



# ArcGIS Online: Accessibility Best Practices for Web Apps

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# Session Agenda

## ArcGIS Online: Accessibility Best Practices for Web Apps

- Esri Accessibility Program
- Accessibility and Disability Background
- Accessibility Testing Principles
- Building Maps for Accessibility
- Configuring Web Apps
- Esri Accessibility Resources
- Open Discussion

# Esri Accessibility Program

What does Accessibility mean to Esri?

Support and Inclusion for  
people of all abilities

Promote product accessibility  
across Global Standards

Compliance for government  
accessibility requirements

Deploy cross-platform strategy to

- drive **accessibility innovation** in our product development
- **make a difference** in our global culture
- support our users in **successful implementation of GIS** with robust and accessible software.

# Introduction to Accessibility

Why is accessibility important?



**1 billion**

people worldwide are living  
with a disability

**2030**



by this year, 2 billion people will need  
at least 1 assistive technology

**25+**



countries currently have web  
accessibility laws and policies



**20%**

of web traffic could come from a  
person with a disability

# Accessibility Standards & Guidelines

## US Section 508

US standards for ICT accessibility  
for federal agencies

## ADA

Civil rights law for businesses  
in private or public sector

## WCAG

**W**eb  
**C**ontent  
**A**ccessibility  
**G**uidelines

Internationally recognized  
accessibility standards;  
2.1 AA is industry standard

European Union

Japan

Canada

Australia, New Zealand

United Kingdom

# ArcGIS Accessibility Conformance Reports

## VPAT

Voluntary Product Accessibility Template;  
Commonly used template

## ACR

Accessibility Conformance Report;  
Documentation for product accessibility details;  
May use VPAT template as part of ACR report

### Esri Accessibility C

#### Product Information

Product Name/Version: Arc

Report Template: Revised S

Product Release Date: Dec

Report Date: January 05, 20

Product Description: ArcGIS  
presenting location-based i  
a single screen. Every orga  
visualize trends, monitor sta

Notes: This report is written  
authoring environment as w

Evaluation Methods Used: 1  
manual and functional testi  
accessibility professionals o  
Dashboards using, among c  
exclusive use of the keyboa  
typical user workflows was i

Contact Information: Enviro

For more information regard  
<https://www.esri.com/en-us/le>

Specific inquiries may be er  
Contracts and Legal Depart

### Web Content Accessibility Guidelines (WCAG) Report

#### WCAG Principle 1: Perceivable

Information and user interface components must be presentable to users in ways they can perceive. Report contains Level A and AA only (Revised Section 508 does not apply to AAA).

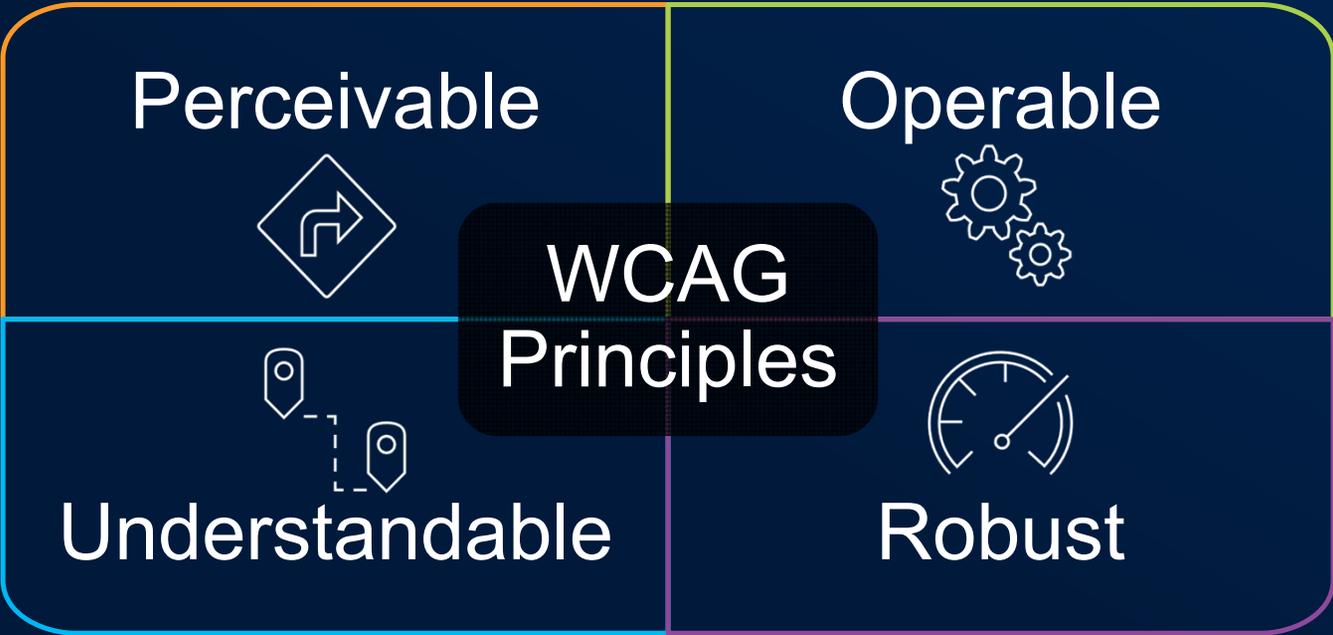
Table 4: WCAG Principle 1 Success Criteria - Perceivable

Criteria	Conformance Level	Remarks and Explanations
<b>1.1.1 Non-text Content (Level A)</b> All non-text content that is presented to the user has a text alternative that serves the equivalent purpose, except for the situations listed below.	Partially Supports	Some non-text content that is presented to the user has a text alternative that serves the equivalent purpose. However, a rating of Partially Supports has been given for the following reasons: <ul style="list-style-type: none"> <li>Most SVG elements are not marked as decorative images.</li> <li>Some custom controls do not provide proper textual name, role, and state information.</li> <li>In some cases, content intended to be hidden from all users is exposed to assistive technologies.</li> </ul> Additional information specific to the output of this product: <ul style="list-style-type: none"> <li>There are rare instances where content is not visible to assistive technology.</li> <li>In some cases, meaningful images and charts lack a textual equivalent.</li> </ul>
<b>1.2.1 Audio-only and Video-only (Prerecorded) (Level A)</b> For prerecorded audio-only and prerecorded video-only media, the following are true, except when the audio or video is a media alternative for text and is clearly labeled as such:	Supports	The product does not have pre-recorded audio-only or pre-recorded video-only content.
<ul style="list-style-type: none"> <li>Prerecorded Audio-only: An alternative for time-based media is provided that presents equivalent information for prerecorded audio-only content.</li> <li>Prerecorded Video-only: Either an alternative for time-based media or an audio track is provided that presents equivalent information for prerecorded video-only content.</li> </ul>		
<b>1.2.2 Captions (Prerecorded) (Level A)</b> Captions are provided for all prerecorded audio content in synchronized media, except when the media is a media alternative for text and is clearly labeled as such.	Supports	The product does not contain prerecorded content requiring synchronized captions.
<b>1.2.3 Audio Description or Media Alternative (Prerecorded) (Level A)</b> An alternative for time-based media or audio description of the prerecorded video content is provided for synchronized media, except when the media is a media alternative for text and is clearly labeled as such.	Supports	The product does not contain prerecorded content requiring synchronized audio description.
<b>1.2.4 Captions (Live) (Level AA)</b> Captions are provided for all live audio content in synchronized media.	Supports	The product does not have live video or audio content.



# Testing for Web Accessibility

# Web Content Accessibility Guidelines



# Testing for accessibility

## Color and Contrast

- Elements in the foreground (especially text) need to stand out clearly and be legible against the background
- Can test with [WebAIM Contrast Checker](#) (should be 4.5:1 or greater for maximum accessibility)

The image shows a screenshot of a color contrast checker tool. It features two color selection panels and a contrast ratio display. The foreground color is #620028 (dark red) and the background color is #FFFFFF (white). The contrast ratio is 13.54:1, which is highlighted in a green box. The tool also includes lightness sliders for both colors.

Color Type	Hex Code	Lightness Slider Position
Foreground Color	#620028	Low (dark)
Background Color	#FFFFFF	High (light)

Contrast Ratio: **13.54:1**

# Testing for accessibility

## Color and Contrast

- As many as 1 in 20 people worldwide have some form of Color Vision Deficiency (CVD)
  - Deuteranopia (green-blind)
  - Protanopia (red-blind)
  - Tritanopia (blue-blind)
- Test your content's color palette to check for forms of CVD



*Full-color vision*



*Deuteranopia  
(red-green CVD)*



*Protanopia  
(red-green CVD)*



*Tritanopia  
(yellow-blue CVD)*

# Testing for accessibility

## Keyboard Navigation

### Who does this impact?

- Individuals using keyboards may have mobility disabilities
- Many consumers of online content use the keyboard (or any other text entry devices) rather than a mouse to navigate through web pages, apps, etc.
- Consider the Permanent, Temporary, and Situational conditions that could impact ability to use a keyboard

# Testing for accessibility

## Keyboard Navigation

### Why is testing for keyboard navigation important?

- Keyboard navigation maps to other types of navigation interfaces (e.g. voice recognition software, switch controllers, pedals, etc)
- Optimizing for keyboard support takes you a long way in optimizing for other assistive technologies
- Relatively easy to test and confirm navigability of your technology

# Testing for accessibility

## Keyboard Navigation

<b>Tab</b>	move forward through interactive elements (e.g. link, button, form)
<b>Shift + Tab</b>	move backward through interactive elements
<b>Arrow keys</b>	move between parts of composite UI elements
<b>Enter</b>	activate the current selection (e.g. links, buttons)
<b>Space</b>	check/uncheck, and activate the current selection
<b>Escape</b>	close the current selection and return focus to the element that opened it
<b>Shift + Arrows</b>	expand/close dialog divider
<b>Shift + F10</b>	open a context menu (pop-up menu)
<b>Alt + Down Arrow</b>	opens a combo box

# Testing for accessibility

## Screen Readers

### Who does this impact?

- Upwards of 2.2 billion people have vision impairment (as of 2022)
- More than 12 million people in the US (over 40) have vision impairment (as of 2021)
- Screen reader users are often blind, but also include users with low vision, cognitive or learning disabilities, and those who prefer voice assistants
- Consider the Permanent, Temporary, and Situational conditions that could impact a human's sight

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

# Testing for accessibility

## Screen Readers

<b>SCREEN READER</b>	<b>BROWSER</b>	<b>OS</b>
<u>NVDA</u>	Firefox, Chrome	Windows
<u>JAWS</u>	Chrome, IE	Windows
<u>Narrator</u>	Edge, Chrome	Installed in WIN 10
<u>VoiceOver</u>	Safari, Chrome	MacOS, iOS
<b>TalkBack</b>	Chrome	Android mobile

*Data from WebAIM 2019 Survey on Screen Reader Preference*

# Testing for accessibility

Automated testing tools – Web Scanners

## Accessibility Insights

Optimized for various environments:

- Web browser extensions
- Windows OS version
- Android apps (run on desktop)
- Created by Microsoft

## Axe Dev Tools

Optimized for web and desktop:

- Web browser extensions (free and upgraded modes of operation)
- Axe-core API for testing (open source)
- Created by Deque



# Building Maps for Accessibility

# Building Maps for Accessibility

## Combined Approach

Enhanced Contrast  
Basemaps in basemap gallery

Map navigation keyboard shortcuts in Map Viewer

Map description in ArcGIS  
Instant Apps



Map accessibility: Add a description to provide a text equivalent of your map and its content for app viewers with vision impairment.

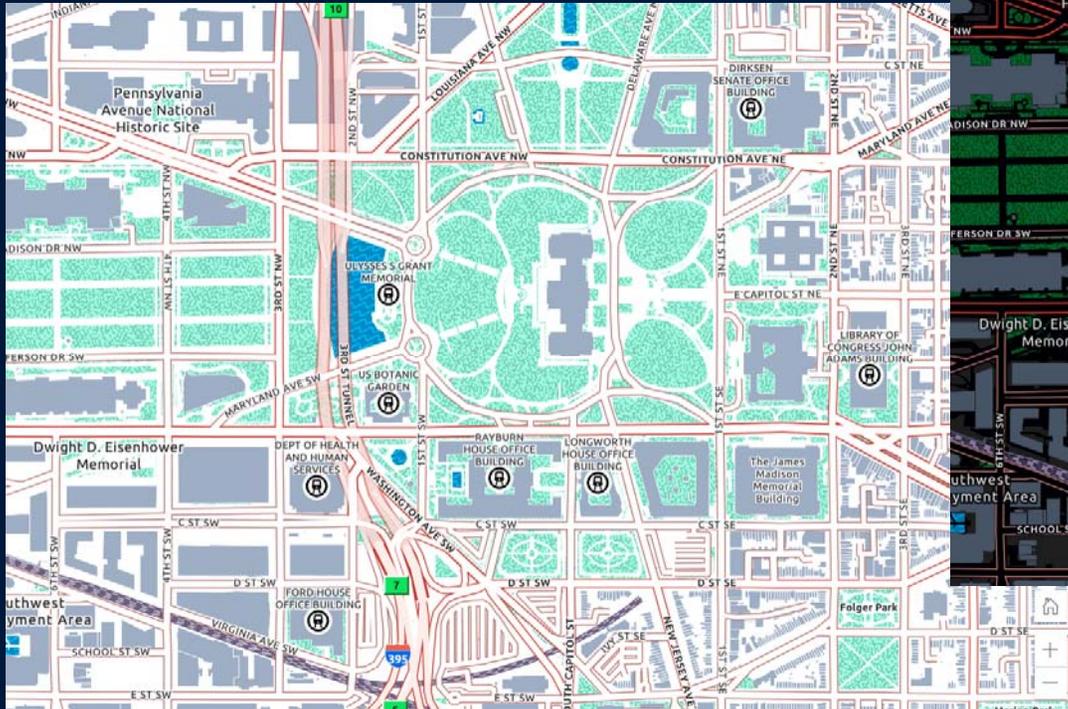
Map description 

When map view is in focus	
Nudge the view to left, right, up, or down	Arrow keys
Adjust view to point north	N
Rotate map counterclockwise	A
Rotate map clockwise	D
Zoom in to center of the map	+
Zoom out from center of the map	-

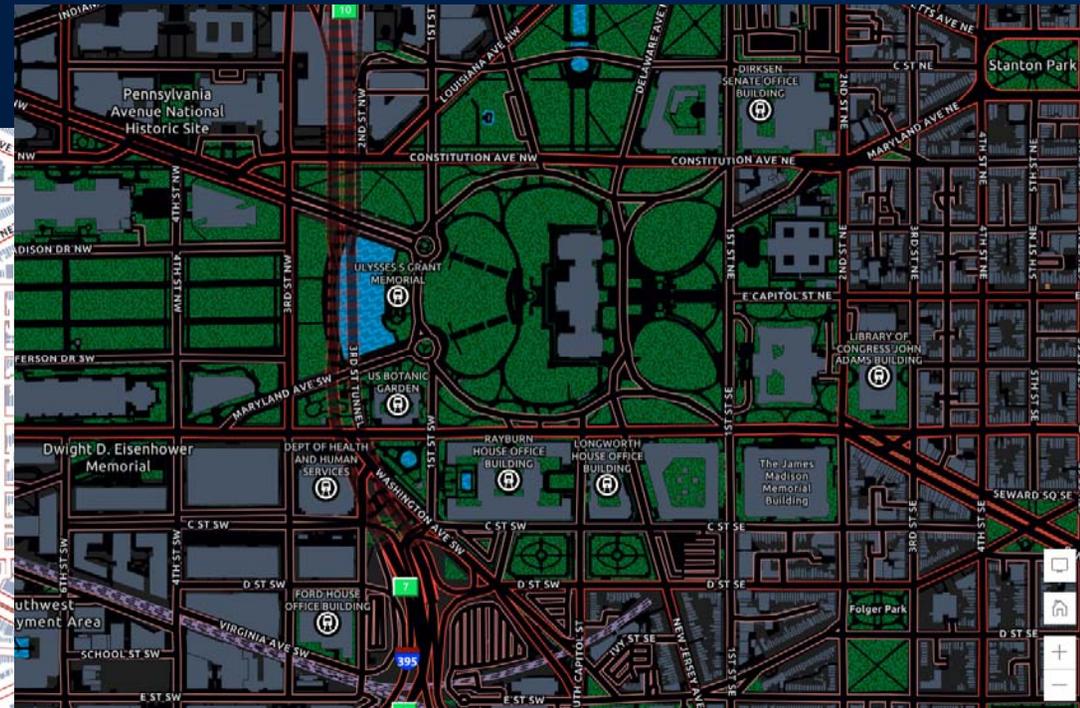
# Building Maps for Accessibility

Enhanced Contrast Basemaps

Enhanced Contrast Map



Enhanced Contrast Dark Map



# Building Maps for Accessibility

## High Contrast Basemaps

ArcGIS Living Atlas of the World

Home Browse Apps Blog

\*Enhanced Contrast Map\*

Search

All Trending Basemaps Imagery Boundaries People Infrastructure

All content types All time All regions  Esri-only content  Authoritative-only content

Enhanced Contrast Map

Web Map By esri\_vector

This web map provides a detailed vector basemap for the world with enhanced contrast that aim to meet the standards for WCAG and US Government Section 508 compliance. The map detail is built with higher contrast and color-vision-deficient-safe colors. This item is in beta.

Enhanced Contrast Map (WGS84)

Web Map By esri\_vector

This web map provides a detailed vector basemap for the world with enhanced contrast that aim to meet the standards for WCAG and US Government Section 508 compliance. The map detail is built with higher contrast and color-vision-deficient-safe colors. It uses WGS84 Geographic, version 2 tiling scheme. This...

Enhanced Contrast Reference (WGS84)

Tile Layer By esri\_vector

This (v2) vector tile layer is the base layer for a basemap that displays features

Enhanced Contrast Base (WGS84)

Tile Layer By esri\_vector

This (v2) vector tile layer is the base layer for a basemap that displays features

Rio de Janeiro

ArcGIS Living Atlas

Working with Enhanced Contrast basemaps to improve accessibility.

Mapping  
June 30, 2022

Andy Skinner

# Color Ramps for Color Vision Deficiency

- [Esri color ramps](#)
- [Designing Apps with Color Blind Users in Mind](#)
- <https://colorbrewer2.org>
- Testing tools
  - Colorblindly
  - Color Oracle



# Data and Information

- Avoid information overload
- Clear concise language
- Avoid visual clutter
  
- [Tips from the W3C](#)
- [Writing for Web Accessibility](#)

1230-1698 Quest Rdg, Sylva, North Carolina, 28779

0 6.6 mi 10

Results: 1

2022 Current Open Sites Operating 1

**Scotts Creek Elementary** (3.27 mi)

Program Type	SSO
Site Name	Scotts Creek Elementary
Site Status	Open
Site County	Jackson
Site Address 1	516 Parris Branch Road
Site Address 2	
Site City	Sylva
Site State	NC
Site Zip	28779
Site Supervisor Last Name	Grasty
Site Supervisor First Name	Ali
Site Supervisor Phone	(828) 631-2740
Sponsoring Organization	Jackson County Schools
Site Start Date	9/30/2021, 5:00 PM
Site End Date	7/28/2022, 5:00 PM
Meal Types Served	B,L



# Configuring Web Apps for Accessibility

# ArcGIS Instant Apps

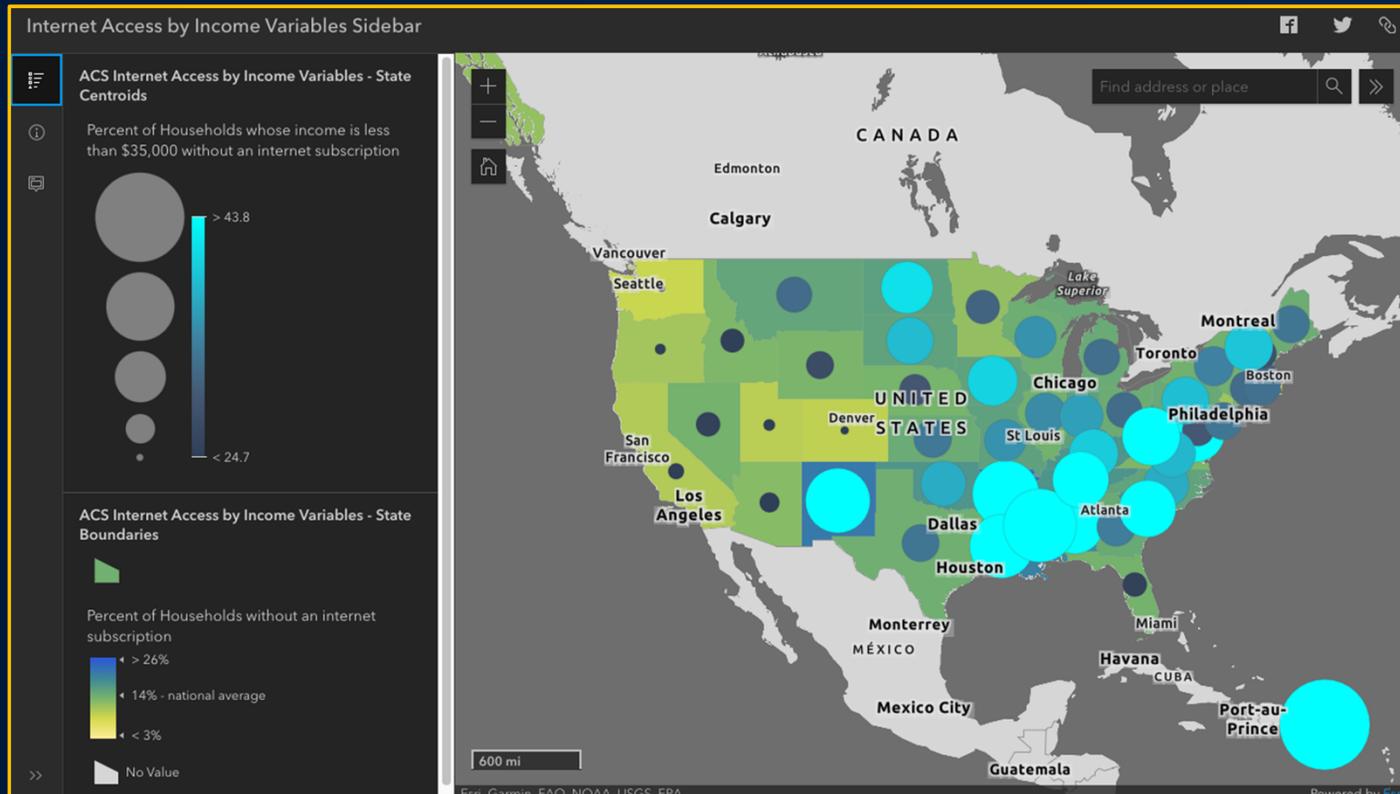
Configuring apps for accessibility



The image displays the ArcGIS Instant Apps configuration interface. On the left, the 'Express' settings panel is visible, with the 'Express' toggle turned on and the 'Theme & Layout' step highlighted. The main content area shows the 'Express' configuration steps: Step 1. Map, Step 2. Countdown, Step 3. About, Step 4. Interactivity, and Step 5. Theme & Layout. A 'Select a preset theme' dialog is open, showing various theme options: None, Custom, Shared theme, Forest, Beach, and Ocean. The 'Shared theme' option is highlighted. On the right, the 'Theme & Layout' settings panel is shown, with the 'Theme' section highlighted. Below the main interface, a preview of the Instant App is shown, displaying a map and an 'Imagery Viewer' control.

# ArcGIS Instant Apps

## Configuring apps for accessibility



# ArcGIS Instant Apps

Configuring apps for accessibility

**Map accessibility:**  
Map description ⓘ

Shortcuts menu ⓘ



Shortcut	Action
Option + M	Select the map

Select the map

Shortcut	Action
Arrow keys	Nudge to left, right, up, or down
N	Adjust to point north
A	Rotate counterclockwise
D	Rotate clockwise
+	Zoom in at the center
-	Zoom out at the center

# ArcGIS Instant Apps

Configuring apps for accessibility



Select a font ⓘ

Avenir Next ▼

Select a preset theme ⓘ

Forest ▼

Colors and contrast ratio ⓘ

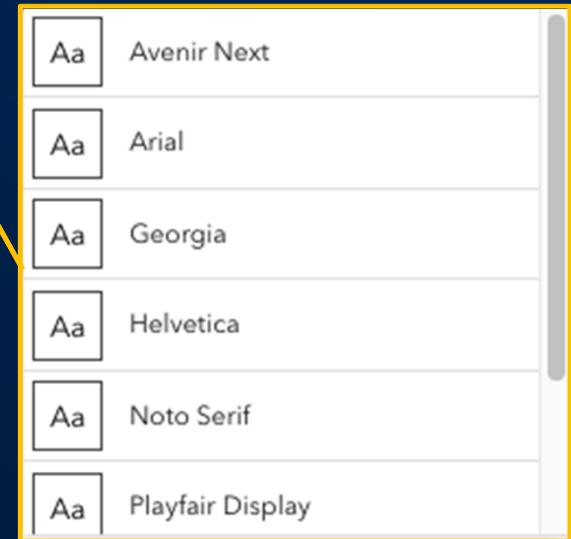
Primary ^

Background #0D3F14

Text #FFFFFF 12.1

Secondary ▼

Accent ▼



# ArcGIS StoryMaps

Configuring apps for accessibility



# ArcGIS StoryMaps

Configuring apps for accessibility

ArcGIS StoryMaps has been evaluated for conformance with WCAG 2.0 AA, WCAG 2.1 AA, and Section 508 standards. This evaluation, the Voluntary Product Accessibility Template (VPAT), can be found [here](#).

The StoryMaps team has also put a lot of effort into giving authors the ability to produce maximally accessible stories through a variety of features.



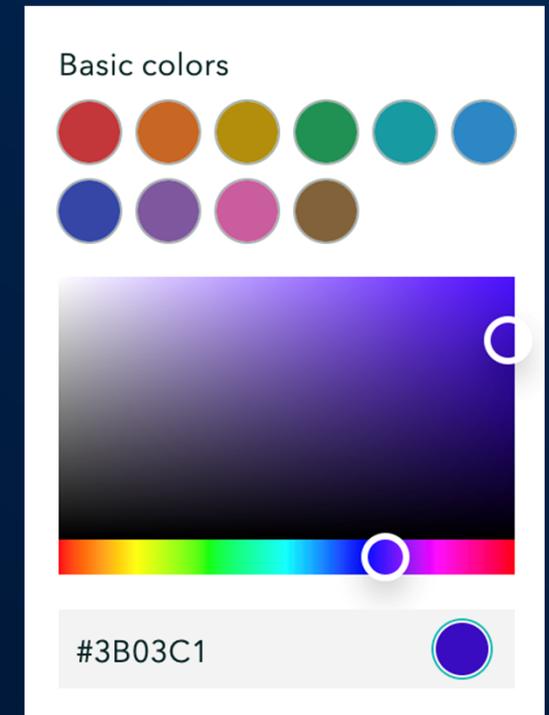
# ArcGIS StoryMaps

## Story Theming

**Theme Builder** — Gives authors a lot of control over the aesthetic look and feel of their story

- Color

- Theme builder's color picker lets users input any hex code (or drag selector to desired spot on color ramp)
  - Can control the story's background color, primary and secondary accent colors, text colors, and colors of other elements such as separators and button links
- As mentioned earlier, check for accessible contrast ratio and compatibility with CVDs!

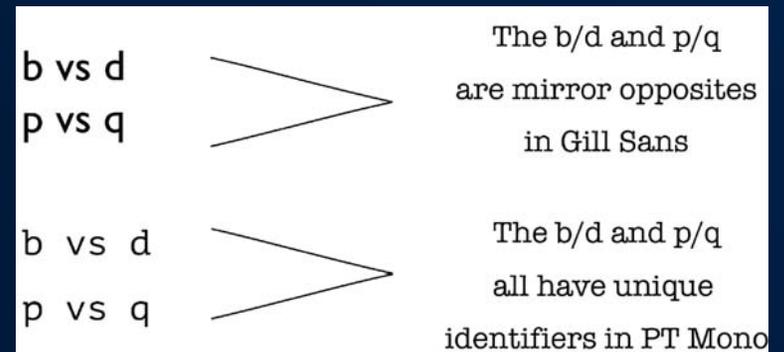
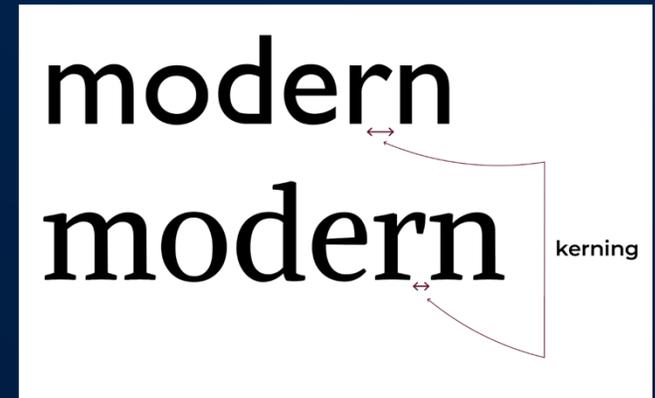


# ArcGIS StoryMaps

## Story Theming

### • Typography

- Theme builder allows authors to select from the entire library of Google Fonts (over 1,000 fonts). Many of these can be difficult to read for consumers with vision impairments or conditions such as dyslexia.
- Some considerations when selecting an accessible font:
  - Sans serif fonts tend to be more legible in digital formats
  - Kerning (spacing between characters in a given typeface). If it's too tight, multiple characters can blend together and look like one letter (ex: "cool" can read as "cod")
  - Fonts with all unique characters are most accessible (tip: compare capital l (eye), lower-case l (ell), and number 1)
  - Use display fonts judiciously: they can be fun, but also not very accessible



# ArcGIS StoryMaps

## Media

**Media:** photos, videos, audio, embedded content

- Videos or audio clips with speech should be captioned or have a transcript made available through a link
- Limit use of graphics that have text within them (especially if the text is important)
  - Screen readers won't pick up on words within graphics
  - Real text is more adaptable by consumer (can be enlarged, copy/pasted, available in reader modes, etc.)

# ArcGIS StoryMaps

## Media

- Alternative text

- Describes media for screen readers or if the media doesn't load
- ArcGIS StoryMaps allows adding alt text for all forms of media (videos, maps, audio clips as well as images)
- Most effective alt text finds a balance between too much description and not enough



Too much	Not enough	Just right
A person in a neon red jacket and a hefty backpack kneels in the snow beneath a granite sky, peering through the telescopic lens of a tripod-mounted camera. Their target is cluster of penguins camping out on a rocky outcropping several yards away	Person in a red jacket in the snow	A person in a red jacket kneels in the snow, photographing some penguins on a nearby rock

# ArcGIS StoryMaps

## Story Structure/Language

- Use heading and subheading text types properly
  - Should be used to break story into logical sections and sub-sections, NOT for effect
  - Helps optimize the story for assistive technologies
- Try to avoid paragraphs that are too long or many short paragraphs in a row
  - Both a wall of text and a lot of line breaks can be disorienting
- Use descriptive language for hyperlinks and button links
  - e.g., “[Learn more about rainforest conservation](#)” rather than “[Click here](#) to learn more.”



# ArcGIS StoryMaps

## Story Structure/Language

- Be mindful of using **inclusive language**

- Many commonplace words and phrases have roots in bias (ableism, racism, sexism, etc.) or violence

- Here are some resources to learn more about inclusive language and substitute phrasing for less inclusive terms:

- Linguistic Society of America's [guidelines for inclusive language](#)

- American Psychological Association's [style guide for bias-free language](#)

- National Center on Disability and Journalism's [disability language style guide](#)



# Accessibility Resources

# Esri Accessibility Resources Site

- Customer information and resource site dedicated to Accessibility at Esri
- Product accessibility best practices, articles, documentation, and general resources
- Contact Esri Accessibility Form

The screenshot displays the Esri Accessibility Resources website. At the top, there is a navigation bar with the Esri logo and links for Home, Products, Support & Events, News, and About. Below the navigation, the main header features the text "Esri Accessibility" and a large image of a man with glasses and a headset, gesturing towards a laptop. To the right, there are sections for "Accessibility Conformance Reports" and "Accessibility Resources".

The main content area includes a commitment statement: "We are committed to creating accessible GIS technology for everyone." This is followed by a section titled "Our approach to accessibility at Esri" which lists four key areas: Inclusive design, Conferences and events, Training and education, and Heuristic testing. Each area is accompanied by a small image and a brief description.

Below this, there is a "Contact Esri Accessibility" form with fields for First Name, Last Name, Email, and Country (set to United States). A large text area asks "How can Esri help?" and a "Submit" button is at the bottom. A disclaimer states: "By submitting this form, you confirm that you have read and agree to Esri's Privacy Policy." To the right of the form, there is a small "ArcGIS Online" logo and a link to "Contact Us".

At the bottom of the page, there are sections for "Esri Accessibility articles and blogs" and "Esri Accessibility videos and presentations". The articles section features a grid of 12 items, each with a thumbnail image and a title, such as "Download an Accessibility Checklist" and "Building an accessible product or service". The videos and presentations section includes thumbnails for "Accessible Web Mapping Apps: ADA, WCAG, and 508 Compliance", "ArcGIS StoryMaps Accessibility", and "508 Accessibility".

# Accessibility Community

# Esri Legal Accessibility

**Esri's commitment to accessibility**

In the technology industry, products and their capabilities are changed and improved daily. Esri understands that while the improvement of product functionality is significant in enhancing efficiency for users of the respective products, there is an equally significant and corresponding need to ensure that the functionality is readily available to all users. Our effort to achieve product accessibility for all begins with diligent research of evolving accessibility capabilities and continues with the development and incorporation of these capabilities into GIS functions across our product line. With each release of ArcGIS, we further empower our customers to enjoy our products and make informed choices about Esri products that best serve them.

**For our US customers—Compliance with Section 508, WCAG, and ADA**

Section 508 of the Rehabilitation Act of 1973 (29 U.S.C. 794d) requires federal agencies to procure technology products that are the most readily accessible to people with disabilities. To assist agencies in making this determination, Esri publishes Voluntary Accessibility Templates, or VPATs, for our various products. These are designed to provide our customers with a thorough breakdown of compliance areas so they may evaluate and select the products that best meet their accessibility needs.

**For our international customers—Compliance with WCAG**

A large portion of our international customers reside in jurisdictions where...

**Accessibility Conformance Reports**

In 2017, the US Access Board published a rule on requirements for federal agencies to procure technology products that are the most readily accessible to people with disabilities. This page contains Accessibility Conformance Reports (ACR®) for Esri products, including users with disabilities. This page contains Accessibility Conformance Reports (ACR®) for Esri products, solutions, and services. Each report describes the conformance level for accessibility features, assistive technologies, and evaluation methods used, with additional information about general product accessibility. We strive to follow accessibility requirements based on the US Access Board (Section 508), Web Content Accessibility Requirements (WCAG 2.0 A & AA) to websites, as well as to non-web documents and software.

Core products	Apps	Services, tools, and extensions	
ArcGIS Pro 2.8 (2021)	ArcGIS Desktop 10.7.1 (2019) 10.6 (2018) 10.5.1 (2017)	ArcGIS Enterprise 10.8.1 (2020) 10.7.1 (2019) 10.6.1 (2018)	ArcGIS Online March 2022

# Esri Accessibility Resources

- Esri Accessibility Site
  - <https://www.esri.com/en-us/accessibility/overview>
- Esri Legal Accessibility
  - <https://www.esri.com/en-us/legal/accessibility/conformance-reports>
- Esri Accessibility Community
  - <https://community.esri.com/t5/accessibility/ct-p/accessibility>
- [EsriAccessibility@Esri.com](mailto:EsriAccessibility@Esri.com)
  - Email alias for issues and request for assistance



## Esri Accessibility Resources (cont)

- ArcGIS Instant Apps resources:
  - <https://www.esri.com/en-us/arcgis/products/arcgis-instant-apps/resources>
- ArcGIS StoryMaps resources:
  - <https://storymaps.arcgis.com/stories/02670c9018f14cfbbaef7cba5c54d453>





# Questions and Discussion



**esri**<sup>®</sup>

**THE  
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OF  
WHERE**<sup>®</sup>