

# An A11y-First Approach to Web Development & Testing

A11y CoP

March 26, 2024

# Agenda

- **Behind Closed Code: An A11y-First Approach**
- **A11y First: Catching Issues Before Deployment**
- **Testing Challenge**
- **DRAFT: Digital Accessibility and Usability Standards**
- **Open Discussion**



# Behind Closed Code: An A11y-First Approach

Amy Hepler, Lead UX/Accessibility Developer, NCDIT

# Applying the WCAG Principles

The W3C Web Content Accessibility Guidelines (WCAG) defines four principles:

- **Perceivable** - Information can be presented in different ways; for example, in braille, different text sizes, text-to-speech, etc.
- **Operable** - Functionality can be used in different modalities; for example, keyboard, mouse, sip-and-puff, speech input, touch, etc.
- **Understandable** - Information and functionality is understandable; for example, consistent navigation, simple language, etc.
- **Robust** - Content can be interpreted reliably by a wide variety of browsers, media players, and assistive technologies.



# Accessible Content: HTML's Unseen Impact

- Assistive technologies use a web page's HTML to translate content into a readable format.
- No matter how good content authors are, they may not be able to make content fully accessible.

- **HTML code must:**
  - **use semantic markup with proper syntax**
  - **be resizable, zoomable, reflowable**
  - **be focusable**
  - **use correct ARIA attributes**
  - **tested and validated**

# Semantic Markup Examples

## HTML5

```
<header>  
<nav>  
<main>  
<aside>  
<footer>  
<section>  
<article>  
<form>
```

## Headings

```
<h1>Heading  
  <h2>Sub-Heading  
    <h3>Sub-Sub-  
      Heading  
  <h2>Sub-Heading  
    <h3>Sub-Sub-  
      Heading
```

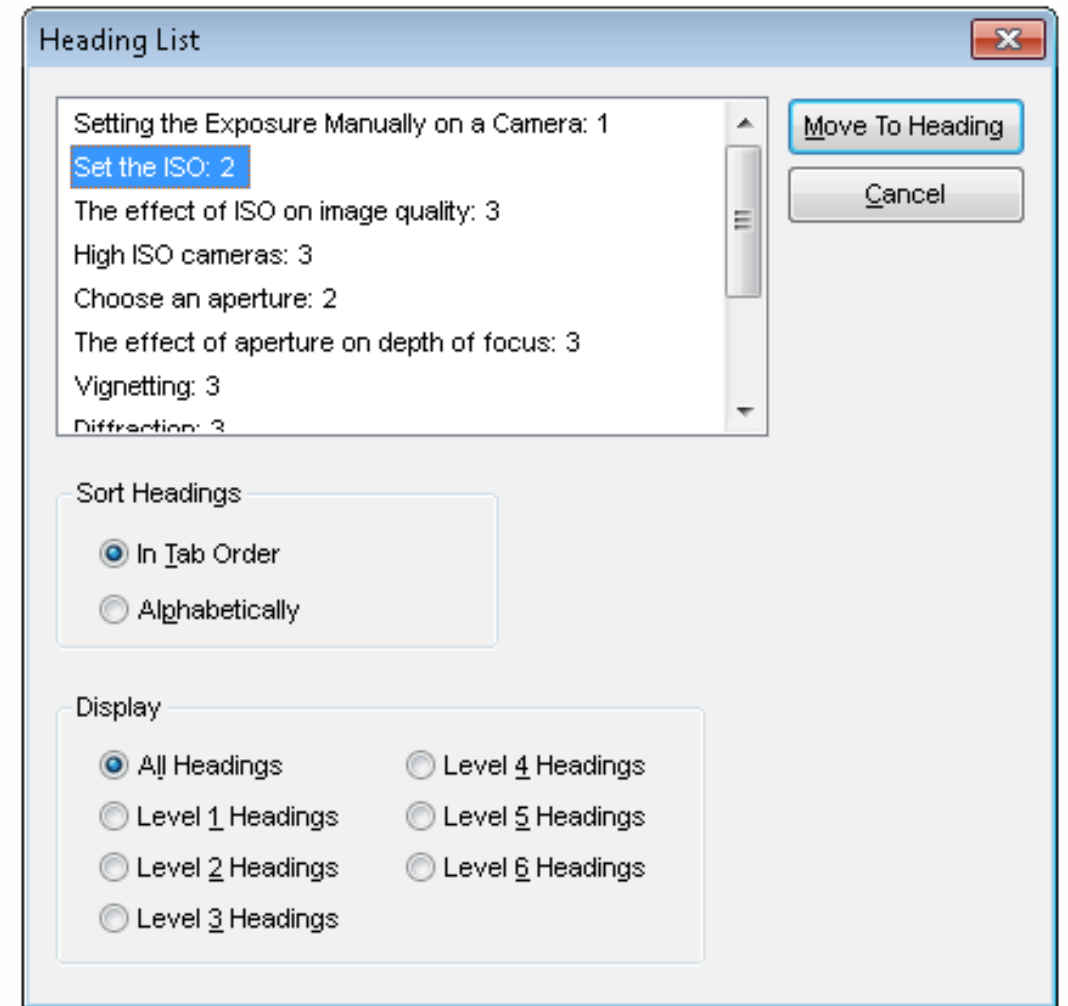
## Lists

```
<ul>  
  <li>  
  <li>  
    <ul>  
      <li>  
      <li>  
    </ul>  
  </li>  
</ul>
```

# Semantics are Important

Screen readers allow users to navigate by elements:

- Landmarks
- Headings
- Lists
- Links
- Tables
- Forms
- Graphics
- Iframes
- And several other categories of semantic elements



# Resizable, Zoomable, Reflowable

- Allowing users to adapt the page to suit their individual needs:
  - Font size
  - Font styles
  - Line-spacing
  - Margins
  - Orientation
  - Colors
  - Borders
  - Outlines



**Which of the following visual styles do most screen readers announce to users while reading in normal browse mode?**

- A. Bold
- B. Italic
- C. Background colors
- D. Colors
- E. Visual placement
- F. Indentation
- G. None of the above

# Keyboard Accessibility

## Critical:

All functionality can be achieved solely by using a keyboard.





# Diverse Access Paths

## Alternative Input Devices

Some users may not be able to use a mouse or a physical keyboard such as:

- Keyboard emulators
- Speech
- Head pointers
- Motion tracking or eye tracking
- Switch Devices

# Sip-and-Puff Switches

Triggered by sipping and puffing into a straw which then mimics tabbing and clicking.



# Button Switches

Activated by using the hand, foot, or head and can be single or multiple switches.



# Head Switches

Operated by the head, knee,  
elbow, cheek, etc., with very  
little pressure.



# Eye Tracking

Measured by point of gaze or eye motion relative to the head.



# Keyboard Checks

- Tab to all active elements including links, form fields, buttons, and media player controls.
- Tab order follows the logical reading order according to the language on the page.
- Focus is clearly visible as you tab through the elements.
- You can activate all elements using enter or spacebar and use arrow keys to move through the elements' options without triggering an action.
- You can tab away from all elements that you can





# WAI-ARIA

Web Accessibility Initiative –  
Accessible Rich Internet Applications

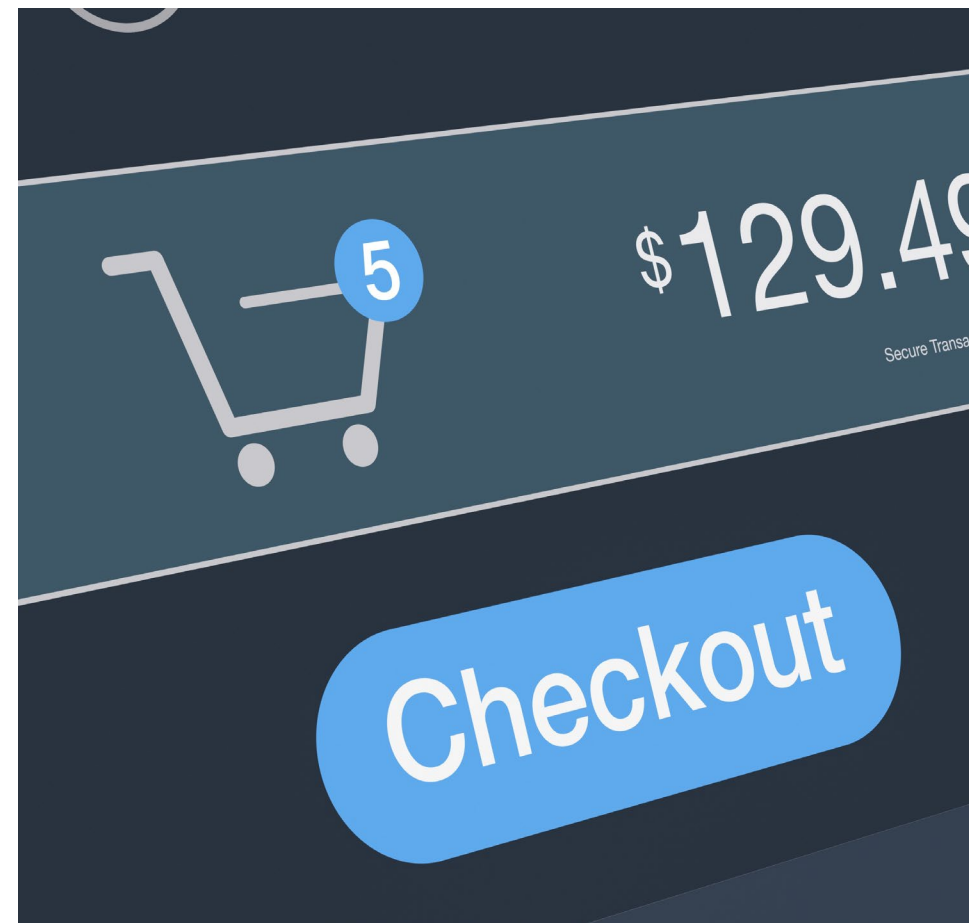
*“A way to make Web content and Web applications more accessible to people with disabilities. It especially helps with dynamic content and advanced user interface controls developed with Ajax, HTML, JavaScript, and related technologies.”*

– W3C WAI group



# ARIA Roles, States, Properties & Relationships


- Communicates information to assistive technology about an element's role, state, properties and relationships:
  - Labels
  - Roles
  - States
  - Properties
  - Relationships
  - Live announcements




# Multiple Navigation Methods: Using ARIA to Identify Menus

- Utility menu
- Main menu
- Breadcrumbs
- Sidebar menu
- Footer menu

An official website of the State of North Carolina [How you know](#) ▾

About Blog NC DIT NC.gov  Select Language

NC Digital Commons  
**SUPPORT**

Guide ▾ Training ▾ **Accessibility ▾** Get Support 

**<nav aria-label="Main">**

**Accessibility > Alternative Text**

## Alternative Text

Image alternative text, also called alt text, is used to describe an image, animation, graph, etc. that screen-reading users may not be able to see. It provides different sensory processing or learning abilities.

Well-written alt text accurately describes an image as well as communicates its purpose and context, to provide an accessible and functional user experience for everyone. Alt text also has important benefits for your website rankings. Search engines crawl alt text, so optimizing your images' alt text is an easy way to improve the user experience for all visitors.

### Alt Text Best Practices

Below are a few best practices to help you write meaningful alt text.

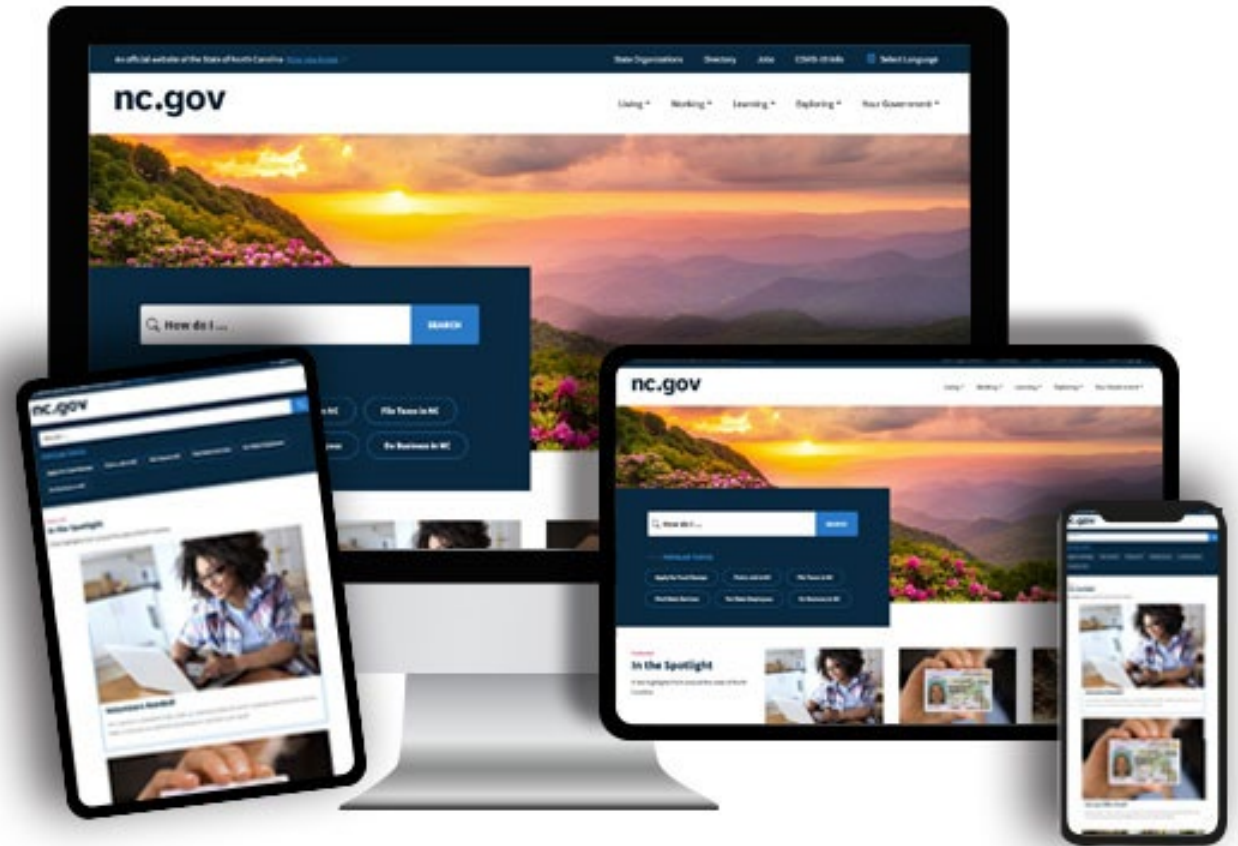
- Describe the image in its context, and focus on the details the image adds to the text.
- Be specific, but try make the alt text fewer than 140 characters. Some screen readers will cut off once that limit is reached.

**<a href="/" aria-current="page">**

**Accessibility**

- [Accessibility Checker](#)
- [Alternative Text](#)**
- [Audio and Video](#)
- [Color Contrast](#)
- [Headings](#)
- [Languages](#)
- [Lists](#)
- [Meaningful Links](#)
- [PDFs and Documents](#)

# Responsive Design for Universal A11y

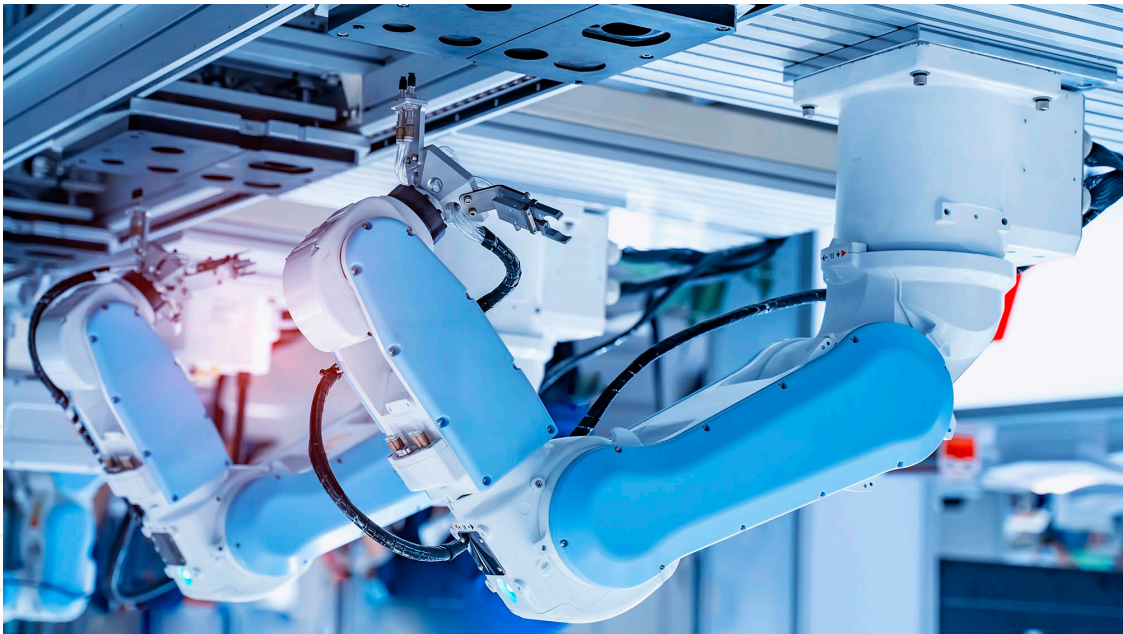


# A11y First – Catching Issues Before Deployment

Marla Laubisch, Software Test Engineer, NCDIT

# What is Automated Testing?

It exercises the software under test using an automation toolset or framework, in contrast to manual testing by a human.

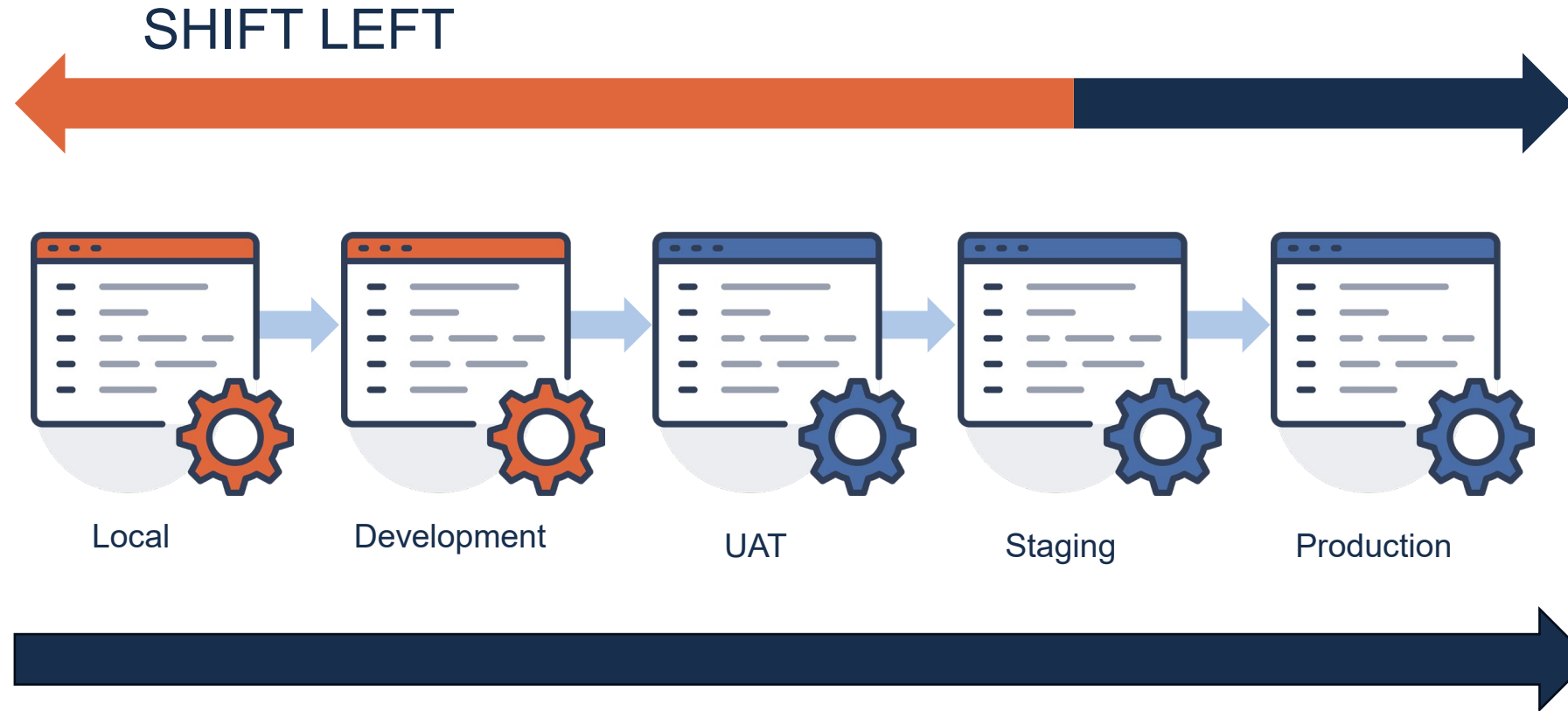


# What are the Benefits?

- Cost/speed
- Test coverage
- Accuracy
- Repeatability
- Reporting



# Test Early, Test Often



Testing new requirements

Testing new code

Testing every build

Testing every deployment



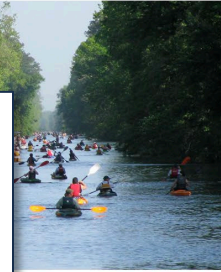
# Building a Test Suite Pays Off

## Accordion on a Landing Page, no padding

Accordion AA



14 Jun



id=#AccordionAA-1655. Text in Content area, Inline image in Content area, Event Card in Content area, CTA Card in sidebar. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam molestie luctus dolor, a pellentesque ex.



Image caption.



CTA in sidebar

Description field

### Event Cards

No image

28 Feb

FEBRUARY 28, 2025 —  
WILMINGTON, NC

Link text

This is the Event Type  
(optional)

Image style: None

28 Feb

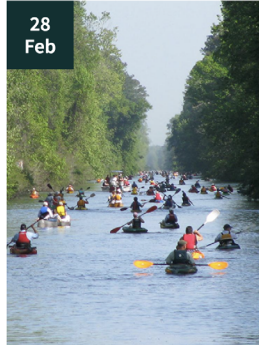


FEBRUARY 28, 2025 —  
WILMINGTON, NC

Link text

Image style: Portrait

28 Feb



Square, no Location

28 Feb



FEBRUARY 28, 2025

Link text

E PARK, NC  
e Border

Guide > Example Content Type > Visual Regression Testing > VRT Blog Example



SEPTEMBER 21, 2019

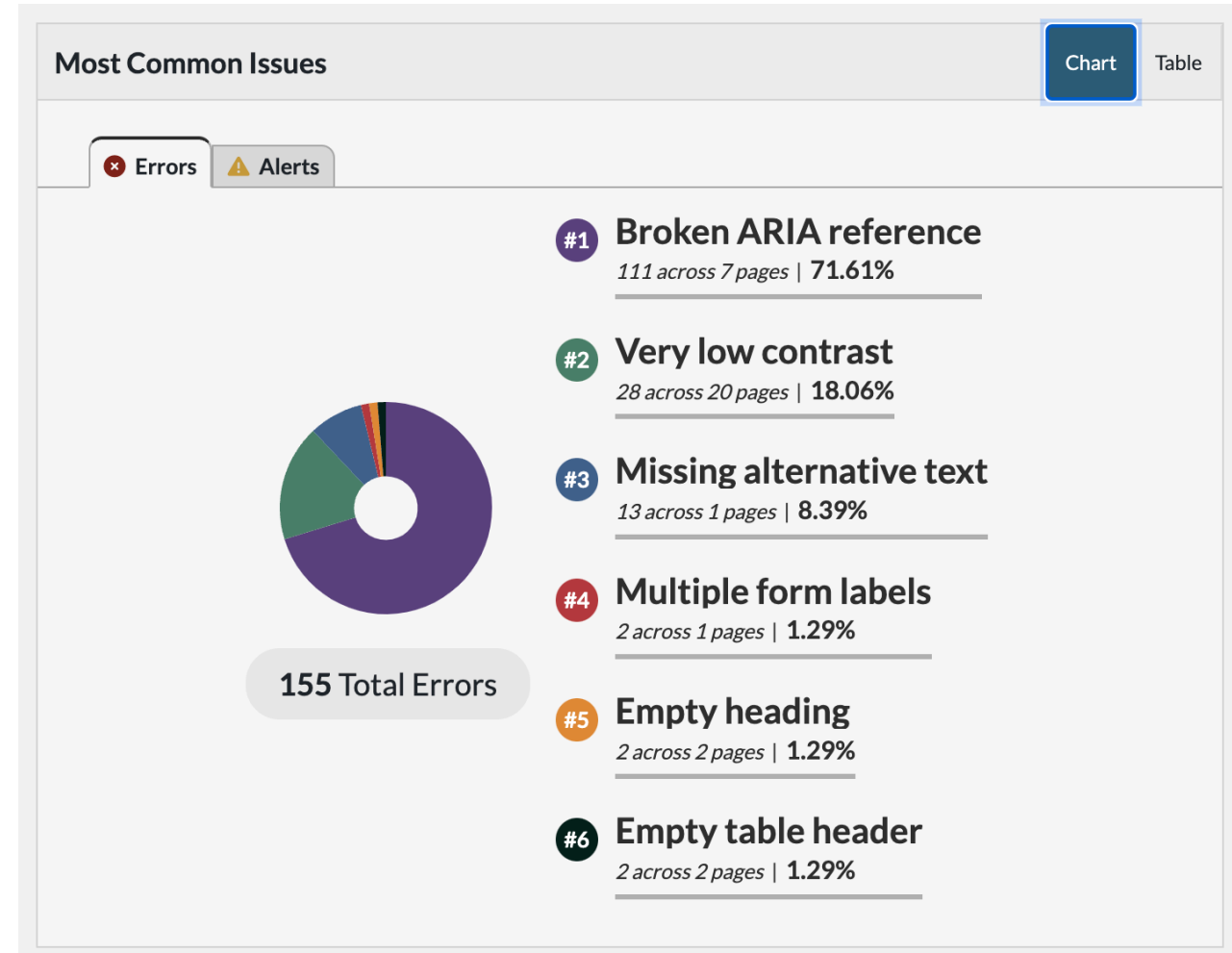
## VRT Blog Example with a title field that is long enough to wrap to two lines

Subtitle for Blog

Summary field. This page displays the Blog available on the Digital Commons platform. It serves as a baseline for visual regression testing when code is deployed to the platform. Note that not every combination shown is desirable or a best practice.

# A11y Testing with Popetech

- Automatically finds accessibility issues on designated websites
- Scheduled to work with our development cadence
- Flags ARIA and structural errors
- Provides a record of issues
- Integrated with JIRA to create tickets from results



# Popetech Reporting



## Broken ARIA reference

### What it means

An aria-labelledby or aria-describedby reference exists, but the target for the reference does not exist.

### Why it matters:

ARIA labels and descriptions will not be presented if the element referenced does not exist in the page.

### How to fix it:

Ensure the element referenced in the aria-labelledby or aria-describedby attribute value is present within the page and presents a proper label or description.

WCAG 2.2 Success Criteria:  
[1.3.1 Info and Relationships \(Level A\)](#)  
[4.1.2 Name, Role, Value \(Level A\)](#)

### The Algorithm... In English

An element has an aria-labelledby or aria-describedby value that does not match the id attribute value of another element in the page.

2058



```
<details data-drupal-selector="edit-field-metatags-0-schema-event" aria-describedby="edit-field-metatags-0-schema-event--description" id="edit-field-metatags-0-schema-event" class="js-form-wrapper form-wrapper claro-details" data-once="details">  <summary role="button" aria-controls="edit-field-metatags-0-schema-event" aria-expanded="false" class="claro-details__summary">Schema.org: Event<span class="claro-details__summary-summary"></span></summary><div class="claro-details__wrapper details-wrapper">
```

### ^ Schema.org: Event

See Schema.org definitions for this Schema type at <https://schema.org/Event>. Also see [Google's requirements](#).

### @type

REQUIRED. The type of event.

# Semi-Automated Testing: WAVE



WAVE powered by WebAIM web accessibility evaluation tool

Styles: OFF  ON

### Summary

Summary Details Reference Order Structure Contrast

0 Errors	0 Contrast Errors
12 Alerts	8 Features
42 Structural Elements	49 ARIA

[View details >](#)

Congratulations! No errors were detected! Manual testing is still necessary to ensure compliance and optimal accessibility.

The following apply to the entire page:

- \*en\*

An official website of the State of North Carolina [How you know](#)

- \*aria-controls="collapseExample"\*
- \*aria-label="How you know"\*/-

[Reset Language to English](#)

- \*aria-label="Reset Language to English"\*
- \*tabindex=0\*

State Organizations Directory Jobs COVID-19 Info

- \*aria-labelledby="block-utilitymenu-menu"\*

nc.gov

- \*Home\*
- Living +/-
- Living +/-
- Living +/-
- Living +/-
- Living +/-
- Living +/-
- \*aria-label="Main Menu"\*
- \*aria-labelledby="mon-pa-pageassist-label mon-pa-logo-label"\*/-
- \*PageAssis Loading\*

</> Code

# Semi-Automated Testing: Axe

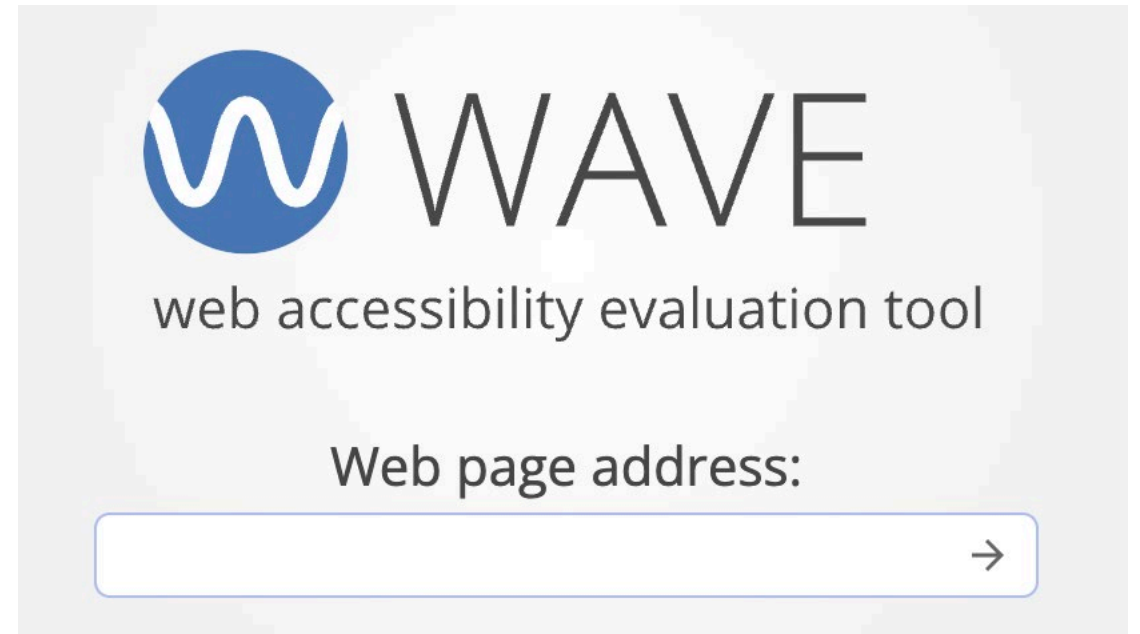


The screenshot shows the Chrome DevTools interface with the axe DevTools extension. The browser tab is titled 'axe DevTools'. The main content area shows a test result for the URL 'https://www.nc.gov/exploring'. The test name is 'All page content should be contained by landmarks'. The total number of issues is 1. The issue is categorized as 'Automatic Issues' and is of 'Moderate' severity. The interface also shows a summary of issues: 1 Automatic, 0 Guided, 0 Manual, 1 Best Practice, 0 Critical, 0 Serious, 1 Moderate, and 0 Minor. The 'Best Practices' section is set to 'ON' and 'WCAG 2.1 AA' is selected.

Category	Count
TOTAL ISSUES	1
Automatic Issues	1
Guided Issues	0
Manual Issues	0
Best Practice	1
Critical	0
Serious	0
Moderate	1
Minor	0

# Let's Test a Page!

1. Go to [wave.webaim.org](http://wave.webaim.org)
2. Test the following URL:  
[digitalcommons.nc.gov/igor](http://digitalcommons.nc.gov/igor)



# Homework

- Test your own sites!
- You can use the WAVE website, or you can add the WAVE or Axe Dev Tools extensions to your browsers.

# DRAFT: Digital A11y & Usability Standards

- WCAG 2.1 (level AA) compliance
- Write in plain language (8<sup>th</sup> grade level)
- Optimize for search
- User-centered design
- Responsive, mobile-first experiences
- Digital option for forms







## **Open Discussion**