

DIGITAL MAPPING TECHNIQUES 2026 LITE

The following was presented at DMT'26 Lite
(April 1, 2026 - A Virtual Event)

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2026)

<http://ngmdb.usgs.gov/info/dmt/>

Building Accessible Digital Maps: Progress at the Michigan Geological Survey

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Digital Mapping Techniques Lite 2026








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Overview

- Accessibility Tools Used by the Michigan Geological Survey
- Preliminary Workflow for Assessing Web App Accessibility
- Highlights of Issues
- Accessible Design Solutions

Accessibility Tools Used by MGS

- *Siteimprove* browser extension 
- *Axe DevTools* browser extension 
- *Wave WebAIM* browser extension 
- *WCAG Color Contrast Checker* browser extension 
- *Fusion/Jaws* screen reader desktop software 

Rapid Manual Review: Low Hanging Fruit

- Color contrast with text and UI components
- Missing alt text
- Font issues
- Content unreadable at 200% zoom level

Detailed Automated Tool Review

- *Siteimprove* browser extension
- *Axe DevTools* browser extension
- *Wave WebAIM* browser extension
- *WCAG Color Contrast Checker*

MGS Accessibility Review Checklist

Software Tool	Issue/Error	Conformance Level	Success Criterion	Occurrences	Tool Comments	MGS Comments	Solution	Status
Siteimprove Browser Extension	Container element is empty	A	1.3.1 Info and Relationships	1	Some roles are designed to contain other roles. This element has this type of role, but it doesn't contain any required-own elements.	It flags role='list', but doesn't highlight anything on the dashboard.	Gone after replacing text with real header.	Resolved
Siteimprove Browser Extension	Text is clipped when resized	A	1.4.4 Resize Text	1	Visitors should be able to scale text to 200% without losing any information. Problems often arise when overflow: hidden is used to prevent text from rendering outside of a specified area. This clips the content at the edge of its container and makes the overflow invisible.	It originally flagged the Dashboard title text; It also flags the Ok button in the popup.	Title text issue is gone; Tested the dashboard at 200%, the Ok button is not clipped, it is visible. I made the error on the Ok button go away by changing the font size from 24 px to 18 px.	Resolved
Siteimprove Browser Extension	Text is clipped when resized	A	1.4.4 Resize Text	4	Visitors should be able to scale text to 200% without losing any information. Problems often arise when overflow: hidden is used to prevent text from rendering outside of a specified area. This clips the content at the edge of its container and makes the overflow invisible.	It flags the header space; currently is visible up to 175%, but text disappears at 200%. Logo becomes distorted starting at 150%.		
Axe DevTools Browser Extension	Scrollable region must have keyboard access	A, AA		6	To solve this problem, you need to fix at least (1) of the following: Element should have focusable content, Element should be focusable	Similar to Siteimprove, but only 6 flags; interestingly, not getting flagged in Axe anymore, but still happening in siteimprove	Error gone after redesign. I don't know what is stopping the error, but I did start using Headings and the legend is now in a	Resolved

Troubleshooting / Attempt Content Redesign

1. Confirm the presence of false positives with screen reader / keyboard test.
2. Web research to see if outstanding issues have been resolved by GIS community.
3. Attempt content redesign to resolve outstanding issues.
4. Final comprehensive assessment with detailed checklist.

Misdirection

- The automated tools are not perfect.
- Tools create false flags
 - **WCAG 2.2 AA Success Criterion 2.5.8** requires UI components be 24 x 24px.
 - I have seen this error falsely flagged by automated tools when the target is set to **WCAG 2.1 AA**. (IT ticket created 1+ month ago; still unresolved).
- Best practices get lumped into conversations about WCAG requirements; creates undesirable confusion.

Programmatic Issues with GIS Web Apps

Experience Builder

- Pop-ups with scrolling text sometimes have problems; not always.
- Legend scroll issues.
- *Header bar content not visible at 200x zoom.*
- *Charts: invisible 'g' scrolling error.*

Survey123

- *Missing/empty labels.*
- *Dropdowns*
- *Hyperlinks – low contrast*

Survey123 – CoreKids Request Form Example

Survey123 Form

CoreKids Education and Outreach Request Form

Explore educational opportunities with the Michigan Geological Survey (MGS)! Whether you're a student, educator, or geoscience enthusiast, MGS has something for you.

K-12 CoreKids Program: Access educational materials, classroom visits, and field trips tailored for K-12 students.

Outreach Team: Partner with us to bring geoscience to your events. We offer exhibits and speakers to enhance your event experience.

Career Development: Participate in career development activities, including large-scale exhibitions, local and regional events, and access digital resources available on our website.

Accessibility Statement

This survey form has gone through accessibility checking. However, technical constraints in Survey123 software limit the ability to make all aspects of the form fully accessible in its existing format. A future software update is expected to resolve outstanding issues. If a user needs additional assistance with accessing this form, please contact the Michigan Geological Survey at geos-mgsmaps@wmich.edu.

Wave WebAIM Results

Details

Details Reference Order Structure Contrast

✘ 2 Errors	●● 0 Contrast Errors	⚠ 19 Alerts
✔ 29 Features	🏗 21 Structure	📄 80 ARIA

AIM Score: 8.7 out of 10

✔ ✘ 2 Errors

- ✔ 1 Missing form label ⓘ
- ✔ 1 Empty form label ⓘ

Siteimprove Results

CoreKids Educa...h Request Form

https://survey123...0386b8401cb5fd89d5

Issues Design kit

Issues 4

Search One filter selected X

- Interactive element does not meet minimum size nor spacing
AA 2.5.8 Target Size (Minimum) 4 >
- Hidden element has focusable content
A 4.1.2 Name, Role, Value 1 >
- Container element is empty
A 1.3.1 Info and Relationships 1 >
- Form field missing a label
A 4.1.2 Name, Role, Value 1 >

Survey123 – Hyperlink Example

Survey123 Form

The screenshot shows a Survey123 form with the Western Michigan University and Michigan Geological Survey logos. The title is "Wastewater Treatment Plant Characteristics". Below the title is a paragraph of text explaining the purpose of the survey. A red box highlights the email address matt.reeves@wmich.edu. Below the text are three sections: "Wastewater Loading (Section 1 of 3)", "Wastewater Treatment (Section 2 of 3)", and "Additional Information (Section 3 of 3)". A "Submit" button is at the bottom.

Wave WebAIM Results

The screenshot shows the Wave WebAIM results for the Survey123 form. The "Details" tab is selected, showing a summary of accessibility issues: 4 Errors, 1 Contrast Error, 45 Alerts, 85 Features, 53 Structure, and 228 ARIA. The "AIM Score" is 7.9 out of 10. A red box highlights the "1 Contrast Errors" section, which includes "1 Very low contrast".

Category	Count
Errors	4
Contrast Errors	1
Alerts	45
Features	85
Structure	53
ARIA	228

AIM Score: 7.9 out of 10

- 4 Errors
 - 1 Missing form label
 - 1 Empty form label
 - 2 Broken ARIA menu
- 1 Contrast Errors
 - 1 Very low contrast


Siteimprove Results

The screenshot shows the Siteimprove results for the Survey123 form. The "Issues" tab is selected, showing 0 issues. A large green checkmark icon is displayed, indicating that there are no issues. The text "No issues here" is followed by a note: "Reset any filters you might have applied to see if there are any issues within other categories."

No issues here
Reset any filters you might have applied to see if there are any issues within other categories.

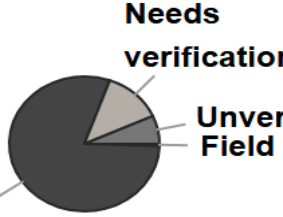
No Content Loss at 200% Zoom Level

Historic **Active**

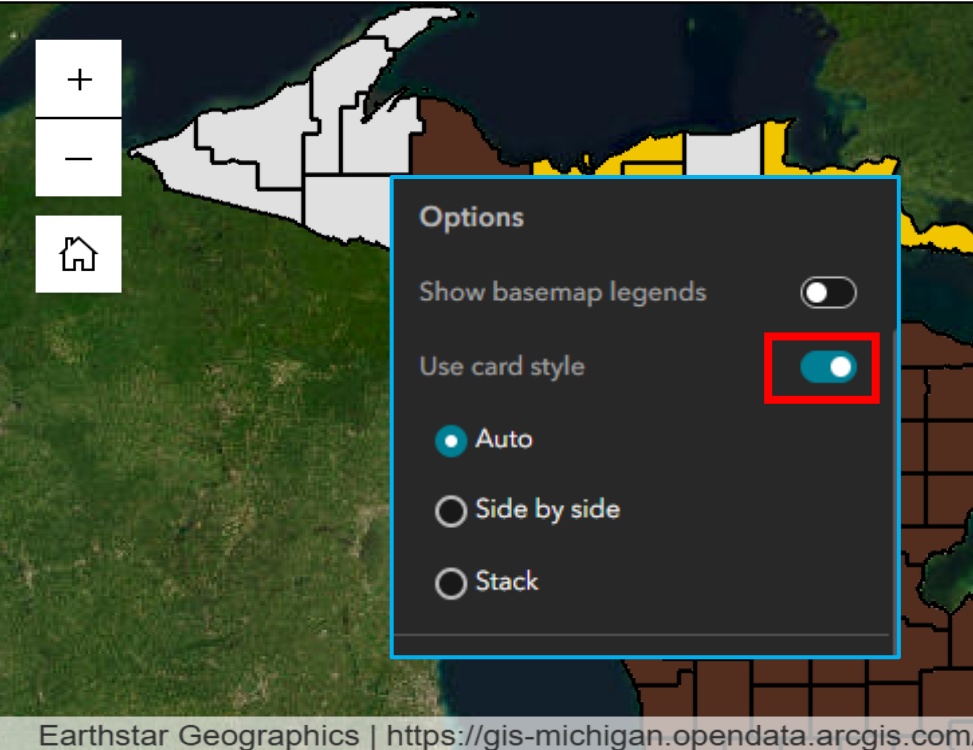


- Active
- Historic
- Other
- Repurposed
- Unknown

Verification Status of Pits and Quarries



- Needs verification
- Unverified Field
- GIS



Options

- Show basemap legends
- Use card style
- Auto
- Side by side
- Stack

Earthstar Geographics | <https://gis-michigan.opendata.arcgis.com/datasets/Michigan::count...> Powered by Esri

County Inventory Validation Status

In Progress Yes No

Aggregate Resource Project Statistics

Total Resource Locations: 36,411

Locations Validated: 31,764 (87%)

Newly Identified Locations: 14,406

County Inventories Validated: 71

Geology Maps Completed: 22

Conclusions

- ***Be mindful of false flags*** and currently unsolvable issues.
- Testing with a ***screen reader is essential*** to confirm accessibility.
- Use ***accessible design solutions*** to sidestep programmatic issues.