

Data Analysis and Visualization

These guidelines aim to help institutions to effectively communicate information through GIS data analysis and visualizations. Key recommendations include:

- Data Analysis
- Data Visualization

Data Analysis

i. Geoprocessing:

- Verify the spatial relationships to avoid overlaps, gaps, or invalid geometries.
- Ensure all spatial datasets have the same coordinate system or project them to a common one for accurate analysis.
- Convert data between different formats (e.g., vector to raster) based on analysis requirements.

ii. Spatial Analysis:

- Utilize buffering and proximity analysis to study the relationships between features and their surroundings.
- Combine spatial datasets and aggregate data to analyze relationships and summarize information.
- Use appropriate spatial interpolation methods to estimate values at unsampled locations.
- Apply network analysis to model movement and connectivity within spatial networks.

iii. Statistical Modelling:

- Split the dataset into training and testing subsets for model training and evaluation.
- Clearly define the dependent variable and select relevant independent variables for the model.
- Choose appropriate statistical models based on the nature of the data. (e.g., linear regression, logistic regression).
- Assess model performance using appropriate metrics (e.g., accuracy, RMSE, R-squared) and cross-validation techniques.
- Interpret the results of the statistical model in the context of the research objectives and data patterns.
- Validate the model on unseen data to ensure its generalizability and avoid overfitting.

Data Visualization

i. Map Design Principles:

- Simplicity - Maps should be visually clean, focusing on the most important information while removing unnecessary elements.
- Legibility - Ensure that the map's text, labels, and symbols are easy to read and understand, even when zoomed in or out.
- Balance - Maintain a visual balance on the map by evenly distributing elements, avoiding overcrowding in any particular area.
- Contrast - Use contrasting colors and symbols to make the map visually appealing and enhance the distinction between different features.
- Hierarchy - Arrange map elements in a clear hierarchy, with more important or prominent features receiving greater visual emphasis.
- Consistency - Maintain a consistent design style, color scheme, and symbology throughout the map to create a coherent visual experience.

ii. Use of Symbology:

- Color - Use color wisely to convey meaning, such as warm colors for higher values and cool colors for lower values.
- Size - Use different symbol sizes to represent varying magnitudes or quantities, ensuring that the size variation is easily distinguishable.
- Shape—Differentiate between various features using distinct symbol shapes, especially when dealing with multiple datasets on the same map.
- Iconography—Utilize appropriate icons to represent specific features or categories, making the map more visually informative.
- Labels—Provide clear and concise labels for important features or regions to enhance map readability
- Transparency—Use transparency for overlapping elements to prevent visual clutter and improve comprehension.