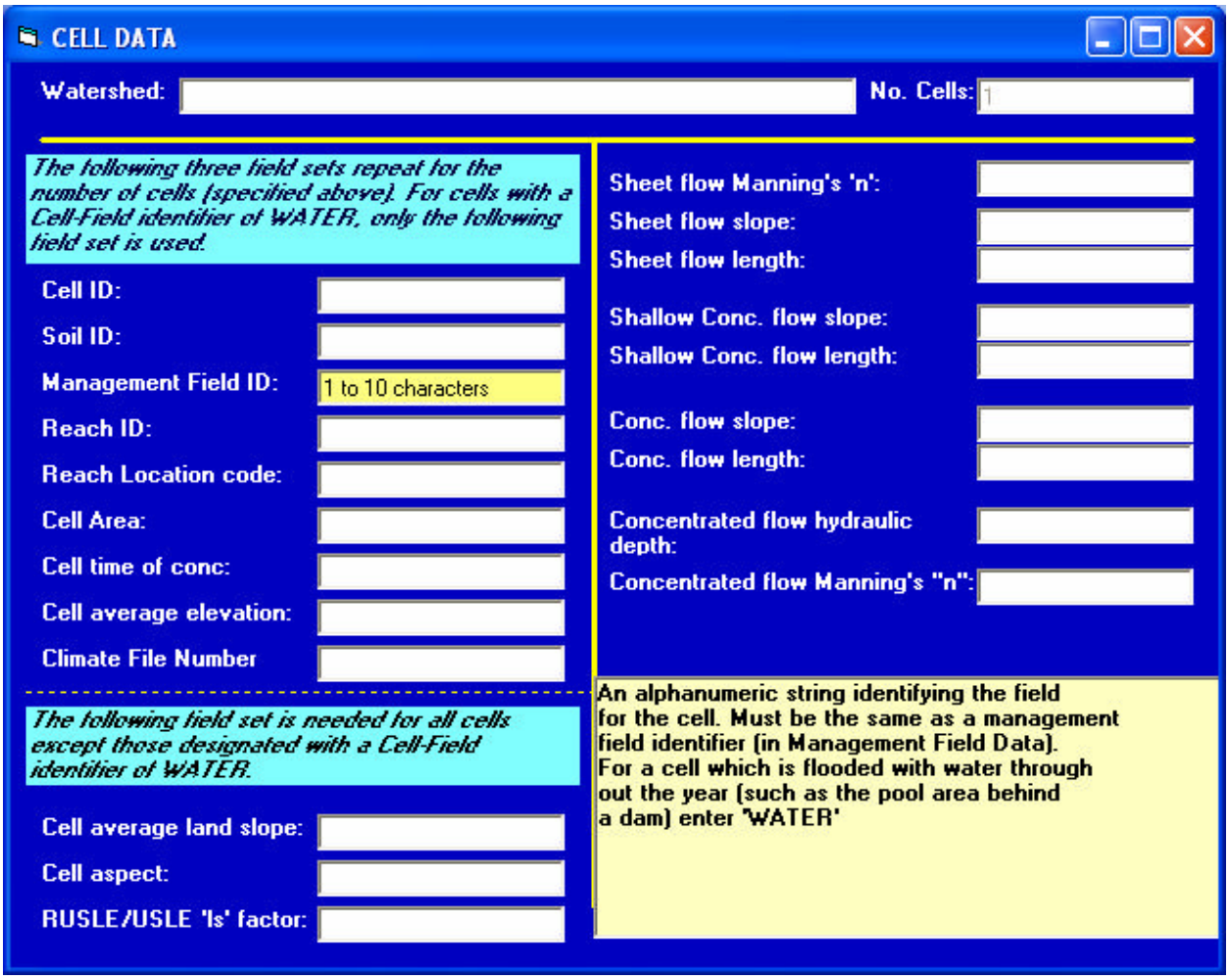
Continuing On: Once the user has clicked the "Accept" or "Forget" button on the AnnAGNPS Identifier and Watershed Data section form, the program enables two additional menu bar items. (1) Data (A-N) which contains all section names between A and N inclusively; and (2) Data (O-Z) which contains all section names between O and Z inclusively. The user can select which data section to work on by clicking the section name from the menu bar.



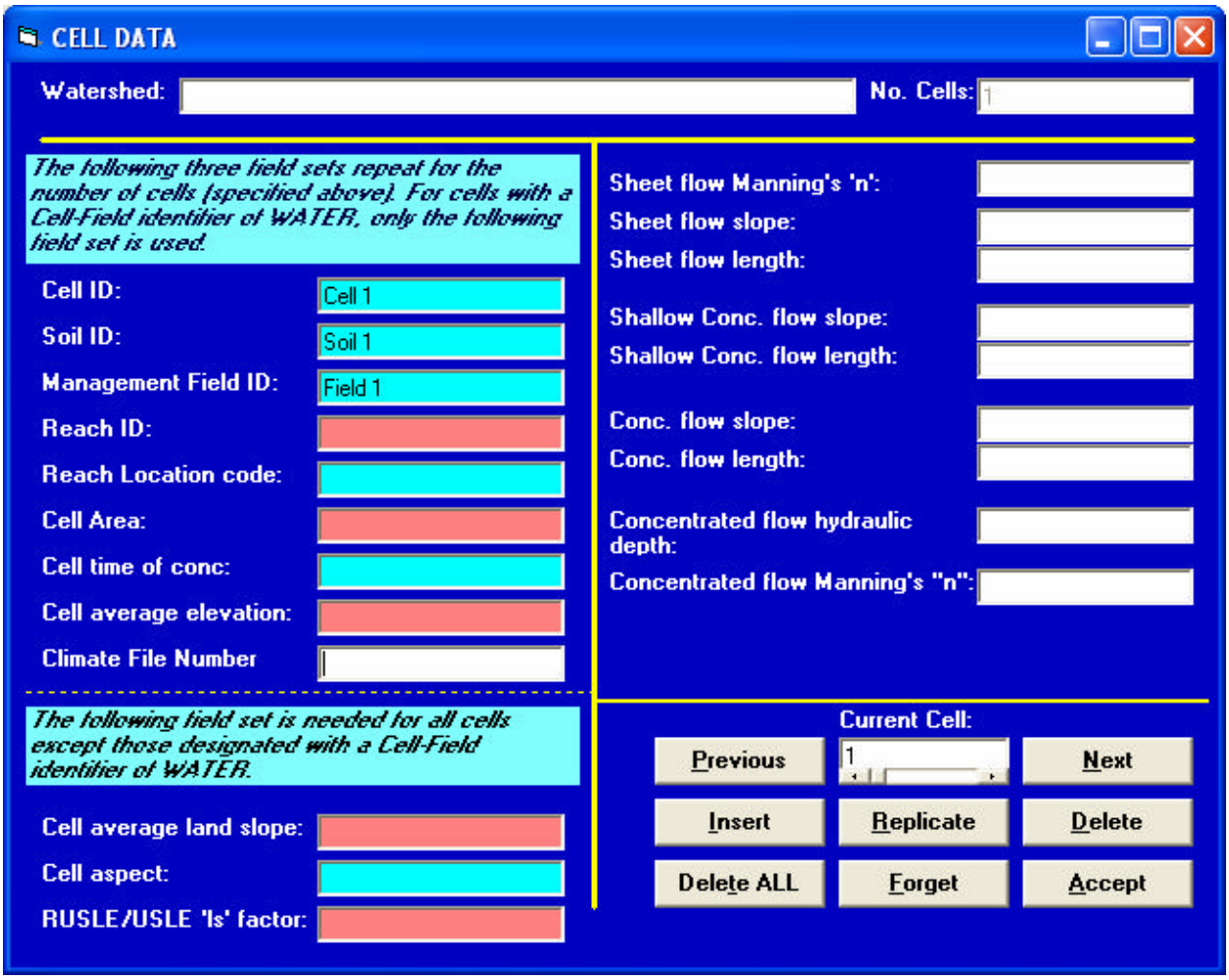
Sample Section Form: All of the data section forms are very similar, so we will examine only one, (Cell Data), for the purpose of this documentation. The data section form contains parameter fields that the user will fill in primarily using the keyboard. Flownet Generator output data can be imported into the Cell Data section form and the Reach Data section form for selected parameter fields. A data section form also contains buttons that will aid the user in: inserting; deleting; and replicating data. There is an Insert button on most of the section forms. The Insert button creates a new record after the current record. The Replicate button allows the user to select a record and then replicate that record one or more times at a user specified location in the data. The Delete button allows the user to delete one or more records in the data. The Delete All button allows the user to delete all of the records in the data. There are also buttons, Previous and Next, that allows the user to move back and forth through the data set. The data section form contains description labels for each parameter field that indicates to the user what information is expected in that parameter field. A yellow line separates data field sets (a field set is equivalent to a line set specified in the AnnAGNPS Input Specifications documentation



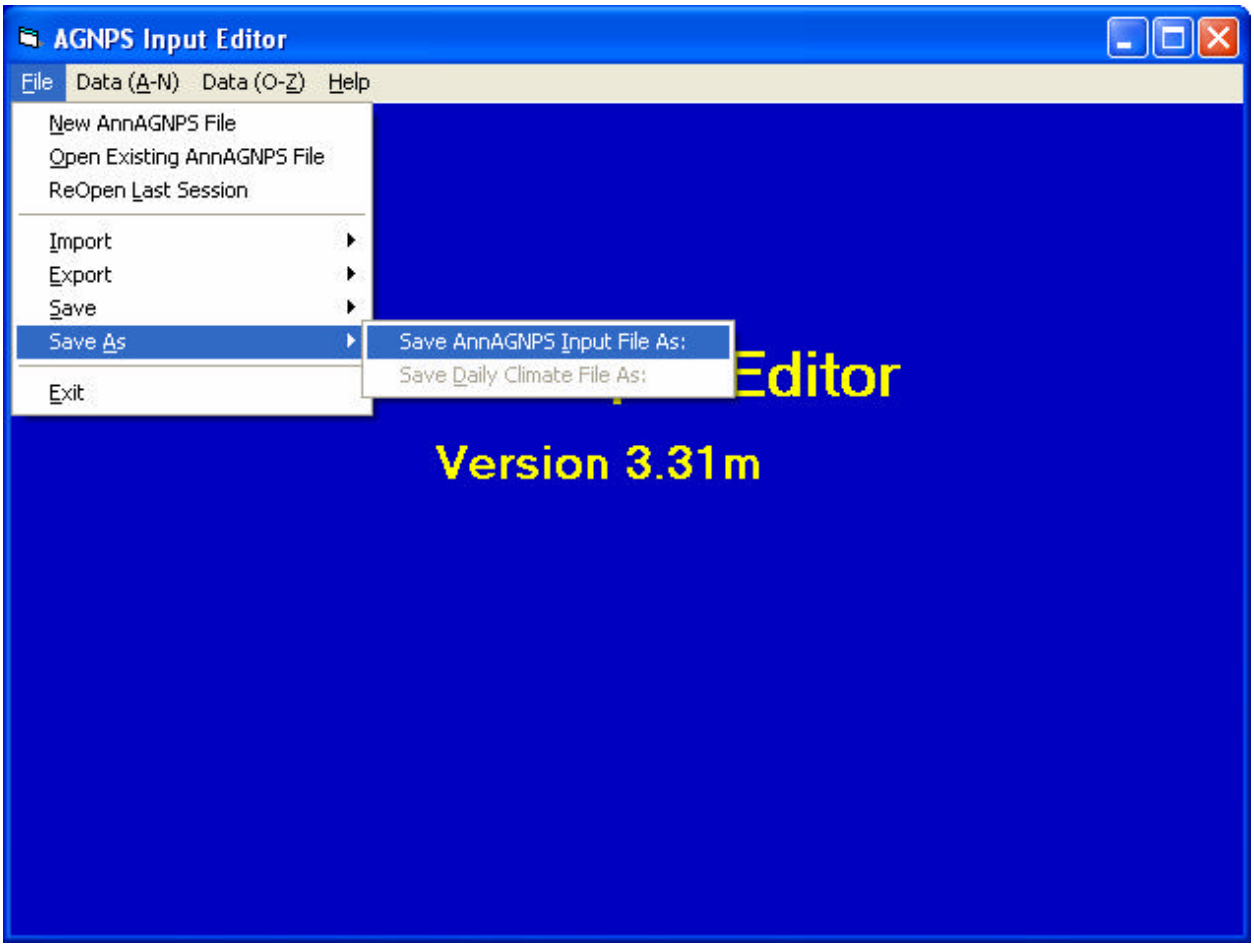
Getting Online Help: Online help is available to the user with the click of the mouse on the description label. For example, if the user clicks "Cell Field identifier:" a yellow help box will appear containing information on the Cell Field identifier. This information is a reflection of the information contained in the AnnAGNPS Input Specifications documentation. The parameter field will also turn yellow and will contain a valid range for that parameter field. The online help is a toggle function of the mouse. One click anywhere on the description label will turn on the help box and another click will turn it off.



Validity Checks: The user can move from parameter field to parameter field by pressing the tab key. A validity check is performed on the contents of the parameter field as soon as that field is exited. The parameter field will turn red if the contents are outside the valid range or blue if the contents are within the valid range for that field. This will allow the user to quickly see which parameter fields need attention. NOTE: This program only checks the validity of the parameter fields. This program does not check the relationship of one parameter field to another parameter field or one section of data to another section of data. For example, the help for Cell-Reach identifier in the Cell Data section states that data entered in this parameter field must be the same as a reach identifier in the Reach Data section. This relationship would be tested in the AnnAGNPS model and therefore is not tested in this program.



Saving a Work Session to a File: The user can save changes to the work session by clicking the "Accept" button. This saves the changes to a temporary location. When the user is ready to terminate the program those changes need to be saved to a file. This is accomplished in one of two ways. (1) The user can click File then Save As which will open a file dialogue box where the user can specify the location and the filename where the data is to be saved. (2) The user can click File then Exit. The program will check for changes and automatically open the file dialogue box if changes have been made. If no changes have been made then the program terminates. **NOTE: Clicking the [X] at the top right hand side of the screen or double clicking the [-] at the top left hand side of the screen will not save any changes.**



E. AGNPS-to-AnnAGNPS Converter

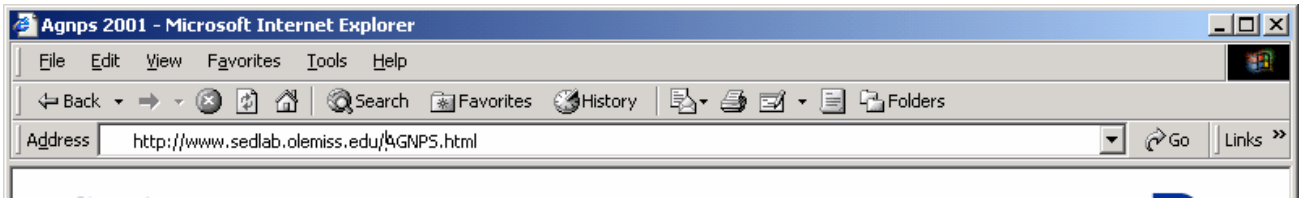
Abstract This program is to convert existing AGNPS v4.03b or v5.00 input files to AnnAGNPS 3 input files. The resulting AnnAGNPS 3 file may be used by AnnAGNPS 3 for: (1) a single-event execution; or (2) further modification by the AnnAGNPS Input Editor for a continuous simulation execution.

Contact: Vance Justice

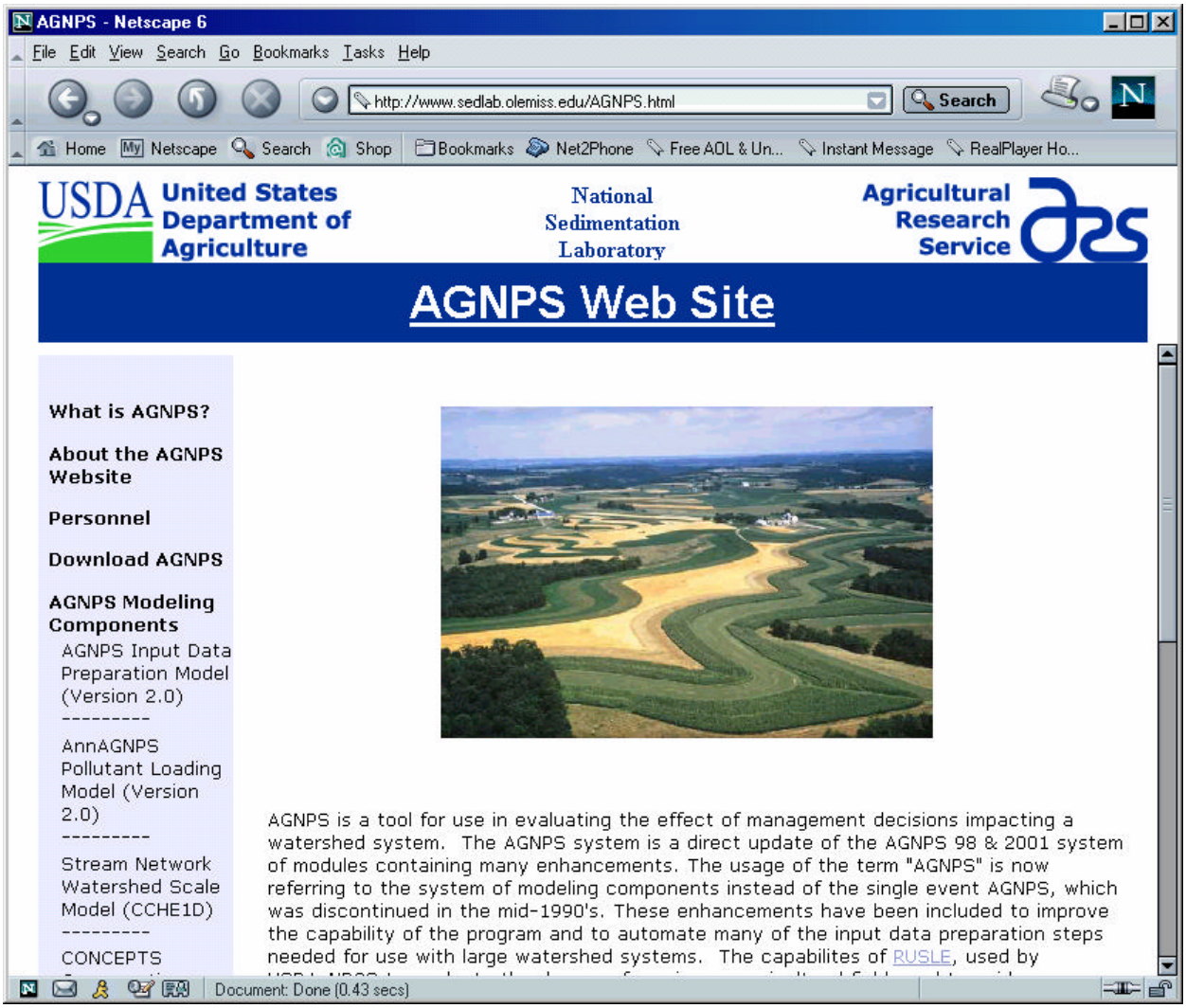
Installing the AGNPS-to-AnnAGNPS Converter

Steps for installing the AGNPS-to-AnnAGNPS Converter:

Open a web browser by clicking on the appropriate icon on the desktop or by clicking **Start**, **Programs**, and find the web browser program and click to execute. Enter http://www.sedlab.olemiss.edu/AGNPS.html in the address bar of the browser and press **Enter** on the keyboard.



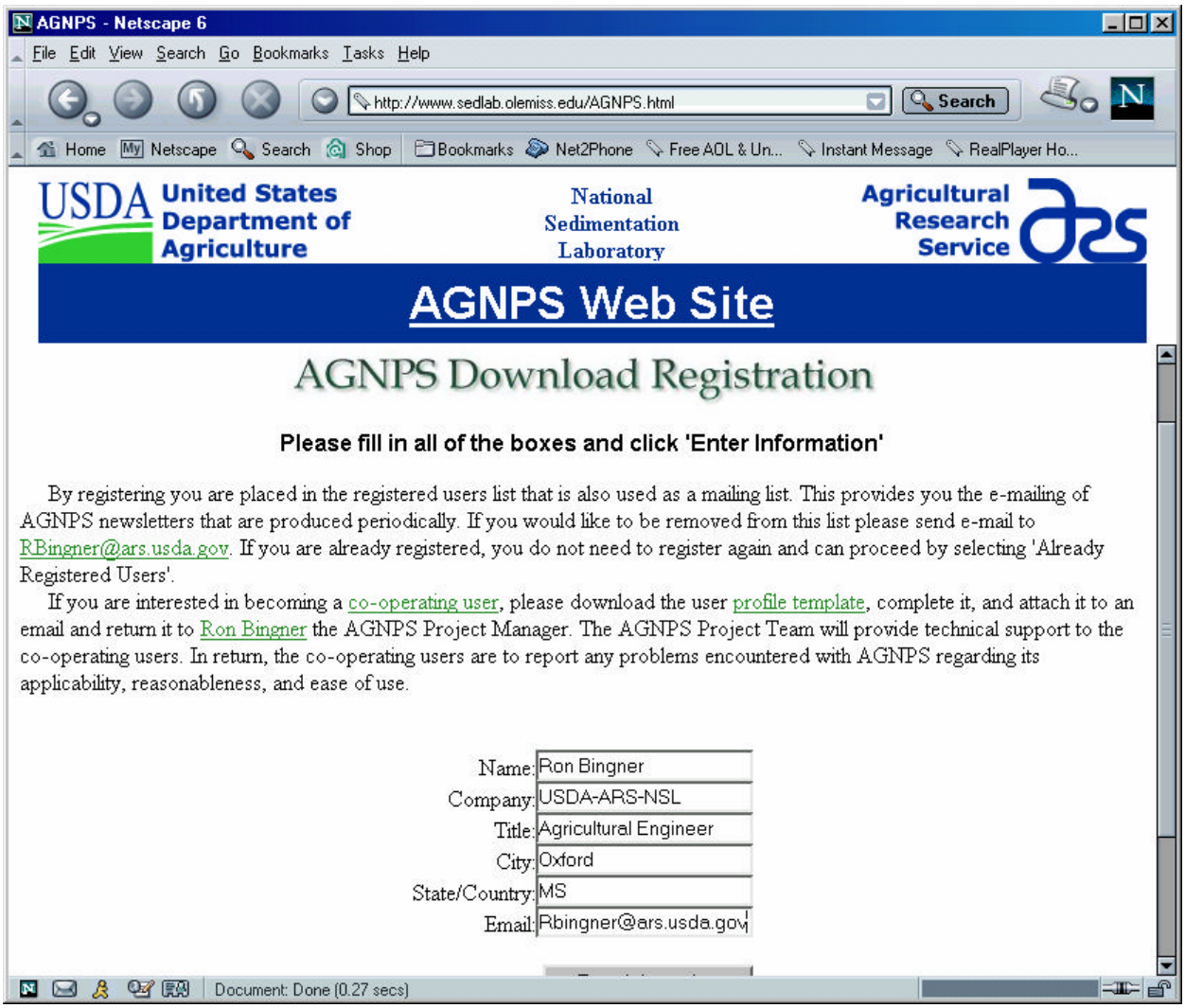
Click on AGNPS Input Data Preparation Model



Scroll down to section A: AGNPS-to-AnnAGNPS Converter and click on the **Download Now** button.

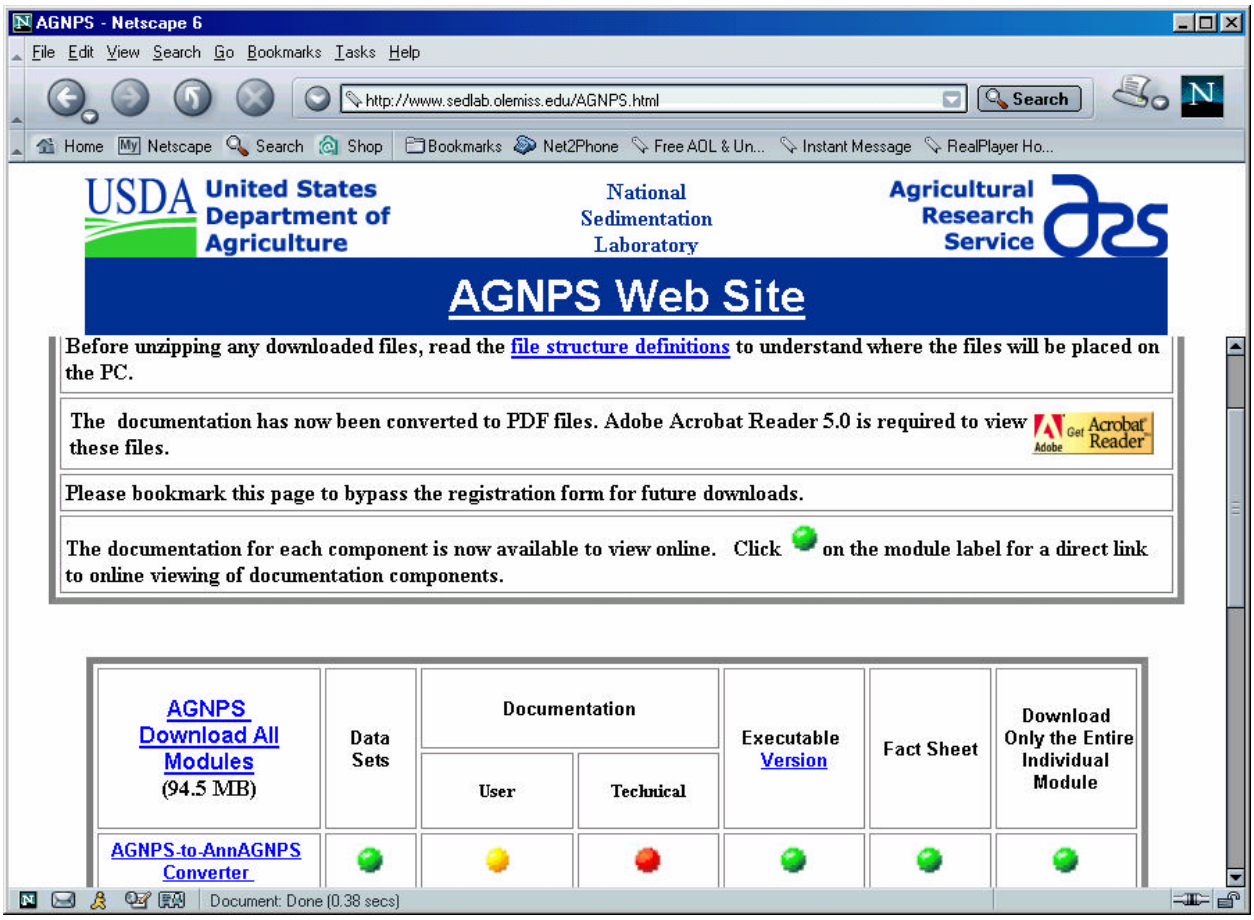
Fill out the AGNPS Registration Form and click the **Submit** button.

Registration must be completed for the first use only. If you've previously registered then click the **Already Registered Users** button to continue to the download page (Step 6).

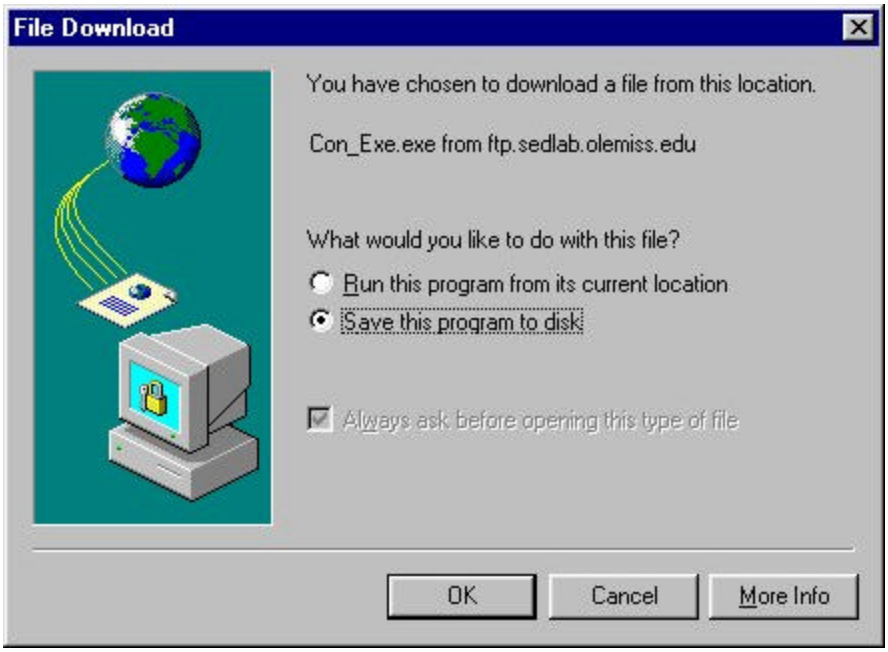


Click on 'Enter Information' to proceed.

Scroll down to AGNPS-to-AnnAGNPS Converter and click on the **green bullet** under the Executable column.



Select the option "**Save this program to disk**." and click **OK**.



Use the drop down box to select or type in the path and click **Save** to save the self-extracting archive file "Con_exe.exe" to a temporary location on the local hard disk for extraction. Make a note of where you saved this file. The file path will be needed in step 10.

Repeat step 6 for Data Sets ("Con_Data.exe") and Documentation ("Con_Doc.exe").

Using Windows Explorer, locate the self-extracting archive files that were saved in Step 6.

Double click "Con_exe.exe" to begin extraction.

NOTE - Accept the default path of C:\ and click the Unzip button.

Upon successful completion, a dialogue box showing the number of files unzipped will appear.

Repeat Steps 8 and 9 for the remaining files, Data Sets ("**Con_data.exe**") and documentation ("**Con_Doc.exe**")., saved in step 6.

This completes the installation of the AGNPS-to-AnnAGNPS Converter components of the Flownet Generator.

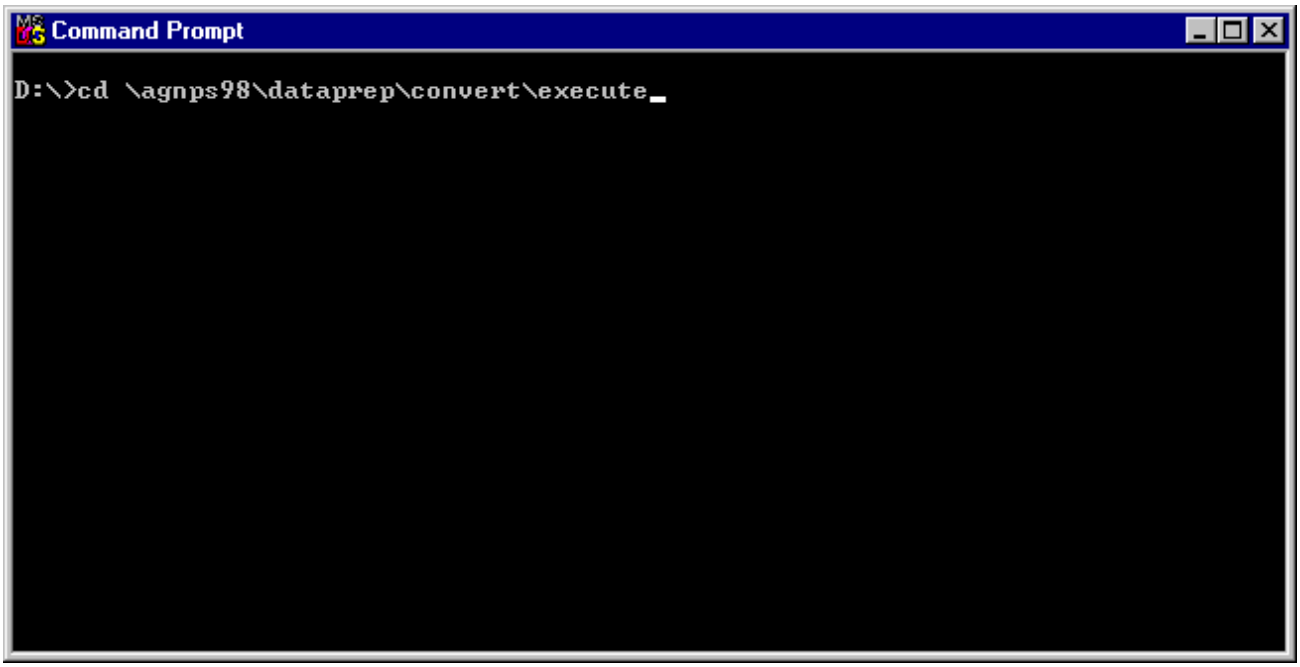
Executing the AGNPS-to-AnnAGNPS Converter

Use Notepad, WordPad, or another text editor to edit the "AGNPS.fil" in the directory which contains the AGNPS-to AnnAGNPS Converter. The file consists of one line,

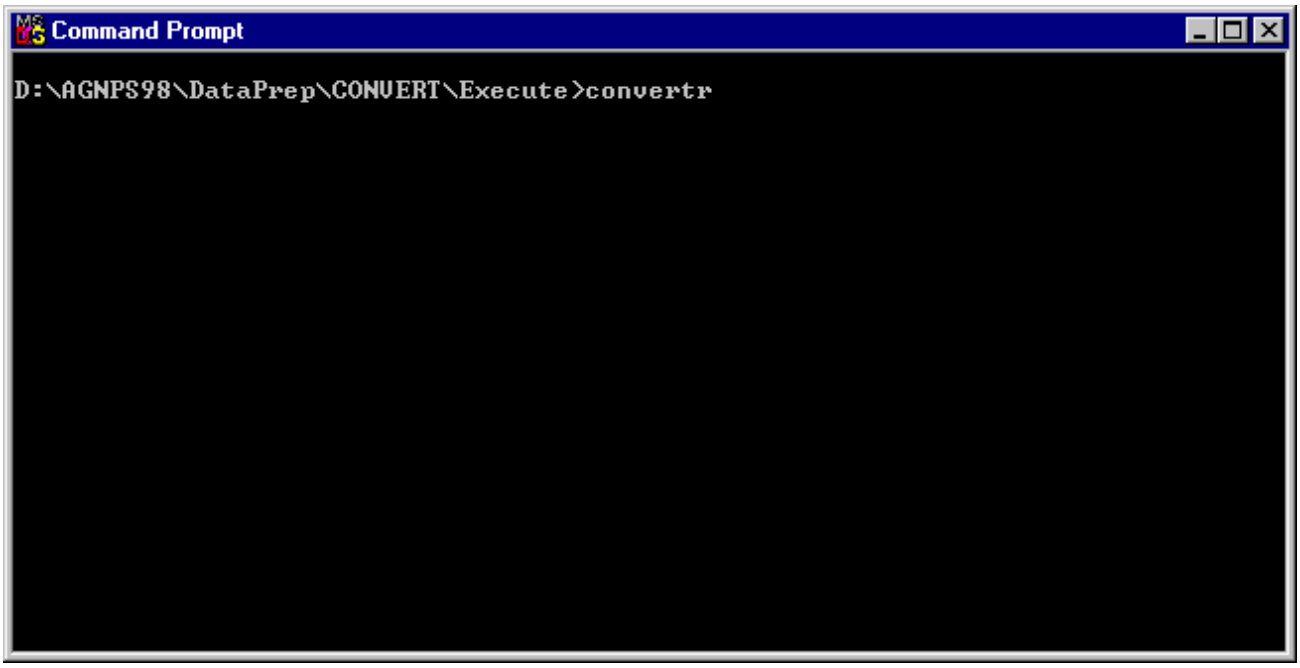
that is simply the file name of the file you wish to convert.

2.) Open a DOS Window.

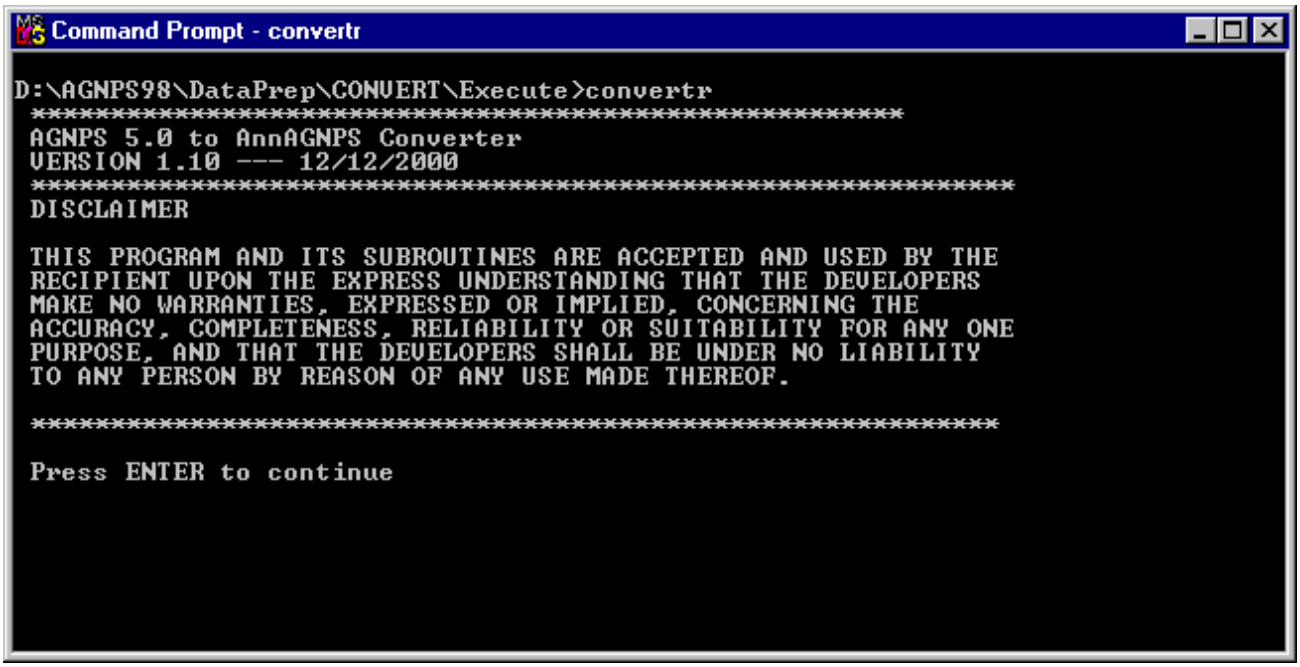
3.) In the DOS window, change directories to the one containing the AGNPS-to- AnnAGNPS Converter executable file.

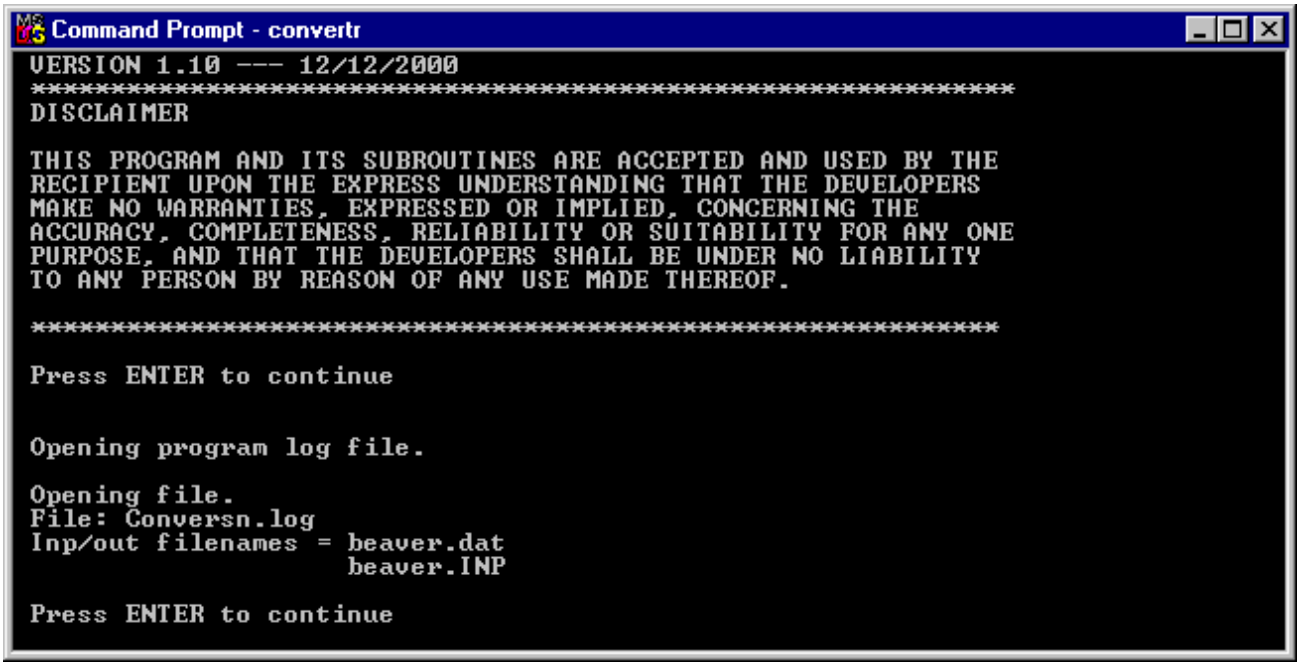


Enter "Convertr" at the prompt.

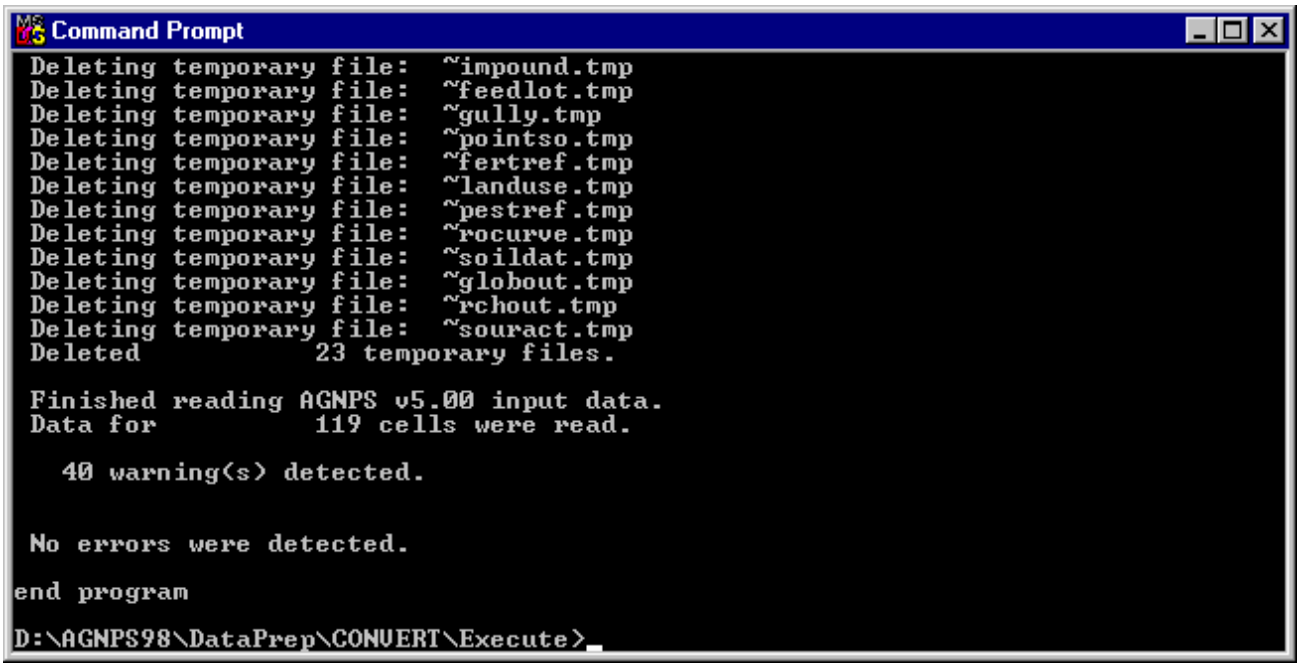


Press "Enter" to continue when prompted.





The program will execute and store the output in the file "yourfile.inp". The resulting AnnAGNPS file may be used by AnnAGNPS for: (1) a single-event execution; or (2) further modification by the AnnAGNPS Input Editor for a continuous simulation execution.



F. GEM

Abstract: A beta version of a synthetic weather generator (Generation of weather Elements for Multiple applications—GEM) has been written in FORTRAN 77 for the UNIX operating system. It can be used to generate the precipitation and min/max air temperatures for AnnAGNPS. However, historical records would have to be used to complete the remaining required synthetic weather parameters (relative humidity, percent sky cover, & wind speed) so that they would be compatible with the generated precipitation and air temperatures. For example, there should be more high humidity days with greater cloud cover on rainy than on non-rainy days. While GEM does generate solar radiation, it is neither required by nor can be used by AnnAGNPS.

Contact: Greg Johnson

End of Document