Focus on the Future: Creating Born-Digital Standards for Large-Format Photography

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Abstract

Heritage Documentation Programs (HDP) administers Historic American Buildings Survey (HABS), established in 1933 under the Works Progress Administration, and companion programs Historic American Engineering Record (HAER) established in 1969, Historic American Landscapes Survey (HALS) established in 2000. Documentation produced through the programs constitutes the nation's largest archive of historic architectural, engineering, and landscape documentation. Since its inception, photography produced for HDP consisted of perspective corrected, large-format archival film negatives created with a view camera. HDP is currently examining digital photography to determine if it can meet the Secretary of the Interior's Standards and Guidelines for Architectural and Engineering Documentation that govern the documentation produced for the collection.

Background

Heritage Documentation Programs, part of the National Park Service (NPS), administers the Historic American Buildings Survey, the Federal Government's oldest preservation program, and companion programs Historic American Engineering Record, and Historic American Landscapes Survey. Records on over 40,000 historic sites, consisting of large-format, black and white photographs and color transparencies, measured and interpretive architectural, engineering, and landscape drawings, and written historical reports, are curated, housed, and made accessible at the Library of Congress, and through the Library's website. HDP documentation provides a permanent record of the nation's most important historic sites such as Monticello (HABS VA-241), important landscape elements such as the original 1910 Japanese cherry trees in Washington, D.C. (HALS DC-8), and important large-scale objects such as the Space Shuttle *Discovery* (HAER TX-116-A).

HDP conducts a nationwide documentation program in partnership with state and local governments, private industry, professional societies, universities, preservation groups, and other Federal agencies. The program assigns highest priority to sites of national significance that are in danger of demolition or loss by neglect, and to National Park Service properties. In addition to the HABS/HAER/HALS summer recording program which employs students and emerging preservation professionals, documentation enters the collection through mitigation activities under appropriate sections of the National Historic Preservation Act of 1966, submissions in prize competitions, and donations.

Secretary's Standards

HDP develops and maintains the *Secretary of the Interior's Standards and Guidelines for Architectural and Engineering Documentation (Secretary's Standards),* codified into law in the early 1980s, which govern documentation produced for the collection. The *Secretary's Standards* consist of four standards:

- Documentation must accurately convey the significance of the resource being documented
- Documentation must be durable, archival, and standard in size and format for easy storage and reproducibility
- Documentation must be clear and concise
- Documentation must be accurately prepared from reliable sources [1]

HDP's guidelines for the application of these standards for the creation of HABS, HAER, and HALS documentation serve as an authoritative point of reference, and many other historic preservation documentation programs are based on the *Secretary's Standards* and the HDP guidelines.

For the last 80 years, HDP has required the use of large format film and a view camera in the production of photographic documentation. Large-format film creates clear, concise images capable of conveying minute details, and allows for perspective correction at the time of capture to minimize distortion of the structure being documented. HDP has been closely examining digital photography and the new opportunities, and issues, that it introduces to determine if it can meet the four standards, so that it can then work to create a digital photography guideline for the programs. Additionally, HDP would need to create a high-production quality control workflow that supports the production, receipt, and review of approximately 5,000 images per year. There are currently no existing guidelines for digital equivalents that meet all of the HDP documentary criteria achieved in large-format negatives. HDP must create them.

Convey Significance

Digital photography is no different from film photography in its ability to convey the significance of the resource, so there are no challenges to meeting this standard in the *Secretary's Standards*.

Archival Durability

HDP has used film negatives for 80 years, and with few exceptions, negatives from 80 years ago are indistinguishable from those shot in 2013. While HDP has some trepidation about abandoning a well-established archival medium such as film, the archival community has made great strides in long-term preservation of raster images, so durability of digital data is gradually becoming less of a concern. But it is still questionable whether digital photography can meet the 500 year durability standard outlined in the *Secretary's Standards*. HDP

documentation is stored at the Library of Congress, and the burden of maintaining the digital files will fall on the Library. The Library of Congress has made significant investments in digital preservation, and it has expressed willingness to accept and maintain born-digital HDP large-format photography.

Clear and Concise

While digital photography is moving closer to the capabilities of large-format film, the ability of digital cameras to capture the same amount of information contained in a 5x7 negative in a single shot is a relatively new reality. Other technologies that involve stitching or tiling in camera, in addition to associated post production software, may be an option and a recent review seems to indicate that this process can be quite accurate and adds minimal distortion. [2] Current research shows that there are only a few cameras with these capabilities and their high cost may limit their broad accessibility.

HDP is having difficulty expressing the quality and quantity of information that is captured in a 5x7 film negative in a way that is understandable by students and professional photographers. HDP staff produces only about a third of the documentation that is accessioned into the collection each year; about a third is produced by students, and another third is donated to the collection through mitigation activities under Section 106 activities under the National Historic Preservation Act. If all records were created by HDP photographers, the integrity, methodology and equipment used to capture the image could all be controlled. But the critical public participation in the HDP programs means our guidelines must be accessible not only in-house, but to professional photographers and students as well. HDP has always viewed educating the next generation of preservation and architectural professionals as one of its top priorities, and so any guidelines we create must be easily understood by students. HDP faces challenges on how to create guidelines that express that image quality is about much more than resolution. It is difficult to convey concepts such as the importance of the quality of optics of a lens, to express the importance of signal to noise ratios (and at what point too much noise means the image is not acceptable). The entire preservation community faces challenges on how to measure the data captured by imaging systems, and tests have consistently shown that even though a camera manufacturer may claim that its camera creates 80 megapixel file-sizes, the actual optical resolution may not be nearly that high.

Accurate and Reliable

Another hurdle HDP faces is establishing the accuracy and authenticity of a digital image, an essential aspect in meeting the *Secretary's Standards*. Perspective correction using shift lenses is an essential part of HDP photography. Perspective control is essential in minimizing distortion in an image, especially when capturing large or tall structures. Some of professional digital camera systems include shift lenses, but the choices for focal lengths are limited and the expense of these systems is more than double the cost of a traditional view camera. While the majority of HDP photography is currently possible using digital shift lenses, many large scale objects such as the Statue of Liberty, bridges, and ships would be challenging to accurately capture using current camera systems. "Perspective correction" of a sort is possible after capture by manipulating the image in Adobe Photoshop or similar software, but HDP has found that the emulation of optical perspective correction varies in each software program and does not depict the resource in the same way as optical correction in-camera. [See Figures 1, 2, and 3]

The film negative provides an important element of validity as well, because manipulation of the image is fairly easy to detect and forgery of the film artifact is more work than proper film capture – exactly the reverse of the issues with born-digital capture. The question we ask is: Does the documentary image accurately reflect the state of this site, structure or object at this moment in time? Establishing the authenticity of digital data is extremely difficult (e.g., was the image manipulated in processing), and there are few cost effective tools available that can be utilized to do quality control in a high-production environment. Currently, every single negative is examined by HDP archivists as the documentation is being accessioned, and HDP archivists possess the skill and knowledge to tell in a matter of seconds whether a negative has been properly processed and perspective corrected.

The tools that are available to perform quality control in a digital environment do not come close to the speed and ease that film provides. Many of the tools currently available such as JHOVE or DROID verify the integrity and format of the file, (e.g., is it a well-formed TIFF file), but not whether an image is true and authentic. It is only in the last few years that authenticity has been identified as a problem, and digital forensic tools are just now beginning to be developed to assess authenticity. [3] Performing quality control on digital files requires much more staff time than the few seconds it takes for HDP archivists to assess the quality of the photography currently. HDP is facing staff and funding shortages that plague many Federal agencies, and devoting more staff time to quality control is simply not an option. Also, many digital forensic tools require more computing power than the average computer can provide. The National Park Service does not have the IT infrastructure in place to allow for complex, memory intensive digital forensic programs.

Also, large format digital photography presents a practical, but very real challenge to the National Park Service: how to receive and process large data sets. There currently is no way for NPS to receive large data sets other than by means such as external hard drives. NPS doesn't have the storage capabilities for large data sets, even for short periods of time, let alone the computing power to do quality control, edit metadata, and prepare those files for transmittal to the Library of Congress. Transmission of large data sets to the Library of Congress is not currently practical by any means except by technology such as external hard drives. These very simple, but very real problems cannot be overlooked.

For HDP to adopt born-digital photography, it will need to meet all four of the Secretary's Standards, currently only three are met. In addition, HDP is having great difficulty establishing an efficient workflow for verification and accession of born-digital images into the collection. Moreover, there are no existing guidelines for a born-digital equivalent to large-format photography for HDP to utilize. HDP faces great challenges in creating standards for born-digital photography that could be both easily understood and achieved by photographers inside and outside the programs.

Figure 1: Building distortion from digital camera angled up. This is what a normal camera captures

Figure 2: Building distortion corrected at time of capture in camera using a view camera with shift lenses

Figure 3: Building distortion present in born-digital capture in Figure 1 corrected post capture in Photoshop

References

[1] Secretary of Interior Standards for Architectural and Engineering Documentation, *Federal Register*, Vol. 48, No. 190, September 29, 1983, pp. 44730-44731.
[2] FADGI (Federal Agencies Digitization Guidelines Initiative) meeting. 2012.
[3] "*Fourandsix Unites Photoshop Team Veteran with Renowned Dartmouth Scientist to Fight Photo Fakery.*" http://www.fourandsix.com/press-releases/fourandsix-unites-photoshop-team-veteran-with-renowned-dartm.html. September 18, 2012.

Author Biography

Anne Mason began working for the National Park Service in 2001 for the National Register of Historic Places and National Historic Landmarks as a Digital Library Production Manager, overseeing the digitization of the archives. Anne represents NPS cultural resources on a number of committees, including the NPS' Digital Information Services Council and the Federal Agencies Digitization Guidelines Initiative. She has been the Collections Manager for HDP since 2006, working closely with the Library of Congress.

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