A Cartography Checklist and Recommendations for Good Maps... (Static & Interactive)

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Note that this work was originally based on a document titled "What All Good Maps Must Have" from Dr. Andy Bach's Cartography Class at Huxley College of the Environment, WWU, circa 2003. It has been expanded and updated since that time.

STATIC Maps Checklist

While there are no absolute rules for cartography there are commonly agreed-upon conventions that are typically followed for professional map production. Regardless of the cartographic style or content, most maps have the following elements. While not required for every map, these elements should at least be considered.

1. TITLE ("Required")

The title should be in a large font, easily identifiable as the title of the map and typically include descriptive text as to the location and purpose of the map. If the map is thematic, the theme should be included in the title. For example: *Corn Production in Washington, 1990*. The title is usually the largest font size of all lettering on the layout and is typically a dark color, however, it should not dominate the map graphic itself. The title does not need to be at the top of the page (though it often is). For published materials (e.g., books or articles) the title may be included in a figure caption instead. Map should not have (nor need) the word 'Map' in their title.

2. MAP CREDITS ("Required")

Map credits are highly recommended for professional maps, providing documentation on who-what-when regarding the map's production and greatly increasing the map's usability (and longevity). Credits can include:

- SOURCE OF DATA (especially on thematic maps)
- NAME of the cartographer
- DATE of the map creation/publication
- DATE of the map data
- Optional: PROJECTION of the map (especially for small-scale maps)

3. SCALE INDICATOR (Recommended)

The scale of the map is typically indicated by a graphic scale bar, a representative fraction or a verbal scale so that the reader is able to determine distance. For maps that will be shared digitally a graphic scale indicator (*not* a representative fraction or a verbal scale) must be used. For small scale (global) maps where the scale varies across the map it is better to indicate scale by showing lines of latitude and longitude or by use of a variable scale indicator. For a recognizable geographic area (for example the continental USA) a scale indicator may not be needed.

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4. ORIENTATION / NORTH INDICATOR (Recommended)

A map should indicate which way is north (and/or south, east and west). Commonly this is done by a north arrow or a compass rose. Orientation may also be shown by tic marks or a graticule (e.g. lines of latitude and longitude). By convention north is towards the top of the page (thus some maps do not have north arrows). For maps where north is not at the top of the page a north arrow (or indicator) is essential. For a very recognizable geographic area (for example the continental USA) the geography itself can provide orientation and serve as the indicator.

5. LEGEND (Recommended)

A legend defines the symbols or colors used on the map. Maps (and/or certain map features) do not need legends if the symbology is so common or simple as to be easily understood by the reader. However, it must be clear what each marker or line type, weight and pattern represents. The legend does not need to be labeled "Legend." The more complicated the symbology on a map the more important the legend becomes.

6. MAP AND PAGE BORDERS (or Neatlines) (Recommended)

A MAP border identifies exactly where the mapped area ends. The border is sometimes the thickest line on the map and should be close to the edges of the mapped area. The distance between the mapped area and the map border should be the same on all sides (balanced).

A PAGE border surrounds the entire map layout (enclosing and grouping the map(s) and the map elements: title, legend, text boxes, etc.).

Both of these borders are sometimes referred to as a 'neatline.' In addition, there is sometimes a thin additional line just inside or just outside of a map border or a page border (accentuating the border and ideally making it more visually appealing) that may also be referred to as a neatline.

7. LOCATOR MAP (INSET) (Recommended)

A Locator inset map is needed if the area of the map is not easily recognizable, especially for large scale maps. Locator maps are *smaller* scale (as compared to the map they are used with), and have simpler symbology and less detail, text, etc. Within the Locator map there should be an indication of where the main map is located (an extent indicator, a label, etc.).

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OPTIONAL: An Inset map can also be used for a DETAIL map. Detail maps are *larger* scale (as compared to the map they are used with) and show a sub-set area of the main map in greater detail.

8. EFFECTIVE GRAPHICAL DESIGN

Layout design refers to the planning and decision-making processes involved in the visual display of the cartographic elements. You can achieve balance by rearranging the size, shape and location of the map elements (north arrow, legend, scale, title, etc.) and changing size of the text, border. etc. The layout / map elements should be:

- Neat and clear
- Appropriately and consistently generalized
- Symmetrically balanced (avoid crowding or large blank areas)
- Without unnecessary clutter (keep it simple, be wary of 'artistic' details)

9. VISUAL HIERARCHY

A hierarchy of symbology should be used for the lettering, line weights and shading. More important features are typically larger and/or darker, less important/background information should be smaller and/or lighter. Strive to not "over weight" or "under weight" features.

10. PURPOSE / Audience

All maps have a purpose which should influence every element of the map and the map layout. A cartographer should be able to clearly articulate the purpose of their map and should keep the audience (who the map is going to be used by) and the client (who the map is being produced for) in mind. Even if a map is a general reference map intended for a broad audience, that is still a purpose and audience.

NOTE: Any, or all, of the above 'rules' can be (and frequently are) violated at the discretion of the cartographer. This is fine IF doing so better serves the map's purpose and audience.

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INTERACTIVE (Web) Maps Checklist

Note that for interactive, online maps created using ArcGIS Online, most of the requirements below are a part of the "Web Mapping Application" as opposed to the "Web Map." An ArcGIS Online Web Mapping Application is the container that allows a Web Map to be delivered to the general public in an intuitive and useful manner. As such, the Web Mapping Application needs to supply whatever support information is required to use the map properly. For simplicity, these combined Web Map Applications and Web Maps are referred to here as "Interactive Maps."

As with static maps, there are no absolute rules for interactive maps. Instead, the elements below are guidelines of common web-map best-practices, regardless of the software platform.

1. TITLE ("Required")

The title should be in a large font, easily identifiable as the title of the map and should include descriptive text as to the location and purpose of the map. If the map is thematic, the theme should be included in the title. For example: *Corn Production in Washington, 1990*. Interactive maps often have a descriptive sub-title supporting the main title. Sub-titles can also be used for listing the name of the cartographer and/or the organization hosting the map. This Title is often repeated in the *About* and/or *Credits* sections.

2. CREDITS ("Required")

Map credits are sometimes combined with an *Info / About* section. Some of the information can also go in the title or sub-title or can be included in names of the data layers. Regardless, the following information should be included and available somewhere.

- NAME of the CARTOGRAPHER
- NAME of the ORGANIZATION responsible for the map (often including a Logo and/or URL)
- DATE of the MAP creation/publication
- DATE of the map DATA
- SOURCE OF DATA
- SOURCE(S) OF PHOTOS (if photos are used)

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3. LEGEND / Layer List (Recommended)

A Legend defines the symbols or colors used on the map. Maps (and/or certain map features) do not need legends if the symbology is so common or simple as to be easily understood by the reader. However, it must be clear what each marker or line type, weight and pattern represents. Having labels and / or 'pop-ups' associated with features lessens the need for a legend. The more complicated the symbology on a map is the more important the legend becomes.

Interactive maps often also have a list of *Layers*. Optionally, these Layer Lists can allow the user to turn individual layers On / Off (see Interactivity below).

Sometimes the Legend and the Layer List are combined (i.e., a list of layers that can be turned on / off and show symbology for each layer).

4. ABOUT SECTION / Information / Usage Instructions / Help / Statement of Map Purpose (Recommended)

The About section is sometimes provided via a Splash screen when the map is first opened. The About section is sometimes combined with the map Credits. The About section is sometimes labeled Help, Info, Usage, etc.

Unless the entire content and functionality of the map is completely obvious the map should have an easily located About section telling the user what the intention of the map is and how to use the features included.

Links to data sources used in the map, hosting organizations, sources for more information, or related websites may also be provided. Likewise, a Contact link (to the Cartographer and/or their Organization) may be provided.

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5. INTERACTIVITY (With Instructions) (Recommended)

The most fundamental difference between an interactive map and a static map is that online maps are interactive. Almost all interactive maps should include:

- The ability to PAN and ZOOM the map
- The ability to turn LAYERS ON / OFF
- The ability to click on a feature to obtain more information (i.e., an Attribute Pop-Up)
- The ability to print or export the map (or a portion of the map)

Interactive maps can also include (optional) other interactive tools, such as:

- The ability to change the BASEMAP
- Spatial BOOKMARKS
- The ability to see one's LOCATION on the map (via a GPS or other location methods)
- The ability to find ADDRESSES, FEATURES or LOCATIONS on the map
- The ability to perform ROUTING and directions
- The ability to change the SYMBOLOGY of the map (colors, etc.)
- The ability to ADD DATA layers to the map
- The ability to EDIT DATA layers in the map
- Analytical and GEOPROCESSING tools

The choice of which tools or types of interactivity are provided is determined by the purpose / audience of the map.

Whatever tools or interactivity are provided, they should be clearly explained (both their function and their usage) if they are not completely intuitive. This can be in an *About* section, in a *Splash Screen*, a *Help* section or elsewhere. Regardless, it should be easy to find and understand.

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6. SCALE INDICATOR (Recommended)

Since the scale of an interactive map is variable a SCALE INDICATOR is usually included. The scale of an interactive map is typically indicated by a graphic bar scale.

7. ORIENTATION (Optional)

Most interactive maps default to North being up. If the map's orientation can be rotated, then a NORTH INDICATOR is recommended.

8. LOCATOR MAP (INSET) (Optional)

An Inset LOCATOR MAP (also referred to as an Overview map) can be helpful if the area of the map is not easily recognizable or will frequently be used at large scales (zoomed in).

9. EFFECTIVE GRAPHICAL DESIGN

Layout design is less of a component for interactive maps than for static maps. Still, the layout / design of the webpage / container for the map remains important. Graphical design refers to the planning and decision making processes involved in the visual display of the spatial data. The map and map elements should be:

- Neat and clear
- Without unnecessary clutter (keep it simple, be wary of 'artistic' details)
- Easy to find *Credits, About* and *Help* sections

10. VISUAL HIERARCHY

A hierarchy of symbology should be used for the lettering, line weights and shading. More important features are typically larger and/or darker, less important/background information should be smaller and/or lighter. At the same time, do not "over weight" or "under weight" features. Using scale-dependent symbology and labeling can help in maintaining a usable map at varying scales.

Visual hierarchy (i.e., drawing the user's attention to the important elements of the map) can be enhanced by the use of SCALE-BASED VISIBILITY and SCALE-BASED SYMBOLOGY. This is the use of 'scale ranges' for different data layers so that certain features are only shown at certain map scales (typically showing more features and more text as the user zooms in). Likewise Scale can be used to change the symbology of features (again, typically showing more detail as the user zooms in).

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11. PURPOSE / Audience

All maps have a purpose which should influence every element of the map and the page layout. A cartographer should be able to clearly articulate the purpose of their map and should keep the audience (who the map is going to be used by) and the client (who the map is being produced for) in mind. Knowing the purpose and audience of a map drives many of the decisions regarding symbology, map tools to include (or not), Pop-Ups, etc.

NOTE: Any, or all, of the above 'rules' can be (and frequently are) violated at the discretion of the cartographer. This is fine IF doing so better serves the map's purpose and audience.

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