Digital Scholarship Foundations: Digital Mapping

Week 1: An Introduction to Mapping and Spatial Data

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Princeton Research Data Service (PRDS)

Princeton Research
Data Service

Data Management Workshops from PRDS

Interested in learning more about data management and how to improve your research data workflows? The Research Data Stewardship workshop series is now open to all Princeton University faculty, staff, and students! There are no prerequisites, so sign up for any session that is interesting to you.
Questions? Email prds@princeton.edu

Research Data Stewardship series: Introduction to Data Management
Wednesday, October 8, 2025, 11-12pm
Location: Commons Library Classroom (D112)

Research Data Stewardship series: Data Organization
Wednesday, October 15, 2025, 11-12pm
Location: Commons Library Classroom (D112)

Research Data Stewardship series: Documentation and Metadata
Wednesday, October 22, 2025, 11-12pm
Location: Commons Library Classroom (D112)

Research Data Stewardship series: Publishing Research Data
Wednesday, October 29, 2025, 11-12pm
Location: Commons Library Classroom (D112)

DSF Workshop Series Objectives

- Participants will apply version control methods
- Participants will recognize different types of data, the file types that support them, and how to use them.
- Participants will effectively manage project repositories.
- Participants will learn the building blocks of the web and digital publication.
- Participants will develop their own project or proof of concept.
- Participants will discuss the ethics and responsibilities of working with data and digital maps.

So what does that mean?!

DSF Overview

We will:

- Learn a range of transferable skills
- Discuss sustainability and preservation
- Think critically about the application and limitation of digital methods

Our approach:

We will build a series of map that use common digital tools and work through the full research life cycle.

My Lens: Spatial Humanities

Definition: An interdisciplinary field and collection of methods that utilize geographic information to analyze and interpret different spatial forms

Some key questions:

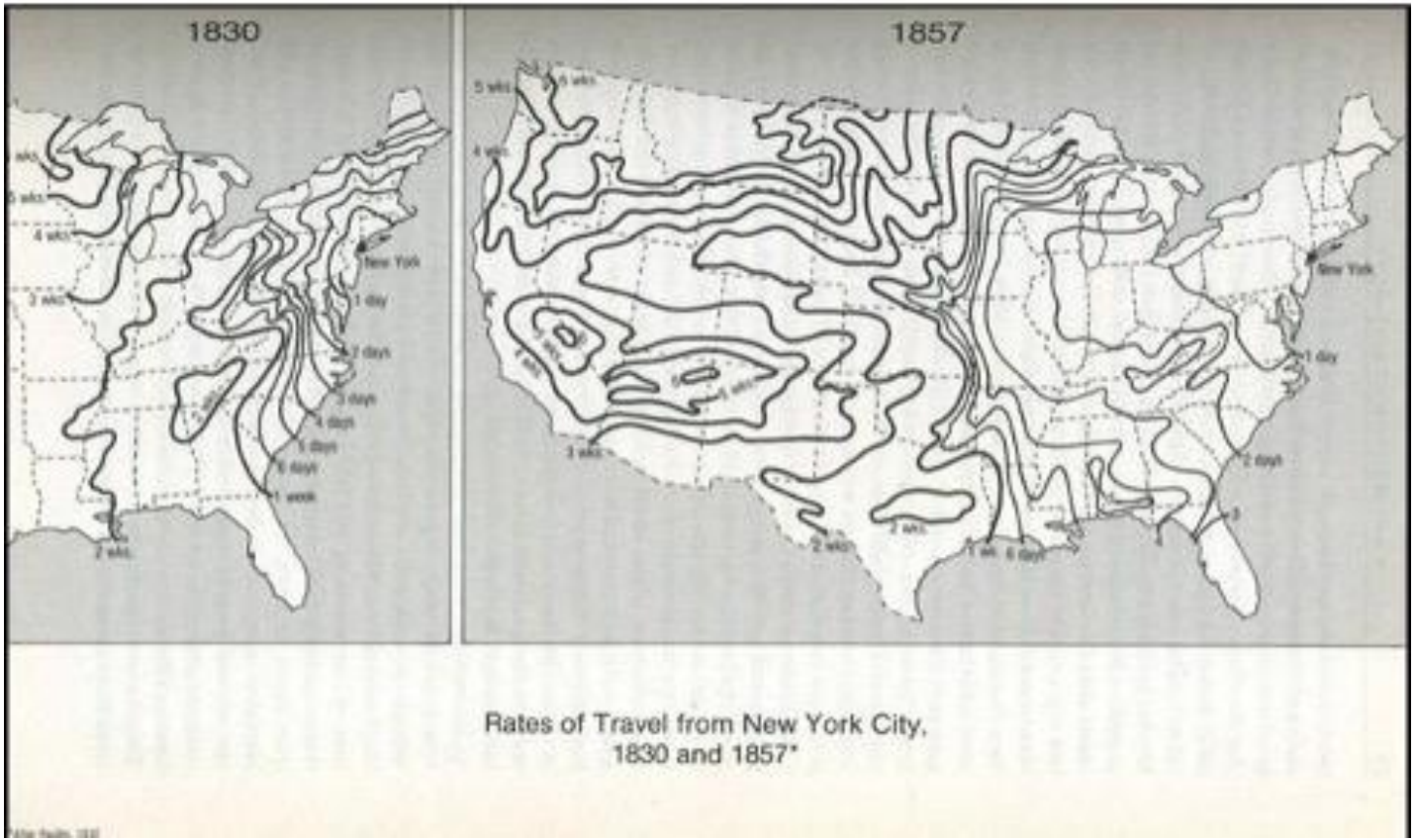
- How can we think about and engage with space?
- How do we address the tension between the supposed precision of mapping and the ambiguity and uncertainty of our research?
- What tools will help us create maps that further our research agenda?

Why Digital Mapping?

Spatial Analysis

Representations and/or Illustrations

Storytelling



William Cronon, *Nature's Metropolis: Chicago and the Great West*

Today’s Objectives

- Introduce the benefits and challenges of digital mapping
- Identify key technical and methodological concepts of digital mapping
- Review different file and data types
- Become comfortable with a text editor
- Discuss the relationship between data and visualization

The Digital Map Mapmaker's Toolkit

Plain text files

Text editor

Geocoder

Visualization platform

Publishing mechanism

Thinking Spatially About Your Research

What in your research can be represented on a map?

What data do you have already? And what data do you still need?

How does spatial information need to be structured for mapping and what are the main types of spatial data?

Mapping Data Challenges

Common challenges

- Multiple names for a place
- Place does not exist anymore
- Uncertainty about location of place

What challenges do you anticipate with your map/data?

Geographic information

Spatial Humanities: An interdisciplinary field and collection of methods that utilize geographic information to analyze and interpret different spatial forms

Need to familiarize yourself with vector and raster data

Raster data

a matrix of pixels or cells

use when representing continuous fields or surfaces

We will create raster data when we georeference a map

Vector Data

Potential representations

- Points
- Lines
- Polygons

Data Structures

To create digital maps, you may need to familiarize yourself with data structures and file types that you do not use regularly or have not encountered before. Throughout this series we will engage with three main structures:

- tabular: Tabular data is probably what you are most comfortable with. If you have ever worked with a spreadsheet, you have worked with tabular data.
- key-value: Linked data items that establish constants (the key) and variables (the value).
- tree-like: Nested data that branches out from nodes to maintain hierarchical relationships of data. Think of how a family tree begins and then branches out each generation.

Common File Types for Mapping

.csv: Comma-Separated Values (tabular)

.json: JavaScript Object Notation (key-value)

.kml: Keyhole Markup Language (tree-like)

.shp: Shapefile

Approaching Mapping Platforms

Each platform has its own particularities and limitations.

Determine what requirements are needed for you to use that platform by browsing documentation.

- What are its file requirements?
- Do we need to change our data structure?
- Do we need to add anything to our dataset?

Visual Studio Code and Text Editors

What is VS Code

- Lightweight, but powerful text editor
- Popular with programmers and others
- Integrated Development Environment (IDE)

Why VS Code or another text editor

- Easily read and edit plain text files
- IDE allows for predictive code and other development features all in one space

Getting Started: Questions about Data

What data do you have?

What data might you need?

What is the most important data you want to show?

How do you want your data to relate to each other?

Getting Started: Questions about Visualization

How will others interact/engage with your project?

How will others interpret your visualizations/maps?

Are there any maps or visualizations out there you like?

Are there any you don't like?

Getting Started: Representing your Data

Potential Representations

- Points
- Lines
- Polygons

Accompanying Representations

- Pop-up cards
- Icons
- Legends
- Layers

More Decisions: How Will Computers Read your Data?

How will you make your data machine readable?

Structure: tabular; key-value; tree-like

File Formats: .csv; .json; .xml

Transformation Tools:

- tabular: Excel; Google Sheets; OpenRefine
- key-value: APIs; Programming Languages
- tree-like: Oxygen

One Tool to Rule them All: Text Editor

Structuring Your Data

Structuring: Organizing your data and gathering additional data

Questions to ask yourself and of your data:

- What do you want your map to display?
- What columns do you need to organize and add data?
- What data will be visible to the end user?
- Is your data consistent?
- How do you make your data mappable?

What Data Do We Need to Transform?

Photographs as JPEGs

Hand drawn map as PNG

Metadata spreadsheet as Google Sheet