Quality Control and the GIS Data ReViewer

Nathan Noble
Thomas Breed
Workshop Overview

• Introduction to GIS Data ReViewer

• Visual Data Review

• Automated Data Review

• Collective Data Review (Batch Jobs)
Introduction to GIS Data ReViewer
Introduction to GIS Data ReViewer

- Understanding GIS Data ReViewer
- Administering GIS Data ReViewer
- Demo: Starting a ReViewer Session
Understanding GIS Data ReViewer

GIS Data ReViewer and PLTS

- PLTS – Production Line Tool Sets
- PLTS Foundation
  - Multiple components packaged together
- Data ReViewer sold as part of the package or stand alone
  - Functions the same
Understanding GIS Data ReViewer

- System to process and assess spatial data quality
  - Review
    - Automated checks
    - Visual checks
    - Custom checks
  - Correct
    - Core ArcGIS Edit tools
    - PLTS Edit tools
  - Verify
    - Validation of corrections
Understanding GIS Data ReViewer

Components of the GIS Data ReViewer

• Main toolbar
  – Manage ReViewer sessions
  – Perform data review

• Database environment to manage the review
  – ReViewer Table
Understanding GIS Data ReViewer

The ReViewer Table

- Heart of the ReViewer session
- Tracks all anomalies/errors located during review
- Records correction and verification status
- Contains tools to manage the records
### Understanding GIS Data ReViewer

**Grouping Columns**

#### ReViewer Table Properties

- Toggle Table Edit Mode
- Symbolize Reviewer Records
- Grid Selection
- Duplicate Records
- Statistics

#### Notepad

- Line Notepad
- Point Notepad
- Polygon Notepad

#### Browse Through ReViewer Table Records

<table>
<thead>
<tr>
<th>RECORDID</th>
<th>OBJECTID</th>
<th>SUBTYPE</th>
<th>REVIEWERCATEGORY</th>
<th>REVIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>112</td>
<td></td>
<td>1</td>
<td>188</td>
</tr>
<tr>
<td>3</td>
<td>125</td>
<td></td>
<td>1</td>
<td>188</td>
</tr>
<tr>
<td>4</td>
<td>144</td>
<td></td>
<td>1</td>
<td>188</td>
</tr>
<tr>
<td>5</td>
<td>146</td>
<td></td>
<td>1</td>
<td>188</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td></td>
<td>1</td>
<td>207</td>
</tr>
<tr>
<td>7</td>
<td>71</td>
<td></td>
<td>1</td>
<td>207</td>
</tr>
<tr>
<td>8</td>
<td>402</td>
<td></td>
<td>1</td>
<td>207</td>
</tr>
<tr>
<td>9</td>
<td>3369</td>
<td></td>
<td>1</td>
<td>207</td>
</tr>
<tr>
<td>10</td>
<td>17</td>
<td></td>
<td>1</td>
<td>207</td>
</tr>
<tr>
<td>11</td>
<td>17</td>
<td></td>
<td>1</td>
<td>221</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td></td>
<td>1</td>
<td>177</td>
</tr>
<tr>
<td>13</td>
<td>519</td>
<td></td>
<td>1</td>
<td>95</td>
</tr>
<tr>
<td>14</td>
<td>7</td>
<td></td>
<td>1</td>
<td>177</td>
</tr>
<tr>
<td>15</td>
<td>24</td>
<td></td>
<td>1</td>
<td>217</td>
</tr>
<tr>
<td>16</td>
<td>2</td>
<td></td>
<td>1</td>
<td>228</td>
</tr>
</tbody>
</table>
Understanding GIS Data ReViewer

ReViewer Table Field Properties

• Set field visibility with ReViewer Table Properties
  – Table Properties Page button

• Grouping Records by Field Types
  – Fields managed by groups created by user
  • Sorting
  • Quicker access to specific records
Understanding GIS Data ReViewer

Correction & Verification

- Context Menus for selected records allow the user to
  - Correct
  - Delete
  - Verify

- As Well as Zoom Pan and Select the Geometry of Selected records
Administering GIS Data ReViewer
Administering GIS Data ReViewer

ReViewer Storage Options

• **Inside or outside of production database**
  – Personal Geodatabase
  – File Geodatabase
  – Enterprise (SDE) Geodatabase

• **Stores**
  – ReViewer dataset
  – ReViewer table
  – ReViewer polygon grids

• **Reviewer data set spatial reference**
  – Must be set to the same as the data being reviewed
Administering GIS Data ReViewer

**ReViewer Session**

- **Similar to an edit session**
  - Provides interaction with data

- **Where you perform the data review**
  - Write records to the ReViewer table

- **Stored in the ReViewer database**
  - Multiple ReViewer Sessions per database
  - Associated with user
  - Associated with version
  - Stores user preferences
Administering GIS Data ReViewer

Starting a ReViewer Session

- Create a user name
  - Defaults to user login
- Choose a Workspace
- Session
  - New
  - Existing
- Select a Version
- Start/End Session

[Image showing the ReViewer Session Manager window with options for workspace, user name, session ID, and version selection.]
Starting a ReViewer Session
Visual Data Review
Visual Data Review

• Create Polygon Grid Wizard

• Committing Errors

• Flagging Missing Features

• Demo: Performing Visual Data Review
Visual Data Review

Create Polygon Grid Wizard

- **Location**
  - Any Geodatabase type
  - Example: Personal, SDE

- **Extent**

- **Cell Specifications**
  - Row/Col or specify interval
Visual Data Review

Commit Records to Reviewer Table

- **From a selection set**
  - Browse Features button
  - Commit to ReViewer Table button

- **Single Features**
  - Select feature
  - Commit to ReViewer Table button

- **Batch Checks**

- **Flag Missing Feature**
Visual Data Review

Capturing Missing Features

- **Store missing feature geometry**
  - Point Notepad
  - Polygon Notepad
  - Polyline Notepad

- **Feature Class created in a Scratch Pad GDB**
  - Located in your ESRI Application data folder (Scratchdb.mdb)

- **Geometry can be copied to the Production GDB**

- **Buttons in ReViewer Table**
Performing Visual Data Review
Automated Data Review
Automated Data Review

- Running Data Checks
- What Features to Check?
- List of ReViewer Checks
- Demo: Conducting Automated Data Review
Automated Data Review

Running Data Checks

• Select a batch check
• Run the desired test
• Browse results or write to table
Automated Data Review

What features to check?

• Select the extent of check
  – Selection Set
    • Those features currently selected
  – Current Extent
  – Definition Query
  – Full Database

• Parameters selection??
Automated Data Review

ReViewer Checks

• ReViewer Checks Poster (pdf file)
Automated Data Review

Default Checks

- **Invalid Geometry**: Finds features whose geometry is empty, nesting, or not simple, as well as features with empty envelopes.

- **Multipart Line**: Searches for polylines with more than one part. Companion to Topology: Line must be single part.

- **Multipart Polygon**: Finds polygon features with more than one part and polygon features with holes.

- **Non-Linear Segment**: Searches for non-linear segments such as arcs and curves in line and polygon features.

- **Polyline or Path Closes on Self**: Finds paths and lines in polylines that touch or cross themselves. Companion to Topology: Line must not self-intersect, or self-overlap.
Automated Data Review

Feature on Feature Checks

**Geometry on Geometry**
- Searches for features from two different feature classes or within the same feature class that spatially interact (e.g., intersect) or are within a tolerance of each other.
- Comparison to Topology:
  - Line—must not overlap, intersect, overlap with
  - Polygon—must not overlap, contain point, overlap with

**Intersection on Geometry**
- Returns geometries for features in Feature Class 3 that intersect with the intersections of features from Feature Class 1 and 2.

**Polygon Overlap/Gap is Sliver**
- Returns overlap/gap geometries between polygon features from two feature classes that have a Thinness Ratio beneath a user-specified threshold. Optionally requires that the overlap/gap polygons be beneath a maximum area threshold.
- Comparison to Topology:
  - Polygon must not have gaps
Automated Data Review

Duplicate Geometry Checks

- **Duplicate Geometry**: Finds features of the same geometry type that are co-located.

- **Duplicate Vertex**: Searches for vertices in selected polyline or polygon feature classes that are within a specified tolerance of each other.
Automated Data Review

Database Validation Checks

**Condition Table (C array)**
- Finds records from selected feature class or table that do not meet the specified CTH parameters.

**Connectivity Rules**
- Perform geometry for features that violate the geometric network connectivity rules.

**Domain**
- Validates coded value and range domains to ensure that all values meet domain constraints.

**Relationships**
- Searches for records that are orphans or have improper cardinality in a relationship class.

**Subtype**
- Searches for feature classes with improper or null subtypes.

**Valid Value Tables (VVT)**
- Searches a selected feature class for features that do not have attribute combinations that correspond with rows in the valid value table.
Automated Data Review

Topology Checks

Find Dangles: Within a database topology, finds polyline features that have nodes that are within a tolerance but not connected to other features in the database topology.
Comparison to Topology:
Line must not have dangles.

Orphan: Finds single polyline features that are not connected in the database topology.

Unnecessary Nodes: Finds features that share a node and have identical attributes in editable fields.
Comparison to Topology:
Line must not have pseudo nodes.

Unnecessary Polygon Boundaries: Finds adjacent polygon features that share a boundary and have identical attributes in editable fields.
Conducting Automated Data Review
Collective Data Review (Batch Jobs)
Collective Data Review (Batch Jobs)

• About Batch Jobs

• Batch Job Manager

• Creating Batch Jobs

• Batch Validate

• ReViewer Service

• Demo: Creating and Executing a Batch Job
About Batch Jobs

• **Groups of batch checks**
  – Saved and run against the data

• **Managed using Batch Job Manager**

• **Saved as a ReViewer Batch Job file (*.rbj)**
**Batch Job Manager**

- **Create New Batch Job**
  - Right click in blank area at the top of the dialog box and click New Group.

- **Open Existing Batch Job**
  - Navigate to the .rbj file to open.

- **Insert Batch Job**
  - Inserts batch job into another batch job
  - Navigate to the .rbj file to insert.
Batch Job Manager...

Creating Batch Jobs

• Create Group

• Select Categories

• Select batch checks
Batch Validate

- Runs Batch Jobs
- Generates Log Files
  - C:\Documents and Settings\student\Application Data\ESRI\PLTS
ReViewer Service

- Windows Service that can be scheduled to execute a Batch Job.
- Can schedule multiple “Jobs” (runs in series)
ReViewer – Executable

• Run ReViewer validation outside ArcMap in several ways:
  – In Geoprocessing wrapped in python script
  – From command line
  – Through JTX as a workflow step
ReViewer – Other 9.3 Enhancements

• **New Checks**
  – Composite Check
  – Connectivity Check

• **Validate Only Modified Features**
  – In ArcMap and ReViewer Service
  – For versioned enterprise databases
  – Runs checks **only** on modified data

• **Improved Performance**
  – Optimized code to reduce Batch Job processing time
  – Large datasets with very large Batch Jobs will see the most improvement
Demo

Creating and Executing a Batch Job
For More Information

• [www.esri.com\reviewer](http://www.esri.com/)
  – Product Information
  – Demos

• [www.esri.com\training](http://www.esri.com/)
  – ESRI Virtual Campus
    • Intro to PLTS for ArcGIS 9.2 (Free)
    • Intro to MPS-Atlas ($25)
  – ESRI Instructor - Led Training
    • Data QC Using the PLTS GIS Data ReViewer
    • Data Production with PLTS
    • Cartography with PLTS MPS-Atlas
Questions?