InterPARES 2 Project

International Research on Permanent Authentic Records in Electronic Systems

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Introduction

This report summarizes the results of a Web-based questionnaire surveying the recordkeeping practices of photographers who use digital technology. Undertaken by professor Marta Braun (Ryerson University), research assistant Jessica Bushey (University of British Columbia) and conducted under the auspices of the InterPARES 2 Project, the survey aimed to contribute to the overall research project goals of investigating the continuing reliability, accuracy, authenticity, accessibility and the long-term preservation of digital entities produced in the course of artistic, scientific and e-government activities.[1] The survey made evident photographers' concerns about the use and longevity of digital technology. It showed that their assumptions about such issues as maintenance or preservation lack cohesion and are not backed by data. The findings of this survey document the actual recordkeeping practices of photographers using digital technology.

Purpose

While the image in an analogue photograph can be seen as long as the photograph exists, visual information stored digitally is impossible to read, interpret or understand without the aid of a computer. Digital media require hardware and software to render images for accurate display. When hardware and software become obsolete, however, the image becomes unreadable. Consequently, creators need to implement preservation practices into their procedures for creation, maintenance and storage of digital images that will ensure accurate, reliable and authentic records over the long term.

As the photographic industry replaces analogue-based equipment and materials with digital capture devices and image-processing software and hardware, some professional photographers have been forced to transform their practices. Client demands for faster service and higher quality are foremost among the pressures on photographers to adopt digital technologies and to keep current with rapidly improving imaging hardware and software.

The survey data should assist creators (photographers) and preservers (archivists and collection managers) in understanding the digital recordkeeping practices of photographers who

[1] InterPARES2, *Project Summary*, 2004, Available at http://www.interpares.org/ip2/ip2_index.cfm. See also Luciana Duranti, Terry Eastwood and Heather MacNeil, *Preservation of the Integrity of Electronic Records*, The Archivist's Library, vol. 2 (Dordrecht: Kluwer, 2002), 86-91.

operate in artistic, scientific and e-government environments. The survey findings will provide some insight into what archivists and collection managers will face in the future when dealing with the long-term preservation of and access to digital images. Ultimately, analysis of the data will facilitate the formulation of recordkeeping guidelines for digital photographers, and will assist in developing strategies for the appraisal and preservation of authentic digital images.

Definitions/Terminology

The term "Digital photography" is not specific enough for our purposes because it does not discriminate between *native digital* and *digitized*. Native digital refers to images that are generated from either a digital camera or digital sources such as the Web and imaging software applications. Unlike a digitized image, which is created from the process of scanning an analogue photograph or film, the native digital image has no analogue original. Terms such as "digital master," "original digital image" or "primary image" have been used to refer to the native digital image before it is altered by image processing software. If the native digital image is destroyed or altered through accident or intention, it is permanently lost. Digitized images, on the other hand, function primarily as digital surrogates or copies to facilitate access or reduce handling of the original analogue photograph which can be re-scanned.

The advent of digital technology and its integration into photographic practice have presented an opportunity to re-define the relationship among the concepts of originality, reliability and authenticity as they regard photography. Native digital images are presented and consumed in the same contexts as traditional analogue photographs (i.e., newspapers and court proceedings), but digital technology challenges traditional assumptions about their production. Because many of the definitions stem from analogue methods or materials, they may not accurately represent the true nature of digital image practice. As the types of digital images and their characteristics become more prevalent, new terms and taxonomies will become part of the vernacular.

Research Methodology

An iterative research design was predicated on the exploratory nature of the research topic and the lack of existing sources specific to the integration of archival concepts into

photographic practice. A Web-based survey was constructed to collect information about what methods were used for creating native digital images as reliable records and insuring their authenticity over time. Photographers who create digital images and/or use digital technology to manage and store their digital images were identified through online professional associations and published Web sites and invited to participate via invitations sent through e-mail and through postings made to online listserv communities. (See Appendix A for the full text of the invitation.)

Posting an invitation to association newsletters and members-only notice boards provided both an opportunity for, and a limitation to, the survey. It was impossible to obtain an accurate number of how many photographers actually received the invitation to participate and compare this number with the completed responses. While the sample was derived from a combination of association membership lists and invitations sent directly to individual's e-mail addresses, it represented only a broad approximation of possible survey participants. For example, the National Press Photographers Association (NPPA) has a total membership of 10,000, yet it is impossible to know how many of these are currently receiving association information on a regular basis. The total number of photographers who had the opportunity to receive or view the invitation was approximately 14,500. (See Appendix B for the full list of participating associations and institutions.)

The strategy of using an online self-administered questionnaire was based on the assumption that photographers using digital technology would respond to an online survey. While this assumption supports the use of a Web-based survey approach, the authors were aware of the literature on the challenges of creating a successful survey design for the online environment.[2] Every attempt was made to keep the questionnaire as brief as possible and to limit answers to close-ended options.

Interested candidates were asked to contact the researchers to receive an "Informed Consent Letter," which listed the survey URL and the general login and password. Where possible, the letter was posted to restricted membership forums of the selected listservs. Candidates were requested to complete and submit the electronic consent letter before gaining access to the questionnaire. The consent letter outlined the criteria for participation in the survey,

[2] See, for example: Don A. Dillman and Dennis Bowker, *The Web Questionnaire Challenge to Survey Methodologists* (Pabst Science Publishers, 2001), available at http://survey.serc.wsu.edu/dillman/papers.htm; and Don A. Dillman, *Mail and Internet Surveys: The Tailored Design Method*, 2nd ed. (New York: John Wiley & Sons, 2000).

specifically the individual's "experience and knowledge regarding digital photography," in an attempt to limit participation from those outside of the target population. An e-mail was sent out one month after the first invitation to remind candidates to participate in the survey before the deadline four weeks later.

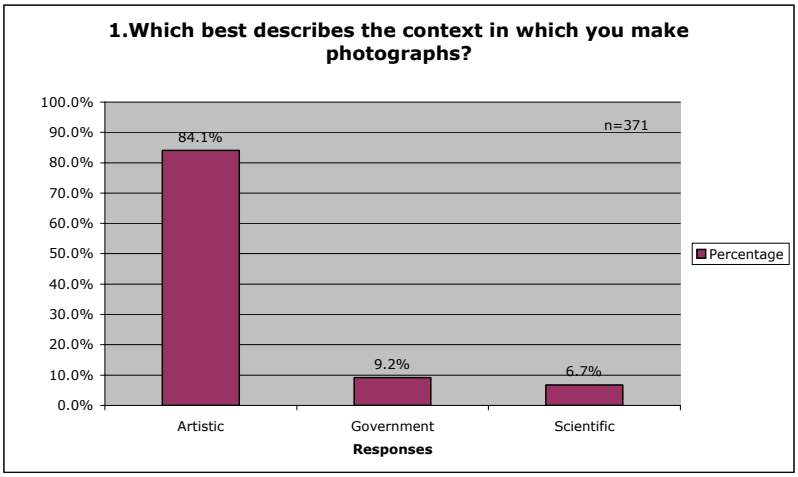
The potentially large number of respondents and the online environment were factored into the design of the instrument for data collection. The survey consisted of thirty-three questions, one of which was optional. Thirty-two of the thirty-three questions were either single- or multi-select multiple choice type questions. The self-administered questionnaire presented each question on a separate page and skip options were built-into the server-side HTML form. All thirty-three questions provided a space for participants to make any additional comments about the research topic, the research instrument or anything else they wanted to share about their digital practice and its objects.

Results

The data were collected during October and November 2004. Respondents represented in the survey sample were from Canada, Great Britain, the United States and Australia.

The inclusion of professional photographers from the arts, sciences and government brought to the survey disparate knowledge bases from different photographic fields and industries. As a result, analysis of the collected data reflects the variety of sources and garnered new and useful information regarding both individual attitudes and industry practices. The inclusion of free text boxes helped us discover unfamiliar imaging industry standards and best practices, and facilitated a greater understanding of individual work habits and routines.

Questions 1 and 2 establish the broad professional and technological context within which the respondents operate.

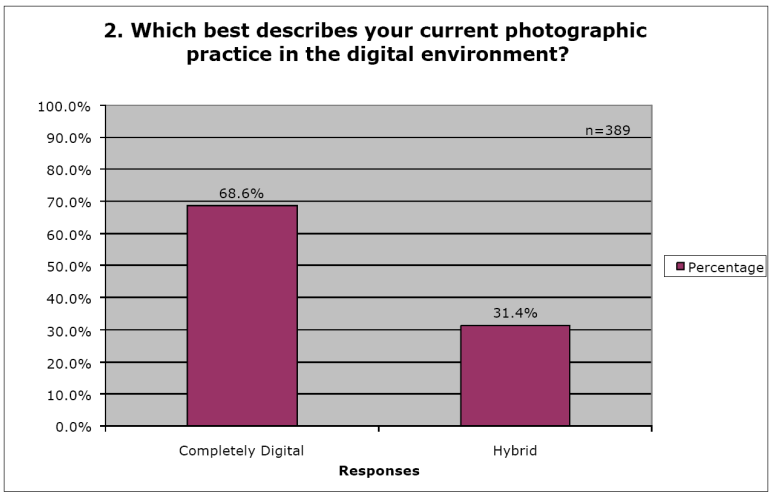


a. Artistic
b. Government
c. Scientific

Question 1 divided our respondent group into areas that represented the research domains of InterPARES 2. Almost half of all respondents—171 out of 371—entered additional information to more accurately describe the context(s) within which they operate as professional photographers. More than half of this group—97 out of 171—identified themselves as photojournalists.

The following practices were identified within the three categories:

1) Artistic—Photojournalism, Commercial/Advertising, Conceptual and Fine Art, Industrial
2) Scientific—Clinical, Dental, Forensic, Archaeology (georeferenced) and Astrophotography
3) Government—Intelligence, Medical, Forensic, University and Military



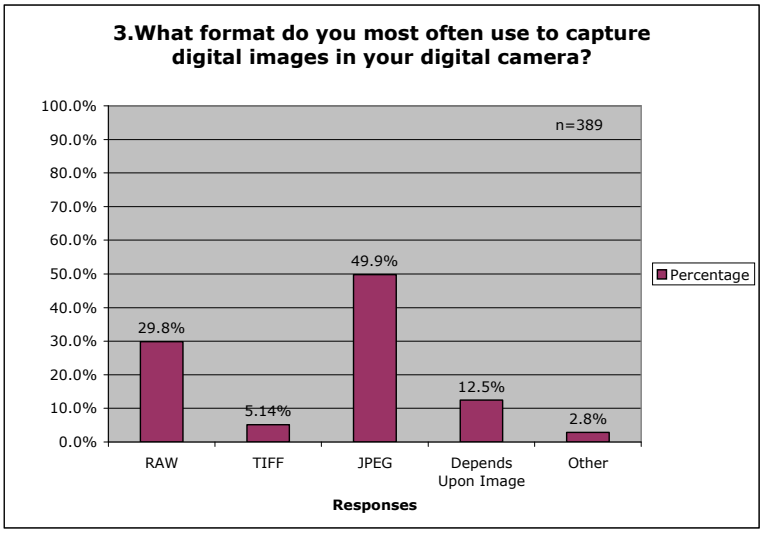
a. **Completely digital** (i.e., I use a digital camera or digital scanning device, computer program manipulation, digital printing and/or digital display)
b. **Hybrid** (i.e., I use a mixture of analogue and digital technology, such as a film camera image scanned into a computer and manipulated before being printed)

Analysis of the qualitative responses to Question 2 revealed that the question could have been worded more carefully. The inclusion of a scanning device in both examples was confusing and may have led respondents to assume that digitization of analogue images is representative of both a hybrid and completely digital practice. The use of a scanner as the primary capture device (i.e., to scan objects) is a completely digital application; however, this distinction was not clearly explained.

One respondent commented that the use of the term "manipulation" in the suggested activities "should have been thought out better."[3] Research into digital imaging guidelines and best practices revealed that the term manipulation is applied differently according to the environment in which a photographer operates; generally it has a negative connotation and implies the image has been changed in a manner that is beyond the "traditional darkroom" techniques such as contrast adjustment and cropping.[4]

[3] See, Question 2 in Appendix C, iii.
[4] Scientific Working Group on Imaging Technologies (SWGIT), "Guidelines and Recommendations for the Use of Digital Image Processing in the Criminal Justice System," Version1.2, June 2002, 8-10. PDF Available at http://www.theiai.org/swgit/guidelines/sec1_2_3_2002_06_06.pdf.

Questions 3-12 address file management and documentation procedures; their aim is to understand how and what photographers create in the digital environment and to learn about the procedural and documentary context.[5] These questions address activities and procedures that contribute to the reliability of a digital image and explain current attitudes towards authorship and the concept of the original in the digital environment.



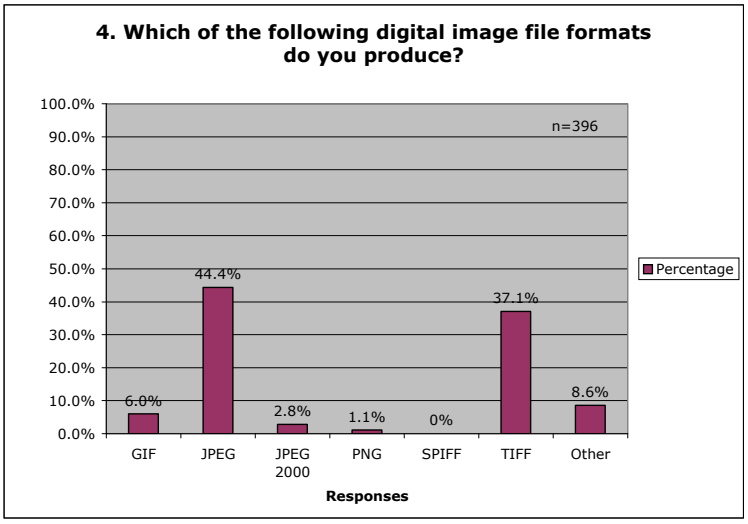
a. RAW
b. TIFF (Tagged Image File Format)
c. JPEG (Joint Photographers Experts Group)
d. Format depends upon image
e. other (please explain)

In general, industry requirements influence the choice of file format(s). The standard file format delivery of images for newspaper publication (i.e., dailies) is the JPEG, which is an open standard that utilizes a compression algorithm. Photojournalists use JPEG because of its capacity for efficient and secure transmission, its support of news industry metadata and multi-platform interoperability.[6]

[5] The procedural context refers to the business procedure in the course of which the record (textual or image) is created. The procedural context is made evident by workflow. The documentary context refers to the fonds which a record belongs and its internal structure. It is made evident through classification schemes, indexes and other methods or devices for uniquely identifying the relationship between images in the same collection and of the same creator. InterPARES 1, "Template for Analysis," Appendix 2, November 7, 2000, 9. PDF Available at http://www.interpares.org/display_file.cfm?doc=ip1_template_for_analysis.pdf.

[6] The metadata schema used for transmitting news information (textual, image & multimedia) is the *Information Interchange Model (IIM)*, which was promulgated by the *International Press Telecommunications Council (IPTC)* and the *Newspaper Association of America (NAA)* in 1991. The *IPTC/NAA-IIM* schema has been updated and its specific application for digital still images and their "captions" is known as *IPTC Core.* See IPTC, "IPTC Core Schema for XMP Version1.0," Specification Document, IPTC Standards, 2005. PDF Available at http://www.xml.coverpages.org/IPTC-CoreSchema200503-XMPSchema8.pdf.

The RAW format, which refers to the raw unprocessed data captured by the digital camera's sensors, is an uncompressed and proprietary format with specifications determined by each camera manufacturer. RAW specifications are not made available to the public, thus widespread use of the RAW format presents the problem of future interoperability. Photographers favour the RAW format because it presents an image file before in-camera settings such as white balance or compression have been applied and has the capacity for greater bit-depth (i.e., luminosity and colour) than other image file formats. By using RAW, photographers have a greater range of creative flexibility; however, the format is currently limited by its reliance on converters and plug-ins (software modules to assist in import) to download files.[7] Moreover, RAW is not a standardized image file format; it therefore remains unsupported by some image software applications and presents an impediment to interoperability and image longevity.

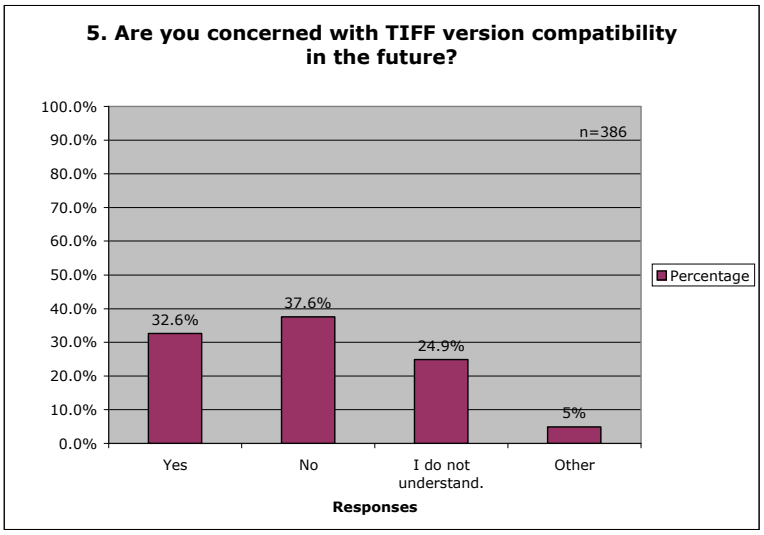


a. GIF (Graphics Interchange Format)
b. JPEG (Joint Photographers Experts Group)
c. JPEG 2000
d. PNG (Portable Network Graphics)
e. SPIFF (Still Picture Interchange File Format)
f. TIFF (Tagged Image File Format)
g. other (please explain)

The file formats in Question 4 were selected on the basis of formats sanctioned as open standards by the International Organization for Standardization (ISO) and those discussed within the archival community for their interoperability across platforms and systems.

[7] Adobe Systems Inc., released a universal format for *RAW* camera capture, the *Digital Negative (DNG*) in 2005, and a *DNG Converter*, which allows photographers a publicly available specification with which to convert their manufacture specific *RAW* formats. Both initiatives are aimed at providing future interoperability and metadata exchange for image files stored in *RAW* format. See Adobe Systems Inc., "Digital Negative," available at http://www.adobe.com/products/dng/indexmain.html.

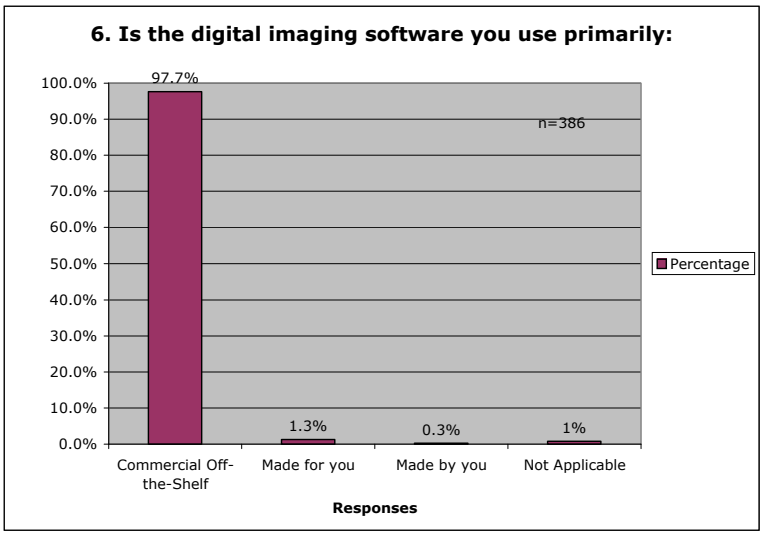
The *Adobe Photoshop* PSD file format, which is proprietary, was identified by a number of respondents who chose "other." Additional comments explained respondents' used PSD files as a a way to save digital images in uncompressed layers: they can save a history of their processing actions that reveals each alteration made to the digital file, for example, cropping, or the application of a filter. A history of sequential changes is thus saved along with the image file and is evidence of the techniques or operations used to alter the image. By saving an image in layers, the opportunity always exists for reversal of the image processing operations without permanently affecting the image.



a. yes
b. no
c. I do not understand the question
d. other (please explain)

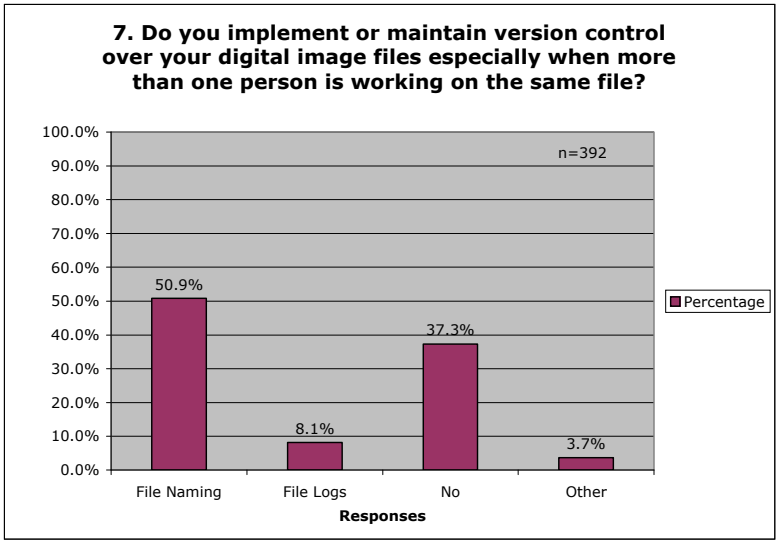
The motivation for including Question 5 was that TIFF 6.0 is a file format that has been identified by the archival community as suitable for long-term preservation. TIFF 6.0 was launched in 1992 and standardized TIFF as a "versionless" file format: TIFF's lack of a real version number was a specific design decision to allow older software to read newer TIFF files; therefore, TIFF is backwards compatible and hardware/software independent.

Analysis of the qualitative response data revealed a degree of confusion regarding the purpose of this question. Comments revealed a reliance on technology to solve any future interoperability problems as well as a general lack of awareness regarding TIFF versioning and the possible problems presented by file format versioning. The significant percentage of respondents that selected "I do not understand" made evident the need to rephrase the question.



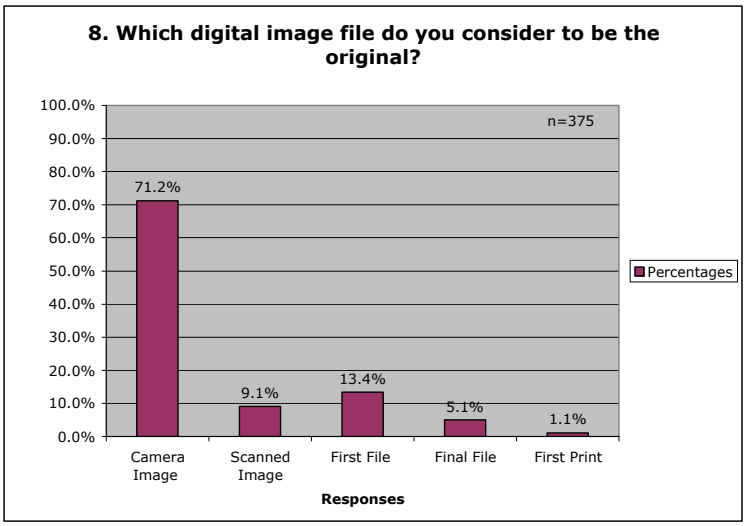
a. off-the-shelf commercial software
b. made for you
c. made by you
d. not applicable (please explain)

Question 6 addresses the technological context in which photographers operate and explores the issue of proprietary software applications and possible interoperability problems in the future. Of the respondents that indicated they use Commercial Off-the-Shelf (COTS) software for processing their digital images, *Adobe Photoshop* is the dominant image processing application. Respondents also listed image management software (IMS), also known as digital asset management (DAM), as types of COTS they use to manage their images collections. IMS and DAMs are essentially proprietary applications that function as image databases which provide varying degrees of control over the creation, use and storage of digital images.



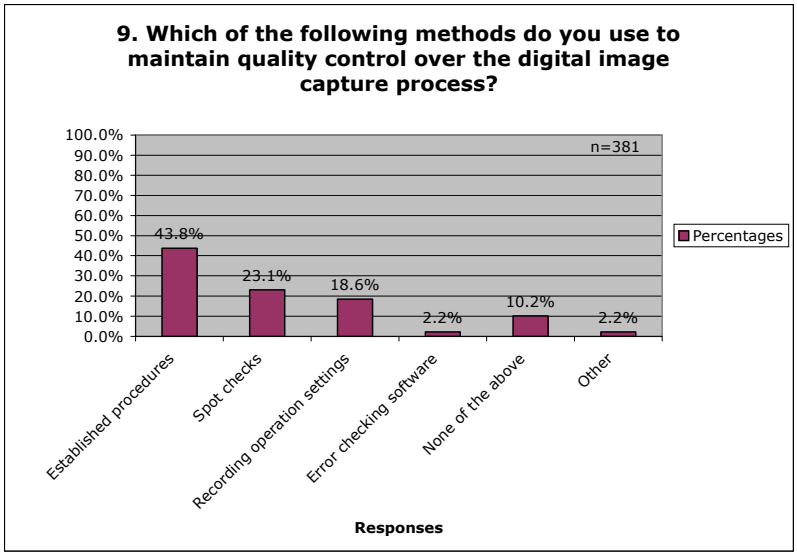
a. Yes, I apply file-naming conventions (e.g., including a version in the file name, such as or imagename.draft.1 or creation date and version, such as imagename.date.version)
b. Yes, I keep file logs (e.g., a written log, in either a digital format such as an excel spreadsheet or an analogue format such as a journal)
c. No, I do not maintain version control
d. other (please describe)

Additional comments to Question 7 described automated workflows and routine procedures that provide control over creation and management and thereby contribute to the reliability and authenticity of the digital images. Examples of such actions include the routine capture of image metadata, uniquely identifying originals and digital surrogates, off-line storage of original images and routine back-ups. Respondents used the term "archiving" to refer to actions taken to protect a digital image from alteration, such as removing it from the active workspace and burning it to recordable compact disc (CD-R) and storing it.



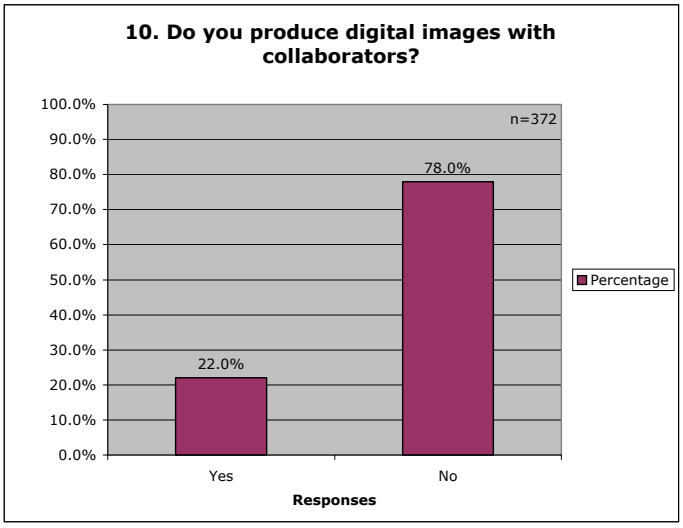
a. the camera image file on the memory card before being downloaded onto a personal computer
b. the scanned image file before importing into another software program
c. the first file saved by the software program
d. the final file saved after completing manipulations and alterations before printing
e. the first digital print made

Question 8 explores the concept of the original image in the digital environment. Additional comments identified the in-camera image as analogous to a film negative and provided individual procedures for creation of the original and surrogate images. In general, the procedures involved saving the first image captured by the digital camera as the archival master (original) and then creating a copy to function as a digital surrogate for image processing. Image alterations are made to the digital surrogate and saved for final output to various products.



a. established procedures
b. spot checks on digital image files
c. recording of operation settings (equipment calibration)
d. error checking software
e. none of the above
f. other (please explain)

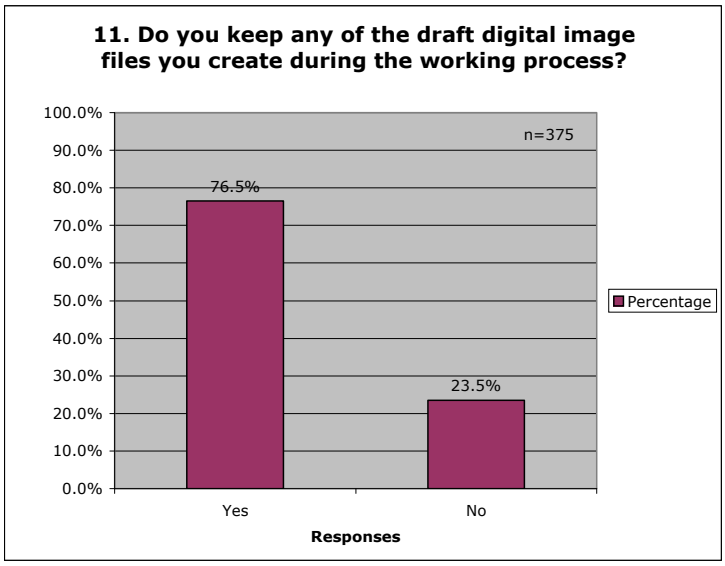
Additional comments to Question 9 revealed that photographic organizations implement their own industry standards and best practices via procedures to ensure quality and consistency across the board, whereas individuals relied on their own "best effort."



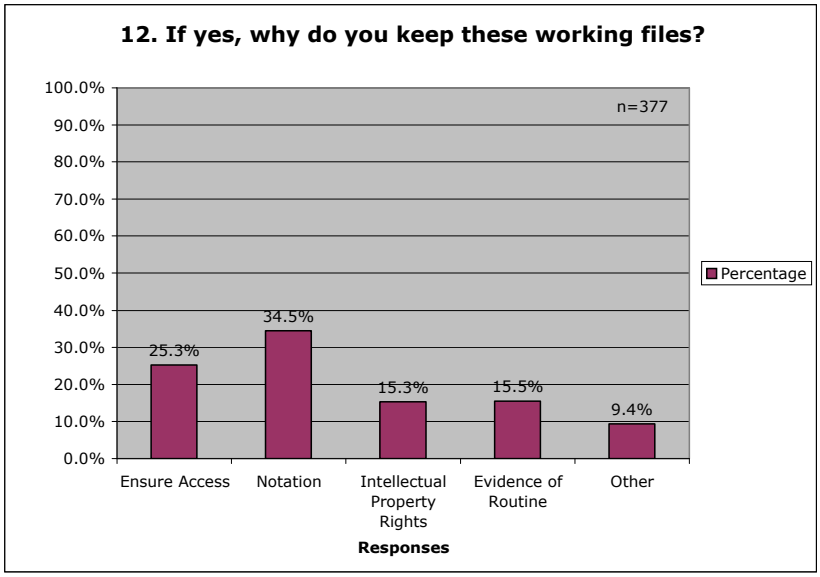
a. yes
b. no

Additional comments to Question 10 reinforced the individualistic nature of most photographic practice. Additional comments questioned whether the design and editorial team at

a newspaper or magazine might be considered collaborators since they are permitted to alter the photographer's images selected for publication.



a. yes
b. no

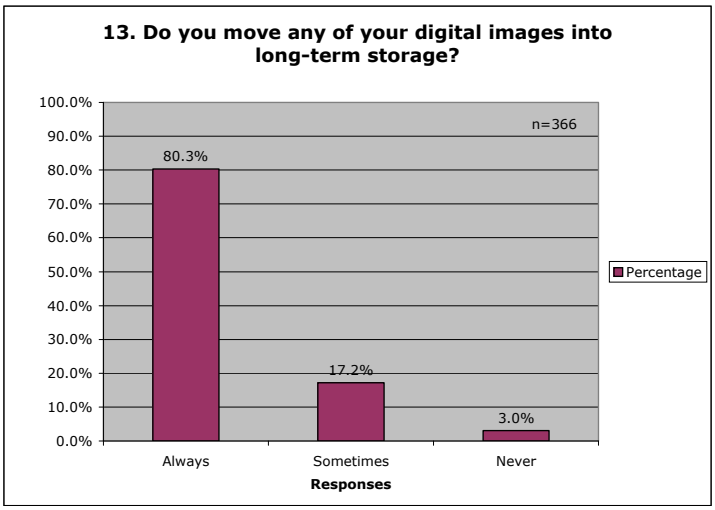


a. to help ensure access, the files can be re-located or re-used by someone else
b. as a form of notation, to reveal the way in which a digital image was compiled and manipulated at different stages in its creation
c. to protect intellectual property rights
d. as evidence of routine work procedures
e. other (please explain)

Additional comments to questions 11 and 12 explained that backwards compatibility was the most important aspect of proper notation. The respondents defined backward compatibility as

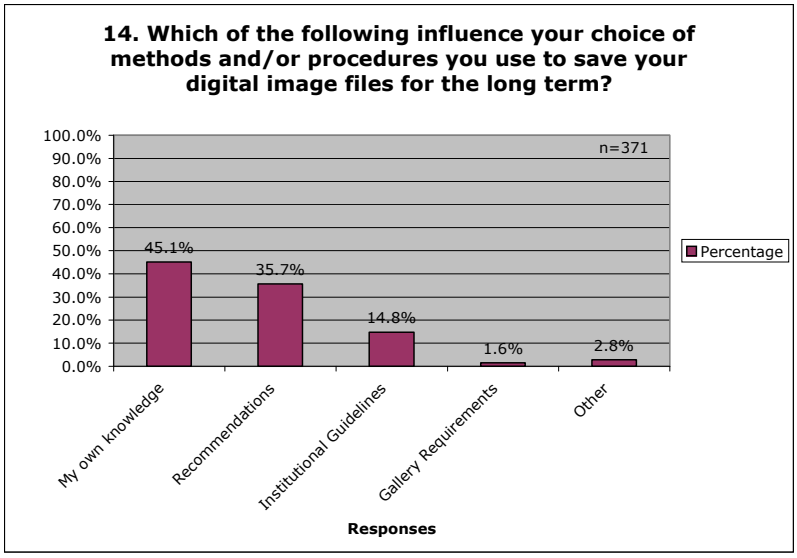
the capability to return a digital image to its first instantiation as a digital surrogate (made directly from the digital master) to fulfill business-related needs such as client reviews, rules of evidence and additional creative pursuits.

Questions 13-21 address issues of digital preservation. The aims of these questions are to explore methods and procedures that contribute to the authenticity of a digital image.



a. always
b. sometimes
c. never

Additional comments to Question 13 identified methods for "archiving" digital images onto CD-R and Digital Video Discs (DVD). In their comments, respondents queried the length of time indicated by the term "long-term;" in retrospect, a definition of *long-term* as it applies to the digital environment and issues of preservation should have been included with the question.

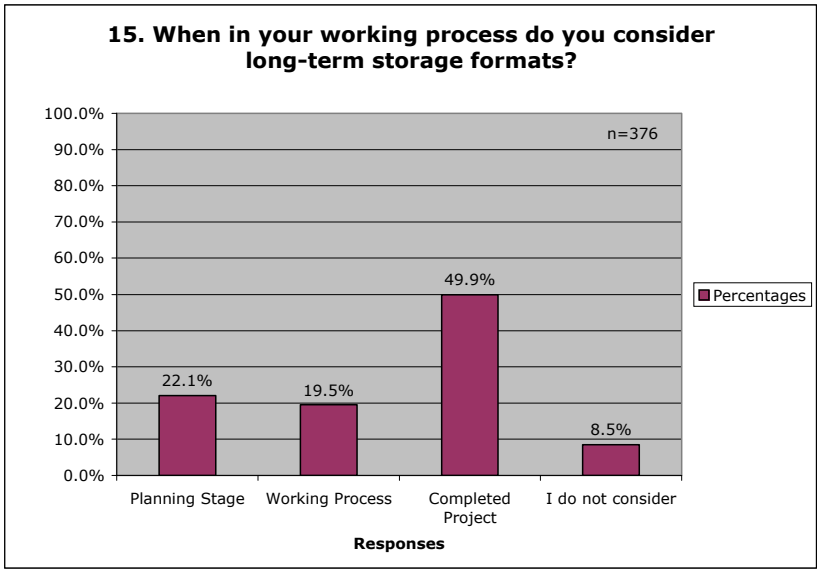


a. my own knowledge about long-term digital image preservation
b. the recommendations of other colleagues
c. the preservation guidelines or standards mandated by the institution in which I work
d. requirements stated by an art gallery or third party that represents my artistic work
e. other (please describe)

The majority of respondents relied on their own knowledge about long-term digital image preservation and/or the recommendations of other colleagues. Additional comments showed photographers keep up-to-date about technological developments in both media specifications and methods for preservation through professional online forums and industry publications. Limited budgets and a lack of time were cited by respondents as obstacles to their implementation of more thorough approaches to preservation.

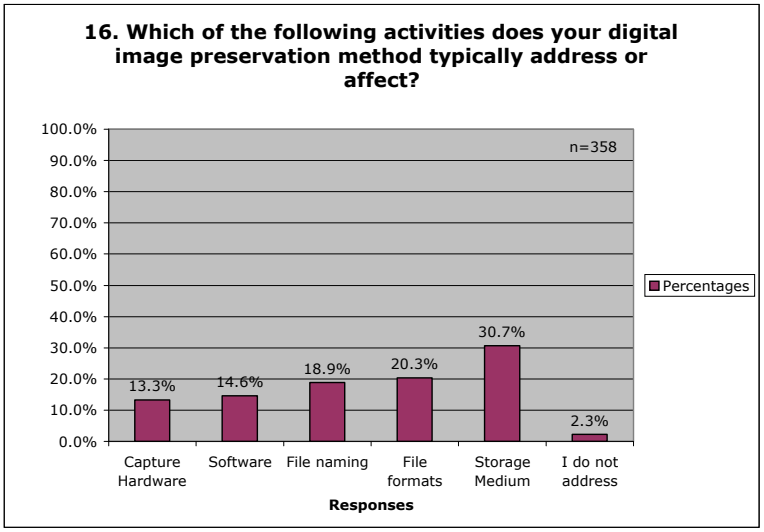
The respondents who answered that "the preservation guidelines or standards are mandated by the institution in which I work" provided valuable information on existing best practice guidelines and industry standards promulgated by professional associations such as the Scientific Working Group on Imaging Technology (SWGIT). SWGIT provides recommendations for and guidelines on the use of imaging technologies within the criminal justice system.[8]

[8] Guidelines and best practices are available as download documents from the International Association for Identification, "SWGIT." Available at http://www.theiai.org/swgit/.



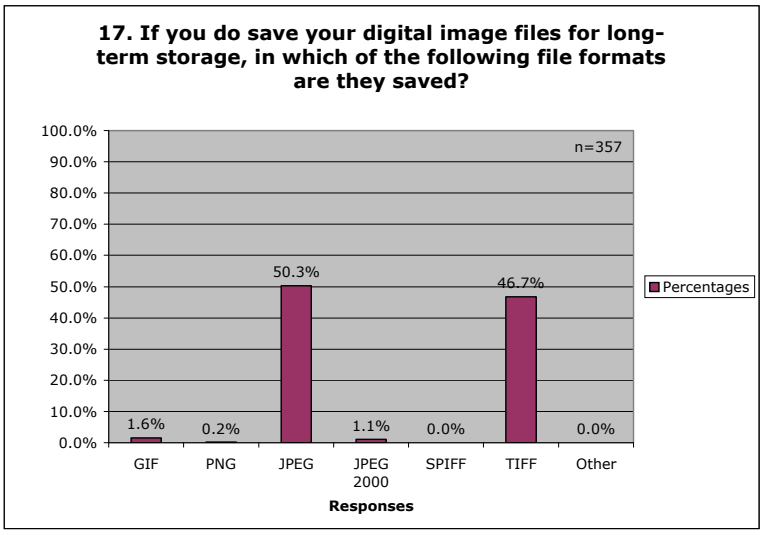
a. at the planning stage of the project
b. at each stage of the working process
c. after the project is completed
d. I do not consider long-term storage formats

Additional comments to Question 15 identified CD-Rs and DVD*s* as preferred media for storing image files for the long term.



a. choice of capture hardware (i.e., camera make or type, scanner make or type, computer make or type)
b. choice of software (i.e., software program attributes)
c. choice of file naming practices (i.e., naming originals and drafts in a manner that can link them to each other at a later date)
d. choice of file formats (i.e., choosing the TIFF format for storage)
e. choice of storage medium(i.e., choosing to store images on external drives, CD, and/or keeping preservation copies in a safe off-site location)
f. I do not address digital image preservation

Question 16 offered six choices that affect a digital image's identity, integrity and usability over the long-term. Respondents were prompted to select any and all choices that were relevant to their professional practice. The relatively equal distribution of responses implied that photographers used a combination of more than one method in their approach to digital image preservation.



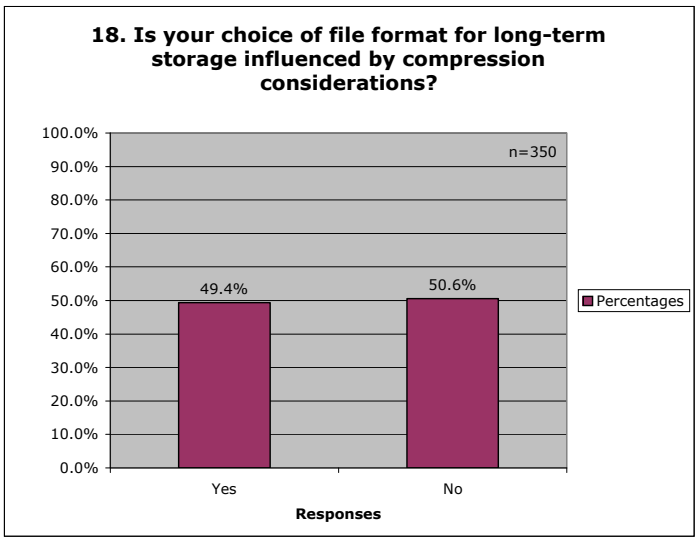
a. GIF (Graphics Interchange Format)
b. PNG (Portable Network Graphics)
c. JPEG (Joint Photographers Experts Group)
d. JPEG 2000
e. SPIFF (Still Picture Interchange File Format)
f. TIFF (Tagged Image File Format)
g. other (please explain)

The list of six image file formats presented in Question 17 was selected on the basis of existing file formats sanctioned by ISO and identified in best practice documents prepared by the photographic and archival communities.

The choice of JPEG for long-term storage was surprising since the file format utilizes a lossy compression algorithm which removes irrelevant data. The removal makes little difference to the perception of the image by the human eye and may reduce the image file size by ten percent of its original size without distortion; however, the compression is irreversible and the information is permanently discarded.[9] TIFF provides *lossless* compression—data in the digital image is not removed in order to compress. A common practice revealed by additional comments to this question is to save a digital image in both JPEG and TIFF.

[9] Technical Advisory Service for Images (TASI), "File Formats and Compression." Available at http://www.tasi.ac.uk/advice/creating/fformat.html.

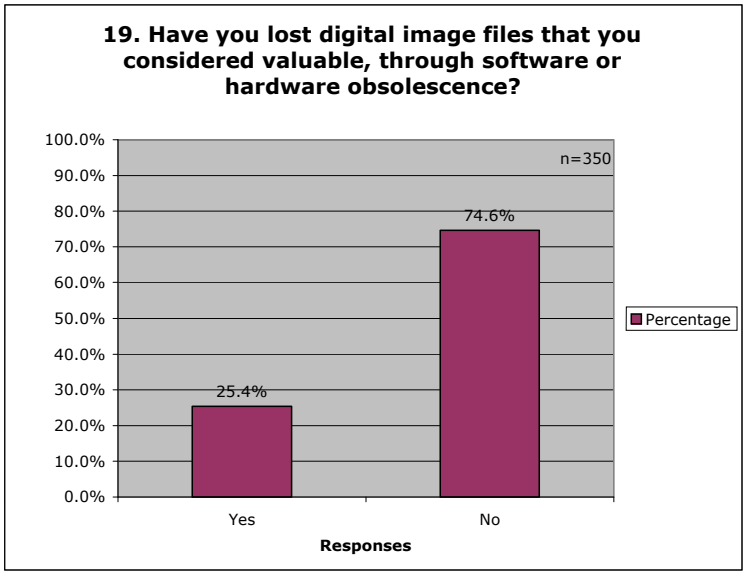
RAW and PSD file formats were not included in the list of choices because they are not open standards; nevertheless, additional comments identified 22% of all respondents saved in RAW and 10% saved in PSD as additional file formats for digital image preservation.



a. yes
b. no

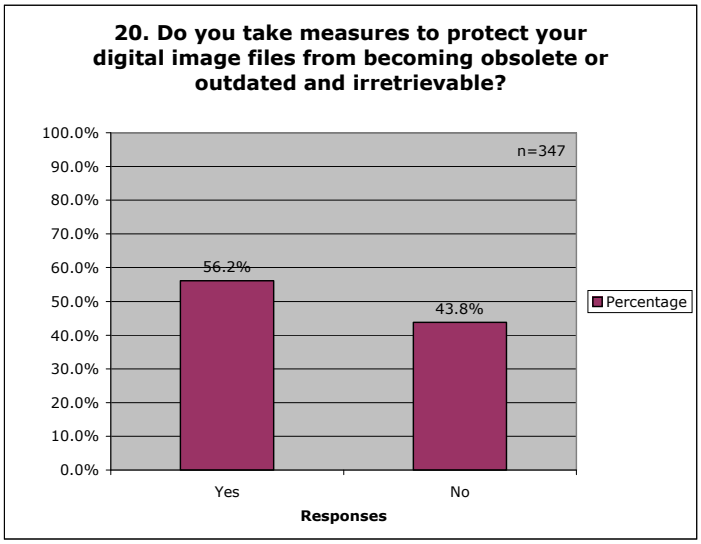
Analysis of the comments accompanying both *no* and *yes* responses revealed the respondents misunderstood Question 18. Both those respondents who selected *no* and those who selected *yes* explained that they used file formats that utilize lossless compression (i.e., TIFF or RAW). In both cases the photographer was aware of the differences between lossy and lossless compression and made the decision to use lossless compression.

On the basis of these responses, the researchers concluded that photographers were acutely aware of compression issues, that they knew the differences between file formats that used lossy and lossless compression, and that their preservation decisions were based on these factors and resulted in their selection of file formats that used lossless compression for the long-term preservation of digital images.



a. yes
b. no

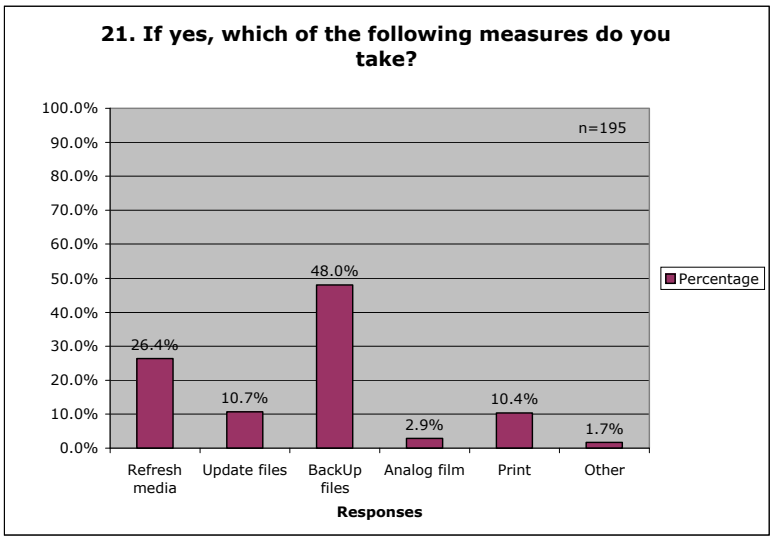
Of the respondents who selected "yes," the reasons listed in additional comments included hardware failure, technological obsolescence and human error.



a. yes
b. no

Additional comments to Question 20 listed protective methods such as back-up CDs, refreshing CDs to prevent loss due to media obsolescence and migrating file formats to prevent loss due to perceived future problems with hardware and software compatibility

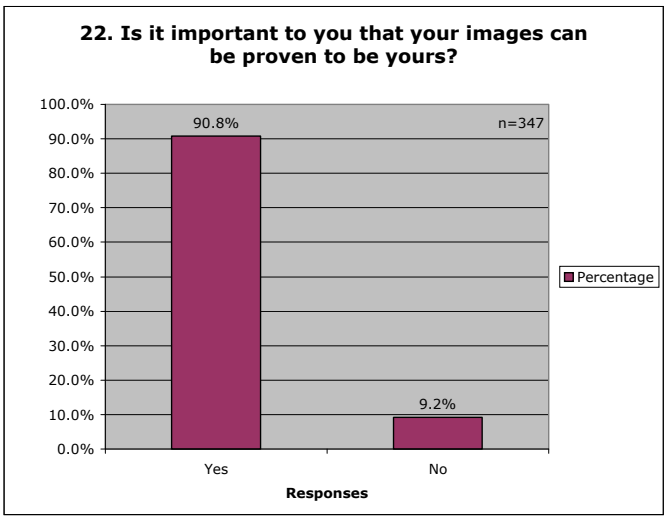
Additional comments made by respondents who do not protect their digital images explained that they were aware of the risk of technological obsolescence, but had yet to address the situation.



a. I refresh the media storage formats that I use
b. I update digital image files whenever new software or hardware is implemented
c. I back up digital image files on another physical medium (i.e., saving files from a drive onto CD)
d. I create analogue film versions of the digital image file, such as slides
e. I print the digital image file
f. other (please describe)

In general, respondents undertook more than one measure to ensure their digital images were protected from obsolescence. Additional comments included measures such as keeping older computers to run outdated software or using dedicated third party servers for "archival" purposes. Individual photographers who identified their practice as hybrid, and thus had to protect the analogue rather than the digitized image, did so by such physical preservation methods as proper housing and the monitoring of environmental controls.

Questions 22-30 explore the methods and procedures that photographers use to protect the security of their digital images during transmission and throughout long-term storage. These questions address issues related to the authenticity of digital images.

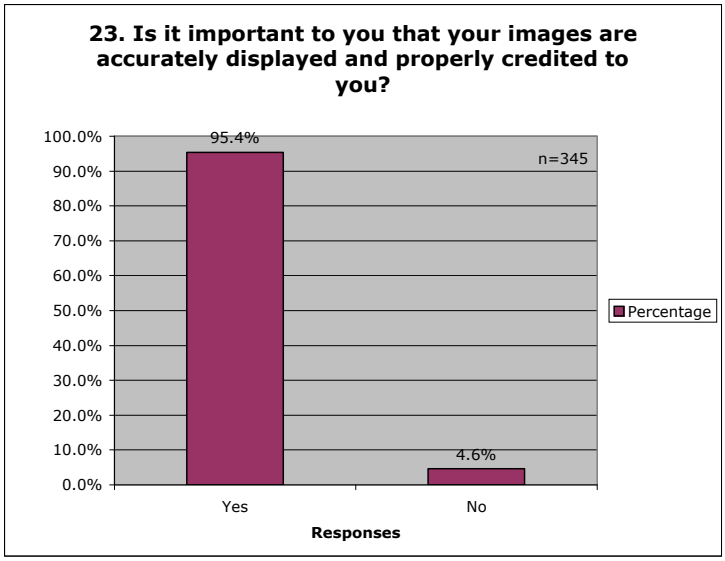


a. yes
b. no

Additional comments from respondents who selected *yes* identified their motivations for proving their proprietary rights. These included claiming intellectual property rights and satisfying requirements for the admissibility of digital images as documentary evidence in court proceedings.

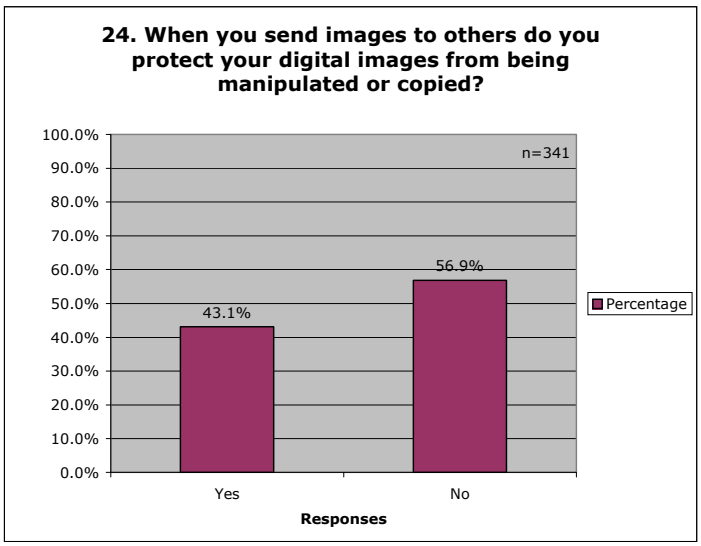
Of the small percentage of respondents who selected "no," their additional comments described a work environment in which the individual photographer didn't own the copyright to his or her images. The photographer was given credit for their images but the "work for hire" contract stipulated that the organization or agency became the owner of the copyright.[10]

[10] This is the case when a photographer is hired or commissioned by a client to produce images unless stated otherwise in their contractual agreement. For more information on Canadian Copyright see, Canadian Intellectual Property Office, "A guide to Copyrights: Copyright Protection." Available at http://strategis.ic.gc.ca/sc_mrksv/cipo/cp/copy_gd_protect-e.html.



a. yes
b. no

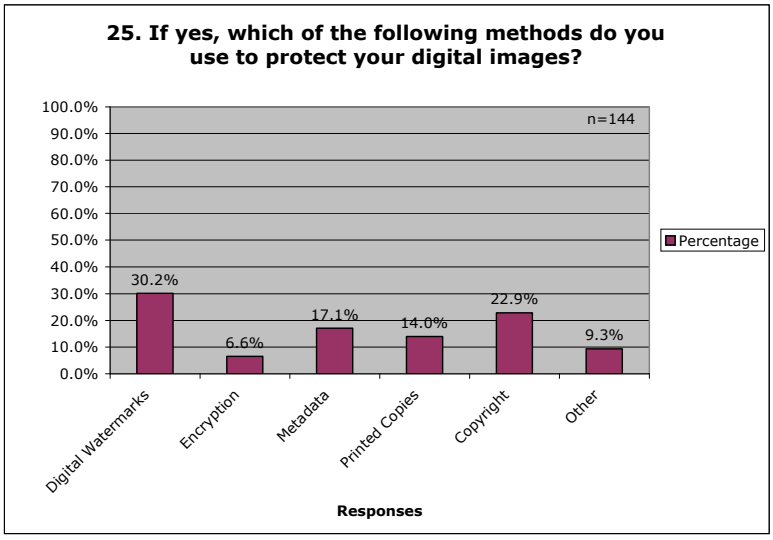
Additional comments to Question 23 explained that the accountability framework for professions such as forensic photography and medical imaging require that specific contextual information remain linked to the digital image throughout its lifecycle; such a requirement reinforced the need for images to be accurately displayed and properly credited to the photographer responsible for their creation and management.



a. yes
b. no

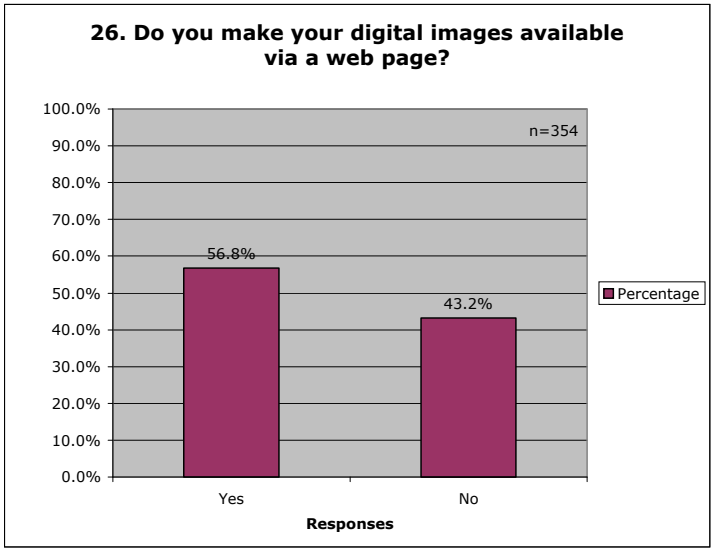
Additional comments to Question 24 indicated that photographers who selected *no* actually did attach copyright information with their transmitted digital images by including a

textual statement along with the digital image file, embedding a digital watermark into the image and/or including copyright metadata. Such methods were also used by the respondents who said they did protect their images during transmission (see Question 25); they also used low-resolution files and contractual agreements that outlined their usage and rights restrictions.



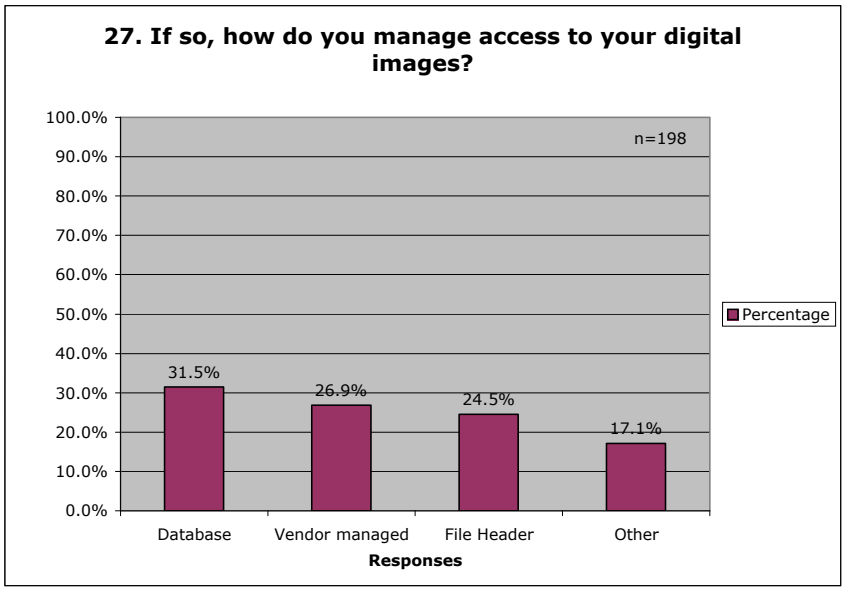
a. digital watermarks
b. encryption (computer algorithms that rearrange the data bits into digital signals in order to prevent reading by unauthorized users)
c. metadata (structured data about data)
d. printed copies kept for comparison to digital files
e. copyright registration of images
f. other (please explain)

In general, respondents used more than one method to protect their digital images. The most common combination was *digital watermarks, metadata and copyright.*



a. yes
b. no

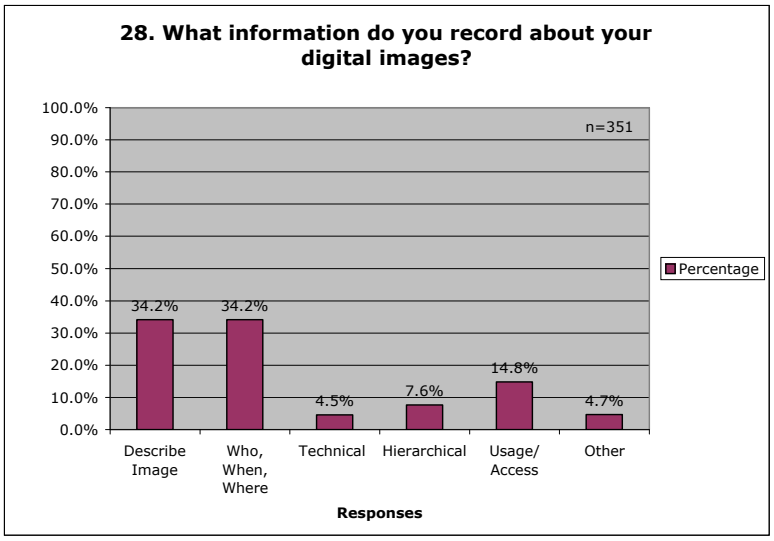
Of the respondents who did not make their images available over the Internet, some indicated in their comments their intentions to doing so in the near future.



a. I use a database I created to manage all my images.
b. I use a vendor management package that manages access to my images for me.
c. I store information in the header of the digital file itself.
d. other (please explain)

The three techniques for managing access were almost equally represented; however, a larger percentage of photographers used IMS/DAM products to manage their online collections. Respondents who worked within large organizations relied on their Web-management

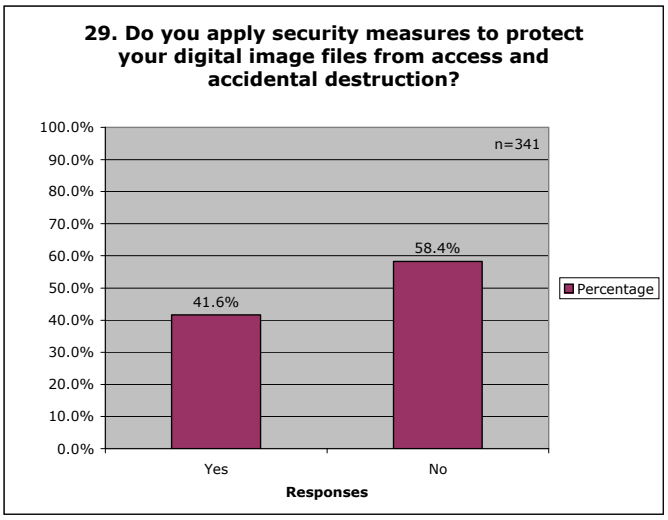
department to oversee all aspects of online delivery, or a dedicated Web server built to meet their unique business requirements.



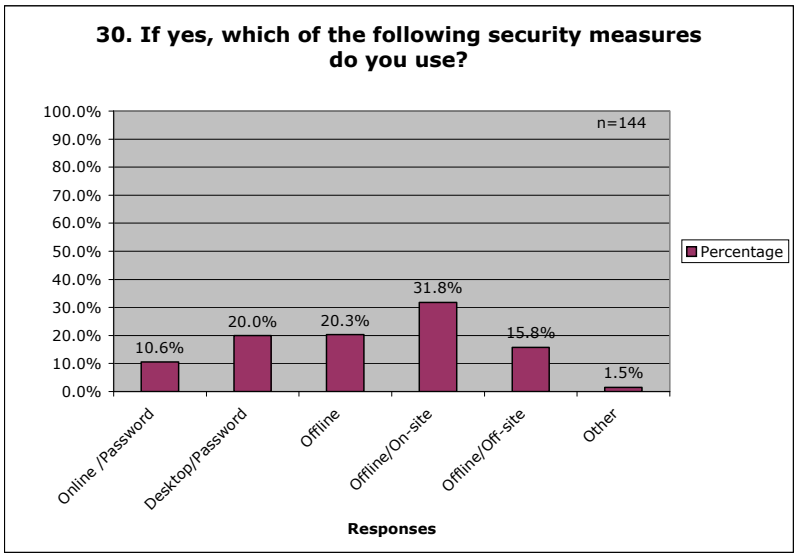
a. information describing the image itself to allow access and retrieval
b. information about who created the images, when and where they were taken, and why
c. information about the technical relationships between files, such as software or hardware dependencies
d. information about hierarchical relationships, such as an image forming part of a series, or a detail from a larger image
e. information about usage restrictions and access
f. other (please describe)

The small percentage of respondents who selected "other," identified copyright, colour space and compression along with technical camera settings, such as *EXIF* metadata as additional information they recorded about their digital images.[11]

[11] *EXIF* is metadata that is automatically captured by the digital camera at the time of creation. It is essentially technical metadata that describes the camera settings, make and model and provides a date and time stamp for each image. The potential to search and retrieve images by their *EXIF* metadata is limited, see *Japan Electronics and Information Technology Industries Association (JEITA),* "*EXIF* Specifications." Available at http://www.exif.org/.



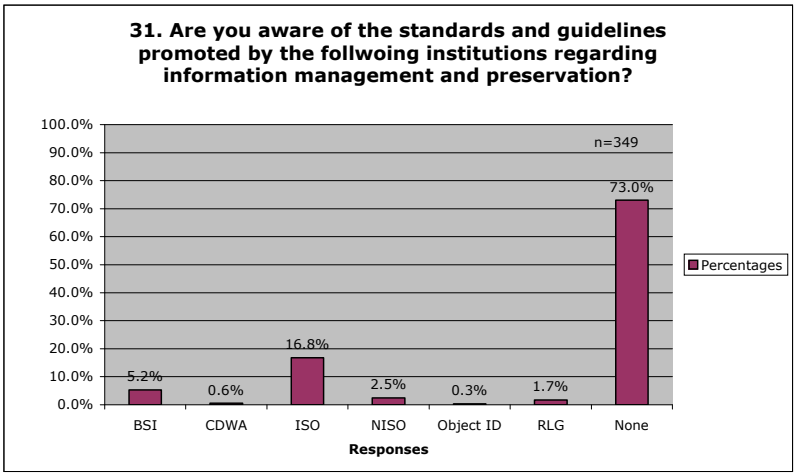
a. yes
b. no



a. My digital image files are stored online on a network and password protected
b. My digital image files are stored on a personal computer and password protected
c. I have made one or more read-only, offline copies of my digital image files
d. I have stored offline copies of my digital image files in an on-site location
e. I have stored offline copies of my digital image files in an off-site location
f. other (please explain)

Question 30 presented five different security measures and asked photographers to choose any or all that applied to their practice. Ten percent of the total respondents selected all of the security measures presented. Additional comments also identified burning digital image files onto back-up CDs and DVDs, keeping storage media under lock and key and controlling access through administrative restrictions.

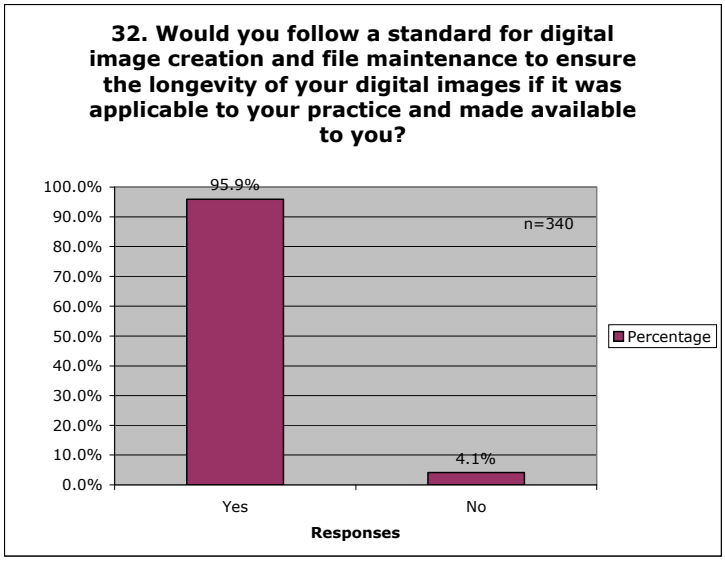
Questions 31 and 32 test the awareness of photographers regarding standards and guidelines for the creation, use and preservation of digital images.



a. BSI (British Standards Institution)
b. CDWA (Categories for the Description of Works of Art)
c. ISO (International Organization for Standardization)
d. NISO (U.S. National Information Standards Organization)
e. Object ID
f. RLG (Research Libraries Group's Preservation Metadata Elements)
g. No, I am not aware of any.

Additional comments demonstrated that most photographers relied on their own standards; however, individuals suggested alternatives from within the photographic community, such as the Digital Imaging Group's (DIG35) metadata initiative, and archival and library community guidelines, such as those of Library and Archives Canada (LAC) and the Canadian Conservation Institute (CCI). Industry specific guidelines and standards, such as the Scientific Working Group on Imaging Technologies' (SWGIT) "Guidelines for Field Applications of Imaging Technologies,"[12] and the International Press Telecommunications Council's (IPTC) "IPTC Core Schema for XMP,"[13] were also listed.

[12] Available at http://www.fbi.gov/hq/lab/fsc/backissu/jan2000/swigit.htm.
[13] Available at http://www.iptc.org/IPTC4XMP/.



a. yes
b. no

Comments identified concerns with a universal standard's cost efficiency, ease of implementation and integration into current digital image workflow and cross-platform compatibility.

The final question asked for any additional comments the respondent thought would be useful. The answers ranged widely across all the topics covered in the survey. They are listed in Appendix C.

Conclusion

From our survey, it is clear that professional photographers have universally embraced the transition from analogue to digital photography. The majority of photographers who responded identified their practice as completely digital, allocating the use of analogue film to the occasional personal project. Even amongst those who identified their practice as a hybrid of digital and analogue, the bulk of their images were originally created in digital form; they made only a small percentage of analogue images and most of these were eventually digitized.

The survey provided an opportunity to gather valuable information regarding the record-creating and recordkeeping practices of professional photographers working with digital technology. Photographers usually keep their digital images for re-use and reference. Respondents chose in-camera file formats and multiple versions of a digital image (including working drafts) to enable the selection and use of multiple instantiations that will serve

undetermined future needs. Photographers are generally concerned with authenticity and reliability as evidenced by their routine capture of metadata and population of file information headers for digital masters and their surrogates, by the quality control procedures they undertook and by their routine preservation procedures that incorporated a measure of security. The researchers also note that methods to protect digital images during transmission could be improved. Finally, from the willingness of the photographers to participate in our survey, the researchers have shown that photographers have begun to grasp the challenges of providing continuing access to and long-term preservation of their digital image collections despite proprietary digital systems and technological obsolescence. They save digital images in more than one file format, refresh digital media, upgrade older file formats to operate on newer versions of image applications and demonstrate willingness to adopt a standard for image creation and preservation.

Photographers are well aware of the fragility of the digital media they work with and the potential obsolescence of the technology. While most of the photographers we surveyed have not lost valuable digital image files through software or hardware obsolescence, many of them have experienced problems accessing early text-based documents and are currently implementing preservation actions. But the business needs and artistic intentions that determine the professional photographers' creation, management and preservation decisions result in choices that often place the longevity of their digital images at risk. And while the majority of photographers recognize the vulnerability of the digital environment, they also lack confidence in the methods and procedures currently in use to protect digital assets. Many of the respondents offered comments that were, essentially, asking for advice. This was especially true of freelance photographers who did not operate in institutional settings and were not directly regulated by a specific industry.

Photographers are not aware of international standardization organizations that inspect and approve technology to support and/or directly affect the digital imaging industry; yet they are aware of industry specific standards and best practices that guide the creation and preservation of digital images in their specific work environment. Suggestions made by respondents revealed industry initiatives and association publications followed within their community but unknown to many archivists and collections managers. By establishing and disseminating technical standards, the likelihood for sustained interoperability amongst digital

image file formats, software applications and operating systems is far greater than at present. Both photographers working in the digital environment and digital collection managers such as archivists will benefit from such advances.

Appendix A: Invitation to Participate in the Survey

Dear XXXXXXXXXXXXXXX,

This email is to request your participation in an online survey of record-keeping practices of photographers using digital technology. The survey is being sent to photographers the world over identified on the basis of published lists of professional photographers using digital imaging. It is conducted under the auspices and the purposes of InterPARES 2.

The InterPARES (International Research on Permanent Authentic Records in Electronic Systems) 2 Project is a multidisciplinary project involving researchers from twenty countries and five continents, directed from the University of British Columbia. It investigates issues surrounding the continuing reliability, accuracy, authenticity, accessibility and the long-term preservation of digital entities produced in the course of artistic, scientific and e-government activities because of technological frailty, incompatibility and obsolescence. By participating in the survey, you would be helping in the identification of such issues with regard to digital photography and the development of methods and applications that individuals and institutions can use for addressing them, and would support the production of legislation, policies, strategies and standards regarding copyright, authenticity, and intellectual property in general.

For more information on the InterPARES 2 Project, please visit the InterPARES Project Web site at www.interpares.org.

Participation involves an anonymized, online survey composed primarily of multiple choice questions. The entire survey is designed to be completed in approximately 20 minutes. The results will enable the InterPARES Project to obtain a holistic perspective on what photographers are facing and how they are dealing with the long-term preservation of, and access to, their digital images.

To start the survey, go to <www.interpares.org/gs07/login.cfm>, and using the login: 'digital' and the password: 'photography' (no quotes), log into the survey site. All responses are anonymous. If you have any questions, please contact me at jess@cajacreative.com.

If you are aware of other photographers that you believe would be interested in participating, we would appreciate your assistance in drawing their attention to this survey.

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Graduate Research Assistant:
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email: jess@cajecreative.com.

Thank you for your time.

Jessica Bushey
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InterPARES 2 Project
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Appendix B: List of Participating Organizations and Institutions

- Canadian Association of Photographers and Illustrators in Communications (CAPIC)
- Columbia Street Gallery
- Editorial Photographers United Kingdom & Ireland (EPUK)
- Institute of Medical Illustrators (IMI)
- National Press Photographers Association (NPPA)
- Professional Photographers of Canada (PPOC)
- Professionals Using Digital Imaging (ProDIG)
- Stock Artists Alliance
- Toronto Photographers Workshop (TPW)
- U.S. National Institute of Justice

Appendix C: Textual Responses to Survey Questions

Additional text responses provided by survey respondents are provided below. They have been edited for length and for privacy reasons, including the removal of personal names, e-mail addresses and Web sites. Where several respondents provided identical answers, these responses have been collapsed and a notation added (in parentheses) to indicate how many responses are represented.

The survey design presented only one question per screen. One can see, from the comments offered below, that respondents were frequently unaware that an initial yes/no question would be followed by additional questions on the same topic.

Question 1: Which best describes the context in which you make photographs?

1. None of the categories match my photography.
2. I work in all 3 areas – Artistic, Scientific, Government
3. Too narrow a view of who takes photographs.
4. Machines take the majority of real scientific pictures.
5. Photojournalism. (100)
6. Medical Photographer (clinical). (14)
7. You forgot commercial style, and editorial style. (14)
8. Portrait, Wedding, and/or Events (including sports). (9)
9. Forensic – photography and/or imaging. (6)
10. Commercial, industrial. (4)
11. Fine Art Photography. (9)
12. University photographer. (3)
13. Architecture. (3)
14. Educational.
15. Editorial stock photography (2).
16. Concert and entertainer photography.
17. Dental Photography.
18. Also some science.
19. Some of the images I take for government are used for scientific examination.
20. Many of my images are scientific in content and artistic in purpose.
21. Artistic is the nearest but not a good description of my industrial work.
22. In the main I don't consider my work of photographing industrial products to be artistic.
23. I consider myself a conceptual artist that uses photography among a diverse range of other media.
24. Most of what I do is technical, not scientific.
25. I work predominately in the documentary as art genre.
26. I also use photographs for business purposes.
27. While many photographs I make have an artistic component, the images are made primarily for business reasons: advertising, documentation, etc.

28. My photos are editorial in nature which can be considered governmental if they are of for example a crime in progress and are subject to court subpoena.
29. I am also involved in documenting current law enforcement trends and actions, which puts me in closer proximity to crime photos.
30. I am a Corporate Photographer and do freelance commercial/editorial photography.
31. Intelligence and or Evidence.
32. I teach photography and photojournalism.
33. Photos are part of the database for a church database.
34. The provincial online digital locations database.
35. Central still and digital images storage for the Canadian Forces.
36. I use georeferenced digital photos to record excavated surfaces of archaeological deposits.
37. Astrophotography, but I do a considerable amount of work which can be defined as 'artistic'.
38. Clients (individuals, companies) commission me to photograph a wide range of subject matter.

Question 2: Which best describes your current photographic practice in the digital environment?

1. I still produce a few slides.
2. For the last 5 years NO film....
3. Your use of "manipulation" should be better thought out.
4. The use of manipulation and the term photography should never be used in the same context.
5. I have been trained on both systems, but digital is the fastest and most cost effective.
6. I have aspirations of doing more work with film. I do use film when photographing a wedding but that is infrequent.
7. Went digital in 1999.
8. Changed to a completely digital workflow in July 2004.
9. I still shoot a little bit of film that is eventually scanned. (7)
10. Some scanning of older film photographs.
11. I am shooting 95% on digital cameras. (9)
12. For work purposes, I use almost entirely digital equipment, from start to finish. I use film for personal photo needs. (6)
13. But the analogue share is very small, 5-10% at most.
14. Additionally I shoot on Medium Format film.
15. I use film very rarely, only when using very long exposures for photos at night when using digital creates too much "noise" on the image.
16. There are still some rare times that I use color negative film or slide film.
17. My work is now about 60% digital and 40% film. I still find there are situations where I have more faith in film.
18. Film is dead for dailies.
19. Some clients prefer film; some are ready for digital.
20. I use both digital and film cameras. (6)
21. I am an advertising photographer who is about to make the jump from film to digital workflow.
22. Most new work will be entirely digital format. (5)

23. Conventional film used only for specialist retinal photography.
24. At work we are strictly digital, but have film archives over 50 years that are scanned when needed.
25. We also directly capture images using cameras and both film and flatbed scanners. We also work on images sent via e-mail and images from videotape.
26. Film isn't quite dead, though I expect to stop using it for new imaging almost entirely within 5 years.
27. I take pictures on a 4 x 5 camera using 64 Tungsten color film transparencies. I scan them using top quality drum scanners and technicians.
28. Mostly digital but sometimes film and slides depending on the client's needs.
29. I use very little silver based material, small amount of Polaroid and scanning existing 35mm film and prints.

Question 3: What format do you most often use to capture digital images in your digital camera?

1. Only RAW (2)
2. RAW for most work.
3. Mostly RAW but some JPEG for candid type images at a wedding reception or ceremony.
4. Mainly with RAW (.NEF) and JPG where appropriate.
5. RAW for portraits.
6. RAW when color and exposure accuracy are important (e.g. fine art).
7. RAW for more "artistic" shots when trying to get the best dynamic range, etc.
8. RAW, if the camera allows it. Prefer to shoot RAW and JPEG simultaneously for better workflow.
9. Usually RAW, but if I'm doing a multiple rapid exposure, I'll use JPEGs.
10. Use RAW when lighting conditions are questionable or when color/contrast issues are present.
11. Large JPEG for people-based shots.
12. JPEG for photojournalism. (2)
13. JPEG for weddings. (3)
14. Generally use JPEG for overall scene photos and TIFF for any photos that may require further examination.
15. I use JPEG and TIFF all the time.
16. Most images are large JPEG, with the remainder RAW.
17. Sports = JPEG.
18. All others RAW.
19. For commercial work I shoot RAW and JPEG, for newspaper work JPEG only. (2)
20. Most of the newspapers require work in JPEGs but I use RAW and JPEG when working on personal projects. (4)
21. The majority of what I shoot is in JPEG, but RAW workflow is so easy that I am starting to go that direction for more of my smaller jobs.
22. More JPEG than RAW, I'm using RAW increasingly.
23. I shoot JPEG 98% of the time. On a few assignments I will shoot RAW.
24. RAW and JPEG, mostly JPEG. (6)
25. We prefer RAW files. Generally, we are lucky if we get high-resolution JPEGs; but we ask for TIFFs and Acquired TIFFs with as much caption as possible.

26. Most of our work is captured in JPEG format. All images captured for analysis (fingerprints, footwear, etc.) are captured either RAW or lossless TIFF.
27. I use RAW and JPEG on my personal work if it is shot digitally.
28. I use JPEG because my camera is very slow when used to capture TIFFs & RAW. When I upgrade to a better camera, I will be more likely to use RAW (NEF) and/or TIFF.
29. My next camera will have the capability to save RAW images.
30. We are required to save as JPEGs, so we shoot JPEGs. For printing, we use TIFFs.
31. RAW is sometimes used for special circumstances. With bigger and cheaper card capacity RAW will be used more often.
32. Archive with TIFF's.
33. I use TIFF to archive my best or most important photos, but even they are most often edited in JPEG.
34. I'm not using a digital camera. I scan my films. (2)
35. I don't use a digital camera (3)
36. For the digital cameras I have used, I have saved images as TIFF and JPEG images.
37. We were hoping for RAW and TIFF files; but we are grateful for even High Resolution JPEGs.
38. Mostly RAW format but this is not always an option. Some tools have limitations.
39. I capture video then isolate stills.
40. Images scanned from transparency film.
41. Depends on client requirements!
42. RAW and JPEG, shoot both simultaneously, all the time. (4)
43. Some TIFF.
44. I use analogue cameras and film, but my digital files are TIFFs.
45. JPEG - generally for images from DSLR.
46. Canon Mark II camera now uses RAW images called .CRT files. (3)
47. Since I use Canon equipment, I also encrypt my images in camera with a code for authentication.
48. Most of our images are uncompressed at full resolution.
49. Kodak DCR files.
50. We currently use Kodak DCS520 and Canon D2000 digital SLR cameras. Both are borderline antiques. When we upgrade to better Canon cameras, we will shoot in RAW and JPEG mode simultaneously.
51. From Scanner to BTIF (a lossless proprietary format created by http://www.binuscan.com/).

Question 4: Which of the following digital image file formats do you produce?

1. Other is layered PSD *Photoshop* native. (44)
2. RAW (7)
3. EPS (Encapsulated Postscript) (8)
4. *Photoshop* (PSDs) and PDFs (4)
5. .NEF – *Nikon* RAW format. (3)
6. I also create files in .swf and .fla formats
7. Here, our JPEGs are turned into RichTIFFs for use in production. This is an almost-archaic format. They are turned into JPEGs for archiving.
8. TIFF - mostly for printing and backup; JPEG - for Web.
9. CPT *(Corel Photopaint*)

10. All RAW images are migrated to TIFF files for conservation. Some JPEG images are produced for quick viewing and E-Mail purposes.
11. .ai
12. bmp
13. Our current working environment of a four-color newspaper requires the transfer of images to the paginator in EPS format. Primarily, the archived files are JPEG's. We hope to change this system due to the destructive nature of the JPEG conversion.
14. Video
15. I also make my photos into PSDs in Photoshop if I'm doing any manipulation that requires layering.
16. BTIF. This is a format that is more flexible than any of the above. It is based on TIFF.
17. Depends on application.
18. Depends on the client's demands. (2)
19. I would Use JPEG 2000 if my clients could open it but most couldn't.
20. I use PSD files for many of my pre-output images because they are smaller than TIFF files, and I can keep my layers separate.
21. The majority of our imagery is displayed as JPEG's within a HTML context, or is converted to a PDF format for printing purposes.
22. I use TIFFs for my professional use and JPEGs for e-mail purposes.
23. Also use TGA.
24. NEF and CRW
25. JPEG is the most commonly accepted file format for digital photos for both Mac and PC environments.
26. We have been receiving everything from GIF, DCR, NEFs, PSDs, JPEGs and TIFFs. We convert to either TIFFs for our files and JPEGs for our customers in most cases.

Question 5: Are you concerned with TIFF version compatibility in the future?

1. I wasn't concerned, but I hadn't heard about this before you mentioned it. So now that you have mentioned it, then yes, I'm concerned. (2)
2. Yes, image accessibility and compatibility is important in my field. Records are kept for a long time.
3. Compatibility for the future is a great concern for me.
4. Yes - but only if you're saying that there will be compatibility issues. (5)
5. Yes, somewhat! Although technology is improving in leaps and bounds, with the changing mediums I fear that something may fall between the cracks!
6. I am concerned with any technology changes in relation to wanting future software to be able to open my current files.
7. It is like buying the old beta videotapes and being left behind with VHS.
8. Over 5 years- no. Over 20 years- yes.

Question 6: Is the digital imaging software you use primarily:

1. Again, *Canon* provided software made available to *Canon* users only. (2)
2. Depending on the deliverable we use a variety of imaging software. These include: Off- the-shelf packages such as *Photoshop CS*, *Roxio PhotoSuite* and Specifically designed Event software for on-site manipulation and printing.

3. Using *iBase* software. The original software has been configured and improved to meet our requirements.
4. Pal's 'ware' or commercial shops.
5. *Adobe Photoshop Creative Suite,* with lots of homegrown actions and a variety of plug-ins.
6. *C1 Pro* – professional *RAW* conversion.
7. Off-the-shelf designed for photo-journalistic application.
8. I Beta test the software and have a little input into final release tweaks.
9. *Compupic* for general quick management. *Photoshop* for manipulation.
10. *Extensis Portfolio*
11. Photojunction
12. *Adobe Photoshop* (9)
13. Off-the-shelf but customized. (2)
14. *Kodak* proprietary software—upgraded through *Kodak* web site
15. *Photoshop 6.0, 7.0* and most frequently *CS*.
16. Also use *Photomechanic 4.1*. (3)
17. Generally, I view my images and work with a program called *Portfolio* and *Photoshop*.
18. *Adobe Photoshop CS* (2)
19. I try to use public domain software whenever possible, such as the *GIMP*, the *PNG* suite, *Image Magic*, and *xv*. These are supported by most operating systems, but I primarily use *Linux* and *Mac OSX*.
20. I manage imagery with software that is not off-the-shelf. I edit with off-the-shelf.
21. We use a *Kodak ImageViewer*, then to *Photoshop*, then to *MediaGrid*.
22. *Apple iPhoto*
23. *Nikon Capture, Nikon View.*
24. I augment my commercial software with a fair amount of self-authored programs. These programs typically do everything from thumbnail page generation to file renaming.
25. Some is general off-the-shelf type software, others are obtained through training seminars.

Question 7: Do you implement or maintain version control over your digital image files, especially when more than one person is working on the same file?

1. This is something that we have discussed, but we have not yet come up with and implemented a system.
2. As a law enforcement service, we are interested most in preserving and protecting our originals. Versions may only be necessary for enhancement work that is done on image analysis (fingerprints, etc.).
3. While there is no version control, the original file is usually saved as part of the entire take.
4. I maintain a copy of the first image which came off the camera, and do not change that version.
5. Original camera files, regardless of format are numbered and stored in a separate folder titled "Camera Files". After initial imaging work is done on the file: cropping, initial color correction, etc., the resulting file is stored in a "Work" folder. Final use versions of the file: size, resolution, sharpening, etc., are stored in a "Print" folder. All three sub-folders are stored in a main folder named by the numbering system. (i.e., 2004-xxx). The individual files also have a "jpg" etc at the end.
6. On the hard-drive I maintain a folder for the originally shot images.
7. I work on my files alone. (8)

8. *Extensis Portfolio* is metadata software.
9. When a file is modified from the original an extra letter is added (e.g. 419U2345), if this file is altered in some way and I wanted to keep the original version the new file would be 419U2345B.
10. We only work on the same file, at one networked location. If one person is not working it on then someone else can open it.
11. Once photos are registered and multiple photos are joined in a mosaic this file has a new name representing the block number rather than individual unit numbers.
12. Version control is not as consistent as this question implies, depends on commercial application.
13. An internal database working with "keywords", image numbers, photographers name and occasions help locate the required item.
14. I keep the RAW file and then rename any future files.
15. I keep PSD versions with all the layers and changes, unflattened (i.e., in layers) and only flatten before sending to the lab or client.
16. I use *Portfolio* to log the files, and a standard naming convention.
17. Everything is saved on multiple CD's and kept with it's contacts
18. I embed all pertinent information in the International Press Telecommunications Council (IPTC) data automatically using a script during the archiving process. (http://www.iptc.org).
19. I endeavor to maintain a 'recognizability' in image naming but it is not consistent I fear.
20. At my workplace or at home if I make any changes to the '*RAW*' file I always keep an original untouched copy of that file. If someone else needs to change the photo in any way (i.e., resize) they would create their own version of the same photo and make their own version, again leaving the original untouched.
21. On our staff everyone actively archives their own stuff, each person's archive is searchable by keyword on a server and is searchable by each photographer.
22. I have TIFFs and some JPEGs on un-filed discs.

Question 8: Which digital image file do you consider to be the original?

1. This answer is the "theoretically true one"- in practice, since I have such limited appreciation of the in-camera image, I find the first opening of the image on a computer or laptop for preliminary (non-invasive) editing, functionally "my" original.
2. I typically copy my images from the card to the computer and would consider those files to be the originals. (2)
3. The RAW file is the original regardless of storage media. (11)
4. My answer to this question depends on my method of production, which varies. When shooting with a digital camera, I consider the original file to be the file saved to the camera. When scanning an image, I consider the original to be the first scan I save using *Photoshop*, after having made any adjustments to the scan immediately necessary.
5. While the camera image file on the memory card is the first instance an original image is saved, it is our practice to download the image in it's native format (RAW/ TIFF depending upon the purpose of the image), save it to the hard drive and burn a CD-R for permanent storage.
6. There are not enough options for this question, I would classify the original file as the *RAW* file first saved to the hard drive, as in most cases we are shooting tethered.

7. This question is confusing as you are combining analogue and digital formats. If I'm scanning, the original is the piece of film, and the "original" or RAW scan always requires manipulation, and doesn't require storage, as you can always rescan the film. With a digital camera file this is more critical, as there is no film to go back to.
8. Question is not clear, as this file is unchanged when it is first saved on the computer from the card. This is the original, also.
9. A digital file straight from the lens to the recording device is just like a negative in my mind.
10. No difference between the file on memory card and once it is downloaded onto the computer.
11. As with analogue (film) formats, most believe that the negative/positive is the original work.
12. Always use SAVE AS and leave the original untouched.
13. If the image was captured on film, the digital original is the scan file.
14. But only if true RAW unprocessed data.
15. Scientific Working Group on Imaging Technologies (SWGIT) guidelines (fbi.gov) call for the "original" to be the unaltered image as saved onto digital recordable only media (CD-R for example) directly from the memory card. The image on the memory card is the "primary" if I recall. It also depends on the capture device, but it is always the first created/captured image that is the original. We name this as the Primary Image and it is never worked on. Only a copy of the Primary is worked on.
16. The image as it is taken on the digital camera in its own software is the original on the hard disc. In the studio I shoot straight to desktop machine. (2)
17. The RAW file and I would include a file converted with the new *Adobe* DNG file format.
18. I maintain the out of camera files as original to protect my works credibility, and legal status, and as a method of tracing what others do to my work.
19. Post-digitization/pre-manipulation, generally speaking.
20. The originals are: 1) from the digital camera, 2) Or from the film scanner (old analogue production) or from the first scan of a print out of the flatbed scanner.
21. There are laws in some parts of North America that state that anything that can be viewed is the original. Therefore, the image on the *Compact Flash* card, viewed on the camera is the original. Copy it to a computer and e-mail it across the continent and the recipient has the original. If he prints it, that is the original.
22. Load RAWs to personal computer, burn 2 disks, and these are originals.
23. I consider that the Camera file on my PCMCIA Card as the original. Now, I have learnt that imported images that could be manipulated should be considered "originals".
24. In practice, we can only keep the RAW file as the nearest to the in-camera original. This file is the original for me, but if possible, I keep the manipulations reversible buy using adjustments and layers in PSD format.
25. For a long while, a version that had been manipulated in the software was considered the "master." We have now moved towards keeping an un-manipulated version (after importing into *Photoshop* though...) as the master, but it's not a written policy yet and there are issues still to explore.
26. The primary image-on the memory card. (2)
27. Re: The first file saved by the software program.
28. Always Shoot Tethered and the original is the *RAW* capture, I also archive the final, which is the finished file.

29. Primary file scanned from negative.
30. The file saved to a *WORM* disc directly from the camera's memory card before any work is carried out on the image
31. The mini-DV source tape.
32. None of the above - The *RAW* file (and any Finder copies made of it), when it is first transferred to the computer. (3)
33. The original is the file before any manipulation has been applied. It doesn't matter if it resides on a memory card or in a computer. If nothing has been done to the file, it is the original. I always save all image capture files.
34. I'm not sure that the question of originality is important in the digital arena, given the nature of the technology. The image is infinitely manipulatible - are all possible states to be considered "originals"?

Question 9: Which of the following methods do you use to maintain quality control over the digital image capture process?

1. We use record and preview at time of capture.
2. Do not understand this question. (5)
3. Except that if/when image degradation is noticed, equipment will be cleaned and/or checked by camera technicians.
4. I shoot as much as I can to have the greatest selection of a range of quality images to choose from.
5. My eye is the best measuring tool so far.
6. I keep a written log in the file for any enhancements, who received a copy and on what media type (and serial #), when it was downloaded and what CD it was saved to including ser #.
7. I look at each unit picture as it is taken.
8. I am not as consistent as this question implies. I try but too often get swamped. (3)
9. Whenever all the digital images are gathered, a CD or DVD of the images are created, the image is reviewed by the person who made it first, then it is checked by that person's supervisor before it is incorporated into our database.
10. The *Photoshop* technicians that actually work with the individual files keep a log on any quality issues. (2)
11. All files are viewed and edited. (2)
12. Accurate camera settings, white balance and exposure, are vital to top quality.
13. I do the best with the knowledge I have of the program. The newspaper's Production Dept. takes it from there. (2)
14. In photojournalism it is supposed to be an "established procedure" for the publisher NOT to manipulate the photo in any way prior to printing, except color adjustment from say RGB to CMYK etc. *NIKON* and most, if not all other software, capture camera settings and other data, which also somewhat applies to this question.
15. RAW, RAW, RAW!
16. Lighting, white balance, exposure.
17. Do you mean at the point of image capture (i.e., clean lenses), or the level of JPEG compression on the camera and file size?
18. I use a *Canon 1D* and have it set to JPEG large, after that I move the pictures through to the page the same way each time.

19. We use software to calibrate our monitors, scanners and printers on a semi-annual basis with daily operator tests (i.e., hardware diagnostics, antivirus check, print know test image).
20. Monitor calibration. (2)
21. I use *Spyder* on my monitor for calibration.
22. With 5 photographers we must have established protocols and must be able to describe the process in a legal setting.

Question 10: Do you produce digital images with collaborators?

1. Rarely, art department folks use my images in their own "photo illustrations" without my input or awareness.
2. Not at the present, but plan to in the future.
3. Except in the sense that some images are manipulated mildly to extremely by designers placing them into publication. (4)
4. Not generally, the procedure that we follow is laid down by directives, which we follow.
5. Only to the extent that I collaborate with other people on the content of the images. The production of the file is left to the photographer.
6. My printer helps me "tweak" and perfect the image in *Photoshop.*
7. Photoengravers.

Question 11: Do you keep any of the draft digital image files you create during the working process?

1. I keep the original and the final only. (2)
2. We don't store any files that aren't submitted for publication.
3. My newspaper ke*eps* all the images I make. I can use the images for my portfolios.
4. Occasionally I will keep the multi-layer *Photoshop* file so that I can change curves, etc. after the event. (2)
5. Yes, for *Data Trail Record* (*DTR*) purposes in Medico-Legal & Forensic Imaging.
6. Original RAW, first TIFF, final file.
7. All RAW files saved.
8. Unless the flash misfires or some other glaring error renders the file useless, I keep a copy.
9. Until the project is complete and the final image is selected. (3)
10. Depends on what sort of image we are creating. (3)
11. If you mean downloaded originals, I save images in a "To Be Archived" file and burn to two separate CDs monthly. Anything else is held in the server for two weeks and then ditched.
12. They are archived to *MAM-A* 'archival' DVD for offsite storage, and an 8.5 x 11 *Ultra chrome* print is made for each file with the filename and DVD # printed as well. All files are also recorded into a *Filemaker* database and stored in three locations.
13. I archive the "original camera produced" file onto a CD.
14. Experimentation and alternative versions, usually. Also web-resolution drafts are produced during the process.
15. Sometimes I'll keep a copy of the "un-worked" file along with what is submitted, if it's an image that's requires a lot of color correcting etc… that has degraded image quality since the cameras we use only have a 2.71 mb. file.
16. We keep ALL RAW files and backup off-line.
17. Various versions of an original, RAW, TIFFs, PSDs, JPEGs - all saved at various sizes, processed TIFFs, all without "control."

18. We archive what we call our "outtakes", JPEG files saved from our assignments that have not been toned.
19. Originals, cleaned up and cropped images are saved on computers, CDs and DVDs.

Question 12: If yes, why do you keep these working files?

1. I often find that I use various working files to later produce different final productions.
2. To ensure the original can be used again in another format, style, size, and dpi.
3. I may want to reprocess RAW (as software changes). I may want to produce different final files for different purposes. (5)
4. I use my images as teaching illustrations in photojournalism classes.
5. It helps me to see what happened in photographs around the photograph I want to use.
6. Sometimes for note-taking purposes.
7. To help ensure access, the files can be re-located or re-used by "me." (4)
8. So that I can have as much image data as possible from the original file. (3)
9. So that I can go back and rework them if and when the need arises. (16)
10. Archived on CD in case of hard drive failure.
11. The picture that might be selected for a current project might be the only one from the shoot considered useful. At a later date for the same client or a different client another picture may be more suitable. When we used transparency film, we kept all of the out-takes and when shooting on digital it is just as important to keep all of the images.
12. All RAW files are kept (if they are of acceptable quality) to provide alternative lighting, composition, camera angle etc. as a service. It's also quicker to keep everything than selectively discard.
13. For back up and precautionary measures. (5)
14. To maintain versatility in the artistic process. (3)
15. Later review of images created other than the one(s) published can have scholarly applications.
16. As I work on the image it is saved 2 or three times, but as I work on the image, these 'saves' are over-written.
17. Until I am finished with the image and I am ready to use it. To clarify, I only archive a camera file 'version' of the image and a completed 'version' of the image after I am done working on it.
18. To have an "un-worked" file for possible future use, possibly a better version of *Photoshop* program in the future that'll "work" the image with less quality loss, etc?
19. Since I work on a newspaper, we archive everything shot.
20. Images are often used in legal cases and we have to be able to produce an un-manipulated original image for audit purposes.
21. In case of reorder, more continued editing or adjustments are required it will be possible.
22. Some of the above are partly true. My work process is 3 phased: #1 download from flash card, #2 rough edit to choose the best photos, and #3, final edit where I may crop and dodge /burn / color adjust the image for final submission. I keep all three of these st*eps* mostly as a matter of record to keep all my images and also because it is easier as a habit.
23. To compare versions.
24. Different formats/sizes for different clients/libraries.
25. Storage is cheap; why not keep all of them? (3)

26. The work files provide a good fallback starting point if the client is not pleased with the final result. For instance, a client might like the color and tone of the image but not the final crop. Having the digital intermediate saves a great deal of time. (2)
27. I keep a CD of everything I deliver to my clients.

Question 13: Do you move any of your digital images into long-term storage?

1. CD and DVD. (7)
2. But I am concerned about long-term storage. Will it be like film, were you could go back 20 - 30 years and still pullout a negative? Not likely because the programs that created/saved that image will probably not be around 30 years later.
3. About once every other month. (2)
4. At the end of each week, all original images, as well as, final photos are backed up on to CD and stored.
5. We conserve digital images on *Mitsui Gold* CDs in 2 copies for the moment. We plan to conserve our digital images on servers in the future.
6. I always store all my digital files [not only image files], to CD and to an external hard drive, as backup. (3)
7. The *RAW* file is like a digital negative and a backup copy of everything you shoot is important.
8. Original digital images that are received are numbered and filed, once we transfer the TIFF file over to a Gold CD. They are also numbered and remain as the working copy while the original is kept in a temperature/humidity controlled room.
9. Burned to DVD, added to a disk jukebox for archiving.
10. The use of the words “move” and definition of “long-term” are not clear. Long term for us is 25 to 75 years depending on the case.
11. Working photographs and potential file photographs (basically the choice pictures of any shoot) are archived and saved onto servers where a program called *MediaGrid* is used to search, sort, etc. Then the entire shoot (as well as what is on the servers) is burned to CD.
12. Images are kept on a hospital server. IT department back-up files on a nightly basis.
13. External hard drive and DVD. (2)
14. I archive the edits from each day onto a hard-drive as TIFF’s then to an external hard-drive after a few months, when the server clogs up.
15. Originals are all kept in a climate-controlled room.
16. Only images that I feel are of value or may be used for stock.
17. I plan to. I have an off-site storage space.
18. Good ones that I may want for possible contests, etc.

Question 14: Which of the following influence your choice of methods and/or procedures you use to save your digital image files for the long term?

1. I am just going with recommendations from colleagues with longer experience in the field.
2. The newspaper burns the images onto DVD’s. But I am concerned about long-term storage. What is the archival longevity of CD’s DVD’s etc....
3. My knowledge is limited, and my long-term storage is on CD - DVD disks.
4. Standards practiced by my industry.
5. Information that I read about long-term image preservation.

6. I used a combination of online resources that recommend standards for long-term preservation and updates found in newspapers, trade periodicals, etc. The choice is limited to backup on CD or hard drive- I try to do both.
7. I back up to CD, and am concerned that this is not a proper archival solution.
8. Several years of personal research (continuing) into the best file formats, archival storage media, optical scanning settings, gamma, ICC color profiles and more. Much garnered from the Library and Information Science programs, Getty Art Museum, and National Preservation Library.
9. I have experience in Pre-Press and apply that knowledge based on trade standards.
10. I use CDs (they are provided to me by my company); they are more or less universal. I also burn duplicates.
11. Continual research on upcoming technology.
12. We are aware of the limitations to certain systems, we use a 3-prong attack, live online using computer raid systems, tape backup of all files and an archive of images to DVD (two copies of each disk.)
13. I have 16 years experience in Electronics / IT , and this has guided my choices.
14. Scientific Working Group on Imaging Technologies (SWGIT) guidelines (available at fbi.gov) and our quality assurance procedures.
15. Research and comparison, statistics from well-known objective industry sources.
16. Medium depth on the subject through Internet research.
17. Via PPOC/PPA and photography magazines (which are mostly all us too!)
18. I back up photos onto DVDs and hard disk... just in case the hard disk fails (never happened yet) I have the DVDs and vice versa.
19. Financial limitations of newspaper - CD burner.
20. Price and equipment available. We burn CD back-ups, and that is it, we soon hope to go to DVD.

Question 15: When in your working process do you consider long-term storage formats?

1. That was addressed when setting up workflow procedures. It is not reconsidered on a daily basis. (6)
2. The format that is always burned onto DVD's by the newspaper is the RAW format from the disk (JPEG).
3. Depends on the project.
4. Each stage or format a copy is kept and filed in some location in the National Capital Region (NCR) to protect from lost or destruction from fire, explosion or flooding.
5. All RAW files are archived.
6. I save in the TIFF format via *Photoshop*.
7. Do you mean burning to a CD? That is what I mean by long-term storage formats. (2)
8. When I see that the photograph is good enough to want to keep for the future.
9. I don't really think of a hard-drive as being very long term.
10. I save all my images for what I have hoped to be the long term by saving all my images onto good quality CDs.
11. Every once in a while I also back up completed image files to DVD and or an external hard drive.

Question 16: Which of the following activities does your digital image preservation method typically address or affect?

1. Only data that also contains RAW images qualifies for long-term storage (i.e., if an image is only in JPEG format, then it will not be archived.)
2. I store in the RAW format.
3. Two versions of images are stored. The RAWs of all images made, an image "worked-up" and saved at the highest quality for printing and then my work archives the image that were used for printing. All these files are named appropriately, depending on where they are being saved or used.
4. I burn them onto a CD with a filing number that my paper's library uses to file them for possible future use.
5. I don't understand the question.
6. I don't know. I save all RAW disks (disk per session) then several completed orders on CD, then also to DVD or external hard drive version, in either TIFF or PSD. I am not consistent with format.
7. We have been accepting DCR, PSD, NEFs, TIFFs, and low resolution JPEGs from other Units, Establishments and Bases. There are so many types of digital cameras out there and so many ways of capturing the images. In our attempts to educate photographers, we could inadvertently alienate them from conforming.

Question 17: If you do save your digital image files for long-term storage, in which of the following file formats are they saved?

1. RAW (66)
2. PSD (32)
3. EPS (4)
4. RAW and TIFF
5. JPEG, if that is what is supplied.
6. We save the original file after it's been downloaded into the computer with no manipulation.
7. I save in JPEG format if burning to an optical CD and save as TIFF or RAW, or *Photoshop* (PSD), if saving to an external hard drive.
8. RAW format (JPEG) off the disk.
9. CPT (a RAW format). I usually save a copy in three formats and will probably start using the JPEG 2000 sometime soon.
10. I save the original RAW file and the final JPEG file.
11. PSD files and RAW files from the camera. (2)
12. RAW and/or original JPEG (2)
13. RAW and PSD (2)
14. If an image has a lot of retouching/manipulation done to it then a PSD file will be saved including all of the layers. (2)
15. Proprietary formats. (2)
16. The RAW file is the primary back up. When time has been spent working on a file I always make a back up of the processed TIFF file.
17. Very little TIFF
18. .PSD format uses less space than TIFF and also has no compression artifacts.
19. Archival prints
20. I preserve my original RAW images and save JPEGs or TIFFs as needed.

21. I save all RAW originals, converted version to JPEG and any PSD manipulated files, and I keep them all together on final disk. I will have 3 disks at the completion of a job. One CD with RAW files straight from the camera, one CD with edited and color corrected JPEGs and a final CD with any order files for albums and reprints in PSD and JPG lab order versions.
22. TIFF, with no compression (LZW, ZIP or JPEG are now options since *Photoshop* 7, but I do not use any of these).
23. RAW images are always used, and their JPEG equivalents are generally included on the storage media.
24. Some files are saved as .PSD's as well as JPEG.
25. BTIF and JPEG
26. I save the original in whatever format it was captured in, plus a PSD.
27. RAW and EPS
28. I only save my RAW images. JPEGs or TIFFs can always be created at any time from those. I consider my RAW images to be my negatives and the computer is my enlarger.
29. Or .CRT
30. RAW - however I am concerned that there seems not to be any recognized long-term format. I suspect that ordinary JPEG will be the most compatible in the long term. People keep messing around with TIFF too much.
31. Adobe® will never let their native .PSD files become obsolete because of the billions of them in use word-wide by the largest collections on the planet.
32. RAW with conversion to *Adobe* DNG format in the future.
33. I usually save at least 2 formats, sometimes 3 formats.
34. Always RAW and depending upon the job/client some PSD sometimes JPEG is sufficient sometimes TIFF.
35. I may also burn to CD some of the images as a JPG, but always archive all RAW files.
36. Saved as RAW files as well as TIFF and PSD.
37. For long-term storage, we DO NOT RESAVE THE IMAGE FILES, we make a copy of all the files including original, processed, and output files resized for a specific output device.
38. Our working CDs are images in the form of TIFFs.
39. Having archived the RAW file, we keep only a processed JPEG, but are likely to move to JPEG 2000 with new cameras. TIFF files would be more appropriate for images that have required a lot of processing.

Question 18: Is your choice of file format for long-term storage influenced by compression considerations?

1. The photo dept. doesn't seem to be setup for anything but JPEG…
2. I am not using image compression. (8)
3. In most all applications we use lossless formats. (3)
4. I avoid the use of compression with TIFF. If we move forward to JPEG2000, then this might be an influencing factor.
5. It's influenced by how long it would take to batch process all the JPEGs into TIFFs and burn them onto CDs or DVDs.
6. Disk space is the new "cheapest resource." That's one reason it is replacing conventional film in all market segments.
7. They're about the same. But yes, I would not archive JPEGs.
8. Compactness is necessary.

9. Image quality is paramount for advertising images; therefore, artifacts from compression are not tolerated.
10. We don't have the resources to save everything in an uncompressed format, plus we are sticking to the format that the camera uses for compression.
11. Yes, but mostly for future access.
12. I want all of the information the camera captured in my archived files. JPEG's are great for printing, but if I want to make a large color or exposure change I will always go back to the original RAW file.
13. I save my JPEGs at Maximum to ensure that there will be minimal loss of data in the file.

Question 19: Have you lost digital image files that you considered valuable, through software or hardware obsolescence?

1. Not yet. (13)
2. Not that I'm aware of so far. I almost lost some images saved in *Photo*-CD format, but with some work we were able to retrieve. (2)
3. Not that I am aware of, but then you don't know that something is lost until you try to find it. (4)
4. I've lost perhaps 1% of digital image files created in the mid 90s, which were stored on floppy disk - due to I guess a combination of degradation and improper storage [near a monitor, for example]. The rest have since been transferred to CD and external hard drive.
5. I re-save stuff before it become obsolete
6. Not yet, it is something we are currently trying to develop policy to address.
7. Ask *NASA*. They have, I believe.
8. But I have lost word processing files and I worry about losing digital image files.
9. But I am concerned about that issue. What happens to everything I have burned onto CD's in the future? What is the longevity of CD's? Is there a better storage system available? What if CD's become obsolete? This is the big issue for me. Trying to find the "forever" storage system for my files.
10. No, but will *Photoshop* or something equivalent be around in 20 years?
11. Did you know memory cards would make it through the laundry??
12. Almost. Original work produced with *Kodak DCS3* camera is now unreadable by contemporary software. Must keep "old" version of *Photoshop* and appropriately acquire modules if files are to be accessed.
13. Only human error maybe.
14. Yes, but I recovered the images with software...
15. Failure of a hard drive before the images were transferred to CDs.
16. Corrupt media cards!
17. "That'll teach you to buy cheap CD-R disks."
18. When I started the best method was optical burners. Ha! That was a good move, since they lasted about 2 years.
19. Some early camera images - 10 years old - require acquiring proprietary software that we have lost.

Question 20: Do you take measures to protect your digital image files from becoming obsolete or outdated and irretrievable?

1. But, tell me how? (3)

2. The photo dept. seems to be unmotivated in taking measures until it is necessary.
3. Not at this stage, however if CD/DVD readers start to become obsolete then I will have to address this problem. (2)
4. I've not needed to as yet - but I am planning to. (8)
5. I don't, but my employer does. (2)
6. I am starting to address this issue, before the volume becomes unmanageable and the technology changes. (4)
7. But I probably should. (5)
8. I am looking at secondary backup procedures.
9. I don't know of any system other than CD's at this point... By which I mean that if it looked like TIFF on CD would shortly no longer be viable, I would then do something about it, such as transferring the archives to updated format/protocols.
10. Hope *Kodak* will address this issue if it becomes a problem.
11. Keep updating to latest version, which is not cost effective.
12. In establishing the workflow procedures.
13. Only by having several copies in case of files becoming unreadable.
14. I pretty much trust the TIFF format above the others since so many programs recognize it.
15. I do things like save to newer media [from floppy to CD, to external drive, as examples], and ensure files are saved in current formats.
16. In following our standard operating procedures, using accepted industry practices and keeping informed with new technologies, I believe we are reasonably prepared in our protection of image files. (3)
17. Check CDs and re-burn.
18. Look for better ways to protect images for future use.
19. Try to keep the CDs in jewel cases and in a somewhat constant temp/humidity environment.
20. We up-date storage methods and copy old files onto new systems.
21. We have standardized on JPEG for this reason.
22. When a new economical medium of proven superior archival and storage abilities becomes available from a world-class supplier, we will migrate our stored files to it. We estimate that this will be necessary every seven to ten years or so.
23. I update storage mediums, such as from *Magneto Optical* / CD / DVD and then I duplicate them to protect from physical damage.
24. Simple and good advice from the early days of computing: Save Early, Save Often.
25. I try to save them in the latest version of *Photoshop* I have access to at work.
26. It is obviously important to be aware of equipment changes and obsolescence that could render images unrecoverable. Also of any research, which shows used media to be potentially corrupted in any way as a result of aging.
27. We have a service contact agreement with *iBase* and receive updates.
28. By reviewing data on subject.
29. Getting the pictures off of CD's!!!!

Question 21: If yes, which of the following measures do you take?

1. Removable hard drives.
2. I try to save a jpg version of the image if the capture/acquire software changes.
3. Ensure the PSD saved file is saved with all compatibility turned to max.

4. I sometimes create analogue versions of a digital file, such as printing to chromogenic photographic paper, but these are not 'archiving' practices: rather, they are in the production of exhibition quality visual art.
5. I try to keep duplicate copies onto CD.
6. Since I use a hybrid model, I consider my original film as my archival file.
7. As I shoot on film, I've always got negative or transparency to fall back on. This has saved my bacon several times this year.
8. I keep an old computer with all the relevant software running. (2)
9. I use one CD for items that need to be retrieved and another I don't use. Eventually, I will make copies of those.
10. We will update as software evolves.
11. Our major digital images are also archived to film.
12. We have used JPEG as a standard since 1993. There have been no damaging changes.
13. To the point of keeping old computers with old programs and all the programs. Such as *Windows 95* because some old file formats and programs only run on specific operating systems.
14. I store images in a dedicated archive.

Question 22: Is it important to you that your images can be proven to be yours?

1. Yes and No. My employer has the rights to all of my images. I hope that the credits are correct, but mistakes can happen.
2. Not quite yet, but I have considered this issue when allowing low-resolution proofs to be accessed through a web page.
3. Almost all of our work is produced for a client who owns the work (after they pay for it!)
4. No, but it should be.
5. Yes. But, only the good ones. It is also important for me to be able to prove the bad images are surely not mine.
6. Yes, for copyright purposes and for forensic evidence.
7. The photographer's name follows the digital picture in the International Press Telecommunications Council (IPTC) metadata (http://www.iptc.org/IPTC4XMP/).
8. Yes, but having original, dated files, with versions, has put me at ease [e.g. I do not feel a need to purchase software to 'watermark' my digital images.]
9. Somewhat, although it has not become an issue - I know it affects others more profoundly in other professions.
10. But I do nothing different from when I used 35mm film.
11. Important, but I do not know how to do so!
12. I'm not sure why this question is in a questionnaire for pro photographers.
13. VERY! I use EXIF data provided via the camera itself, and an outstanding program from *Canon*, which encrypts your file as it is created. Simply an outstanding system in my opinion.
14. Intellectual Property thieves are still Thieves.
15. But I don't know, as of now, what this 'means' in the digital world. I don't know of a broadly usable means of implementing this security.
16. Anybody I show them to will have to take my word for it that they're mine.
17. I would need to know the cost attached (i.e., if my capture device must be encoded by law or my computer), then probably not.

18. This is a capital issue. I would love to see a feature on a digital camera that imbeds my name into the file when it is still in my flash card.
19. Not so much mine as the Institution where I work. Fighting a losing battle here with electronic files.
20. Watermarks are not acceptable for forensic work.
21. Medical images must be recorded such that we can demonstrate an audit trail.

Question 23: Is it important to you that your images are accurately displayed and properly credited to you?

1. AP stands for Anonymous Photographer.
2. Credit the creator AND owner, such as: Associated Press photo by John Q. Public
3. Also, I believe that credit should be given to photographers just like stories have bylines.
4. I'm just not as sensitive on this subject as most people seem to be, not keen of someone making money from them though without my approval.
5. It depends on the application – commercial, yes; for private clients, not as much. They pay more without credit.
6. As long as I am properly compensated.
7. This issue was always important even with film.
8. Working in a commercial environment, pictures are often altered by the client and usually appear without credit, but never without compensation.
9. When used in books and magazines, I expect a credit.
10. Yes for portrait and stock images - No for most commercial and industrial applications.
11. Especially students who are often doing a certain amount of work free of charge but still want to be credited for their work.
12. Proper display is more important. I realize that photo credits aren't always possible, but I don't want an artist manipulating my image other than cropping for publication.
13. Evidence may be required in a court of law. We need to be able to say who took the photograph and give the date and time.
14. It gives the industry and newspaper credibility to see a name on a photo and story.
15. Security, consent for use and control over usage are legal requirements in the UK for medical data - which of course includes clinical photography.
16. Somewhat important depending on the image.

Question 24: When you send images to others do you protect your digital images from being manipulated or copied?

1. Other than only sending low-resolution images, I don't know how to do this. (7)
2. Oftentimes other users of my work need to make changes that would prohibit me from saving it in an unchangeable format. I try to monitor that they do not misrepresent my work when it reaches final production. But I admit that is difficult.
3. I would like to if there were a method of doing this- but actually there is very little available to prevent this from happening.
4. I include terms of use in my communications.
5. International Press Telecommunications Council (IPTC) (http://www.iptc.org/IPTC4XMP) - copyright info / low-resolution supplied for "positionals."
6. Currently, I know of no foolproof way of protecting digital files from being changed or copied. (4)

7. The protection is done by professional ethics.
8. Besides noting in *Photoshop* "file info" that the image is copyrighted, and with written correspondence to that effect, no other st*eps* are taken in advance.
9. Because this is part of the sales agreement.
10. We do not release the original *RAW* image, only the *JPEG* equivalent. We do identify ourselves in the EXIF data, we sometimes watermark. This can be bypassed in most circumstances, unless proprietary programs are used (in which case there is a limitation on who can view them.)
11. If I sell a digital image, they have the use of it. "File info" and my name are saved with the image.
12. I have either been compensated or I am sending downsized thumbnail JPEG's.
13. My images are for publication and they are delivered to a client to be reproduced.
14. I don't do anything other than restrict the size to the final usage.
15. If proofing only, I drop text on the file describing it as such and identifying copyright.
16. Other than watermarking, which I have heard is not foolproof either, I do not know of a failsafe procedure to do this.
17. Copyright is protected, and some images are watermarked.
18. Too complicated. I send an attachment with basic rules: Destruction after use, etc.
19. Not usually because I have few doubts about the integrity of those to whom I send images. However on prints when supplied I have a copyright notice on the reverse.
20. I do inform in writing that the images are intended for a particular use and are not to be republished or reproduced beyond those stated intentions.
21. I give notice that the photograph is to be used under copyright laws and ask for a credit line. Also if someone requests a photo from me, I will charge accordingly.
22. Previews may be sent watermarked - all files are accompanied by standard terms detailing copyright and extent to which the image file may be manipulated or modified.
23. We try to maintain control over distribution, but have no foolproof method of preventing copying/ manipulation.
24. But only through stating who owns copyright on print, or CD with details of the images licensed usage. Nothing physically stops them, only the law!
25. As much as I can. (6)
26. Clients are informed that any alterations made to the files, remove me from being responsible for the performance of the altered files.
27. We have a copyright protocol.
28. I try by using small file sizes (low resolution) and watermarks if suitable. (4)
29. Our clients usually receive their end product in the form of a print or analogue videotape.
30. Pictures are marked as "Copyright" material and clients are advised to use images only as licensed. It is hard to protect your pictures from theft.
31. Sometimes. Control is handled by the photo editor.
32. This is achieved through the statement of terms and conditions around the use of the image.
33. Depends who is receiving them. Clients get TIFFs. Mail shots are either low-resolution JPEGs or PDFs.
34. Depending on use. Commercial images will most likely be manipulated. Consumer images are protected as much as possible but that doesn't stop someone from manipulating or copying.

35. It really depends on what use they are being sent to others for. If it's for reproduction, then I make them the best quality I am able to for transmission over the Internet. If they are for previews they are low-resolution and watermarked.
36. For professional images… yes.
37. Not practical in the press arena but on the web - yes I do.
38. It is currently our policy not to release digital images. We supply hard copies to our users using conventional photographic methods or dye-sublimation prints.
39. "Protect" would mean "prevent", and that is an expensive and ephemeral system that nobody has made universal. We do our utmost to label, embed and announce our copyright legibly and digitally in each image. Groups of images can then be sent to the US copyright office periodically.
40. I maintain the "original" and I always fill in the IPTC data (International Press Telecommunications Council, at http://www.iptc.org/IPTC4XMP/).
41. Dictated by prior agreement with clients based on our trademark and copyright.
42. The jpg files are small and printouts are of a very poor quality. But, I have seen a poster made for a talk I was giving and the image was downloaded from my web site and it was a surprise, in that it did reproduce very well. So how do you stop that from happening? I haven't a clue.
43. This is not possible in reality. I just do not post or make images available for others to "improve on" or screw with.
44. Generally I send screen-resolution images via the computer. They won't print nicely for anything larger than a 4x6 typically. If the client is a real business customer of mine, then I'll send them the high-resolution image on a CD. I can't really stop them from manipulating the images, but at least my publicly-available online images have embedded copyright notices, so any artist would immediately know that they may not have rights to do whatever they're about to do to my photos.
45. There are cases in which I know they will be manipulated (and, for that matter, displayed without credit). I make sure my contract takes this into account.
46. I put a copyright notice, but people could ignore it and the photographs could still be copied.
47. Incorporate Author/Copyright details into image.
48. Only by visual observation. If there is software that locks the image from being manipulated...I don't know how to use it.
49. Trusted recipients (i.e., my artist representation agency, my collaborators), I will not use protection with them.
50. When I can - but don't know too much about it. The ways I have tried have made some files unavailable to third parties in the past.
51. I send low-resolution files over e-mail and credits in "file info."
52. We insist that our customers are aware of copyright laws.
53. Yes if the images are for selecting a "best one" of a series
54. No if the image has been commissioned and paid for.
55. How? Apart from marking images as copyright.
56. When sending for review I will visibly watermark any "comp" images with a filename, or copyright symbol. If I'm delivering a file for reproduction I will include information in the metadata, and will often include a "read-me" file including licensing information.
57. I don't use cyber transmission. (2)

Question 25: If yes, which of the following methods to you use to protect your digital images?

1. I am just starting to use watermarks, up until recently it has been that I have a signed contract with users rights etc outlined.
2. We often use read-only files.
3. Reduce the file size as a print can't be made, it is only for viewing. (5)
4. JPEG at low resolution.
5. I graphically watermark my images as well. (2)
6. Check to be sure photograph is published the way it was sent.
7. Text tags state copyright.
8. Images marked as my copyright using "file info" in *Photoshop*. CD's sent out with a "License to Use."
9. Notice in paper format and as PDF burnt onto the CD
10. I have contracts or contributors agreements that spell out how the image can be used.
11. CRC check and byte count.
12. Agreements with purchasers of newspaper images.
13. I will never send file sizes that are large enough for printing unless a contract has been reached regarding the use and frequency of use of my images.
14. I try to maintain a level of trust and respect with my clients regarding my work and their usage of my work.
15. "File info" - *Photoshop*, copyright details across the picture.
16. *Canon* encryption via software provided from *Canon.*
17. There is no "Copyright Cops." We have to do our own detective work.
18. When sending images to someone that I think will exceed my rights to my image, I will try to provide an image that is not easily reproduced without compromising the image quality. For example, it will be a small JPEG file in a low-resolution. I try to make it clear (verbally and written) to the person receiving the image that reproduction without authorization is illegal.
19. Licensing paperwork often accompanies the CD with which it is delivered.
20. My original digital files are kept for comparison to printed media for alteration.
21. Some software will burn slideshows that prohibit copying (encryption).
22. If a print, then ALWAYS a copyright/contact info stamp on the back
23. In the UK, Copyright is a right, not an option!
24. Outside contractors, publishers or anyone who may profit from our images go through the Directorate of Intellectual Property for permission. Newspapers, National and International magazines and private individuals get the images without any cost!
25. Slide-show formats from which individual images cannot be captured.

Question 26: Do you make your digital images available via a web page?

1. Not yet but soon. (11)
2. They are available for viewing only, like a portfolio. (2)
3. Rarely and not all my images. (7)
4. Only low-resolution. (15)
5. But only in small (resized) JPEG versions.
6. Some. (3)
7. Not all my images, and at typically unprintable resolutions.

8. Even if I didn't work in the photojournalism industry, I'd publish photos on the web, but highly protected from copying and retransmission.
9. Proofs only with filename and copyright imbedded on image.
10. A secure limited access page.
11. The company does.
12. Newspaper has online version - images are 72 dpi.
13. They appear on my web page but are not offered as commercial or indeed free products.
14. Images viewed over the intranet via a web browser system. But only internally to authorized users. (3)
15. My images are available for download via the web to paying registered users only.
16. I do not supply original data on the web I only provide images that we have processed.

Question 27: If so, how do you manage access to your digital images?

1. I don't manage or restrict access to my images.
2. I use an Open Source gallery program.
3. Not managed by a database, I use a file-naming structure of my own. (4)
4. Pictures on line all have a white border with © symbol and contact information should a person wish to use them. I have a warning notice on every page of my site advising that the pictures are Copyright material and available for license.
5. Another party manages access. (12)
6. Unique URL's are supplied for specific work(s). (2)
7. Files stored on CD. File name saved on computer, as a tree of folders: Client Name>Job.
8. We developed our own secure server that will only allow pre-approved individuals access to image that have been assigned to them.
9. Just standard access controls of the web server. (3)
10. Copies of photos published in our various newspapers are sent to a photos-online file weekly. These are burned onto a CD, and when a request is made the photo is uploaded to an entity that produces hard copies for the customer.
11. Online picture library.
12. I use clear Copyright info as text on each page the image appears. No image can be clicked and dragged-off without a warning appearing.
13. I don't really manage the low quality images on my web site. I do not allow any public access to my exhibition quality digital files.
14. Access to database only by password. (2)
15. I use a *Filemaker* database to manage all my jobs. Each client's images are stored on a CD and DVD (monthly) under their name. It is not important to me to know and retrieve individual images.
16. We use *iBase* medical image manager.
17. I have in my edit process the ability to know which images I have sold and to which publication. When one is requested it is relatively easy to locate.
18. Only a small number of images are online at one time. After a short time I remove them from my web site.
19. Usually ftp a *Photoshop* automated gallery to my own web site as folder "smith." Client accesses by web address/smith.
20. I put together my own web page in Flash, which doesn't allow the user to take the photo from online.

21. Unauthorized use of images by anyone for personal or commercial profiting has been or will continue to be addressed in the court of law.
22. The DBMS was written in consultation with a steering group of high-level users, so have all the controls we require built into it.

Question 28: What information do you record about your digital images?

1. Color space/conversion information.
2. client, date, product
3. Information relative to the application.
4. Filename only.
5. This information is found in the naming convention for each photo file.
6. Name of the distributor.
7. Any enhancement is described in the note, with sufficient detail to allow another competently trained individual to carry out the same process.
8. I create contact sheets of all the stock files to aid me in finding the images. A number on the contact sheet identifies each picture.
9. Filed using Job numbers/dates and diary entries.
10. EXIF is important as well.
11. Not necessarily all of the above or all of the time.
12. My name and contact details (as copyright and personal advertising).
13. Information about what is captured by the image.
14. Caption info, where applicable.
15. At this point I don't use a sophisticated system, but will need to as I increase the percentage of digital work vs. traditional film.
16. Date and location. (3)
17. The file format carries detailed date/exposure information.
18. Level of consent given by the patient is also recorded to prevent misuse of clinical images.
19. Client name. No information, apart from automatic information, is applied to my shot work.
20. Notes describing processes applied (i.e.: values used when adjusting levels).
21. Any info I may want is embedded in the *RAW* image.
22. I label the disk or client envelope with date, etc.
23. Because of limited office software, images carry very little information.
24. Name of photographer, a one-word description and the last time the image was saved.
25. Technical relationships... is a good idea. But don't do it.
26. You've missed something out here - information about ownership. I leave no doubt that I am the owner of the intellectual property in my pictures.
27. The Five Ws in the caption, the name of the photographer, File number, image number and on which CD it is being kept!

Question 29: Do you apply security measures to protect your digital image files from access and accidental destruction?

1. Not at this time, but I'd like to. (3)
2. Sometimes I do, but it depends. I sometimes generate a hundred files a day. (2)
3. My employer does.
4. I have copies, but it is something that I need to review. (2)
5. Read-only media.

6. I copy the digital files from the storage card onto a CD, and burn the CD to archive.
7. Unless you mean keeping the archived CD's locked inside my business.
8. Security - no. Protection - yes. All files are stored twice on hard drives, three times on DVD's.
9. Accidental destruction. (2)
10. We have internal storage.
11. Work in progress is usually stored in 2 to 3 locations on the network. Once burnt to CD/DVD only physical destruction of the disc would prove a problem.
12. Back up of files. (2)
13. Back up of images to tape and DVD's.
14. I store the archived data in a fire rated safe, and hope in the future to use a Bank Vault.
15. Back up discs and two sets of archive discs.
16. There are only two administrators who have authority to delete photographs.
17. Physical security.
18. Restrictive entry, chemical fire retardant, locked room and climate controlled.
19. I burn my own DVDs apart from work and at work they burn two sets of DVDs.

Question 30: If yes, which of the following security measures do you use?

1. I make 2 CDs and/or DVD's for archival storage. One stays on-site. The second is stored at a separate site. (3)
2. Some images are encrypted.
3. Images are watermarked. (2)
4. Files may also be archived to film.
5. I don't share details of security measures.
6. I store them in bank vaults too.
7. I never store original work online or any image which the public has not had public access to as a printed copy or online.

Question 31: Are you aware of the standards and guidelines promoted by the following institutions regarding information management and preservation?

1. I usually just do the *DOG* test standard. I'm surprised you didn't include it in your list. It is far superior to all of the above.
2. Library and Archives of Canada and the Canadian Conservation Institute guidelines.
3. Not directly.
4. I am probably aware of many of these institutions guidelines but not so familiar that I can quote which ones say what. (2)
5. I am a newcomer to the digital arena - I'm interested in the images but not the technical considerations.
6. I'm aware they exist, I've just never bothered to look them up. (3)
7. Although I have not checked into the above standards institutions, I will copy the above names you have posted and investigate them. (2)
8. I have not found these to be of great help.
9. No, only our ongoing fight over the copyright act.
10. I follow my own standards. These organizations are all way behind the standards developed by photographers who are at the cutting edge.

Question 32: Would you follow a standard for digital image creation and file maintenance to ensure the longevity of your digital images if it was applicable to your practice and made available to you?

1. Our current data should be able to port to any future standard. (2)
2. Probably. (2)
3. Probably not.
4. Only if it fitted in with my present practices. (5)
5. It would depend on cost and file compatibility and ease of use and so on. (4)
6. Its reliability will have to be scientifically proven.
7. As long as it's written in plain, simple English and does not occupy more than 1 side of a page in 12 point type!!
8. We have recommended guidelines from the Scientific Working Group on Imaging Technologies (SWGIT), which are most applicable to our profession (fbi.gov). (2)
9. ASCLD/LAB has recently recognized digital evidence as a credible discipline. It has looked to SWGIT and SWGDE (Scientific Working Group for Digital Evidence), for direction as not all issues in the sub-disciplines has been completely resolved to the community's satisfaction.
10. Only if it were made universally written and encoded/adaptable on every major computer platform, and had been examined for two years at least by leading industry developers.
11. Let me know what is the best scientific method to archive my digital images. (4)
12. YES, but only as one of several methods, and it would have to be affordable.
13. If this standard will not change the original format and if the Press around the world will accept it.
14. It would be against my will to use a format that was impractical or not easily integrated with older forms of archived storage.
15. I think new types of files will be created by *Canon*, *Nikon* etc. in the future and I assume that you mean not setting a standard file type for a camera to capture, but for saving after editing.

Question 33: Please add anything further that you think might be useful for us to know about your digital photographic practice.

1. Images are kept on one PC and the related database on another.
2. I have tried to be aware of the various physical characteristics of CD and DVD storage media. What company provides the most stable disks is an ongoing point of concern. Some studies have shown significant deterioration after only 3 months. I have started the move from CD's to DVDs. However, the double density DVD's are questionable in my mind.
3. Very basic. I use a client-driven, alphabetical library with a folder for each letter sub folders in client's names then subject name plus date.
4. I think that we need a way to always have a "negative"-type digital file to go back to. We will need to be able to correct for color, crop, etc., but should any question of alteration come into play, an unchangeable file needs to exist.
5. Am looking for an easier record keeping method that is efficient and easy to use.
6. Much of the criteria we use is determined by the need for image integrity and authenticity as is applies to Forensic Science and Law Enforcement.
7. Daily newspapers record history in a hurry and I'm worried our children won't be able to access information we recorded because of changing formats.

8. We're likely to lose a lot of our history soon.
9. I have discovered that when using *RAW* files in *Photoshop* CS, the changes made to the *RAW* files are only readable to the particular software that created them. If you have a network and a *RAW* file is manipulated, other computers on the network will not be able to view the manipulations until the image is converted to a *TIFF*, *JPEG* or other format.
10. Use Mitsui Gold CDs to back up all your images. Use several servers located in different locations to conserve digital collections. Duplication is the key for digital preservation. That is what banks do. Use good Metadata software to preserve the collection information and duplicate this information.
11. I keep track of my processed pictures via a database software and keep the camera name along the editing process, so from the *RAW* to *JPEG* for catalog through to the original they have the same number, the flaw of this method is that I am losing the names of some images I combined to make a later one.
12. All my eggs are not in the digital image format basket. Ease of image loss through hard-drive failure or other inexplicable problems unique to digital image format only reinforces the logic and efficiency of silver-based image storage.
13. Every time I download files I create a CD number - I started with CD1 and after eighteen months of digital shooting I'm up to CD 137. Each CD can be as little as one disk or as many as ten which then become: CD-_1, CD1_2, CD1_3 etc. All the images from my *Canon* 1Ds camera start the image number by default 419U, which is a number *Canon* automatically assigns to my camera. So when I download the pictures from my next shoot I'll create CD138, all of the pictures will have sequential numbering that start with (e.g. 419U7685). I will rename the processed files 138U7685 etc… In this way I can quickly find the original files on CD. When the camera gets to 419U9999 it will revert to 419U0001. By replacing the 419U with my CD number I ensure that I will never repeat the same number. This system worked for me.
14. I currently use a hybrid system of digital imaging because it offers not only the most flexibility in terms of image making but also the best system of back up to ensure longevity of the images.
15. As this business evolves, my approach to archiving and record keeping is best described as 'rolling with the punches'.
16. I am currently burning two CDs each time I have 700M of info about certain topics. I have about 80 CDs of images (including copies). I am about to re-catalogue and burn everything to DVD. I will use *Extensis Portfolio* to manage my files. I will again burn a copy and maintain it off site.
17. Since switching to digital imaging I have been constantly improving the process of saving and archiving our images, to the point where I feel we have a reasonably foolproof system. The only unknown for me at this time is how well and for how long the media will retain the images.
18. Storing digital images is much more convenient than storing film images. Retrieval is quick and the digital images are far safer.
19. When we shoot analogue we save all negatives or images, now we don't.
20. My experiences have been more towards documents and images compiled for case management.
21. While there is no official company policy or procedure at this newspaper chain for archiving photos, other than saving photos for purchase by readers, the photographers here took it

upon themselves to do so. Methods are by no means uniform. I do it monthly, with photos and caption info in folders by category. Another burns a CD when he has enough to fill it.
22. I do find it difficult keeping track of image files although it is much easier than film!
23. I work for a newspaper, and those in charge of the photo lab / archive library take care of all of our image storage.
24. We currently operate under SWGIT guidelines, quality assurance procedures and industry recommendations.
25. Actually I have little faith in the long-term viability of digital images, or any digital data for that matter. Digital data is at the mercy of IT corporate interests and format evolution, which renders files unreadable. I was a musician and have lost a huge amount of audio data to file format, software and hardware obsolescence. Try finding a working *SyQuest* drive now!
26. For really important images the best storage medium is probably an archival print. You don't need a machine to read that.
27. As for record-keeping, we need easily accessible common guidelines, promoted by all the major professional bodies and insisted on by major clients.
28. Essentially my backup procedure is to write to CD and as yet they have not let me down.... I have CDs that go back to 1996. Before then I used optical drives but have not needed to access these.... yet!!
29. I have not formalized a method of keeping my digital images—not in the same way that my film images are kept. I don't feel good about the lack of standards, but I keep going because the benefits of digital photography are so great. Digital might mean ephemeral.
30. If *Photoshop* continues to purchase and make proprietary extensions and people in the industry continue to support them, the archiving of images is going to be controlled by one or two companies. Reality is it's a business, and control is money. One has only to look at the music industry of the 60's and 70's, where musicians of that era have to sue for the right to perform the music they wrote and made popular. Should a government decide to control a standard then they would control all the works all the work, everything. Be it a company or government or any person or group, they will control everything visual, artistic, where, when and how, every aspect.
31. My original is the digital file, however the signed print is the original for everyone else, in limited edition, with documentation.
32. Everything saved as photo CD - will CD ever change?
33. Stop making new formats and incompatibility with existing files and current consumer software. Too many software programs are for PC only or abandoned by creators. Too many agencies and magazines have their own formats. It is a nightmare. On the other hand: The cameras are improving, the medias are more reliable that is the good news. The digital files then depends so much of your computer and personal choices.
34. I would like JPEG formats to retain author and copyright information even after sending them through e-mail.
35. Lots of teething problems to start with. However, overall digital imaging has numerous advantages over the conventional method, particularly with regard to: faster working, images available more quickly for the users, networked system, patient data protection, confidentiality and consent. The users accessing the system can be audited and this helps to prevent misuse of clinical images.
36. I only wish that the process of burning CDs became faster.
37. It would be fantastic to have lifetime shelf life on CD storage.

38. I create 2 copies of each file upon completion of jobs both copies to CD-R. Will move to DVD in near future. Also looking at 3rd back up - onto external hard drive.
39. I am a member of PACA (Picture Archive Council of America), which is actively working to create a series of digital standards for the creation/maintenance/transfer of digital images.
40. I have digital JPEG files from 12 years ago stored on CD that are still OK.
41. Very refreshing to see such technical questions (and definitions of some of these algorithms) whatever you're up to over there you're on the right track!
42. I am concerned about CD's that were fine, but now aren't. Or they get scratched etc., which is why multiple backups are a good idea. However CD's haven't been around long enough to know if they will prevail. I don't worry too much as we will all be in the same boat and the issue will be "understood". Portrait clients aren't likely to require images after a few short years anyway.
43. I would like to see improved management of RAW files, i.e., not camera specific and just easier to use generally.
44. I keep all my photographs organized as to date and subject matter. When I have enough for a CD, I will place them there for permanent storage. I am also in the process of scanning my 6 yr. old film negatives and archiving them for permanent storage.
45. Due to intellectual property rights, the question must be asked – "who owns what", especially if you are employed by a company or organization. The artist must also ensure that even if the company he or she works for uses a system of archiving their digital files that the artist must also have their own copy of the images. Again this may present a legal problem but it does guarantee that the work isn't lost. That being said, file formats do change over time.
46. One concern about digital storage is that image files do go corrupt. Having stored digital images over the last ten years I occasionally retrieve files that are unreadable and lost forever. These are not necessarily older files but could just as easily be 3 months old. Perhaps it's dust on the storage medium.
47. If the file is important, it should be backed up multiple times.
48. Archiving for our company is a disgraceful activity and regretfully neglected. The files are saved with about the same amount of information as traditional film negatives. Lack of knowledge on the best ways to save and archive the information is a big concern.
49. Backing up on CDs, portable hard drive & a laptop's hard drive. All this out of fear of losing images through file corruption or accidents.
50. It is important to preserve the metadata associated with each image file and the dates associated with each image file.
51. I keep a duplicate CD of all the work I deliver and keep them in chronological order with key words to identify each job.