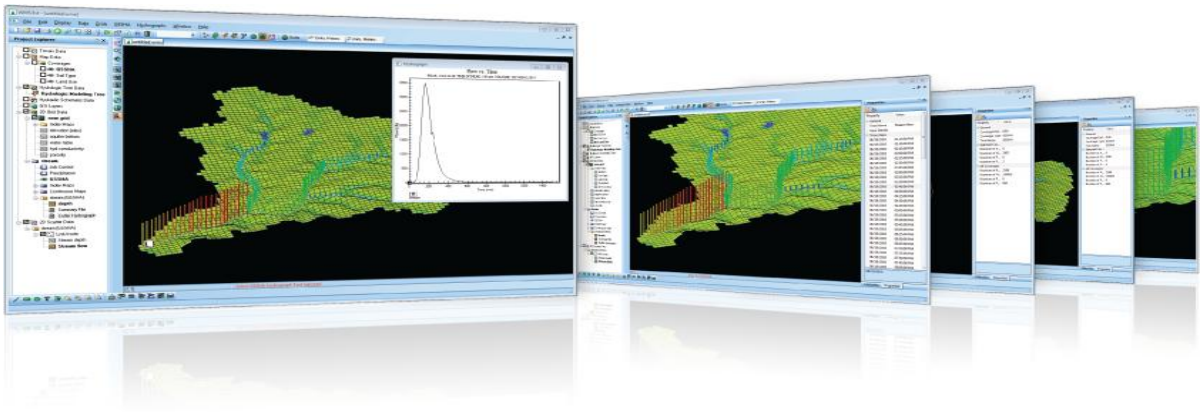
WMS 10.0

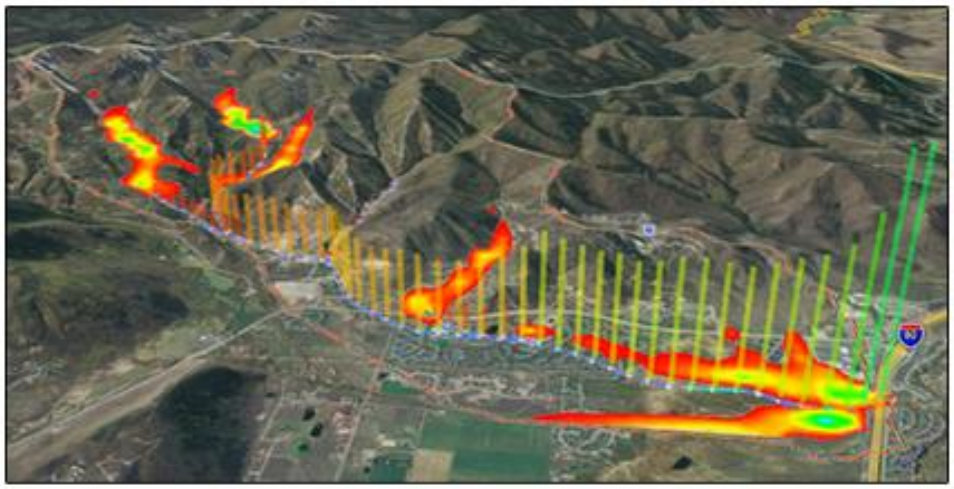
Watershed Modeling System

Harness the entire spectrum of watershed analysis tools with WMS - the all-in-one hydrologic and hydraulic solution

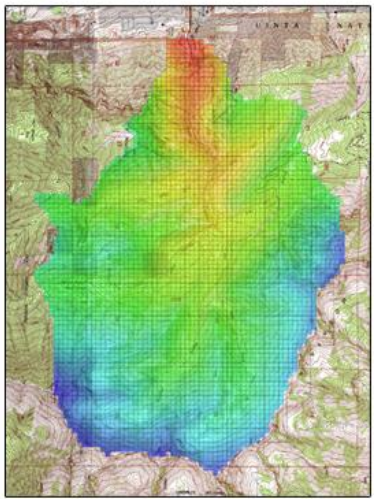


The complete all-in-one watershed solution

- GIS Tools
- Web-based data acquisition tools
- Terrain data import and editing tools
- Automated watershed delineation & hydrologic modeling
- Support for the most industry standard hydrologic models
- Step-by-step hydrologic modeling wizard
- Hydraulic modeling & floodplain mapping
- Storm drain modeling
- 2D (Distributed) Hydrology
- Integration with FHWA hydraulic calculation software
- Export WMS animations to Google™ Earth



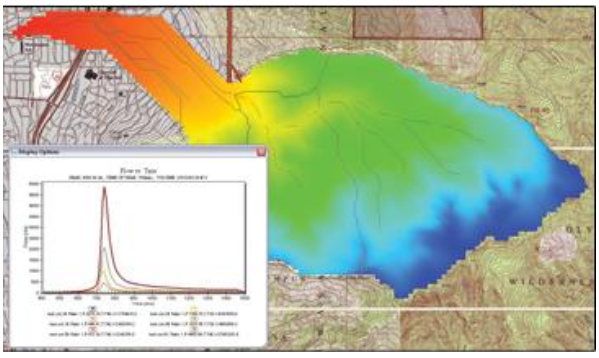
Automated watershed delineation & hydrologic modeling



- Automatically delineate a watershed and sub-basins using digital terrain data
- Automatically compute geometric basin data such as area, slope, mean elevation, maximum flow distance and more
- With a small amount of input, compute hydrologic basin data such as time of concentration, curve number, and infiltration parameters
- Industry standard equations for computing sub-basin lag times and times of concentration are included with WMS
- Add any number of interior outlet points and let WMS subdivide the watershed automatically
- Manipulate stream networks to represent man-made features or proposed changes to the watershed
- Override derived basin boundaries to match your knowledge of the watershed

Support for most industry standard hydrologic models

A license of WMS Hydrology or greater includes an interface for the following industry standard hydrologic models:



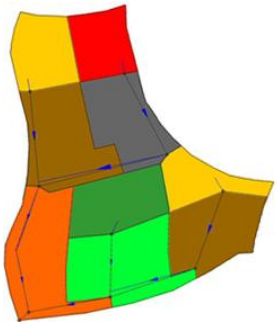
- HEC-1
- HEC-HMS
- TR-20
- TR-55
- Rational Method
- MODRAT
- OC (Orange County, California) Rational
- OC Hydrographic
- HSPF
- National Streamflow Statistics
- Convert and compare the results of a watershed developed for one model with any of the other models supported in WMS
- Read and compare observed hydrographs with computed hydrographs

Hydraulic modeling & floodplain mapping

- Define a stream centerline and bank stations
- Define cross section locations
- Automatically cut cross sections and derive Manning's roughness values from elevation and ground material data
- Export cross sections to the HEC-RAS or Simplified Dam Break hydraulic models
- Run the hydraulic model and read the water elevations back into WMS
- Read water surface elevation data from a hydraulic model or manually input known water surface elevations

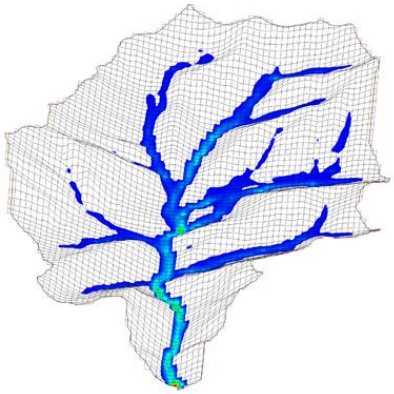
- Create flood extents and flood depth maps using digital terrain data and water surface elevation data points
- Link the peak flow or complete hydrograph from any of the WMS-supported hydrologic models to an HEC-RAS hydraulic model

Storm drain modeling



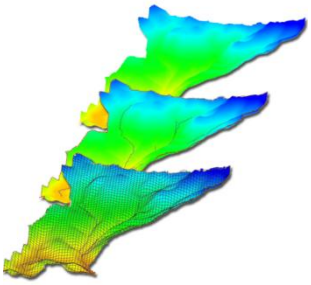
- Draw a storm drain network or import a network from GIS
- Compute elevations, lengths, and slopes of pipes from underlying elevation data
- Link the storm drain network to your hydrologic model data
- Export the hydrologic model data and the storm drain network to EPA-SWMM or XP-SWMM
- Import existing EPA-SWMM or XP-SWMM files into WMS

2D (Distributed) hydrology



- WMS supports 2D models:
- The US Army Corps of Engineers (USACE) GSSHA model
- The HMS version of the quasi-distributed MODClark method
- Flood forecasting (depth and velocity over entire 2D domain)
- Thunderstorm (localized rainfall) flood analysis
- Surface ponding and infiltration analysis
- Wetland modeling
- Land use change impact modeling
- Groundwater/surface-water interaction modeling
- Sediment and contaminant modeling

Import what you need



- USGS DEMs - download and use any format of DEM from the USGS
- USGS NED data - seamless elevation data can be downloaded and read into WMS
- ArcGIS Raster (ASCII format) - read elevation or attribute data in gridded format from ArcGIS
- ESRI Shape files - read all shapes and attributes into WMS
- DXF and DWG CAD files - WMS now supports the latest versions of DXF and DWG
- TIFF, JPEG image files - images along with geo-referencing information can be read by WMS
- Any data supported by ArcGIS can be read into WMS (ArcGIS license required, compatible with ArcGIS 10.0)

Software from an Industry Leader

WMS is developed by Aquaveo, an engineering services company with many years of experience developing watershed modeling solutions.

- Step-by-step tutorials and how-to videos
- Online community forum and product documentation
- Phone and email technical support
- Regularly scheduled training courses taught by expert modelers
- On-site training available
- Professional consulting services

Customized Watershed Modeling Tools

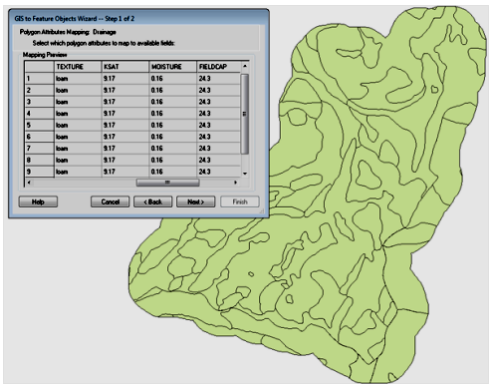
WMS 9.0 includes a host of customized tools that help complete your projects quickly

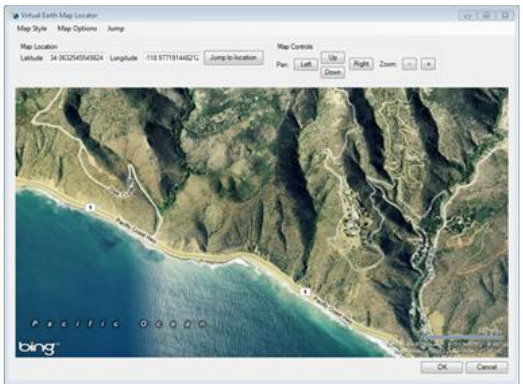
GIS Tools

- Without ArcGIS: import shapefile data and use the imported data for building hydrologic and hydraulic models
- With ArcGIS: import and use any file format supported by ArcGIS for hydrologic/hydraulic models (ArcGIS 10.0 supported)
- Export hydrologic and hydraulic model data to a variety of raster and vector GIS formats

❖ WMS Models

- **HEC-1**
- **HEC-HMS**
- **NSS**
- **TR-20**
- **TR-55**
- **MODRAT**
- **Rational Method**
- **HSPF**
- **EPA-SWMM Intg.**
- **XP-SWMM Intg.**
- **HEC-RAS**
- **SMPDBK**
- **GSSHA**
- **CE-QUAL-W2**



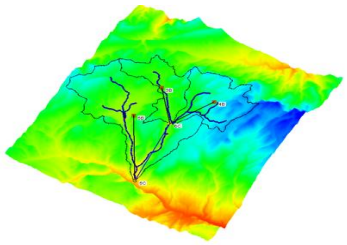


Web-based data acquisition tools

- Download USGS elevation, topographic map, and aerial photography data directly from WMS
- Seamlessly import downloaded data and use it for building hydrologic and hydraulic models

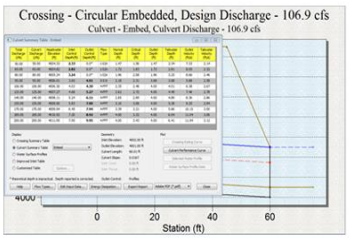
Terrain data import and editing tools

- Import a variety of elevation data formats:
  - USGS DEMs - download and use any format of DEM from the USGS
  - USGS NED data
  - ArcGIS Raster (ASCII format)
  - Contour data (as ArcGIS shapefiles or CAD files)
  - XYZ survey points
- Read, view, edit, and build models with elevation data inside of WMS
- Combine and modify elevation data from multiple sources into a single dataset that can be used for modeling
- Modify individual elevation values or stamp linear features (such as levees or stream elevations) into elevation data



Integration with FHWA hydraulic calculation software

- A license to WMS includes the HY-8 modeling wizard, which guides you through the process of:
  - Delineating a watershed upstream from a culvert and computing a hydrograph
  - Sizing the culvert
  - Routing the hydrograph downstream from a culvert
  - Determining the inundated area behind a culvert
  - Analyzing an existing culvert
- Draw culvert and roadway layouts, compute lengths, and transfer computed and entered data between WMS and HY-8
- Create hydraulic structures (stream channels, gutters and inlets, riprap structures, weirs, detention basins, and rational method basins) and run hydraulic computations using FHWA-approved methods in the Hydraulic Toolbox
- WMS provides interfaces to the latest versions of HY-8 and the Hydraulic Toolbox distributed by FHWA



WMS 10.0 System Requirements

- **Operating System**: Windows XP*, Vista®, Windows 7 or Windows 8
  *Limited support for Windows XP with some limitations using certain fonts and display options.
- **RAM**: 1 GB (8GB or more recommended)
- **CPU**: WMS software is CPU intensive. Some models and utilities integrated with WMS can take advantage of multiple processor cores simultaneously.
- **Graphics Card**: For all display features to be enabled, OpenGL 1.5 or higher must be supported. The use of a dedicated graphics card is strongly recommended. Integrated graphics can result in significantly reduced performance and may not support some visualization features.
- **Display Resolution**: 1024 x 768 or greater