

Hydro_AS-2D Model Interface Enhancements

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SMS Development Highlights (13.1 Beta Release)

- 1D Cross Section Tools (multiple)
- Map Module Enhancements (multiple)
- Floodway Tool Update
- Additional Online Map Support
- Project Explorer Tree Management
- Vector Dataset Visualization
- 3D Bridges/Plot Options
- Bridge Scour Tool
- HEC-RAS 1D Export

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1D Cross Section Tools (13.1 Beta Release)

- Extract Cross Section Options
- Importing to Cross Section Database
- Trim Cross Sections (to channel or other feature)
- Cross Section to Surface (TIN)
- Cross Section Interpolation

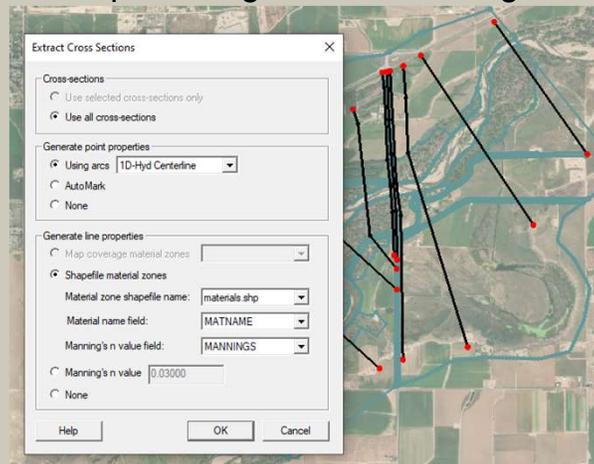


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Extracting Cross Sections

- Can use shapefile to generate Manning's N



- https://www.xmswiki.com/wiki/SMS:1D_Hyd_Cross_Section_Coverage#Extracting_Cross_Sections

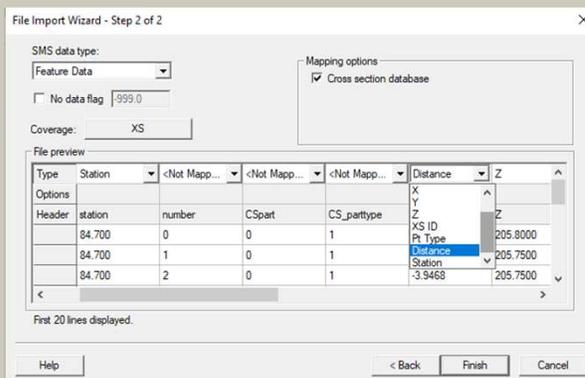


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Importing to Cross Section Database

- Cross sections in annotated tabular file
 - Point type
 - SC ID
 - Station
 - Distance



- https://www.xmswiki.com/wiki/SMS:File_Import_Wizard
- https://www.xmswiki.com/wiki/SMS:Cross_Section_Notes#Creating_a_Cross_Section_Database_from_Text
- **Annotated Cross Sections Tutorial**

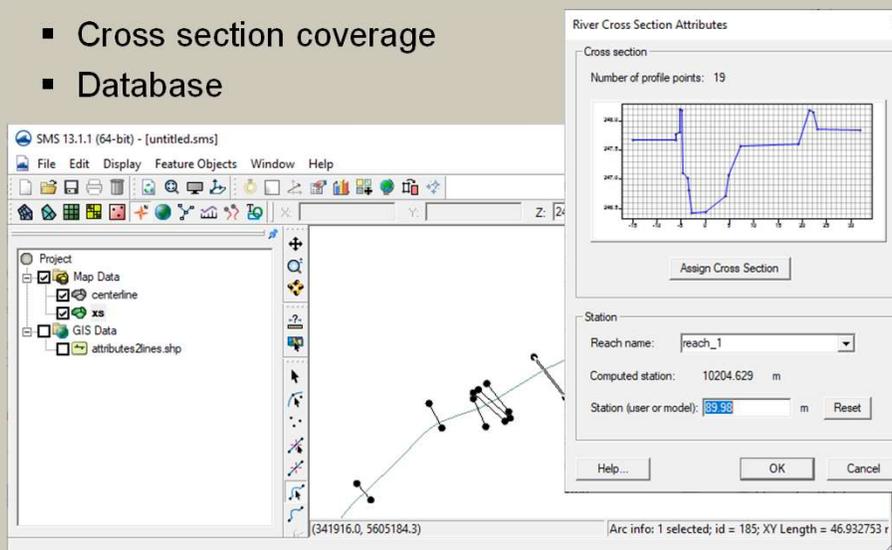


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Resulting Cross Sections

- Cross section coverage
- Database

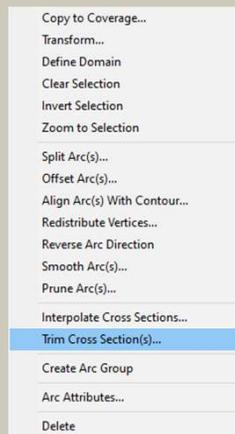
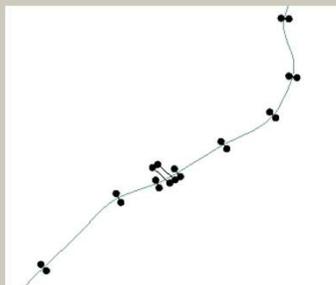


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Trim Cross Sections

- Right click command
- Trim to desired feature
 - Channel



- https://www.xmswiki.com/wiki/SMS:Cross_Section_Notes#Trimming_Cross_Sections_to_Annotation_Type

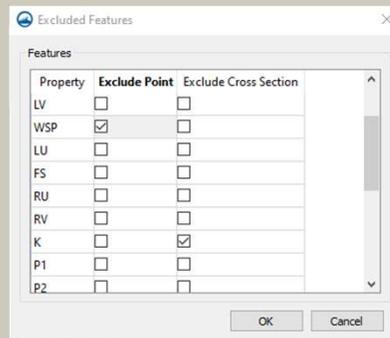
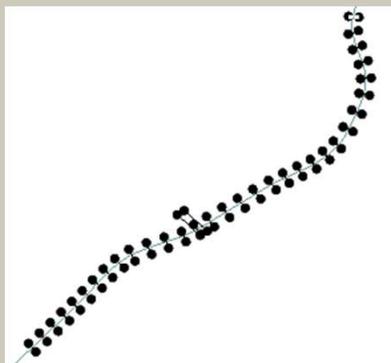


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Cross Section Interpolation

- Relative to centerline
 - Defined spacing
 - Number of sections



- https://www.xmswiki.com/wiki/SMS:Cross_Section_Notes#Interpolating_Cross_Sections_Alone_a_Centerline

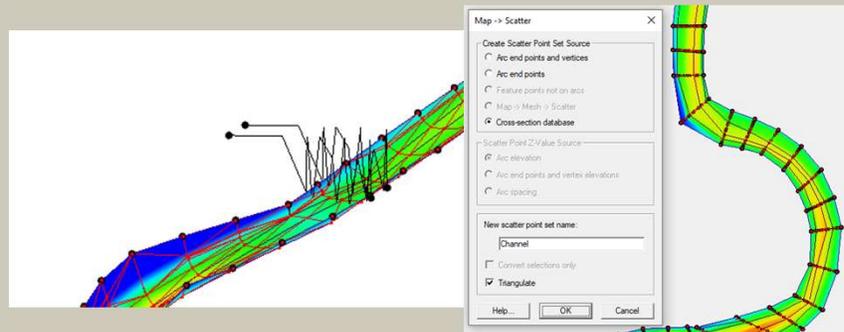


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Cross Section to Surface (TIN)

- Connects cross sections to adjacent cross sections
- Honors features (thalwegs, banks, ...)



- https://www.xmswiki.com/wiki/SMS:Cross_Section_Notes#Converting_Cross_Sections_to_a_2D_Scatter
- **Cross Section to Surface Tutorial**

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Map Module Enhancements (13.1 Beta Release)

- Extract Features
- Universal Select Tool
- Select Intersecting Objects
- Export to Shapefile from Coverage
- Copy to Coverage Command
- Annotations on Arcs

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Feature Extraction

- Convert all survey data to DEM
- Pre-process DEM (TOPAZ, TauDEM, ...)
- Extract features
 - Specified starting points
 - Networks
 - Conveyance channels
 - Hydraulic controls (embankments and ridges)
- https://www.xmswiki.com/wiki/SMS:Extract_Features_Tool
- **Extract Features Tutorial**

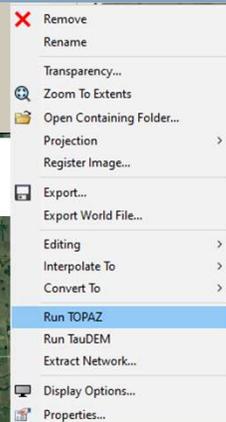
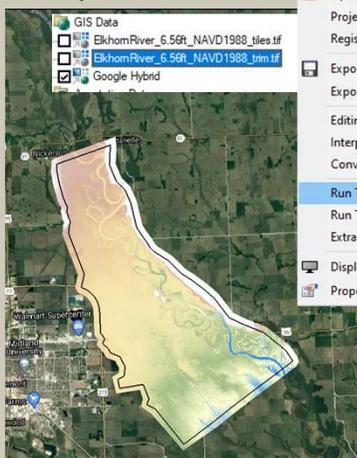
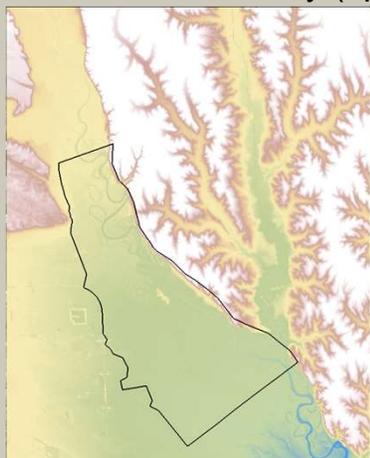


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DEM Preparation and Pre-Process

- Right click to create if needed
- Trim for efficiency (optional)

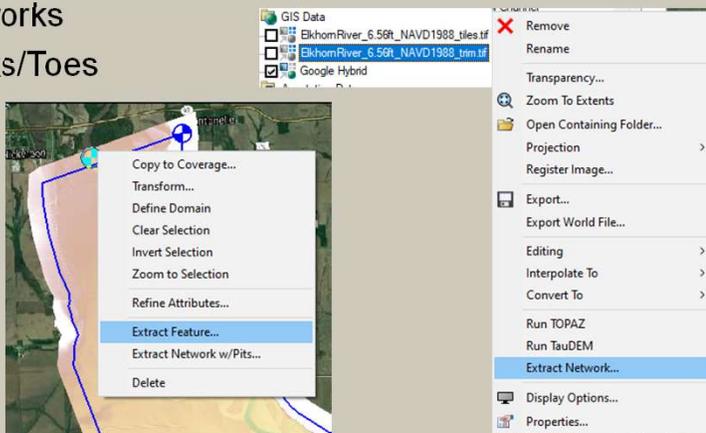


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Extract Features

- Channels and Ridges
- Specific (based on user selected location(s))
- Networks
- Banks/Toes



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Extracted Channel Centerline – smoothed



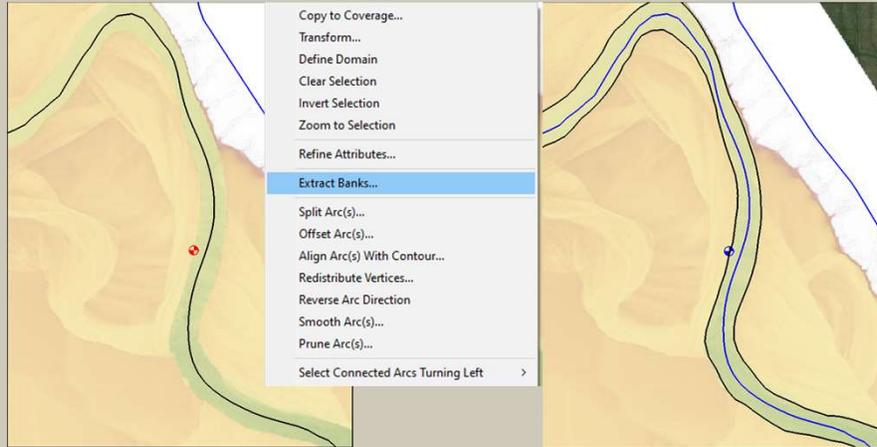
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Channel Banks for Low Flow

- Start with “arc/polyline” and “bank/toe point”
- Bank/toe lines extracted and smoothed



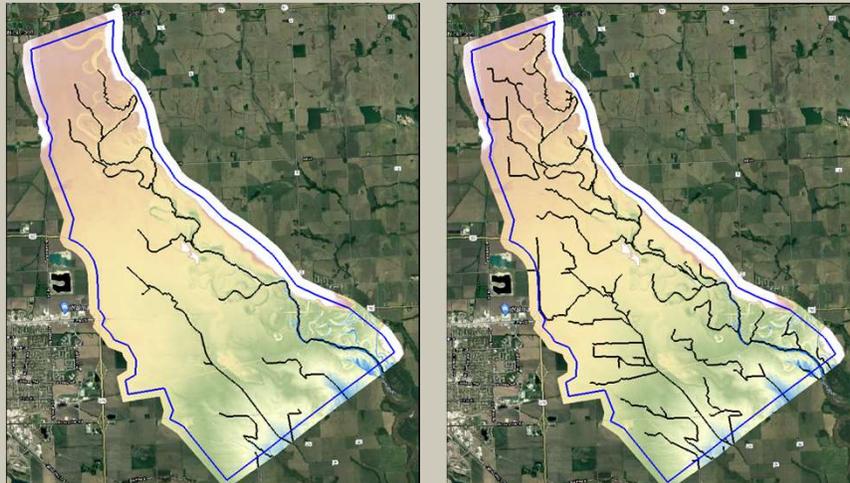
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Channel Networks

- User specifies type and “accumulation”



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Extreme Network – 0.005%

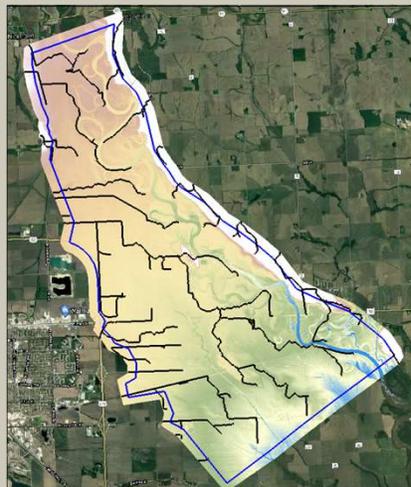


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Ridge Networks



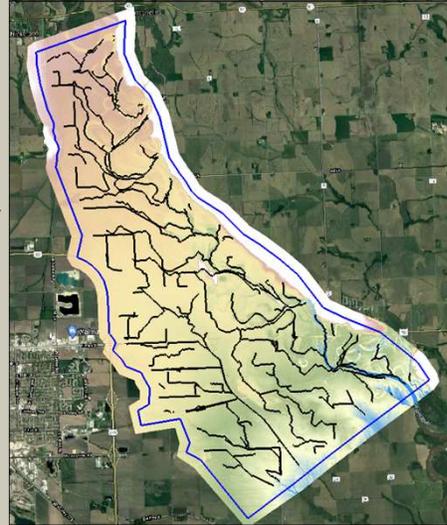
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Combined Network - Trimmed

- Trim
 - Close to boundary
- Specify
 - Spacing along features
 - Spacing along boundary
 - Target interior spacing



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Sample "Automatic" Mesh

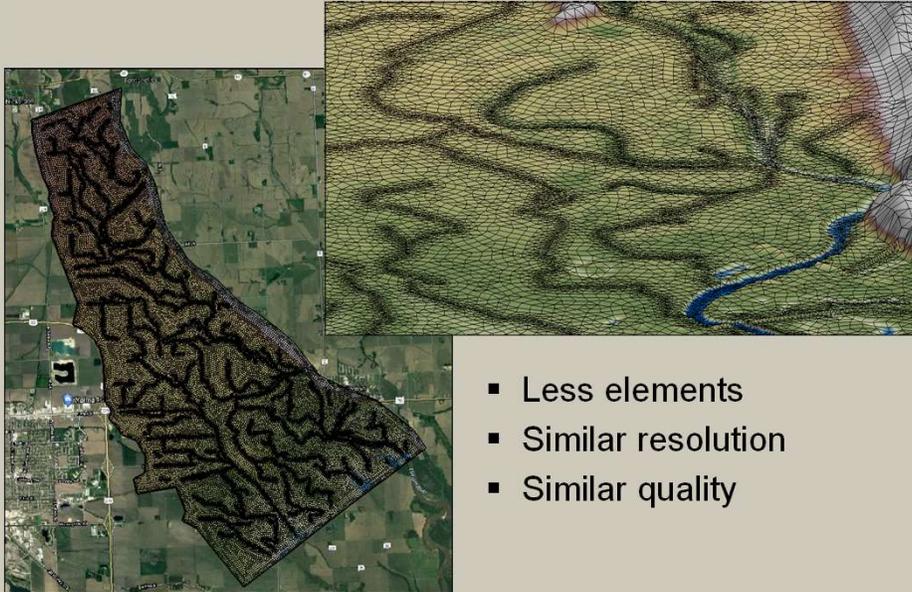


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Conversion to Quadrilaterals



- Less elements
- Similar resolution
- Similar quality

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Feature Addition

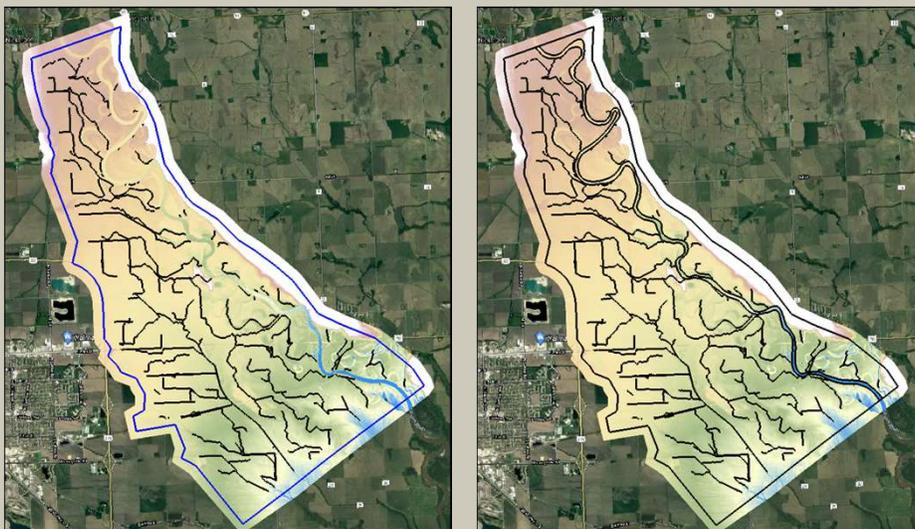
- Two Options
 - Modify Mesh Generation Coverage
 - Demonstrated in following slides
 - Modify the Mesh
 - Start with current mesh and a new polygon
 - Insert new elements into old mesh

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Network Trimmed to Channel and Combined

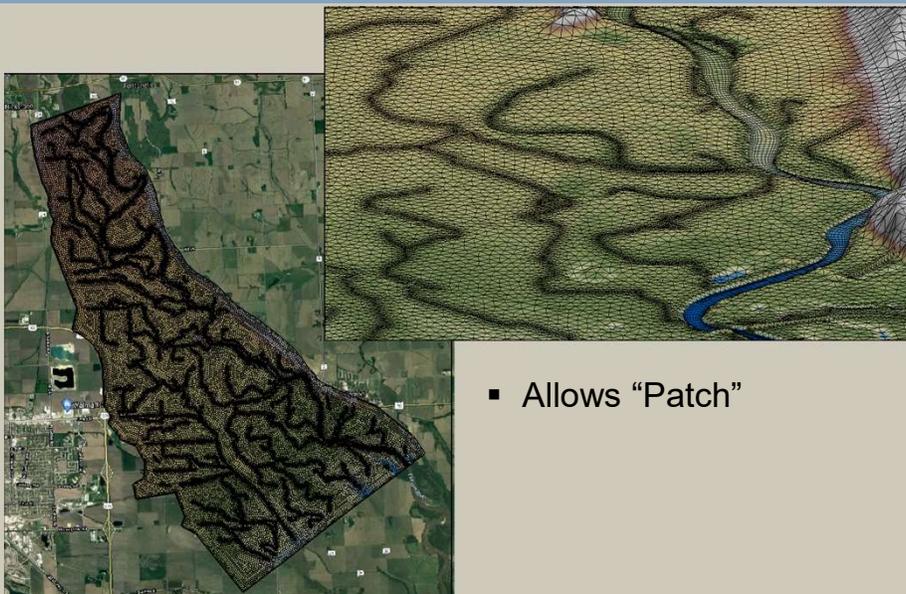


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Mesh from Feature Network and Channel



- Allows "Patch"

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Mesh from Feature Network and Channel - Quads



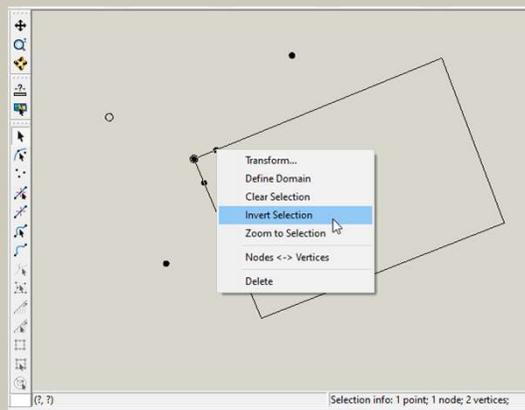
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Universal Select Tool

- Selecting multiple types of feature objects
- Right-click contains union of commands for selected objects



- https://www.xmswiki.com/wiki/SMS:Map_Module_Tools

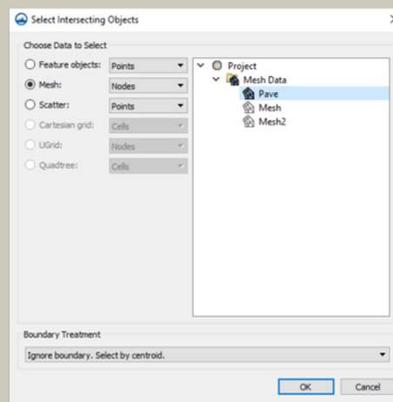
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Select Intersecting Objects

- Select one or more polygons
- Right click to select
- Any object type
 - Including Map objects



- https://www.xmswiki.com/wiki/SMS:Select_Intersecting_Objects

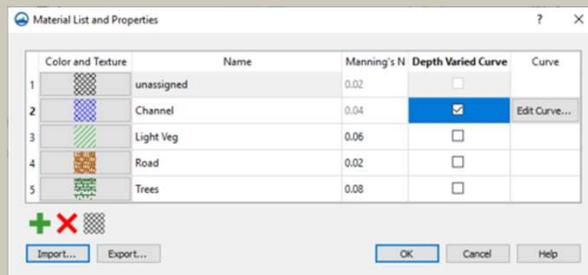
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Export to Shapefile from Coverage

- File | Save as...
- Right-click Export command
- Saves all attributes



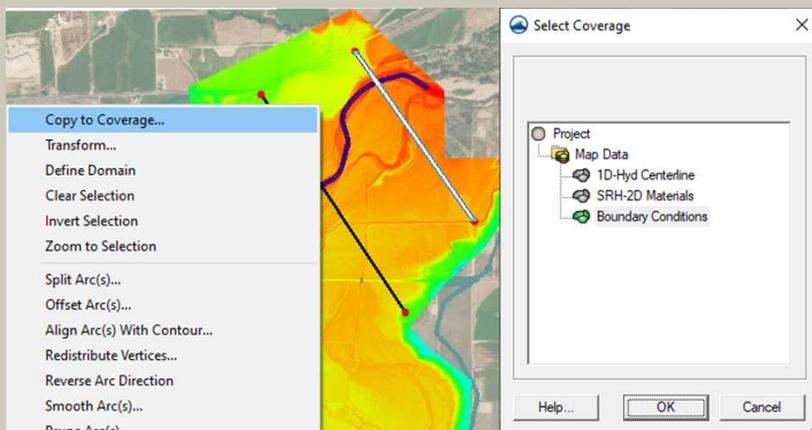
- https://www.xmswiki.com/wiki/SMS:Map_Project_Explorer#Coverage_Item_Right-Click_Menus

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Copy to Coverage Command



- https://www.xmswiki.com/wiki/SMS:Map_Module_Tools#Tool_Specific_Right-Click_Menus

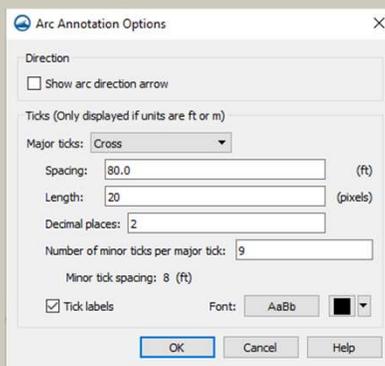
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Arc Annotations

- Access from display options
- Arc direction
- Stationing
 - Ticks
 - Labels



- https://www.xmswiki.com/wiki/SMS:Map_Module_Display_Options#Annotations

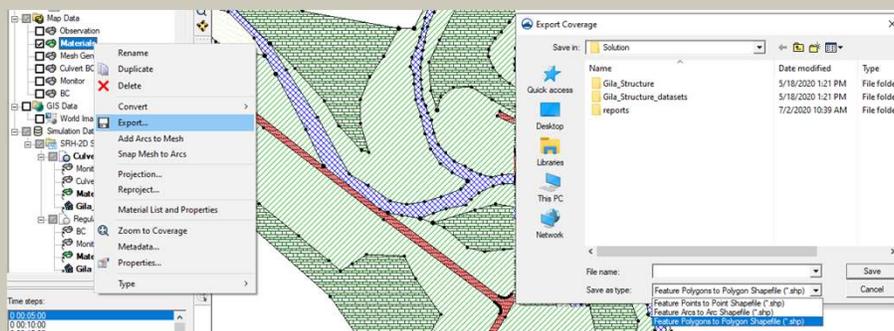
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Shapefiles (import/export)

- From coverages
- From meshes



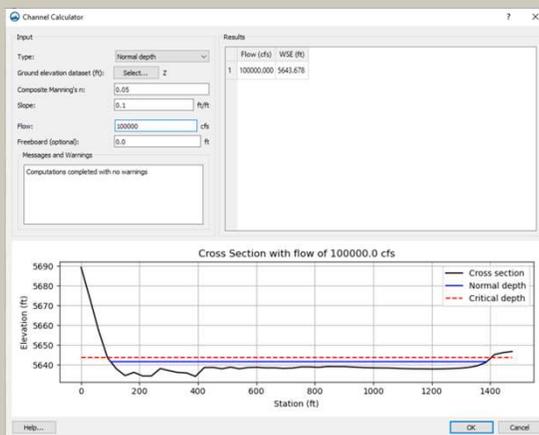
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Enhanced Channel Calculator

- Replaces “Populate”



- https://www.xmswiki.com/wiki/SMS:SRH-2D_Channel_Calculator

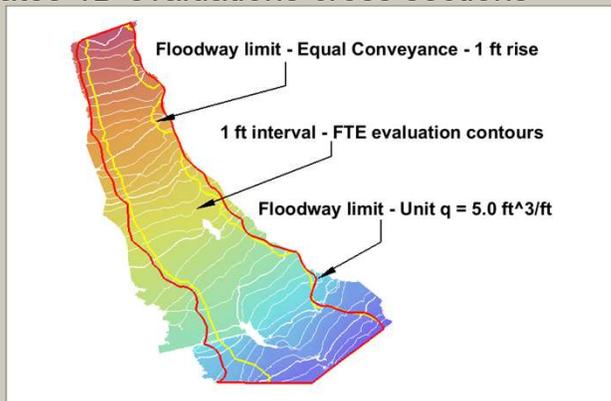
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Floodway Delineation Improvements

- Two Methods – Equal Conveyance & Unit q
- Creates 1D evaluations cross sections



- https://www.xmswiki.com/wiki/SMS:Floodway_Delineation
- **Floodway Delineation Tutorial**

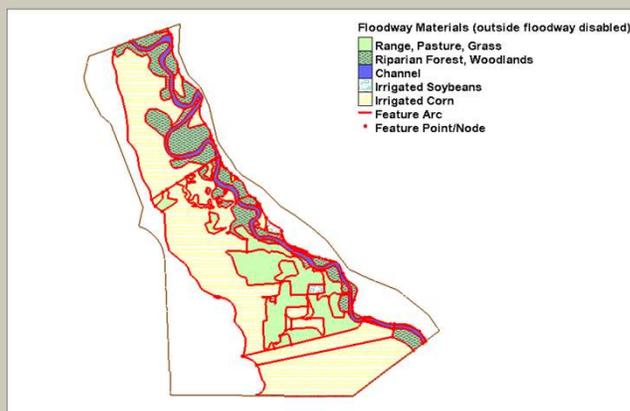
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Floodway Delineation Improvements – cont.

- Creates new material coverage
- Creates new simulation



- https://www.xmswiki.com/wiki/SMS:Floodway_Delineation
- **Floodway Delineation Tutorial**

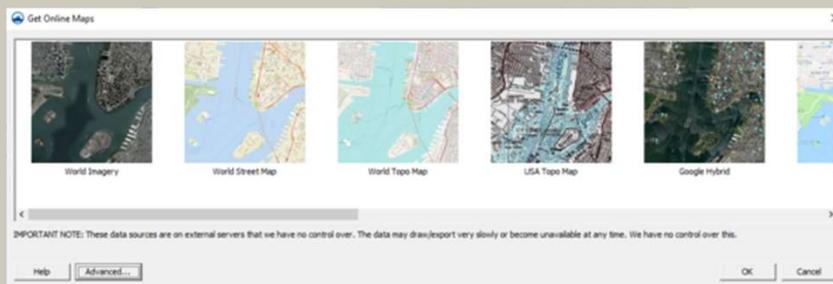
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Additional Online Map / Import From Web Support

- Google Services
 - Hybrid, Map, Satellite, Terrain
- ArcGIS
 - NatGeo, Ocean, World Physical/Shaded/Terrain
- Advanced



- https://www.xmswiki.com/wiki/Get_Online_Maps

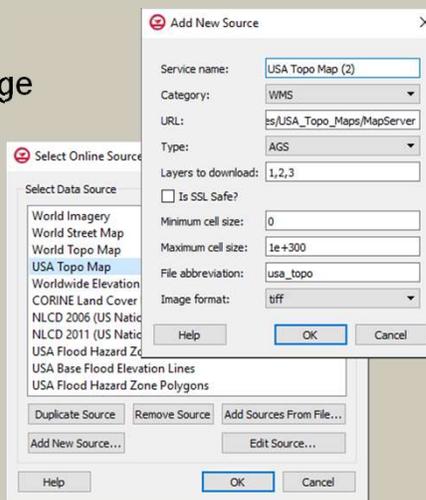


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Advanced Online Map services

- Images and Maps
- Land Cover and Land Usage
- FEMA Flood and Hazard
- Customize Provided Links
- User Links



- https://www.xmswiki.com/wiki/Get_Online_Maps#Advanced_Options



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Project Explorer Tree Management

- Right Click on “Project”
 - New Simulation
 - Projection...
 - Collapse/Expand All
 - Check/Uncheck All
 - Save as CAD
 - Project Summary Report... (13.0)
 - Open Project Folder
 - Properties (13.0)

- https://www.xmswiki.com/wiki/SMS:Project_Explorer_Right-Click_Menus#Project_Explorer_Project_Right-Click_Menus

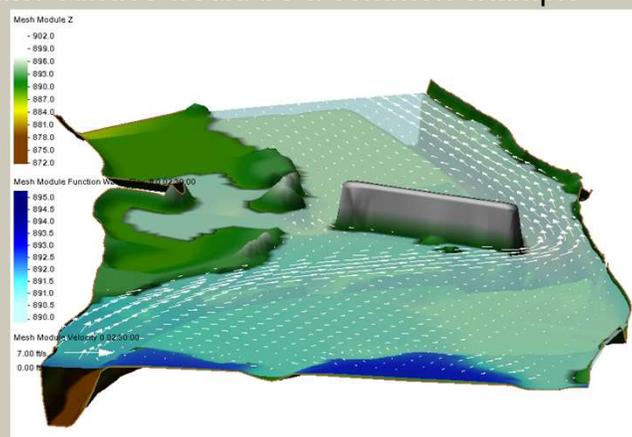


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Vector Dataset Visualization

- Places vectors at the value of another dataset
 - Water surface would be a common example



- https://www.xmswiki.com/wiki/SMS:Vector_Display_Options#Origin



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3D Bridges

- Define bridge in new coverage
- Visualize with terrain (3D) and in 2D plot



- https://www.xmswiki.com/wiki/SMS:3D_Bridge
- **3D Bridge Tutorial**

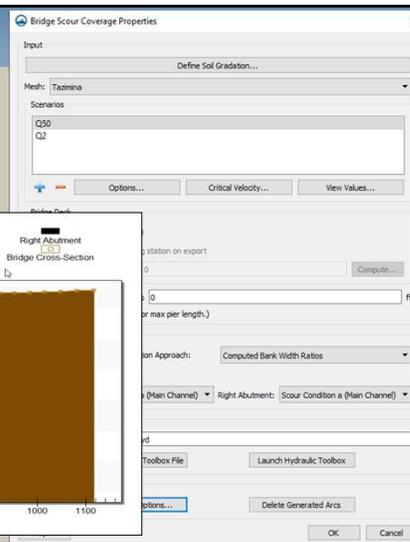
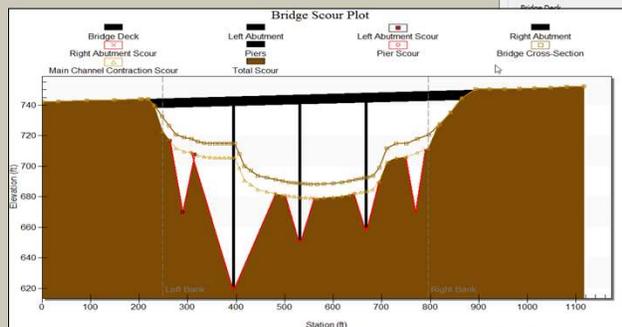
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Bridge Scour Tool

- Creates Hydraulic Toolbox file
- Supports multiple scenarios



- https://www.xmswiki.com/wiki/SMS:Bridge_Scour
- **Bridge Scour Scenarios Tutorial**

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HEC-RAS 1D Export

- Exports Cross section coverage to HEC-RAS 1D
 - Extracts geometry to XS
 - Extracts Manning's N value from polygon shapefile
 - Shapefile created from SRH-2D Materials coverage
 - Extract centerline and bank from Centerline coverage

- <https://www.xmswiki.com/wiki/SMS:HEC-RAS>

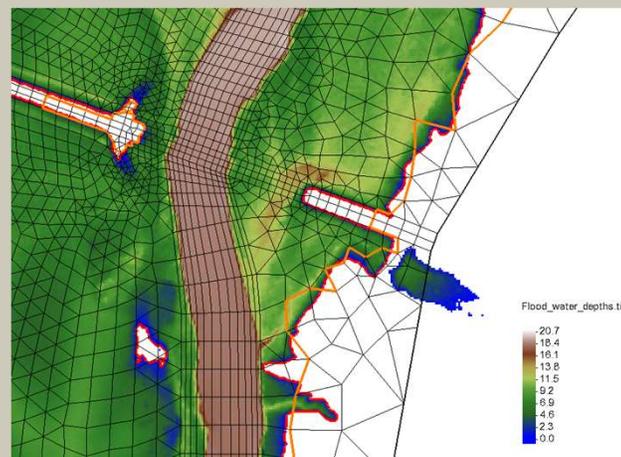
- **HEC-RAS 1D Tutorial**

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Generation of a Flood Depth Raster



- https://www.xmswiki.com/wiki/SMS:GIS_Conversion_and_Editing#Flood_Depths

- **Raster to Flood Depth Tutorial**

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- Thank you very much for this opportunity and your Attention

- Questions?

- azundel@aquaveo.com
 - Suggestions and comments are very welcome