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# Accessibility Guide for Static Digital Maps

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**Static maps** are included as part of electronic documents, usually PDFs. The maps generally function as images which cannot be interacted with by the viewer. To be accessible for a visually impaired reader, the maps must be explained by text that can be accessed by other reading technologies. This text can be a description of the map message, a data table, a list, a link to more information, or contact information for someone who can describe the map. Simple maps can include the data with the map; complex maps may need to point elsewhere.

All elements should flow together as if it were a text-only document. Imagine the document without the maps, with alt-text in its place. Does the map stand alone or does it need more information? Does a good description of the map message exist in the surrounding text or elsewhere? Does the order makes sense and does it flow?

The recommendations are followed by common design scenarios. Find a situation similar to yours, then be creative. Applying accessibility varies with software. See the “Software Tips” section for suggestions.

## Recommendations

- Organize the map’s message by arranging all the elements in a logical reading order.
  - Connect the elements by placing them in order, by referencing, or by linking.
  - A good electronic reading order for comprehension is text first, then the map, then a table. Difficult reading order can be touched up after exporting to PDF by moving elements in the tag tree.
  - Don’t repeat. Each element should add unique information and work with the rest.
- Use captions and alternative text (alt text).
  - Put the detail in body text or captions so it is available for all readers and editors. These are easier to edit since word processing features are available like spell check, find/replace, links, indexing, and automatic numbering. With this information available, the alt text can be brief. A short alt text can indicate the type of map and then reference the more detailed descriptions.
  - If the alt text must stand alone, it must detail the message the map is trying to convey. However, keep in mind that alt text is hidden from most users and may be forgotten when other updates are made to a document.
- Make repetitive text easier to scan; list the unique information first. For example:
  - Figure 12: Water table elevations, map of Felton Prairie Fen Area, Clay County, Minnesota
  - Figure 13: Pre-mining conditions, map of Felton Prairie Fen Area, Clay County, Minnesota
- Export maps as images when possible, and insert them into a document program that applies accessibility, such as MS Word or InDesign. Note that image files are only pixels, so there is no text available for reading technology. Important text such as titles and captions should be typed into the document outside the image. Apply accessibility measures such as alt text with the document program.
- If exporting maps directly to PDF, export flattened (without layers). Check the dialog boxes for options. Then apply accessibility with a version of Acrobat Professional. Tag the entire map and legend as a figure, then add alt text. Tag captions and titles as text. Tag tables as tables and establish header rows.
- Tidy up. Remove any elements that clutter the message by tagging them as background, such as decorative images. Repetitive items may be able to be described as a group with the first one, and the rest tagged as background.
- Read the final flow. Does it make sense? Could you use the text alone? If you needed more information, could you easily find it?

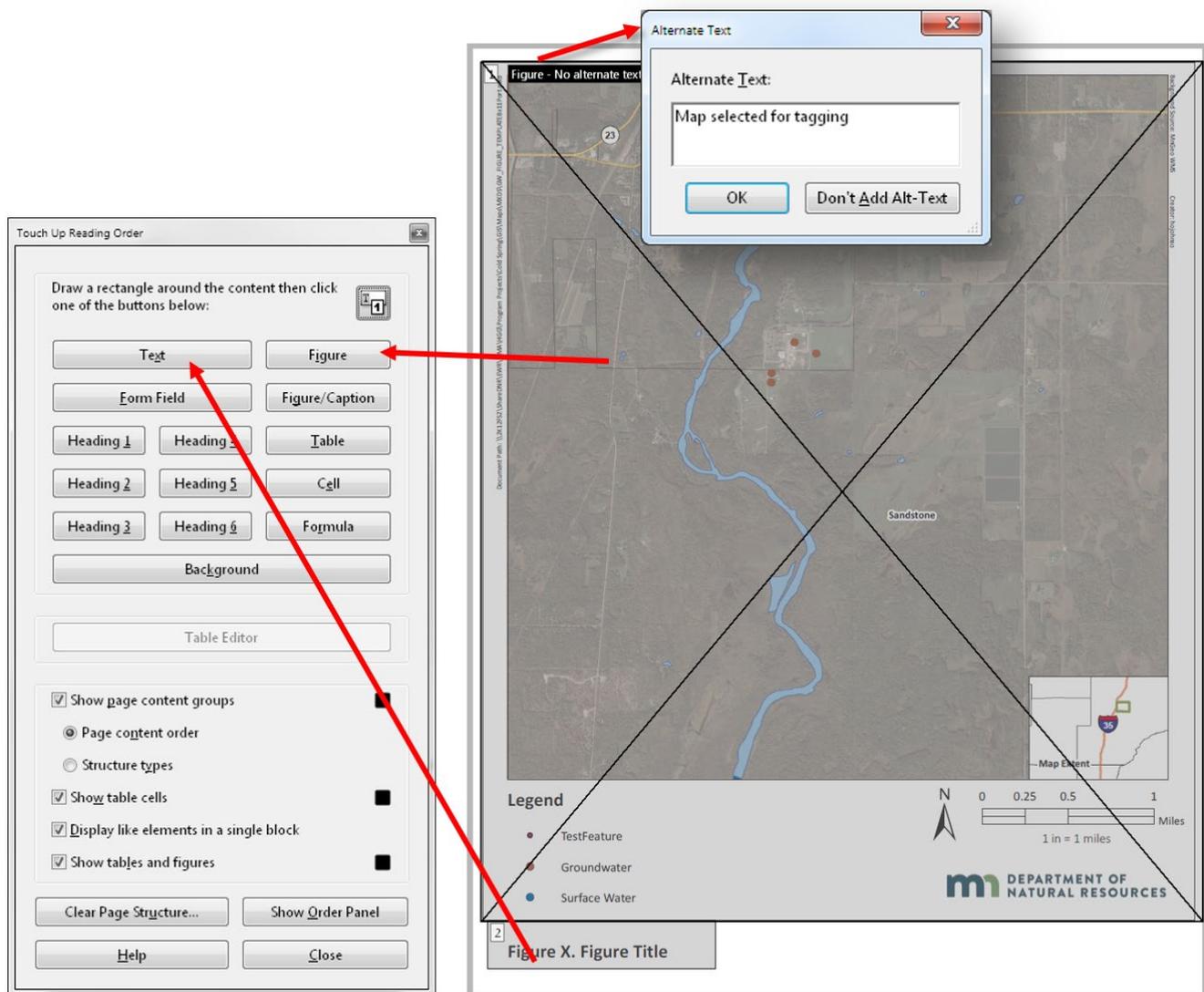
# Tagging map PDFs with the Acrobat Professional

This short checklist is for tagging maps in PDFs using Acrobat Pro, XI, DC, 2017, 2018, etc. The exact steps will vary with each version.

Design your maps so the text is outside the map image area so each is easy to select, and export without layers (flattened) or items may disappear during tagging.

Open the tool “Touch Up Reading Order” or “Reading Order,” select an item with the cursor, and tag as follows.

1. Select the entire map and legend as one unit and tag it as a **Figure**.
2. Select the caption or title and tag it as **Text** (or a heading, depending on your structure).
3. Add **alternate text**.



Additional accessibility protocols must be applied to the rest of the document but are not covered in this guide. The “Software Tips” section contains a longer checklist on page 10.

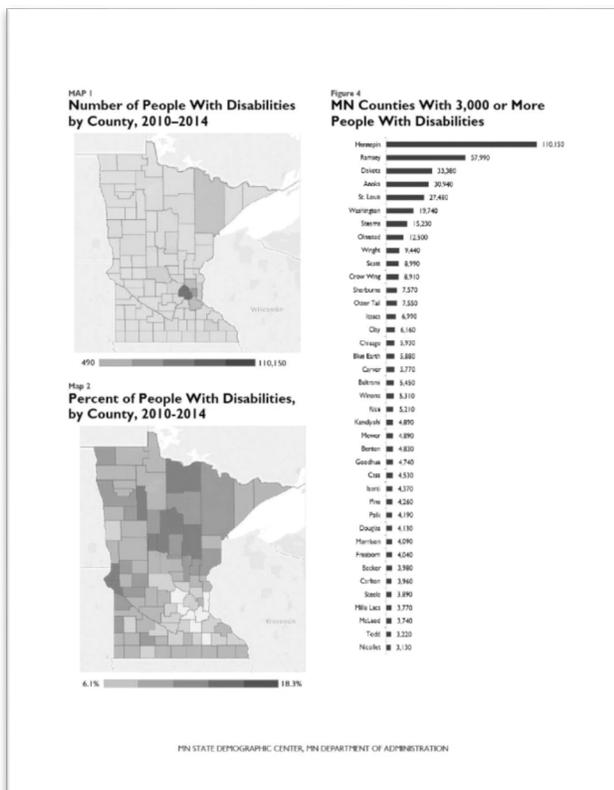
See the state accessibility website listed on the cover page for best practices for map design (**Map Design Guide**),” other types of maps, and making other software accessible.

# Design scenarios for accessibility

## Include map, description, and data together in the document

This example is ideal for simple maps. It shows a map with a good title, description, and data table, all following each other. Since the necessary descriptions and titles are already present in a proper order, the alt text can simply refer to the table: "Map 1. See Table 1, page 6."

- This is possible for smaller data sets. For larger tables, link to a table in an appendix, a website, or a spreadsheet/CSV file. Ensure that the linked text matches the title.
- If the table is too large or complex to be useful, give good descriptions of the map message somewhere: in the body text, caption, alt text, or a link to more information elsewhere. Arrange all in a reading order that makes sense. See examples on the following pages.



**Differences in Disabilities by Racial and Cultural Groups**

As with many health outcomes observed in Minnesota's population, wide disparities in the prevalence of disabilities exist when examined by race and cultural groups. Recent analysis by our office to examine disabilities in the typical working-age population (ages 18-64) found disability rates ranging from about 18-22% for Ojibwe, African-American, and Dakota populations, compared about rates below 5% for Asian Indian, Chinese, Filipino, Korean, and Russian populations. Estimates of the number and percent of working-age adults affected by a disability by cultural groups are shown in Table 1.\* These data can assist disability advocates and service providers better understand disability rates among various groups, as well as culturally tailor their services.

**TABLE 1**

**Number and Percent of People With Disabilities, Ages 18-64, By Cultural Groups, Minnesota, 2010-2014**

Broad Race or Ethnicity Group	Cultural Group Within Broad Race or Ethnicity Group	Estimated People (Ages 18-64) With A Disability	Estimated Percent (Ages 18-64) With A Disability
American Indian	Dakota	900	22%
American Indian	Ojibwe	3,400	18%
Asian	Asian Indian	900	3%
Asian	Chinese	400	2%
Asian	Filipino	300	3%
Asian	Hmong	3,700	10%
Asian	Korean	600	4%
Asian	Laotian	500	6%
Asian	Vietnamese	1,500	8%
Black	African-American	24,100	19%
Black	Ethiopian	1,000	9%
Black	Liberian	600	6%
Black	Somali	2,000	9%
Hispanic	Mexican	7,100	7%
Hispanic	Puerto Rican	1,000	13%
White	Russian	200	4%
White	White, Not Russian	227,500	8%
All Minnesotans	All Minnesotans	287,400	9%

**Work Status and Labor Force Participation Among Minnesotans With Disabilities**

Compared to persons without disabilities in Minnesota, persons with disabilities are:

- 2.6 times more likely to be unemployed (among those ages 18-64)
- 3.4 times more likely to be not participating in the labor force (among those ages 18-64)
- More than half as likely to work full-time, year-round (among those ages 18-64)

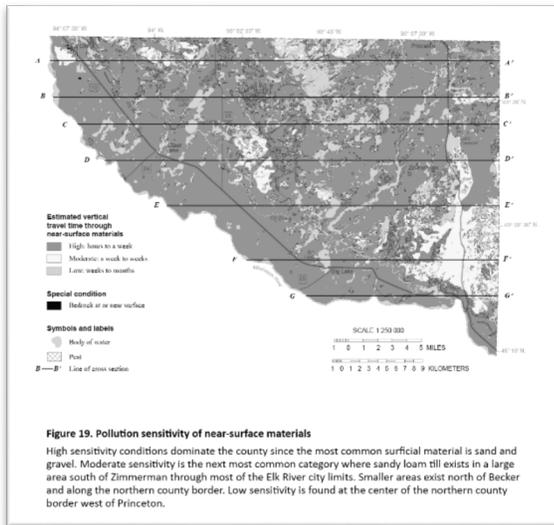
These data reveal that many persons with disabilities face a challenging employment environment. Due to the nature of their disability, some individuals have constrained job prospects or inability to work whatsoever, while others may experience hiring discrimination due to employers wrongly perceiving that they cannot perform a particular job or hesitation to put the necessary accommodations in place to support a worker with a disability.

\* These data were originally published in the January 2016 report, "The Economic Status of Minnesotans: A Chartbook With Data For 17 Cultural Groups," available online at <http://mn.gov/admin/demography/reports-resources/our-publications/>

PN STATE DEMOGRAPHIC CENTER, PN DEPARTMENT OF ADMINISTRATION

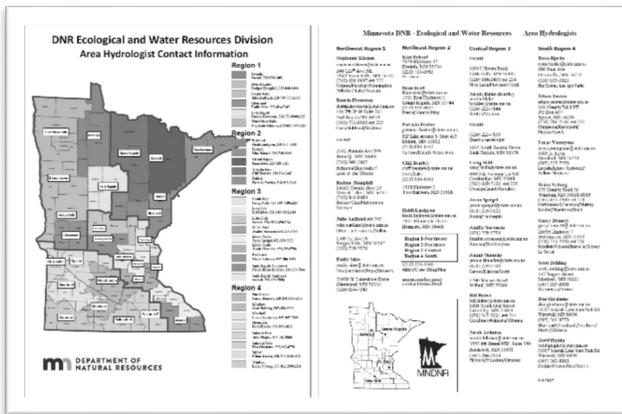
# Provide descriptive text near the map

When the data table cannot be included, describe what the map is trying to convey in the body text or a caption that immediately precedes or follows the map. Then the alt text can simply refer to the figure number and type of map. How much detail you put in the alt text depends on how much other information is provided around it.

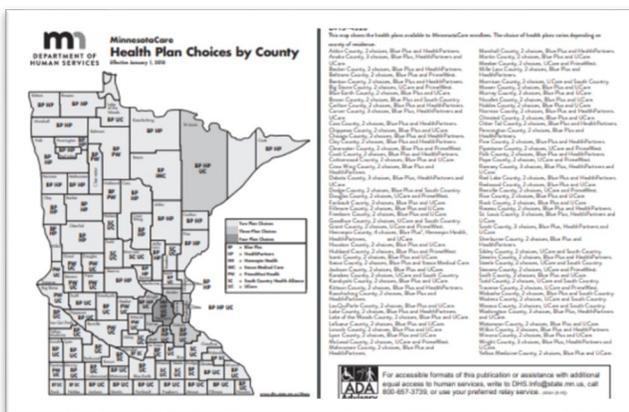


Provide alt text that directs the reader to data or a list.

Example 1: “Map of Minnesota DNR regions. Addresses on following page.”



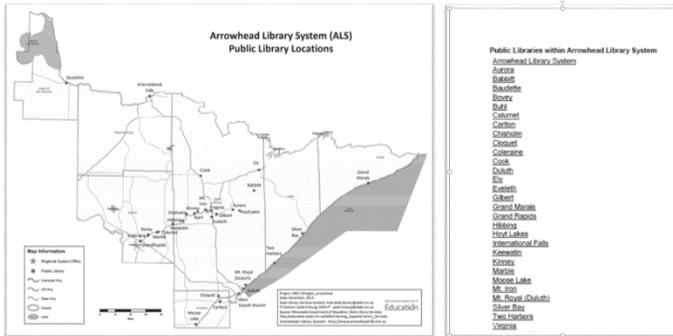
Example 2: “Minnesota Map of county health care choices. See list on following page.”



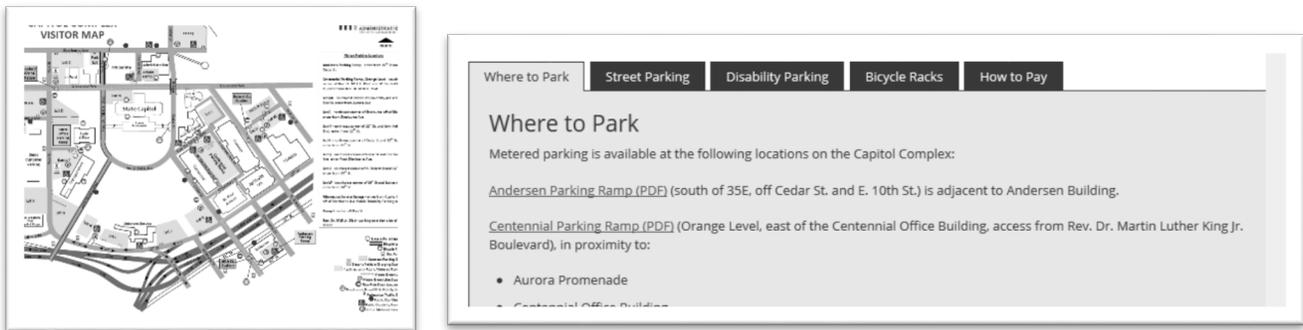
## Link from the map to more information

Provide alt text that directs to a hyperlinked list:

“Map of libraries in the arrowhead region. Links to libraries on following page.”

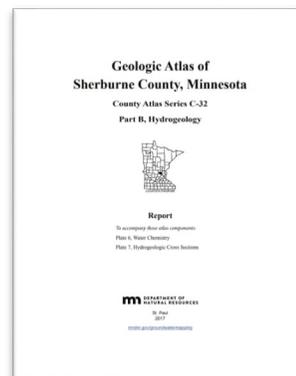
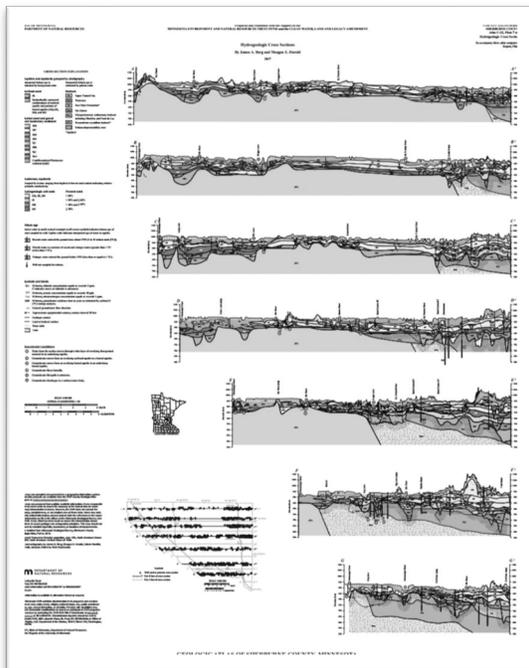


Provide a link in the document to a navigable website with descriptive text and addresses.



Provide hyperlinks or references between documents.

- Jump to or reference within a document: from the text description to a map on another page (and back).
- Jump to or reference another document with a link. If the target document is long, the text of the link should include the specific page and/or figure number.



## Provide a human contact

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A human is the best accessibility tool. Provide contact information, put it up front in the reading order where it is easy to find, and make sure that your staff is prepared to take calls for the life of the map. Assistance may involve providing the maps in an alternative format, or merely guiding a caller through the map contents. Decide whether providing an alternative format or a human being would be more effective. See your agency for your departmental policy.

## Resources

WCAG Tutorials:

- [Complex images](#)

4 Syllables:

- [Writing text alternatives for maps](#)
- [Text alternatives for images with captions](#)

# Software Tips

The following are some notes and tips gathered on software commonly used to create maps.

## Creating maps and exporting

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### GIS Software

Most maps are created from a GIS program like ArcMap then exported to other formats such as PDF or JPG. GIS software currently will not produce PDFs tagged for accessibility, so this will have to be done in other software such as MS Word, InDesign, or Acrobat Pro. These export settings for ArcMap may make the process easier.

Export to PDF and tag in Acrobat. Select settings for the purpose of your document.

- Decide what you really need. Try for the simplest PDF. Additional attributes can clutter up tags and add to the file size. Check that your files aren't too large for practical downloading.
- Export PDFs flattened. Layers can disappear when applying accessibility to the exported PDF.  
In ArcMap: Options > Advanced > None.
- Note: applying accessibility in Acrobat can remove georeferencing.
- Export to an image file, place in a document application, and apply accessibility. Here are things to consider:
  - Exporting to an image file will tag easily but may pixelate, depending on the chosen resolution.
  - Exporting to a vector file may be crisper but also may bring in messy attributes.

### Adobe Illustrator

GIS maps can be exported to Adobe Illustrator and refined for publication. In Illustrator, the export to PDF has many export options. The following are a few suggestions.

File > Save As > PDF: select settings for the purpose of your document.

- The comments about GIS exports above also apply to Illustrator.
- Flatten your art when possible. Layers increase file size and sometimes disappear when accessibility features are applied in Acrobat. Decide if they are needed for your purposes.
- "Optimize for fast web view" reduces file size by compressing text and line art with no loss in quality.
- Deselect "Preserve Illustrator Capabilities" unless you want others to be able to modify your PDF. It increases file size.
- Color and Grayscale Bitmap images: stay at 300 dpi or above for quality purposes
- Color conversion: Converting from CMYK to RGB is okay. The reverse is not recommended.

## Inserting maps in document programs

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### Microsoft Word

MS Word is a document program that receives maps as images, and has accessibility functions built in to produce a tagged PDF. Inserting images eliminates the extra attributes that come in from exports to PDF from ArcMap or Illustrator. Using MS Word allows more flexibility with editing, and allows you to apply the accessibility and save it. The drawback is that you can't control the image quality or the scale.

Procedure:

- Export maps as image files, insert into MS Word as inline pictures, and add alt text.
- Keep the title and caption out of the image so it can be edited and tagged with MS Word.
- Apply accessibility to the rest of the document elements.
- You can check for issues within MS Word before exporting to PDF. Final tweaking will need to be completed in the PDF with Acrobat. See the state accessibility site listed on the cover page for more information.

### Adobe InDesign

InDesign is an advanced layout application that receives finished map documents and has advanced accessibility functions. It is made for long documents and mixed layouts (text and graphics) and professional publication to print, web, or e-documents. Map files are linked, so work can continue on maps and the InDesign file simultaneously. Accessibility is applied within the program and saved before export to PDF.

Image procedures and recommendations: add alt text to each image: right-click > Object Export Options.

- If done individually, use Custom, Based on Object, and fill in the alt text.
- If there is already metadata with the image, use From Structure and choose the option that contains the alt text. Alt text can be added at any time to the images. You can also set up an object style to do this automatically as the images are placed in the document.
- Flatten linked images when possible. This guards your image from being divided up or elements disappearing.
- Ensure all your links are updated.
- Apply all the other accessibility functions to the text, tables, reading order (articles and layers panel), and metadata.
- Export the InDesign file to PDF and complete the accessibility process.
- Save as Type:
  - Print setting: select Create Tagged PDF, as well as Bookmarks and Hyperlinks.
  - Interactive setting: changes color space to RGB. Later versions (2017) will do everything, including setting the Display Title and Language.
- The export dialog box will tell you if there are any issues to go back and fix.
- Open in Acrobat and run the accessibility checker. Fix any issues in InDesign, re-export and repeat.

## Tagging an exported PDF

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This is a general checklist is for tagging an PDFs for accessibility using Acrobat Pro, XI, DC, 2017, 2018, etc. The exact steps will vary with each version. This list is only a general reminder. For more details see the state accessibility website resources listed on the cover page.

1. **Export without layers** without layers (flattened). Look for advanced options when exporting.
2. Design the page so the map and text can be selected separately.
3. In the Accessibility tools, open **Touch Up Reading Order** or **Reading Order**.
4. Select the entire map with the cursor and tag it as a **Figure**.
5. Select the text (figure title or caption) and tag it as **text** (or headers if you choose).
6. Add **alternative text** to figures.
7. Tag items you want ignored as **Background**.
8. Close the Accessibility tool.

Continue to apply the remainder of the nonmap accessibility functions.

9. Tag **text** as text or headers if needed.
10. Give **tables** headers if needed.
11. Create **links** if needed.
12. Fill in properties (metadata), File > **Properties**: Title, Author, Subject, Keywords.
13. Change to **Document title** in the **Initial view tab**.
14. Change the language to **English** in the **Advanced tab**.
15. Set the **tab order**.
16. Run a full accessibility check and fix the issues. See state PDF guides for assistance.

Other Notes:

- Acrobat Professional is necessary for exporting with tags and applying accessibility. Acrobat Reader does not have the capability.
- There are options to reduce the file size after exporting: File > Save As Other > Optimize PDF). You choose the settings.
- Multiple files can be assembled into a PDF with later versions of Acrobat tools: (File > Create). Multiple files from different programs can all be done in one step. This is preferable so the tags will be in proper order. Assembling PDF pages manually causes the tags for the new pages to go to the end.

For problems and troubleshooting for PDFs in general, consult a more detailed PDF guide.

## Troubleshooting

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Each software handles accessibility differently and versions are changing rapidly. This list includes best practices that can be applied generally and can help make the best choices.

### Export to an image

- Exporting maps to an image file (jpg, png, tiff, gif, etc.) is the smoothest option, but the raster (bitmap) image output may suffer quality and pixelate.
- Vector images have better resolution but may bring in extra attributes that could present problems with tagging for accessibility.
- Image files must be placed in a program like MS Word or InDesign to add alt text.
- If the entire image is converted to a PDF page and you cannot grab it to tag it, try running an Optical Character Recognition in the PDF. You could also convert it to an image from Acrobat.
- Recommendation for JPG settings: choose color model RGB, with at least quality 8 and text optimized, import into PDF, tag and add alt text. This can compromise the quality of some elements, so check resolution.
- Remember to keep the title and caption text out of the figure or it won't be read.

### Export directly to PDF and apply accessibility with Acrobat

You may want to do this when the resolution or scale is not satisfactory with an image, or other features are needed. Unfortunately, unwanted attributes can come with it and cause difficulty with accessibility.

- Flatten your map layers before exporting. This will prevent items from disappearing when you apply accessibility in Acrobat. This applies to multi-layered files from programs like ArcMap, Illustrator, and Photoshop. Note that this may remove attributes from some applications like MaPublisher.
- Do not include layers when possible (see export options dialog boxes). If you must and there is a problem, check the problem item in your layers in the Edit PDF tool and try to rearrange the layers.
- Check ArcMap export. Choose resolution according to your end product. The option for optimized text should give the best clarity.
- If items become transparent after tagging, make sure the document doesn't have any overprints. If you have checked for overprints and it is still happening, try ungrouping the items and export again.
- When possible, embed fonts or use common fonts that are resident on most computer systems. Unique fonts may generate accessibility errors for some people, and for future software.

### Printing

- When printing from a PDF, you may sometimes see blocky shapes you did not create. If you can't fix the source file, you can fix the outcome in the PDF print dialog box: **Advanced > Print as image**. You may have to tell your recipients to do this, or put instructions on the website. The problem is on the receiving end, and may happen on some printers and not on others. It is a printer software/ driver issue.
- You could also try exporting your PDF to an earlier version that does not support transparency: PDF X1a, Acrobat 4.