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CC: Heidi Schroeder, MSU Libraries
Subject: BioOne Complete High-Level Accessibility Evaluation for the Library Accessibility Alliance
Date: January 29, 2020

MSU Usability/Accessibility Research and Consulting (MSU UARC) conducted a high-level accessibility evaluation of the BioOne Complete platform to evaluate its conformance with WCAG 2.0 AA Criteria. This evaluation did not include all functionality or content of the site or all WCAG 2.0 AA Success Criteria.

During this evaluation, a number of issues were found that may make the site and its content impossible to use for many individuals with disabilities and difficult to use for most others.

Keyboard users, including screen reader users and users with dexterity impairments, will find it impossible to use a considerable portion of site content. Critical content cannot be reached or operated via keyboard, making it impossible to use for those that rely on keyboard access. Focus order is incorrect in some places, increasing the difficulty of using the site with a keyboard. Most interactive elements lack a sufficiently visible focus indicator, making it difficult for many keyboard-only users to effectively use them, as they cannot determine when they have reached the correct element.

Individuals with visual impairments, including those that rely on screen readers, will also have significant problems using the site. Some content is not read out correctly and structural information (including headings and lists) is not appropriately conveyed to users, making it difficult or impossible to understand content and organization in places. Some form inputs are not appropriately labeled, making those inputs difficult or impossible to use for those that rely on screen readers. Custom elements do not correctly announce themselves to screen readers, making them difficult to understand and use. Most images lack appropriate alternative text, significantly impacting users with visual impairments. Images of text are also used in place of styled text, preventing users of a variety of assistive technologies from being able to effectively understand some content.

The PDF has not been tagged for accessibility and no structural information is provided to assistive technologies, making it extremely difficult to use and navigate for users with disabilities. Additionally, no title or language are provided to assistive technologies.

Other issues were found that will make it difficult for users with a variety of disabilities to effectively use the system, including insufficient color contrast, use of color alone to convey information, insufficient link context, inconsistent focus identification, no means to bypass repeated navigation, and inappropriate page titles.

To improve access for users with disabilities, MSU UARC recommends a full WCAG 2.0 AA evaluation and that the problems discovered be remediated.

Note: Results for "global warming" were used as an example of a Search Results page and "Media evolution and public understanding of climate science" was used as an example of an Article page and PDF.

For reference, a screenshot of the Home Page at the time this evaluation was completed has been included at the end of this memo.

High-Level Findings

Document Structure

- Headings are not appropriately structured throughout the site. [[WCAG 2.0 SC 1.3.1](#)]
 - On the Home page, "Search more than 200 leading titles in the biological, ecological, and environmental sciences." should not be tagged as a heading
 - On the Home page, "BioOne COMPLETE" should be tagged as an h1
 - On the Home page, "About Us", "BioOne Career Center", "BioOne Complete Welcomes Back Four Journals...", etc. should be tagged as h3s, not h4s
 - On the Home page, "Featured articles" should be tagged as an h2, not an h1
 - On the Home page, "AGRICULTURE & AGRONOMY", "BIODIVERSITY CONSERVATION", etc. should be tagged as headings (h3s)
 - On the Home page, contents within "AGRICULTURE & AGRONOMY", "BIODIVERSITY CONSERVATION", etc. should not be tagged as headings (e.g., "Control of net form...")
 - In the Advanced Search lightbox on the Home page, "ADVANCED SEARCH" should be tagged as a heading (h1)
 - On the Search Results page, "REFINE BY" should be tagged as a heading (h2)
 - On the Search Results page, "SEARCH WITHIN RESULTS" should be tagged as a heading (h3)
 - On the Search Results page, "YEAR", "PUBLICATION TITLE", etc. should be tagged as h3s, not h4s
 - On the Article page, "Media evolution and public understanding of climate science" should be tagged as a heading (h1)
 - On the Article page, "Abstract", "Citation", "JOURNAL ARTICLE", "ARTICLE SOURCE", "KEYWORDS", "RELATED CONTENT", etc. should be tagged as headings (h2)s
 - On the Article page, "Table 1", "Table 2", etc. should be tagged as h4s, not h2s
 - On the Article page, "The media and public understanding of global warming", etc. should be tagged as an h3, not an h2
 - On the Article page, heading levels should match intended levels visible in PDF
 - In the Figures tab on the Article page, "Table 1", "Table 2", etc. should be tagged as headings (h2s)
 - In the Cited By tab on the Articles page, "Google Scholar" should be tagged as a heading (h2)
 - In the Cited By tab on the Articles page, "View citing articles on Google Scholar" should not be tagged as a heading
- Throughout the site, most visual lists are not coded as programmatic lists (e.g., lists under "References", "KEYWORDS", and "RELATED CONTENT" on the Article page). [[WCAG 2.0 SC 1.3.1](#)]
- PDF is untagged, and provides no structural information to assistive technologies. [[WCAG 2.0 SC 1.3.1](#)]

- The language of the PDF is not defined. [[WCAG 2.0 SC 3.1.1](#)]

Keyboard Support

- "Sign In" and "ADVANCED SEARCH" links in the page header cannot be reached via keyboard. [[WCAG 2.0 SC 2.1.1](#)]
- "Browse" and "Resources" menu dropdowns in the page header cannot be reached via keyboard. [[WCAG 2.0 SC 2.1.1](#)]
- On the Home page, the "ADVANCED SEARCH" link under the search input cannot be reached via keyboard. [[WCAG 2.0 SC 2.1.1](#)]
- In the Advanced Search lightbox on the Home page, "Remove", "+ Add another field", and "Clear Form" links cannot be reached via keyboard. [[WCAG 2.0 SC 2.1.1](#)]
- In the Advanced Search lightbox on the Home page and on the Search Results pages, "<" and ">" sliders in the "YEAR" section cannot be controlled via keyboard. [[WCAG 2.0 SC 2.1.1](#)]
- On the Search Results page, buttons to remove selected filters (e.g., "x global warming", "x 2015-2020") cannot be reached via keyboard. [[WCAG 2.0 SC 2.1.1](#)]
- On the Search Results page, buttons to expand or collapse "Refine By" sections ("+"/"-") cannot be reached via keyboard. [[WCAG 2.0 SC 2.1.1](#)]
- On the Search Results page, checkboxes in the "Refine By" section cannot be reached via keyboard. [[WCAG 2.0 SC 2.1.1](#)]
- On the Search Results page, "View all titles" link in the "Refine By" section cannot be reached via keyboard. [[WCAG 2.0 SC 2.1.1](#)]
- On the Article page, "Translator Disclaimer", "Save to My Library", "Share", and "Get Citation" links cannot be reached via keyboard. [[WCAG 2.0 SC 2.1.1](#)]
- On the Article page, tabs ("Article", "Sections", "Figures & Tables", "References", "Cited By") cannot be reached via keyboard. [[WCAG 2.0 SC 2.1.1](#)]
- Focus does not reset to the top of the page when the back to top button is activated. [[WCAG 2.0 SC 2.4.3](#)]
- On the Article page, an invisible, non-interactive element receives focus after the "Next Article" link. [[WCAG 2.0 SC 2.4.3](#)]
- Focus is not sufficiently visible for a variety of interactive content. [[WCAG 2.0 SC 2.4.7](#)]
 - All page header content with the exception of "Browse", "Resources" and the Search text input (i.e., "BioOne", "BioOne COMPLETE", "BioOne CAREER CENTER", "View Cart", "Help", "BioOne COMPLETE", search button)
 - Back to top button
 - "BioOne COMPLETE", social media icons, "Privacy Policy", and "Terms of Use" in page footer
 - Text links throughout the site
 - "SEARCH >" button on the Home page
 - Image links (e.g., photographs below Search section, logos in "NEWS & INFO" section) on the Home page
 - "Year Range" arrow buttons in the Advanced Search lightbox on the Home page and on the Search Results page
 - Dropdowns, radio buttons, and "SEARCH" button in the Advanced Search lightbox on the Home page
 - "Search within" button on the Search Results page

- "Sort By" and "Display" dropdowns on the Search Results page
- "Download PDF", "Save to My Library", "Read Abstract +", and "Hide Abstract -" links on the Search Results page
- Breadcrumbs ("Home", "Journals", "Politics and the Life Sciences", etc.) on the Article page
- "Author Affiliations", "Politics and the Life Sciences, 30(2)", "https://doi-org.proxy2.cl.msu.edu/10.2990/30_2_20", "Download Citation", "Previous Article", "Next Article", "Subscribe to BioOne Complete", "Receive erratum alerts for this article", and "Receive alerts when this article is cited" links on the Article page
- "Looking for a new position?" and "ARTICLE IMPACT" impact graphic links on the Article page
- Reference number and table links on the Article page
- Table image links in the Figures tab on the Article page

Navigation

- Page titles are not sufficiently descriptive (e.g., none mention site name, "Search" doesn't mention results). [[WCAG 2.0 SC 2.4.2](#)]
- PDF is not titled. [[WCAG 2.0 SC 2.4.2](#)]
- On the Article page, the targets of table image links are not apparent. [[WCAG 2.0 SC 2.4.4](#)]
- On the Article page, no means to bypass repeated navigation exists (no h1 at the start of unique page content and no "Skip to Main" link provided). [[WCAG 2.0 SC 2.4.1](#)]
- Link selection (i.e., keyboard focus or mouse hover) is inconsistent, indicated by adding an underline in some cases, switching from grey to black text in some cases, switching from black to grey text in some cases, no change in some cases, etc. [[WCAG 2.0 SC 3.2.4](#)]

Forms and Data Submission

- In the Advanced Search lightbox on the Home page, "All Titles" and "Choose Title(s)" inputs are not programmatically associated with grouping label ("PUBLICATION TITLE:"). [[WCAG 2.0 SC 3.3.2](#)]
- In the Advanced Search lightbox on the Home page and on the Search Results page, all text inputs in the "YEAR" section are not programmatically labeled. [[WCAG 2.0 SC 3.3.2](#)]
- On the Search Results page, "Sort By" and "Display" are not programmatically labeled. [[WCAG 2.0 SC 3.3.2](#)]

Images

- A variety of images throughout the site do not have appropriate alternative text. [[WCAG 2.0 SC 1.1.1](#)]
 - All images in page header (i.e., "BioOne", "BioOne COMPLETE", "BioOne CAREER CENTER", and search button)
 - All images in page footer (i.e., "BioOne COMPLETE" and social media icons)
 - Image for "Ageing Northern Saw-Whet Owls..." on the Home page
 - Close ("x") button in the Advanced Search lightbox on the Home page
 - "Open Access" images on the Search Results page

- Search button (under "SEARCH WITHIN RESULTS") on the Search Results page
 - "Looking for a new position?" image on the Article page
- On the Article page, inappropriate alternative text is used for all table graphics (e.g., "i1471-5457-30-2-20-t03.tif"). [[WCAG 2.0 SC 1.1.1](#)]
- On the Home and Search Results pages, "Open Access" is an image of text, instead of styled text. [[WCAG 2.0 SC 1.4.5](#)]
- On the Article page, "Looking for a new position?" image is an image of text, instead of styled text. [[WCAG 2.0 SC 1.4.5](#)]
- On the Article page, tables are images of text, instead of formatted text. [[WCAG 2.0 SC 1.4.5](#)]

Color and Visual Characteristics

- White text on green background (e.g., "NEWS & INFO" on Home page, "REFINE BY" on Search Results page, "RELATED CONTENT" on Article page) and dark grey on light grey (e.g., "Read the article", "Who we are" on Home page; "Read Abstract +", "Sign In to Save Search" on Search Results page; "Author Affiliations +", reference links on Article page) have insufficient contrast. [[WCAG 2.0 SC 1.4.3](#)]
- On the Search Results page, color alone is used to highlight search terms. [[WCAG 2.0 SC 1.4.1](#)]
- On the Search Results page, color alone is used to indicate selected/focused author links. [[WCAG 2.0 SC 1.4.1](#)]

Custom Elements and Dynamic Content

- Roles and values (i.e., that they expand and whether they are expanded or collapsed) are not provided for "Browse" and "Resources" menus. [[WCAG 2.0 SC 4.1.2](#)]
- In the Advanced Search lightbox on the Home page and on the Search Results page, names, roles, and values are not provided for "<" and ">" sliders in the "YEAR" section. [[WCAG 2.0 SC 4.1.2](#)]
- On the Article page, roles and values (i.e., that they are tabs and whether they are selected) are not provided for tabs ("Article", "Sections", "Figures & Tables", "References", "Cited By"). [[WCAG 2.0 SC 4.1.2](#)]
- On the Search Results page, roles (i.e., that they expand) are not provided for "Read Abstract +" and "Hide Abstract -" links, and screen readers are not notified when they are opened or closed. [[WCAG 2.0 SC 4.1.2](#)]
- On the Search Results page, role (i.e., that it expands) is not provided for "Author Affiliations" link, and screen readers are not notified when it is opened or closed. [[WCAG 2.0 SC 4.1.2](#)]

Usability Observations

- On the Article page, reference and table links are duplicated and broken (e.g., "1234561,2,3,4,5,6,7", "1717,18", "see Tables 1–Table 2Table 34").
- On the Article page, headings within the article do not match PDF heading levels (it is impossible to determine the intended nesting of headings via the web version).

Disclaimer: This high-level evaluation was conducted for the Library Accessibility Alliance, and represents a good faith effort conducted within a limited time frame. It should not be assumed to be complete or free from error. No warranties or guarantees are implied. UARC is not responsible for direct, indirect, or incidental damages based on this work; its use or interpretation by any individual, group, or organization; or on conditions beyond our control.

Home Page Screenshot

Search more than 200 leading titles in the biological, ecological, and environmental sciences.

Enter Search Term

Ageing Northern Saw-Whet Owls (*Aegolius acadicus*) from Remigial Molt Patterns
Nova Mackentley, Eugene A. Jacobs, David L. Evans
[Read the article](#)

Citizen Science in the Class-Room: The Consistency of Student Collected Data and Its Value in Ecological Hypothesis Testing
Daichi Tsujimoto, Chun-Ho Lin, Nozomi Kurihara, Craig R. Barnett
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The response of mixed-species bird flocks to anthropogenic disturbance and elevational variation in southwest China
Liping Zhou, Indika Peabotuwage, Hao Gu, Diemeng Jiang, Guohua Hu, Awei Jiang, Christos Mammides, Mingxia Zhang, Rui-Chang Quan, Eben Goodale
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AGRICULTURE & AGRONOMY
Control of net form of net blotch in barley from seed- and foliar-applied fungicides
(Crop and Pasture Science)
Factors affecting seed germination, seedling emergence, and survival of *Ustilago tritici*
(Wheat Science)

BIODIVERSITY CONSERVATION
European badger habitat requirements in the Netherlands – combining ecological niche models with neighbourhood analysis
(Wildlife Biology) [Open Access](#)
The Osteology and Phylogenetic Position of *Luperosuchus fractus* (Archosauria: Loricata) from the Latest Middle Triassic or Earliest Late Triassic of Argentina
(Anatomical)

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Aquatic Larvae of Eulichedidae and Ptilodactylidae (Coleoptera: Byrrhoidea) from Thailand, with Description of the Larva of *Pseudocladotoma Pic*
(The Coleopterists Bulletin) [Open Access](#)
Correct Identification and biosecurity decision-making: Two species instead of one in *Aceria genistae* complex (Acar: Eriophyidae) in New Zealand
(Systematic and Applied Acarology) [Open Access](#)

ENVIRONMENTAL SCIENCES
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(Journal of Shellfish Research) [Open Access](#)
First Limnological Characterization of Crater Lake Billy Mitchell (Bougainville Island, Papua New Guinea)
(Pacific Science)

ORNITHOLOGY
Testosterone and Triiodothyronine in Franklin's Gull (*Leucophaeus pipixcan*) Eggs
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