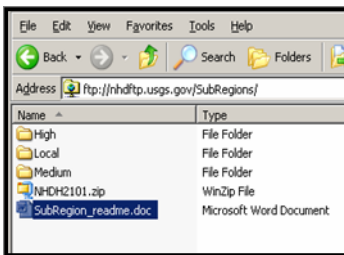
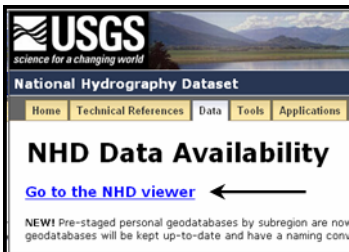


The National Hydrography Dataset
NHD QuickStart

The National Hydrography Dataset (NHD) is a vector geospatial theme for surface water hydrography obtained from topographic maps and additional sources. It is available Nationwide as medium resolution at 1:100,000-scale, and as high resolution at 1:24,000-scale or better. In Alaska, the NHD is available at 1:63,360-scale. A few “local resolution” areas also are available at varying scales. The hydrography of the United States is organized by drainage areas. The **subbasin** [(8-digit Hydrologic Unit Code (HUC)) drainage area is the most practical area for high resolution NHD. **Subregions** (4-digit HUCs) are composed of varying numbers of subbasins.

The NHD is available in Environmental Systems Research Institute (ESRI) personal geodatabase format known as NHDinGEO, a file-based geodatabase format, and in ESRI shapefile format known as NHDGEOinShape. The NHD is organized by hydrologic units, but can be downloaded in various extents.

Accessing NHD Data



There are two ways to access the NHD:

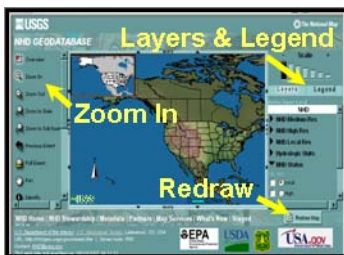
Go to <http://nhd.usgs.gov/data.html> then click on the **Go to the NHD viewer** link. The viewer provides the ability to check on the status of the data, view the data directly, and obtain the data. Using this option allows for selecting subbasins from a map display.

Note: this Web application uses popup windows - you will need to disable popup block software to fully use this site.

Another option is to download pre-staged personal geodatabases by subregion from the NHD ftp site, <ftp://nhdftp.usgs.gov/SubRegions>. Select the High, Local (limited availability), or Medium resolution folder. The pre-staged subregion geodatabases will be kept up-to-date as revised data become available. You also can go to this site by clicking the link on the NHD Data Availability page.

Note: if you have trouble accessing the ftp site you may need disable your passive FTP setting in Internet Explorer. To change this setting click Tools -> Options -> Advanced and scroll down about half way until you find a checkbox for "Use Passive FTP...". If you uncheck this box, you should be able to get to the site.

Viewing NHD Data in NHD Viewer



to your region of interest. The tool is located in the upper left hand column of the viewer.

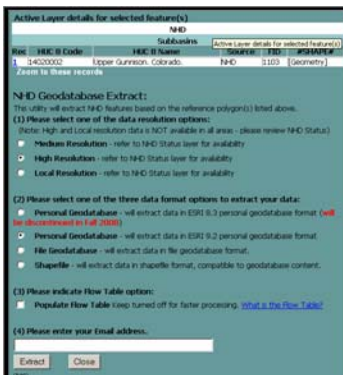
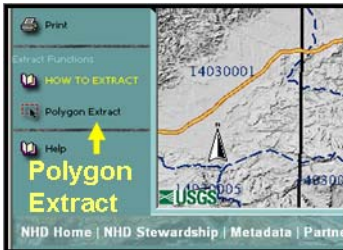
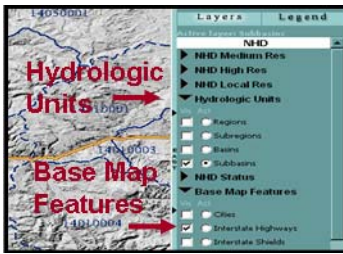
Under the **Layers** tab in the upper right part of the viewer, check the box (under “Vis”) to make visible the layers you want to view. Visible layers include those listed under the headings: **Hydrologic Units**, **Base Map Features**, and **Shaded Relief**. (Layers are scale dependent; you may need to zoom in to see all options.)

Click **Redraw Map** at the bottom of the right column in the viewer to refresh the map.

Click on **Legend** tab adjacent to the **Layers** tab to view the legend.

Obtaining NHD Data

Selecting Data

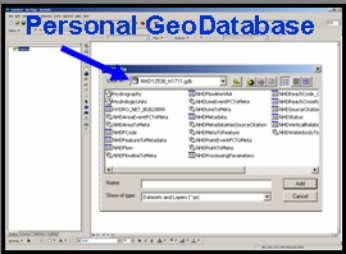



To extract NHD data:

1. Zoom in to your region of interest.
2. Make visible subbasins under the **Hydrologic Units** tab.
3. Activate the layer that you want to extract data from by clicking the radio button (Act) next to the appropriate layer.

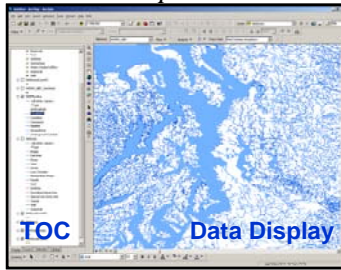
Note: the chosen data format results in a dataset limited to the boundary of the given format. For example, if you choose to download “24K Quad Index” data, then you will receive a dataset that contains only those streams that lie within the chosen quad boundary. With the exception of subbasins, you can only select one reference polygon per extract request.

4. Click **Polygon Extract**.
5. Click and drag mouse within the reference polygon(s) for the NHD data you want to extract. For subbasin data you may select up to 10 reference polygons at once for high and medium resolution data downloads.
6. A detailed list of your selected data and download options are provided in the proceeding pop-up window.
7. Select one data resolution option:
 - Medium Resolution (1:100,000-scale)
 - High Resolution (1:24,000-scale)
 - Local Resolution (scale varies, limited availability)
8. Select one data format option:
 - Personal Geodatabase: recommended format
 - File Geodatabase: smaller file size, (works the same as Personal Geodatabase in ArcMap)
 - Shapefile: loses ‘network flow’ capabilities
9. Select “Populate Flow Table” if you are working with applications outside of ESRI geodatabase solutions and want to maintain the network flow navigation capabilities. Click on **What is the Flow Table?** to learn more.

<p>Obtaining NHD Data, <i>Continued</i></p>	<p>10. Enter your email address and click Extract.</p> <p>11. A .zip file containing a personal geodatabase, file geodatabase, or shapefile will be created and stored on an FTP site. An email will be sent to you with instructions on where to download the file. Please be patient, this may take up to a few hours.</p> <p>For more information on how to download data, click on the How to Extract link in the lower left-hand side of the NHD viewer.</p>
<p>Accessing NHD Data</p>	<p>To access your NHD data:</p> <ol style="list-style-type: none"> 1. Navigate to your data by clicking on the FTP site link provided in the email you receive from the NHDAutoEmailer. 2. Download the data to your desktop and/or network drive by saving the zip file when prompted. 3. Unzip the file. The personal geodatabase will produce one Microsoft Access file, which is the database used for the NHD. It is useful to rename the file based on personal preference such as the subbasin or county name you receive. 4. This is the NHDinGEO format for use in ESRI's ArcGIS. The following QuickStart exercise is for NHDinGEO.
<p>Viewing NHD Data in ArcMap</p> <p><i>Add Data</i></p> 	<p>To view NHD Data in ArcMap:</p> <ol style="list-style-type: none"> 1. Open ArcMap and select the “Empty map” option. 2. Click on Add Data  in the ArcMap toolbar. 3. Browse to the data and double-click on the .mdb file. This is the Access file you downloaded. Two Feature Datasets are listed in addition to a number of object classes. 4. Click on the Hydrography feature data set and then click Add. This is the spatial component of the NHD. 5. The NHD data will display along with a Table of Contents (TOC) to the left in the ArcMap window.

Viewing NHD Data in ArcMap, Continued

ArcMap Window



Change Symbology



6. The TOC for the Hydrography Feature Dataset will list **nine** feature classes. The first three feature classes will be of primary interest. (NHDAreaEventFC)

- a. NHDFlowline – The core linear network of the surface-water drainage system primarily consisting of streams, and artificial paths through polygons.
- b. NHDWaterbody – Polygons representing areal hydrographic waterbody features such as lakes.
- c. NHDArea – Polygons representing areal hydrographic landmark features.
- d. HYDRO_NET_Junctions – Nodes between NHDFlowlines used by the geometric network for flow navigation.
- e. NHDPoint – Points representing hydrographic landmark features.
- f. NHDLine – Line features representing linear hydrographic landmark features.
- g. NHDPointEventFC – Point Features addressed to the network. Includes stream gages and dams.
- h. NHDLineEventFC – Line Features addressed to the network. Normally empty.

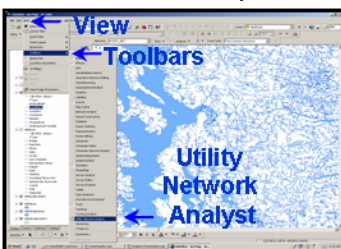
7. To change the symbology:

- a. Double-click on the symbol in the TOC.
- b. Choose the appropriate graphic, color, and size.

8. The Hydrologic Units feature data set contains the watershed boundary data, and can be added to ArcMap in the same way the Hydrography feature dataset was added. It is used as a reference theme only, and although related to the NHD, it is not a part of the NHD.

Navigating NHD Flow Path

Trace Utility



It is possible to navigate the path upstream or downstream from any point on the NHDFlowline network using the Utility Network Analyst that comes standard in ArcMap. You can view navigation results as a drawing in your ArcMap display window or as a selection.

To begin, activate the Utility Network Analyst toolbar:

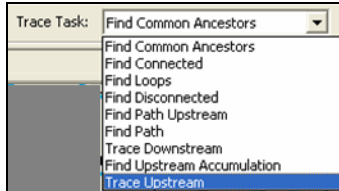
- a. Click on **View, Toolbars**, and then check the “Utility Network Analyst” box.
- b. HYDRO_NET will appear automatically in the Network box within the Utility Network Analyst toolbar. HYDRO_NET references the HYDRO_NET_Junctions dataset that also is displayed in the TOC.

Navigating, Continued

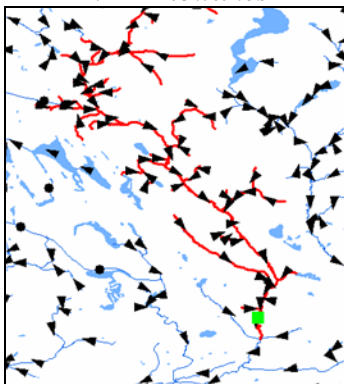
Add Edge Flag Tool



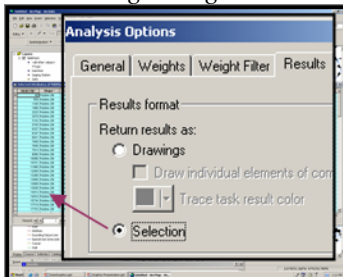
Trace Task



NHD Flowlines




Select Features Using Navigation



To “Draw” your navigation results:

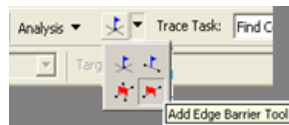
1. Start by clicking on the **Add Edge Flag** tool. The flag marks the start of the navigation path.
2. Click cursor at appropriate point on any NHDFlowline to set your starting navigation location. The entire NHDFlowline feature will be included in the navigation result.
3. Select “Trace Task”:

- a. Trace Downstream – finds all paths downstream including divergences.
- b. Trace Upstream – finds all paths upstream including tributaries and branches.

4. Click on the **Solve** icon  located at the right end of the Utility Network Toolbar. The navigation will highlight the appropriate NHDFlowlines.

5. NHDFlowline Options:

- a. It is possible to stop the navigation path using a barrier. Click on the **Add Edge Barrier** icon, and then click on a point on the NHDFlowline where the flow path is to stop.



- b. To clear result and navigate another path, click on **Analysis**, then **Clear Flags**, **Clear Barriers** or **Clear Results**. Define a new starting navigation location.



- c. To do a point-to-point navigation, start upstream, use a downstream barrier, and trace downstream.

Navigating, Continued

To select features using navigation:

6. Select “Features” using the Navigation Path. The method above provides the navigation path using a graphic. It may be desirable to select NHDFlowlines on the navigation path for network analysis.
 - a. Click on **Analysis** in the Utility Network Analyst toolbar, click **Options**, and then **Results**.
 - b. Click on the **Selection** radio button, **Apply**, then **OK**.
 - c. Perform navigation. The navigation path will select and display NHDFlowlines.
 - d. To see the attribute table of the selected NHDFlowlines, right click on **NHDFlowline** in the TOC on the left side of the screen. The attribute table will appear with the appropriate NHDFlowlines selected.
 - e. To save the selected NHDFlowlines as a Shapefile, right click on **NHDFlowline** in the TOC, scroll to **Data**, then click on **Export Data**. A pop-up window will appear to name the new Shapefile.