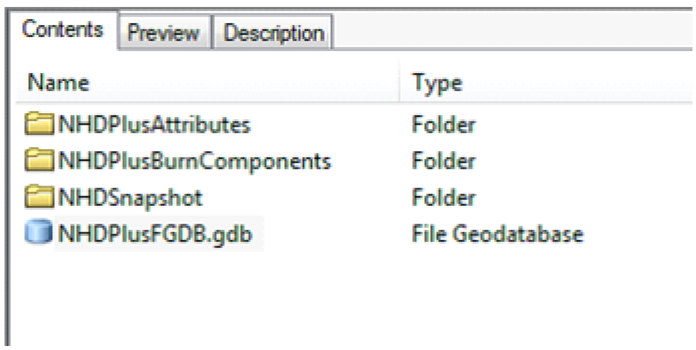
Within this document, the term NHDPlus is used when referring to NHDPlus Version 2.1 (unless otherwise noted).

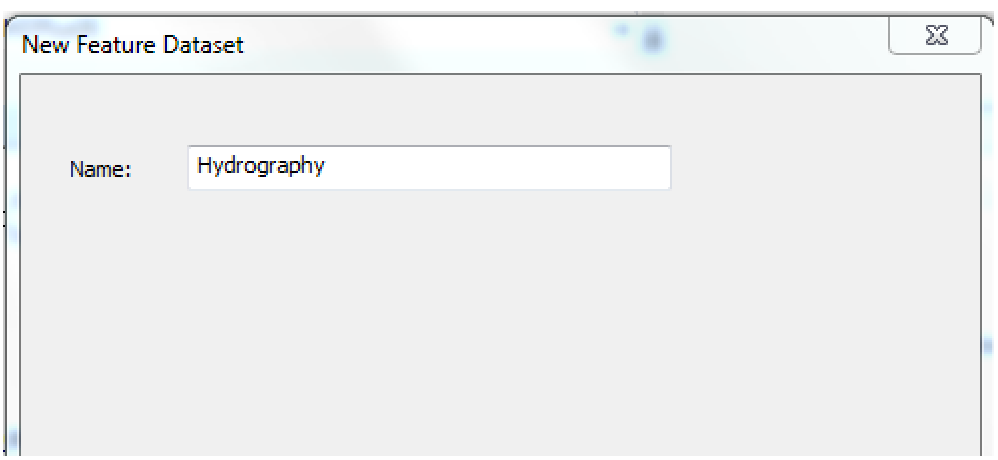
Using ArcCatalog we begin by creating a new personal geodatabase and a geometric network from the NHDFlowlines:

1. Start ArcCatalog.

2. Right-click on the \NHDPlus06 folder, go to New, File Geodatabase. The database will be added to the left and right windows. Rename the database to NHDPlusFGDB.

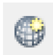


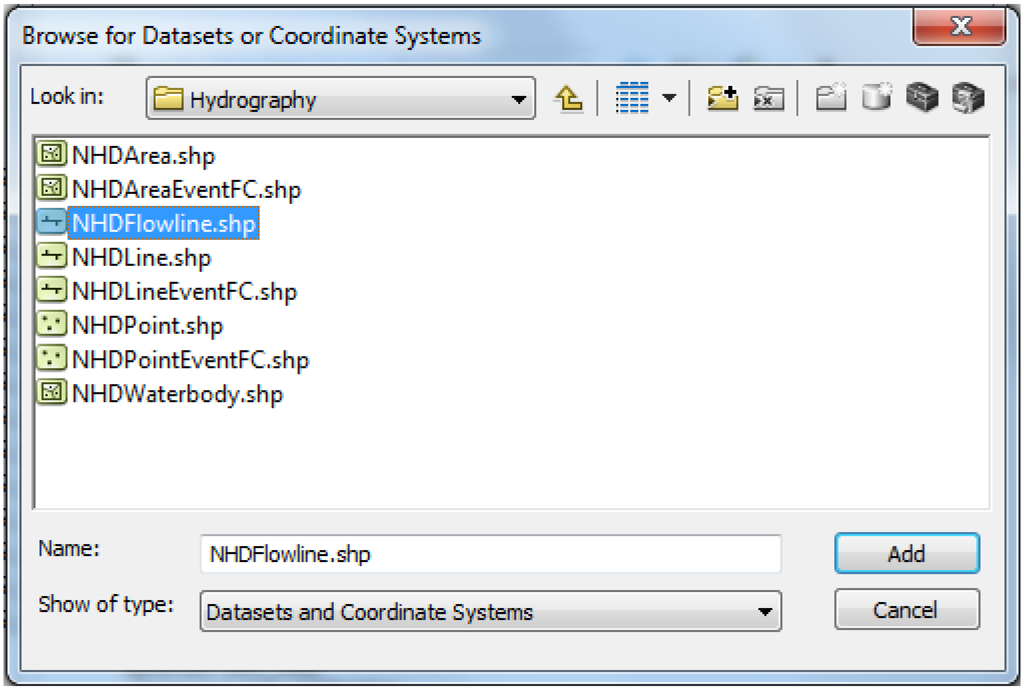
3. Right-click on NHDPlusFGDB in the left window, go to New, Feature Dataset. In the New Feature Dataset dialog, Name the feature dataset Hydrography.



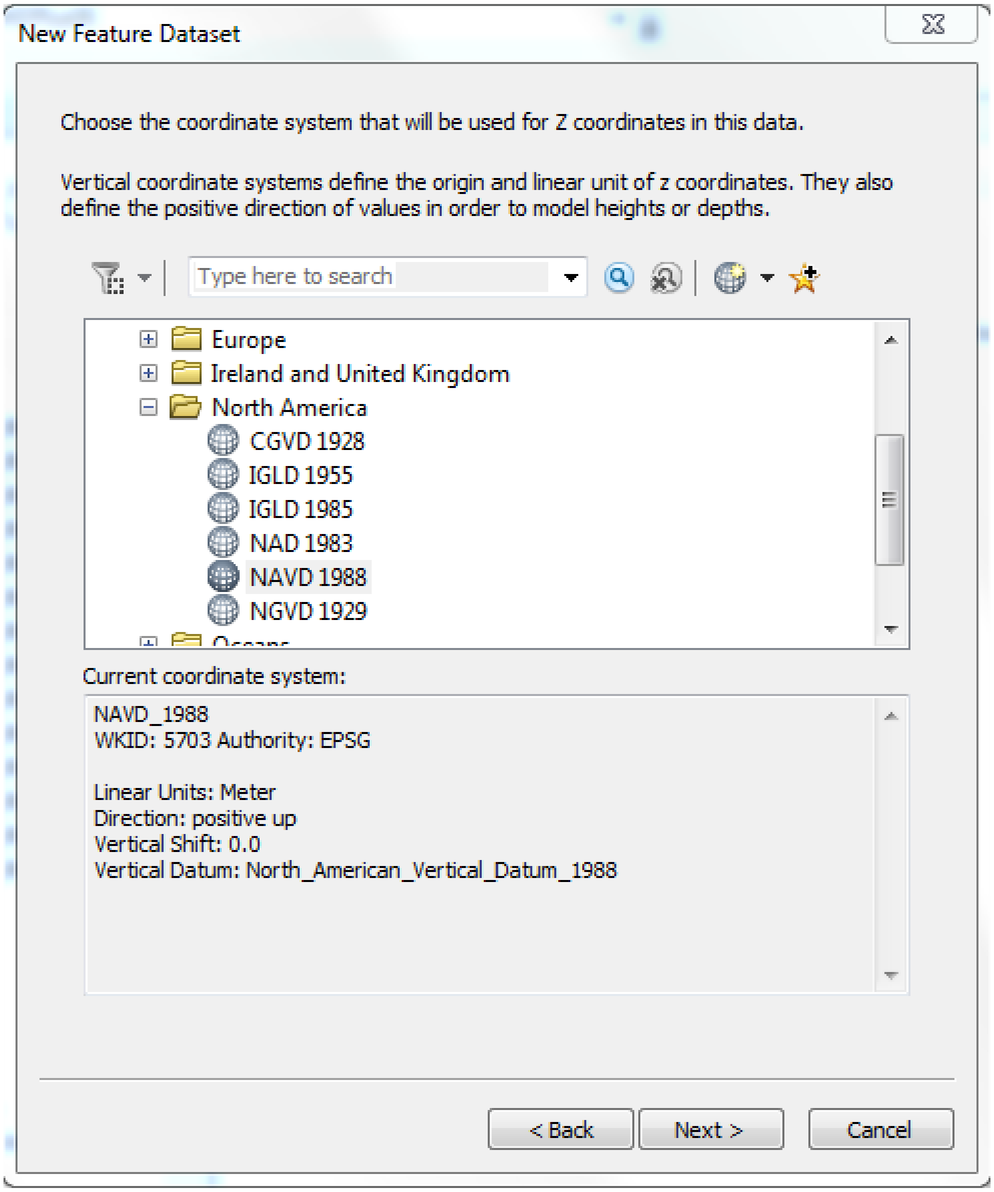
4. Click Next.

5. The next screen prompts you to choose a coordinate system.

Click  then click “import". In the NHDPlus06\NHDSnapshot\Hydrography directory search for the nhdflowline.shp and add it.

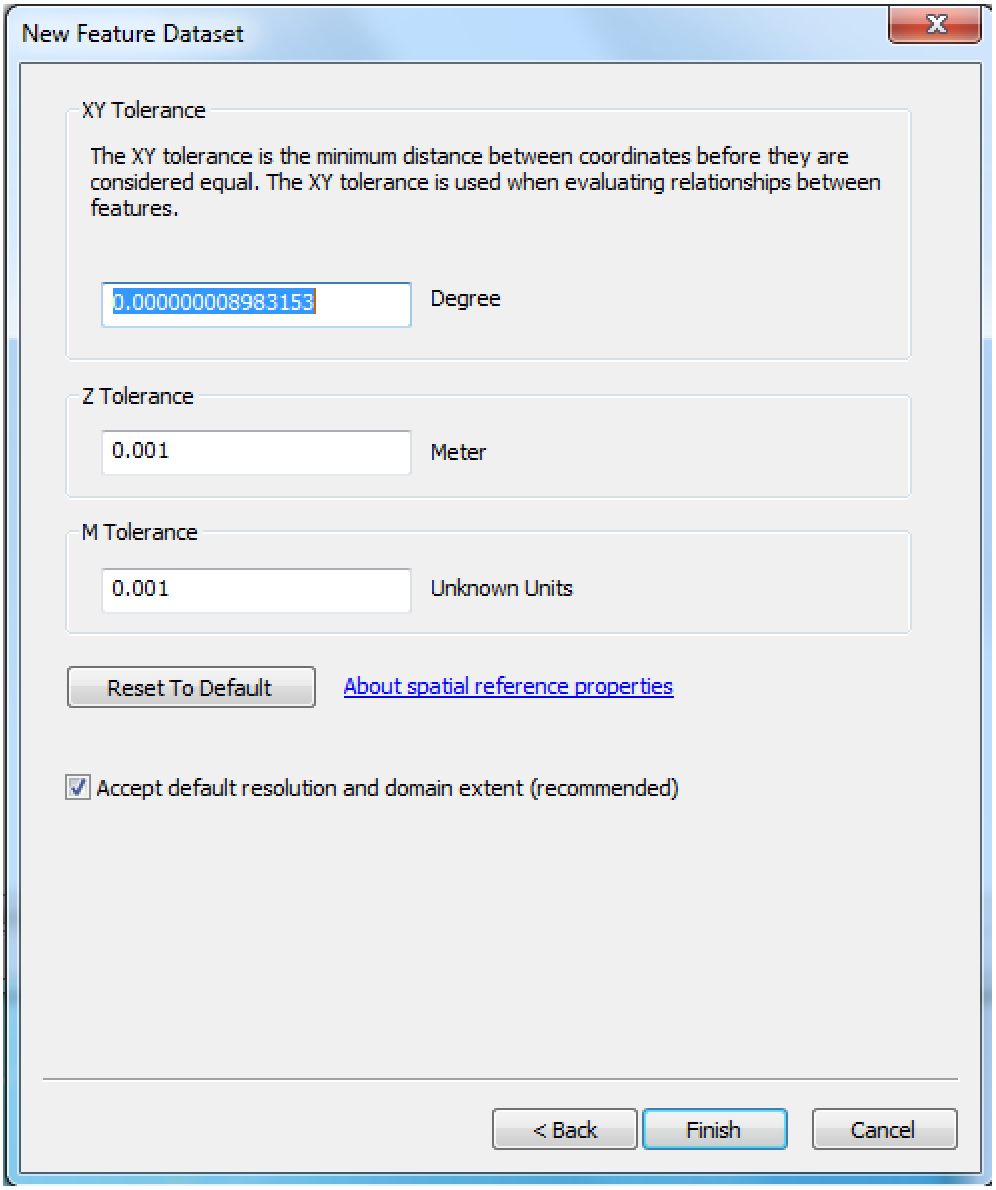


6. Click next.

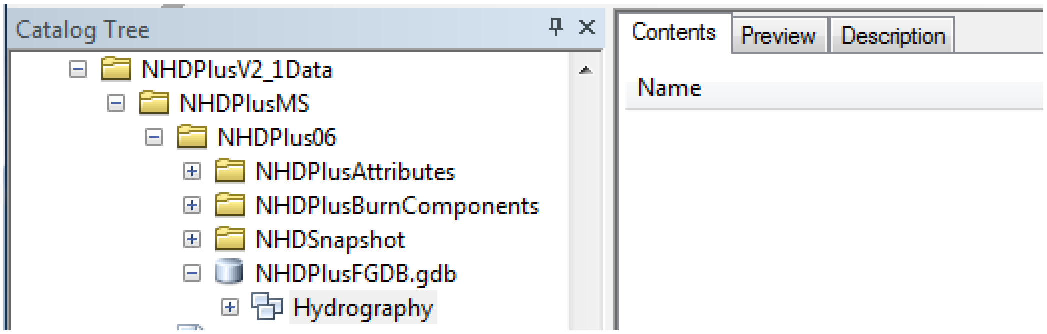


7. Choose the coordinate system that will be used for Z coordinates (NAVD 1988 under North America) and click Next.

8. Leave XY, Z and M Tolerance field defaults and click Finish.



9. The new feature dataset called Hydrography is now created and appears in the left window of ArcCatalog under the NHDPlusFGDB personal geodatabase. Next we add the data to the geodatabase.



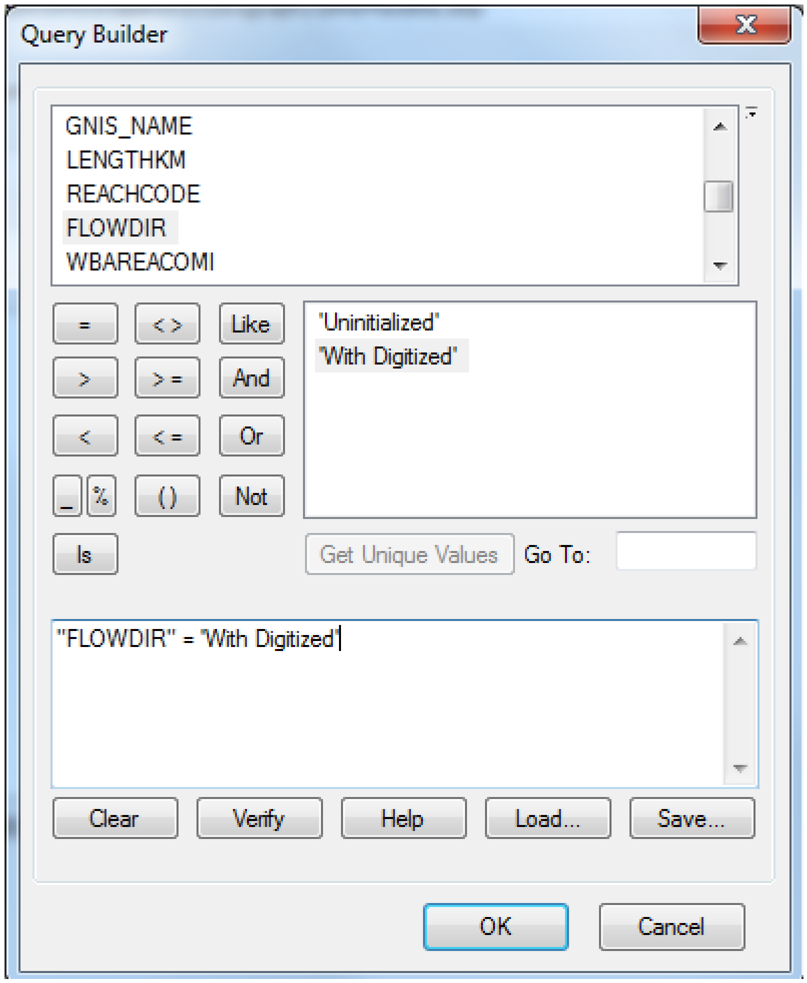
10. Right-click on the Hydrography feature dataset in the left window. Go to Import, Feature Class (single). In the Feature Class to Feature Class dialog.

11. Use the Folder button to browse to \NHDPlus06\NHDSnapshot\Hydrography and select NHDFlowline.shp for Input Features

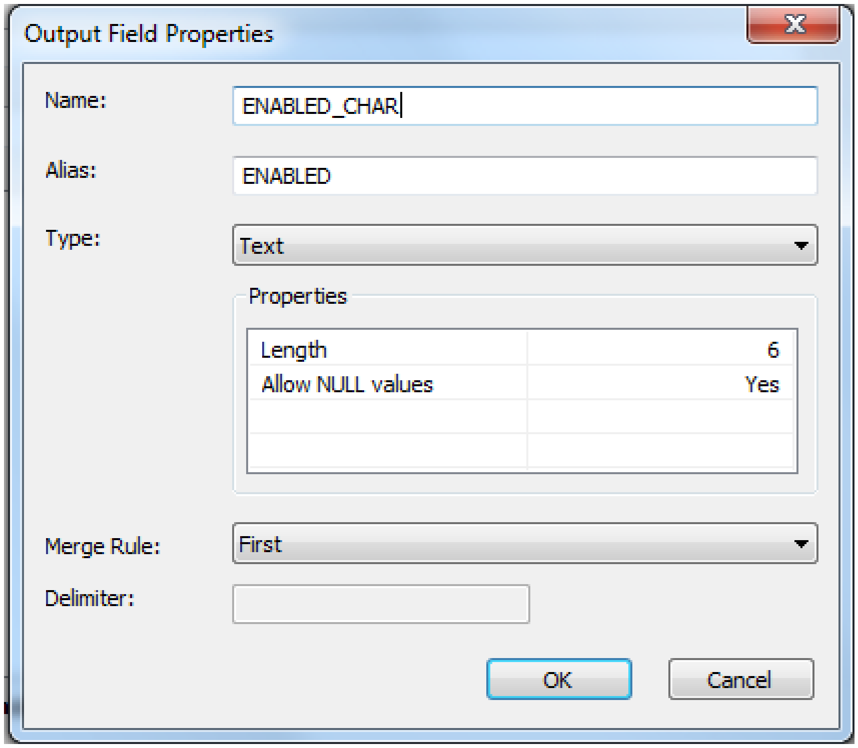
12. Leave Output Location as: …\NHDPlus06\NHDPlusFGDB.mdb\Hydrography

13. Enter NHD_KnownFlow in Output Feature Class.

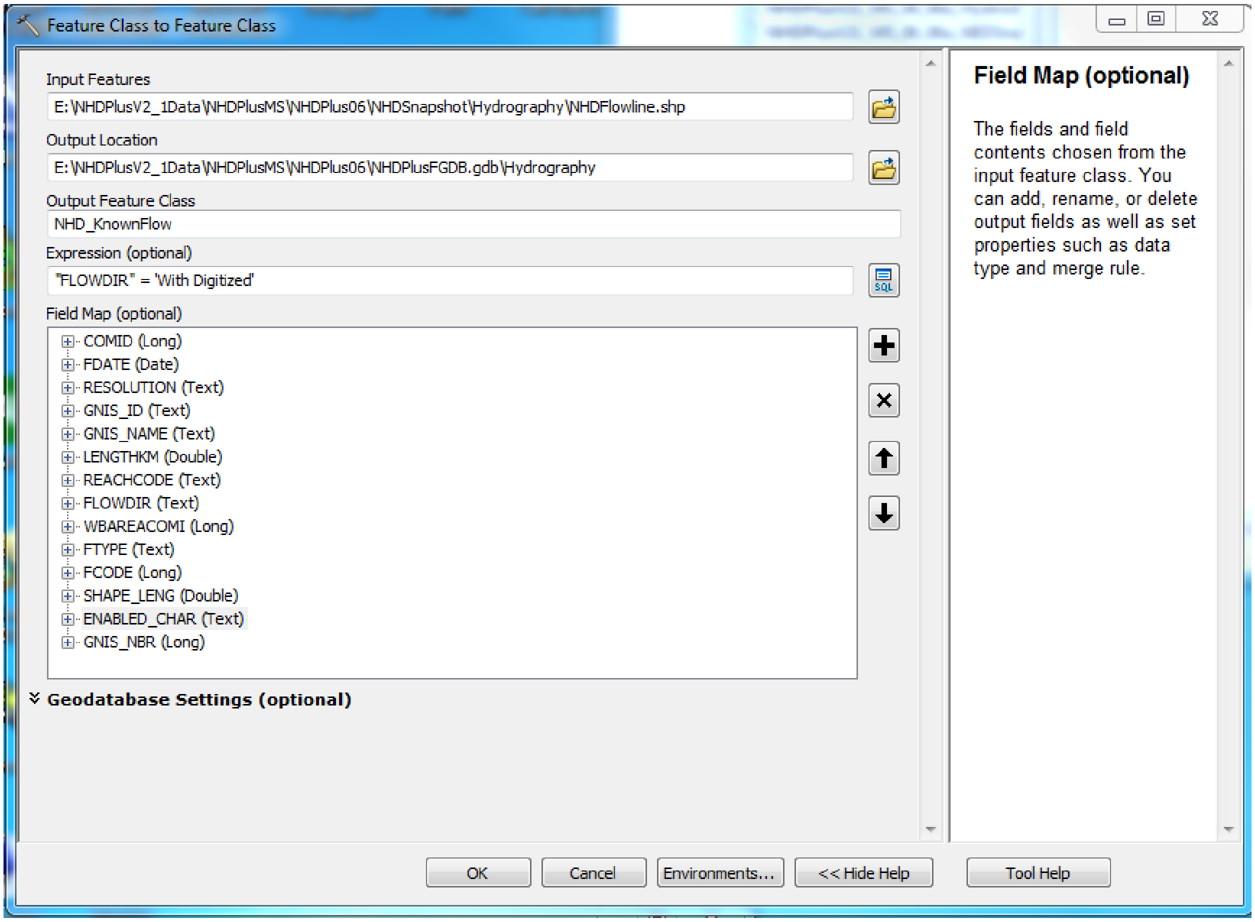
14. Use the SQL button  to build an Expression as shown below. This expression extracts from all the NHDFlowlines, only those with known flow direction. The expression should read: "FLOWDIR" = ‘With Digitized’ Note the single quotes around the ‘With Digitized’. Click on Get Unique Values in order to select ‘With Digitized’. Click OK.



15. Returning to the Feature Class to Feature Class dialog, scroll down in the Field Map box and right click ENABLED and select properties. Change the name to ENABLED_CHAR. Click OK.



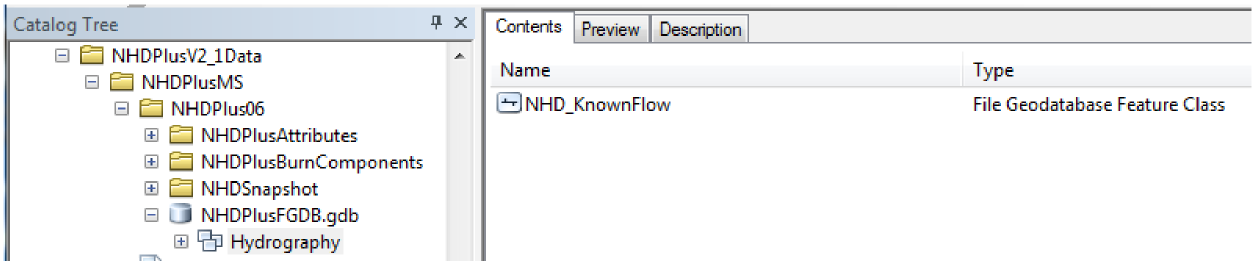
16. Leave the remaining items in the dialog at their default values and click OK.



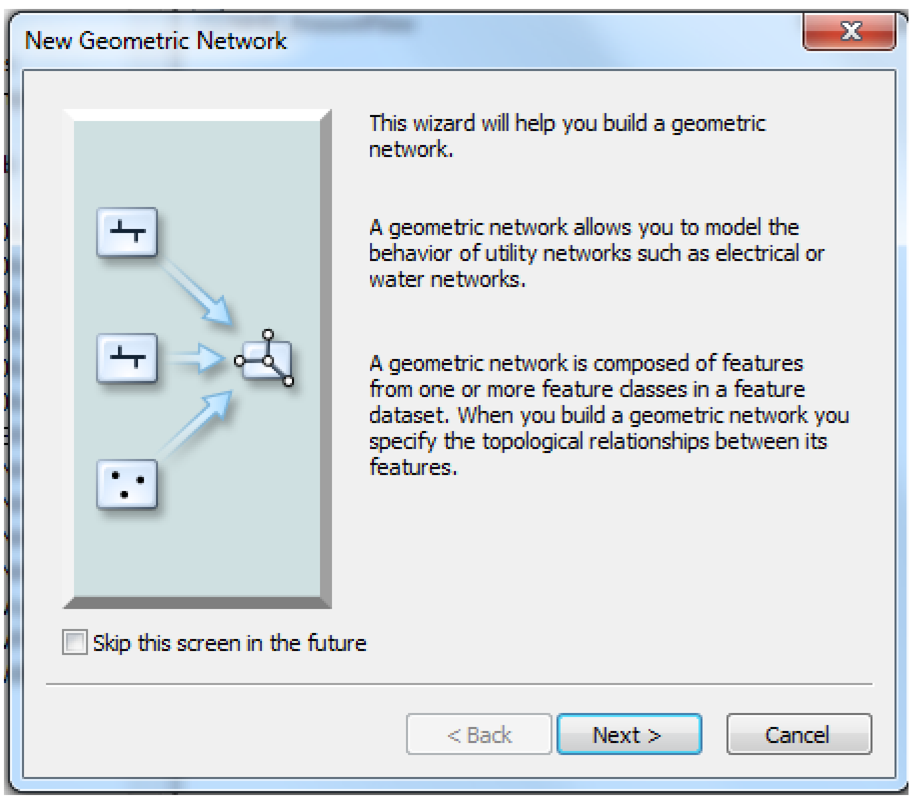
17. Click OK back in the Feature Class to Feature Class dialog box.

18. The import Feature Class to Feature Class operation will execute. Wait until the import is complete. Then click “close”.

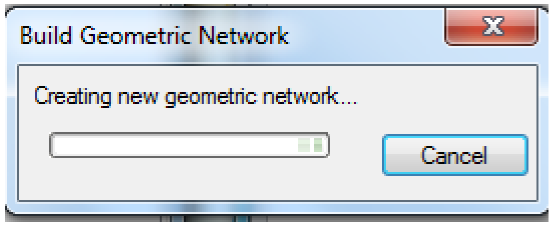
19. The new feature class called NHD_KnownFlow is now created and appears in the left window of ArcCatalog under the Hydrography feature dataset (if the + next to Hydrography is clicked).



20. Right-click on the Hydrography feature dataset in the left window. Go to New, Geometric Network. Proceed through the Build Geographic Network Wizard, taking <u>all the defaults</u>. The geometric network called hydrography_net will be created.

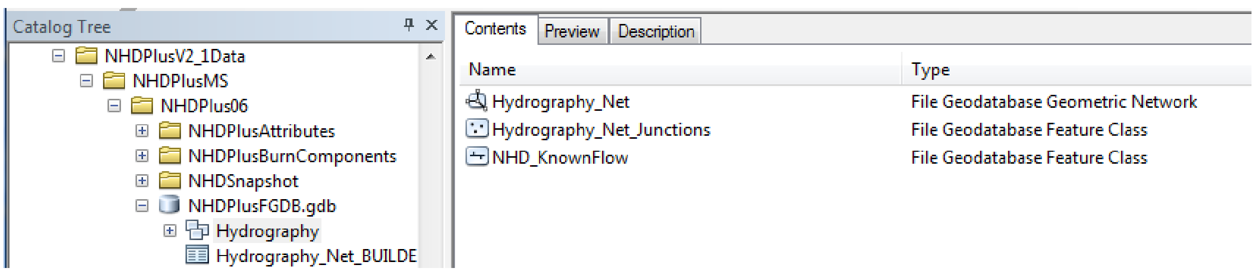


21. The last step of the wizard will build the new geometric network from the NHD_KnowFlow feature class.



22. The geometric feature classes, Hydrography_net and Hydrography_Junction will appear in the left window of ArcCatalog under the Hydrography feature dataset.

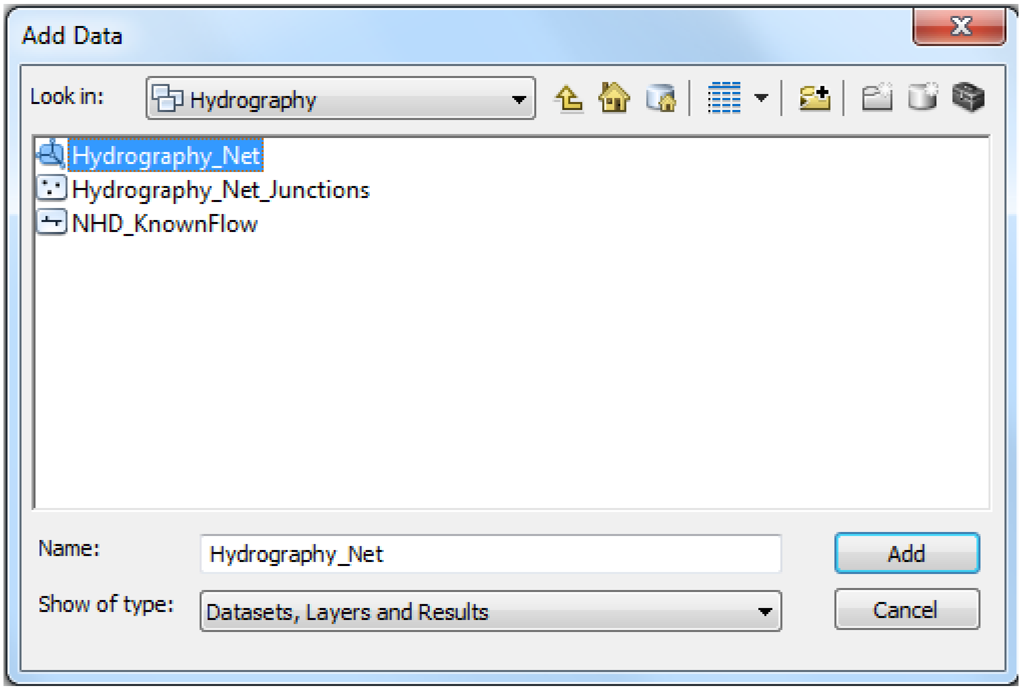
    You may receive a “Build Geometric Network” at this point. It reads: ‘The geometric network has been created with n build errors. The build errors are stored in the Hydrography_Net_BUILDER_table’. For the purposes of this tutorial, you may ignore the network errors.



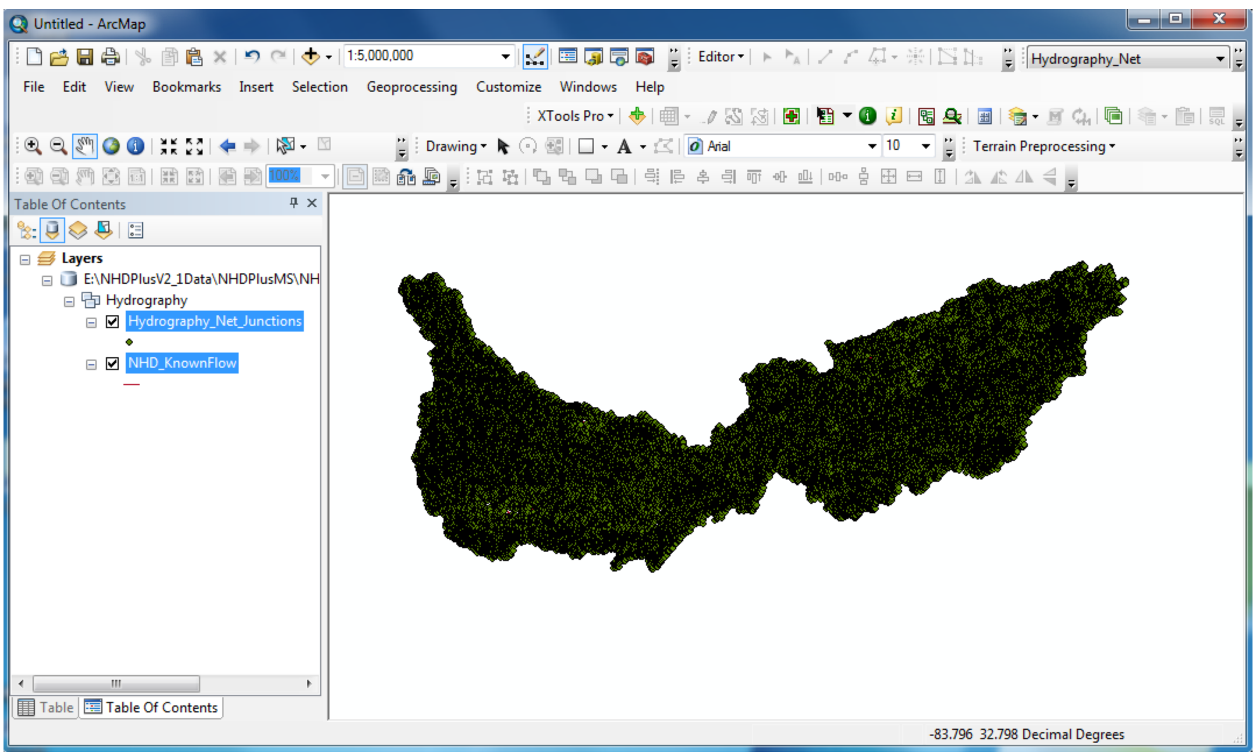
23. Close ArcCatalog.

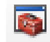
24. Start ArcMap.

25. Use the File, Add Data menu. In the Add Data dialog, navigate to the \NHDPlus06 folder, under the NHDPlusFGDB, select Hydrography and then Hydrography_Net. Click Add.

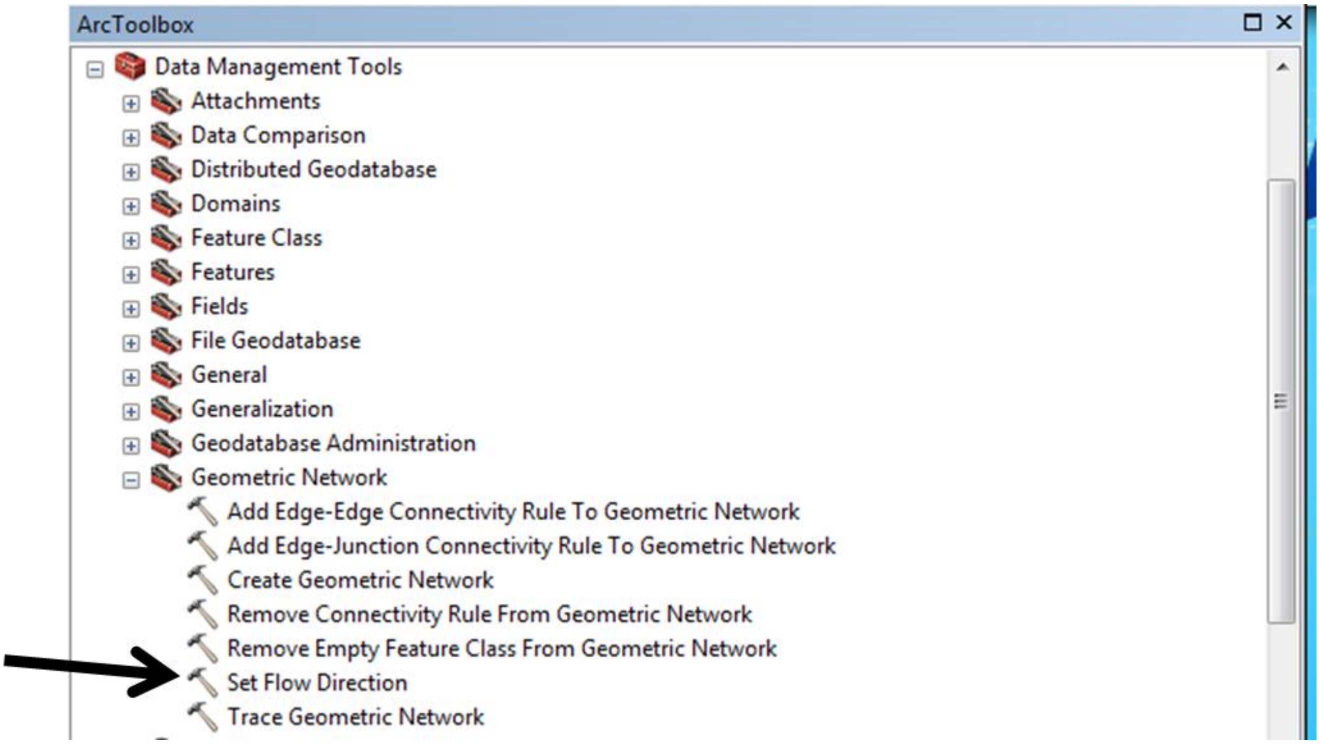


26. At this point, the content of your map should contain the NHD_KnownFlow and the Hydrography_Net_Junctions layers.

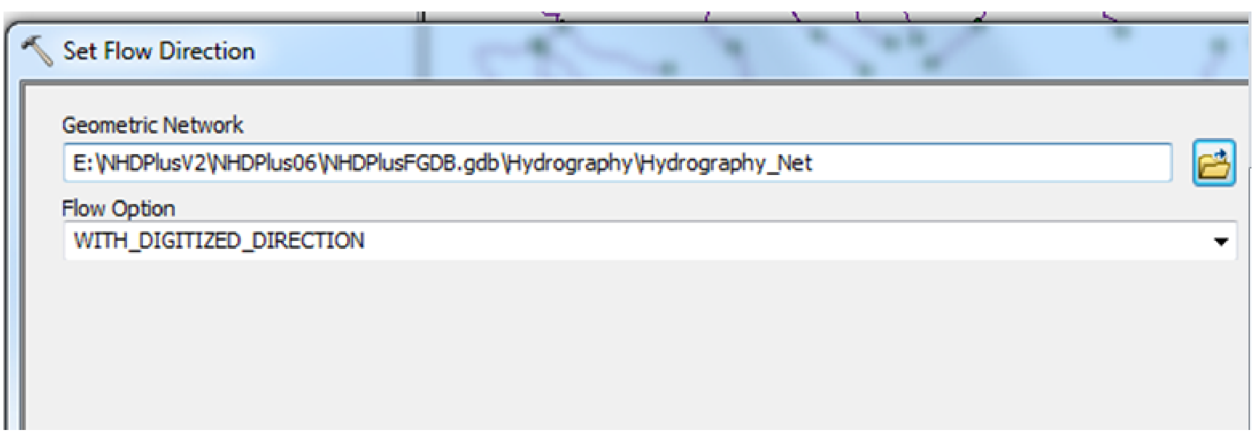


27. Before navigation can be accomplished, one last operation is needed. The flow direction on the network must be established. An easy way to establish flow direction is to use the ArcToolbox  .

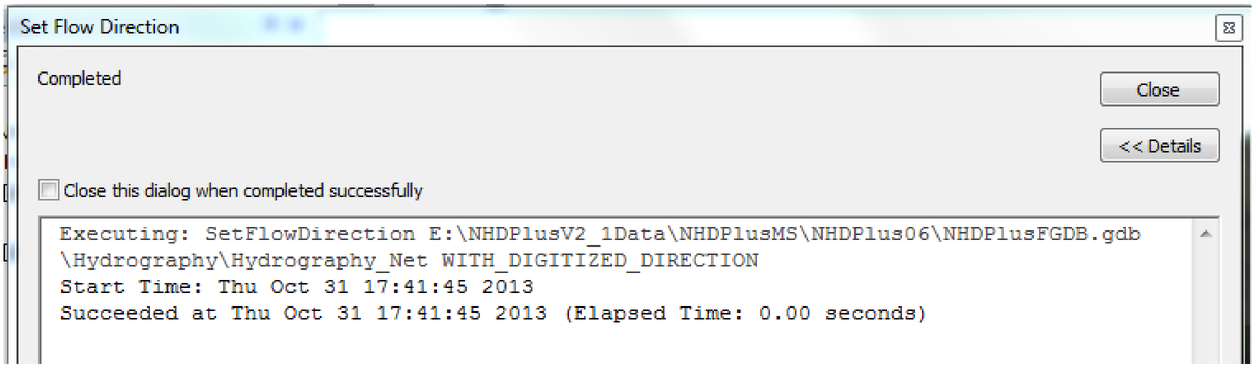
28. Under Data Management Tools select “Geometric Network”, then click on “Set flow Direction”.



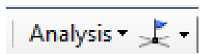
29. In the dialog box that appears set the Geometric Network as “Hydrography.net”, and the flow option to “WITH_DIGITIZED_DIRECTION”. Then click OK.

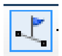


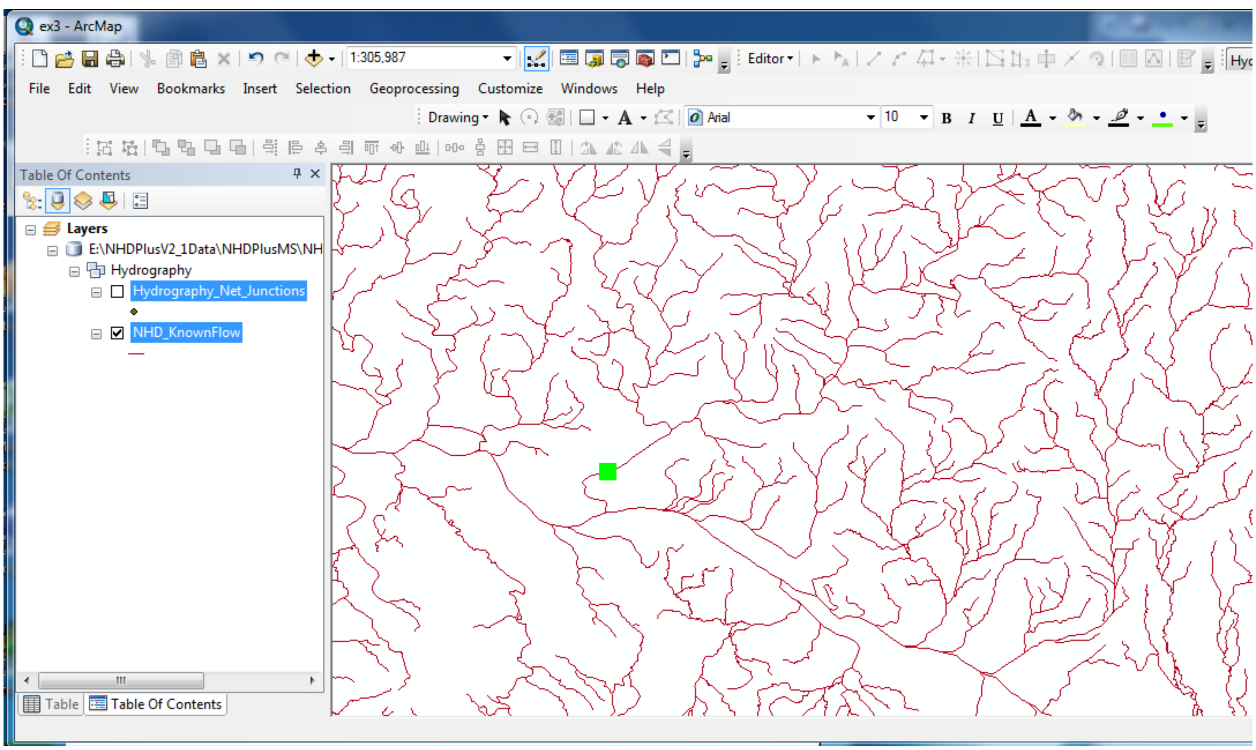
30. The Following box should appear.

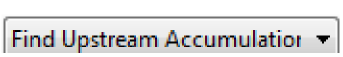


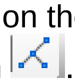
31. Use the zoom in tool, , to zoom into an area in the NHD_KnownFlow layer.

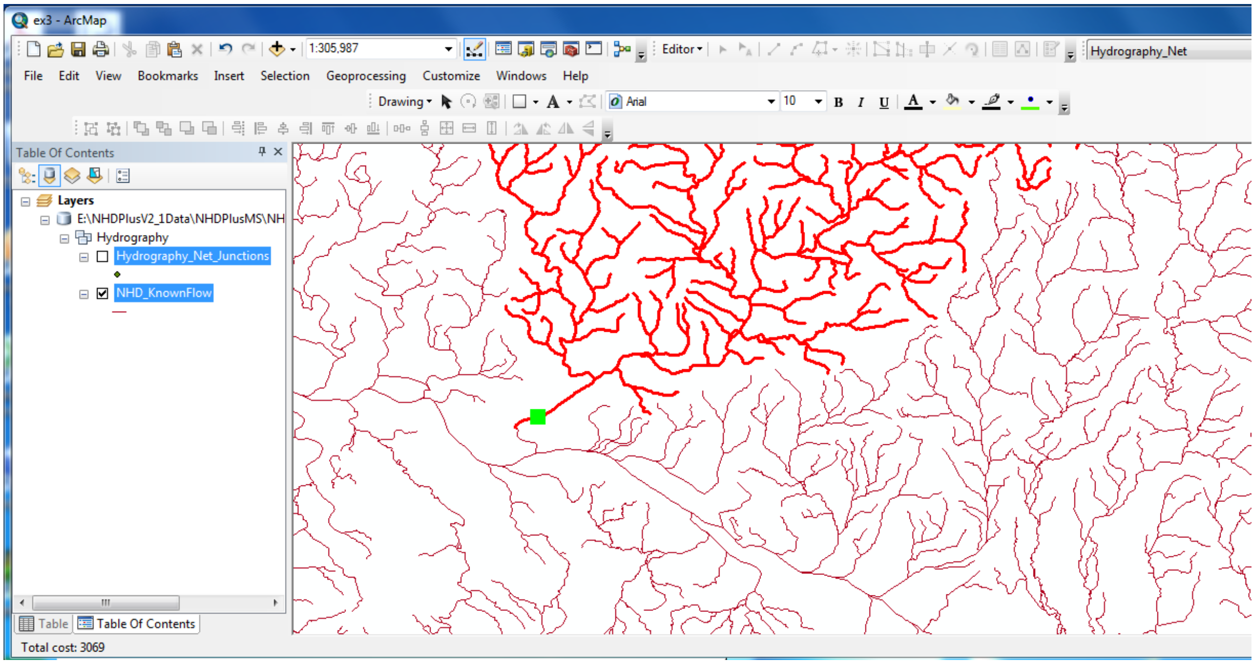
32. From the ArcMap Customize/Toolbars menu, check on the Utility Network Analyst toolbar. Use the 

Flag tool, to place a flag on a junction or place a  Flag tool on a network line.



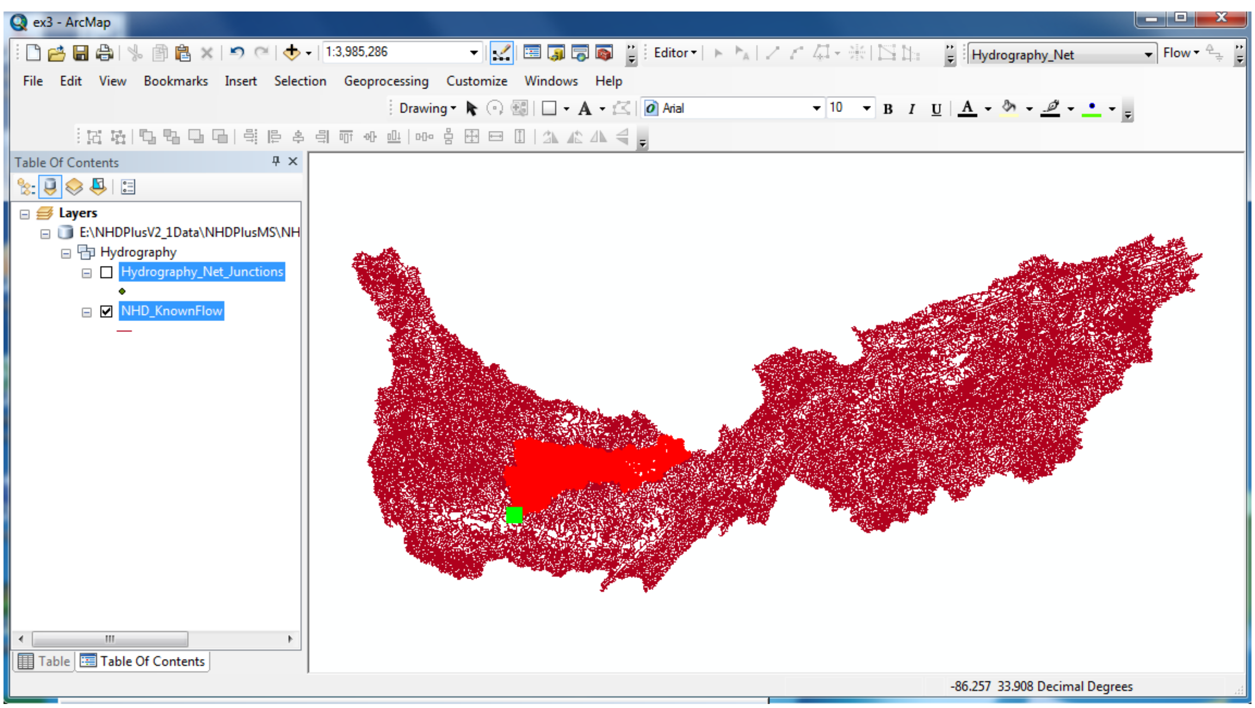
33. Use the 

on the right side of the Utility Network Analyst toolbar and click the solve button .

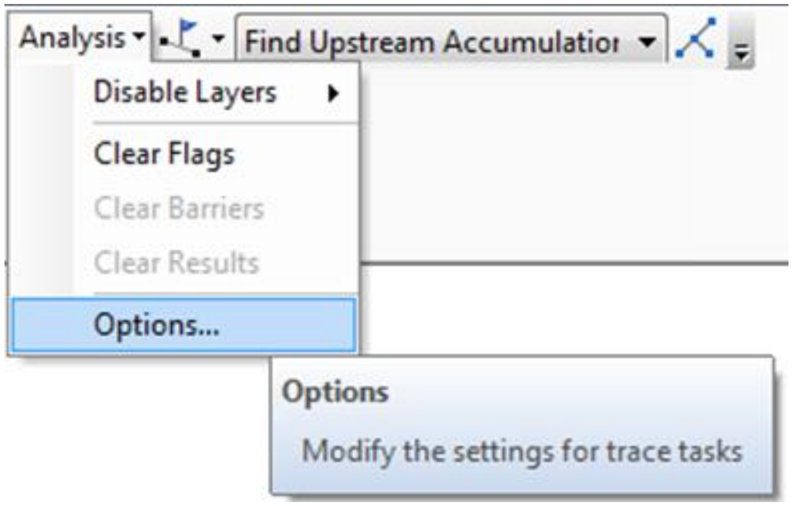


34. The trace results will be displayed in red. The navigation goes to the headwaters of the network.

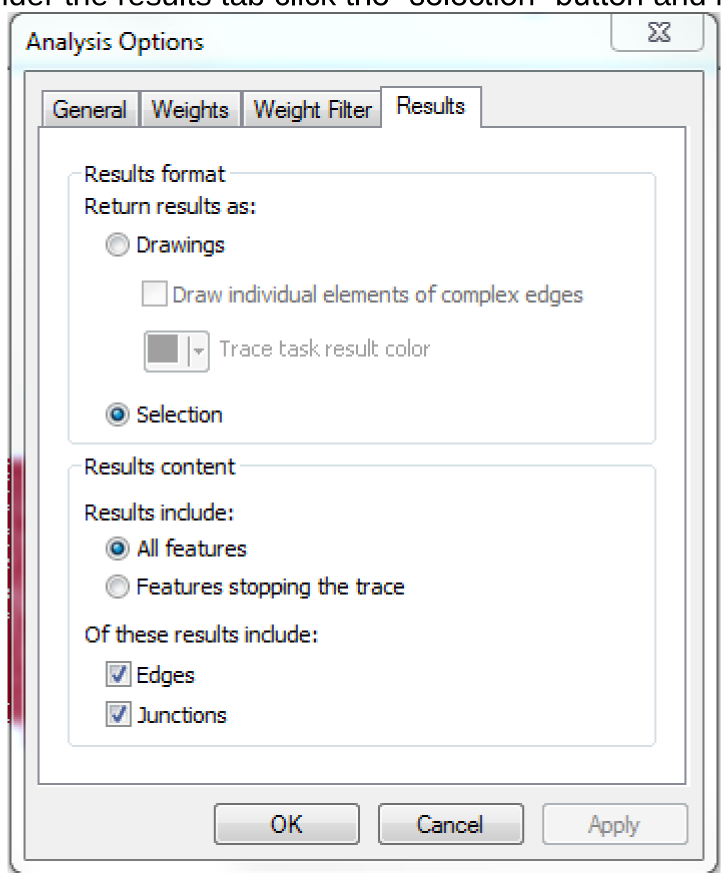
35. Right click on the NHD_KnownFlow layer and select Zoom to Layer to see the results of the trace.

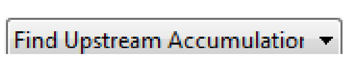


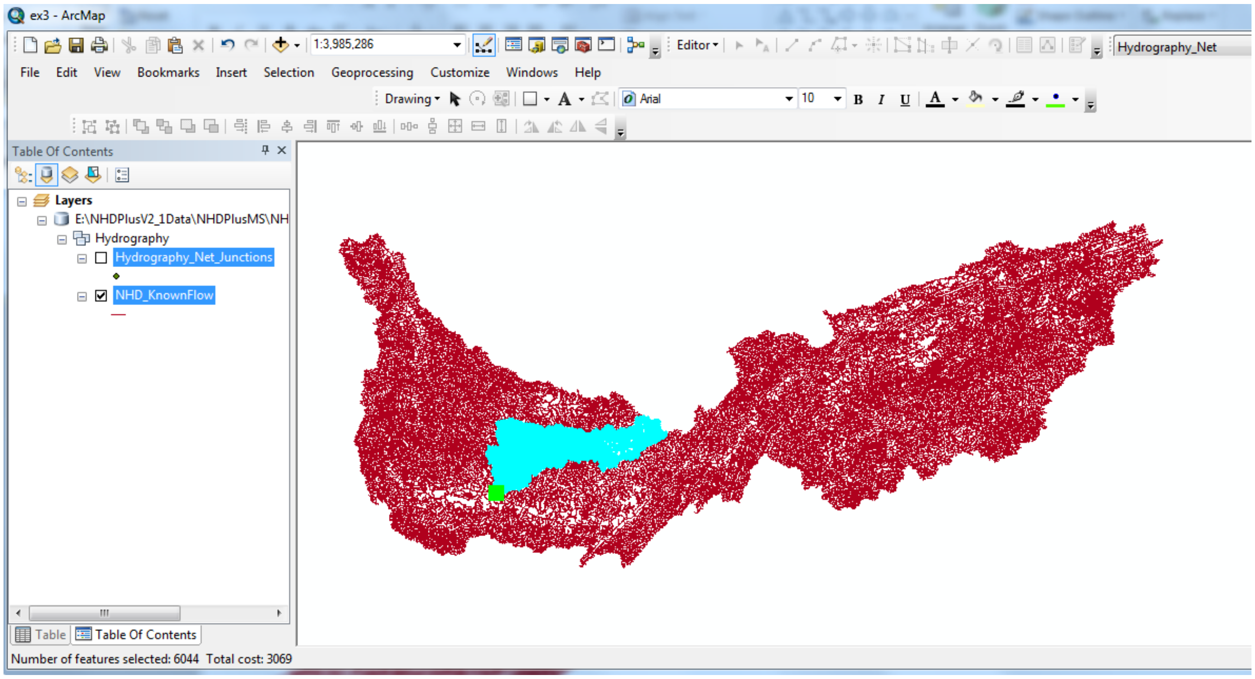
36. You may also have the results return a selected set of flowlines. To do this using the “Utility network Analysis toolbar” you then click on “analysis” and then “options”



37. And then under the results tab click the “selection” button and hit OK.



38. Now when you use the  and click the solve button  you get a selected set of flowlines.



39. The selected flowlines may then be used to create a new layer by right clicking on NHD_KnownFlow in the table of contents and then clicking “selection” and then “Create Layer From Selected Features”..

40. A cautionary note about geometric navigations: NHDPlus contains logical connections between streams that flow out of the U.S. into Canada or Mexico and the streams where those waters flow back into the U.S. Since these are logical connections and there is no geometry connection, the use of geometric navigations in these areas will not work correctly.