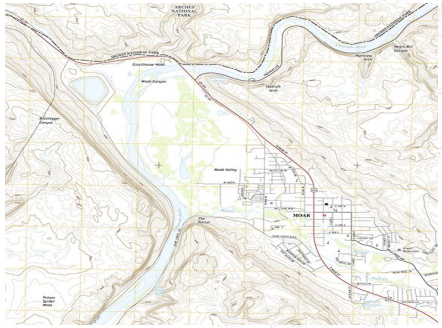
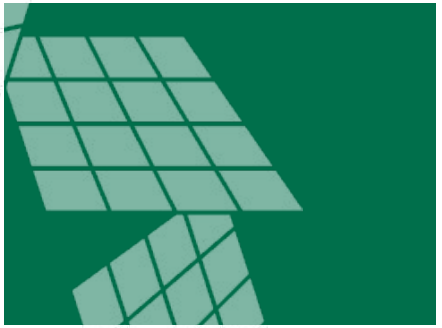
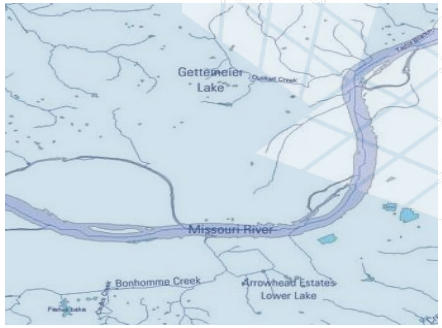
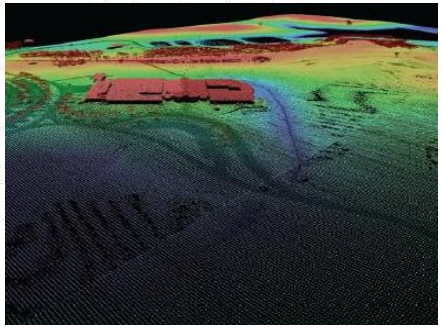
NHDPlus High Resolution VAA Navigator









Karen Adkins, NGTOC Senior Hydrography Lead

Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI) Hydroinformatics 2019 Conference

Agenda

- Overview of the NHDPlus HR VAA Navigator
- System Requirements
- NHDPlus HR VAA Navigator Toolbar
- Navigation Options
- Using the NHDPlus HR VAA Navigator from a User-written Program
- Demonstration

NHDPlus HR VAA Navigator

- Uses the NHDPlus HR Network Value-Added Attributes to perform network navigation
- Navigation of any NHDPlus HR .gdb
  - Single hydrologic unit (HU)
  - Appended HUs
- ArcMap toolbar
- Call from code
  - Navigate multi-HU drainage areas without appending

System Requirements

- Windows 7 Service Pack 1 64-bit
- ArcGIS 10.5.1
- Microsoft .NET Framework 4.0.3 or higher
- Microsoft SQL Server 2012 Express LocalDB 64-bit
- Microsoft SQL Server 2012 Management Studio

NHDPlus HR VAA Navigator Toolbar

Up Mainstem
Navigate upstream following the main path

Up with Tribs
Navigate upstream following all tributaries

Down Mainstem
Navigate downstream following the main path

Down with Tribs
Navigate downstream following all tributaries

Delete Working Database
Deletes the SQL Server working database

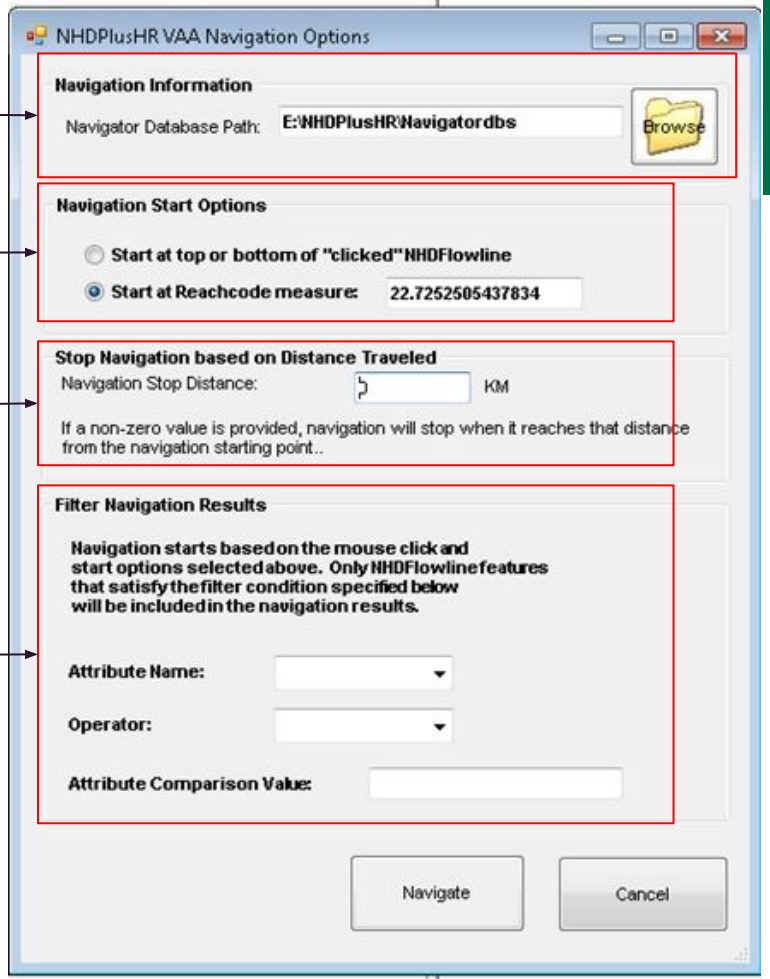
Navigation Options

Location where the navigator will place the MS SQL database

Select where to start the navigation

Stop navigation based on stop distance (option)

Filter navigation results based on a specified value of a selected NHDPlus attribute (option)



Filter Navigation Results

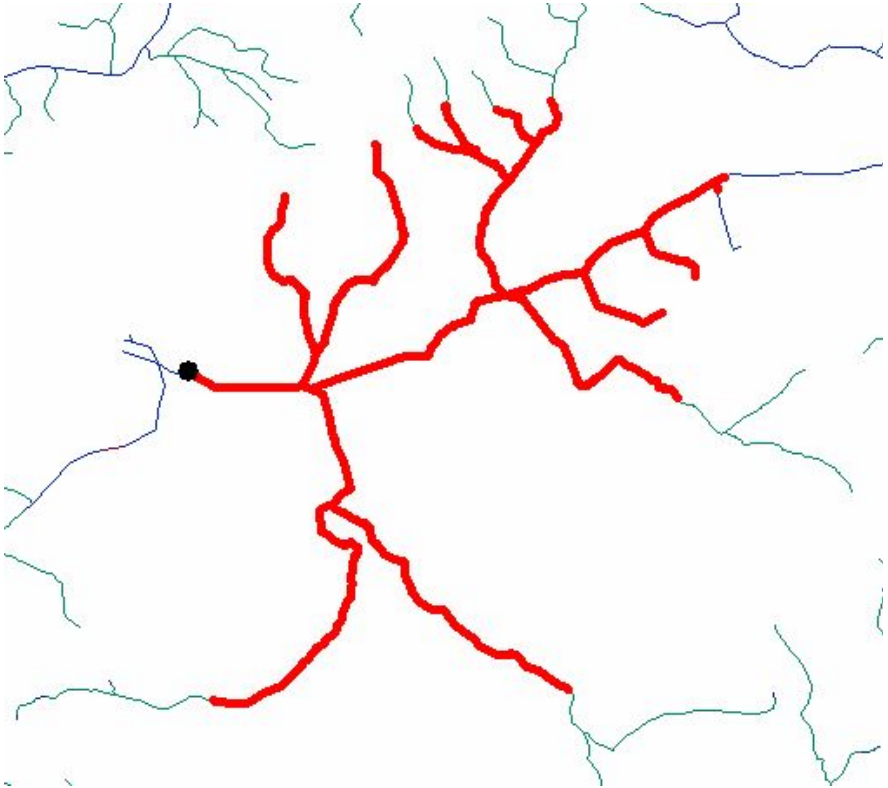
Select an Attribute

PathLength	Distance to the terminal NHDFlowline feature downstream along the mainpath	Continuous Numeric(13,4)
ArbolateSum	Kilometers of stream upstream of the bottom of the NHDFlowline feature	Continuous Numeric(13,4)
TotDASqKm	Total Upstream Cumulative Drainage Area at the downstream end of the NHDFlowline feature	Continuous Numeric(14,6)
DivDASqKm	Divergence-routed Cumulative Drainage Area at the downstream end of the NHDFlowline feature	Continuous Numeric(14,6)

Select an Operator

<	Less than
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to

Demonstration



Using from User-Written Programs

Tool consists of three parts (classes or modules):

- **LoadSqlServerDB**
  - Loads NHDPlusFlowlineVAA, NHDPlusFlow, and NHDPlusMegaDiv data for a single NHDPlus HR gdb into the working SQL Server database.
- **MakeWorkingTable**
  - Creates a working table to be used for a single navigation from the data previously loaded into the database via LoadSqlServerDB.
- **V03Navigator**
  - Performs a navigation and places the results in a SQL Server table named t<sessionid>_navresults.

Using from User-Written Programs

InputNHDPlusLocation – input property
Type: String
Applies to calls to: LoadSqlServerDB
Value: Folder location where the NHDPlusHR data is stored. Example:
InputNHDPlusLocation = "D:\NHDPlusHRData "

SessionID – input property
Type: StringApplies to calls to: MakeWorkingTable, V03Navigator
Value: SessionID for the navigation, unique value based on the computer system date and time allowing multiple concurrent calls to the Navigator

WorkingTableName – input/output property
Type: String
Applies to calls to: MakeWorkingTable (output), V03Navigator (input)
Value: Table name (of the form t<sessionid>_VAA) for the working table that holds the VPU data. This table is overwritten each time MakeWorkingTable is called with the same <sessionid>.

```
# Initialize the NHDPlusHRVAANavigator objects
o1 = win32com.client.Dispatch("NHDPlusHRVAANavigator.clsLoadSQLServerDB")
o2 = win32com.client.Dispatch("NHDPlusHRVAANavigator.clsMakeWorkingTable")
o3 = win32com.client.Dispatch("NHDPlusHRVAANavigator.clsV2Navigator")

# Create a session_id for this run which is added to the working folder.  Each execution
of the script has a unique session id.
now = datetime.datetime.now()
session_id = datetime.datetime.strftime(now, "%Y%m%d%H%M%S%f")[:16]

# Create the temporary working folder
TmpWorkAreaPath = WorkingFolder + "\\" + session_id
if not os.path.exists(TmpWorkAreaPath):
        os.makedirs(TmpWorkAreaPath)

# Load the SQL Server database (DBname) with the NHDPlusHR gdb needed for the
navigations in this run.
        # Set the variable for the return value from LoadSQLServerDB
        intReturn = 0
        # Set common properties for LoadSQLServerDB
        o1.DatabaseLocation = DBlocation
        o1.DatabaseName = DBname
        o1.TempWorkAreaPath = TmpWorkAreaPath
        o1.SQLConnectionTimeout = 120
        o1.SQLCommandTimeout = 120
          o1.AddToExisting = False
```

See the NHDPlus HR VAA Navigator User Guide at
https://github.com/ACWI-SSWD/nhdplushr_tools
for complete properties list and Python example

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Questions?

Thank you!

Karen Adkins

kadkins@usgs.gov

Phone: 719-202-4394

Cell: 573-465-5159