• Previously state of data based on qualitative approach
• Need to quantify state of our data and identify deficiencies
• End-goal is great data
- ArcInfo Coverages to SDE
- Hansen 7 to Infor Public Sector 8
- Data managed by many people over the last 20 years with limited documented workflows
No surprise, there are issues with the data...

- Orphans between GIS and asset management
- Coverages now in Geometric network (flow direction, snapping, multi-part features, etc.)
- Spatial accuracy (average 10 ft. off based on field testing)
- How are we supposed to know if our data is "good" or "bad"?!
• Analyzing data health is not always fun or exciting
• Need to define and weight metrics (checks)
• Create tools (easy, standardized)
• Share results with organization
Sewer Asset Statistics

- 7 Feature Classes
- 107,420 features total
- 8 Check Types in Data Reviewer
- 2 Check Types in Python
- 5-10 Checks per Feature Class
- 46 Checks in Data Reviewer
- 80 Total Checks and growing

Groups of Checks

- Geometry and Polyline
- Database Validation
- Table
- Custom (using Python)
The Metrics

Find in the Data Map, a tool for viewing your data. This page is important, the results from a check are inputs to your quality assurance/quality control processes. The lower the number, the greater the priority the check's results have.

1. Start ArcMap.
2. On the main menu, click Customize > Toolbars > Data Reviewer.
3. Click the Select Data Check drop-down arrow on the Data Reviewer toolbar, click the plus sign (+) next to Duplicate Geometry Checks, then click Duplicate Geometry Check. The Duplicate Geometry Check Properties dialog box appears.

4. If necessary, type a unique name for the check in the Check Title text box.
The Metrics

- Duplicate Geometry checks
- Event checks
- Feature on Feature checks
- Polygon checks
- Polyline checks
- Spatial Parameter Evaluation checks
- Table checks
- Z-value checks
- Working with composite checks

On the main menu, click Customize > Toolbars > Data Reviewer.

Click the Select Data Check drop-down arrow on the Data Reviewer toolbar, click the plus sign (+) next to Database Validation Checks, then click Domain Check.

The Domain Check Properties dialog box appears.

Enter a name for the check in the Check Title text box.

Note: The check title can be used to describe the conditions you are looking for with the check.
Unique ID Check

- Null Values
- Unique Values

Checking for unique IDs
- Comparing table attributes
- Finding features with a SQL query
- Z-value checks
- Working with composite checks

3. Click the Select Data Check drop-down arrow on the Data Reviewer toolbar, click the plus sign (+) next to Table Checks, then click Unique ID Check. The Unique ID Check Properties dialog box appears.

4. If necessary, type a unique name for the check in the Check Title text box.

Note: The check title can be used to describe the conditions you are looking for with the check. This is useful when you have multiple instances of the same check to validate the same feature classes or tables but with different validation parameters.
Score Factors

- Number of Features
- Check Criticality
Output: SummaryTable.csv

- Derived from Data Reviewer output table and custom check output using Python.

- Table is then hosted in ArcGIS Online where we have the ability to overwrite and feed our operations dashboard.
Operations Dashboard for ArcGIS

- Provides out of the box elements/widgets
- Simple enough for any audience
- Easy to access, and requires little to no maintenance.
- Supports real-time data and can be automated to update on a schedule
Sewer Utilities Totals

**Vaults**
- Active, City Maintained: 76

**Catch Basins**
- Active, City Maintained: 9

**Manholes**
- Active, City Maintained: 15,944

**Lift Stations**
- Active, City Maintained: 29

**Complexes**
- Active, City Maintained: 1

**Cleanouts/Lampholes**
- Active, City Maintained: 1,914

**Valves**
- Active, City Maintained: 146

**Miles of Mains**
- Active, City Maintained: 347.96

**Pipe Types (Active, City Maintained)**
- Concrete Pipe: 41.75%
- Asbestos Current: 1.55%
- Null: 1.47%
- Ductile Iron Pipe: 1.34%
- Pulpoylin Chloride: 40.21%
- Reinforced Concrete Pipe: 7.24%
- Unknown: 4.52%

**Length of Active Mains by Type**
- Main: 3.24
- Force Main: 15.2
- Relief or Overflow: 1.8
- Flow Split: 0.2
- Siphon: 0.1
- Suspended Main Line: 0.1
- Diversion: 0.7
<table>
<thead>
<tr>
<th>Data Health Check Statistics</th>
<th>Mains</th>
<th>Manholes</th>
<th>Valves</th>
<th>Treatment Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feature</td>
<td>3,245</td>
<td>425</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>Check</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DR - Null values, key</td>
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</tr>
<tr>
<td>Error Count</td>
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<tr>
<td>Feature Total</td>
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<tr>
<td>Percent Total</td>
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<tr>
<td>Final Percent</td>
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<tr>
<td>Weight</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Errors</td>
</tr>
<tr>
<td>Total Sewer Assets</td>
</tr>
<tr>
<td>Overall Data Health (%)</td>
</tr>
</tbody>
</table>

- Mains: 3,245
- Manholes: 425
- Valves: 63
- Treatment Plants: 0
- Services: 790
- Pumps: 0
- Lift Stations: 2
- Nodes: 1,389
- GIS and IPS Orphans: 939
- Geometry Checks: 73
- Null Value Checks: 2,751
- Unique ID Check: 1,142
Where we are going...

- Develop a maintenance plan or allocate staff to fix these inconsistencies
- Track change over time
- Build checks for other utility datasets
The Conclusion

- State of data was based on an approximation/gut feeling but is now quantifiable
- Deficiencies have been identified and can be fixed
- Tools developed for ease of analysis
- Results are shared with organization
- Still more to do (other data sets, spatial analysis, track change over time, etc.)
Image and Movie Credits

The Cowboys (1972)
Annie (1982)
Princess Bride (1987)
The Matrix (1999)
The Greatest Showman (2017)
Back to the Future (1985)
The Good, the Bad and the Ugly (1966)
City of Salem Capitol

https://traveloregon.com/