Terrain Datasets for Watershed Modeling

William Millinor – Jones Edmunds
Maria Martinez – Jones Edmunds

Steve Dicks – SWFWMD

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Overview

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- FEMA/SWFWMD floodplain mapping
- Traditional elevation model building techniques
- Terrain advantages
- Terrain creation workflow
- Streamlined workflow benefits using Terrain
- Statewide FDEM initiative
- Moving forward with Terrain
- Image server discussion
- Questions

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FEMA Floodplain Mapping and Elevation Models

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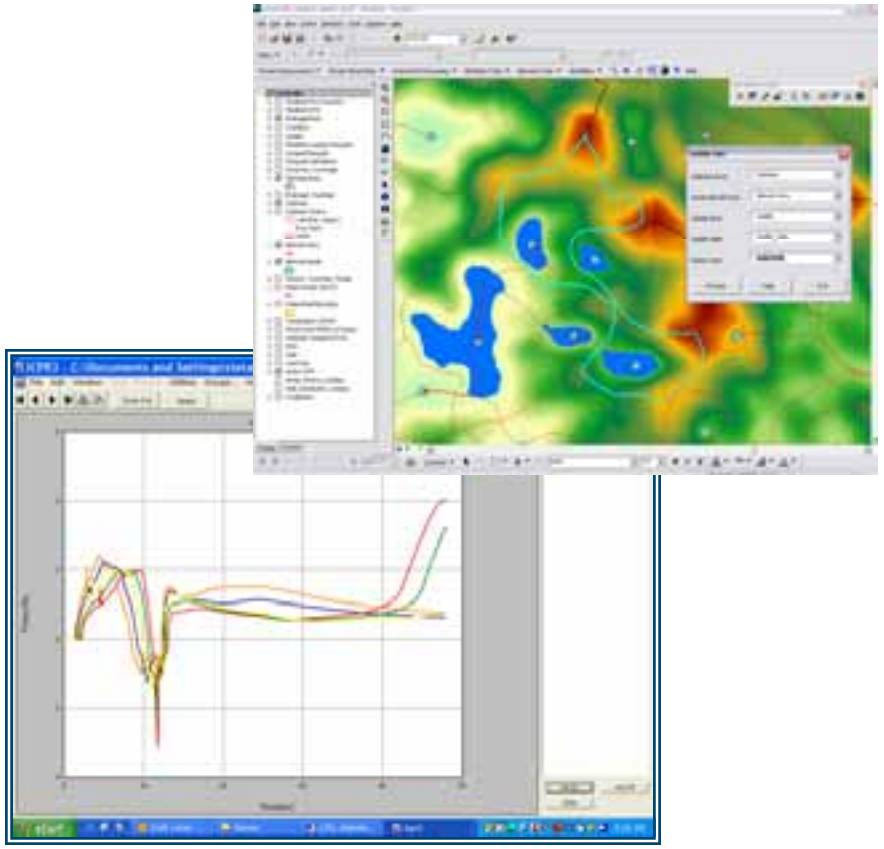
- Important uses for the DTM are:
  - Accurate subbasin delineation
  - Determining flow paths
  - Parameterize features such as overland weirs and channel cross-sections
  - Characterizing storage within subbasins
  - Plotting an accurate floodplain



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FEMA Floodplain Mapping and Elevation Models

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- Advantages of the Terrain for modeling purposes:
  - Data is easily accessible in one location
  - Quick to update for topo void replacement
  - TINs and rasters can be easily exported
  - Large watersheds fit into one Terrain

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Traditional Elevation Model Generation Workflow

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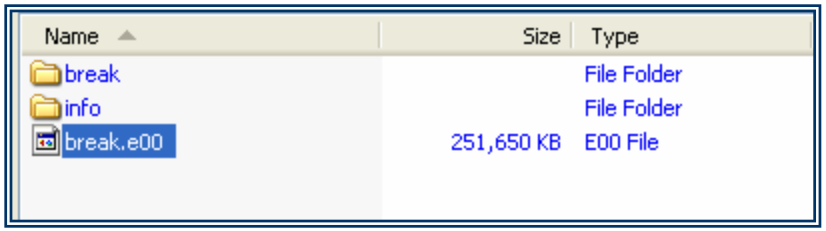
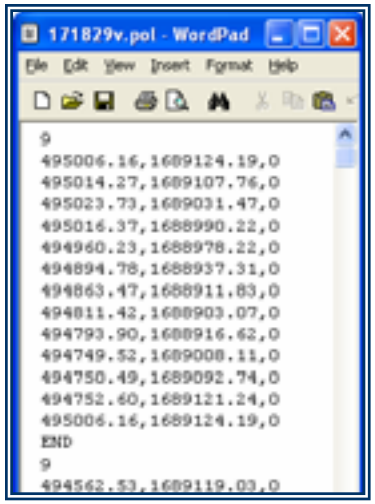
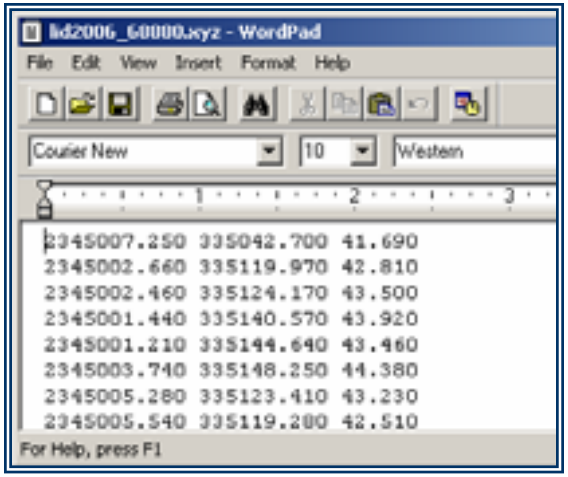
- Data Formats and Conversion
  - Data arrives in multiple formats
    - .e00, ASCII, xyz, generate files, flt, coverages







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Traditional Elevation Model Generation Workflow

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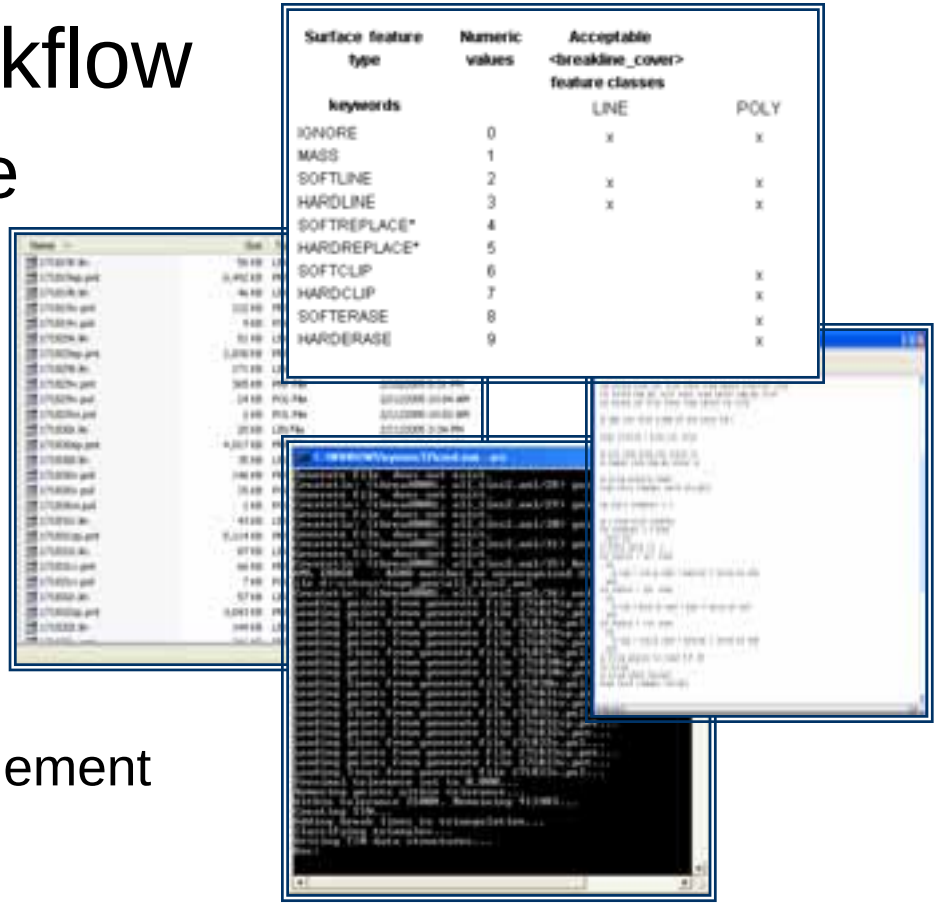
- Traditional DTM Workflow
  - ArcInfo command line
    - Organize the data
      - Multiple files
      - Multiple data types
    - Custom AMLs
    - File size limitations
      - Tiles
      - Increases data management issues



Surface feature type	Numeric values	Acceptable <breakline_cover> feature classes	
keywords		LINE	POLY
IGNORE	0	x	x
MASS	1		
SOFTLINE	2	x	x
HARDLINE	3	x	x
SOFTREPLACE*	4		
HARDREPLACE*	5		
SOFTCLIP	6		x
HARDCLIP	7		x
SOFTERASE	8		x
HARDERASE	9		x

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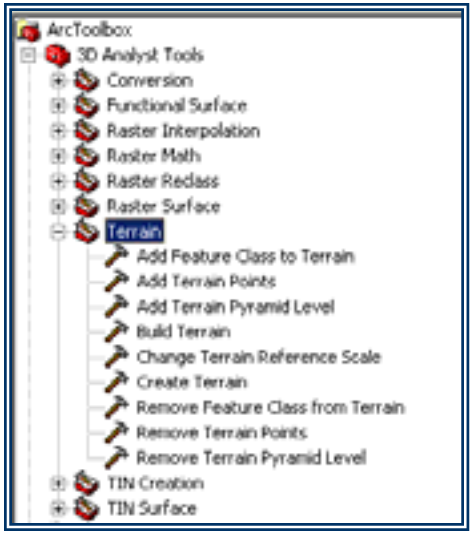
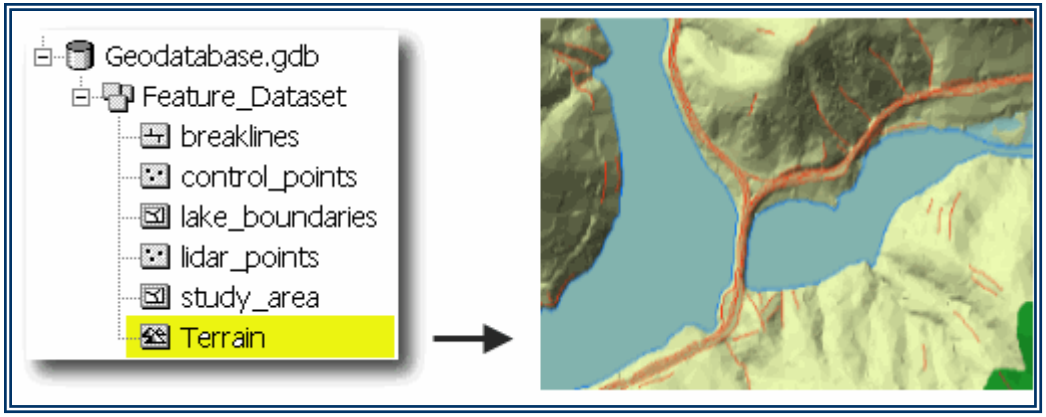
Terrain Datasets

- Multi-resolution TIN-based surface
- Built in a geodatabase
- References data sources for faster retrieval
- New set of tools in ArcToolbox





Source: http://webhelp.esri.com

Terrain Advantages

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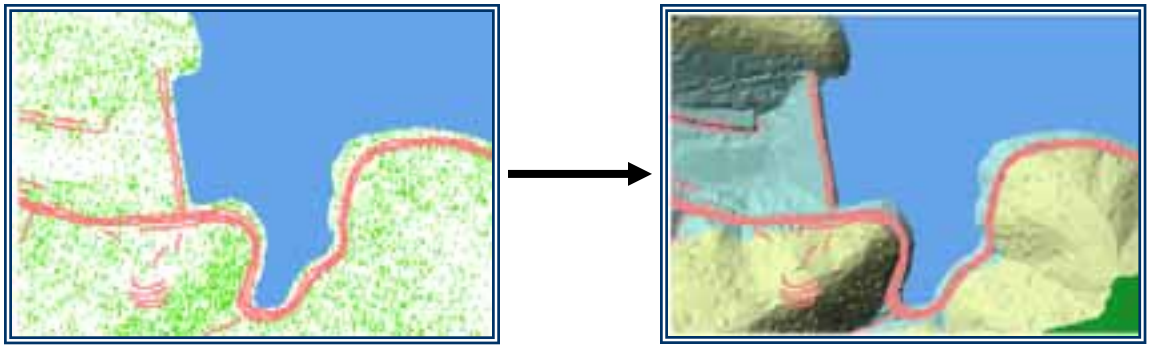
- Ability to import traditional data types
- Store and manage data in geodatabases
- Much larger file size capabilities
  - Allows for creation of single project wide datasets



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Sample Terrain Workflow

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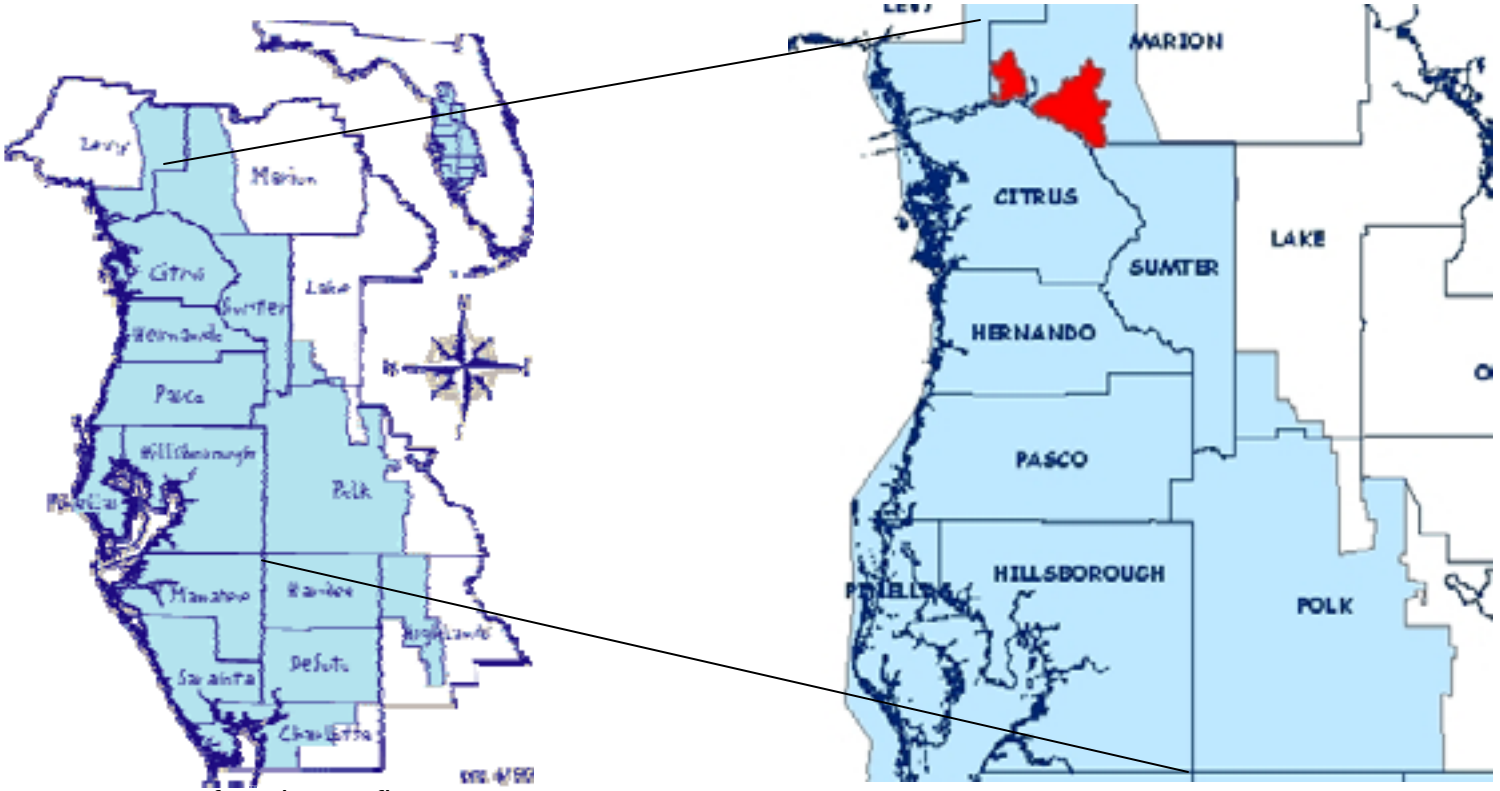
- Withlacoochee River Watershed



Source: www.swfwmd.state.fl.us

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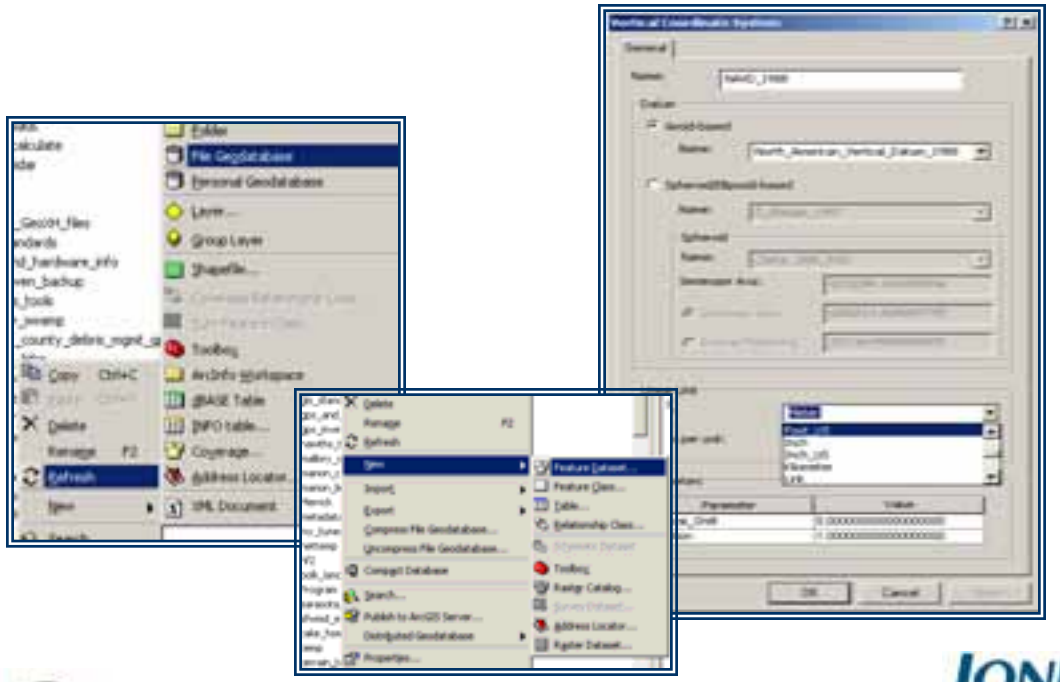
Sample Terrain Workflow

- Build Terrain in a File Geodatabase – 1 TB size limitation
- Set Horizontal and Vertical Projections
  - Check NAVD88 units – default is meters



Sample Terrain Workflow

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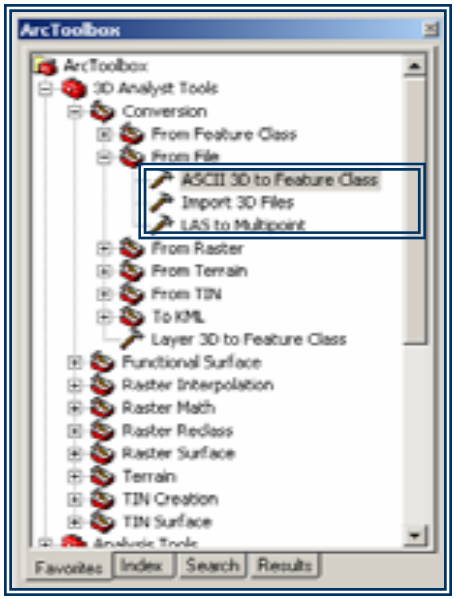
STEP 1. Import Data

- Point, breaklines, project boundary, contours
- All inputs stored in the same feature dataset
- Split feature classes into separate surface feature type



THE IMPORTANCE OF METADATA

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Sample Terrain Workflow

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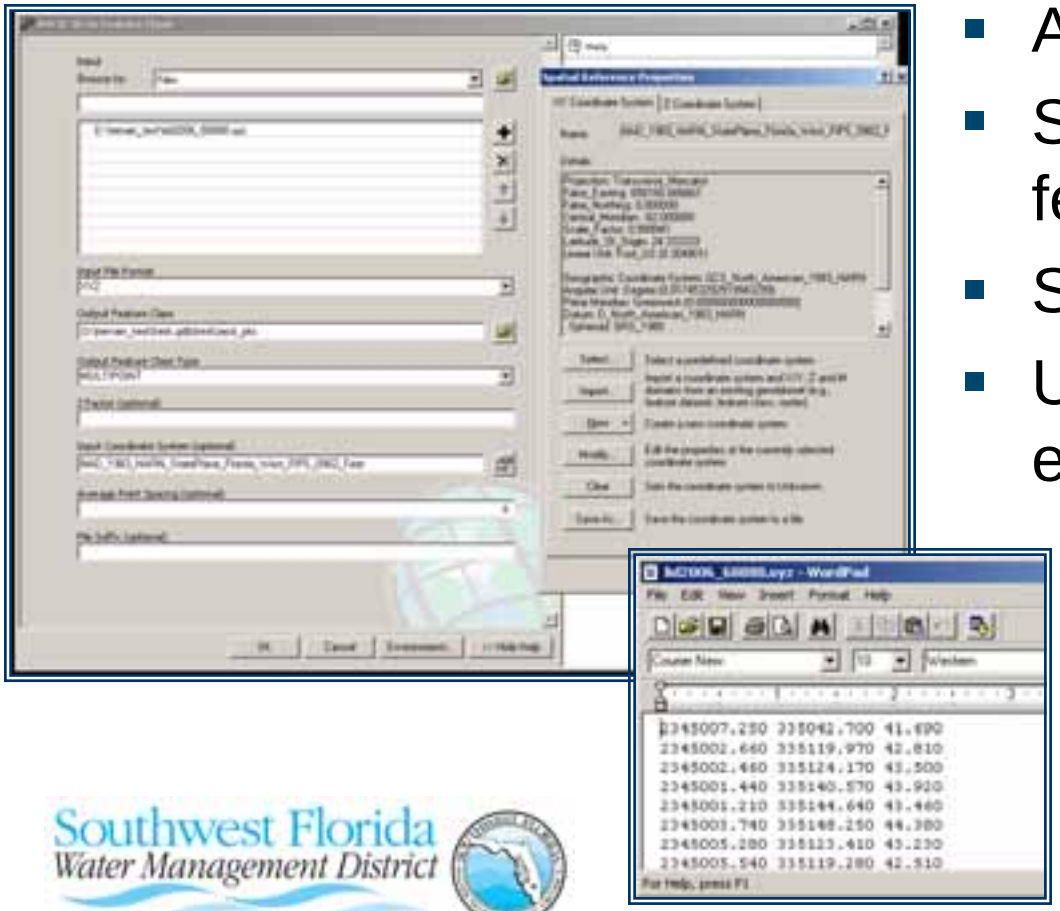
- Import from ASCII, XYZ Files or Generate….



- Ability to import entire folder
- Select appropriate output feature class type
- Set average point spacing
- Use file suffix when importing entire folder

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Sample Terrain Workflow

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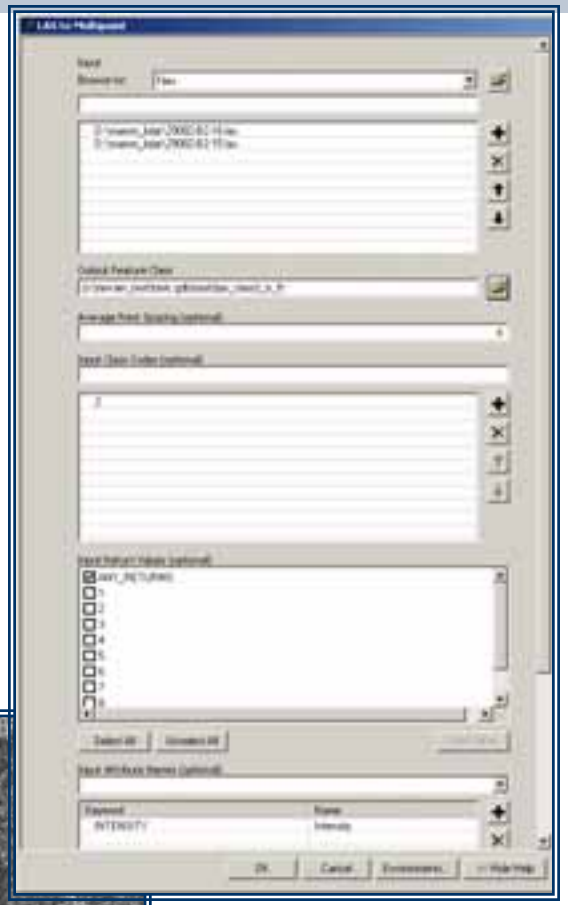
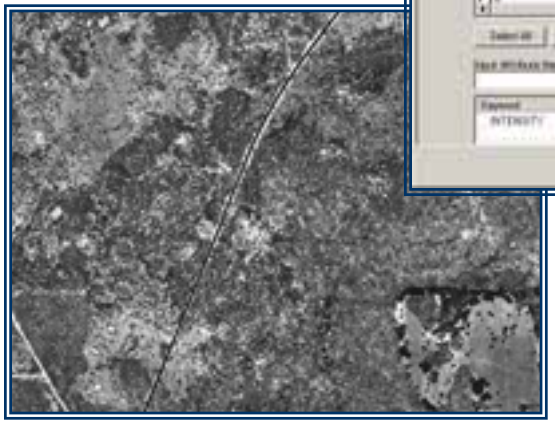
- Import from LAS Files…
  - Set average point spacing
  - Input correct class code
    - Select bare-earth only
  - Input “Intensity” for attribute name
    - Not available for viewing yet within ArcMap





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Sample Terrain Workflow

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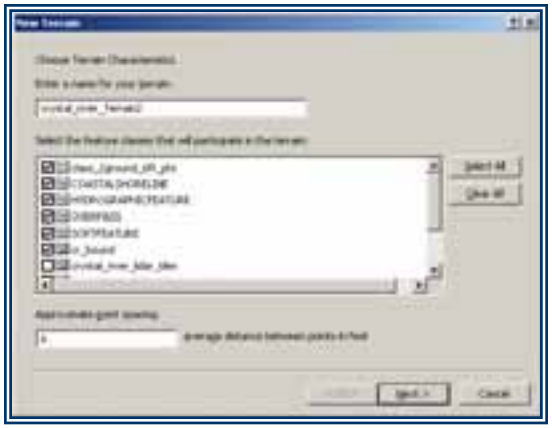
STEP 2. Create Terrain…



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Sample Terrain

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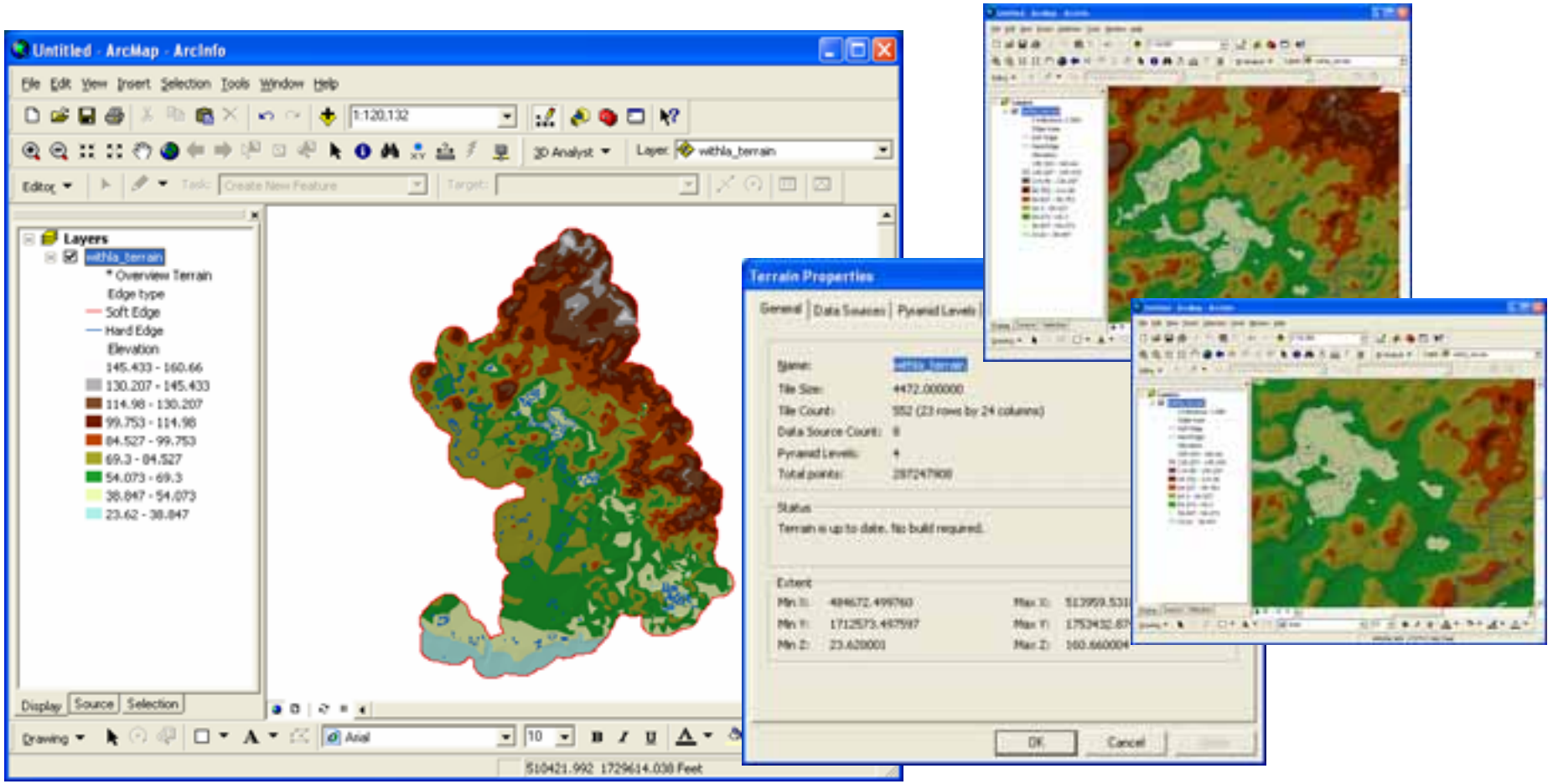

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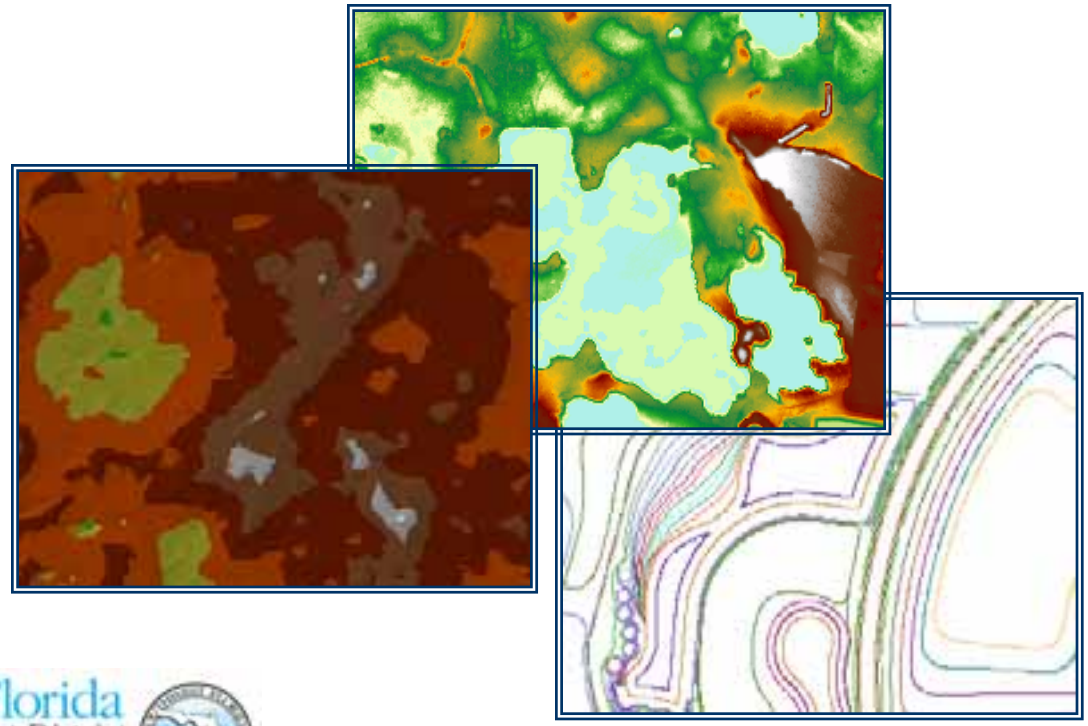
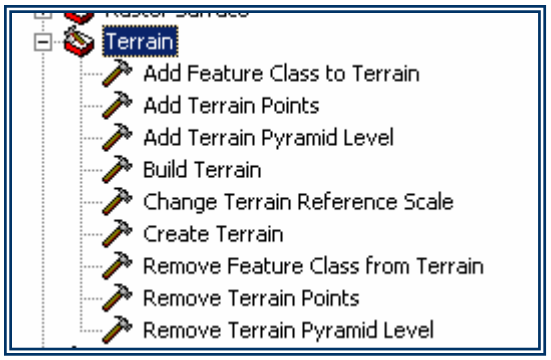
Exporting to Other Formats

- Export to other formats:
  - Raster, TIN, Contour (not directly)



Editing and Updating Terrains

- Other tools for updating terrains
  - Add/Remove Feature Class
  - Add/Remove Terrain Points
  - Add Terrain Pyramid Levels
  - Build Terrain



Florida Division of Emergency Management Statewide Coastal Mapping

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- ~13,000 square miles of new LiDAR mapping
- Statewide LiDAR and orthophotography specifications
  - Started w/ SWFWMD's specifications and Terrain GDB design
- Data management
- Quality assurance

Simple feature class **MASSPOINT**

Geometry *Multipoint*
Contains M values *No*
Contains Z values *Yes*

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
DATESTAMP_DT	Date	Yes			0	0	8

Simple feature class **OBSCUREDVEG**

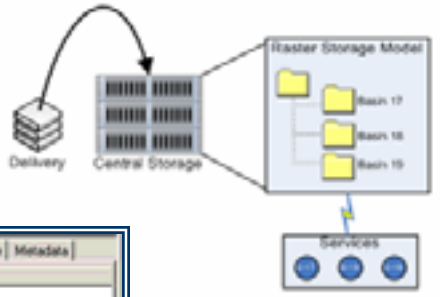
Geometry *Polygon*
Contains M values *No*
Contains Z values *No*

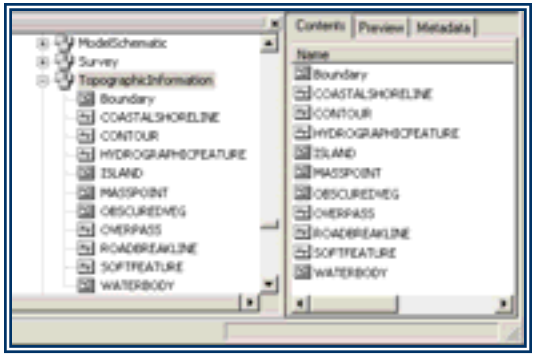
Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
DATESTAMP_DT	Date	Yes			0	0	8
Shape_Length	Double	Yes			0	0	
Shape_Area	Double	Yes			0	0	

Simple feature class **OVERPASS**

Geometry *Polyline*
Contains M values *No*
Contains Z values *Yes*

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Object ID						
Shape	Geometry	Yes					
DATESTAMP_DT	Date	Yes			0	0	8
Shape_Length	Double	Yes			0	0	





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Current Issues with Terrain

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ArcGIS 9.3 Enhancements

- Cannot use Terrain to convert features to 3-D
- Cannot use Terrain for volume calculations to determine storage within subbasins

Future Enhancements on Tools

- Cannot export directly from Terrain to Contours
- Cannot use geoprocessing tools in 3D Analyst toolbar

- Cannot export Terrain to a DEM or TIN using a polygon boundary

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Scratching the Surface of Image Server

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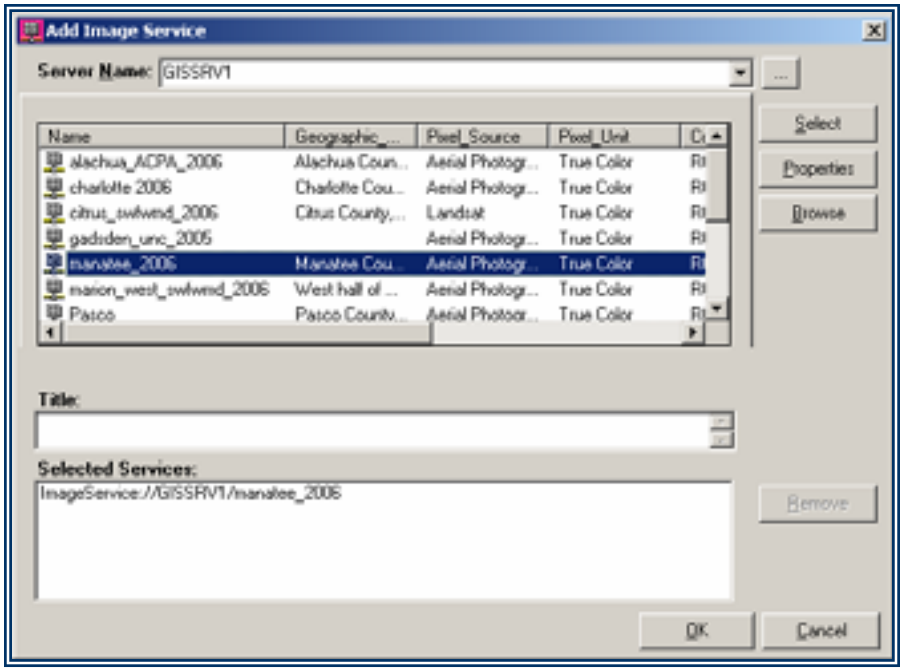
- We have loaded all SWFWMD's 2006 imagery with great success
- Images are stored in traditional flat files
  - Reduced load times
  - Reduced color balancing and display issues if imagery is already color balanced and matched
- Very fast display of the imagery across networks



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Questions

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2006 Charlotte County

2006 Pinellas County

2006 Pasco County

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