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Federal Laws and Regulations Requiring Curation of Digital Archaeological Documents and Data

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This report by Cultural Heritage Partners, PLLC describes and analyzes federal requirements for the access to and long-term preservation of digital archaeological data. We conclude that the relevant federal laws, regulations, and policies mandate that digital archaeological data generated by federal agencies must be deposited in an appropriate repository with the capability of providing appropriate long-term digital curation and accessibility to qualified users.

Federal Agency Responsibilities for Preservation and Access to Archaeological Records in Digital Form

Federal requirements for appropriate management of archaeological data are set forth in the National Historic Preservation Act ("NHPA"), the Archaeological Resources Protection Act ("ARPA"), the regulations regarding curation of data promulgated pursuant to those statutes (36 C.F.R. 79), and the regulations promulgated by the National Archives and Records Administration (36 C.F.R. 1220.1-1220.20) that apply to all federal agencies. We discuss each of these authorities in turn.

Statutory Authority: Maintenance of Archaeological Data

Archaeological data can be generated from many sources, including investigations or studies undertaken for compliance with the NHPA, ARPA, and other environmental protection laws. The NHPA was adopted in 1966, and strongly supports historic preservation activities and programs, including archaeology. The NHPA requires that archaeological data be: 1) maintained permanently in appropriate data bases, 2) made available to potential users, and 3) deposited in an institution with adequate long-term curatorial capabilities, including the ability to ensure access to and long-term preservation of archaeological digital documents and data.[1]

The NHPA mandates:

> "[e]ach Federal agency that is responsible for the protection of historic resources, including archaeological resources pursuant to this Act or any other law shall ensure… records and other data, including data produced by historical research and archaeological surveys and excavations are permanently maintained in appropriate data bases and made available to potential users pursuant to such regulations as the Secretary shall promulgate."[2]

The NHPA also directs the Secretary to:

[1] *See generally* 16 U.S.C. 470a.
[2] 16 U.S.C. 470h-4(a)(2).

> "promulgate, or revise, regulations… ensuring that significant prehistoric and historic artifacts and associated records, subject to Section 110 of this Act, the Act of June 27, 1960 (16 U.S.C. 469c), and the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa and following) are deposited in an institution with adequate long-term curatorial capabilities."[3]

The term "associated records" is defined broadly in the accompanying regulations and includes digitally recorded data such as "computer cards and tapes, computer disks and diskettes." These regulations are described in more detail in the following section of this report.

ARPA protects archaeological resources and sites on public (federal) lands and Indian lands. It also calls for the preservation of objects and associated records in a suitable repository once recovered from a site. ARPA was enacted in 1979 in recognition of the fact that archaeological resources are an irreplaceable part of America's heritage and they are increasingly endangered because of the escalating commercial value of some kinds of artifacts.[4] ARPA also speaks to the need for access to and preservation of the results of archaeological investigations. It establishes that:

> "the archaeological resources which are excavated or removed from public lands will remain the property of the United States, and such resources and copies of associated archaeological records and data will be preserved by a suitable university, museum or other scientific or educational institution."[5]

In the spirit of generating public and professional awareness of and interest in the archaeological records, ARPA then goes on to stipulate that "[e]ach Federal land manager shall establish a program to increase public awareness of the significance of the archaeological resources located on public lands and Indian lands and the need to protect such resources."[6]

ARPA then imposes a qualified duty upon the Secretary of the Interior to expand the archaeological data base and encourage mutual access to archaeological records among private individuals and professional organizations:

> "…the Secretary shall, to the extent practicable and consistent with the provisions of this chapter, make efforts to expand the archaeological data base for the archaeological resources of the United States through increased cooperation between private individuals referred to in paragraph (1) and professional archaeologists and archaeological organizations."[7]

This language from ARPA clearly shows the statutory requirement of expanding, preserving and requiring the accessibility of U.S. archaeological records derived from public lands and, read

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[3] 16 U.S.C. 470 a(a)(7)(A).
[4] *Archeology Law and Ethics*, National Park Service, http://www.nps.gov/archeology/public/publicLaw.htm (last visited Oct. 25, 2012).
[5] 16 U.S.C. 470cc(b)(3).
[6] 16 U.S.C. 470ii(c).
[7] 16 U.S.C. 470jj. The referenced individuals in paragraph 1 are "private individuals having collections of archaeological resources and data which were obtained before the date of the enactment of this chapter (October 31, 1979)."

together with the NHPA and more recently promulgated regulations, even more clearly demonstrates the affirmative duties the law imposes upon federal agencies and their agency heads to expand, preserve and make accessible archaeological records.

Regulatory Authority: Adequate Long-Term Curatorial Services

The Secretary of the Interior, under the authority granted by the NHPA, has promulgated regulations pertaining to the curation of federally owned and administered archaeological collections. In 1990, these regulations, which apply to the activities and undertakings of all federal agencies, were published in final form as "36 C.F.R. 79: Curation of Federally-Owned and Administered Archaeological Collections." Under these regulations, collections include both "material remains" (*e.g.*, artifacts, specimens, etc.) recovered as part of an archaeological investigation, as well as the "associated records" generated by and describing the investigation and analysis of the archaeological project. The scope of applicability of these regulations is extraordinarily wide both as to the records covered and the duties associated with those covered records. Section 79.3(a) states:

> "[t]he regulations in this part apply to collections, as defined in §79.4 of this part, that are excavated or removed under the authority of the Antiquities Act (16 U.S.C. 431–433), the Reservoir Salvage Act (16 U.S.C. 469–469c), section 110 of the National Historic Preservation Act (16 U.S.C. 470h-2) or the Archaeological Resources Protection Act (16 U.S.C. 470aa-mm)."[8]

Directly on point regarding the curation of digital data, it goes on in Section 79.3(a)(2) to include in its coverage:

> "[d]ata that are generated as a result of a prehistoric or historic resource survey, excavation or other study are recorded in associated records, as defined in §79.4 of this part. Associated records that are prepared or assembled in connection with a Federal or federally authorized prehistoric or historic resource survey, excavation or other study are the property of the U.S. Government, regardless of the location of the resource."[9]

As the owners of these public records, federal officials are responsible to ensure their long-term preservation and availability for educational, scientific, and other appropriate uses, as described generally in Section 79.10.

Section 79.3 of the regulation concludes by imposing a sweeping duty upon federal agencies to ensure that repositories preserve, maintain, and curate digital data derived from investigations instigated by the agencies:

> "[a]ny repository that is providing curatorial services for a collection subject to the regulations in this part must possess the capability to provide adequate long-term curatorial services, as set forth in §79.9 of this part, to safeguard and

[8] 36 C.F.R. § 79.3(a).
[9] 36 C.F.R. § 79.3(a)(2).

> preserve the associated records and any material remains that are deposited in the repository."[10]

A review of these duties reveals the depth of responsibilities that these regulations impose upon federal agencies and agency heads in the area of adequate long-term curatorial services. According to the 36 C.F.R. § 79.5,

> "[t]he Federal Agency Official is responsible for the long-term management and preservation of preexisting and new collections subject to this part. Such collections shall be placed in a repository with adequate long-term curatorial capabilities . . . appropriate to the nature and content of the collections."[11]

The regulations further specify the "standards to determine when a repository possesses the capability to provide adequate long-term curatorial services," including the ability to ". . .catalog, store, maintain, inventory and conserve the particular collection on a long-term basis using professional museum and archival practices,"[12] as well as "provide access to the collection."[13] Qualified repositories must further comply with a lengthy list of other capabilities as appropriate to the nature of the collection (see generally 36 C.F.R. § 79.9).

With respect to digital records, the regulations specifically require "[s]toring a duplicate set of records in a separate location; or [e]nsuring that records are maintained and accessible through another party."[14] Section 79.10 refers to the use of collections and requires the "Federal Agency Official shall ensure that the Repository Official makes the collection available for scientific, educational, and religious uses…"[15] The regulations specify a depth and breadth of defined records that only begin in Section 79.4(a)(2) with the following:

> "[a]ssociated records means original records (or copies thereof) that are prepared, assembled and document efforts to locate, evaluate, record, study, preserve or recover a prehistoric or historic resource. Some records such as field notes, artifact inventories and oral histories may be originals that are prepared as a result of the field work, analysis and report preparation. Other records such as deeds, survey plats, historical maps and diaries may be copies of original public or archival documents that are assembled and studied as a result of historical research. Classes of associated records (and illustrative examples) that may be in a collection include, but are not limited to: (i) Records relating to the identification, evaluation, documentation, study, preservation or recovery of a resource (such as site forms, field notes, drawings, maps, photographs, slides, negatives, films, video and audio cassette tapes, oral histories, artifact inventories, laboratory reports, computer cards and tapes, computer disks and diskettes, printouts of computerized data, manuscripts, reports, and accession, catalog and inventory records)."

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[10] 36 C.F.R. § 79.3(e).
[11] 36 C.F.R. § 79.5.
[12] 36 C.F.R. § 79.9(a).
[13] 36 C.F.R. § 79.9(b)(9).
[14] 36 C.F.R. § 79.9(b)(6)(ii) and (iii).
[15] 36 C.F.R. § 79.10(a).

See 36 C.F.R. § 79.9[16] for the full and rather extensive set of defined archaeological records encompassed by federal regulations.

The Law on Records Management by Federal Agencies

Federal law imposes an affirmative duty upon the heads of federal agencies to establish safeguards against the destruction of digital archaeological records not otherwise scheduled for destruction. As machine readable materials, digital archaeological records meet Section 3301 of 44 U.S.C. Chapter 33's definition of "records":

> "'records' includes all books, papers, maps, photographs, machine readable materials, or other documentary materials, regardless of physical form or characteristics, made or received by an agency of the United States Government under Federal law or in connection with the transaction of public business and preserved or appropriate for preservation by that agency or its legitimate successor as evidence of the organization, functions, policies, decisions, procedures, operations, or other activities of the Government or because of the informational value of data in them."

Section 3105 protects against unscheduled destruction of these records in that:

> "[t]he head of each Federal agency shall establish safeguards against the removal or loss of records he determines to be necessary and required by regulations of the Archivist. Safeguards shall include making it known to officials and employees of the agency-- (1) that records in the custody of the agency are not to be alienated or destroyed except in accordance with sections 3301-3314 of this title, and (2) the penalties provided by law for the unlawful removal or destruction of records."

Congress has enacted statutory rules for the retention, management and disposal of federal records (see 44 U.S.C. Chapters 21, 29, 31, and 33). Federal agencies[17] are responsible for establishing and maintaining a records management program that complies with NARA and GSA regulations and guidance.[18]

The associated records from archaeological investigations conducted in compliance with the NHPA and ARPA meet the definition of "federal records" at 44 U.S.C. 3301 and federal agency records management programs must apply to the associated records. "Records" or "Federal records" is defined in 44 U.S.C. 3301 as quoted at the beginning of this section.

The National Archives regulations require that "[a]gencies must create and maintain authentic, reliable, and usable records and ensure that they remain so for the length of their authorized retention period."[19] In the case of associated archaeological records, that retention

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[16] 36 C.F.R. § 79.9 (b)(1) and 36 C.F.R. § 79.9 (b)(6).
[17] "Federal agency" means "any executive agency or any establishment in the Legislative or Judicial branches of the Government (except the Supreme Court, Senate, the House of Representatives, and the Architect of the Capitol and any activities under his direction)." 44 U.S.C. 2901(14).
[18] 36 C.F.R. § 1220.10(b).
[19] 36 C.F.R. § 1220.32.

period is set by the NHPA, which mandates that the associated record be permanently maintained.[20]

The National Archives regulations also require that agencies protect records against technological obsolescence[21] and, at 36 C.F.R. § 1236.28, specify requirements for maintenance of electronic records storage media for permanent records. Even more importantly, 36 C.F.R. § 1236.14 mandates in many respects a higher duty of care in the curation of digital records than the law might otherwise demand for more traditional physical records, given the established fact that many types of digital records degrade and ultimately become unusable as records. To wit:

> "[a]gencies must design and implement migration strategies to counteract hardware and software dependencies of electronic records whenever the records must be maintained and used beyond the life of the information system in which the records are originally created or captured."[22]

Because federal agency heads know or should know that digital archaeological records degrade and ultimately become unusable, the law implies a duty on the part of federal agency heads to curate and preserve digital archaeological records not otherwise scheduled for destruction in formats and repositories that ensure that they will not degrade and become unusable.

Policy Authority: Mandated Use of Industry Standards

Increasingly, archaeological records and data are being recorded electronically. Legal and regulatory mandates require that these electronic data be curated effectively so that they are accessible for current appropriate uses and subject to long-term preservation for future availability and use. Up-to-date digital curation methods and techniques need to ensure that the requirements are met effectively. However, in most of the repositories that currently store digital archaeological data, the digital storage media that contain digital data (*e.g.*, computer disks and magnetic tapes) are the focus of curation rather than the information encoded as discrete bits of data.[23] Such a curating method focusing on digital storage media fails to meet the standard

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[20] 16 U.S.C. § 470h-4(a)(2).

[21] 36 C.F.R. § 1236.14. "To successfully protect records against technological obsolescence, agencies must:
(a) Determine if the NARA-approved retention period for the records will be longer than the life of the system where they are currently stored. If so, plan for the migration of the records to a new system before the current system is retired.
(b) Carry out upgrades of hardware and software in such a way as to retain the functionality and integrity of the electronic records created in them. Retention of record functionality and integrity requires:
(1) Retaining the records in a usable format until their authorized disposition date. Where migration includes conversion of records, ensure that the authorized disposition of the records can be implemented after conversion;
(2) Any necessary conversion of storage media to provide compatibility with current hardware and software; and
(3) Maintaining a link between records and their metadata through conversion or migration, including capture of all relevant associated metadata at the point of migration (for both the records and the migration process).
(c) Ensure that migration strategies address non-active electronic records that are stored off-line."

[22] 36 C.F.R. § 1236.14.

[23] Departmental Consulting Archeologist, *Secretary of the Interior's Report to Congress on the Federal Archeology Program, 2004-2007*, Archeology Program, National Park Service, Washington, D.C., 2010, at 50–53, http://www.nps.gov/archeology/SRC/reportPdfs/2004-07.pdf; *see also* Joshua Watts, *Policies, Preservation, and Access to Digital Resources: The Digital Antiquity 2010 National Repositories Survey*, Reports in Digital Archaeology #2, Sept. 2011, at 6–7, 10–11, 17–18, 20–25, *available at* http://www.digitalantiquity.org/wp-

expressed in the NHPA for three reasons. Archaeological data are at risk because the physical digital media is subject to degradation,[24] because the physical nature of digital media renders the data inaccessible to the vast majority of potential users,[25] and because the digital format of the information may become unusable due to software and hardware advances.

First, digital media are inadequate for long-term preservation because removable magnetic and optical media (*e.g.*, magnetic tapes, floppy disks, compact disks and digital video disks) deteriorate over time. In his report to Congress, the Secretary of the Interior acknowledged that digital media are not archival and "many begin to degrade in less than a decade," adding, "[w]e are on the verge of permanently losing significant amounts of carefully collected data."[26] Irreplaceable archaeological data are at risk because magnetic and optical media gradually, but inevitably, 'rot.'[27] Because of this inevitable deterioration, removable magnetic disks and optical media are not an adequate permanent means of storing digital data even though a curating facility may carefully package digital media and place that media securely on a shelf in a repository.

Second, removable digital media and individual computer hard drives are inaccessible to a vast majority of qualified researchers because the media is available only within the repository.[28] Researchers or others with legitimate interests who are seeking access to archaeological data must first submit a request to the curating institution for copies of the data.[29] The curator must then search, locate, access, and extract the data from the media. This method also presumes interested researchers have knowledge that pertinent information exists and where it is held. It has been established that, while many collections are laudable for the quality of their content, metadata, and preservation techniques, they often remain obscure, unknown, and therefore inaccessible to their intended user populations.[30] It is not at all difficult to extrapolate on this basis that there is a large volume of archaeological data produced annually that is not used efficiently and effectively because interested persons are often unaware of data already obtained and reported.

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uploads/2011/07/20111215_Final.pdf; S. Terry Childs & Seth Kagan, *A Decade of Study into Repository Fees for Archaeological Collections*, Studies in Archaeology and Ethnography #6, Archeology Program, National Park Service, Washington D.C., 2008, at 7–8, *available at* http://www.nps.gov/archeology/pubs/studies/study06A.htm.

[24] Barry M. Lunt, Ryan Sydenham, Feng Zhang & Matthew R. Linford, *Digital Data Preservation: The Millennium CD and Graceful Degradation*, Brigham Young University, at 1, http://fht.byu.edu/prev_workshops/workshop07/papers/3/Digital-Preservation.pdf (last visited Oct. 25, 2012).

[25] Julian Jackson**,** *Digital Longevity: the Lifespan of Digital Files (compiled for R&D in Digital Asset Preservation)*, Digital Preservation Coalition, http://www.dpconline.org/events/previous-events/306-digital-longevity (last viewed on Oct. 25, 2012).

[26] *See* Departmental Consulting Archeologist, *supra* note 23, at 51.

[27] *See* Lunt et al., *supra* note 24.

[28] *See* Departmental Consulting Archeologist, *supra* note 23; Watts, *supra* note 23.

[29] *See, e.g.*, State of California Resources Agency, *Guidelines for the Curation of Archaeological Collections*, May 7, 1993, at 11, *available at* http://www.ohp.parks.ca.gov/pages/1054/files/guide93.pdf; South Carolina Institute of Archaeology and Anthropology, *Curation, Loan and Access Policy*, Feb. 2005, at 15, *available at* http://www.cas.sc.edu/sciaa/pdfdocs/cm2005.pdf.

[30] Robert A. Schrier, Syracuse University, *Digital Librarianship and Social Media: The Digital Library as a Conversation Facilitator*, D-Lib Magazine, July-August 2011, *available at* http://www.dlib.org/dlib/july11/schrier/07schrier.print.html.

Third, archaeological records and data physically stored on digital media become inaccessible as hardware and software technologies advance, making older technology obsolete.[31] The Blue Ribbon Task Force on Sustainable Digital Preservation and Access wrote in February 2010 that:

> "[t]he pace of innovation in data-intensive research is so rapid that there is always the risk stewardship practices embraced today will be superseded by new ones tomorrow. Strategies and best practices should be flexible enough to adapt rapidly to changes in technology, selection criteria and data uses." [32]

English Heritage's Management of Research Projects in the Historic Environment Technical Guide to Digital Archiving and Digital Dissemination advises that:

> "[i]f data is not in a format that can be stored or migrated effectively then this may mean that primary data – i.e. data which was only collected in a digital format – is lost. In the case of archaeological sites which have been excavated, then there will be no way of repeating the collection of the information."[33]

Inaccessible data is essentially lost, contributing to the factors that make using digital storage media an inappropriate method of curating data.

The nature of digital storage media, which is subject to degradation, accessible only within the repository, and in danger of obsolescence makes it an inadequate means of curating digital data under the professional standards Congress expressed in Section 112(a)(2) of the NHPA and ARPA.[34]

By implementing adequate data migration and using metadata, digital repositories fulfill the long-term preservation and access standards for curating institutions established by the federal archaeological curation regulations and the National Archives regulations. Data migration is the process of copying digital data from one format to another making certain data can be read by current versions of software.[35] This process prevents data loss by rescuing the data before it becomes stranded and inaccessible on outdated media and in obsolete formats.

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[31] Jeff Rothenberg, RAND Corporation, *Ensuring the Longevity of Digital Information*, Council on Library and Information Resources, Feb. 22, 1999, at 2, *available at* http://www.clir.org/pubs/archives/ensuring.pdf.

[32] The Final Report of the Blue Ribbon Task Force on Sustainable Digital Preservation and Access, *Sustainable Economics for a Digital Planet: Ensuring Long-Term Access to Digital Information*, National Science Foundation, Andrew W. Mellon Foundation, Library of Congress, UK Joint Information Systems Committee, National Archives and Records Administration, and the Council on Library and Information Resources, Feb. 2010, at 56, *available at* http://brtf.sdsc.edu/biblio/BRTF_Final_Report.pdf.

[33] English Heritage, *Management and Research Projects in the Historic Environment – MoRPHE Technical Guide 1 Digital Archiving and Digital Dissemination*, May 2006, at 5, *available at* http://www.english-heritage.org.uk/publications/morphe-technical-guide-1/morphetechnicalguide1.pdf.

[34] 16 U.S.C. 470h-4(a)(2) and 16 U.S.C. 470jj.

[35] *Data Migration*, Wikipedia: The Free Encyclopedia, http://en.wikipedia.org/wiki/Data_migration (last visited Oct. 25, 2012); *see also Ensuring the Integrity, Accessibility, and Stewardship of Research Data in the Digital Age*, National Academy of Sciences, National Academy of Engineering, and Institute of Medicine of the National Academies Press, Washington, DC, 2009, at 8–9, 109–13, 120, *available at* http://www.nap.edu/openbook.php?record_id=12615&page=R1; Blue Ribbon Task Force, *supra* note 32, at 10–12, 73–79, 98–105.

Appropriate digital repositories facilitate access to stored data by assigning metadata to digital records. Tagging documents with metadata enables researchers to search and locate relevant information efficiently, thereby maximizing accessibility.[36] Appropriate digital repositories implement data migration processes and collect metadata necessary to ensure the long-term preservation of, and access to, data thereby meeting the federal curation and records management standards.

Conclusion

We at Cultural Heritage Partners, PLLC, have completed our conduct of due diligence in reviewing and analyzing federal access and preservation requirements as they apply to digital archaeological data. We have established that the NHPA and ARPA require that archaeological data be maintained permanently in appropriate data bases, made available to potential users, and deposited in an institution with adequate long-term curatorial capabilities. We have noted the government-wide regulations (36 C.F.R. § 79) to meet the statutory requirement of "adequate long-term curatorial services." We have documented the policy demands of Congress and the federal agencies in insisting that repositories that maintain digital archaeological data meet industry standards of long-term preservation and access for curating institutions as mandated by the NHPA and ARPA and the National Archives regulations. We put particular emphasis on the duty that federal law imposes on federal agency heads to establish safeguards against the deterioration or destruction of archaeological records. Read together, we conclude that the relevant federal laws, regulations, and policies mandate that digital archaeological data generated by federal agencies must be deposited in an appropriate repository with the capability of providing appropriate long-term digital curation and accessibility to qualified users.

Cultural Heritage Partners, PLLC is a Washington, D.C.-based law firm that focuses on cultural resource management and cultural heritage issues. More information available at www.culturalheritagepartners.com

[36] Jeff Santilli, *Using Metadata Effectively in OS X*, Gigaom (Feb. 1, 2007), http://gigaom.com/apple/using-metadata-effectively-in-os-x/.