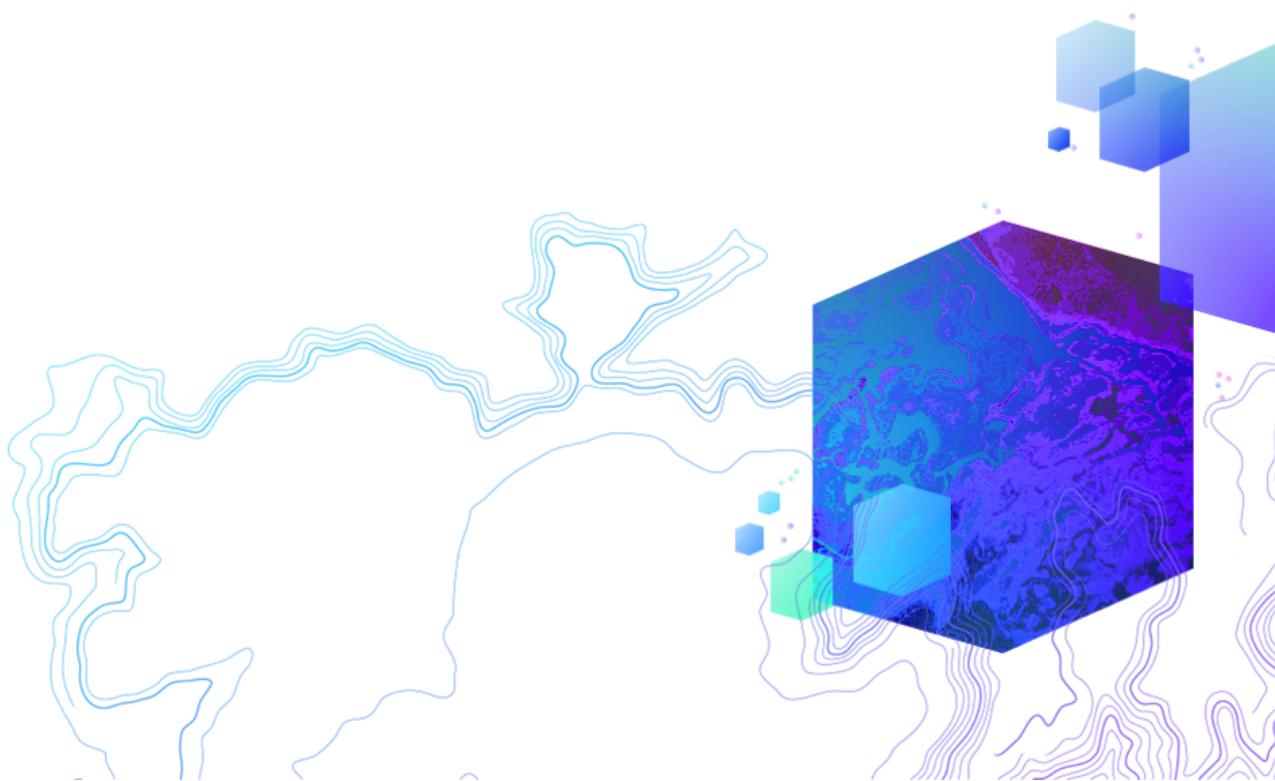


Web Accessibility Best Practices

Kelly Hutchins

Tao Zhang

Jan 23, 2019 · Esri GeoDev Webinar



GoToWebinar Control Panel

In Practice Mode Start Webinar

Sharing Dashboard Attendees: 3 of 1001 (max) Feedback

Audio

Computer audio Phone call

Built-in Microphone Change

Click to change audio input device. Change

Built-in Output Change

Talking: Javier Gutierrez

Webcam

Questions Feedback

Show Answered Questions

Question	Asker

Type answer here

Send Privately Send To All

Polls Handouts: 0 of 5 Chat Feedback

An Introduction to 3D on the Web with the ArcGIS API for JavaScript
Webinar ID# 383-140-627

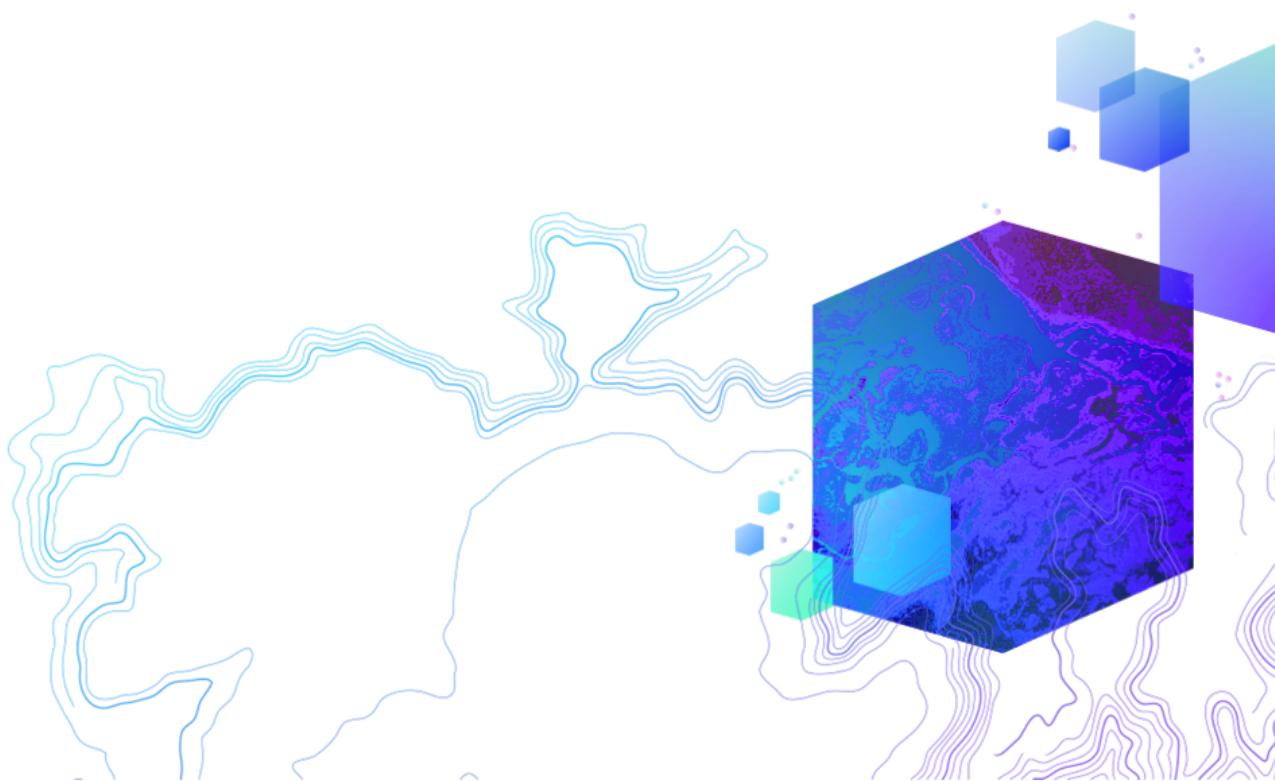
 GoToWebinar

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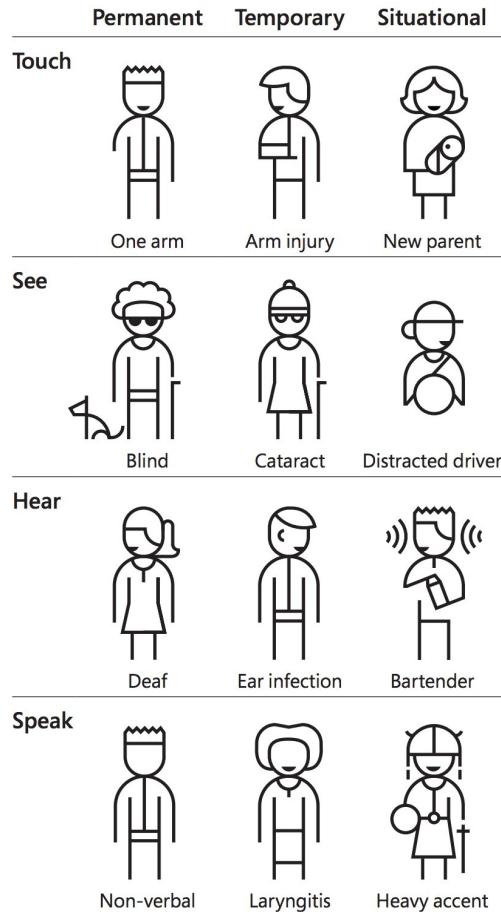
What is accessibility?

Make content usable for everyone regardless of abilities

Disability statistics

- 15% of world population lives with some form of disability
- In the US, 1 in 5 adults has a disability
- 8% of male have some degree of color blindness

Wide range of disabilities



Why is accessibility important?

- The ADA and Section 508
- People with different abilities should have equal access to the web
- Good accessibility is good user experience

How is Esri doing?

- Reviewing products internally for compliance
- Fixing accessibility issues
- Working accessibility into new features
- Sharing knowledge and best practices

The screenshot shows the GeoNet Accessibility group page. At the top, there's a banner with the text "More New Accessibility Features in Story Maps". Below the banner, there's an announcement by Owen Evans from June 27, 2018, stating that the Story Maps Team has focused on improving the accessibility of stories created with Esri's Story Map templates. The June 2018 update marks the release of additional work in this area. The main content area shows a dark-themed header with the GeoNet logo and "The Esri Community". Below the header, the page title is "All Places > Accessibility". A navigation bar includes "Overview", "Activity", "Content", "People", and "Calendar". A note at the top right says "Log in to follow, share, and participate in this socialgroup." On the left, a "Welcome to Accessibility" section describes the group as a place to discuss, ask questions, and share ideas about accessibility. It lists "GROUP ADMINS" with profile pictures for Khutchins-esristaff and TZhang-esristaff. On the right, there are three buttons: "Browse Content" (orange), "Start Discussion" (purple), and "Share File" (blue). At the bottom, a "LATEST BLOG POSTS" section shows three recent blog entries: "Making an Accessible PDF" by KSchmitt-esristaff (2 months ago), "Welcome to the Accessibility group - Let's get started!" by khutchins-esristaff (1 year ago), and "Great Read: Color Design for the Color Vision Impaired" by Langdon.Sanders (10 months ago).

WCAG

Web Content Accessibility Guidelines

[\[contents\]](#)

Web Content Accessibility Guidelines (WCAG) 2.0

W3C Recommendation 11 December 2008

This version: <https://www.w3.org/TR/2008/REC-WCAG20-20081211/>

Latest version: <https://www.w3.org/TR/WCAG20/>

Previous version: <http://www.w3.org/TR/2008/PR-WCAG20-20081103/>

Editors:
Ben Caldwell, Trace R&D Center, University of Wisconsin-Madison
Michael Cooper, W3C

Loretta Guarino Reid, Google, Inc.
Gregg Vanderheiden, Trace R&D Center, University of Wisconsin-Madison

Previous Editors:
Wendy Chisholm (until July 2006 while at W3C)
John Slatin (until June 2006 while at Accessibility Institute, University of Texas at Austin)
Jason White (until June 2005 while at University of Melbourne)

Please refer to the [errata](#) for this document, which may include normative corrections.

See also [translations](#).

This document is also available in non-normative formats, available from [Alternate Versions of Web Content Accessibility Guidelines 2.0](#).

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Abstract

Web Content Accessibility Guidelines (WCAG) 2.0 covers a wide range of recommendations for making Web content more accessible. Following these guidelines will make content accessible to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photosensitivity and combinations of these. Following these guidelines will also often make your Web content more usable to users in general.

WCAG 2.0 success criteria are written as testable statements that are not technology-specific. Guidance about satisfying the success criteria in specific technologies, as well as general information about interpreting the success criteria, is provided in separate documents. See [Web Content Accessibility Guidelines \(WCAG\) Overview](#) for an introduction and links to WCAG

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- 0.2 WCAG 2 Layers of Guidance
- 0.3 WCAG 2.1 Supporting Documents
- 0.4 Requirements for WCAG 2.1
- 0.5 Comparison with WCAG 2.0
- 0.5.1 New Features in WCAG 2.1
- 0.5.2 Numbering in WCAG 2.1
- 0.5.3 Conformance to WCAG 2.1
- 0.6 Later Versions of Accessibility Guidelines

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- 1.1.1 Non-text Content
- 1.2 Time-based Media
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- 1.2.2 Captions (Prerecorded)
- 1.2.3 Audio Description or Media Alternative (Prerecorded)
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- 1.4.9 Images of Text (No Exception)
- 1.4.10 Reflow
- 1.4.11 Non-text Contrast

Web Content Accessibility Guidelines (WCAG) 2.1

W3C Recommendation 05 June 2018



This version:

<https://www.w3.org/TR/2018/REC-WCAG21-20180605/>

Latest published version:

<https://www.w3.org/TR/WCAG21/>

Latest editor's draft:

<https://w3c.github.io/wcag/21/guidelines/>

Implementation report:

<https://www.w3.org/WAI/WCAG21/implementation-report/>

Previous version:

<https://www.w3.org/TR/2018/PR-WCAG21-20180424/>

Previous Recommendation:

<https://www.w3.org/TR/2008/REC-WCAG20-20081211/>

Editors:

Andrew Kirkpatrick (Adobe)
Joshue O Connor (Invited Expert, InterAccess)
Alastair Campbell (Nomensa)
Michael Cooper (W3C)

WCAG 2.0 Editors (until December 2008):

Ben Caldwell (Trace R&D Center, University of Wisconsin-Madison)
Loretta Guarino Reid (Google, Inc.)
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Jason White (University of Melbourne)

Please check the [errata](#) for any errors or issues reported since publication.

See also [translations](#).

This document is also available in non-normative formats, available from [Alternate Versions of Web Content Accessibility Guidelines 2.1](#).

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Abstract

Web Content Accessibility Guidelines (WCAG) 2.1 covers a wide range of recommendations for making Web content more accessible. Following these guidelines will make content more accessible to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, limited movement, speech disabilities, photosensitivity, and combinations of these, and some accommodation for learning disabilities and cognitive limitations; but will not address every user need for people with these disabilities. These guidelines address accessibility of web content on desktops, laptops, tablets, and mobile

Overview of WCAG 2.0

Principles	Success Criteria	Level A	Level AA	Level AAA
1. Perceivable	1.1 Text Alternatives	1.1.1		
	1.2 Time-based Media	1.2.1 – 1.2.3	1.2.4 – 1.2.5	1.2.6 – 1.2.9
	1.3 Adaptable	1.3.1 – 1.3.3		
	1.4 Distinguishable	1.4.1 – 1.4.2	1.4.3 – 1.4.5	1.4.6 – 1.4.9
2. Operable	2.1 Keyboard Accessible	2.1.1 – 2.1.2		2.1.3
	2.2 Enough Time	2.2.1 – 2.2.2		2.2.3 – 2.2.5
	2.3 Seizures	2.3.1		2.3.2
	2.4 Navigable	2.4.1 – 2.4.4	2.4.5 – 2.4.7	2.4.8 – 2.4.10
3. Understandable	3.1 Readable	3.1.1	3.1.2	3.1.3 – 3.1.6
	3.2 Predictable	3.2.1 – 3.2.2	3.2.3 – 3.2.4	3.2.5
	3.3 Input Assistance	3.3.1 – 3.3.2	3.3.3 – 3.3.4	3.3.5 – 3.3.6
4. Robust	4.1 Compatible	4.1.1 – 4.1.2		

What we will cover today

- Focus and tab order
- Color and color contrast
- Text alternatives
- Map for non-sighted users
- A DIY accessibility test process

Our focus today

- How to get started in accessibility
- Simple and effective actions
- Finding issues before working with the code

Past presentations

- DIY Accessibility
- Accessible Web Mapping Apps

Presentations at DevSummit 2019

- DIY Accessibility, March 6, 5:30-6:30pm
- Accessible Web Mapping Apps, March 7, 9:00-10:00am
- Improving Accessibility with ArcGIS Online Web Apps, March 7, 2:30-3:00pm

Focus and tab order

Focus and tab order

- WCAG 2.4.7: Interactive elements should have clear focus.

Focus and tab order

- WCAG 2.4.7: Interactive elements should have clear focus.
- WCAG 1.3.2: Navigation (tab) order should be logical and intuitive.

Focus and tab order

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Focus and tab order

- WCAG 2.4.7: Interactive elements should have clear focus.
- WCAG 1.3.2: Navigation (tab) order should be logical and intuitive.
- WCAG 2.1.1: Keyboard users should be able to use functionalities using keyboard only.
- WCAG 2.1.2: Content does not "trap" keyboard focus within subsections.

Demo: Focus and tab order

Demo: Focus trap in dialog

Example: Accessible App of Electric Charging Stations

Test focus and tab order

- Tab through page to verify all interactive elements have focus
- Focus order matches intended reading order
- Interact with all links and controls using only keyboard
- No keyboard trap except for modals
- Off-screen/invisible content does not receive focus

Color and color contrast

Color and color contrast

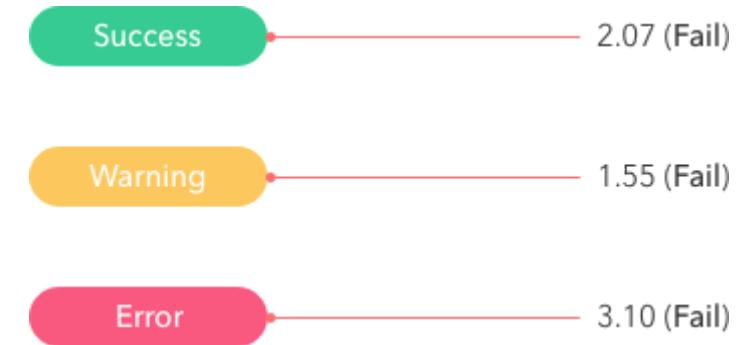
- WCAG 1.4.1: Color is not the only visual means of conveying information.

Color and color contrast

- WCAG 1.4.1: Color is not the only visual means of conveying information.
- WCAG 1.4.3: Text needs to have contrast ratio of at least 4.5:1.

Demo: Color and color contrast

White text on colored background



White text on colored background

Success → 2.07 (Fail)

Warning → 1.55 (Fail)

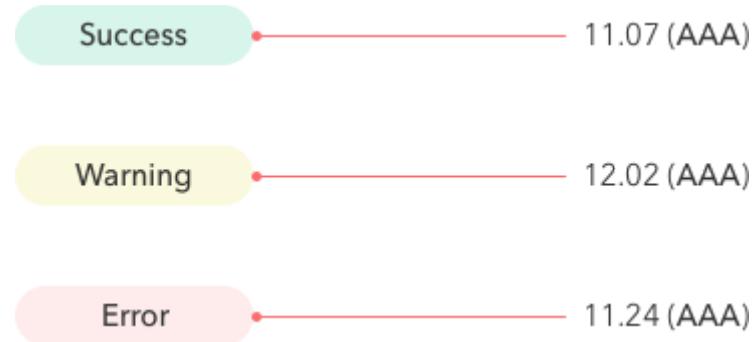
Error → 3.10 (Fail)

Success → 5.96 (AA)

Warning → 5.06 (AA)

Error → 5.34 (AA)

Flipping the contrast



Test color and color contrast

- Look for content differentiated by color only
- Use a [contrast ratio calculator](#)
- Review color contrast issues reported by automated test tool ([aXe](#))

Text alternatives

WCAG 1.1.1: Non-text content has text alternative.

If image is decorative, use alt="" .

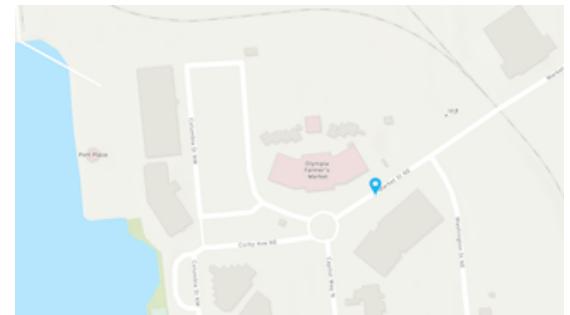
- Demo: Text alternative - empty alt
- Demo: Text alternative - descriptive

Write effective alternate text

- Think about how users will be doing with the information
- Be accurate in presenting the content in images
- Be succinct
- No need to use the phrase "image of ..." to describe images

Accessible maps

- Display a text description of the map
- Provide data in an alternate format



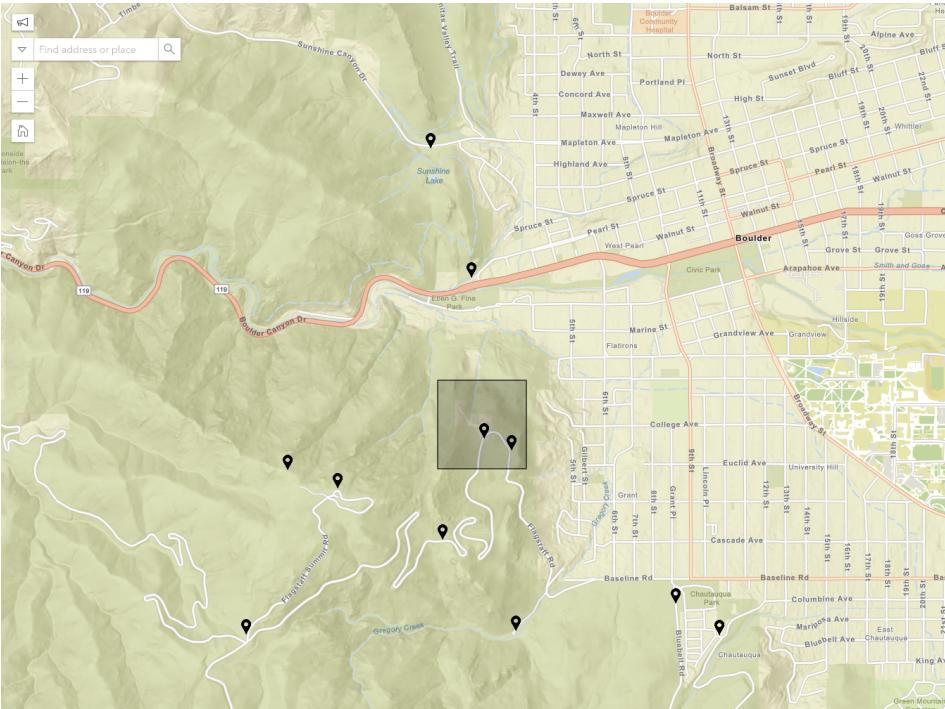
The Esri Olympia regional office is located at 111 Market St NE Suite 250 across the street from the Farmer's Market

Default map navigation

Arrow Keys	Nudge the view to left, right, up or down
N	Adjust the view to point north
A	Rotate the view counterclockwise
D	Rotate the view clockwise
+	Incrementally zoom in at the center of the map
-	Incrementally zoom out at the center of the map

Map View documentation: <https://developers.arcgis.com/javascript/latest/api-reference/esri-views-MapView.html>

Map for non-sighted users

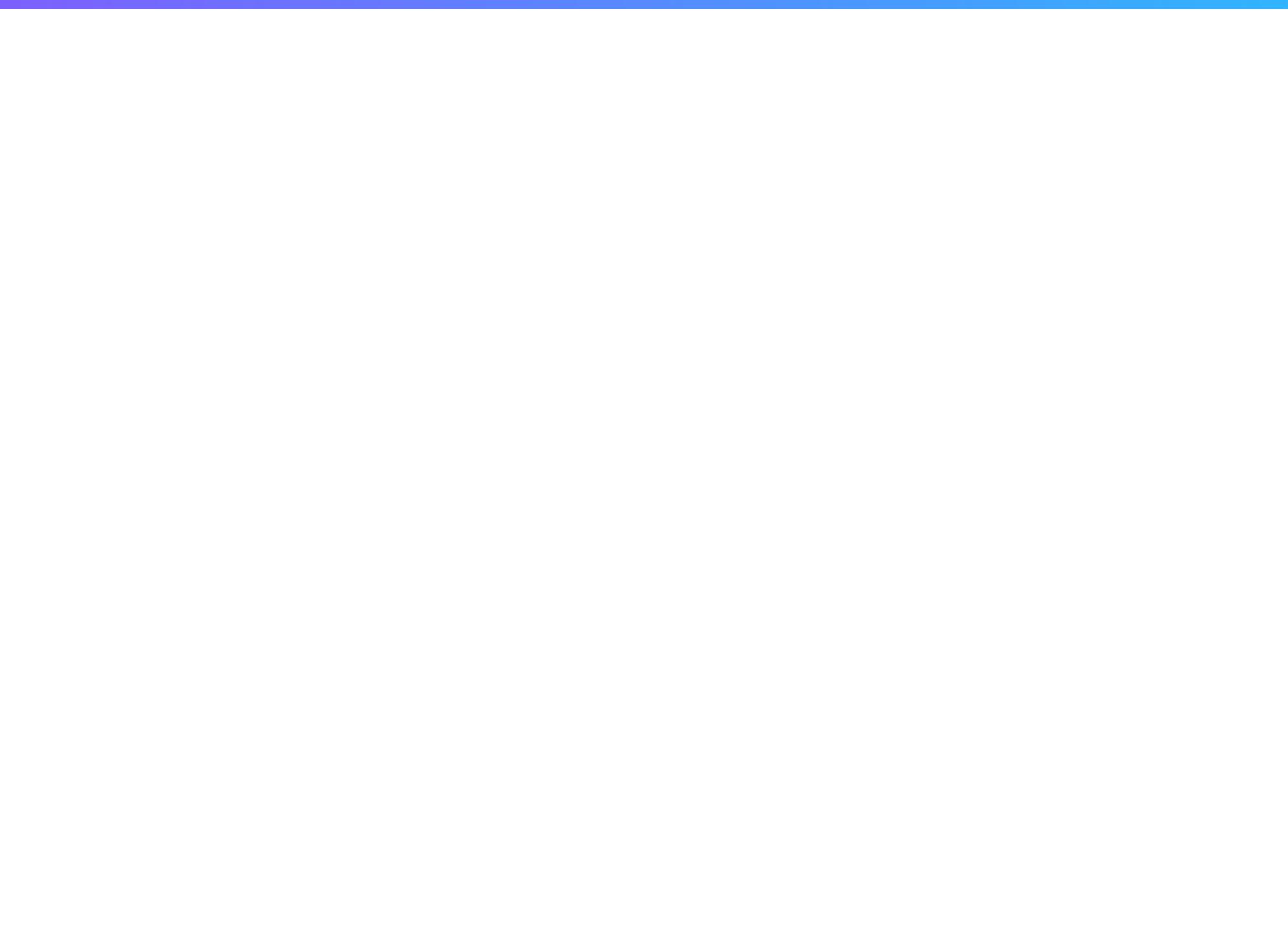


Use the arrow keys to navigate the map and find features. Use the plus (+) key to zoom in to the map and the minus (-) key to zoom out. For details on your current area press the i key. Press the h key to return to the starting map location.

1 Halfway House 2 Panorama Point

Esri, NASA, NGA, USGS, FEMA | City of Boulder, Esri, HERE, Garmin, INCREMENT P, USGS, EPA, NPS, US Census Bureau, USDA
Moving north.
Powered by Esri

GitHub repo: <https://github.com/Esri/a11y-map>



DIY accessibility test

1. Automated test
2. Keyboard test
3. Screen reader test
4. Color test

Automated test with aXe

The screenshot shows the aXe results interface. At the top, there's a navigation bar with icons for aXe, Run again, and Help. Below it, a summary table shows 96 total issues: 2 ARIA attributes must conform to valid names, 65 Elements must have sufficient color contrast, 5 Frames must have title attribute, and 1 Images must have alternate text. The 'Images must have alternate text' row is highlighted in blue. On the right, a detailed view of this issue is shown. It includes an 'Issue description' section with the text 'Ensures elements have alternate text or a role of none or presentation', an 'Impact' section labeled 'critical' with a 'Learn more' link, and a 'To solve this violation, you need to:' section with a list of steps. The 'Element location' is listed as '.sdk-home-banner-image > img'. The 'Element source' is listed as ''. At the bottom, there are 'Issue tags' including category: text-alternatives, wcag2a, wcag111, section508, and section508.22.a.

- Tests rendered page in browser
- Less false positives
- Accessible

Demo: Automated test using aXe

Keyboard test

tab

shift

tab

Move keyboard focus

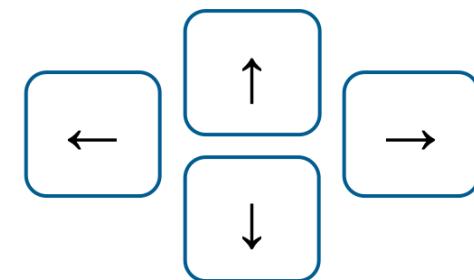
enter

Click links

enter

space

Click buttons



Menus and some form controls

Screen reader

OS	Screen reader	Browser
MacOS	VoiceOver	Safari
Windows	NVDA	Firefox
Windows	JAWS	IE/Edge

Screen reader basics

- A11ycasts: VoiceOver
- A11ycasts: NVDA

Color test

- Automated color contrast test results may need manual verification
- Look for information differentiated only by color

Additional resources

- MDN: Accessibility
- Google Developers Web Fundamentals: Accessibility
- The A11Y Project
- GeoNet: Accessibility

Questions?

Slides: <https://arcg.is/1a910T>

ArcGIS Online Accessibility Survey: <https://arcg.is/8m9am>