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The Effects of Section 508: The Rehabilitation Act and Electronic and Information Technology Accessibility Standards on Federal Agency Web Site Development

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THE EFFECTS OF SECTION 508:
THE REHABILITATION ACT AND
ELECTRONIC AND
INFORMATION TECHNOLOGY
ACCESSIBILITY STANDARDS ON
FEDERAL AGENCY WEB SITE
DEVELOPMENT

by

Shawn M. Schuur

A final report submitted in partial
fulfillment of the requirements for the
degree of

Master of Science in Information System
(MSIS)

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Committee Members:

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Dakota State University

Abstract

**THE EFFECTS OF SECTION 508: THE
REHABILITATION ACT AND
ELECTRONIC AND INFORMATION
TECHNOLOGY ACCESSIBILITY
STANDARDS ON FEDERAL AGENCY WEB
SITE DEVELOPMENT**

by Shawn M. Schuur

This project will consider the effects Section 508, The Workforce Investment Act of 1998 will have on current and future website development at federal agencies. Section 508 requires, in part, that federally funded websites allow individuals with disabilities to have the same level of access to information as individuals without disabilities. Using the USGS EROS Data Center as a case study for this project I will first provide an analysis of websites compliancy with Section 508. Second, using Section 508's standards I will modify EROS' websites to conform to those standards. Finally, I will provide an analysis of the changes and associated modification needed at the EROS websites to meet the standards of Section 508.

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SECTION 508

Introduction:

This semester I did a research project on Section 508. Section 508 of the Rehabilitation Act and Electronic and Information Technology Accessibility Standards requires that Federal agencies develop information so that individuals with disabilities have the same level of access to Web site information as others as of June 21, 2001.

I work for the U.S. Geological Survey's Earth Resources Observation Systems Data Center. Commonly referred to as EROS. EROS is a Federal agency and must comply with Federal mandates such as Section 508. I am leading and will continue to lead the efforts of Section 508 compliancy at EROS.

Unlike other projects, this project does not end at the end of a semester or after a final presentation. This project will continue on forever at all Federal agencies and will grow in it's requirements as time passes.

On May 22, 2000 my life changed. It was my first opportunity to experience Section 508. I was a summer Intern hired on at EROS Data Center. My first and very important task as a new hire was to become acquainted with this unfamiliar SEC. 508. ELECTRONIC AND INFORMATION TECHNOLOGY ACT.

I would spend every possible minute in-between other projects to learn and study more about Section 508, the future of EROS Data Center Websites and the WWW community. I learned of the extreme federal importance of this Act and knew that the pressures would be coming down for our websites to comply. It was not just something that we decided to do, it was soon becoming Federal regulation for us to comply and I wanted to be ahead of the game. I started in on making EROS pages compliant and learned a great deal along the way. Putting research to practical applications is a great learning tool.

I have spent hours upon hours researching accessibility and Section 508 guidelines. Although, never fully an expert because there is always new things to learn, I do understand what is necessary to get done to be Section 508 compliant, how it should get done and why it should get done. I understand the potential problems with non-compliance. I do work for the Federal government and it does directly affect me as a web developer. I do believe that in time everybody will find the importance of becoming accessible because it affects a large sector of the community.

I could foresee multiple opportunities for me to grow as an individual, grow for the company, and grow as a student. Opportunities such as explaining how we can make our websites better and be usable to people with disabilities. Researching where we are currently at with our websites and accessing what we need to do to take the next step. Seeing the impact that some small changes can actually have to a person accessing a compliant website and that it was successful is extremely important.

Vocal opportunities that I never dreamt of or that I would have been prepared to do are now changing. I am looking forward to them and enjoy talking about Section 508 with anybody that has an interest. Sometimes I find myself talking with the other web developers on accessibility for too long and realize that I should get back to my office, but they are interested in it too so I am willing to express my knowledge.

I work under a Raytheon Contract, which is funded by the United States Geological Survey (USGS) of the Department of the Interior (DOI). My government sponsor for our division has gave me full support to work on Section 508 at EROS Data Center.

I am a member of the W3C (World Wide Web Consortium) for the accessibility regulations and read several e-mails every day about new changes, regulations, comments and ideas. My involvement with Section 508 goes way beyond the scope of a MSIS Final Project and will affect me forever and I hope other developers will take an active role like me.

Real World Disability, my first interview:

In order to gain insight on how I was going to make the EROS web sites better, I had to understand first hand what it was like to not be able to access a web site. For that I turned to Mr. Keith Bundy from Dakota State University. After meeting with Keith several times in person and with email all semester long, I started to understand what accessibility really meant. Keith has even looked at some EROS web pages after I work on them and lets me know how accessible they really are.

On January 18, 2001 I met Keith Bundy. Keith works in the Student Services at Dakota State University. He is blind. He was born blind and started learning Braille at age 5. Previously I would have never guessed that a blind user could use the computer so efficiently. Before entering his office and introducing myself I stood in the office doorway and watched him interact with his speech-reading software. He was very good at interacting with the software called JAWS. What JAWS does is give Keith the ability to use the computer just as you and I would reading everything on the page to him. As I watched him interact he pushed many keys and given certain keystrokes could navigate through the entire web page.

The big step, introduction. I was a little nervous, and I'm not sure why. Probably because it was a new terrain for me since Keith is the first blind person that I have ever met. I soon realized that he was a great guy and had a lot of information to share with me. I asked him what that box was on his desk. It was a Braille computer system that can allow him to hook it up to the computer and interact with JAWS. Keith has been working with computers for 15 years and started using the very basic screen reading software used in DOS. Since then he has seen a lot of advancements in accessibility hardware/software that now makes the WWW available to him. He is very happy about that and uses the Internet a lot for information like it was meant to be.

He says that the Internet needs to work on becoming fully accessible and is really happy to see the initiatives being taken to make it accessible. I asked him how he thought DSU's websites in general were, he said they are not bad, but in talking with him I realized that they are not as good as they could be. Some simple changes could greatly increase the accessibility. Changes as simple as "ALT" tags on images and visual information would increase the accessibility greatly. We also talked about if it is not accessible and nobody tells him that he is missing something, he might not even know that it's bad because he doesn't know it's there.

When asked what does he do when he gets to a website that is inaccessible to him he says that he tries really hard to work his way through the website and after best efforts he either leaves the website or gets a sighted person to help him.

The software (JAWS) that he uses is quite extensive. I asked him to find a web page that I thought had a table on it to see how he navigates through tables. Tables are often misused for layout and presentation. He turned to his computer, pushed a bunch of keys and was off surfing the web. Soon navigated his way and found the page that I was looking for. He had his monitor off and he told me that there was no table on that page and that it would be available soon. It was a tutor schedule for DSU students. I was really impressed with his ability to surf the web.

Since he works at DSU he would like to see DSU's websites become more accessible. He says that the most common problems that he experiences are inability to have alternatives to graphics, links that are graphics that do not have any text associated with them.

Experiencing first hand the reality of a blind disabled user was very beneficial to me. Keith asked me something that made me think. I have been practicing with the JAWS software and he said, have you tried it with the monitor off. I soon realized that in my practicing I had been peeking to help me through the page. He said, I can not peek.

Soon my meeting with Keith was over. He flipped open the glass cover on his watch and told me what time it was. I was puzzled, he showed me his watch, which has Braille on each of the numbers and feels where the hand is.

I really appreciate the time that Keith spent with me helping me understand.

Software:

InFocus:

EROS purchased a copy of InFocus for me to use on our web sites. InFocus is automated software that diagnoses and fixes the websites for Section 508 compliance. We saw that it steps the developer through each of the problems on the page starting with the priority one problems. It has easy to use wizards that step you through each problem and it actually changes the code for you. Essentially it is a development tool that fixes your problems and allows you to change the code if you need to make additional changes.

JAWS:

JAWS (Job Access With Speech) provides speech technology that works with your Windows 95/98/Me or Windows NT/2000 operating system to provide access to today's popular software applications and the Internet. JAWS uses an integrated voice synthesizer and your computer's sound card to output the content of your computer screen to speakers. JAWS also outputs to refreshable Braille displays. This technology provides access to a wide variety of information, education, and job related applications. I downloaded and tested out this popular screen reading software. It seemed to work really well, provided you were familiar with many shortcut keys to operate the software. I use screen reading software at EROS to test out our difficult pages for accessibility.

Bobby v3.2:

Bobby is a free application developed by the Center for Applied Special Technology (CAST) that will analyze Web pages for their accessibility to people with disabilities. I used Bobby extensively to gather the data for the level of compliancy on the EROS web sites. I extracted all the data from the results it brought back and formulated them into easy to understand charts and graphs.

Science Data Centers Symposium 2001:

I completed my research of where EROS stood for Section 508 compliancy on six major EROS websites. I presented that information in a poster format at the Science Data Centers Symposium March 28-28 in Pasadena, California. There I had the opportunity to speak first hand with other Federal agencies. We discussed where we were both at and how we were handling the compliancy efforts. I had the opportunity to share my knowledge and gain insight on how other agencies were becoming compliant.

Abstract:

Section 508 of the Rehabilitation Act and Electronic and Information Technology Accessibility Standards requires that Federal agencies develop information so that individuals with disabilities have the same level of access to

Web site information as others as of June 21, 2001. At the Raytheon Science Data Centers Symposium, this poster session will consider the effects the legislation will have on Federal Web site development, particularly at U.S. Geological Survey's Earth Resources Observation Systems Data Center. This session will cover current concerns and the steps and guidelines data centers might follow in complying with Section 508.

Data and information found at:
<http://edcw2ks15.cr.usgs.gov/Section508Results/index.html>

Priority Levels for accessibility:

[Priority 1] – A Web content developer **MUST** satisfy this checkpoint. It is a basic requirement for some groups to be able to use web documents.

- Example: Provide ALT tags for Images

[Priority 2] – A web content developer **SHOULD** satisfy all of these checkpoints. Satisfying this checkpoint will remove significant barriers to accessing web documents.

- Example: Use Style Sheets to Control Layout and Presentation.

[Priority 3] – A web content developer **MAY** address this checkpoint. Will improve access to Web documents.

- Example: Provide Summaries For Tables.

The six websites all have accessibility barriers to their websites. During the research and study of the types of accessibility problems at the sites, the information provided in the charts was found. Examples of common problems that cause barriers to the websites include images that do not provide alternative information via ALT Tags or LONG Descriptions to explain the images. Cascading Style Sheets should be used to define the style of elements on a web page. Another problem is color often causes accessibility problems. For example, color blind users or blind users that are asked to click on a red link may not know which one to go use. Priority should be given to reducing the number of priority one and priority two errors. Time frame for compliancy range from less than one

minute to fix issues such as ALT tags to more lengthy time frames to implement a universal Cascading Style Sheet for overall website design. The majority of the problems are relatively easy to fix and can improve accessibility in a reasonably short time frame. The USGS EROS Data Center has a strategic plan in place to manage the web, which includes minimizing accessibility issues.

Short summary of common high-priority accessibility barriers found in websites:

- Provide alternative text for images. Image based navigational tools need text based alternatives. ALT tags or LONG DESC descriptions.
- Don't rely on Color Alone. Example: Click on the RED link:
red blue green
- Tables should be used for truly tabular data, not visual layout. Provide row & column header information to aid in navigation.
- Pages featuring new technology may not be capable of rendering information. Use NOFRAMES, NOSCRIPT or other accessible formats to get the information conveyed.
- Use Client-Side image maps instead of Server-Side image maps. Server-side images do not allow the user to know what they are clicking on until they try it.
- Hypertext Links: Use text that makes sense when read out of context. For instance, avoid "Click Here".
- Images that cannot be described in around 10 words should include a long description of the image.
- Cascading Style Sheets should be used to define the style of elements on a Web page.
- Multimedia (Audio and Video) should provide alternative forms of multimedia. Transcripts for audio/video.

EROS Forums:

There are many web developers that work at EROS Data Center. Each one of them needs to be familiar with Section 508 guidelines. While they all do not individually have the time to learn about accessibility to the extent of my knowledge, they do need to learn some. That is where I come into hand. I am the lead on Section 508 efforts and people come to me with questions on Section 508. I gladly answer them or show them what needs to be done. We

have bi-weekly web development meetings where we dedicate time towards Section 508. I am doing training sessions for our web developers, working one on one and doing forums and status of our websites to upper management. Having one person that knows it to the max is much better than having everybody know a little bit, but not everything.

EDC INSTRUCTION NO. 1028 EDC External World Wide Web Policy

Question :

How do you make something be enforceable by your web developers at EROS?

Answer :

You make it a EDC Instruction Policy and employees have to follow the regulations in it. I wrote this portion of our WWW External Policy on Section 508. It explains the law, why it's important, when it goes into effect and what needs to be done in accords with the Final Standards.

The Rehabilitation Act of 1973, Amendments of 1998, Section 508 (Electronic and Information Technology) requires that "all Federal agencies ensure that when they develop, procure, maintain, or use electronic and information technology, that it is accessible to employees with disabilities. It also requires that individuals with disabilities who are seeking information or services from Federal agencies have access to, and use of, all information provided by whatever medium, including the Web."

Under Section 508, all USGS websites created, modified, or updated after June 21, 2001 MUST be compliant. The Section 508 standards are listed in the *Federal Register Electronic and Information Technology Accessibility Standards; Final Rule*, published on December 21, 2000.

Web-based Intranet and Internet Information and Applications: An Overview

"The criteria for web-based technology and information are based on access guidelines developed by the Web Accessibility Initiative of the World Wide Web Consortium. Many of these provisions ensure access for people with vision impairments

who rely on various assistive products to access computer-based information, such as screen readers, which translate what is on a computer screen into automated audible output, and refreshable Braille displays. Certain conventions, such as verbal tags or identification of graphics and format devices, like frames, are necessary so that these devices can "read" them for the user in a sensible way. The standards do NOT prohibit the use of web site graphics or animation. Instead, the standards aim to ensure that such information is also available in an accessible format. Generally, this means the use of text labels or descriptors for graphics and certain format elements (HTML code already provides an Alt Text tag for graphics, which can serve as a verbal descriptor for graphics). This section also addresses the usability of multimedia presentations, image maps, style sheets, scripting languages, applets and plug-ins, and electronic forms."

A web site required to be accessible by Section 508, is in complete compliance if it meets paragraphs (a) through (p) of the following Federal Register Electronic and Information Technology Accessibility Standards. A compliant USGS website would also meet the WCAG 1.0 Priority 1 checkpoints and paragraphs (l) through (p) of the standards below.

Paragraph (a) requires that a text equivalent for every non-text element shall be provided.

Paragraph (b) provides that equivalent alternatives for any multimedia presentation shall be synchronized with the presentation. An alternative might be to provide a transcript of the speech, which could be saved, reviewed, and searched.

Paragraph (c) prohibits the use of color as the single method for indicating important information on a web page.

Paragraph (d) provides that documents must be organized so that they are readable without requiring browser support for style sheets.

Paragraph (e) requires web page designers to include redundant text links for each active region of a server-side image map with their pages.

Paragraph (f) provides that client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.

Paragraph (g) and **Paragraph (h)** permit the use of tables, but require that the tables be coded according to the rules for developing tables of the markup language used.

Paragraph (i) addresses the use of frames and requires that they be titled with text to identify the frame and assist in navigating the frames.

Paragraph (j) defines limits on the blink or flicker rate of screen elements.

Paragraph (k) requires that a text-only web page shall only be provided as a last resort method for bringing a website into compliance with other requirements.

Paragraph (l) requires that when web pages rely on special programming instructions called "scripts" to affect information displayed or to process user input, functional text shall be provided. It also requires that the text be readable by assistive technology such as screen reading software.

Paragraph (m) requires that web pages, which provide content such as Real Audio or Portable Document Files (.PDF) files, also provide a link to a plug-in that will meet the software provisions.

Paragraph (n) requires that people with disabilities have access to interactive electronic forms.

Paragraph (o) requires that a method be used to facilitate the easy tracking of page content that provides users of assistive technology with the option to skip repetitive navigation links.

Paragraph (p) addresses the accessibility problems that can occur if a web page times-out while a user is completing a form.

Resources:

I have thought about how am I going to list all my resources for this research project. I have looked at hundreds of web pages on accessibility. My short list that I have kept as my most useful websites is over 50 long. While I'm not directly quoting any resources, I have accumulated all of the knowledge in my URL's and resources and interviews into one gigantic knowledge pool in my brain.

- Advance Data 292, National Center for Health Statistics, 1994
- Government Technology, "BREAKING THE ACCESS BARRIER" February 2001
- Federal Computer Week, "ROAD TO COMPLIANCE" April 9, 2001. Matthews, William
- www.508compliant.com
- Designing an Accessible Web: Challenges, Tools, and Techniques by David L. Govoni
- http://www.netmechanic.com/news/vol4/promo_no7.htm
- <http://www.webaim.org/standards/508/checklist>
- <http://www.webaim.org/>
- <http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/>
- United States Department of Education Q&A TITLE IV - REHABILITATION ACT AMENDMENTS OF 1998 SECTION 508: ELECTRONIC AND INFORMATION TECHNOLOGY
- <http://www.access-board.gov/indexes/accessindex.htm>
- <http://www.access-board.gov/news/508-final.htm>
- <http://www.w3.org/WAI/>
- <http://access.adobe.com/>
- <http://www.hj.com/JAWS/JAWS.html>
- <http://www.cast.org/bobby/>
- <http://www.cast.org/udl/index.cfm?i=211>
- <http://www.ssbtechnologies.com>
- <http://www.webable.com/>
- http://www.netmechanic.com/news/vol4/promo_no7.htm
- <http://edcw2ks15.cr.usgs.gov/Section508Results/index.html>
- <http://vischeck.com/>
- <http://www.section508.gov/>

Shawn Schuur's Final Presentation

The Effects Of Section 508:
The Rehabilitation Act And
Electronic And Information
Technology Accessibility
Standards On Federal
Website Development

What is Section 508?

- Section 508 is a part of the Rehabilitation Act of 1973 which requires that electronic and information technology developed, procured, maintained, or used by the Federal government be accessible to people with disabilities.

Timeline

- December 21, 2000, the Board issued final accessibility standards for electronic and information technology under section 508 of the Rehabilitation Act
 - The statutory compliance date: June 21, 2001
Any web page created after June 21, 2001, must be 508 compliant
 - If an existing web page is modified, the web must be made 508 compliant at that time.

Disabilities on the Web

- Sensory
 - Visual
 - Low Vision
 - Total Blindness
 - Color Blindness
 - Auditory
 - Reduced hearing to total deafness
- Physical/Motor
 - Paralysis, missing limbs: difficulty with input devices
- Cognitive/Language
 - Attention Deficit Disorder, Short-term memory, learning disabilities

More than the disabled

- Many more able-bodied users must or choose to "behave disabled" while online
 - Surf with graphics turned off due to slow Internet connections
 - Use older browsers that cannot detect or use new features
 - Use "poor" input or output devices with a text only or small screen (Example, Palms or mobile phones)
 - Are in a situation (for example, driving) where their eyes, ears, or hands are interfered with

How many does it affect?

- More than 8 MILLION Americans have visual impairments.
- Nearly 3 MILLION Americans are color blind
- 7.4 MILLION Americans use Assistive Technology Devices (ATDs)
- 22 MILLION Americans are hearing-impaired
- Nearly 2.7 MILLION Americans have speech impairments
- (Source: Vital and Health Statistics Series 10, No. 200, National Center for Health Statistics, 1996)

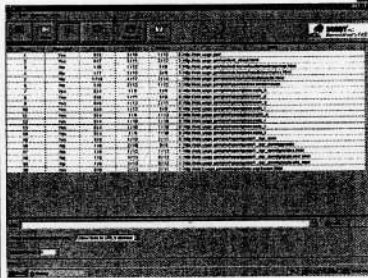
Section 508 Checklist

- Easy to use checklist goes over standards paragraphs A-P with a pass or fail checkpoint.
- Includes checklist for Scripts, Plug-ins, Java, etc.
- Good manual check for individual web pages
- <http://www.webaim.org/standards/508/checklist>

How do we get data faster?

- Bobby v3.2 - Bobby is a free application developed by the Center for Applied Special Technology (CAST) that will analyze Web pages for their accessibility to people with disabilities.

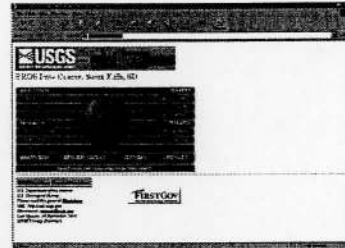
Data Research Bobby v3.2



<http://www.cast.org>

EROS Data Center

- <http://edc.usgs.gov/>

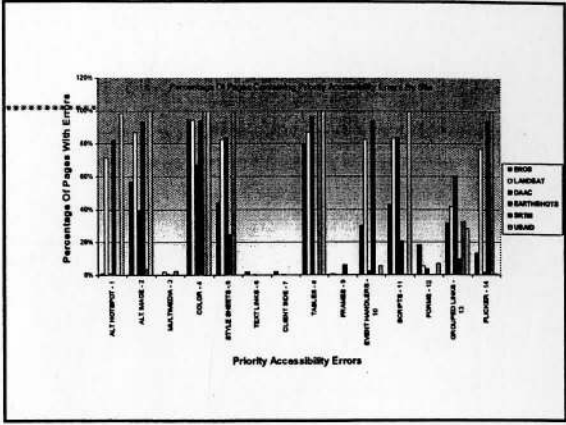
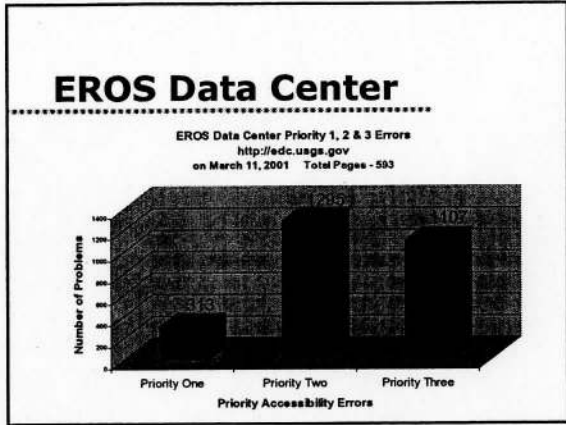


EROS Data


- <http://edcw2ks15.cr.usgs.gov/Section508Results/index.html>
- The Data that I presented at the Science Data Centers Symposium

Priority Levels

- **[Priority 1]** - A Web content developer **MUST** satisfy this checkpoint. It is a basic requirement for some groups to be able to use web documents.
 - Example: Provide ALT tags for Images
- **[Priority 2]** - A web content developer **SHOULD** satisfy all of these checkpoints. Satisfying this checkpoint will remove significant barriers to accessing web documents.
 - Example: Use Style Sheets to Control Layout and Presentation.
- **[Priority 3]** - A web content developer **MAY** address this checkpoint. Will improve access to Web documents.
 - Example: Provide Summaries For Tables.




ALT Text



- A simple technique that can improve your search engine rank, make navigation easier and increase the accessibility of your site
- 78% of Web sites do not use ALT Tags
- ALT="Description of Image"

WebAble

- One stop shopping, WebAble is a site that links to almost all your accessibility needs.
- www.webable.com



Demo

- Demonstrate an accessible site vs. a non-accessible site.
- Bad:
<http://edcw2ks15.cr.usgs.gov/section508/default.htm>
- Good:
<http://edcw2ks15.cr.usgs.gov/section508/good.html>

Any Questions???