Pixel Preservation: Observations on the Current Collecting and Preservation Practices of Cultural Heritage Institutions Regarding Born Digital Photographic Materials

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Abstract

The role of born digital photographic materials in the collections of cultural heritage institutions is growing, as are concerns about preserving these images for the future. In order to ensure the longevity of these materials, there are many complex issues that need to be considered before museums, libraries, archives, and other cultural collecting institutions acquire born digital photographic materials in significant quantities. There are many components involved in making appropriate decisions for any particular institution. This thesis project will address some of the issues that should be tackled before collecting born digital photographic materials, and it will also share some thoughts about what selected institutions are doing currently in regard to collecting and preserving born digital photographic materials. There also will be suggested guidelines for institutions to consider when starting to study the acquisition process, as well as resources to contemplate before and after undertaking any acquisition process of born digital photographic materials.

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Dedication

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Introduction

Traditionally, photographic collecting institutions acquired photographs that fit their mission in aesthetic, historical, and cultural terms. Depending on a photographic object's origin and type, collecting institutions developed methods of preserving and conserving particular types of photographic objects. In the last twenty-five years, emerging and converging technologies in the field of computer image recording have created a new type of photography, which is digital imaging. Digital imaging is the process of taking an image with a digital camera or creating one with a scanner, and then using computer hardware and software to view and/or print the image. There is no chemical developing or film negative involved in the born digital imaging process. The processes involved with digital imaging are still in their early years and present new challenges in the maintenance and preservation of digital images, whether in their file form or in a printed expression of the file form. The threat of technological obsolescence is the principal menace that photographic collecting institutions face when acquiring born digital images. In the past, the general public and the collecting community alike had come to expect that photographs, when treated with proper care, would last several generations if not a hundred years or more. With digital images at this time, this expectation of longevity of a hundred years or more cannot be met readily due to concerns regarding technological obsolescence and related technological problems.

As a result of this new technology, the cultural heritage community has started to collect born digital photographic images. "Born digital information is created digitally and has functionality which requires use of appropriate hardware and software."[1] As a part of the born digital group of information records, a born digital photographic image is an image that has no negative in the traditional sense, is made of pixels, needs a device which includes computer software or hardware, or needs to be printed in order

[1] Marsha Hanna. "Born Digital – Live Digital? Maybe." http://www.icsti.org/forum/38/index.html.

to be viewed. For example, an artist might use a digital camera to create images for an art installation and then give a small art museum the original digital files. The small art museum now faces the challenge of caring for and preserving the born digital photographic materials in their original file format.

There is a difference between the born digital image and a digital image. The born digital image has no analogue equivalent; other digital images start with an analogue equivalent. For example, a digital image can start with a photograph scanned into a software program and then uploaded to a database. This original photograph that has been scanned is the analogue version; and the born digital image has no physical equivalent to that.

There are many fears about the longevity of born digital photographic images: there are concerns about technological obsolescence of computer software and hardware, problems of longevity of media storage devices, and the related need to have financial means sufficient to care for a collection. Before I could form suggestions about policy creation in relation to born digital photographic materials, I wanted to become aware of what photographic collecting institutions were already conscious of in regard to caring for born digital photographic materials. Given the uncertainty regarding the longevity of born digital images both in their digital and their printed forms, I decided to survey a group of selected photographic collecting institutions to find out what their current thoughts and policies are about collecting born digital photographic materials. The general uncertainty about the longevity and stability of born digital photographic materials is a problem that collections managers are starting to encounter; and they would benefit from a greater understanding of the current information surrounding born digital photographic materials. I decided that it would be important to share my findings with other members of my profession as I believe there is a gap in knowledge about the technical aspects of collecting born digital images and collecting a born digital image because of its aesthetic worth.

Originally, I wanted to send the survey to one or two online forums related to digital photographic images and/or photographic conservation for response as well as sending the survey to a variety of cultural photographic collecting institutions. It was clear that sending the survey to online photographic forums would not return the thoughtful concise results that were needed therefore I decided only to send the survey to a group of select institutions. The survey was specifically aimed at collections managers and registrars, as these are the people that possibly have to manage born digital photographic materials on a daily basis.

The results of my survey showed that a few collecting institutions chose to collect born digital images before this medium became a standard of twenty-first century photography. Other collecting institutions have been forced by circumstances to collect born digital photographic materials. For example, the Smithsonian's National Museum of American History's (NMAH) Photographic History Collection first began collecting their born digital photographic materials due to the events of September 11, 2001. As Shannon Perich, Associate Curator of Photography, relayed to me, "9/11 was an event that was documented digitally; and therefore we had to collect the born digital images of the events".[2] This has created an interesting problem for the NMAH's Photographic History Collection that of having collected objects without knowing how to care for them in a proper manner. Unfortunately, the returned surveys indicated that NMAH is not the only collecting institution that is coping with this dilemma.

When the combination of the personal computer, the digital camera, photographic software, and computer photographic printers became financially accessible for a significant number of photographers, it changed society's concept of photography. A photographer no longer has to spend hours in a darkroom processing, developing, and printing images. In the same amount of time it took to process images in a darkroom, born digital photographic images could be produced and reproduced

[2] Shannon Perich (Associate Curator – Photographic History Collection, Smithsonian NMAH), in discussion with the author, December 2005.

many times over. However, this ability to create large quantities of born digital photographic images has created an interesting dilemma for museums, libraries, archives, and other cultural institutions that collect photography because there is now a proliferation of images in a much shorter amount of time. The technology used to create and print born digital photographic images is untested in terms of longevity, which creates an enormous problem for these institutions and their responsibilities. Some of these responsibilities for certain institutions are legally mandated regarding collecting and maintaining born digital photographic materials. To discover how collecting institutions are coping with born digital photographic materials, I sent the survey with a range of questions to fifty-four institutions representing libraries, archives, museums, and historical societies.

Most current literature about digital collections is all-encompassing, meaning that the information is mostly about electronic documents with a section about born digital photographic materials. There are a few pieces of literature solely about collecting and preserving born digital images. Some current thoughtful literature about collecting and preserving born digital materials comes from the British Library, Library and Archives Canada, and the Library of Congress. These institutions are legally mandated through either state or federal laws to maintain the stewardship of their collections in perpetuity; and they, therefore, need to keep abreast of current trends and practices in computing and digital photography.

A print made from a digital image file may be more fragile than prints produced via established pre-digital photographic processes. A digital image's existence depends on adequate storage of machine readable binary code. If archivists wish to keep a human readable expression of the image data, they may elect to produce prints on paper. But they must keep in mind that printers will create an interpretation of the digital information that will begin its own process of deterioration. Variations of ink, paper, and printer will determine both quality and longevity of the print. Collection managers and registrars should understand that ink-jet prints (to use an example) may

have different preservation needs than those of established pre-digital photographic materials.

One of the most active researchers in the field of photographic preservation, Henry Wilhelm, has dedicated his career to studying problems encountered with both photographic prints and digitally printed images. Wilhelm carries on very comprehensive research about the reliability of manufacturers' statements regarding the longevity of prints, including aging tests and dark fading tests. He is considered an expert in the field, and his website has an enormous amount of information regarding ink-jet printing. The Image Permanence Institute at the Rochester Institute of Technology is another significant source of information about preservation materials for images.

The world of born digital photographic materials has a language of its own, ranging from the file types to the media storage devices for digital information. Among the file types that are included in this paper are JPEG, JPEG2000, and TIFF. Joint Photographic Experts Group or JPEG is the most common file format. The JPEG is a file compression format which loses image information every time that the file is saved or re-saved. The change in compression alters spatial resolution, tonal range and color, and further causes compression of numerical derivatives of all the file components. JPEG is not considered a preservation format because of this loss of information when saving. JPEG2000 is the next generation of image compression tools: it is supposed to have lossless technology but this is relative to the traditional JPEG file. The use of JPEG2000 requires special software downloads to work in photographic manipulation software such as Adobe Photoshop and to open JPEG2000 files in web browsers. JPEG2000 is in the preliminary user stage and has been slow to catch on. Tagged Image File Format or TIFF is considered a preservation format because it is a lossless file wrapper. It is a file wrapper because it contains all the elements needed to produce

or reproduce the image at full resolution and bit depth. [3] At this time, the TIFF file seems to be the most well known and practical storage solution.

CDs and DVDs are storage devices. CD is the abbreviation for Compact Disc, which is a small optical disk on which data such as music, text, or graphic images are digitally encoded. A DVD is a digital videodisc or digital versatile disc, which is a recording on an optical disk, played on a computer or DVD player. The full descriptions of these terms are rarely used in everyday context. Information that is on CDs and DVDs is written on those storage devices by a laser as well as read by a laser.

To gather information about various institutional collecting policies and the thoughts of collection managers and registrars about collecting born digital photographic materials, I devised a survey with fifteen questions to send to museums, libraries, archives, and other cultural heritage institutions. The survey was formulated after reading a selection of current articles about the subject and talking with selected professionals who care for and collect photographic materials. The survey was sent to fifty-four institutions in three countries (United States, Canada, and England). The institutions were picked because of their known interest in collecting photography. In some cases, photography is the emphasis of the institution; and in other cases, the emphasis of the institution is widespread within cultural heritage categories. The selected institutions comprised a variety of sizes, both in their collections and institutional size. Both government and privately funded and operated collecting institutions were chosen.

The survey was printed on resume weight paper, ivory in color, and sent out through the United States Postal Service. The color and weight of the paper was selected deliberately to give the survey importance once it reached someone's desk. My

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[3] Tim Vitale. "Digital File Formats – TIFF, JPEG & JPEG2000." May 2006 http://aic.stanford.edu/sg/emg/library/pdf/vitale/2006-01-vitale-digital_image_file_formats.pdf (accessed July 2006)

hope was that it would stand out because it appeared not only professional but also physically different from typical office-style papers. The survey consisted of a letter to the collections manager or registrar, a cover note for the survey, the five page survey, and a self-addressed stamped envelope,[4] and the entire piece was devised so that it would take not more than fifteen minutes to complete. (see Appendix D)

A deadline of approximately two and a half weeks was set. The responses to the survey were solicited through the postal system rather than through e-mails or telephone calls. If they found the survey easier to fill out within an electronic document, the respondents could request an electronic copy of the survey. The survey could be returned in one of three ways: through the postal system, via e-mail, or via fax. After approximately two weeks, if an institution had not responded to the survey, a follow up e-mail was sent to institutions for which e-mail addresses were available. The respondents could remain anonymous but participate in the survey and receive a copy of the tabulated results. As part of a last chance effort to gather survey results about ten days after the final deadline, one more e-mail was composed and sent to the institutions that had responded in one of two ways previously: they had asked for an electronic version of the survey and then never responded further or the survey had been passed on to a more appropriate individual within the organization. For the purposes of this survey, I was interested only in born digital photographic materials in either their file or printed forms, not digital images such as those created for surrogate collections for a collections management database.

The project questions were difficult to formulate considering the relative newness of the technology as well as the lack of a universal language to describe born digital photographic materials and their formats. The survey questions underwent several revisions before being sent to the photographic collecting community.

[4] Except for the two surveys going to institutions in England

Survey Results and Analysis

In the following section, I will review the results of the Born Digital Photographic Materials survey and analyze the resulting answers. An astounding approximately fifty percent of the queried institutions returned answers to the survey. There were many more inquiries about the survey than responses. Of the fifty-four institutions who received the survey, twenty-seven institutions from the United States and Canada completed and returned the survey. Twenty institutions are interested in the results of the survey, and a number of the institutions that did not have born digital photographic materials in their collections requested the results of the survey. Eleven institutions will remain anonymous as they requested. A collated version of the survey results can be found in Appendix E. Each question is reviewed and analyzed below.

Question 1.

Does your institution collect born digital photographic materials?

Of the twenty-seven institutions that responded to the survey, sixteen collect some type of born digital photographic material, and eleven do not. While I felt that I was beginning the survey with a very basic question, I discovered that I had failed to define in the survey my definition of born digital photographic materials. As a result, several institutions inquired about the term for clarification purposes before responding to the survey and other institutions jumped in with an interpretation of their own. I responded in e-mail form to institutions that inquired with this response: "I am referring to photographs that were made with a digital camera where the image is made of pixels not film". It was assumed that the images made in a digital manner did not need to be developed using chemistry. Some institutions used a broad interpretation of the term born digital photographic materials and included prints such as ink-jet. In retrospect, I would have included a definition of born digital photographic materials in the body of the survey and/or the first question.

Question 2.

If your institution collects born digital photographic materials - what number of digital images do you have in the collection (approximately)?

The answers to this question directly related to the first question based on each institution's understanding of the definition for born digital photographic materials. Most respondents interpreted born digital photographic materials as I expected and answered the question using the number of digital files as opposed to the number of prints made from digital files. The numbers of born digital photographic materials collected are quite varied as well as impressive. The number of digital files range from one to one hundred thousand. Most respondents were either in the hundreds or multiple thousands category. The respondents that answered the question using the number of digital prints had lesser numbers ranging from one to several hundred. A misconception exists about the ease of storage of digital materials because these files only take up space on a hard drive or CD it is easy to assume that one can collect many images without causing a physical storage problem. I believe that the number of digital files collected or acquired relates directly to the fallacy of the ease of physical storage. The digital file does not take up large quantities of physical space in an institution's storage area; and therefore, the digital files are easier to collect in large quantities; but that presents a problem with storage space on a hard drive, computer server, or other computer storage device. Photographers who use the digital medium also seem to produce a much larger number of images than those who use film. Instead of a decline of objects produced with modern digital technology, there has been an explosion of items both in their digital and printed digital expressions. Digital photographic technology has made it easier for photographers and artists to take multiple images at a time and know whether or not they have captured/created the image that they want because of the ability to see the image instantaneously without a need for chemicals and paper or the time traditional methods take. For those institutions that collect images from events – such as sports, news/journalism, or historical events - digital photographic technology has made it easier than ever for collecting institutions to acquire images as all one needs to do is send an e-mail with an attachment or hand a

CD to a curator. Collecting institutions do not necessarily want to collect the proliferation of images that digital imaging seems to produce.

Question 3.

When did your institution begin collecting born digital photographic materials (approximately)?

I wanted to be aware of the year that each institution first began collecting born digital photographic materials so that I could better understand when the born digital phenomenon began to take place. While every institution did return a date, the respondents indicated the earliest institutional collection of born digital photographic materials occurred during the 1990s. Three respondents were early adaptors of the new technology of born digital photographic materials. [Two of these institutions preferred to remain anonymous; the third was University of California at Riverside/California Museum of Photography (UCR/CMP).] These three institutions collected either early digital prints or digital photographic files. They were early adaptors because they started collecting born digital photographic materials in the early 1990s just as the entire concept of born digital photographic materials came into existence. At the time, there was no understanding of the problems and longevity issues that collecting institutions face today regarding born digital photographic materials. Kodak, Sony, and Apple produced the earliest true digital cameras during the early to mid 1990s. It took about six to eight years for digital camera technology to come down in price and become available to most consumers. This correlates with the first year of collection for many institutions as most of the institutions that responded to the survey started collecting in/or after 2001. Three institutions, the Library of Congress, the Smithsonian's National Museum of American History Photographic History Collection, and the New York Public Library found the events of September 11, 2001, to be a turning point in their born digital photographic collecting practices. Whether these institutions were ready or not, they had to collect born digital photographic materials.

Question 4.

Does your institution consider the media storage device (CDs, DVDs, hard drives, etc) to be the "collection object", or is the "collection object" the born digital photographic image on the media storage device?

This question was placed in the survey as different people within various institutions will place a different emphasis on what constitutes the collection object. Respondents were divided about how their institution saw the born digital image versus the storage device. Some institutions, such as the Hockey Hall of Fame in Toronto, Canada, responded, "Initially the CD or DVD but then the image on the storage unit." [5] The Smithsonian's NMAH Photographic History Collection said, "The CD is the object, like an album, and the images on it like the photos in an album." [6] Other institutions who wish to remain anonymous took into account the artist's intent. The Library of Congress responded "that the 'collection object' is the born digital photographic image that resides on a media storage device. This is due to the shelf life of CDs, DVDs, hard drives and other storage devices". [7]

The life span of CDs and DVDs depends greatly on the type of CD or DVD that one has, as well as the environmental conditions in which the CD or DVD is stored. A guide created for librarians and archivists by the National Institutes of Standards and Technology states:

> "They [Manufacturers] test discs by using accelerated aging methodologies with controlled extreme temperature and humidity influences over a relatively short period of time. However, it is not always clear how a manufacturer interprets its measurements for determining a disc's end of life. Among the manufacturers that have done testing, there is consensus that, under recommended storage conditions, CD-R, DVD-R, and DVD+R discs should have a life expectancy of 100 to 200 years or more; CD-RW, DVD-RW, DVD+RW, and DVD-RAM discs should have a life expectancy of 25 years or more. Little information is available for CD-ROM and DVD-ROM discs (including audio and video), resulting

[5] Hockey Hall of Fame response to survey "Born Digital Photographic Materials Survey" June 2006.
[6] SI NMAH response to survey "Born Digital Photographic Materials Survey" June 2006.
[7] Library of Congress response to survey "Born Digital Photographic Materials Survey" July 2006.

in an increased level of uncertainty for their life expectancy. Expectations vary from 20 to 100 years for these discs." [8]

Question 5.

What was the first type of born digital photographic material that your institution collected?

For this question, the survey was seeking an answer that mentioned a file type or type of printed image; the question did not elicit the expected responses. The answers were extremely varied as some institutions responded with artists' names, projects, or events, and others stated a file type or type of printed image. Ten of the respondents left the answer blank. Only three respondents answered with a file type. The file types were Tiff, JPEG, and bitmap. If the survey were sent out again, this question would be reformulated.

Question 6.

What spurred the decision to collect born digital photographic materials?

The responses ranged from "technological change" [9] to "necessity – this is how you collect new photography" [10] and included "general acceptance from professional photographers. Shift from traditional still film cameras to digital capture devices" [11] and "Timeliness. The fact that the only record created was created digitally." [12] These responses show the variety of the institutions that collect photography as well as some of the reasons that they collect. From the Hall of Fame collections where the images are a part of history in addition to part of their media outlet to the art museums, the institutions see the main way to collect twenty-first century photography is using the digital photographic realm. The depth and variety of institutions that collect born digital photographic materials is amazing. This shows how much the born digital image has embedded itself into the culture of our lives in just the last ten to fifteen years.

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[8] Fred Byers. "Care and Handling of CDs and DVDs – A Guide for Librarians and Archivists" 2004.
[9] Amon Carter Museum response to survey "Born Digital Photographic Materials Survey" June 2006.
[10] Chicago History Museum response to survey "Born Digital Photographic Materials Survey" June 2006.
[11] Library and Archives Canada response to survey "Born Digital Photographic Materials Survey" July 2006.
[12] New York Public Library response to survey "Born Digital Photographic Materials Survey" July 2006.

The cellular phone camera is a great example of the technological and societal change that has occurred in the last few years. The ability to take an image with one's cellular phone and instantaneously send it across the world is amazing. This ability has been used in a number of recent historical events such as the train bombings in Madrid and London and the tsunami in Indonesia. These images instantly become part of history and some will become part of cultural heritage collections. As Phil Michel at the Library of Congress in Washington, D.C., responded to the question about what spurred the Library of Congress to collect born digital photographic materials, it was "not so much an intent to collect born digital as intent to collect photographs of an important subject that happened to be digital." [13]

Question 6. Part A

Was the institution forced by circumstances (i.e. a specific event or piece) to collect these materials?

The responses to this question were almost evenly divided between yes and no. Most respondents did not annotate their answers but the few that did revealed interesting information such as "UCR/CMP [University of California at Riverside/ California Museum of Photography} is obligated by its institutional mission to collect, preserve, and interpret genre and media that relates to photography." [14] The UCR/CMP also felt they should accept born digital photographic materials into their collection since it is part of their collecting mission; it is an accepted practice to acquire new work that is more experimental. On the other hand, the New York Public Library said, " ... There were a number of factors at play. As stated before, certain cataclysmic events occurred but as well, the technology changes have moved the archiving issues in a certain direction. We are now trying to help photographers farther upstream so that they capture properly for long-term preservation and do not leave all of the work to the

[13] Library of Congress, response to survey "Born Digital Photographic Materials Survey" July 2006.
[14] UCR/CMP response to survey "Born Digital Photographic Materials Survey" July 2006.

custodial institutions."[15] The New York Public Library was the only institution to talk about educating photographers to assist both the photographer and the collecting institution with preservation of born digital images for the long-term using preemptive methodology. This was very interesting as a number of institutions are bound by either mission or law to preserve the objects that they collect. Educating the people that create the objects that the institutions are collecting is a great idea that could potentially cut down on at least one variable of the many involved with collecting born digital photographic materials.

Question 6. Part B.

Was the institution able to prepare with appropriate planning and/or consultation?

Again, the respondents were evenly divided between yes and no. There were eight yes's with qualifiers and eight no's with qualifiers. The Smithsonian's NMAH's Photographic History Collection response was no to being able to prepare and NMAH gave this anecdotal statement, "Not really. We struggled with existing standards of collection, museum policy, and photography industry standards." [16] This answer typifies the problems that most institutions have when thinking about collecting born digital photographic materials. The statement could have qualified one more aspect and discussed computer technology standards as well as how they play into collecting. The New York Public Library had a response that was neither a yes nor a no but truthful for the collecting community not just when collecting born digital photographic materials: "It is never that simple whether it is digital or analog or audio or whatever. The opportunity to collect may only happen once. The institution tries to be as prepared in terms of infrastructure and processing as possible, but of course many items are accessioned without the luxury of ideal environments." [17] The institutions that started collecting born digital photographic materials, from the events of September 11, 2001,

[15] New York Public Library response to survey "Born Digital Photographic Materials Survey" July 2006.
[16] SI NMAH response to survey "Born Digital Photographic Materials Survey" June 2006.
[17] New York Public Library response to survey "Born Digital Photographic Materials Survey" July 2006.

did not have a choice; it was to collect those objects or to lose the chance forever. In that case, one collects and then figures out how to care properly for the object later.

Question 7.

What storage media are used to house born digital photographic collections (for example hard drives, CDs, DVDs)?

The respondents gave a variety of answers ranging from CDs, DVDs, Video Disc, various tape systems, to an XServe RIAD. Two respondents mentioned the type of CD that they were using to house born digital photographic images. The International Center of Photography (ICP) uses "Multiple Mitsui CDs with media roll-over plan." [18] Mitsui is a brand name for gold CDs. In a report from 2003, The National Institute for Standards and Technology (NIST) recommends using CDs with a gold metal reflective layer commonly known as gold CDs for the best longevity, since these CDs are considered the most archival.[19]

Question 8.

What file format(s) are used for digital image storage (for example, TIFF, JPEG, JPEG2000, DNG)?

The answers to this question were wide-ranging, with a number of institutions using JPEG, RAW, and/or TIFF. Several institutions stated that the file type was dependent on the form or file in which the image came to them. The Library of Congress stated, "Primarily TIFF. Will retain original file in format as it was received." [20] This is to maintain the integrity of the collections object as it was donated, but what is not mentioned is whether or not they have permission from the donor to copy and change the type of file. If one were a collections manager, it would be interesting to know what type of process one needed to go through to get information regarding changing of file types. Two of the survey institutions responded that they saved and maintained the

[18] ICP response to survey "Born Digital Photographic Materials Survey" July 2006.
[19] Fred Byer. "Care and Handling of CDs and DVDs – A Guide for Librarians and Archivists." 2004.
[20] Library of Congress response to survey "Born Digital Photographic Materials Survey" July 2006.

digital images in three file types - RAW, TIFF, and JPEG. After completing research about file types, I believe this is to increase the possibility that the image will be able to be viewed in the future. Having more than one file type of the same image is a wonderful luxury for a collection but greatly increases media storage space needed. The multiple file types have the possibility of decreasing the usage of particular files making them by default a master file versus a user file much like some institutions can have reference copies of particular images to decrease the wear and tear on particular photographs but still make them accessible to researchers. One needs to be aware of the fact that RAW files are not universal. The creation of RAW files is dependent on the camera used to make them, and RAW files also need special downloads to be able to be read within a photo manipulation software program such as Adobe Photoshop.

Question 9.

Has your institution designated a particular file format as a standard for digital master files? If so, what file format has been designated as the standard for digital master files?

The respondents were equal in their answers - half said that their institution had designated a particular file format as their institutional standard and half said that they had not designated a particular file format as their institutional standard. Of those institutions that have a standard file format, the designation TIFF is by far the most common. Only one institution said that JPEGs were their standard file format. Only one institution considers the RAW file format as their standard, but Library and Archives Canada "is reviewing JPEG2000 and RAW as alternates to the TIFF file format type." [21]

Question 10.

How does your institution house and care for born digital photographic materials?

The respondents gave a variety of answers for this question. Four of the respondents interpreted the question as a cool/cold storage question and responded with

[21] Library and Archives Canada response to survey "Born Digital Photographic Materials Survey" June 2006.

temperature and humidity numbers. Other respondents interpreted the question to explain where the digital files reside, which in some cases was the "centralized digital asset manager", [22] and the New York Public Library answered, "The digital masters that we have committed to preserving are housed on the SAN (archive) and are managed through an Oracle backend that supports the bibliographic metadata and the technical repository." [23] The survey was looking for both of these types of answers because there are least two distinct types of born digital photographic materials - the digital image files themselves, and the printed expression of the digital image files. As it affects their longevity, it is important to care for the DVDs and CDs in the proper temperature and humidity ranges. "The Image Permanence Institute recommends that CDs and DVDs are stored between 54 degrees Fahrenheit (12°C) and 40 degrees Fahrenheit (4°C) with minimal temperature and relative humidity recycling. The relative humidity should be between 30% to 50%." [24] The above information is considered the optimum storage condition at this time.

The printed digital expressions occupy the same physical space for storage that analogue prints do. Born digital photographic materials need the same amount of care that analogue photographic materials need, but many of these needs are yet to be determined because computer industry technology changes on an almost daily basis. There are also constant changes in the printing, ink, and computer paper industries that will create problems for the collecting community.

Question 11.

What are your institution's concerns regarding the long-term preservation of the born digital photographic materials (i.e. on a digital storage device)?

[22] Anonymous I response to survey "Born Digital Photographic Materials Survey" June 2006.
[23] New York Public Library response to survey "Born Digital Photographic Materials Survey" July 2006.
[24] Peter Z. Adelstein."IPI Media Storage Quick Reference" Image Permanence Institute 2004.

Many of the respondents used such words or phrases as "Longevity of the digital storage device," [25] "...obsolescent nature of the particular digital formats...," [26] "storage unit faults over time," [27] and "Adherence to schedule migration to appropriate file type to assure readability over time. Assurance of digital security to prevent deliberate or accidental destruction of image data." [28] In essence, although many institutions are collecting born digital photographic materials, they are very worried about preserving the images for the future – concerns such as the manpower and knowledge needed as well as the costs of storage and preservation. The born digital photographic industry is very young in terms of proven ways to insure longevity of the digital image. We have all had a bad experience where a file, disk, or hard drive has failed without warning, leaving us with no readable document or image.

There was only one anonymous respondent that admitted that their institution had "not much discussion on this yet." [29] This institution has ten to twelve thousand born digital photographic images. One of the institutions to discuss stewardship of collections was the California Museum of Photography, part of the University of California at Riverside. The respondent discusses the commitment of any collecting organization acquiring any digital materials: "It is the commitment of any institution that accepts to work with digital technology to remain as a steward of what it undertakes. This applies to any digitization effort or digital asset management, as one is responsible for the loss of any item even when there is no tangible artifact. For this reason, the museum established its digital reference collection to restore and recover lost or damaged files to contribute to an overall reliability and sustainability of the digital storage object and the native environment it was first created in. This move is paramount to long-term preservation of the born digital material as it allows one to recover, examine, restore and preserve these types of items in their native

[25] Amon Carter Museum response to survey "Born Digital Photographic Materials" June 2006.
[26] Anonymous C response to survey "Born Digital Photographic Materials" July 2006.
[27] Hockey Hall of Fame response to survey "Born Digital Photographic Materials" June 2006.
[28] Anonymous B response to survey "Born Digital Photographic Materials" July 2006.
[29] Anonymous H response to survey "Born Digital Photographic Materials Survey" June 2006.

environments." [30] Some institutions are much more educated in terms of digital technology and can describe their concerns about the long-term preservation of born digital photographic materials in depth; other institutions know just enough to know that there is the potential for readability problems in the future.

Question 12.

If your institution has considered the long-term preservation issues, what steps are being taken to preserve your born digital photographic materials?

Six institutions indicated that they had considered the long-term preservation issues of born digital photographic materials and were taking steps to preserve born digital photographic materials for the future. Four institutions responded that they had not been taking steps to preserve born digital photographic materials. One anonymous respondent said that the "museum was working to create policy reflecting those concerns." [31] Three of the responding institutions replied that they kept their CDs and DVDs in cool or cold storage. The recommendation for cool and cold storage for CDs and DVDS is recent and shows those institutions are keeping abreast of the new discoveries in media storage preservation technology.

Question 13.

What does your institution consider the current "best practice" in caring for digital photographic materials (the current preferred method)?

There seem to be two opinions about "best practices" from the responding institutions. One opinion is that at this point in collecting born digital photographic materials there are no "best practices". The "best practices" are to keep up with the current research in the field from trusted sources such as the Library of Congress, the Image Permanence Institute, and Library and Archives Canada. These institutions are actively researching the problems associated with twenty-first century collecting. The Library of Congress and Library and Archives Canada have certain federal mandates

[30] UCR/CMP response to survey "Born Digital Photographic Materials Survey" July 2006.
[31] Anonymous C response to survey "Born Digital Photographic Materials Survey" June 2006.

that need to be adhered to; as a result, they are actively researching and trying to solve some of the problems associated with collecting any born digital material, which includes born digital photographic materials.

The second opinion is that the current "best practice" is to use layers of back up systems as well as keeping up with the current research. There were two respondents that plainly stated "we have not prepared a full policy and procedures manual on this topic yet,"[32] and "we have not established one."[33] This does not mean that these institutions are not trying to preserve the born digital photographic materials that they have but just that they have not established formal procedures. This is not an unusual position for institutions to have at this point because of rapidly changing technology. If an institution has only a small number of born digital photographic materials, there will not be much money and time devoted to solving preservation problems surrounding born digital photographic materials.

Question 14.

Does your institution plan for migration of born digital photographic materials to ensure they can still be read/viewed in the future?

Again, the respondents were evenly divided between those institutions that have a plan for the migration of born digital photographic materials and those that do not. Two institutions offered the opinion that migration may not be the only or best way to preserve born digital materials. UCR/CMP responded "...our institution has created a Digital Reference Collection. This collection will insure by the best means possible the ability to open files that are housed using older technology as well as preserve their initial appearance based on their creation software. The museum has found that the migration of materials to newer technology alters the initial appearance so drastically in some cases that the initial intention is lost. Therefore creating a native space for the

[32] ICP response to survey "Born Digital Photographic Materials Survey" July 2006.
[33] SI - NMAH response to survey "Born Digital Photographic Materials Survey" June 2006.

original digital asset to be opened in insures its initial intensions." [34] One of the institutions who wishes to remain anonymous responded "plan yes - reality depending on funding." [35] This is unfortunate because the institution has already committed itself to collecting born digital photographic materials but does not have the monetary means to care for the acquired objects.

Question 15.

Does your institution have a unique storage environment for the physical prints made from digital collections (such as a particular temperature and humidity)?

Most respondents answered that if they had physical prints made from digital collections that they stored the prints in cool or cold storage. For the most part the prints are stored in the same room with other more established photographic materials but not in the same boxes. Several institutions said that they either did not make prints or had very few prints in their holdings.

[34] UCR/CMP response to survey "Born Digital Photographic Materials Survey" July 2006.
[35] Anonymous G response to survey "Born Digital Photographic Materials Survey" June 2006.

Suggested Guidelines for Institutions That Are Thinking About Collecting Born Digital Photographic Materials

Create standards regarding born digital photographic materials for the institution in accordance with that institution's collecting mandates. If an institution is going to collect large amounts of born digital photographic materials, that institution should consider hiring a data curator or electronic records specialist with a specialty in born digital photographic materials. These job positions are discussed later in this paper.

Some of the questions that should be asked are as follows:

If you are collecting born digital photographic files:

What type of digital file is the image and what version of the file type was used to save the file?

What metadata is available to you?

What machine, camera and/or program was used to create the image?

Which software and what version was used to save and/or create the image?

Was the image saved on a Mac or PC?

What software program is used to view the image?

What brand and type of CDs/DVDs was used to burn the images?

At what speed were the CDs/DVDs burned?

How old are the CDs and DVDs?

Where were the CDs and DVDs stored before they came to your institution?

If you are collecting the printed expression of an image file:

What type of file did it come from?

What brand of printer was used to print it?

What type and brand of ink was used in the printing process?

What brand and type of paper was used to print the image?

How old is the printed expression and where was it stored?

Afterthoughts About the Survey

As a first time survey writer, I felt the response to the survey was outstanding at approximately fifty percent. In the survey results, there were questions that were ignored or not answered. This did not negate the other answers in a specific respondent's survey.

After the survey was crafted and sent out for response, I discovered that there were other questions that should have been included in the survey. They are the following: "If your institution does not collect 'born digital photographic materials', why not? ", and "What type of security are you providing for the images/materials so that copyright is respected etc.?" and "How do you mark your CDs and DVDs?". I realized that I was as interested in whether institutions were collecting born digital photographic materials as why they might not be doing this. The concept of copyright protection of digital objects is still undergoing development; therefore, I am curious to see how institutions are managing the protection of copy and reproduction rights. The most common way to mark CDs and DVDs with identifying information is to mark it with a black felt tipped pen. [There is recent research that this not the most archival or safe way to write identifying information on a CD or DVD; therefore I am curious as to how institutions are marking their CDs]. A question about "What type of metadata do you collect for your objects?" or "do you collect metadata about your collections objects?" would also have been prudent.

Conclusion

When technology is upgraded in cameras, scanners, printers, computer hardware and software, inks, and papers, the world of born digital photography changes as well. As with established photographic practices, there are pros and cons to creating and keeping born digital images and their printed expressions. In the twenty-first century, cultural collecting institutions have a burden to bear as this is the way many photographs are created, yet no one knows how long the images will last in either a digital form or a printed expression. There are several ways to manage this burden. An institution could choose not to collect any born digital photographic materials, but then the institution would miss collecting potentially important images. The institution could choose to collect only printed expressions of digital files thus avoiding the problems of keeping up with upgraded computer technology. Or the institution could plunge into the collecting of born digital photographic materials as many institutions have. The policies, mandates, and interests of the institution dictate the choice.

If an institution chooses to collect born digital photographic materials, it has to be aware of the quagmire of issues surrounding the preservation and continuing longevity of born digital photographic materials. One of the most disturbing issues is the threat of technological obsolescence - meaning the ability through hardware, software, or media storage device to see or read the image. Knowing that information is one of the most important steps in creating a policy or procedure, institutions need to educate themselves about the preservation of born digital photographic materials enough to know what types of issues and problems they will encounter if they choose to collect these materials. If an institution chooses to collect born digital photographic materials, it has to come to terms with the fact that it is the steward of a currently fugitive technology.

Some digital materials preservation professionals believe that the future will bring a new specialty into the field that of a "data curator". A data curator is defined as "...a combination of scientist (or other data specialist), statistician, and information expert." [36] This is a very interesting concept to which one more degree of specialization should be added. When the data concerns born digital photographic materials, I think these data curators additionally should have a specific area of expertise in a field such as history or twenty-first century photography. In the response from the Smithsonian's Archives Collection comes the information that the Smithsonian has recently hired an electronic records archivist whose job will be to review concerns and implement solutions to cope with some of the concerns of technological obsolescence and data storage that have been discussed in this paper.[37] This position is a similar position to the above described data curator but deals with all types of electronic records not just images.

There is much information and knowledge to be aware of if an institution is collecting born digital photographic materials either in their file form or in their printed expression. One of the first items to be aware of is the need to back up the data in as many ways as one can without losing crucial information. Another item that must be understood is the need to keep educating professionals and the institution about the ongoing changes in technology in order to maintain the proper stewardship of the born digital photographic collection. From my research, one should be aware of several collaborative projects. The Library of Congress and the British Library are two institutions that have ongoing research and collaborative projects regarding born digital photographic materials that are easily accessible to the public. These collaborative projects seem like a logical and economical way to use each institution's strengths and to enable joint growth of knowledge. One possible way to share information and knowledge would be to create a consortium of institutions to share information within

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[36] David Talbot. "The Fading Memory of the State." *Technology Review* July 2005.
[37] Smithsonian Institution - Archives response to survey "Born Digital Photographic Materials Survey" August 2006.

this community. The consortium members could be made up of people with varied expertise and interests in collecting and preserving born digital photographic materials.

My bias and knowledge shaped the questions that I asked as well as how I interpreted the responses that I received. The respondents answered the survey with candor and showed incredible knowledge. For the most part, the responses to the surveys reinforced the knowledge that I had before sending out the survey, which is that there are many factors to be aware of when collecting born digital photographic materials. The collecting of born digital photographic materials is here to stay, and we had better educate ourselves to be able to keep viewing these precious objects in the future. The fact that there is not a universal language to describe the technological aspects of born digital photographic materials is a problem that should be addressed in the larger collecting and technology communities. If there were a universal language, certain aspects of preserving and collecting born digital photographic materials would be easier. There is a burden placed on the surveyor when there is no universal language from which to draw knowledge and information. The lack of a universal language when describing born digital photographic materials makes it difficult to convey questions and thus be able to communicate effectively with the broader cultural collecting community.

In the survey results, I was most surprised at the lack of inherent understanding of the term "born digital photographic materials" especially from institutions that collect either born digital photographic materials or institutions that would be expected to collect born digital photographic materials. The term born digital photographic materials is self explanatory in my estimation as well as in the estimation of the museum professionals that I consulted with before sending the survey out. There was some debate about whether the term should be born digital photographic material or digital born photographic material before the survey was constructed. The project's first question should have been devised to better distinguish between the various born digital photographic materials and a definition should have been included in the

introductory letter to institutions. In the world of born digital photographic materials, there are several types of born digital photographic materials - some are straight born digital images, others are born digital images that have been loaded into various software programs to create a particular effect, and still others become the printed expression of the born digital image. Every institution defines these images (objects) in a different manner. I corresponded with an institution who knew that they had born digital photographic materials in their collection but not as single pieces; therefore, they could not answer the survey because of the way information was imputed into their cataloging system.

The most common name for images or photographs created with a digital camera is simply digital images. Digital image is a generic term for all types of digital images which can be comprised of digital images that are strictly born digital meaning created using a digital camera, digital images that are created using a scanner, or digital images created using other methods. For this project, I chose the term born digital photographic materials because I believe that it is a term that accurately describes images solely created using a digital camera which is the area I directed my research. I could have chosen any of the following terms for born digital photographic materials such as digitally created images, non-film based images, or "native-digital" [38] as long as I specified that I was interested only in digital files that originated with no physical equivalent in either negative or printed form. I think of born digital files as unique files. If there is no print or electronic copy made from the digital file, that specific image file could be lost forever in one click of a mouse or one glitch in software.

While a number of born digital files are printed which creates a tangible representation of the image; a number of born digital files remain as digital files and are just looked at on computer screens or other viewing devices. When people refer to the printed version of digital image files, the general public generally calls them digital

[38] Marta Braun (Professor – Ryerson University), in e-mail communication August 23, 2006.

prints whether they are an ink-jet print, Giclee (another type of ink-jet print), or other type of computer print. The computer generated print is really the printed expression or representation of the digital file and not simply a digital print.

While I chose the term born digital photographic material for this project as I felt it to be the current best descriptive term, I could have chosen another term. As the evolution of digital imaging moves forward, I believe that someone or a company will create several phrases or an acronym which will identify and specify various types of image based digital materials creating terms which will become universal in usage. Perhaps as technology evolves, a more readily descriptive term will become the common term used.

There are broad long-term implications to collecting born digital photographic materials. One of the long-term implications is the ability to care for the images over a period of years, requiring not just the technological ability but also the financial ability to care for born digital images. An analogue object can be left in an archival storage box in the proper environmental conditions for a number of years and will survive through benign neglect but a born digital image may not. Therefore, the financial health of the collecting institution is extremely important in its ability to insure the stewardship of the born digital objects. The choices that collecting institutions make bind them to particular technologies, so one must be careful when choosing the technology to preserve the digital materials as the choice can tie the institution to a technological dead end. Another long-term implication when collecting born digital photographic materials is the inability to plan for collecting certain types of images. The born digital images from September 11, 2001, are a clear example of being unable to plan ahead to collect; but collecting institutions can hedge the results in their favor of being able to collect by having guidelines in place which will enable them to ask as many questions as possible as born digital images are acquired by them.

Appendix

Appendix A: Thesis Project Proposal

"How should institutions make decisions about acquiring collections that contain digital images, their printed forms, and related media; and what should the decision-making process be regarding the collections policy and preservation issues around these materials?"

An example of this quandary is the collection of digital images recently acquired by the Photographic History Collection at the Smithsonian's National Museum of American History (NMAH) relating to the events of September 11, 2001. The images are a variety of digitally produced objects that have raised numerous acquisition related questions for the institution. These questions include decisions that should be made before and after acquisition of any digital materials, the viewing of material - taking into account the intentions of the artist balanced with the capabilities of the institution, image accessibility problems, fading or deterioration of digitally produced prints, and the ethics involved with creating new outputs. By using this collection as an example, I would like to make information available to museum professionals to aid in their understanding regarding the issues concerning collecting digitally related materials. With proper housing, traditional materials can last for over a century; whereas digital files are sometimes unreadable within years, reducing their longevity and increasing usability problems for a collection.

After seeing the 9/11 collection at NMAH in order to form preliminary questions, I will start my research. For my research, I will survey other photography collecting institutions. There will be two groups of collecting institutions that I will survey; I will pick a small group of collecting institutions with established photography collections and contact them with a questionnaire as well as creating a list of questions for one or more list-serves related to photographic collections and preservation. There are three areas that I will research within the digital realm which are the digital image receptacle (i.e. CDs, DVDs), the output materials (the final printed image, ink, printer, and paper), and the hardware (or ability to read the digital file). I will also survey relevant current museum literature for articles and views regarding this topic.

I will write a research paper answering the thesis project question and supporting suggested acquisition guidelines to use when considering collecting digitally related media. In addition, I will tally my findings from surveyed institutions about how those institutions established their guidelines and care for these materials. The true impact of digital photography on the history of photography and photographic collections is just beginning to be felt.

Appendix B: Cover Letter to Institution

June 9, 2006

Dear Collections Manager/ Registrar (this part was personalized where ever possible),

I am a second year graduate student in the Photographic Preservation and Collections Management program at Ryerson University in Toronto, Ontario, Canada in collaboration with George Eastman House in Rochester, New York. I am conducting research addressing issues faced by museums, libraries, and archives concerning born digital photographic materials.

In conjunction with my research, I am conducting the attached survey concerning born digital photographic materials. I have chosen your institution because of its extensive photographic collection and dedication to collecting photography. If your institution is not collecting born digital photographs – please note that on the survey sheet and return it to me. If you are not the best person to answer these questions, please pass it on to the appropriate individual.

The survey should take no more than 15 minutes of your time. If you prefer to complete a digital version of this survey, please email me at the address below and I would be happy to send you an electronic version of this document. Please note in your response if you would like to remain anonymous – I will assure your anonymity if requested.

Please return the survey by **June 30, 2006**. It can be returned to me in one of three ways:

Using the enclosed SASE –

via email

via fax

Please write on the cover sheet - Attn: PPCM/ Ryerson

If you have further questions about the survey please contact me at the email address listed above stating "photographic survey" in the subject line. If you feel there are pertinent questions about born digital photographic materials that have not been addressed in the survey please note them at the end of the survey. I would be happy to provide you with a copy of my survey results – just note your request at the end of the survey.

Thank you very much for your time.

Sincerely,

Siobhan Creem

Appendix C: Cover Letter to Survey

Born Digital Photographic Materials Survey [Sample]

Please return the survey by **June 30, 2006**. The survey can be returned to me in one of three ways:

Using the enclosed SASE –

Siobhan Creem

Via email to

Via fax – Please write on the cover sheet - **Attn: PPCM/ Ryerson**

At the end of the survey, please remember to note whether you would like to remain anonymous, as well as, whether you would like a copy of the results of the survey.

Please feel free to use additional paper if needed to answer questions.

Appendix D: Survey Questions

1. Does your institution collect born digital photographic materials?

2. If your institution collects born digital photographic materials - what number of digital images do you have in the collection (approximately)?

3. When did your institution begin collecting born digital photographic materials (approximately)?

4. Does your institution consider the media storage device (CDs, DVDs, hard drives, etc) to be the "collection object", or is the "collection object" the born digital photographic image on the media storage device?

5. What was the first type of born digital photographic material that your institution collected?

6. What spurred the decision to collect born digital photographic materials?

    a. Was the institution forced by circumstances (i.e. a specific event or piece) to collect these materials?

    b. Was the institution able to prepare with appropriate planning and/or consultation?

7. What storage media are used to house born digital photographic collections (for example hard drives, CDs, DVDs)?

8. What file format(s) are used for digital image storage (for example, TIFF, JPEG, JPEG2000, DNG)?

9. Has your institution designated a particular file format as a standard for digital master files? If so, what file format has been designated as the standard for digital master files?

10. How does your institution house and care for born digital photographic materials?

11. What are your institution's concerns regarding the long-term preservation of the born digital photographic materials (i.e. on a digital storage device)?

12. If your institution has considered the long-term preservation issues, what steps are being taken to preserve your born digital photographic materials?

13. What does your institution consider the current "best practice" in caring for digital photographic materials (the current preferred method)?

14. Does your institution plan for migration of born digital photographic materials to ensure they can still be read/viewed in the future?

15. Does your institution have a unique storage environment for the physical prints made from digital collections (such as a particular temperature and humidity)?

_____

Name (please print) _____

Signature _____

Institution_____

Job Title_____

_____ I would like to remain anonymous.

_____ I would like a copy of the survey results. Please note below the address you would like the survey results sent to:

Mailing address (please print)

_____

_____

_____

_____

Or email address (please print)

_____

Appendix E: Survey Responses

	Anonymous A
Q1.collect at all -Yes	–
collect at all -No	X
Q2. How many BDPM in the collection?	–
Q3.How long collecting BDPM?	–
Q4. Is the media storage device the collection object or the image the collection object? Storage	–
Q4. Is the media storage device the collection object or the image the collection object? Image	–
Q5. First type	–
Q6.What spurred the decision to collect?	–
Q6. Part A forced	–
Not forced	–
Q6. Part B prepared yes	–
Prepared no	–
Q7.What storage media are used to house BDPM?	–
Q8.What file formats are used for digital image storage?	–
Q9.Standard file format? Yes	–
Standard file format? No	–
What the standard file format is?	–
Q10.How does your institution house & care	–
Q11.What is your institutions concerns regarding the long-term preservation...?	–
Preservation? Yes	–
Preservation? No	–
Q12.Long-term preservation steps?	–
Q13. "best practice" for caring for digital photographic materials	–
Q14. Plan for migration? Yes	–
Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	–

	Anonymous B
Q1.collect at all -Yes	X
collect at all -No	–
Q2. How many BDPM in the collection?	several hundred
Q3.How long collecting BDPM?	2005-06
Q4. Is the media storage device the collection object or the image the collection object? Storage	–
Q4. Is the media storage device the collection object or the image the collection object? Image	The born digital photographic image on the media storage device.
Q5. First type	An artist' work distributed by his gallery on a computer platform, ready for display.
Q6.What spurred the decision to collect?	Importance of the artist's work
Q6. Part A forced	–
Not forced	X
Q6. Part B Prepared Yes	–
Prepared No	X
Q7.What storage media are used to house BDPM?	Primary hard drives with hard drive back-ups in separate location.
Q8.What file formats are used for digital image storage?	JPEG was supplied for the above project, but in general the museum will request TIFF
Q9.Standard file format? Yes	X
Standard file format? No	–
What the standard file format is?	TIFF
Q10.How does your institution house & care	Currently stored in archival space primarily used for other types of collection objects.
Q11.What is your institutions concerns regarding the long-term preservation...?	Adherence to schedule of duplication to appropriate media. Adherence to schedule migration to appropriate file type to assure readability over time. Assurance of digital security to prevent deliberate or accidental destruction of image data. Linking of images to catalog data and image metadata.
Preservation? Yes	–

Preservation? No	X
Q12.Long-term preservation steps?	Museum is working to create policy reflecting those concerns
Q13. "best practice" for caring for digital photographic materials	Practice is responsive to concerns of question #11
Q14. Plan for migration? Yes	X
Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	We use the same storage facility as is used for photographs

	Anonymous C
Q1.collect at all -Yes	_
collect at all -No	X - not actively
Q2. How many BDPM in the collection?	One set of installation work by Lucas Samaras
Q3.How long collecting BDPM?	2005
Q4. Is the media storage device the collection object or the image the collection object? Storage	Depending on the nature of the work. In the case of aforementioned Samaras piece the as well as the digital files are considered as the integral part of the work of art
Q4. Is the media storage device the collection object or the image the collection object? Image	_
Q5. First type	I-Movie/I-photo images by Lucas Samaras
Q6.What spurred the decision to collect?	New acquisition of the work by Lucas Samaras
Q6. Part A forced yes	_
Not Forced	Again rather incidental. It was the chosen medium of the artist
Q6. Part B prepared Yes	_
Prepared No	X- we are still considering various options
Q7.What storage media are used to house BDPM?	hard drives and back up system
Q8.What file formats are used for digital image storage?	Apple proprietary formats: imovie and iphoto
Q9.Standard file format? Yes	_
Standard file format? No	X
What the standard file format is?	no standard format established
Q10.How does your institution house & care	Currently we do not
Q11.What is your institutions concerns regarding the long-term preservation...?	Accessibility in the future - obsolescent nature of the particular digital formats and the equipment
Preservation? Yes	_
Preservation? No	X
Q12.Long-term preservation steps?	not actively considered
Q13. "best practice" for caring for digital photographic materials	layers of back up system
Q14. Plan for migration? Yes	_

Plan for migration? No	As the needs arise, I'm sure we will actively explore options.
Q15. Unique storage conditions for physical prints made from digital collection?	No

	Anonymous D
Q1.collect at all -Yes	_
collect at all -No	X
Q2. How many BDPM in the collection?	_
Q3.How long collecting BDPM?	_
Q4. Is the media storage device the collection object or the image the collection object? Storage	_
Q4. Is the media storage device the collection object or the image the collection object? Image	_
Q5. First type	_
Q6.What spurred the decision to collect?	_
Q6. Part A forced Yes	_
Forced No	_
Q6. Part B Prepared Yes	_
Prepared No	_
Q7.What storage media are used to house BDPM?	_
Q8.What file formats are used for digital image storage?	_
Q9.Standard file format? Yes	_
Standard file format? No	_
What the standard file format is?	_
Q10.How does your institution house & care	_
Q11.What is your institutions concerns regarding the long-term preservation...?	We only use such materials for graphic design purposes
Preservation? Yes	_
Preservation? No	_
Q12.Long-term preservation steps?	_
Q13. "best practice" for caring for digital photographic materials	_
Q14. Plan for migration? Yes	_
Plan for migration? No	_
Q15. Unique storage conditions for physical prints made from digital collection?	_

	Anonymous E
Q1.collect at all -Yes	X
collect at all -No	–
Q2. How many BDPM in the collection?	200
Q3.How long collecting BDPM?	1993
Q4. Is the media storage device the collection object or the image the collection object? Storage	It depends on maker's intent. We have both DVDs and prints
Q4. Is the media storage device the collection object or the image the collection object? Image	–
Q5. First type	prints
Q6.What spurred the decision to collect?	It was what artists were using
Q6. Part A Forced yes	–
Forced No	X
Q6. Part B Prepared Yes	X
Prepared No	–
Q7.What storage media are used to house BDPM?	CD's but mostly DVDs
Q8.What file formats are used for digital image storage?	Jpeg
Q9.Standard file format? Yes	–
Standard file format? No	X
What the standard file format is?	–
Q10.How does your institution house & care	Cold storage
Q11.What is your institutions concerns regarding the long-term preservation...?	–
Preservation? Yes	–

Preservation? No	–
Q12.Long-term preservation steps?	Cold storage for CDs and DVDs
Q13. "best practice" for caring for digital photographic materials	Cold storage for CDs and DVDs
Q14. Plan for migration? Yes	Will re-consider when next generation reaches market
Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	Separate boxes from other media but in same storage rooms (either cool 60°/40RH or cold 40°/40RH, as appropriate) as other prints

	Anonymous F
Q1.collect at all -Yes	_
collect at all -No	X
Q2. How many BDPM in the collection?	_
Q3.How long collecting BDPM?	_
Q4. Is the media storage device the collection object or the image the collection object? Storage	_
Q4. Is the media storage device the collection object or the image the collection object? Image	_
Q5. First type	_
Q6.What spurred the decision to collect?	_
Q6. Part A Forced yes	_
Forced No	_
Q6. Part B Prepared yes	_
Prepared No	_
Q7.What storage media are used to house BDPM?	_
Q8.What file formats are used for digital image storage?	_
Q9.Standard file format? Yes	_
Standard file format? No	_
What the standard file format is?	_
Q10.How does your institution house & care	_
Q11.What is your institutions concerns regarding the long-term preservation...?	_
Preservation? Yes	_
Preservation? No	_
Q12.Long-term preservation steps?	_
Q13. "best practice" for caring for digital photographic materials	_
Q14. Plan for migration? Yes	_
Plan for migration? No	_
Q15. Unique storage conditions for physical prints made from digital collection?	_

	Anonymous G
Q1.collect at all -Yes	X
collect at all -No	–
Q2. How many BDPM in the collection?	several hundred ink jet prints
Q3.How long collecting BDPM?	1990s
Q4. Is the media storage device the collection object or the image the collection object? Storage	–
Q4. Is the media storage device the collection object or the image the collection object? Image	–
Q5. First type	Unknown
Q6.What spurred the decision to collect?	directions of art world
Q6. Part A Forced Yes	–
Forced No	X
Q6. Part B Prepared Yes	–
Prepared No	X
Q7.What storage media are used to house BDPM?	Video disc, CD,DVD, beta master
Q8.What file formats are used for digital image storage?	NA
Q9.Standard file format? Yes	–
Standard file format? No	X
What the standard file format is?	–
Q10.How does your institution house & care	Cool storage area
Q11.What is your institutions concerns regarding the long-term preservation...?	hardware and software becoming obsolete
Preservation? Yes	–
Preservation? No	–
Q12.Long-term preservation steps?	Storage with other photographs/works on paper/film material
Q13. "best practice" for caring for digital photographic materials	–
Q14. Plan for migration? Yes	X - plan yes - reality depending on funding
Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	Ink jet, etc -prints stored with other color photographic materials

	Anonymous H
Q1.collect at all -Yes	X
collect at all -No	_
Q2. How many BDPM in the collection?	10,000-12,000
Q3.How long collecting BDPM?	2003
Q4. Is the media storage device the collection object or the image the collection object? Storage	_
Q4. Is the media storage device the collection object or the image the collection object? Image	born digital photographic image
Q5. First type	Images of the 2003 Hall of Fame Inductions weekend
Q6.What spurred the decision to collect?	Much quicker to supply media outlets with our event images
Q6. Part A Forced Yes	X
Forced No	_
Q6. Part B Prepared Yes	_
Prepared No	X
Q7.What storage media are used to house BDPM?	Cds, DVDs, and hard drives -mostly hard drives
Q8.What file formats are used for digital image storage?	Tiff, Raw files and Jpegs
Q9.Standard file format? Yes	_
Standard file format? No	X
What the standard file format is?	_
Q10.How does your institution house & care	Stored on a separate server
Q11.What is your institutions concerns regarding the long-term preservation...?	Not much discussion on this yet
Preservation? Yes	_
Preservation? No	_
Q12.Long-term preservation steps?	_
Q13. "best practice" for caring for digital photographic materials	_
Q14. Plan for migration? Yes	_
Plan for migration? No	No - discussion yet
Q15. Unique storage conditions for physical prints made from digital collection?	Climate controlled room for original prints and digital temp 50 F and 45% humidity

	Anonymous I
Q1.collect at all -Yes	X
collect at all -No	–
Q2. How many BDPM in the collection?	100,000 in process for stories 20,000 in permanent collection
Q3.How long collecting BDPM?	2003
Q4. Is the media storage device the collection object or the image the collection object? Storage	–
Q4. Is the media storage device the collection object or the image the collection object? Image	–
Q5. First type	The image
Q6.What spurred the decision to collect?	That's what photojournalists are shooting with. We collect the images that we publish and license
Q6. Part A Forced Yes	–
Forced No	–
Q6. Part B Prepared Yes	–
Forced No	X -Not really learning as we go
Q7.What storage media are used to house BDPM?	Hard drives for permanent storage, DVDs CDs for delivery
Q8.What file formats are used for digital image storage?	RAW, TIFF, JPEG - kept for all images
Q9.Standard file format? Yes	X
Standard file format? No	–
What the standard file format is?	RAW is the master
Q10.How does your institution house & care	Centralized digital asset manager
Q11.What is your institutions concerns regarding the long-term preservation...?	? - look at survey
Preservation? Yes	–
Preservation? No	–
Q12.Long-term preservation steps?	? - look at survey
Q13. "best practice" for caring for digital photographic materials	? - look at survey
Q14. Plan for migration? Yes	X
Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	We don't make prints

	Anonymous J
Q1.collect at all -Yes	X
collect at all -No	–
Q2. How many BDPM in the collection?	1
Q3.How long collecting BDPM?	2004
Q4. Is the media storage device the collection object or the image the collection object? Storage	–
Q4. Is the media storage device the collection object or the image the collection object? Image	Depends on artist
Q5. First type	DVD
Q6.What spurred the decision to collect?	Curatorial Decision
Q6. Part A Forced Yes	–
Forced No	X
Q6. Part B Prepared Yes	–
Prepared No	X
Q7.What storage media are used to house BDPM?	DVD
Q8.What file formats are used for digital image storage?	Movie on DVD
Q9.Standard file format? Yes	–
Standard file format? No	X
What the standard file format is?	–
Q10.How does your institution house & care	Stored in climate controlled art storage
Q11.What is your institutions concerns regarding the long-term preservation...?	Migrating Data to new media
Preservation? Yes	–
Preservation? No	–
Q12.Long-term preservation steps?	None
Q13. "best practice" for caring for digital photographic materials	NA
Q14. Plan for migration? Yes	–
Plan for migration? No	Depends on the artist
Q15. Unique storage conditions for physical prints made from digital collection?	No

	Anonymous K
Q1.collect at all -Yes	–
collect at all -No	X
Q2. How many BDPM in the collection?	–
Q3.How long collecting BDPM?	–
Q4. Is the media storage device the collection object or the image the collection object? Storage	–
Q4. Is the media storage device the collection object or the image the collection object? Image	–
Q5. First type	–
Q6.What spurred the decision to collect?	–
Q6. Part A Forced Yes	–
Forced No	–
Q6. Part B Prepared Yes	–
Prepared No	–
Q7.What storage media are used to house BDPM?	–
Q8.What file formats are used for digital image storage?	–
Q9.Standard file format? Yes	–
Standard file format? No	–
What the standard file format is?	–
Q10.How does your institution house & care	–
Q11.What is your institutions concerns regarding the long-term preservation...?	–
Preservation? Yes	–
Preservation? No	–
Q12.Long-term preservation steps?	–
Q13. "best practice" for caring for digital photographic materials	–
Q14. Plan for migration? Yes	–
Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	We store the majority of the photographs in our collection at 50 degrees Fahrenheit, 45% relative humidity. For fugitive color work (for example, chromogenic color prints) 30 x 40 inches and smaller, we have a reach-in unit that is kept at 2 degrees Centigrade, 35% relative humidity.

	Anonymous L
Q1.collect at all -Yes	_
collect at all -No	X
Q2. How many BDPM in the collection?	_
Q3.How long collecting BDPM?	_
Q4. Is the media storage device the collection object or the image the collection object? Storage	_
Q4. Is the media storage device the collection object or the image the collection object? Image	_
Q5. First type	_
Q6.What spurred the decision to collect?	_
Q6. Part A Forced Yes	_
Forced No	_
Q6. Part B Prepared Yes	_
Prepared No	_
Q7.What storage media are used to house BDPM?	_
Q8.What file formats are used for digital image storage?	_
Q9.Standard file format? Yes	_
Standard file format? No	_
What the standard file format is?	_
Q10.How does your institution house & care	_
Q11.What is your institutions concerns regarding the long-term preservation...?	_
Preservation? Yes	_
Preservation? No	_
Q12.Long-term preservation steps?	_
Q13. "best practice" for caring for digital photographic materials	_
Q14. Plan for migration? Yes	_
Plan for migration? No	_
Q15. Unique storage conditions for physical prints made from digital collection?	_

	Amon Carter Museum
Q1.collect at all -Yes	X
collect at all -No	–
Q2. How many BDPM in the collection?	1
Q3.How long collecting BDPM?	2005
Q4. Is the media storage device the collection object or the image the collection object? Storage	–
Q4. Is the media storage device the collection object or the image the collection object? Image	1
Q5. First type	Drop on demand ink jet print
Q6.What spurred the decision to collect?	Technological change
Q6. Part A Forced Yes	–
Forced No	–
Q6. Part B Prepared Yes	Yes
Prepared No	–
Q7.What storage media are used to house BDPM?	NA
Q8.What file formats are used for digital image storage?	NA
Q9.Standard file format? Yes	–
Standard file format? No	–
What the standard file format is?	NA
Q10.How does your institution house & care	Cold storage vault 60F and 50% humidity
Q11.What is your institutions concerns regarding the long-term preservation...?	Longevity of the digital storage device, capacity of our network to store large image files.
Preservation? Yes	X
Preservation? No	–
Q12.Long-term preservation steps?	Our conservator of photographs monitors the field and keeps abreast of the new technology.
Q13. "best practice" for caring for digital photographic materials	We store our drop on demand ink jet print in a vault that is kept at 60 degrees Fahrenheit and 50% humidity. The object is only put on view for 6 months at a time then is required to rest in storage for at least a year. We consult regularly with our conservator of photographs for advice and opinions on storage and preservation of this object.
Q14. Plan for migration? Yes	We believe this will be necessary when we reach this stage and are keeping up to date with the field

Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	Yes, cold storage kept at 60 degrees Fahrenheit and 50% humidity. If the image is in color it is up to the conservator of photographs to determine it will be kept in the second cold storage vault which is kept at 20 degrees Fahrenheit and 40% humidity

	Chicago History Museum (formerly Chicago Historical Society)
Q1.collect at all -Yes	X
collect at all -No	_
Q2. How many BDPM in the collection?	1000 Est.
Q3.How long collecting BDPM?	2002
Q4. Is the media storage device the collection object or the image the collection object? Storage	_
Q4. Is the media storage device the collection object or the image the collection object? Image	collection object is the image
Q5. First type	Tiffs and Jpegs
Q6.What spurred the decision to collect?	Necessity - this is how you collect new photography
Q6. Part A Forced Yes	Forced by changing technology - We are bound to acquire what others make
Forced No	_
Q6. Part B Prepared Yes	X
Prepared No	_
Q7.What storage media are used to house BDPM?	CDs usually, some DVDs
Q8.What file formats are used for digital image storage?	Depends on how they came to us
Q9.Standard file format? Yes	_
Standard file format? No	X
What the standard file format is?	_
Q10.How does your institution house & care	CDs in cool storage 60 degrees F
Q11.What is your institutions concerns regarding the long-term preservation...?	Lack of resources to refresh media. Lack of funs for qualified staff to develop preservation strategy
Preservation? Yes	_
Preservation? No	Not Really
Q12.Long-term preservation steps?	none so far. We had a "digital archive task force" but it died
Q13. "best practice" for caring for digital photographic materials	_
Q14. Plan for migration? Yes	_
Plan for migration? No	No - We hope to but haven't yet got a plan
Q15. Unique storage conditions for physical prints made from digital collection?	Depends on the print type and if it's reference copy only or an accessioned print

	Harry Ransom Humanities Research Center (Photography Collection)
Q1.collect at all -Yes	–
collect at all -No	X
Q2. How many BDPM in the collection?	–
Q3.How long collecting BDPM?	–
Q4. Is the media storage device the collection object or the image the collection object? Storage	–
Q4. Is the media storage device the collection object or the image the collection object? Image	–
Q5. First type	–
Q6.What spurred the decision to collect?	–
Q6. Part A Forced Yes	–
Forced No	–
Q6. Part B Prepared Yes	–
Prepared No	–
Q7.What storage media are used to house BDPM?	–
Q8.What file formats are used for digital image storage?	–
Q9.Standard file format? Yes	–
Standard file format? No	–
What the standard file format is?	–
Q10.How does your institution house & care	–
Q11.What is your institutions concerns regarding the long-term preservation...?	–
Preservation? Yes	–
Preservation? No	–
Q12.Long-term preservation steps?	–
Q13. "best practice" for caring for digital photographic materials	–
Q14. Plan for migration? Yes	–
Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	–

	Historical Society of Saratoga Springs
Q1.collect at all -Yes	_
collect at all -No	X
Q2. How many BDPM in the collection?	_
Q3.How long collecting BDPM?	_
Q4. Is the media storage device the collection object or the image the collection object? Storage	_
Q4. Is the media storage device the collection object or the image the collection object? Image	_
Q5. First type	_
Q6.What spurred the decision to collect?	_
Q6. Part A Forced Yes	_
Forced No	_
Q6. Part B Prepared Yes	_
Prepared No	_
Q7.What storage media are used to house BDPM?	_
Q8.What file formats are used for digital image storage?	_
Q9.Standard file format? Yes	_
Standard file format? No	_
What the standard file format is?	_
Q10.How does your institution house & care	_
Q11.What is your institutions concerns regarding the long-term preservation...?	_
Preservation? Yes	_
Preservation? No	_
Q12.Long-term preservation steps?	_
Q13. "best practice" for caring for digital photographic materials	_
Q14. Plan for migration? Yes	_
Plan for migration? No	_
Q15. Unique storage conditions for physical prints made from digital collection?	_

	Hockey Hall of Fame and Archives
Q1.collect at all -Yes	X
collect at all -No	–
Q2. How many BDPM in the collection?	50,000 plus
Q3.How long collecting BDPM?	2001-2002
Q4. Is the media storage device the collection object or the image the collection object? Storage	Initially the CD or DVD but then the image on the storage unit
Q4. Is the media storage device the collection object or the image the collection object? Image	–
Q5. First type	JPEG
Q6.What spurred the decision to collect?	Transition from Film to Digital Among Hockey/ Sport Photographers
Q6. Part A Forced Yes	X
Forced No	–
Q6. Part B Prepared Yes	X
Prepared No	–
Q7.What storage media are used to house BDPM?	Cds, DVDs and then transferred to AS400
Q8.What file formats are used for digital image storage?	JPEG
Q9.Standard file format? Yes	JPEG
Standard file format? No	–
What the standard file format is?	–
Q10.How does your institution house & care	AS400 with monthly back ups to tape
Q11.What is your institutions concerns regarding the long-term preservation...?	Storage unit faults over time
Preservation? Yes	X
Preservation? No	–
Q12.Long-term preservation steps?	AS400 with monthly back ups to tape
Q13. "best practice" for caring for digital photographic materials	AS400 with monthly back ups to tape
Q14. Plan for migration? Yes	x
Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	We do have climate controls but very few prints are being made

	International Center of Photography (ICP)
Q1.collect at all -Yes	X
collect at all -No	–
Q2. How many BDPM in the collection?	Not available
Q3.How long collecting BDPM?	–
Q4. Is the media storage device the collection object or the image the collection object? Storage	If the art work is a CD ROM or a DVD (published as such) than that is the art object. If we make a CD to contain an image file, "born digital" then we would refer to the image (and its file) as the work with the CD as a mere container.
Q4. Is the media storage device the collection object or the image the collection object? Image	–
Q5. First type	MANUAL, works from "Iterations" exhibition 1993 Pedro Meyer, "I Photograph to Remember" 1991
Q6.What spurred the decision to collect?	Again, I really see the only relevant question are works intended to be experienced via technological interface (CD, web works, multimedia projection). I see images made with digital cameras, truly "born and raised digital" to eventually reside in prints in the wall to have little to due with an exploration of ideas or issues in digital media. They are just means to an end and that end is still a photograph. It is just a photograph made from a digital "negative" or original matrix.
Q6. Part A Forced Yes	–
Forced No	X
Q6. Part B Prepared Yes	X
Prepared No	–
Q7.What storage media are used to house BDPM?	Multiple Mitsui CDs with media roll-over plan.
Q8.What file formats are used for digital image storage?	TIFF for archival images but we are considering some RAW files now as well.
Q9.Standard file format? Yes	–
Standard file format? No	–
What the standard file format is?	–
Q10.How does your institution house & care	above
Q11.What is your institutions concerns regarding the long-term preservation...?	Roll-over and conversion utilities and protocols
Preservation? Yes	–
Preservation? No	–
Q12.Long-term preservation steps?	Above
Q13. "best practice" for caring for digital photographic materials	We have not prepared a full Policy and Procedures manual on this topic yet.
Q14. Plan for migration? Yes	X

Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	Same as regular climate-controlled photographic print storage facility

	Philadelphia Museum of Art
Q1.collect at all -Yes	_
collect at all -No	X
Q2. How many BDPM in the collection?	_
Q3.How long collecting BDPM?	_
Q4. Is the media storage device the collection object or the image the collection object? Storage	_
Q4. Is the media storage device the collection object or the image the collection object? Image	_
Q5. First type	_
Q6.What spurred the decision to collect?	_
Q6. Part A Forced Yes	_
Forced No	_
Q6. Part B Prepared Yes	_
Prepared No	_
Q7.What storage media are used to house BDPM?	_
Q8.What file formats are used for digital image storage?	_
Q9.Standard file format? Yes	_
Standard file format? No	_
What the standard file format is?	_
Q10.How does your institution house & care	_
Q11.What is your institutions concerns regarding the long-term preservation...?	_
Preservation? Yes	_
Preservation? No	_
Q12.Long-term preservation steps?	_
Q13. "best practice" for caring for digital photographic materials	_
Q14. Plan for migration? Yes	_
Plan for migration? No	_
Q15. Unique storage conditions for physical prints made from digital collection?	_

	Smithsonian Institution (Archives)
Q1.collect at all -Yes	x
collect at all -No	_
Q2. How many BDPM in the collection?	_
Q3.How long collecting BDPM?	_
Q4. Is the media storage device the collection object or the image the collection object? Storage	The "collection object" is the born digital photographic image (the content) of the media storage device
Q4. Is the media storage device the collection object or the image the collection object? Image	_
Q5. First type	bitmap
Q6.What spurred the decision to collect?	The institution was compelled to collect these materials as part of our "mandate to collect records of enduring value"
Q6. Part A Forced Yes	X
Forced No	_
Q6. Part B Prepared Yes	_
Prepared No	_
Q7.What storage media are used to house BDPM?	Hard drives, CDs, DVDs. The principle is: redundant copy of CD
Q8.What file formats are used for digital image storage?	TIFF
Q9.Standard file format? Yes	X
Standard file format? No	_
What the standard file format is?	TIFF (24 RGB)
Q10.How does your institution house & care	Depends on the unit: cool or cold vaults, gold CDs, hard drives/ climate controlled, and sub-optimal
Q11.What is your institutions concerns regarding the long-term preservation...?	Media and format viability over time (proprietary issues, media obsolescence and deterioration
Preservation? Yes	x
Preservation? No	_
Q12.Long-term preservation steps?	Staff: SI now has an electronic records archivist, dedicated to reviewing concerns, implementing solutions
Q13. "best practice" for caring for digital photographic materials	See Gov't Printing Office report on Digital Preservation Experts, June 2004. Summarizes SIA's target practice
Q14. Plan for migration? Yes	Yes, depending on original format, periodic reviews are scheduled. In addition, IT standards and formats are monitored constantly to ID any unexpected concerns.

Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	Yes, 60 degrees F and 40% RH

	Smithsonian Institution (NMAH- Photo History Collection)
Q1.collect at all -Yes	X
collect at all -No	–
Q2. How many BDPM in the collection?	1300
Q3.How long collecting BDPM?	shortly after Sept 11,2001
Q4. Is the media storage device the collection object or the image the collection object? Storage	The CD is the object, like an album, and the images on it like the photos in an album.
Q4. Is the media storage device the collection object or the image the collection object? Image	–
Q5. First type	Film negatives printed digitally
Q6.What spurred the decision to collect?	Sept. 11th became a digital story; it was at least an event that seriously highlighted the way in which images were produced at that time. We were forced to deal with the collecting of contemporary photography from commercial, fine art, military, serious and amateur photographers.
Q6. Part A Forced Yes	X
Forced No	–
Q6. Part B Prepared Yes	–
Prepared No	Not really. We wrestled with existing standards of collection, museum policy, and photography industry standards.
Q7.What storage media are used to house BDPM?	We have CD-ROM. Anticipate DVDs. No hard drives. And of course prints. If we were an archive, we might take a different approach.
Q8.What file formats are used for digital image storage?	We have not standard. The Photographic Services unit uses TIFF. We receive files as they are delivered to us at the photographer's discretion.
Q9.Standard file format? Yes	–
Standard file format? No	X
What the standard file format is?	–
Q10.How does your institution house & care	Most CD-ROMs are stored together.
Q11.What is your institutions concerns regarding the long-term preservation...?	Will there be a way to "read" the files and the media format in the future? Will we be required to story many computers, or at least many versions of PhotoShop, etc?
Preservation? Yes	–
Preservation? No	No thought has been given.
Q12.Long-term preservation steps?	–
Q13. "best practice" for caring for digital photographic materials	We have not established one.
Q14. Plan for migration? Yes	–

Plan for migration? No	X
Q15. Unique storage conditions for physical prints made from digital collection?	No, just regular storage environmental conditions.

	The California Historical Society
Q1.collect at all -Yes	_
collect at all -No	X
Q2. How many BDPM in the collection?	_
Q3.How long collecting BDPM?	_
Q4. Is the media storage device the collection object or the image the collection object? Storage	_
Q4. Is the media storage device the collection object or the image the collection object? Image	_
Q5. First type	_
Q6.What spurred the decision to collect?	_
Q6. Part A Forced Yes	_
Forced No	_
Q6. Part B Prepared Yes	_
Prepared No	_
Q7.What storage media are used to house BDPM?	_
Q8.What file formats are used for digital image storage?	_
Q9.Standard file format? Yes	_
Standard file format? No	_
What the standard file format is?	_
Q10.How does your institution house & care	_
Q11.What is your institutions concerns regarding the long-term preservation...?	_
Preservation? Yes	_
Preservation? No	_
Q12.Long-term preservation steps?	_
Q13. "best practice" for caring for digital photographic materials	_
Q14. Plan for migration? Yes	_
Plan for migration? No	_
Q15. Unique storage conditions for physical prints made from digital collection?	_

	The J.Paul Getty Museum
Q1.collect at all -Yes	_
collect at all -No	X
Q2. How many BDPM in the collection?	_
Q3.How long collecting BDPM?	_
Q4. Is the media storage device the collection object or the image the collection object? Storage	_
Q4. Is the media storage device the collection object or the image the collection object? Image	_
Q5. First type	_
Q6.What spurred the decision to collect?	_
Q6. Part A Forced Yes	_
Forced No	_
Q6. Part B Prepared Yes	_
Prepared No	_
Q7.What storage media are used to house BDPM?	_
Q8.What file formats are used for digital image storage?	_
Q9.Standard file format? Yes	_
Standard file format? No	_
What the standard file format is?	_
Q10.How does your institution house & care	_
Q11.What is your institutions concerns regarding the long-term preservation...?	_
Preservation? Yes	_
Preservation? No	_
Q12.Long-term preservation steps?	_
Q13. "best practice" for caring for digital photographic materials	_
Q14. Plan for migration? Yes	_
Plan for migration? No	_
Q15. Unique storage conditions for physical prints made from digital collection?	_

	The New York Public Library
Q1.collect at all -Yes	X
collect at all -No	–
Q2. How many BDPM in the collection?	Not quantified at this point. Some of the born digital photography collections are part of larger manuscript collections, which include video, digital, databases, etc. New work being done by processing units in including this information in finding aids.
Q3.How long collecting BDPM?	Manuscript collections with digital photos have been coming to the library for approximately 10 years. Photography collections that are "born digital", that use digital capture instead of analog capture and film output, have been accepted since approximately 2001.
Q4. Is the media storage device the collection object or the image the collection object? Storage	–
Q4. Is the media storage device the collection object or the image the collection object? Image	The collection object is the digital photograph on the storage device. We migrate off of external storage, as much as possible.
Q5. First type	9/11 Archive.
Q6.What spurred the decision to collect?	Timeliness. The fact that the only record created was created digitally.
Q6. Part A Forced Yes	–
Forced No	I wouldn't say "forced". There were a number of factors at play. As stated before, certain cataclysmic events occurred but as well the technology changes have moved the archiving issues in a certain direction. We are now trying to help photographers farther upstream so that they capture properly for long-term preservation and do not leave all of the work to the custodial institutions.
Q6. Part B Prepared Yes	–
Prepared No	It is never that simple whether it is digital or analog or audio or whatever. The opportunity to collect may only happen once. The institution tries to be as prepared in terms of infrastructure and processing as possible, but of course many items are accessioned without the luxury of ideal environments.
Q7.What storage media are used to house BDPM?	The eventual home is a server farm. The short term home can be anything from CD to *.dat tape to laser disk.
Q8.What file formats are used for digital image storage?	TIFF, JP2000, WAV, AIFF, SID
Q9.Standard file format? Yes	X

Standard file format? No	_
What the standard file format is?	TIFF 6.0
Q10.How does your institution house & care	The digital masters that we have committed to preserving are housed on the SAN (archive) and are managed through an Oracle backend that supports the bibliographic metadata and the technical repository.
Q11.What is your institutions concerns regarding the long-term preservation...?	The cost of managing the assets. Regardless of the cost of any piece of storage equipment, the administration and safe store of archival files is resource heavy. Furthermore the movement and integrity checking of digital files is time consuming and requires expertise that has not been a core part of preservation activities until recently.
Preservation? Yes	X
Preservation? No	_
Q12.Long-term preservation steps?	All digital masters are vetted by the Harvard JHOVE application. Digital signatures are created (verified) and recorded in xml documents that are passed to Oracle and eventually become part of a FEDORA object. Regular integrity checks against the FEDORA values and the actual file values and header values are performed during backups and ingest. Any movement of files repeats the actions.
Q13. "best practice" for caring for digital photographic materials	I am not sure I understand the question. There is no single "best practice". At what point in life-cycle management would you take a measurement. Need to be more specific.
Q14. Plan for migration? Yes	X
Plan for migration? No	_
Q15. Unique storage conditions for physical prints made from digital collection?	Where possible. We are beginning to set policy on what file types we will migrate. Since we may accession content that we do not have the capacity to migrate, we will need to have full disclosure and a policy for what to do with the "aged-out" materials.

	Library of Congress
Q1.collect at all -Yes	X
collect at all -No	_
Q2. How many BDPM in the collection?	500- we expect this number to rise by several thousand during the next year
Q3.How long collecting BDPM?	2002
Q4. Is the media storage device the collection object or the image the collection object? Storage	
Q4. Is the media storage device the collection object or the image the collection object? Image	Almost always the image that is stored on the device. But we can envision situations in which the storage media may contain pertinent data to warrant its handling as part of the "collection object" as well.
Q5. First type	Documentary photographs of 9/11
Q6.What spurred the decision to collect?	Not so much an intent to collect born digital as intent to collect photographs of important subject that happened to be digital
Q6. Part A Forced Yes	To an extent, but we did not hesitate or resist collecting born digital
Forced No	_
Q6. Part B Prepared Yes	Some advance planning and preparation was done, but much was on the fly
Prepared No	_
Q7.What storage media are used to house BDPM?	Primary storage: file servers with redundant back up/archiving services. All managed by IT service unit. Secondary Storage: Original media as collected or CD (when acquisition was electronic transfer)
Q8.What file formats are used for digital image storage?	Primarily TIFF. Will retain original file in format as it was received.
Q9.Standard file format? Yes	X
Standard file format? No	_
What the standard file format is?	Currently use TIFF as digital master but would go as far to say that this is standard
Q10.How does your institution house & care	File server storage. Derivative versions accessible via online catalog. Redundant back ups. Technical metadata extraction...and a fair amount of vigilance
Q11.What is your institutions concerns regarding the long-term preservation...?	The usual concerns media obsolescence/ decay, format obsolesce , data (bit level) integrity, authentication, asset management, metadata management, migration issues.
Preservation? Yes	X
Preservation? No	_

Q12.Long-term preservation steps?	Actions as described above regarding storage and redundancy and use of master format. Otherwise a strong research agenda attached to NDIIP Program. Digitalpreservation.gov
Q13. "best practice" for caring for digital photographic materials	I don't think we could say at this point, they are still developing. We are employing a variety of practices that we believe and hope are sufficient given today's knowledge...all to be adapted into a best practice some day.
Q14. Plan for migration? Yes	_
Plan for migration? No	This is one of the strategies we'd likely employ, but it is not yet a formalized practice.
Q15. Unique storage conditions for physical prints made from digital collection?	Very few digital prints in our holding . Current environment is same as for other photographic prints.

	Library and Archives Canada
Q1.collect at all -Yes	X
collect at all -No	–
Q2. How many BDPM in the collection?	25000
Q3.How long collecting BDPM?	2001
Q4. Is the media storage device the collection object or the image the collection object? Storage	–
Q4. Is the media storage device the collection object or the image the collection object? Image	The LAC does not have a formal policy that governs the physical format. Fundamentally, the decision around the physical format depends on the media type (ie., video or sound. The LAC considers the file format type (still raster images) to be the "collection object."
Q5. First type	Some of the first collections acquired by the LAC in a born digital photographic format were images from the Prime Ministers Office, Jean-Marc Carisse, and the British Columbia fires in 2003.
Q6.What spurred the decision to collect?	General acceptance from professional photographers. Shift from traditional still film camera's to digital capture devices. Chip technology almost equivalent to traditional film.
Q6. Part A Forced Yes	–
Forced No	–
Q6. Part B Prepared Yes	Yes, the LAC is prepared and is continuing to plan for the ongoing care of all our digital collections.
Prepared No	–
Q7.What storage media are used to house BDPM?	The LAC uses a tier approach to storage. We currently have four primary levels of storage. The first two levels are an online environment with different types of spinning disc storage. The next level is a near-line storage system that utilizes tape libraries and drives such as the StorageTek system. The final level is referred to off-line storage (various tapes systems). These tapes end up on a physical shelf within the LAC vaults.The LAC is using the Reference Model for an Open Archival Information System (OAIS). This reference model is a high level framework to preserve the types of digital data held and created in libraries, archives, and museums.
Q8.What file formats are used for digital image storage?	Please refer to Guidelines for Computer File Types, Interchange Formats and Information Standards. http://www.collectionscanada.ca/information-management/002/007002-3017-e.html
Q9.Standard file format? Yes	–

Standard file format? No	–
What the standard file format is?	See above. The LAC considers the TIFF file format type to be the digital master file. The LAC is reviewing the JPEG 2000 file format and the RAW file as alternatives to the TIFF file format type.
Q10.How does your institution house & care	Born digital photographic materials are seen as a part of a large LAC digital collection and is managed much like other digital objects within our care. The LAC is currently implementing a Digital Preservation Infrastructure that will have a Digital Content Management system that will provide aspects of the digital preservation management of the objects.
Q11.What is your institutions concerns regarding the long-term preservation...?	• Deterioration of the storage medium • Obsolescence of the storage medium • Obsolescence of the software • Obsolescence of the hardware • Failure to document the format adequately • Long-term management• Legal requirements • Accountability • Protecting the long-term view – data loss • Protecting organizational investment • Enabling future re-use opportunities • Protection for future generations • User expectations – dependence on digital information • Business processes and efficiencies •Preserve old technology • Emulate old technology • Migrate formats • Standardize formats • Persistent object preservation
Preservation? Yes	–
Preservation? No	–
Q12.Long-term preservation steps?	See note above regarding the Digital Preservation Infrastructure and the Digital Collection Catalytic Initiative. preservation and accessibility of Canada's digital documentary cultural heritage. --These efforts will serve to inform a national and global process of partnership and collaboration in the challenge of continuing use of our digital resources. --LAC Digital Collection Development Policy --'The managed activities necessary to ensure continued access to digital materials for as long as necessary.' --Preservation activities maintain the following attributes of digital publications and records: •Understandable •Reliable •Authentic
Q13. "best practice" for caring for digital photographic materials	Trusted Digital Repositories: Attributes and Responsibilities (RLG/OCLC)www.rlg.org/longterm/repositories.pdf OAIS Reference Model (CCSDS) ssdoo.gsfc.nasa.gov/nost/wwwclassic/documents/pdf/CCSDS-650.0-B-1.pdf --Toward a Canadian Digital Information Strategy http://www.collectionscanada.ca/cdis/index-e.html
Q14. Plan for migration? Yes	X -Yes, this is but one method. Please see above.
Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	http://www.collectionscanada.ca/preservation/130202_e.html

	University of California Riverside/California Museum of Photography (UCR/CMP)
Q1.collect at all -Yes	X -Yes. Materials are mainly donated as prints with discs and supporting hardware readers if on atypical storage.
collect at all -No	–
Q2. How many BDPM in the collection?	Most of the museum's born digital works are the products of artists and digital initiates working within the museum's digital studio. Only this year have we started cataloging virtual-centric works. The best we can do is estimate our quantities. If one considers web exhibitions as born digital, we can claim several thousand digital images. Digital prints stored within the collection room number between one and two hundred.
Q3.How long collecting BDPM?	In 1996, the museum commissioned three artists to produce a CD that showcased their digital works.
Q4. Is the media storage device the collection object or the image the collection object? Storage	–
Q4. Is the media storage device the collection object or the image the collection object? Image	Our institution believes that the "collection object" is the born digital photographic image that resides on a media storage device. This is due to the shelf life of CDs, DVDs, hard drives and other storage devices. We have found that the storage life of a CD is between 5-8 years, DVD-R about 5, DVD-ROM about 6, DVD+R and DVD+R Dual Layer are relatively new and we have a few images that we have stored this way only as a redundant backup as there is uncertainty regarding the reliability with this new technology. Flash drives and other "no-movable" devices are also questionable in terms of reliability as this technology is still new. SyQuest has a life of 10+ years. Next to SyQuest hard drives remain the most reliable means of storage as they have a 5+ year running life or if turned off intermittently may last 10+ years depending on if they are housed in they own enclosure and are not tampered with.
Q5. First type	The first born digital works were created in 1995, formatted onto a CD.
Q6.What spurred the decision to collect?	–
Q6. Part A Forced Yes	X - UCR/CMP is obligated by its institutional mission to collect, preserve and interpret genre and media that relates to photography.
Forced No	–
Q6. Part B Prepared Yes	Over the years, virtual-centric items have accumulated. Membership in groups such as "Faces of LA" and "Museums and Online Archives of California" has enabled UCR/CMP with access to experts in the field and with practical applications that have become appropriate for sustaining metadata. UCR/CMP works diligently in pursuit of the best practices associated with collecting, preserving, and disseminating collected items—physical and virtual.

Prepared No	–
Q7.What storage media are used to house BDPM?	Currently we are moving all our digital and born digital collection objects to a XServe RAID which uses redundant array technology as to not loose information. This is backup on to DVD-R disks. We have also established a Digital Reference Collection that we use to recover digital photographic images from older media. This reference collection includes older CPU's, software, and peripherals.
Q8.What file formats are used for digital image storage?	Traditionally we have scanned images using the TIFF format. Photographers who have donated images have given us primarily JPEG as this is the most common format used by digital cameras. In some cases these have been mastered to TIFF. Currently we are documenting items found in our collection using Large JPEG and RAW features on our camera. These images are mastered to TIFF but the JPEG and RAW file are saved with them.
Q9.Standard file format? Yes	Tiff
Standard file format? No	–
What the standard file format is?	Our digital master file type is TIFF for photographic images and high quality JPEG for text scans. We prefer artist to donate high quality TIFF files but have accepted JPEG files as well.
Q10.How does your institution house & care	See question 7 for storage media. Care is ongoing as newer technology offers better ways of storing large quantities of images. RAID is a log standing and established means for large storage and is currently the means by which we store our media. As our collection grows we can add and update drives as well as file manage. It has been the museums experience that leaving files on hard drives is the most sustainable means to managing a digital collection.
Q11.What is your institutions concerns regarding the long-term preservation...?	It is the commitment of any institution that accepts to work with digital technology to remain as a steward of what it undertakes. This applies to the any digitization effort or digital asset management, as one is responsible for the loss of any item even when there is no tangible artifact. For this reason the museum established its digital reference collection to restore and recover lost or damaged files to contribute to a overall rely and sustainability of the digital storage object and the native environment it was first created in. This move is paramount to long-term preservation of the born digital material as it allows one to recover, examine, restore and preserve these types of items in their native environments.
Preservation? Yes	X
Preservation? No	–

Q12.Long-term preservation steps?	Our latest move was to purchase a XServe RAID and a G5 Server to exclusively handle the storage and maintenance of our digital assets. In addition are continually researching and working partnering institutions to find the best means possible to manage digital assets as newer technology and methods become available.
Q13. "best practice" for caring for digital photographic materials	Our "best practice" is currently dictated (limited) by budget. We have made a variety of improvements as noted in the sections above and are continually learning of new methods for storing of born digital assets and digitizing of images. The above answers currently contribute to our storage and digitization standards. In terms of tracking of asset we have developed a asset management system that currently tracks digital files and traditional parent photographs and digital daughter images.
Q14. Plan for migration? Yes	X -Re questions 7 and 11 our institution has created a Digital Reference Collection. This collection will insure by the best means possible the ability to open files that are housed using older technology as well as preserve their initial appearance based on their creation software. The museum has found that the migration of materials to newer technology alters the initial appearance so drastically in some case that the initial intention is lost. Therefore creating a native space for the original digital asset to be opened in insures its initial intensions.
Plan for migration? No	–
Q15. Unique storage conditions for physical prints made from digital collection?	Physical prints are stored within acid-free boxes on shelves within a monitored environment—62 degrees Fahrenheit at 33 percent relative humidity.

Appendix F: Selected Additional Readings

For more information about various topics discussed in this thesis project, the following is a selected group of sources. It is by no means a complete list of references for these topics.

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I list here only the works that have been used in the written portion of this thesis project excluding personal communications and Born Digital Photographic Materials survey responses. This bibliography is by no means a complete record of all the works and sources I have consulted. Please see Appendix D for a selected group of further source materials.

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