HEC-GEORAS WORKSHOP

March 9, 2010

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Presentation Outline Basic Overview of HEC-GeoRAS Data Requirements for HEC-GeoRAS Creating Hydraulic Model Geometry Data Importing GIS Data into HEC-RAS Floodplain Mapping Using GIS

HEC-GeoRAS Overview



Geospatial hydraulics toolkit for engineers with limited GIS experience

Develop stream network, cross-sections, storage areas, Manning's n values, etc.
HEC-RAS model input
Floodplain mapping

• Requires ESRI ArcGIS 9.2 or 9.3 with 3-D Analyst and Spatial Analyst

HEC-GeoRAS - Data Requirements

Digital Terrain Model (DTM)
 TIN or GRID
 Created from LIDAR or contours
 Backbone of HEC-GeoRAS Analysis



HEC-GeoRAS - Data Requirements

- Create the following using the HEC-GeoRAS/GIS editor:
 - Stream centerline
 - Flowpath line (left, channel & right reach length lines)
 - Cross-section cut lines (cross-section locations)
 - Optional layers
 - Bank Lines, storage areas, levees, Manning's n values, ineffective flow areas, etc.

Creating Hydraulic Model Geometry Data

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Layer Setup	Bank Lines
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YE Cut Line Attributes	XS Cut Lines
	Bridges/Culverts
Manning's n Values 🕨 🕨	Ineffective Flow Areas
Levees 🕨	Blocked Obstructions
Ineffective Flow Areas	Landuse Areas
Blocked Obstructions	Levee Alignment
Bridges/Culverts	Levee Points
Inline Structures	Inline Structures
Lateral Structures	Lateral Structures
Storage Areas	Storage Areas
Storage Area Connections	Storage Area Connections
Extract GIS data	All

Stream Centerline

- Draw centerline from upstream to downstream
- Centerlines for each tributary should not intersect
- Main channel centerline should be continuous (junction created in HEC-RAS)
- Each stream centerline needs a unique river and reach name just like HEC-RAS



Creating Hydraulic Model Geometry Data

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 Assign River and Reach Names

 Assign River Code/Reach Code Tool and click on each streamline to assign a unique name

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Flow Path Lines

 Represent channel and overbank paths used by HEC-GeoRAS to calculate reach lengths between crosssections

- Draw flow path lines from upstream to downstream
- Each stream reach has their own set of channel, left and right flow path lines





ASSIGN LINE TYPE

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 Click Assign Line Type tool, click on a Flowpath Line and designate and ID

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Cross-section Cut Lines

- Represent the cross-section locations where station and elevation data will be pulled from the TIN
- Drawn in order upstream to downstream, from left to right looking downstream
- No cross-section cut lines may intersect
- Must lay within the boundary of the TIN

Example of Cross-section Cut Lines



Analyzing HEC-GeoRAS Data

- Assigns stations, elevations, lengths, etc.
- If errors occur or the process does not complete, verify that the Stream Centerline and Terrain filenames are correct
- Check cross-sections using the HEC-GeoRAS cross-section viewer

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Storage Areas		
Storage Area Connections		
Extract GIS data		

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Exporting HEC-GeoRAS Data

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Extract GIS data	XS Cut Lines XSCutLines_FHDT
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Exporting HEC-GeoRAS Data

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Importing HEC-GeoRAS Data to HEC-RAS

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Importing HEC-GeoRAS Data to HEC-RAS



FLOODPLAIN MAPPING USING GIS Step 1: Export HEC-RAS Results

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FLOODPLAIN MAPPING USING GIS Step 2: Convert sdf file to xml file

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FLOODPLAIN MAPPING USING GIS Step 3: Layer Setup

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FLOODPLAIN MAPPING USING GIS Step 4: Read RAS GIS File

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-New layer created from "Output Directory" name specified during Layer Setup (Step 3)

-Terrain (either TIN or Raster) automatically carried over to new layer

FLOODPLAIN MAPPING USING GIS Step 4: Read RAS GIS File, cont.

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FLOODPLAIN MAPPING USING GIS Step 5: Generate Water Surface TIN



FLOODPLAIN MAPPING USING GIS Step 5: Generate Water Surface TIN, cont.

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FLOODPLAIN MAPPING USING GIS Step 6: Convert MaxWS TIN to Raster



-Starting here, use built-in GIS functions to carry out floodplain mapping



FLOODPLAIN MAPPING USING GIS Step 8: Reclassify Raster



FLOODPLAIN MAPPING USING GIS Step 9: Export Raster as Shapefile

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FLOODPLAIN MAPPING USING GIS Step 10: Edit Floodplain Shapefile



FLOODPLAIN MAPPING USING GIS



-Delete any outlying floodplain areas

-Clean up floodplain to required scale

Questions/Comments?

Luke Sherry Jeana Gowin

Christopher B. Burke Engineering, Ltd.