

**Section 508 Compliance Assessment
of the
PDFs Published by the
Statistical Compendia Branch
of the
United States Census Bureau**

*for the
United States Bureau of the Census
Statistical Compendia Branch*

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Executive Summary

The Rehabilitation Act Amendments of 1998 requires access to electronic information and information technology procured by the Federal government be provided to persons with disabilities, to the extent that this access does not pose an “undue burden.” On December 21, 2000, the Architectural and Transportation Barriers Compliance Board (Access Board) issued final accessibility standards for electronic and information technology covered by Section 508 of the Rehabilitation Act Amendments of 1998 (Section 508). These standards speak to various means for disseminating information, including computers, software, and electronic office equipment. The law also provides a complaint process under which complaints concerning access to technology are to be investigated by the responsible Federal agency.

The United States Bureau of the Census’ (Census Bureau) Statistical Compendia Branch regularly produces several popular statistical reports that are made available as Adobe Acrobat PDF files on the United States Bureau of the Census’ web site at <http://www.census.gov/statab/www/>. The product line includes the *Statistical Abstract of the United States*, and the *State and Metropolitan Area Data Book 1997-98*.

The Census Bureau has contracted Computer & Hi-tech Management, Inc., (CHM) to conduct a compliance assessment of these PDF files measured against the December 21, 2000, Final Rule published in the Federal Register, and paying particular attention to the Technical Standards published for Subpart B, § 1194.21 and § 1194.22, and Subpart C, § 1194.31.

This report finds that there is no perfect solution to making complex tables such as those in the *Statistical Abstract* fully accessible to visual impaired people. The current technology has a number of limitations.

Five options are presented to improve the accessibility of complex tables are presented and analyzed. These options ranked in increasing complexity and resource cost are:

1. Provide a link to Adobe’s free conversion service.
2. Provide custom created tables for individuals requesting them
3. Provide tables using the new HTML 4.01 accessibility enhancements.
4. Use XML to generate tables.
5. Use Adobe Acrobat 5.0, along with the various accessibility-enhancing plug-ins offered by Adobe Systems, to increase the accessibility of its PDFs;

1. Document Scope

The Statistical Compendia Branch of the United States Census Bureau produces statistical reference documents that are primarily tabular in Adobe Acrobat PDF file format for placement on the Bureau's web site and on CD-ROM. The Adobe Acrobat process for producing these files and the final files need to meet the standards of accessibility under Section 508 of the Rehabilitation Act of 1973, as amended (Section 508) that are effective as of June 21, 2001.

This document presents an evaluation and analysis of the current Adobe Acrobat Portable Document Format (PDF) files maintained on the Statistical Compendia Branch's web site, <http://www.census.gov/statab/www/>, as regards Section 508. Specifically, CHM will assess these Adobe Acrobat PDF files' compliance with Section 508, measured against the December 21, 2000, Final Rule published in the Federal Register, and paying particular attention to the Technical Standards published for Subpart B, Sections 1194.21 and 1194.22. Specifically, this document addresses:

1. The compliance with Section 508 of PDF files currently found on the Statistical Compendia Branch's web site;
2. The state of compliance of Adobe Acrobat 5.0 and Adobe Acrobat Reader 5.0 with Section 508;
3. Alternative recommendations on how currently deployed PDF files can be made compliant with Section 508; and
4. Alternative recommendations on future Statistical Compendia publication can be made available on the Internet in a manner consistent with the requirements of Section 508.

2. Introduction

The Rehabilitation Act Amendments of 1998 requires access to electronic and information technology procured by the Federal government be provided to persons with disabilities, to the extent that this access does not pose an "undue burden." On December 21, 2000, the Architectural and Transportation Barriers Compliance Board (Accessibility Board) issued final accessibility standards for electronic and information technology covered by Section 508 of the Rehabilitation Act Amendments of 1998 (Section 508). This covers computers, software, and electronic office equipment. Complaints concerning access to technology are investigated by the responsible Federal agency.

The Statistical Compendia Branch regularly produces several popular statistical reports as Adobe Acrobat PDF files on the United States Bureau of the Census' web site at <http://www.census.gov/statab/www/>. The product line includes the *Statistical Abstract of the United States*, the *State and County Area Data Book*, and the *County and City Data Book*.

Under Section 508, all Census Bureau web pages, including PDF files, published after July 21, 2000, must be made accessible to persons with disabilities (*i.e.*, visually-impaired and blind persons). Additionally the United States Department of Commerce established the goal of making *all* of its web data products fully accessible to persons with disabilities. The Section 508 accessibility requirements for these documents are two-fold:

3. The documents must be accessible to persons with visual impairments, *i.e.*, those who are “hard of seeing,” who are color blind, or who have limited contrast-perception, etc.; and
4. The documents must be accessible to persons who are blind or who have sufficient visual impairment such that they use assistive devices, *e.g.*, screen magnification software, text-to-voice screen readers, and refreshable Braille displays, when utilizing the web.

Additionally, Section 508 requires Federal agencies ensure accessibility internally to Federal employee as well as to the general public. Any technology procured for the purposes of making the subject Adobe Acrobat PDF files compliant with Section 508 must, in turn, also meet the accessibility standards laid out therein. In this instance, Adobe Acrobat 5.0, if procured by the Census Bureau to be used by Census Bureau employee, must be a Section 508 compliant software package.

Adobe, Inc. currently markets Acrobat Reader 5.0 and Acrobat 5.0, which provide a number of new capabilities that improve the accessibility of both the software and the information communicated in PDF files.

5. Section 508 Accessibility Requirements

Section 508 addresses accessibility standards for electronic and information technology programs and services procured or provided by the Federal government and seeks to guarantee that persons with disabilities have equal access to those programs and serves as do person without disabilities. Most observers understand this to mean that Federal web sites must be accessible to persons with disabilities.

Section 508 also requires that third-party plug-ins, applets, or other applications such as Adobe Acrobat Reader utilized to view or interact with content deployed on web sites must also be compliant with the requirements of Section 508, and requires that web content authors provide a link to that plug-in, applet, or application. (*See*, 36 CFR part 1194, Section 508 of the Rehabilitation Act Amendments of 1998, at § 1194.22 (m).)

Section 508

requires that when Federal agencies develop, procure, maintain, or use electronic and information technology, they shall ensure that the electronic and information technology allows Federal employees with disabilities to have access to and use of information and data that is comparable to the access to and use of information and data by Federal employees who are not individuals with disabilities....”

(*Fed. Reg. Electronic and Information Accessibility Standards*. Vol. 65, No. 246, Rules and Regulations, pp. 80500 to 80528. at 80500).

Section 508 appears to require:

1. All web pages published by a government agency after July 21, 2000 on web site be accessible;
2. Any plug-in program such as Adobe Acrobat Reader must be accessible to persons with disabilities.

3. Products used by the Census Bureau to publish data (such as Adobe Acrobat Writer) on the web must be accessible themselves.

3.1. Measuring Section 508 Compliance

Three subparts of Section 508 address the Census Bureau’s publication of Adobe PDF documents online. They are:

1. Subpart B, § 1194.21, which governs software applications and operating systems. Regulations listed under § 1194.21 are relevant to the Bureau’s assessment of Adobe Acrobat 5.0 and Adobe Acrobat Reader 5.0, and those program’s compliance with accessibility requirements;
2. Subpart B, § 1194.22, addressing web-based Intranet and Internet information and applications. Regulations listed under § 1194.22 speak directly to the Census Bureau web pages; and
3. Subpart C, § 1194.31, which define the functional performance criteria by which an information technology is to be measured.

The text of these subparts is included in Appendix I.

3.2 Additional Tests for Measuring Compliance Under Section 508

Section 508 provides several additional tests that agencies are to apply when measuring a system’s or program’s compliance with Section 508: Whether compliance would impose an “undue burden” upon the agency; Whether there are commercial products available that comply in any part with Section 508; Whether compliance with Section 508 would compromise mission-critical national security activities; or Whether the system or program is acquired or used by a contractor an incidental to contracted for services.

“Undue Burden”

Agencies are not required to meet Section 508’s accessibility requirements if doing so would impose “undue burden.” In its Proposed Rule, the Access Board defined “undue burden” as

“significant difficulty or expense.” In determining what is a significant difficulty or expense, each agency must consider the resources available to the program or component for which the product is being developed, maintained, used or procured. The proposed rule defined undue burden as an action that would result in significant difficulty or expense considering all agency resources available to the agency or component. The [Access] Board sought comment in the NPRM [Notice of Proposed Rulemaking] on two additional factors (identified as factor (2) and factor (3) in the preamble) for agencies to consider in assessing a determination of an undue burden. Factor (2) addressed the compatibility of an accessible product with the agency’s or component’s infrastructure, including

security, and the difficulty of integrating the accessible product. Factor (3) concerned the functionality needed from the product and the technical difficulty involved in making the product accessible. Fed. Reg. *Electronic and Information Accessibility Standards*. Vol. 65, No. 246, Rules and Regulations, pp. 80500 to 80528. at 80505.

Factors (2) and (3) above were not included in the Final Rule; the Access Board concluded that, while those factors might be appropriate in determining what is and is not an “undue burden” upon an agency, there was insufficient case law or regulatory basis for establishing these factors as determinative factors.¹ *Id.*, at 80506. Instead, the Final Rule holds that determinations of “undue burden” would be met on a case-by-case basis.

The Access Board based this definition on a variety of factors, including:

- Case law interpreting Section 504 of the Rehabilitation Act (*See, for instance, Southeastern Community College v. Davis*, 442 U.S. 397 (1979)) (Section 504); definitions of “undue burden” derived from *Davis* has been included in agency regulations issued under section 504 since the *Davis* case. *See, e.g.*, 28 CFR 39.150.
- Title III of the Americans with Disabilities Act (ADA), 42 U.S.C. 12182(b)(2)(A)(iii). The legislative history of the ADA states that the term undue burden is derived from Section 504 and the regulations thereunder, and is analogous to the term “undue hardship” in Title I of the ADA, which Congress defined as “an action requiring significant difficulty or expense.” 42 U.S.C. 12111(10)(A). *See*, House Rept. 101.485, pt. 2, at 106..

A finding of “undue burden” does not, however, waive Section 508 requirements. According to §1194.2 (a)(1), “When compliance with [Section 508] imposes an undue burden, agencies shall provide individuals with disabilities with the information and data involved by an alternative means of access that allows the individual to use the information and data.” The agency is also required to provide documentation explaining why, and to what extent, compliance creates this “undue burden.”

Following that, the Access Board has determined that “undue burden,” on a provision-by-provision basis. If there are three Section 508 provisions for guaranteeing accessibility that cannot be met by an agency because of “undue burden,” each exception must be separately documented.

Is There a Commercial Product Available That Complies Fully with Section 508’s Accessibility Requirements?

§1194.2 (b) of Section 508 requires that,

[w]hen procuring a product, each agency shall procure products that comply with the provisions in this part when such products are available in the commercial marketplace or when such products are developed in response to a Government

¹ Notably, however, the United States Department of Commerce and a majority of advocacy groups representing persons with disabilities opposed the inclusion of Factors (2) and (3) because they felt that these factors would create loopholes by which agency could *avoid* complying with Section 508. Fed. Reg. *Electronic and Information Accessibility Standards*. Vol. 65, No. 246, Rules and Regulations, pp. 80500 to 80528. at 80506. Equally noteworthy is Adobe System *support* for Factors (2) and (3). *Id.* *Section 508 Compliance Assessment of the PDFs Published by the Statistical Compendia Branch of the United States Census Bureau*

solicitation. Agencies cannot claim that a product as a whole is not commercially available because no product in the marketplace meets all the standards. If products are commercially available that meet some but not all of the standards, the agency must procure the product that best meets the standards.

As discussed elsewhere in this analysis, neither Adobe Acrobat 5.0 nor Adobe Acrobat Reader 5.0 fully comply with Section 508.

While Adobe Acrobat is a very popular method of publishing statistical tables on the web, it is also possible to use Hyper Text Markup Language (HTML). The most recent version (4.01)² includes tags designed to work with assistive technology such as screen readers.

Does the Statistical Compendia Branch Engage in Activities That Would be Compromised by Section 508's Accessibility Requirements?

Section 508 provides an exception for telecommunications or information systems whose function, operation, or use involves intelligence activities, cryptologic activities related to national security, command and control of military forces, equipment that is an integral part of a weapon or weapons system, or systems which are critical to the direct fulfillment of military or intelligence missions.

The Census Bureau's Statistical Compendia Branch's activities are not related to any of these activities. As such, the documents published by the Statistical Compendia Branch online are not exempt from Section 508 compliance requirements.

Are the Systems and Programs Acquired Incidental to Contracted for Services and Therefore Outside the Scope of Section 508?

Section 508 does not require the systems and programs used by contractors who provide information technology solutions to the Federal government comply with the regulation. For instance, when the Census Bureau contracts with a service provider for web page development services, the development and design programs used by the contractor do not have to be accessible to persons with disabilities. Those development and design tools are considered "incidental to" the actual product being provided, in this example a web site.

Following that logic, where the Census Bureau to contract with a service provider to create PDF files compliant with Section 508, the requirement that Adobe Acrobat 5.0 also be in compliant with the provisions laid out in Subpart B, § 1194.21 would fall to the wayside.

Acrobat Writer presents some accessibility issues because it uses fixed font sizes and pop up menus to display options.

4. The Statistical Compendia PDFs Currently Published on Census's Web Site

The Census Bureau's Statistical Compendia Branch web publishes popular statistical reports and tables including the *Statistical Abstract of the United States*, the *State and County Area Data*

² See <http://www.w3.org/TR/html4/struct/tables.html>

Book, and the *County and City Data Book*. Many of these tables from the *Statistical Abstract* are published as PDFs. Because these tables are frequently accessed, the Branch is interested in making them more accessible according to the compliance standards set forth in Section 508.

These PDFs currently present accessibility issues:

- These PDFs commonly utilizes a two-column (newspaper) text layout in its publications. Text-to-voice screen readers often are unable to properly translate documents laid out in

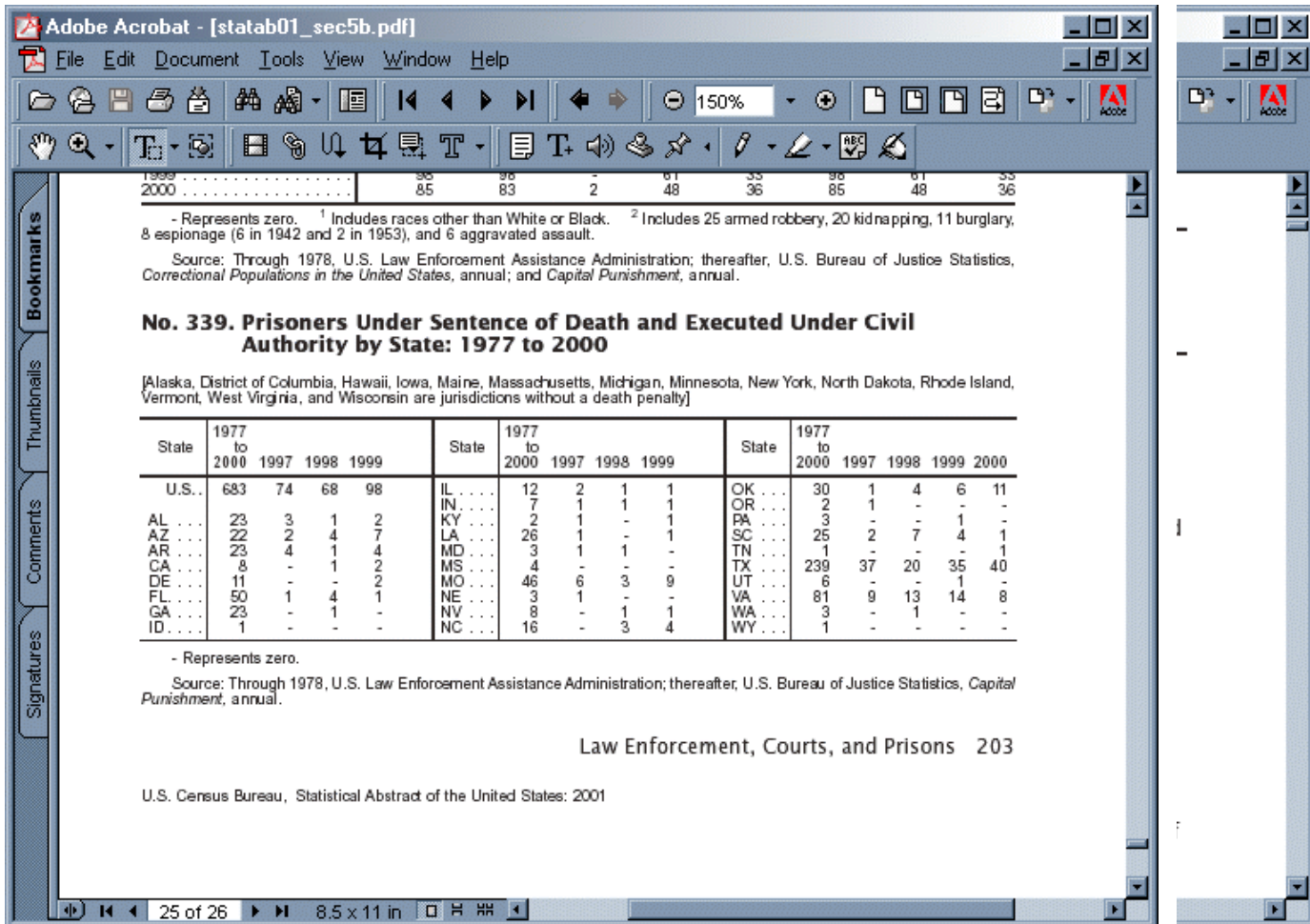


Figure 2. An example of the complex table formats published by the Statistical Compendia Branch.

this manner. These assistive devices often “read” text from left to right across the width of the screen, such that screen output such as that appearing in Figure 1 is read by text-to-voice screen readers as, “This section presents data on crimes comcrimes—there are two major approaches mitted, victims of crimes, arrests, and taken in determining the extent of crime. Data related to criminal...,” etc. This inability to perceive the logical structure of the document makes the information contained in the document inaccessible.

- Similarly, person with visual acuity greater than 20/70 (with glasses) cannot increase the font size of the text in Figure 1, except to increase the page zoom level. These users’ access to the information published in the PDF is compromised inasmuch as they are

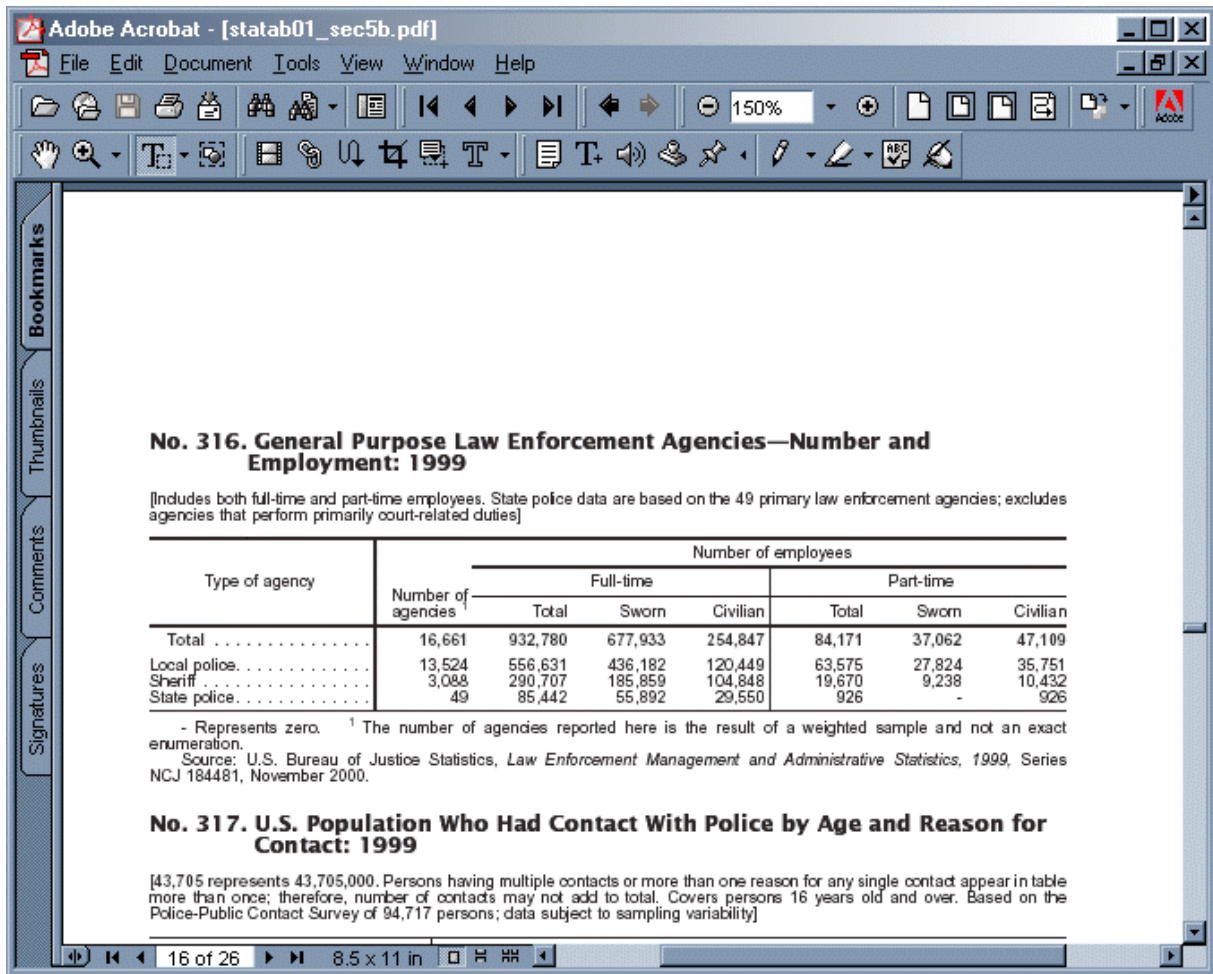


Figure 3. An example of the complex table formats published by the Statistical Compendia Branch.

required to “know” the logical (in this case, column-based) structure of the document before selecting it.

- Data are frequently presented in complex tables. Figures 2, and 3 provide examples of these formats. Visually impaired persons are unable to access the information in these tables: 1) When the table utilizes spanning column headers such as shown in Figure 3., text-to-voice screen readers and refreshable Braille displays cannot capture the hierarchal relationship being provided visually in the table; and 2) When row headers include complex parent-child relationships, text-to-voice screen readers and refreshable Braille displays cannot communicate those relationships. For assistive technologies to interpret tables, technologies have been developed to read cell-by-cell, but tables can be made so complex that the traditional two-dimensional structure of a table is disrupted. If the structure of the table is disrupted due to these complex tables, the logical structure of the table is also likely to be disrupted. Subpart B, § 1194.22 (g) and 11994.22 (h) of Section 508 state that when information is displayed in a table format, “[r]ow and column headers shall be identified...” and “[m]arkup shall be used to associate data cells and header cells....” This allows users using assistive technologies, specifically text-to-voice screen

readers, to non-visually navigate the table's data. However, this requirement also contemplates that the subject table will be coded in HTML, XML, or some other standard web language. Adobe Acrobat does allow content authors some limited ability to "mark-up" individual cells in a table.

- The current PDFs format the more complex tables as non-text elements (similar to graph and charts) that cannot be assessed by assistive devices.

5. Adobe Acrobat 5.0, Adobe Acrobat Reader 5.0, and Section 508

5.1 New Accessibility-Augmenting Features in Adobe Acrobat and Acrobat Reader

Adobe's PDF proprietary document format has become the global standard for electronic document distribution. The PDF file format grew from a publishing world paradigm, where authors maintained control over document presentation as well as content. Because it preserves the exact look and feel of a document, and because Adobe's Reader program is freely available on the Internet, PDF has become the preferred file format for creating and distributing source material on the web. Acrobat is also used to distribute electronic documents over corporate networks, by e-mail, and on CD-ROM.

Acrobat Writer 5.0 and Acrobat Reader 5.0 provide new features to:

- Create "tagged" Adobe PDF files from applications such as Microsoft Office 2000 for Windows. These "tags" provide structure to Adobe PDF files that can be used to control text flow, create content blocks, define titles, subtitles, and other hierarchical information, and otherwise define structural information within a document and make that information available to assistive devices;
- Troubleshoot and optimize Adobe PDF files for accessibility with tools such as the Accessibility Checker and Tags Palette;
- Convert existing PDF files to "tagged" Adobe PDF with their Make Accessible plug-in;
- Add text to scanned pages for improved accessibility with their Paper Capture plug-in; and
- Export text from "tagged" PDF files to an .rtf (Rich Text Format) file, or .txt (ASCII text) file, or to an HTML or XML page with the Save as XML plug-in.

Adobe also provides a more accessible interface to content creators:

- Adobe Acrobat 5.0 supports the Microsoft Active Accessibility (MSAA) Application Programming Interface (API) for the Windows platform for integration with assistive technology products, including text-to-voice screen readers from vendors such as GW Micro and Freedom Scientific; and
- Adobe Acrobat 5.0 and Adobe Acrobat Reader 5.0 provide usability enhancements, including enhanced keyboard shortcuts, support for high-contrast viewing, and the ability to zoom in and reflow text on the screen.

Acrobat Reader 5.0 enhances these accessibility-optimized PDFs:

- It reads Adobe PDF documents with Windows-based text-to-voice screen readers from vendors such as Freedom Scientific and GW Micro;
- It uses “keyboard navigation” to navigate the document;
- It views documents in high contrast mode; and
- It can zoom in on text and reflow to fit any size view when working with “tagged” Adobe PDF files.

Acrobat Reader 5.0 present challenges for the visually impaired who prefer non-Windows computers. Specifically:

1. Acrobat Reader 5.0 does not provide accessibility to electronic forms when a user attempts to use a PDF by means of a text-to-voice screen reader (Subpart B, § 1194.22, web-Based Intranet and Internet Information and Applications).
2. Neither Acrobat 5.0 nor Acrobat Reader 5.0 provide an on-screen indication of focus or on-screen focus tracking (Subpart B, § 1194.21, Software Applications and Operating Systems).
3. Neither Acrobat 5.0 nor Acrobat Reader 5.0 makes information about user interface elements available to assistive technologies (Subpart B, § 1194.21, Software Applications and Operating Systems).
4. Neither Acrobat 5.0 not Acrobat Reader 5.0 makes the attributes of text contained in a PDF available to assistive technologies, although Adobe provides on-line conversion services (Subpart B, § 1194.21, Software Applications and Operating Systems).
5. Adobe Acrobat 5.0 does not provide alternate keyboard access for all of its functions, e.g., freehand drawing tools and hypertext creation (Subpart B, § 1194.21, Software Applications and Operating Systems).

Subpart B, § 1194.21, Software Applications and Operating Systems.

The following table summarizes the several Section 508 requirements under Subpart B, § 1194.21, Software Applications and Operating Systems, and maps these requirements against Adobe Acrobat 5.0 and Adobe Acrobat Reader 5.0.

Section 508 Requirement	Adobe Acrobat 5.0 Functionality	Acrobat 5.0 Windows	Acrobat 5.0 Macintosh	Acrobat 5.0 Reader Windows	Acrobat 5.0 Reader Macintosh
Keyboard Access When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be discerned textually.	Keyboard navigation is provided for all menu commands in Adobe Acrobat Reader 5.0	Not Applicable	Not Applicable	Yes	Yes

	All Keyboard navigation available in Adobe Acrobat Reader is also available in the full Adobe Acrobat 5.0 product. Some functions in full Acrobat, such as freehand drawing tools for electronic markup of Adobe PDF files and creation of hyperlinks, are not keyboard accessible	Yes, with some exceptions	Yes, with some exceptions	Not Applicable	Not Applicable
On-screen focus and tracking A well-defined on-screen indication of the current focus that moves among interactive interface elements as the input focus changes shall be provided. The focus shall be programmatically exposed so that assistive technology can track focus and focus changes	Adobe Acrobat 5.0 provides on-screen indication of current focus that moves among interactive interface elements as the input focus changes.	Yes	Yes	Yes	Yes
	Focus is programmatically exposed through the Microsoft Active Accessibility (MSAA) Application Programming Interface (API) in Adobe Acrobat 5.0 for Windows. No comparable standard for exposing focus programmatically existed on the Macintosh platform during the development of Acrobat 5.0.	Yes	No	Yes	No
Information about user interface elements Sufficient information about a user interface element including the identity, operation and state of the element shall be available to assistive technology. When an image represents a program element, the information conveyed by the image must also be available in text.	Adobe Acrobat 5.0 for Windows provides information about user interface elements through the MSAA API. No comparable standard existed on the Macintosh platform during the development of Acrobat 5.0.	Yes	No	Yes	No
Consistent Meaning of Images When bitmap images are used to identify controls, status indicators, or other programmatic elements, the meaning assigned to those images shall be consistent throughout an application's performance.	The Adobe Acrobat 5.0 user interface consistently uses bitmap images to identify controls, status indicators or other programmatic elements.	Yes	Yes	Yes	Yes

<p>Availability of textual information Textual information shall be provided through operating system functions for displaying text. The minimum information that shall be made available is text content, text input caret location, and text attributes.</p>	<p>Adobe Acrobat 5.0 for Windows provides textual information through the MSAA API including text content and text input caret location. Text attributes are not supported. No comparable standard for exposing focus programmatically existed on the Macintosh platform during the development of Acrobat 5.0. Adobe provides free online PDF-to-text, or PDF-to-HTML conversion services for users that cannot take advantage of MSAA tools on the Window platform. In addition, Macintosh users can export tagged Adobe PDF files to RTF, XML, HTML, or text.</p>	<p>Yes, except text attributes Includes option to save as RTF, XML, HTML, Text</p>	<p>web-based conversion services offered Includes option to save as RTF, XML, HTML, Text</p>	<p>Yes, except text attributes</p>	<p>web-based conversion services offered</p>
<p>Color Coding Color-coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.</p>	<p>The Adobe Acrobat 5.0 user interface does not use color as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.</p>	<p>Yes</p>	<p>Yes</p>	<p>Yes</p>	<p>Yes</p>
<p>Interaction with electronic forms When electronic forms are used, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.</p>	<p>Adobe Acrobat 5.0 for Windows and Macintosh enables people with motor impairments, low vision and other disabilities excluding blindness, to interact with, complete and submit forms through the use of keyboard navigation. For people with blindness, Adobe Acrobat 5.0 for Windows enables text-to-voice screen readers to access the information, field elements and functionality required for completion and submission of Adobe PDF forms when those forms have been authored in a manner that optimizes them for accessibility. This functionality is delivered via the MSAA API on the Windows platform. No comparable standard existed on the Macintosh platform during the development of Acrobat 5.0.</p>	<p>Yes</p>	<p>Yes, except text-to-voice screen reader support</p>	<p>Yes</p>	<p>Yes, except text-to-voice screen reader support</p>
<p>Flash or blink frequency Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.</p>	<p>Adobe Acrobat 5.0 software does not use flashing or blinking text, objects or other elements in the software's user interface.</p>	<p>Yes</p>	<p>Yes</p>	<p>Yes</p>	<p>Yes</p>

<p>Animation When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.</p>	<p>Generally, PDF files are not used for the creation and distribution of animated content. However, Adobe Acrobat 5.0 provides support for JavaScript, which could be used by the creator of an Adobe PDF file to animate elements on a page. Creators of Adobe PDF files should make sure any animation is done in a manner that is consistent with the standard. Acrobat software also has the ability to support the display of QuickTime movies. Adobe advises customers to review the accessibility options of QuickTime software to determine if QuickTime content in an Adobe PDF file will meet their accessibility objectives.</p>	Yes	Yes	Yes	Yes
<p>Contrast and color settings Applications shall not override user selected contrast and color selections and other individual display attributes.</p>	<p>Adobe Acrobat 5.0 does not override user selected contrast and color settings when they are available in the operating system. Adobe Acrobat 5.0 for Windows also has the ability to automatically adopt the color and contrast settings of the Windows operating system in the Acrobat user interface and in the display of an Adobe PDF file.</p>	Yes	Yes	Yes	Yes
<p>Variety of color selections When a product permits a user to adjust color and contrast settings, a variety of color selections capable of producing a range of contrast levels shall be provided.</p>	<p>Adobe Acrobat 5.0 allows users to customize the contrast and color settings of the text and background of an Adobe PDF file to a wide range of colors supported by their system.</p>	Yes	Yes	Yes	Yes
	<p>Adobe Acrobat 5.0 software for Windows also has the ability to automatically adopt the color and contrast settings of the Windows operating system in the Acrobat user interface and in the display of an Adobe PDF file.</p>	Yes	Not Applicable	Yes	Not Applicable

Subpart B, § 1194.22, Web-Based Intranet and Internet Information and Applications.

The following matrix summarizes the Section 508 requirements under Subpart B, § 1194.22, web-Based Intranet and Internet Information and Applications, and maps these requirements against Adobe Acrobat 5.0 and Adobe Acrobat Reader 5.0.

Section 508 Requirement	Adobe Acrobat 5.0 Functionality	Acrobat 5.0 Full Product Windows	Acrobat 5.0 Full Product Macintosh	Acrobat 5.0 Reader Windows	Acrobat 5.0 Reader Macintosh
ALT Tags A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).	The Adobe PDF 1.4 specification provides the ability to encode text equivalents for non-textual information, such as graphics and images, and to provide expanded textual descriptions for elements such as form fields or abbreviations. These files are called "tagged" Adobe PDF files. These text equivalents can be exposed to assistive technologies through the support of MSAA interface in Acrobat 5.0 for Windows. Adobe Acrobat 5.0 lets document authors add or modify these text equivalents.	Author's discretion	Author's discretion	Not Applicable	Not Applicable
	Adobe Acrobat 5.0 for Windows can automatically create Adobe PDF files that include alternate text specified in Microsoft Office 2000 documents.	Not Applicable	No	Not Applicable	Not Applicable
Multimedia alternatives Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.	Adobe PDF does not provide inherent support for multimedia although an Adobe PDF file may contain multimedia elements from other sources, such as QuickTime movies. Creators of Adobe PDF files should review the accessibility capabilities of QuickTime and other multimedia formats before including them in an Adobe PDF file.	Author's discretion	Author's discretion	Not Applicable	Not Applicable
Color information on web pages web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.	Adobe PDF supports the ability to display any type of page layout and design, including arbitrary uses of color with fonts, backgrounds, etc. The creators of Adobe PDF files should review the page layout and design to make sure it uses color in a manner consistent with the standard.	Author's discretion	Author's discretion	Not Applicable	Not Applicable

Data table header Row and column headers shall be identified for data tables.	The Adobe PDF 1.4 specification enables customers to preserve markup in tables in an Adobe PDF file, including table rows, header cells and data cells. Acrobat 5.0 for Windows enables users to create tagged Adobe PDF files automatically from Microsoft Office 2000 for Windows applications. If the author defines table rows, header cells and data cells in the application, Acrobat 5.0 will automatically include that information in the PDF file. Users of Macintosh or Windows versions can create or edit data table header information using the Acrobat tags palette.	Author's discretion via MS Office export or tags palette.	Author's discretion; create or edit information via tags palette only.	Not Applicable	Not Applicable
Data table markup Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.	See the response in "data table headers".	Author's discretion	Author's discretion	Not Applicable	Not Applicable
Reliance on style sheets Documents shall be organized so they are readable without requiring an associated style sheet.	Not applicable to PDF. Style sheets are a concept applied to web pages created in markup languages such as HTML.	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Server-side image maps Redundant text links shall be provided for each active region of a server-side image map.	Not applicable to PDFs. Image maps are used by web pages created in HTML.	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Client-side image maps 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.	Not applicable to PDF. Image maps are used by web pages created in HTML.	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Frame titles Frames shall be titled with text that facilitates frame identification and navigation	Not applicable to PDF. Frames are a concept associated with viewing multiple HTML pages simultaneously in a web browser.	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Screen Flicker Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.	Adobe PDF files are typically static files that do not cause the screen to flicker. Adobe Acrobat 5.0 software does provide support for JavaScript, which could be used by the creator of an Adobe PDF file to cause elements on a page to flicker. Creators of Adobe PDF files using JavaScript in this way should insure that flickering elements are within the tolerances defined in the standard.	Author's discretion	Author's discretion	Not Applicable	Not Applicable
Equivalent Information A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.	Adobe Acrobat 5.0 for Windows provides an extensive tool set to help authors create tagged Adobe PDF files that provide accessible content for users with disabilities so that only one version of the document can be used.	Author's discretion	No	Not Applicable	Not Applicable

	If an author does want to convert Adobe PDF files into other formats, Adobe has multiple tools to assist with this process. Adobe Acrobat 5.0 enables Adobe PDF files to be saved as Rich Text Format (RTF) files. The "Save As XML" plug-in allows the user to save as XML, HTML, or text. Adobe also offers on-line services that allow users to convert Adobe PDF files to plain text or HTML.	Save as RTF, XML, HTML, Text	Save as RTF, XML, HTML, Text	web-based conversion services to HTML or text	web-based conversion services to HTML or text
Scripting languages When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.	Acrobat Reader 5.0 does not support scripting languages to dynamically display content or interface elements in an Adobe PDF file.	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Adobe Acrobat 5.0 includes support for JavaScript, which could be used to create Adobe PDF files that display content or create interface elements. JavaScript information identified with functional text cannot be passed to assistive technology in Acrobat 5.0.	No	No	Not Applicable	Not Applicable
Link to required applications When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with 1194.21(a) through (l).	Adobe Acrobat Reader 5.0 is a free downloadable application available from adobe.com that allows users to view, read, and print Adobe PDF files across a broad range of hardware and operating systems.	Not Applicable	Not Applicable	web master's discretion	web master's discretion
Interaction with electronic forms When electronic forms are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.	Adobe Acrobat 5.0 allows authors to optimize Adobe PDF forms for accessibility. These optimized forms can enable people using assistive technologies to access the information, field elements and functionality required for completion and submission of Adobe PDF forms.	Author's discretion	Author's discretion	Yes, except local file submission	Yes, except local file submission
Repetitive links A method shall be provided that permits users to skip repetitive navigation links.	Adobe PDF files may contain navigation links. Creators of Adobe PDF files should make sure any navigation links are used in a manner that is consistent with the standard.	Author's discretion	Author's discretion	Not Applicable	Not Applicable
Timed response When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.	Adobe Acrobat 5.0 includes support for JavaScript, which could be used to create Adobe PDF files with timed responses. Creators of Adobe PDF files should make sure any timed responses are used in a manner that is consistent with the standard.	Author's discretion	Author's discretion	Not Applicable	Not Applicable

Subpart C, § 1194.31, Functional Performance Criteria.

The following table illustrates the Section 508 requirements under Subpart C, § 1194.31, Functional Performance Criteria, and maps these requirements against Adobe Acrobat 5.0 and Adobe Acrobat Reader 5.0.

Section 508 Reference	Adobe Acrobat 5.0 Functionality	Acrobat 5.0 Full Product Windows	Acrobat 5.0 Full Product Macintosh	Acrobat 5.0 Reader Windows	Acrobat 5.0 Reader Macintosh
<p>Alternate for visual impairment At least one mode of operation and information retrieval that does not require user vision shall be provided, or support for assistive technology used by people who are blind or visually impaired shall be provided.</p>	Provides direct support for text-to-voice screen readers via the MSAA API for the Windows platform. MSAA lets Acrobat 5.0 integrate with assistive technology products including newer versions of text-to-voice screen readers from vendors such as Freedom Scientific and GW Micro. Supports high contrast viewing and the ability to zoom in and reflow text on the screen for users with low vision.	Yes	Yes	Yes	Yes
<p>Enhancement for low vision At least one mode of operation and information retrieval that does not require visual acuity greater than 20/70 shall be provided in audio and enlarged print output working together or independently, or support for assistive technology used by people who are visually impaired shall be provided.</p>	Provides direct support for text-to-voice screen readers via the MSAA API for the Windows platform. MSAA lets Acrobat 5.0 integrate with assistive technology products including newer versions of text-to-voice screen readers from vendors such as Freedom Scientific and GW Micro. Supports high contrast viewing and the ability to zoom in and reflow text on the screen for users with low vision.	Yes	Yes	Yes	Yes
<p>Alternate for no hearing At least one mode of operation and information retrieval that does not require user hearing shall be provided, or support for assistive technology used by people who are deaf or hard of hearing shall be provided</p>	Adobe Acrobat 5.0 does not require user hearing in order to operate the software.	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Adobe Acrobat 5.0 does support the ability to play audio files, such as .wav or QuickTime files that may be embedded in an Adobe PDF. Creators of Adobe PDF files that include audio files should make sure this is done in a manner that is consistent with the standard.	Author's discretion	Author's discretion	Author's discretion	Author's discretion
<p>Enhancement for auditory information Where audio information is important for the use of a product, at least one mode of operation and information retrieval shall be provided in an enhanced auditory fashion, or support for assistive hearing devices shall be provided.</p>	Adobe Acrobat 5.0 does not require user hearing in order to operate the software.	Author's discretion	Author's discretion	Not Applicable	Not Applicable
	Adobe Acrobat 5.0 does support the ability to play audio files, such as .wav or	Author's discretion	Not Applicable	Author's discretion	Author's discretion

	QuickTime files that may be embedded in an Adobe PDF. Creators of Adobe PDF files that include audio files should make sure this is done in a manner that is consistent with the standard.				
Alternate for speech impairment At least one mode of operation and information retrieval that does not require user speech shall be provided, or support for assistive technology used by people with disabilities shall be provided.	Adobe Acrobat 5.0 does not require user speech to operate the software.	Not Applicable	Author's discretion	Not Applicable	Not Applicable

6. Using Acrobat 5.0 to Make PDFs Accessible

6.1. Making Previously-Published PDFs 508 Compliant

Adobe Systems markets its Acrobat 5.0 as a solution to making historical PDFs Section 508 compliant without returning to the non-PDF source. Adobe suggests that this conversion can be achieved in either one of two ways:

1. The file can be opened in the latest version of the originating application and converted to an accessible PDF document using Acrobat Distiller with Adobe Acrobat 5.0; or
2. The file can be opened in Adobe Acrobat 5.0 and converted to an accessible PDF file using Adobe's "Make Accessible" plug-in.

However, the "Make Accessible" plug-in has difficulty converting pages with very complex layouts that are frequently used in the *Statistical Abstract*. These documents lose their logical structure. To retain the logical structure:

1. Acrobat "tags" must be added to maintain the logical structure information in the PDF files, and bookmarks must be provided to provide an overview of document contents; and
2. The generation of documents in other file formats that are usable by assistive devices, e.g., HTML, XML, or ASCII text, requires manual addition of additional accessibility information.

The PDFs published by the Statistical Compendia Branch, however, present special circumstances that frustrate this process.

First, the originating application's source files are in a proprietary postscript file format utilized by XY Enterprises. XY Enterprises and Adobe utilize different postscript extensions that are not shared across the two platforms.

Second, in order for assistive technologies to interpret tables, technologies have been developed to read cell-by-cell; Census Bureau tables are so complex, however, that the traditional two-dimensional structure of tables is disrupted. Subpart B, § 1194.22 (g) and 11994.22 (h) of Section 508 state that when information is displayed in a table format, "[r]ow and column headers shall be identified..." and "[m]arkup shall be used to associate data cells and header cells..." This allows users depending upon assistive technologies, specifically text-to-voice

screen readers, to non-visually navigate the table's data. However, this requirement also contemplates that the subject table will be coded in HTML, XML, or some other standard web language.

The Adobe PDF 1.4 specification enables content author to preserve markup in tables in an Adobe PDF file, including table rows, header cells and data cells. Acrobat 5.0 for Windows enables users to create tagged Adobe PDF files automatically from Microsoft Office 2000 for Windows applications. If the author defines table rows, header cells and data cells in the application, Acrobat 5.0 will automatically include that information in the PDF file. However, Adobe does not provide this support for *spanning* table headers, and does not provide support for defining complex parent-child hierarchal relationships in column headers.

Because of the complex nature of the tables published by the Statistical Compendia Branch, Acrobat Writer often treats these tables as non-text elements similar to graphics. These non-text elements can be described only as a whole much like one might describe a painting as "a picture of a mountain."

6.2 Making New PDFs Accessible

Making future PDFs accessible presents similar challenges, but it does offer the advantage that the non-PDF source is available. For relatively simple tables, Microsoft Excel 2000 can automatically generate this information. The *Statistical Abstract's* tables are too complex for this approach. Depending on the format of the source tables, descriptive information can be included and passed to the PDF. In most cases this will destroy the appearance of the table and prevent the use of the table for other purposes such as direct viewing and publication in printed form.

7.0 Using Adobe Acrobat Reader 5.0 to Achieve Section 508 Compliance

Section 508 does not provide a specific requirement that web sites be accessible by all operating systems or all browsers (and, indeed, the most popular assistive technologies are compatible with Windows-based machines). However, in its Comments, the Access Board suggests that Federal agencies consider issues of cross-browser and cross-platform support for assistive devices. Because Reader 5.0 uses Microsoft's Active Accessibility Application Programming Interface (MSAA API), full functionality can be achieved only on a Windows PC.

Adobe offers a free service online that will convert PDF files to a file format that can be used by assistive technologies, *e.g.*, XML, HTML, ASCII text or Rich Text Format (RTF). However, because of the complex nature of the tables published by the Statistical Compendia Branch, and Adobe's resultant treatment of these tables as non-text elements, akin to graphics, these online conversion services will not "recapture" these tables as text, but will instead continue to treat them as non-text elements. In this instance, the tabular data would remain inaccessible to assistive devices.

8.0 Options for Achieving Section 508 Compliance

The Statistical Compendia Branch has four options to meet the requirements of Section 508. These are provided in order of estimated resource cost.

- 1 Provide a link to Adobe's free conversion service.
- 2 Provide custom created tables for individuals requesting them
- 3 Provide tables using the new HTML 4.01 accessibility enhancements.
- 4 Use XML to generate tables.
- 5 Use Adobe Acrobat 5.0, along with the various accessibility-enhancing plug-ins offered by Adobe Systems, to increase the accessibility of its PDFs;

These options are not mutually exclusive.

8.1 Linking to Adobe's Free Conversion Service

The Branch's web pages could provide a link to automatically submit a PDF table to this free service to make the pages more accessible.

The advantages of this are that it would be easy to implement. Only a minor amount of a few web pages are changed. Other government agencies are using this option. The user can save the file for future reference.

The disadvantage of this that for conversion is less than ideal.

8.2 Providing Custom Conversion

The Branch's web pages could be changed to provide an automatic email for the public to request a custom conversion to one of a number of formats.

The advantage of this approach is that users could request the format that is most useful to them. There would probably be more resources involved than using Adobe's free service, but it would be minimal compared to the other alternatives because only those tables desired would be provided.

The disadvantage of this is the time and effort that would be required to create the custom tables. It would also be necessary to track requests and to store tables for future use. Requests might come in at inconvenient times. Also, this option does not provide the user with rapid availability. This will limit a visually impaired person's ability to browse or search through several tables.

8.3 New HTML Tables

The Branch could replace the current PDF tables with HTML tables. This could be done manually or with a new automated system.

The advantage of this is that there is one presentation for all users. By using an open standard, the burden of correcting any problems in accessing data would not fall on the Census Bureau.

The disadvantage is that manual table conversion would be subject to errors and is slow. To automate the process a new entire workflow would have to be developed. The original tables must be transformed into a format that can produce HTML 4.01 tables without preventing it from being used for the hard copy publication of the *Statistical Abstract*. The cost is likely to be substantial.

8.4 XML

XML is a cutting edge technology that separates data from their presentation. An XML editor would replace the current spreadsheet and various XML-related technologies such as XSL (eXtensible Style Sheets) used to format the output. XML can generate ASCII files and most commonly used formats. It currently can be used to generate PDF files, but there may be difficulties generating PDFs with complex tables. Alternatively, server-side XML can be used to generate HTML that meets current accessibility requirements.

The advantage of XML is that is designed to be flexible. If accessibility requirements change in the future, XML will be able to meet them. XML is not well supported by browsers today so it cannot replace HTML on a web page, but it can be processed on the server to create an HTML page. It can also generate pages for other portable devices such as PDAs and cell phones.

The disadvantage is cost. In addition to the change in workflow required to generate HTML, the XSLs must be created resulting in greater cost. Another potential problem is that cutting edge technologies frequently have subtle requirements or undocumented features that make their use difficult.

8.5 Hand Edited PDFs

The current PDFs can be converted to tagged PDFs that will work with screen readers.

Advantages of this approach are keeping the current format the web users are familiar with.

The disadvantages are the cost of performing these hand conversions every year for every publication on the Branch's web page. The Adobe Writer 5.0 tool is a marvel of technology, but it cannot be run in batch mode. Unless spreadsheet technology changes to allow the automatic generation of these accessibility tags, the process must be repeated annually for each table. This will require proof reading not only of the original numbers, but also of the PDF tags.

9.0 Conclusion

The PDF files presently residing on the Census Bureau's web site are difficult for persons who a) have partial visual impairment such that they lack visual acuity greater than 20/70 when corrected with glasses, but who are not fully impaired; and b) persons who are blind to use.

Specifically:

1. PDF documents created with Adobe Acrobat version other than 5.0 do not provide a means for users to self-select high-contrast color schemes, thereby reducing accessibility;

2. Assistive technologies are unable to properly translate text when that text is laid out in the document in columns or tabular form when those PDFs are created with a version of Adobe Acrobat other than 5.0; and
3. Versions of Adobe Acrobat Reader other than 5.0 cannot make non-text elements such as complex tables available to assistive technologies.
4. Non-Windows versions of Acrobat Reader provide less functionality for visually impaired users.

This report presented five options for improving accessibility ranging from providing links to a free conversion site to re-engineering the publication process.

Appendix
Section 508

Subpart B, § 1194.21

For software applications and operating systems procured by the Federal government, Section 508 list the following requirements designed to guarantee accessibility to persons with disabilities:

- (a) When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be discerned textually.
- (b) Applications shall not disrupt or disable activated features of other products that are identified as accessibility features, where those features are developed and documented according to industry standards. Applications also shall not disrupt or disable activated features of any operating system that are identified as accessibility features where the application programming interface for those accessibility features has been documented by the manufacturer of the operating system and is available to the product developer.
- (c) A well defined on-screen indication of the current focus that moves among interactive interface elements as the input focus changes shall be provided. The focus shall be programmatically exposed so that assistive technology can track focus and focus changes.
- (d) Sufficient information about a user interface element including the identity, operation and state of the element shall be available to assistive technology. When an image represents a program element, the information conveyed by the image must also be available in text.
- (e) When bitmap images are used to identify controls, status indicators, or other programmatic elements, the meaning assigned to those images shall be consistent throughout an application's performance.
- (f) Textual information shall be provided through operating system functions for displaying text. The minimum information that shall be made available is text content, text input caret location, and text attributes.
- (g) Applications shall not override user selected contrast and color selections and other individual display attributes.
- (h) When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.
- (i) Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.
- (j) When a product permits a user to adjust color and contrast settings, a variety of color selections capable of producing a range of contrast levels shall be provided.
- (k) Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.

(1) When electronic forms are used, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.

Subpart B, § 1194.22

For Federal Intranet and Internet information and applications, Section 508 list the following requirements designed to guarantee accessibility to persons with disabilities:

- (a) A text equivalent for every non-text element shall be provided (*e.g.*, via “alt”, “longdesc”, or in element content).
- (b) Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.
- (c) Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.
- (d) Documents shall be organized so they are readable without requiring an associated style sheet.
- (e) Redundant text links shall be provided for each active region of a server-side image map.
- (f) 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.
- (g) Row and column headers shall be identified for data tables.
- (h) Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.
- (i) Frames shall be titled with text that facilitates frame identification and navigation.
- (j) Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.
- (k) A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.
- (l) When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.
- (m) When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with § 1194.21(a) through (l).
- (n) When electronic forms are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.
- (o) A method shall be provided that permits users to skip repetitive navigation links.
- (p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

In addition, according to the Architectural and Transportation Barriers Compliance Board³ (Access Board),

[a] Web site required to be accessible by Section 508 would be in complete compliance if it met paragraphs (a) through (p) of these standards..., [but, alternatively, it could also] comply if it fully met the [World Wide web Consortiums' web Accessibility Initiative's web Content Accessibility Guidelines version] 1.0, priority one checkpoints *and* paragraphs (l), (m), (n), (o), and (p) of these standards. Federal Register. Electronic and Information Accessibility Standards. (Emphasis added.) Vol. 65, No. 246, Rules and Regulations, pp. 80500 to 80528. at 80510.

³ The Architectural and Transportation Barriers Compliance Board is an independent Federal agency established by Section 502 of the Rehabilitation Act whose primary mission is to promote accessibility for individuals with disabilities. The Access Board consists of 25 members. Thirteen are appointed by the President from among the public, a majority of who are required to be individuals with disabilities. The other twelve are heads of the following Federal agencies (or designees whose positions are Executive Level IV or above): The departments of Health and Human Services, Education, Transportation, Housing and Urban Development, Labor, Interior, Defense, Justice, Veterans Affairs, and Commerce; the General Services Administration; and the United States Postal Service.

Subpart C, § 1194.31

Subpart C, § 1194.31 provides functional performance criteria for overall product evaluation, and for technologies or components for which there is no specific requirement under other sections. These criteria are also intended to ensure that the *individual accessible components work together* to create an accessible product, and require that all product functions, including operation and information retrieval, be operable through at least one mode addressed in each of the following paragraphs:

- (a) At least one mode of operation and information retrieval that does not require user vision shall be provided, or support for assistive technology used by people who are blind or visually impaired shall be provided.
- (b) At least one mode of operation and information retrieval that does not require visual acuity greater than 20/70 shall be provided in audio and enlarged print output working together or independently, or support for assistive technology used by people who are visually impaired shall be provided.
- (c) At least one mode of operation and information retrieval that does not require user hearing shall be provided, or support for assistive technology used by people who are deaf or hard of hearing shall be provided.
- (d) Where audio information is important for the use of a product, at least one mode of operation and information retrieval shall be provided in an enhanced auditory fashion, or support for assistive hearing devices shall be provided.
- (e) At least one mode of operation and information retrieval that does not require user speech shall be provided, or support for assistive technology used by people with disabilities shall be provided.
- (f) At least one mode of operation and information retrieval that does not require fine motor control or simultaneous actions and that is operable with limited reach and strength shall be provided

Appendix II

Checkpoints

The Architectural and Transportation Barriers Compliance Board is an independent Federal agency established by Section 502 of the Rehabilitation Act whose primary mission is to promote accessibility for individuals with disabilities. The Access Board consists of 25 members.

Thirteen are appointed by the President from among the public, a majority of who are required to be individuals with disabilities. The other twelve are heads of the following Federal agencies (or designees whose positions are Executive Level IV or above): The departments of Health and Human Services, Education, Transportation, Housing and Urban Development, Labor, Interior, Defense, Justice, Veterans Affairs, and Commerce; the General Services Administration; and the United States Postal Service.

Those checkpoints are as follows:

Checkpoint 1.1. Provide a text equivalent for every non-text element (*e.g.*, via "alt", "longdesc", or in element content). This includes: images, graphical representations of text (including symbols), image map regions, animations (*e.g.*, animated GIFs), applets and programmatic objects, ASCII art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks of video, and video.

Checkpoint 1.2. Provide redundant text links for each active region of a server-side image map.

Checkpoint 1.3. Until user agents can automatically read aloud the text equivalent of a visual track provide an auditory description of the important information of the visual track of a multimedia presentation.

Checkpoint 1.4. For any time-based multimedia presentation (*e.g.*, a movie or animation), synchronize equivalent alternatives (*e.g.*, captions or auditory descriptions of the visual track) with the presentation.

Checkpoint 2.1. Ensure that all information conveyed with color is also available without color, for example from context or markup.

Checkpoint 4.1. Clearly identify changes in the natural language of a document's text and any text equivalents (*e.g.*, captions).

Checkpoint 5.1. For data tables, identify row and column headers.

Checkpoint 5.2. For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells.

Checkpoint 6.1. Organize documents so they may be read without style sheets. For example, when an HTML document is rendered without associated style sheets, it must still be possible to read the document.

Checkpoint.2. Ensure that equivalents for dynamic content are updated when the dynamic content changes.

Checkpoint 6.3. Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page.

Checkpoint 7.1. Until user agents allow users to control flickering, avoid causing the screen to flicker.

Checkpoint 8.1. Make programmatic elements such as scripts and applets directly accessible or compatible with assistive technologies if functionality is important and not presented elsewhere.

Checkpoint 9.1. Provide client-side image maps instead of server-side image maps except where the regions cannot be defined with an available geometric shape.

Checkpoint 11.4. If, after best efforts, you cannot create an accessible page, provide a link to an alternative page that uses W3C technologies, is accessible, has equivalent information (or functionality), and is updated as often as the inaccessible (original) page.

Checkpoint 12.1. Title each frame to facilitate frame identification and navigation.

Checkpoint 14.1. Use the clearest and simplest language appropriate for a site's content.