

Hydro networks (information summarised or modified from the book Arc Hydro GIS for water resources edited by D.R. Maidment)

Hydro networks

- simplified representation of the blue lines on maps defining streams, rivers, and water bodies

Flow line

- Flow lines trace the path of water movement in one-dimensional flow

Water flow: through a hydro network along HydroEdges

HydroJunction: points on the hydro network

Flow direction: uncertainty in downstream direction:
(e.g.) loop at irrigation canal system → manual assign required

Flow direction (represented by arrows):

Transition from map hydrography to network hydrography

Connecting features to HydroJunctions

- Topology of the hydro network connects only points and lines.
- BUT areas such as water bodies and drainage areas are also important and should be connected to the network.
- Solution: (i) assign a point for representing the waterbody
(ii) connect the point to the network

Connecting features to HydroJunctions

Hydro navigation: a process of tracing water movement from feature to feature through the landscape.

- Three types within Arc Hydro
- Network navigation: carried out using the ArcGIS network tracing tools applied to the hydro network.
- Next downstream navigation: carried out on HydroJunctions or other classes that have a NextDownID attribute assigned to them.
- Schematic navigation: carried out on a pair of separate feature classes, called SchematicLink and SchematicNode, that serve to link strategic locations with straight lines in a schematic diagram.

Hydro navigation: Schematic network

SchematicLinks(black lines) + SchematicNodes(white dots)

River addressing

- River addressing is used to locate objects on a river or stream system (cf) Dynamic segmentation, Street addressing
- These addresses are constructed using the linear referencing tools in ArcGIS.
- Traditionally in hydrology, river addressing has been done using river miles or kilometers measured upstream from the river mouth (e.g.) A is located on B River mile 531.
- e.g. location of dam using (i) absolute coordinates (ii) river addressing (easily reveals relationship with river system)

Hydro events

- Objects located by linear referencing on a hydro network are called hydro events
- Hydro events carry a ReachCode attribute to identify which HydroEdge or set of HydroEdges they are referenced to.
- HydroPointEvents: point location on a HydroEdge
- -have a Measure attribute to specify where within that reach the point is located
- HydroLineEvents: a line between two identified points on a HydroEdge
- -have FMeasure and TMeasure attributes, to locate the end-points of the linear event on the reach
- -have attribute Offset, which allows the line events to be displaced to the left or right of the reference line