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# **Accessibility Guide for Interactive Web Map Tools**

December 2021

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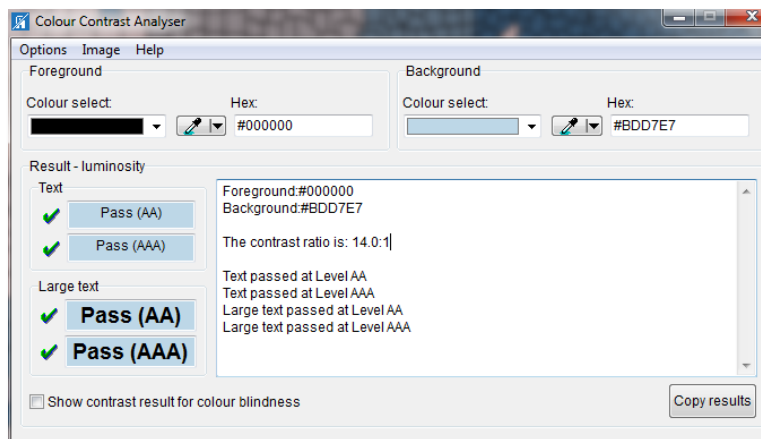
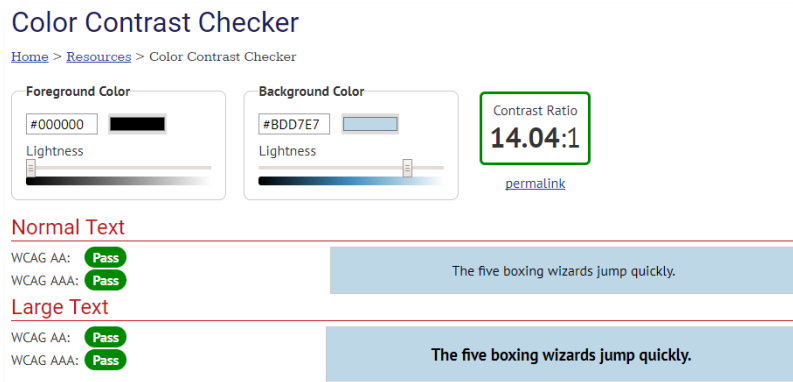
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# Appendix A. Color Contrast Analyzer Tool

## Description

There are many tools that can aid in analyzing color contrast on web sites and interactive web mapping applications. Some examples include [WebAIM's Color Contrast Checker](#) (website) and [Colour Contrast Analyser](#) (software).



## Steps for using the tool

1. Install the tool, if needed.
2. Open your application, and open the Colour Contrast Analyzer.
3. On the Colour Contrast Analyser select the eyedropper in the "Foreground" section, then move to your application and position your cursor over the foreground text such as the letters in a button and left-click with the mouse. You can magnify the screen to enable a more accurate

color capture. The Colour Contrast Analyser in the foreground area should now display the color of that text, along with the Hex code for that color.

4. Go back to the Colour Contrast Analyser and this time select the eyedropper in the “Background” section. Move to your application, position your cursor over the background color, and click on it with your mouse. The Colour Contrast Analyser in the background area should now display the color of that area, along with the Hex code for that color and the contrast ratio between the two colors. Verify that the contrast meets standards.
5. As an alternative to using the mouse, or if you know the Hex values of the Foreground/Background, you can also enter the Hex values directly into the Foreground and Background sections to test the Color Contrast.

## Appendix B. Web Accessibility Evaluation Tool (WAVE)

### Description

In addition to color contrast there are also tools for identifying other types of accessibility issues associated with interactive web mapping application. Tools such as WAVE can help with identify structural problems with the application that can impact the support for accessibility needs, such as: support for keyboard-only navigation and assistive technology users (e.g., screen reader users).

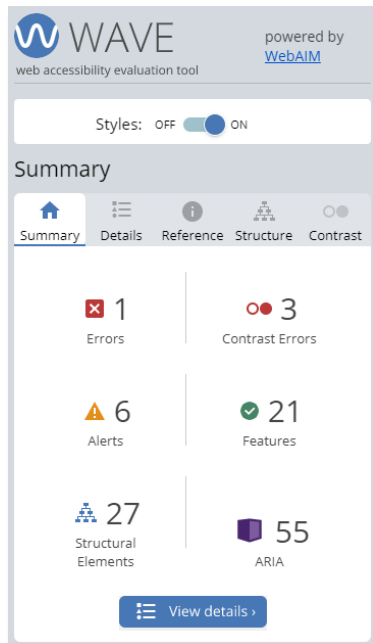
### Steps for using the tool

1. If needed, install the WAVE extension for the Firefox or Google Chrome browser from the [Chrome Web Store](#) or [Firefox Add-ons page](#). To do so in Chrome, search for “WAVE Evaluation Tool” and install by clicking the “Add to Chrome” button.
2. Open your mapping application in the Google Chrome or Firefox browser, and click the WAVE extension button to activate and open the WAVE tool.



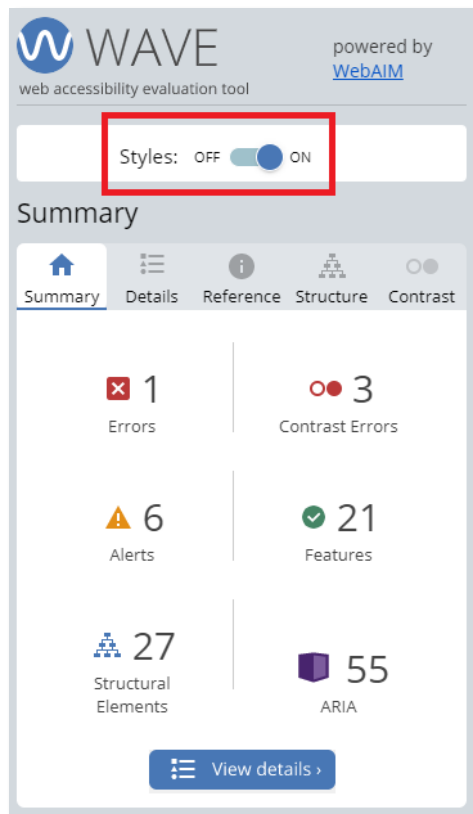
**Figure 3.** Screenshot of WAVE extension button in the Google Chrome browser.

3. Once the WAVE extension is enabled, a panel will open on the left side of the browser window.



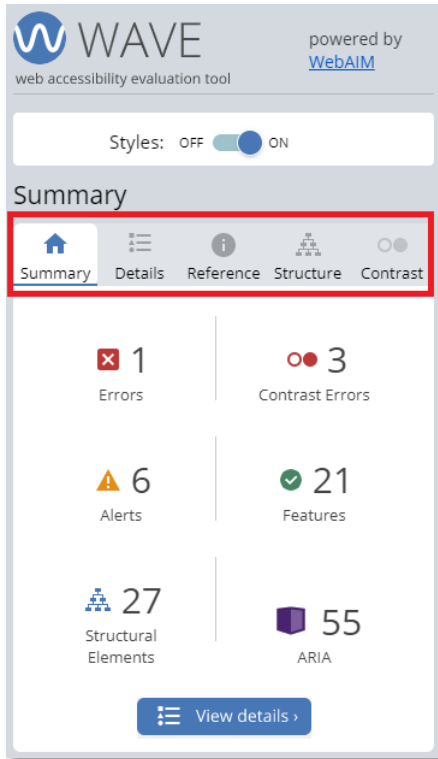
**Figure 4.** Screenshot of the WAVE extension enabled on the page.

4. At the top of the panel there will be an option to toggle the styles on and off:
- **Styles on** (activated on initial load): The page displays as it normally does with CSS/styles in tact
  - **Styles off**: The page displays without CSS/styles, which can be very useful when going through interactive web mapping applications



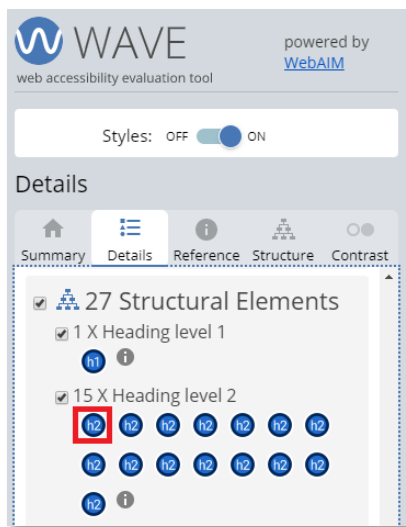
**Figure 5.** Screenshot of the WAVE extension enabled on the page with the styles option on.

5. In addition, the following options are present in the left hand panel:
- **Summary** (activated on initial load): A snapshot of items on the page, grouped by: errors, alerts, features, structural elements, HTML5 and ARIA, and contrast errors; For example: 1 errors, 1 alerts.
  - **Details**: Includes the full detailed list of the summary items grouped by: errors, alerts, features, structural elements, and HTML 5 and ARIA. For example: Errors (1): 1 x Missing alternative text.
  - **Reference**: An explanation of the WAVE icons and how to make your page more accessible
  - **Structure**: The page's heading structure (h1, h2, h3, etc.).
  - **Contrast**: Any color contrast issues on the page will be displayed once selected.



**Figure 6.** Screenshot of the WAVE extension enabled on the page with the options highlighted: summary, details, reference, structure, and contrast.

6. When items are accessed with the “Details” tab, elements will be highlighted on selection.



**Figure 7.** Screenshot of WAVE details that when clicked will highlight and jump to on the page.



**Figure 8.** Screenshot of WAVE activated and highlighting a heading level 2 element.

7. When verifying and fixing the errors, alerts, and color contrast elements it is recommended you consult with the recommendations provided in the **WAVE extension and the [Web Content Accessibility Guidelines \(WCAG\) 2.1](#)**. Another check via the WAVE extension tool can determine if you have met the criteria set by WAVE and/or WCAG 2.1.

However, no automated tool can fully determine if a website or application is accessible, and a full accessibility audit is strongly encouraged.



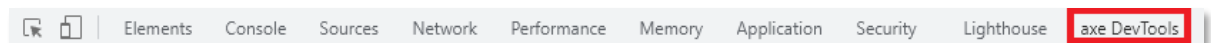
## Appendix C. axe Accessibility Testing Tool

### Description

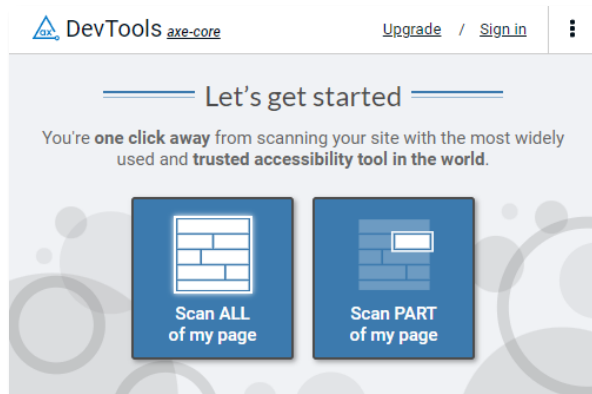
Axe is an accessibility testing tool that is embedded in a browser's developer tools. It is currently available for Chrome and Firefox.

### Steps for using the tool

1. If needed, install the axe extension for [Chrome](#) or [Firefox](#).
2. Locate the mapping application that you want to assess in your web browser.
3. Open the developer tools. Shortcuts: "F12" key on the keyboard, or "Ctrl" + "Shift" + "I".
4. Once the developer tools pane is open, navigate to the "axe DevTools" tab, and select the "Scan ALL of my page" option.

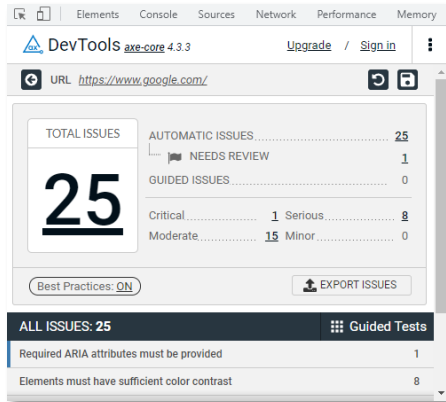


**Figure 9.** Screenshot of the developer tools in Chrome, accessing the "axe DevTools" tab



**Figure 10.** Screenshot of the axe tool's scanning capabilities

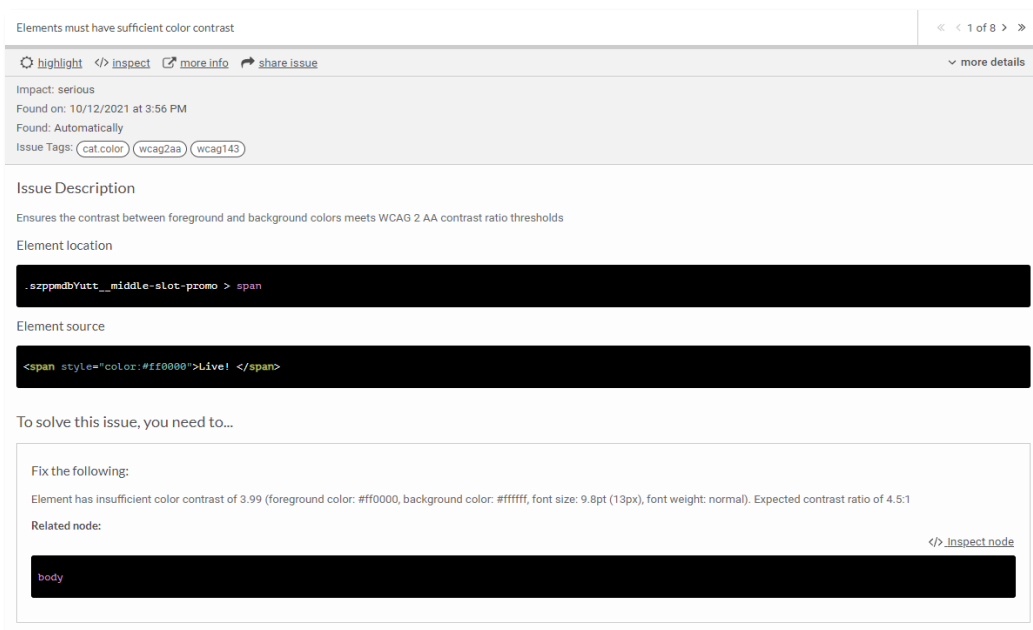
5. Once the page has been scanned, the axe tool will compile a list of violations, with a brief description of the violation and number of instances this occurs from the scan. Advance through individual issues using the left "<" and right ">" arrows to move through each issue instance.



**Figure 11.** An example of a list of violations that the axe tool provides.

By clicking on a violation, specific details are provided, such as:

- An issue description
- The element’s location in the page’s source code.
  - The “</> inspect” link will open the location of the violation in the code
  - The “Highlight” link will visually outline the element on the web page
- The impact of the issue – a score of “critical”, “serious”, etc.
- If there are multiple violations of the same type, there will be a control in the upper right corner of the panel to navigate through each instance of the issue.



**Figure 12.** An example of an issue/violation details

## Appendix D. Text Color Contrast Analyzer Tool (Chrome Extension)

### Description

This tool allows a user to identify text color contrast issues on a web page, even over complex backgrounds and images using WCAG 2 test color contrast requirements.

The Color Contrast Analyzer tool was developed by [IT Accessibility at NC State University](#) and the [source code can be accessed on GitHub](#).

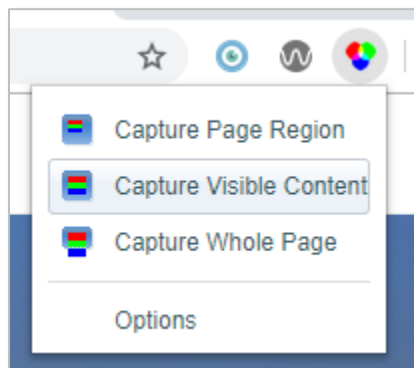
An information page, including some basic user guidelines, tips, and a YouTube video (captioned) demonstrating the tool is available on the [North Carolina University IT Accessibility Resources webpage](#).

### Steps for using the tool

1. If needed, install the axe extension for [Chrome](#).
2. Locate the mapping application that you want to assess in Chrome, and click on the Color Contrast Analyzer button



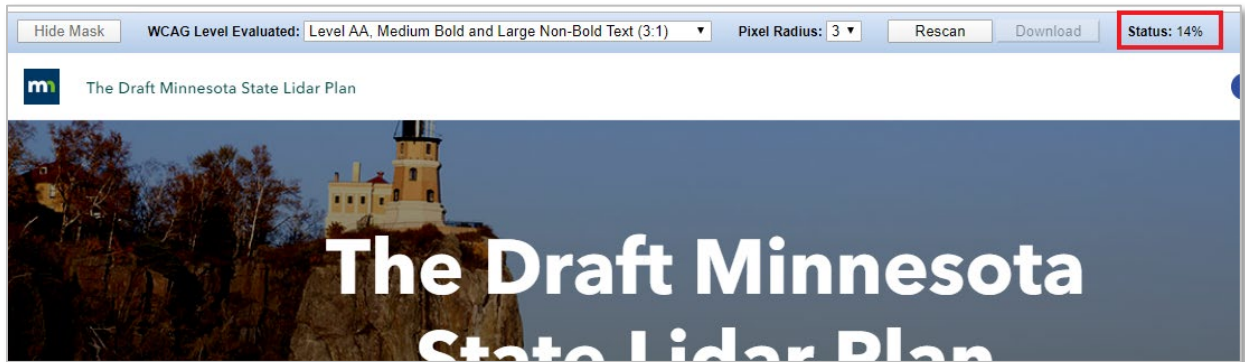
**Figure 13.** A screenshot of the Color Contrast Analyzer extension shown in Chrome



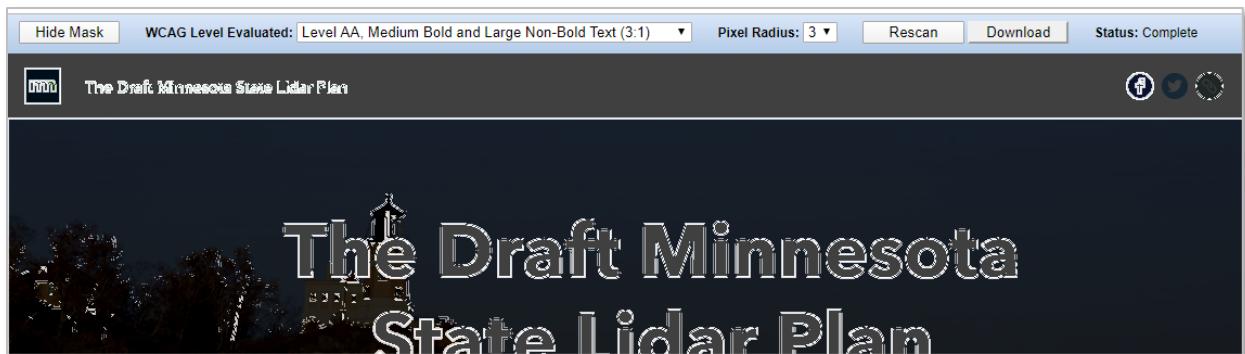
**Figure 14.** A screenshot showing the menu, along with the capture options

The Options menu will allow the WCAG 2 Level to be specified, the type of text you will be testing (small non-bold, medium bold, etc.), as well as a pixel radius to be chosen. The pixel radius will affect how thick the outlines will be in the results.

4. After selecting the area to run the tool on, the tool will open in a new tab, and will begin analyzing the page. A status percentage will be displayed to show the progress.



**Figure 15.** An example of the Color Contrast Analyzer running, showing the status percentage



**Figure 16.** An example of the resulting image the Color Contrast Analyzer will produce

6. At this point, the process can be repeated by clicking “Rescan”. Select a new WCAG level, or pixel radius if needed, but the new settings will only be applied after clicking “Rescan”. The “Download” button will allow a PNG image of the results to be downloaded.

## Appendix E. Screen Readers (e.g., JAWS, NVDA, Voiceover)

### Description

Screen readers convert digital text into synthesized text, empowering users to listen to content and navigate the web with a keyboard. In particular, screen readers help people who have low vision or are blind to use technology with the same level of independence and privacy as others.

It takes time to get accustomed to a screen reader and its capabilities, but once users are acclimated to their uses, they can get to content rapidly. This is best achieved by those who use screen readers for everyday use. As such, is strongly recommended that **screen reader testing be completed by professionals or individuals who use screen readers on a regular basis** and are familiar with how other screen reader users' access information.

### No Mouse Challenge

This guide does not provide a step-by-step process for screen readers, as it is recommended to seek out those who use screen readers on a regular basis. However, a good first step prior to screen reader testing is to conduct a no mouse challenge.

#### *Keyboard access tips:*

- Use **Tab** to access the next link, form element, or button.
- Use **Shift + Tab** to access the previous link, form element, or button.
- Use **Enter** or the **spacebar** to access the current link, or button.
- Use **arrow keys** to access elements from a list (e.g., radio button).

#### *While not using your mouse, try to answer the following:*

1. Can I access all of the maps navigation buttons (e.g., zoom in, zoom out)?
2. Can I access the map?
3. Can I access the map's widgets (if applicable)?
4. Can I access the data (if applicable)?
5. Can I operate all of the buttons?
6. Can I operate all the sliders and other controls?
7. Can I easily tell where I am on the page?