

Accessibility for Everyone

Beth Tucker Long

Beth Tucker Long

- PHP Developer
- Stay-at-home Mom
- User Group Leader
- OSMI volunteer



WHAT'S ACCESSIBILITY?

What's Accessibility?

The measure of a web page's usability by persons with one or more disabilities.

--Usability.gov

<https://www.usability.gov/what-and-why/glossary/accessibility.html>

What's Accessibility?

- Improving your usability
 - Following government mandates
 - Improve customer satisfaction
 - Increase customer diversity
 - Be fair
-
- Widening your audience

How much bigger?

The United Nations estimates:

- 10% of the world's population has a disability

<http://www.un.org/en/sections/issues-depth/persons-disabilities/index.html>

All Age Issue

Regardless of age, disabled Americans are adopting tech at lower rates

% of U.S. adults who say they have ...

	Ages 65+			Ages 18-64		
	Any disability	No disability	Diff	Any disability	No disability	Diff
Desktop/laptop computer	50	66	-16	67	84	-17
Smartphone	32	45	-13	70	87	-17
Home broadband	36	57	-21	66	80	-14
Tablet	21	36	-15	44	57	-13

Source: Survey conducted Sept. 29-Nov. 6, 2016.

PEW RESEARCH CENTER

<http://www.pewresearch.org/fact-tank/2017/04/07/disabled-americans-are-less-likely-to-use-technology/>

Main Areas of Difficulty

- Vision
- Mobility
- Hearing

Vision

- Colorblindness

<http://www.colourblindawareness.org/colour-blindness/>

Vision

- Vision Impairment

<http://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment>

Mobility

- Movement

https://ftp.cdc.gov/pub/Health_Statistics/NCHS/NHIS/SHS/2016_SHS_Table_A-10.pdf

Hearing

- Hearing Trouble

<https://www.cdc.gov/nchs/fastats/disability.htm>

Need More to Sell This?

- It's not just for people with disabilities.
- <http://www.pewresearch.org/fact-tank/2017/12/12/nearly-half-of-americans-use-digital-voice-assistants-mostly-on-their-smartphones/>

WHAT CAN WE DO?

Vision - Color

Last Name *

Address Line 2

State *

Country *

Sign Me Up

Last Name *

Address Line 2

State *

Country *

Sign Me Up

Vision

- Here is some text that does not have high enough contrast.

Vision

- Here is some text that does not have high enough contrast.
- High contrast is important.

Vision

- Here is some text that does not have high enough contrast.
- High contrast is important.
- High contrast makes a difference.

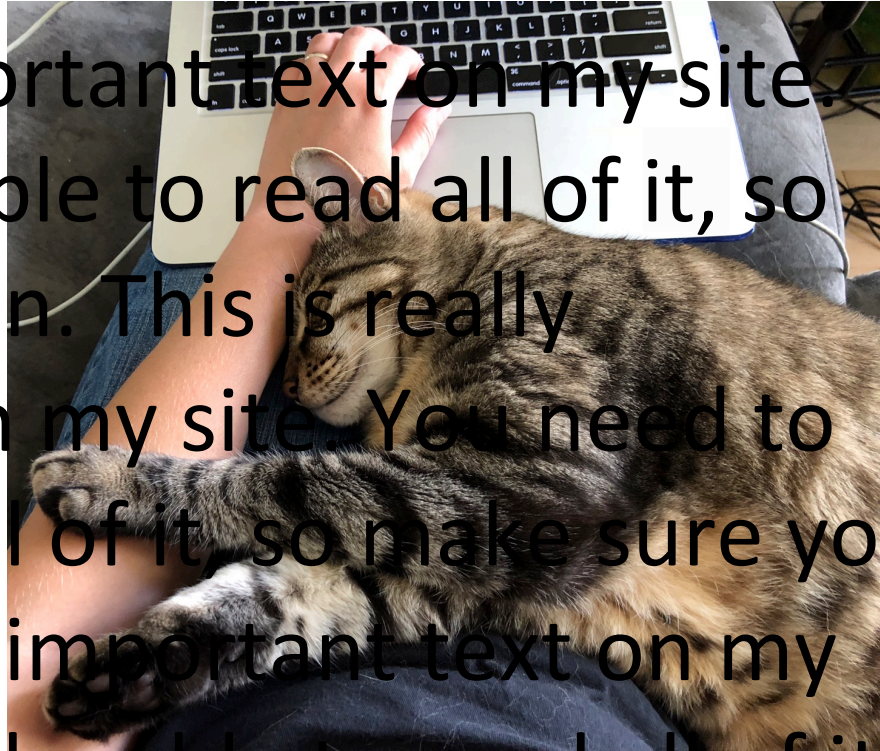
Vision

This is really important text on my site. You need to be able to read all of it, so make sure you can. This is really important text on my site. You need to be able to read all of it, so make sure you can. This is really important text on my site. You need to be able to read all of it, so make sure you can. This is really important text on my site. You need to be able to read all of it, so make sure you can.



Vision

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Vision



Vision

This is the great description of my website.
You can click [here](#) to get to some great content or you could click [here](#) to get to our newsletter or you could click [here](#) to send us an email.

Vision

1. Enter your name.
2. Enter your email.
3. Click Continue.
4. Choose an item.
5. Click Continue.
6. Choose the color.
7. Click Continue.
8. Enter payment info.

Mobility

Personal Information (see [Privacy Policy](#))

First Name *

Last Name *

Address Line 1 *

Address Line 2

City *

State *



Zip *

Country *

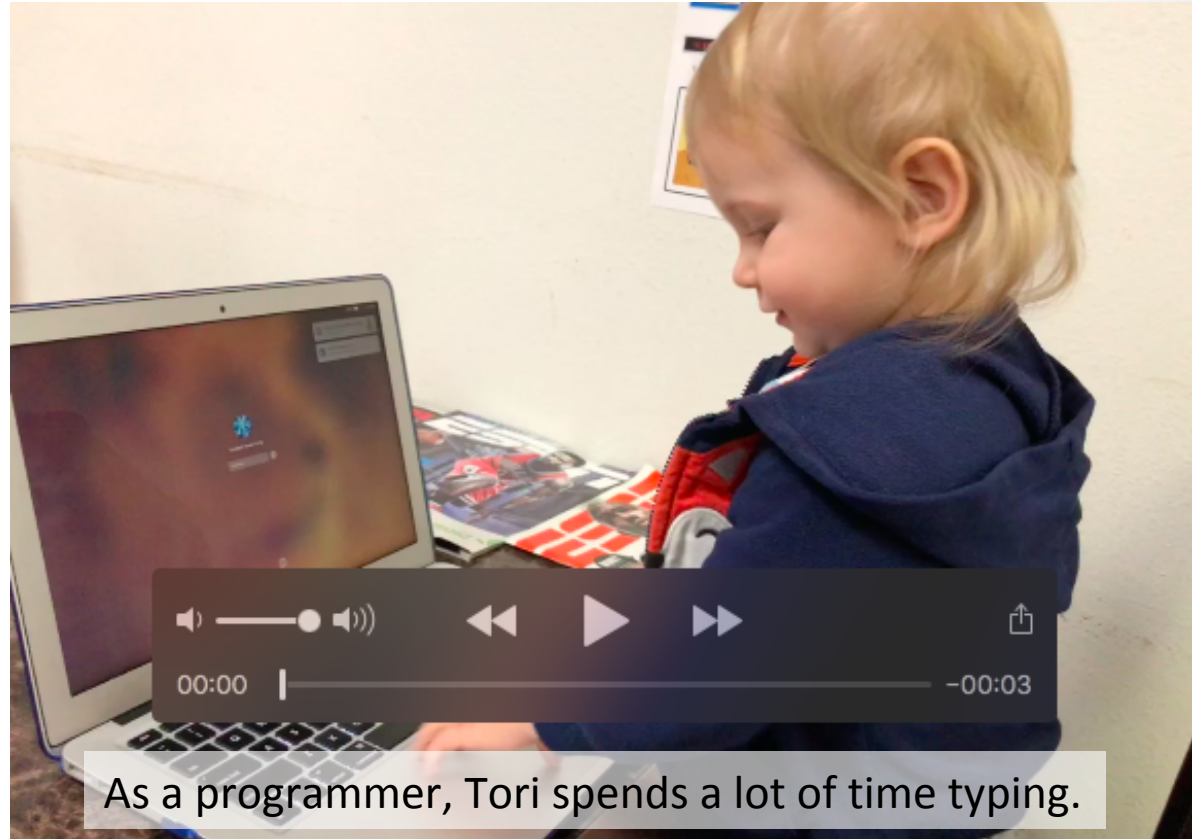


[Special Shipping Instructions?](#)

Clear Form

Sign Me Up

Hearing



TESTING

Vision

- Enlarge your fonts
- Turn down your screen brightness
- Adjust the color saturation on your screen
- Disable your stylesheets

Vision

- Turn your monitor around and use

VoiceOver

<https://help.apple.com/voiceover/info/guide/>

Narrator

<https://support.microsoft.com/en-us/help/17173/windows-10-hear-text-read-aloud>

Simulate Colorblindness

altreus.github.io says

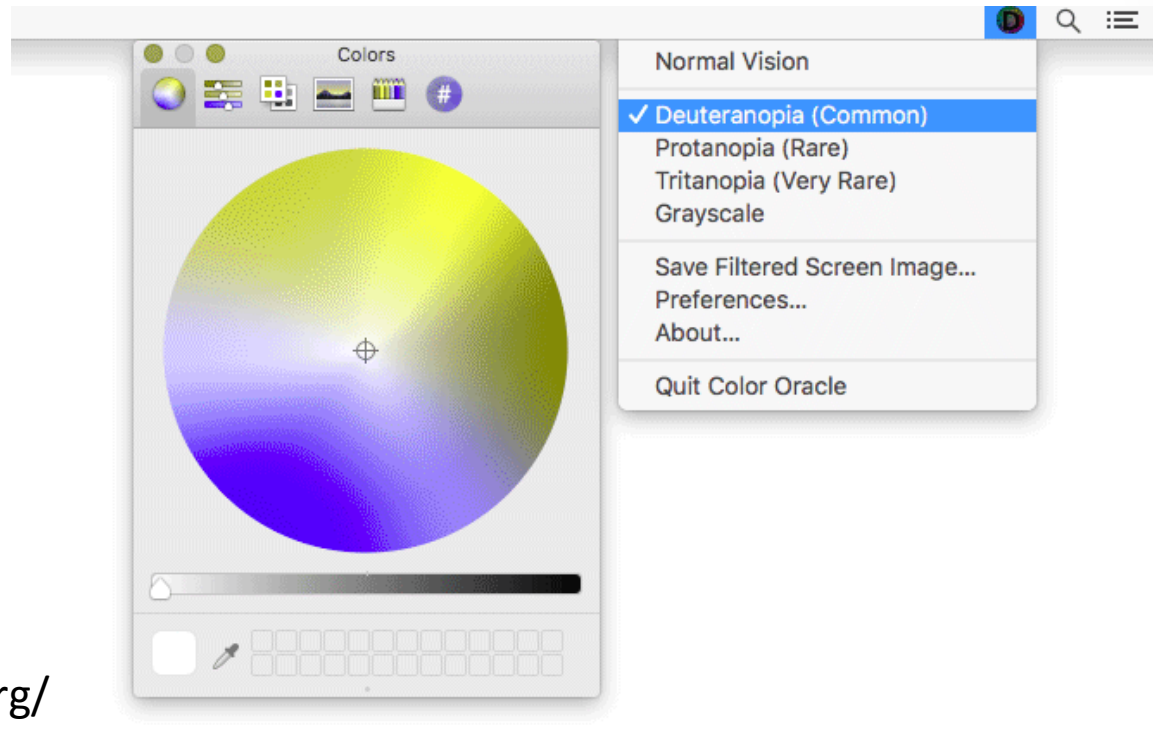
0: off; 1: protanopia; 2: protanomaly; 3: deuteranopia; 4:
deuteranomaly; 5: tritanopia; 6: tritanomaly; 7: achromatopsia; 8:
achromatomaly;

Cancel OK

Colour Blind

<https://github.com/Altreus/colourblind>

Simulate Colorblindness



Color Oracle
<http://colororacle.org/>

Generate a Color Palette

Background Color	Font-Family	Font-Size (px)	Font-Weight	WCAG Standard ⓘ
<input type="text" value="#ffffff"/>	<input type="text" value="Helvetica"/> ▾	<input type="text" value="24"/>	<input type="text" value="400"/> ▾	<input type="text" value="AA"/> ▾

Editable Text

The quick brown fox jumps over the lazy dog.


GENERATE COLOR PALETTE


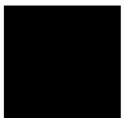

<http://colorsafe.co/>

Color Palette Accessibility Evaluator

Color Palette Accessibility Checker: WCAG 2 Level AA [Switch to WCAG 2 Level AAA](#)

Color Palette

 **Select a color to analyze**

 00FF00	 000000	 0000FF
---	---	---

[Back to palette creator](#)

Analysis

Small Non-Bold Text (less than 18pt, or approximately 1.5em rendered) for 00FF00

Color Code	Sample Text	Sample Text (inverted)	Pass or Fail	Ratio (pass>=4.5)
000000	Lorem ipsum	Lorem ipsum	PASS	15.3
0000FF	Lorem ipsum	Lorem ipsum	PASS	6.26

Large Non-Bold Text (18pt or greater, or approximately 1.5em rendered) for 00FF00

Color Code	Sample Text	Sample Text (inverted)	Pass or Fail	Ratio (pass>=3.0)
000000	Lorem ipsum	Lorem ipsum	PASS	15.3
0000FF	Lorem ipsum	Lorem ipsum	PASS	6.26

<https://accessibility.oit.ncsu.edu/tools/color-contrast/>

Snook.ca Color Contrast Check

Foreground Colour:

33FF33

Red:

Green:

Blue:

Hue (°)

Saturation (%)

Value (%)

Background Colour:

333333

Red:

Green:

Blue:

Hue (°)

Saturation (%)

Value (%)

Results


**This is example text. Some of it bolded.
Some of it italicized.**


Brightness Difference: (>= 125)	<input type="text" value="119.747"/>
Colour Difference: (>= 500)	<input type="text" value="204"/>
Are colours compliant?	<input type="text" value="NO"/>
Contrast Ratio	<input type="text" value="9.321"/>
WCAG 2 AA Compliant	<input type="text" value="YES"/>
WCAG 2 AA Compliant (18pt+)	<input type="text" value="YES"/>
WCAG 2 AAA Compliant	<input type="text" value="YES"/>
WCAG 2 AAA Compliant (18pt+)	<input type="text" value="YES"/>

https://snook.ca/technical/colour_contrast/colour.html


WebAIM- Color Contrast Checker


Foreground Color

#0000FF 

Lightness 

Background Color

#FFFFFF 

Lightness 

Contrast Ratio

8.59:1

[permalink](#)

Normal Text

WCAG AA: **Pass**

WCAG AAA: **Pass**

The five boxing wizards jump quickly.

Large Text

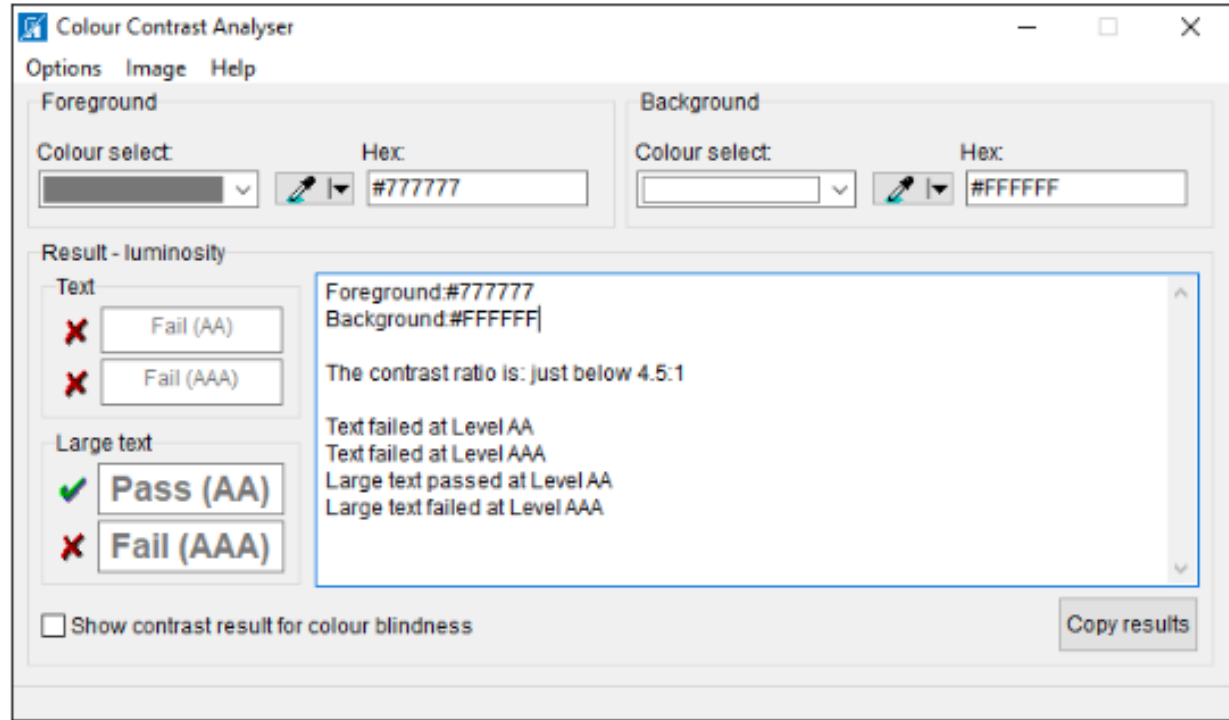
WCAG AA: **Pass**

WCAG AAA: **Pass**

The five boxing wizards jump quickly.

<https://webaim.org/resources/contrastchecker/>

Vision - Colour Contrast Analyser



<https://developer.paciellogroup.com/resources/contrastanalyser/>

Vision

Colour Contrast Analyser from The Paciello Group



<https://developer.paciellogroup.com/resources/contrastanalyser/>

Mobility

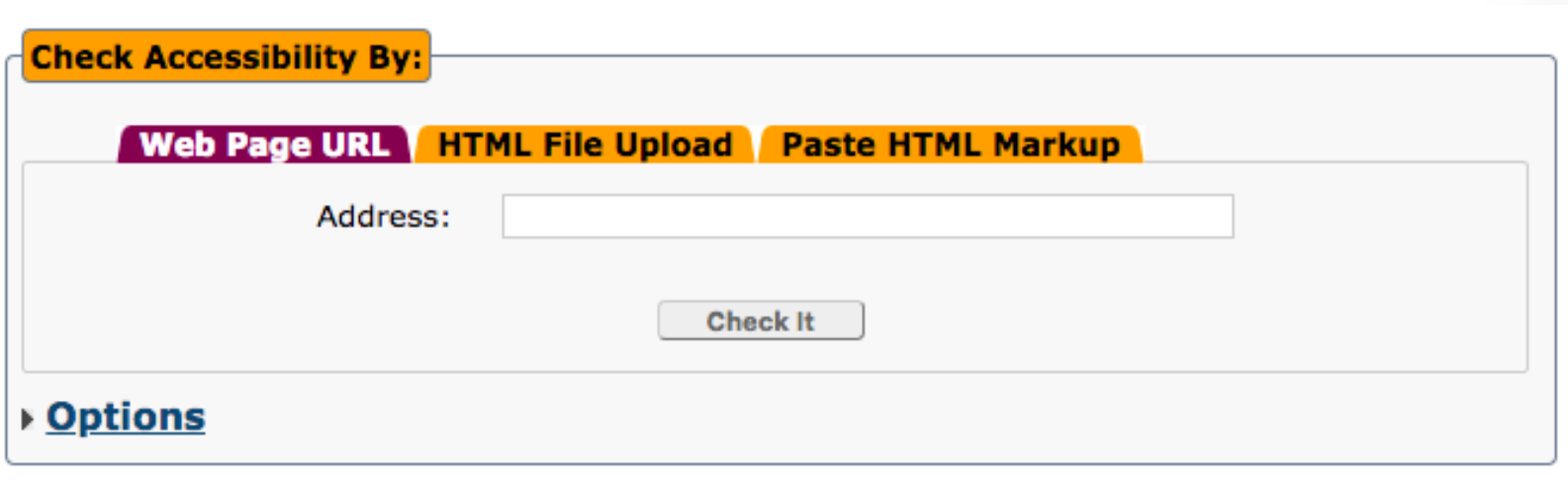
- Disable your mouse/trackpad
- Interact with a touch screen using a stylus you hold with tweezers, chopsticks, or in your mouth
- Use your website one-handed
- Install eye tracking navigation software

Hearing

- Turn off the sound

Whole Analysis

- AChecker



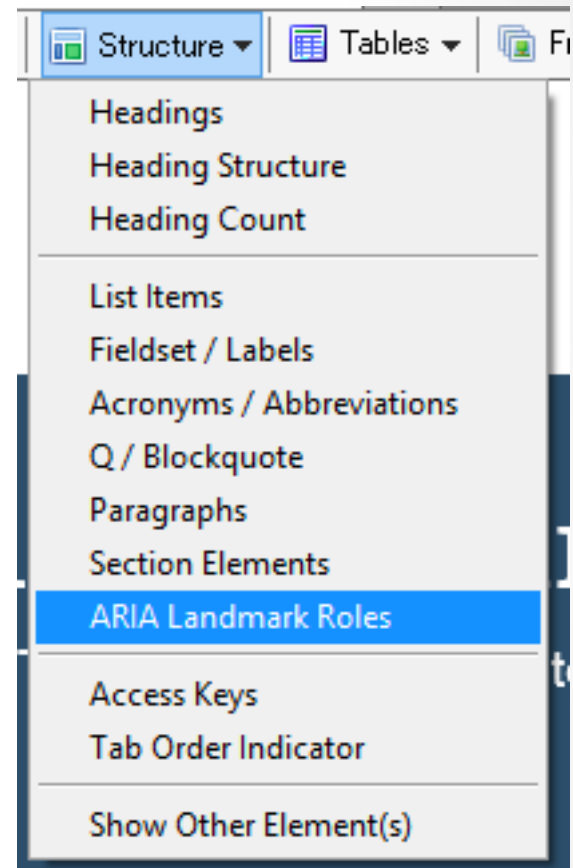
The screenshot shows the AChecker web interface. At the top, there is a section titled "Check Accessibility By:" with three tabs: "Web Page URL" (selected), "HTML File Upload", and "Paste HTML Markup". Below the tabs is a form with the label "Address:" followed by a text input field. A "Check It" button is positioned below the input field. At the bottom left of the form, there is a link labeled "Options" with a right-pointing triangle icon.

<https://achecker.ca/checker/index.php>

Whole Analysis

- Web Accessibility Toolbar

The Paciello Group



<https://developer.paciellogroup.com/resources/wat/>

Whole Analysis

- WAVE API
<http://wave.webaim.org/api/>

Dinolytics front-end for WAVE
<https://dinolytics.com/>

WAVE Runner
<http://wave.webaim.org/waverunner>

Whole Analysis

WAVE Browser Extension - <http://wave.webaim.org/extension/>

The screenshot displays the WAVE web accessibility evaluation tool interface. On the left, a sidebar contains the WAVE logo and navigation options: 'Styles', 'No Styles', and 'Contrast'. Below this is a 'Summary' section with a list of detected issues: 2 Errors, 4 Alerts, 3 Features, 3 Structural Elements, 53 HTML5 and ARIA, and 1 Contrast Error. Further down are 'Panel Options' for 'DETAILS', 'DOCUMENTATION', and 'OUTLINE'. The main content area shows a Google search page with various accessibility annotations overlaid. These include a yellow checkmark icon at the top, a search input field with a title attribute, and buttons for 'Google Search' and 'I'm Feeling Lucky' with their respective aria-labels. The bottom of the page shows a footer with 'Advertising Business' and 'Privacy Terms Settings' links, along with a code editor icon and an ARIA attribute annotation.

WAVE
web accessibility evaluation tool

Styles No Styles Contrast

Summary

WAVE has detected the following:

- 2 Errors
- 4 Alerts
- 3 Features
- 3 Structural Elements
- 53 HTML5 and ARIA
- 1 Contrast Error

Panel Options

- DETAILS: A listing of all the WAVE icons in your page.
- DOCUMENTATION: Explanation of the WAVE icons and how you can make your page more accessible.
- OUTLINE: The heading structure of the web page.

The following apply to the entire page.

Google

aria-autocomplete="both", aria-haspopup="false", aria-label="Search" title

Google Search aria-label="Google Search" I'm Feeling Lucky label="I'm Feeling Lucky"

Advertising Business Privacy Terms Settings ARIA aria-controls="seti"

Whole Analysis

aXe Browser Extension - <https://www.deque.com/axe/>

The screenshot displays the aXe browser extension interface. On the left, a sidebar shows a list of issues found: 'All issues found 77' with a 'Run again' button. Below this, a list of issues is shown, with 'Elements must have sufficient color contrast' highlighted, showing 74 instances. Other issues include 'Heading levels should only increase by one' (1 instance), 'Content should be contained in a landmark region' (1 instance), and 'Elements should not have tabindex greater than zero' (1 instance).

The main panel shows the details for the selected issue: 'Elements must have sufficient color contrast'. It includes a description: 'Ensures the contrast between foreground and background colors meets WCAG 2 AA contrast ratio thresholds'. The impact is listed as 'serious' with a 'Learn more' link. The element location is shown as 'button[data-disable-with="Creating\ file.."]'. The element source is displayed as a code block:

```
<button class="btn btn-sm BtnGroup-item" type="submit" data-disable-with="Creating file.."> Create new file </button>
```

Below the source code, a note states: 'We are not sure this is an issue, because: Element's background color could not be determined due to a background gradient'. A 'Related node' section shows the same element location with an 'Inspect' link. At the bottom, there are radio buttons to toggle 'This is an issue' (selected) or 'This is not an issue', a text input field for 'Provide an issue description:', and 'Issue tags: category: color wcag2aa wcag143'.

Whole Analysis

SiteImprove- <https://siteimprove.com/>



Automate Tests

- Unit Tests
- Integration Tests

Writing Automated Tests for Accessibility

<https://www.deque.com/blog/writing-automated-tests-accessibility/>

Diverse Testers

Standard Usability Tests

<https://www.usability.gov/how-to-and-tools/methods/usability-evaluation/index.html>

Live Accessibility Testing

- Accessible360
<https://accessible360.com/>
- Perkins Access
<https://www.perkins.org/access>
- AccessWorks
<https://access-works.com/>

Lots More Tools

Web Accessibility Evaluation Tools List
<https://www.w3.org/WAI/ER/tools/>

18F Accessibility Guide – Resources
<https://accessibility.18f.gov/>

18F Accessibility Guide – Tools
<https://accessibility.18f.gov/tools/>

GAAD

The purpose of GAAD is to get everyone talking, thinking and learning about digital (web, software, mobile, etc.) access/inclusion and people with different disabilities.

<http://www.globalaccessibilityawarenessday.org/>

- Home
- Meet Our Customers
- Contact Us Today
- Reviews

Web Design to Bring your Business to the Top

At Treeline Design, LLC, we will build you a dynamic website or custom web application to fit your business needs. We program in HTML, PHP, and MySQL/SQL, as well as create custom graphics to make your site stand out. It is our goal to maximize your efficiency while keeping your costs down. Let your website do the work!

How We Work

We will get to know you, your business, and your customers. We will sit down with you and talk through your vision, your goals, and your budget for the project. Then, we will come up with a plan to get you where you need to be and discuss each step of that plan with you. Our goal is not to just work for you, but to work with you. After completing the work, we will make sure that you are not only happy with the solution, but feel comfortable using it. We will always make sure that you receive a high-quality product that fits your business needs and personality.

Our site upholds the following standards:





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↘ Meet Our Customers

↘ Contact Us Today

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will build you a dynamic
website or custom web
application to fit your
business needs. We program
in HTML, PHP, and

↘ Reviews.....

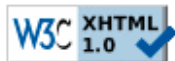
1. [➤ Home](#)
2. [➤ Meet Our Customers](#)
3. [➤ Contact Us Today](#)
4. [➤ Reviews](#)

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TREELINE DESIGN

CUSTOM WEBSITE DESIGN AND PROGRAMMING

Web Design to Bring your

#006d05

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Contrast ratio

6.6:1

Foreground colour

#006D05

HEX



Background colour

(white)

#FFFFFF

HEX



▼ Sample preview

example text showing contrast



WCAG 2.1 results

▶ 1.4.3 Contrast (Minimum) (AA)

✔ Pass for large and regular text

▶ 1.4.6 Contrast (Enhanced) (AAA)

✔ Pass for large text only ✖ Fail for regular text

▶ 1.4.11 Non-text Contrast (AA)

✔ Pass for UI components and graphical objects

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Colour blindness simulation

Monochromacy

Achromatopsia (8.3:1) <i>no color</i>	Achromatomaly (8:1) <i>almost no color</i>
Sample	Sample

Dichromacy

Protanopia (6.6:1) <i>no red</i>	Deuteranopia (6.6:1) <i>no green</i>	Tritanopia (6.6:1) <i>no blue</i>
Sample	Sample	Sample

Trichromacy

Protanomaly (6.9:1) <i>low red</i>	Deuteranomaly (7:1) <i>low green</i>	Tritanomaly (6.7:1) <i>low blue</i>
Sample	Sample	Sample

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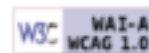
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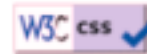
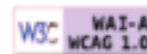
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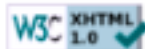
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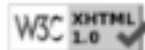
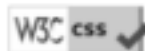
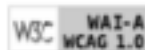
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We will get to know you, your business, and your customers. We will sit down with you and talk through

Our site upholds the

The screenshot shows a web browser window with the developer console open. The console displays an accessibility error: "Page must have one main landmark". The error details include the issue description, impact (moderate), element location (html), and element source code. The source code shows an HTML document with an XML namespace and language attributes.

Elements Console Sources Network Performance Memory Application Security Audits Adblock Plus axe


Page must have one main landmark
[Inspect Node](#) [Highlight](#)

Issue description
Ensures the page has only one main landmark and each iframe in the page has at most one main landmark
Impact: **moderate** [Learn more](#)

Element location
html

Element source
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">

To solve this violation, you need to:
Fix the following:
Page does not have a main landmark

 i	
All issues found 18 ▾	Run again
Page must have one main landmark	1
All page content must be contained by landmarks	1
Elements must have sufficient color contrast	16

Elements must have sufficient color contrast

[Inspect Node](#) [Highlight](#)

Element source

```
<div id="header">Treeline Design</div>
```

We are not sure this is an issue, because:

Element's background color could not be determined due to a background image

Related node:

[Inspect](#)

```
#container4
```

This is an issue This is not an issue

[SAVE](#)




Issue tags: category: color wcag2aa wcag143

Summary

WAVE has detected the following:

- 0 Errors
- 0 Alerts
- 7 Features
- 3 Structural Elements
- 0 HTML5 and ARIA
- 5 Contrast Errors

Panel Options

-  DETAILS: A listing of all the WAVE icons in your page.
-  DOCUMENTATION: Explanation of the WAVE icons and how you can make your page more accessible.
-  OUTLINE: The heading structure of the web page.

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At Treeline Design, LLC, we will build you a dynamic website or custom web application to fit your business needs. We program in HTML, PHP, and MySQL/SQL, as well as create custom graphics to make your site stand out. It is our goal to maximize your efficiency while keeping your costs down. Let your website do the work!

How We Work

We will get to know you, your business, and your customers. We will sit down with you and talk through your vision, your goals, and your budget for the project. Then, we will come up with a plan to get you where you need to be and discuss each step of that plan with you. Our goal is not to just work for you, but to work with you. After completing the work, we will make sure that you are not only happy with the solution, but feel comfortable using it. We will always make sure that you receive a high-quality product that fits your business needs and personality.

- alt *You are here - image: Leaf* Home
- alt *Leaf* Meet Our Customers
- alt *Leaf* Contact Us Today
- alt *Leaf* Reviews

Our site upholds the following standards:

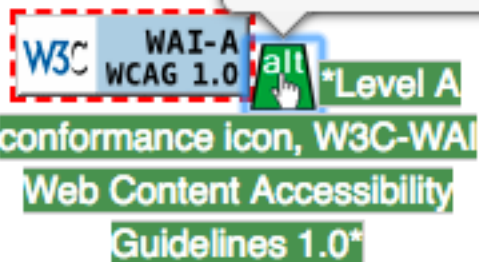
-  WAI-A WCAG 1.0  *Level A conformance icon, W3C-WAI Web Content Accessibility Guidelines 1.0*
-  W3C CSS  *Valid CSS!*
-  W3C XHTML 1.0  *Valid XHTML 1.0 Transitional*

Our site upho
following star

Linked image with alternative text

Alternative text is present for an image that is within a link.

[More Information](#)



Learn More - Design

- Inclusive Design Principles
<https://inclusivedesignprinciples.org/>
- Inclusive Design 24
<https://inclusivedesign24.org/>
- The Paciello Group: cupper
<https://github.com/ThePacielloGroup/cupper>
- Nutrition Cards for Accessible Components
<https://davatron5000.github.io/a11y-nutrition-cards/>

Learn More - Tools

- An Introduction to Screen Readers (Webinar)
<https://accessibility.deque.com/live-webinar-introduction-to-screen-readers>
- Facebook's Alt Tag AI
<https://newsroom.fb.com/news/2016/04/using-artificial-intelligence-to-help-blind-people-see-facebook/>

Status of Platforms

- HTML5 Accessibility
<https://www.html5accessibility.com/>
- HTML5 Implementation Status
<http://stevefaulkner.github.io/html-mapping-tests/>
- Android and iOS Mobile Testing Guide
https://developer.paciellogroup.com/downloads/TPG_Mobile_Testing_Guide.pdf
- Windows Accessibility Options
<https://www.microsoft.com/en-us/accessibility/windows>
Apple Accessibility Options
<https://www.apple.com/accessibility/>

Standards

- Section 508 Guidelines and Resources
<https://www.section508.gov/>
- United States Laws relating to 508 Standards
<https://www.w3.org/WAI/policies/united-states/>
- VFO Standards
<https://github.com/FreedomScientific/VFO-standards-support>
- Web Content Accessibility Guidelines
<https://www.w3.org/WAI/standards-guidelines/wcag/>
- ADA Standards for Accessible Design
https://www.ada.gov/2010ADAstandards_index.htm

Standards Help

- Use Assistive Technology to Comply with Section 508
<https://www.youtube.com/watch?v=4XJcswWmmAw>
- HTML 508 Checklist
<https://www.hhs.gov/web/section-508/making-files-accessible/checklist/html/index.html>

Resources

- Stories of Web Users
<https://www.w3.org/WAI/people-use-web/user-stories/>
<https://www.w3.org/WAI/people-use-web/tools-techniques/>
- Mythbuster's Guide to Accessibility
<https://medium.com/the-u-s-digital-service/mythbusters-guide-to-accessibility-92ccd88655c6>
- Usability.gov's Accessibility Page
<https://www.usability.gov/accessibility>

Additional Articles

- "Not All Screen Reader Users Are Blind" by Adrian Roselli
<http://adrianroselli.com/2017/02/not-all-screen-reader-users-are-blind.html>
- "The Accessibility of Styled Form Controls & Friends"
https://scottaohara.github.io/a11y_styled_form_controls/
- "Lessons in iOS Voiceover Accessibility"
<https://medium.com/aaptiv-engineering/lessons-in-ios-voiceover-accessibility-834c5ed9a374>
- "The Importance Of Manual Accessibility Testing"
<https://www.smashingmagazine.com/2018/09/importance-manual-accessibility-testing/>
- "Involving Users in Evaluating Web Accessibility"
<https://www.w3.org/WAI/test-evaluate/involving-users/>

More Additional Articles

- "5 accessibility tests you can do in 5 minutes"
<https://openinclusion.com/blog/5-accessibility-tests/>
- "The 6 Simplest Web Accessibility Tests Anyone Can Do"
<http://www.karlgroves.com/2013/09/05/the-6-simplest-web-accessibility-tests-anyone-can-do/>
- "Easy Checks - A First Review of Web Accessibility"
<https://www.w3.org/WAI/test-evaluate/preliminary/>
- "Handling common accessibility problems"
https://developer.mozilla.org/en-US/docs/Learn/Tools_and_testing/Cross_browser_testing/Accessibility

Takeaways

- Accessibility testing doesn't have to be expensive.
- A diverse testing group means better testing.
- Improving accessibility helps everyone.

Find Me

- Twitter: e3betht
- Madison PHP User Group (Meetup)
<http://www.MadisonPHP.com> (@MadisonPHP)
- Madison Web Design & Development Meetup
<http://www.MadWebDev.com> (@MadWebDev)

Find Me

- Feedback:

<https://joind.in/talk/aeb8d>

or

Beth@TreelineDesign.com

- Slides:

<http://www.TreelineDesign.com/slides>