

Accessibility Best Practices

Jessica McCall, Esri

Accessibility basics

Introduction to accessibility

Why is accessibility important?



1.3 billion

Number of individuals living with a disability worldwide



2030

By this year, 2 billion people will need at least 1 assistive product



25+

Countries that currently have web accessibility laws and policies



20%

Percentage of web traffic that could come from a person with a disability

Designing for individuals

Design for a range of abilities benefit everyone

Individuals can have a range of impairments that can change over time

- Health conditions
- Age related impairments
- Temporary or situational limitations
- Changing abilities
- Multiple disabilities



Accessibility Laws: US Federal, State, and Local

US Section 508 of Rehabilitation Act 1973

- Federal agencies
- [US Access Board](#)
- [Section508.gov](#) (GSA)

ADA - Americans with Disabilities Act

- [Ada.gov](#)
- Title II – State and local
- Effective April 2026

WCAG

Web **C**ontent **A**ccessibility **G**uidelines

Internationally recognized
accessibility standards

Accessibility in maps and apps

Accessibility in GIS: Planning for accessibility



Author apps with **accessibility** in mind



Convey a purpose and create a comparable experience



Commit to **ongoing** accessibility improvements



Test **early and often** throughout development process

Use of color and color contrast

Choosing the right color scheme supports individuals with low vision or color vision deficiency.

WCAG 1.4.3: Contrast (AA)

Text and images of text have a contrast ratio of at least 4.5:1.

WCAG 1.4.11: Non-text Contrast (AA)

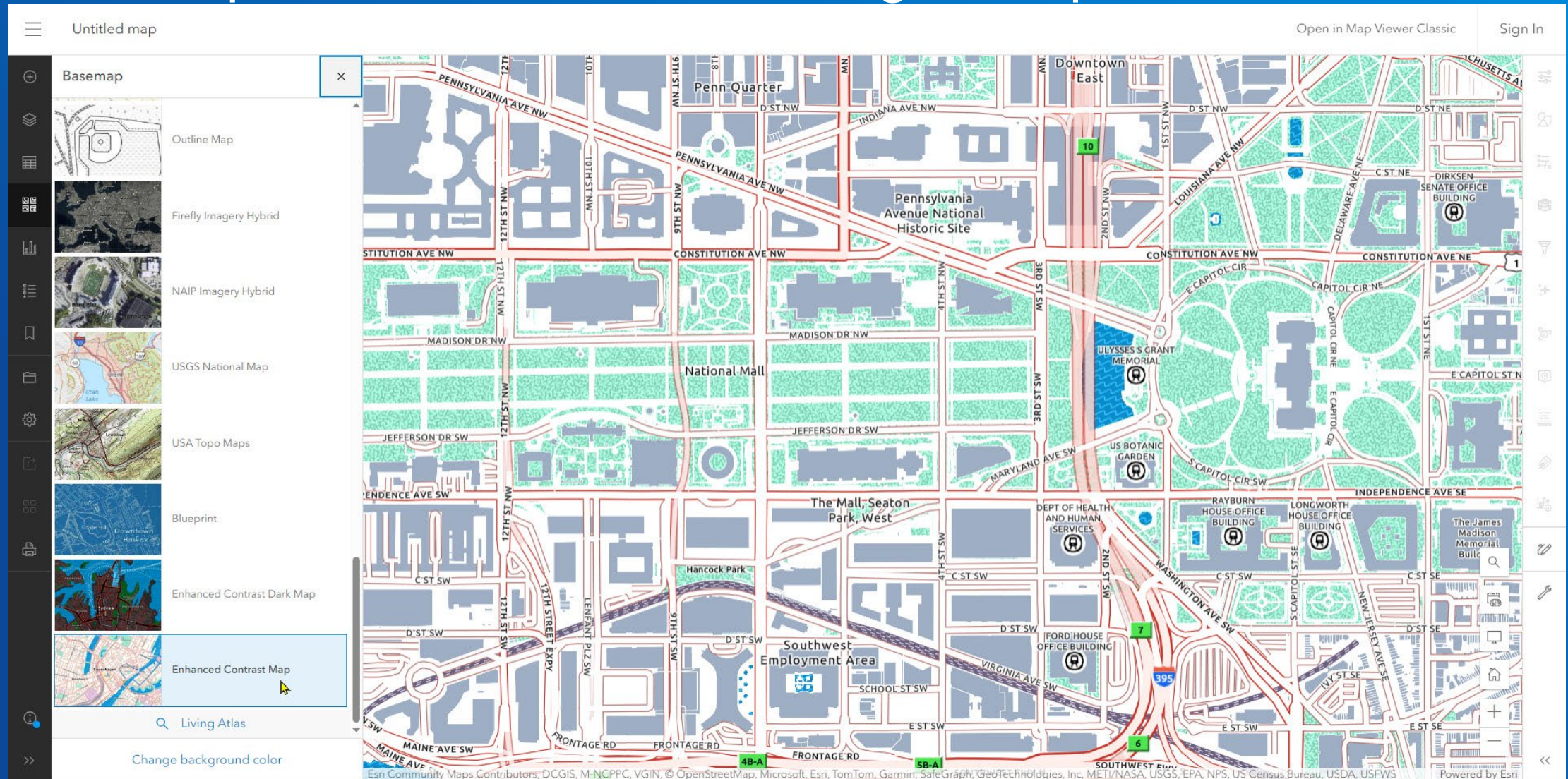
The visual presentation of UI and graphics must have a contrast ratio of 3:1

WCAG 1.4.1: Use of Color (A)

Color is not used as the only visual means of conveying information.

- Do the colors in the text and background have a 4.5:1 contrast?
- Do the colors in the graphics, polygons, and points have a 3:1 contrast?
- Are there any colors that should be shown in another method?
- Do the colors have enough contrast with color filters?

Basemaps: Enhanced Contrast “Light” Map



Basemaps: Enhanced Contrast “Light” Map Grayscale Effect

The screenshot displays the Esri Map Viewer interface with the 'Enhanced Contrast Base' map style selected. The map shows a grayscale view of Washington, D.C., with labels for various landmarks and streets. The left sidebar shows the 'Basemap' section with 'Enhanced Contrast Map' selected. The right sidebar shows the 'Effects' panel for the 'Enhanced Contrast Base' style, which includes a list of effects and their settings.

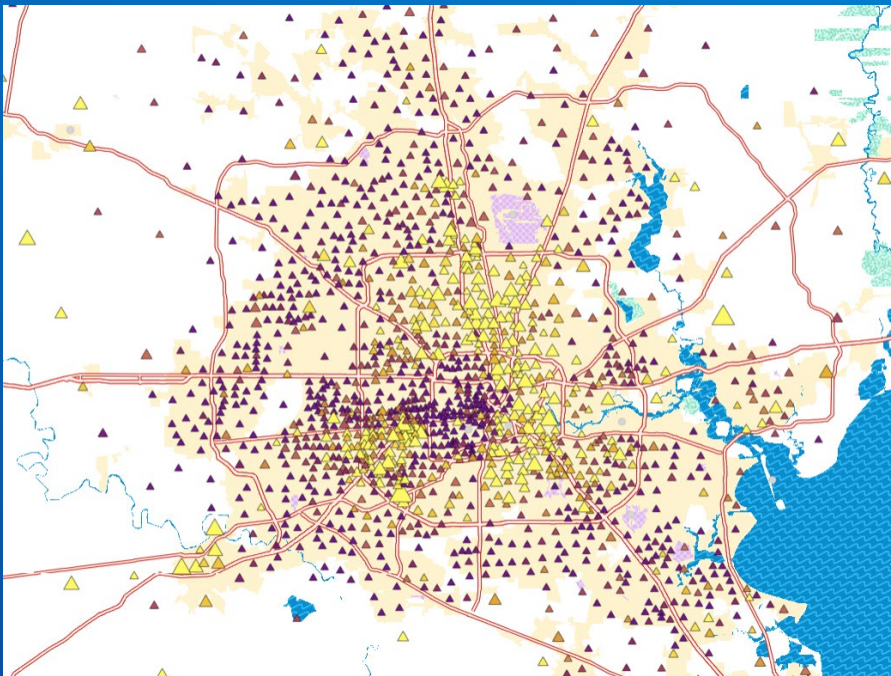
Basemap

- Enhanced Contrast Map
- Enhanced Contrast Reference
- Enhanced Contrast Base

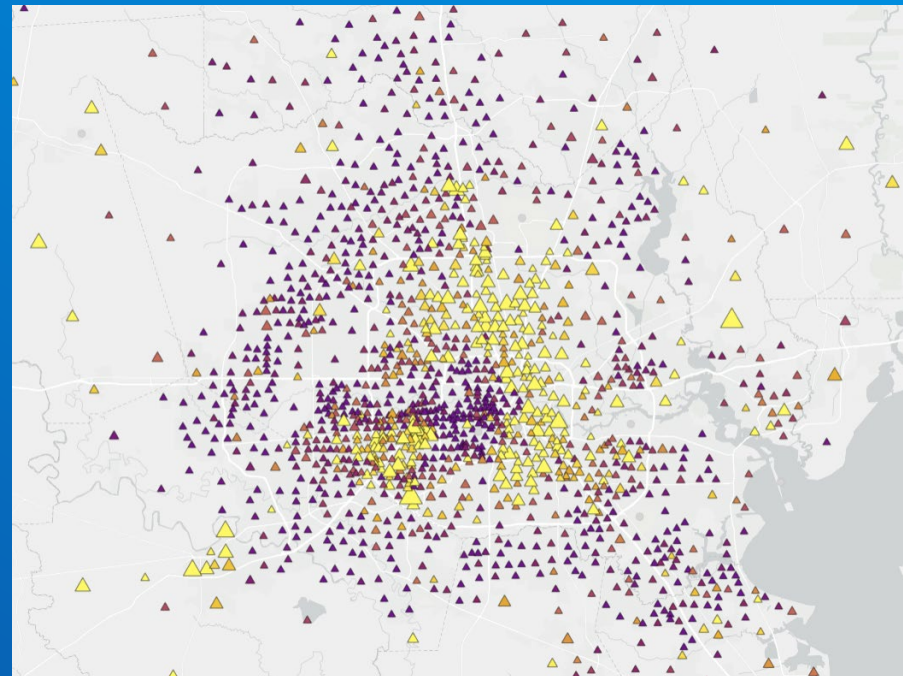
Effects

- Grayscale: Decrease or remove color. ☒
- Bloom: Add a colored neon-like glow. ☐
- Drop shadow: Make objects look like they are floating. ☐
- Blur: Defocus or soften the edges of map features. ☐
- Brightness & Contrast: Adjust how light or dark map features are. ☐
- Hue rotate: Transform colors relative to one another. ☐
- Saturate: Increase or decrease the intensity of the colors. ☐
- Invert: Transform all colors to their opposite, like a negative image. ☐
- Sepia: Convert colors to shades of brown to mimic old photographs. ☐

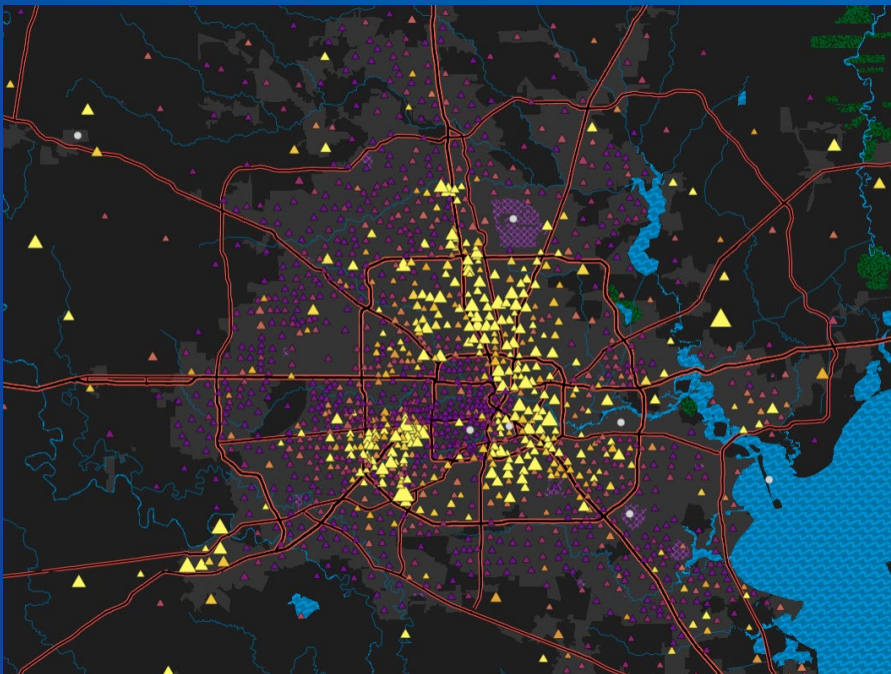
Enhanced
Contrast
Map



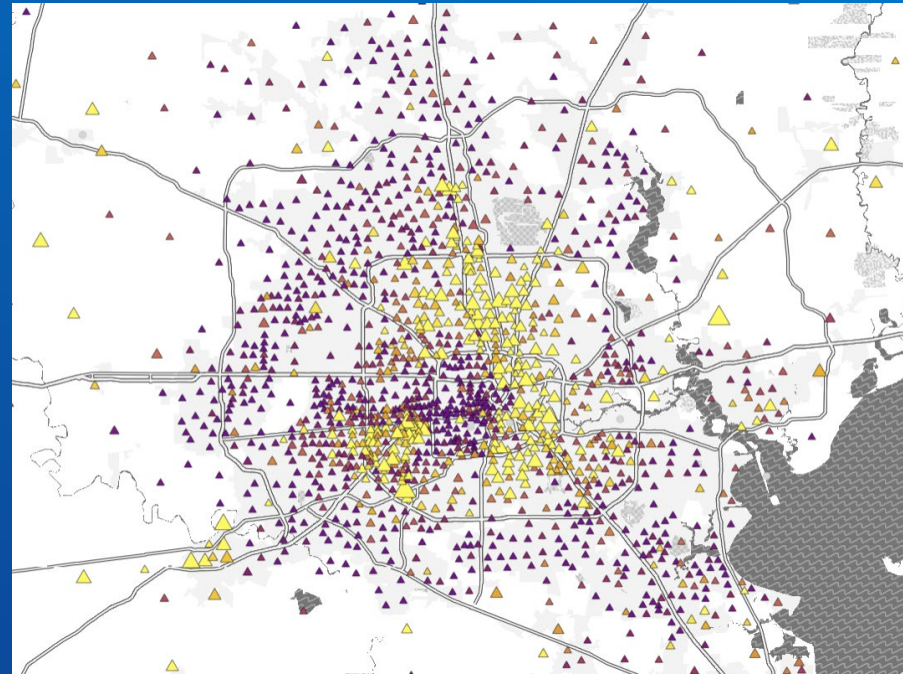
Light
Gray
Canvas



Enhanced
Contrast
Dark
Map



Enhanced
Contrast
Map

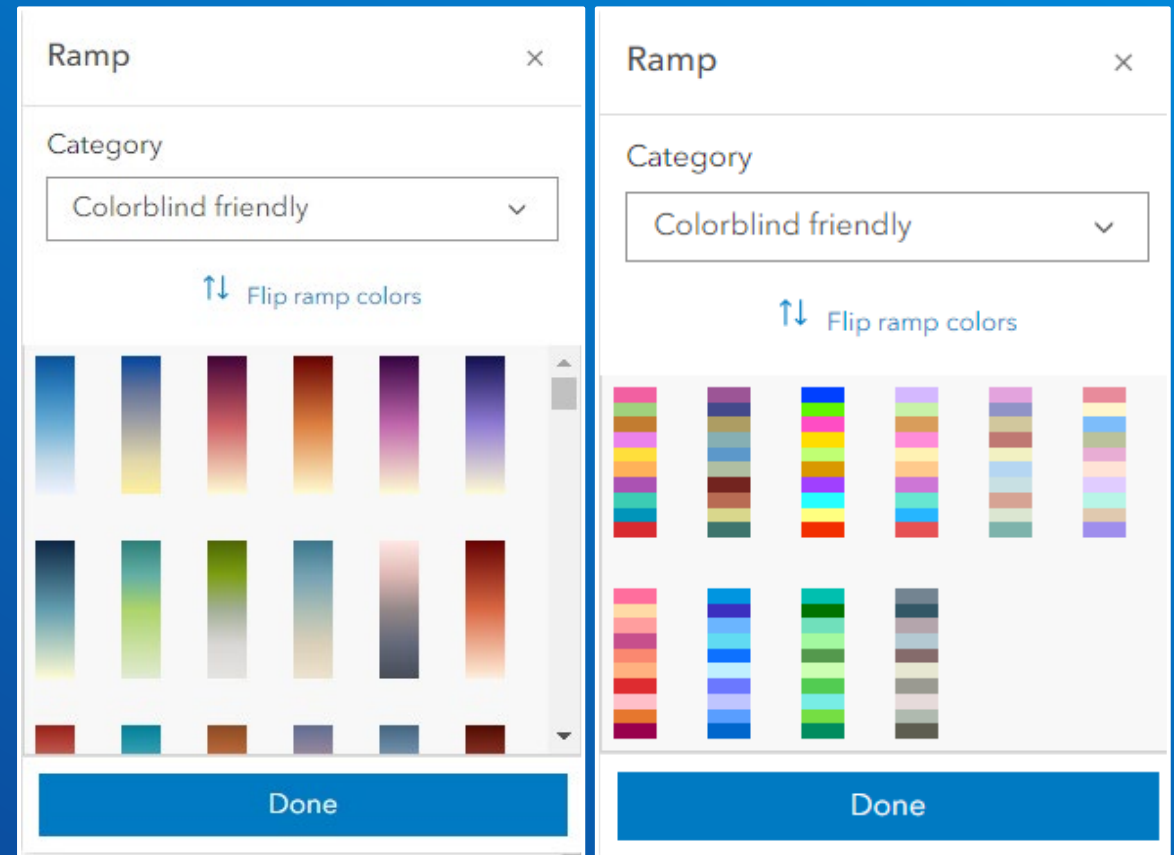


grayscale
effect

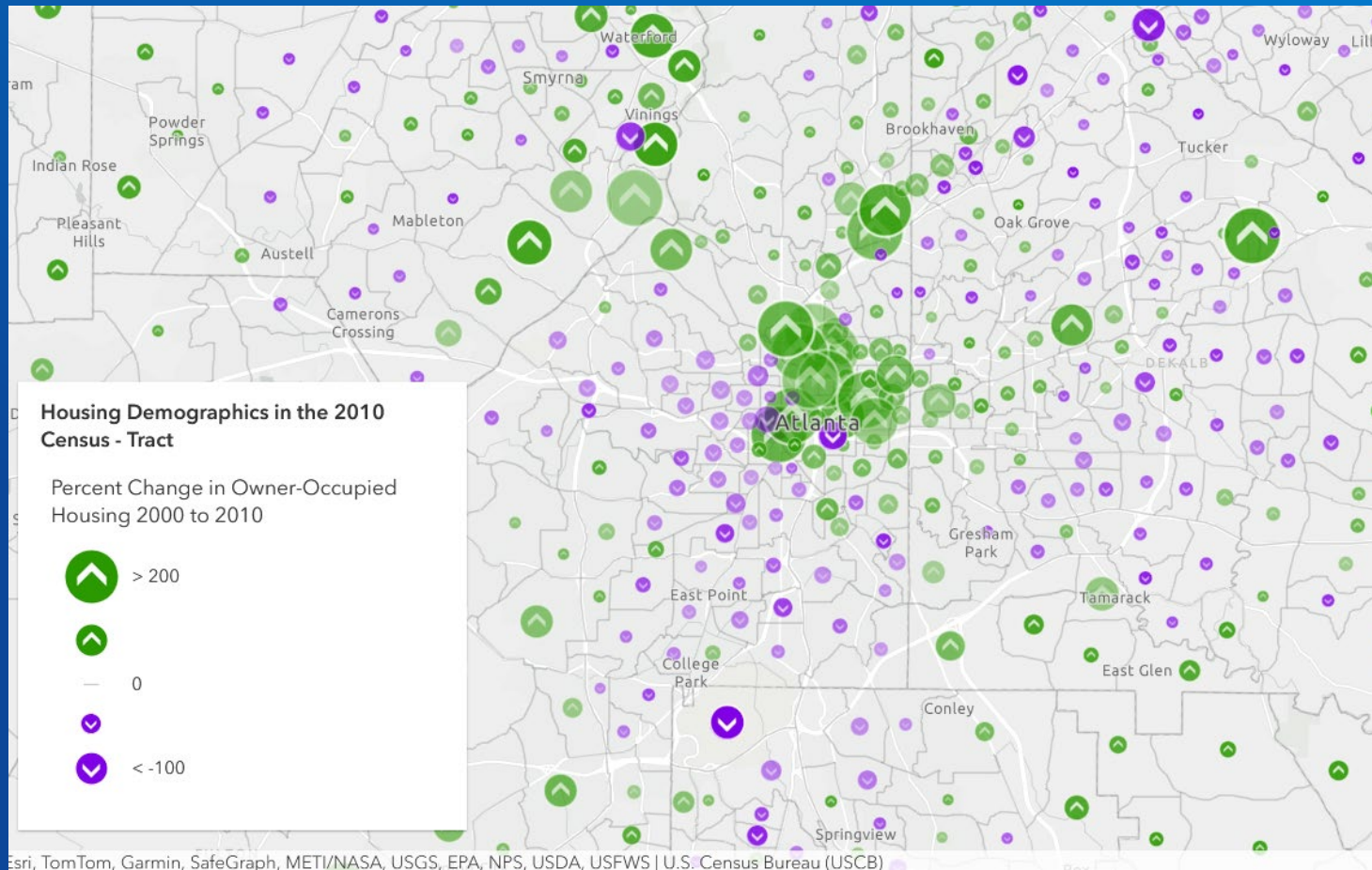
Houston, Texas map with ACS data on the percent of households with no internet connection.

Accessible color ramps

- Select colors tested for good contrast – 3:1
- Test color selection with color filters for color vision deficiency
- Review symbology contrast against basemaps



Colors and symbology



Map of Atlanta, Georgia shows housing demographics by US Census tract.

- Choose colors purposefully and intentionally
- Use filters and contrast tools to test colors
- Consider providing options for data in different color schemes

Color Contrast Checker by WebAIM

[Link to WebAIM](#)

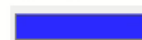
Contrast Checker



[Home](#) > [Resources](#) > Contrast Checker

Foreground Color

#2929FF



Lightness



Background Color

#FFFFFF



Lightness



Contrast Ratio

7.35:1

[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.

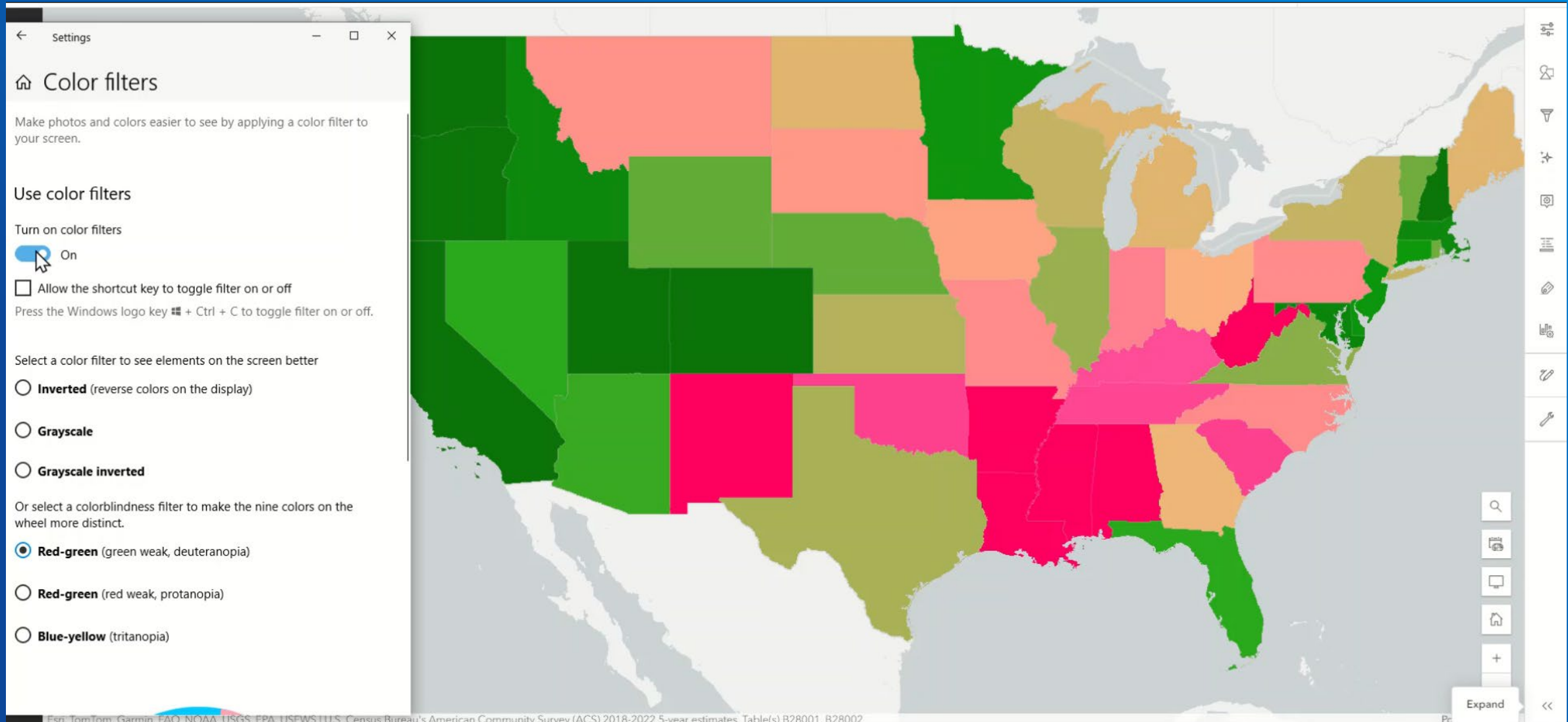
Graphical Objects and User Interface Components

WCAG AA: **Pass**



Text Input

Demo: Color vision filters in Windows Ease of Access menu



Meaningful sequence and headings

Provide context and clarity page navigation

WCAG 1.3.2: Meaningful Sequence

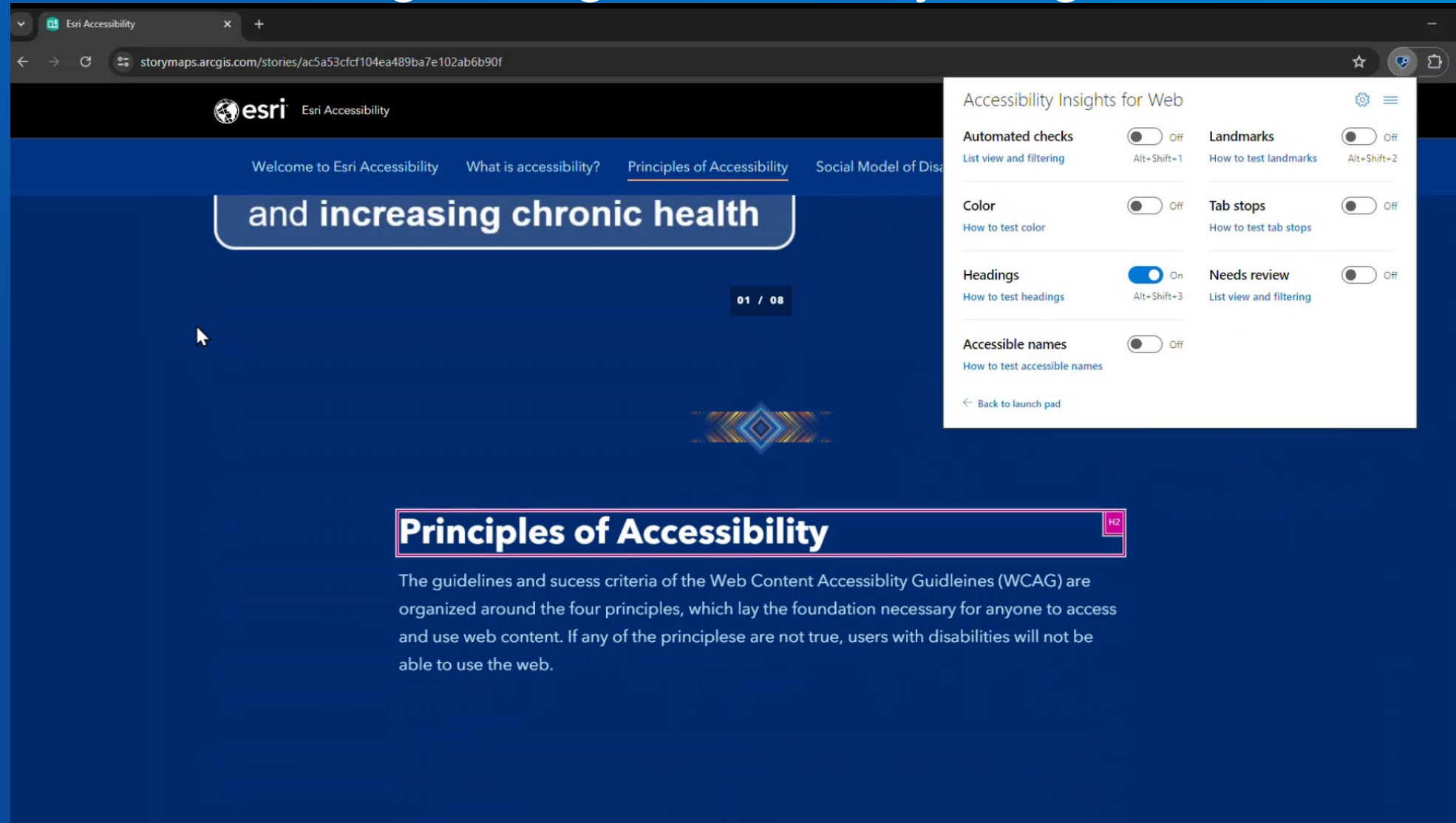
Use markup to preserve correct reading sequence which affects understanding.

WCAG 2.4.6: Headings and Labels (AA)

If headings or labels are present, they need to be descriptive

- Is the page structured in a logical order?
- Do the headings reflect the content?
- Are any heading levels skipped, out of order, or blank?
- Can the user easily determine how to navigate the page?

Demo: Headings using Accessibility Insights



The screenshot shows a web browser window with the URL `storymaps.arcgis.com/stories/ac5a53cfcf104ea489ba7e102ab6b90f`. The page is titled "Esri Accessibility" and has a navigation bar with links: "Welcome to Esri Accessibility", "What is accessibility?", "Principles of Accessibility" (which is underlined), and "Social Model of Dis". The main content area has a blue background with a white box containing the text "and increasing chronic health". Below this, there is a small black box with the text "01 / 08". At the bottom, there is a decorative graphic of a diamond shape made of lines.

Accessibility Insights for Web

- Automated checks
 - List view and filtering
- Color
 - How to test color
- Headings
 - How to test headings
- Accessible names
 - How to test accessible names
- Landmarks
 - How to test landmarks
- Tab stops
 - How to test tab stops
- Needs review
 - List view and filtering

Back to launch pad

Principles of Accessibility

The guidelines and success criteria of the Web Content Accessibility Guidelines (WCAG) are organized around the four principles, which lay the foundation necessary for anyone to access and use web content. If any of the principles are not true, users with disabilities will not be able to use the web.

Text alternatives and narratives

Support assistive technologies with alternative text and descriptions.

WCAG 1.1.1: Non-text Content (A)

All non-text content has a text alternative that serves an equivalent purpose.

WCAG 2.4.4: Link Purpose (A)

The purpose of each link can be programmatically determined.

WCAG 3.1: Readable

Text content can be read by users and by assistive technology to ensure information is understandable.

- Do all images and graphics have alternative text?
- Do all links programmatically describe the link?
- Is the content readable and in plain, concise language?

Demo: Accessible names and text alternatives

The screenshot shows a web browser displaying the Esri Accessibility website. The browser's address bar shows the URL `storymaps.arcgis.com/stories/ac5a53cfcf104ea489ba7e102ab6b90f`. The website has a dark blue header with the text "Esri Accessibility" and "We are committed to creating accessible te". Below the header is a navigation bar with links: "Welcome", "What is accessibility?", "Principles of Accessibility", "Principles of Inclusive Design", "Social Model of Disability", "Basic Steps to Accessibility", and "Resources". The main content area features a large heading "Welcome to Esri Accessibility" and a subheading "Man at computer with banner title Esri A.". The "Accessibility Insights for Web" tool is open on the right side of the browser window. The tool's settings are as follows:

Category	Setting	Shortcut
Automated checks	Off	
Landmarks	Off	Alt+Shift+2
Color	Off	
Headings	Off	Alt+Shift+3
Accessible names	On	
Tab stops	Off	
Needs review	Off	

The tool also includes a "Back to launch pad" button at the bottom left.

Demo: Map descriptions

✕ Hub ▾

> Creating Inclusive Content FedGIS 2024 ▾

> Pages > Text Alternative

Save ▾


⋮

<Layout

Image

Image URL

Upload



Options

Add a short description to your image to help non-sighted users and improve your web accessibility.

Image Alt Text

Circles on map of world depict aggregated events clustered and labeled with number of events per cluster.

Image Hyperlink

Open: New Tab ▾

https://...

Please enter a valid Hyperlink URL

Image Caption

Image Captions: Do not repeat alt-text.

Scale Image to Fill ☐

GIS Day November 20, 2024

Events from around the globe during previous years.


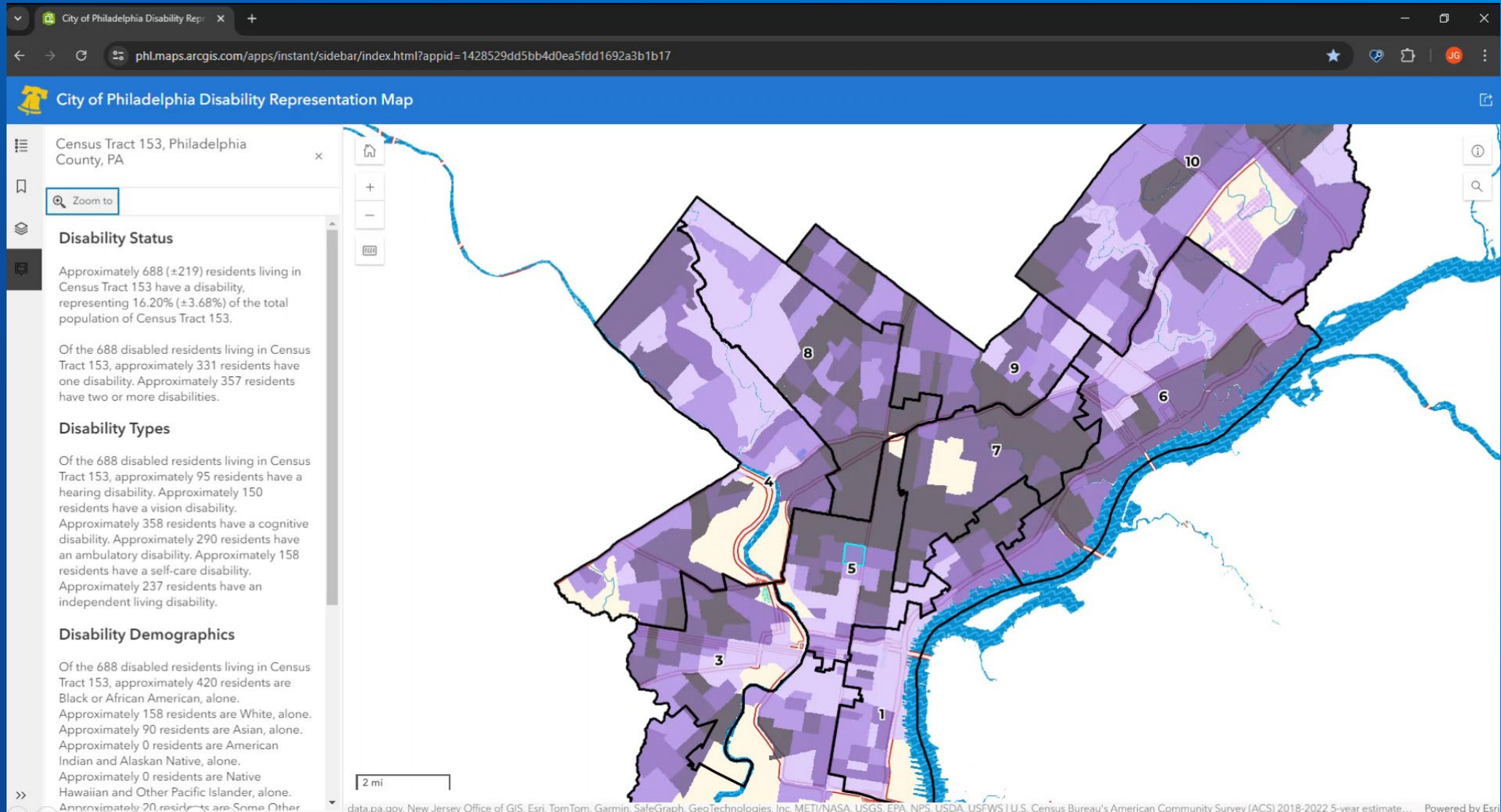


Image Captions: Do not repeat alt-text.

AltText for map:
Circles on map of world depict aggregated events clustered and labeled with number of events per cluster.

Demo: Popups and narratives with keyboard navigation



Provide alternative access to data

Plan ahead to make your data accessible to more people.

WCAG 1.3.1: Info and Relationships

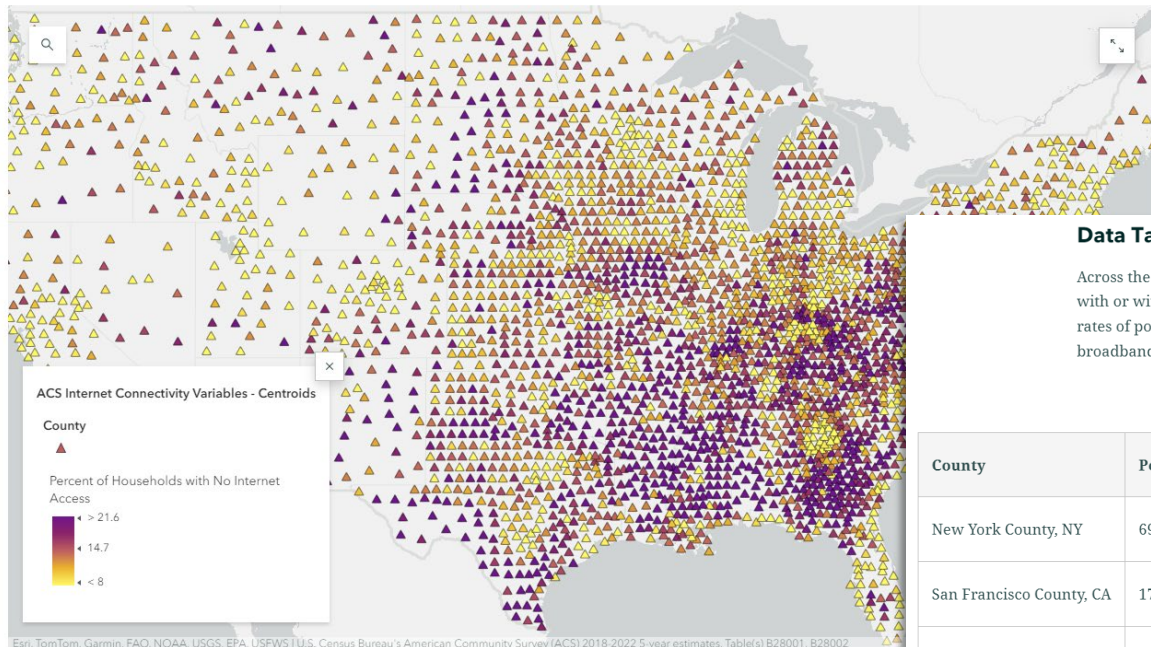
Information, structure, and relationships conveyed through presentation can be programmatically determined or are available in text.

- Are there options for users to consume the data in a different format?
- Can a narrative be added support understanding the data?
- Does the content in text, tables, or other forms preserve the original meaning?

Data Tables

Interactive Map

Explore ACS Internet Connectivity Variables across the globe, where main urban centers are depicted by size and color in relation to the percent of the population with access to ACS Internet services.



Caption for UC 2024 Demo Map

- Avoid information overload and visual clutter
- Provide data in tabular format, if possible
- Provide the option to export to PDF or CSV

Data Table

Across the United States, the top five counties with the highest rates of internet connect with or without a subscription are found in dense population areas. Counties with higher rates of population density are more likely to provide access to internet service, including broadband of any type, and Internet access without a subscription.

County	Population per square mile	Access w/ no Subscription	Access w/ Broadband	No Access
New York County, NY	69,468	1.84%	90%	8.16%
San Francisco County, CA	17,179	2.25%	92%	5.75%
Hudson County, NJ	13,730	1.5%	75.5	23%
Philadelphia County, PA	11,380	3%	78%	19%
District of Columbia, DC	9,320	4.8%	88.8%	6.4%

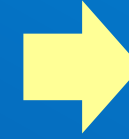
Caption for UC 2024 Demo Table

Organizational Best Practices

Understand Compliance



Provide Training



Use GIS specific guidelines

- Review compliance process
- Find what tools are used in testing
- Are exceptions allowed?



- Provide ongoing internal training
- Share training across teams
- Utilize info from other organizations



- GIS accessibility guidelines
- Checklist for content creators
- Monitor feedback



Resources

Accessibility resources from Esri

Esri Accessibility

<https://esriurl.com/a11y>

Esri Accessibility – Resources

<https://esriurl.com/a11y-resources>

Esri Community – Accessibility

<https://esriurl.com/a11y-community>

